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EXECUTIVE SUMMARY

In its 74th session, the Texas Legislature directed the Public Utility Commission of Texas (the Commission) to conduct a study of the scope of competition in the electric industry in Texas as follows:

> *Before January 15 of each odd-numbered year, the commission shall report to the legislature on the scope of competition in electric markets and the impact of competition and industry restructuring on customers in both competitive and noncompetitive markets. The report shall include an assessment of the impact of competition on the rates and availability of electric services for residential and small commercial customers and a summary of commission actions over the preceding two years that reflect changes in the scope of competition in regulated electric markets. The report shall also include recommendations to the legislature for further legislation that the commission finds appropriate to promote the public interest in the context of a partially competitive electric market.*[1]

This volume is a part of the first report prepared for the Legislature under this directive. As the first such investigation, this report serves a dual function by investigating the scope of competition in the electric industry in Texas today and by creating a benchmark by which future competitive changes and the impacts of those changes can be measured.

In this first investigation into the scope of competition, the Commission is taking the opportunity to provide the Legislature with a more broad based and in-depth investigation into the structure of the electric industry, generally, and the prospects for industry and regulatory restructuring. On November 6, 1995, the Commission established three projects that have become the platforms for investigating competition and restructuring issues:

1. *Project No. 15000:* An investigation into issues related to the electric utility industry and regulatory restructuring;
2. *Project No. 15001:* An investigation into potentially stranded investment in the electric utility industry in Texas, conducted in accordance with §2.057(e) of PURA95; and
3. *Project No. 15002:* An investigation into the scope of competition in the electric utility industry in Texas, conducted in accordance with §2.003 of PURA95.

[ES-1]Public Utility Regulatory Act of 1995, Tex. Rev. Civ. Stat. Ann. art. 1446c-0 §2.003 (Vernon Supp. 1996) (PURA95).

The Commission's report is presented in three volumes. Volume I is the Commission's report to the Legislature on the Scope of Competition and Potentially Strandable Investment (ECOM), pursuant to PURA95 §§ 2.003 and 2.057(e). Volume II (this volume) is the Commission's detailed analysis of the scope of competition in the electric industry in Texas. The Commission's detailed report to the Legislature on stranded investment may be found in a companion to this volume.[2] The treatment of potentially stranded assets is perhaps the most conceptually challenging and contentious issue in the debate on electric industry restructuring.

This second volume is presented in two parts. Part I presents the Commission's detailed response to the Legislature on the scope of competition. Part II presents the results of the Commission's investigation into industry restructuring. The Commission's detailed report on restructuring is intended as a *primer* for parties involved in discussions of the future of the electric industry in Texas. Using this report, interested parties may conduct a discussion of industry restructuring with common terms of reference and an appreciation of many of the complex issues involved.

A. THE COMMISSION REPORT ON THE SCOPE OF COMPETITION

The Commission's report on the scope of competition demonstrates that competition in the electric utility industry in Texas has arrived. At present, that competition is quite limited in scope and available only to a select set of customers, but the conditions creating pressure for expanded competition may be irreversible. Over the last decade, a combination of changes in legislative and regulatory requirements and improvements in generating technologies have unleashed these competitive forces. Changes to the Public Utility Regulatory Act (PURA) adopted by the 74th Texas Legislature jump-started competition in the Texas wholesale electric market. Federal initiatives including the Public Utility Regulatory Policies Act of 1978 (PURPA) and the 1992 Energy Policy Act (EPAct) introduced new categories of competitors into the Texas electric generation market. These State and federal initiatives are already changing the market for electricity in Texas.

[ES–2] Public Utility Commission of Texas, *Report to the 75th Legislature Volume III Potentially Strandable Investment (ECOM) Report: A Detailed Analysis*, Austin, Texas (January 1997), hereafter, the "Stranded Investment" Report.

The critical issues now are: what should the competitive market look like? and how will the transition to competition be managed? If the market is left to itself to define the nature of competition, residential and small commercial customers may find themselves missing the benefits of competition—or even paying more for their electricity than they pay in the current regulated market.

1. Utilities' Monopoly Status is Being Questioned

In the past, economic regulation of electric utilities was considered a measured response to the economic underpinnings of electricity provision. The electric market has long been presented as a classic case of "natural monopoly." Under natural monopoly conditions, a single firm is the most efficient form of providing service; however, the potential for monopoly power abuses necessitates rate regulation. Today, mounting evidence is challenging the traditional notion that the generation portion of the electric industry is a natural monopoly:

- New competitors are vying against traditional utilities in the wholesale electric market. The results of recent federal and State regulatory innovations are already being witnessed in Texas.
- New players appear willing to compete against traditional utilities in retail electric markets. The mere presence of these companies challenges the idea that the cost structure of providing electricity is a significant barrier to entry.
- Companies that do not own transmission and distribution networks are offering to provide supply (generation) services, only. These entrants are challenging the existence of traditional economies of scope and the necessity of vertical monopolies.
- Emerging technologies are changing the cost structure of providing new sources of power.

If indeed, the industry—or at least the generation side of the industry—is no longer characterized by conditions typical of natural monopolies, the economic justification for the current regulatory structure is changed as well. The regulatory structure developed to oversee monopoly operations naturally deserves greater scrutiny.

2. The Risk of Unmanaged Marketplace Changes is Shifting Costs to Captive Customers

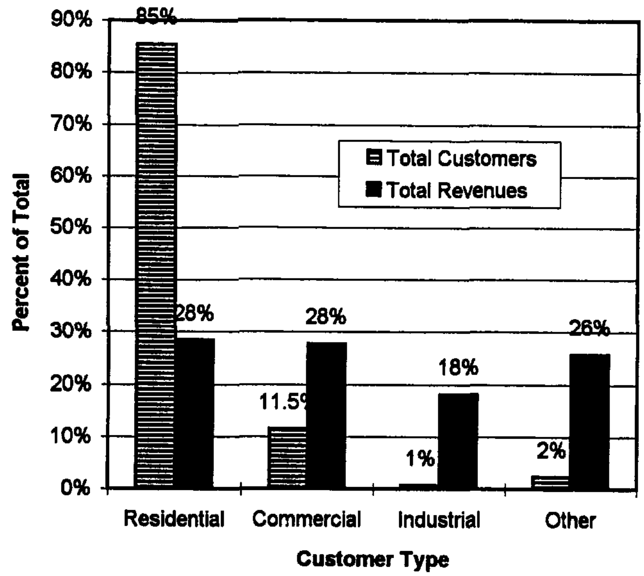
At the same time that new opportunities are opening the Texas electric market to competition, these opportunities may also create hazards for residential and small commercial customers in an *unmanaged* transition to competition. In today's partially regulated market, wholesale customers and large industrial and commercial customers have more opportunities for alternative energy supplies, which—if taken advantage of—would allow these customers to leave the established electric supply system. Captive residential and small commercial customers could face higher rates if they bear costs shifted from large customers who have left the system or are left to bear the so-called "stranded costs" from large customers escaping the system. Rate discounts offered to the utilities' largest industrial and commercial customers also raise the prospect of cost shifting.

As the marketplace changes within the current regulatory framework, large electricity consumers face incentives to engage in "bypass." Bypass occurs when an existing utility customer leaves its traditional utility supplier for an alternative supplier—either another utility or a non-utility—offering lower cost service. A variety of bypass alternatives are available to the largest electric customers in Texas: wholesale wheeled power; self-generation; co-generation; fuel conversion; and end use substitution and demand-side management.

Although bypass is a rational response of wholesale customers and retail firms to economic and financial circumstances, bypass raises the stakes of maintaining the current regulatory system in light of changing market realities. As individual customers bypass the existing system, the embedded costs of serving those former customers do not disappear (these *stranded* costs remain on the books of the bypassed company). Hence, the embedded costs previously being paid by those choosing to bypass stand the risk of being "shifted" from the departing customers to the remaining (or "captive") customers. In the future, if more and more customers bypass existing utilities, the ever-shrinking set of remaining customers could be required to shoulder the growing per capita burden of the utility's stranded costs.

A sense of the vulnerability of residential customers is revealed in Figure ES–1, which shows the total 1995 electric customers and revenues in Texas broken down by type of customer. Although industrial customers are only a small portion of the total number of customers—less than 1 percent—they are responsible for a much greater share of the State total retail electric bill, about

Figure ES–1: Bypass could Shift Substantial Costs to Residential Customers



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.
Note: Other includes public lighting, irrigation, cotton gins, and sales to municipalities.

18 percent. Commercial customers are 11.5 percent of total customers, but 28 percent of revenues. On the other hand, residential customers make up about 85 percent of retail customers, but pay only 28 percent of the total. If even a small proportion of nonresidential customers opt to bypass the traditional electric system, the cost burden shifted to captive, mostly residential, customers could be quite significant.

3. Current Competition in the Electric Industry in Texas

The electric industry in Texas consists of a diverse set of organizations established to generate and distribute power throughout the State. These organizations take different structural forms that differ by the role that each plays in the generation and distribution system. Until recently, all electricity generators and distributors were classified as "utilities" of one sort or another. Utilities include investor-owned utilities (IOUs), generation and transmission (G&T) cooperatives, distribution cooperatives, river authorities, and municipally owned utilities. All retail public utilities in the State are required to obtain a certificate of convenience and necessity (CCN) prior to offering retail service. Utilities are also subject to rate regulation under PURA95 and the Commission's rules, although the degree of regulatory oversight differs by the type of utility. In particular, municipal governments have original jurisdiction over utility rates and services within their limits.

Federal and State legislative innovations have introduced new categories of non-utilities. Non-utility suppliers include qualifying facilities (QFs), power marketers, exempt wholesale generators (EWGs), and renewable resource developers. The non-utilities sell only on the wholesale market, in which they are free from the legal requirements of operating under a CCN and from Commission rate regulation.

Another category of provider is energy service companies (Escos). Unlike the utilities and non-utility energy providers, Escos typically do not generate or supply power. Rather, Escos supply "demand-side management" (DSM) services that allow energy users to monitor, manage, or reduce energy consumption.

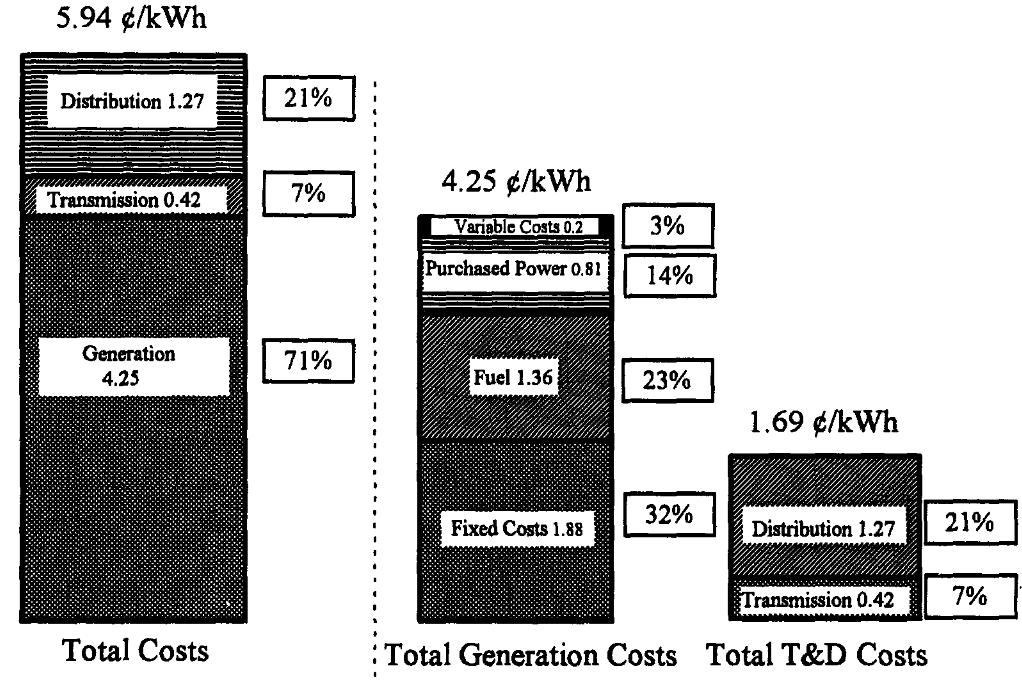
Traditionally, operating utilities in Texas have integrated the various services required to provide electricity at retail. The services that operating utilities typically provide can be divided into three separate, but non-exhaustive, functions:

1. *Generation* consists of the physical production of electric power.
2. *Transmission* refers to transportation of power along the high-voltage wires and the promotion of stability and reliability of the power grid.
3. *Distribution* consists of the transportation of power from the transmission network, over low-voltage facilities, to final consumers.

Integration refers to the incorporation of these three integral functions under a single umbrella. A "fully vertically integrated" utility provides generation, transmission, and distribution services, and may also supply fuel and energy services. Although provision of electricity by integrated utilities has been the general rule in the past, competitive pressures are challenging the need for integration of generation with transmission and distribution (i.e., "wires") functions.

Figure ES–2 illustrates the relative magnitude of total utility costs attributable to the three primary integrated functions on a cent per kilowatt-hour (¢/kWh) basis. The left-hand portion of the figure shows the magnitude of generation, transmission, and distribution cost components in total utility costs. Generation costs are by far the largest portion of total utility costs, in this illustration, 4.25 ¢/kWh, about 71 percent of the total cost of 5.94 ¢/kWh. The right-hand side of Figure ES–2 further disaggregates the components of utility costs, and shows the relative magnitude of generation and transmission and distribution costs. Generation costs can be

Figure ES–2: Illustration of Integrated Components of Utility Costs in Texas



Source: Commission Staff computation based on sample data drawn from FERC Form 1 submissions.
Note: Specific values are an illustration of conditions in Texas, but do not represent a specific utility or an average value for the State.

disaggregated into fixed costs (1.88 ¢/kWh), fuel (1.36 ¢/kWh), purchased power, i.e., wholesale purchases (0.81 ¢/kWh), and variable costs (0.2 ¢/kWh).

This figure can also be used to consider the implications of a more competitive electric market. Most observers believe that transmission and distribution will remain monopoly functions for the foreseeable future.[3] Of the generation cost components, only certain components are likely to be affected by competition. Fixed costs are prior cost commitments of the utilities. Because fixed costs are already on the utilities' books, they will not be reduced by efficiency gains, at least in the short- and intermediate-term.[4] Fuel costs are somewhat influenced by the purchasing power of the larger utilities, and the recent merger activity between electric utilities and natural gas supply

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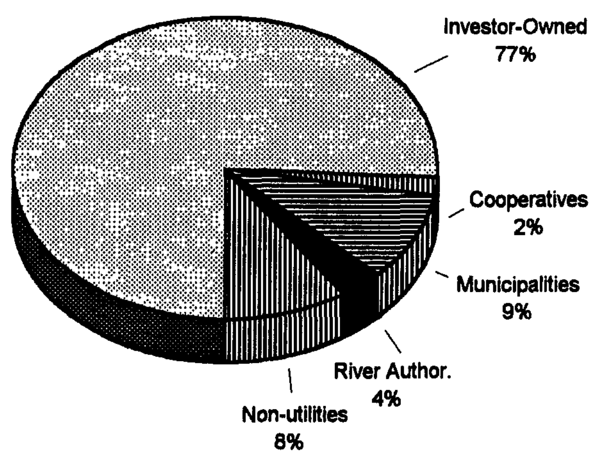
[ES–3] Although transmission and distribution are likely to remain monopoly functions, legislative and regulatory activities can create incentives for utilities to reduce costs of transmission and distribution. See for example the discussions of energy services unbundling in Chapter VI and incentive regulation in Chapter XII.

[ES–4] The value of fixed costs on a company's books could be changed by writing down the value of utility assets or by policy decisions related to stranded investment allocation and recovery.

companies may create greater supply efficiencies. On-going capital investments may improve the efficiency of fuel consumption in power plants. Current ratemaking practices pass the costs of fuel price fluctuations to electricity customers.

The remaining fractions of generation costs in Figure ES–2 are purchased power and variable costs, equal to about one cent in this illustration, or about 17 percent of total utility costs. In the short-term, this is the portion of utility costs where competitive pressures will have a direct effect. Although some utilities may not be able to control their purchased power (wholesale) costs directly, the wholesale market is increasingly subject to competition. Competition will put substantial pressure on the utilities to become more efficient in operations and maintenance. In the longer term, fixed costs and fuel will be affected as well, but that will be a gradual influence as uneconomic plants are phased out, utilities improve existing plants, and new, more efficient fuel supplies are introduced.



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Notes: Data as reported by the utilities for 1995. The share of non-utility power may be underestimated. Some non-utility data may be excluded from the results because non-utilities complied voluntarily with the Data Request, while utility compliance was mandatory. The reported capacity of multistate utilities has been adjusted for Texas demand allocation.

Figure ES–3: 1995 Generation in Texas by Type of Generator

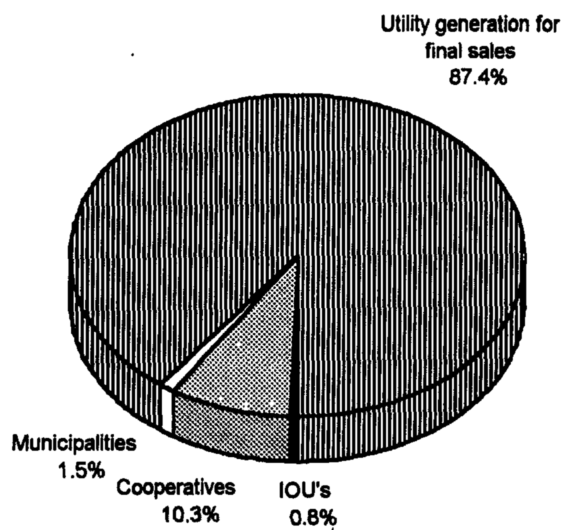
a) Electric Industry Sales and Prices

In 1995, the utilities and non-utilities in Texas combined generated 284 million megawatt-hours (MWh) of electric energy. Figure ES–3 shows the breakdown of generation by type of provider.

IOUs are by far the largest type of generator, accounting for 77 percent of generation in the State in 1995. All together, utilities generated 92 percent, while non-utility generators provided 8 percent.

i) The Size of the Wholesale Market

Electricity sales can be divided into wholesale and retail functions depending upon the final disposition of the power. Wholesale transactions involve sales for resale; the wholesale market is often referred to as a "commodity" market. Retail electricity markets are those in which electricity services are delivered to end users. Retail sales are defined as sales from utilities to end users. Wholesale sellers may be either utilities or non-utilities. Some utilities, including G&T cooperatives and river authorities, sell exclusively at wholesale. Distribution cooperatives and municipally owned utilities that do not own generation resources are the primary buyers of wholesale power. IOUs will also buy at wholesale on a short-term basis in the "economy energy" market. The new categories of non-utility providers are participants in wholesale markets. QFs sell excess power into the wholesale market. EWGs and power marketers are allowed to sell only at wholesale.



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Figure ES–4: Total Texas Wholesale Purchases as a Share of Total Retail Sales (1995)

The wholesale market among Texas utilities represents a small portion of total Texas utility generation. Figure ES–4 shows the relative size of the Texas wholesale market by type of wholesale buyer. Total system retail sales in Texas equaled 265.2 million megawatt-hours (MWh) in 1995 (the size of the entire pie). Of total retail sales, 87.4 percent was sold by the generator directly to the end user. The remaining 12.6 percent was first sold in the wholesale market before being resold to the retail consumer. Figure ES–4 shows the relative sized of wholesale purchases of IOUs, municipally owned utilities, and cooperatives.

ii) The Distribution of Retail Sales and Prices

Table ES–1 shows total retail sales by customer class, for each of the three types of retail utilities. Total retail sales by IOUs are over forty times the retail sales of distribution cooperatives and municipally owned utilities. Residential sales are about one-third of total IOU sales; but for cooperatives and municipal utilities, residential sales are a much larger share of the total, as much as 60 percent of total sales for distribution cooperatives. Together, the two largest utilities in Texas, Texas Utilities Electric Company (TU Electric) and the Houston Lighting and Power Company (HL&P), accounted for approximately 57 percent of the total retail sales in the State in 1995.

Table ES–1: 1995 Utility Retail Sales by Customer Class (million MWh)

Utility Type	Customer Class				Total
	Residential	Commercial	Industrial	Other	
IOUs	67.50	57.04	73.22	8.29	206.04
Distribution cooperatives	10.12	3.40	2.51	1.02	17.04
Municipally owned	10.24	7.32	5.15	2.33	25.03
Total	87.85	67.75	80.88	11.64	248.12

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

The final price of electric energy delivered to retail customers in Texas varies across utility type, individual provider, and customer class. Prices for different customer classes will differ for a variety of reasons; the unit costs of serving a given customer may depend upon the quantity of electricity purchased, the load shape (i.e., the consistency of the demanded quantity), and the accessibility of the customer. Table ES–2 presents the average retail price of electricity for the different types of electricity supplier. Comparing differences across customer classes reveals that on average, residential customers paid 7.84 ¢/kWh for electric service in 1995, while commercial customers paid 6.80 ¢/kWh. Industrial customers, on average, paid 4.81 ¢/kWh, almost three cents less per kWh than residential customers.

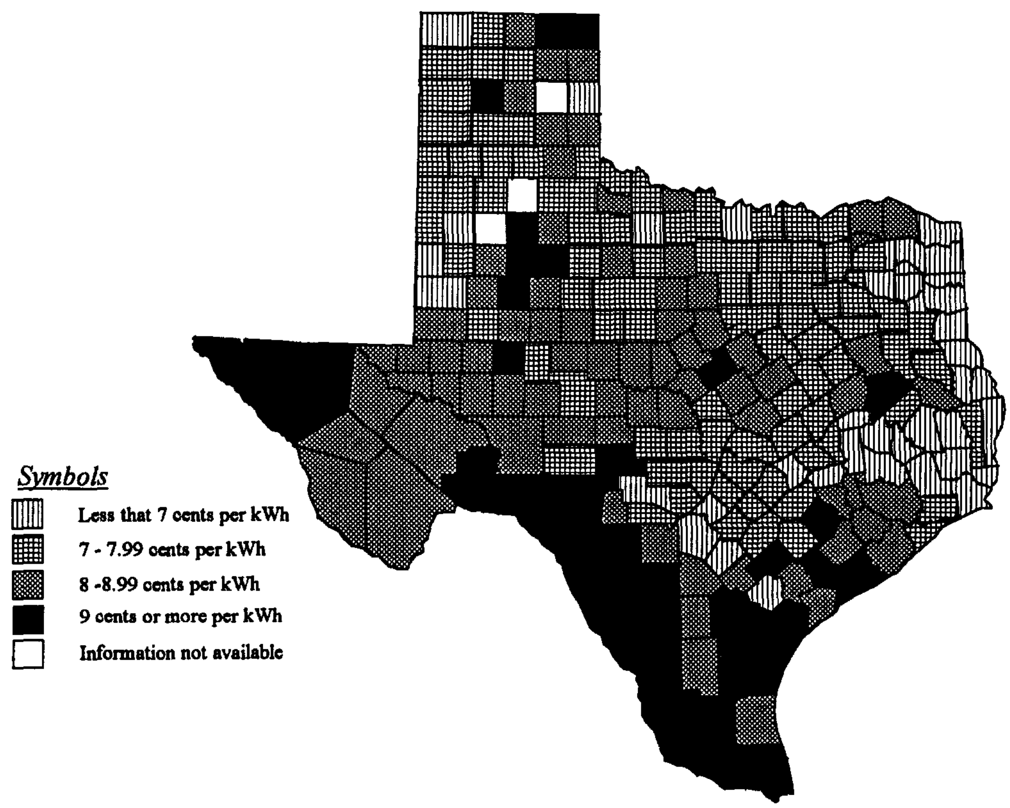
Table ES–2: 1995 Average Retail Price by Customer Class (¢/kWh)

Utility Type	Customer Class				Weighted
	Residential	Commercial	Industrial	Other	Average
IOUs	8.04 ¢	6.81 ¢	4.73 ¢	9.97 ¢	6.60 ¢
Distribution cooperatives	7.47	6.92	5.12	9.70	7.15
Municipally-owned	6.92	6.66	5.69	5.16	6.42
Weighted average	7.84	6.80	4.81	8.99	6.62

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Note: Average price is measured as total revenue divided by total sales (kWh) of all utilities in the State by type. Overall averages weighted by sales (kWh). Average price is the total cost of electric service, including generation, transmission, and distribution costs.

Figure ES–5 shows the distribution of retail residential prices for bundled electric service averaged by county for 1995. More lightly hatched areas in the figure indicate lower average



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Figure ES–5: Distribution of Average Residential Prices in Texas

prices in a particular county; darker areas indicate higher average prices. Although counties are not perfectly differentiated by individual utility service territories, many of the price gradations shown on the map overlap with the boundaries of the service territories of utilities in Texas. The figure also shows some clear geographic distinctions.

There is no question, that these residential electricity price differentials are in part due to the *un*competitive nature of retail electricity markets in Texas. Because retail residential customers cannot choose to receive service from alternate providers, there is little or no opportunity for consumer behavior to affect prices. These price differentials point out the potential opportunities for many residential ratepayers in more competitive markets.

b) Competition in the Wholesale Market

Legislative and regulatory changes at the federal and State level have jump-started the competitive wholesale market in the United States and in Texas. Until the recent changes in the wholesale market brought on by EPAct and PURA95, wholesale *competition* in Texas was almost nonexistent. Three key components of S.B. 373 that are dramatically changing the wholesale market are:

1. *New nonutility participants:* As of the Fall of 1996, at least 50 power marketers and EWGs have registered with the Commission as required under PURA95 §2.053.
2. *Comparable transmission access:* Effective March 3, 1996, the Commission adopted a rule requiring that transmission-owning utilities provide transmission service on a comparable and non-discriminatory basis. The regulations require any transmission-owning utility, including municipal utilities, to provide transmission services to third parties on the same basis and price that it provides transmission service to itself.
3. *Competitive resource solicitation:* The Commission adopted integrated resource planning rules, effective July 29, 1996. These rules require generating electric utilities to assess their additional resource needs and to conduct a solicitation for new resources. The resource solicitation process advances wholesale competition by requiring that vertically integrated utilities look beyond the traditional "build" option.

The effects of these changes can already be seen in the wholesale electric market in Texas. Since the implementation of PURA95, a limited number of existing contracts have been considered for renewal, identified in Table ES–3. In each case, it appears that service will be provided by the new provider at a lower rate than under the prior contract. In one case, Lyntegar and Taylor

Electric Cooperatives renewed contracts with TU Electric, but at a discount from the prior contract. The City of College Station replaced its service from TMPA and City of Bryan with cheaper service from TU Electric. The City of Weatherford also switched from one utility supplier to another, at a reported savings of 13 percent, or about $7.9 million per year over the life of the contract.

Table ES–3: Recent Firm Capacity Contracts Renewed and/or Replaced

Purchasing Utility	Prior Supplier under Contract	New Supplier under Contract	Firm Capacity under Contract (MW)	Contract Term (years)
Lyntegar Electric Cooperative and Taylor Electric Cooperative	TU Electric	TU Electric		
City of College Station	TMPA and City of Bryan	TU Electric	120	4
Granbury Municipal Electric Department	Brazos Electric Cooperative	LG&E Power Marketing	16	5
City of Weatherford	Brazos Electric Cooperative	WTU	53	5
Rayburn Country Electric Cooperative	TU Electric	LG&E Power Marketing	300	5

Notes: Although Lyntegar and Taylor retained supply from TU Electric, the final contract incorporated a discounted rate (see Docket No. 14716).

Sources: Docket Nos. 14716 and 15296. "Marketer Replaces Brazos Co-op as Supplier of 16 MW to Tex. Muni," *Electric Utility Week* at 7 (May 13, 1996). "West Texas strikes five-year deal with Weatherford muni" *Current Competition*, Vol. 7(14) at 5 (July 11, 1996). "LG&E Power Marketing Scores a Big One," *The Electricity Daily*, Vol. 7(40) at 1 (August 27, 1996).

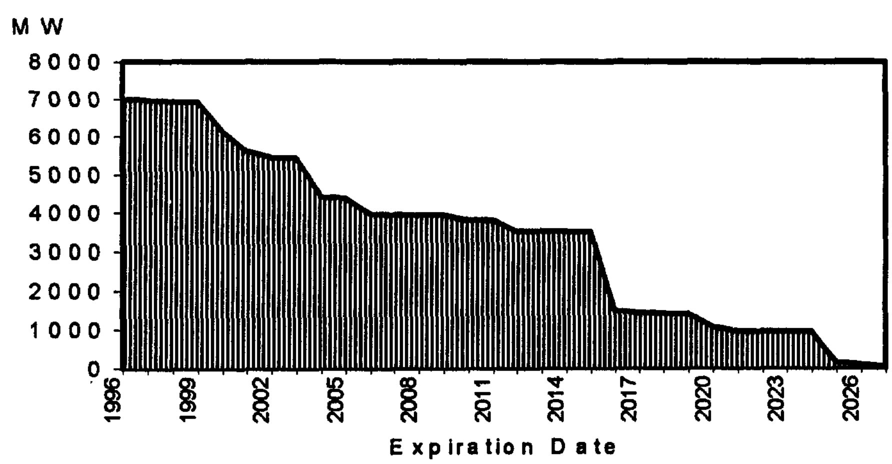
In the remaining two cases, a power marketer—LG&E Power Marketing—replaced an existing utility supplier. Granbury Municipal Electric Department will buy 16 MW from LG&E over a five year term, replacing a contract supplied by Brazos Electric Cooperative. Rayburn Country Electric Cooperative also contracted with LG&E for 300 MW over a five year term, replacing a contract with TU Electric, at a reported savings to the distribution cooperatives served by Rayburn Country of at least 20 percent.

Most of these recent contract renewals and replacements could not have occurred prior to PURA95. Some new contracts require transmission wheeling services from a third party that may not have been available at comparable terms before the Legislature opened access to the transmission system. Contract replacements with power marketers would not have been possible prior to the introduction of these new categories of wholesale suppliers in the State. Even for wholesale contracts that are renewed with the original supplier, it is likely that the contract will be at more favorable terms for the buyer because of the new competitive opportunities available in the wholesale market.

In sum, the Commission's review of activities in the wholesale market in the Scope of Competition report indicates that conditions are in place for robust wholesale competition in the State:

- Recent regulatory reforms guarantee access to the market for wholesale suppliers. Commission rules have opened access to the transmission system and ensured comparable treatment of all transmission users.
- A host of both traditional and new firms are operating in the Texas wholesale market. Commission rules for integrated resource planning require open solicitation by utilities for all new resource needs. In 1996, several wholesale contracts were replaced by new contracts—some with power marketers—at more favorable terms.
- Current excess capacity is helping to moderate wholesale prices.

On the other hand, the level of activity of the wholesale market may remain restricted for a number of years because of the large quantity of power committed to long-term wholesale



Source: Commission Staff computations based on responses to the Commission's Data Request under, Project No. 15002, issued April 11, 1996, and follow up communications with representatives of reporting utilities.

Figure ES–6: Expiration of Wholesale Power Contracts in Texas (in MW)

contracts, many of which do not expire for almost 20 years. Figure ES–6 shows the dates when existing contracts are scheduled to expire. The height of the bars in the figure show the quantity of all contracts in place in each given year, measured in megawatts (MW). In 1996, over 7,000 MW of capacity are under contract in Texas. The change in height from one year to the next shows the MWs under contract expiring each year. Only a tiny portion of the contracts expire by the year 2000, and it is not until 2004 that more than one-third of all wholesale contracts have expired. Fully one-half of the wholesale contracts in Texas are scheduled to remain in place through 2015. By their long-term commitments, buyers in the wholesale market are excluded from the competitive wholesale market unless they are able to renegotiate or come to some other agreement with their suppliers allowing them back into the wholesale market. In the next few years in particular, it is unlikely that a dynamic wholesale market can develop to its full potential given the scale of existing commitments. However, just how tightly the wholesale market will be restricted also depends on anticipated growth. If growth in demand rapidly exhausts the current excess capacity in Texas, the expiration cycle of these existing contracts may not be as severe a limitation on the wholesale market.

c) Competition in the Retail Market

In contrast to the wholesale market, there are very few opportunities for retail competition in the Texas electric industry. Retail electric service continues to be provided exclusively by IOUs, municipally owned utilities, and distribution cooperatives. Current law precludes new entrants from providing retail electric services. There are however, several exceptions to the restrictions on competition at the retail level:

- *Multiple certification:* Some multiply certificated areas offer a choice of more than one supplier, but at a potential cost of facilities duplication and switching fees.
- *Self- and co-generation:* Industrial and large commercial customers have competitive supply options because they may self- or co-generate. Electric consumers that are able to self- or co-generate consumed over 20 million MWh for their own use in 1995. At least 20 percent of electricity consumed for industrial use appears to be produced by self- and co-generators. Most self- and co-generators are located in only a few areas of the State, in particular the Houston Ship Channel, Beaumont-Port Arthur, and Corpus Christi areas.
- *Discounted rates:* Retail discounted rates are available to some customers—primarily industrial and large commercial—that have competitive alternatives. In

some circumstances, discounted tariffs may also be available to other customers for whom bypass is not a serious consideration.

- *End-use alternatives:* Many customers can choose between electricity and natural gas for space heating and other applications.

Although these are meaningful competitive alternatives, the scope of retail competition is quite limited. In each case, competition is restricted to only a small set of customers. Where available, customers benefit from retail competitive opportunities, but in general, the market is not competitive and cannot be competitive within the existing legal framework.

For the most part, retail price differentials will be sustained into the future by the current legal and regulatory structure. But these price differentials also point out the potential opportunities in a more competitive market. Under competition, such differences cannot be sustained unless due to differences in the costs of serving different types of customers or regions.

4. Competition in the Energy Services Market

In the whole of the electric utility industry, the retail energy services market is most directly linked to the ultimate consumer. Energy services allow energy consumers to better manage their use of electricity and competing sources of power. Retail energy service providers include:

- *Distribution utilities:* In addition to providing reliable electricity distribution to consumers, distribution utilities provide metering, billing, energy efficiency guidance (e.g., home energy audits), alternative pricing arrangements (e.g., time-of-use pricing), optimal load control, and customer services.
- *Retail energy service providers:* Energy service companies, energy engineering firms, fossil-fuel providers, on-site generation developers, and financial and risk management firms provide services to consumers to help them manage, control, and reduce consumption. These providers are largely unregulated
- *Retail consumers:* Consumers themselves make decisions about the type of power (e.g., electricity versus gas), the type and efficiency of electricity-consuming devices, and the type and size of energy efficiency investments.

While many independent companies provide energy service in the marketplace, distribution utilities are a dominant presence due to their long-standing connections with electricity customers.

Technological innovations and pressures from consumers to keep energy costs down are creating the potential for greater competition in the energy services market. New technologies available in appliances and devices are improving consumers' abilities to use electricity more efficiently and increasing the ease with which consumers control electric usage. Better communications (e.g., metering devices that give consumers greater information about their consumption patterns) can improve consumers' abilities to respond to efficient pricing signals, such as time-of-use rates.

Basic economic principles show that choices among service options will increase consumer satisfaction and increase economic efficiency by improving the allocation of services and scarce resources. With a set of service and pricing options, consumers could choose among alternatives for the set best meeting their needs. A limited set of customer service and pricing choices are being offered today. In the face of competitive pressures, alternative pricing and service options provide competitive opportunities for electric utilities to position themselves strategically to compete for retail consumers. In a few cases, new tariff options are being offered that reflect variations in the cost of service by hour (time-of-use tariffs) or allow consumers to choose alternative levels of reliability (interruptible, curtailable, and direct load control activities).

B. THE COMMISSION'S REPORT ON REGULATORY RESTRUCTURING

As one of the first steps in its investigation of industry restructuring, Commission Staff assembled a broadly representative selection of interested parties to develop a set of goals and principles to guide the investigation. These goals and principles can provide benchmarks for evaluating specific proposals and for comparing various models for a restructured electric industry. Through a series of meetings, the interested parties developed alternative proposals capturing these goals and principles. At the conclusion of the goals and principles exercise, the parties developed a consensus collection of ten overarching goals and principles; however, the parties were unable to achieve consensus on "framing statements"—more broadly stated interpretations of each of the goals and principles. (Staff later separated one goal into its four separate parts, resulting in a list of thirteen goals and principles.)

Using the proposed framing statements of various parties, Staff developed a set of framing statements for the consensus goals and principles. The Commission voted to use the consensus goals and principles to guide the Commission's investigation of industry restructuring. The consensus goals and principles with Staff framing statements are as follows:

Goals and Principles to Guide Industry Restructuring

1. **Reliability and Safety**

The current high level of reliability and safety shall be maintained or improved.

2. **Obligation to Serve / Universal Service**

Electric service is essential for the health, safety, and economic prosperity of all Texans. High quality, reasonably priced electric services shall be available to all.

3. **All Customers Benefit**

All classes of customers shall benefit from improvements in economic efficiencies and the development of service choices. Restructuring shall not benefit one customer class to the detriment of another.

4. **Consumer Protection**

Consumers shall be protected from abuses from pricing, cross-subsidies, market power, and anti-competitive behavior. The public shall have the opportunity for extensive input into the restructuring process.

5. **Consumer Choice**

Expanding the number of choices available to consumers is a fundamental element of a competitive electric industry. Consumers have the right to clear, accurate, and comprehensive information concerning service choices and pricing options.

6. **Environment**

The current level of environmental protection shall be maintained or improved.

7. **Role of Competition**

The implementation of competitive markets should produce lower prices for all consumers relative to the existing system. Competition should result in additional consumer choices and improved economic efficiencies while ensuring the availability of high quality electric services to all Texans.

8. **Appropriate Regulation and Timing of Transition**

A comprehensive timeline shall be developed to identify explicit milestones and deadlines for actions. Consistent with the public interest, Texas shall proceed in a deliberate, orderly, and expeditious manner. The appropriate level of regulation should be determined after a deliberate analysis of the market sectors.

9. **Economic Efficiency**

A competitively structured electric industry should result in enhanced economic efficiencies.

10. **Market Framework**

Market sectors should be analyzed to determine the extent of competitiveness in each sector. Markets considered to be insufficiently competitive should continue to be regulated. Where market sectors are determined to be sufficiently competitive, regulation should encourage efficient competition.

11. **Economic Development**

A competitively structured electric industry should create new markets, reduce inefficiencies, and lower costs and prices allowing opportunities for economic development.

12. **Excess Cost over Market**

The recovery of costs associated with facilities that are not competitive should be borne in a manner that balances the needs of all parties.

13. **Resource Mix**

A diverse resource mix in Texas is important both economically and strategically. Regulatory measures may be required where to ensure a balanced generation mix during the transition.

1. Alternative Structures of the Electric Market

In discussions of regulatory restructuring that have been taking place across the country, a number of alternative organizational structures have been proposed, including: full wholesale competition under a contracts structure; wholesale competition with a centralized power exchange or "Poolco;" and retail consumer choice of service provider, or "retail access." Given the underlying complexity of the entire electric system, any restructuring proposal must account for an array of detailed concepts and relationships. Some of the more complex issues concern:

- *The framework for conducting market transactions*: Because the electric system is a network of instantaneous interactions, it differs from networks and systems that are more easily observed and understood. No matter what form restructuring and competition take, active network management will be needed to constantly oversee system security.
- *The issue of market power*: Vertical market power occurs when a vertically integrated utility favors the sale of power from its own generating units by virtue of its control over the transmission and distribution systems. Horizontal market power results from horizontal integration at any level—control over all production, transportation, or distribution facilities in a particular geographic area. If market power is sustained in a restructured market, the market will not become fully competitive, and a portion of the potential benefits of expanded competition will be lost.
- *Different forms of unbundling*: Functional unbundling is the administrative separation of utility functions. Structural unbundling is the division of an integrated utility into smaller, separate firms. Excessive market power can be addressed by unbundling utility functions.

a) Roles and Responsibilities in a Restructured Market

Today's electric market is dominated by integrated electric utilities. As a result, many of the complications of providing electric service seem to take care of themselves because the integrated structure keeps the complications within the confines of a single entity. A restructured industry may rewrite many of the relationships of the different components of electricity provision. Among the many issues to be addressed, any restructuring proposal must consider:

- *Control of the physical infrastructure:* Integrated electric services could be provided by any combination of generation companies, transmission companies, distribution companies, retail service companies (e.g., companies providing metering and billing), and energy service companies.
- *Market functions:* The market functions that are currently being performed by vertically integrated utilities, and that will need to be performed in a restructured industry, include load (demand) aggregation, resource (supply) aggregation, control-area coordination (i.e., moment-to-moment balancing of supply and demand), procurement of new resources, and price-risk management.
- *Market participants:* In a restructured industry, in addition to the entities controlling the physical infrastructure, a variety of market participants may exist, including an independent system operator (ISO) to ensure open transmission access; power marketers who bring wholesale sellers and buyers together; and energy service companies to provide retail customers with a wide variety of energy service options.
- *Market organizations:* A restructured market will see the creation or development of new market organizations to facilitate transactions. These may include hubs for energy aggregation, storage, and distribution; market centers for financial services; spot markets where short-term energy is bought and sold; and futures and options exchanges.

b) Expanded Wholesale vs. Retail Competition

There are two basic approaches to increased wholesale competition. The first approach is a gradual increase in wholesale competition through continued implementation of S.B. 373. The other approach is an expedited approach where utilities are disaggregated so that competition can take place between newly created wholesale entities. Allowing the wholesale market to expand gradually is the least disruptive approach to expanding competition, but may be limited in the near- to intermediate-term by the prevalence of long-term contracts already in existence. Expediting conversion to a full wholesale market would accelerate the pace at which competitive benefits become available.

Some parties have argued that the full benefits of competition cannot be achieved at the wholesale level; competition must be extended to retail customers. Under retail competition, retail customers may access and contract directly with suppliers (or their marketing representatives), or customers may access the market through their own representatives (aggregators). Because consumers have choice over their electricity suppliers, providers will have incentives to offer service at the lowest feasible cost. Incentives are also created to provide innovative pricing and service offerings to keep customers from switching to an alternative supplier.

c) Evaluating Functional vs. Structural Unbundling

There are three widely divergent points of view on how to properly evaluate the functional vs. structural unbundling debate. Some parties argue that functional unbundling is an adequate remedy for concerns about excess market power, cross-subsidization between monopoly and competitive services, and self-dealing between regulated and competitive affiliates. Also, functional unbundling has a lower implementation cost than structural unbundling, and protects economies of scale and scope while skirting the issue of what to do about restrictive bond indentures that stand in the way of structural unbundling. Other parties contend that functional unbundling and open transmission access are not enough—that the only way to prevent abuses from excess market power, cross-subsidization and self-dealing, is to implement structural unbundling. Also, it is argued, concerns about losing scale economies are misplaced, and creative legal mechanisms can be found for working around bond indentures. Yet a third group maintains that because the potential for excess market power is overstated and the curative powers of open transmission access are understated, there is no need to implement either form of unbundling (i.e., the current bundled industry structure should be maintained for the immediate future). Leaving the current industry structure in place also would recognize the unique status of municipal and cooperative utilities relative to investor-owned utilities.

2. Lessons Learned from Restructuring in Other Industries and Countries

Restructuring efforts in other industries and countries provide lessons in a number of areas. The Commission's report on industry restructuring reviews experiences in other industries and countries for lessons applicable to any restructuring effort affecting the Texas electric industry. Outcomes in other industries show that continued regulatory intervention may be required in the aftermath of restructuring to assure that the benefits of restructuring are shared by all segments of the market. In the long distance telecommunication and natural gas industries, reductions in costs did not translate into price reductions for all classes of customers. Similarly, in the restructured British electric industry, reductions in costs may not have led to price reductions without continued attention of regulatory authorities. In the airline industry, average airline prices have fallen in real terms for consumers; however, some outlying customers have experienced decreased service. If a goal of industry restructuring is to spread benefits to all customers, continued regulatory involvement appears to be necessary.

Observation of other industries and countries has also led to the following potential lessons for a restructuring in Texas:

- Uneconomic bypass and cost shifting may be exacerbated if restructuring is not addressed.
- Restructuring must address universal service and the possibility of price discrimination.
- Reliability, safety, and service quality must be addressed in a restructuring effort.
- Restructuring may lead to industry volatility.
- Market power must be addressed during restructuring and beyond.
- Stranded investments must be addressed.

Each of these lessons poses challenges that must be surmounted in a restructuring effort. By appreciating the lessons of other restructuring efforts, potentially serious pitfalls can be avoided.

Across the country, four out of five states have been or are addressing electric industry restructuring at some level. While some states have taken formal action to alter their electricity industry (California, Pennsylvania and Rhode Island have passed legislation ordering retail access), others are discussing restructuring in educational forums and workgroups. Many common issues are being discussed in other states: should retail access be adopted, and if so, how should it be phased in? should generation be functionally or structurally separated from wires functions? how should market power be addressed in a restructured market? how should stranded investments be addressed?

Electric industry restructuring also is receiving considerable attention at the federal level. In the most recent congressional session, as many as five bills have been introduced in the House and Senate. The most comprehensive restructuring bills filed in the 104th Congress were the bills filed by Representative Daniel Schaefer, House Commerce Committee (H.R. 3790) and Representative Tom DeLay (H.R. 4297). Both bills would require the states to introduce retail access by a fixed date.

3. Ensuring the Benefits of the Present Electric System

As currently organized, the electric system provides a variety of benefits over and above the provision of power. These benefits fall under the labels "system" and "social" benefits. The Commission's investigation of industry restructuring identified eight categories of system and social benefits that are provided through or in association with the electric system:

1. System reliability and safety;
2. Research and development;
3. Universal service;
4. Resource diversity and renewables;
5. Energy efficiency;
6. Environmental protection;
7. Low-income programs; and
8. Consumer protections.

If system and social benefits are no longer provided (or are under provided) in a restructured electric market, the benefits may become *stranded* benefits. If system and social benefits become stranded, the Legislature and the Commission will face the question whether the benefits should continue to be provided, either through the electric system or some other source? and if so, what mechanisms should be implemented to provide stranded system and social benefits?

System and social benefits may not be provided in a competitive electric market for a variety of underlying reasons, the first four of which are commonly known as "market failures":

- *Externalities:* An externality arises from a breakdown of private markets in which the price of a good does not reflect the complete cost incurred in producing it or the total benefits derived from consuming it. Because the price does not reflect the full costs, an inefficient amount (either too much or too little) of the good is consumed.
- *Public goods:* Public goods are also associated with a breakdown of private markets in which too little of a good or service is produced because an individual's private production incentive does not reflect the larger benefit to the public. Individuals also face an incentive to be a "free rider;" by relying on others to finance the good, the free rider can pay nothing but receive the same benefit.
- *Information failure:* Information failure occurs when the marketplace provides insufficient information for producers and/or consumers to make efficient investment and buying decisions.
- *Destructive competition:* Destructive competition involves competitive practices that can ultimately lead to economically undesirable outcomes (e.g., excessive cost cutting that endangers safety).
- *Income insufficiency:* Income insufficiency—for lack of a better term—simply refers to the inability of some members of society to be able to afford crucial services. Many low-income, elderly, disabled, and rural residents face income constraints that make tradeoffs between electricity and other essential services a particular concern.

The Commission's report on regulatory restructuring reviews the means by which each system and social benefit is currently provided, the reasons why that benefit may not be provided in a competitive, restructured market, and questions whether the benefit would become stranded. If the Legislature and the Commission chose to ensure that system and social benefits continue to be offered, a variety of approaches could be used, no one of which is necessarily appropriate for each benefits category:

- *Regulatory standards:* Establishment of regulatory standards has been the most common means to address many market failures; most environmental laws fall under this heading.
- *Incentive measures:* Incentive measures are designed to overcome breakdowns of private markets. Examples of incentive measures include

taxes, tax exemptions, and market mechanisms like emissions trading programs. Externalities and public goods are candidates for economic incentive measures.

- *Public provision:* Public provision is the direct provision of services by governmental entities. Libraries and public highways are examples of public provision.
- *Financial support:* Financial support typically involves subsidies to supplement provision of a particular good or service. The State currently provides financial support for low-income electricity consumers.
- *Information access and dissemination:* Certain potentially strandable benefits may be due to insufficient (or disparate) information in the hands of consumers. Information failure can be overcome by requirements for equal access to information, information dissemination, and educational services.
- *Pooling:* Pooling involves combining large numbers of high risk customers under the anticipation that the individual risks will be spread across the entire risk pool.

These mechanisms rely on a variety of different approaches. Different mechanisms may be appropriate for addressing particular types of system and social benefits or can be used in combination to achieve desired goals.

4. Managing Regulation in the Transition To Competition

In the interim period between today's electric market and the arrival of a fully competitive market, a number of special issues must be addressed to ensure that all parties are able to share in the benefits of a competitive market. Of particular concern in a not yet fully competitive market is the impact on residential and small commercial customers. Consequently, several of the most critical transition issues involve consumer protections.

The most challenging issue in the transition period will be the allocation and recovery of stranded investments. Those issues are examined in the Commission's detailed analysis of potentially strandable investment (Volume III), which is a companion to this report. The analytical results in Volume III show that over time, stranded investment diminishes as plant and equipment depreciate and utilities continue to collect revenues at regulated rates, paying down the booked value of their assets. Because stranded investment diminishes over time (in real dollar terms), it could be tempting to defer any action on stranded investment allocation and recovery, relying on time to eliminate a portion of the concern. However, this approach would not solve the problem, because to defer action entirely is an implicit allocation decision, providing 100 percent recovery to the electric utilities from electric users without competitive options. Deferring a decision on stranded investment will also defer the potential economic efficiencies of industry restructuring.

a) Quality of Service

Maintaining or improving the existing high quality of electric service to all the citizens of Texas is the preeminent concern as the electric industry becomes competitive. Quality of service is a measurement of the utility's ability and commitment to provide safe, reliable, and timely electric services at the lowest reasonable cost.

Today, because capital investments are recovered in the utility's rates, reliability investments may contribute to company profits. In a more competitive environment, the economic incentives will be reversed. Plant maintenance and customer services are other areas of concern if competition leads utilities to cut costs severely in order to be competitive.

b) Market Power Issues

The existence and exercise of market power is a critical consumer oriented concern of the transition period. Prior to establishment of a fully competitive market, firms may be able to exploit opportunities for market power, raising costs and restricting choices of utility customers. In any restructuring proposal, parties ought to demonstrate that the market concentration in the relevant markets within Texas will not be large enough to extract above-market prices.

c) Code of Conduct

Independent of the design of any particular restructuring plan, a concern for *fair competition* will arise. For example, if an incumbent utility is allowed to subsidize the activities of its non-regulated affiliate, a competitive market will not result and, customers may end up paying higher prices for power. Some proponents of restructuring have argued that a "code of conduct" that governs the relationship between a regulated utility and its non-regulated subsidiary could alleviate this concern. A code of conduct could also provide a limited tool for addressing some market power concerns arising from vertical integration.

d) Information Issues

One of the critical components of a competitive market is access to information by consumers and industry protection of its proprietary information. In textbook competition, consumers have access to all relevant information instantaneously and free of charge. The key questions in this area are how can consumers receive the most relevant information in an understandable format at a minimum cost? what are the Commission's information needs in a restructured industry? and how can customers' privacy and the companies' proprietary information best be safeguarded while ensuring competitive balance?

e) Performance-Based Regulation

With increasing competitive pressures in electricity generation, many regulators have begun to consider incentive regulation (one form of which is performance-based regulation or "PBR") as an alternative to traditional cost-of-service regulation of electric utilities. PBR creates incentives for utilities to aggressively keep costs down while the Commission retains regulatory oversight. PBR has been suggested as an interim approach to regulation of generation in a transition to competition and as a permanent approach to transmission and distribution if those functions remain under monopoly control.

f) Prevention of Cost Shifting

During any transition to competition, it will be the role of the Commission to protect captive ratepayers from shifting costs. Cost shifting could be a means by which utilities reduce the costs of serving the most desirable customers in preparation for a fully competitive market and once the competitive market arrives. Cost shifting has been an area of contention in recent contested cases before the Commission pertaining to discounted rates.

g) Fuel Cost Recovery During the Transition

As the market becomes increasingly competitive, the logic of the Commission's current treatment of fuel expenditures is being challenged. In a fully competitive market, fuel expenditures can be competitive as well. In the transition to a competitive market, a number of fuel cost recovery methods are available that begin to alter the economic incentives faced by utilities in their fuel investments and procurement.

Part I: The Scope of Competition in the Electric Industry in Texas

I. INTRODUCTION

In its 74th session, the Texas Legislature directed the Public Utility Commission of Texas (the Commission) to conduct a study of the scope of competition in the electric industry in Texas as follows:

> *Before January 15 of each odd-numbered year, the commission shall report to the legislature on the scope of competition in electric markets and the impact of competition and industry restructuring on customers in both competitive and noncompetitive markets. The report shall include an assessment of the impact of competition on the rates and availability of electric services for residential and small commercial customers and a summary of commission actions over the preceding two years that reflect changes in the scope of competition in regulated electric markets. The report shall also include recommendations to the legislature for further legislation that the commission finds appropriate to promote the public interest in the context of a partially competitive electric market.*[1]

This is the first report prepared for the Legislature under this directive. As the first such investigation, this report serves a dual function by investigating the scope of competition in the electric industry in Texas today and by creating a benchmark by which future competitive changes and the impacts of those changes can be measured.

Prior to the passage of Senate Bill 373 by the 74th Legislature, competitive opportunities in the electric industry in Texas were extremely limited. S.B. 373 introduced sweeping changes to the Texas wholesale electric market. The Legislature found that wholesale competition is in the public interest:

> *. . . the wholesale electric industry through federal legislative, judicial, and administrative actions is becoming a more competitive industry which does not lend itself to traditional electric utility regulatory rules, policies, and principles and that, therefore, the public interest requires that new rules, policies, and principles be formulated and applied to protect the public interest in a more competitive marketplace. The development of a competitive wholesale electric market that allows for increased*

[1]Public Utility Regulatory Act of 1995, Tex. Rev. Civ. Stat. Ann. art. 1446c-0 §2.003 (Vernon Supp. 1996) (PURA95).

participation by both utilities and certain nonutilities is in the public interest.[2]

In PURA95 §2.057, the Legislature directed the Commission to adopt rules on wholesale transmission service, rates, and access that guarantee open access and comparable service to the State's wholesale transmission system. During 1996, the Commission adopted rules implementing the legislative directive to encourage wholesale competition. Because these rules were only recently adopted, evidence of the impact of competition on customers is limited; however, indications of the potential prospects for competition are emerging. This report therefore presents data on the electric market in Texas that can be used in future reports as points of comparison in assessing the impact of competition on customers.

A. OVERVIEW OF COMMISSION PROJECT NOS. 15000, 15001, AND 15002

In recent years, the idea of competition in electric services has been at the forefront of debate in the regulatory community, not only in Texas, but across the nation and the globe. A number of countries have opened their once protected electric industries to competition, most notably Great Britain. Other states have also addressed electric industry competition. Over 30 states have initiated dockets or study groups concerning electricity competition and restructuring, and at least 9 states have ordered some form of retail competition or implemented a competition pilot program. In the last year, legislatures in California, Rhode Island, Pennsylvania, and New Hampshire have adopted legislation implementing retail competition.

In light of these events, the Commission recognized that this first investigation into the scope of competition provides an opportunity for a broad investigation into the structure of the electric industry, and the prospects for industry and regulatory restructuring. On November 6, 1995, the Commission established three projects that have become the platforms for investigating competition and restructuring issues:

[2] PURA95 §2.001(a).

1. *Project No. 15000:* An investigation into issues related to the electric utility industry and regulatory restructuring;
2. *Project No. 15001:* An investigation into potentially stranded investment in the electric utility industry in Texas, conducted in accordance with §2.057(e) of PURA95; and
3. *Project No. 15002:* An investigation into the scope of competition in the electric utility industry in Texas, conducted in accordance with §2.003 of PURA95.

The Commission's report is presented in three volumes. Volume I is the Commission's report to the Legislature on the Scope of Competition and Potentially Strandable Investment (ECOM), pursuant to PURA95 §§ 2.003 and 2.057(e). Volume II (this volume) is the Commission's detailed analysis of the scope of competition in the electric industry in Texas. The Commission's detailed report to the Legislature on potentially strandable investment may be found in Volume III;[3] however, the Commission appreciates that the two detailed volumes are intimately related. The treatment of potentially stranded investment is perhaps the most conceptually challenging and contentious issue in the debate on electric industry restructuring.

This second volume of the report is presented in two parts. Part I presents the detailed version of the Commission's response to the Legislature on the scope of competition. Part II presents the results of the Commission's investigation into industry restructuring. The Commission's report on restructuring is intended as a *primer* for parties involved in discussions of the future of the electric industry in Texas. Using this report, interested parties may conduct a discussion of industry restructuring with common terms of reference and an appreciation of many of the complex issues involved.

B. ORGANIZATION OF THIS VOLUME

This volume is organized into two parts. Part I discusses the current scope of competition in the electric industry in Texas. It discusses the legislative, regulatory,

[3]Public Utility Commission of Texas, *Report to the 75th Legislature Volume III Potentially Strandable Investment (ECOM) Report: A Detailed Analysis*, Austin, Texas (January 1997), hereafter, the "Stranded Investment" Report.

and technological underpinnings of the current shift in competitiveness of the electric industry. Part I also discusses the prospects for competition under the new rules adopted by the Commission in response to S.B. 373, as well as additional opportunities for competition within the current legal and regulatory structure in Texas.

Part II presents results of the Commission's investigation into regulatory restructuring. It includes a review of the goals and principles developed by interested parties in the State, and further summarized by the Commission Staff, as a guide to any restructuring effort. Part II includes a discussion of alternative market structures and a discussion of lessons learned from restructuring efforts in other jurisdictions. It also describes the potential benefits of competition, and includes a discussion of system benefits (i.e., existing programs and services provided through the electric system) that may become stranded in a competitive market. As the market increasingly moves to a more competitive footing, a number of issues will arise during the transition. A selection of these issues is discussed as well.

The remainder of this introduction presents a more detailed summary of each chapter of the report, followed by an overview of the Commission's investigation.

Part I: The Scope of Competition in the Electric Industry in Texas.

Chapter II: Traditional Utility Regulation in Texas and Changes Setting the Stage for Competition. This chapter reviews the traditional justification for regulation—concern over the exercise of monopoly power. The legal/regulatory structure that arose in response to monopoly is then explained. More recently, innovative legislation introduced new types of *unregulated* firms to the electric industry. These firms are able to utilize the latest electric generating technologies, allowing them to be cost competitive with traditional regulated utilities. The chapter discusses the changes in both State and federal regulations that allowed these unregulated firms into the market. The elements of this chapter introduce the complex set of factors that have led to an increasingly competitive market for electricity in Texas.

Chapter III: Emerging Competition in the Changing Texas Electric Market. This chapter concludes the discussion introduced in Chapter II with a review of the concerns raised by allowing the electric market to become even further competitive without appropriate legislative/regulatory oversight. Left to itself, increasingly competitive forces in the market could result in residential and small commercial customers missing the potential benefits of competition, or in the most extreme case, paying even more for their electric service. The chapter discusses the financial incentives for "bypass," the link between bypass and stranded investment, and the evidence of bypass in Texas. It concludes with a discussion of the potential hazard of expanded bypass—shifting greater costs to residential and small commercial customers.

Chapter IV: Basic Economics of Competitive Markets. Chapter IV discusses some basic economic concepts that are important considerations in determining whether the electric market in Texas is truly competitive. The economic conditions necessary for a competitive market are first presented, followed by a discussion of economic efficiency and the link between efficiency and competition. Two alternative economic models are presented, contestable markets and workable competition. The chapter then discusses the characteristics of partially competitive markets. Functioning markets may at times not be competitive because of conditions known as "market failures." Four types of market failures are discussed. These conditions will be especially important to the discussion in Chapter XI on system and social benefits. Finally, the chapter defines and discusses the concept of market power. If companies can retain and exercise market power, the market will not be fully competitive and consumers may be precluded from benefiting from a more competitive market. Market power is a key issue throughout much of Part II of the report.

Chapter V: Current Electricity Competition in Texas. This chapter discusses the structure of the current electric market in Texas and the degree of competitiveness of the Texas market today. The chapter begins with an overview of the types of companies operating in the electric market, the types of generating resources in the State, and a summary of retail sales. The wholesale and retail segments of the market are discussed separately. Recent federal and State laws and regulations have introduced competition in the wholesale market. Non-utility suppliers and power marketers are playing a larger role, resource solicitations must be conducted competitively, and several expiring wholesale contracts have been replaced recently with new contracts incorporating more favorable terms. The potential competitiveness of the wholesale market remains constrained, however, by the prevalence of existing wholesale contracts, many of which do not expire for 15 or more years. Some areas of the State have experienced a limited form of retail competition in multiply certificated areas; however retail competition remains extremely restricted. The chapter discusses the characteristics of retail markets, both geographic and product markets, as a first step in assessing whether retail markets in Texas can become fully competitive. Differential retail prices across the State are examined as an indicator of the potential for retail competition. Finally, the chapter discusses challenges to the current distinction between wholesale and retail markets.

Chapter VI: Opportunities for Competition in Energy Service Markets in Texas. Chapter VI focuses on two main topics: the operations of the energy service market and the opportunities for competition in that market; and opportunities for expanded consumer choices in the provision of electric services. Retail energy service markets function at the level of the ultimate consumer, rather than at the generation and transmission (wholesale) level. By extending the array of service and pricing options, consumers will be able to choose a set of energy services that best satisfy their needs. Functional "unbundling" (i.e., functionally separating activities, costs, and information) is discussed as a means to increase competition in energy services. As new pricing and service options broaden the choices available to consumers, additional on-site alternatives and energy services may become economical, consumers will be able to customize what they receive, lower their cost, and increase the value of energy services.

Part II: An Investigation into Electric Industry Restructuring.

Chapter VII: Goals and Principles to Guide An Investigation Into Industry Restructuring. This chapter reviews the goals and principles used to guide the Commission's investigation into industry restructuring. Though finalized by Commission Staff, these goals and principles were initially developed by an informal group of industry stakeholders. These parties, through negotiation, agreed upon a consensus set of underlying goals and principles. Commission Staff built upon the progress of the parties, and arrived at framing statements for the goals and principles after consideration of the recommended framing statements of the parties and the draft statements of two committees of the National Association of Regulatory Utility Commissioners (NARUC).

Chapter VIII: Analysis of Alternative Market Structures. This chapter begins with a discussion and clarification of the basic terms and concepts related to industry restructuring. Some key topics covered include the distinction between wholesale and retail competition, a functional description of a pure Poolco (the original United Kingdom model), an explanation of market power as a potential barrier to competition, and an explanation of industry unbundling as a cure for market power. Building on this basic understanding, the chapter then addresses the necessary infrastructure, market functions, and market organizations that will comprise a restructured industry. The chapter continues with scenarios for expanded competition (both wholesale only and retail), and concludes with an extensive evaluation of two major restructuring issues: whether to pursue wholesale-only competition or extend competition to the retail level; and whether to require functional (administrative) unbundling of industry functions or require structural unbundling (i.e., corporate divestiture) to cleanly separate generation, transmission, and distribution.

Chapter IX: Lessons Learned in Other Industries and Jurisdictions. This chapter reviews industry restructuring efforts in other industries, as well as electric industry restructuring in other countries and states, and at the federal level. In the United States, long distance telecommunications, the natural gas industry, and the airline industry have all been substantially restructured in recent years. The actions taken in those industries are instructive to an investigation of electric industry restructuring. Moreover, investigations into electric industry restructuring are a global phenomenon. Countries around the world have restructured, often by privatization, their electric industries; and a majority of the states in this country are investigating the possibility of restructuring. Electric industry restructuring is also the subject of a number of bills filed in the U.S. Congress in 1996, and is anticipated to be at issue in the Congress in 1997. This chapter summarizes the restructuring activities of those other industries and jurisdictions, and summarizes of some of the key lessons learned in those efforts.

Chapter X: Benefits of Competition: Competition is expected to bring three primary benefits to the electric industry: lower prices, customer choice, and innovation. These benefits are achieved partially through productive efficiency, (brought about by lower resource and production costs), and the introduction of new and improved supply-side technologies. The benefits of competition are also achieved through allocative efficiency (brought about by the use of appropriate customer choice and pricing signals), and by the introduction of new and improved demand-side technologies. The dynamic efficiencies generated from the appropriate trade-off of long-term capital costs and recurring operating expenses are a third source of benefits in a competitive environment. A number of studies of the effects of competition have been presented to the Commission in the course of Project No. 15000. In the chapter, Commission Staff briefly review these studies, finding each insufficient in its characterization of the effects of competition.

Chapter XI: Providing System Benefits in a Restructured Industry. System and social benefits are benefits that the current electric system provides to customers. Such benefits could become stranded (i.e., no longer or under provided) in a restructured industry. Chapter XI identifies the categories of system and social benefits and discusses the potential reasons why system and social benefits may not be adequately provided in a restructured industry. Mechanisms for providing system benefits in a competitive market are discussed, with emphasis on available market mechanisms. Each category of system and social benefit is reviewed to help determine whether the benefit is likely to be stranded in a competitive market. Appropriate mechanisms for providing each system and social benefit in a competitive market are also discussed.

Chapter XII: Managing Regulation in the Transition To Competition. This chapter discusses the interim period between today's electric market and the arrival of a fully competitive market. When contemplating regulatory needs during a transition period, it is necessary to prepare for a number of market outcomes. Maintaining safe and reliable electric service is the preeminent concern in a transition to competition. Several of the most critical transition issues involve customer protections. The existence and exercise of market power is a key consumer-oriented concern of the transition period. Prior to establishment of a fully competitive market, firms may be able to exploit opportunities for market power, raising costs and restricting choices of utility customers. Merger activity may also create market power opportunities, particularly as electric utilities merge with natural gas suppliers. To further consumer protections, some parties have proposed that the State adopt a "code of conduct" outlining acceptable business practices and requiring companies to provide consumers with certain information. This chapter also focuses on regulatory options, such as the potential for using performance-based regulation in place of cost-of-service regulation for transmission and distribution services and the potential for alternative methods for treating fuel expenses during the transition period.

C. Overview of the Commission's Investigation

Throughout its investigation into Project Nos. 15000, 15001, and 15002, the Commission actively sought input from interested parties representing the diversity of the citizens and businesses of Texas. Many members of the community—electric utilities, cooperatives, municipalities, business and industry groups, citizens and environmental groups, and individual interested citizens—responded by providing illuminating input to the Commission and the Commission Staff. A detailed list of participants in various stages of the Commission's investigation is provided in Appendix 1 of this report.

Interested parties have been involved in every stage of the investigation, including defining the nature and scope of the project. The Commission held a lengthy series of workshops and technical sessions in which interested parties were invited to attend and participate. In anticipation of these sessions, Commission Staff invited parties to respond to—sometimes lengthy—lists of questions on a wide range of topics. Commission Staff incorporated the written responses in the design of the workshops and technical sessions and has incorporated many of the lessons learned from the various parties in Texas into this report.

Table I–1 presents an overview of some of the significant milestones of the investigation into Project Nos. 15000, 15001, and 15002. A few of those highlights are particularly noteworthy:

- *Commission workshops:* The Commissioners hosted a series of eight workshops, ranging in topics from the design of Project No. 15000 to models for investigating potentially stranded investments, to current structure of the electric market in Texas, to issues of concern for customers. Of particular interest was the February 14th and 15th workshop held at the J. J. Pickle Research Center in Austin at which a panel of national experts provided their perspectives to the Commissioners and over 100 participants on restructuring experiences in other countries, industries, and states.
- *Consensus categories for goals and principles:* The Commission Staff assembled utility and nonutility participants in Project No. 15000 to reach a consensus position on goals and principles. Although they agreed to the

Table I–1: Project Nos. 15000, 15001, and 15002 Milestones

Date	Milestone Description
November 6, 1995	Commission establishes Project Nos. 15000, 15001, and 15002
December 1, 1995	Commission Workshop: Scope of Project No. 15000 and Goals of Restructuring
December 20, 1995	Commission approves Staff Proposal for Project Nos. 15000, 15001, and 15002
January 17, 1996	Commission Workshop: Stranded Investment Report—Lost Revenues
January 30, 1996	Commission Workshop: Stranded Investment Report—ECOM
February 14-15, 1996	Commission Workshop: Restructuring Activities in Other Industries, States, and Countries
February 26, 1996	Staff releases Draft ECOM Order (Project No. 15001)
March 1, 1996	Staff releases Draft Data Request (Project No. 15002)
March 4, 1996	Technical Session: Draft ECOM Order
March 11, 1996	Technical Session: Draft Data Request
April 1, 1996	Commission Workshop: Market Structure I—Generation
April 10, 1996	Commission approves Data Request
April 24, 1996	Commission issues ECOM Order and accompanying Staff paper
April 30, 1996	Commission Workshop: Market Structure II—Customer Choice
May 28, 1996	Commission Workshop: System Benefits
June 3, 1996	Parties file responses to Data Request
June 11, 1996	Commission Workshop: Regulatory Restructuring
June 24, 1996	Parties file responses to ECOM Order
September 10, 1996	Parties file legislative recommendations
October 29, 1996	Staff drafts of Scope of Competition and Stranded Investment reports circulated to interested parties
November 8, 1996	Technical Session: Comments of interested parties on Staff drafts of Scope of Competition and the Stranded Investment reports
December 12, 1996	Commission approval of Volumes II and III

categories of principles to be used, differing parties defined the individual goals differently. The Commission Staff worked with the party position statements and the positions taken by others to reach a statement on goals and principles for the investigation of electric industry restructuring. These goals and principles are reviewed in Chapter VII of this report. The full text of the Staff report was filed in Project No. 15000.

- *Data request:* On April 10, 1996, the Commission approved a data request designed by the Commission Staff to collect data from all the relevant utilities and non-utilities in the State.[4] The data request was

[4]Project No. 15002, Scope of Competition Report Concerning the Electric Industry in Texas, *Staff Data Request* (April 10, 1996).

submitted to every investor-owned utility, river authority, cooperatively owned utility, and municipally owned utility in the State and to all the non-utility generators, power marketers, and exempt wholesale generators that Staff was able to identify. Responses to the data request comprise the most comprehensive data set available to evaluate the scope of competition in Texas. A complete list of respondents to the data request is included in Appendix I.

- *ECOM order:* On April 24, 1996, the Commission issued an order requiring investor-owned utilities, river authorities, and generating cooperatives and requesting municipally owned utilities to estimate the amount of their potentially strandable generation (i.e., Excess Costs Over Market or "ECOM") assets using a copyrighted financial model designed by Commission Staff.[5] The responses to the ECOM Order are a key component of the Commission's companion report on potentially strandable investments in Texas.
- *Public review and comment on draft reports:* On October 29, 1996, the Staff released to the public drafts of the two legislative reports for review and comment by interested parties and the general public. The Staff held a Technical Session on November 8, 1996, at which interested parties and members of the public were given the opportunity to provide Staff with comments on the draft reports. All comments filed with the Commission and presented at the Technical Session were reviewed by the Staff, and the final reports reflect many of the comments received from interested parties and the public.

[5]Project No. 15001, Stranded Cost Report, *Estimation of ECOM for Generating Utilities in Texas, Order Initiating Investigation* (April 24, 1996).

II. TRADITIONAL UTILITY REGULATION IN TEXAS AND CHANGES SETTING THE STAGE FOR COMPETITION

Competition in the electric utility industry in Texas has arrived. At present, that competition is quite limited in scope and available only to a select set of customers, but the conditions creating pressure for expanded competition may be irreversible. Over the last decade, a combination of changes in legislative and regulatory requirements and improvements in generating technologies have unleashed these potentially competitive forces. The critical issues now are: what should the competitive market look like? and how will the transition to competition be managed? If the market is left to itself to define the nature and terms of competition, residential and small commercial customers may find themselves missing the benefits of competition—or even paying more for their electricity than they pay in the current regulated market.

This chapter of the Scope of Competition report discusses the historical context of regulation of the electric industry and the changes that are unleashing the forces of competition. Section A of this chapter briefly explains the traditional economic basis for public utility regulation. Section B discusses the traditional regulatory structure in Texas and important legislative and regulatory changes at the State and federal level. Section C discusses some of the inefficiencies of the traditional regulatory approach. Section D describes recent changes in generation technologies that have altered the costs of building new resources.

A. HISTORICAL ECONOMIC CONTEXT FOR UTILITY REGULATION

Public utilities have long held an uncommon position in society, located at the crossroads of business and government. Services that provide transportation, clean water and wastewater treatment, heating and cooling, and communications are essential to everyday life. In their infancies, private companies provided most of these essential services. But over time, as the services became ever more fundamental to daily life and as state and local governments across the country recognized that many such services tended toward monopoly provision, economic regulation was introduced to ensure fair and efficient production. In time, economic and regulatory changes introduced competitive forces into some industries, allowing governments to step away from intensive economic regulation.

The electric utility industry remains at the crossroads. In the past, economic regulation of electric utilities was considered a necessary response to the economic underpinnings of electricity provision. The electric market has long been considered a classic "natural monopoly," in which a single firm is the most efficient form of providing service; however, the potential for monopoly power abuses necessitates rate regulation. Today, the existence of natural monopolies in some segments of the electric market is being challenged. Many participants believe that all roads lead in a competitive direction.

1. Natural Monopoly Defined

In its simplest definition, a natural monopoly exists when the costs of producing some good are lower for a single firm than for any other number of firms.[1] More technically, a natural monopoly is characterized by economies of scale and economies of scope.

- *Economies of scale:* An economy of scale exists when it is less expensive for a larger firm to manufacture a product than several smaller firms.[2]
- *Economies of scope:* An economy of scope exists when it is less expensive for one firm to produce two or more different, but related goods, than for multiple firms to produce those goods.[3]

In a sense, a monopoly arises "naturally" because of the costs of supplying a product to the marketplace; if it is cheapest for one firm to satisfy market demand for a good (or combination of goods), a monopoly can result. The economies of scale and scope that

[1] For a more thorough discussion of the characteristics of natural monopoly, see Train, Kenneth E., *Optimal Regulation: The Economic Theory of Natural Monopoly*, Cambridge, MA: The MIT Press (1991); Kahn, Alfred E., *The Economics of Regulation: Principles and Institutions*, Revised edition, Volume II Institutional Issues, Cambridge, MA: The MIT Press (1988); or Berg, Sanford V. and John Tschirhart, *Natural Monopoly Regulation: Principles and Practice*, Cambridge: Cambridge University Press (1988).

[2] In other words, the average production cost of manufacturing a good is declining as the quantity produced increases. Expanding production lowers the average unit cost of all goods produced. Thus, one large firm can produce the good at a lower average cost than two or more smaller firms.

[3] Economies of scale and scope can be summarized in terms of "subadditivity of production costs." Train, *Id.* at 11 defines costs as demonstrating subadditivity if "at a given level of one or more outputs . . . the cost of producing these outputs is lower with one firm than with more than one firm, regardless of how the output might be divided among the multiple firms. . . . the concept of subadditivity incorporates considerations of both scope and scale and identifies whether, given all considerations, one firm is cheapest."

lead to monopoly production will also serve as barriers preventing new firms from establishing themselves as an alternative to the monopoly firm.

Electricity production traditionally has been considered a natural monopoly because of underlying economies of scale and scope:

- *Economies of scale in the electric industry:* Typically, electricity production is considered to require large fixed costs for plant construction.[4] Those costs must be expended before a plant can supply electricity to even one customer. As the plant serves additional customers, the average cost of serving each customer declines. Declining average costs is the essential condition for economies of scale.
- *Economies of scope in the electric industry:* Provision of electricity is often characterized as being composed of distinct elements: fossil fuel extraction; electricity generation; transmission; distribution; and energy services. Economies of scope exist if it is cheaper for one firm to provide combinations of these services than for separate firms to do so. Electric utility companies that *integrate* generation, transmission, distribution, and energy efficiency services capture economies of scope. Such companies are often referred to as "vertically integrated."[5]

Whether market conditions are likely to give rise to a natural monopoly is also dependent on the definition of both the market and the product at issue. In the context of electric power generation in Texas, it is an open question whether the relevant market encompasses the whole state or whether the State contains a set of smaller, regional markets. Certainly, if the State of Texas is the relevant market, it would be more difficult to claim that the entire State is subject to natural monopoly.[6] If generators could compete only regionally or locally (for example, due to transmission

[4] As explained later in this chapter, this notion is being challenged, in part because of new, cheaper technologies for producing electricity.

[5] Restructuring proposals that call for separating vertically integrated companies into distinct operations for generation, transmission, distribution, and other functions (e.g., energy services) challenge the notion of existence of economies of scope.

[6] If power generated at one end of the State can compete for sales at the other end, then Texas should be considered one large market. Two conditions, in particular, may limit electricity generated at one end of the state from competing for sales at the other end. Adequate transmission capacity must be available for long distance competition to occur. In addition, electricity losses increase with the transmission distance, raising the costs of competition over long distances.

limitations), the market would be defined more narrowly, and is more likely to be a monopoly.

Similarly, the existence of a natural monopoly depends upon the specific product at issue. Many participants in the Commission's workshop series have commented that generation services do not satisfy conditions for natural monopoly, while transmission and distribution remain monopoly services. Distinctions have also been drawn between wholesale and retail power.

2. Inefficiencies of Monopolies

As the sole producer in a market, an unregulated monopoly firm pursues its own profitability, but in so doing, creates inefficiencies, leading to higher costs for customers and lower overall wealth and welfare for all market participants. In order to maximize its profits, a monopoly firm will produce a lower quantity of output—and sell that output at a higher unit price—than if its output were produced and priced in a competitive market.[7] By pricing its products above the additional cost of producing an extra unit and producing a lower quantity of output, monopolies lead to two marketplace outcomes:

- *Increased transfer from consumers to producers:* By charging a higher price, consumers end up paying more for less. The difference is the monopoly firm's higher profit.
- *Reduced consumer welfare:* Higher prices (and lower production levels) reduce consumers' overall welfare.

This increased transfer from consumers to producers is why monopolies can sometimes be accused of excessive profitability and price gouging. Reduced consumer welfare is the efficiency loss, representing real wealth sacrificed by society at large. Thus on net, the benefits arising from the transaction between the monopoly firm and its customers are lower than could be realized when setting prices as a competitive firm would do. If

[7] All monopolies face incentives to raise profits by lowering output and raising prices. For a *natural* monopoly firm, characterized by economies of scale and scope, marginal costs are always below average costs over the relevant range of output. By pricing at marginal cost, the firm would make negative profits. To maintain positive profits, a natural monopoly must produce less output at a price higher than its marginal cost.

the firm raised its production and priced its products at the competitive price level, the company's profits would be lower, but the total wealth enjoyed by society would be the greatest possible.

3. Justification for Economic Regulation

The need to oversee natural monopolies has been the traditional justification for regulation of public utilities. The Legislature explicitly acknowledged that monopoly is the basis for utility regulation in the Public Utility Regulatory Act of 1995 (PURA95), stating:

> *The legislature finds that public utilities are by definition monopolies in many of the services they provide and in many of the areas they serve, and that therefore the normal forces of competition that operate to regulate prices in a free enterprise society do not always operate, and that therefore, except as otherwise provided for in this Act, utility rates, operations, and services are regulated by public agencies.*[8]

Regulation of electric rates (and the related issue of the quantity of electricity supplied) is a substitute for a competitive market, which is intended to achieve the market outcomes associated with competition.[9]

Although the aim of utility regulation may be straightforward, the utility regulatory process has developed into a complex, multilayered structure. As will be discussed throughout this report, such detailed regulatory oversight has created economic and financial incentives that affect both utility operations and the consumer purchasing decisions. Much of utility regulation, therefore, is an act of balancing marketplace inefficiencies, like monopolized supply, against the inefficiencies introduced by regulation.

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[8] Tex. Rev. Civ. Stat. Ann. art. 1446c-0 § 2.001(a). (Vernon Pamphlet 1996). Note that the Legislature continued by finding that ". . . the wholesale electric industry . . . is becoming a more competitive industry which does not lend itself to traditional electric utility [regulation] . . .".

[9] Alfred Kahn summarized this point, stating: "The economic purpose of holding price to average total cost, including only a competitive return on investment, is *to produce the competitive level of investment and output.*" *supra* at 106 Vol. II (emphasis added).

The components of utility regulation are not set in stone. In a little more than the past decade, significant changes in federal and State requirements have introduced competitive pressures in electricity markets in Texas and throughout the country. These legislative and regulatory requirements have altered the electricity market and called into question the traditional approach to utility regulation.

B. Summary Of Key Legislation And Regulations

Municipal governments initiated the first steps in utility regulation. Later, the Legislature adopted economic regulation in response to the potential for utility exercise of monopoly power. Over time, the Legislature, in conjunction with new federal laws, expanded the regulatory scope beyond rate regulation. Economic regulation was supplemented by additional requirements, for example, fuel type restrictions and resource planning guidelines, intended to promote other goals. More recently, in the late 1980s and '90s, federal and State legislation helped initiate the renewed focus on competition and the electricity restructuring debate.

When the Public Utility Commission of Texas (the Commission) was created by the Legislature on September 1, 1975 pursuant to the Public Utility Regulatory Act of 1975 (PURA75 or the Act), Texas became the last state in the nation to adopt a comprehensive regulatory system governing its electric and telecommunications utilities.[10] PURA75 became the foundation for establishing a regulatory structure that has governed utility activities and provided guidance to the Commission for the past two decades. This section reviews the significant legislative and regulatory milestones that have shaped the Commission over those two decades, including the most recent regulatory changes in the wholesale electric market.

[10] Nichols, H. Louise, and Randall Hagan Fields, "Rate Base Under PURA: How Firm Is The Foundation?," *Baylor Law Review, Volume 28, Number 4*, Waco, TX: Baylor University School of Law at 861 (Fall, 1976).

1. Utility Regulation Before 1975

Prior to 1975, electric utilities in Texas were subject to varying degrees of rate regulation through local municipal governments.[11] The municipal government provided the utilities with a franchise—a contract between the two parties. The utility agreed to provide its services at reasonable rates to all residents and businesses within the franchise territory; in turn, it received a right to conduct business in that territory, using the streets and public ways in providing service.[12]

As demand for electricity in Texas continued to grow, utilities wanted a franchise that extended for many years to provide some surety for their long-term capital commitments to meet capacity needs. However, attempts to delineate the details of a regulatory agreement within the contractual franchise framework proved cumbersome. Consequently, the Texas Legislature expanded the regulatory authority of municipalities to include direct regulation of rates and services. Direct regulation of rates and services allowed the regulatory authority flexibility to address utility issues that were difficult to address with only a franchise agreement. The statutory grant was quite simple—utility rates were to be fair, just, and reasonable, and services were to be adequate and efficient.[13]

2. Events Leading to the Establishment of the Texas Commission in 1975

The municipal system worked reasonably well as long as electricity was cheap or declining in price, as it was from the 1920s until the early 1970s.[14] The Texas economy

[11] Information on utility regulation prior to 1975 may be found in Webb, Robert A., "The 1975 Texas Public Utility Regulatory Act: Revolution or Reaffirmation?" *Houston Law Review* Vol. 13(1) (October 1975). Gee, Robert W., and Kentton C. Grant, "Regulation in the Lone Star State," *Reinventing Electric Utility Regulation*, Vienna, VA: Public Utilities Reports, Inc. at 273 (August 1995) provides a readable history of Texas electric utility regulation.

[12] For a detailed discussion of the statutory background of municipal franchises, see Newcomb, Marshall, "Some Aspects of Regulation of Public Utilities Operating in the State of Texas," *Baylor Law Review, Volume 5, Number 4,* Waco, TX: Baylor University School of Law at 335-339 (Summer, 1953), and Hopper, Jack, "Legislative History of the Texas Public Utility Regulatory Act of 1975," *Baylor Law Review, Volume 28, Number 4,* Waco, TX: Baylor University School of Law at 779 (Fall, 1976).

[13] Newcomb, *supra* at 336, and Hopper, *supra* at 779.

[14] Gee, *supra* at 273.

was flourishing during much of this period, and there was no apparent need for instituting any kind of statewide regulation. However, the fuel crisis of the early 1970s and the recognition of the limitations of municipal regulation, among other factors, brought about changes in regulation.

a) The Recognition of the Limitations of Municipal Regulation

Municipal regulation functioned reasonably well as long as companies confined their operations to a single community. With the development of interconnected systems, serving numerous towns and adjacent rural areas, the inadequacy of local franchise regulation became apparent.[15] The creation of regional utility systems providing service to more than one municipality made it increasingly difficult, if not impossible, for municipal governments to isolate facilities that were solely related to their communities and regulate rates and services accordingly. A municipality could not effectively regulate one part of a massive network of wires and facilities stretching throughout the state.[16]

b) The Fuel Crisis of the Early 1970s

Perhaps the watershed event leading to the recognition of the need for statewide regulation of electric utilities was the huge increase in the price of natural gas in the early 1970s coupled with the energy market uncertainties associated with the 1973 OPEC oil embargo. Texas electric utilities were especially vulnerable to natural gas prices because natural gas was virtually the exclusive fuel for generating capacity at that time. Accordingly, there was widespread recognition of a need to lessen utility dependence on fossil fuels and build capacity using alternatives to natural gas and oil. The resultant construction of nuclear and other capital-intensive baseload facilities contributed to the continuing cost increases and uncertainties in the industry.[17] The uncertainties surrounding natural gas supplies were further exacerbated by the

[15] Deloitte Haskins & Sells, *Public Utilities Manual*, Deloitte Haskins & Sells at 8 (July 1988).

[16] Pleitz, Dan, and Robert Randolph Little, "Municipalities and the Public Utility Regulatory Act," *Baylor Law Review, Volume 28, Number 4*, Waco, TX: Baylor University School of Law at 977-978 (Fall, 1976).

[17] Federal Energy Regulatory Commission (FERC) Final Order No. 888 at 11-12, (April 24, 1996).

curtailments and shortages of natural gas supplies that occurred in the Texas intrastate gas market as early as 1971, and on a national basis, in the record-cold winters in 1976 and 1977.[18]

c) The 64th Legislature

The recognition of the limitations of municipal regulation and the utility cost increases and uncertainties associated with the fuel crisis revealed a regulatory scheme that was not well suited to resolving conflict or addressing statewide energy issues.[19] In addition, utility companies increased their rates more frequently between 1967 and 1973, and consumers were becoming more concerned with the higher costs of utility service.[20] Several regulatory reform bills were drafted during the 63rd Legislature, but they never made it out of committee. However, this new surge of interest in utility regulation set the stage for the 64th Legislature to establish a statewide regulatory commission to oversee a comprehensive utility regulatory system in Texas.[21]

As a result of the 64th Texas Legislative session, on September 1, 1975, the Commission, pursuant to PURA75, assumed jurisdiction over the rates and services of investor-owned electric and telecommunications utilities in Texas. The introductory language of PURA75 recognized the need for the regulation of natural monopolies and the consequent role of the Commission to serve as a surrogate for competition.[22] The declared purpose of PURA75 was as follows:

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[18] Philley, Steven M., Supplemental Direct Testimony at 22, PUC Docket No. 15195, "Petition of Texas Utilities Electric Company, Inc., To Reconcile Its Fuel Costs and Fuel Cost Revenues, And For An Accounting Order Under P. U. C. SUBST. R. 23.23(b)(2)(B)(v)."

[19] Gee, *supra* at 273.

[20] Hopper, *supra* at 780. Mr. Hopper's article is a very good source for those interested in following the chronological process of hearings and investigative reports that led the 64th Legislature to enact PURA75 and the formation of the Texas Public Utility Commission.

[21] Adams, Don, "Utility Regulation: A Public Demand," *Baylor Law Review, Volume 28, Number 4*, Waco, TX: Baylor University School of Law at 774 (Fall, 1976).

[22] Tex. Rev. Civ. Stat. Ann. art. 1446c, § 2, (Supp.1975). (PURA75). "The legislature finds that public utilities are by definition monopolies in the areas they serve; that therefore the normal forces of competition which operate to regulate prices in a free enterprise society do not operate; and that therefore utility rates, operations and services are regulated by public agencies, with the objective that such regulation shall operate as a substitute for such competition."

> *To establish a comprehensive regulatory system which is adequate to the task of regulating public utilities as defined by this Act, to assure rates, operations, and services which are just and reasonable to the consumers and to the utilities.*[23]

3. Electric Industry Regulation in Texas following PURA75

The statutory framework adopted in PURA75 incorporated the regulatory concepts that had developed during the years of municipal regulation. The Legislature also adopted the traditional rate-making principles employed by a number of other state commissions and the Federal Energy Regulatory Commission (originally the Federal Power Commission). In large part, that statutory framework remains in place today. Some of the key components of the Commission's oversight of electric utilities have included the issuance of certificates of public convenience and necessity (CCNs) for both service territories and facilities, cost-of-service (COS) ratemaking, fuel diversification requirements, fuel cost recovery and review, prudence reviews, and antitrust concerns.

a) The Distinction between State and Federal Regulatory Jurisdiction

The electric industry is subject to economic regulation by both the Federal government and by the States. The Federal government regulates interstate wholesale electric service, and the states regulate retail service. The Federal Power Act authorizes the Federal Energy Regulatory Commission (FERC) to regulate "the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce . . ."[24]

The enactment of PURA75 authorized the Commission to regulate retail service and intrastate wholesale service. In Texas, a significant part of the State is not directly interconnected with electrical facilities in other states.[25] Therefore, wholesale electric

[23] PURA75 § 2.

[24] 16 U.S.C. §824(a) (1985).

[25] These portions of the State are connected to the Southwest Power Pool through two high voltage transmission lines (see the discussion in Chapter V).

service in Texas' *intra*state network (known as "ERCOT") is subject to State regulation under PURA rather than federal regulation (although multi-jurisdictional utilities with affiliates operating both within and outside ERCOT may be regulated by the FERC). That the Texas intrastate transmission system is outside the regulatory purview of the federal authorities is unique among the continental states and has allowed Texas to establish rules governing competitive transmission in advance of related federal rules.[26]

b) Certificates of Public Convenience and Necessity

CCNs are special permits, issued by the Commission, that authorize utilities to engage in business, construct facilities, or perform other services that the Commission determines to be necessary and in the public interest. Utilities were first required to hold CCNs for their retail utility service under the provisions of PURA75.[27] The Commission also granted certificates for the construction of electric utility generating plants and transmission lines. Generating plants existing or planned when PURA75 was enacted were "grandfathered" under Section 53 of the Act, i.e., issued CCNs without the scrutiny required for a new plant.[28]

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[26] In comments on the draft report, Texas Utilities Electric Company notes that "Houston Lighting & Power Company . . . and TU Electric began operating in *interstate* commerce by virtue of the North and East HVDC interconnections . . . Although TU Electric and HL&P were excluded from plenary FERC jurisdiction by virtue of Section 201(b)(2) of the Federal Power Act ("FPA"), they nonetheless are subject to the FERC's authority to order interconnections and transmission service under Sections 210, 211 and 212 of the FPA. Moreover, to the extent any other ERCOT utilities own and operate electric power transmission facilities that are used for the sale of electric power at wholesale, they fall within the FERC's definition of "transmitting utilities" under FPA . . ." *Comments of Texas Utilities Electric Company Concerning Second Staff Draft Report to the 75th Legislature: The Scope of Competition in the Electric Industry in Texas and an Investigation into Electric Industry Restructuring*, Project No. 15002 at 8 (November 8, 1996).

[27] Webb, *supra* at 35.

[28] The Commission's Examiner's Report and Order in Docket No. 44, "Application of Bluebonnet Electric Coop., Inc., et al, Concerning The Counties of Bee, Calhoun, Dewitt, Goliad, Gonzales, Jackson, Karnes, Matagorda, Refugio, Victoria, Wharton and Wilson," dated May 26, 1977, identifies all generating plants that were issued CCNs under Section 53 of the Act. Generating units receiving CCNs subsequent to the Order in Docket No. 44 are as follows: (Docket No. 6526) - TU Electric - Morgan Creek Units 1-6 and Permian Basin Units 1-5 -natural gas. (Docket No. 6992) - TNP - TNP One, Units 1 and 2 - lignite. (Docket No. 10883) - Brazos Electric - R.W. Miller Units 4 and 5 - natural gas. (Docket No. 11000) - HL&P - San Jacinto Steam Electric Station Units 1 and 2 - natural gas. CSW noted in its comments on the draft document that the list of grandfathered plants should also include WTU's and CPL's Oklaunion plant and SWEPCO's Dolet Hills plant. *Central and South West Corporation's Comments*, Project No. 15002 at 7 (November 8, 1996).

The Commission's certification authority as outlined in PURA75, and which remains much the same today, includes the following:

- A utility receiving a certificate from the Commission shall serve every retail consumer within its certified area and shall render continuous and adequate service within the area or areas.[29]
- The granting of a certificate from the Commission does not guarantee the recipient of the certificate exclusive service or property rights in and to the area certificated.
- To issue certificates, the Commission must find that it is necessary for the service, accommodation, convenience, or safety of the public.
- The Commission may grant CCNs on a nondiscriminatory basis after considering the following:
  1. the adequacy of existing service;
  2. the need for additional service;
  3. the effect of the granting of a certificate on the recipient of the certificate and on any public utility of the same kind already serving the proximate area; and
  4. such factors as community values, recreational and park areas, historical and aesthetic values, environmental integrity, and the probable improvement of service or lowering of cost to consumers in such areas resulting from the granting of such certificate.
- All public utilities must obtain a certificate from the Commission for the purpose of rendering service.[30]

PURA75 recognized the monopoly characteristics of electricity supply in its oversight of the certification process. In providing for a rational distribution of services within defined geographic areas, the certification authority under PURA75 also served to prevent the indiscriminate expansion of facilities that had occurred prior to the enactment of the statute.[31] A unique aspect of the Commission's certification history is the reality of existing retail competition that has occurred in the State and remains in

[29] The obligation to serve customers in the utility's service territory does not extend to *wholesale* customers, unless agreed upon in a contract between the utility and the wholesale customer.

[30] PURA75, §§ 50(1), 54(b), 54(c), 58(a), (Supp.1975) and P.U.C. SUBST. R. 23.31(g).

[31] Toben, Bradley J., "Certificates of Convenience and Necessity Under the Texas Public Utility Regulatory Act," *Baylor Law Review, Volume 28, Number 4,* Waco, TX: Baylor University School of Law at 1116 (Fall, 1976).

place today. In an article on the history of public utility regulation in Texas, Commissioner Robert Gee noted,

> *Due in part to urban growth and the lack of formal service boundaries, many utilities claimed to serve the same geographic areas, and many were in fact doing so. Although the utilities and the PUC were able to resolve some of the boundary disputes, roughly twenty percent of the State was left dually certified, and in some areas as many as three different utilities were certified for purposes of providing retail electrical service. As a consequence, retail competition has been in existence for many years in certain geographic areas.*[32]

c) Cost-of-Service Ratemaking

Although regulatory commissions have many powers and duties, perhaps the principal reason for their existence is the regulation of rates. The basic principles of rate regulation rest on concepts of fairness and equity, and avoidance of unreasonable discrimination. The utility is entitled to make a reasonable return on its investment, but is not entitled to charge rates that are unfair to its customers. The Commission determines utility rates through rate case proceedings.

Rate cases have been the most visible of all Commission oversight activities.[33] The most widely used basis for setting public utility rates, the cost of service method, was the Commission's primary regulatory tool supplied in PURA75.[34] This method equates a utility's "revenue requirement" or "cost of service" with the total of operating expenses, depreciation, taxes, interest on customer deposits, and a return on the utility's investment in rate base (facilities and other assets used in supplying utility service). Once the company's revenue requirement is determined, all of the costs that make up the revenue requirement are assigned or "allocated" to different customer classes based on principles of cost causation. Following the cost allocation process is design of rates that will recover the costs which have been allocated to each customer

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[32] Gee, *supra* at 274.

[33] PURA75 § 37 vests the Commission with its ratemaking authority and states that it ". . . is empowered to fix and regulate rates of public utilities, including rules and regulations for determining the classification of customers and services and for determining the applicability of rates."

[34] *Id.* at 12.

class. Once approved, the company's rates are filed with the Commission in the form of tariffs, or rate schedules, which list the price per unit of electricity that the utility will charge each different customer class.

For a generating utility, the cost allocation process consists of three steps: *functionalization*, *classification*, and *allocation* among customer classes. In the functionalization process, costs are separated into the different functions of utility operations. Typical functions included are production or purchases of power, transmission, distribution, customer service and facilities, and administrative and general activities. The second step, classification, involves taking the functionalized costs and separating them into categories that represent components of utility service being provided. The three principal cost classifications are *demand* (which varies with kilowatt (kW) demand imposed by the customers), *energy* (which varies by kilowatt-hour (kWh) produced), and *customer costs* (which vary primarily by the number of customers served). In the final stage of the process of cost allocation, the functionalized and classified costs are allocated among the customer classes. Distinctions between customer classes are based on the nature of the service provided and on customer load characteristics. The three principal classes of customers are *residential*, *commercial*, and *industrial*.[35]

Following the completion of cost allocation, the rate design process begins. In rate design, the billing determinants (numbers of customers, kWh sales, and, for some customer classes, kW demand) are used with the chosen rate structure to calculate rates that will produce the revenue requirement for each customer class. The rate structures are chosen based on a variety of considerations, such as historical precedent, policy considerations, marginal cost information, customer load patterns, and desired price signals. After final approval, the utility files rates with the Commission in the form of tariffs, or rate schedules, which list the price per unit of electricity that the utility will charge each customer class. A typical customer pays a fixed monthly charge

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[35] See The National Association of Regulatory Utility Commissioners, *Electric Utility Cost Allocation Manual*, Washington, DC at 12-23 (January 1992).

(often called the "customer charge" or "facilities charge") for the service connection, metering, billing, and customer service expenses. Utilities collect the fixed charge even if a customer uses no electricity during the month. In addition, the customer pays an energy charge, expressed in cents per kWh, which is multiplied by the amount of electricity the customer consumes. Non-residential customers may also be assessed a charge based on kW demand. The demand charge may vary according to the individual customer's demand. These charges, namely, the fixed monthly charge, the energy charge, and the demand charge are collectively known as base rates.[36]

In implementing its ratemaking authority, the Commission has historically embraced the equity principles, basing its decisions on the utility's adherence to traditional COS methodology. Included in the Commission's mandate from PURA75 and the Commission's Substantive Rules are the following:

- To ensure that every rate is just, reasonable, sufficient, equitable, and consistent in application to each class of consumers and not unreasonably preferential, prejudicial, or discriminatory;
- To fix a utility's overall revenues at a level which will permit it to recover its operating expenses together with a reasonable return on its invested capital;
- To preclude any rate which will yield more than a fair return upon the adjusted value of the invested capital used and useful in rendering service to the public;[37] and
- To set rates based upon a utility's cost of rendering service to the public during a historical test year, adjusted for known and measurable changes.[38]

d) Fuel Diversification

As already noted, natural gas was virtually the exclusive generation fuel used by the electric utilities in Texas in the early 1970s. Accordingly, volatile natural gas prices and market uncertainties resulting from the energy crisis of the 1970s influenced fuel choice decisions beginning in the late '70s. Utilities' fuel choices were also influenced

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[36] The term "base rates" has been commonly used in Texas to refer to those charges which are designed to recover the non-fuel costs of the utility.

[37] PURA75 §§ 38, 39, 40, and (Supp. 1975).

[38] P.U.C. SUBST. R. 23.21(b).

by the 1978 Power Plant and Industrial Fuel Use Act (FUA).[39] As the Commission reviewed utility filings for rate changes and other requests, it evaluated the utilities' fuel choices for generating plants.

The FUA, which was predicated on the perception of diminishing natural gas supplies and national reliance on foreign energy services, prohibited new construction of base-load generating plants powered by natural gas.[40] Consequently, Texas utilities built coal, lignite, and nuclear power plants and entered into long-term fuel supply contracts with suppliers and transporters to assure the delivery of these fuels.

The historic fuel diversification activities of the State's utilities are especially significant today. The coal, lignite, and most notably, the nuclear power plants built in response to the FUA and other factors are now included in the respective utilities' rate bases. These plants are the largest sources of potentially strandable investment in Texas.

e) Fuel Cost Recovery and Review

Utility fuel costs are substantial, comprising anywhere from 30 to 50 percent of a utility's total operating and maintenance expenses.[41] Both PURA and the Commission's Substantive Rules have recognized the magnitude of utility fuel costs and have established mechanisms for fuel cost review and recovery.

From 1976 to 1983, fuel costs were recovered through an automatic fuel adjustment clause (FAC). Under the FAC mechanism, estimated fuel costs were billed to customers in one month and adjusted for actual fuel costs in a subsequent month. The FAC mechanism for fuel cost recovery was prohibited as a result of amendments to

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[39] The desire to lesson U.S. dependence on foreign energy sources prompted a rash of legislation culminating in the National Energy Act of 1978. The Act was made up of five major laws: the National Energy Conservation Policy Act, the Public Utility Regulatory Policies Act, the Energy Tax Act, the Natural Gas Policy Act, and the Power Plant and Industrial Fuel Use Act. The National Energy Act set three goals: reduce petroleum imports; reduce natural gas use; and increase use of abundant domestic coal to replace petroleum and natural gas.

[40] Charles River Associates, Inc., Energy Ventures Analysis, Inc., and Jensen Associates, Inc., *Natural Gas For Electric Generation: The Challenge of Gas and Electric Industry Coordination*, Electric Power Research Institute, Palo Alto, CA at 1-2 (September, 1992).

[41] The discussion on fuel cost recovery and review is derived from the Commission's Substantive Rules 23.23(b)(2) and 23.23(b)(3) and all subsections therein, and from a review of parties' comments received in conjunction with a Commission workshop addressing alternative ratemaking treatments for fuel cost recovery under Project No. 15485 (July 19, 1996).

PURA75 made by the Legislature in 1983 and implemented by the Commission's Substantive Rules in 1984.[42] The FAC prohibition meant that a utility was no longer able automatically to pass its fuel expenses through to the customer, and its fuel charges could only be increased after notice and hearing. The procedure established in 1984 for fuel cost recovery and review was a fixed fuel factor and a fuel reconciliation review of the reasonableness of the fuel expenses recovered through the fuel factor.

A utility's fixed fuel factor is determined by dividing its projected net fuel expenses for a one year period by the corresponding projected sales for the period in which the fuel factor is expected to be in effect. In evaluating the proposed fuel factor for a utility, the Commission determines if the utility's projected fuel expenses and electricity sales are "reasonable estimates."

In a fuel reconciliation proceeding, the Commission determines whether the utility's fuel expenses recovered through the fixed fuel factor during the reconciliation period were reasonable and necessary to provide reliable electric service. Those fuel expenses that are determined by the Commission to be unreasonable or unnecessary are disallowed and reimbursed to the ratepayers in the form of a fuel refund. An evaluation of alternative ratemaking methods for fuel cost treatment was initiated by the Commission in Project No. 15485, and a discussion of alternative fuel cost recovery mechanisms will be presented later in this report.

f) Prudence Reviews

By 1975, construction had begun on several nuclear generating units in Texas, and several more were in the planning stage.[43] Although the growing Texas economy needed the additional generating capacity, increased federal safety measures and double-digit inflation contributed to substantial cost overruns at most nuclear projects then under construction. Construction at most nuclear sites continued because the sunk

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[42] In comments on the draft report, City Public Service of San Antonio notes that "some [municipally owned utilities] still use AFACs in billings to electric customers." *Comments of City Public Service of San Antonio on the Scope of Competition Report*, Project No. 15002 at 3 (November 7, 1996).

[43] The nuclear generating units either already under construction or planned included the South Texas Project Units 1 and 2, River Bend Unit 1, Comanche Peak Units 1 and 2, and Palo Verde Units 1, 2, and 3.

costs for many projects were large, and nuclear power was still viewed as a potential hedge against the uncertainty of fuel volatility.[44] The utilities filed rate cases with the Commission to recover investment in nuclear facilities. The Commission was faced with the task of evaluating the prudence of the associated costs. The evaluation process was costly and litigious, and the arguments were as diverse as the interests of the various parties. In the end, the Commission attempted to balance all of the competing interests, adopting rate orders based on the merits of each case.[45] The Commission approved \$32.8 billion in utility nuclear investments as prudent and recoverable, disallowing a total of \$3.6 billion for Texas' investments in four nuclear plants.

g) Antitrust Concerns

Commission authority and history has been limited with respect to its antitrust oversight. Prior to the introduction of competition in the Texas electric industry, the integrated nature of the industry and the existence of service territories minimized mergers and antitrust concerns. Under PURA, however, the Commission is authorized to make a public interest finding regarding sales, transfers and mergers involving regulated utilities, but the statute is clear that it is not authorized to disallow the transaction completely. It is only able to disallow the "effect of such transactions if it will unreasonably affect rates or service."[46] By limiting the Commission's power to affect a sale of property or merger by a utility, PURA leaves the door open for federal preemption of the Commission's antitrust authority. In the only merger cases the Commission has considered, decision-making authority concerning mergers and

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[44] FERC, *supra*, at 11 and Gee, *supra* at 275.

[45] As discussed in the prudence review portion of the Examiner's Report in PUC Docket No. 9300, "Application of Texas Utilities Electric Company For Authority To Change Rates," at 8 - 9, the Hearings Examiner states: "Although PURA does not expressly state a prudent investment standard, traditional ratemaking principles embodied in the statute nevertheless require the Commission to exclude imprudent expenditures from invested capital. (PURA §§ 2, 38, 39, and 41) To carry out this statutory responsibility, the Commission has consistently adopted the following standard of prudence: The exercise of that judgment and the choosing of one of that select range of options which a reasonable utility manager would exercise or choose in the same or similar circumstances given the information or alternatives available at the point in time such judgment is exercised or option is chosen."

[46] PURA75, § 63.

antitrust issues rested with the Department of Justice and federal regulatory authorities, with the ultimate enforcement authority over these laws remaining with the courts.[47]

C. Federal and State Legislative and Regulatory Innovations

Although the general rules and processes of electric utility regulation were widely accepted across the State and the country, new innovations in national energy policy in the late 1970s introduced the first significant changes in the regulatory structure, and later the electric market. Throughout the 1980s and 1990s, additional legislative and regulatory innovations set the stage for the emerging competitive market.

1. Federal Legislative Initiatives

The initial change in the regulation of electric utilities was introduced in the Public Utility Regulatory Policies Act (PURPA) of 1978.[48] More than a decade later, the Congress adopted the Energy Policy Act (EPAct) of 1992.[49] Together these laws changed the rules under which utilities traditionally operated and introduced new classes of competitors to challenge the established utilities.

a) The 1978 Public Utility Regulatory Policies Act

PURPA was passed as a part of the National Energy Act in 1978 in response to the unstable energy climate of the late 1970s. PURPA was intended to promote energy conservation and efficient resource use. However with respect to competition, the most relevant aspect of PURPA is that it created a new class of non-utility generators,

[47] The Commission has ruled on the merger of Gulf States Utilities with Entergy in Docket No. 11292 and issued an interim order on the merger request of El Paso Electric Company in Docket 12701 prior to the request being withdrawn. A proceeding for the proposed merger of Southwestern Public Service Company and Public Service Company of Colorado, Docket No. 14980, is currently pending before the Commission. An interesting look at PURA75 and perspectives on the Commission's antitrust implications is found in Patillo, III., R.D. Spike, and Randall Hagan Fields, "Antitrust and PURA: Look Before You Leap," *Baylor Law Review, Volume 28, Number 4*, Waco, TX: Baylor University School of Law (Fall, 1976). The authors discuss the states' preemption by federal and judicial authority of the doctrines of "primary jurisdiction" and *Parker v. Brown*, and the antitrust liability that states might have in attempting to address antitrust concerns.

[48] Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended in various sections of 16 U.S.C).

[49] Energy Policy Act of 1992, 42 U.S.C.A. §§ 6349, 6350, 8262g, 13369, 13474 (West Supp. 1996).

known as qualifying facilities (QFs), from which utilities are required to buy power.[50] Until the enactment of PURPA, utilities had virtually no competition in the power generation market, and each utility built its own power plant to serve its own territory. PURPA changed the market dramatically.

PURPA requires that utilities buy power from QFs, as long as that power is priced at or below that utility's *avoided cost*. Simply put, the avoided cost is the cost the utility would pay for generating the electricity itself or purchasing it from another source. This purchase requirement created incentives for utilities to lower the costs of their own generating sources and effectively opened the door to a limited amount of competition in generation.

> *The improved economics of small-scale generation units began to undermine the assumption that "bigger is better" and that only vertically-integrated utilities could build new generation facilities. The passage of the Public Utility Regulatory Policies Act of 1978 (PURPA) was the federal legislative response to a changing perception: smaller-scale generation facilities owned and operated by nonutility entities could provide the country with an economical source of new capacity.*[51]

Following its implementation, PURPA had a significant influence on Texas utility regulation. One of the most important aspects of the 1983 amendments to PURA75 was reconciliation with the PURPA requirements that electric utilities in Texas buy power from QFs. The amendments also required the Commission to develop a method for calculating avoided costs and set up procedures for a biennial review of utilities' avoided costs.

b) The 1992 Energy Policy Act

The passage of the 1992 Energy Policy Act (EPAct) introduced competition for electricity at the wholesale level by allowing the FERC to open up the national electricity transmission system to wholesale suppliers. EPAct created a new category

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[50] The Commission's Substantive Rule 23.66(a)(15) defines a qualifying facility as "a co-generation facility or a small power production facility which is a qualifying facility under Subpart B of the FERC's regulations under the PURPA of 1978, §201, with regard to co-generation and small power production."

[51] Costello, Kenneth W. and Douglas N. Jones, "Lessons Learned in State Electric Utility Regulation," *Reinventing Electric Utility Regulation*, Vienna, VA: Public Utilities Reports, Inc. at 71, (August 1995).

of electricity producer, the exempt wholesale generator (EWG),[52] which circumvented the Public Utility Holding Company Act of 1935 (PUHCA)[53] impediments to the development of non-utility electricity generation. The new law allows a non-utility or an unregulated affiliate of a utility to own and operate a power plant without being subject to economic regulation.

In order to create a competitive market, EPAct established open transmission access as well as new EWG competitors. EPAct requires that all interstate transmission utilities allow open-access network services to third parties at reasonable costs on a basis comparable to that utilized by the utility to provide its own services. The change in the transmission laws was significant because of the reluctance of those utilities owning the transmission lines to provide adequate transmission access for those generators not owning lines.

2. Texas Adopts Competitive Innovations: S.B. 373 and PURA 1995

In 1995, the 74th Texas Legislature passed Senate Bill 373 and enacted PURA95 to conform State law with the major components of the federal EPAct.[54] The focus of the legislation and statute was to introduce wholesale competition to the Texas electric power industry, and the major provisions enacted reflect that focus, as does the legislative policy statement which states:

> ***The legislature finds that the wholesale electric industry through federal legislative, judicial, and administrative actions is becoming a more competitive industry which does not lend itself to traditional electric utility regulatory rules, policies, and principles and that, therefore, the public interest requires that new rules, policies, and principles be formulated and***

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[52] The Commission's Substantive Rule 23.19(b)(2) defines exempt wholesale generator as "a person that is engaged directly, or indirectly through one or more affiliates, exclusively in the business of owning, operating, or both owning and operating all or part of one or more facilities for the generation of electric energy and selling electric energy at wholesale in Texas and that does not own facilities for the transmission of electricity, other than essential interconnecting transmission facilities necessary to effect a sale of electric energy at wholesale."

[53] PUHCA gave the Securities and Exchange Commission responsibility for regulating holding companies. PUHCA contained several restrictions, designed to ensure that electric utilities concentrated on serving their customers, e.g., the prohibition of utilities owning other utilities outside their service area or non-utilities from operating power plants. EPAct removed many of these restrictions and allowed utilities to own power plants outside their service territory.

[54] A detailed discussion of S.B. 373 can be found in the September 1996 *Interim Report to the 75th Legislature on the Implementation of S.B. 373*, prepared by the Texas Senate Committee on State Affairs.

> *applied to protect the public interest in a more competitive market place. The development of a competitive wholesale electric market that allows for increased participation by both utilities and certain nonutilities is in the public interest.*[55]

The provisions of S.B. 373 include the following major sections relating to the creation of a wholesale competitive environment:

- Cooperative partial rate deregulation;
- EWGs and power marketers;[56]
- Transmission service; and
- Integrated resource planning (IRP).[57]

a) Cooperative Partial Rate Deregulation

Section 2.2011 of PURA95 allows the members of an electric cooperative to vote to have its rates deregulated; consequently the board of the cooperative may change rates without a Commission review for reasonableness. The provision also protects affected parties by allowing them to request a Commission review of those rates approved by the board of directors of a cooperative. As of November 26, 1996 the Commission issued 47 certificates of deregulation. Of these 47 cooperatives who received certificates of deregulation, 17 have applied to institute rate changes since becoming deregulated, and there have been no petitions of any kind requesting a review of the rates.

b) EWGs and Power Marketers

To conform Texas law with the major components of EPAct that allow for competitive entry and participation in the wholesale power market, Section 2.053 of PURA95

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[55] PURA95 §2.001.

[56] The Commission's Substantive Rule 23.19(b)(1) defines a power marketer as "a person that becomes owner of electric energy in this state for the purpose of buying and selling the electric energy at wholesale; does not own generation, transmission, or distribution facilities in this state; and does not have a certificated service area."

[57] IRP is defined by PURPA as "a planning and selection process for new energy resources that evaluates the full range of alternatives . . . in order to provide adequate and reliable service . . . at the lowest system cost. The process shall take into account necessary features for system operation, such as diversity, reliability, dispatchability, and other factors of risk; shall take into account the ability to verify energy savings achieved through energy conservation and efficiency . . . ; and shall treat demand and supply resources on a consistent and integrated basis."

authorizes EWGs and power marketers operating in Texas to sell electric energy at wholesale, and requires them to register with the Commission. The 74th Legislature recognized and created these new categories of electricity producers and sellers, and removed barriers to entry into the wholesale electric market by developing sections in the statute concerning transmission access and pricing. As of Fall on 1996, at least 50 EWGs and power marketers had registered with the Commission.

c) Transmission Service

Sections 2.056 and 2.057 of PURA95 require utilities to provide comparable transmission service. This requirement is vital to achieving the Legislature's objective of wholesale competition. Utilities own the transmission system, or "grid," which delivers wholesale power, and are competing with EWGs and power marketers in the wholesale market. Effective March 3, 1996, the Commission adopted rules on transmission access and pricing establishing the following:

- Utilities must provide unbundled transmission service.
- Utilities must provide, on an unbundled basis, services that are ancillary to basic transmission service.
- A pricing mechanism for transmission service is established that determines the cost of the service based on a wholesale customer's electrical load and the impact of transmitting power to the customer.
- Utilities must separate personnel engaged in selling power in the wholesale market from personnel operating the transmission system.
- An informal process, using mediation or arbitration, is established to resolve disputes relating to transmission service.
- An information network is created, which will give utilities, qualifying facilities, power marketers, and EWGs access to information concerning the availability of transmission service and availability and the cost of ancillary services on a non-discriminatory basis.
- Utilities in the Electric Reliability Council of Texas (ERCOT), the state's intrastate electrical network, must establish an independent system operator (ISO). The ISO will function as a point of contact for initiating transmission service and making decisions concerning the use of transmission facilities when demand for the use of the facilities is high.

d) Integrated Resource Planning

Section 2.051 of PURA95 requires each utility to develop a plan to provide electricity at the lowest reasonable system cost and requires the Commission to develop an IRP planning process. The Commission's IRP rule became effective on July 29, 1996. The rule requires that generating utilities file IRP plans covering a ten year planning horizon every three years and provides for the following:

- *Planning objective:* Utilities must provide reliable service at the "lowest reasonable system cost," taking into account such elements as customer bills and rates, future fuel cost risks, and appropriateness and reliability of the resource mix.
- *Public participation:* Utilities must query customers on their values and preferences with regard to resource planning issues and options.
- *Competitive bidding:* Utilities must use an all-source resource solicitation process to acquire new resources. An all-source resource solicitation must consider and integrate the effects of supply-side resources (purchases of power and new power plants) and demand-side resources (changes in consumption).[58]

During the transition to a more competitive electric market, the IRP requirements ensure public participation in the planning process and extend competition in resource planning through the all-source solicitation requirements.

D. INEFFICIENCIES OF THE REGULATED ELECTRIC INDUSTRY

As the preceding discussion shows, economic regulation of electric utilities in Texas arose under a complex web of influences. Oversight of monopoly operations is a key element of the resulting regulatory structure. However, regulatory oversight creates its own set of costs and inefficiencies. Economic and financial incentives created by the regulatory system may have substantial impacts on the behavior of firms and customers.

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[58] In adopting IRP rules, the Commission defined demand-side resources broadly to include both electric and non-electric technologies and options. The Commission also considered alternatives to all-source solicitation, including targeted bidding (which will be permitted on a case-by-case basis) and a standard offer approach for demand-side management activities. 21 *Texas Register* at 6780 (July 19, 1996). In their comments on the draft report, particularly related to Chapter VI, Good Company Assiociates, in conjunction with the Texas Propane Gas Association and the National Association of Energy Service Company reiterated their support of the standard offer approach as an alternative to formal competitive bidding. Good Company Associates, *Comments on Docket 15,000 Draft Report*, Project No. 15000 (November 7, 1996).

This section discusses three sets of incentives arising from the regulatory system as currently constituted:

1. *Investment incentives*: utility rate regulation creates financial incentives that influence the type and size of capital investments that utilities make over the long-run.
2. *Operating incentives:* cost-of-service ratemaking allows utilities to pass operating costs through to ratepayers and provides limited incentives for efficient operations.
3. *Customer incentives:* prices influence customers' day-to-day decisions on electricity use and their use patterns; embedded average cost pricing creates pricing signals that motivate inefficient consumption patterns and decisions (relative to marginal cost pricing).

Although the extent to which each of these individual incentives influences behavior of firms and customers is unclear, the likely result is greater production inefficiency and reduced consumer welfare.

1. Investment Incentives under Regulation

Texas state law guarantees a utility "a reasonable opportunity to earn a reasonable return on its invested capital . . .", a fundamental principle of the rate-setting process.[59] This opportunity to collect earnings linked to the amount of invested capital creates an incentive encouraging firms to *overinvest* in capital facilities, leading to excess capacity. In essence, it can be argued that rate regulation rewards utilities for constructing costly plants. Because revenues are related to the utility's amount of capital assets, expanding the asset base will be accompanied by increased revenues.[60] Although the firm is

[59] PURA95 § 2.203.

[60] Economists have branded the tendency of regulated enterprises to invest in capital beyond an efficient level as the "Averch-Johnson effect" or "A-J effect," after the two economists who first articulated the hypothesis. Averch, Harvey and Leland L. Johnson, "Behavior of the Firm under Regulatory Constraint," *American Economic Review* Vol. 52 at 1052 - 69 (December 1962). Although a full discussion of the A-J effect involves a lengthy mathematical proof and the strict result has been substantially revised and updated since it was first described in the early 1960's, the basic hypothesis can be summarized quite simply: because revenue is a function of rate base, revenues will increase with any expansion of the rate base (as long as the utility's allowed rate of return is greater than its cost of capital). The larger the rate base, the larger the profit that can be passed on to shareholders. The A-J model has been tested extensively by economists, with mixed evidence as to its empirical validity. For an excellent summary of the empirical literature on the subject, see Berg, Sanford V. and John Tschirhart, *Natural Monopoly Regulation: Principles and Practice,* Cambridge: Cambridge University Press at 339 (1988). In part, the uncertainty surrounding the A-J model is due to the simplicity of the model in the face of a highly complex regulatory structure and process.

exposed to a variety of other incentives that encourage it to keep down costs, the regulatory opportunity to earn a return on its capital assets may still induce the firm to overinvest in capital (i.e., build more capacity than necessary) and to invest more capital-*intensively* than the firm would otherwise.

In part, the regulatory review processes followed by the Commission in the award of CCNs and in prudence review—to name just two of the Commission's oversight processes—were crafted to serve as checks on excess capital investment. Whether or not such review processes have been entirely successful in curbing overinvestment is a question for debate. However, the underlying incentive is not eliminated by regulatory review, only held in check. As Alfred Kahn said in his seminal work on the economics of regulation:

> *There just is no easy way of eradicating these possible distortions of incentives, within the regulatory context; all the commission can do is to supervise, prod, and subject proposed investments, promotional prices and the like to economic tests.*[61]

At present, the electric generation market in Texas is characterized by excess capacity. According to load forecast data filed with the Commission in 1995, the current reserve margin is about 20 percent.[62] The reserve margin is a utility's capacity need, in excess of expected peak demand, that is required to maintain reliability. Assuming no changes in capacity, the projected reserve margin will remain at or above 15 percent through the year 2000. One factor underlying this excess capacity may be that regulation led utilities to be more capital-intensive than they would have been otherwise.

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[61] Kahn, *supra* at 36. But, as Professor Kahn continues, "[B]y the same token, these dangers can be drastically attenuated or eliminated to the extent that regulated companies can be exposed to the same incentives and pressures as apply *outside* of the regulatory context—the incentives of higher or lower profits depending on individual performance, and the pressures of competition." More recently, Kahn noted a temporary shift in investment incentives: "Because of the disallowances in the '80s, the industry experienced (and is probably still subject today to), in effect, a reverse Averch-Johnson incentive—a fear of expanding rate base and particularly of risky long-lead-time investments . . ." Kahn, Alfred E., "Can Regulation and Competition Coexist? Solutions to the Stranded Cost Problem and Other Conundra," *The Electricity Journal* at 16 (October 1994).

[62] Office of Regulatory Affairs, *1996 Statewide Electrical Energy Plan for Texas* Austin, TX: Public Utility Commission of Texas at Appendix I (June, 1996).

2. Operating Incentives Under Regulation

As a monopoly, an electric utility faces limited incentives to keep operating and maintenance costs as low as firms in competitive markets. Regulatory oversight is intended to create incentives similar to those present in a competitive market. However, the whole of the regulatory cost structure imposes a variety of conflicting incentives.[63]

a) Nonfuel Operations and Maintenance Expenditures

Utilities face conflicting incentives to keep nonfuel operations and maintenance (O&M) costs as low as possible. O&M costs—excluding fuel—are built into each utility's base rates. Because the firm is guaranteed recovery of its O&M costs (e.g., administration and salaries, routine repairs, and advertising and marketing) and is free from low cost competition, there may be little incentive for management to keep costs at a level comparable to a competitive company.

The utility also faces a conflicting incentive to cut costs. Utilities pass nonfuel O&M costs through to ratepayers in their monthly bills. O&M costs are fixed for the period between rate cases. Shareholders retain any cost reductions achieved in the period before the next rate case as increased earnings. In this sense, the base rate acts as an "incentive rate" for the firm to keep costs low between rate cases. Lower O&M costs will not be passed through to ratepayers until the savings can be captured in a subsequent rate case.

b) Fuel Expenses

As noted above, fuel costs are not included in base rates; rather, a fixed fuel factor is recovered from ratepayers, with periodic reconciliation proceedings. The treatment of fuel factors creates a variety of different incentives, including:

1. Bias toward fuel-intensive resources;
2. Bias against fuel-saving maintenance and investment; and

[63] Kahn, *supra*, at 28 notes that utilities also have an incentive to pay excessive prices to unregulated affiliates for fuel and other services as a means of passing additional costs to ratepayers, thereby increasing monopoly profits.

3. Reduced incentive to procure fuel aggressively.

i) Fuel-intensive Resource Selection

Since fuel cost pass-through mechanisms were introduced in the 1970s, allowing a utility to recover all of its fuel costs, utilities have had an incentive to select relatively more fuel-intensive resources. While traditional ratemaking treatments do not guarantee dollar-for-dollar recovery of capital and operating costs, utilities may fully recover fuel costs immediately with little risk through fuel clause recovery mechanisms. Consequently, fuel clause treatment may encourage utilities to select generating resources with large fuel cost components and avoid generating resources with small or no fuel cost components (such as renewable resources).[64]

ii) Maintenance or Investment versus Fuel Expense

Throughout the life of a generating plant, a utility has repeated opportunities to perform maintenance or invest in capital additions that improve the efficiency of the plant and, correspondingly, reduce the amount and the cost of fuel consumed. Traditional cost recovery, with base rates and fuel clauses, permits the fuel savings to pass through to customers, but the additional costs associated with maintenance or capital additions do not flow through to customers until the utility's next general rate case. This cost recovery artifact motivates a regulated utility to avoid or defer performing maintenance.

iii) Effective Fuel Procurement

A common criticism of fuel clauses is that fuel clauses do not reward utilities for aggressively pursuing low-cost fuel supplies. Presumably, the full recovery of costs fails to motivate a utility to secure the lowest cost fuel and energy because the utility can pass fuel costs through to its customers, i.e., the utility does not bear financial responsibility for fuel prices. Also, because fuel costs are passed through to customers, the utility does not benefit from low fuel prices; customers receive the full benefit from an aggressive utility's diligence.

[64] This incentive may partially offset other incentives that utilities experience to over-invest in capital so as to increase shareholder return.

In some jurisdictions, regulators have attempted to provide an incentive for utilities to procure fuel more aggressively, most commonly through a retrospective audit of fuel costs to ensure that all fuel acquisition is efficient, necessary, and reasonable. Such audits may promote better utility diligence at fuel acquisition, but utility shareholders will not benefit from the improvement.

3. Customer Incentives for Consumption

Section B, above, notes that customers pay rates based on the average embedded costs of providing electric service. Under this type of rate design, *consumers are virtually always faced with a pricing signal promoting inefficient consumption*. A utility's costs change season-by-season and hour-by-hour as changes in demand and resource availability lead the utility to change its mix of power purchases and utilization of its generating units. In an efficient market, electricity prices would change with the costs of providing services, giving customers accurate signals that would be incorporated into purchasing decisions. Instead, customers—particularly residential customers—typically see the same average electricity price at all times of day, and in some cases, seasons of the year. Thus, in the aggregate, consumers are likely to pay too much (and consume too little) during off-peak periods, and more significantly, are likely to pay too little (and consume too much) during peak periods.

Average cost pricing also creates distortions across customers within a customer class. Because rates are based on averages, some customers benefit because they are more costly to serve than the average customer, given their locations and particular use patterns. Other customers will pay more than the costs of their own service.

Altogether, such distortions lower consumer welfare and foster inefficient utility investment patterns. Because demand is not directly affected by the costs of electricity generation, customers are not offered an opportunity to control their usage patterns and thereby the costs of their electric service. An alternate rate design that recognizes differences in generation cost would allow customers to alter their usage patterns—

perhaps by running appliances in off-peak hours instead of peak times—and make more informed investments in energy efficiency.

In turn, consumer use patterns influence utility planning and investments. Plants required only for peaking periods may be more expensive to operate given the limited time that the plants are on-line. Because averaged rates make customers indifferent to the pattern of their usage, utilities must provide more on-peak resources. If rates were designed to encourage customers to manage their usage patterns efficiently, the reduction in peak demand would also allow utilities to invest more efficiently, probably resulting in more investment in low cost, off-peak power.

E. CHANGING TECHNOLOGY OF GENERATION

Over the last decade, improvements in electric generation technologies have advanced at a rapid pace. Technological progress is evident to a varying degree in generation technologies of all types, including coal-fired, natural gas-fired, wind, photovoltaic, and fuel cells, among others. Of these generation technologies, the natural gas-fired combined-cycle combustion turbine unit (CCCT) currently sets the standard for new generating units. Several factors have converged to cause the CCCT to dominate the list of recent and planned capacity additions in Texas, namely:

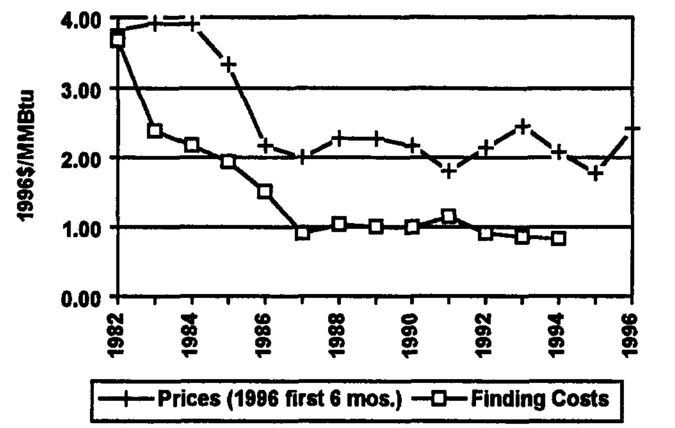
- Availability of abundant natural gas supplies at modest price levels;
- Low capital and operating costs; and
- High thermal efficiencies.[65]

1. Natural Gas Prices

As shown in Figure I-1, subsequent to the deregulation of the natural gas market at the wellhead in the mid-1980s, annual average natural gas prices have settled to lower levels. The decline in natural gas finding/replacement costs in the late 1980s was mirrored by a decline in retail gas prices through 1987, when finding costs stabilized and have remained relatively flat in real terms. Since the mid-1980s, retail natural gas

[65] As noted above, the 1978 PURPA required that utilities buy power from QFs at or below the utilities' avoided cost. The subsequent prevalence of natural gas-fired QFs helped spur research and production of the CCCT.

prices have been subject to seemingly random fluctuation with no discernible positive or negative growth trend.



Source: Natural Gas Week, Degolyer & McNaugton's 20th Century Petroleum Statistics, Arthur Andersens's Oil and Gas Reserve Disclosures.

Figure II-1: Average Natural Gas Finding Costs and Prices of Natural Gas Delivered to Texas Utilities.

Annual natural gas prices as delivered to utilities in Texas averaged $2.11 per MMBtu ($1996) for the years 1986 to 1995. Forecasts of natural gas prices through the year 2010 indicate annual real compounded growth rates between 1 and 5 percent. Most forecasting groups have revised their forecasts downward in recent years to reflect a more moderate growth rate.[66] Even with these recent downward revisions in natural gas price forecasts, the Commission is not aware of any published forecast incorporating a real decline in the long-term price of natural gas.

In developing market price estimates for use in the ECOM Model, the Commission used a baseline natural gas price of $2.11 per MMBtu in 1996 and increased the price in each subsequent year at the rate of inflation, or 0 percent real growth.[67] In light of the numerous positive real growth forecasts, a 0 percent real growth baseline is a conservative estimate. Despite these lower forecasts, the average price of natural gas is expected to remain higher than the average delivered price of coal in future years. The Energy Information Administration (EIA) projects that the price of natural gas

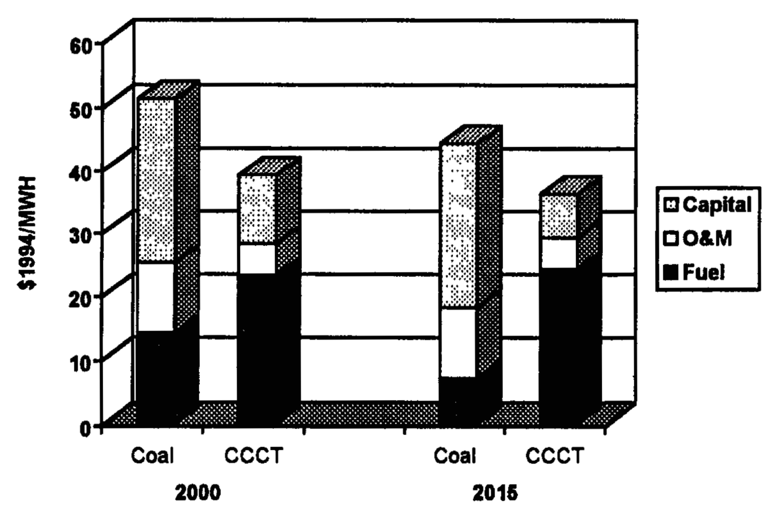
[66] Commission Staff have reviewed forecasts by the Department of Energy/Energy Information Administration, Gas Research Institute, Energy Ventures Analysis, the WEFA Group, DRI/McGraw-Hill, American Gas Association, National Petroleum Council, National Economic Research Associates, and ICF Resources.

[67] See the companion to this volume, the Stranded Investment Report.

delivered to electric generators will average $2.24 per MMBtu in the year 2000 with coal prices averaging $1.29 per MMBtu (both in $1994). By the year 2010, the EIA projects natural gas prices for electric generators to reach an average $2.49 per MMBtu, while delivered coal prices remain flat in real terms at $1.29 per MMBtu.[68]

2. Combined-Cycle Combustion Turbines

The CCCT consists of a natural gas-fired combustion turbine in combination with a steam boiler, referred to as a heat recovery steam generator (HRSG). In combined-cycle operation, natural gas is combusted in the turbine that is connected to a generating unit to produce electricity. Unlike a stand-alone gas turbine in which the exiting hot flue gas is lost to the environment, the CCCT routes the hot flue gas to the HRSG. HRSG uses the turbine exhaust heat to produce steam that drives a steam turbine, which in turn, drives a separate generating unit to produce more electricity.



Source: U. S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 1996*.

Figure II–2: Electricity Generation Costs for Conventional Coal and CCCT Technologies

The ability of the CCCT to take advantage of otherwise unused energy along with advanced turbine design have resulted in large efficiency gains for CCCT units in recent years. The thermal efficiency of a power plant represents the

[68] U. S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 1996*. Coal prices were presented by the EIA in dollars per short ton and have been converted to dollars per MMBtu by assuming an average heat content for coal of 10,000 Btu per pound.

percentage of energy in the fuel being converted to electrical energy. The efficiency of traditional fossil and nuclear generating units are in the range of 30 to 35 percent, while CCCT units are currently available with efficiencies around 50 percent. Continued advances in CCCT design are expected, with typical efficiencies of 60 percent or better by the year 2015.[69]

From a cost standpoint, CCCT units benefit from lower capital, operations, and maintenance costs, while coal units benefit from lower fuel costs. However, as shown in Figure I-2, on a total cost basis, the high efficiency of the CCCT, combined with lower capital and O&M costs, produces an expected electricity cost from a CCCT unit that is less than the cost of traditional coal-fired technology through the year 2015. Additional benefits of the combined-cycle technology include:

- Rapid delivery and construction times;
- Reduced CO_2, NO_X, and SO_2 emissions; and
- The ability to add capacity in small increments.

Reduced delivery and construction time for a combined-cycle plant is a clear advantage over coal or lignite plants. The former may be designed and constructed in less than two years, where the latter can take eight to ten years.[70] Thus CCCTs give the utility greater flexibility in planning and construction of new generation resources.

Combined-cycle generating units reduce CO_2, NO_X, and SO_2 emissions by burning relatively clean natural gas. High operating pressures and temperatures and the use of the combustion exhaust to produce additional steam achieve additional emissions reductions.

The ability to add combined-cycle units in small increments, without a reduction in efficiency, gives these units a further advantage in a competitive generation market. CCCT units can be added in blocks of capacity as small as 50 megawatts. Coal and

[69] *Id.*

[70] *Electric Light and Power,* Power Generation, Delivery and Information Technology at 23 (April 1996).

lignite plants are typically in the 300 to 500 megawatt range due to the economies of scale in expensive capital items such as fuel delivery and handling facilities.

III. EMERGING COMPETITION IN THE CHANGING TEXAS ELECTRIC MARKET

Chapter II introduced the economic basis for cost-of-service regulation, the historic development of the regulatory structure, subsequent legislative and regulatory changes within that structure, and advances in electricity generating technologies. Together, these factors set the stage for the current movement toward greater competition in the electric industry. Although these factors have only recently emerged, examples of increasing competition are already evident.

At the same time that competitive opportunities are being created in Texas, these factors also underlie the potential hazards that face residential and small commercial customers in an *unmanaged* transition to competition. In today's partially regulated market, wholesale customers and large industrial and commercial customers have more opportunities for alternative energy supplies, which—if taken advantage of—would allow these customers to leave the established electric supply system. Captive residential and small commercial customers could face higher rates if they are required to bear costs shifted from large customers who have left the system.

Section A of the chapter discusses the financial incentives for large utility customers to leave their traditional suppliers to get lower electric rates. Section B explains how stranded investments can be created when current utility customers switch their suppliers or receive rate discounts from their existing suppliers. Section C reviews evidence that large utility customers are bypassing their traditional suppliers, and Section D discusses the potential impact of this behavior on the smallest, captive customers.

A. FINANCIAL INCENTIVES FOR BYPASS

As the marketplace changes within the current regulatory framework, large electricity consumers face incentives to engage in "bypass." Bypass occurs when an existing utility customer leaves its traditional utility supplier for an alternative supplier—either another utility or a non-utility—offering lower cost service. A variety of bypass alternatives are available to the largest electric customers in Texas:

- *Wholesale wheeled power:* Wholesale wheeling is the generation and delivery of power to a reseller, perhaps a municipality or co-operative. EPAct and PURA95 created opportunities for a new generation of non-utility wholesale power suppliers capable of circumventing utility power provision. Federal and State open access transmission rules are crucial components of wholesale wheeling.
- *Self-generation:* A company may choose to generate its own power. This option has long been available to the largest manufacturing interests, but with reductions in the cost and minimum-size of generating units, self-generation is becoming a viable option for relatively small power users.
- *Co-generation:* Co-generation is the simultaneous production of electrical energy and steam, or electrical energy and heat, for use in industrial or commercial processes. As discussed above, PURPA required utilities to purchase (at a utility's avoided cost) electricity produced by co-generators. In many cases, manufacturing interests contract with independent companies to construct and operate co-generation units.
- *Fuel conversion:* Energy users may switch from consumption of electricity to consumption of alternative fuels, in particular natural gas. For example, a commercial interest that requires a large amount of heated water may switch from electric to gas-fired heating. Natural gas prices are relatively low, and are expected to remain low for an extended period, making fuel conversion increasingly attractive.
- *End-use substitution and demand side management:* Customers may have opportunities to change end-use products and/or processes in ways that reduce electricity consumption. For example, a customer could switch to gas-fired home appliances in place of electric appliances. Demand side management refers to investments in energy efficiency controls and improvements that allow customers to manage electricity consumption more effectively.

Two conditions are necessary for wholesale customers and retail firms to take advantage of bypass: there must be an opportunity for bypass, and bypass must result in perceived cost savings for the bypassing customer, whether or not such bypass is economically beneficial for society as a whole.[1] Bypass opportunities can be separated into two categories, economic and uneconomic bypass:

- *Economic bypass:* occurs when available choices offer level competitive opportunities between incumbent electricity providers and new market entrants. Economic bypass improves economic efficiency for society as a whole.
- *Uneconomic bypass:* occurs when an entrant succeeds at capturing a customer from an incumbent provider by charging a lower price than the incumbent, even though the entrant is not as efficient as the incumbent supplier. For uneconomic bypass to occur, the incumbent provider must be somehow restricted from lowering its price below the price charged by the less efficient entrant.

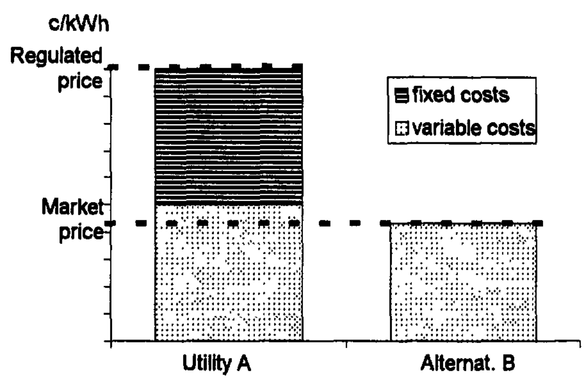


Figure III-1: Simplified Example of Economic Bypass

A simplified example of economic bypass is illustrated in Figure III-1. The height of the first vertical bar in the figure represents the *regulated* price of electricity, in cents per kWh sold by Utility A to a large consumer. That price is composed of fixed costs, the embedded costs of providing utility plant and equipment, and variable costs, operating costs—including fuel—that depend upon the amount of power provided.

Due to the changes in the electricity market, supply is also available from Alternative B—represented by the second bar—perhaps from co-generation or wholesale wheeling.

[1] In addition, incumbent utilities provide a subsidy for bypass. Regulated utilities retain an obligation to serve customers in their service territories. Hence, a bypassing customer is guaranteed the right to return to the utility, which means that the bypassing customer can use the utility as a guaranteed source of backup power at no cost.

Alternative B is able to supply electricity at the market price, which is lower than the regulated price offered by Utility A.[2] The customer will choose to switch to the cheaper source of supply offered by Alternative B. In this case of *economic* bypass, the market price is lower than the utility's variable cost,[3] and society as a whole benefits from the buyer's shift from Utility A to Alternative B (i.e., the switch is efficiency-improving).

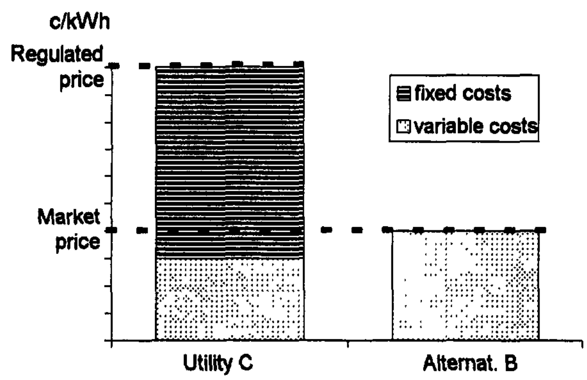


Figure III–2: Simplified Example of Uneconomic Bypass

Figure III–2 depicts a simplified case of uneconomic bypass. In this case, a different large customer faces a choice between the regulated price from Utility C or Alternative B (as before). Because Alternative B costs less than the utility's rate, the customer will switch from Utility C to Alternative B. In this example, however, the market price is greater than Utility C's variable costs. Because Alternative B is more costly than the added costs for Utility C to supply additional power (i.e., its variable, or short-run marginal cost), it is societally inefficient for the customer to switch to Alternative B. Alternative B appears cheaper to the customer only because it

[2] In the figure, Alternative B's costs are depicted as entirely variable costs, which may be an accurate assumption in the short-run. Nevertheless, the implication of the example is unchanged if Alternative B's costs are a mix of variable and fixed costs.

[3] In the short-term, the utility's variable cost equals its marginal cost of providing electricity. Given ongoing conditions of excess capacity in Texas, production decisions made on short-run marginal cost will be economically efficient. In the long-run, marginal cost will include a fixed (capacity) component. Nevertheless, the implication of the example is unchanged if Alternative B's marginal costs are composed of both fixed and variable components (i.e., long-run marginal cost) rather than just a variable cost component (i.e., short-run marginal cost) as depicted in the simplified example.

is able to compete against the historic, embedded cost portion of Utility C's regulated rate.

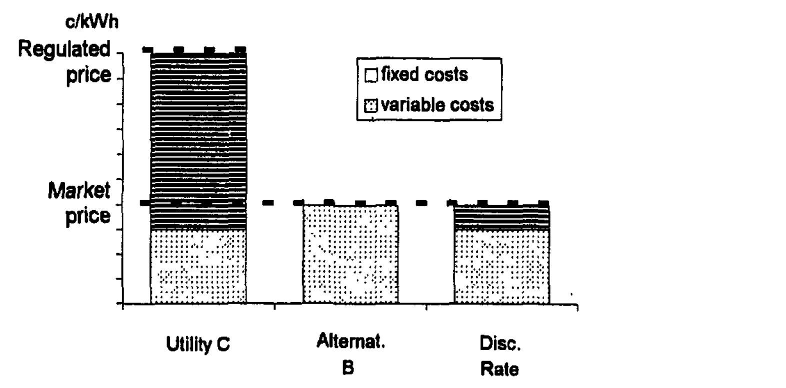


Figure III–3: Offering a Discounted Rate May Prevent Uneconomic Bypass

In response to the threat of bypass, some Texas utilities have begun to offer rate discounts—sometimes referred to as "load retention rates"—designed to retain existing customers rather than lose them to alternative supplies.[4] Figure III–3 illustrates how a load retention rate prevents bypass. In this example, as in Figure III–2 , a customer faces a choice between the regulated rate offered by Utility C and Alternative B. To prevent the customer from switching to Alternative B, the utility instead offers the third bar in the figure, its load retention rate at or near the market price. By accepting the discounted rate, the customer gets a market price without switching to Alternative B. In some instances, it may be possible for a customer to use the *threat* of bypass to bargain for a market rate even if the customer never intended to switch to an alternative.[5]

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[4] Discounted rates are allowed under certain conditions according to PURA95 §§ 2.001(b) and 2.052(b).

[5] Because the discounted rate must be at least as high as its marginal costs (under PURA95 §2.052(b)), discounted rates should be successful at retaining customers only in the case of *uneconomic* bypass. Note in Figure III–1, if utility A offers a discounted rate equal to its marginal cost—which in the short-run equals its variable cost—the customer will still switch to Alternative B because the market price is below Utility A's marginal cost.

Another alternative to prevent bypass may be an interruptible rate. Interruptible rates offer a discount in return for allowing the utility to interrupt service under specific conditions. Because of excess capacity in Texas, service is only rarely interrupted. Thus, interruptible rates can be a means to purchase nearly firm power at lower than standard rates for firm supply, potentially circumventing restrictions on cost shifting.

Under State law, the utility offering the discount may not shift the unrecovered cost of the discount to its other customers.[6] Thus, shareholders will absorb the costs of providing discounts. In the case of cooperatives, ratepayers and members are one and the same; therefore, the costs of rate discounts offered to specific customers will be absorbed by the cooperative's other member ratepayers. Discounts offered by municipally owned utilities may result in shifting costs from specific customers to the taxpayers.

B. Bypass Creates Stranded Investment

The electric service choices reflected in the above discussion also illustrate how stranded investments are created. Stranded investment can be defined as *the historic financial obligations of utilities incurred in the regulated market that become unrecoverable in a competitive market.* Prices in competitive markets are uncertain, and the competitive price of electricity is likely to be below regulated prices. If a utility cannot charge as much in a competitive market as it would have charged in a regulated market, a portion of the value of its assets may become unrecoverable or "stranded." Thus, the change from a regulated to a competitive market can create stranded investment.

Figure III–2 (above), can be used to illustrate the source of stranded investment. In the figure, a portion of the utility's fixed costs are above the dotted line representing the competitive market price. These fixed costs are historic costs of supplying that customer. Because a portion of the historic fixed costs are above the competitive market price, that portion of the fixed costs will be unrecoverable in the competitive market. The portion of fixed costs above the market price is the stranded investment the utility will incur if the customer opts to bypass the utility.[7] These stranded costs must eventually be shifted to other customers or absorbed by shareholders.

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[6] See PURA95 §2.001(d).

[7] In Figure III–1, the stranded investment is equal to the fixed costs above the dotted line representing the market price. Stranded investment does *not* include the portion of Utility A's variable costs that lie above the market price.

C. EVIDENCE OF BYPASS IN TEXAS

Actual evidence of bypass in Texas is limited at this time. Because retail competition is not permitted in Texas, and because the mechanisms required for wholesale competition are still in the process of being implemented by the Commission, few bypass opportunities have been or are available, other than self- and co-generation. Nevertheless, evidence is accumulating that bypass in Texas could reach a significant level:[8]

- *Self- and co-generation:* Although reporting on self- and co-generation in Texas is incomplete, these sources accounted for at least 11 percent of existing generation capacity in Texas in 1995. In one notable example of self-generation bypass proposed in Texas, Gulf Coast Power Connect, Inc. proposed to build a transmission line to provide transmission-only electric service to a specific end user from a self-generation facility owned by the same end user at a different location.[9]
- *Wholesale competition:* In the short time since adoption of transmission access rules in Texas, several parties have entered into contracts with non-utility providers, replacing prior contracts held with utilities. Other parties have replaced their existing contracts with utility providers for agreements with different utilities. Granbury Municipal Electric Department will buy 16 MW of load from LG&E Power Marketing, replacing Brazos Electric Cooperative.[10] Rayburn Country Electric Cooperative also selected LG&E Power Marketing to supply more than 300 MW of load currently served by Texas Utilities.[11] Prior to the transmission access provisions of PURA95, these wholesale buyers would have been captives of utility suppliers. The City of College Station agreed to a contract with TU Electric for 120 MW over four years, replacing a contract with the Texas Municipal Power Agency.
- *Potential retail bypass:* In the event that retail wheeling is allowed, a few examples indicate that bypass would be an option. The national retail chain Service Merchandise has agreed to buy all of its power requirements from Utilicorp United of St. Louis, beginning in each state as the electric

[8] For additional details on these and other examples, see the discussion in Chapter V.

[9] The application of Gulf Coast Power Connect was considered in Docket No. 13943. The Commission did not rule on the policy issues in the case due to procedural complications, allowing Power Connect to withdraw the case with the opportunity to refile its application in the future.

[10] "Marketer Replaces Brazos Co-op as Supplier of 16 MW to Texas Muni," *Electric Utility Week*, at 7 (May 13, 1996).

[11] "Rayburn G&T Co-op Will Buy 300 MW in Deal with LG&E Power Marketing," *Electric Utility Week*, at 7 (July 1, 1996).

industry is deregulated.[12] In a separate example of possible retail bypass, Power Clearinghouse, Inc. (Docket No. 16147) proposed to bypass the City of Austin's retail electric service by selling electricity to an apartment complex in Austin that is currently served by the City utility. Providing service would require that Austin wheel power from the Lower Colorado River Authority to the apartment complex.[13]

- *Rate discounts:* A number of utilities in Texas offer discounted rates to some customers. Discounted rates include economic and industrial development rates, enterprise zone service rates, load retention rates, interruptible service, time-of-use rates, and other types of discounted and flexible rates.[14]

As this list shows, even though competitive opportunities are relatively recent in Texas, a number of examples of bypass have already occurred or been considered in the State. Non-utility providers are playing a much greater role in the electric industry, both in Texas and nationally (as will be discussed in Chapter V). Given the recent changes in Texas regulations encouraging the development of the wholesale power market, many more bypass examples are anticipated.

D. Cost Shifting—the Hazard of Expanded Bypass

Although bypass is a rational response of wholesale customers and retail firms to economic and financial circumstances, bypass raises the risks of maintaining the current regulatory system in light of changing market realities. As individual customers bypass the existing system, the embedded costs of serving those former customers do not disappear (the costs remain on the books of the bypassed company). Hence, the embedded costs previously being paid by those choosing to bypass stand the risk of being "shifted" from the departing customers to the remaining (or "captive") customers. In the future, as more and more customers bypass existing utilities, the

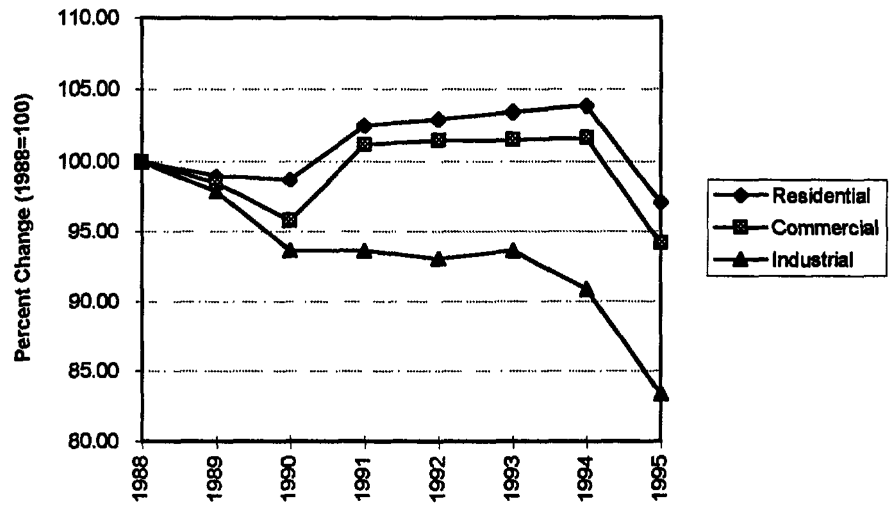
[12] Copelin, Layan, "Utility Officials Bracing for Jolt of Deregulation," *Austin American-Statesman* at 1-A (June 11, 1996).

[13] *Complaint of Power Clearinghouse, Inc., Against the City of Austin Electric Department for Denial of Transmission Service*, Docket No. 16147.

[14] Utilities in Texas submitted lists of their flexible or discounted retail tariffs in response to narrative request number one of the Commission's Data Request under Project No. 15002, issued April 11, 1996.

ever-shrinking set of remaining customers might be required to shoulder the growing per capita burden of the utility's embedded costs.

1. Recent Trends in Electric Prices



Source: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, at T. 66 (various years).

Notes: Converted to constant dollars using the Consumer Price Index for Electricity.

Figure III–4: Annual Percent Change in Real Revenue per kWh by Customer Class in Texas

From the late 1980s through the mid 1990s, average electricity prices (in real terms) have fallen slightly or remained steady in most parts of the country. Averaged over all utility customers, real average prices in Texas were about the same in 1994 as in 1988, but fell substantially between 1994 and 1995. However, not all customer classes have benefited equally from this period of rate stability. Figure III–4 shows the divergence in average prices (measured in revenues per kilowatt-hour (kWh)) for residential, commercial, and industrial customers. Between 1988 and 1994, residential and commercial customers paid more in real terms for each kWh used, while industrial customers paid less.[15] Although average costs declined for all customer classes in

[15] The Commission has not conducted a rigorous investigation of the underlying causes of this divergent trend. One source of the divergence of industrial rates from those of residential and commercial customers is the changes in the price of fuel. Because rates for industrial customers include a larger component for fuel

1995, the divergence between residential/commercial rates and industrial rates remained. Increased opportunities for bypass and discounts available to some customers could exacerbate this divergence.

2. Bypass Shifts Stranded Costs to Other Customers

As noted above, a portion of the embedded costs of providing electric service exceeds market costs, creating potentially strandable investments, some of which could not be recovered in a fully competitive market. In regulatory restructuring discussions in Texas and throughout the nation, a key question is the appropriate allocation method and recovery mechanism for these potentially strandable investments. It is likely that utility customers will be called upon to pay for some portion of stranded costs. The prospect of bypass and discounted rates raises concern that some of the costs stranded by bypassing customers will be shifted to residential and small commercial customers. If the largest utility customers are able to bypass the electric system today, those customers will not be available to pay for their share of the investments they are leaving stranded, resulting in customers who cannot bypass the system paying for those stranded costs. Discounted rates help illustrate the problem. The discount provides large customers a means of avoiding some or all of the potentially strandable investments originally made to serve them. Customers not receiving discounts pay their full share of these costs in their utility bills.

In testimony before the Senate State Affairs Committee, Commissioner Judy Walsh stated that concern over the allocation of potentially strandable investments to small consumers is, in part, driving the debate over competition. Commissioner Walsh stated:

> *[I]f enough of the big customers are able to [buy power at market or deal for a discounted rate], and we don't address stranded costs or some tools to deal with what's happening in our own market, when we get to [the*

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expenditures, recent decreases in fuel costs would disproportionately lower the rates paid by industrial customers. A second source of the observed divergence in rates is the increased use of discounted rates for industrial customers. Thirdly, it is possible that, to the extent that electric rates in Texas historically reflected a subsidy of residential and commercial customers by the industrial customer class, the reduction of the cross-subsidy over time in utility rate cases could be responsible partially for this divergence.

> *year] 2001 . . . the only people that are left [to pay stranded costs] are the utility shareholders and the small captive customers, and we are going to have the choice of high rates for the small captives or perhaps financial jeopardy for our utilities.*[16]

Although the extent of the ECOM burden that could be shifted through bypass is unclear, a sense of the vulnerability of residential customers is revealed in data collected by the Commission in its survey of retail electric suppliers conducted for this report. Table III–1 shows that while industrial customers are only a small portion of the total number of customers, they are responsible for a much greater share of sales and revenues. In 1995, industrial customers represented only 0.8 percent of all the retail electricity customers in Texas. However, those customers used nearly 31 percent of the retail electricity consumed in Texas, and paid over 18 percent of the total State retail electric bill. On the other hand, residential customers make up about 85 percent of retail customers, but pay only 28 percent of the total. If even a small proportion of industrial customers opt to bypass the traditional electric system, the stranded cost burden shifted to captive customers could be quite significant.

Table III–1: Customer, Revenue, and Sales Shares of Each Customer Class in Texas (1995)

Retail Customer Class	Share of Total Customers	Share of Total kWh Sales	Share of Total Revenues
Residential	85.4 %	30.2 %	28.4 %
Commercial	11.5	33.9	27.7
Industrial	0.8	30.8	18.2
Other	2.3	5.1	25.7

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Note: Other includes public lighting, irrigation, cotton gins, and sales to municipalities.

3. Summary

Mounting evidence is challenging the traditional notion that the generation segment of the electric industry has the characteristics of natural monopoly:

[16] Walsh, Judy, Testimony before the Texas Senate Committee on State Affairs (July 10, 1996).

- Due to recent federal and State regulatory innovations, new competitors are vying against traditional utilities in the wholesale electric market.
- New players appear willing to compete against traditional utilities in retail electric markets. The mere presence of these companies challenges the idea that the cost structure of providing electricity is a significant barrier to entry.
- Companies that do not own transmission and distribution networks are offering to provide supply (generation) services, only. These entrants are challenging the existence of economies of scope and the necessity of vertical monopolies.
- Emerging technologies are changing the cost structure of providing new sources of power.

If indeed, the industry—or at least the generation side—is no longer characterized by conditions typical of natural monopolies, the economic justification for the current regulatory structure is changed as well. The regulatory structure developed to oversee monopoly operations naturally deserves greater scrutiny.

Although this discussion has greatly simplified the complex circumstances arising in today's electricity market, it has served to illuminate the root of the concern over *unmanaged* progress to greater competition. Traditionally, the marketplace offers more opportunities for large customers. It is unlikely that the changing electric market will be an exception. Left alone, these marketplace developments may lead to higher costs and poorer services for the smallest, captive customers—individuals, families, and small businesses. Without legislative or regulatory attention to changes in the market and to the regulatory incentives that affect the behaviors of utilities and customers, a new bypass-dominated regime may emerge in which substantial costs are shifted to those captive customers.

IV. BASIC ECONOMICS OF COMPETITIVE MARKETS

As a precursor to a discussion of the competitiveness of the electric market in Texas, this chapter presents some background on the economics of competition. Economic issues are at the heart of electric industry regulation and the ongoing transition to competition. Any legislative and/or regulatory modifications affecting the delivery of electricity, electricity providers, costs of producing electricity, and prices charged for electric services can create opportunities for economic development and wealth creation. Policy changes could also create adverse economic outcomes for specific sets of producers or consumers.

Throughout this report, issues will be raised that hinge on the basic economics of competition. This chapter provides a simplified overview of basic economic issues that can provide the necessary background for those decisions. It describes the competitive market ideal and the partially competitive market outcomes that are more widely observed in the "real world."

The chapter begins in Section A with a discussion of the competitive market ideal, so-called "perfect competition" and the conditions for perfect competition. Section B discusses the link between competitive markets and economic efficiency. Economic efficiency is the mechanism through which greater competition in the electric industry can lead to greater wealth and economic development in the State.

Section C discusses alternatives to the ideal of perfect competition. In the real world, no markets operate in a perfectly competitive manner. Economists have developed alternatives to the perfectly competitive model, to reflect the conditions and operations of working markets. Two examples are presented here—"contestable" markets and "workably competitive" markets. If markets are contestable, access to the market is the key means to achieving economic efficiency. Workable competition translates the strict conditions for perfect competition into a more practical framework. In Section D, two partially competitive market models are also discussed. If competitive conditions are met only partially, monopolistic competition or oligopoly may result. These outcomes could limit severely the potential benefits of competition.

For a variety of reasons, markets may fall short of competition, and thus fail to generate the potential efficiency benefits associated with competition. Section E presents examples of these so-called "market failures" that fall under the headings of externalities, public goods, information failure, and destructive competition. These types of market failure will be especially relevant in the discussion of system benefits in Chapter XI. An additional undesirable outcome is market power, the ability of a firm or firms to influence market prices or production levels, which is discussed in Section F. Market power is a particular concern in any transition to competition. The discussion describes market power, and presents a simplified means of measuring it that can be used by regulators as a screening tool.

A. CHARACTERISTICS OF A COMPETITIVE MARKET

"Perfect competition" is one of the two extreme cases that define how an economic market may operate. Monopoly is the other extreme. All other market forms are somewhat less than perfectly competitive. While perfect competition is rarely, if ever, achieved in the real world, the conditions for perfect competition can be used as benchmarks in the analysis of real world markets. A market with many of the features of a perfectly competitive market may reap some or most of the benefits of perfect competition.

The technical conditions that define a perfectly competitive market are enumerated in most economics textbooks.[1] A few of the key characteristics include:[2]

- *Large number of both sellers and buyers:* The market is composed of a large number of sellers and buyers, each of whom attempts to maximize profits or consumer welfare. If a large number of sellers are available to supply a product, no one seller can manipulate the product's price.

[1] See for example, Varian, Hal R., *Microeconomic Analysis* 2nd edition, New York: W.W. Norton & Company (1984).

[2] Perfectly competitive markets also depend on the absence of transaction costs and market failures, and freedom from government intervention.

Similarly, with a large number of buyers, no one customer's purchases will affect the market price.[3]

- *Sellers offer an identical (homogeneous) product:* If sellers all supply the same product, no one seller's product is differentiated from any others'. By differentiating its product, a seller could raise the price and collect excess profits.
- *Perfect information:* All buyers and sellers have access to all relevant information about costs, prices, and availability of all relevant goods in the market. With perfect information, no one participant can manipulate the market by having access to information unavailable to others.
- *Ease of entry and exit in the market:* New firms are free to enter or leave the market at no cost—no "barriers to entry."[4] Thus, if there is insufficient production, new firms can enter the market and supply additional goods.
- *Freedom from economies of scale:* As noted in Chapter II, economies of scale arise when one firm can supply the market at a lower average cost than multiple firms. Markets characterized by economies of scale may tend to concentrate production in a limited number of firms.

These conditions ensure that all buyers and suppliers have the opportunity to participate in a market free from inherent advantages for particular players. All participants face the same, fair price, equal to the marginal cost of producing more output. If one firm chooses to offer its goods for sale above the prevailing market price, consumers will switch to another supplier. Only a firm with a production cost advantage can lower its price, but no lower than its marginal cost of producing more output. A firm that priced below marginal cost could not recover its costs. Thus, in a competitive market, marginal cost becomes the market price.[5]

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[3] Competitive markets are often characterized as markets in which all buyers and sellers are "price takers," implying that there is a single, take-it-or-leave-it, price for that good. A potential customer may choose to buy the good at that price, but no single customer's decision will alter the price in the market. Similarly, whether a producer decides to sell its product at that price will have no influence on the price.

[4] Entry barriers may be financial, regulatory, legal, technical (e.g., patents), informational, and/or strategic. Exit barriers may also preclude a firm from salvaging the remaining value of its investment.

[5] In a theoretical perfectly competitive market for electricity, the marginal cost—and hence the price—would change instantaneously as supply and demand conditions led producers to dispatch or withdraw (marginal) generating units. Because the cost of producing the last (marginal) unit of electricity varies with the costs of the last plant brought on line, price will be determined by supply and demand conditions. At times of high demand, (e.g., the middle of a Summer day), marginal cost—and hence the price of electricity—would be much higher than at a time of lower usage (e.g., the middle of the night in the Spring and Fall).

In contrast to the monopoly described in Chapter II, no producer can lower its production level, raise its prices and expect to make excessive profits—conditions that create inefficiencies. If any firm attempts to do so, another firm will step in at the prevailing price, capturing all the customers from the more highly priced supplier.

B. COMPETITIVE MARKETS AND ECONOMIC EFFICIENCY

Promoting competition is a vital policy goal because competitive markets hold costs down, squeeze out waste, spur economic development and create wealth—wealth that may be shared between both buyers and sellers. This was the central point of Adam Smith's notion of the "invisible hand," that each individual's (or firm's) pursuit of economic self-interest contributes to the greatest benefit for all parties combined. In more formal economics terms, competition is the principal means of achieving economic efficiency.[6]

1. Definition of Economic Efficiency in Competitive Markets

"Economic efficiency" has been a primary justification for economic regulation of public utilities. Although this idea of economic efficiency has a very specific meaning to economists, the general public may not find the concept meaningful or have a sense of the benefits of efficiency improvements. *Achieving greater economic efficiency in the electric utility industry is more than just a catchy phrase. All Texans have a real stake in this issue because improvements in economic efficiency mean greater wealth and welfare for the citizens of the State.*

Economic efficiencies (and inefficiencies) arise from the responses of manufacturers and consumers to pricing signals sent in the market. Markets will be most efficient when the prevailing price of a product equals the cost of producing the next unit. In other words, efficiency requires that the price of a product or service equals the "marginal cost" of production—one of the most fundamental outcomes of competitive markets. Under these conditions, the choices made by suppliers about what resources

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[6] Under certain market conditions, it can be proven mathematically that a competitive market will result in the greatest degree of economic efficiency ("Pareto efficiency"). This proposition is sometimes known as the "fundamental theorem of welfare economics." For a formal proof, see Varian, *supra* at 200.

to employ in the provision of their products and by consumers about which products to buy lead to the greatest possible improvements in wealth and welfare.

2. Productive Efficiency

Economic efficiency in the manufacture/provision of products and services is called "productive efficiency." In an efficient market (or firm), resources are put to their best, most productive, use—an efficient industry (or firm) will produce the most output possible with the least contribution of inputs. In the electric utility industry, productive resources include labor, fuel, investment capital, materials, technical knowledge, patents, and others. An efficient electric firm will provide power with the lowest cost combination of those inputs. The excess cost arising from the less efficient mix of inputs is wasted wealth, excess that would be captured by an efficient firm.[7] An efficient provider may make greater returns or pass on its lower costs to customers. For any individual firm operating at less than peak efficiency, that waste may seem like a small amount, but adding together all firms, inefficiencies rapidly can become quite large.

3. Allocative Efficiency

From the consumers' perspective, economic efficiency is known as "allocative efficiency."[8] Consumers allocate their limited income between the available products and services using prices as a signal in the allocation process. In deciding to purchase electric services, consumers (whether individual residential customers or the largest industrial manufacturers) will make comparisons between the prices and benefits of purchasing electricity versus natural gas, versus energy efficiency—or to spend the

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[7] The excess costs due to an inefficient combination of productive resources can be divided into two components. In part, a firm may be able to raise its prices, capturing some of the excess costs in a transfer from its customers. The remainder is the efficiency loss. Economists often refer to the latter component as "dead-weight loss."

[8] In the extreme case, efficient allocation will result in "Pareto efficiency," so named after the late 19th century economist Vilfredo Pareto. In the standard definition, "[a]n economic situation is *Pareto efficient* if there is no way to make any person better off without hurting anybody else." See Varian, Hal R. *Intermediate Microeconomics: A Modern Approach*, New York: W. W. Norton & Company at 305 (1987).

Although Pareto efficiency improvements will always be wealth creating, efficiency says little about which parties directly benefit from a change. Efficiency benefits may be captured by one party or a subset of parties. Thus, one of the chief concerns expressed in the Commission's electric utility industry restructuring workshops was ensuring that *all* of Texas' citizens share in the benefits of industry restructuring.

money on some other good or service entirely. In a competitive market, when prevailing prices of goods are equal to their marginal costs, consumers will be able to select a combination of goods that provides the greatest degree of consumer welfare at the least cost. When prices do not equal marginal costs, consumers will not be able to purchase a package of goods and services making them as well off as in a competitive market.

4. Dynamic Efficiency

Dynamic efficiency refers to efficiencies occurring over time. Investments in electric utility resources have a recurring component—e.g., the costs of fuel, labor and operations—and capital costs that are one-time investments. Producers considering making long-term investments must balance the recurring costs of operating alternatives with the long-term capital costs of those alternatives. In a dynamically efficient market, this balancing will lead to investments that generate the greatest difference between the *net present value* of revenues and costs. By analogy, an auto buyer balances the capital costs of the vehicles under consideration and the costs of their operations, which include gas, maintenance, and insurance.

Some regulations may interfere with dynamic efficiency. Chapter II discussed the incentives for investment in capital-intensive generation resources arising from the regulatory structure. If regulation encourages utilities to make inappropriate capital investments (whether for too much capital or in some favored technology), dynamic efficiency will be reduced, at the cost of less wealth creation over time.

C. Alternative Models of Competitive Markets

In some instances, most of the efficiency benefits associated with perfectly competitive markets may be achieved even though the conditions for perfect competition are not all met. Economists have developed alternatives to the perfectly competitive market model that take into account more practical observations about the operations of working markets. Like all practical market models, however, the magnitude of anticipated efficiency benefits is uncertain (and in some cases controversial).

1. Contestable Markets

Some economists have argued that the benefits of competition can be achieved in a less than fully competitive market if new competitors can enter (or "contest" for) the market. They argue that competitive forces have such a strong influence over markets that a *credible threat* of competition will cause the market participants to behave in ways that yield the same efficiency benefits as a fully competitive market. From a public policy perspective, this idea suggests that regulators should focus on barriers to entry in electric markets—particularly transmission access—as well as simply the number and sizes of firms operating in a market.

A market can be called "contestable" if market entry is free, and the ability of a firm to exit the market is costless.[9] "Free" entry does not mean literally zero costs, but rather the entering firm will face costs no greater than the costs of an existing firm and that the potential entrant will not face any additional entry barriers. Similarly, costless market exit does not mean zero cost, but rather that the firm can leave the market and recover its embedded costs. Thus, a new firm can enter the market, offering the same product as an incumbent firm, at a competitive cost, and if too many firms eventually enter the market, some may choose to exit and will be able to recover their invested costs.

In such a market, if prices exceed marginal cost, creating a positive profit, a new market entrant can step in, charging less than the prevailing price and thereby capture sales from the established firms. This entry threat forces the incumbent firms to keep prices low—at marginal cost—to prevent the new firm from entering the market. Thus the threat of market entry holds prices at the level that would prevail in a fully competitive market.[10]

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[9] For a more detailed treatment, see Train, Kenneth E., *Optimal Regulation: The Economic Theory of Natural Monopoly*, Cambridge, MA: The MIT Press at 303 - 313 (1994).

[10] Contestability theory was originally presented in Baumol, William J, "Contestable Markets: An Uprising in the Theory of Industry Structure," *American Economic Review*, Vol. 72(1) at 1 - 15 (March, 1982) and Baumol, William J., John C. Panzar, and Robert D. Willig, *Contestable Markets and the Theory of Industry Structure*, Harcourt Brace Jovanovich (1982). Since its introduction, contestability theory has met with great controversy, primarily due to the strict conditions on free entry and costless exit. Critics argue that much like the unattainable

2. Workable Competition

Because perfect competition is virtually unattainable in any working market, a notion of "workable" competition has emerged. Workable competition describes a market in which the underlying characteristics of a competitive market are *sufficient* to achieve many of the competitive benefits of perfect markets, even though perfect competition is not attained. Although the specific characteristics that make any market workable are difficult to define with specificity, workable competition, nevertheless, gives policy makers a more reasonable target than perfect, yet unattainable competition.

Although there are a number of possible ways to classify the necessary conditions for workably competitive markets, three particular market characteristics are required to achieve workable competition: [11]

1. *At least five reasonably comparable competitors.* This provides for unremitting mutual pressure for efficiency and innovation, as well as avoidance of any sustained coordination and collusion among competitors.
2. *An absence of single-firm dominance.* This prevents strong unilateral market control over much or most of the market, which could exploit and/or create imperfections in the market.
3. *Reasonably free entry into and among all segments of the market*, so that numerous new firms can enter, survive, and acquire significant market shares.

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concept of perfect competition, perfect contestability can never exist because market entry can never be truly free and instantaneous, nor is costless exit ever guaranteed.

Critics also argue that incumbent firms may retain market power that can be utilized to keep a new entrant out. Before the entrant can establish its operations, the incumbent can lower its price, removing any opportunity for the entrant. If however, long-term contracts can be agreed upon by the entrant and customers before the new firm begins operations, the incumbent's market power can be abated. This may well be the key means of market contestability in the electric market. The potential new supplier could agree to contracts with customers, at a lower price than their current service, prior to plant construction. Power marketers not reliant on specific new operating units may also be able to overcome incumbent market power due to their ability to enter a market quickly. The sharpest critic of contestability has been William G. Shepherd. See in particular, "Contestability vs. Competition" *American Economic Review* Vol. 74 at 572 - 87 (1984). For an examination of contestability in the long distance market following the break up of AT&T, see Shepherd, William G. and Robert J. Graniere, *Dominance, Non-dominance, and Contestability in a Telecommunications Market: A Critical Review*, Columbus, Ohio: National Regulatory Research Institute (1990).

[11] Shepherd, William G., "Deregulation: From Monopoly Only to Dominance? Telecommunications, Railroads, and Electricity, *NRRI Quarterly Bulletin*, Vol. 17(2), Columbus, Ohio: National Regulatory Research Institute at 152 (Summer, 1996), some footnotes have been deleted; italics added.

Markets that incorporate these characteristics, while not perfectly competitive, may be sufficiently competitive to yield the efficiency benefits of a competitive market.

D. Partially Competitive Markets

In partially competitive markets, one or more firms can gain an *un*competitive advantage over other suppliers with the result that economic efficiency is never fully realized.[12] In some instances, partially competitive markets can lead to higher prices and output restrictions that benefit producers at the expense of consumers. Two types of partially competitive markets are discussed below. These market models differ primarily by the number of firms operating in the market, the ability of firms to charge prices in excess of marginal cost, and the ability to price-discriminate among customer classes. Typically, the fewer the number of viable firms, the greater the opportunity of those firms to reduce production, raise prices, and collect excess profits. However, such conclusions are not hard and fast.

1. Monopolistic Competition

A monopolistically competitive market exists when a number of competitors offer differentiated products. In other words, each firm produces a somewhat different, though similar, product from products available from other firms. Some type of market barrier (e.g., a patent or lack of technical know-how) prevents firms from offering the competing firms' versions of the product. Each firm retains the power to manipulate the price of its product to earn excess profits, but the magnitude of those profits are limited by the presence of competitors with somewhat similar products. In the long-run, excess profits will only persist to the degree that a producer of a particular brand can maintain the perception of product differentiation through advertising and brand loyalty.

A typical example of monopolistic competition is the soft drink industry. While Coke, Pepsi, and Royal Crown are all colas, each has a different taste, not quite duplicated by

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[12] In other cases, partial competition may arise from an insufficient number of buyers, e.g., monopsony conditions, but these models are less relevant for the electric market.

the competitors—RC Cola is the only product that tastes just like an RC. Differences in each product should allow competitors to achieve some degree of excess profitability, but profit potential is limited; if one manufacture raises its price too high, consumers will switch to a different cola.

The retail market for electricity exhibits some of the characteristics of a monopolistically competitive market. It is conceivable that a competitor in the electric services market could differentiate its services from other competitors in ways that are difficult to duplicate. For example, an incumbent distribution company could differentiate itself as offering greater reliability and more responsive customer service, using its extensive customer data base to help maintain that distinction. The perceived quality difference could be a sufficient barrier to entry of alternative suppliers.

In a competitive generation market, a firm could differentiate by its reliability, price stability, or environmental record. Consider a generation utility using only renewable resources in its generation portfolio. That firm could claim a unique product, and if demand for power from renewable resources is great enough or can be sustained through advertising, the firm can earn an excess profit.

Although monopolistic competition is a less than perfectly competitive outcome, a market may be sufficiently competitive to force firms to hold down the prices of their differentiated products by concern that customers will switch to a competitors substitute product. Pursuit of market share, however, may require large advertising expenditures, keeping costs and prices above a competitive level. Thus, monopolistic competition may achieve some of the efficiencies available in competitive markets, but some efficiency will be sacrificed and diverted to the struggle for product differentiation and brand identification.

2. Oligopoly Markets

An oligopoly market is made up of a limited number of firms, and barriers to entry may prevent new firms from entering the market. Each of the limited number of firms in the market is likely to have some degree of influence over the market price. Excess capacity may occur in oligopoly markets, giving rise to inefficient investment behavior and operations.

Oligopoly markets follow few predictable behavioral rules. With a small number of participants, firms often engage in strategic behavior, falling somewhere between the two extremes of collusion and predatory pricing wars.[13] Either extreme outcome is unstable. Collusion can only be maintained as long as all firms cooperate; just one firm undercutting the prevailing group price can dissolve the coalition. On the other hand, price wars may drive down excess profits to (below) zero, contrary to the self-interests of the individual firms.

Airlines are sometimes considered oligopolies because of the limited number of firms and non-trivial barriers to entry. In the airline market, only a few carriers compete on any route, and entry is restricted by a number of barriers, e.g., limited gate "slots." Airfares fluctuate dramatically from route to route and week to week as the airlines jockey for market position. Prices also vary across distinct classes of passengers—business travelers with fewer scheduling options pay higher fares than more flexible recreational travelers.

As currently structured, the electric industry in Texas displays many oligopoly characteristics. Data presented in Chapter V shows that just two Texas utilities account for about 57 percent of retail sales. Barriers to entry, including high fixed costs, the prevalence of long-term wholesale contracts, and regulatory requirements and restrictions have prevented new suppliers from competing in the electric industry.

E. MARKET FAILURE

Market failure—the inability of a market to achieve and sustain allocative efficiency—may arise if any of the competitive conditions are not met. In some cases, conditions giving rise to monopoly, oligopoly, or other market outcomes may interfere with efficient allocation. Other relevant examples of market failures include externalities,

[13] Of course, outright collusion is illegal, but some alternate pricing strategies can mimic collusive outcomes, e.g., leader–follower pricing.

public goods, information failure, and destructive competition. The types of and existence of market failures are particularly important in Chapter XII on system benefits that may become stranded in a competitive market.

1. Externalities

An externality arises from a breakdown of private markets in which the price of a good does not reflect the complete costs of the production and/or consumption of the good.[14] Buyers in the market base their purchasing decisions on the price of a product rather than on the true cost of the product. If the price of a good is below its true costs, (i.e., a portion of the cost of the good are external to the market decision), buyers will consumer more of the good relative to other goods than if the good's price reflected its true cost. As a result, an inefficient amount (either too much or too little) of a good is consumed.

Air pollution is a classic example of an externality. Because there is no effective market mechanism for air quality, pollution emitters treat the air as free and (absent other regulatory mechanisms) do not include the cost of diminishing clean air in the prices of their products. Thus, plants emit pollutants that affect the environment and the health of individuals not associated with the plant. Because the price of electricity does not reflect the health and environmental consequences of air emissions, too much electric power is produced, and too little health and environmental protection is produced because the value of these externalities is also not properly internalized in the price of electricity.

The mix of different resources selected may also be inefficient because of the incomplete pricing signal. Alternative plant technologies lead to different levels of health and environmental effects, e.g., gas and coal plants have different emission characteristics. In choosing between alternative generation resources, prices will not reflect the differential health and environmental costs of each resource option. The

[14] Externalities may be either positive or negative. For a formal economic definition, see Baumol, William J. and Wallace E. Oates, *The Theory of Environmental Policy*, 2nd edition, Cambridge, England: Cambridge University Press (1988).

resultant choice may have higher total costs than options passed over, even though the decision to invest in a particular plant is based on the lowest construction and operations expenditures.

2. Public goods

Public goods are also associated with a breakdown of private markets in which too little of a good or service is produced. Public goods are defined as "nonrival" and "nonexclusive," in other words, consumption by one person does not diminish the ability of others to consume the good, and no consumer can be excluded from consuming it. While individuals may attach some private value to the good, everyone benefits collectively from its provision; however, all individuals contributions may be needed to produce the total amount desired by the entire community. Because it is infeasible to exclude any individual from receiving the good, individuals will face an incentive to understate the value they place on the good, relying on others to finance it instead. Thus, a "free rider" can pay nothing but receive the full benefit of the good's provision. The interstate highway system is an example of a public good; if left to individuals (or even state governments), each would hope to benefit from the others' expenditures, spending as little as possible. The total contribution of all the individual (or states) would likely be insufficient for collective travel.

In the electricity industry, research and development (R&D) can be considered a public good. Government funding or incentives are often used to attract R&D because firms may wish to be free riders on the R&D advances of others.

3. Information Failure

Information failure occurs when the marketplace provides insufficient information for producers and/or consumers to make efficient investment and buying decisions. Under the National Appliance Energy Conservation Act of 1987, the federal government required that all home appliance carry energy efficiency information, enabling buyers to make more informed decisions. Truth in lending disclosures for home mortgages provide home buyers with a remedy for information failure in the housing market.

In some cases, consumers may not have the training to make complex costs comparisons. Many energy appliances differ both in the up-front costs and the on-going operating costs. Without the mathematical and/or financial skills to make comparisons across products with differing mixes of fixed and operating costs, consumers will not be able to make efficient choices.

4. Destructive Competition

Competitive markets may sometimes lead to potentially destructive outcomes that may harm, rather than benefit consumers:[15]

- *Price volatility:* Under conditions of slack capacity, firms may engage in strategic pricing behavior, leading to widely fluctuating prices. Price volatility makes long-range planning difficult, creating uncertainty and inefficiency.[16]
- *Limitations on necessary expenditures:* Revenue pressures may lead firms to postpone or curtail expenditures that benefit consumers in the long-run. For example, analysts fear that the airline industry has been under-investing in safety equipment and training because of price competition following airline rate deregulation. Customer service may also have suffered as competition has increased for some local phone service providers. Similar results could arise if the electric industry is further deregulated.
- *Product quality uncertainty:* Customers may find it difficult to judge product quality given limited information about competing alternatives. Lower prices may lead customers to unknowingly choose lower quality services.[17]
- *Cream-skimming:* Competing firms may attempt to capture only the most lucrative (high volume, low cost) customers, "skimming the cream" of the market, leaving less attractive, high cost customers to find service elsewhere. High cost customers will often be low income, elderly, and rural residential customers who could be left to face higher prices.

[15] Kahn, *supra* at Vol. II, at 173, points out that destructive competition will be most in evidence in markets having large fixed costs of production and periods of excess capacity (i.e., sustained periods in which average costs exceed marginal cost), both conditions that may apply to the electric utility industry in Texas. These conditions encourage firms to slash expenditures, price strategically, and fight for the most lucrative customers.

[16] Recall the ferocity of the public outcry in early 1996, when natural—but unanticipated—fluctuations in the price of gasoline sent near-term prices upwards throughout the country.

[17] For example, companies that scrupulously attend to product quality may lose customers to lower cost providers rather than be rewarded with a higher price for quality service. Kahn, *supra* at Vol. II, at 176 - 177.

F. MARKET POWER

The preceding discussion illustrates a central condition required for competitive markets: the larger the number of evenly matched competitors, the more likely that a market will be truly competitive and produce efficiency benefits for all. But when is the set of competing firms sufficient to ensure an adequately competitive market? Economists have developed measures that can be used as preliminary screens to help determine whether the number and sizes of firms in a market may be sufficient to sustain effective competition. Rather than simply counting the number of competitors, these measures assess the *influence* of individual competitors—the ability of a firm to exercise "market power."

1. Market Power Defined

Market power can be defined as "the ability [of] a single firm or a group of competing firms in a market [to] *profitably* . . . raise prices above competitive levels and restrict output below competitive levels for a sustained period of time."[18] In other words, a firm (or firms) able to exercise market power has sufficient influence over the market that it can manipulate the market price and the amount of output supplied to the market in order to earn excess profits.

Market power can be categorized as either vertical or horizontal—somewhat analogous to the vertical and horizontal lines of integration in utility firms. Vertical market power arises from a firm's ability to use its presence in one market to influence another market to its benefit. An electric utility controlling both transmission/distribution and generation could use its control of transmission and distribution to cross-subsidize its generation services or protect high priced generation market share by restricting transmission access of other generators. Both structural unbundling and open access policies are intended to restrict vertical market power. Recent mergers between

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[18] Joskow, Paul L. *Horizontal Market Power in Wholesale Power Markets*, working paper, Cambridge, MA: Massachusetts Institute of Technology at 11 (August, 1995). A brief introduction to the economics of market power is provided in Werden, Gregory J., "The Economist's View: Identifying Market Power in Electric Generation," *Public Utilities Fortnightly* at 16 - 21 (February 15, 1996).

electric providers and natural gas supply companies have raised a new vertical market power concern, ownership of energy supplies as well as generating plant.

Horizontal market power is a function of the number of suppliers in a market, and will be most concentrated if the number of potentially competing firms is small and product substitutes are unavailable or otherwise limited. A monopoly possesses the fullest possible market power, while a single firm in a competitive market has no market power, because no firm or group of firms can influence the market using price or output leverage in a way that creates excess profits. All other outcomes fall somewhere in the muddy middle. An oligopoly market will have a restricted number of competitors; however, if no firm(s) is able to exercise significant market power, oligopolistic competition may still give rise to some consumer benefits. On the other hand, an oligopoly with market power could keep prices up, capturing the potential consumer savings until substitutes or new markets become available.

2. A Screen for Market Power

A number of measures have been developed to assess the extent of market power. However, each measurement approach looks at only a subset of the characteristics of the firms in that market. Measures should be used as no more than rules of thumb for indicating whether a market is likely to be at least workably competitive. Other key issues, such as barriers to entry and exit, availability of substitutes, information availability, and economies of scale must also be examined. Nevertheless, these measures are important tools for drawing inferences about opportunities for market power.

One measure in particular, the Herfindahl–Hirschman Index (HHI) for measuring seller concentration, has gained wide acceptance as a screen for market power.[19] The U.S.

[19] A number of measures of both more and lesser sophistication are available, including extremely complex general equilibrium economic models. There is some indication that results of the HHI model will be similar to those of more sophisticated models (see for example Schmalensee, Richard and Bennett W. Golub, "Estimating Effective Concentration in Deregulated Wholesale Electricity Markets," *The Rand Journal of Economics*, Vol. 15 at 12 - 26 (Spring, 1984)). Recognizing that an empirical measure of market power is most useful as a screening tool, this report utilizes the HHI, which has been repeatedly tested and is widely accepted. In other contexts, a more sophisticated measure may be desirable.

Department of Justice (DOJ), Antitrust Division, uses the HHI as a market power indicator of antitrust concern in merger cases.[20] The HHI is calculated very simply as the sum of the square of market share of all suppliers in the market of interest. Because the HHI is calculated using the *square* of market share, it grows much larger as the market share of any single firm rises. For example, if a market consists of five firms, each with 20 percent of the market, the HHI will equal 2,000 [20 * 20 * 5 = 2,000]. But if those same five firms are divided into one firm with half of the market while the other four firms equally share one-half the market, the HHI will equal 3,125 [(50 * 50) + (12.5 * 12.5 * 4) = 3,125]. Although the number of firms is the same, the increase in market share of only one firm raises the index value by more than 50 percent. Note that for a monopoly—a single firm with 100 percent market share—the HHI equals 10,000. In a very competitive market, the HHI would be very small.

The DOJ merger guidelines use bands or ranges of values as indicators concern over market concentration. A market with a HHI below 1,000 is characterized as unconcentrated, between 1,000 and 1,800 is moderately concentrated, and above 1,800 is considered highly concentrated.[21] The DOJ uses these guidelines as part of its investigation of antitrust concerns in corporate mergers.

It is unclear whether these same bands are relevant in determining if an emerging electric market will be sufficiently competitive.[22] For the emerging electric market, Paul Joskow has suggested a three-part screening criterion:[23]

1. A *market* is at low risk of market power domination with a HHI of 2,500—equivalent to four equally sized firms.
2. A *firm* is at low risk of exercising unilateral market power if its market share is less than or equal to 20 percent, no matter what the prevailing HHI.

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[20] U.S. Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines* (April 2, 1992).

[21] *Id.* at §1.5.

[22] The DOJ guidelines address whether increased concentration among competing companies in an established market creates unacceptable market power concerns. In the electric industry, the question is instead whether a deregulated industry can ignite competitive markets.

[23] Joskow, *supra* at 35 - 36.

3. A *firm* is at low risk of exercising unilateral market power if its market share is less than or equal to 35 percent and the HHI is no more than 2,500.

V. CURRENT ELECTRICITY COMPETITION IN TEXAS

Segments of the electric market in Texas are becoming increasingly competitive. Other segments are insulated from competition almost entirely. Conditions that promote competition in the wholesale market have already arrived, and the results of those conditions can be seen in the emergence of a number of new types of transactions. The scope of wholesale competition may remain somewhat restricted, however, as long as existing long-term wholesale contracts and franchise agreements lock up a portion of that market.

Conditions are not in place for extensive retail competition, on the other hand. Although limited retail competition is occurring in Texas in multiply certificated areas, that form of competition is not new to Texas. Self-generation and co-generation for own-use offer competitive alternatives to some industrial customers, and some customers have been able to take advantage of discounted retail rates. These options are limited to a select set of industrial and large commercial customers.

This chapter begins in Section A with an overview of the structure of the electric industry in Texas, including the types of companies in the market, the basic characteristics of the generation mix across the State, and the distinction between wholesale and retail markets. It also identifies the largest operating utilities in the State, identifies the non-utility suppliers, and presents statewide data about electric capacity, sales, and average prices. Section B discusses the competitiveness of the wholesale electric market, identifying the recent changes in the wholesale market arising in response to the federal and State legislative changes discussed in Chapter II. Section C discusses the retail market, pointing out the limited existing opportunities for competition. As retail competitive opportunities are currently limited, the section focuses on the definition of retail markets and points out the differences in average retail prices across the State, differences that are, in part, sustained by the current regulatory structure. Finally, Section D discusses a case appearing before the Commission recently that raises new challenges to the traditional distinctions between wholesale and retail markets.

A. TEXAS ELECTRIC INDUSTRY STRUCTURE

The electric industry in Texas consists of a diverse set of organizations established to generate and distribute power throughout the State. These organizations take different structural forms that differ by the role that each plays in the generation and distribution system. Until recently, all electricity generators and distributors were classified as "utilities" of one sort or another. PURA95 defines a utility as ". . . owning or operating for compensation . . . equipment or facilities for producing, generating, transmitting, distributing, selling, or furnishing electricity in this state . . . [except as specifically defined]."[1] Utilities therefore include investor-owned utilities (IOUs), generation and transmission (G&T) cooperatives, distribution cooperatives, and municipally owned utilities. All retail public utilities in the State are required to obtain a certificate of convenience and necessity (CCN) prior to offering retail service. Utilities are also subject to rate regulation under PURA95 and the Commission's rules, although the degree of regulatory oversight differs by the type of utility.[2] River authorities operate similarly to utilities, but are defined separately under the law.[3]

As noted in Chapter II, legislative changes beginning in the late 1970s with the passage of the Public Utility Regulatory Policies Act (PURPA) created new classes of power providers that are not regulated as utilities. These entities were formally incorporated in Texas law in PURA95. Non-utility suppliers include qualifying facilities (QFs), power marketers, exempt wholesale generators (EWGs), and renewable resource developers. The non-utilities are free from the legal requirements of operating under a CCN and from rate regulation.

Another category of provider is energy service companies (Escos). Unlike the utilities and non-utility energy providers, Escos typically do not generate or supply power.

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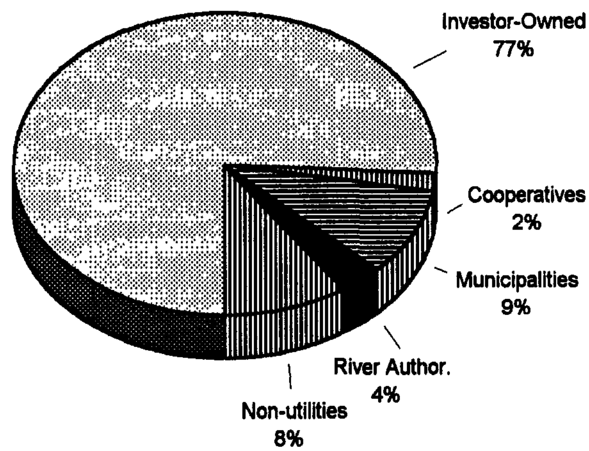
[1] PURA95 §2.0011(1).

[2] Under PURA95 §2.101, municipal governments have original jurisdiction over utility rates and services within their limits. PURA95 §2.2011(a) allows certain cooperatives to opt out of Commission rate regulation.

[3] See PURA95 §2.0012.

Rather, Escos supply value-added services such as "demand-side management" (DSM), which allow energy users to monitor, manage, or reduce energy consumption.



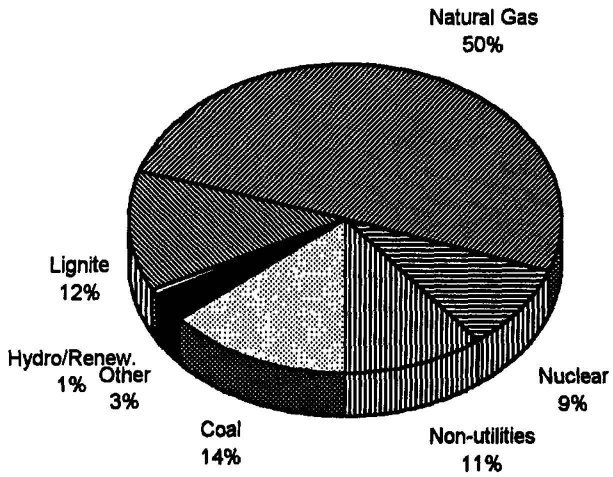
Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Notes: Data as reported by the utilities for 1995. The share of non-utility power may be underestimated. Some non-utility data may be excluded from the results because non-utilities complied voluntarily with the Data Request, while utility compliance was mandatory. The reported capacity of multistate utilities has been adjusted for Texas demand allocation.

Figure V–1: 1995 Generation in Texas by Type of Generator (MWh)

In 1995, the utilities and non-utilities in Texas combined generated 284 million megawatt-hours (MWh) of electric energy. Figure V–1 shows the breakdown of generation by type of provider. IOUs are by far the largest type of generator, accounting for 77 percent of generation in the State in 1995. All together, the utilities and river authorities generated 92 percent, while non-utility generators provided 8 percent.

Electricity generating facilities in Texas rely on a fairly diverse mix of fuels. Figure V–2 presents the breakdown of installed generating capacity (in MW) by fuel type for 1995. Figure V–3 presents the breakdown of total 1995 generation by fuel type (in MWh). Generating capacity is dominated by natural gas, accounting for 61 percent of the total (50 percent utilities and 11 percent non-utilities.) Most of the large utilities



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

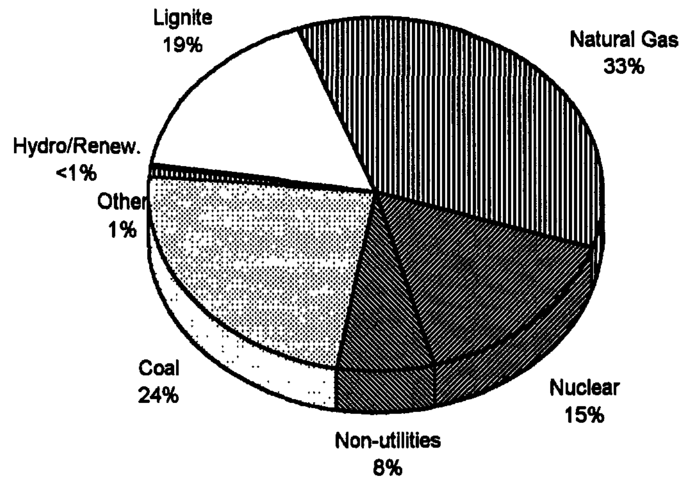
Note: Net dependable capacity owned by the respondents to data requests. The share of non-utility power may be underestimated because non-utilities complied voluntarily with the Data Request, while utility compliance was mandatory. The reported capacity of multistate utilities has been adjusted for Texas demand allocation. Other includes diesel, gas/oil, oil, and diesel/natural gas facilities.

Figure V–2: 1995 Installed Capacity in Texas by Fuel Type (MW)

operate a variety of different plant types, but non-utility production is predominantly natural gas.[4] Coal is the next most common fuel, accounting for 14 percent of generation capacity, followed by lignite at 12 percent. Nuclear power is 9 percent of installed capacity, while hydroelectric power and renewables account for only 1 percent of capacity.

Although natural gas dominates installed generating capacity, gas accounts for a smaller amount of total generation, equal to 41 percent of total generation (33 percent utilities and 8 percent non-utilities). The share of gas in total generation differs from the share in installed capacity because economic and physical differences among generating technologies lead to differences in use profiles. Large generating units with high capital costs such as nuclear, coal, and lignite facilities usually have lower operating costs on a per unit of output basis than lower capital cost natural gas

[4] Two notable exceptions involve facilities larger than 100 MW. Alcoa's generation facility uses lignite as fuel, and AES's plant uses petroleum coke.



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Note: The share of non-utility power may be underestimated. Some non-utility data may be excluded from the results because non-utilities complied voluntarily with the Data Request, while utility compliance was mandatory. The reported capacity of multistate utilities has been adjusted for Texas demand allocation.

Figure V–3: 1995 Electricity Generation in Texas by Fuel Type (MWh)

facilities. As utilities work to meet customer demand in any given day, individual generating units are added (i.e., dispatched) to the generation mix on an increasing cost basis. (The unit with the lowest variable costs is dispatched first, followed by increasingly higher cost units.) Comparatively larger generating units such as nuclear, coal, and lignite facilities have relatively low fuel costs, and typically require longer periods for starting up and shutting down. Optimally, a system operator would prefer to keep these facilities on line as much as possible to avoid start-up and shut-down, and possibly damaging the units. As a result, nuclear, coal, and lignite plants are typically operated as "baseload" plants—those that are run above some minimal level around the clock—while more flexible natural gas plants are dispatched as intermediate or peaking facilities. Thus, coal plants account for 24 percent of total generation, while lignite is 19 percent, and nuclear plants fill 15 percent.

1. Vertical Integration of Operating Utilities in Texas

Traditionally, operating utilities in Texas have integrated the various services required to provide electricity at retail. The services that operating utilities typically provide can be divided into three separate, but non-exhaustive, functions:

1. *Generation* consists of the physical production of electric power.
2. *Transmission* refers to transportation of power along the high-voltage wires and the promotion of stability and reliability of the power system.
3. *Distribution* consists of the transportation of power from the high-voltage transmission network, over low-voltage facilities, to final consumers.

Integration refers to the incorporation of these three integral functions under a single umbrella. A "fully vertically integrated" utility provides generation, transmission, and distribution services. Integration may also extend beyond these three functions. Some utilities also own and operate fuel supplies, such as lignite resources and natural gas production facilities, storage facilities, and pipelines.[5] Many utilities have also integrated energy services with distribution.

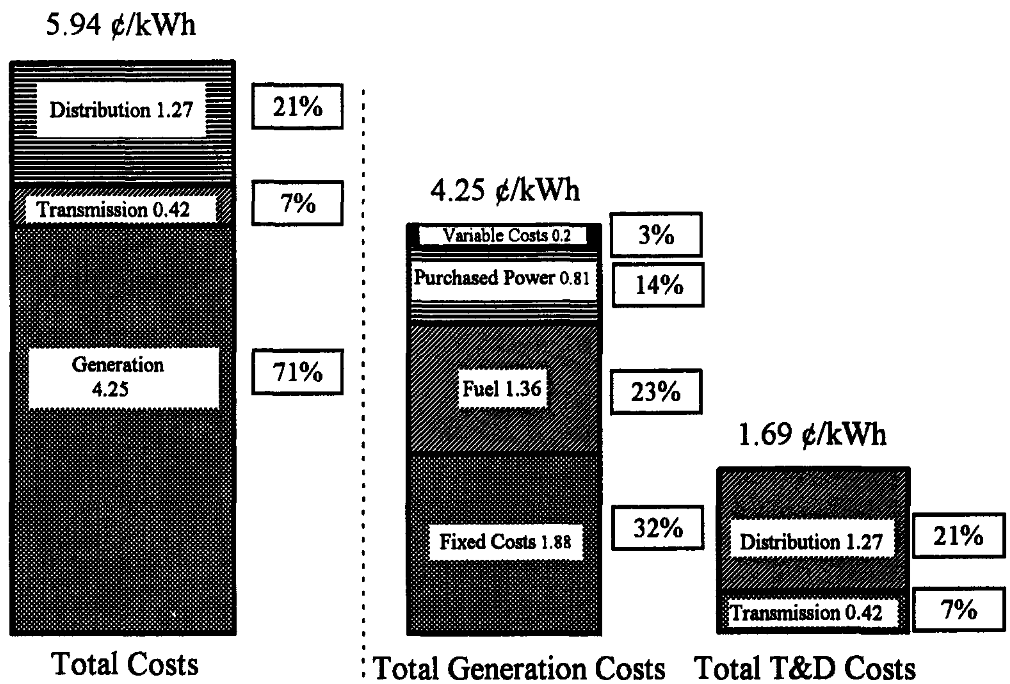
The typical degree of vertical integration differs by type of energy provider. All of the investor-owned utilities in Texas currently integrate generation, transmission, and distribution.[6] River authorities and generation and transmission (G&T) cooperatives perform only generation and transmission functions, while distribution cooperatives may provide distribution and transmission or distribution only. No cooperatives in Texas are fully vertically integrated. However, cooperatives achieve vertical integration on a contractual basis because the G&T cooperatives are owned by their

[5] For example, Texas Utilities Electric Company (TU Electric) affiliates include Texas Utilities Mining Company (TUMCO) and Texas Utilities Fuel Company (TUFCO). TUMCO and TUFCO are involved in the production and transportation of lignite and natural gas, respectively, for use in TU Electric's generating facilities. As a further example of diversification in the Texas energy services market, Texas Utilities and Houston Industries currently have mergers pending with Enserch Corporation and Entex, respectively, which are the two largest local distribution companies of natural gas in the State.

[6] Southwestern Electric Service Company (SESCO) is the one exception. SESCO is a subsidiary of TU Electric Company, and obtains its power requirements from its parent company.

member distribution cooperatives.[7] Municipally owned utilities may be fully vertically integrated or may provide only distribution services or transmission and distribution.

Figure V–4: Illustration of Integrated Components of Utility Costs in Texas



Source: Commission Staff computation based on sample data drawn from FERC Form 1 submissions.
Note: Specific values are an illustration of conditions in Texas, but do not represent a specific utility or an average value for the State.

Figure V–4 illustrates the relative magnitude of total utility costs attributable to the three primary integrated functions on a cent per kilowatt-hour (¢/kWh) basis. The left-hand portion of the figure shows the magnitude of generation, transmission, and distribution cost components in total utility costs. Generation costs are by far the largest portion of total utility costs, in this illustration, 4.25 ¢/kWh, about 71 percent, of the total cost of 5.94 ¢/kWh. The right-hand side of Figure V–4 further disaggregates the components of utility costs, and shows the relative magnitude of generation and transmission and distribution costs. Generation costs can be

[7] A G&T cooperative generates and transmits electricity to non-generating, distribution utilities. In Texas, several G&T utilities own both generating units and transmission lines. Other G&T utilities own little or no generating or transmitting facilities. These "paper G&Ts" are cooperatives comprised of other cooperatives. The purpose of the paper G&T is to pool the other cooperatives' demand, increase bargaining power, and reduce administrative costs.

disaggregated into fixed costs (1.88 ¢/kWh), fuel (1.36 ¢/kWh), purchased power, i.e., wholesale purchases (0.81 ¢/kWh), and variable costs (0.2 ¢/kWh).

This figure can also be used to consider the implications of a more competitive electric market. Most observers believe that transmission and distribution will remain monopoly functions for the foreseeable future.[8] Of the generation cost components, only certain components are likely to be affected by competition. Fixed costs are prior cost commitments of the utilities. Because fixed costs are already on the utilities' books, they will not be reduced by efficiency gains, at least in the short- and intermediate-term.[9] Fuel costs are somewhat influenced by the purchasing power of the larger utilities, and the recent merger activity between electric utilities and natural gas supply companies may create greater supply efficiencies. On-going capital investments may improve the efficiency of fuel consumption in power plants. Current ratemaking practices pass the costs of fuel price fluctuations to electricity customers.

The remaining fraction of generation costs in Figure V–4 are purchased power and variable costs, equal to about one cent in this illustration, or about 17 percent of total utility costs. In the short-term, this is the portion of utility costs where competitive pressures will have a direct effect. Although some utilities may not be able to control their purchased power (wholesale) costs directly, the wholesale market is increasingly subject to competition. Competition will put substantial pressure on the utilities to become more efficient in operations and maintenance. In the longer term, fixed costs and fuel will be affected as well, but that will be a gradual influence as uneconomic plants are phased out, utilities improve existing plants, and new, more efficient supplies are introduced.

[8] Although transmission and distribution are likely to remain monopoly functions, legislative and regulatory activities can create incentives for utilities to reduce costs of transmission and distribution. See for example the discussions of energy services unbundling in Chapter VI and incentive regulation in Chapter XII.

[9] The value of fixed costs on a company's books could be changed by writing down the value of utility assets or by policy decisions related to stranded investment allocation and recovery.

2. Wholesale and Retail Markets Defined

Electricity sales can be divided into wholesale and retail functions depending upon the final disposition of the power. Wholesale transactions involve sales for resale; the wholesale market is often referred to as a "commodity" market. Wholesale sellers may be either utilities or non-utilities. Utilities often make short-term wholesale sales of excess power, but most wholesale transactions occur under long-term contracts. Some utilities, including G&T cooperatives, sell only at wholesale. River authorities also sell exclusively at wholesale. Distribution cooperatives and municipally owned utilities that do not own generation resources are the primary buyers of wholesale power. IOUs will also buy at wholesale on a short-term basis.

The new categories of non-utility providers are participants in wholesale markets. QFs sell excess power into the wholesale market. EWGs and power marketers are allowed to sell only at wholesale.

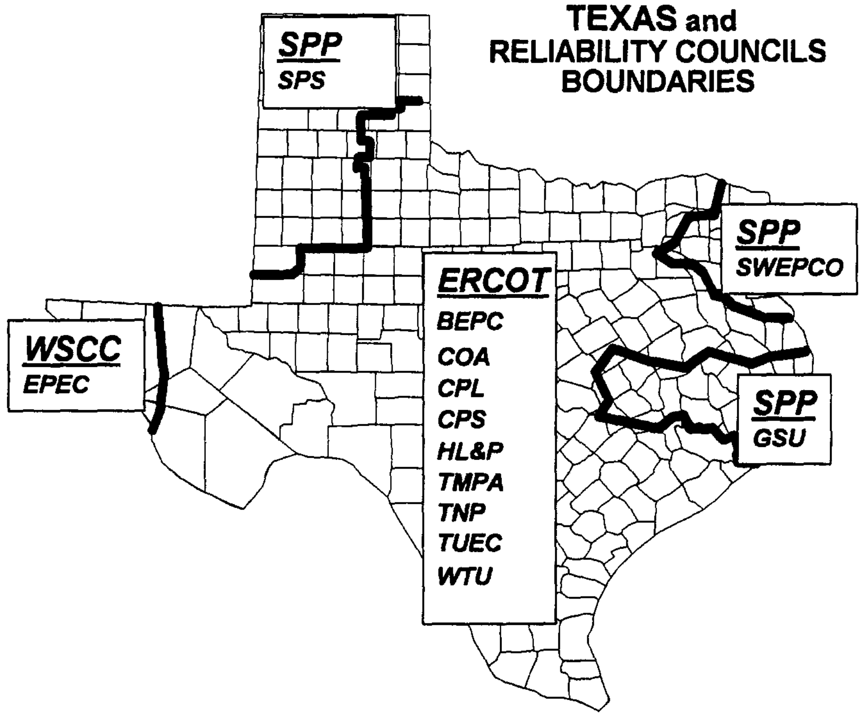
Retail electricity markets are those in which electricity services are delivered to end-users. Retail sales are defined as sales from utilities to end-users in the residential, commercial, industrial, and "other" classes.[10] Retail public utilities include IOUs, distribution cooperatives, and municipally owned utilities, all of which operate under CCN requirements and alternative forms of rate regulation.[11] Fully integrated utilities are able to take advantage of the integrated structure to sell at both retail and wholesale.

3. Reliability Councils Interconnect Utilities within the State

All utilities in the United States operate within a reliability council. The Electric Reliability Council of Texas (ERCOT) operates entirely within the State of Texas. Other utilities in Texas are members of the Southwest Power Pool (SPP) or the

[10] Other retail sales include, but are not limited to, energy delivered to street lighting, pumping, cotton gins, and government customers.

[11] Qualifying co-generators are explicitly excluded from the list of entities defined as retail public utilities under PURA95 §2.251.



Note: SPP = Southwest Power Pool; ERCOT = Electric Reliability Council of Texas; WSCC = Western Systems Coordinating Council

Figure V–5: Boundaries of ERCOT and Neighboring Reliability Councils

Western Systems Coordinating Council (WSCC). Figure V–5 shows the boundaries of the various reliability councils serving Texas.

ERCOT is unique among the nine reliability councils in the United States, because ERCOT is the only council operating entirely within the boundaries of a single state. As a result, laws governing the transportation of electricity in *inter*state commerce may not apply to ERCOT utilities, and some specific requirements may differ from requirements for non-ERCOT utilities. The unique status of ERCOT, being entirely within the State boundary, allows the Commission jurisdiction over transmission in ERCOT apart from the jurisdiction of the FERC.[12] Thus, the recent transmission rules issued by the Commission under the authority of PURA95 stem from this unique arrangement.

[12] The FERC has exercised rate-setting authority with respect to CPL and WTU.

Reliability councils are significant because they provide a means of interconnection and stability among the many utilities in a region. The interconnection provides access to the transmission system within the reliability council, facilitating the flow of wholesale power. Interconnection also provides backup power and system support that minimizes disruptions in the system.[13]

The interconnection between the utilities in ERCOT and the utilities in SPP and WSCC is limited to a total of 820 MW. ERCOT and SPP are connected through two direct current ties (DC ties). The first is the "North DC Tie" with a capacity of 220 MW, located at the Oklaunion power plant in Wilbarger County, Texas. This tie is owned by two CSW operating companies; WTU (in ERCOT) owns 12.5 percent and Public Service of Oklahoma (in SPP) owns 87.5 percent. The second is the "East DC Tie" with a capacity of 600 MW, connecting the Monticello power plant and the Welsh power plant in Titus County. TU Electric owns the Monticello plant and 16.67 percent of the DC tie. The other ERCOT utility owners of the East DC tie are CPL with 25 percent and HL&P with 33.33 percent ownership. On the SPP side of the tie, SWEPCO owns the Welsh power plant and 25 percent of the East DC tie. Together, the DC ties represent a little over 1 percent of the total capacity installed in Texas.[14] Although ERCOT utilities are interconnected with those in the SPP, the capacity limitations of the DC ties imply that ERCOT utilities may face somewhat different competitive conditions from those outside ERCOT.

Under rules adopted by the Commission in the Fall of 1996, ERCOT will be reorganized, becoming the nation's first independent system operator (ISO). The ISO will be responsible for the reliability of the intrastate portion of the Texas electric grid and for ensuring equal access to transmission service by all wholesale market participants in the ERCOT region. The ISO's responsibilities will include:

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[13] The same interconnection may also be a vulnerability of the system. As the two widespread power outages in the western United States demonstrated in the summer of 1996, under certain conditions, the interconnection may contribute to more widespread disruptions.

[14] The only respondent to the question of the Commission's Data Request under Project No. 15002 issued April 11, 1996, on imports and exports through the DC ties was CSW, which reported activity for 1995 that represents less than 0.4 percent to the total energy sold in Texas.

- Daily administration of the ERCOT transmission tariffs (including alternative dispute resolution procedures and the implementation of the loss compensation mechanism);
- Coordinating the scheduling of generation and transmission transactions;
- Overseeing the instantaneous balancing of generation and load;
- Curtailment and redispatch of generation and transmission transactions in emergencies;
- Analysis, coordination, and redispatch of generation transactions for economic purposes to free up transmission capacity; and
- Serving as a single point of contact for the initiation of transmission transactions.

The ISO will not purchase or sell bulk electricity or dispatch generation facilities, but will have full authority to direct the redispatch of generation facilities under emergency conditions. The ISO will also administer the ERCOT electronic transmission information network. Transmission-owning utilities are required to post information concerning the capability of transmission facilities to provide transmission service to potential customers on their electronic information network. Utilities that operate transmission facilities may not provide preferential access to transmission information not available on the network. The electronic network will permit utilities, and their competitors—QFs, power marketers, EWGs, and other utilities—to access contemporaneous, real-time information about the availability of transmission and ancillary services.

4. Operating Utilities in Texas

There are 158 utilities operating in Texas,[15] as well as four river authorities.[16] Table V–1 presents the principal Texas utilities and river authorities with generation and transmission facilities. Figure V–6 presents a service area map for the largest operating

[15] Operating utilities are defined as those utilities that sell electricity to final consumers, either self-generated or purchased in the wholesale market and those that generate electricity to be sold in wholesale markets. Operating utilities include ten IOUs, eight G&T cooperatives, 70 municipally owned utilities, and 78 distribution cooperatives (Public Utility Commission of Texas, *Electric Utilities in Texas 1996 Directory*, Austin, Texas). Operating utilities do not include power marketers or industrials selling in wholesale markets (QFs and EWGs).

[16] Public Utility Commission, *1995 Annual Report*, Austin, TX (June 1996).

Table V–1: Major Generation and Transmission Utilities in Texas

Investor-owned Utilities	Headquarters	Reliability Council
Central Power and Light Company (CPL)	Corpus Christi, TX	ERCOT
El Paso Electric Company (EPE)	El Paso, TX	WSCC
Gulf States Utilities Company (GSU)	Beaumont, TX	SPP
Houston Lighting & Power Company (HL&P)	Houston, TX	ERCOT
Southwestern Electric Power Company (SWEPCO)	Shreveport, LA	SPP
Southwestern Electric Service Company (SESCO)	Dallas, TX	ERCOT
Southwestern Public Service Company (SPS)	Amarillo, TX	SPP
Texas-New Mexico Power Company (TNP)	Ft. Worth, TX	ERCOT
Texas Utilities Electric Company (TU Electric)	Dallas, TX	ERCOT
West Texas Utilities Company (WTU)	Abilene, TX	ERCOT
River Authorities	**Headquarters**	**Reliability Council**
Brazos River Authority (BRA)	Waco, TX	ERCOT
Guadalupe-Blanco River Authority (GBRA)	Seguin, TX	ERCOT
Lower Colorado River Authority (LCRA)	Austin, TX	ERCOT
Sabine River Authority (SRA)	Orange, TX	SPP
Generation & Transmission Cooperatives	**Headquarters**	**Reliability Council**
Brazos Electric Power Coop. (BEPC)	Waco, TX	ERCOT
Northeast Texas Electric Coop. (NTEC)	Longview, TX	SPP
Rayburn Country Electric Coop. (RCEC)	Rockwall, TX	ERCOT
Sam Rayburn G&T Electric Coop. (SRG&T)	Nacogdoches, TX	SPP
San Miguel Electric Coop. (SMEC)	Jourdanton, TX	ERCOT
South Texas Electric Coop. (STEC)	Nursery, TX	ERCOT
Tex-La Electric Coop. of Texas (Tex-La)	Nacogdoches, TX	ERCOT
Western Farmers Electric Coop. (WFEC)	Anadarko, OK	SPP
Major Municipally owned Utilities	**Headquarters**	**Reliability Council**
City of Austin Electric Utility (COA)	Austin, TX	ERCOT
City Public Service of San Antonio (CPS)	San Antonio, TX	ERCOT
Lubbock Power & Light (LP&L)	Lubbock, TX	SPP
Public Utilities Board of Brownsville (PUBB)	Brownsville, TX	ERCOT
Texas Municipal Power Agency		ERCOT
City of Bryan	Bryan, TX	ERCOT
Denton Municipal Utilities	Denton, TX	ERCOT
Garland Utilities	Garland, TX	ERCOT
Greenville Utilities	Greenville, TX	ERCOT

Source: Public Utility Commission of Texas, *1995 Annual Report*, Austin, TX: Public Utility Commission of Texas (June 1996); *Electric Generating Unit Inventory*, Austin, TX (November 1994)

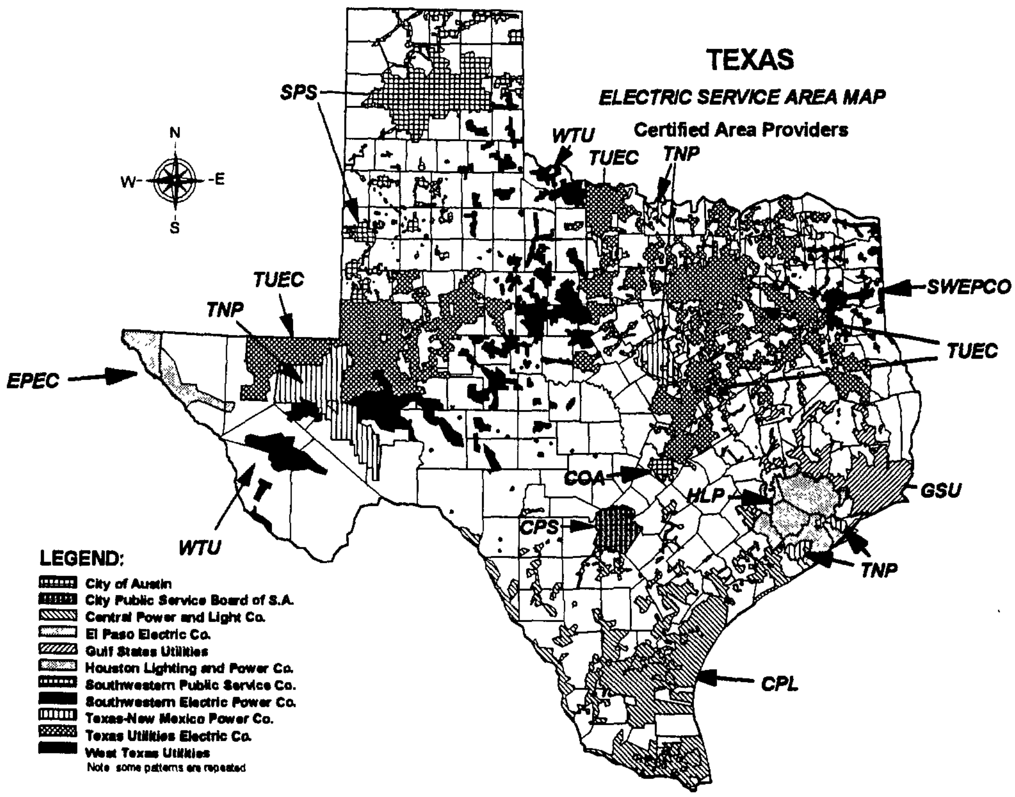

Figure V–6: Service Territory Boundaries of Major Utilities

utilities in Texas. A few utilities have very broad service territories, for example, TU Electric, CPL, and WTU. Many of the smaller distribution cooperatives and municipally owned utilities are dispersed in and around the territories of many of the more geographically dispersed utilities.

a) Retail Sales

In 1995, the operating utilities sold 265 million MWh of electricity in the State, 248 million MWh of which was delivered to retail (i.e., end-use) customers. Table V–2 shows total retail sales by customer class, for each of the three types of retail utilities. Total retail sales by IOUs are over forty times the retail sales of distribution cooperatives and municipally owned utilities. Residential sales are about one-third of total IOU sales; but for other types of utilities, residential sales are a larger share of the total. For municipally owned utilities, residential sales are about 41 percent of all retail sales, and for cooperatives, residential sales are nearly 60 percent of the total.

Table V–2: 1995 Utility Retail Sales by Customer Class (million MWh)

Utility Type	Customer Class				Total
	Residential	Commercial	Industrial	Other	
IOUs	67.50	57.04	73.22	8.29	206.04
Distribution cooperatives	10.12	3.40	2.51	1.02	17.04
Municipally owned	10.24	7.32	5.15	2.33	25.03
Total	87.85	67.75	80.88	11.64	248.12

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Texas' eleven largest retail utilities provided approximately 90 percent of the retail electricity in 1995. Table V–3 presents the 1995 retail sales of the thirteen largest utilities (11 primarily retail, 2 exclusively wholesale) broken down by customer class, as well as total generation for each of the major utilities. The difference between total generation and retail sales is primarily wholesale sales, but also includes generation used internally. Comparing the results in Table V–3 with the totals in Table V–2 shows that the two largest utilities, TU Electric and HL&P, accounted for 63 percent of all retail sales in Texas in 1995. Note the distinction between TU Electric and HL&P with respect to the size of sales by customer class. For TU Electric, industrial sales are about 24 percent of all its retail sales, with residential sales 38 percent of the total. For HL&P, industrial sales are fully 46 percent of its total retail sales, while residential sales are 30 percent, and commercial sales are approximately 23 percent.

b) Peak Demand, Capacity, and Capacity Needs

Generating units are often identified as base load, intermediate, and peaking. As noted above, base load units—usually nuclear, coal, and lignite—are the largest generating plants, those which operate nearly full-time. Intermediate units are usually dispatched after baseload units, and peaking units are usually the last units dispatched to meet short-term peak period demand.

Table V–3: Retail Sales and Generation of Major Operating Utilities in Texas, 1995

Utility	Own Generation (millions of MWh)	Retail Sales (millions of MWh)				Retail sales (% of own generat.)
		Resid.	Comm.	Ind.	Other	
TU Electric	88.4	30.7	25.6	19.5	5.6	92.1 %
HL&P	56.4	18.1	14.2	27.8	0.1	106.7
CPL	25.6	6.2	6.6	5.2	0.6	72.7
CPS of San Antonio	15.4	5.6	2.2	3.8	1.9	87.7
GSU	14.8	3.9	2.8	6.3	0	87.8
SPS	11.4	1.9	2.1	6.1	0.4	92.1
LCRA	10.3					N/A
City of Austin	8.5	2.8	3.7	0.4	0.3	84.7
WTU	6.7	1.5	1.1	1.2	0.5	64.2
EPE	4.4	1.1	1.4	1.1	0.7	97.7
SWEPCO	5.4	1.7	1.5	4.1	0.2	138.9
TNP	2.6	1.9	1.5	1.6	0.1	196.2
BEPC	2.2					N/A

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Generation excludes purchases from QFs. Generation of multijuisdictional utilities adjusted for Texas generation demand allocation, as filed in Project No. 15001. Sales include non-ERCOT sales in Texas.

Operating utilities in Texas experienced an aggregated 53,759 MW coincident peak demand in the summer of 1995.[17] TU Electric had a peak demand of 18,631 MW, which was the highest in the state. Net system capacity in Texas in 1995 reached 64,246 MW, resulting in a statewide reserve margin of 19.51 percent.[18] A utility's reserve margin is the utility's capacity in excess of its expected peak. An adequate reserve margin is required to maintain system reliability. ERCOT requires its member utilities to maintain a minimum 15 percent target reserve margin. Thus, *excess* capacity—capacity in excess of the 15 percent reserve margin—is almost 5 percent. Excess capacity is projected to continue until at least the year 2000.[19] Estimated

[17] Office of Regulatory Affairs, *1996 Statewide Electrical Energy Plan for Texas*, Austin, TX: Public Utility Commission of Texas at Appendix I (June, 1996).

[18] *Id.* Peak demand estimates are adjusted for demand-side management and exogenous factors.

[19] *Id.*

excess capacity may be underestimated, however, because system capacity and reserves exclude non-utility power.

Although ERCOT currently requires a 15 percent reserve margin, additional technological and/or market efficiencies could reduce the quantity of reserves required to maintain reliability. Any such reduction in the reserve margin guidelines would extend the excess capacity and the interval until which capacity is required.

Excess capacity can contribute to competition and lower prices of electricity. A utility with excess capacity improves its financial performance when it attracts a new customer if it charges this customer a price above the utility's marginal cost. The benefits can be obtained from the contribution that the new customer makes to the utility's fixed costs. The utility may also benefit from the diversification of the load, that is, a more efficient use of existing generation capacity. On the other hand, if a utility does not have excess capacity, it cannot make a credible threat to offer electricity to another's utility customer at a lower price, unless it provides new generation capacity, increases its wholesale purchases, improves efficiency, or stops serving its own customers.

c) The Price of Electricity at Retail

The final price of electric energy delivered to retail customers in Texas varies across utility type, individual provider, and customer class. Prices for different customer classes will differ for a variety of reasons; the unit costs of service a given customer may depend upon the quantity of electricity purchases, the load shape (i.e., the consistency of the demanded quantity), and the accessibility of the customer. Table V–4 presents average retail revenue per unit (i.e., the average cost to the final consumer), for the different types of electricity supplier. On average across all utility types, there is only limited variation among the rates of the different types of providers, ranging from 6.42 ¢/kWh for municipally owned utilities to 7.15 ¢/kWh for distribution cooperatives. However, comparing differences across customer classes reveals much greater variation. On average, residential customers pay 7.84 ¢/kWh for electric service, while commercial customers pay 6.80 ¢/kWh. Industrial customers, on average, pay 4.81 ¢/kWh, almost three cents less per kWh than residential customers.

For residential customers, the average price of power supplied by IOUs is more than a cent higher than power supplied by municipally owned utilities, but for industrial customers, the reverse is true—the average price from municipally owned utilities is almost one cent *greater* than for IOUs. Although there is considerable variability in the average price that different types of utilities charge residential and industrial customers, there is little variability among the utility types in the average prices facing commercial customers. These differences in residential and industrial prices for different types of utilities may be a result of policies by municipally owned utilities that subsidize residential rates from industrial rate revenues.

Table V–4: 1995 Average Retail Price by Customer Class (¢/kWh)

Utility Type	Customer Class				Weighted
	Residential	Commercial	Industrial	Other	Average
IOUs	8.04 ¢	6.81 ¢	4.73 ¢	9.97 ¢	6.60 ¢
Distribution cooperatives	7.47	6.92	5.12	9.70	7.15
Municipally owned	6.92	6.66	5.69	5.16	6.42
Weighted average	7.84	6.80	4.81	8.99	6.62

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Note: Average price is measured as total revenue divided by total sales (kWh) of all utilities in the State by type. Overall averages weighted by sales (kWh). Average price is the total cost of electric service, including generation, transmission and distribution costs.

5. Non-utility Electricity Suppliers in Texas

Non-utility suppliers in Texas include power marketers, exempt wholesale generators, qualifying facilities (co-generators and small power producers), renewable resource developers, and energy service companies:

- *Power marketers* become owners of electric energy for the purpose of buying and selling at wholesale. They do not own generation, transmission, or distribution facilities and do not have certificated service areas.[20]

[20] The legal role of a power marketer is defined in PURA95 §2.0011(3).

- *Exempt wholesale generators* own generation facilities for the purpose of producing and selling electric energy at wholesale but do not own transmission or distribution facilities other than essential interconnecting transmission facilities necessary to facilitate the sale.[21] This legal class of companies was created by Title VII of the 1992 EPAct to allow registered public utility holding companies and other corporate entities and individuals to own and operate separate wholesale generating facilities and co-generation facilities exempt from the provisions of PUHCA. An EWG may be an affiliate of a utility.
- *Qualifying facilities* are individuals or corporations that own and/or operate generating facilities, but are not primarily engaged in the generation or sale of electric power. QFs are either co-generation facilities or small power production facilities that qualify under PURPA. Co-generation facilities produce electric energy, steam used in manufacturing, and useful thermal energy used for industrial and commercial heating/cooling. Small power production facilities produce electric energy using biomass, waste, renewable resources,[22] or any combination thereof as a primary energy source. Capacity cannot be greater than 80 MW to qualify as a Small Power Production Facility.
- *Energy service companies* are private companies that provide energy management services. Escos provide energy audits; finance, install, and maintain equipment; provide demand-side management under contract, and manage customer risk. Such companies are not established under State or federal law as are other categories of non-utility suppliers.

Effective September 1, 1995, EWGs and power marketers were allowed to conduct business in Texas. Power marketers and EWGs who intend to purchase or sell electric energy in Texas are required to register with the Commission subject to PURA95 §2.053. The registered EWGs and power marketers are listed in Table V–5; as of September 1996, 50 entities have registered as either power marketers or EWGs. In many cases the registrants are affiliates of existing utilities and competing suppliers (e.g., natural gas pipeline companies). Many of these generators and marketers are currently bidding in resource solicitations, and are expected to bid in future resource solicitations conducted as part of the integrated resource planning process.

[21] See PURA95 §2.0011(2).

[22] Renewable resources include any source of energy that is continually available or that can be renewed or replaced. Examples include wind, solar, geothermal, hydro, photovoltaic, and wood power. As of 1995, renewable resources comprised a minute portion of the total electric generation in the State although the LCRA and the City of Austin have contracted with a wind power developer to provide 35 MW.

Table V-5: Texas Registered EWGs and Power Marketers as of September 1996

Company	EWG	Marketer	Date
Southern Energy Marketing, Inc.	✓	✓	June 26, 1995
LG&E Power Marketing		✓	July 25, 1995
Electric Power Clearinghouse, Inc.		✓	August 28, 1995
Delhi Energy Services, Inc.		✓	September 1, 1995
Mesquite Energy Services, Inc.		✓	September 13, 1995
Coastal Electric Services Corporation		✓	September 19, 1995
Destec Power Services, Inc.		✓	September 25, 1995
Englehard Power Marketing, Inc.		✓	September 25, 1995
Associated Power Services, Inc.		✓	September 27, 1995
Enron Power Marketing, Inc.		✓	September 29, 1995
Cuero Hydroelectric, Inc.		✓	October 3, 1995
Power Clearinghouse, Inc.		✓	October 4, 1995
Houston Industries Energy - Peru, Inc.	✓		October 4, 1995
Industrial Energy Applications		✓	October 5, 1995
Morgan Stanley Capital Group, Inc.		✓	October 16, 1995
Vitol Gas & Electric, LLC		✓	October 19, 1995
Phibro, Inc.		✓	October 30, 1995
Energy Transfer Group		✓	November 8, 1995
Entergy Power, Inc.		✓	November 30, 1995
Encogen One Partners Ltd.	✓		December 27, 1995
Lone Star Energy Plant Operations, Inc.	✓		December 27, 1995
Louis Dreyfus Electric Power		✓	January 9, 1996
Duke/Louis Dreyfus, LLC		✓	January 9, 1996
Calpine Power Services Company		✓	January 29, 1996
Brazos Power Marketing Cooperative, Inc.		✓	January 30, 1996
Coral Power, LLC		✓	January 30, 1996
Eastex Power Marketing, Inc.		✓	February 23, 1996
Entergy Power Marketing Corp.		✓	March 1, 1996
Valero Power Services Company		✓	March 26, 1996
CSW Power Marketing	✓		March 27, 1996
Western Power Services		✓	April 4, 1996
New Gulf Power Ventures	✓		April 16, 1996
National Gas & Electric, LP		✓	April 19, 1996
Alcoa Power Marketing, Inc.		✓	May 14, 1996
Vastar Power Marketing		✓	May 16, 1996
Seagull Power Services, Inc.		✓	May 28, 1996
DuPont Power Marketing		✓	June 11, 1996
Noram Energy Services		✓	June 21, 1996
Rainbow Energy Marketing Coalition		✓	June 27, 1996
Preferred Energy Services		✓	July 11, 1996
Newgulf Power Venture, Inc.	✓		August 2, 1996
Latrobe Power Corporation	✓		August 6, 1996
Windpower Partners	✓		August 15, 1996
Quester Energy Trading		✓	August 22, 1996
Power Source		✓	August 30, 1996
Entergy Power Development	✓		September 6, 1996
Liberty Power Ltd.	✓		September 6, 1996
North American Energy Service	✓		September 10, 1996
Williams Energy		✓	September 11, 1996
EnergyOne		✓	September 18, 1996

Source: Registration applications filed with the Public Utility Commission of Texas, Project No. 14406.

Although a number of companies have registered with the Commission as power marketers and EWGs, most of the non-utility energy supplied in Texas is produced by QFs.

Under Project No. 15002, the Commission conducted an extensive survey of utilities and alternative energy producers. As the alternative producers are not required under PURA95 to respond to Commission data requests, the request directed a more limited set of questions at alternative suppliers. Alternative suppliers were asked to provide:

1. Generating capacity in Texas;
2. Total generation for 1994 and 1995;
3. Total sales to IOUs and other entities during 1994 and 1995;
4. Total revenues for 1994 and 1995;
5. Texas transactions conducted by power marketers; and
6. Contract terms for contracts with utilities in Texas.

Sixty-nine parties not falling within the purview of Commission regulatory authority responded voluntarily to the Commission's data request. Because of concern for confidentiality, 20 firms submitted an aggregated response, utilizing the services of an independent aggregator. Of the total, 30 responding firms are classified as QFs (primarily co-generators), and 10 are self-generators. Five responding firms are classified as power marketers; one reported as an EWG. An additional 20 firms responded but reported that they do not generate electricity. Of the known firms that did not respond to the Commission's data request, at least 11 are Power Marketers, with no activity during 1994 and 1995. Given available evidence from Commission Staff interactions with the relevant parties in Texas and periodic review of trade publications, it is likely that the responding parties represent the bulk of non-utility generation, but the unreported quantity is unknown. In particular, the responses to the data request may significantly under represent self-generators.

The total installed capacity in 1995 reported by non-utilities is close to 10,000 MW. These facilities generated 41.6 million MWh in 1995, an increase of 6 percent from 1994. These non-utilities sold 21.3 million MWh to utilities, and used the remaining

20.3 million MWh for their own consumption. Due to the selective reporting, these aggregate values are underestimates, but are likely to account for most of the non-utility generation. Although the Commission data request asked companies to supply additional data on revenues and contract terms, few parties submitted responses to these questions.

6. Texas Electric Utilities Activities in International Markets

At the corporate level, the electricity portion of the energy market is increasingly becoming an international market. Electric industry privatization and restructuring initiatives across the globe have introduced new opportunities for foreign investments in generating plants, distribution companies, and other related industries. In the past few years, Texas utilities have been active international investors. Table V–6 presents a selection of major international investments by Texas electric utilities in 1995 and 1996. The dollar value of these investments exceeds $4.7 *billion*. (Further discussion of mergers of Texas electric utilities with domestic natural gas supply companies is included in Chapter XII.)

Table V–6: International Investments of Texas Electric Utilities in 1995 and 1996

Texas Utility	Transaction Description	Date	Value of Investment
CSW	Seeboard—U.K. electric utility	1996	$ 2.12 billion
CSW	Vale—Brazilian electric distribution utility	1996	approx. $ 40 million
Entergy	Central Buenos Aires Project—co-generation facility	1995	$ 3.6 million
Entergy	EDEGAL—Peruvian electric generator	1995	$ 165 million
Entergy	Citipower—Australian electric distribution utility	1996	$ 1.2 billion
Houston Industries	Light—Argentine electric utility	1996	$ 392 million
Houston Industries	EDELAP—Argentine electric utility	1996	$ 82 million
Houston Industries	HIE-Argener & HIE_OPCO—Argentine co-generation facilities	1995	$ 38 million
Houston Industries	Rain—Indian coke calcinating facility	1995	$ 8 million
Texas Utilities	TU Australia	1995	$ 671 million

Sources: Company 10-K and 10-Q reports to the Securities and Exchange Commission and Quarterly Report of Fuco and Foreign EWG Investments pursuant to P.U.C. SUBST. R. 23.18.

B. Competition in the Wholesale Electric Market

Legislative and regulatory changes at the federal and State level have jump-started the competitive wholesale market in the United States and in Texas. Current retail competition in Texas is extremely limited, confined to a relatively small portion of the State that is multiply certificated. Despite rapidly developing changes in the wholesale market, analytic evidence of the extent of current competition is limited because these competitive developments have only recently emerged. Where available, hard evidence of competition and its effects is presented below. Since that evidence is limited, this section serves, in part, to create a benchmark against which competitive developments can be compared in future Scope of Competition reports.

1. Emergence of a Competitive Wholesale Market

The 74th Legislature amended PURA95 to promote competition in the wholesale market. The statute does not attempt to define "wholesale" or the phrase "sales for resale."[23] For the purposes of this report, wholesale electric markets are interpreted as "electric sales for resale." As noted above, the Texas wholesale market is relatively small. Most of the electricity consumed in Texas is generated by vertically integrated electric utilities and distributed to end-use customers by those same entities.

Until the recent changes in the wholesale market brought on by EPAct and PURA95, wholesale *competition* in Texas was almost nonexistent. IOUs engaged in some short-term exchanges of excess wholesale power in the economy energy market, but most wholesale transactions have been governed by long-term supply contracts. Because of the vertical integration of the industry and the control of the transmission network by a few large utilities, wholesale buyers in the past had few alternative suppliers for their bulk power contracts other than contiguous integrated utilities. Although legislative and regulatory changes are beginning to create a viable wholesale market, the level of

[23] Prior to the 1995 session of the Texas Legislature the term "wholesale" did not appear in the Public Utility Regulatory Act. Although the term "wholesale" is not specifically defined in PURA95, two sections of the current law address competition in wholesale markets: §2.001 (Legislative Policy Concerning Regulation of the Electric Utility Industry) and §2.057 (Wholesale Competition). The operational definition of wholesale is found in the Federal Power Act §201(d): "a sale of electric energy to any person for resale."

activity of that market may not reach its full potential for a number of years because of the large quantity of power committed to long-term wholesale contracts. In comments on the draft report, HL&P noted that utilities are becoming active in the economy energy segment of the wholesale market:

> *If the wholesale market has [cheaper] power available . . . why wouldn't we buy it? We could back down our generation, purchase something cheaper, and either pocket the difference or pass that through . . .*[24]

As has been discussed in this report, PURPA introduced the first new category of competitors, co-generators. The EPAct allowed new types of generators into the market, along with the power marketers. In any truly competitive market, goods must be capable of being transferred at little or no additional cost within the market to those who value the good most dearly. For other types of goods, this function is often filled in financial markets for spot, futures, and option contracts, mechanisms that have not previously existed in the electric industry. In the wholesale market for electricity, power marketers are now playing a related role in the transfer of excess power to those most willing to pay for it. Although the economy energy market has been relatively small in the past, competitive pressures to cut costs are likely to lead to a much more active exchange. In the future, the economy energy market may dominate the wholesale power market.

The requirements under PURA95 for open access and comparability of service—and comparable requirements from the FERC in its Order No. 888—now guarantee EWGs and power marketers access to the transmission system. Without transmission access comparable to the access that integrated utilities have for their own wholesale power, these new suppliers would not be able to succeed in the market. The Commission's new rules guaranteeing comparable access to the transmission system in ERCOT mean that *all of ERCOT is now the relevant market for wholesale power*.

[24] McGoldrick, Joe, HL&P oral comments on the Staff Draft Scope of Competition report at the Staff Technical Session on the Draft Legislative Reports, Project No. 15000 (November 8, 1996).

2. The Nature of Wholesale Markets

The operation of the wholesale market is determined by the rules—both formal and informal—under which it operates. Three factors in particular affect the opportunities available for market participants:

- The prevalence of wholesale contracts;
- Access to transmission facilities; and
- Rules governing resource solicitations.

These factors will have a significant influence on the degree to which the wholesale market becomes competitive.

a) Wholesale Contracts

The wholesale market has traditionally operated largely through long-term contracts. Long-term contracts provide distribution utilities lacking generation resources a guaranteed source of supply. In a sense, contracts provide distribution utilities the same degree of security of supply as the integrated utilities relying on their own integrated resources. For wholesale power suppliers, long-term contracts provide a guaranteed source of revenue.[25] In the increasingly competitive wholesale market, contracts could play a different role; the existence of long-term contracts may be a *constraint* on the wholesale market because the existing contract commitments prevent buyers and sellers locked into contracts from participating actively in the newly available market.

b) Access to Transmission Facilities

Access to transmission is a key component of the wholesale electric market because access allows competitors into the market. In the past, an integrated utility could use its ownership of transmission lines as a barrier to market entry by refusing to wheel power for others or by charging high rates for wheeling services. Effective March 3, 1996, the Commission adopted a rule requiring that transmission-owning utilities

[25] Capacity planning has typically included wholesale load.

provide transmission service on a comparable and non-discriminatory basis.[26] The new regulations require any transmission-owning utility, including municipal utilities, to provide transmission services to third parties on the same basis and price that it provides transmission service to itself and to provide the ancillary services that support the transmission of power on a comparable, non-discriminatory basis. Under the statute, the Commission is authorized to order utilities to provide transmission service and to require the construction or enhancement of transmission facilities.[27]

c) Competitive Resource Solicitation

A third key feature defining the nature of the wholesale market is resource planning and acquisition. Under State law, vertically integrated utilities are required to conduct long-term resource planning under the supervision of the Commission. Utilities have been required to obtain a CCN for power plants since the inception of the Commission. In 1983, the Commission was directed by statute to regulate electric utilities' planning activities, including the promotion of qualifying co-generators and small power producers and to consider conservation and other resources as alternatives to new power plant construction.[28] In August 1992, the Commission adopted a mandatory resource solicitation process (competitive bidding) for electric utilities.[29]

In its 1995 session, the Legislature replaced the Commission's existing planning authority with a new integrated resource planning (IRP) process. The Commission adopted IRP rules, effective July 29, 1996.[30] These rules require generating electric utilities to assess their additional resource needs and to conduct a solicitation for new resources. Certain non-generating utilities must also conduct a resource solicitation.

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[26] 21 *Tex. Reg.* at 1397 (February 20, 1996). P.U.C. SUBST. R. 23.67, Open-Access Comparable Transmission Service, implementing PURA95 §2.057(a). The Commission is now preparing to set transmission rates for each transmission-owning utility in various docketed proceedings.

[27] PURA95 §§ 2.056(a) and 2.051(w)(3).

[28] Public Utility Regulatory Act, Tex. Rev. Civ. Stat. Ann. art. 1446c (Vernon's 1980), as amended in 1983 (68th Legislature, S.B. 232), §§ 16 and 54. Section 16 related to the filing of biennial resource forecasts; §54 related to the certification of new power plants, including the two-step notice of intent and CCN process.

[29] 7 *Tex. Reg.* at 5683 (August 14, 1992).

[30] PURA95 §2.051, codified in 21 *Tex. Reg.* at 6780 (July 19, 1996).

The resource solicitation provides third parties an opportunity to bid to provide power and to have their bids weighed against other bids. The formal resource bidding process in Texas is an open (transparent) process, with bidders aware of the resource selection criteria and their assigned weights.

The new IRP process advances wholesale competition by requiring that vertically integrated utilities look beyond the traditional "build" option. The new process should give utility and non-utility suppliers an opportunity to provide generation to meet utility load previously served only by utility-owned generation.

3. The Scope of Competition at the Wholesale Level

There are several ways to gauge the competitiveness of the wholesale market in Texas. Some approaches rely on static measures of electric sales or power contract obligations. More dynamic approaches rely on estimating the level of current and potential market activity. These approaches include an examination of:

- Wholesale sales as a percent of total sales in Texas;
- Purchases of "firm" capacity by utilities under contract as a percent of total capacity available in Texas;
- The quantity of wholesale power tied up in long-term contracts;
- The magnitude of wholesale contracts changing hands in recent years, including the number of customers leaving current suppliers;
- The level of power marketing activity in Texas;
- Projected load growth and capacity needs; and
- The number of contracts that have been re-negotiated in anticipation of the coming of competition and open markets.

Even the simplest static measures of wholesale sales involve some complexities. Different measures of sales can be used, including the quantity of MWhs traded at wholesale, the capacity under contract, and the dollar value of wholesale revenue. An additional complication arises because more than one wholesale transaction may be involved before power is delivered from the generator to the final consumer. In such cases, the quantity of wholesale power traded may be *double-counted*. To measure the wholesale share of final sales, all double-counting should be eliminated. Secondary transactions may be relevant, however, in determining the level of activity in the wholesale market.

Trends in wholesale power are also difficult to identify exactly because reporting is incomplete—or at least scattered in various records—for some market participants. The Commission does not have extensive regulatory authority over all non-utility generators, and cannot compel comparable information disclosure and reporting. Thus, the total quantity of QF power and other non-utility data are not entirely clear.[31]

a) Size of the Wholesale Market

Net wholesale sales by Texas utilities equaled 12.6 percent of their total retail sales in the State in 1995.[32] Table V–7 presents net wholesale sales for selected years since 1981. Over that period, total system sales in Texas grew 44 percent, while total wholesale sales grew by 60 percent. Nevertheless, the wholesale share of total system sales has remained relatively stable during most of this period. The wholesale sales figures in the table net out the double-counting that occurs when a utility buys at wholesale and in turn resells at wholesale. Therefore, *total* wholesale activity—including secondary wholesale transactions—as a percent of final sales to the consumer would be higher than the values in the table, but the magnitude of the difference is unclear.

An alternate measure of the size of the wholesale market relates to the "firm" commitments of power plants installed to meet customer needs. "Firm power" is defined as "power or power-producing capability that is available to the electric utility pursuant to a legally enforceable obligation for scheduled availability over a specified term,"[33] and is often relied upon for peak demand. Firm power has a high likelihood of

[31] The Commission has reporting authority over EWGs and power marketers.

[32] Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

[33] P.U.C. SUBST. R. 23.66(a)(6). This definition appears in the "QF" section (Arrangements Between Qualifying Facilities and Electric Utilities), but the term is in common usage in electric proceedings before the Commission.

delivery because buyers pay an extra charge (which is generally embedded as a part of the standard rate) to reserve backup generating capacity and backup transmission capacity. Firm power commitments exclude economy energy transactions—short-term sales to balance electricity demand.

Table V–7: Texas Wholesale Sales as a Share of Total for Selected Years

Year	Total System Sales (million MWh)	Wholesale Sales (million MWh)	Wholesale Share of Total (percent)
1981	184.1	21.1	11.5 %
1983	193.3	25.6	13.2
1985	216.4	27.9	12.9
1987	219.9	28.2	12.8
1989	233.9	31.3	13.4
1991	242.5	30.7	12.6
1993	252.9	32.0	12.6
1995	265.2	33.8	12.7

Notes: Percentages presented may not match percentages of some components due to rounding. An alternate source of data collected for this report, the Data Request, indicates that wholesale sales by utilities equaled 12.6 percent of total retail sales in 1995.

Sources: Office of Regulatory Affairs, *1996 Statewide Electrical Energy Plan for Texas*, Austin, TX: Public Utility Commission of Texas at Appendix I (June 1996).

Table V–8 presents firm power purchases by Texas utilities for selected years since 1980. Between 1980 and 1995, total State generating capacity grew over 27 percent. During that period, firm purchases grew by over three times from 1,379 MW to 4,447 MW. Over the past decade, utility firm power purchases have held around 7 percent of total system capacity. In other words, 93 percent of utilities' needs have been met by power plants owned by those utilities, while the remainder has been bought from other utilities or non-utilities under firm contracts for power. Since 1980, shortly after the passage of PURPA, the largest change in the market for firm purchases has been the increased presence of non-utilities; firm purchases of non-utility capacity have grown almost 10 times.[34]

[34] Most of the purchases classified as "non-utility" in the table have been purchases from QFs. In the future, non-utility purchases may be filled by power marketers and EWGs.

Table V–8: Firm Power Purchases as a Share of Total System Net Capacity

Year	Texas Net System Capacity (MW)	Purchases from Utilities (MW)	Purchases from Non-Utilities (MW)	All Purchases as a Percent of Total	Non-utility Purchases as a Percent of Total
1980	50,481	1,132	247	2.7 %	0.5 %
1985	54,334	2,250	1,989	7.8	3.7
1990	62,894	1,230	3,482	7.5	5.5
1995	64,246	2,148	2,299	6.9	3.6

Notes: Net system capacity is calculated as total installed capacity, plus purchase commitments, less any off-system (out-of-Texas) commitments.

Sources: Office of Regulatory Affairs, *1996 Statewide Electrical Energy Plan for Texas*, Austin, TX: Public Utility Commission of Texas at Appendix I (June 1996). The 1980 data appeared in the 1992 report, Volume II, at 1.22.

b) The Rise of QF Power

Power purchases from non-utilities—primarily QFs—have grown in significance since passage of PURPA in 1978. In 1980, utilities contracted for only 247 MW of firm power from non-utilities. Table V–8 shows that by 1990, firm purchases from non-utilities grew to almost 3,500 MW, representing 5.5 percent of Texas' net system capacity. In the 1990s, firm power contracts with non-utilities have declined as contracts with QFs expired. Some of these contracts were not renewed because the Texas recession and the completion of the large nuclear generating units led to excess capacity, reducing the need for additional firm power commitments. Utilities have also suggested that the high price of QF power contracts made renewal unattractive.[35]

Although non-utilities provided about 3.6 percent of the firm capacity in Texas in 1995, non-utilities accounted for about 8 percent of electric production in Texas (as shown in Figure V–1). Non-utility production as a percent of total production is greater than the percent of power under firm contract for two reasons. First, non-utility units operate at a high capacity factor, that is, they operate for most of the hours in a year, so these units produce more energy than equal-sized utility units that are used less intensively.

[35] *Central and South West Corporation's Comments*, Project Nos. 15000 and 15002 (November 8, 1996).

Second, electricity is provided on both a firm and "non-firm" basis. Non-firm energy comes from generating facilities not under a firm contract with a utility.

Trends in capacity additions suggest that non-utility power should play an even larger role in the future. Although Texas data are not readily available, Table V–9 indicates that recent capacity additions in the United States are dominated by non-utility investments. In 1994, approximately 85 percent of capacity additions were made by non-utilities. Non-utility capacity has grown from 2.5 percent of total U.S. capacity in 1984 to 8 percent in 1994. No Texas utilities are constructing new power plants at this time, while several non-utility projects are under construction or have recently been completed. Capacity needs are generally being met through open solicitations, which provides non-utility suppliers an equal footing in filling capacity needs in the State.

Table V–9: Net U.S. Generating Capacity Additions

Year	Net U.S. Generating Capacity Additions: Electric Utilities (MW)	Net U.S. Generating Capacity Additions: Non-utilities (MW)	Non-utilities as Percent of: Total Additions	Non-utilities as Percent of: Total Capacity (US)
1984	14,280	606	4.1 %	2.5 %
1985	16,271	5,549	25.4	3.2
1986	18,951	2,401	11.2	3.5
1987	10,372	4,694	31.2	4.0
1988	5,796	3,726	39.1	4.5
1989	7,031	6,526	48.1	5.2
1990	4,168	4,860	53.8	5.8
1991	4,906	4,925	50.1	6.3
1992	1,694	5,136	75.2	6.9
1993	3,038	2,946	49.2	7.2
1994	1,265	6,876	84.5	8.0

Note: Electric utilities include investor-owned utilities, cooperatives, and all government-owned resources. Non-utilities include non-regulated entities, such as affiliates of electric utilities, QFs, and other IPPs authorized to operate in certain states.

Source: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry 1994* at T. 1.

c) Long-term Contracts Constrain the Wholesale Market

Despite the many changes that are opening the wholesale market to competition, the level of wholesale activity will remain restricted for many years by the presence of long-term supply contracts, some of which stretch until the year 2027. Table V–10 presents a summary of wholesale purchases under long-term contracts as of 1995. Almost two-thirds of the 166 contracts are to supply power to distribution cooperatives.

Municipally owned utilities hold about one-third of the contracts. IOUs hold only 5 total contracts. Although cooperatives hold just under two thirds of the contracts, they account for a much greater portion of the power. Distribution cooperatives account for almost 80 percent of the capacity under contract and over 81 percent of the total sales.

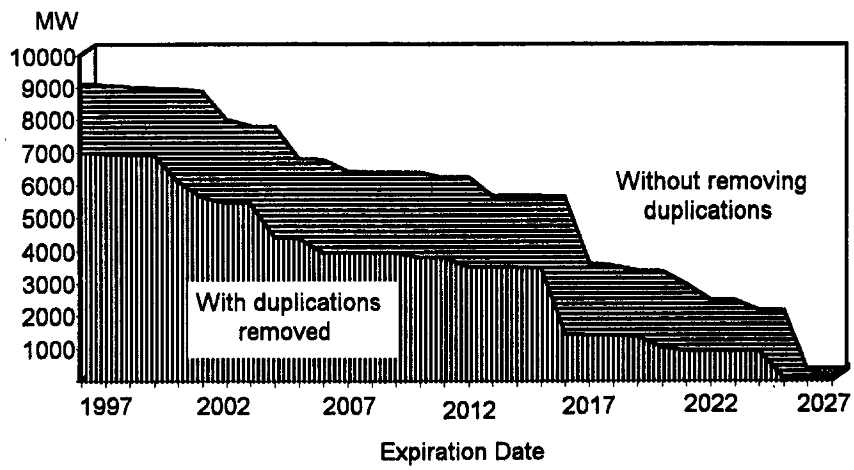
Table V–10: Allocation of Wholesale Contracts Among Final Purchasers

Utility Type	Number of Contracts	Capacity in All Contracts (MW)	Sales under Contract (1995; thousands MWh)
IOUs	5	587	1,971
Cooperatives	106	5,627	24,931
Municipally owned utilities	54	850	3,490
All utilities	166	7,064	30,562

Sources: Commission Staff computations based on responses to the Commission's Data Request, Project 15002, Scope of Competition Report, issued April 11, 1996, and follow up communications with representatives of reporting utilities.

Figure V–7 shows the dates when existing contracts are scheduled to expire. The height of the upper part of the figure (horizontally hatched) shows the quantity of all contracts in place in each given year, measured in MW. In 1996, over 9,000 MW of capacity are under contract in Texas. The change in height from one year to the next shows the MWs under contract expiring each year. The vertically hatched portion of the figure represents the *net* quantity of power after eliminating double-counting, over 7,000 MW. Double-counting (i.e., existence of secondary contracts) occurs when more than one wholesale transaction takes place between the generator and the ultimate retail customer. In most cases involving secondary contracts in the past, G&T cooperatives served as intermediaries on the part of member cooperatives. In the future, the amount of secondary wholesale activity should increase as power marketers play a larger role.

Figure V–7 indicates that the net quantity of contracts (vertically hatched) is approximately 7,000 kW in 1996. Only a small portion of the contracts expire by the year 2000, and it is not until 2004 that more than one-third of all wholesale contracts will have expired. Fully one-half of the wholesale contracts in Texas, or approximately 3,500 MW, are scheduled to remain in place through 2015.

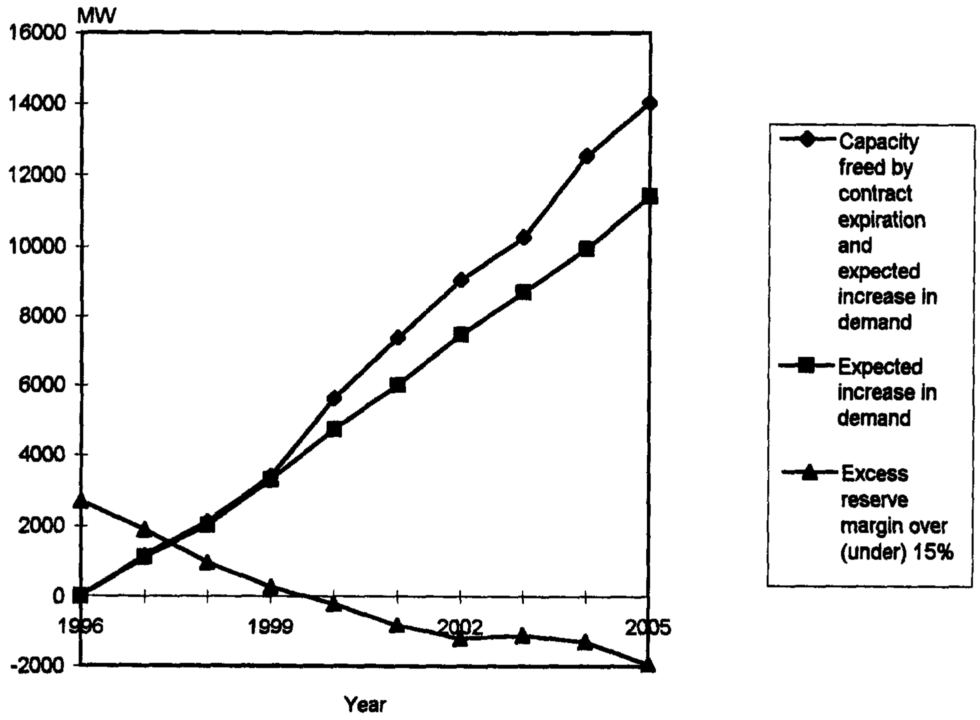


Source: Commission Staff computations based on responses to the Commission's Data Request, Project 15002, Scope of Competition Report, issued April 11, 1996, and follow up communications with representatives of reporting utilities. "Duplications" refer to transactions between two wholesale entities, such as a G&T cooperative and a distribution cooperative.

Figure V–7: Expiration of Wholesale Power Contracts in Texas (in MW)

The contract expiration schedule is significant in a competitive environment because firms purchasing power under contract—distribution utilities of all types, but primarily cooperatives—are among the most likely buyers of firm power in wholesale markets. By their long-term commitments, these distribution utilities are excluded from the competitive wholesale market unless they are able to come to some other agreement with their suppliers allowing them into the wholesale market. In the next few years in particular, it is unlikely that a dynamic wholesale market can develop to its full potential given the scale of existing commitments.

Just how tightly the wholesale market will be restricted also depends on anticipated growth. If growth in demand rapidly exhausts the current excess capacity in Texas, the expiration cycle of these existing contracts may not be as severe a limitation on the wholesale market.[36]



Source: Contract expirations from Commission Staff computations based on responses to the Commission's Data Request, Project 15002, Scope of Competition Report, issued April 11, 1996, and follow up communications with representatives of reporting utilities. Excess reserve margin and anticipated increase in demand from Office of Regulatory Affairs, *1996 Statewide Electrical Energy Plan for Texas*, Austin, TX: Public Utility Commission of Texas at Appendix I (June 1996).

Figure V–8: Opportunities for Increased Wholesale Market Activity

Figure V–8 shows the opportunities that *may* arise in the wholesale market in the next 10 years. The lower upward sloping line in the figure represents the anticipated increase in demand in the State. The top upward sloping line combines that anticipated increase in demand with the demand added to the market as existing wholesale contracts expire. The downward sloping line in the figure shows the anticipated excess reserve margin (over the required 15 percent reserve). The figure shows that excess reserves are anticipated to be eliminated by 2000 as the market expands.

[36] Such growth in demand would likely spur corresponding growth in the wholesale market as wholesalers would seek additional generation resources necessary to fulfill contractual obligations with their wholesale customers.

d) Resource Solicitation

In response to the Commission's 1992 regulations requiring a resource solicitation prior to the certification of new power plants, the State's electric utilities began to rely on the formal solicitation process for new and replacement resources. Those

Table V–11: Selected Recent Resource Solicitations in Texas

Utility	Date and Description of Request for Proposals
Houston Lighting & Power Company	Issued October 15, 1993. HL&P sought demand-side and supply-side resources totaling 1,200 MW. HL&P later revised its forecast of need, withdrew its supply-side offer, and continued to seek up to 100-MW of DSM. HL&P has signed several contracts with bidders.
Texas Utilities Electric Company	Issued December 1993. TU Electric issued two requests, one to explore renewable energy resources (approx. 65 MW wind and 1 MW solar) and one for up to 100 MW of DSM. TU Electric incorporated the results (one wind project, 8 DSM projects) into its IRP case (Docket No. 13575). Eight DSM contracts and one renewable resource project contract have been approved by the Commission in Docket Nos. 13575, 14570, and 15328.
City of Austin Electric Utility	Issued January 24, 1994. COA sought up to 300 MW of power or DSM to meet needs within the transmission-constrained downtown area. The city was interested in exploring alternatives to the downtown Holly Street Power Plant.
Texas-New Mexico Power Company	Issued July 1995. TNP sought alternatives to its purchases from Texas Utilities Electric Company. Up to 700 MW of capacity is requested by 2004. Current status is unknown; TNP recently withdrew its restructuring proposal in Docket No. 15560.
Magic Valley Electric Cooperative	Issued April 1996. Phase I of solicitation seeking all or part of wholesale power requirements. MVEC now buys from CPL. Phase II of solicitation issued November 1996. The cooperative awarded contracts to Enron and GSU.
East Texas Electric Cooperative	Issued March 20, 1995. ETEC conducted the solicitation on behalf of its members (Northeast Texas Electric Cooperative, Tex-La Electric Cooperative of Texas, and Sam Rayburn G&T Electric Cooperative) to replace 35 MW of power currently purchased from Gulf States Utilities Company. This was a follow-up to a 1993 solicitation that was previously suspended.
Golden Spread Electric Cooperative	Issued January 23, 1995. Golden Spread sought alternatives to its purchases from Southwestern Public Service Company. A 400 MW peaking proposal was revised to a baseload proposal. A 489 MW combined-cycle generating unit has been proposed for Denver City, TX. Contract approval has been requested (Docket No. 15100).
City of College Station	The City of College Station conducted a resource solicitation to replace power from its current supplier, the Texas Municipal Power Agency. The City approved a 120 MW, four-year contract with TU Electric (expandable for up to 10 years).
Rayburn Country Electric Cooperative, Inc.	Issued January 31, 1995. Rayburn Country sought up to 350 MW to replace purchases from TU Electric. Rayburn later chose LG&E Power Marketing under a five-year 300-MW agreement. The cooperative awarded a full requirements contract to LG&E Marketing.
Southwestern Public Service Company	Issued September 1995. SPS issued five parallel requests for DSM, interruptible loads, purchases, new power plants, and renewable resources. SPS has not announced the status of the solicitation in light of the proposed merger with Public Service of Colorado.
Northeast Texas Electric Cooperative	An RFP for 30 to 50 MW was issued in May 1996. Current provider, SWEPCO will continue to provide power.
Southwest Electric Service Company	A full-requirements RFP was issued October 1, 1996 for 240 MW. Bids were filed in November 1996.

Sources: Dates and descriptions are from the utilities' requests for proposals. "Rayburn G&T Co-op Will Buy 300 MW" *Electric Utility Week* at 7 (July 1, 1996). "New Texas RFP rules trip up Magic Valley solicitation," *Current Competition* at 7 (September 5, 1996).

requirements are now codified in PURA95 §2.057. Table V–11 summarizes a selection of the RFPs issued under the solicitation process. The solicitation process extends the opportunity to contest for both supply-side and demand-side resources to all interested bidders. Prior to the Commission's adoption of a solicitation process, it is likely that most utilities would have satisfied resource needs by building new facilities or buying power from a vertically integrated utility.

e) Recent Wholesale Power Contract Renewals and Replacements

Since the implementation of PURA95, a limited number of existing contracts have been considered for renewal, identified in Table V–12. In each case, it appears that service will be provided by the new provider at a lower rate than under the prior contract. In one case, Lyntegar and Taylor Electric Cooperatives renewed contracts with TU Electric, but at a discount from the prior contract. The City of College Station replaced its service from TMPA and City of Bryan with cheaper service from TU Electric. The City of Weatherford also switched from one utility supplier to another, at a reported savings of 13 percent, or about $7.9 million per year over the life of the contract.[37]

In the remaining two cases, a power marketer—LG&E Power Marketing—replaced an existing utility supplier. Granbury Municipal Electric Department will buy 16 MW from LG&E over a five year term, replacing a contract supplied by Brazos Electric Cooperative. Rayburn Country Electric Cooperative also contracted with LG&E for 300 MW over a five year term, replacing a contract with TU Electric, at a reported savings to the distribution cooperatives served by Rayburn Country of at least 20 percent.[38]

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[37] "CSW Wins Five-Year Muni Sale," *Electricity Daily* (July 2, 1996).

[38] "LG&E Power Marketing Scores a Big One," *The Electricity Daily*, Vol. 7(40) at 1 (August 27, 1996).

Table V–12: Recent Firm Capacity Contracts Renewed and/or Replaced

Purchasing Utility	Prior Supplier under Contract	New Supplier under Contract	Firm Capacity under Contract (MW)	Contract Term (years)
Lyntegar Electric Cooperative and Taylor Electric Cooperative	TU Electric	TU Electric		
City of College Station	TMPA and City of Bryan	TU Electric	120	4
Granbury Municipal Electric Department	Brazos Electric Cooperative	LG&E Power Marketing	16	5
City of Weatherford	Brazos Electric Cooperative	WTU	53	5
Rayburn Country Electric Cooperative	TU Electric	LG&E Power Marketing	300	5

Notes: Although Lyntegar and Taylor retained supply from TU Electric, the final contract incorporated a discounted rate (see Docket No. 14716).

Sources: PUC Docket Nos. 14716 and 15296. "Marketer Replaces Brazos Co-op as Supplier of 16 MW to Tex. Muni," *Electric Utility Week* at 7 (May 13, 1996). "West Texas strikes five-year deal with Weatherford muni" *Current Competition*, Vol. 7(14) at 5 (July 11, 1996). "LG&E Power Marketing Scores a Big One," *The Electricity Daily*, Vol. 7(40) at 1 (August 27, 1996).

These recent contract renewals and replacements are for more limited terms than has been common practice in the past. None of the new contracts extends for more than five years. In a fully competitive wholesale market, it is likely that new contracts will be for much shorter durations than in the past, allowing distribution utilities the flexibility to shop for new power suppliers more frequently as market conditions change.

f) Bypass and Competition Put Downward Pressure on Rates

Chapter III includes a discussion of bypass and the possible implications for competition. Bypass occurs when an existing utility customer leaves its traditional supplier for an alternate supplier offering a lower price. When opportunities for bypass are available in the market, it suggests that excessive prices under regulation have created opportunities for unregulated competitors to underbid the utilities, capturing some of the most lucrative customers.[39] In order to fend off potential bypass, a utility

[39] Chapter III also discusses the difference between *economic* and *uneconomic* bypass. With economic bypass, the potential competitor will have lower costs that the incumbent. Under uneconomic bypass, the potential competitor's costs are lower than the regulated *rates* of the incumbent, but higher than the incumbent's marginal

may offer discounted rates (under some conditions). If a utility's regulated rate is above its marginal cost, then the market may contain excess profits and/or inefficiencies that could be squeezed out by competitive market forces. In that case, a utility can offer potentially bypassing customers a discounted rate that exceeds the utility's marginal cost of providing service. It is important to note that bypass is an outcome in *regulated* markets. In unregulated markets, comparable activities would be considered the normal interplay of competitive firms.

In a regulated market, rate discounts raise concerns about cost-shifting. If a utility offers a customer a discount, the lost revenues must be reallocated among either the utility's shareholders or its ratepayers, or both. PURA95 prohibits costs that are allocable to customers receiving discounts from being borne by the utility's other customers.

i) Discounted Rates: PURA95 §§ 2.001(b), 2.052(b) and 2.001(d)

Wholesale and retail discounted rates are governed by §§ 2.001(b) and 2.052(b) of PURA95, which state:

> *On application by a public utility, the regulatory authority may approve [wholesale or retail] tariffs or contracts containing charges that are less than rates approved by the regulatory authority but equal to or greater than the utility's marginal cost.*

In addition, PURA95 contains additional safeguards to ensure that the discount is not financed by other utility customers. Specifically, PURA95 §2.001(d) states:

> *Notwithstanding any other provision of this Act, the commission shall ensure that the utility's allocable costs of serving customers paying discounted rates under this section or Section 2.052 of this Act are not borne by the utility's other customers.*

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costs. The potential competitor in the economic bypass case could capture a share of the market in an unregulated market, but in the uneconomic bypass case, the competitor can only be successful in a regulated market. In other words, economic bypass is efficiency improving, while uneconomic bypass is efficiency degrading.

The Commission interpreted PURA95 §2.001(d) for the first time in Docket No. 14716, a case involving an application by TU Electric Company to offer discounted rates to two wholesale customers with expiring contracts.[40] In the case, TU argued that the term "allocable costs" means "allocable share of marginal costs," and not "allocable share of embedded costs" as proposed by the General Counsel and the Office of Public Utility Counsel. In its order, the Commission issued the following finding of fact and conclusion of law relating to the application of PURA95 §2.001(d):

> *Section 2.001 of PURA requires that the Commission ensure that the allocable costs of serving customers paying discounted rates are not borne by the utility's other customers. The Commission's interpretation of this requirement . . . is that "allocable costs" refers to embedded costs, rather than marginal costs. This interpretation is supported by the Commission's conclusions that requiring the utility to bear the fully embedded costs is necessary to (a) preclude costs of serving discounted customers from being shifted to other customers and (b) limit a utility's ability to subsidize its activities in a competitive market with revenue from a captive market.*[41]
>
> *The term "allocable costs" in § 2.001(d) means "allocable share of fully embedded costs," not "allocable share of marginal costs."*[42]

Thus, the Commission's order in Docket No. 14716 precludes any costs that are allocable to customers receiving discounted rates from being borne by the utility's other customers. This protection is achieved by the requirement that the utility bear the fully embedded cost of serving the discounted customer rather than just the allocable marginal cost of serving that customer, as proposed by TU Electric.[43] Until its next rate case, the utility's rates will continue to be based upon the cost allocation and rate design principles applied in its last rate case. The potential to shift costs only arises at the time of the utility's next rate case, and the Commission has specified that, in setting

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[40] *Application of Texas Utilities Electric Company for Authority to Implement Rate WP1 to Lyntegar Electric Cooperative, Inc. and Taylor Electric Cooperative, Inc.*, Docket No. 14716 (March 21, 1996).

[41] *Id.* Finding of Fact No. 56A.

[42] *Id.* Conclusion of Law No. 13.

[43] Houston Lighting & Power Company also filed an *amicus curiae* brief supporting TU Electric's proposed interpretation of PURA95 §2.001(d).

future rates, the utility will bear the difference between the costs allocable to a discounted customer and the revenues actually received from that customer.

ii) Application of PURA95 §2.001(d) to Cooperatives

Application of the provisions of PURA95 §2.001(d) becomes more complex when applied to a cooperatively owned utility because cooperatives are owned by their customers (members), not shareholders.[44] The Commission first addressed the application of §2.001(d) to cooperatives in Docket No. 15133, which involved an application by several East Texas cooperatives for approval of a tariff that would allow them to offer competitive industrial rates.[45]

In Docket 15133, the cooperatives proposed to offer discounted rates to qualifying industrial customers by procuring low-cost wholesale power specifically targeted to the requirements of the industrial customers. The purpose of the rate was to:

1. Attract new industrial load;
2. Encourage expansion of existing industrial load; and
3. Retain industrial customers with viable self-generation alternatives.

The cooperatives proposed that, rather than the embedded cost of power contained in the cooperatives' standard rates, the discounted customers would be charged a price slightly higher than the cost of the selectively procured power.[46]

The dilemma in the case of cooperative discounted rates is that, unlike the IOUs, there are no shareholders to absorb the difference between the embedded and discounted rate as required by PURA95 §2.001(d).

In its final order, the Commission found that:

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[44] A similar issue arises for municipally owned utilities because the ratepayers are also the taxpayers.

[45] *Application of Northeast Texas Electric Cooperative, Inc., Tex-La Electric Cooperative, Inc., Sam Rayburn G&T Electric Cooperative, Inc., and Their Ten Member Distribution Cooperatives For Authority to Implement Industrial Competitive Rates*, Docket No. 15133 (September 3, 1996).

[46] The cooperatives proposed to charge the discounted customers the actual cost of the competitively priced power plus an adder of not less than 1.5 mills (0.15 cents per kilowatt-hour). The average fixed costs of the G&T cooperatives is in the range of 8 to 9 mills.

> *The statutory language in §2.001(d) provides no distinction between cooperatively and investor-owned utilities; rather, the section refers to all public utilities. In contrast, PURA95 §2.2141—which mandates discounted rates for certain institutions of higher education—states that '[a]n investor-owned public utility may not recover the assigned and allocated costs of serving a state university or college which receives a discount under this section from residential customers or any other customer class.' Given that the Legislature did not limit the prohibition against cost-shifting only to investor-owned utilities in §2.001(d) as it did in §2.2141, principles of statutory construction dictate that the Commission find that §2.001(d) is applicable to all public utilities.*[47]

The Commission further concluded that:

> *As in the case of an investor-owned utility, strict compliance with PURA95 §2.001(d) by the cooperative is necessary to: (a) preclude the allocable costs of serving discounted customers from being shifted to other customers and (b) limit the cooperative's ability to subsidize its activities in a competitive market with revenue from a captive market. If a cooperative's discounted rate does not include the entirety of allocable costs, then the difference is passed on to the cooperative's owners which, because of the cooperative's structure, necessarily shifts allocable costs to the remaining customers. Therefore, to ensure compliance with PURA §2.001(d) and to remove the potential for cost-shifting, the discounted rate offered by a cooperative must recover, at a minimum, the 'allocable share of embedded costs' attributable to the customer receiving the discounted rate.*[48]

In its decision, the Commission specified that the allocable costs for a customer are comprised of the *fixed costs* that would be allocable to the customer under the otherwise applicable standard tariffed rate; and the cooperatives' discounted rates must include, at a minimum, the fixed costs allocable to the customer receiving the discount plus the cost of the competitively price power. Thus, the customer receiving the discounted rate cannot *leave behind* any fixed costs because there are no shareholders to absorb such *stranded* costs.

Because the cooperative must charge a discounted customer its marginal cost *plus* the allocable share of fixed costs to comply with PURA95 §2.001(d), the discounting

[47] Docket No. 15133, Final Order.

[48] *Id.*

flexibility of a cooperative may differ from that of an IOU. All else equal, the IOU has the ability to offer a deeper discount (as low as marginal cost[49]) than the cooperative (marginal cost plus allocable share of fixed costs). However, as described above, this disparate result is necessary to ensure compliance with PURA95 §2.001(d) by *all* public utilities.

Although the cooperatives have argued differently, the consistent application of PURA95 §2.001(d) does not necessarily create an unlevel playing field for cooperatives. There are, in fact, many differences that will affect the competitiveness of IOUs relative to cooperatives. These differences include the tax-exempt status of cooperatives and the differing cost and capital structures of cooperatives versus IOUs, among others.

g) Power Marketing and EWG Activity

Although power marketers have only been authorized to operate in Texas since passage of PURA95 and in the United States, generally, since implementation of EPAct, power marketers are rapidly taking a large role in the supply of electricity across the country. As noted above for the Texas market, power marketing activity is becoming increasingly visible as numerous power marketers have competed for solicitations, and as LG&E Power Marketing has entered into contracts with the Granbury Municipal Electric Department and Rayburn Country Electric Cooperative for 316 MW of firm capacity.

Power marketers have the potential to play a crucial role in reducing the average price of electricity across the State. In large part, power marketers are involved in arbitrage, which is the practice of buying and selling a product in two different markets with different prevailing prices. If wholesale power is available in one region at four cents and in another region at three cents, a power marketer could buy at three cents and sell at four cents, collecting a profit of one cent less operating and transmission costs. By

[49] An IOU would be unlikely to offer a discount as low as marginal cost, as the utility would make zero profit with such a discount. In Docket 14716, TU Electric offered discounted rates that were, on average, approximately 140 percent of its marginal cost.

buying where power is cheap and selling where power is expensive, the transaction puts pressure on prices to eliminate the differences, except the differences that can be explained by the operating and transmission costs. For many other products, financial contracts, like futures and options, bring prices in different markets into line; however, in the electric industry, such markets are only just beginning to develop. Thus, power marketers' transactions are one of the most powerful competitive forces in the electric market.

Table V–13: Sales of Top Ten U.S. Power Marketers (MWh)

Company	1994 Sales	1995 Sales	1st Quarter 1996 Sales
Enron Power Marketing	1,922,945	7,644,872	9,931,207
Electric Power Clearinghouse	1,140	3,540,481	2,430,478
Louis Dreyfus Electric Power	1,441,095	4,230,853	1,523,587
Citizen Lehman	na	1,938,162	2,476,502
LG&E Power Marketing	68,620	1,689,182	2,186,245
Vitol Gas & Electric	151,963	1,175,477	1,042,130
Koch Power Services	na	459,378	1,421,875
CNG Power	na	820,477	796,138
North American Energy Conservation	3,452,236	835,806	533,438
Coastal Energy Services	na	473,339	460,039
Total of top ten	7,037,999	19,618,027	22,801,639

Notes: na = company not formed yet or that little or no deals were completed. Enron, Electric Clearinghouse, Louis Dreyfus, LG&E Power, Vitol Gas & Electric, and Coastal Electric Services have registered as power marketers in Texas. Only LG&E Power is an affiliate of a utility, LG&E Energy Systems; however, Enron is now merging with Portland General Electric Corporation.

Source: Rischard, Randy, "The Top Ten Power Marketers," *Megawatt Markets* at 16 (Summer 1996).

On a national basis, the power supplied by power marketers is soaring. Table V–13 shows the sales of the ten largest power marketers operating in the United States. In 1994, these ten firms supplied just over 7 million MWh. In 1995, the same firms supplied just under 20 million MWh, and in the first quarter of 1996, alone, these firms supplied nearly 23 million MWh, more than for the entire previous year. Although a large share of these sales are firm capacity commitments, short-term, economy energy transactions represent a substantial part of the total. The share of total power market transactions that are non-firm is probably increasing because most of the utilities' firm power needs are tied up in contracts.

By a substantial margin, the largest power marketer operating in the nation is Enron Power Marketing, with sales in 1995 of about 7.6 million MWh. Like Enron, a number of the nation's top ten power marketers are registered to operate in Texas. In the various solicitations listed in Table V–11, several of these companies have presented offers to serve as suppliers in Texas.

Although power marketers may not own generating resources, an EWG may construct merchant power plants,[50] submit bids in response to a utility request for proposals (RFP), or negotiate directly with utilities for the delivery of power. The Commission is not aware of any new EWG construction activities in Texas. There is currently more than adequate capacity in Texas, and new facilities constructed as merchant plants would compete with the operating costs of existing facilities, at least in the near term.

At least one EWG construction project is in the planning stages in Texas. On December 7, 1995, Golden Spread Electric Cooperative, Inc., a G&T cooperative, requested certification of a contract for power with its affiliated, not-for-profit EWG cooperative.[51] On August 9, 1996, the Commission issued an Order of Remand, directing the Administrative Law Judge to evaluate the proposals received from short-list bidders. On December 9, 1996, Golden Spread filed a stipulation, a purchased power agreement with a partnership (Denver City Energy Associates, L.P.), and a contract with its affiliated EWG (GS Electric Generating Cooperative, Inc.).[52] The case is pending at the Commission.

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[50] A merchant power plant is one constructed to serve anticipated market demand, without the benefit of a long-term contract for power supply.

[51] *Request of Golden Spread Electric Cooperative, Inc., for Determinations Required by Section 32(k) of the Public Utility Holding Company Act and for Certification of Contract*, Docket No. 15100 (pending). The EWG cooperative, GS Electric Generating Cooperative, Inc., would have one member, Golden Spread Electric Cooperative, and would operate under a long-term contract with the utility.

[52] Golden Spread's December 9, 1996 pleading, Stipulation at Section 2. Denver City Energy Associates, L.P. is a single purpose company formed by LS Power and Quixx Corporation, a wholly-owned subsidiary of

h) Municipally Owned Utilities and Municipalization

Municipal ownership and operation of electric facilities affects wholesale markets directly, because some utilities are owned by municipalities, and indirectly because municipalities can become electric utilities through the process of municipalization. Municipalities have a unique role in the history of electric industry regulation in Texas, serving as the only source of regulation until 1975, and maintaining original jurisdiction over rates and services since that time.[53]

The vast majority of Texas' cities do not own generation or distribution facilities and as such are not considered municipal utilities. Of the more than 1,200 incorporated cities in Texas, 74 operate municipal utilities. There are two types of municipally owned utilities. Most common are the cities that purchase electricity in the wholesale market and own distribution systems within the city limits. Currently 64 cities, serving an average of 3,308 customers, own distribution systems within their boundaries and purchase energy in the wholesale market.[54] Traditionally, cities have purchased power from the utility that owned transmission lines near the city, because the size of the city's load did not justify building generation, or the city was remotely located relative to competing generation and obtaining wheeling for the power was difficult or impossible for the city. Municipal utilities can now more easily negotiate for outside supplies of electricity because they must be allowed comparable access to the transmission system under the provisions of PURA95. However, the scope of competition is restricted by the existence of long-term bulk power contracts between municipally owned utilities and their suppliers. For example, the cities of New

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Southwestern Public Service Company, that will own and operate approximately 489 MW of generating capacity. GS Electric Generating Cooperative, Inc. will own 50 percent of the generating unit.

[53] The Public Utility Regulatory Act of 1995, §2.101 (a) states "Subject to the limitations imposed in this Act, and for the purpose of regulating rates and services so that such rates may be fair, just, and reasonable, and the services adequate and efficient, the governing body of each municipality shall have exclusive original jurisdiction over all electric utility rates, operations, and services provided by an electric utility within its city or town limits." §2.101 (b) allows a utility to elect to surrender original jurisdiction to the Commission by ordinance or municipal election.

[54] *Electric Utilities in Texas: A Directory*, Austin, TX: Public Utility Commission of Texas (1996).

Braunfels, Lexington, and Giddings all have agreements with LCRA that expire in 2016.

Less common are municipally owned utilities that own generation, transmission, and distribution and use these in conjunction with power purchases to supply electricity to their customers. The City of Austin, City of San Antonio (City Public Service), the City of Lubbock (Lubbock Power and Light), the City of Brownsville (Public Utilities Board), the City of Tulia, the City of Weatherford, and the Cities of Garland, Greenville, Denton, and Bryan (together through TMPA) currently own generation, transmission, and distribution facilities. These integrated municipally owned utilities operate in a manner similar to traditional IOUs with several exceptions. First, municipally owned facilities are financed with tax-free municipal bonds. Second, the city council or a board appointed by the council usually governs utility decision-making. Typically, municipal utilities will contribute a portion of earnings to the city's general fund on a regular basis.[55] Third, municipalities (and electric cooperatives) can purchase electricity at a lower rate from federal entities.[56]

The municipalities that do not operate municipal utilities enter into "franchise agreements" with integrated utilities. The franchise agreement consists of a right-of-way, or street rental agreement. The primary purpose of the franchise agreement is to grant a utility the right to utilize the city's streets, rights-of-way, alleys, and other public property for the purpose of transporting the utility's product to its customers in return for reasonable compensation to the city. Many franchise agreements also contain additional provisions and contracts between the parties; however, the grant of

[55] In some cases, transfers of utility revenues to general funds may be substantial. For example, the City of Austin will transfer $57.2 million of electric revenues to its general fund in 1997, equal to about one-fifth of total City services. Copelin, Laylan, "Bond Rating Fears Propel Utility Decision," *Austin-American Statesman* at A-12 (August 13, 1996).

[56] Walton, Harold, "Financial Statistics of Major U.S. Publicly owned Electric Utilities: Summary," U.S. Department of Energy, Energy Information Administration, Web Page (June 1996).

the right to use city property is the premier and most necessary aspect of the agreements.[57]

Table V–14: Summary of Scope of Municipal Electric Franchise Agreements

Utility Type	Number of Contracts	1995 Sales (thousands MWh)	Total Population (millions)
IOUs	969	138	13.5
Cooperatives	221	35	1.9
All utilities	1,190	173	15.4

Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

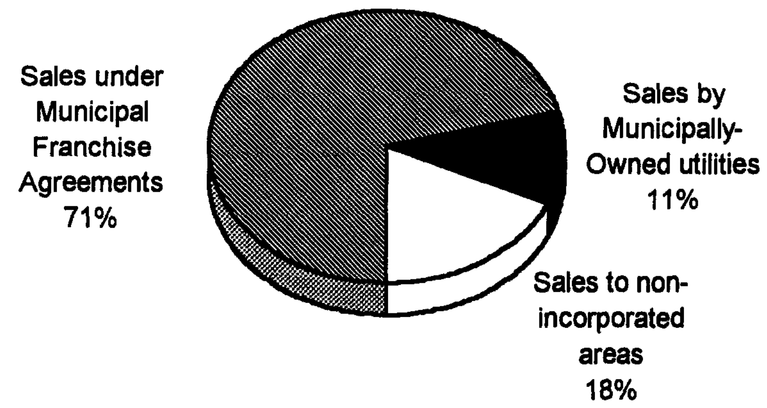
A large part of Texas's population receives power under municipal franchise agreements.[58] Table V–14 presents the number of municipal contracts, amount of sales in 1995 under those contracts, and the percent of the population under municipal agreements. Currently, 15.4 million people are receiving electricity under those agreements. Of those under municipal franchise agreements, 87 percent take power from Texas IOUs.

Figure V–9 presents the breakdown of Texas utility sales by type of agreement: sales by municipal utilities; sales under municipal franchise agreements; and sales to non-incorporated areas. The 15.3 million people under municipal franchise agreements represent approximately 71 percent of energy sales in Texas. Another 11 percent consists of sales from municipal utilities to their own retail customers.

The typical franchise agreement allows the host utility to serve end-use customers directly. The franchised utility also handles billing and maintenance. Upon the expiration of an existing franchise agreement, cities with franchises have the opportunity to form municipal utilities. To shop for electricity in the wholesale market,

[57] Comments of the Texas Municipal League, *Re: Draft Scope of Competition Report*, Project No. 15002 (November 8, 1996).

[58] According to 1990 Census data, the population of Texas was 16,986,510.

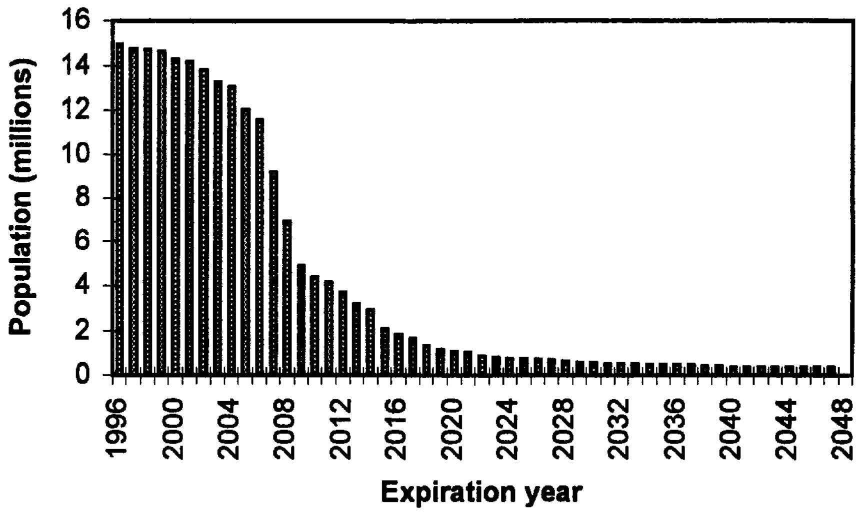


Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Figure V–9: Total Texas Electricity Sales (in MWh) by Type of Agreement

a municipal would have to buy, build, or condemn the existing distribution system. Three major Texas cities have franchise agreements with IOUs that will expire in the next twelve years: Corpus Christi in 2000; Houston in 2007; and Dallas in 2008. Given the length of these and other franchises, existing franchise agreements can act as a damper on wholesale competition, much like the wholesale contracts discussed above.

Figure V–10 presents the population in Texas under expiring municipal franchise agreements. Of the 15 million people purchasing electricity under a municipal franchise agreement, fully 80 percent live in cities that will remain under a franchise agreement until at least 2007. Thus, much like the wholesale market discussed above, few Texas cities will be able to leave existing franchise agreements in the near future to become active in the wholesale market.



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996

Figure V–10: Population Under Expiring Franchise Agreements

The process of forming a new municipal utility, or "municipalization," can take two forms. The first and more traditional form is the creation of a municipal utility as a means of achieving lower electric rates,[59] although occasionally there are other motivating factors such as independence from the host utility.[60] The second, newer form of municipalization is referred to as "load aggregation." Municipal load aggregation occurs when customer groups in previously unincorporated areas form municipal utility districts or other similar legal entities. Load aggregation also takes place when a customer, e.g. a county government, aggregates or pools its electricity demand. Both forms of municipalization create a larger total demand, and therefore, more flexibility in the choice of wholesale supplier.

[59] Vince, C. and C. Fogel, "Franchise Competition in the Electric Industry," *The Electricity Journal* at 14 (May 1995).

[60] Schweitzer, M. *Municipal Electric Utilities: Establishment and Transformation*, Oak Ridge, TN: Oak Ridge National Laboratory at 7 (June 1995).

There are several reasons for formation of an alternative to the host utility. In some cases, the impetus is a large industrial customer.[61] Because current laws preclude retail wheeling and competition, an individual customer may attempt to negotiate for lower rates in conjunction with the city. The tax, regulatory, and financing advantages of municipal systems may also lead cities to consider creation of a municipal utility or municipal utility district (in unincorporated areas).[62] Municipalization can be a form of bypass of the monopoly supplier. In the emerging competitive environment, municipalization may be a viable supply alternative that takes full advantage of *current* utility regulations.

Although municipalization is an option for cities in Texas, there are still some significant impediments to forming a municipal utility. In particular, the process can be onerous. Oak Ridge National Laboratory outlines eight steps city governments must take: [63]

- Initiate the effort;
- Gauge and influence public opinion;
- Conduct negotiations with the host utility;
- Acquire the distribution network, which could include condemnation processes if the host utility is unwilling to sell its distribution facilities;
- Reach agreement with a wholesale supplier for cheaper electricity;
- Arrange transmission access;
- Procure financing; and
- Establish a management structure for the municipal utility.

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[61] *Id.* See also Landis, Karen, *Municipalization*, Austin, Texas: Public Utility Commission of Texas, Competitive Issues Division (January 1996).

[62] Lorton, Stephen G. and Rick Kelly. "The Muni Vote," *Electric Perspectives* at 39 (September/October 1995).

[63] Schweitzer, Martin. *supra*, at 21 - 31.

These steps can take considerable time and money. The City of Las Cruces, New Mexico has been attempting to condemn El Paso Electric's distribution facilities for four years, at an estimated cost, if successful, of $72.5 million.[64]

The readiness of municipalities and municipally owned utilities to compete in the wholesale electricity market in Texas varies considerably. Since most municipal utilities do not own generation facilities, they are purchasers in the wholesale market. Even the municipal systems that own generating capacity do not participate significantly as sellers due to IRS regulations. The rules against arbitrage bonds[65] are in place to prevent all abuses of tax-exempt status, not just abuses from municipal utilities. A municipal utility that violates these rules risks losing its tax-exempt status, as well as lawsuits from its bond holders. If this constraint continues, the role of municipally owned utilities as net purchasers in the wholesale market is not likely to change.

i) Electricity Exchanges and Price Indices

One key component of a competitive market is widely available pricing information. One mechanism that disseminates pricing information is contract trading in financial markets. Trading of electricity futures contracts was introduced by the New York Mercantile Exchange (NYMEX) in the Spring of 1996.[66] NYMEX introduced two separate contracts, one for delivery at the California-Oregon border (COB), the other for delivery at the Palo Verde nuclear generating plant in Arizona. Contracts are for 736 MWh, delivered over a monthly period for 18 consecutive months.[67] Although

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[64] The initial "Energy Options Review" was published February 10, 1992; "Federal Judge Deals Las Cruces, N.M. Setback on Municipalization Effort," *Electric Utility Week* at 6 (September 2, 1996).

[65] Internal Revenue Service Code, § 148 states that, ". . . the term 'arbitrage bond' means any bond issued as part of an issue any portion of the proceeds of which are reasonably expected (at the time of issuance of the bond) to be used directly or indirectly to acquire higher yielding investments, or to replace funds which were used directly or indirectly to acquire higher yielding investments."

[66] "Electricity futures trading to start March 29 on N.Y. Mercantile Exchange," *The Energy Report* at 104 (February 12, 1996).

[67] *Id.*

initially very active, the pace of contract trading slowed significantly. A total of 7,115 COB and 1,235 Palo Verde contracts for June of 1996 were sold.[68]

In Texas, executives from 30 electric utilities and power marketing organizations met July 17, 1996, in Dallas to discuss the creation of an electric price index for ERCOT.[69] By setting a widely recognized and acceptable market price, the electric price index would improve information on prevailing prices. An ERCOT index could help to increase liquidity in the Texas power markets and would allow more utilities and power marketers to become involved. The index would set daily peak and off-peak, and firm and non-firm prices.

In comments to the draft report, Enron suggested that the need for a price index for ERCOT has diminished as price information is becoming more widespread. Enron notes that "[s]ince August [1996], the ERCOT price indices in "Power Markets Week" have been commonly used for trading activities. Accordingly, much of the impetus for a ERCOT price index has disappeared . . ."[70] It is also important to note that the Electronic Transmission Information Network (ETIN) will play a key role in providing information about the prices of ancillary services and possibly posting a price index for wholesale transactions in the future.

4. Summary: Competitiveness of Texas Wholesale Markets

A review of the wholesale electric market in Texas indicates that conditions are in place for robust competition in the State:

- Recent regulatory reforms guarantee access to the market for wholesale suppliers.
- A host of both traditional and new firms are operating in the Texas wholesale market.
- Current excess capacity is helping to moderate wholesale prices.

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[68] Rutland, Joe, "Death of a Contract?" *Megawatt Markets* at 10 (Summer 1996).

[69] Bloomberg, L.P. News Release, "Texas Utilities Developing Electricity Price Index" (July 25, 1996).

[70] *Comments of Enron Capital & Trade Resources on the Draft Report on the Scope of Competition in the Electric Market in Texas*, Project No. 15001 at 2 (November 8, 1996).

On the other hand, a large portion of the wholesale market is tied up in long-term contracts, many of which do not expire for almost 20 years.

On net, are these conditions giving rise to a competitive wholesale market, and will a competitive wholesale market take hold in the State? One way to assess this question is to compare conditions in the market today with the underlying conditions required for a competitive market and for markets that can be described as contestable and/or workable. Consider the conditions for a competitive market presented in Chapter IV:

- *Large number of both sellers and buyers:* A large number of sellers appear to be emerging across the Texas electric market. Generating utilities will now have access, competing with the new class of power marketers. Opportunities in economy energy are largely unexplored at this time, but if price differences persist in different regions, the economy energy market may take off as participants buy and sell power to take advantage of price differences. In the market for firm power supplies, prospects appear to be much more limited due to the constraints of long-term contracts. Over the long-term, contract expiration and incremental load growth will determine, in part, the level of activity in the market for firm power.
- *Sellers offer an identical (homogeneous product):* At present, it appears that much of the wholesale market involves what could be termed commodity power. However, it is unclear whether utilities, power marketers, and other participants will be able to differentiate their products by tying power sales with ancillary services or other energy services. Unbundling of power services should permit buyers or aggregators to put together customized power packages on attractive terms.
- *Perfect information:* The Commission required in P.U.C. SUBST. R. 23.67(p)(4) that the ISO establish an electronic information system for contemporaneous posting of information on transmission and ancillary service transactions, with real-time accessibility. This system could be used to post information on wholesale market transactions, including generation commodity prices and contract terms. While there is no current central clearinghouse for pricing and availability of wholesale power, the new ERCOT ISO and the ETIN may fulfill this role in Texas. An electric price index for ERCOT may provide more transparent pricing information. The degree to which affiliated power marketers can take advantage of company proprietary information is also unclear.
- *Ease of entry and exit in the market:* The creation of power marketers and the opening of access to the transmission system has dramatically changed prospects for entry and exit in the last year. Previously, only the

established utilities and a small group of industrial interests with the ability to co-generate could be identified as potential entrants. Market entry was also restricted by the necessity of acquiring a CCN, limiting the ability of a firm rapidly to construct additional generating resources. Changes in State and federal laws introducing power marketers and providing for open transmission access may sweep away entry barriers to the wholesale market. Market entry has been facilitated by the excess power capacity in the State, allowing cheap excess power to compete. If demand growth outpaces capacity additions to a point at which the reserve margin becomes constrained, there may be less excess power available to the marketers, restricting their market participation.

- *Freedom from economies of scale:* As discussed in Chapter II, advances in generating technologies have changed the cost of production such that it is cost-effective to construct much smaller and more efficient generating units than has been the case in the past.

Reviewing these conditions for a competitive market indicates that the wholesale market will be substantially more competitive than in the past, but a number of uncertainties and questions remain. Recall that an oligopoly market arises when the number of actual competitors is restricted. In this case, the potentially large pool of wholesale electric suppliers is likely to preclude an oligopoly outcome in which a small number of suppliers are able to make excess profits under conditions of market instability.

In the future, the Texas wholesale market may satisfy the conditions for both *workably competitive* markets and for *contestable* markets. Workably competitive markets will require a sufficient number of competitors, absence of a single dominant firm, and reasonably free entry into and among market segments. At this time, it appears likely that these conditions will be satisfied. Market contestablity is determined by firms' ability to enter and leave the market at relatively low cost. The advances in generating technologies and the entry of power marketers imply that the market may become workably contestable, at least from the supply-side.

Still, the largest single constraint on the wholesale market continues to be a limited number of buyers, based on the existence of a substantial number of long-term contracts. Until a substantial portion of these agreements expire or participants make arrangements with their suppliers to renegotiate existing agreements, the wholesale market will not reach its full competitive potential.

C. COMPETITION AT THE RETAIL LEVEL

In stark contrast to the wholesale market, there are few opportunities for retail competition in the Texas electric industry. Retail electric service continues to be provided exclusively by investor-owned utilities, municipally owned utilities, and distribution cooperatives. Current law precludes new entrants from providing retail electric services. Extension of retail electric service is limited by State law requiring retail providers to acquire a CCN:

> *[A] retail public utility may not furnish, make available, render, or extend retail public utility service to any area to which retail utility service is being lawfully furnished by another retail public utility without first having obtained a certificate of public convenience and necessity that includes the area in which the consuming facility is located.*[71]

Although this provision does not guarantee an *exclusive* service territory to existing utilities serving a particular area, obtaining a CCN is a substantial barrier to entering an existing retail market. Retail competition is restricted further by the integrated nature of the provision of retail electric service and the lack of access to transmission and distribution facilities by potential competitors.

There are however, several exceptions to the restrictions on competition at the retail level. A substantial portion of the State is "multiply certificated." In other words, in some areas, more than one retail utility holds a CCN, allowing customers to choose among more than one retail supplier in that particular territory.

Industrial and large commercial customers have competitive supply options because they may self- or co-generate. As noted previously in this chapter, co-generators have become a significant presence in the wholesale market, but that wholesale power is typically available only as excess after internal electricity needs are met. Non-utilities responding to the data request issued for this report generated 20.3 million MWh for

[71] PURA95 §2.252(b).

their own use in 1995; total sales for all reporting non-utilities (including power marketers) equaled 21.3 million MWh in 1995. Recall from Table V–2 that total utility retail sales to industrial customers equaled 80.88 million MWh; thus, it appears that at least 20 percent of industrial electric consumption is self- and co-generation. Most self- and co-generators are located in only a few areas of the State, in particular the Houston Ship Channel, Beaumont-Port Arthur, and Corpus Christi areas. Retail competition can be expected to be most heated in these areas.

Because some industrial and large commercial customers have access to competitive supply options, they may be able to take advantage of retail rate discounts. In some circumstances, discounted tariffs may also be available to a few other customers for whom bypass is not a serious consideration. For instance, some utilities have economic development tariffs in place that offer rate discounts to new or expanding businesses that meet certain qualification criteria.[72]

End-use competition is also a factor in the retail market. Electric service competes with natural gas for space heating and in other applications. Consumers' decisions to switch between electricity and natural gas will be based on cost and convenience. Electricity competes in the end-use market in other ways as well. Cheaper electricity could also provide a boost to the competitiveness of electrotechnologies such as electric vehicles.

Because current retail competition is limited, a significant focus of this section is the definition and identification of retail markets. This discussion will help to establish measures used in future scope of competition reports and show the potential opportunities for retail ratepayers in a more competitive market. Identification of retail markets is also a key step in any future investigation of market power.

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[72] Such discounted rates are subject to compliance with the cost-shifting requirements of PURA95 §2.001(d), which states that "[n]otwithstanding any other provision of this Act, the commission shall ensure that the utility's allocable costs of serving customers paying discounted rates . . . are not borne by the utility's other customers."

1. Multiply Certificated Service Territories

In one sense, a portion of the State has always operated under retail competition. Some 20 percent of the State is certified to two, or even three electric utilities.[73] These areas were served by multiple utilities prior to the original PURA in 1975, or multiply certified areas were created because it was not clear who was providing service to a particular area. PURA95 continues to recognize these multiply certificated areas, stating that "A public utility is not required to secure a certificate of public convenience and necessity for . . . operation, extension, or service in progress on September 1, 1975."[74] Multiply certificated areas are found throughout the State, but are concentrated in the Northeast—around the Dallas/Fort Worth area—in west Texas, and near the Gulf Coast.

Multiple certification creates a *limited* competitive market by allowing consumers to choose from a very small set of electric suppliers. Competitive opportunities (and potential benefits) are limited, because the number of suppliers is still very restricted. As a consequence of multiple certification, some areas will have duplicate facilities, e.g., electric distribution stations, electric poles, and distribution wires. Customers switching from one certificated utility to another may be charged switching fees prior to receiving service from the new provider. Facilities duplication and additional fees may drive up the costs of electric service. Any increase in costs will be balanced against the possibility of lower rates resulting from local competition.

2. Defining a Retail Market for Electricity within Texas

The scope of the market for retail electricity differs substantially from the scope of the wholesale market, which can now be thought to cover all of ERCOT. The retail market must be defined along two dimensions, the geographic scope of the market and the appropriate products under consideration.

[73] 20 percent is based upon geographic area and not upon the number of retail customers or sales. While the actual number of customers located in multiply certificated areas is unknown, Commission Staff estimates that less than 5 percent of retail load is located in multiply certificated areas. In the Project 15002 data request, the Commission included a request for data regarding the number of utility customers located in multiply certificated areas, but most utilities responded by stating that such statistics are unknown.

[74] PURA95 §2.253(a)(3).

The DOJ merger guidelines define a geographic market as:

> *a region such that a hypothetical monopolist that was the only present or future producer of the relevant product at locations in that region would profitably impose at least a 'small but significant and nontransitory' increase in price, holding constant the terms of sale for all products produced elsewhere.*[75]

The guidelines employ a similar definition for a product market. Under the DOJ guidelines, a distinct geographic or product market is defined by the ability of a firm to raise (and sustain) prices in the region (or for the product) in which it operates. In other words, a market can be defined in terms of a supplier's ability to exert market power in a region or over a product. Each distinct market identified will provide an opportunity for competition, but at the same time, defines boundaries inside of which market power may be exercised.

a) Relevant Product Markets

Different products may define an electric market. One clear distinction can be drawn between generation and transmission services. Throughout the on-going discussion of electric market restructuring, it is generally agreed that while electric generation may no longer be a natural monopoly, transmission and distribution will remain monopolies for the foreseeable future. Market power in the transmission and distribution functions is likely to be maintained due to the underlying costs of providing services, and continued economic regulation will be needed even if there is competition between the companies that supply electricity to the end-user. The generation market can be disaggregated further into different types of load. Perhaps the most important product distinction is for peaking power. If for example, peaking generation is subject to market power, then at peak times, a generator or set of generators would be able to influence the market.

[75] U.S. Department of Justice, ***supra*** at §1.21.

b) Relevant Geographic Markets

Traditionally there has been no need to define geographic markets for retail electric service, because retail markets were defined by the service territories of the local utilities. In a more competitive retail electric market, new distinctions will define retail markets:

- *Price differentials:* Retail markets can be identified by price differences. In a fully competitive market with no market power, geographic price differences would be minimized as buyers and sellers attempted to cross geographic boundaries to buy and sell their products.
- *Transmission capacity:* Restrictions in transmission capacity may define geographic markets by isolating a particular region from alternate suppliers.

If the retail market were fully competitive and operated with sufficient transmission capacity, it is possible that geographic markets would no longer exist. The continued existence of distinct geographic markets may signal uncompetitive conditions, such as market power or entry barriers.

i) Price Differentials Define Geographic Markets

In any competitive market, price differentials for different customers are hard to sustain. If a supplier (or suppliers) offers a product under more than one price in two adjacent regions, buyers may cross boundaries to buy in the cheaper region. Alternatively, competing suppliers may attempt to set up shop in the adjacent region. In many cases, brokers will attempt to buy the product in the lower priced region, selling it in the higher priced region. Each of these mechanisms serves to drive up the low price and draw down the high price. Thus, unless there are underlying cost differentials, such as high transportation costs between the two regions, price differentials will be eliminated by market operations.[76] Where long running price differentials can be identified, underlying cost barriers are likely to exist, leading to separate regional markets.

[76] For example, it has long been believed that there are (at least) two distinct regional markets for coal, eastern coal and western coal. Transportation costs have kept the cheaper western coal out of the eastern market. As transportation costs have fallen, western coal is gradually making in-roads into the East.

ii) Transmission Capacity Defines Geographic Markets

Transmission capacity plays a crucial role in the competitiveness of any geographic market. If transmission access is available and sufficient capacity exists, an outside supplier could wheel power into a region, providing a competitive alternative.[77] If transmission is instead constrained, competition in generation will be restricted to the generators located in that region. Thus, access to transmission and existence of capacity bottlenecks can be used to define appropriate regional markets. For the wholesale market, the Commission has adopted rules designed to guarantee open access and comparability in wholesale transmission services across ERCOT,[78] while federal regulations govern open access for Texas' utilities outside of ERCOT. Thus, transmission *access* is available to all wholesale suppliers. The question remains whether wholesale transmission bottlenecks constrain competitive supply of wholesale power in any parts of ERCOT or Texas as a whole.[79]

Although retail competition is extremely limited in Texas, it is possible to speculate about the resulting geographic market distinctions if the retail market were opened to competition. In that event (assuming open access and comparability standards similar to those adopted for wholesale transmission), transmission capacity constraints would

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[77] Some observers have gone so far as to suggest that transmission capacity is a competitive substitute for generation under certain conditions. See for example, Woychik, Eric C. "Competition in Transmission: It's Coming Sooner or Later," *The Electricity Journal* at 46 - 58 (June, 1996). For transmission to be fully competitive with generation, a number of economic conditions must be met. These include open access and comparability (if not structural unbundling) and economically efficient transmission pricing. Efficient pricing entails charging a two-part tariff for transmission—one part a fixed charge and the second part based on transmission congestion costs. The Commission's recent transmission pricing rule (P.U.C. SUBST. R. 23.70) is a first step toward economic transmission pricing.

[78] See P.U.C. SUBST. R. 23.67 and 23.70.

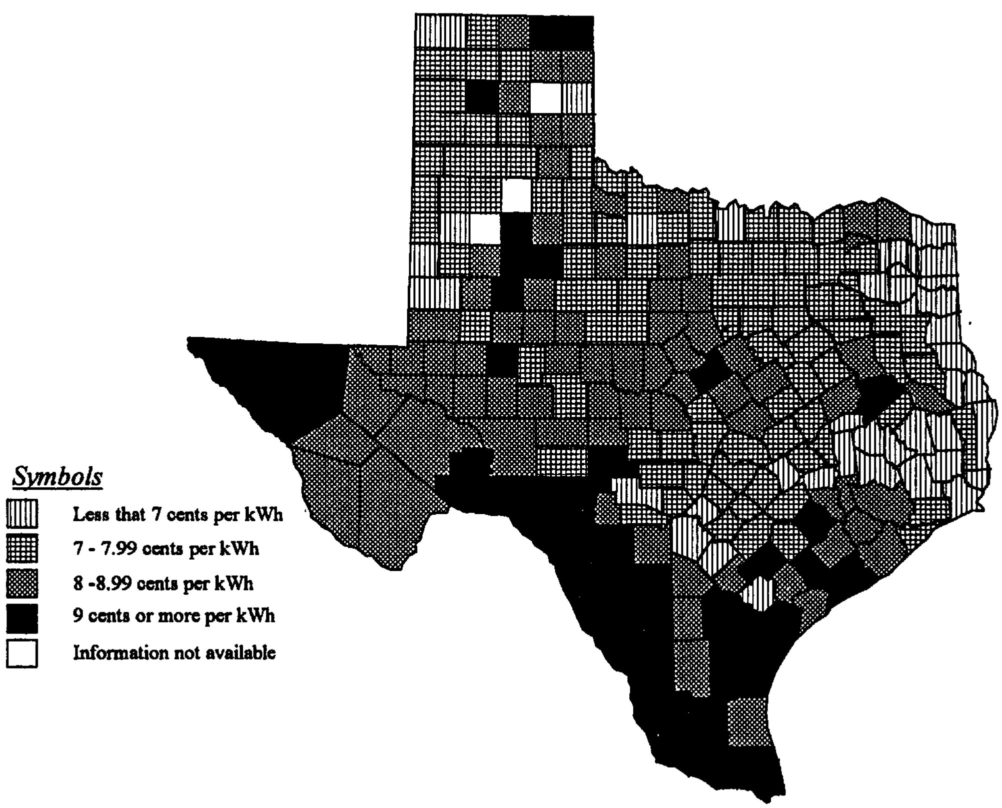
[79] The unique jurisdictional issues in Texas raised by the division of regulatory authority between the Commission, for transmission entirely within ERCOT, and the FERC, for interstate transmission outside of ERCOT, raise further complexities in the identification of appropriate wholesale markets. As a large number of parties noted in the comments in response to Staff's draft request for data used in the preparation of this report, transmission access across the boarders of ERCOT is extremely limited. Thus, both ERCOT and areas outside ERCOT but within the State are appropriate wholesale markets.

Public Utility Commission of Texas, Memorandum to the Parties, "Project No. 15002—Scope of Competition Report Draft Data Request" (March 1, 1996) asked parties for input on relevant geographic markets (at question No. 6). In their responses (filed with the Commission March 18, 1996 in Docket No. 15002), STEC, TNP, Entergy, CSW, Enron Capital and Trade Resources, and the Cities of Denton, Garland, and Greenville all recognized that ERCOT be considered a distinct market.

determine the likely geographic markets in which market power could arise. As the retail market is so much larger than the wholesale market, transmission-constrained pockets are more likely to arise. Identification of these transmission-constrained areas will determine the relevant geographic markets.

3. Sustained Price Differentials in the Regulated Retail Market

Under the traditional structure and operational rules of the regulated electric industry, geographic price differentials have been preserved. Prices have been differentiated by the service territory boundaries of the retail electric utilities. Figure V–11 shows the distribution of retail residential prices for bundled electric service averaged by county for 1995. More lightly hatched areas in the figure indicate lower average prices in a particular county; darker areas indicate higher average prices. Although counties are



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

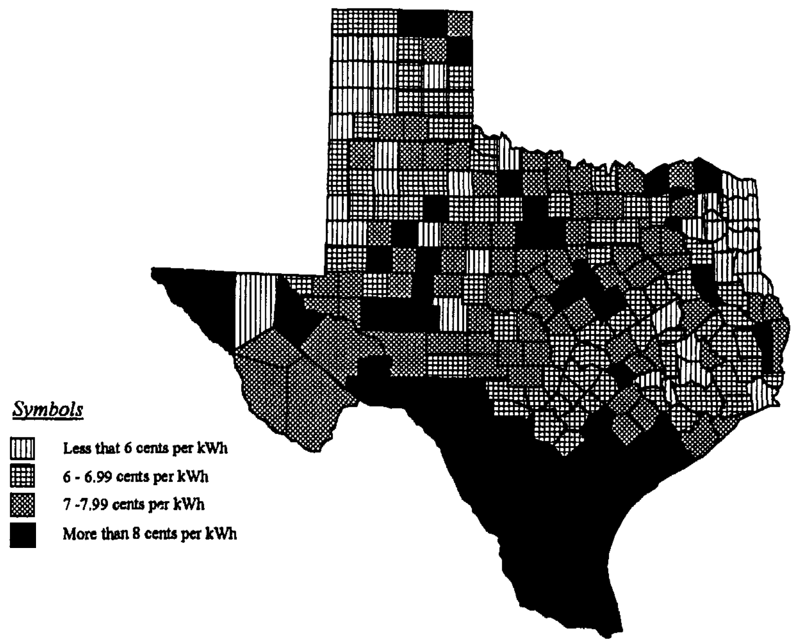
Figure V–11: Distribution of Average Residential Prices in Texas

not perfectly differentiated by individual utility service territories, the map provides a fairly clear picture of service territories of utilities in Texas.

The figure shows some clear geographic distinctions. The highest residential electric prices in the State are in far West Texas, in the counties served by EPEC, and in the Rio Grande Valley and southern Gulf Coast counties largely served by CPL. Average retail residential prices in these counties are in excess of 9 ¢/kWh. The northern Gulf Coast counties served largely by HL&P are also more highly priced at from 8 to 9 ¢/kWh, as are a number of counties in West Texas. The largest consistent pattern of low residential prices—between 6 and 7 ¢/kWh—is in the non-ERCOT counties served largely by SWEPCO and GSU. Many of the counties served by the member companies of Brazos Electric Cooperative and the counties generally served under wholesale contracts through the LCRA have modest average residential prices between 7 and 8 ¢/kWh. Most of the counties served by TU Electric fall in the range between 7 and 9 ¢/kWh.

The Commission has not conducted a detailed study of the underlying causes of the price differences reflected in Figure V–11. Because utility rates are related to the costs of providing service, high prices will be related to the costs of providing service. Those areas served by high cost generating facilities, including the nuclear plants owned by utilities providing service in the State, will have higher prices. The greater costs of serving rural populations may account for some of the price differences, as will the financing advantage available to cooperatives and municipalities. A variety of other factors may contribute to the price differentials. Transmission constraints may affect the prices for counties in the Rio Grande Valley. Whether the prices in areas served by multiple certificated providers has significantly affected residential prices is also unclear.

There is no question, however, that these residential electricity price differentials are in part an artifact of the *un*competitive nature of retail electricity markets in Texas. Because retail residential customers cannot choose to receive service from alternate providers, there is no opportunity for consumer demand behavior to affect prices.

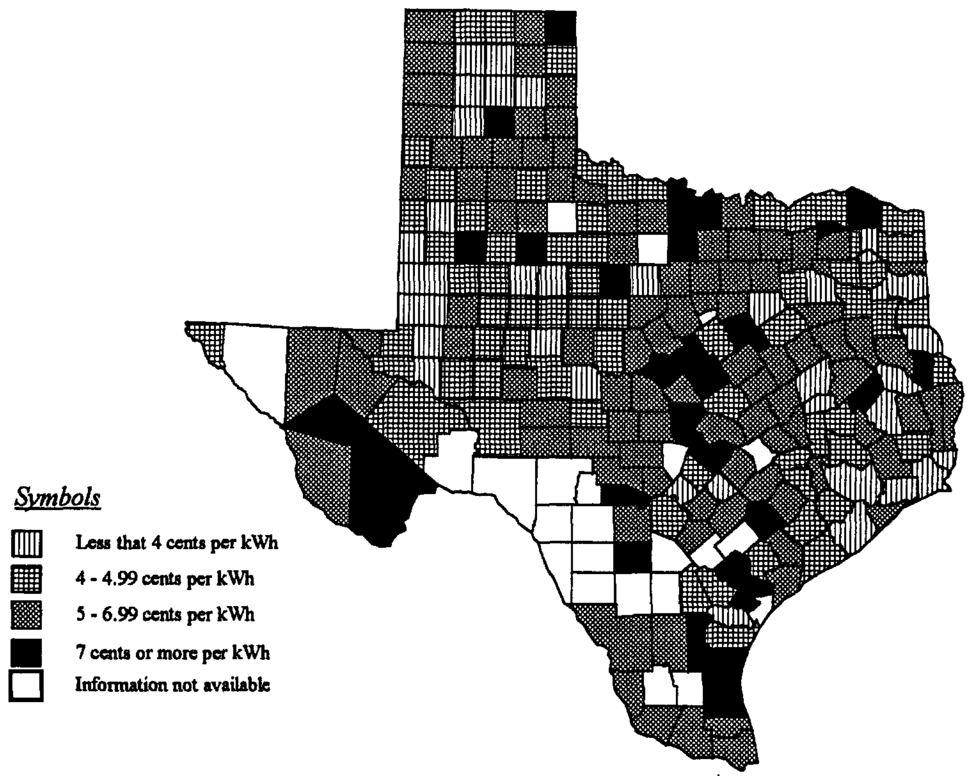


Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Figure V–12: Distribution of Average Commercial Prices in Texas

These price differentials point out the potential opportunities for many residential ratepayers to benefit from lower prices in more competitive markets.

The distribution of retail commercial prices is depicted in Figure V–12. The more lightly hatched counties in the figure are those with the lowest average prices, while the shaded counties have the highest average prices. There is an extremely clear pattern of high commercial prices in the southern portions of the State. The counties of the southern Gulf Coast and Rio Grande Valley, stretching north almost to San Antonio, pay at least 8 ¢/kWh. Several of the West Texas counties served primarily by EPEC also pay at least 8 ¢/kWh for commercial service. Other pockets of rates above 8 ¢/kWh are spread throughout the State. The lowest commercial prices in the State are found in the Northeast, parts of which are served by SWEPCO, and in the northwestern portion of the Texas Panhandle.



Source: Commission Staff computations based on responses to the Commission's Data Request under Project No. 15002 issued April 11, 1996.

Figure V–13: Distribution of Average Industrial Prices in Texas

Average retail industrial prices are shown in Figure V–13. The regional pattern of retail industrial rates is less well defined and shows some distinct differences from the residential and commercial maps. Few clusters of exceptionally high rates can be seen in the figure. Unlike both the residential and commercial figures, high rates are not clustered in the El Paso area or along the Rio Grande Valley and the southern portion of the Gulf Coast. In part, economic development rates may account for lower industrial rates in those areas.

Low rates are clustered in three specific areas: non-ERCOT counties in the northeastern portion of the State that are generally served by SWEPCO; portions of West Texas, some of which are served by SPS and TU Electric; and the northern Gulf

Coast areas generally served by HL&P, but including counties served by TNP and GSU. The cluster of counties near the northern Gulf Coast, the most heavily industrialized portion of the State, suggests that where competition does exist, electricity prices appear to respond. Comparing the pattern of industrial prices in this area with the residential prices in Figure V–13 indicates a large difference. Industrial prices in this area are among the lowest in the State, mostly below 5 ¢/kWh and in some counties below 4 ¢/kWh, while residential prices are fairly high, at least 8 ¢/kWh. Competition is a likely explanation for this difference. In this heavily industrialized area, large numbers of industrial customers have the opportunity to self- or co-generate or may be able to negotiate for discounted rates. Residential customers on the other hand, do not have any significant competitive opportunities or pricing alternatives. It appears that the customers with competitive opportunities can access lower prices, while captive customers continue to pay higher prices.

4. Summary: Potential Competitiveness of Texas Retail Markets

The Texas retail electricity market is competitive in a limited set of circumstances:

- *Multiple certification:* Some multiply certificated areas offer a choice of more than one supplier, but at a potential cost of facilities duplication and switching fees.
- *Self- and co-generation:* Electric consumers that are able to self- or co-generate consume over 20 million MWh for own use.
- *Discounted rates:* Retail discounted rates are available to some customers—primarily industrial and large commercial—that have competitive alternatives. Other customers are able to take advantage of the discounts.
- *End-use alternatives:* Many customers can choose between electricity and natural gas for space heating and other applications.

Although these are meaningful competitive alternatives, the scope of retail competition is quite limited. In each case, competition is restricted to only a small set of suppliers—multiple certification—available to only the largest customers—self- and co-generation and most rate discounts—or to a select set of applications—end-use alternatives. Where available, customers benefits from retail competitive opportunities, but in general, the market is not competitive and cannot be competitive within the existing legal framework.

a) Price Differentials Point to Opportunities

This chapter demonstrates that retail price differentials exist between different customer classes and geographic areas. In a few cases, retail prices may be moderating under competitive pressures, in particular in the industrial areas surrounding the Houston Ship Channel where average industrial prices are among the lowest in the State, but residential and commercial prices remain above average. For the most part however, retail price differentials will be sustained into the future by the current legal and regulatory structure. But these price differentials also point out the potential opportunities in a more competitive market. Under competition, such differences cannot be sustained unless due to differences in the costs of serving different types of customers or regions.

b) Transmission Capacity and Access May Yield Contestable Markets

In a geographically distinct electricity market, excess capacity for transmission from outside that market accompanied by open access to the transmission system may be a powerful means of market contestability. Excess transmission capacity and open access seem to fulfill the conditions for contestablity. Any generator or power marketer with access to a transmission line can import power at little more than the cost of the power and transmission charges. The firm can easily exit the market by ceasing sale of power over the existing transmission line (and perhaps selling its existing contracts at their market values).

As noted above, open access to wholesale transmission services was guaranteed in PURA95 under §2.057. With a similar policy governing retail transactions, a retail market without transmission constraints appears could satisfy the conditions for contestablity in the long-run. In that case, the significant test would be the cost of imported power relative to the cost of producing power within the geographic region. If imported power is cost-competitive, the market should be competitive in that specific geographic market in the long-run no matter how many firms currently operate in that market. In the short-run, however, the current level of supplier concentration may require that market power issues be addressed to ensure the desired level of competitiveness in an open retail market.

D. The Convergence of Wholesale and Retail Markets

The distinction between wholesale and retail markets is critical. As discussed in this chapter, the scope of the opportunity to compete in the Texas electric market is determined by whether a transaction qualifies as a wholesale or retail sale. Federal and State law and recent Commission rules have jump-started competition in the wholesale market. The presence of new entrants in the wholesale market—the power marketers and EWGs—is rapidly changing the scope and availability of wholesale services. In the retail market, however, competitive opportunities are limited to those areas that are multiply certificated and to large industrial and commercial customers who can generate their own power. Any change in the distinction between what constitutes wholesale sales, as contrasted with retail sales, could have a profound effect on the Texas electric market.

A recent case considered by the Commission presented a novel situation that tested the historical distinction between wholesale and retail sales and presented the possibility of greatly expanding the set of transactions that qualify as wholesale sales.[80] In this proceeding, a power marketer registered under the name Power Clearinghouse, Inc. (PCI) asserted that it is authorized under the provisions of PURA95 to make wholesale electricity sales to the landlord/owner of an apartment complex located within the certificated retail service territory of the City of Austin Electric Utility Department (the City). PCI argued that the landlord (Mr. Latham) would resell electricity in a retail sale to his tenants in accordance with the Commission's submetering rules.[81] Because Mr. Latham would be engaging in a retail sale, PCI claimed that its sale to Mr. Latham

[80] *Complaint of Power Clearinghouse Against the City of Austin Electric Utility Department for Denial of Transmission Service*, Docket No. 16147 (Order Granting Motion to Dismiss, October 9, 1996).

[81] See P.U.C. SUBST. R. 23.51.

would be a *sale for resale*. PCI argued that a sale for resale is a wholesale sale, and therefore, PCI is authorized to enter into this transaction without becoming a regulated public utility. PCI filed its complaint in an effort to compel the City to provide wholesale transmission service from LCRA to Mr. Latham's apartment building.

On September 11, 1996, the Commission voted to grant the City's motion to dismiss PCI's complaint.[82] The majority predicated its ruling primarily on a finding that the wiring and submetering system owned by Mr. Latham at Park Place does not rise "to the level of an extensive system for transferring and metering" electricity. Thus, the sale by PCI to Mr. Latham is not a wholesale sale. The majority commissioners also noted that Mr. Latham is precluded by Article 1446d of the Texas Civil Code from marking up his purchases of electricity, and that Mr. Latham cannot resell that portion of the electricity that is used in the common areas of the apartment building. Because Mr. Latham cannot resell this electricity, he cannot purchase this electricity at wholesale for resale to others.

The outcome of this case has broad implications for the competitive electric market. If a landlord can be defined as a wholesaler and a transaction between a landlord and the landlord's tenants is declared to be a retail sale, then the size of the wholesale market could increase dramatically, increasing the size of the competitive market. Many types of commercial customers, e.g., apartments, office buildings, trailer parks, shopping centers, and marinas, could then qualify as electricity wholesalers. By becoming wholesalers, these landlords would no longer be captive customers of their locally certificated electric utility because wholesalers are guaranteed open transmission access under PURA95 §2.056 and the Commission's rules. Landlords would be able to receive service from power marketers, EWGs, or other electric utilities.

Under this scenario, a more broadly based competitive wholesale market could create advantages and disadvantages for various parties. For landlords and for other existing wholesale customers, such competition would likely put downward pressure on electric

[82] The motion passed by a two-to-one margin, with Chairman Wood dissenting.

wholesale prices. The cost reduction would be passed along to apartment and mobile home park residents due to the submetering rule restrictions on mark-ups.

An extension of the wholesale market to include landlords raises concerns for the creation of stranded investment across the State. If landlords were allowed to leave their existing service providers without paying charges covering the previously committed costs of providing them service, those costs might be passed along to the existing providers' remaining captive customers. The set of customers remaining captive to their incumbent utilities would include all residential customers and many of the smaller commercial customers. Thus, the shrinking number of customers with no competitive options would be left to pay the stranded investment resulting from a broader wholesale market.

VI. Opportunities for Competition in Energy Service Markets in Texas

The retail energy service market functions at the level of the ultimate consumer, rather than at the generation and transmission (wholesale) level. While competition in the retail market is presently constrained, there are opportunities for competition in the provision of energy services to ultimate consumers. This chapter focuses on those opportunities and on the service choices that can be offered to electricity customers. New service and pricing options—such as real-time-pricing—allow consumers to better manage their electricity use and increase the value of energy services. Giving customers choices in their electricity services and pricing options will improve consumer satisfaction, allow consumers to better manage their energy use, and enhance economic efficiency.

Do all customers want choices, and if so, what choices do they want? That is one of the key questions underlying the ongoing debates about competition in the electric industry. As Chapter V demonstrates, it appears clear that the largest electric consumers *do* want choices in their energy service options, and many are willing to take action to lower costs and enhance service. Whether small commercial and residential consumers want choices is not so easily answered. Small commercial and residential consumers are not all alike in that regard.

Section A of this chapter provides an overview of the retail energy services market and a discussion of the preconditions for increased competition. Section B discusses the time-varying nature of electricity usage and production costs. Because these characteristics are not fully addressed in existing tariffs, current practices leave opportunities for more efficient retail pricing signals. Sections C and D address the competitive opportunities for large commercial and industrial consumers (Section C), and the competitive opportunities for small commercial and residential consumers (Section D). Section E presents the relationship between consumer choices and market innovation, discusses the effects of unbundling existing energy services, and summarizes the types of service that can be provided by utilities today to expand consumer choice.

A. Overview of the Energy Service Market

An understanding of retail energy services begins with a discussion of "energy services," and a comparison of the "retailing" and "wholesaling" functions. "Energy services" is a broad term that includes all aspects of energy distribution, conversion, and application to meet the desired end-use needs of the consumer.[1] "Service" is defined broadly in the PURA as all acts rendered and performed by public utilities.[2] "Energy service," as used in this chapter, includes all acts rendered and performed by all energy providers—including utilities and their competitors—at the point of contact with ultimate consumers to meet end-use needs.[3] Energy services include a variety of functions relating to consumer wants and needs, including the delivery of electric energy, the delivery of fossil fuels, the capture and conversion of renewable resources, and the associated services relating to price-risk management, appliance maintenance, energy usage management, reliability, power quality assurance, and direct load control and curtailment. The retail energy services market includes various *value-added* services that are or could be provided in a market.

The *energy* service market is broader than the *electric* service provided by regulated public utilities. There are various substitutes for electricity, and these substitutes can

[1] End uses are the ultimate services that consumers desire, such as cooling, water heating, cooking, lighting, and refrigeration. Consumers do not desire electricity for its own sake; they purchase electric services to power appliances and other end-use devices that satisfy an end-use need such as comfort.

[2] PURA95 §1.003(16). Commission regulations define services "in its broadest and most inclusive sense and includes any and all acts done, rendered, or performed and any and all things furnished or supplied, and any and all facilities used, furnished, or supplied by public utilities in the performance of their duties under the Public Utility Regulatory Act to their patrons, employees, other public utilities and the public, as well as the interchange of facilities between two or more of them." P.U.C. SUBST. R. §23.3.

[3] The term "energy service" has been applied by practitioners and advocates of conservation and energy efficiency as synonymous with "end use services." (See, for example, the May 22, 1994, letter from Amory Lovins of the Rocky Mountain Institute to the Hon. Daniel Wm. Fessler of the California Public Utilities Commission at fn. 1 as reprinted in *Electricity Journal*, Vol. 7(6) at 67 (July/August 1994).) The definition in this chapter is broader, more inclusive, and more relevant to the regulatory issues at hand. From a regulatory perspective, "energy services" are "the provisions of electrons, possibly bundled with other services or attributes" (quoting Lovins). A more limited application of the term may evolve as energy service markets are more fully developed in deregulated markets.

provide the same level of end-use service. Substitutes for regulated *electric* service include: fossil-fuel appliances and equipment; on-site generation; the conservation of resources (investments in energy efficiency); and load control (including on-site storage).

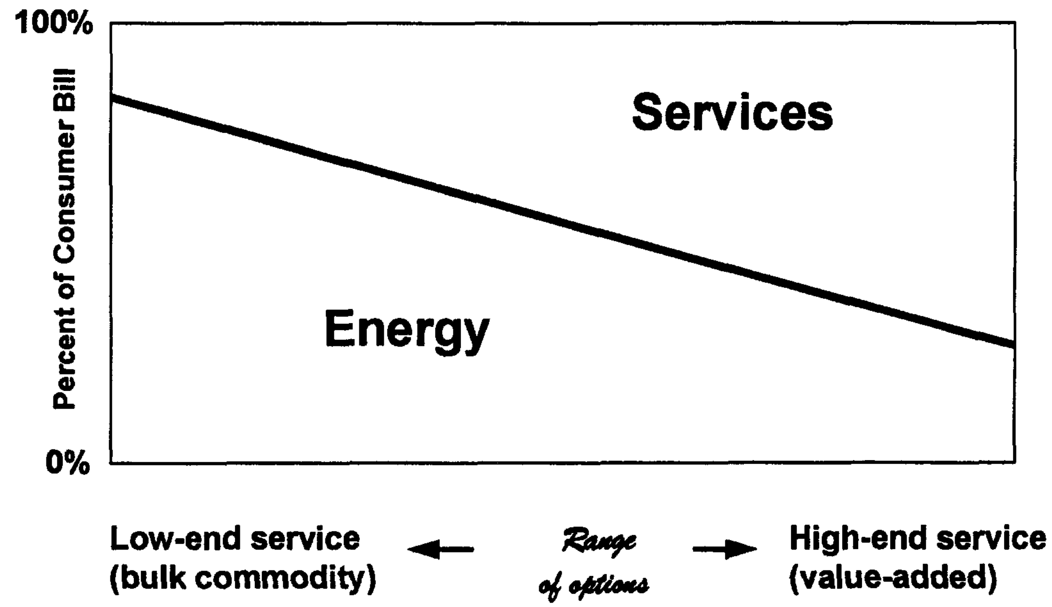
Just as there are *substitutes* for electric service, a variety of electricity *complements* exist as well; however, many complements require a flexible approach to electric service that is not always available today. Typically, the costs and characteristics of electricity are averaged into a one-size-fits-all tariff. Such tariffs inhibit innovation in energy service markets by limiting the flexible use of electricity as a component bundled together with other non-electric products and services, such as load control devices and energy conservation products.

1. Wholesaling and Retailing: Commodities and Services

In the context of the electric industry, the term "commodity" is often used in connection with the wholesale market, while the term "energy service" is associated with the retail market:

- In *wholesale* markets, consumers receive electric power as a *commodity*, typically in bulk quantities, delivered on a guaranteed or as-available basis, to a particular point (where delivery is metered), at a particular time.
- In *retail* markets, consumers receive a unique set of bundled *energy services* that include the electric commodity.

This view of markets makes a distinction between the electric *commodity* and its associated electric *services*. An alternative view considers the terms "commodity" and "energy services" as extremes within a continuum of service. Under this view, the portion of the total cost of energy service going to the electric commodity may vary, depending on the level of associated services desired. The tradeoff is presented conceptually in Figure VI-1. Distribution-level consumers (such as small commercial and residential consumers) spend a larger percentage of their total bill on services as compared to the cost of the power commodity. Transmission-level consumers do not receive distribution-level services, and thus spend a larger percentage of their total electric bill on the bulk commodity, electricity.



Source: Adapted by Commission Staff from: Hamrin, Jan, W. Marcus, C. Weinberg, and F. Morse, *Affected with the Public Interest: Electric Industry Restructuring in an Era of Competition*, National Association of Regulatory Utility Commissioners at 146 (September 1994).

Figure VI-1: Conceptual Display of the Range of Energy Service Options

Low-end services are comprised of the non-firm, bulk, electric commodity and its delivery on a high-voltage transmission line. The consumers of such low-end services receive relatively little in the way of convenience, reliability, or value-added service. For example, large customers that receive interruptible power are not guaranteed firm service. Such customers may not require all the services that others would prefer, or they may provide these services on-site, using transformers (to step down voltage), power conditioners (to improve quality), and backup generators. Further, by relying on on-site energy engineers, they provide their own energy management services. The consumers of high-end services, in contrast, spend a higher portion of their monthly bills on value-added services, such as distribution services, specialized metering or billing services, energy efficiency advice and funding, or facilities maintenance.

2. Energy Substitutes and Alternatives

As the price of electricity and the availability of new technologies have increased, more substitution has become economically attractive. Unbundling services and providing new tariffs broaden the choices available to consumers. As this occurs, additional alternatives or energy services—including investments that customers may make on their premises—may become economical. A variety of energy service providers offer direct substitutes for and complements to electricity, or can make investments that conserve or manage the use of electricity. The following discussion provides an overview of a selection of substitutes and complements:

- Investment in on-site generation (e.g., co-generation);
- Fuel switching (fossil-fuel equipment as an alternative to electrical equipment);
- Renewable resource alternatives;
- Investments in equipment and appliance efficiency;
- Load aggregation, load metering, and load control;
- Risk management services; and
- End-use energy efficiency information.

Co-generation developers, combustion-turbine manufacturers, fossil-fuel suppliers and pipelines, and financial institutions provide hardware or support to a variety of on-site generation technologies. Consumers with large thermal loads may find co-generation attractive. Co-generation is typically installed in conjunction with various electric tariff options, including backup, supplemental, maintenance, and interruptible power service. Co-generation is discussed in Section C of this chapter.

Many consumers also have access to equipment that can use natural gas or propane as a supplemental or alternative fuel source to satisfy certain end uses. For small consumers, these end uses include space heating, cooking, water heating, and clothes drying. For larger consumers, the energy applications are numerous and varied. Fuel switching occurs in both directions: to and from electricity. Some consumers have extremely limited fuel-switching opportunities, notably where a building has been constructed as an all-electric home.[4]

Specialized dealers and distributors provide devices that use renewable resources to satisfy end-use needs. These applications are generally limited to solar water heating and solar space heating. In certain instances, remote customer facilities may rely on off-grid renewable resource technology applications, including micro-hydroelectric power facilities, solar photovoltaic generation, and wind turbines.

Energy service companies (Escos) provide a full range of energy management and end-use energy efficiency services. Escos provide energy audits, financing, installation, operation, and maintenance of end-use equipment. Escos may work with consumers on an ongoing basis to manage energy usage. Many of the State's electric utilities have set up affiliated Escos to provide unregulated energy services. Equipment manufacturers and dealers develop and market the full range of industrial, commercial, and residential equipment and appliances.

Aggregators provide specialized services, such as load management, that can reduce costs to consumers.[5] Through competitive bidding activities, some utilities provide rebates for verified load curtailment by customers. Aggregators also work closely with companies that provide metering, load control, and communications. Specialized metering, load control, and communications capabilities may become more relevant to the industry as utilities implement real-time pricing and load control programs. Load aggregation is discussed further in Chapter VIII in the context of retail access and industry restructuring.

[4] An "all-electric" home is one that does not have natural gas readily available to it. All-electric homes were popular in some regions during the 1960s when the price of electricity was relatively low. Electric utilities in Texas use various pricing techniques, demand-side management programs, and line extension policies to encourage builders to construct all-electric housing developments and apartment buildings.

[5] Load aggregation is the collection of consumers into a buying group for the purchase of electricity. Electric utilities perform this function today. Other entities, such as buyer cooperatives, brokers, or energy service companies, could perform this function in a restructured power market. Aggregation can occur whenever there are potential efficiency gains that result from bargaining power, economies of scale, or reduced transactions costs.

Risk management is not a substitute for electricity *per se*; however, as with many other energy services, risk management complements utility-provided services. As utilities offer variable pricing options, such as real-time-pricing, it may become worthwhile for customers to contract with third-party energy service providers. Some energy service providers manage risks in a manner that fits the customer's specialized needs.[6]

Information that addresses electricity conservation and efficiency is available from a variety of sources, including governmental and non-profit agencies, conservation groups, utilities, and energy service providers. Use of this information can result in reduced or more efficient electricity usage, thus reducing the customer's electric bill and avoiding the need for the construction of additional generation facilities.

This listing of substitutes and complements does not address customers switching among various electric utilities in multiply certificated areas in Texas, or the relocation of customers to other service areas. Nor does it address the activities of customers to obtain wholesale customer status as an alternative to the present electric utility.

3. Potential Energy Service Options

Much of the restructuring debate has focused on the various types of generation that will be available to satisfy the needs of consumers. These generation options range from electricity generated from the lowest-cost, combined-cycle combustion turbines, to the "green" electricity that can be generated with wind energy and other renewable alternatives. Many new service choices will arise in a competitive electric industry that cannot be anticipated today. A list of potential energy service options appears in Table VI-1.

Potential energy service options are related to the management of risk for the customer. Some customers may be able to manage aspects of risk; others will acquire these

[6] Price-risk management provides electricity consumers with control over the variability and uncertainty of electricity prices. For example, some customers may want a price that is indexed to the price of the commodity that they produce, such as aluminum; others may want a guarantee that the price will not fall outside a band; and still others may want to trade price-risk management services for another commodity, such as natural gas. Other aspects of risk management address the customers' operations, including facilities operations or appliance management and maintenance.

services. Facilities operation management refers to options that relate directly to the appliances, devices, and processes that use electricity. Some firms bring special skills relating to particular types of equipment or particular end uses, and these firms will work with customers to manage risks relating to the operation of such equipment. Product-related risk management includes options relating to the management of industrial product and process risks. Some customers require high levels of reliability, while others can store energy-intensive products on site and purchase electricity at a lower level of reliability. Price-risk management includes options relating to the price of electricity and other commodities. Price-risk management services are growing in wholesale markets in Texas, and will extend to retail consumers. Finally, customer convenience relates to those special services and functions that reduce the customer's transactions costs or increase the customer's value of service.

Table VI-1: Potential Energy Service Options

Facility Operations Management	Product-Related Risk Management	Price-Risk Management	Customer Convenience
• Analysis of consumer energy use	• Interruptible & curtailable rates	• Contracted base rates, special terms	• Personalized account representatives
• Financial incentives for efficiency improvement	• Demand subscription services	• Fuel repurchase	• Access to specialized technical reps.
• Leasing end-use equipment	• Direct load control	• Bypass avoidance rates	• Electrical equipment safety check
• Appliance sales, maintenance & repair	• Backup power subscription	• Futures markets	• Equipment telephone hotline
• Co-generation partnerships	• Outage insurance	• Economic development rates	• Electrician referral service
• New building architectural assistance	• Dedicated service crews	• Priority service pricing	• Bill summaries; end-use disaggregation
• Industrial process & new technology advice	• Guaranteed availability	• Sales of end-use service	• Prepaid electric service
• Power quality & reliability recommendations	• Guaranteed quality and performance	• Real-time-pricing	• Comparative rate option analysis & advice

Notes: Adapted by Public Utility Commission of Texas Staff.

Sources: Barakat & Chamberlin, Inc., *Rate Design: Traditional and Innovative Approaches*, Palo Alto: Electric Power Research Institute at 14 - 5 (July 1990). The cited table originally appeared in Hanser, Phil, W. Smith, and J. Chamberlin, "Integrated Value-Based Planning," *Pacific Coast Electrical Association Proceedings* (March 1988).

4. Potential Energy Service Providers

The retail energy service market is complex and diverse today, and it is expected that as regulation is reduced and competition is extended, the energy service market will become more diverse, creative, and complex. It is therefore unrealistic to list all energy service providers or to attempt to describe all categories of energy service providers in Texas.

The preceding subsections characterize existing and potential energy services. New energy service providers may arise in any category of service, and may offer a broad range of services.

One class of energy service providers is the companies affiliated with regulated public utilities in Texas. Affiliated energy service companies are already active in the energy services market, both in Texas and other regions. These companies are working directly with electric consumers today, and are coordinating with their affiliated utilities to make energy services available to electricity consumers. Table VI-2 sets forth some of the utility-affiliated energy service companies.

Table VI-2: Electric Utilities and Their Affiliated Energy Service Companies

Utility	Energy Service Company
Central and South West Corporation*	Enershop, Inc.
Entergy Corporation (GSU)	Sales and Services, Inc.
Houston Lighting & Power Company	HL&P Energy Services; NorAm Energy Management
Lower Colorado River Authority	(Board has approved the creation; no announcement.)
Southwestern Public Service Company	Quixx Corporation
Texas-New Mexico Power Company	Community Public Service
Texas Utilities Electric Company	(Setting one up; no announcement.)

Notes: * CSW is a holding company with three operating electric utilities in Texas: Central Power and Light Company; Southwestern Electric Power Company; and West Texas Utilities Company. A fourth utility, Public Service Company Oklahoma, operates in Oklahoma. Another CSW affiliate, CSW Communications, Inc. may also become more active in the energy services market, particularly in metering and communications.

Several parties have expressed concern that a major issue affecting competition in the energy services sector is the relationship that utilities have with their unregulated affiliates. This kind of special relationship threatens to create a disruption in the existing competitive market as utilities misuse customer information to give the utility affiliate an advantage over other energy service providers.[7] §2.051. The Commission will be addressing these issues in a Spring 1997 rulemaking pursuant to the IRP rulemaking project under PURA95 §2.051.

B. Electric System Characteristics Provide Opportunities for Expanded Competition in Electric Energy Services

The time-varying nature of electric loads and production costs in Texas, and the instantaneous nature of the interconnected system has led utilities to adopt particular approaches to resource planning, power acquisition, and power plant operation. These measures have provided reliable, and until the 1970s, low-cost electric power. This section provides background information relating to electric loads, production costs, the allocation of electric system costs to consumers, and the related activities (such as demand-side management) that utilities have relied upon to send appropriate pricing signals to consumers. This background is necessary to discuss the effect of unbundling and new energy service and pricing options, issues that have recently become important public policy concerns.

1. Electric Loads and Peak Demand

Understanding the nature of the aggregated consumer loads is a key to understanding how the electric needs of Texans are provided. These loads vary over time, and the existing electric system was built to serve these time-varying loads. The electric system and its generating units and control devices are designed to follow the daily load variation on a moment-by-moment basis. This occurs through an automatic adjustment of the voltage, frequency, and current necessary to deliver power to keep the system in balance. Electric utilities are constantly bringing generating units on the system and ramping up and ramping down the generating units to match the load.

The electric system is designed to deal with changes in load over the course of the day, the week, and the seasons. Winter peak demand is often 35 to 40 percent less than

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[7] Good Company Associates, *Comments on Project No. 15,000 Draft Report* (November 7, 1996) filed on behalf of the National Association of Energy Service Companies and the Texas Propane Gas Association. *Comments of Texas Ratepayers' Organization to Save Energy*, Project No. 15000 at 2 - 3 (November 12, 1996).

summer peak demand in Texas, highlighting the need for different planning requirements. The State's largest utility, TU Electric, had a winter peak demand that was approximately 5,000 MW less than its summer peak demand in 1995. Seasonal variations present formidable challenges to utility planners.

Even more challenging are the daily swings in load. In Texas, the daily load swing (that is, the afternoon maximum demand minus the early morning minimum demand) exceeds 18,000 MW on many days in the summer. TU Electric's 1995 annual peak of 19,180 MW occurred on July 28, 1995 at 5:00 PM. Its lowest demand that day was 11,159 MW at 5:00 AM. The difference was a daily swing of 8,021 MW. Typical load shape patterns for TU Electric (two weeks in 1995) are displayed in Figure VI-2.

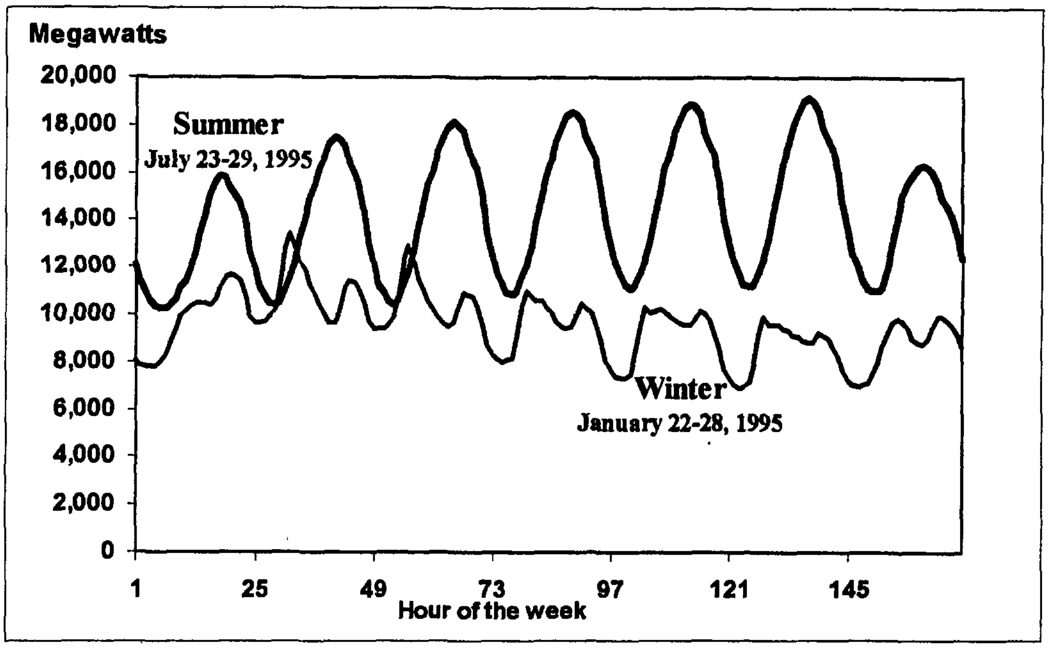

Figure VI-2: Texas Utilities Electric Company Loads for Two Weeks in 1995

ERCOT experienced a daily swing of 18,665 MW on the day of TU Electric's peak, an amount roughly equivalent to the total peak load of TU Electric.[8] In general, the

[8] These data are based on the hourly ERCOT loads that are filed with the Federal Energy Regulatory Commission and are available at http://www.ercot.com.

State's utilities address these load swings with supply-side technologies.[9] Daily and seasonal changes in load are highly correlated with the weather; that is, the usage of cooling devices drive the summer peak demand, and heating devices drive the winter peak demand. As discussed in more detail below, managing the peaks and valleys inherent in fluctuating electric loads offers significant opportunities for new and more competitive energy services.

2. Planning and Dispatch for Peak Requirements

Utilities rely on a variety of power plant capabilities to meet the changing loads. The determination of what type of units to use for base, intermediate, or peaking loads is driven by many factors, including the economics of running the unit and the time required to bring the unit into operation. In general, as load increases and utilities dispatch more generating units, the incremental production costs rise. In other words, a kWh produced at peak times generally costs more than one produced at off-peak times. As loads increase, other costs and constraints increase as well. For example, as some transmission lines approach their limits, the availability of backup or reserve power decreases.

Some generating units are used as "base load" units; that is, power plants that are in operation all of the time (other than during periods of required maintenance or unscheduled outages). A base load unit is one that combines the lowest possible operating cost (measured in terms of operating efficiency and fuel price) together with high availability and reliability.[10] Base load units are required to run whenever they are

[9] While interruptible power has contributed to system reliability for many years, it is only recently that utilities have begun to consider all customer-side-of-the-meter options—including pricing options—to alter loads and improve reliability.

[10] Different technologies operate at different efficiencies measured by the *heat rate* of a fossil-fuel power plant. Heat rate is a measure of the efficiency of a generating plant in converting the heat from a combusting fuel into electricity. A low heat rate is preferred; that is, a generating unit with a low heat rate uses less fuel to produce the same amount of electrical energy as a unit with a higher heat rate. The heat rate is defined as the ratio of units of heat (measured in Btu) required to produce one unit of electricity (measured in kWh). One kWh of electrical energy is equivalent to 3,413 Btu of thermal energy; thus the inverse of the heat rate is a measure of the conversion efficiency. An efficient power plant today may have a heat rate in the range of 7,500 to 10,000 Btu/kWh. A heat rate of 8,000 Btu/kWh is equivalent to 46.7 percent efficient (a conversion ratio of 3,413 Btu/kWh divided by 8,000 Btu/kWh). System efficiencies are about 30 percent because older generating units are less efficient, and because there are losses in the transmission and distribution of electricity.

available.[11] Nuclear, coal, lignite, and the more efficient natural gas plants are normally considered base load units.

"Intermediate load" units bridge the gap between "base load" and "peak load" (or "peaking") units. Intermediate and peaking units are constantly ramped up and down to match the consumer load. Intermediate units must be able to be brought on-line in a timely fashion to handle the load variations during the day. Intermediate units must tolerate the startups and shutdowns which occur daily, and they must have good fuel economy because they operate many hours in a year.

Peaking units generally need to get on-line fast, since they must respond to daily peak loads. In addition, peaking units must follow load variations, and tolerate an even higher number of startups and shutdowns than intermediate units. A higher operating cost is acceptable because peaking units operate for a relatively few hours each year.

Some technologies have operational characteristics that are classified in other ways. For example, wind turbines offer "intermittent power" that depends on the particular characteristics of the wind at the wind turbine site. Wind power is site-specific, with daily and seasonal variations that must be taken into consideration.

Technological and fuel diversity are beneficial to the operation and reliability of the electric system. A diversity of fuels and technologies provides utilities with flexibility as fuel markets change, or as system load changes over time. Responses can be immediate (as in the case of an emergency curtailment of natural gas), or operate over a longer term (as in changes in long-term fuel contracts).

3. Cost-of-Service Regulation and Rate Design

The approach to cost allocation and rate design discussed in Chapter II is referred to as cost-of-service regulation. This form of regulation relies on the allocation of the average embedded cost-of-service to various classes of customers and the subsequent design of tariffs to satisfy the goals of regulation. The steps described thus far—

[11] Base load units do not operate during periods of scheduled maintenance, or during unplanned outages. Because of the high capital cost, the owners of base load units are interested in operating them as much as possible.

projecting peak load requirements, constructing new power plants, dispatching those plants efficiently, accounting for costs, and allocation of costs to customers—are largely a linear process. Figure VI-3 provides a schematic representation of the most fundamental steps in traditional utility planning, cost allocation, and rate design. This approach met the needs of utilities and consumers for the better part of this century.

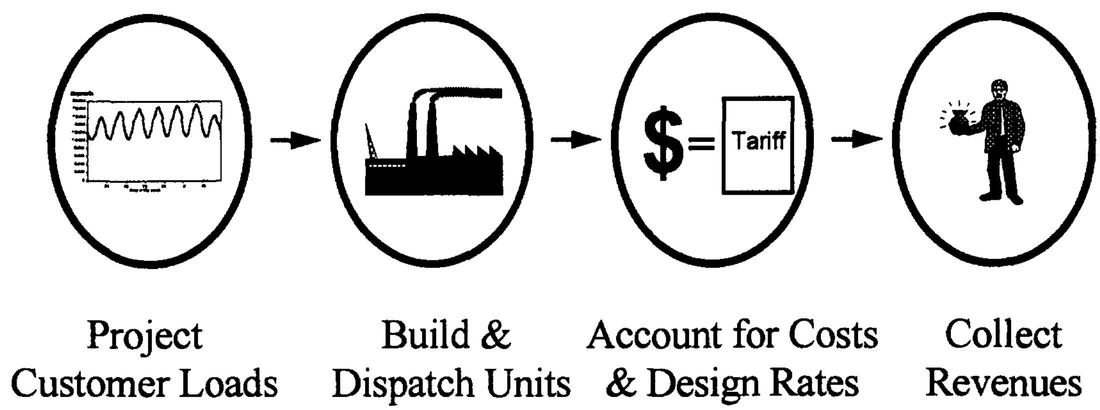

Figure VI-3: Traditional Cost-of-service Tariff Design is a Linear Process

The goals of regulation have changed as the needs of utilities and its customers have changed. For example, cost-of-service regulation provided expanded opportunities for electrification when that was the overriding public policy concern. Cost-of-service regulation has allowed an averaging of power plant cost overruns among all ratepayers when those were the dominant concerns. It has also provided a high degree of electric system reliability, revenue stability for utilities, and a reasonable opportunity for utilities to earn a reasonable return on their invested capital.

An important goal of traditional tariff design has been to ensure the stability of the revenue stream from captive customers. This goal is consistent with the desire to assure a utility a reasonable opportunity to earn a reasonable return on its investments. While revenue stability is consistent with many past regulatory policies, revenue stability is inconsistent with the functioning of a competitive market. In a competitive market, a firm has no guarantee that it will receive "reasonable earnings opportunities."

Utilities have used tariffs to encourage the purchase of electric appliances. Examples include the cost-based all-electric home tariffs, electric water-heating and electric-space-heating tariffs and riders, and declining block residential tariffs. In these instances, average cost is used to provide economic justification for leveling average usage. Such sales increase utility revenues and cash flows, and lower the average cost of a unit of electricity. As the objectives of regulation change, the application of rate design principles and techniques can be modified to help satisfy these objectives.

4. Marginal Cost Pricing and Demand-Side Management

The use of marginal costs in regulated rate design is supported by economic theory, and has been applied to rate design practice in Texas. Marginal-cost pricing has been used by electric utilities in Texas to encourage the purchase of electric appliances by small commercial and residential customers, and to affect the consumption decisions of large industrial customers. These applications are discussed here.

One purpose of all-electric home tariffs, electric water-heating and electric space-heating tariffs and riders, and declining-block residential tariffs is to send pricing signals that are more closely aligned to marginal cost. These tariffs have increased the use of electric appliances and increased electricity sales. This result is not always compatible with other regulatory goals. Since the 1970s, regulation has focused on lowering the cost of reliable service to customers. "Low cost" is generally thought to be synonymous with "low rates," but that is not necessarily the case. In 1983, the statute was amended to require utilities to consider alternatives to power plants, including the conservation of resources, co-generation, and other power purchases. This directive counters other regulatory incentives that encourage the promotion of electricity usage.[12] Some utilities have experimented with rate designs that send a price signal

[12] There is a tension between low electric *rates* and low electric *bills*. PURA95 §2.051 sets forth the purpose of IRP: a balancing of rates and bills to achieve the lowest reasonable system cost of the utility. Greater installation of electric appliances results in *increases* in utility sales, customer bills, and utility revenues (since there is an identity between bill payments and revenue collection). DSM or pricing that would result in an increase in efficiency of installed appliances, in contrast, would result in *decreases* in utility sales, customer bills, and utility revenues.

that varies over time, but such rates have not been widely used in Texas. Time-of-use tariffs are discussed below in the context of customer choice and innovation.

The development of a market for co-generated power resulted in a loss of large industrial customers. Some large industrial sites changed from electricity consumer to electricity producer. As a result, utilities began to come up with pricing approaches based on marginal costs in an effort to reduce the number of customers that would bypass the utility. Some techniques justified such sales at the production costs of the utility (short-run marginal costs), rather than at the full average embedded cost-of-service. The resulting tariffs are based on the ability to interrupt customers (interruptible rates), a desire to maintain an industrial facility in the region (economic development rates), or more recently, on the general authority to adjust prices down to the long-run marginal costs of the utility (flexible pricing).[13]

Marginal cost pricing was also applied to the development of DSM programs. Marginal costs are the basis for determining the design and funding level of the program, including any customer rebate. These programs expand the selection of electric service options for consumers who desire to control their energy costs. Well planned DSM programs initially benefit participating consumers through lower monthly electricity bills. The programs can eventually benefit all utility consumers through reduced fuel costs and deferred capital additions. Further, DSM can allow control of peak demands, improved generating efficiency, and increased system reliability. Utility application of DSM to reduce consumption and peak demand has been limited in Texas, largely because of a concern over "lost revenue" and its impact on shareholder profits.[14]

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[13] OPC comments that "by the early 1990's, some utilities were producing as much as 20 percent of their output for interruptible sales" in the context of cost shifting. *Office of Public Utility Counsel's Comments on Scope of Competition Report,* Project No. 15002 at 6 (November 8, 1996).

[14] The experience in Texas with respect to DSM has been mixed. Parties claim that utilities have disregarded Commission directives to implement conservation programs and encourage energy efficiency. Some utilities have modified conservation programs to encourage usage; for example, by giving higher DSM rebates for efficient heat pumps (that use electricity for heating) than for efficient air conditioners. The air conditioner rebate would leave the fossil-fuel furnace intact; the heat pump requires the customer to switch to electric heating.

C. Competitive Opportunities for Large Commercial and Industrial Customers

Industrial consumers are becoming increasingly creative in developing cost-reducing alternatives to purchases from the electric utility. Industrial and large commercial consumers, because of their size, sophistication, and operational flexibility, can often take one of several approaches to energy management and cost control. These approaches can be classified as follows: changes in industrial processes; on-site electricity generation; tariff options; load aggregation; and choice of power service. Each of these approaches allows consumers to manage, complement, or reduce their purchases of electricity from the public utility.

1. Industrial Processes and Energy Efficiency

Technological innovation has recently made new technologies and processes available to industrial consumers, effectively expanding their choices. It is beyond the scope of this report to fully address these technological options; this section, however, provides an introduction to the concept of "electrotechnologies" (electrically-driven technologies) that are applicable to industrial processes.[15]

Electrotechnology adoption generally has one of four impacts, each of which reduces cost relative to production for the adopting firm:

- Increased electricity and primary energy use (e.g., natural gas), but with positive impacts on other factors of production (e.g., labor savings);
- Decreased electricity use with negligible fossil-fuel impact;
- Increased electricity use but with reduced primary energy use; and

[15] Many of these are relatively recent technologies that use electricity to make industrial processes more energy efficient, often replacing direct fuel consumption (e.g., on-site coal or natural gas). Examples of electrotechnologies include: ultraviolet and electron-beam curing; infrared (for heating and drying); microwave/radio frequency heating; induction (for melting, through-heating, and heat treating); indirect resistance heating; arc plasma heating; high-temperature heat pumps for heat recovery; freeze concentration/separation; direct resistance melting (especially for glass); high-efficiency motors; adjustable speed (frequency) drives, particularly in the process industries (chemicals, pulp and paper, food, and petroleum refining); membrane separation; electrolytic separation (particularly in the aluminum, chlor-alkali, magnesium, and copper industries); supercritical fluid separation; laser cutting, welding, and heat treating; and electron beam welding. See Sparrow, F. T. and P. S. Schmidt, "Demand-side Management Implications of Electrically based Manufacturing Technologies," *Energy*, Vol. 18(10), Great Britain: Pergamon Press Ltd. at 1070 (1993).

- Decreased electricity and primary energy use.[16]

Each industrial firm will make its own decisions regarding which technologies to apply to make its products.[17] New electrically driven technologies expand the options for these customers. Industrial customers are looking at new combinations of technologies and electric pricing approaches to reduce costs and increase value in their businesses.

2. Co-generation, Self-generation, and Qualifying Facilities

Co-generation is most attractive, both technically and economically, in industrial operations with a large and constant need for steam. These include pulp and paper industries, chemicals, primary metals, and petrochemicals. In Texas, the majority of the large industrial co-generation potential lies along the Gulf Coast. Co-generation may also be economical in institutional and commercial settings. In such cases, the thermal applications are for cooling and heating loads rather than for industrial process use. For example, the State of Texas has applied co-generation technology at its universities, and many hospitals have round-the-clock operations and thermal applications that make the investment worthwhile.

Large industrial consumers with on-site co-generation (i.e., consumers that are also self-generators) are able to reduce their purchases from electric utilities, as well as sell excess power to utilities through the use of co-generation technology. Co-generators may also serve as *qualifying facilities* (QFs) under the Public Utility Regulatory Act of 1978 (PURPA) to the extent they sell electricity that they generate to other parties.

[16] *Id.* at 1067.

[17] For example, separation processes are widely used in industry to purify raw materials, separate by-products, and remove contaminants (for example, distillation, filtration, extraction, adsorption, crystallization, evaporation, and membranes). A variety of industrial firms are studying new processes. Conventional separation processes are inefficient and energy-intensive and represent about 40 percent to 70 percent of the capital and operation costs in many process industries. Distillation, for example, with an efficiency that seldom exceeds 10 percent, accounts for more than 40 percent of annual energy use in chemicals manufacture and petroleum refineries, two energy-intensive segments of the US economy. The new technologies that will replace distillation are still somewhat risky, but public and private sector research continues. US Department of Energy, *Task Force on Strategic Energy Research and Development*, Annex 1: Technology Profiles, Washington, DC at 95 (June 1995).

Utility purchases from a QF expand the role of large industrial consumers from that of end-use consumer to one of *both* consumer and producer.[18]

Access to wholesale markets for sales of electricity through the mandatory wheeling of QF power has changed the economics of co-generation by making it even more economical. In a similar manner, access to interruptible, back-up, maintenance, and supplemental power tariffs has changed the economics of co-generation. The developers of co-generation projects are able to rely on these utility services in assessing the reliability of the production of electricity and in sizing the generating units and associated equipment. In certain instances other self-generators (that are not technically co-generators) have had similar access.[19]

Under Commission rules, QFs are allowed to sell power to an end-use (retail) customer only if the customer is "the sole purchaser of the thermal output of the qualifying facility."[20] PURA95 incorporated this rule into statutory law in the definition of "retail public utility." Most, if not all, qualifying co-generators sell electricity to the industrial customer that purchases the thermal output. Qualifying facilities may request a CCN from the Commission for retail sales to an end-user, and in at least one instance the Commission has certified such a request.[21]

3. Tariff Options

Competition may also be affected by the types of services offered by a utility through its tariff. To date, industrial and large commercial consumers have benefited from an array of pricing and tariff options. For example, utilities have offered tariffs to avoid

[18] The Commission originally adopted rules for QFs in 1981. Utilities must sell capacity and energy to co-generating facilities within their service areas at non-discriminatory rates, including supplementary power, backup power, maintenance power, and interruptible power. The Commission also required utilities to transport or wheel electricity from QFs to other utilities. In 1983, the Legislature mandated that utilities evaluate alternatives to traditional power plants, including additional power contract arrangements with co-generators, thus giving continued serious consideration to investment in co-generation.

[19] For example, HL&P's tariff for standby service is not restricted to qualifying facilities.

[20] P.U.C. SUBST. R. 23.31(c)(1)(E).

[21] *Petition of Cogen Power, Inc. for Determination Concerning Applicability of Certificate of Convenience and Necessity Provisions to Certain Sales of Power by Qualifying Facility* and *Application of Cogen Power, Inc. for Certificate of Convenience and Necessity to Sell Electric Power from One Portion of a Qualifying Facility to the Owner of the Qualifying Facility*, Docket Nos. 6488 and 6841, 12 P.U.C. BULL. 1696 (February 11, 1987).

uneconomic bypass, promote economic development, and encourage load shifting. "Anti-co-generation tariffs" and flexible pricing are provided by utilities in an effort to forestall the development of co-generation facilities. In a few instances, federal and State facilities are served as wholesale consumers.[22]

A few electric utilities offer their large consumers access to wholesale market prices on an as-available basis. These "buy-through" tariff options allow an industrial consumer to acquire interruptible power from a third-party generator. In a buy-through arrangement, the utility recognizes the arrangement, and adds a small charge for the right to allow the consumer to "buy through" the utility. These transactions are interruptible at the discretion of the utility, and are often only available when the utility has interrupted power to the consumer on its tariff. The utility marks up the price slightly to cover certain costs of the transactions.

A similar "buy through" tariff is becoming more prevalent among cooperative utilities with their ability to offer discounted rates to certain customers.[23] In these cases, the cooperatives offer full requirements (non-interruptible) power to certain customers on a "buy-through" basis, with the "buy-through" power being priced lower than the standard wholesale power rate.[24]

Consumers may also have access to utility tariff provisions that allow a choice of pricing options. These provisions include flexible, time-of-use, real-time, and advance-notice pricing options. While larger consumers may be able to take greater advantage and recognize greater gains of these pricing options, some utilities offer these options to residential and small commercial consumers at least to a limited extent. These pricing options are discussed in more detail in the subsection that addresses competitive opportunities for residential and small commercial consumers.

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[22] For example, Texas A&M University is a wholesale consumer of Brazos Electric Power Cooperative, Inc.

[23] See Chapter V(B)(3)(f)(i) for a discussion of cooperative discounted rates and the Commission's interpretation of PURA 95 with respect to such discounted rate offerings.

[24] The Commission has indicated its concern about this legal but discriminatory practice in *Application of Northeast Texas Electric Cooperative, Inc., Tex-La Electric Cooperative, Inc., Sam Rayburn G&T Electric Cooperative, Inc., and Their Ten Member Distribution Cooperatives For Authority to Implement Industrial Competitive Rates*, Docket No. 15133 (September 3, 1996).

4. Load Aggregation

Load aggregation involves organizing individual consumers into a group to serve the aggregate load of the group's members.[25] The most common approach to load aggregation with applicability to large customers is *conjunctive billing*. Conjunctive billing is a billing arrangement where two or more billing points (e.g., buildings) belonging to a single business are aggregated for the purpose of calculating the monthly bill. Conjunctive billing increases the opportunities for a consumer to manage loads at two or more sites.

In addition to conjunctive billing, two new approaches to load aggregation have been proposed:

- *Load management cooperative:* A load management cooperative is a collection of consumers that jointly control their loads to bring predictable peak demand reductions to the utility system. A load management cooperative could be formed in response to a utility resource solicitation, in response to a utility tariff or program specifically designed for the purpose, or through negotiations with a utility.
- *National account management*: National account management involves the aggregation of related energy management services for a chain of stores. Escos offer load and energy management services to these national chain consumers. In the near term, this provides a consolidation of energy accounting and management activities. More importantly, these national chains position themselves to take advantage of retail access when and if it is adopted. Of equal importance is the strategic benefit for Escos as an "energy service provider of choice" in a competitive market.[26]

5. Choice of Power Service

Large consumers utilize numerous methods of achieving cost savings by seeking access to low cost power. In addition to self-generation and purchases from a QF (if the purchaser is the sole purchaser of the thermal output), the versions of retail sales

[25] Electric utilities aggregate small loads into larger loads within a geographical region, and the Commission-approved service area CCN provides electric utilities with some assurance of cost recovery for the efforts and investments in facilities needed to serve those consumers. Assurance of cost recovery has been particularly important where small loads are widely dispersed, as in rural Texas.

[26] The national retail chain Service Merchandise has entered into such an agreement with Utilicorp United of St. Louis. Copelin, Layan, "Utility Officials Bracing for Jolt of Deregulation," *Austin American-Statesman* at 1-A (June 11, 1996).

transactions that have been proposed by large industrial consumers usually rely on a corporate or affiliated relationship between the producer and consumer of the electricity. Each of these focuses on access to a particular generating unit or choice of power service. Three dimensions of retail access that have been pursued recently can be classified as follows:

- Affiliate wheeling;
- Self-generation at a distance; and
- Partnerships.

Affiliate wheeling is an arrangement in which a consumer obtains transmission service to wheel power from one industrial site to serve another industrial site of the same company. In one instance, the Commission ordered HL&P to consider the potential reductions in peak demand that could be achieved by considering affiliate wheeling proposals in a required DSM resource solicitation.[27] The Commission has also considered affiliate wheeling as a means to balance competition among HL&P and co-generation developers where the Commission authorized flexible pricing for the utility.

Self-generation at a distance refers to arrangements that allow industrial sites that are distant from one another to transmit electricity between sites. One proposal considered by the Commission would have allowed a new transmission utility, Gulf Coast Power Connect, to construct a transmission line to link two such sites. The proposal was eventually withdrawn from consideration.[28]

New partnerships are one means of forming a corporate relationship where none previously existed, particularly where the partners provide electricity. In a recent case that did not come before the Commission, a district court judge determined that a proposed transmission line to connect the generator, CoGen Lyondell, Inc. (a Destec

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[27] *Application of Houston Lighting and Power Company for Approval of Notice of Intent*, Docket No. 12138. The Commission ordered HL&P to consider self-service wheeling in its forthcoming solicitation for resources. Finding of Fact 114 and Ordering Paragraph No. 4, December 22, 1993. HL&P subsequently revised its estimate of need. The case was remanded in response to a motion for rehearing. The December 1993 Order was reconsidered and withdrawn on May 26, 1994.

[28] *Application of Gulf Coast Power Connect, Inc. for a Certificate of Convenience and Necessity for a Proposed Transmission Line in Chambers and Harris Counties, Texas*, Docket No. 13943.

subsidiary), and the consumer, Lyondell Petrochemical Company (no prior connection to CoGen Lyondell) would result in a sale of power and not the provision of power by a company to itself, notwithstanding the structure of the relationship as a partnership.[29]

D. COMPETITIVE OPPORTUNITIES FOR RESIDENTIAL AND SMALL COMMERCIAL CUSTOMERS

This section focuses on the opportunities currently available to residential and small consumers to affect their usage of electricity through: fuel switching; the purchase of efficient appliances; service initiation; load management and energy storage; and load aggregation. Generally, these concepts are similar to the opportunities available to larger consumers. Customer size and access to economical and properly sized equipment, however, may tend to limit the benefits that can accrue to small consumers, as compared to larger consumers. In addition, small consumers have less flexibility in their operations, and they lack sophistication, information, and financing for cost-reducing investments. Finally, with many small consumers the person paying the electric bill (tenant or homeowner) is not the same person who makes the initial investment decision regarding appliance type and efficiency (landlord or homebuilder).

1. End-use Fuel Switching

There is limited retail competition for certain end uses, particularly where appliances, such as clothes dryers, are available in alternative models that use different energy inputs. Electric-to-gas competition for end uses occurs when consumers make initial appliance choices, and when consumers have the option of replacing an appliance or piece of equipment. For example, switching from electric-resistance heating to a natural-gas furnace or switching from a natural-gas furnace to an electric heat pump may be considered during a major home retrofit. Competition exists for a variety of end uses, including space heating, space cooling, domestic and commercial water heating and cooking, drying, and even decorative lighting.

[29] Houston Lighting & Power Company vs. Public Utility Commission of Texas, Destec Energy, Inc., and Destec Operating Company, Cause No. 96-02867, in the District Court 345th District, Travis County (1996). See also "Texas Judge Rejects Plan by Destec to Sell 61 MW to an HL&P Industrial," *Electric Utility Week* at 16 (October 7, 1996).

End-use competition has increased as natural gas prices have decreased and as co-generation and conservation technologies have proliferated. The market for end-use equipment and the energy to operate it is influenced by regulators at the federal, state, and local levels: for example, federal appliance efficiency standards, state commission regulation of promotional activities and hook-up policies, and city building codes.

As an energy-producing state, Texas has a long tradition of viewing energy sales as linked to economic prosperity. Indeed, the State's budget is linked to energy extraction both directly and through taxation of related industries. Texas has been more resistant to energy conservation than some other states. There is also a great deal of suspicion among promoters of alternative fuels—propane, natural gas and electricity—about programs that might induce fuel switching. The suspicion may be aggravated by Texas' bifurcated regulatory approach for electric and natural gas utilities. During the past decades each industry has accused the other of inappropriately promoting its favored fuel or of engaging in anti-competitive practices. Recently, the two regulatory authorities have begun to work more closely together.[30]

Competing natural gas utilities and electric utilities have played a significant role in end-use fuel substitution and competition. The mergers of TU Electric with Enserch Corporation (the owner of Lone Star Gas Company), and HL&P with NorAm Energy Corporation (and its local gas distribution company, Entex) are likely to affect end-use competition and fuel switching. The combined multi-fuel utilities should consider the profit margins on each type of appliance in determining whether to market electric or natural gas appliances, eliminating one marketing activity in deference to another. The heightened need for the functional unbundling of monopoly distribution operations in the electric industry is discussed below.

[30] An interagency workshop entitled "Integrated Resource Planning and Demand-side Management: Impacts on Fuel Markets " was conducted between the Texas Railroad Commission and the Public Utility Commission of Texas on December 14, 1995. The Commission followed up with a workshop of its own on April 3, 1996, as part of the integrated resource planning rulemaking proceeding, Project No. 14400.

2. Appliance Efficiency

Customers can acquire energy-efficient appliances on their own, or they can take advantage of a utility DSM program. Customer investments in appliance efficiency and DSM that targets the efficiency of specific devices are closely related. Customer-initiated conservation occurs all the time as consumers weigh the likely bill savings of their investments in energy efficiency. However, the averaging of costs for traditional ratemaking purposes tends to dampen consumer response. Consumers do not generally receive accurate pricing signals on the cost of various heating and cooling uses during different times of the day. A customer's consumption of electricity at the time of the utility's peak (or during a system emergency) results in higher costs than those reflected in the tariff, and such costs are borne by all customers whether or not they use electricity at that moment.

Past practice with respect to DSM program design has been to give a rebate to compensate for average-embedded cost-of-service tariffs. DSM rebates have been controversial because some parties view the rebate as a subsidy for certain consumer behaviors. Other parties argue that rebates *are themselves* a proper pricing signal, given the circumstances of the regulated utility. As a consequence of these views, and in response to a need for more efficient program implementation, there is a trend in favor of time-differentiated rates in lieu of DSM programs.[31] Such rates would send more accurate pricing signals, and would not be restricted to particular technologies or end uses. As pricing better reflects the cost of service on a time-differentiated basis, consumers would respond (or not) in whatever manner they choose, without reference to a particular technology. It is anticipated that appliance purchasing decisions will become more efficient when consumers receive accurate pricing signals, and as

[31] Efficient pricing provides an ongoing incentive that is not restricted to a specific technology or end use. In a regulated market, the closer that prices track cost, the more likely that the customers' responses to price will increase system efficiency. Pricing is, in effect, a *standing offer* to electric customers to increase efficiency. In both the IRP rulemaking proceeding, Project No. 14400, and this proceeding, Project No. 15000, several parties have stated that a *standard offer* approach to the acquisition of DSM would solve many problems. In adopting IRP rules, the Commission established the all-source solicitation for resource acquisition after a consideration of the standard offer approach. 21 *Texas Register* at 6780 (July 19, 1996). See Good Company Associates, *Comments on Docket 15,000 Draft Report*, Project No. 15000 (November 7, 1996).

competing energy service providers work more closely with consumers to respond to consumers' preferences.

3. Building Construction and Service Initiation

Consumers respond to a variety of signals when making appliance choice and usage decisions. The relative prices of alternative appliances and their energy inputs affect customers' evaluation and choice among options with different energy efficiency levels. The energy efficiency of new or substantially retrofitted buildings can be addressed through building codes or related fees and standards. These are generally classified into two categories:

- Building codes (model energy codes); and
- Utility incentives or hookup standards and fees.

Building codes are locally mandated minimum construction standards for new buildings. Some cities have standards for retrofits as well. While some states have adopted uniform building codes recommended by national bodies, the Texas State Legislature has not adopted Statewide standards for building codes, leaving the matter to local decision. Many municipalities in Texas have adopted building codes for safety and health reasons; however, only a few have adopted energy efficiency-related building codes, such as the model energy code.

Utilities have played a role in the design of new buildings. In Texas, electric utilities have influenced the design and construction of buildings through:

- Pricing strategies to encourage electric appliances;
- Rebates to promote energy-efficient appliances and building construction practices;
- Builder/developer programs to promote all-electric homes; and
- Line extension practices.

Utilities have used declining-block tariffs, rebate programs, and equipment sales programs to increase the purchase of electric appliances by consumers. Some electric utilities sell electric appliances to residential and small commercial consumers, particularly consumers located in rural parts of the State. Appliance rebates to encourage consumers to buy electric appliances have been used by some utilities.[32]

Utility practices with builders and home developers have tended to promote all-electric homes. Homes that use electricity for all end uses tend to have higher load factors and higher electricity purchases, and thus are financially lucrative from the utility's perspective. Hookup and line extension policies directly affect the location of a building, and could indirectly affect building design and efficiency. Hookups are made without regard to the energy efficiency of the building structure. Hookups without energy efficiency standards spread the costs of growth in electric sales (and consumption inefficiencies) to all consumers. Without standards for efficiency, all consumers pay for the cost to serve a new consumer, including the cost of the increased generating capacity, without regard to the lack of investment by such a consumer for efficient appliances and building insulation.

Line extension policies affect consumer consideration of renewable resource technologies.[33] The longer the allowable line extension, the more likely a consumer will be to ignore off-system alternatives. Conversely, the higher the line extension charge, the better the off-grid options will look. It has been utility practice to extend lines to all new consumers and to have all consumers pay the increased investment in distribution facilities.

4. Load Management and Energy Storage

Load management refers to utility-initiated activities to influence customer energy use patterns in a manner that provides benefits to the integrated electric system. Thomas Edison encouraged electric motors in the early years of the industry to build daytime loads that would complement the growing nighttime lighting usage. By increasing the

[32] For example, see Houston Lighting & Power Company's *December 1987 Energy Efficiency Plan* filed pursuant to P.U.C. SUBST. R. 23.22. The Commission subsequently ordered HL&P to cease seven promotional DSM programs in *Application of Houston Lighting & Power Company for Authority of Change Rates*, Docket No. 8425, 16 P.U.C. BULL. 2199, 2394-2397 (September 18, 1990).

[33] For a new customer, a utility will extend service from existing utility facilities at no fee to the customer, for a given distance. Beyond that distance, the utility may impose a line extension fee.

daily load factor—the ratio of actual usage to maximum possible use—Edison could reduce the average cost of electricity on a per-unit basis. This was accomplished through the increased use of the generating units that had the lowest cost per unit. In a modern utility system, a higher daily load factor also implies smaller variations in the daily load swings.

Load management includes direct load control, load shifting, and promotional activities designed to improve the load factor of the utility. Direct load control is the reduction in peak demand on an electric utility system by direct control of electric devices. Customers may choose to have one appliance (for example, a water heater) cycled on and off at the discretion of the utility. Customers often receive a price discount for this service, as the reliability of service to a particular device is effectively decreased. The application of direct load control in Texas is presently limited to a few utilities.

Load shifting occurs when the peak demand on an electric utility system is reduced through the storage of energy produced during an off-peak period. Commercial cool storage, for example, relies on the operation of the customer's chilling unit (air conditioner) at night to produce cool water. This cool water is circulated in the building the following afternoon to provide cooling without the operation of the chilling unit. Other common energy storage devices are water heaters, well-insulated homes and apartments, and refrigerators and freezers.

The storage of energy in non-electric forms is relevant to competition because of the system benefits that may accrue. Electric demand is not constant over time, and the excess generation available during off-peak periods can be used to recharge (heat or cool) an energy storage device in order to increase capacity during peak periods. This effectively allows off-peak power to be shifted to on-peak use, improving load factor. Energy storage allows an energy consumer subject to time-of-day pricing to shift energy purchases from high cost to low cost periods.

Energy storage also has a dimension that affects reliability. As more consumers install on-site energy storage or buy uninterruptible power supplies to protect electronic equipment, their need for a high level of system-wide reliability may decrease. Such consumers may be willing to accept interruptions in their electric service, thus reducing demand at critical periods.

5. Aggregation

Load aggregation is important to small commercial and residential consumers because it can reduce transactions costs. As the industry evolves, small consumers may be aggregated in the traditional manner—by geography within the service area and within customer classes defined by the utility—or through new techniques relating to other characteristics of the consumers. For example, new pricing options, such as "green pricing," may result in the aggregation of like-minded environmentally conscious customers.[34]

Municipalities could provide load aggregation services in a competitive market. A utility could cooperate with the municipalities it serves to avoid municipalization. In the Texas-New Mexico Power Company "Community Choice" proposal (later withdrawn), the utility proposed to allow municipalities to return to their original role as load aggregator for the community.[35]

E. Customer Choices and Innovation

Do all customers want choices, and if so, what choices do they want?[36] Regulatory policy has recognized the importance of increasing consumer choice to lower societal costs and to improve electric system efficiency, and there is much that the Commission

[34] Green pricing refers to service options that allow a consumer to pay a rate differential, with the resulting revenue dedicated to renewable resources investments.

[35] *Application of Texas-New Mexico Power Company for Approval of its Community Choice Transition Plan*, Docket No. 15560 (May 2, 1996).

[36] As the experience in the deregulation of the telephone industry indicates, many telephone customers *chose not to choose*, remaining with AT&T and refusing offers of rate discounts. At the least, these customers are not any worse off simply because other choices are available to them. Thus, expanded opportunities for service and pricing options for small customers should benefit those who want additional control over their electric service, and should not discomfort those who are content with their current service. A key role for the regulator is to ensure that expanded choices for one set of customers does not lead to cost shifting to those customers who do not choose alternatives.

can do to increase customer choice.[37] This section addresses the methods through which these opportunities may become available to consumers.

1. Choices Provided Through Unbundling

The purpose of unbundling is the functional separation of activities, costs, and information so that clear, accurate, non-discriminatory price signals are available to all market participants. There are several reasons why unbundling operations is useful:

- *Compare costs and efficiencies:* The economies of scale and scope in the traditional integrated industry are being judged against the efficiency that might be gained in competitive markets. Unbundling allows regulators to analyze each component of service to determine whether benefits may arise in competitive markets.
- *Track and reduce anti-competitive activities:* There is a statutory mandate to ensure that utilities refrain from anti-competitive activities. Unbundling allows closer scrutiny of each activity, and a closer tracking of costs (to detect cross subsidization) and information flows (to determine whether competitors are treated in the same manner as affiliates of the utility).
- *Customer choice:* Customer choice is emerging as an important public policy apart from any economic benefits associated with it.

Unbundling permits consumers to choose and pay for just those services that they desire, and it may permit them to use discrete services offered by other suppliers. Unbundling gives the power of information to consumers, and leads to more efficient

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[37] TU Electric recognizes that new services may be provided by electric utilities under existing law:

> *Other than choice of generation supplier, there are no choices proposed under a retail access scheme that could not be made available to electricity consumers under a regulated environment. New consumer options relating to time-of-use pricing, service quality and reliability, and efficiency and demand services are likely to develop under the current industry structure, since there is a growing appreciation for such choices on the part of electric utility consumers. A regulatory environment that encourages consumer choice options, permits the adoption of alternative solutions outside of traditional regulatory restrictions, and permits differentiated services and innovative rate designs targeted to meet the needs of individual market segments would allow and encourage utility adoption of creative technology and system solutions to meet consumer needs.*

See *Comments of Texas Utilities Electric Company Concerning the Market Structure II—Customer Choice and Distribution Workshop* at 18 - 19 (April 22, 1996).

consumption decisions. Competition can enhance consumers' abilities to examine their options and to meet their needs in the most economical manner.

Unbundling requires a utility to separate its fundamental cost components (its unbundled costs) before it can offer new pricing and energy services options. The electric industry has traditionally been divided along three functional lines into generation, transmission, and distribution.

The vertically integrated structure of the industry has resulted in a sharing, averaging, and cross-subsidization of costs, information, and personnel from one function to another. With the recent regulatory reforms as well as the advent of competition in both the generation and distribution sectors, the three industry sectors (or functions) are becoming more separate and distinguishable. In adopting new open-access comparable transmission service rules, the Commission required electric utilities to functionally unbundle and separate costs for the generation, transmission, and distribution sectors.[38] Contested cases are pending at the Commission to determine these costs and establish transmission service tariffs.[39] It is generally recognized that transmission and distribution facilities are natural monopolies, and will remain regulated monopolies for years to come. In contrast, the ancillary services associated with transmission and distribution are more flexible and less monopolistic in nature. These ancillary services are likely to be offered in a competitive market.[40]

Unbundling is essential to provide opportunities for new entrants in the energy services market. Monopolies can use their technology, information, and revenues to erect barriers to entry and thereby discourage competing businesses. Once other service providers are technically and legally allowed to provide certain services, the regulator's

[38] 21 *Texas Register* at 1416 (February 20, 1996). Amended Substantive Rule 23.67(o) requires utilities to make a filing with the Commission to separate costs and rates, based on a separation of the utility's generation, transmission, and distribution operations.

[39] Docket No. 15840, *Regional Transmission Proceeding to Establish Postage Stamp Rate and Statewide Loadflow Pursuant to SUBST. R. 23.67*, and numerous utility-specific proceedings.

[40] For example, the maintenance of power quality is a distribution-level service that has been provided by utilities, In the future, it is possible that on-site, consumer-owned power conditioners (e.g., uninterruptible power supply) will maintain power quality at a lower cost. As costs fall, a market for these devices may arise.

job should be ensuring that new entrants will receive fair treatment. In the case of energy services, the Commission has begun a proceeding pursuant to PURA95 §2.051(m) and §2.216 to require a utility to separate its costs and rates, based on the costs associated with the utility's distribution operations.

a) Rulemaking on Distribution Function Unbundling

The Commission has initiated a rulemaking proceeding to address unbundling distribution functions.[41] This rulemaking arose out of the IRP rulemaking proceeding.[42] The objective of this rulemaking is to encourage competition in the energy service market in those cases in which provision of specific services does not favor a natural monopoly. Utilities may be required to file information regarding the functional unbundling of distribution activities and their costs. Such cost separation may include costs related to three functions:

1. *Distribution wires:* Costs relating to substations, poles, wires, transformers, and the control of the electrical flows;
2. *Metering and billing:* Costs relating to meters and meter reading, billing and consumer account management, and the collection and management of customer load information; and
3. *Energy services:* Advertising, marketing, DSM, direct load control, and other activities that affect consumption and customer convenience.

Utilities may also be asked to file information regarding the physical separation of personnel in the utility's distribution operations, including:

- Physical separation of utility personnel to the maximum extent practicable and necessary to accomplish distribution functional unbundling;
- Adoption of a code of conduct for exchanges of information among the functionally unbundled distribution units to ensure that all transactions are conducted on an arm's length basis; and

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[41] Project No. 16536, *Rulemaking on Unbundling of Electric Distribution Facilities and Functions.*

[42] In adopting a new policy on distribution functional unbundling, the Commission recognized that the functional separation of electric distribution operations would: (1) increase opportunities for customers, (2) increase opportunities for service providers, and (3) address the potential for utilities to engage in anti-competitive behavior in the energy service sector.

- Establishment of written procedures governing the exchange of information among the utility's functionally separated distribution units.

In many small cooperatives, one person performs many functions, thus limiting the ability of some cooperatives to satisfy full unbundling requirements. It is also possible that larger cooperatives and IOUs could request limitations on the requirement to separate their personnel based on a showing that complete physical separation would impair reliability.

b) The Effect of Unbundling on Markets

In general terms, an unbundled market should result in new contracts between energy service providers and consumers to fill service gaps that are currently the exclusive domain of electric utilities. First, electric utilities provide some price-risk management through rates that remain constant between rate cases and by managing a diversified fuel portfolio that averages and levelizes fluctuating energy costs. Second, electric utilities provide some energy efficiency, load management, and electric bill management services through their DSM activities. Third, electric utilities provide certain value-added services to consumers, relating to power quality, reliability, and other dimensions of convenience. Each of these is subject to some level of competition.

Contracts between consumers and energy service providers would likely vary in terms of price and duration, renewal or termination provisions, and a host of other factors that would depend on the preferences of consumers and providers. Contracts are likely to reflect these preferences through a process of preference aggregation and in response to the specialized services of certain energy service providers. The energy service providers will become proficient at tailoring packages of energy services that include varying combinations of electric service quality, reliability, specialized billing, energy management, and other attributes.

There are limits to the expansion of competition within the existing market structure. These limits arise from the monopoly status of the utilities and from the limitations of regulation in ensuring that rates and services balance the competing objectives of efficiency and fairness. Unbundling distribution operations may be a necessary precondition for active competition in energy services. However, if unbundling merely leads to new utility-provided services (e.g., the utility rebundles its services into new utility-provided rates and services), innovation may be hampered and competition may be limited because other energy-service providers could be denied access to the market. The appearance of consumer choice and competition might exist while the incumbent utility segments the market with new, differentiated products and prices in a discriminatory fashion.

2. Choices Provided Through Pricing Options

Electric utilities are re-examining rates and services to position themselves strategically with respect to retail consumers. Successful implementation of new pricing strategies requires that utilities have information on how various consumer groups differ in their valuation of each aspect of service, and requires that utilities understand the differences in the costs of changing each dimension of service.[43] The Commission has initiated a rulemaking proceeding to address energy service and pricing options.[44]

The new utility pricing and service options can be characterized by the types of choices implied for consumers:

1. Choices relating to the time of usage;
2. Choices relating to reliability and quality;
3. Choices relating to geography (point of generation to point of delivery);
4. Choice of power service; and
5. Other choices.

The first three categories relate to the physical attributes of electricity (its time of delivery, quality, and point of delivery). The fourth and fifth categories bring together options that are a function of law, policy, and practice. This classification scheme is explained further in the following sections.

[43] Barakat & Chamberlin, Inc., *Rate Design: Traditional and Innovative Approaches*, Palo Alto: Electric Power Research Institute at 14 - 15 (July 1990).

[44] Project No. 16535, *Rulemaking on Energy Service and Pricing Options*.

a) Choices Relating to the Time-of-Usage

Several utilities in Texas offer tariffs that reflect variations in costs over time. Because electricity is hard to store, a pricing approach that reflects the time-of-use of production can send a pricing signal that encourages consumers to alter their consumption efficiently.[45] The interaction between time-of-use pricing and consumer behavior can be strong, and can bring cost-reducing strategies to the utility. The alternative approaches to dealing with time-varying electricity costs are classified as:

- Seasonal block pricing;
- Daily time-of-use pricing; and
- Real-time pricing.

Seasonal block pricing relies on averaging costs over a season rather than over a full year. Under a flat rate, there is no seasonal differentiation, and the consumer sees no difference in the cost of production between the summer and winter.[46] In Texas, several utilities use seasonally differentiated residential rates so that the blocks reflect the higher cost of production in the summer.

Time-of-use pricing and real-time-pricing are related. Time-of-use prices set forth a charge per energy unit that varies with the hour of the day. In general, these charges are set for peak periods (afternoons in summer weekdays), "shoulder hours" (certain summer and winter peaking hours), and off-peak periods (the remaining hours of the year). Time-of-use pricing reflects the time-varying nature of the utility's daily production costs in a fairly stable manner. These variances are related to the dispatch costs of the production units, discussed earlier, which are related to the load variations. Load variations, in turn, are affected by the pricing approach selected by the utility. Time-of-use tariffs in Texas are not mandatory; they are an option that is available to

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[45] While storing *electricity* is difficult, consumers have an advantage in storing of other forms of *energy*.

[46] There are month-to-month variations in the charges for purchased power and fuel. These variations are averaged and lagged; therefore, the variations do not affect consumer pricing in a manner that would enhance efficiency, and such variations may encourage inefficient behavior. Other tariffs may send a seasonal signal. Inverted block tariffs result in higher charges during high-usage periods, and these are usually the summer months; commercial customers pay demand charges that may vary in different seasons, or which reflect the higher summer usage; commercial rates may differentiate various load factors, thus reflecting usage in different seasons.

consumers.[47] A few residential consumers have selected time-of-use pricing. Commercial and industrial consumers that are able to adjust their consumption patterns find that time-of-use pricing reduces overall cost. For example, customers with thermal energy storage (cool storage) find that a significant portion of their load can be shifted to the less expensive off-peak (nighttime) hours, and thus time-of-use pricing can provide benefits.

Real-time pricing takes the principles of time-of-use pricing to the next step. In practice, "real-time-pricing" does not occur in real time, but in day-ahead notification of prices. This advanced-notice pricing relies on a projection of hourly costs one day in advance. Typically, a utility sends the subscribing consumers a set of 24 hourly prices (or 48 half-hourly prices) during the afternoon prior to the day the prices will be in effect. These prices reflect the dispatch order of the utility's generating units (or economy purchases) for the next day, along with their heat rates and fuel prices. The consumer has the option of consuming at the announced price, or adjusting consumption.[48]

In contrast with traditional cost-of-service tariff design, real-time-pricing integrates the realities of system production—with its real-time costs and constraints—with the load response of customers who are willing to assume such risks. Figure VI-4 presents this relationship in a conceptual manner.

[47] Time-of-use tariffs are offered by Gulf States Utilities Company, Houston Lighting & Power Company, Magic Valley Electric Cooperative, Inc., McLennan County Electric Cooperative, Inc., Texas-New Mexico Power Company, and Texas Utilities Electric Company.

[48] The details of real-time-pricing programs are beyond the scope of this chapter. For example, some programs rely on a true-up of prices the next day, while others take the announced price as a final price. Another variation among the experiments in Texas relates to the allocation of estimates of outage costs. Some programs rely on an estimate of the loss of load applied to each hour of the day, while other programs rely on a real-time determination of critical pricing periods, and the subsequent transmittal of critical-period pricing information to the consumer. The Central and South West Corporation operating companies use a day-ahead projection of the probable loss of generating capacity and the ability to serve load as a component of the hourly price. Houston Lighting & Power Company, in contrast, relies on a critical pricing signal that will occur only during system emergencies; that is, when interruptible consumers are notified of an interruption, real-time-pricing consumers will be notified of a higher, critical price.

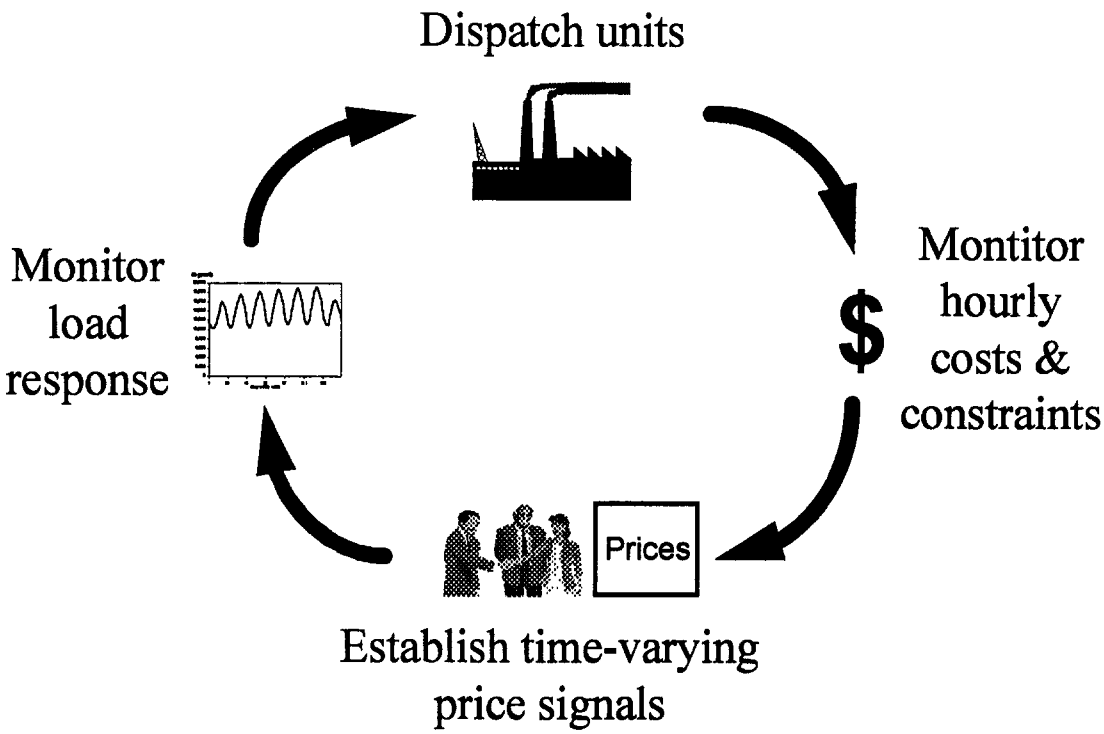

Figure VI-4: Real-time Pricing Integrates System Realities and Consumer Response

Real-time-pricing is an experimental and voluntary program in Texas.[49] It is sometimes offered in conjunction with interruptible or standby tariffs. The real-time-pricing programs in Texas provide critical information relating to the response of consumers to changing prices. Customers have more information on the operation of the electric system and the time-varying nature of electricity production, and have more control over their consumption decisions because even small changes in price may provide cost-reducing opportunities that go unnoticed under a flat-rate regime. Real-time pricing provides for more efficient use of generating equipment as consumers increase usage during low-cost periods and reduce consumption during high-cost periods. The

[49] HL&P and GSU experimented with advanced-notice pricing in the mid-1980s with some success. While the current programs are classified as experiments, there do not appear to be any technical impediments to widespread use of real-time-pricing in Texas.

use of generation resources may also be used more efficiently as consumers (and in turn generators) respond to cost variations.

b) Choices Relating to Reliability and Quality

Reliability and power quality are two variables that may become more prevalent in pricing alternatives in a more competitive environment. These alternatives are available to some consumers today, as with non-firm or interruptible pricing. These choices also bring forth the need for additional support services for consumers, such as backup and standby services. Pricing reliability and power quality options are classified as:

- Reliability-of-service pricing (variations in firmness or interruptibility);
- Quality-of-service pricing (voltage fluctuation or other quality attributes); and
- Backup, standby, maintenance, and supplemental power service.

Optional interruptible tariffs are available to QFs and other customers in Texas.[50] Interruptible consumers provide benefits to the utility system because a utility does not need to plan to serve the load during critical periods. Customers receive a reduced price as compensation for the reduction in reliability.

Interruptible tariffs can be classified as instantaneous interruptible or notice interruptible. With instantaneous interruptible, the consumer is connected to the electric utility through an under-frequency relay, set to disconnect at a frequency sufficiently below normal operating levels to cause concern about the stability of the system.[51] Notice interruptible consumers agree by contract with the utility to reduce

[50] P.U.C. SUBST. R. 23.66(j) requires that electric utilities provide interruptible service to qualifying facilities. Interruptible tariffs are offered by Bailey County Electric Cooperative, Inc., Brazos Power Electric Cooperative, Inc., Central Power and Light Company, City Public Service Board San Antonio, Dickens Electric Cooperative, Inc., El Paso Electric Company, Guadalupe Valley Electric Cooperative, Inc., Gulf States Utilities Company, Houston Lighting & Power Company, Johnson County Electric Cooperative, Inc., Lea County Electric Cooperative, Inc., Lighthouse Electric Cooperative, Inc., McLennan County Electric Cooperative, Inc., Pedernales Electric Cooperative, Inc., Sam Rayburn G&T Electric Cooperative, Inc., South Plains Electric Cooperative, Inc., South Texas Electric Cooperative, Inc., Southwestern Electric Power Company, Southwestern Public Service Company, Texas-New Mexico Power Company, Texas Utilities Electric Company, and West Texas Utilities Company.

[51] 59.7 Hz at the customer's meter.

load by a specified amount upon telephone notice by the utility. Customers generally contract for a notification period of 10 minutes to 30 minutes.

Quality of service has not generally been regarded as a pricing issue, largely because a high quality system for all consumers has been a planning goal for the utility and a goal of regulation. Increasingly, consumers are demanding a higher quality system to meet their production needs. Some consumers install power conditioning devices on their premises in order to maintain the desired quality. Other consumers may not prefer a one-size-fits-all approach to reliability and quality.[52]

Backup, supplementary, and maintenance service tariffs are collectively referred to as standby tariffs. In Texas, utilities with QFs are required to provide standby service.[53] Standby rates are offered by the large utilities with significant co-generation in their service areas.[54] Customers with on-site generating capacity are interested in standby tariffs so that their energy needs can be met when their generating unit is undergoing routine maintenance or otherwise not producing power.

Some consumers that purchase most of their electricity from the utility also maintain on-site generating units as standby power for emergency purposes. Hospitals and other commercial buildings that use electricity in life and death situations need the extra security of backup generators on their premises. HL&P has a program to put these generating units to use during periods other than emergencies, buying standby services *from* consumers.[55] This option is generally classified as a load management option because the consumer's load appears to decrease when its on-site generating unit is

[52] While all consumers state that they would prefer high-quality power, when given a range of prices and choices, some consumers may find that on-site power conditioning for a few appliances or a few pieces of electronic equipment is more economical.

[53] P.U.C. SUBST. R. 23.66(j) requires that electric utilities provide standby service to qualifying facilities.

[54] Standby rates are offered by El Paso Electric Company, Gulf States Utilities Company, Houston Lighting & Power Company, Southwestern Electric Power Company, Southwestern Public Service Company, and Texas Utilities Electric Company.

[55] *Houston Lighting & Power Company's 1996 Energy Efficiency Plan*, DSM Solicitation Program (Planergy—Commercial Load Cooperative), at III(C)(3)(1) (February 28, 1996).

operating. There are important interrelationships among standby power, on-site generation, and power quality and reliability.

c) Choices Relating to Geography

Current practice averages costs among the consumers in a particular geographical region: the utility's service area. This is a long-standing regulatory practice. In fact, some cooperatives have blended rates that rely on the averaging of power costs from suppliers within two reliability councils (ERCOT and SPP). Costs vary from point to point within the service area, notwithstanding the existence of different points of connection. Even within a well-integrated system, some customers are literally at the end of the line, and the cost to serve them may be higher.

Costs relating to the transmission and distribution of electricity are likely to remain averaged for the indefinite future. In pricing transmission services, the Commission has reaffirmed the importance of averaging costs over geographic variations and the need for a transmission pricing policy that allowed generators throughout Texas to compete in that market.[56] Texas' new transmission pricing rule establishes transmission rates based on both a postage-stamp method that averages costs across ERCOT (weighted 70 percent) and on a geographically differentiated price called the "megawatt-mile" approach (weighted 30 percent).

Two other points bear mentioning with respect to geographically differentiated rates and services:

- *Multiply certificated areas.* Geographically differentiated pricing and services exist to a limited extent with respect to multiply certificated areas in Texas; and
- *Distributed resources.* There is an increasing interest in geographically differentiated DSM or time-of-use pricing as a resource alternative.[57]

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[56] 21 *Texas Register* at 1397 (February 20, 1996).

[57] A distributed resource is a generation, energy storage, or targeted demand-side resource, generally between one kilowatt and ten megawatts, located at a customer's site or near a load center, and connected at the distribution voltage level (60,000 volts and below), that provides geographic advantages to the system, such as deferring the need for upgrading local distribution facilities. P.U.C. SUBST. R. 23.3.

While some of the geographic variation in costs could be incorporated in competitive pricing, there are no proposals before the Commission to address location-specific pricing other than those mentioned here.

d) Choice of Power Service

Electricity cannot be directed from a generating unit to a specific consumer. However, many utilities, consumers, and advocacy groups discuss power flows as if each electron could be attributed to a discrete generating unit or to particular energy service providers; while electrons cannot be tracked, accounting practices can attribute a given quantity of power to a specific source and/or customer. A number of pricing options rely on this attribution, including:

- Retail wheeling (full retail competition);
- Green pricing (access to renewable resource technologies);
- Flexible pricing (access to a generating unit "at the margin");
- Self-service wheeling (access to a particular generating unit); and
- Buy-through rates (access to a particular supplier).

Retail wheeling is addressed in Chapter VIII.

Green pricing or green marketing is a service option that allows a consumer to pay a rate differential, with the resulting revenue dedicated to renewable resources investments. In Texas, the most economical new investment in renewable resource technologies appear to be in West Texas and the Panhandle, where the prevailing winds are favorable to wind turbine installations. The majority of Texans live elsewhere, so the investment in wind turbines will not directly service the city dwellers. However, because costs can be attributed to a specific generation source and/or customer, customers who are not located near the renewable resource could purchase "green power." In that case, accounting practices should be closely monitored to ensure that the proper attributions are made.

Customers who can take advantage of cost-reducing alternatives are presented with another option—reduced (or flexible) prices. Flexible pricing allows a customer access to a particular generating unit "at the margin" because the capacity component of such units are the basis for calculating the floor price for electric service. Electric utilities have been granted the ability, subject to Commission approval and conditions , to price flexibly to maintain retail consumer loads. Electric utilities that are able to retain a consumer or a consumer load are able to maintain some of the revenue that was anticipated from that consumer. Large retail consumers are exploring their options—including switching to alternative fuels, switching to another utility in a multiply certificated area, or examining self-generation alternatives—in order to obtain a lower price from utilities.

Self-service wheeling and buy-through tariffs (discussed above in the context of large customer choices) allow customers to obtain access to a particular generating unit for accounting purposes.

It is worth noting that other pricing options, such as real-time-pricing, include elements of choice of power service. Real-time pricing consumers have access to the costs of the generating units "at the margin" on a hour-by-hour basis.[58] These real-time-pricing consumers trade the benefits of *average* energy pricing for the opportunity to respond to *marginal* operating costs of various generating units.

e) Other Choices

The final category includes several options that confound simple categorization. This set of pricing options differs from the first three options discussed above because this set does not relate to physical differences in the delivery of electricity. Table VI-1, Potential Energy Service Options, sets forth a variety of products and services that may be provided to consumers in the future. In that discussion, the services were classified with respect to facilities operation management, product-related risk management, price-risk management, and customer convenience. Three choices relating to these are presented here to give a sense of the changes that may come in the future.

[58] As a general rule, real-time pricing customers obtain the marginal energy costs, while flexible pricing customers obtain the marginal capacity costs.

i) Load or End-use Disaggregation and Appliance Maintenance

Some electric loads receive service according to an end-use-specific tariff. The most notable are roadway and security lighting. Such lighting services are seldom metered. Because of the nature of the service—with well understood technologies and times of usage—the monthly bill is based on an estimate of energy usage which is rolled into the fixed-cost component. In many cases, lighting is provided on a total service basis, with the utility providing the pole, lighting fixture, repair, and periodic light bulb replacement.

As the industry evolves, some customer and energy service providers may identify other end uses that could be provided on a total service basis. These may or may not necessitate the metering of the electricity usage, because the energy service provider will be supplying the on-site technology and its maintenance, as well as the energy and capacity necessary for electric service. Some building owners sign contracts with Escos for full-service heating and cooling, excluding electricity. Specialized entities may be able to provide particular end uses more efficiently than the customer can arrange on his or her own.

ii) Price-risk Management

Many commodity markets include price-risk management arrangements. Market participants manage their exposure to commodity price risk to establish an appropriate risk/return profile. While small consumers may not procure such risk management tools directly, aggregators may bring an array of choices to consumers in a manner that will allow consumers to manage their exposure to risk. There are numerous benefits of price-risk management. It is appears that these tools will become commonplace in the electric industry, as discussed in Chapter VIII.

iii) Service Guarantees

As markets become increasingly competitive, utilities and energy service providers may find that some consumers are interested in various non-price criteria related to consumer relations, service quality, and convenience. One utility that is applying this approach is Public Service Electric & Gas Company (PSE&G). PSE&G offers the following service guarantees with *monetary refunds* to the consumer for failures in service:

- Keeping appointments with consumers;
- Providing new service on time;
- Activating service as promised;
- Responding to outages in a timely fashion;
- Installing and repairing street lights (for municipalities) and dawn to dusk lighting (for retail consumers);
- Conducting appliance repair work; and
- Guaranteeing accurate billing.[59]

Other consumers may be drawn to utilities or other energy service providers that are willing to back up their promises with guarantees. One benefit of this approach is that a number of consumer-related issues are dealt with in a manner that reduces the need for regulatory scrutiny. Customer guarantees provide a means of improving service to consumers without government mandates. As a transitional tool the Commission could adopt rules that would require payments to consumers for utility failure to perform according to the contract for service. Such rules would be largely self-enforcing.

3. Regulatory Policy and Customer Choice

Basic economic principles indicate that choices among service options will increase consumer satisfaction and increase economic efficiency by improving the allocation of services and scarce resources. With a broader set of service and pricing options, consumers could choose among alternatives for the set best meeting their needs.

A limited set of customer service and pricing choices are being offered today, particularly for small commercial and residential customers. In the face of competitive pressures, alternative pricing and service options provide competitive opportunities for electric utilities to position themselves strategically to compete for retail consumers. In

[59] "PSE&G to Guarantee Monetary Refunds for Service Slips; Eye on Competition," *Electric Utility Week*, at 3 (July 31, 1995).

a few cases, new tariff options are being offered that reflect variations in the cost of service by hour (time-of-use pricing) or allow consumers to choose alternative levels of reliability (interruptible, curtailable, and direct load control activities). Several utilities are considering pricing that allows consumers to express their preferences for environmentally benign generating technologies (green pricing). The Commission is pursuing these expanded pricing and service choices within the bounds of its authority.

There are limits to the expansion of competition within the existing market structure. These limits arise from the monopoly status of the utilities and from the limitations of regulation in ensuring that rates and services balance the competing objectives of efficiency and fairness. In order to improve the efficiency and fairness of regulation, the Commission is pursuing distribution functional unbundling as a supplement to the IRP rulemaking. The functional separation of activities, costs, and information at the distribution level should provide clear, accurate, non-discriminatory price signals to all market participants. Distribution functional unbundling will be useful because it will allow the Commission to analyze each component of service and to track and reduce anti-competitive activities (that is, to detect cross subsidization and to determine whether competitors are treated in the same manner as affiliates of the utility). Also, the Commission is addressing distribution functional unbundling to ensure competition in energy services, rather than allowing utilities to merely rebundle rates to price discriminate.[60]

Enhanced customer choice is emerging as an important public policy apart from any economic benefits associated with it. Unbundling permits consumers to choose and pay for just those services that they desire, and it may permit them to use discrete services offered by other suppliers. Unbundling gives the power of information to consumers, and leads to more efficient consumption decisions.

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[60] PURA95 §2.214 relates to unreasonable preference or prejudice. PURA95 §2.216 relates to discrimination and restrictions on competition. In addition to the distribution functional unbundling rulemaking proceeding cite above, the Commission is investigating the meaning of the phrase "tends to restrict or impair such competition" in Project No. 16279, Commission Investigation into the Scope and Application of PURA95 §§ 2.216 and 3.217.

Part II: An Investigation of Electric Industry Restructuring

VII. Goals and Principles to Guide an Investigation Into Industry Restructuring

In conjunction with this investigation of the Scope of Competition in the Electric Industry in Texas, the Commission initiated an Investigation into Electric Industry Restructuring under Commission Project No. 15000. Industry restructuring is a generic phrase that refers both to alternative forms of organization of the parts of the electric services industry and to the regulatory framework within which the industry functions. Electric industry restructuring has become one of the most discussed issues in the national regulatory arena. Since the late 1970s, the country has experienced restructuring in virtually all of the industries that were once subject to rate regulation, beginning first with airline deregulation, but also including natural gas production and transportation, trucking, banking, and telecommunications. Internationally as well, electric restructuring is taking place on almost every continent. In the last year, a number of electric restructuring proposals also have been introduced in the U.S. Congress. To date, four states have adopted comprehensive electric restructuring programs. Thus, with the widespread attention to these issues, the Commission believes that it is essential to investigate alternative industry and regulatory structures and the implications of those alternatives for the electric market and Texas electric consumers.

As one step in its investigation of industry restructuring in Commission Project No. 15000, Commission Staff assembled a broadly representative selection of interested parties to develop a set of goals and principles to guide the investigation. These goals and principles can provide benchmarks for evaluating specific proposals and for comparing various models for a restructured electric industry. Through a series of meetings, the interested parties developed alternative proposals capturing these goals and principles. At the conclusion of this effort, the parties developed a consensus collection of ten overarching categories for goals and principles; however, the parties were unable to achieve consensus on "framing statements," i.e., more broadly stated interpretations of each of the goals and principles. (Staff later separated one goal into its four separate parts, resulting in a list of thirteen goals and principles.)

At the conclusion of the discussion of interested parties, the Commission Staff assembled the consensus categories and the alternative framing statements of the various parties into a summary document.[1] The Staff paper on goals and principles also reviews the goals statements of other states investigating industry restructuring and of the National Association of Regulatory Utility Commissions (NARUC). Throughout this project, Commission Staff followed the collected goals and principles as a guide to its investigation.

The remainder of this chapter presents a summary of the thirteen consensus categories for goals and principles developed by the parties and the framing statements developed by Staff for each. Chapter VIII follows with an overview and discussion of alternative structures for organizing the electric services industry. Chapter IX examines restructuring in other industries—specifically, natural gas, telecommunications, and airlines—and in other countries whose electric restructuring efforts preceded efforts in the United States. A number of lessons from those restructuring efforts are presented and discussed. Chapter X discusses the potential benefits of competition and of restructuring the electric industry, while Chapter XI discusses "system benefits," i.e., services and protections currently provided to customers that could become "stranded" in a competitive market. Chapter XII presents a variety of issues that should be considered during any transition to competition, including service quality, market power issues, a code of conduct for affiliate transactions, consumer protection, incentive rate mechanisms, and reform of the fuel reconciliation process.

A. The Statements of Goals and Principles

Based on the positions of the interested parties, Commission Staff collected the goals and principles in two different formats, Proposal No. 1 and Proposal No. 2.

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[1] *Proposed Goals and Principles for Electric Industry Restructuring*, Project No. 15000 (April 4, 1996).

Proposal No. 1

1. Reliability and Safety

The current high level of reliability and safety shall be maintained or improved.

2. Obligation to Serve / Universal Service

Electric service is essential for the health, safety, and economic prosperity of all Texans. High quality, reasonably priced electric services shall be available to all.

3. All Customers Benefit

All classes of customers shall benefit from improvements in economic efficiencies and the development of service choices. Restructuring shall not benefit one customer class to the detriment of another.

4. Consumer Protection

Consumers shall be protected from abuses from pricing, cross-subsidies, market power, and anti-competitive behavior. The public shall have the opportunity for extensive input into the restructuring process.

5. Consumer Choice

Expanding the number of choices available to consumers is a fundamental element of a competitive electric industry. Consumers have the right to clear, accurate, and comprehensive information concerning service choices and pricing options.

6. Environment

The current level of environmental protection shall be maintained or improved.

7. Role of Competition

The implementation of competitive markets should produce lower prices for all consumers relative to the existing system. Competition should result in additional consumer choices and improved economic efficiencies while ensuring the availability of high quality electric services to all Texans.

8. Appropriate Regulation and Timing of Transition

A comprehensive timeline shall be developed to identify explicit milestones and deadlines for actions. Consistent with the public interest, Texas shall proceed in a deliberate, orderly, and expeditious manner. The appropriate level of regulation should be determined after a deliberate analysis of the market sectors.

9. Economic Efficiency

A competitively structured electric industry should result in enhanced economic efficiencies.

10. Market Framework

Market sectors should be analyzed to determine the extent of competitiveness in each sector. Markets considered to be insufficiently competitive should continue to be regulated. Where market sectors are determined to be sufficiently competitive, regulation should encourage efficient competition.

11. Economic Development

A competitively structured electric industry should create new markets, reduce inefficiencies, and lower costs and prices allowing opportunities for economic development.

12. Excess Cost over Market

The recovery of costs associated with facilities that are not competitive should be borne in a manner that balances the needs of all parties.

13. Resource Mix

A diverse resource mix in Texas is important both economically and strategically. Regulatory measures may be required where to ensure a balanced generation mix during the transition.

Proposal No. 2

1. **EQUITY**

   - Electricity is essential for the health, safety, and economic prosperity of all Texans.
   - Reliability and environmental protection shall be maintained or improved.
   - High quality, reasonably priced electric services shall be available to all.
   - All classes of customers must benefit from restructuring; one class of customers shall not benefit to the detriment of another.

2. **ECONOMIC EFFICIENCY**

   - If properly conceived and implemented, restructuring should enhance economic efficiency.
   - Expanded consumer choice is a fundamental element of restructuring.
   - Greater economic efficiency should lead to a flourishing of new markets, a lowering of costs and prices, reduced inefficiencies, and enhanced economic development.
   - Market sectors should be analyzed to determine whether they are competitive, partially competitive or monopolistic, and monopolies should continue to be regulated.
   - Competitive and partially competitive markets should be monitored and regulated to the extent necessary to prevent anti-competitive behavior.
   - Consumers have the right to receive clear, accurate, and comprehensive information concerning service choices and pricing options.
   - Consumers shall be protected from pricing abuses, cross-subsidies, market power abuses, and related anti-competitive behavior.

3. **TRANSITION**

   - The public shall have the opportunity for extensive input into the restructuring process.
   - The appropriate level and nature of regulation during the transition shall be determined based on a thorough analysis of behavior in all markets.
   - Consistent with the public interest, Texas shall proceed with electric industry restructuring in a deliberate, orderly, and expeditious manner. A comprehensive restructuring time line shall identify explicit milestones and deadlines for action.
   - The recovery of costs in excess of market should be borne in a manner that balances the needs and interests of all.

Proposal No. 1 outlines the thirteen consensus goals and principles with associated framing statements. Proposal No. 2 presents an alternative grouping of the goals and principles into three functional categories.

B. FRAMING STATEMENTS DEVELOPED BY COMMISSION STAFF

After reviewing the two proposals compiled by the Staff, the Commission voted to use the recommended goals and principles to guide the Commission's investigation of industry restructuring. Staff's framing statements—based on the thirteen goals and principles included in Proposal No. 1—are presented below, followed by a more detailed explanation of each.

a) Reliability and Safety

The current high level of reliability and safety shall be maintained or improved.

The recommended goal and framing statement combines the various positions of the parties. Alternative industry structures should be judged on their impact on reliability and safety without creating an arbitrary requirement that reliability and safety be improved in any particular proposal. However, maintenance of safe and reliable power is not negotiable. Any restructuring proposal must maintain, at a minimum, current levels of reliability and safety before it will be considered.

b) Obligation to Serve/Universal Service

Electric service is essential for the health, safety, and economic prosperity of all Texans. High quality, reasonably priced electric services shall be available to all.

Any restructuring effort must protect the obligation to serve and universal service. This state has traditionally supported the policy of access to all persons at reasonable rates and restructuring proposals that do not continue that policy will not be considered. Similarly, special rates for low-income families must remain a goal of this industry so that, at a minimum, these families are not made worse off by a restructured industry. The Obligation to Serve/Universal Service goal must incorporate universally affordable rates for high quality electric service.

c) All Customers Benefit (Fair Prices, Cost Shifting)

All classes of customers shall benefit from improvements in economic efficiencies and the development of service choices. Restructuring shall not benefit one customer class to the detriment of another.

This goal incorporates all of the concerns of the parties while filtering out the outcome-based portions of the parties' definitions. The goal as stated promotes the ideals of a fair and reasonable opportunity for expanded choices and the sharing of economic benefits by all customers. It incorporates a concern for cost shifting between customers, one of the key issues of concern in an *unmanaged* transition to competition.

d) Consumer Protection

Consumers shall be protected from abuses from pricing, cross-subsidies, market power, and anti-competitive behavior. The public shall have the opportunity for extensive input into the restructuring process.

One of the fundamental goals of the Commission over the last twenty-one years has been the protection of consumers from market power and anti-competitive behavior. This goal must remain a fundamental Commission responsibility in any restructured industry proposal. The manner in which the consumer is protected in a restructured industry will, in all likelihood, differ from the manner the consumer is protected today.

e) Consumer Choice

Expanding the number of choices available to consumers is a fundamental element of a competitive electric industry. Consumers have the right to clear, accurate, and comprehensive information concerning service choices and pricing options.

This framing statement integrates the positions of the parties. All industry stakeholders believe that increased consumer choice should be a goal of industry restructuring. Utilities focused on increased tariff options and flexible prices while many non-utilities focused on providing choice of retail providers. The issue of clear, accurate, and comprehensive information is included in this statement based on the assumption that the availability of this information is necessary to create real consumer choice.

f) Environment

The current level of environmental protection shall be maintained or improved.

Environmental quality affects the health, safety, welfare, and economic prosperity of every Texan. The electric industry, more than most other industries, significantly affects our state's environment. Maintaining or improving environmental protection must be a goal/principle of any industry restructuring proposal.

g) Role of Competition

The implementation of competitive markets should produce lower prices for all consumers relative to the existing system. Competition should result in additional consumer choices and improved economic efficiencies while ensuring the availability of high quality electric services to all Texans.

Competition should not be a goal in and of itself. Instead, competition may be a valuable tool if it provides greater benefits to stakeholders than the status quo. Therefore, the recommended framing statement focuses on the ability to achieve lower prices through competition, as well as increasing consumer choice and improving economic efficiencies. Economic theory suggests that greater competition will yield greater efficiencies.

h) Appropriate Regulation and Timing of Transition

A comprehensive timeline shall be developed to identify explicit milestones and deadlines for actions. Consistent with the public interest, Texas shall proceed in a deliberate, orderly, and expeditious manner. The appropriate level of regulation should be determined after a deliberate analysis of the market sectors.

Appropriate regulation is, in part, a function of the nature and development of markets at a particular point in time during a transition. Milestones can be used to measure the development of a restructured industry. The framing statement preserves the ability for all stakeholders to argue their vision for the industry while providing a framework for any potential restructuring effort.

i) Economic Efficiency

A competitively structured electric industry should result in enhanced economic efficiencies.

Enhanced economic efficiency is one of the overriding goals of industry restructuring. Economic efficiency means greater wealth in the hands of the electric industry and Texas energy consumers. The recommended statement is open-ended and does not specify one method of obtaining economic efficiency. All suggestions to improve the efficiency of the electric industry should be considered and evaluated with regard to the other goals and principles of the industry.

j) Market Framework

Market sectors should be analyzed to determine the extent of competitiveness in each sector. Markets considered to be insufficiently competitive should continue to be regulated. Where market sectors are determined to be sufficiently competitive, regulation should encourage efficient competition.

This goal accommodates a variety of suggested alternatives. It is the Commission's responsibility to provide effective regulatory incentives that foster a market framework that will unleash competitive forces. Continuing Commission regulations should provide safeguards from market power and anti-competitive behavior and regulate participant activities where a fully competitive industry is lacking.

k) Economic Development

A competitively structured electric industry should create new markets, reduce inefficiencies, and lower costs and prices allowing opportunities for economic development.

Economic development is important for Texas and its citizens. It is essential that the electricity industry be organized in a manner that promotes economic efficiency and helps to create the conditions that foster economic development and job growth in Texas.

l) Excess Costs over Market/Treatment of Costs

The recovery of costs associated with facilities that are not competitive should be borne in a manner that balances the needs of all parties.

The appropriate treatment of ECOM is among the most contentious issues in the restructuring debate. This framing statement recognizes that the concerns of all parties must be taken into account. Although it does not guarantee the outcomes suggested by utility and non-utility stakeholders, it recognizes that any restructuring effort should be coordinated with the treatment of ECOM.

m) Resource Mix

A diverse resource mix in Texas is important both economically and strategically. Regulatory measures may be required to ensure a balanced generation mix during the transition.

The recommended framing statement combines most of the important concerns of the industry stakeholders. The recommended statement recognizes the importance of a diverse resource mix—a position stressed by non-utility stakeholders—but it does not conclude that a specific mix is a prerequisite of a restructuring proposal. However, the statement recognizes that regulation may be necessary in the future to provide an appropriate resource mix.

VIII. ANALYSIS OF ALTERNATIVE MARKET STRUCTURES

In discussions of regulatory restructuring taking place across the country, a number of alternative organizational structures have been proposed, including: full wholesale competition under a contracts structure; wholesale competition with a centralized power exchange or "Poolco"; and retail consumer choice of service provider or "retail access." Given the underlying complexity of the entire electric system, any restructuring proposal must account for an array of detailed concepts and relationships. Many of those concepts and relationships are discussed in this chapter, as are arguments for and against alternative organizational forms.

In this chapter, Section A presents the basic terms and concepts needed for a discussion of alternative market structures, including the use of industry unbundling to address concerns about market power. The basic components of a restructured electric industry are presented in Section B, including the physical infrastructure, the market functions, the market participants, and the market organizations. The next two sections present a detailed discussion of expanded wholesale-only competition (Section C) and expanded retail competition (Section D). The wholesale and retail alternatives are evaluated in Section E. Finally, Section F provides an evaluation of functional and structural unbundling and the relationship of unbundling to effective and sustained competition.

A. FUNDAMENTAL TERMS AND CONCEPTS

Discussions about industry restructuring generally revolve around a limited number of fundamental terms and concepts. This section covers four of these topics:

- Wholesale vs. retail competition;
- The framework for market transactions;
- The issue of market power, and
- Different forms of unbundling.

1. Different Forms of Competition

The generic forms of competition in the electric industry mirror those in other industries: wholesale competition and retail competition. As in other industries, situations may arise that do not fit neatly into either category. For the sake of simplicity, this chapter presents the two extreme options—expanded wholesale-only competition and full retail competition—as distinct choices. In reality, a future industry structure may be based on a mixture of wholesale and retail competition.

a) Wholesale Competition

The wholesale market is also called the "bulk power" market. A wholesale transaction is a transaction between a power producer and a power distributor, or between market intermediaries representing a power producer and a power distributor. Under a wholesale-only competitive structure, distributors can buy power from a variety of power producers, who in turn compete to sell power to a variety of distribution companies.[1] The distribution companies resell the energy to the end-users.

Wholesale competition maintains the existing monopoly franchise for the retail distribution of electricity and for the provision of associated electric services. Distribution utilities retain their service territories, and customers are not given an option to shop for alternative electricity providers. Monopoly distribution utilities continue to have an obligation to serve, as well as an obligation to plan and acquire resources to meet the expected level of future customer demand,[2] and the end-user's purchase of electricity from the monopoly distributor continues to be governed by administratively approved tariffs.

[1]National Association of Regulatory Utility Commissioners, "Affected with the Public Interest," [database on-line] (Washington, DC, accessed Feb. 5, 1996); available from http://www.puc.texas.gov./naruc/glossary/htm; Internet, at 13 of 13 (NARUC glossary).

[2] Austin, Tom, et. al., *Perspectives in Electric Utility Restructuring*, The Regulatory Assistance Project at 17 (February 1996).

Texas currently has generating capacity well above the expected peak demand for power, with little need for new resources until the year 2000.[3] Therefore, most wholesale transactions—and most instances of wholesale competition—take place among regulated utilities. However, at least 8 percent of the generating capacity in Texas is owned by non-utilities, whose existence helps hold down wholesale electricity prices. As new resources are needed, many of the State's utilities will be required to obtain those resources through a solicitation process (competitive bidding).[4] Consequently, the number of wholesale transactions and the opportunities for non-utility players will expand.

b) Retail Competition

Under retail competition (also called "direct access" or "retail wheeling"), electric suppliers compete to sell electricity directly to end users or to other market players (aggregators) who sell directly to end users. In this situation, retail customers are not captive to a monopoly distributor, but may buy electricity directly from whomever they choose, whether directly from a producer or through a middleman. Under retail access, retail customers would be *allowed*, but not *required*, to use a market intermediary. Many electric customers and producers are likely to prefer using a retail distribution firm rather than engaging in direct transactions (just as most households and bakers prefer using the convenience of grocery stores). The successful implementation of retail competition on a broad scale might require extensive education for the majority of retail customers who will need to become familiar with the mechanics of arranging for their own power supply.

Retail competition breaks the link between customers and their local utility by removing the requirement that the utility acquire generation resources on behalf of its customers. The historic utility obligation of ensuring that adequate generation is

[3] Portions of the State have peak capacity needs earlier, and due to transmission constraints are not able to purchase capacity freely from other portions of the State. The Panhandle region (which is outside of ERCOT) and the extreme southern portion of ERCOT (the Rio Grande Valley) have peak capacity needs in 1999.

[4] As discussed in Chapters II and V, certain electric utilities are now required to conduct a solicitation for resources (within the IRP process). In the past, utilities constructed power plants with Commission approval, and without the full pressure of market forces to control costs.

available to serve all customers (which remains under wholesale competition) is replaced by an obligation to connect all customers to the utility's distribution system. Thus, customers continue to be hooked up to the same set of wires, with the *delivery* of energy purchased as a separate monopoly service. By removing the obligation to serve, all customers have the responsibility of contracting for their own power supply.[5]

If retail competition progresses, it is expected that there will be vertical disaggregation of the industry (i.e., structural unbundling or divestiture of the generation, transmission, distribution, and/or customer service functions). The current vertically integrated utilities would cease to exist, and new entities would arise. These entities are sometimes referred to by the names "Gencos," "Poolcos," "Transcos," "Discos," "Retailcos," and "Escos," which help give an idea of each entity's function.[6] If this disaggregation occurs, the Transco and Disco functions will become common-carrier services that are provided on a nondiscriminatory basis to power marketers, Gencos, Retailcos, and directly to end users.

As discussed in Chapters V and VI, there is little retail competition now in Texas because PURA95 requires that a supplier obtain a certificate of convenience and necessity (CCN) from the Commission in order to serve retail customers. Thus, limited retail competition exists only in areas that are dually certificated (with more than one utility holding a CCN); where customers can select among competing fuels (natural gas versus electric water and space heating); or in circumstances where self-generation is a viable option.

c) Retail vs. Wholesale Transactions

Because of the physical laws that govern the flow of electricity and the resulting manner in which the generation/transmission grid operates, electrons from a particular producer of electric power cannot be shepherded to a specific consumer. The grid can

[5] Austin, *supra* at 25.

[6] The terms "Genco," "Poolco," "Transco," "Disco," and "Retailco" are terms of art that came into usage during the past decade as analysts attempted to describe the likely transformation of the electric industry. The terms are introduced at this point for convenience. A more detailed discussion of each is provided in Section B.

be likened to a lake full of electrons; producers are on one shore pumping electrons into this wholesale reservoir, and distributors and consumers are on the other shore drawing co-mingled electrons out. There is no hose stretched across the lake to link a particular producer with a particular consumer.[7]

In a utility control room, for a particular power transaction, the mechanics of accommodating a retail transaction would look identical to the mechanics of accommodating a wholesale transaction. Consequently, a retail electric transaction cannot be distinguished from a wholesale electric transaction except by looking at the accounting records for that transaction.

In a purely *physical* sense, there is no such thing as wheeling; the implied specific performance is a fiction. However, whether or not retail competition can take place in a physical sense is the wrong question to ask. The right question is, given its potential impact on economic efficiency and customer choice, is retail access a *workable fiction*? If the answer is yes, then it might make sense through accounting mechanisms to stretch a hypothetical hose across that electron lake, linking individual producers and consumers.

d) Hard-to-Categorize Competition

Just as the physical distinctions between retail and wholesale power transactions are blurry, so are the legal distinctions. For example, a municipal utility that does not own any generation is clearly a wholesale entity engaging in a wholesale transaction when it buys power for resale from a generation-owning utility. However, the picture is less clear for the operator of an industrial park who wants to buy and resell power to the individual companies in the park or for the owner of an apartment complex who wants to buy and resell power to apartment residents.[8]

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[7] Berlier, John C. Jr., and David J. McCarthy, "A Proposal to Rationalize Transmission: Picture the Grid as a Lake," *The Electricity Journal* at 12 - 17 (June 1996).

[8] *Complaint of Power Clearinghouse Against the City of Austin Electric Utility Department for Denial of Transmission Service*, Docket No. 16147 (Order Granting Motion to Dismiss, Oct. 9, 1996). Chapter V addresses the convergence of wholesale and retail markets.

2. The Framework for Conducting Market Transactions

Whatever the ultimate form of competition in Texas, there are aspects of the operation of an electric network that will continue to require a coordinated function. The nature of competition in the future is often characterized as a choice between a "Poolco" and a "bilateral contracts" arrangement. These terms and their relationship to retail and wholesale competition are explored below.

No matter what form competition takes in a restructured electric industry, active network management will be needed to constantly oversee the security of the interconnected grid. There are a variety of mechanisms and organizational approaches that address the continued management of the electric network. Reliability and network security have been high priorities as the Commission considered open-access transmission regulations. In Texas, the Independent System Operator of the Electric Reliability Council of Texas (ERCOT) will address these functions.

a) Wholesale Bilateral Contracts

The current industry structure could be characterized as wholesale-only competition, where investor-owned utilities, municipalities and cooperatives engage in wholesale bilateral contracts; there is no requirement (no restriction) that transactions must go through a central clearinghouse. Traditionally, these contracts have been negotiated directly. In the future it is likely that many of these contracts will be handled by market intermediaries such as power marketers. These contracts may be short-term, intermediate-term or long-term in nature, with terms and conditions tailored to meet the needs of the specific needs of the contracting wholesale parties. The only constraints on these terms and conditions are the technical characteristics of the transmission/generation grid. Temporary power surpluses or deficits are handled through a wholesale spot market.

System reliability and security are currently assured through the operation of power pools. A power pool is a voluntarily established entity with two key functions: coordination of short-term operations among members to maintain the stability and security of the interconnected systems; and least-cost dispatch of generating units among the members. Traditionally, the members of a power pool have been vertically integrated utilities. Within ERCOT, reliability and security have been the dominant functions. Least-cost dispatch, in contrast, has been the prerogative of individual utilities within ERCOT, and has been limited to the nine "control areas" that roughly correspond to the largest nine ERCOT members.[9] Hence, because it serves only one of the major purposes of a power pool, ERCOT would have to be characterized as a very loose power pool (although some observers would go a step further and argue that ERCOT is not a power pool).

Least-cost dispatch can provide for backup power supply, short-term sales and purchases of excess energy, spinning reserve, and reactive power support. Historically, because of the cooperative nature of power pools, some of these services were provided on a reciprocal unpriced basis as part of the members' utility franchise obligations. However, under comparable open-access transmission service, these services will be offered on an unbundled and *priced* basis (with prices set to recover individual costs).

In a power pool, coordination of short-term operations includes the aggregation and firming of power from various generators, arranging exchanges of power between generators, and establishing (or enforcing) the rules of conduct for wholesale transactions. The pool may own, manage and/or operate the transmission lines (wires) or be an independent entity that manages the transactions between entities with ownership of these lines.

b) Poolco (Wholesale-Only Competition)

The Poolco model is based on an organizational and operating structure that parallels the structure of highly centralized power pools, known as "tight" power pools. As described in Chapter IX, this model has been adopted in the United Kingdom and Argentina. In such a model, a central operator matches supply bids from generating

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[9] ERCOT membership has changed during 1996 in response to the need for open-access transmission and power marketing.

companies with demand bids from distribution companies to determine the total demand for power, the unit dispatch order needed to satisfy that demand, and resulting market-clearing price of power. The central operator also receives a forecast of demand from the retail supply companies or conducts its own demand forecast.[10]

A "pure" Poolco thus refers to a specialized, mandatory, centrally dispatched power pool that functions as a wholesale spot market. It would establish, on an ongoing basis, the short-term market clearing price of electricity and provide a system of long-term transmission compensation contracts. The Poolco would be regulated to provide open access to the transmission grid—i.e., all generators and electricity providers would receive comparable transmission service, and the owners/managers of the transmission grid would receive appropriate cost recovery. The Poolco would make ancillary generation services—including load following, spinning reserve, backup power, and reactive power—available to all market participants on comparable terms and provide settlement mechanisms for reconciling imbalances between contracted and actual volumes between buyers and sellers of energy and capacity.[11]

In the United Kingdom, for example, the pool manager receives half-hourly supply and demand bids one day in advance. Based on these bids, the operator then runs a unit commitment model to decide how much capacity will be required during each half hourly block. By listing the generator supply bids in order from the lowest cost bid to the highest cost bid, the operator can then prepare a schedule of market clearing prices for each half hour of the next day, based on always fulfilling demand from the least costly source.

Because all transactions, both buying and selling, go through the pool, the pool manager acts like a buyer, reaching an agreement with the sellers concerning which specific hours they will run on the following day. The manager also acts as a seller,

[10] Stalon, Charles G., and Eric C. Woychik, "What Model for Restructuring? The Debate in the Competitive Power Market Working Group," *The Electricity Journal* at 63 - 73, (July 1995); Henney, Alex, "Poolco, Bilateral Trading, and Theology," *Public Utilities Fortnightly* at 25 - 27, (March 15, 1995); Hogan, William, "To Pool or Not to Pool: A Distracting Debate," *Public Utilities Fortnightly* at 24 - 26 (January 1, 1995).

[11] *Id.*

supplying energy to all retail aggregators or retail customers who buy directly from the grid at a price equivalent to the highest generating cost for each half hour (i.e., the marginal supply cost for that block of time). With this arrangement, there are relatively few players in the market and few if any market intermediaries (i.e., power marketers) working between the generators and pool.[12]

A properly constructed Poolco (one in which market power does not exist) is consistent with a high level of competition in the wholesale *spot* market and with a gradually increasing amount of wholesale competition for long-term supplies of energy and capacity (as load growth and retirement of current generating assets spur the need for new capacity). A Poolco is also consistent with a limited (and perhaps gradually increasing) amount of retail competition. However, by definition, a Poolco is not consistent with an immediate or rapid move to full retail competition.

c) Retail Competition

A bilateral contract refers to any two-party contract. In a world of retail competition, power producers, market intermediaries, and ultimate customers have the freedom to craft bilateral contracts spanning a limitless number of options. In the prevalent usage in industry restructuring debates, a bilateral contract refers specifically to a contract between a power producer and a retail customer, or between market intermediaries (e.g., power marketers and retail aggregators) representing power producers and retail customers. In a more generic sense, a wholesale contract is also a bilateral contract in the sense that it is written between two wholesale entities (e.g., one utility can have a bilateral contract with another utility to supply it with wholesale power). Most commodity markets are bilateral in the retail sense: there is no monopoly wholesale merchant acting as the sole buyer and sole seller.

Bilateral contracts vary in terms of price and duration, renewal or termination provisions, and a host of other factors and attributes that will depend on consumer

[12] Bupp, I. C., and Bruce Humphrey, *The UK Electricity Experiment; From 'Regulatory Lite' to Reintegration*, Cambridge Energy Research Associates (January 1996); Harris, Louis, *The British Model: An Assessment*, The Edison Electric Institute (June 1994).

preferences. A competitive market will reflect consumer preferences through a process of electric load and preference aggregation. Retail service providers will become proficient at tailoring packages of end-use services that include the electric commodity and varying combinations of electric service quality, reliability, price-risk management, specialized billing, on-site energy management, etc. The country of Norway serves as an example of an electric system that operates predominantly on bilateral contracts.

Because buyers and sellers have the freedom—within technical constraints—to tailor contracts to their specific needs, the bilateral contracts model provides for significantly more flexibility than the Poolco model on both the physical side of the electric market and the financial side (where risk management tools such as futures and options are traded). Because there are no restrictions on who may trade with whom, the bilateral contract model also provides for many more players to enter and participate in the market, and therefore encourages a higher degree of competition.

3. The Issue of Market Power

Market power was previously defined in Chapter IV as the ability of a single firm or a group of competing firms in a market profitably to raise prices above competitive levels and restrict output below competitive levels for a sustained period of time. In a competitive environment, firms constantly vie for market power. When an unregulated firm acquires too much market power, or sustains market power for too long, the firm may raise prices or lower service quality. The magnitude of the firm's market power determines how much prices can be raised or quality can be degraded.

a) Vertical vs. Horizontal Market Power

There are two types of market power that can prevent unregulated markets from being workably competitive: *vertical* market power and *horizontal* market power. Vertical market power occurs when a vertically integrated utility favors the sale of power from its own generating units—thereby increasing its revenues and profits—simply by virtue of its dominance and control over transmission and distribution. Horizontal market power results from complete control of one or more separate levels—generation, transmission, distribution, customer service—of the production process. In other words, horizontal market power occurs when a single utility owns all—or at least a sufficiently large share—of the generating plants, transmission facilities, distribution facilities and/or customer service operations for a particular geographic market area. Horizontal market power has become a problem in the United Kingdom, where two private electric companies generate roughly 75 percent of the electricity.

b) Open Access Transmission and Market Power

Both PURA95 and the ongoing Federal Energy Regulatory Commission (FERC) Order No. 888 proceeding promote nondiscriminatory open-access transmission as a way to limit utilities' ability to exercise vertical market power. Even with open access transmission tariffs, however, integrated utilities may still maintain sufficient market power to operate electric systems in a manner that favors their own generating units and garners additional sales, revenues, and profits. Particularly during a transition period, competition may be insufficient to insure that vertically integrated utilities do not affect the market supply and market prices.

c) Market Power Concerns in ERCOT

Texas is not free from concerns about horizontal market power. As noted in Chapter V, two companies, TU Electric and HL&P made well over one-half the retail sales in Texas in 1995. Thus, the circumstances within ERCOT could parallel those of the United Kingdom. ERCOT is nearly an island unto itself, with only limited capability to transfer power over the high-voltage direct current ties with the Southwest Power Pool. In a recent case, the Commission found that the ERCOT electric market is highly concentrated.[13] To help address this potential source of market power, Texas is placing an ISO in charge of operating the electric system in an open and nondiscriminatory manner.

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[13] *Application of Texas Utilities Electric Company for Authority to Implement Rate WP1 to Lyntegar Electric Cooperative, Inc. and Taylor Electric Cooperative, Inc.*, Docket No. 14716, Final Order, (March 1996) See Revised Finding of Fact 17 and Finding of Fact 36A. The Commission found that TU Electric serves about 40 percent of the peak demand in ERCOT and owns more generating capacity than any other ERCOT utility. The Commission concluded that "TU Electric possesses significant market power."

An ERCOT power pool may enhance the market power of the companies that dominate the market, even if there are a large number of small players. While outright collusion is illegal, bid signaling and price leadership may occur. Such problems have arisen in England and New Zealand with pool pricing. In particular, if one entity owns a significant fraction of the *incremental* generation (the generation that performs load-following and that fills the gap between baseload power and peaking power), that entity gains market power with respect to the use of such specialized generating units.

The application of anti-trust law is one possible remedy to the problem of market power, but it is generally viewed as an inadequate remedy. The implementation of anti-trust remedies can be so resource intensive and time consuming that market power problems drag on for an extended period of time. For this reason, many industry observers believe that the transformation from a regulated environment to a competitive market environment should proceed slowly and with caution. The idea is that this will allow market power issues to be resolved before they become a problem. Also, a slow timetable should allow mechanisms to be put in place to properly monitor market power. Addressing market power in the transition to competition is discussed in Chapter XII.

d) Curing Vertical Market Power: Functional vs. Structural Unbundling

One means of addressing excessive market power is unbundling utility functions.[14] Unbundling is the breaking of a large, integrated utility into smaller, separate components. The two basic forms of unbundling—functional unbundling and structural unbundling—create different costs, offer different benefits, and imply different risks.

[14] Chapter VI contained a discussion of unbundling in the context of energy service markets. Unbundling is important in both contexts. In the former, unbundling can foster competition in existing energy services markets *within the existing regulatory framework*. In this latter instance, unbundling is an element of restructuring to insure that market barriers are lowered and market power is contained.

Unbundling the electric industry in the United States is already underway, despite the disagreement about how far this unbundling should ultimately extend.[15]

Functional unbundling is an *administrative* form of unbundling consisting of formally and methodically separating various functions within a company *without* actually splitting the company apart. With functional unbundling, the physical operations and operating personnel are separated, and financial and accounting information becomes separately tracked.[16] Structural unbundling—also called *divestiture*—is a *legal* form of unbundling in which a utility is split apart along the functional lines (e.g., generation, transmission, distribution, and customer service). In other words, under structural unbundling, the generation, transmission, distribution, and customer service functions are divested and become separate companies that must now contract with each other through arms-length negotiations.

e) Curing Horizontal Market Power: Disaggregation (Horizontal Unbundling)

Horizontal unbundling (disaggregation) consists of dividing a firm into a number of smaller firms that must compete against each other. Disaggregation is a mechanism for overcoming the perceived problem of market power within a region (*especially* at the generation level) where it is not uncommon for a single utility to control a significant percentage of the total generating capacity. For example, by breaking one large generating company into several small generating companies, no single company in the specified geographic or market area would be large enough to exercise market power.

4. Unbundling of Service Offerings and Rates

Just as the electric industry *structure* is in the process of being unbundled, electric industry *service offerings* and *rates* are being unbundled as well. No matter what type

[15] In Texas, generation, transmission, and distribution costs were unbundled during 1996 to establish permanent tariffs for open-access transmission services. Further analysis of the unbundled cost of various ancillary (generation-related) services is being conducted.

[16] Functional unbundling is sometimes known as putting up a "Chinese wall" between the functions within a utility.

of physical unbundling takes place, unbundling service offerings and rates is a necessary step in the transition to a fully competitive electric industry.

a) Description of Bundled vs. Unbundled Service Offerings and Rates

A bundled rate is a single price for a bundled package of goods and service offerings. In the vertically integrated (bundled) electric industry, it has been common practice to charge bundled rates that include, but do not distinguish among, the costs of generation, transmission, distribution, and customer service.

In contrast, unbundling service offerings and rates means separating service offerings and rates into their basic components, and offering each component for sale with a separately identifiable rate. That is, an unbundled rate details the separate cost elements that make up a bundled package of goods and services. Unbundling service offerings and rates gives the customer the choice of buying different services (and different levels of service quality) from different providers, rather than being forced to buy all services at one quality level from one provider.

b) Bundled Service Offerings and Rates: a Competitive Roadblock

Bundled service offerings and rates are appropriate to vertically integrated monopolies, but inappropriate in a competitive market. If a consumer cannot see the separate price components in a bundled good or service, the consumer is receiving an inaccurate price signal about the value of the underlying services. With inaccurate price signals, the consumer is almost certain to be over-consuming or under-consuming each item in the bundled commodity. Some of the fundamental problems with bundled service offerings and rates that tend to naturally follow from a bundled (vertically integrated) industry structure include: [17]

- *Hindering offerings by competitors.* Bundled service offerings and rates are anti-competitive because of the lack of price transparency of the components of the rate. This prevents current and potential competitors from understanding the utilities' service offerings and rates in a

[17] NARUC Glossary, *supra* at 12.

disaggregated form, and clouds the decisions of competitors concerning their service offerings and rates.

- *Potential for cross-subsidy.* When service offerings and rates are bundled, there is significant potential for cross-subsidy between generation, transmission, distribution, and energy services—creating significant barriers for potential competitors who must operate without subsidies. The presence of cross-subsidies prevents the development of active markets in unbundled services.
- *Discouragement of price flexibility and service innovation.* Pricing flexibility and service innovation would be enhanced if intermediaries had an opportunity to provide an array of services—covering all aspects of physical delivery and risk management—for both generation and transmission. These pricing and service innovations would add value for customers and enhance the viability and reliability of the industry.
- *No linkage between cost and value.* Bundled service offerings and rates give customers no clear sense of the relative costs of generation, transmission, distribution, and energy services compared to their relative values. Therefore, customers have no incentive to vary their consumption according to the relative value of their needs and preferences. Also, in the absence of unbundled market information relating cost and value, utilities make less efficient investment decisions (i.e., resources are inefficiently allocated).
- *Inefficient operating decisions.* If the only choice is the bundled service, then the customer's location and operating decisions may be considerably different than if the opportunity existed to choose from a large—and correctly priced—menu of service options.
- *Encouragement of inefficient uniformity.* Bundling service offerings and rates encourages uniformity of service offerings and rates, and discourages price differentiation based on such critical factors as time-of-use, geography, and service quality. With unbundling and competition, industry participants may expect to see services begin to reflect their true economic costs.

Unbundling all aspects of electric service would be likely to spur competition in energy service markets in ways that are not immediately evident.[18] In an unbundled market, energy service providers are likely to find opportunities to work with customers to provide new combinations and levels of reliability, power quality, environmental services, as well as those attributes of service relating to price risk management, on-site

[18] The effect of unbundling on the retail energy service markets was discussed in more depth in Chapter VI.

load management, appliance repair, specialized customer billing, and so on. Each consumer, individually or through an alternative service provider, will determine how to maximize value at lowest cost.

B. Basic Components of a Restructured Market

A restructured electric industry would likely perform the supply and demand functions in a different manner than the present structure. This section presents the basic components of a *fully unbundled* marketplace in four categories: the physical infrastructure; market functions; market participants; and several approaches to market organization that are under consideration. Although no one knows for certain what future market structures will look like, those structures are sure to contain all of the elements listed below. The discussion of market structures that follows will draw from the fully unbundled organizational description in Figure VIII-1.

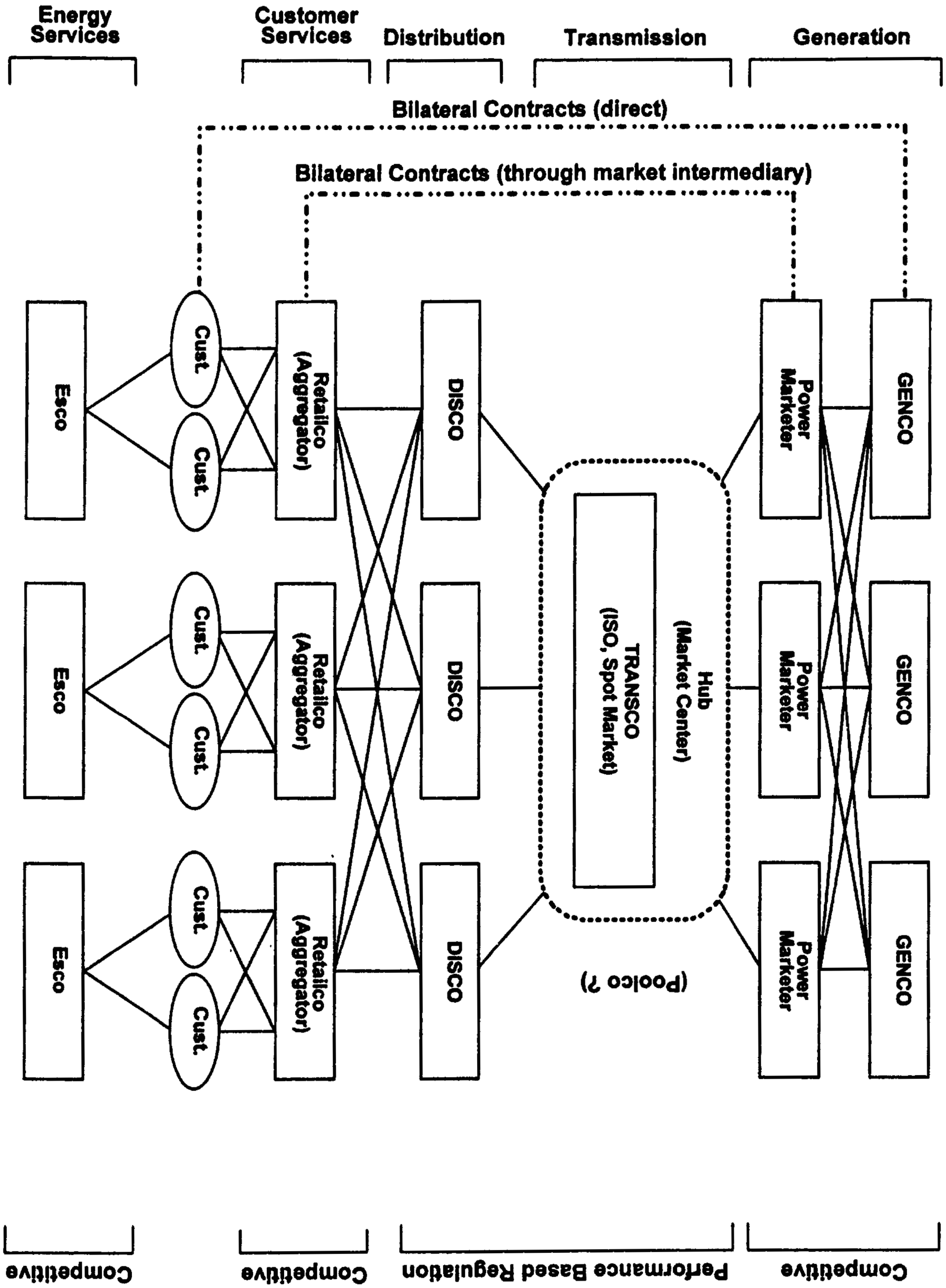
1. Physical Infrastructure

If the market structure in Texas were changed radically overnight, an aerial view of the Texas landscape the next morning would offer no clue that there had been a transformation. Every generating facility, every transmission line, every distribution line, every customer service facility would look just as it did the night before. And in the short-term to intermediate-term, it is unlikely that observing the physical operation of the electric system—from generation to customer service—would indicate a radical organizational change.

a) Separation of Physical Infrastructure: Underlying Concepts

In general terms, an electric utility system carries out four major functions in the production and ultimate delivery of electricity to consumers: generation; transmission; distribution; and customer service. Hence, vertically integrated electric utilities can be thought of as a combination of a Genco, a Transco, a Disco, and a Retailco. Each vertically integrated utility can be thought of as having *contractual* relationships among

Figure VIII-1: An Illustration of the Fully Unbundled Electricity Market



each of these segments. For example, an entity named "TU Electric Genco" could be thought of as operating under contractual agreements with "TU Electric Transco," "TU Electric Disco" and "TU Electric Retailco."

Currently, these contractual relationships could be characterized as *internal*, *implicit*, and *informal* in nature. In other words, nowhere in writing is it stated that "TU Electric Genco" will be the primary source of energy and capacity for "TU Electric Disco" or that "HL&P Genco" will be the primary source of energy and capacity for "HL&P Disco." However, because of vertical integration, utilities operate under implicit contractual relationships.

b) Generation Companies (Gencos)

A Generation Company (Genco) is a regulated or non-regulated entity that operates and maintains generating plants, but does not transmit or distribute electricity.[19] If the electric industry in Texas were disaggregated (horizontally unbundled) at the generation level, the appropriate or most efficient degree of unbundling is unclear. At one extreme, each investor-owned utility in Texas could see all of its generating facilities remain intact as a single Genco—e.g., there would be a TU Electric Genco, an HL&P Genco, a CPL Genco, etc. At the other extreme, in order to create a multitude of competing Gencos, each generating facility could be set up as a separate Genco.

In between these two extremes, horizontal unbundling could take any number of different forms, either by initial design or through the dictates of market competition. It is difficult to predict how the generating units might be aggregated in the future, but there is likely to be a tendency for the units owned by one utility to stay grouped together. Another logical and appropriate aggregation of generating units might arise based on technology type, so that operational expertise might be shared. Another grouping might bring peaking units together; in another scheme one owner might acquire and refurbish a number of units based on older steam technologies, in hopes of upgrading their operation to meet the competitive challenges of the wholesale market.

[19] NARUC Glossary, *supra* at 5.

c) Transmitting Utilities (Transcos)

A Transco is a regulated entity that owns, builds and maintains transmission lines used to transmit wholesale power.[20] The Transco may or may not handle the power dispatch and coordination functions. Under state and federal laws and rules, the Transco is regulated to provide non-discriminatory connections, comparable service, and cost recovery.[21] It is possible that the Transco could become lightly regulated, particularly once the rules of providing service and expanding the network are set forth in operating guidelines and through practice.

There are no technological impediments to the competitive transmission of electricity, and transmission service could be provided by competitive entities stringing up competing lines. It is unclear, however, whether transmission is free from economies of scale that may lead to monopolization. It is generally agreed that the competitive provision of transmission services would be duplicative and socially wasteful, and it is therefore anticipated that the provision of transmission services will remain a regulated monopoly for years to come.

d) Distribution Utilities (Discos)

A Disco is a regulated utility that constructs and maintains the distribution wires connecting the generation and transmission grid to the final customer.[22] A Disco does

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[20] The transmission function is responsible for connecting multiple sources of power supply to local areas and for the delivery of electricity at relatively high voltages from the generator to the distribution facilities. The transmission function requires the planning, building, maintenance, and operation of the transmission network. The transmission network, in turn, is a system of many transmission lines normally rated in excess of 60 kilovolts (kV). The bulk transmission system is made up of transmission lines that operate in parallel and some lower voltage lines that are connected radially. Parallel lines are those lines which are connected to the transmission network at more than one point and upon which power flows can normally occur in either direction. Parallel lines can be referred to as looped transmission lines. Radial lines are those lines connected to the transmission network at only one point and upon which power flows normally occur in only one direction. The transmission network connects generating plants and takes their high voltage output and transmits it over long distances to large loads (load centers). When delivered to load centers, electricity is reduced to a lower distribution voltage through the use of the distribution substations.

[21] NARUC Glossary, *supra* at 12.

[22] The distribution utility is responsible for operating the distribution substations and distribution network. The distribution function involves the planning, building and maintenance of the final delivery system. The distribution utility connects loads either to distribution facilities or directly to transmission lines. Ordinarily, the distribution network consists of distribution lines operating at voltages of 33 kV and below. The distribution network is used to deliver electricity through looped and radial feeders to the end users' meters.

not engage in the generation or transmission of electricity. It serves as a common carrier for electricity distribution between producers and end users or between producers and aggregators (or resellers) acting on behalf of end users. The Disco may or may not serve as a retail electric provider (i.e., the Disco may or may not have a *direct* sales, service, and marketing link with end users).

e) Retail Services Companies (Retailcos)

A Retailco is a competitive entity that performs many of the sales, service, and marketing functions that are currently performed by distribution utilities (or the distribution segments of integrated utilities). These customer service functions include:

- Aggregating customers to buy power;
- Finding and evaluating power supply options and negotiating specific purchases;
- Arranging for connection of customers to the distribution grid;
- Acting as an interface for customer complaints regarding distribution, transmission and generation; and
- Metering and billing customers, and transferring moneys owed to the Disco, Transco and Gencos.

For customers who do not have the ability to contract directly with Discos and Gencos (i.e., customers who must rely on market intermediaries), the Retailco would be the initial contact point with the electric production, transmission, and distribution network.

2. Market Functions

Vertically integrated utilities perform a number of standard market functions that may not be recognized as such. Under any form of industry restructuring, these standard market functions will continue to be performed, but by a number of market participants rather than just one. Entirely new market functions may arise that are standard features in other commodity industries (e.g., price-risk management).

a) Load Aggregation

Many industrial customers and certain large commercial customers would be sufficiently sophisticated to contract directly with Gencos under retail competition. The vast majority of small commercial and residential customers, in contrast, would contract with an aggregator, the Retailco. These aggregators will add up the loads of small customers to reduce transactions costs and to develop market leverage that is comparable to that of industrial and large commercial customers.

Aggregation will develop in a variety of patterns based on obvious characteristics like geography, community, load patterns, and other preferences. These preferences will include such things as environmental values, preferences for price-risk management, and preferences for level of convenience and insurance in the operation and maintenance of appliances and equipment. Aggregators will thus fill particular niches, some geographic, some relating to the type of generation, and some relating to the degree of specialized services that are preferred by consumers.

b) Resource (Supply) Aggregation

If the industry is horizontally disaggregated for competitive reasons into a larger number of Gencos, it is possible that many smaller Gencos will find themselves in the same situation as commercial and residential customers—too small to have sufficient bargaining leverage and sophistication to compete effectively in the new market place. In this situation, these smaller Gencos would need to access the market through some type of supply aggregation. In addition, Gencos that *are* large enough to possess bargaining leverage and sophistication might find it more economically efficient to hire a supply aggregator to engage in bargaining and preparing contracts.

c) Procuring New Resources

Under any industry structure, new resources will still need to be planned for, financed, and constructed. And because of the interconnected nature of the electric grid, the pattern and timing of new resources will still have to be coordinated among market participants. Decisions about what types of resources to add to the grid, as well as when and where to add these resources to the grid, cannot be made without reference to some overall plan.

Beginning in 1996, resource planning and coordination will be conducted under an IRP framework, where resource decisions come under close regulatory scrutiny. If electric competition remains limited to the wholesale level, it is conceivable that the current IRP framework could remain largely intact, with distribution utilities conducting their planning and solicitations (and seeking contract certifications) under the watchful eye of the Commission.

It is doubtful that IRP would be appropriate under retail competition. It seems inevitable that retail bilateral contracts will transform planning and coordination so that decisions are made by independent market participants, guided by competitive price signals, but constrained by the need to maintain system security and reliability. Security and reliability constraints could be established and enforced by the regional reliability council and the ISO.[23]

d) Management of Price Risk

In a commodity market, a key facet of customer choice is the ability to choose an appropriate level of exposure to price risk, monitoring and adjusting this exposure as market conditions change. Because of the fundamental economic link between expected risk and expected return, the ability to manage price risk—and hence revenues and profits—is also the ability to manage expected return.

For virtually all commodities—agricultural products, international currencies, financial instruments, precious metals, petroleum, natural gas—it is now commonplace for market participants to manage their exposure to price risk through the use of standard price-risk management tools. In fact, by combining price-risk management tools (a process known as "financial engineering"), a firm can fine-tune its exposure to commodity price risk and establish what it considers to be an appropriate risk/return profile.

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[23] Austin, *supra* at 41.

The standard price risk management tools include:

- *Forward contracts:* A forward contract allows the buyer and seller to lock in a future price. A forward is a tailor-made contractual agreement between a buyer and seller such that at some future point, the seller will deliver to the buyer a fixed quantity of a good, and the buyer will pay the seller an agreed-upon price.
- *Futures contracts:* A futures contract is a standardized forward contract, suitable for volume trading on a formal market exchange.
- *Swaps:* A swap is a contractual agreement between two parties to exchange their periodic payments (i.e., Party A agrees to pay Party B's fixed payment stream, and in return Party B agrees to pay Party A's variable payment stream.) A swap allows Party A to convert its variable payment stream into a fixed payment stream, which reduces Party A's exposure to price risk. Party B converts its fixed payment stream into a floating payment stream, thus taking on additional price risk.
- *Options.* An option is a contract between two parties in which the purchaser of the option has the *right*, but not the *obligation*, to buy an asset before a specific date at a specified price (a call option), or to sell an asset before a specific date at a specified price (a put option). Standardized options—bought and sold on exchanges such as the Chicago Board of Trade—allow parties to constantly adjust and fine-tune their exposure to price risk.

The benefits of using price-risk management tools include:[24]

1. *Insuring against adverse price movements* by locking in today the future price at which a good will be bought or sold;
2. *Creating a competitive advantage* by locking in price certainty in one area of operations so that greater price risk and higher expected return can be established in another area of operations;
3. *Reducing customer price variability* by reducing the variability of prices paid for resource inputs;
4. *Facilitation of planning and budgeting* through greater certainty in future revenues and commodity expenses; and

[24] "Current Perspectives on Energy Risk Management," JP Morgan & Company. (July 1994); Jones, Scott T. and Frank Felder, "Using Derivatives in Real Decision making," *Public Utilities Fortnightly* at 18 - 25 (October 15, 1994; Mango, Bob and John A. C. Woodley, "The Inevitable Commoditization of Electric Power Markets," *Public Utilities Fortnightly* at 27 - 32 (November 1, 1995); "Risk Management Will Replace Regulation," *Utilities & Perspectives*, Standard & Poors Corp. at 1 (July 10, 1996).

5. *Ensuring the viability of investment decisions* by locking in future prices and revenues for the output of a facility, reducing variability and expected return, which in turn reduces financial risk and financing costs.

Small consumers are not likely to procure such risk management tools directly, particularly because of the need for sophistication and the significant transactions costs relative to their small gain. However, aggregators may bring an array of choices to consumers in a manner that will allow consumers to manage their exposure to risk.

Given the numerous benefits of price-risk management tools and the patterns in other commodity markets (where the daily volume of trading in price-risk instruments dwarfs the volume of trading in the market for physical delivery), it is virtually certain that these tools will become commonplace as well in the electric industry.[25]

3. Market Participants (Non-infrastructure)

The market functions described above will be performed by a number of current and future market participants, some of whom have already been discussed in the context of the physical infrastructure or the market functions. The following descriptions supplement those already discussed.

a) Independent System Operator

With the federal legislative mandate for open transmission access and the potential for conflict-of-interest in vertically integrated utilities (who must act as grid "gatekeepers" with regard to many of their current and potential competitors), the need for ISOs has become almost universally accepted. An ISO can be defined as a neutral operator that is responsible for maintaining or overseeing instantaneous balancing of generation and load in an electrical system and for controlling access to the transmission grid. The ISO performs this function by supervising the dispatch of flexible plants to ensure that loads match resources available to the system.[26] Importantly, an ISO is *not* a merchant, and does not engage in buying and selling electricity on its own behalf.

[25] Some industry observers have argued that this is only a certainty under retail competition.

[26] NARUC Glossary, *supra* at 6.

In Texas, as a result of Commission rulemaking, the goal of open and non-discriminatory access has been put in motion by assigning the ERCOT ISO the following specific responsibilities:[27]

- The daily administration of the transmission tariffs of the ERCOT utilities operating control areas, including alternative dispute resolution procedures;
- Ensuring that ERCOT control areas perform the instantaneous balancing of ERCOT generation and load;
- Coordinating the scheduling of ERCOT generation and transmission transactions;
- Curtailing and re-dispatching ERCOT generation and transmission transactions on a non-discriminatory basis to preserve system reliability in emergencies;
- Analyzing and coordinating the re-dispatch of ERCOT generation transactions for economic purposes to make transmission capacity available;
- Administering the ERCOT electronic information network; and
- Administering transaction accounting among ERCOT market participants.

In order to maintain its unbiased nature (not favoring any particular entity or transaction over any other entity or transaction), the ERCOT ISO is specifically prohibited from actually dispatching generating facilities and from purchasing or selling bulk electricity.

b) Power Marketers

A power marketer is a competitive entity engaged in power marketing, the value-added discipline of facilitating electrical power transactions by matching electricity producers with buyers. In facilitating transactions, a power marketer may play strictly a *broker* role—providing information and seller/buyer matching services—or a more expansive role where actual title to power is taken for later resale. Currently performed by utilities and non-utilities alike, power marketing could be characterized as a relatively young but rapidly growing profession, particularly since the establishment of

[27] P.U.C. SUBST. R. 23.67.

independent power marketers. Power marketing is growing increasingly sophisticated through the use of financial price-risk management tools and through the coordinated operation of natural gas and electricity markets.

c) Energy Services Companies (Escos)

An Esco is a competitive entity that provides retail electric customers with a menu of end-use products and services. Examples of Esco products would be insulation, energy-efficient heating and air-conditioning systems, energy efficient electric motors for commercial and industrial processes, and energy efficient lighting systems. Examples of Esco services would be energy efficiency audits, and installation and maintenance services for the above-mentioned products.

Other Escos specialize in the provision of load curtailment services. In this instance, the Esco aggregates the load reduction potential of several customers, and then provides a service under contract with a utility to reduce loads by a specified amount upon the request of the utility. In this manner the utility is able to use the peak-reduction capabilities of end-use customers to shave peak and avoid running its most expensive generating units.

The Esco function is currently provided by regulated utilities through their demand-side management programs.[28] As discussed in Chapter VI, electric utilities also have a wide array of pricing mechanisms at their disposal to affect the patterns of customer usage in a manner that is beneficial to the system and to the customer. Time-of-use tariffs, interruptible tariffs, and real-time-pricing tariffs, for example, reduce loads during peak periods or curtail usage during system emergencies. This allows the utility to increase the reliability of its system, and to maintain reliability for its "firm" and "price-inelastic" customers.

Small consumers are interested in managing their exposure to risk in purchasing energy services. For example, consumers may reduce their risk by investing in appliances that

[28] Schuler, Joseph, Jr., "Energy Service Companies: No More Mr. Niche Guy," *Public Utilities Fortnightly* at 20 - 22 (April 15, 1996)

consume less energy or by obtaining load management devices that change the time of usage in response to a time-of-use pricing approach. Escos are likely to continue to work with consumers to manage risk in ways that involve investments on the customers' premises. These traditional approaches to risk are likely to be expanded significantly.

4. Market Institutions

In its most general form, a market is a location for price discovery. The current electric industry relies on markets for certain activities, such as discovery of the price of new generating capacity in a competitive bidding process. However, most prices are administratively determined at the Commission.

In a restructured electric industry, there are certain market organizations that must be in place for a competitive market to function at all or that can be expected to quickly and naturally evolve in the normal course of business. The design and operation of market organizations will unavoidably depend on decisions made by market participants, legislators, and regulatory commissions.

a) Spot Market

A spot market is the short-term market where energy is bought and sold. To the extent that buyers have unfulfilled energy needs not covered under long-term contracts and sellers have excess generating capacity not committed (or not currently being used) under long-term contracts, they meet in the spot market. Market participants also use the spot market to correct temporary imbalances (i.e., energy surpluses or deficits).[29] A well-functioning spot market will serve not only as a complement to the market for long-term contracts, but also as a competitor to this long-term market; certain sellers and buyers may prefer ongoing spot market transactions over long-term commitments.

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[29] Kahn, Edward and Steven Stoft, *Organization of Bulk Power Markets: A Concept Paper*, Lawrence Berkeley Laboratory (December 1995)

b) Futures and Options Exchanges

It is commonplace for market participants to manage their exposure to price risk with standard price-risk management tools. A futures and options exchange is a marketplace where standardized financial derivatives are traded. Well known examples of futures and options exchanges include the Chicago Board of Trade and the New York Mercantile Exchange (NYMEX). The NYMEX is already trading a limited quantity of electricity futures. As competitive and regulatory forces create more active and efficient spot markets for electricity, and hence more price fluctuation and price risk, it is possible that these exchanges will eventually handle a significant volume of electric industry transactions. Market centers will be heavily dependent on, and involved with, futures and options exchanges.

c) Hubs

A hub is a centralized or strategically situated *physical* location, where a product such as electrical energy is brought in and aggregated from suppliers, possibly stored, and distributed for ultimate sale to customers. Hub activities and services would include any activities and services directly related to the physical transportation, handling, storage, and delivery of the relevant product to and from the hub location. In the electric industry, therefore, a hub would likely be a place where a number of high-voltage transmission lines interconnect. There is a hub at the California-Oregon border which is referred to as "COB."

Historically, in other industries, including the natural gas industry, hubs have developed near points which have been defined by one or more of the following characteristics: areas of multiple transportation interconnections; gathering areas in major product-production regions; delivery points in major product-consumption markets; and regions with abundant product storage capacity. A well-positioned hub will have multiple access to market production areas, market consumption areas, or both.[30]

[30] Vallen, Marc A., and Leslie Struble Sharp, "Electricity Hubs and Market Centers: A New Business Tool for Electric Utilities?," *The Electricity Journal* at 26 - 35 (July 1995); Parker, Alfred L., "Hubs and Centers," *Public Utilities Fortnightly* at 29 - 32 (May 15, 1994).

d) Market Centers

A market center typically evolves after a hub, but a market center does not necessarily have to be in the same physical location as the hub. A market center's primary focus is offering services that are complementary to—rather than directly involved with—physical transport and storage. Specifically, a market center offers an array of *financially oriented* services. The reason the hub has to come first is that usually the more sophisticated financial services offered by a market center (i.e., price-risk management) require an existing hub where the physical product is traded in volume.

One key element of a fully functioning market center is liquidity. Once a pricing and physical transfer point (a hub) has been established by the marketplace, the challenge in creating a market center is the development of adequate market liquidity. This requires multiple buyers and sellers of various sizes, where no player is large enough to exercise market power. Liquidity is not created by large volumes of transactions if these volumes are dominated by only a few players. Instead, liquidity develops through the interaction of numerous buyers and sellers with different market perspectives. Liquidity facilitates a trader's ability to conduct business in a timely manner without undue influence on the prevailing market price.

Normally a market center is also characterized by a substantial amount of storage capacity. Storage capacity enhances a market center's ability to attract active traders to hedge and speculate on price-risk. Also, storage capacity enables traders to move product in and out of storage quickly and take advantage of the vagaries of short-term product prices and/or volume changes. This arbitrage function is essential to forcing convergence between different markets—e.g., the cash (spot) market and financial (forward) market. Although current technology does not readily permit storage of electricity in commercial quantities, at some point electric storage technology may advance sufficiently to make this possible.[31]

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[31] Franks, *supra*.

C. Expanded Competition: Wholesale-Only

Expanded competition can be introduced in the electric industry in Texas in a number of different forms. One alternative is to encourage expanded competition but *restrict* it to the wholesale level only. It is not clear whether the full benefits of competition can be realized through full wholesale competition or whether full economic efficiency only follows retail competition. This section describes alternative forms of wholesale-only competition and the institutional requirements for implementing them.

1. The Gradual Approach: Continued Implementation of S.B. 373

The opportunity for an actively competitive wholesale market in Texas is limited by the fact that, compared to other states and regions of the country, utilities in Texas have traditionally relied much more heavily on their own capacity to serve long-term energy and capacity needs, rather than contracting for capacity and energy in the wholesale marketplace.[32] At present, only 12.6 percent of total sales among the utilities in Texas include wholesale sales. As the wholesale market fostered by S.B. 373 continues to develop and current levels of excess capacity diminish, with demand growth, Texas will move closer to fully competitive wholesale markets in which 100 percent of sales are acquired through the market. However, as noted in Chapter V, the prevalence of long-term wholesale contracts may be a damper for the wholesale market for many years to come.

a) Increased Economy Energy (Spot Market) Transactions

Texas also has an economy energy market in ERCOT that is equivalent to the spot market described above. As more power marketers come to Texas, and as all players take advantage of open-access transmission service, market forces should accelerate the development of this portion of the market. Currently, only a small percentage of the electrical energy produced in Texas is bought and sold through the economy energy market. The advent of open-access transmission service should increase the number of economy energy transactions in the state and the amount of energy traded through the

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[32] See discussion in Chapter V of this report.

economy energy market. This in turn should create a more efficient (lower cost) statewide economic dispatch of generating resources, where dispatch decisions are made with less regard to ownership.

b) Competitive Bidding to Add New Resources

The need for new capacity generally arises from two sources. The first source is the normal growth in demand for electricity that accompanies increased population, employment, and personal income. The second source is the need to replace existing generating facilities as they reach the end of their economic lives.

Under PURA95 and the new IRP requirements, utilities solicit for competitive bids when they have new resource needs.[33] The generating utilities must obtain a Commission order approving the solicitation process, and the results of the competitive bidding will be reviewed prior to contract certification. It is expected that a significant portion of new resources will come from a source other than the utility conducting the competitive bidding. Thus, the solicitation requirement can create new opportunities for non-utility producers and marketers. However, the gradual replacement of existing rate-based utility capacity with wholesale power contracts is expected to take several decades.

As the competitive bidding process becomes more commonplace, it may become somewhat self-regulating. As long as a planning process like IRP is in place, electric utilities will have some motivation to keep costs low by obtaining the best possible resource bids and power contracts. As competition forces all market participants to hold down costs, solicitations may become a standard practice regardless of continuing IRP requirements.

c) Competitive Bidding on Expiring Wholesale Contracts

The wholesale electric market in Texas is not a static market. Long-term wholesale contracts do periodically expire, allowing the purchaser to reach the universe of potential suppliers able to serve it through open access, standardized transmission

[33] P.U.C. SUBST. R. §§ 23.34 - 23.37.

prices, terms, and conditions. In certain circumstances these utilities are required to conduct a formal competitive bidding process. Expiring wholesale contracts will eventually expand the functioning and level of activity in the Texas wholesale electric market, even if these contracts do not increase the actual percentage of capacity supplied through the wholesale market.

2. The Expedited Approach: Taking Steps to Disaggregate the Industry

Significant excess capacity, the possibility of significantly lower minimum reserve requirements, the prevalence of long-term wholesale contracts, and the current reluctance of utilities to make long-term capacity investments bode for a slow transition to full wholesale competition in Texas. Changes to PURA95, however, could hasten this transition and the pace at which the full benefits of competition are available to consumers.

a) Vertical Integration: Implicit Wholesale Contracts

As noted above, each vertically integrated utility in Texas can be thought of as a collection of a Genco, a Transco, a Disco, and a Retailco. The significance of this concept is that each vertically integrated utility can also be thought of as having a contractual relationship between each of these different business segments. Currently, these relationships could be characterized as *internal*, *implicit*, and *informal* in nature; however, because of vertical integration, this is the manner in which vertically integrated utilities operate, and the manner in which they are regulated.

b) Vertical Disaggregation: Moving Toward the Full Wholesale Competition

If the generation resources of the vertically integrated utilities in Texas were disaggregated from the rest of the utilities' operations, the "contractual" arrangements now in place would change from internal, implicit and informal to *external*, *explicit*, and *formal*. In other words, *conceptual* contracts now in place for wholesale purchased power and transmission service would be transformed into *real* contracts. Vertical disaggregation of utilities in Texas and the substitution of wholesale purchased power contracts for internal arrangements would transform the 12.6 percent wholesale market into something much closer to a 100 percent competitive wholesale market.

Full disaggregation or divestiture of generation from transmission and distribution to create a fully competitive wholesale market in Texas would require clear rules as to the independence and separation between the once-affiliated Gencos and Discos. Some degree of initial and on-going regulatory policing of these contracts and relationships would be appropriate—but too much regulatory review would only stifle and slow down a fully competitive wholesale market.

D. Expanded Competition: Retail Access

Some interested parties argue that the full benefits of competition cannot be achieved at the wholesale level; competition must be extended to retail customers. Under retail competition, retail customers may access and contract directly with suppliers (or their marketing representatives), or they may access the market through their own representatives (aggregators).

1. Basic Forms of Retail Competition

There is obviously no need for consumers to band together (or be banded together) to purchase staples such as eggs or bread. However, the physical nature of electricity and the physical laws that govern the transmission grid may require, as a practical matter, that most commercial and residential customers participate in the retail market through some form of aggregation.

a) Franchise Competition: Aggregation at the Community Level

Franchise competition means competition between two or more utilities for the franchise to provide exclusive service to a specific group of retail consumers (under a franchise agreement).[34] There are several cases of franchise competition, where

[34] Vince, Clinton A., and J. Cathy Vogel, "Franchise Competition in the Electric Utility Industry," *The Electricity Journal* at 14 - 25 (May 1995); Fairman, James F., "The Franchise Bottleneck," *The Electricity Journal* at 28 - 37 (May 1995); and Ridley, Scott, "Seeing the Forest from The Trees: Emergence of The Competitive Franchise," *The Electricity Journal* at 39 - 49 (May 1995).

consumers dissatisfied with local rates or service can seek to change suppliers in the hope that the change will bring lower costs and better service:

- *Municipalization:* the replacement of an existing utility through the formation of a new municipal utility;
- *Privatization:* the supplanting of a municipal utility with a private entity; and
- *Community choice:* existing communities are allowed to choose an entity to serve them.[35]

When the impetus for municipalization comes from an existing municipality, which is already acting as a wholesale agent for its residents, municipalization is properly thought of as a form of wholesale competition. However, when the impetus for municipalization comes directly from a group of retail customers, hoping on an aggregated basis to find a new electric supplier, municipalization is properly thought of as a form of retail competition.

Some industry participants view franchise competition as a revolutionary new development. Others maintain that it is simply a continuation of a traditional form of competition, albeit one that could have the potential to accelerate based upon the new pro-competitive environment in the electric industry and the enactment of the Energy Policy Act of 1992 (EPAct), which authorizes the FERC to order wholesale wheeling.

b) Commercial Aggregation

Commercial aggregation simply means the aggregation of retail customers by a commercial firm into economic units large enough to create some economic clout and bargaining leverage. The notion here is that the vast majority of commercial and residential customers will not, individually, represent enough load or have enough bargaining sophistication and economic leverage to negotiate directly with power marketers, Gencos, and other suppliers in a competitive market. So for most commercial and residential customers, the option of direct access, i.e., direct choice of supplier, may actually take place through a market intermediary. As a point of

[35] Texas-New Mexico Power Company proposed this alternative in Docket No. 15560 (withdrawn).

comparison, franchise competition can be thought of as a public aggregation of customers as opposed to commercial aggregation.

c) Direct Retail Access

Direct retail access means that all retail customers will have the opportunity to access Gencos directly. The dizzying pace of improvement in computer and telecommunications technology may make this a practical reality in the not-too-distant future for the vast majority of retail customers; however, in the near term, many industry observers believe that industrial customers—because of their size, bargaining sophistication, and economic leverage—would be the first retail customers to receive direct retail access.

d) Mixed Forms of Customer Aggregation

These various forms of customer aggregation are not necessarily inconsistent. It is possible, perhaps even likely, that if competition at the retail level is introduced, such competition will forge ahead on all three fronts: some retail customers will access competition markets through continued franchise competition; some will do it through commercial aggregators; and some will access the markets directly.

2. Changes to PURA Needed to Implement Retail Competition

If retail access is developed, provisions of PURA95 that define current industry operations must be examined to identify those that are inconsistent with retail competition. Portions of PURA95 that should be addressed include:

- Certificates of Convenience and Necessity under PURA95 §2.251;
- The obligation to serve under PURA95 §2.259;
- Monopoly status of utilities under PURA95 §2.001(a);
- The definition of public utilities in PURA95 §2.0011(1);
- Recordkeeping and reporting requirements under PURA95 §§ 1.201 through 1.206;
- Jurisdiction over affiliated interests in PURA95 §§ 1.171 and 1.272;
- Rate provisions under PURA95 §§ 2.214 and 2.215;
- Integrated resource planning under PURA95 §2.051; and

- Mergers and sales of property under PURA95 §§ 1.251 through 1.253.

3. Technical and Other Requirements to Implement Retail Competition

The organization and management of a retail access market for electricity—on the face of it—appears to be an exceedingly complex undertaking. Some critics have argued that the complexities of organizing the market will prevent the potential benefits of competition from reaching all segments of the public. Four state legislatures have adopted comprehensive retail access plans. Several other states are currently undertaking limited pilot programs on retail access. These experiences point to a number of technical requirements that must be addressed in the design and management of a retail market. Many of the significant changes from current practice will be in the areas of metering, billing, and accounting rather than operations and physical assets.[36]

a) Metering and Billing

Although the provision of certain types of pricing for retail service (e.g., time-of-day rates) would require new meters, some commentors argue that no changes to physical metering are necessary to implement retail access. The key issues are maintaining a balance between generation and load, which is accomplished with ancillary services and imbalance accounting. These parties argue that sufficient accuracy for scheduling purposes can be achieved using established load profiles rather than sophisticated metering. Nonetheless, competitive firms will need access to the "meter socket" so that they can install their own metering equipment when it is economically justified to provide a desired service to a customer.

Meter reading and billing is a potentially competitive function that could be accomplished by the distribution utility, the power supplier (Retailco), or by an independent party. With new metering technology it may no longer be necessary to physically "read" meters. Rather, the meters will be able to report demand and consumption data either by sending signals back through the distribution system or by

[36] Much of the following discussion is based on comments to the Staff Draft Report filed by Enron Capital & Trade Resources, *Comments of Enron Capital & Trade Resources on the Draft Report on the Scope of Competition in the electric Industry in Texas*, Project No. 15001 (November 8, 1996).

cellular telephone technology. Although different parties may be responsible for actually preparing and distributing the bills, no party argued that doing so would require any significant change from the current hardware and software that is used for this purpose. Moreover, if billing services were competitive, it would be up to the competitive provider to determine the best mix of technology and labor to meet the need.

b) Extension of Open Access and Comparability to Distribution

If the industry is restructured to allow retail access, open access and comparable service requirements must be extended to the distribution level. The logic of distribution comparability is identical to the logic behind the need for comparable transmission access, which is already in place in Texas.

The role of the ISO may need to be extended to include lower voltage transmission and distribution facilities that are currently excluded from the ISO's purview. The roles of the ISO, control area utilities, and the distribution utilities in scheduling deliveries to individual customers will have to be carefully defined. The ISO may also have responsibility for resolving technical disputes between retail power merchants and distribution utilities. Recent Commission rules also provide for the ancillary services related to wholesale power transfers.[37] If retail competition is implemented, it will be necessary to revisit these ancillary services and perhaps identify additional services to facilitate the ability of competitive suppliers to serve retail loads.

c) Fair Access to the Customer

Although discussed elsewhere in the report, it is important to note here that several potential pitfalls could limit the ability of competitors to attract customers on a basis comparable to the incumbent utility. These include access to customer information, including the names and addresses of electric customers. An incumbent utility should not be able to use this information to its competitive advantage. Fair access to the "customer interface" is critical. To the extent that the utility uses "bill stuffers" to offer

[37] P.U.C. SUBST. R. 23.67 and 23.70.

competitive services to customers, all competitors should be extended the same opportunity on comparable terms. In fact, the billing envelope may prove to be a valuable means to distributing information to customers about competitive changes, and as was the case in the phone industry, a good means of distributing "ballots" for customers to choose their supplier from a list of competitors. Consumer rights and information issues are discussed further in Chapter XII.

E. Evaluating Wholesale vs. Retail Competition

The desirability of extending competition to the retail market has been a highly volatile topic. Some industry observers have argued that all the potential benefits of competition can be gained through competition at the wholesale level, obviating the need for retail competition. Other observers maintain that the full benefits of economic efficiency and customer choice will only be realized by extending competition to the retail level.

These arguments are set forth in three categories:

- Support of expanded wholesale competition under S.B. 373;
- Support of expanded wholesale competition under a Poolco; and
- Support of full retail competition.

Note that the Commission does not necessarily endorse any of these arguments that support the alternative restructuring proposal.

1. Arguments in Support of Expanded Wholesale Competition Under S.B. 373

A form of wholesale competition already exists in Texas, and although there is probably no disagreement regarding the desirability of increased wholesale competition, there is considerable disagreement regarding the pace at which competition needs to increase. A gradual increase in wholesale competition could be achieved by simply continuing to implement the provisions of S.B. 373, as enacted in PURA95.

The comments received in Project No. 15000 regarding the desirability of expanding wholesale competition under S.B. 373—but going no further—are set forth in five arguments:

- *Need to Fully Implement S.B. 373.* The intent of the 74th Texas Legislature was to make the *wholesale* electricity market increasingly competitive through a series of specific measures: authorizing additional unregulated market participants; requiring utility filing of open-access transmission tariffs; and requiring competitive solicitation of resources. The push for retail competition is occurring at a time when the ink is barely dry on Senate Bill No. 373, and the provisions in this bill to increase wholesale competition have not yet been fully implemented. The results should be evaluated before hurrying to implement retail competition.[38]

- *Need to Fully Implement ISO.* It is premature to implement any further changes in wholesale markets until the ISO concept has been completely implemented and debugged. Once the ERCOT ISO is fully functional and tested by experience, we can consider whether and how to address retail competition. Consideration at this time of implementation of a new industry structure in Texas, or moving beyond that to retail access, is premature, unnecessary, and inappropriate.[39]

- *Evidence that Increased Wholesale Competition is Already Taking Place.* The wholesale electricity market in Texas is already becoming more competitive. Evidence of the strength of the Texas wholesale power market, particularly in terms of the number of market participants, has been demonstrated recently through the responses to several resource solicitations.[40]

- *Need to Wait and Learn From Actual Experiences In Other States.* By waiting and observing outcomes in other states, Texas would gain valuable market data and experience related to competitive wholesale power markets and the mechanics and impact of retail competition. After waiting and watching other states' experiences, Texas could make more insightful decisions about whether and how best to allow retail competition and how to handle each utility's remaining stranded investment exposure.

- *Market Power May Not Be a Problem.* While there may be an opportunity for the exercise of market power in the Texas wholesale

[38] *TU Electric Company's Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[39] *Id.*

[40] See for example, Texas-New Mexico Power Company's (TNP) request for proposals (solicitation) to replace purchases from TU Electric. The solicitation yielded proposals offering more than 7,000 MW of wholesale power in response to a need for 800 MW. TNP subsequently "shortlisted" 23 bids from 14 companies, including four power marketers, and ten independent power producers.

generation market by generating companies or generating utilities, nothing definitive is known. Absent clear proof that market power in wholesale generation exists and is harming the State's welfare, there may be no justification for implementing retail competition in Texas. *Workably* competitive does not mean *perfectly* competitive, and some market power is present in most unregulated markets.

2. Arguments in Support of Expanded Wholesale Competition

If the current pace of increased wholesale competition is deemed too slow, an intermediate step between the current industry structure and a retail access environment is to significantly expand the degree of wholesale competition. The comments received in Project No. 15000 regarding the desirability of expanding wholesale competition are set forth in five arguments:

- *Benefits of Competition Available to All Customers.* A fully competitive wholesale market will be an effective alternative for driving down the cost of generation. All customers could participate equally in the benefits of wholesale competition. No retail customer would be able to garner an advantage through a direct bilateral contract. Thus customer classes with more bargaining power would not be able to take greater advantage of retail access.
- *Flexibility to Allow Some Retail Bilateral Contracting.* A fully competitive wholesale market could be structured either with all bilateral contracts or with some form of a pool or power exchange (Poolco). A pool structure would provide the flexibility for some bilateral contracting. While a retail customer would *not* have the ability to participate directly in the wholesale spot market, such a market could coexist in an efficient manner alongside retail bilateral contracts and a retail spot market.
- *Ease and Minimal Cost of Implementation.* Full wholesale competition would be relatively simple and inexpensive to implement. This approach also would postpone a host of implementation issues associated with retail access: who has access? how much access is appropriate? will aggregators be viable? what is the obligation to serve? and when should access begin? A competitive wholesale market would provide the benefits of competition, *and* provide time to resolve retail access implementation issues.[41]

[41] Budhraja, Vikram and Fiona Wolf, "POOLCO: An Independent Power Pool Company for an Efficient Power Market," *The Electricity Journal* at 42 - 47 (April 1994); Garber, Don, William W. Hogan and Larry Ruff, "An Efficient Electricity Market: Using a Pool to Support Real Competition," *The Electricity Journal* at 48 - 60 (April 1994).

- *Competitive Efficiencies Are Obtainable From Fully Centralized Economic Dispatch.* A Poolco would institute a centralized economic dispatch, instead of a utility-by-utility economic dispatch.[42] Thus, instead of the electric production process being optimized part-by-part, a Poolco arrangement would optimize (minimizing the cost of) electric production across the entire pool. If the Poolco operates as intended, economic efficiency rather than utility ownership of resources would dictate the dispatch of generating units on an ERCOT-wide basis. Therefore, it would *not* be necessary to implement retail access to obtain the increased efficiencies associated with a more competitive electricity market.[43]
- *Reflection of Physical Realities of Electric Generation and Transmission.* A Poolco would more accurately reflect the physical realities of the electric grid. A single generator or group of generators cannot physically deliver a specific set of electrons to a specific load or set of loads over an alternating current network.

3. Arguments in Support of Full Retail Competition (Bilateral Contracts)

A number of industry participants and observers believe that full retail competition should be the goal of regulatory reform within the electric industry. These participants consider wholesale competition as an intermediate stage, lacking in several key elements. This section examines how a fully competitive market will address several of the key concerns that must be addressed in a wholesale market.

The comments received in Project No. 15000 regarding the desirability of full retail competition are set forth in four arguments:

- *Market Forces Can Determine Resource Needs.* In a fully competitive market, the preferences of consumers are expressed as market forces that *directly* determine long-term generating capacity and energy service (demand-side management) needs. These needs are not filtered through a regulatory process or through market intermediaries that are constrained by law to perform certain functions. As technological innovation advances, the lead times necessary to build new facilities will shorten, and

[42] During the restructuring workshops, the strongest advocate of a Poolco was Central & Southwest Corporation.

[43] Jurewitz, John, "Retail Wheeling: Why the Proponents Must Bear the Burden of Proof," *The Electricity Journal* at 62 - 70 (April 1994); Lesser, Jonathan A., and Malcolm Ainspan, "Retail Wheeling: Deja Vu All Over Again?," *The Electricity Journal* at 34 - 47 (April 1994).

supply and demand imbalances will be so rare or non-existent that coordination of resource decisions will not be necessary.[44]

- *Alleviation of Market Power Concerns.* Market power would be at least as much of a concern under wholesale-only competition as it would under the current industry structure. A loose or tight wholesale power pool might encourage collusion (explicit or implicit), leading to controlled results. In such situations it is sometimes difficult to distinguish whether a market result is based on the invisible hand of the marketplace or the guided hand of market-power-wielding entities.[45] An ERCOT wholesale pool may enhance the market power of large players such as TU Electric and HL&P who dominate the market.[46] The ultimate solution for market power concerns is not wholesale-only competition, but retail competition.

- *Nature of Competition in Other Deregulated Industries.* The deregulation experience in other industries creates another argument in favor of retail competition. The concepts of wholesale-only competition, and wholesale pooling, differ substantially from the form of restructuring that has been used successfully in other deregulated industries. In the long distance telephone industry, for example, customers are able to choose from among many competing suppliers.

- *Options for Customers:* Customers want to be able to choose what, how, when, for how much, and from whom they consume goods and services. Electricity is the last significant market in which most consumers have no choices or options. The economic and technical factors that once justified the lack of choice have changed, and there are now no compelling technical obstacles to full retail choice.

- *Development of Robust Forward and Futures Market.* Forward markets in electricity will develop once retail competition is underway. By allowing buyers and sellers to commit today to prices for future deliveries, a forward market will shift market price volatility risk from buyer to seller, and at the same time, will send accurate signals about the need for (or lack

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[44] Michaels, Robert J., "Wholesale Pooling: The Monopolist's New Clothes," *The Electricity Journal* at 64 - 75 (December 1994)

[45] *Destec Energy, Inc.'s Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[46] It is widely reported that pricing abuses occurred in the United Kingdom experience with Poolco. While outright collusion is illegal, bid signaling and price leadership are likely to occur. There have been such problems in England and New Zealand with pool pricing. If one entity owns a significant fraction of the *incremental* generation—the generation that performs load-following, and which fills the gap between baseload power and peaking power—that entity gains market power. This potential for market-power abuse was raised in the California and Pennsylvania restructuring proceedings. In California, the Poolco proponents suggested that in the WSCC the presence of over 60 utilities would eliminate market power. Nonetheless, in the California commission's most recent restructuring decision there was a requirement that utilities file a plan to sell or spin off at least 50 percent of their fossil generating capacity. Thus, it appears that while California contemplated the institution of Poolco, the commission was seriously concerned with the potential for market power problems.

of need for) additional investments. Further, by permitting investors to lock in future costs and revenue streams, a futures market can lower the capital cost of new investment.

F. Evaluating Functional vs. Structural Unbundling

Almost as hotly debated as the wholesale-retail competition issue are the matters relating to industry structure, vertical and horizontal integration, and mandatory unbundling and disaggregation. The following sections summarize the key arguments that have been put forward to support three divergent approaches to unbundling and disaggregation:

- Support of functional unbundling;
- Support of structural unbundling (divestiture); and
- Support of retaining a bundled industry structure.

Note that the Commission does not necessarily endorse any of these arguments that support functional and structural unbundling.

1. Arguments in Support of Functional Unbundling

Many market participants believe that functional unbundling without full divestiture can facilitate a fully competitive wholesale market without the serious legal, economic, and practical problems that accompany divestiture (i.e., structural unbundling or disaggregation). Most of the arguments favoring functional unbundling of electric utilities as a solution to the problem of market power focus not on the benefits of functional unbundling but on the problems with forced divestiture.

The comments received in Project No. 15000 regarding the desirability of functional unbundling are set forth in six arguments:

- *Adequate Safeguards Exist for Cross-Subsidization and Self-Dealing.* Under organizational (functional) unbundling of the various utility operations, each functional unit becomes a separate profit center that is judged by its specific performance, rather than by the performance of the firm as a whole. The employees of each functional unit are then judged by the performance of that unit, and not the performance of the firm as a whole. Given this internal incentive structure, there would be little incentive for one function to cross subsidize another function.

- *Sufficient Market Power Safeguards Exist.* Recent changes in federal and State law now require that a utility provide transmission access to third parties under terms and conditions comparable to the utility's own use of its transmission system and to employ competitive solicitations for new resources. The Commission will continue to ensure that retail rates do not contain costs (such as the costs of affiliates) that should not properly be borne by utility customers. Improper self-dealing by utilities is effectively prohibited. Functional unbundling is therefore an adequate competitive safeguard.[47]

- *Lower Implementation Costs vs. Structural Unbundling.* Functional unbundling is less costly than structural unbundling. An unbundled generation function will operate in the marketplace with the same incentives for efficiency and performance as other generators in the market, at least up to that point in time where the utility decides physical divestiture is the most effective financial strategy. Structural unbundling could be expensive in terms of transactional financing costs which arise from several sources: legal fees; time; uncertainty; stock equity allocation; personnel assignments; tax consequences;[48] corporate bond indentures; requiring refinancing of corporate debt;[49] and bank-related transaction fees from temporary (bridge) financing provided by commercial banks during the pendency of a transaction. Another consideration is that if a considerable amount of generating capacity were put up for sale at one time in response to a regulatory mandate, then "fire-sale" conditions could drive down the sales price for those assets below what would otherwise be market levels, increasing stranded costs to the detriment of the seller and its customers.

- *Protecting Economics of Scale and Scope.* It is generally undisputed that there are significant economies of scale and scope in the vertically integrated electric utility structure. Such economies produce not only lower costs, but also greater price stability through a diversity of assets, skills, and fuel mix. It is not possible to know prior to structural

[47] *TU Electric Company's Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[48] *Entergy Inc.'s Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[49] Most debt securities issued over the past two decades either provide for premiums upon early repayment of debt or provide for no early repayment of debt unless the securities are tendered (at a negotiated premium over face value). The interest rate protection afforded bondholders through call premiums or no-call bond provisions has been key to capturing the savings of declining interest rates for customers, and has permitted utilities to finance with relatively small spreads over rates for government securities. While repurchases of outstanding debt have been accomplished in the past, bondholders are required to compensate for the loss of interest rate security.

unbundling whether the economic efficiency gains will be sufficient to offset the lost economies of scale.[50]

- *Restrictions Imposed by Bond Indentures:*
  - *Investor-owned Utilities*. Most utility assets are encumbered by the mortgage indentures that accompany the issuance of first mortgage bonds. Specifically, under the use of this type of financing, virtually all of a utility's plant and equipment is pledged as collateral, and can be released only as collateral if other (equally valuable) assets are available to replace them. An alternative method of releasing assets from mortgage indentures is paying down the mortgage debt, but this can be a costly and impractical process. The typical asset release provisions in mortgages do not permit the release of specific categories of assets such as generation assets or distribution assets. Thus, utilities would not be able to structurally unbundle and divest their physical assets without completely restructuring their entire debt.
  - *Municipalities*. The indenture problem is not just limited to IOUs. Municipal utilities finance under similar restrictions. For example, it is possible for a municipal utility to have in place combined utility system revenue bonds, the repayment of which is not tied to any specific asset, but rather is backed by the revenue stream of the water, wastewater, and electric utility systems. If such a municipal utility were required to divest its electric utility, its bond covenants would require it to refinance all outstanding combined utility system bonds, potentially on a non-tax-exempt basis.
  - *Cooperatives*. To the extent that cooperative' assets are mortgaged through the Rural Utilities Service (RUS) and the Cooperative Financing Corporation (CFC), cooperatives would not be able to divest these assets without the express consent of the RUS and CFC. It is uncertain that the RUS and CFC would give such consent, faced with the likelihood that their collateral would diminish in value.
- *Dealing With Nuclear Assets*. Any attempt to divest nuclear assets would necessitate a new owner with extremely "deep pockets" to prevent financial failure in the event of a nuclear plant accident or premature decommissioning. It may be very difficult to find such an owner willing to take the risks associated with nuclear power, as was demonstrated in England. Without the prospect of any willing buyers, nuclear units may need to remain with the regulated distribution utility (albeit with strong

[50] Reintegration of some generation and distribution in the United Kingdom provides evidence that the benefits expected from disaggregation did not offset the lost scope economies. (See, e.g., statements of Robert Shapiro at February 14, 1996 Commission Workshop on Industry Restructuring, Transcript, at 14 and 20).

performance-based regulatory incentives to operate as efficiently as possible), or be owned by a quasi-government entity as in the United Kingdom. Thus, a final argument in favor of functional unbundling is that it skirts the difficult issue of how to treat nuclear assets under divestiture.

2. Arguments in Support of Structural Unbundling (Divestiture)

The structure of today's electric industry is a result of almost a century's worth of laws, regulations, and policy determinations premised on the existence and continuation of electric utilities as vertically integrated, natural monopolies. Many industry observers argue that this industry structure possesses a variety of expectations and preferences (biases) that weigh in the utilities' favor as the attempt is made to move forward into a more competitive marketplace. Unless these institutional impediments to fair competition are removed through structural unbundling, the market will not be truly competitive, and customers will be denied the substantial benefits expected from a competitive marketplace.

The comments received in Project No. 15000 regarding the desirability of structural unbundling are set forth in seven arguments:

- *Current Market Power Is Too Great.* The strongest argument holds that functional unbundling is simply not a sufficient competitive safeguard. A utility that owns generation can use its distribution monopoly and its control over the billing envelope to give its own generation an advantage, both over other generation and over energy efficiency investments offered by other market players. Functional unbundling does not get rid of conflicts of interest and cross-subsidies that must be resolved for the generation market to become fully competitive. Furthermore, if a utility is allowed the choice between divestiture and functional unbundling for its *individual* assets, it is likely to make strategic choices that maximize its value given its superior knowledge of its own plants.[51]
- *Open Transmission Access Is Not Sufficient.* The filing of open access tariffs and functional unbundling will *not* be sufficient to cure the fundamental dysfunction of today's bulk power market nor the ills of

[51] In particular, the utility would divest those assets that it believes the market has fairly valued or overvalued. It would functionally unbundle other assets where it believes the market has not valued them fairly. If an appraisal or similar process is used to calculate market value and stranded costs for assets that are functionally unbundled, and the utility has a choice over which assets to unbundle or divest the utility will almost certainly attempt to over-collect on its stranded costs. Divesting generation will have the advantage of having a clear line drawn between the regulated entities operating transmission and distribution and all of the competitors on the generation side. *TIEC's Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

tomorrow's direct access market. The current industry structure is characterized by vertically integrated corporations that function as sole buyers of generation in franchised service territories, while also often serving as exclusive sellers of electric services. Additionally, these corporations typically have full control over bottleneck transmission facilities required by competitors. Full corporate divestiture is the only route to ensure that all sellers of generation services can compete fairly to supply customers' needs, whether at wholesale *or* retail.[52]

- *Misplaced Concerns About Economies of Scale and Scope*. Divestiture may not compromise utilities' economies of scale and scope. Since about 1970, large-scale generating facilities have ceased to be more economic than small-scale facilities, and today the economies of integration come from the ability of the vertically integrated utility to amass capital, to reduce external transaction costs, and to benefit from volume purchasing. However, the efficiencies of competition may offset these lost economies. The economies that come from the relationship with a large pool of customers—economies in aggregation, metering and billing—are not dependent on the vertical integration of generation and distribution. Also, economies that arise from supply and demand aggregation are not dependent on utility *ownership* of generation, but could be carried out by market intermediaries.[53]

- *Easing the Need for Regulatory Oversight*. Another argument in favor of total disaggregation of generation is that it will reduce the need for regulatory oversight and allow the remaining transmission/distribution utilities more flexibility without exposing customers to greater risk. This argument also contends that the greater discretion afforded the "wires business" utilities under this option should enhance their ability to protect consumer interests while enabling more effective oversight by regulatory agencies. Without such separation of functions, there is the ever-present risk that transmission-owning utilities will use their transmission monopoly to gain a competitive advantage in the supply of generation services. Separation of the competitive generation function from the non-competitive distribution function will provide a level playing field upon which all generating entities can compete to the benefit of all consumers. Simple accounting changes cannot eliminate the unbalanced incentives inherent in the current integrated utility structure.

- *Equal Access to Customer Information*. Regulated utilities have huge volumes of billing and other data that have been acquired at customer expense. These data can be used to the advantage of unregulated affiliates in marketing services to the utility's customers. Structural unbundling

[52] *Destec Inc.'s Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[53] *Economies of Scale and Vertical Integration in the Investor-Owned Electric Utility Industry*, Columbus, OH: The National Regulatory Research Institute (January, 1996)

would facilitate the two equitable solutions to this problem: either give competitors equal access to these data and/or require unregulated affiliates to pay an appropriate royalty for use of these data. Failure to implement these solutions will result in unfair competition.[54]

- *Preventing Cross-Subsidization.* When a utility is engaged in both a monopoly and competitive business, that utility is almost certain to incur costs that are common to both endeavors. If the utility remains intact, then the common costs must be fairly apportioned between the monopoly and competitive business segments. Another argument in favor of structural unbundling is that cost apportionment is unnecessary between divested utility segments, so no cross-subsidization is possible. The traditional measures for preventing pricing abuses, by ensuring that the regulated side of the business bears only its reasonable share of joint costs, are of questionable effectiveness. Given the historical difficulty of successfully implementing protections under a vertically integrated industry structure, it is difficult to imagine successfully implementing them in a more competitive environment, where the temptation for abuse will be even greater.

- *Prevention of Tying.* In negotiations for access to monopoly services, a utility can make service less desirable for customers that buy their competitive services from other sources by forcing those customers to purchase a related good or service.[55] Although comparability rules are intended to prevent this type of behavior, the incentive remains, the penalties are unclear, and in technical areas, e.g., transmission and distribution planning, the utility has a great deal of discretion not easily reviewed by regulators.

- *Bond Indentures Can be Coped With.* A few utilities around the country have taken voluntary steps to reduce their first mortgage bond debt and free themselves from the restrictive bond indentures that accompany this type of debt.[56] This suggests that the problem of bond indentures is manageable, and that other utilities can and should be encouraged to voluntarily reduce their outstanding balance of first mortgage bonds.

[54] For example, a utility could provide meter reading and billing services to an unregulated generation affiliate, while requiring its competitors to unnecessarily duplicate these services. Contracting for metering, billing, and use of the billing envelope must be required on standard terms and conditions for all generators and carefully regulated if utilities continue to own generation. *Destec Inc.'s Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[55] For example, a utility may make it more difficult for a housing developer to obtain timely distribution service unless the housing development is constructed as an all-electric development.

[56] Boston Edison cut its first mortgage bonds from $ 678,375,000 at the end of 1984 to $ 631,825,000 at the end of 1992, to $ 40,000,000 at the end of 1993. Long-term debentures rose from zero, to $ 385,000,000, to $ 1,200,000,000, at the same dates. Consolidated Edison cut first and refunding mortgage bonds from $2,480,000,000 at the end of 1984, to $1,140,000,000 at the of 1992, to $300,000,000 at the end of 1993. Long-term debentures rose from zero, to $1,050,000,000 to $1,927,743,000.

Utilities should not be allowed to characterize their secured debt and associated bond indentures as an insurmountable obstacle to divestiture even where their flexibility may be limited. Just as they do when making changes such as mergers and acquisitions, utilities should be encouraged to find creative solutions to the problem of bond indentures.

3. Arguments in Support of Retaining a Bundled Industry Structure

In a future competitive market, it is unclear whether lost economies of scale and scope would be offset by the efficiency gains from a more competitive environment. It is likely, however, that any form of unbundling will raise some utility costs by requiring additional personnel and equipment, in circumstances where one person or piece of equipment had previously performed multiple jobs or functions. Reliability and efficient operations could suffer as communication between the groups becomes more formal, ultimately increasing the time to make key decisions.

The comments received in Project No. 15000 regarding the desirability of keeping the current bundled industry structure are set forth in four arguments:

- *Current Market Power Is Overstated.* Some industry observers argue that, because of ease of entry into the market, and the existence of many competing electric generators in Texas, there is every reason to presume that market power will *not* be a problem in a more competitive and open generation market, even if *no* attempt is made to unbundle utilities. However, if it does appear at some point in the future that the exercise of market power is creating excessively high prices for consumers, this should be controlled by specific and targeted measures (such as addressing transmission constraints), rather than by imposing broad additional rules or regulations *now*, out of a concern for the *potential* exercise of market power.
- *Open Transmission Access Is Sufficient.* Some parties believe that open transmission access by itself should eliminate the barriers to entry in the generation market that are imposed by the current ownership and operation of the transmission system.[57] It appears that the rationale for the push for divestiture is to place all market participants on an equal footing so that no participant has a competitive advantage and no participant may be discriminated against. This concern, however, should be eliminated once the ISO and the Electronic Information Network are fully implemented. At such time, all market participants will have access to the

[57] *Houston Lighting & Power Company's Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

timely and full disclosure of information relating to the availability of transmission service, and the availability of ancillary services, on a non-discriminatory basis, as well as other information required by P.U.C. SUBST. R. 23.67. If establishment of the ISO squeezes all competitive advantage out of the market, this would mean that neither divestiture nor functional unbundling would have a significant role to play in opening the generation market to competition.

- *Absence of Horizontal Market Power in Long-term Markets.* Regardless of the presence or absence of market power in the economy energy (spot) market, a strong case can be made that there is no horizontal market power in the regional market for *long-term* capacity and energy.[58] Technological change over the last 15 to 20 years in the field of electric generation, especially in the development of new gas-fired combined cycle technologies, has reduced the economies of scale and barriers to entry in this business to the point where new generating capacity can be developed by a broad range of potential competitors. If the promise of such technologies is truly realized, the electric market may be contestable, and the threat of entry may be adequate to cap the price of electricity in the long-term. In a fully contestable wholesale market, new capacity will be brought into service whenever developers anticipate that the price for electricity will justify a reasonable return on their investment.

- *Unique Status of Cooperative and Municipal Utilities.* Some cooperative utilities argue that it should not be assumed that structural unbundling of generation is needed for cooperatives, even if it is mandated for IOUs.[59] Many of the following arguments are equally applicable to municipally owned utilities. Cooperatives tend to be a fraction of the size of IOUs, and collectively control only a small portion of generation and load in Texas; thus, they have no market power to abuse. There is a marked difference between cooperatives and IOUs in ownership and organizational structure; cooperatives are owned by their customers, rather than stockholders, and run by member-elected boards. Hence, a cooperative is not subject to the customer/shareholder conflict that IOUs face. Also, cooperatives are based on an inherently different motivation since they are set up as non-profit entities, whereas the shareholders who own an IOU are primarily seeking to earn a profit on their investment. All of these factors combined make it highly unlikely that a cooperative would wish to exercise market power—even if it had any to exercise. Thus, this argument concludes, even if the structural unbundling remedy is necessary for IOUs, there is no need to apply it to cooperatives.

[58] *Entergy Inc.'s Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

[59] *South Texas Electric Cooperative's Prefiled Comments to Market Structure I - Generation*, Project No. 15000 (April 1, 1996).

IX. LESSONS LEARNED IN OTHER INDUSTRIES AND JURISDICTIONS

Over the past two decades, restructuring has taken place in a number of traditionally regulated industries including: telecommunications, airline, trucking, natural gas, and railroad. Federal railroad regulation first emerged as far back as the latter part of the 19th century following passage of the Interstate Commerce Act of 1887.[1] Federal and state regulatory oversight of electric power and several other industries began in the 1930s.

Recent efforts to deregulate and restructure regulated industries have been initiated, in part, because of a set of similar marketplace conditions that preceded restructuring, including: technological advances; emerging legal and regulatory pressures; changing market expectations; and encroachment of unregulated competitors. As demonstrated in prior chapters, these same conditions are now present in the electric industry. This chapter reviews changes in other industries and jurisdictions and draws out some of the lessons learned from those restructuring activities.

To best understand the complexities and potential unintended consequences of industry restructuring, the Commission's investigation into industry alternatives has examined how deregulation and restructuring proceeded in other countries, states, and industries. As part of its series of exploratory workshops on key issues, the Commission organized a two-day conference to explore other restructuring experiences, and invited interested parties in Texas to submit information, analysis, and comment on the process and outcome of restructuring in other countries, states, and industries.

In this chapter, Section A discusses United States restructuring activities in other relevant industries. Section B discusses electric industry restructuring in other countries. The lessons learned from restructuring in other industries and countries are discussed in Section C. Section D provides an overview of restructuring efforts in some of the most active states and at the federal level.

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[1] February 4, 1887, Ch. 104, 24 Stat. 855.

A. RESTRUCTURING IN OTHER INDUSTRIES

The telecommunications, natural gas, and airline industries have all undergone substantial restructuring over the last two decades. In each of these restructurings, as is anticipated for potential electric industry restructuring, issues arose concerning market concentration, universal service, and system safety and reliability.

1. Telecommunications Industry

The telecommunications industry has some important similarities with the electric industry. Both have been characterized as natural monopolies, in part because they require large capital investments and operate massive service networks connecting central facilities with customers. Moreover, the existence of one provider was seen as consistent with universal service policy goals, i.e., favoring one provider per territory so that utilities could provide service to high-cost customers at prices below cost while recouping those losses by charging low-cost customers prices above cost via average rates. Many observers argue that tremendous technological improvements made the break up of AT&T inevitable.[2] Before the breakup, AT&T maintained a vertically integrated telephone network that combined local service, long distance, and technology development. As new technologies emerged, competitors were able to compete with AT&T in certain market segments. As the industry appeared to become able to support multiple competitors, the integrated nature of AT&T's corporate structure became more problematic.

a) Telecommunications Industry Before Divestiture

The telecommunications industry prior to divestiture was categorized by vertical and horizontal integration. This integrated nature was viewed as consistent with the economies of scale and scope that were deemed to exist in that industry.

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[2] See e.g., Simon, Sam A., Michael Whelan, *After Divestiture: What the AT&T Settlement Means for Business and Residential Telephone Service*, White Plaintes, N.Y.: Knowledge Industry Publications, at 8 - 10 (1985). Competition in long distance led to the construction of multiple fiber optic networks across the country. The existence of this fiber capacity has been integral to the growth of the Internet.

i) Vertical Integration

Almost from the start, the Bell Company (Bell), later AT&T, was characterized by vertical and horizontal integration. By 1895, less than twenty years after the first telephone call, Bell had integrated manufacturing, local telephony, and long distance service.[3] Bell exhibited its vertical market power by refusing to interconnect competitors' local lines with its long distance lines.[4] AT&T continued this practice until the FCC approved Microwave Communications, Inc.'s (MCI) application to build a private line microwave telecommunications system between St. Louis and Chicago in 1969.[5]

In manufacturing, AT&T continued its monopoly position until the 1960s. By the 1960s, the technology and demand were such that the manufacturing of telephones and related instruments allowed for multiple competitors. Still, AT&T refused to allow customers to attach their own equipment to the telephone outlet in their homes and businesses, arguing that foreign devices could damage the network.[6] In 1968, the FCC rejected AT&T's argument in the *Carterphone* case,[7] in which the FCC ruled that AT&T's prohibition against attaching customer-provided terminal equipment was unreasonable, discriminatory, and unlawful.[8] The *Carterphone* case and the FCC's approval of MCI's application demonstrated that opportunities to bypass AT&T's integrated system existed in particular market segments.

ii) Horizontal Integration

The local telephone industry was initially competitive in the early 1900s. In 1907, for example, independent telephone companies served almost half of the installed

[3] Krause, Constantine R. and Alfred W. Duerig, *The Rape of Ma Bell: the Criminal Wrecking of the Best Telephone System in the World*, Secaucus, N.Y.: Lyle Stuart, Inc., at 26 (1988).

[4] *Id.* at 27.

[5] 6 R.R.2d 953 (1966).

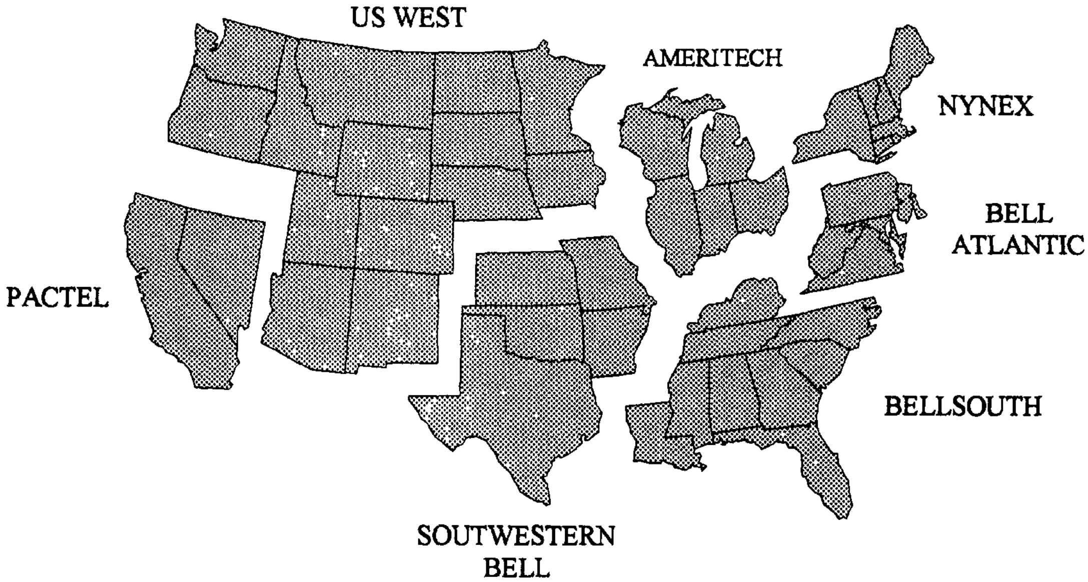
[6] See, e.g., Crandall, Robert W., *After the Breakup: U.S. Telecommunications in a More Competitive Era*, Washington D.C.: The Brookings Institute, at 74 - 105 (1991)(for a discussion of the evolution of the telephone equipment market).

[7] 13 FCC.2d 420 at 434 - 435 (1968).

[8] *Id.*

telephones in the country.[9] Moreover, the advent of radio-carried telephony in the post-World War II era provided a potentially competitive technology for long distance services.[10]

b) Restructuring in the Telecommunications Industry: The Divesting of AT&T



Source: Vieter, Richard H. K., "AT&T and the Public Good: Regulation and Competition in Telecommunications, 1910-1987," *Future Competition in Telecommunications*, Cambridge MA: Harvard Business School Press at 82 (1989) citing Tunstall, W. B., *Disconnecting Parties*, New York, N.Y.: McGraw-Hill at 130 (1985).

Figure IX-1: The Seven Regional Bell Operating Company Territories

Divestiture was based, in part, on the Department of Justice's (DOJ) desire to limit the ability of AT&T to wield vertical and horizontal market power. A DOJ inquiry led to a consent decree with AT&T, which was modified by the presiding judge, whereby AT&T agreed to divest itself of its local exchanges. The local exchanges were divided into seven Regional Bell Operating Companies (RBOCs), each with approximately $16 billion in assets. Figure IX-1 shows the territories of the RBOCs, and Table IX-1

[9] Brock, Gerald W., *The Telecommunications Industry: The Dynamics of Market Structure*, Cambridge, MA: Harvard University Press at 174 (1981).

[10] *Id.*

shows the assets, revenues, and number of employees of each of the RBOCs at the time of the AT&T divestiture.

Table IX-1: The Seven Regional Bell Operating Companies Upon Divestiture

RBOC	Assets (millions)	Revenues (millions)	Employees
Ameritech	$ 16.26	$ 8.34	79,000
Bell Atlantic	16.26	8.32	80,000
BellSouth	20.81	9.80	99,100
NYNEX	17.39	9.83	98,200
Pacific Telesis	16.19	8.08	82,000
Southwestern Bell	15.51	7.75	74,700
U.S. West	15.05	7.44	75,000

Source: Vieter, Richard H. K., "AT&T and the Public Good: Regulation and Competition in Telecommunications, 1910 - 1987," *Future Competition in Telecommunications*, Cambridge MA: Harvard Business School Press at 82 (1989) citing Tunstall, W. B., *Disconnecting Parties*, New York, N.Y.: McGraw-Hill at 130 (1985).

To maintain economies of scale in the area of research, Bell Communications Research (Bellcore) was organized to supply research, training, and to supply services to the RBOCs.[11] Additionally, exchange operations were reorganized into 161 Local Access and Transport Areas (LATAs).[12] Switched calls that originate and end in the same LATA are generally the sole responsibility of the LEC. Calls that cross LATA boundaries (interLATA) are passed to an interexchange carrier. Interexchange carriers have historically helped support local service by paying access charges to LECs when completing calls on their networks. Over the ensuing decade, AT&T has lost market share in its long distance services, mostly to MCI and Sprint; however, it has maintained 55 to 60 percent of total long distance by revenues. Long distance is often characterized as oligopolistic, rather than competitive.[13]

[11] *Id.* at 80.

[12] Newton, Harry, *Newton's Telecom Dictionary*, Fourth Edition, Telecom Library Inc.: Chelsea, MI at 33352 (1991).

[13] See e.g., Taylor, William E. and J. Douglas Zona, "An Analysis of the State of Competition in Long-Distance Telephone Markets," Cambridge, MA: National Economic Research Associates, Inc. at 27 (May 1995). The article argues that the divergence in price and cost reductions along with "AT&T's firm-specific price elasticity of demand suggests pricing behavior inconsistent with a price-taking firm in a competitive market."

In 1996, the Federal Telecommunications Act[14] (FTA96) took substantial steps to increase the number of competitors in the long distance market and to encourage competition at the local level. FTA96 removes many of the barriers remaining after the AT&T divestiture including allowing AT&T, as well as other long distance carriers, to enter local exchange markets, and allowing the RBOCs to compete in the long distance market once local competition exists. FTA96 also limits state actions that could be construed to be barriers to entry.[15]

c) Telecommunications After Divestiture

After the AT&T divestiture in 1984, AT&T competed in a variety of telecommunications industry segments, including long distance and manufacturing, while the regional Bell operating companies (RBOCs) held regional monopolies for local telephone services. A number of studies have evaluated the impact of competition for long distance service since AT&T's divestiture.[16] One study, for example, found that, in nominal terms, the rate of decline in AT&T's long distance rates more than doubled after 1980.[17] However, it is still unclear whether the decrease in long distance prices translated into consumers' savings or if those charges were shifted to local service.

d) Effects of the Telecommunications Restructuring

Some observers of telecommunications deregulation argue that the divestiture of AT&T has resulted in four major benefits:

1. Lower long distance prices;
2. Expanded customer choices;
3. Enhancement of the telecommunications infrastructure; and

[14] Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996) (to be codified at 47 U.S.C. §§151 *et seq.*) (FTA96).

[15] *Id.*

[16] See e.g., Piepmeir, James M., David O. Jermain, and Terry L. Egnor, "Breakup of the Bell Monopoly: Lessons for Electric Utilities," *The Electricity Journal*, Vol. 6(6) (July 1993).

[17] Arkin, Zander, "Benefits of Competition," Cambridge, MA: Harvard Electricity Policy Group at 22 (1995)(a discussion draft). From 1960 to 1980, AT&T's nominal price for a 10 minute call from New York to Los Angeles fell at an annual rate of approximately 2.18 percent. From 1980 to 1991, the nominal price fell at an annual rate of approximately 4.8 percent.

4. Emergence of New Competitors.

Others have argued that the sole reason for the fall in long distance prices was the lowering of access charges that long distance carriers have to pay to local exchanges (i.e., cost shifting to local service).[18] Beginning in 1984, the FCC began rebalancing local and toll prices. First, the subscriber line charge was added, which shifted cost recovery previously reflected in long distance rates.[19] Second, accounting changes were instituted by the FCC that lowered *inter*state costs while increasing *intra*state costs.[20] It has been estimated that these changes lowered carrier access charges by approximately $10.86 billion a year. For customers, however, the change in access charges paid by the long distance companies to the local exchange carriers (LECs) has meant a symmetrical increase in the prices charged at the local level. Taylor and Taylor noted that "AT&T's tariffed prices actually grew in nominal terms at an annual rate of about 1.5 percent per year between 1984 and 1992," and in real terms, fell only about 2.2 percent per year.[21]

There remains skepticism regarding whether the restructuring of the long distance market has created a market that is competitive. At least one study has determined that the high concentration in the long distance industry has allowed long distance companies to engage in pricing behavior consistent with an oligopoly.[22] For example, reductions in the access charges paid by long distance carriers in the 1990s have not been reflected in the prices charged by long distance companies.[23] This behavior appears to have prevented customers from obtaining all of the price reductions expected from vigorous competition."[24]

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[18] Taylor, William E. and Lester D. Taylor, "Postdivestiture Long-Distance Competition in the United States," *American Economic Review*, Vol. 83(2) at 185 - 189 (1993).

[19] *Id.* at 186.

[20] *Id.*

[21] *Id.*

[22] Taylor and Zona, *supra* at 27 - 32.

[23] *Id.*

[24] *Id.* at 27.

e) Character of Existing Regulation

Regulation after the divestiture of AT&T has taken two forms. In long distance markets, regulation has been lessened as AT&T has lost market share. In local markets, traditional cost of service regulation continued; however, the trend is to replace traditional cost of service regulation with price cap regulation, a form of performance based ratemaking.

i) Long Distance

The long distance telecommunications market is not free from regulatory involvement. AT&T is still required to file long distance tariffs with the FCC, and the Department of Justice maintains an anti-trust role. Regulatory prohibitions also prevented AT&T from expanding into local telephony and the RBOCs from entering into the long distance market, until the enactment of FTA96. AT&T may now enter into local markets and the RBOCs may enter into long distance markets; however, RBOCs must show that a competitive checklist has been met in its local markets before they can provide long distance services.[25]

ii) Local

A key restructuring issue affecting the telecommunications industry is maintaining quality service. As a number of states have moved to price cap regulation, critics have suggested that LECs will sacrifice service quality as they attempt to lower costs. This appears to have happened with U.S. West. Throughout its service territory, states opted for price cap regulation. Over time the company's service quality diminished. In Utah, for example, the number of delays in a service period climbed from 148 to 1,882.[26] To respond to service quality deficiencies, the Utah Public Service

[25] The impact of the Federal Telecommunications Act of 1996 on telecommunications markets, is discussed in detail in The Commission's report on competition in telecommunications. See Public Utility Commission of Texas, *1997 Report to the Texas Legislature on the Scope of Competition in Telecommunications Market*, Austin, TX (January 1997).

[26] Utah Public Service Commission, URL: http://web.state.ut.us/bbs/psc/dlog/9294PR.wpd.

Commission was forced to set service quality targets. If U.S. West does not meet those targets, the company could suffer penalties.[27]

2. The Natural Gas Industry

The development of the natural gas industry paralleled the telecommunications and electric industries in many respects. Most importantly, the infrastructure expense of laying the massive interstate pipeline system is substantial. The natural gas industry also saw increased pressures to bypass the local distribution companies' price structures.[28]

a) Natural Gas Industry Prior to Restructuring

Federal regulation of the natural gas industry began with the passage of the Natural Gas Act of 1938 (NGA).[29] The NGA authorized the Federal Power Commission (FPC) to oversee the rates charged by interstate gas pipelines.[30] It also prohibited building new pipeline facilities in areas already being serviced by a gas pipeline. The NGA also gave the FPC authority to regulate the wellhead price of gas *if the producer was an affiliate of the interstate pipeline company purchasing the gas.*[31] It was not until 1954 that the U.S. Supreme Court ruled in *Phillips Petroleum Co. v. Wisconsin* that the FPC had oversight responsibility over all gas field sales destined for interstate commerce.[32] After *Phillips Petroleum Co.*, the FPC imposed cost of service regulation on all gas produced for interstate consumption. Due to the large number of gas producers, however, cost of service ratemaking proved impracticable.[33]

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[27] *Id.*

[28] Hamrin, Jan, William Marcus, Fred Morse, Carl Weinburg, *Affected with the Public Interest: Electric Utility Restructuring in an Era of Competition* at 89 (1994).

[29] Tussing, Arlon R. and Connie C. Barlow, *The Natural Gas Industry: Evolution, Structure, and Economics*, Ballinger Publishing Co.: Cambridge, MA at 97 (1984).

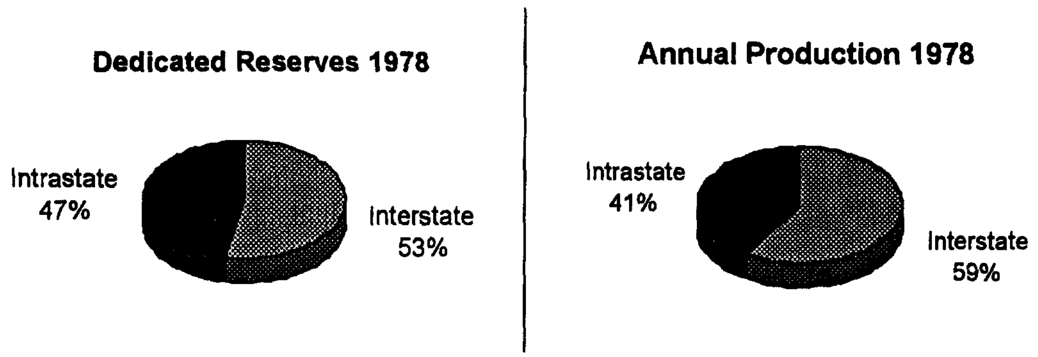
[30] *Id.*

[31] See *Colorado Interstate Gas Co. v. Federal Power Commission*, 324 U.S. 581 (1945).

[32] *Phillips Petroleum Co. v. Wisconsin*, 347 U.S. 672 (1954).

[33] Tussing, *supra* at 103. In 1959, the FPA was only able to act on 200 of the 1,265 applications for rate increases.

By the late 1960s, the nation's known gas reserves were beginning to decline.[34] Moreover, as the price of oil increased in the 1970s, regulatory cost ceilings held the price of gas below market levels. Thus, resources were diverted away from natural gas exploration. The price ceilings also lagged far behind *intra*state gas prices in Texas and Louisiana. As a result, while gas shortages and curtailments occurred in many northern states, vast amounts of natural gas were being consumed in the intrastate markets of Texas, Louisiana, and Oklahoma.[35] Figure IX-2 shows that by 1978 the percentage of gas reserves and production dedicated to intrastate uses almost reached 50 percent of the nationwide totals.



Source: Tussing, Arlon R. and Connie C. Barlow, *The Natural Gas Industry: Evolution, Structure, and Economics*, Cambridge, MA: Ballinger Publishing Co. at 97 (1984).

Figure IX-2: The Natural Gas Industry in 1978.

b) Restructuring in the Natural Gas Industry

The restructuring of the natural gas industry has two interrelated components. First, the wellhead price of natural gas was deregulated starting in 1978. Then, steps were taken to restructure the pipeline market segment.

[34] *Id.* at 105.

[35] *Id.* at 110 *citing* Energy Information Administration, U.S. Department of Energy, *Gas Supplies of Interstate Natural Pipeline Companies 1978*, Washington D.C.: U.S. Gov't Printing Office (April 1980).

i) Wellhead Gas Price Deregulation

Proponents of competition argued that once the prices for wellhead natural gas were deregulated, the industry would have the incentive to increase its production and thereby resolve the existing gas shortage. Congress accepted this line of reasoning when it passed the Natural Gas Policy Act of 1978 (NGPA).[36] The NGPA called for step by step decontrol of wellhead prices. By 1983, gas shortages were replaced with gas surpluses and the need to further regulate wellhead gas prices was in doubt leading to an acceleration of the gas price deregulation, culminating with all remaining price controls being lifted in July, 1989, ahead of the schedule contemplated by the NGPA.

ii) Pipeline Deregulation

Gas pipeline companies have traditionally served a merchant function. They purchased gas at the wellhead, transported their own gas, and sold the gas to end users. Often the pipeline company entered into long-term contracts at both ends of the transaction to ensure adequate supply and demand. In the late 1970s and early 1980s, the prices were based on NGPA-regulated gas prices.[37] The gas pipeline system eventually became subject to bypass. To avoid the high prices charged by the pipeline companies, some large customers built their own pipelines and entered into separate gas contracts. Large customers also pursued discounts in lieu of leaving the system.[38] This practice left smaller users in a position of paying a growing share of the gas utilities' common costs.

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[36] *Id.* at 114 - 115.

[37] Gorak, Thomas C., "Assessing Consumer Welfare in a Restructured Gas Industry (FERC Orders 436, 500, 528, and 636) and LDC Restructuring Issues and Options," at 1 (presented at the 38th Annual Regulatory Studies Program on August 6, 1996).

[38] As discussed in Chapters III and IV, a similar process is taking place in the electric industry. Large industrial customers often have the option to leave the incumbent utility in favor of self-generation or co-generation. Utilities have responded by offering discounted rates in P.U.C. Docket No. 14435, *Application of Southwestern Electric Power Company for Approval of Agreement for Electric Service to Eastman Chemical Company*, Docket No. 14716, *Application of Texas Utilities Electric Company for Authority to Implement Rate WP1 to Lyntegar Electric Cooperative, Inc.*, and Docket No. 15133 *Application of Northeast Texas Electric Cooperative, Inc., Sam Rayburn G&T Electric Cooperative, Inc. and Their Ten Member Distribution Cooperative for Authority to Implement Industrial Competitive Rates.*

(a) FERC Order No. 436

In October 1985, the Federal Energy Regulatory Commission (FERC) Order No. 436 expressed the FERC's commitment to nondiscriminatory access to transportation in the gas industry.[39] Non-discriminatory access was based on the theory that it would:

- Assure that the benefits of competitively priced wellhead gas would reach the most people;
- Maximize throughput to the greatest number of customers; and
- Prevent pipeline companies from discriminating against potential customers.[40]

To achieve non-discriminatory access FERC Order No. 436 did the following:

- Required that pipelines offer firm and interruptible transportation service;
- Allowed firm sales customers to reserve pipeline capacity for gas purchased from a third party; and
- Allowed firm sales customers to reduce their purchase requirements of their current contracts.[41]

FERC Order No. 436 had the effect of converting pipeline companies into transport companies by requiring them to provide open access to all prospective shippers on non-discriminatory terms (similar to the open access and comparability provision of PURA95 §2.057 and P.U.C. SUBST. R. 23.67). Pipeline companies were not released from their obligations under existing long-term contracts to purchase natural gas at prices well above the newly deregulated wellhead prices. As a result, many pipeline companies faced substantial losses, commonly known as "take or pay" obligations.

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[39] Gorak, *supra* at 4. The FERC has expressed the same commitment to nondiscriminatory access to electricity transmission in FERC Order No. 888, Docket Nos. RM95-8-000 and RM94-7-001, *Promoting Wholesale Competition Through Open Access Nondiscriminatory Transmission Service by Public Utilities* and *Recovery of Stranded Costs by Public Utilities and Transmitting Utilities.*

[40] *Id.*

[41] *Id.* at 4 - 5. The portion of Order No. 436, *Regulation of Natural Gas Pipelines After Wellhead Decontrol*, FERC Stats. & Regs. ¶ 30,665 (1985), allowing firm customers to reduce their contractual demand obligations was vacated and remanded by the Court of Appeals for the District of Columbia.

(b) FERC Order No. 500

FERC Order No. 500,[42] issued in August of 1987, established a partial cost recovery mechanism for pipeline companies that allowed them to bill their customers for 0 percent to 50 percent of these "take or pay" costs if the shareholders agreed to absorb an equal percentage.[43] The remaining portion of take or pay costs could be charged as a commodity charge.[44] If a pipeline company agreed to these sharing mechanisms, it would avoid prudence reviews. Customers had the right to seek a prudence review, but if the pipeline company's investments were found to be prudent, the customer would be liable for 100 percent of their ratable share of the pipelines "take or pay" costs.[45]

The overall effect of the FERC Order No. 500 sharing mechanism was to guarantee recovery of up to 75 percent of the pipeline's "take or pay" costs without having to show that its actions were prudent. Although FERC Order No. 500 was modified numerous times, the general outline of the "take or pay" cost sharing mechanism remained intact.[46]

(c) FERC Order No. 636

Order No. 636[47] required pipeline companies to unbundle prices of services and offer services to customers on demand. Pipelines must offer firm and interruptible transportation service to all customers regardless of whether they buy natural gas supplies from the pipeline.[48] Remaining "take or pay" costs were allocated entirely to ratepayers.

[42] Order No. 500, FERC Stats. & Regs. ¶ 30,761 (1987).

[43] *Id.* at 6.

[44] *Id.*

[45] *Id.*

[46] *Id.* at 9. See e. g., Order No. 528, 53 FERC ¶ 41,163 (1990).

[47] Order No. 636, FERC Stats. & Regs. ¶ 30,939 (1992).

[48] Arkin, *supra* at 28.

c) Price Impact of Natural Gas Industry Restructuring

The natural gas industry restructuring is continuing.[49] To date, the gas industry restructuring has had a substantial impact on the gas industry and its customers. While there is disagreement as to the efficacy of particular steps taken to deregulate the natural gas industry, there seems to be some consensus that the restructuring has been a success. Pricing signals in the commodity gas market have arguably become more efficient with the advent of futures and option trading.

1. Real residential prices for natural gas decreased by 25 percent from 1984 to 1994.[50]
2. Real prices for industrial and utility customers decreased by 50 percent from 1984 to 1994.[51]
3. The natural gas system has remained safe and reliable.
4. Net environmental impacts have been positive as some customers opted for natural gas rather than coal.[52]

Others point out two potential defects with the natural gas industry restructuring. First, cost savings were not shared equally. Although the wellhead price of natural gas decreased by 25 percent after deregulation, the price to end users varied from a *33 percent decrease* to a *0.5 percent increase* for residential customers.[53] The lack of benefits to consumers has been viewed as a failure by state regulators to manage the flow-through of the benefits of increased wholesale competition. On the other hand, it is quite possible that without restructuring, more large customers may have bypassed the local distribution companies, shifting a greater share of fixed cost recovery onto

[49] For example, the Circuit Court for the District of Columbia has recently remanded for further consideration FERC's Order No. 528-A. Also, retail wheeling pilot programs are currently testing the feasibility of retail wheeling in the natural gas industry. The most ambitious of these programs is in Iowa. Wisconsin has recently approved a natural gas retail pilot project for eastern Wisconsin. Wisconsin PSC, "PSC Approves WGC Natural Gas Pilot: Customers Can Choose Suppliers," at URL: http://badger.state.wi.us/agencies/psc/new/gaspilot.htm, (July 27, 1996).

[50] Leitzinger, Jeffrey J. and Stephen R. Warwick, "Restructuring U.S. Power Markets: What Can the Gas Industry's Experience Tell Us?," Micronics, Inc. at 2.

[51] *Id.*

[52] Some observes argue that to the extent lower prices led to fuel switching from coal to natural gas, environmental impacts have been lessened.

[53] Hamrin, *supra* at 90.

smaller consumers. The impact of such a practice may have caused much larger increases in prices for small consumers, but could have led to lower consumer prices on goods produced from industrial plants.

3. The Airline Industry

The airline industry has been affected by deregulation, possibly more than any other industry. Airlines now have the freedom to choose the routes they serve and the prices they charge. This has led to expanded routes to some cities, a decrease in routes to other cities, and pricing that is more reflective of cost.

a) Airline Industry Prior to Restructuring

The Civil Aeronautics Board (CAB) began regulating the airline industry in 1938.[54] The general powers of that board over the airline industry included:

1. Controlling entry and exit of air carriers from the industry;
2. Regulating fares under the provisions of the Interstate Commerce Act;
3. Awarding subsidies to air carriers;
4. Reviewing mergers and intercarrier agreements;
5. Investigating deceptive and anticompetitive practices; and
6. Exempting carriers from the provisions of the Act.[55]

The CAB also regulated safety until the Federal Aviation Act of 1958 created a separate federal safety regulator, the Federal Aviation Administration (FAA).

Regulation of this industry focused on the safety of travelers, the need for service in markets throughout the country and the financial viability of airlines. Some opponents to airline restructuring argued that in a competitive environment, companies would have the incentive to cut safety-related costs, including maintenance.[56] Proponents

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[54] Bailey, Elizabeth, David R. Graham, and Daniel P. Kaplan, *Deregulating the Airlines*, Cambridge, MA: MIT Press at 11 (1985).

[55] *Id.*

[56] The argument concerning safety in a competitive market continues to plague the airline industry. In the aftermath of the ValueJet DC-9 crash in the Florida everglades on May 1, 1996, the issue of airline maintenance and cost-cutting by market competitors, especially new entrants, has become heated. See e.g., Bryant, Adam, "Crash Stirs Up Safety Debate In U.S. Agency," *New York Times* at 1, 12 (May 15, 1996).

counter this argument by pointing out that prior to the May 11, 1996, crash of a ValueJet DC-9, no entrant that became an air carrier after the 1978 deregulation had suffered a fatal airplane crash.[57] This issue is currently being debated in the U.S. Congress and at the FAA.

b) Airline Industry Restructuring

Some observers of airline deregulation point to two overarching problems with the regulated airline industry. First, rates were not reflective of costs. The rates promulgated by the CAB were based on the over land routes taken by railroads; however, technological innovations led to faster cruising speeds, higher altitudes, and more direct routes.[58] Second, the rigidity of the ratemaking process did not allow sufficient flexibility for airlines to adjust to fluctuations in demand caused by seasonal travel. Such adjustments would allow airlines to maximize their capital investment by filling a larger number of seats.

Others argued that the CAB helped assure service to small communities through its subsidy programs.[59] Beginning in the 1940s and early 1950s, these subsidized routes had been awarded to local service airlines that were not allowed to compete for non-stop service with the large, trunk airlines. It was, therefore, unclear whether the small service airlines would require subsidies if they were allowed to compete in large markets as well.

Another problem with the CAB regulatory procedures concerned its route award policies. Incumbent airlines had a significant advantage over new airlines because the CAB took into account the incumbent's proven track record and numerous connecting

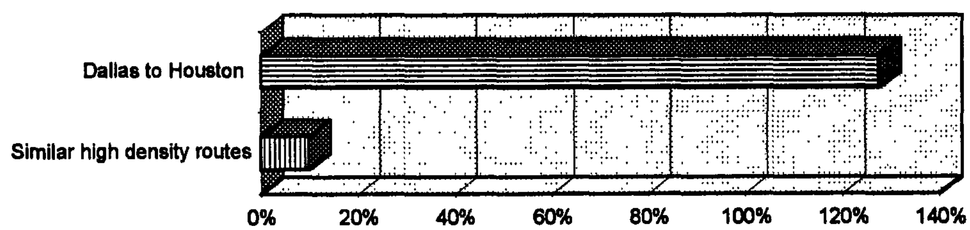
[57] Bryant, *supra* at 12.

[58] Based on similar complaints, the Staggers Act, 49 U.S.C. §10101 (1982) was enacted into law to facilitate the restructuring of the railroad industry. The primary goals of that act were promoting safety and efficiency, maintaining reasonable rates where there is an absence of effective competition, allowing, where possible competition and demand for service to establish reasonable rates, and providing for revenue enhancement for loads running at a loss. For a discussion of the restructuring of the railroad industry see Tye, *The Transition to Deregulation: Developing Economic Standards for Public Policies*, Quorum Books (1991).

[59] *Id.* at 13.

opportunities when awarding new routes.[60] Second, when seeking an award to serve a market already served by an incumbent, an applicant was required to show that its entry was in the public interest and would not harm the incumbent airline. Thus, if it appeared likely that the new entrant would erode the profits earned by the incumbent, approval of the application was unlikely.

As in the gas industry, pressures for restructuring arose from *intra*state competition. In Texas in 1971, Southwest Airlines (Southwest) began serving Dallas, Houston, and San Antonio. It offered innovative pricing strategies, encouraged high labor productivity with short out-and-back routes, and took advantage of the flexibility that came with not being regulated by the CAB. For example, Southwest Airlines (Southwest) was able to differentiate itself from other airlines by serving Houston's Hobby Airport, instead of Houston Intercontinental Airport. Southwest and other intrastate carriers in Texas and California offered prices lower than those of CAB regulated airlines, maintained quality service, and earned profits.[61] Figure IX-3 shows that the Dallas to Houston route experienced traffic growth far greater than that of city pairs with similar density routes. Moreover, with its lower prices, as demonstrated by Figure IX-4, Southwest helped foster increasing demand for passenger service.



Source: Bailey, Elizabeth, David R. Graham, and Daniel P. Kaplan, *Deregulating the Airlines*, Cambridge, MA: MIT Press at 28 (1985).

Figure IX-3: Traffic Growth for High Density Routes: 1970-1974

[60] *Id.* at 12.

[61] *Id.* at 27 - 29.

c) The Airline Industry After Restructuring

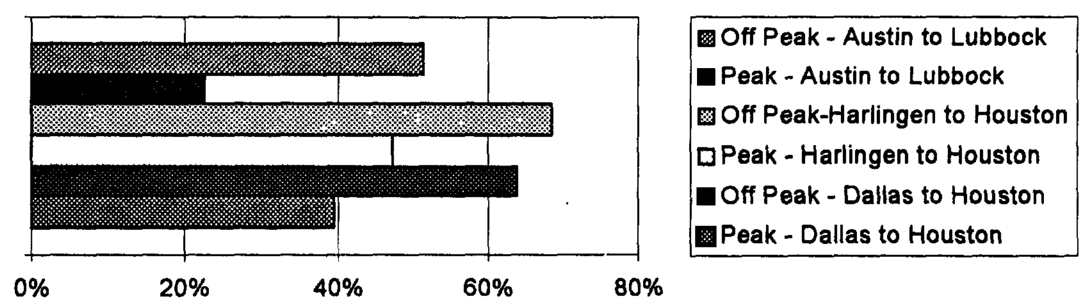
The airline industry was profoundly changed by restructuring. Administrative oversight was lessened allowing flexible pricing policy by airlines. Once the Airline Deregulation Act was enacted, all route and fare regulation began to be phased-out.

i) Administrative Reform Prior to the Airline Deregulation Act

Restructuring of the airline industry began with administrative reform. Beginning in 1976 and increasing the following year with the appointment of pro-competition economist Alfred Kahn to the CAB, the CAB adopted a more flexible approach to regulation.[62] Some of the steps taken by the CAB included:

1. Board approval of discount fares;
2. Granting permissive routes allowing companies to enter and exit certain routes without CAB approval; and
3. Proposing giving carriers authority to reduce fares and eliminate restrictions on charter operations.

These reforms helped lead to the first reduction in interstate air fares, in current dollars, since 1966.



Source: Bailey, Elizabeth, David R. Graham, and Daniel P. Kaplan, *Deregulating the Airlines*, Cambridge, MA: MIT Press at 28 (1985).

Figure IX-4: Rates of Southwest Airlines - Percentage Below CAB Rates

[62] *Id.* at 33.

ii) Airline Deregulation Act

Similar to the deregulation of wellhead prices for natural gas under the NGPA, the Airline Deregulation Act (ADA) phased out route and fare regulation.[63] The remaining functions of the CAB were slowly moved to other agencies, and the CAB ceased operations on January 1, 1985.

The ADA also provided consumer protections during the transition. It established notice procedures for airlines wishing to terminate service to a particular community and created the Essential Air Service Program to ensure air service to local communities while subsidies were phased out.

d) Effects of Airline Industry Restructuring

The deregulation of the airline industry has had profound effects on the way air services are supplied to customers. Specifically, airlines modified the routes they fly to maximize their load factor, and the market structure changed substantially with the advent of mergers and bankruptcies.

i) Hub-and-Spoke Operations

One of the most recognizable changes in the airline industry since restructuring is the development of "hub-and-spoke" operations.[64] Under this route structure, passengers travel on a densely traveled route to a hub airport, then take a connecting flight to their final destination. By concentrating passengers with different destinations on one flight, airlines have been able to increase their load factors, thereby lowering their costs per passenger.[65] Figure IX-5 shows the traffic growth achieved by American Airlines at DFW Airport and Continental Airlines at Houston Intercontinental Airport after these airlines began using the airports as hubs.

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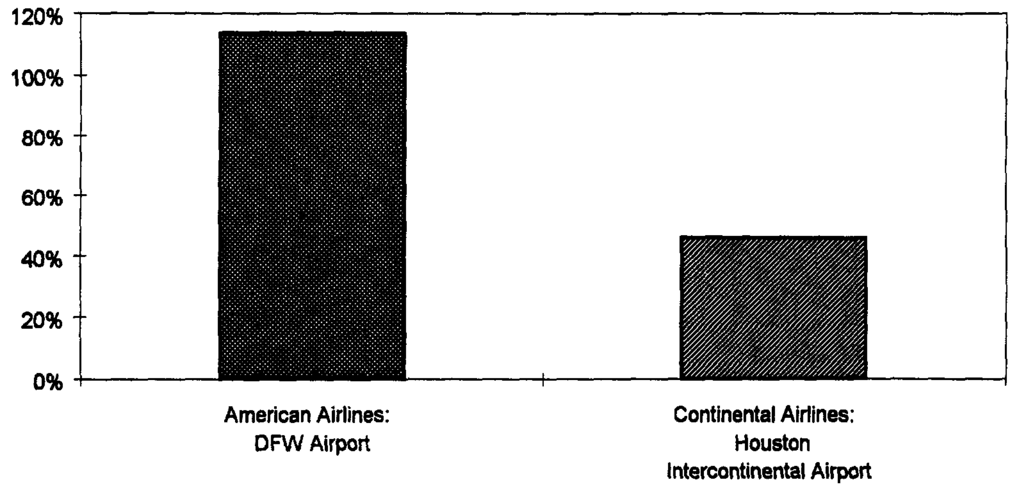
[63] See generally *Id.* at 34 - 37 for a discussion of the Airline Deregulation Act.

[64] *Id.* at 74.

[65] *Id.*



Source: Bailey, Elizabeth, David R. Graham, and Daniel P. Kaplan, *Deregulating the Airlines*, Cambridge, MA: MIT Press at 79 (1985), taken from CAB Report to Congress on Implementation of Deregulation Act.

Figure IX-5: Traffic Growth 1978 - 1983 for Texas Hubs

ii) Market Volatility

Market volatility in the airline industry has led to increasing market concentration. There were over 50 mergers, acquisitions, and consolidations during the first decade of competition.[66] Once the merger and acquisition activity diminished, the industry appeared more highly concentrated than before deregulation. From 1978 to 1991, the combined market share of the four largest airlines rose from 57.7 percent to 63.9 percent.[67] Table IX-2 shows the U.S. airlines flying in 1991 and the airlines that were combined to produce each.

[66] Dempsey, Paul S. and Andrew R. Goetz, *Airline Deregulation and Laissez-Faire Mythology*, Quorum Books at 13 (1992).

[67] Williams, George, *The Airline Industry and the Impact of Deregulation*, Brookfield, VT: Ashgate Publishing Co. at 61 (1993). Market share is measured by revenue passenger miles.

Table IX-2: U.S. Airlines in 1991 and the Airlines Combined to Create Them

Airlines in 1991	Airlines Incorporated Into the Existing Airline Since Deregulation
American	American and Air California
America West*	America West
Continental	Continental, Texas International, Frontier, and People Express*
Delta	Delta and Western
Northwest	Northwest Orient, Hughes Airwest-Republic, Northcentral, and Southern
Pan Am	Pan Am and National
Southwest	Southwest
TWA	TWA and Ozark
United	United and Air Wisconsin
US Air	USAir (formerly Allegheny), Pacific Southwest, and Piedmont
Alaska	Alaska and Jet America*
Horizon*	Horizon
Aloha	Aloha
Hawaiian	Hawaiian
Markair	Alaska Int. Air
Midway	Midway
Midwest Express*	Midwest Express
Trump Shuttle*	Trump Shuttle
West Air	West Air

Note: * indicates airlines that began doing business after the enactment of the Airline Deregulation Act.
Source: Williams, George, *The Airline Industry and the Impact of Deregulation*, Brookfield, VT: Ashgate Publishing Co. at 42 (1993).

Some observers have argued that the degree of concentration in the airline industry may reduce the benefits received by passengers of deregulation. As has been argued about the long distance telecommunications market, airline concentration may have prevented prices from accurately reflecting costs.[68]

iii) Consumer and Economic Welfare

The provision of airline services has been affected in three major ways by airline deregulation. Customers have had access to discount fares as airlines attempt to price discriminate among consumers. Airlines have realized cost reductions, use of airline services has increased, and small community service has continued but in a manner that differs from the regulated industry.

[68] Dempsey, *supra* at 345 - 347.

(a) Price Discrimination

Since deregulation, the airlines have developed methods for price discrimination between customer classes. They have imposed a two-tier pricing structure in which travelers with few alternatives—particularly business travelers— pay higher prices, while more flexible passengers—primarily leisure travelers—pay less.[69] Lower prices are often available for reservations made in advance. From 1981 to 1985, discounted traffic, as a percentage of total traffic, increased from 70.6 percent to 90.5 percent, and the average discount increase was from 46.2 percent to 66.5 percent.[70]

(b) Cost Reductions

Since deregulation, the airlines have been able to reduce costs in two primary areas:

- Reduced employment costs; and
- Restructured route system.

Reductions in airline industry labor costs have, at times, been substantial. Continental, for example, reduced its unit labor costs by 36 percent (labor costs per passenger-mile).[71] Most of Continental's cost savings were achieved by replacing unionized employees with a non-union work force.[72] Other airlines reduced their labor costs by increasing productivity and/or adopting two-tiered wage scales, paying new employees less than existing employees.[73]

The hub-and-spoke system created the second category of cost savings. Hub-and-spoke networks allow airlines to take advantage of economies of scale. For example, airlines can carry passengers on the same plane who have different final destinations, thereby, achieving load factors on routes leaving a hub 5 to 10 percent higher than

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[69] This phenomenon is measured by economists by measuring the relative elasticity of demand, i.e. the percentage decrease in demand realized by a percentage increase in price.

[70] Air Transportation World, March, 1990 at 148. The phenomenon of high standard rates with substantial discounting programs is also seen in the long distance telecommunications market.

[71] Williams, *supra* at 52.

[72] *Id.*

[73] *Id.*

otherwise.[74] When a network can be utilized in a way that reduces the number of empty seats on a plane, all other things being equal, there will be a reduction in per passenger costs.

One method for determining the cost reductions (efficiency gains) from deregulation of the airline industry is to compare the productivity of the United States airline industry since deregulation to airlines in other countries which continue to regulate them. At least one study shows that productive efficiency in the United States has *increased* by 13.33 percent annually from 1975 to 1983 while it *decreased* by 39.77 percent annually outside of the United States over the same time frame.[75] Table IX-3 shows the average annual efficiency gain in the United States and outside the United States before and after deregulation.

Table IX-3: Average Annual Efficiency Gains In the Airline Industry

	Prederegulation—1970 to 1975		**Postderegulation—1975 to 1983**	
	U.S.	**Non-U.S.**	**U.S.**	**Non-U.S.**
Operating Efficiency	1.8	3.1	2.2	2.0
Technical Efficiency	1.2	1.4	1.1	0.8
Total Productive Efficiency	3.0	4.5	3.4	2.8

Source: Caves, Richard E., "An Assessment of the Efficiency Effects of U.S. Airline Deregulation via an International Comparison," *Public Regulation*, Cambridge, MA: MIT Press at 304 - 305 (1987).

(c) Small Community Service

Of particular concern in all deregulated industries is access to the network for small, often rural, communities. Under regulation, certificated carriers required CAB approval before they could cease service to a particular community. After the passage of the ADA, airlines were able to serve those communities that met the company's business plan. In the first five years after deregulation, 95 non-hub communities lost air

[74] *Id.* at 18.

[75] Caves, Richard E., "An Assessment of the Efficiency Effects of U.S. Airline Deregulation via an International Comparison," *Public Regulation*, Cambridge, MA: MIT Press at 304 - 305 (1987).

service.[76] Many more communities are served by only one airline. For communities in which service is provided by only one or a few carriers, concerns remain about the potential for monopoly behavior, which rate regulation was intended to overcome.

e) Character of Existing Regulation in the Airline Industry

The airline industry is no longer subject to economic regulation. However, the Federal Aeronautic Administration (FAA) continues to regulate safety issues. The Department of Justice continues to have antitrust authority over the industry.

B. Electricity Restructuring in Other Countries

Utility restructuring has been discussed as a method for lowering prices and improving service quality in nearly every region of the globe. This section discusses restructuring activities in the United Kingdom, Norway, Chile, Argentina, Australia, Spain, and Brazil. Most of these countries engaged in a two-step process. First, the electric sector was privatized by selling some or all of the state-owned industry to private interests. Second, each country implemented market rules instituting methods for competition in the generation market, comparable transmission pricing, and delivery of power to end users.

1. Not All Lessons will Apply to Texas

Although a number of nations have recently engaged in electric restructuring, the experiences of other nations will not always be applicable to the restructuring issues in Texas. In particular, lessens from other countries may be limited because of institutional and social structures unique to that nation and the structure of that country's existing electric utility industry.

a) Social Structure

A country's political and social institutions can partially determine what regulatory structures are best for that nation.[77] For example, if a country's legal structure does

[76] Morrison, Steven, *The Economic Effects of Airline Deregulation*, Washington D.C.: The Brookings Institution at 47 (1986).

[77] Levy, Brian and Pablo T. Spiller, "The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation," *The Journal of Law, Economics, & Organization*, Vol. 10(2) at

not have a history of supporting property rights and requiring just compensation when private property is used for public purposes, a "taking" will result. Private industry will be less likely to invest in that country even if the country promotes competitive markets.[78] India is a prime example of the influence of political structure in electric industry restructuring. While still in power, the Hindu nationalist government endorsed Enron's construction of an electric generating plant.[79] This endorsement triggered protests from India's lower house of parliament.[80]

b) Industry Structure

Restructuring alternatives can also be affected by a country's existing industry structure. In the United States, the transmission grid is decentralized with varying degrees of regional control throughout the country. This fact may affect the design of industry alternatives in light of the goal to maintain reliable service. Due mainly to its geography, Chile has two distinct transmission grids. England had a *centralized* national grid prior to initiating its restructuring efforts.[81] In most of the countries that have restructured their industries such as Chile, the United Kingdom, and Norway, the government owned most or all of the electricity generation capacity prior to privatization. Thus, restructuring in those countries included the additional complications of privatization.

2. Restructuring in the United Kingdom

The comparative analysis of international restructuring begins with the United Kingdom, with special focus on England, for a number of reasons.

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201 - 243 (1994) The authors derived their information from studies of the World Bank project "Institution, Regulation and Economic Efficiency."

[78] *Id.* at 240.

[79] "Indian Government OKs Enron Plant," *Houston Chronicle* at C-1 (May 28, 1996). For an article that deals with the effect of domestic institutions on electric industry restructuring, see Salgo, Harvey, "India Faces Restructuring: The Need is With the States," *The Electricity Journal* at 56 - 62 (March 1996).

[80] *Id.* The government that replaced the Hindu nationalists eventually approved the Enron plant in July of 1996. See "Enron Group's India Plant OK'd," *Houston Chronicle* at C-1 (July 10, 1996).

[81] Littlechild, Stephen, "Competition, Monopoly, and Regulation in the Electric Industry," *From Regulation to Competition: New Frontiers in Electricity Markets*, Norwell, MA: Kluwer Academic Publishers at 125 - 126 (1994).

- England is the largest country to substantially restructure its industry to a more competitive model.
- England has been the focus of the most in-depth economic and policy assessments of restructuring.
- The social and political structure in Britain is arguably most similar to that in the United States when compared with the other nations that have restructured their electric industry.

a) Structure of the Electric Industry in Great Britain

Prior to 1990, a state-owned monopoly owned the generation, transmission, and distribution assets in England and Wales. The first step in the British restructuring process involved privatizing the vertically integrated electric industry. The structure of the restructured British electric industry is shown in Figure IX-6. The state-owned industry was split into separate generation, transmission, and distribution functions. The distribution function was transferred to twelve Regional Electricity Companies (RECs). The RECs were then made public. The transmission function was transferred to the National Grid Company (NGC), which is indirectly owned by the twelve RECs. The NGC was divorced from virtually all generation, and Independent Power Producers (IPPs) were given access to the transmission grid. The government-owned generation assets were divided among three companies:[82]

- *National Power*: a private company owning approximately 50 percent of the generating capacity in England and Wales;
- *PowerGen*: a private company owning approximately 30 percent of generating capacity; and
- *Nuclear Electric*: a public entity owning approximately 15 percent of generating capacity, primarily the nation's nuclear-powered generators.[83]

Because Britain established open access to its transmission grid, power producers outside of England, such as Scottish Power, Scottish Hydro Electric, and Electricite de France, may participate in the British electric industry.

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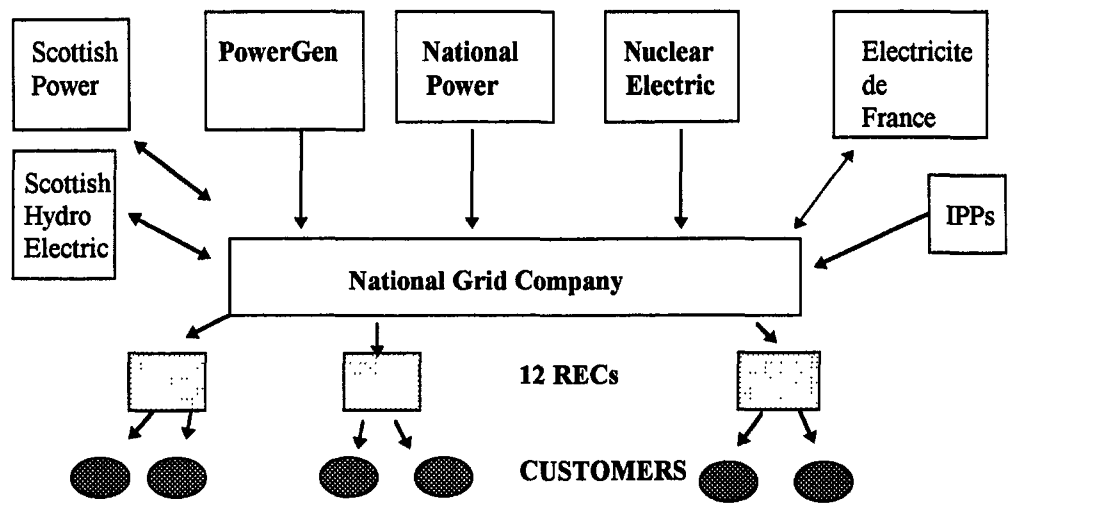
[82] *Id.* at 126 - 128.

[83] Hamrin, *supra* at 57.



Source: Littlechild, Stephen, "Competition, Monopoly, and Regulation in the Electric Industry," *From Regulation to Competition: New Frontiers in Electricity Markets*, Norwell, MA: Kluwer Academic Publishers at 127 (1994).

Figure IX-6: British Electric Industry After Restructuring

Britain created a centralized pool structure for power transactions.[84] Under the British pool model almost all power generated by plants with at least 100 MW of capacity must be bid into the power pool. All power bid into the pool is subject to central dispatch by the NGC. Sellers offer to supply power at a bid price, and buyers bid their electricity needs. The pool system operator dispatches the requested power to buyers in order from the lowest supply bid to the highest bid necessary to meet demand. The marginal bid, i.e., the bid for the last unit needed to balance supply and demand, sets the pool price to be paid to all generating units dispatched by the pool for that hour.[85] An uplift charge is added to the pool marginal price to compensate generators for services necessary to maintain the stability of the system.[86] The pool serves many functions in the British system including:

[84] For a detailed discussion of Britain's power pool see Green, Richard "Britain's Unregulated Electricity Pool," *From Regulation to Competition: New Frontiers in Electricity Markets*, Norwell, MA: Kluwer Academic Publishers at 73-96 (1994).

[85] *Id.* at 92 - 94.

[86] Littlechild, *supra* at 75.

- *Ordering of bids*: The pool orders the supply bids from lowest to highest.[87]
- *Provision of transparent pricing for short term contracts*: The pool price gives parties a starting point for negotiations on private contracts, so called, "contracts for differences."
- *Equal market access for all generators regardless of size*: The British pool gives small generators equal access to customers that may not have been available in a vertically integrated market.[88]

The British system also provides a mechanism for managing risks. Contracts for differences, akin to futures contracts, allow parties to enter into stable long-term contracts. The parties agree to a given price and make side payments to each other covering the difference between the pool price and the contract price.[89]

As part of the privatization program, the British government imposed price controls on the transmission and distribution companies. These controls are based on a price index minus an efficiency factor (a price cap).[90] Since privatization, the utility regulator has been able to increase the efficiency factor across the board causing the real cost of transmission and distribution services to decline. Some critics have argued that improvements in operational efficiency are not applicable to restructuring in the United States because Britain's electric industry was far more inefficient before privatization than is the United States' industry today.[91]

b) Impact of Britain's Restructured Electric Industry

There have been three major impacts resulting from Britain's restructuring. They are in the areas of productivity, prices, and market concentration.

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[87] Green, *supra* at 92 - 94.

[88] See, e.g. Hamrin, *supra* at 58.

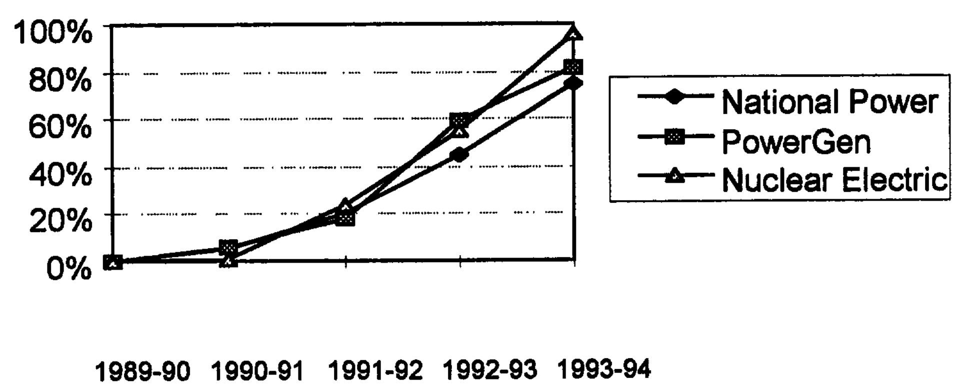
[89] Einhorn, Michael and Riaz Sidiqi, *From Regulation to Competition: New Frontiers in Electricity Markets*, Norwell, MA: Kluwer Academic Publishers at 3 (1996).

[90] The simplified formula used in Britain is "RPI - X," where "RPI" is the relevant index and "X" is the efficiency factor.

[91] Yarrow, George, "Power Sector Reform in Europe with Special Reference to Britain and Norway;" Presentation to the TPUG group, ASSA meetings, Oxford University (January, 1995).

i) Productivity Improvements

The British restructuring was designed to improve productivity by subjecting the industry to market forces where possible and providing price cap incentive regulation to that portion of the industry that remained regulated. Figure IX-7 shows the annual productivity improvements for National Power, PowerGen and Nuclear Electric from 1989 - 90 to 1993 - 94, for example, from 1989 - 90 to 1992 - 93, PowerGen's labor productivity increased by 60 percent. Since restructuring in 1990, there have been dramatic improvements in productivity. Prior to restructuring, labor productivity increased at an average rate of 3.5 percent.[92] Since restructuring, generating companies have realized improvements in labor productivity well in excess of that rate.



Source: Yarrow, George, "Power Sector Reform in Europe with Special Reference to Britain and Norway;" Presentation to the TPUG group, ASSA meetings, Oxford University (January, 1995).

Figure IX-7: Labor Productivity in Britain's Major Generating Companies (1989 - 90 through 1993 - 94)

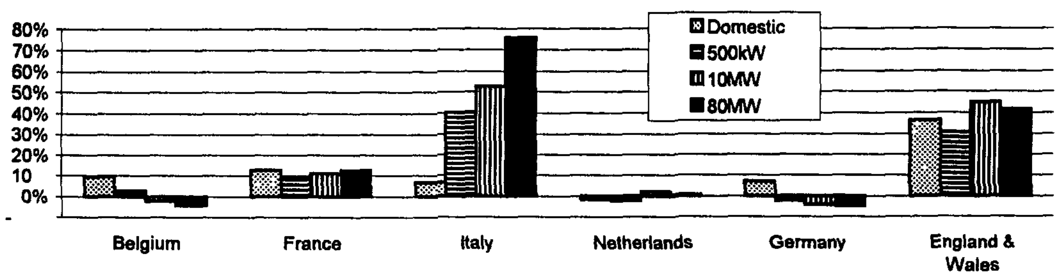
Nuclear Electric's improvement in labor productivity, in part, reflects the improved operational performance of its reactors. The improvements of National Power and PowerGen, in part, reflect the closures of older, less efficient plants. As in the airline industry, a large portion of the efficiencies reflects a reduction in employment levels.

[92] *Id.*

Although not as substantial, the sectors that remained regulated also achieved productivity improvements.[93]

Further productivity improvements may be obtained as new generation comes on line. Since privatization 22,000 megawatts of new generating capacity are under contract, mostly combined-cycle gas turbines.[94] Construction of at least three coal plants has been canceled.[95] Much of the new generating capacity will be owned directly, or indirectly by the 13 regional distribution companies.

ii) Impact on Prices



Source: Yarrow, George, "Power Sector Reform in Europe with Special Reference to Britain and Norway;" Presentation to the TPUG group, ASSA meetings, Oxford University at 17 (January, 1995) from *Power in Europe*, No. 178: Financial times, July 1994.

Figure IX-8: Nominal Percentage Increase in Electricity Prices from Period 1987-1988 to 1993 - 1994

There are no clear signs of the impact of restructuring on electricity prices. Figure IX-8 shows that in nominal dollars, electricity prices in England and Wales increased faster than other countries in the European Union, except for Italy, from 1987 - 1988.[96] However, from 1990 - 1991 to 1994 - 1995, real electricity prices in England have fallen for residential, commercial and industrial customers, as shown by Table IX-4.

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[93] *Id.* at 15. Employment levels fell by approximately 13 percent for the transmission company, as compared to over 30 percent for the generation companies.

[94] Einhorn, *supra* at 4.

[95] *Id.*

[96] Yarrow, *supra* at 17 citing "Power in Europe," No. 178, *London: Financial Times*, July 1994.

Table IX-4: Electric Bills in England and Wales From 1990-1991 to 1994-1995

Customer Class	Typical Bill 1990-1991	Typical Bill 1994-1995	Real Change
Residential	$ 462	$ 450	-2.7 %
Commercial	21,878	21,608	-1.2
Industrial	265,355	260,246	-1.9

Source: Brower, Michael C., Stephen D. Thomas, and Catherine Mitchell, *The British Utility Restructuring Experience: History and Lessons for the United States*, The National Council on Competition and the Electric Industry at 12 (October 1996).

Note: Dollar amounts are 1994 U.S. dollars. Residential consumers are assumed to consume 3,300 kWh a year. Commercial consumers are assumed to demand 100 kW, have a load factor of 20 percent, and an annual load of 175,200 kWh. Industrial consumers are assumed to demand 1,000 kW, have a load factor of 30 percent, and an annual load of 2,628,000 kWh.

It is unclear at this time the extent to which electricity prices in Britain are affected by the concentration of generating capacity. What is clear from Table IX-5 is that the profitability of power generators has increased dramatically since privatization, suggesting that generating companies are not being pressured by the marketplace to cut prices as costs are cut. This result suggests that the concentration of generating capacity may enable these generators to exercise market power to obtain excess profits.

Table IX-5: Revenues and Profits of Generating Companies in the United Kingdom

Company		1989 - 1990 (million current-year dollars)	1994 - 1995 (million current-year dollars)
National Power:	Revenue	$ 6,277	$ 6,206
	Profit	279	1,107
PowerGen	Revenue	4,095	4,529
	Profit	367	865
Nuclear Electric:	Revenue	3,231	4,536
	Profit	-1,457	1,677

Source: Brower, Michael C., Stephen D. Thomas, and Catherine Mitchell, "The British Utility Restructuring Experience: History and Lessons for the United States," The National Council on Competition and the Electric Industry" at 12 (October 1996). Information on generating companies was obtained from annual reports and accounts of the companies.

Note: Profits are pretax. Nuclear Electric's profits were calculated after including the fossil fuel levy (transition charge). Conversions incorporate an exchange rate of one pound to $1.57.

iii) Market Concentration

As discussed previously, privatization awarded approximately 80 percent of the competitive generating capacity in Britain to National Power and PowerGen. Although the level of concentration declined to about 60 percent, it appears that this concentration led, at least initially, to manipulation of the power pool price.[97]

Privatization and open access to the transmission grid have allowed new competitors into the British electricity market. Independent power producers have been able to market power through the pool system, and open access to transmission has allowed Scottish power producers to increase their exports into England providing additional competition in the British market. The true level of expanded competition is unclear; however, because many of the new generating investments in England are owned by the regional energy distribution companies.[98]

There is a potential for the manipulation of pool prices in a restructured electric industry in Texas. Although Texas has many more electricity generators already serving the state than the three major independent operators established in Great Britain, two firms control approximately 60 percent of the generating capacity in ERCOT.[99]

Vertical integration is also an issue in Britain's restructured electric industry. Although the large generating companies were separated from the RECs, the RECs may acquire generating capacity up to 15 percent of their supply needs. Many of the RECs have added generating capacity in order to reach the 15 percent maximum. Moreover, National Power, PowerGen, and Scottish Power have all won bids to acquire RECs.[100]

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[97] *Id.* at 10. The Regulator in Britain determined that PowerGen intentionally declared certain plant not available having the effect of increasing the potential loss of load. The higher potential loss of load increased the amount of capacity payments. On the day of service, it would redeclare this capacity and received uplift payments. In 1992, the Regulator's pool price inquiry, determined that PowerGen and National Power were inflating their bids. With the inflated bids, they were able to raise the pool price. See Littlechild *supra* at 132 - 137.

[98] See e.g., Thomas, Steve, "Electric Reform in Great Britain: An Imperfect Model," *Public Utilities Fortnightly* at 23 (June 15, 1996).

[99] See Chapter XII of this report discusses market power issues in a restructured Texas electric industry.

[100] Brower, Michael C., Stephen D. Thomas, and Catherine Mitchell, *The British Utility Restructuring Experience: History and Lessons for the United States*, The National Council on Competition and the Electric Industry" at 19 (October 1996).

The acquisitions by National Power and PowerGen are being reviewed by the Minister of Trade and Energy.

Horizontal integration is also an issue. Two water companies have already bid for RECs.[101] It is not clear at this time whether the movement towards further vertical and horizontal integration will impair or assist productive efficiency.

3. Norway

The electric restructuring effort in Norway is illuminating for several reasons. Unlike Britain, it did not create a formalized pool, nor did it privatize the industry. Of particular interest, Norway made retail competition available to everyone at one time without a phase-in period.

a) Electric Industry Prior to Restructuring

Norway began its restructuring effort in 1991 with the enactment of the Norwegian Energy Act. In Norway, various government entities owned most of the components of the electric industry. The state-owned utility controlled 30 percent of the electricity generation capacity and 85 percent of the transmission capacity.[102] Municipalities owned approximately 55 percent of the generating capacity and most distribution facilities.[103] Hydroelectric plants account for most of the electricity in Norway.[104]

There were a number of perceived inefficiencies in the existing electric industry. Municipalities tended to over-build generating capacity, rather than purchase power to meet their obligations to serve, leading to excess capacity and investment.[105] Price

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[101] *Id.*

[102] Westre, Einar "Transmission Pricing in Norway," *Electricity Transmission Pricing and Terminology*, Norwell, MA: Kluwer Academic Publishers at 230 - 234 (1996).

[103] Moen, "Regulation and Competition Without Privatization: Norway's Experience," *The Electricity Journal*, Vol. 9(2) at 45 (March 1996); Westre at 230.

[104] Westre, *supra* at 230.

[105] Moen, *supra* at 38.

discrimination in large cities favored residential customers and distribution companies were viewed as operating inefficiently.[106]

b) Restructuring Norway's Electric Industry

The object of the restructuring effort in Norway was to use competition, among other goals, to even out the costs of power among regions, to make generation more efficient, and to have investment reflect the willingness of end users to pay for power and reliability.[107] Norway structurally separated the transmission functions from the generation function.[108] Transmission and distribution remained regulated, while generation and retail sales were opened to competition.

Norway took a number of steps in opening its electric markets. First, monopoly franchises were withdrawn for both generation and retail sales.[109] Existing contracts were honored, but the new operating environment led many parties to renegotiate contracts. Retail access was introduced for all customers at one time.[110] Norway did not incorporate a phase-in period, as is contemplated in the United States by California, Michigan, Pennsylvania, and Rhode Island.

In contrast to Britain, a three-tiered wholesale market has developed in Norway. The wholesale market includes a short-term power pool, a financial futures market, and a long-term bilateral contract market.

Norway also instituted a pricing strategy different than Britain. In Britain, the Regulator instituted a price cap. In Norway, the regulatory body identifies certain regulatory goals, and the utilities offer tariffs consistent with those goals.[111] This deference to the transmission and distribution utilities in Norway may have arisen because most of these utilities remain government-owned.

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[106] *Id.*

[107] *Id.* at 39.

[108] Westre, *supra* at 230 - 231.

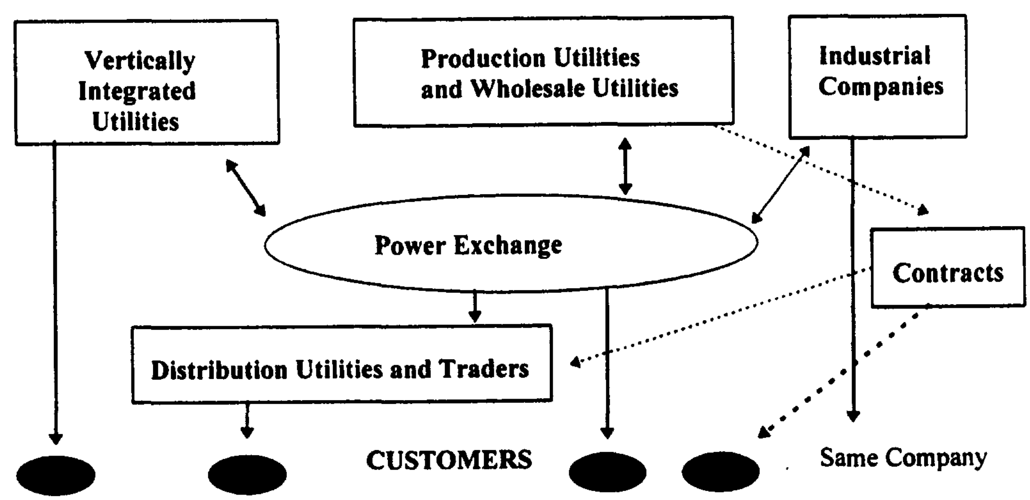
[109] Yarrow, *supra* at 5.

[110] Moen, *supra* at 38.

[111] Yarrow, *supra* at 8.

c) Norway's Electric Industry After Restructuring

The Norwegian restructuring focused on power transactions, with only a secondary focus on market structure. It focused on open access transmission and authorized retail wheeling; however, unlike Britain, government-owned companies continue to play a dominant role in Norway's restructured electric industry. Statnett SF, a government-owned entity, owns a substantial portion of Norway's transmission capacity as well as the Norwegian power pool.[112] Statkraft SF, Norway's largest generating company, is also state-owned.[113] Municipalities continue to own most of Norway's distribution network.[114]



Source: Adapted from http://odin.dep.no/html/nofovalt/depter/noe/publ/fact94/kapo8.htm

Figure I-9: Norwegian Electric Industry After Restructuring

[112] Westre, *supra* at 230.

[113] *Id.*

[114] *Id.*

Compared to the British experience, the power pool plays a smaller role. In 1993, for example, only about 17 percent of power sales were traded in Norway's pool.[115] The remaining sales were conducted through bilateral contracts. Figure IX-9 shows the various ways in which power is traded in Norway. It demonstrates that power producers have the option to trade power through the power exchange or to transact directly with end users, and utilities, independent power producers, and industrial companies that produce excess power may all trade power through the power exchange.

d) Effect of Restructuring in Norway

To date, the Norwegian restructuring effort appears to have been successful at reducing consumer prices below those from the regulated system. Although its 1995 wholesale and retail price surveys showed some price increases, that survey followed the 1993 and 1994 price surveys that demonstrated falling prices in most areas.[116] The 1993 and 1994 surveys showed substantial declines at the wholesale level and declines at the retail level for commercial and residential customers, albeit a lesser reduction for residential customers.[117]

4. Other International Developments

Electric industry restructuring is occurring in many nations around the world; restructuring is not limited to North America and Europe. Chile and Argentina have privatized most of their electric industry. Other South American countries are also selling generating facilities to the private sector.[118] In Asia, the Philippines, Malaysia, and Indonesia are all looking toward the private sector for investment.[119]

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[115] *Id.*

[116] Moen, *supra* at 45.

[117] *Id.* at 44.

[118] Brazil and Bolivia have sold much of their generating assets to the private sector. See Lalor, R. Peter and Hernan Garcia, "Reshaping Power Markets: Lessons From South America," *The Electricity Journal*, Vol. 9(2) (March 1996).

[119] Roseman, Elliot ant Anil Malhotra, "Independent Power: Global Agent of Change," *The Electricity Journal*, Vol. 9(2) at 21 (March 1996).

a) Chile and Argentina

Chile was the first country to move toward a more competitive electric industry, as early as 1980.[120] Chile's electric sector consists of two geographically separated electricity grids. The Chilean restructuring included a number of structural elements discussed in this report, such as privatization, open access to transmission facilities, Poolcos, retail wheeling, virtual retail access,[121] and application of marginal/incremental cost principals.

i) Restructuring Chile's Electric Industry

Along with privatization, Chile instituted three mechanisms to foster competition:

1. Large customers were allowed to contract with any generator or distribution company.
2. The regulated price paid by small customers was linked to the market price (*virtual* retail access).
3. Market prices are used to signal decisions concerning new generation projects by allocating risk to the generating company, not the customer.[122]

Chile also took a number of additional steps to restructure its electric sector, including:

- Creating requirements regarding resource concessions for renewable resources;
- Requiring environmental permits for new generation;
- Requiring open access transmission while continuing to treat transmission as a monopoly; and
- Unbundling the distribution sector into a "wires" segment and a "supply" segment. The wires segment remained regulated as a monopoly subject to open access requirements, while the supply portion was opened up to competition.[123]

To give correct pricing signals concerning the need for additional capacity, generators participating in the pool receive capacity payments as well as an energy capacity

[120] Lalor, *supra* at 64.

[121] See the following section on California for a discussion of "virtual retail access."

[122] Lalor, *supra* at 64 - 65.

[123] *Id.* at 67 - 68.

payment. The capacity payment, which is similar to the uplift charge in the British system, is an adjusted *pro rata* payment to all generators to the extent that there is an over- or under-supply of capacity.[124] When there is an under-supply, the payment is larger providing an additional incentive for companies to create new generation capacity.

The greatest potential weakness of the Chilean restructuring has been the opportunity for both vertical and horizontal market concentration. The Chilean plan did not restrict cross-ownership of assets in different market segments.[125] As a result, one of the two Chilean power pools, the SIC, has been dominated by one company, which owns or controls all of the transmission capacity serving the SIC, much of the generation capacity in the SIC, and is also the largest distribution company in the country.[126]

ii) Restructuring Argentina's Electric Industry

Argentina's privatization followed in the 1990s with the benefit of monitoring the steps taken in neighboring Chile. Its electric industry also suffered problems distinct from those in Chile, as well as Britain and Norway, particularly due to the condition of the electric industry infrastructure. Prior to restructuring, the Argentine electric industry required substantial upgrades to improve reliability and safety.[127] Moreover, the Argentine industry failed to make the investments necessary to improve its system or increase generating capacity as the need arose.[128] By restructuring its industry, Argentina hoped to attract greater foreign investment.[129]

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[124] *Id.* at 66.

[125] *Id.* at 65.

[126] *Id.* at 65. The SIC includes approximately four MW of capacity, 75 percent hydro and 25 percent thermal. *Id.* at 70. Market concentration is also an issue in Brazil. In Brazil, the two largest generating companies, Electrobras and Itaipu, own 38 percent and 24 percent of the Nation's generating capacity.

[127] Friedland, "Utility Deregulation in Argentina Presages Possible U.S. Upheaval," *Wall Street Journal* (June 19, 1996) at. A-1. Prior to restructuring, Argentina suffered from a proliferation of blackouts, illegal electricity hook-ups, and nonpayment of electricity bills.

[128] Infrastructure needs appear to be the driving force in Brazil's electric industry restructuring, as well. For a discussion of Brazil's restructuring efforts see Nolan, "The Brazilian Beat: Orchestrating Investments to Match Restructuring," *Electrical World* at 51 - 53 (July 1996).

[129]Friedland, *supra 127* at A1. Argentina's restructuring succeeded in attracting substantial foreign investment: AES Corp. of Arlington, Virginia and CMS Energy Corp. of Dearborn, Michigan paid $66 million to purchase a

iii) Structural Separation

Argentina borrowed a number of Chile's reforms including open access to wholesale generators and a power pool with least-cost, centralized dispatch.[130] Argentina also made modifications in response to the criticisms of the Chilean model. It mandated complete separation of the generation and distribution functions from the transmission function. Generators are restricted from controlling more than 10 percent of the national capacity. Twenty-six of the government-owned generators were sold while the government retained the remaining seven. As in Britain, distribution companies are subject to incentive regulation.[131]

iv) Efficiency Improvements

Since privatizing generation capacity, the operational efficiency of the country's existing generation has improved. For example, it has been reported that "the Costanera generating station at Buenos Aires had 30 percent availability prior to privatization. Availability rose to around 75 percent by 1994."[132] Generating capacities of two dozen existing generating facilities have increased as losses have been cut and maintenance standards improved.[133] Wholesale prices, expected to fall no more than 20 percent after restructuring, have fallen 40 percent.[134]

b) Spain

Electric industry restructuring in Spain is pertinent because Spain has taken some early steps to enhance competition similar to those taken in Texas, particularly encouraging competition at the wholesale level. The ownership of the various components of the electric industry, however, is unique. A state-owned company owns the entire high-voltage transmission grid. Other companies, some state-run and some wholly owned

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700 MW coal-fired plant. British Gas PLC paid $24.5 million for a 45 percent stake in another Argentine plant. Less than four years, 100 percent of the 700 megawatt plant was sold for only $1.3 million.

[130] Lalor, *supra* at 65.

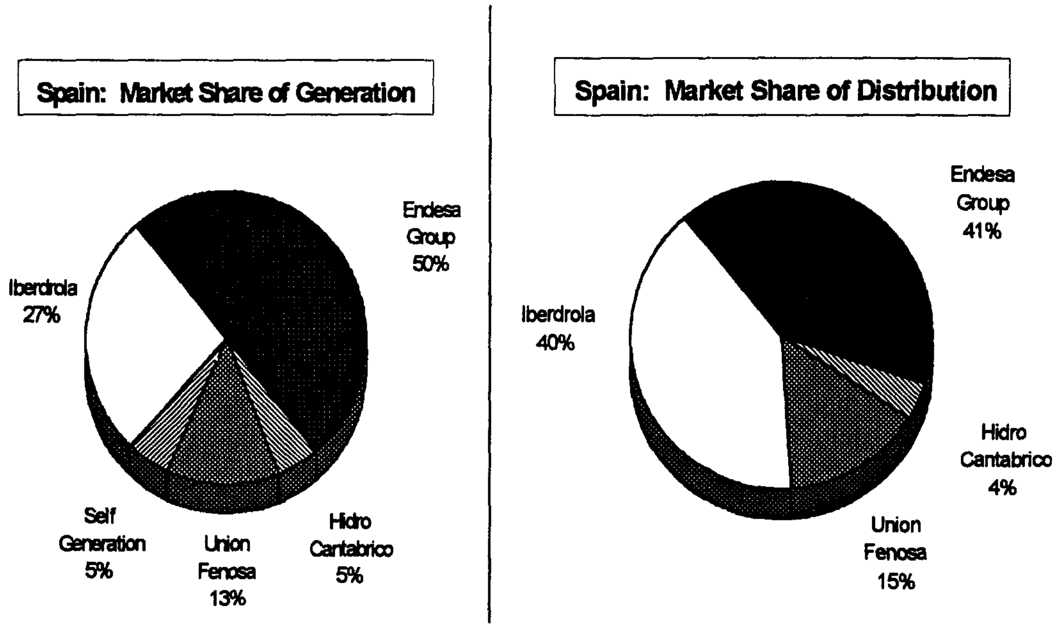
[131] *Id.*

[132] *Id.* at 65.

[133] Friedland, *supra* at A-1.

[134] *Id.*

by the private sector, own generation and distribution assets. Spain has no prohibition against individual companies owning substantial portions of generating capacity and distribution share. Figure IX-10 shows the market concentration in Spain's generation and distribution markets. The figure demonstrates that the same two companies own a majority of Spain's generation and distribution markets.



Source: Kahn, Edward, "The Electricity Industry in Spain," *The Electricity Journal*, Vol. 9(2) at 49 (March 1996) from Endesa, "Overview of the Spanish Electricity Supply Industry Model" (1994)(seminar on Reforming the Electricity Supply Industry in Spain, Rio de Janeiro).

Figure IX-10: Market Concentration in Spain's Electric Industry

i) Fuel Policy—A Constraint on Reform

One of the greatest constraints on a competitive electric industry in Spain is fuel policy. In an effort to protect the national coal industry, the Spanish government passed a law that requires 21 percent of all electricity production to be derived from coal. This requirement is a substantial limitation on the market since 39.2 percent of production is derived from nuclear plants, and 16.5 percent of production is derived from hydroelectric plants.[135] Moreover, Spanish coal is of relatively poor quality with a relatively high sulfur content.[136]

The problem of fuel subsidies may become less of a factor in the Spanish electric market in the future. The European Union (EU) has required that coal subsidies, not including brown lignite, be removed from electricity tariffs. This directive has the potential to lower prices to the point that they will approximate a competitive market for fuel supplies and will make the fuel subsidies more transparent. Also, a recent gas pipeline from Algeria is intended to provide fuel diversity.[137]

ii) Restructuring the industry

In December, 1994, Spain enacted a new electricity law entitled Ley de Ordenacion del Sistema Electrico Nacional (LOSEN).[138] The new law contained three principle features:

1. Creation of a regulatory commission;
2. Competitive bidding for all new generation; and
3. An independent system operator for parties bypassing the national system.[139]

The competitive bidding requirement is similar, in principle, to the solicitation requirements in PURA95 §2.051 in that the bidding process is designed to be open and nondiscriminatory. The process differs, however, since the regulatory commission in Spain determines the bid evaluation criteria and selects the winning project. Thus, although attempting to implement competition in the market for new generating capacity, Spain developed a structure that is far more intrusive than the process created by the Texas Legislature in 1995.

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[135] Kahn, Edward, "The Electricity Industry in Spain," *The Electricity Journal*, Vol. 9(2) at 49 (March 1996).

[136] *Id.*

[137] *Id.* at 50.

[138] *Id.*

[139] *Id.* at 50.

iii) Conclusion

Further movement toward restructuring in Spain will be difficult. Spain has yet to come to terms with stranded costs, fuel subsidies, and the nature of the government's role. The manner in which it resolves these issues will determine the ultimate structure of its electric industry.

C. LESSONS LEARNED FROM RESTRUCTURING IN OTHER INDUSTRIES AND COUNTRIES

Economic forces often create the impetus for industry restructuring. In the telecommunications industry, a number of companies, most notably MCI in the long distance market, proved that it could provide quality service by providing a competitive option to AT&T long distance in certain markets. The natural gas industry was forced to open the pipeline sector to competition as industrial customers continued to bypass the system in favor of lower cost options, which may or may not be *less* efficient. Similarly, airlines faced competition from intrastate carriers.

The Texas electricity industry is facing many of the same forces. Existing utilities are filing applications at the Commission for competitive and discount rates in response to competitive alternatives like co-generation, self-generation, and in dually certified, other utility providers. Such a patch-work system, as in the natural gas industry, does not protect residential consumers. While large consumers have some flexibility in how they receive electricity service, residential consumers have few options. If a substantial share of wholesale and large industrial consumers either leave the system or receive special rates, captive consumers will pay an ever-increasing share of the utility's costs.

Restructuring in the previously discussed industries and countries, suggests a number of lessons that should be considered when evaluating restructuring alternatives for the Texas electric industry. These lessons, while not determinative as to the actions that should be taken in Texas, illustrate the potential consequences of restructuring efforts.

a) Restructuring Risks the Loss of Universal Service and/or Price Discrimination

Restructuring efforts have either incorporated specific regulations to maintain universal service or endured the decline of universal service. The restructuring of the airline industry continued subsidies for small community service during the transition period, but today, many small communities are without airline service. In the natural gas industry, local distribution companies (LDCs) continue to carry an obligation to serve. International restructuring efforts in the electric sector do not appear to have diminished universal service. In Britain and Norway, for example, the regional distribution companies carry the obligation to serve.

Price discrimination exists in all of the restructured industries. In long distance telecommunications and the airline industry, price discrimination has evolved through the development of high standard prices accompanied by substantial discounts for those persons that qualify for discounts. Reorganization of the airline industry into a "hub-and-spoke" model appears to have reduced the service choices for non-hub cities, at least in the area of non-stop service.

The beneficiaries of price discounts in the airline industry have been leisure, non-business, customers. Leisure customers have the flexibility to fly at different times and plan in advance, allowing them to adapt their schedules to airline discount criteria. But in return for their lower rates, leisure travelers are penalized for changes and cancellations. Business customers often have little notice and few options to arrange their schedule. As a result of their inflexibility, they generally do not receive discounts and must pay higher prices. But in return, full fare customers receive enhanced services, such as greater flexibility when a flight needs to be changed. In the electric industry, industrial customers and large commercial customers may have options other than obtaining electricity from the incumbent utility, such as co-generation and self-generation, and may have more flexibility to defer power usage to non-peak hours, such as adding a late shift at a plant. This flexibility suggests that these customers could be the beneficiaries of utility discounts or pricing alternatives. Residential users may have fewer competitive options, and some residential customers will have little opportunity to defer power usage to off-peak hours.

b) Cost-cutting Can Affect Reliability, Safety, and/or Service Quality

The U.S. West example demonstrates that cost-cutting, either due to competition or performance based ratemaking, can adversely affect service quality.[140] The states regulating U.S. West have taken steps to restore service quality. In the airline industry, although the CAB was dissolved and airlines are no longer subject to economic regulation, the FAA continues to regulate airline safety. Any restructuring proposal must address the continuing role of regulation relating to the provision of safe and reliable electric service.

c) Restructuring May Introduce Greater Industry Change/Volatility

Restructuring ushers in great change to an industry that has been closely regulated, and the eventual structure of an industry is hard to predict. The airline industry restructuring was followed by airline bankruptcies, mergers, and strife between airlines and their employees. In long distance telecommunications, AT&T has been able to maintain a 55 to 60 percent market share despite competition. Moreover, in each of these industries, critics argue that market concentration has prevented the full benefits of competition to be realized by customers.

In Britain, the regional distribution companies have been sought after by international investors and have moved quickly to add generation capacity up to the maximum allowed by British law. Privatization in Argentina has been the most turbulent of all. Foreign investors have seen the value of their investments plummet as plants around the country have increased their generating capacity, creating an unexpected level of excess capacity.

Volatility also exists in the prices charged in a restructured industry. The airline industry has experienced fare wars for years. The price of natural gas has been subject

[140] Another example where cost cutting may have diminished system reliability concerns the two major electricity outages in the western United States. Some reports have suggested that the outages could have been avoided if more money was spent on tree trimming.

to seasonal price fluctuations. In Argentina, the price of wholesale electricity dropped to near zero at one point in 1996.

d) Uneconomic Bypass and Cost-Shifting May Leave Customers Stranded During the Transition

Restructuring efforts in the industries discussed above were, to some extent, responses to uneconomic bypass and cost-shifting. In those markets where regulated prices exceeded market prices, new competitors can lure customers by giving them an opportunity to bypass the regulated companies. In some cases, these new firms may be no more efficient than the incumbent firms, but they are able to compete against the *regulated* prices, leading to uneconomic bypass. In the telecommunications industry, MCI was able to serve lucrative city pairs in competition with AT&T. In the natural gas industry, large customers found ways to bypass the regulated gas network. As high volume, low cost, customers leave the regulated provider, a larger share of the provider's costs must be recovered by the remaining customers. The resulting higher rates magnify the incentives for even more customers to leave the system until only those customers with the fewest options remain.

The electric industry is not immune to uneconomic bypass and cost-shifting. As discussed in Chapters III and IV of this report, there are a growing number of examples of wholesale and large industrial customers choosing bypass alternatives while the incumbent utilities try to provide discounts to keep them from leaving.

e) Continued Regulatory Intervention is Necessary to Ensure Sharing the Benefits of Restructuring

In the long distance telecommunication and natural gas industries, reductions in costs did not translate into price reductions for all classes of customers. Similarly, in the restructured British electric industry, reductions in costs have not led to corresponding price reductions. In the airline industry, although average airline prices have fallen in real terms for consumers, price decreases appear to have been a function of the ability of airlines to easily reorganize, shift airplanes from one route to another, and raise prices for businesses and those in small markets.

If a goal of industry restructuring is to spread benefits to all customers, continued regulatory involvement appears to be necessary. Such continuing regulation may include market power analysis and a matching of regulation to the level of competition seen in the market.

f) Market Power Must Be Addressed During Restructuring and Beyond

Few of the industries recently deregulated in the United States could be called truly competitive. Long distance telecommunications is currently dominated by the three major carriers. Many small communities are served by a limited number of air carriers and have few route choices. In international electric restructurings, the same movement toward market concentration exists in a number of countries, including Britain, Chile, and Brazil.

Because the restructuring in Britain did not sufficiently spread generation assets among a sufficient number of generating companies, National Power and PowerGen apparently were able to exhibit sufficient market power to artificially raise the British power pool price. Chile's restructuring effort has also been handicapped by market concentration. Argentina, on the other hand, has avoided many of the market power issues by imposing strict limits on generation capacity ownership and by vertically separating generation from the transmission and distribution functions.

If the number of providers is insufficient to create a competitive market or barriers to entry that preclude competition are established, the potential benefits of competition may not be achieved.[141] The failure to obtain all of the potential benefits of competition would most likely be borne by residential and small commercial customers who lack flexibility in their consumption patterns and supply choices.

[141] This conclusion is consistent with the findings of Taylor and Zona, *supra*, in their evaluation of the long distance telecommunications market.

g) Someone Will Pay the Price for Stranded Assets

It is impossible to escape paying for the costs of existing facilities that generate power at prices above a market price. These facilities will become stranded in a restructured market. This reality is recognized by the goals and principles of the investigation underlying this report where it is stated that "[t]he recovery of costs associated with facilities that are not competitive should be borne in a manner that balances the needs of all parties."[142] In the natural gas industry, consumers have borne a majority of stranded investment; however, pipeline companies have not received 100 percent of their stranded investment. In long distance telecommunications, AT&T significantly wrote down its assets after restructuring. In Britain, taxpayers will pay the stranded costs since the government is unable to sell its nuclear assets at their book values. Even if stranded costs are not explicitly allocated, utilities or their customers will eventually pay for them.

D. RESTRUCTURING ACTIVITIES IN OTHER STATES AND AT THE FEDERAL LEVEL

Approximately four out of five states have been or are addressing electric industry restructuring at some level, some aggressively and some are merely investigating the potential impacts. While some states have taken formal action to alter their electric industry, others are discussing restructuring in educational forums and workgroups. Figure IX-11 shows the states where retail wheeling legislation has been filed. There are 17 such states concentrated mainly in the Northeast, Ohio Valley, and Midwest. Figure IX-12 shows the states that have adopted retail wheeling, either as a pilot program or on a statewide basis, and those states where the state's regulatory commission has rejected retail wheeling.[143] At the federal level, several bills have been

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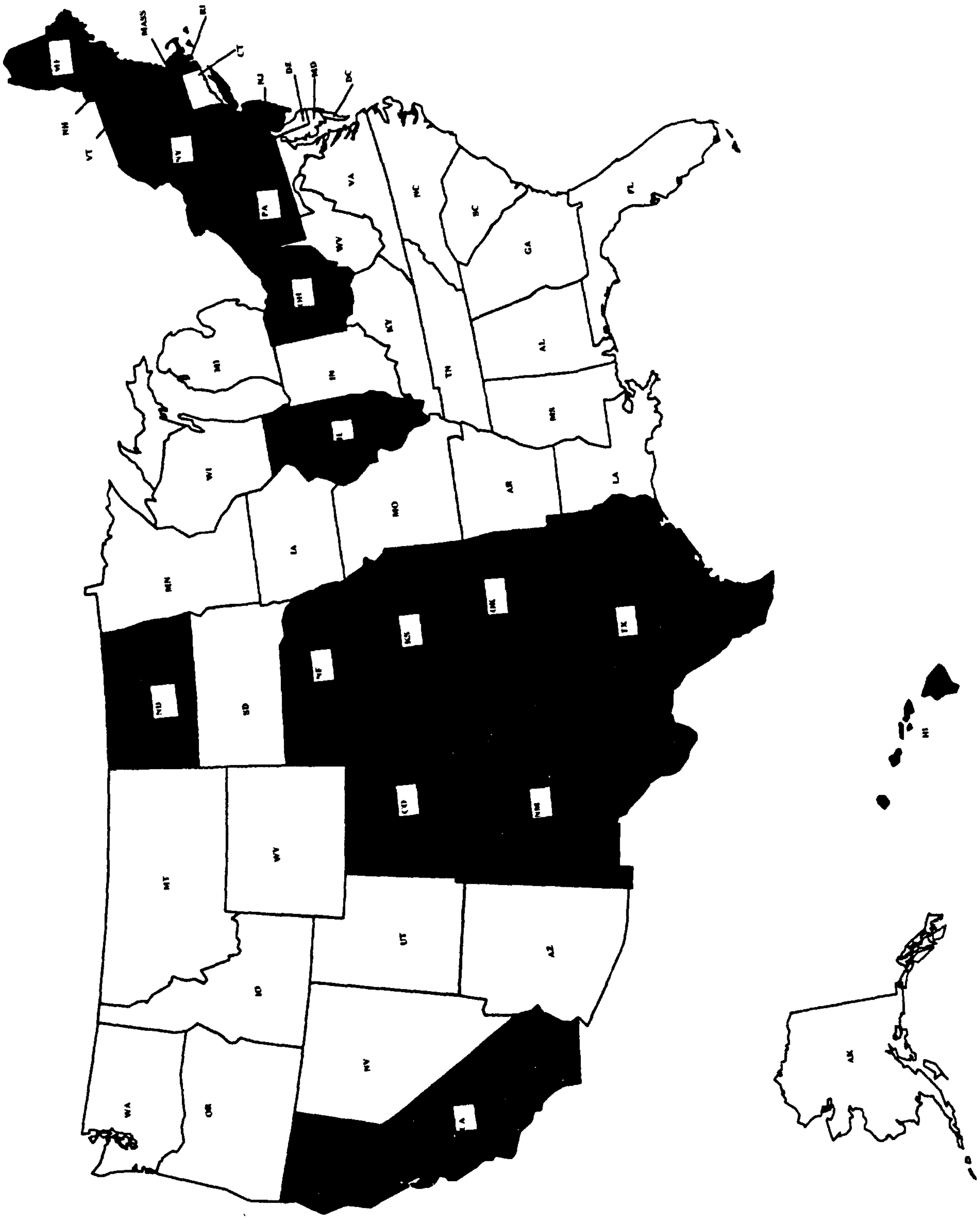
[142] Goals and principles for the investigation on industry restructuring are discussed in Chapter VII of this report.

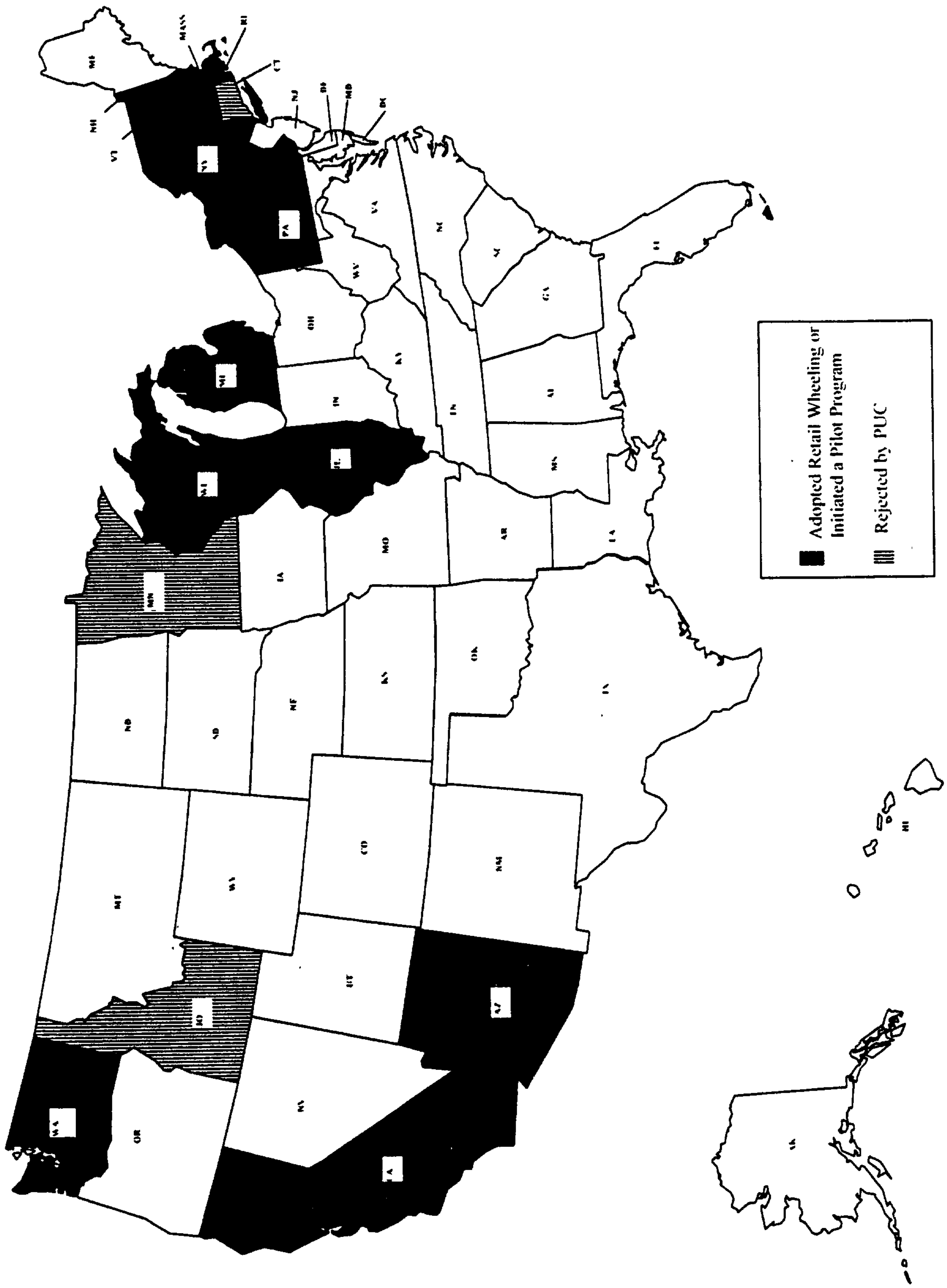
[143] State involvement in electric industry restructuring is very fluid at this time. It is expected that Figure IX-11 and Figure IX-12 will no longer be accurate by the time the Legislature reviews this Report. However, these figures are included to give the legislature a snapshot look at the status of electric industry restructuring on a national level. In Connecticut, for example, while it is true that the regulatory commission rejected retail competition, the Connecticut Attorney General has proposed an electric industry restructuring proposal which would allow for retail wheeling. Figure IX-11 shows states where retail wheeling legislation has been filed. The figure is not intended to imply that retail wheeling will be enacted in those states; for example, in Hawaii, the

Figure IX-11: States Where Retail Wheeling Legislation Has Been Filed



retail wheeling bills did not move out of committee. Figure IX-11 is intended to show those states where electric industry restructuring has been a legislative issue.

Figure IX-12: States that have Adopted or Rejected Retail Wheeling



introduced in the U.S. Congress that if enacted would affect the scope of competition in Texas. Also, the Energy, Environment, Natural Resources and Agriculture (EENRA) Task Force of the American Legislative Exchange Council (ALEC) adopted model state legislation to restructure the electric industry.[144]

1. State Activity

This section of the report focuses on six states that have, or are expected to, adopt major restructuring—California, Rhode Island, Massachusetts, Michigan, New York, and Wisconsin. Their current positions on restructuring are summarized below. Moreover, detailed summaries of restructuring legislation in California and Pennsylvania are attached as Appendices II and III, respectively. The Pennsylvania statute, for example, included a phase in retail access beginning in 1999 and culminating in full choice by 2001, a non-bypassable charge to recover stranded costs, and encourages interstate power pools administered by independent system operators. These states have been chosen to demonstrate how restructuring is being accomplished in some of the more aggressive states, not to imply these states are typical of the states as a whole.

a) California

As a large state and as a state that has taken the lead in electric industry restructuring, California has drawn much attention. After floating various proposals in 1994 and 1995, the California PUC took concrete steps toward restructuring in 1996, starting with the Interim Opinion issued on March 13, 1996, known as the "Roadmap Decision."[145] The Roadmap Decision was to begin a transition to a competitive electric generation industry by January 1, 1998.

[144] The model bill allows retail competition by December 31, 2000 through bilateral contracting. It also allows for market aggregators and establishes a procedure to allow electric utilities to recover the value of prudently incurred and mitigated generation assets stranded by the transition to a competitive marketplace.

[145] The full text of the Roadmap Decision is currently available over the Internet on the California Public Utility Commission home page, http://www.cpuc.ca.gov.

On September 23, 1996, California Governor Pete Wilson signed electric industry restructuring legislation. That statute builds upon the work of the California PUC and mandates a phased-in implementation retail competition.[146]

i) The California PUC's Roadmap Decision

The market structure envisioned by the California PUC is based on the Poolco model managed by an ISO. It also envisioned continued regulatory oversight of California's electric industry to limit market concentration and provide retail access to California consumers.

Direct retail access would have been phased-in starting on January 1, 1998 for the largest industrial customers, and by January 1, 2003, extended to all retail customers. The California PUC would determine the manner in which customers will obtain open and comparable access to competitive suppliers in a contested case format for each of the state's public utilities.

The Roadmap decision sought to expand consumer choice by allowing the following:

- Direct retail access (customers contracting directly with generators);
- Aggregated retail access (customers contracting with an aggregator who then shops around to find the best generator); and
- Increased pricing options, such as real-time pricing.

Moreover, as a surrogate for retail access, the California PUC proposed "virtual direct access." Under virtual direct access, a customer could allow his/her electric bill to fluctuate with the spot market price on the Power Exchange, similar to the way an adjustable rate mortgage fluctuates based on changes in an index rate.

The California PUC also recognized that consumer protections must be addressed in tandem with expanded choice. The California PUC views its role as expanding in the areas of "providing protection, safety and information to consumers, providing a forum for resolution of complaints about all aspects of electric service," and developing

[146] A detailed summary of the California legislation is attached as Appendix II to this Report.

"monitoring protocols and establishing an independent education trust." Finally, the California PUC proposed programs that focus on renewable technologies, energy efficiency, RD&D, and low-income assistance.

ii) California Restructuring Legislation

The electric industry restructuring legislation enacted in California in August of 1996 builds on the investigation of the California PUC. Specifically, the legislation codifies a number of decisions of the California PUC, such as the formation of an ISO, the formation of a Power Exchange, and a phase-in of retail wheeling. The legislation attempts to maintain many of the benefits of the current system while using competitive forces to make the industry more efficient and to lower prices. The California legislation also sets clear rate reduction targets and uses the borrowing power of the State to help the electric power industry achieve those targets. Significant parts of the California legislation are summarized briefly below; a more detailed summary is included in Appendix II.

(a) Structure of the Restructured Electric Industry

The California legislation mandates a phase-in of retail wheeling, the formation of a power pool, called the Power Exchange, and the formation of an ISO. The legislation also requires the California PUC to continue looking at market power issues.

(i) Phasing in Retail Access

The legislation requires that the phase-in of direct retail access on January 1, 1998.[147] The California PUC has the discretion to adopt an implementation schedule; however, all retail customers must have a choice of suppliers by January 1, 2002, one year earlier than in the Roadmap Decision. Moreover, a customer whose electric load is as least 50 percent supplied by renewable technologies shall immediately have direct retail access.

[147] Cal. AB 1890 §365.

(ii) Power Exchange

The California legislation creates a transparent spot market managed by a quasi-public entity, known as the "Power Exchange." The Power Exchange is to provide a competitive auction, open on a nondiscriminatory basis to all power suppliers.[148] It will be subject to an oversight board.

(iii) Independent System Operator

The ISO will coordinate dispatch and delivery of generated power. Investor-owned utilities are to transfer operational control of their transmission facilities to the ISO. Additionally, publicly owned utilities are to transfer control of their transmission networks to the ISO. The ISO, like the Power Exchange, will be subject to an oversight board.[149] As of August 1996, the California PUC and the FERC had not finalized the rules under which the ISO will function.

(iv) Market Power in California's Restructured Industry

The California legislation ordered its commission to consider market power issues when implementing the legislation. The California PUC, like the Texas Commission (and most of the parties that participated in the scope of competition workshops), recognized in its Roadmap Decision that the exhibition of market power could "undermine competition and negate the benefits to be derived from the new competitive framework."

When acting under its implementation discretion, it is likely that the California PUC will be guided by its position in the Roadmap Decision. Concerning *vertical* market power, the California PUC believes that it can mitigate market power by isolating control of transmission in the ISO and establishing an independent dispatch ordering mechanism. By transferring control of transmission to the ISO, it becomes less relevant who owns the facilities.

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[148] *Id.* §§ 355-356.

[149] *Id.* at §§ 334-336.

The California PUC also found in its Roadmap Decision that "concentrated ownership of generation units and the potential for anti-competitive effects result in *horizontal* market power concerns which will almost certainly require the existing investor-owned utilities to divest themselves of a substantial portion of their generating assets." It is unclear, to what extent, the California PUC will require divestiture in the future. Several California utilities have announced plans to sell off some of their generation assets.[150]

(b) Transition Costs

Although the California legislation has been characterized as giving utilities an *opportunity* to recover their stranded investment; however, the statute contains a number of exceptions to the deadline for recovery of stranded investment that will make full recovery more likely. The legislation authorized the recovery of stranded investment from all customers through a nonbypassable usage-based competition transition charge (CTC) that is placed on distribution service.

(i) Composition of Stranded Investment (Transition Costs)

The California legislation defines "transition costs" as follows:

> *". . . the costs, and categories of costs, of an electrical corporation for generation-related assets and obligations, consisting of generation facilities, generation-related regulatory assets, nuclear settlements, and power purchase contracts, including, but not limited to, voluntary restructuring, renegotiations, or terminations thereof approved by the commission, that were being collected in commission-approved rates on December 20, 1995, and that may become uneconomic as a result of a competitive generation market in that those costs may not be recoverable in market prices in a competitive market, and appropriate costs incurred after December 20, 1995, for capital additions to generating facilities existing as of December 20, 1995, that the commission determines are reasonable and should be recovered, provided that these costs are necessary to maintain the facilities through December 31, 2001. Transition costs shall also include the costs of refinancing or retiring of*

[150] See, e.g., "PG&E Planning to Divest Over 3,000 MW to Meet PUC's Market Power Directive," *Electric Utility Week* at 1 (October 28, 1996).

> *debt or equity capital of the electrical corporation, and associated federal and state tax liability.*"[151]

The legislation explicitly grants a property right in favor of electric utilities called "transition property," the regulatory asset caused by incurring transition costs.

(ii) Recovery of Stranded Investment (The CTC and Rate Reduction Bonds)

The legislation authorized the recovery of stranded investment from all customers through a nonbypassable usage-based competition transition charge that is placed on distribution service. Generally, the statute allows a utility an opportunity to recover its stranded investment by December 31, 2001. However, there are a number of exceptions.

If costs of programs "to accommodate direct access, the Power Exchange, and the Independent System Operator, that have been funded by an electrical corporation" have been found to be reasonable by the California PUC or the FERC, the recovery of these costs may extend beyond December 31, 2001. Assuming that the State-mandated rate reductions are part of the accommodation for direct access in California, that State's utilities will be able to potentially recover much of these revenues after the year 2001.[152] If this assumption is correct, then the mandatory rate reduction is a shifting of costs from today's ratepayers to tomorrow's ratepayers. As another exception to the 2001 recovery period, employee related transition costs may be recovered as late as December 31, 2006.[153] These costs can include such things as job retraining programs.

The mandatory rate reductions may be financed by the State's utilities with "rate reduction bonds." These bonds may be used to finance transition costs and acquire transition property.[154] If the California PUC determines that, but for the mandatory rate reductions on residential and small commercial rates, portions of the rate reduction

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[151] *Id.* at §840(f).

[152] *Id.* at §376.

[153] *Id.* at §375.

[154] *Id.* at §840(e).

bonds would have been paid by December 31, 2001, residential and small commercial customers must "continue to pay fixed transition amounts after December 31, 2001, until the bonds are paid in full by the financing entity."[155] Again, this section demonstrates that the mandatory rate reductions may be financed by a later generation of ratepayers.

It should be noted that the mandatory rate reductions and the corresponding bonds do not appear to be integral to the restructuring; but instead, attempt to flow the benefits of lower prices to the current generation of consumers at the expense of a later generation. If competition brings lower electricity prices over time, the rate reduction in the present will have the effect of leveling the prices today with the prices tomorrow.

(c) System Benefits

The California legislation includes provisions continuing a number of programs, such as DSM, renewable technologies, RD&D, and low-income assistance. It requires that costs for research, environmental, and low-income programs be listed on a consumer's bill.[156] The legislation leaves much discretion to the California PUC to implement these programs.

The legislation requires that cost-effective energy efficiency programs be funded at specifically stated levels from January 1, 1998 through December 31, 2001.[157] In its Roadmap Decision, the California PUC envisioned a "minimum renewable purchase requirement" that would apply to all electricity providers, including utilities and non-utilities (also known as a "portfolio requirement"). The portfolio requirement, which was included in the Roadmap Decision, was not included in the legislation.

The California legislation requires the California PUC to allocate RD&D funds to "Public interest research and development not adequately provided by competitive and regulated markets." While this approach appears straightforward, the difficulty is

[155] *Id.* at §841(a).

[156] *Id.* at §392(c)(1)(A).

[157] *Id.* at §381.

created when trying to differentiate between competitive, regulated, and public goods research.

To ensure continued low-income assistance, the California legislation requires that special rates for low-income customers be funded at levels not less than the 1996 authorized levels. The California PUC envisions that the utilities will administer low-income programs in the short-run until the programs can be shifted to an independent entity. The California PUC is currently seeking information concerning the necessary level of program funding.

(d) Consumer Protection

The California legislation has two significant provisions providing consumer protection. First, consumers will be provided information necessary to make educated decisions. Second, statutory provisions are included to help avoid unauthorized switching of customers from one provider to another, commonly referred to as slamming in the long distance telecommunications market.

(i) Consumer Information

The legislation attempts to provide consumers with information that is sufficient and reliable to allow them to "compare and select among products and services provided in the electricity market."[158] First, the legislation requires the electric bill to list separately charges associated with the following:

1. Transmission;
2. Distribution;
3. Generation;
4. Competitive transition charge;
5. Research;
6. Environmental programs; and
7. Low-income programs.

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[158] *Id.* at §392(b).

The bill must also state conspicuously that the transition charge will continue to be charged if the customer changes providers. The California PUC has the discretion to add additional information to this disclaimer.

(ii) Prohibition Against Unauthorized Switching

The statute sets forth a detailed method for prohibiting unauthorized switching of power producers.[159] This procedure includes a number of parts, such as third-party verification and written authorization. The statute also creates a civil cause of action against persons that violate this provision. A wronged party could receive actual damages, exemplary damages, attorney's fees, court costs, and equitable relief.

(e) Other Issues

The California legislation briefly deals with a number of additional issues. These issues include such things as flexible prices, regional cooperation, continued regulatory involvement to maintain system reliability, and a prohibition against shifting transition costs to other classes of ratepayers. Flexible fuel pricing and regional cooperation are discussed below.

(i) Fuel Price Volatility

The legislation contains a provision creating a limited price cap for natural gas costs.[160] Under the legislation, a utility opting for this treatment will not adjust its fuel expense recovery unless the California Border Index, on a 12-month rolling average basis is outside the statutory window of tolerance, 10 percent above or below the starting point. This section of the statute applies only during the transition, becoming inoperative on December 31, 2001.

(ii) Regional Cooperation

Due to the recent wide-spread power outages in the West in the summer of 1996, the legislation expresses an intent to have California enter into a compact with other western states requiring utilities to "adhere to enforceable standards and protocols to

[159] *Id.* at §§ 394 - 395.

[160] *Id.* at §397.

protect the reliability of the interconnected regional transmission and distribution systems."[161] In addition, California utilities are to maintain reliability standards no less stringent than those of the Western Systems Coordinating Council (WSCC) and the North American Electric Reliability Council (NERC).

b) Rhode Island

The Rhode Island Utility Restructuring Act of 1996 was enacted into law on August 8, 1996.[162] The statute creates a phasing in of retail wheeling, structural unbundling, 100 percent stranded investment recovery, and the continuation of DSM, incentives for the implementation of renewable technologies, and low-income rates. The statute is premised, in part, on a belief that:

1. "Lower retail electricity rates would promote the State's economy and the health and general welfare of the citizens of Rhode Island;"
2. "Current research and experience indicates that greater competition in the electricity industry would result in a decrease in electricity rates over time;" and
3. "Greater competition in the electricity industry would stimulate economic growth."[163]

i) Phased in Retail Wheeling

The Rhode Island Legislature took a regional approach to electric industry restructuring. Its legislation includes provisions accelerating the phase-in of retail wheeling if, and when, retail access is available to 50 percent of the kilowatt-hour sales in New England.[164]

(a) How Retail Wheeling Will Be Phased In

On January 1, 1998, electric distribution companies in Rhode Island must offer retail access from nonregulated power producers to all new commercial and industrial customers with an anticipated average annual demand of 200 kilowatts or greater and

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[161] *Id.* at §330(j).

[162] R.I. Gen. Laws §39-1-1, *et. seq.* (96-H8124).

[163] *Id.* at §39-1-27.2 (ii)(d).

[164] *Id.* at §39-1-27.2 (ii)(e).

existing manufacturing customers with an average annual demand of 1,500 kilowatts or greater.[165] On January 1, 1999, distribution companies must expand retail access to all existing manufacturing customers with an average annual demand of 200 kilowatts or greater.[166] By January 1, 2000, retail access must be expanded to 50 percent of the distribution companies' customers in each rate class. By January 1, 2001, all customers in each rate class are to have retail access.

Notwithstanding the above dates, retail access shall be available to all customers by January 1, 2000 if retail access is available to 50 percent or more of the kilowatt-hour sales in New England. The Rhode Island Legislature vested its commission with the authority to extend the retail access deadlines if additional time is necessary.

(b) Purchasing Cooperatives

The legislation recognizes "purchasing cooperatives." These associations, while not legal entities under Rhode Island law, allow consumers to "join for the purchase of power from a nonregulated power producer . . ."[167] It is thought that allowing consumers to aggregate their buying needs will give small customers a better opportunity to benefit from retail competition.

ii) Structural Unbundling

On or before January 1, 1997, electric utilities must file restructuring plans that:

- Transfer ownership of generation assets to an affiliate nonregulated power producer; and
- Transfer ownership of transmission assets to an electric transmission company.

The transfers are to be made at book value net of depreciation and deferred taxes.

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[165] *Id.* at §39-1.27.2 (a).

[166] *Id.* at §39-1-27.2 (b).

[167] *Id.* at §39-1-2 (18).

Upon approval of the plan by the Rhode Island Public Service Commission (R.I. PSC), the transfers shall take place. Once the structural separation is complete, it will be unlawful for distribution companies to:

- Sell electricity at retail;
- Own or operate transmission facilities; or
- Own or operate generating facilities (although an affiliate may own and operate generating facilities).

iii) Existing Contracts and Transition Charge for Stranded Investment Recovery

The Rhode Island statute places stranded costs on the regulated distribution companies. It accomplishes this in a two-step approach. First, it authorizes distribution companies to terminate any all-requirements contracts. Second, upon terminating the contracts, the distribution company becomes obligated to pay a terminating fee equaling the wholesale generator's stranded investment.[168] The components of stranded investment, as viewed by the Rhode Island statute are the following:

1. Regulatory assets of the generator and affiliated fuel suppliers;
2. Transition obligations relating to employee health care costs of the wholesale provider;
3. "Nuclear obligations including decommissioning costs and nuclear costs independent of operation;"
4. "Above market payments to power suppliers for purchase power contracts of the wholesale power supplier in place as of January 1, 1998;" and
5. "The net unrecovered capital costs of all generating plants owned directly or indirectly by the electric distribution company and its wholesale power supplier as of January 1, 1998 together with natural gas pipeline demand charges."

The Rhode Island Legislature limited the recovery period for transition costs to twelve years.

[168] *Id.* at §39-1-27.3.

iv) Continuing Regulation of Distribution Companies

After restructuring, electric distribution companies will remain regulated monopolies. The continuing regulation includes PBR, solicitation requirements for new distribution facilities, environmental programs, such as DSM and renewable technologies, and special rates for low income customers.

(a) Performance-based Ratemaking

The Rhode Island statute requires electric distribution companies to file PBR plans that do not increase their base rates.[169] The details of the PBR format prescribed by the Rhode Island Legislature contain provisions similar to those discussed in Chapter XII of this Report.

(b) Solicitation for New Distribution Facilities

The Rhode Island statute requires electric distribution companies to seek bids for additions to their distribution facilities. This solicitation requirement only applies if the additional cost is more than one million dollars.

(c) Environmental and Low Income Programs

Beginning on January 1, 1997, electric distribution companies are required to charge "2.0 mills per kilowatt-hour delivered to fund demand side management programs and renewable energy resources." The Rhode Island commission is empowered to determine the allocation of these funds. Electric distribution companies are also required to continue special rates for low income customers. A company's costs associated with these discounts may be covered through the distribution rates charged to other customers.

c) Pennsylvania

The Pennsylvania restructuring legislation enacted in November, 1996, phases in retail access. By January of 1999, one-third of the peak load of each customer class (residential, commercial, and industrial) will receive choice of electricity suppliers. In

[169] *Id.* at §39-1-27.4.

January of 2000, the second-third will receive choice, and the remaining customers will receive choice in January of 2001. The Pennsylvania Public Utility Commission (Penn. PUC) is authorized to delay these deadlines up to one year. Some of the other features in the legislation include the following:

- Implementation of a rate cap during the transition period;
- Preclusion of cost-shifting between customer classes;
- Continuation of programs to assist low-income customers;
- Continuation of the obligation to serve with modifications, and
- Recovery of a just and reasonable amount of stranded costs.

Although generating and selling electricity would become competitive, the legislation continues rate regulation of transmission and distribution. A detailed summary of the Pennsylvania Legislation is included in Appendix III.

d) Massachusetts

Fueled by high electric bills and an attempt to improve the competitiveness of the state, the Massachusetts Department of Public Utilities (Massachusetts DPU) has been actively investigating electric industry restructuring. These efforts, which began with a generic inquiry into PBR, have evolved into a detailed inquiry into electric industry restructuring and the introduction in the Massachusetts Legislature of a number of restructuring bills.[170]

i) Commission Activity

As a byproduct of the restructuring inquiry, in August, 1995, the Massachusetts DPU issued an order requiring IOUs to submit proposals relating to a number of issues, such as:

- How restructuring would promote competition and economic efficiency;
- How to extend the choice to all consumers;
- How restructuring could be implemented; and

[170] See e.g., "Report of the Senate Committee on Post Audit and Oversight" entitled *a Prescription for Competition: The Restructuring of the Electric Utility Industry* (December 4, 1995).

- The necessary and appropriate regulatory mechanisms.

The Massachusetts DPU has since commenced an inquiry/rulemaking to focus on:

1. Market structure;
2. Market power;
3. Transmission;
4. Distribution;
5. Stranded cost calculation and recovery mechanism;
6. Rate unbundling;
7. PBR;
8. Environmental regulation and DSM;
9. Default service;
10. Universal service;
11. The effect of restructuring on municipal electric companies; and
12. The local and utility tax impacts of restructuring.[171]

Costs are to be unbundled by January 1997, and retail access is to begin by January 1998. The Massachusetts DPU, however, postponed issuance of a final order on restructuring as of August 1996.[172]

ii) Legislative and Executive Activity

Approximately 20 bills were filed pertaining to the electric industry. Moreover, the Massachusetts governor has proposed a restructuring plan. One of the most significant bills filed in the Massachusetts legislature concerning electric industry restructuring is Senate Bill 447, the "Competitive Franchise" bill, introduced by Senator Mark Montigny. This bill would authorize municipalities to form their own utilities that could purchase power at competitive wholesale rates.

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[171] *Id.*

[172] See "Mass. Delays Release of Competition Rule But Vows to Open market in '98," *Electric Utility Week* at 3, August 19, 1996.

e) Michigan

The State of Michigan, which has relatively high rates and very large industrial customers, has been reviewing electric industry restructuring since May 1995. Beginning first with retail wheeling pilot projects and more recently with Governor Engler's "blueprint for competition," Michigan is moving to the forefront in the promotion of retail access.

i) Retail Wheeling Projects in Michigan

The Michigan Public Service Commission (Michigan PSC) has been investigating retail wheeling for several years. In April 1994, it ordered limited retail wheeling as part of an experiment to determine the benefits of retail wheeling, if any, before a larger scale project is considered. The following year, the Michigan PSC set rates and charges for retail delivery service as part of a five year experimental retail wheeling program for the Detroit Edison Company (Detroit Edison) and Consumers Power Company (Consumers Power).

The PSC staff reached a settlement agreement with Consumers Power to offer up to 650 MW of load for direct access transmission service and competitive procurement by customers. Eligible suppliers were defined as "independent power producers or qualifying facilities located in the State of Michigan." The proposal was filed in connection with the company's pending rate, special competitive services tariff, and depreciation cases.

The Michigan PSC approved an agreement under which Wisconsin Electric Power Company (WEPCo) will sell power to a large industrial consumer located in Upper Peninsula Power Company's (UPPCo) service territory. In exchange, WEPCo will allow UPPCo to have direct retail access within WEPCo's service territory for the same amount of capacity.

ii) The Governor Issues a "Blueprint for Competition"

In January 1996, Michigan Governor John Engler issued a "blueprint for competition" entitled "A Framework for Electric and Gas Utility Reform." The plan contains various goals for three different time periods.

Under the governor's proposal, by January 1, 1997, *new* industrial/commercial electric load will have direct retail access to the generator of choice. Utilities will have the obligation to act as a common carriers for this load, subject to open and comparable transmission rates. Actions are also to be taken to lessen the problem of stranded investment. Ideas suggested include developing a wires charge to pay down stranded costs, reducing stranded costs by "plowing back" excess profits, divesting inefficient plants, and increasing utility return on equity in the short-run. Finally, the plan envisions an investigation into replacing rate of return regulation with rate cap regulation. The rate cap is similar to measures the Texas Legislature instituted for local exchange companies in the telecommunications industry in PURA95.

By January 1, 1998, the plan contemplates the creation of a wholesale electric power pool administered by an ISO. Over time, the power pool could be converted from a California power pool into a regional independent power pool.

By January 1, 2001, the plan would allow *existing* industrial/commercial customers to aggregate demand, purchase electricity at retail, negotiate bilateral agreements, and purchase wholesale power. This portion of the phase-in period does not include residential consumers.

iii) Other Restructuring Issues

It should be noted that Governor Engler's proposal sets out broad categories for action but does not comprehensively address many of the difficult issues posed by industry restructuring. For example, a number of the goals and principals discussed in Chapter VII of this report are not addressed, including reliability and safety issues, resource mix, and environmental protection. Governor Engler's proposal also appears to contemplate an easing of merger and acquisition restrictions and a prohibition against mandating DSM and conservation programs.

iv) Regulatory Reform

Prior to Governor Engler's issuance of his Blueprint for Competition, the Michigan PSC issued a draft proposal to allow greater flexibility in the regulation of utilities (Proposal "M"). Among the recommendations were the following:

- Replacing traditional rate base regulation with revenue cap regulation;
- Making efficient use of the State's existing and future generating capacity in a coordinated, competitive, and least cost manner;
- Allowing greater flexibility for businesses to enter into contractual rates, in effect deregulating these rates;
- Establishing a state-wide, and potentially regional, power pool open to all suppliers of electricity;
- Replacing government mandates with incentive regulation;
- Providing greater flexibility for municipalities to develop distribution systems;
- Providing utilities with greater flexibility to develop new rate proposals; and
- Allowing utilities to reduce rates unilaterally without Michigan PSC approval, limiting rate increases to the rate of inflation less a productivity offset (akin to the British RPI - X pricing factor).

f) New York

The New York Public Service Commission (N.Y. PSC) began its inquiry into retail wheeling and competition by opening a generic investigation in August 1994. The objective of that proceeding was to determine how best to assist the transition to a more competitive electric industry without diminishing the benefits of the current industry structure. This process resulted in a final interim report, and was followed by a staff position paper suggesting a model for electric utility restructuring in New York.[173]

[173] See N.Y. PSC Case 94-E-0952, "In the Matter of Competitive Opportunities Regarding Electric Service."

i) Staff Position Paper

The position paper recommended the following:

- Utility divestiture of most generating operations;
- Continued utility operation of transmission and distribution systems;
- Establishment of an ISO;
- Formation of a regional transmission group (RTG) to perform transmission planning and open access to the transmission system;
- Determination and recovery of stranded costs through a wires charge;
- Support of low-income programs and DSM through a wires charge;
- Short-term N.Y. PSC oversight of RD&D in the areas of transmission and distribution;
- Encourage the formation of ESCOs to competitively provide supply and demand-side services; and
- Regulatory restructuring to encourage competitive bidding, reformed pricing mechanisms, and creation of standards to identify anti-competitive conduct in a restructured market.

The staff proposal also recognized the importance of a continuing obligation to serve and recommends that the transmission and distribution company be the energy service provider of last resort. To implement these measures, the staff proposal suggested that New York utilities be required to file restructuring plans similar to those required by the State of Michigan.

ii) Commission Order Adopting Retail Competition

On May 16, 1996, the N. Y. PSC adopted a proposal to begin wholesale competition in 1997 and retail competition in 1998. It ordered New York utilities not facing pending rate investigations to file restructuring plans that include proposals regarding:

- Corporate structure in the long- and short-term;
- A timeline for introducing retail rates;
- A plan for reducing costs and addressing stranded investment;
- A plan for providing protections to consumers in a competitive market;
- Identification of those public policy programs whose costs will not be recoverable in a competitive market; and

- Identification of potential market power problems and plans to mitigate these problems.[174]

That N.Y. PSC also favors encouraging the utilities to spin-off their energy service functions into separate ESCOs that would be licensed by the N.Y. PSC.[175]

The N.Y. PSC, in its order, expressed concern about market power issues, particularly load pockets. Load pockets exist when a particular generator or group of generators must continue running to assure the reliability of the transmission system. Because such generators would have to keep running, they may be able to yield market power.

On November 25, 1996, a New York court issued a ruling upholding the N.Y. PSC restructuring order. The court found that the order was correct in its rejection of the utilities' demand that all competitive losses be borne by consumers and that making utilities share the stranded cost burden did not breach a regulatory compact, violate New York law, nor infringe on the utilities' constitutional rights.[176]

g) Wisconsin

The Wisconsin Public Service Commission (Wisconsin PSC) opened a generic investigation to examine potential industry restructuring in 1994.

i) Conceptual View of a Restructured Electric Industry

As in Texas, Wisconsin regulates a large number of electric utilities. The Wisconsin PSC regulates 94 electric utilities, 82 of which are municipally owned.[177] The Wisconsin PSC endorsed a "building block" approach to introducing retail competition by the year 2000. The year 2000 goal is dependent on having in place the conditions necessary to sustain a competitive market in the public interest. On February 22, 1996,

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[174] *Re Competitive Opportunities Regarding Electric Service*, 168 P.U.R.4th 515 (1996).

[175] *Id.* at 465 - 466.

[176] *Energy Assoc. of New York State v. Public Service Commission of New York,* New York Supreme Court of Albany County (November 25, 1996).

[177] URL: http://badger.state.wi.us/agencies/psc/pscglanc/index.htm (summarizing the regulatory duties of the Wisconsin PSC).

the Wisconsin PSC submitted a report to the legislature discussing implementation details of the "building block" approach.[178]

Generally, the resulting industry structure would have the following attributes:

- Continued regulation of distribution facilities;
- Functional unbundling of utilities into stand-alone companies or companies affiliated under a holding company structure;
- Wisconsin PSC to retain siting authority for generation;
- Transmission facilities to be overseen by the Wisconsin PSC;
- Creation of an ISO for centralized power dispatch;
- Certification of new entrants;
- Moratorium on disconnections during the winter;
- Low income rates/universal service;
- In-state low cost generating facilities to be restricted to serve Wisconsin customers;
- Deregulation of the generation after market power concentration tests are met;
- Movement toward PBR for distribution;
- Continuation of DSM programs;
- Implementation of pricing options, such as "green" pricing and real-time pricing; and
- Encouragement of renewable technologies.

ii) Regional Power Exchange

As with other power pools discussed in the chapter, the Wisconsin PSC envisions a regional power exchange (RPE) that provides for:

- Lowest-bid dispatch;
- Reliability provided through back up capability and aggregation of operating reserve requirements;
- A spot market for generators to sell power that is not under a bilateral contract;

[178] URL: http://badger.state.wi.us/agencies/psc/restruct/elecrest/index.htm (summarizing Wisconsin PSC report to the Wisconsin Legislature).

- A market price to signal optimal generation and transmission capacity; and
- Elimination of affiliated-interest between generators and buyers that are part of one company.[179]

2. Federal Legislative Activity

Electric industry restructuring is receiving considerable attention at the federal level. In the most recent congressional session, as many as five bills have been introduced in the House and Senate. Most recently, Senator J. Bennett Johnston, ranking minority member of the Senate Energy and Natural Resources Committee, filed a restructuring bill (Senate Bill 1526) that would adopt retail access by the year 2010; Senator Alfonse M. D'Amato, Chairman of the Senate Banking, Housing and Urban Affairs Committee, filed a bill (Senate Bill 1317) that would repeal the Public Utility Holding Company Act of 1935 (PUHCA); Representative Frank Pallone, Jr., House Commerce Committee, filed a bill (H.R. 4316) which prohibits the FERC and/or the states from implementing retail wheeling until certain environmental concerns are addressed; and Representative Edward J. Markey, House Commerce Committee, filed a bill (H.R. 3782) that would do the following:

- Require states to initiate retail competition rulemaking proceedings pursuant to certain federal standards;
- Repeals PUHCA for those holding companies whose service territories have been opened up to full retail competition and met minimum standards for renewables, efficiency, and low-income consumer protections;
- Gives FERC and states enhanced authority to oversee mergers and acquisitions and guard against anticompetitive practices, such as interaffiliate cross-subsidization and self-dealing;
- Directs FERC to establish regional transmission markets that are nondiscriminatory and prevent "pancaking" of rates; and
- Assures FERC and the states full access to electric utility books and records.

The most comprehensive restructuring bills currently under consideration are the bills filed by Representative Daniel Schaefer, House Commerce Committee (H.R. 3790)

[179] See, e.g., Energy Online URL: http://www.energyonline.com/Restructuring/models/wiscon.html.

(The Schaefer Bill or Bill) and Representative Tom DeLay, Majority Whip, (H.R. 4297) (The Delay Bill).

a) The Schaefer Bill

The stated intent of the Schaefer Bill is to give all retail customers a choice of retail electricity providers on, or before, December 15, 2000 "in order to secure lower electricity rates, higher quality services, and a more robust United States economy."[180] The Bill incorporates a number of pro-competition findings, such as:

- The price charged for electricity "has a direct effect on the price, profitability, and competitiveness of goods and services produced in the United States."
- Lower electricity prices can be realized by giving all Americans choice among suppliers of electricity.
- Robust competition will reduce prices charged to all customers; and
- Rate of return regulation has failed.[181]

As a means of providing retail competition, the Bill will ensure that customers have access to retail electricity providers on a reasonable and nondiscriminatory, unbundled basis. Utilities that continue to own transmission and/or distribution assets will remain regulated. Similarly the Bill discusses regulation on a going forward basis for those utilities that will not be deregulated until December 15, 2000.

Utilities that continue to be regulated by state commissions would be subject to incentive-based regulation for their retail electric services to allow the "utility the opportunity to respond fairly to competition." Moreover, if the generating company does not provide local distribution services, state commissions would, for retail electric service, be required to:

- Cease regulating prices;
- Cease requiring the filing of a schedule of charges;
- Cease requiring the filing of cost or revenue projections; and

[180] H.R. 3790, 104th Cong., 2nd Sess. (1996) §2(b).

[181] *Id.* at §2(a).

- Cease regulating depreciation charges.[182]

Additionally, the Schaefer Bill defines many of the terms and conditions for retail competition:

- Insuring neutral and nondiscriminatory access to customers;
- Insuring and enhancing the reliability of electric service;
- Allowing for the recovery of costs incurred prior to July 11, 1996 for those utilities subject to state regulatory authority; and
- Promotion of electric energy efficiency, conservation, and environmental programs.

The Schaefer Bill includes a number of additional changes to the nation's electric industry. It would create a mandatory minimum requirement for generation with renewable resources. Generators could meet the requirement with tradable Renewable Energy Credits.[183] Utilities whose customers are able to purchase retail electric energy services on a competitively neutral and nondiscriminatory basis would be exempt from PUHCA on a state-by-state basis.[184] Moreover, the PURPA requirements to purchase electricity from QFs at the avoided incremental cost of production would no longer apply to utilities whose retail customers have neutral and nondiscriminatory access to retail electricity service providers.[185]

b) The DeLay Bill

The DeLay Bill, like the Schaefer Bill, would give every person the "right to purchase electric service from any electric service provider, notwithstanding any other law."[186] It is based, in part, on a finding that "monopoly cost-of-service regulation of electricity has failed."[187]

[182] *Id.* at §103(d).

[183] *Id.* at §112.

[184] *Id.* at §201 *et seq.*

[185] *Id.* at §301 *et seq.*

[186] H.R. 4297, 104th Cong., 2nd Sess. (1996) §3(a).

[187] *Id.* at §2(6).

The bill prohibits federal, state, and local authorities from discriminating against any person exercising the right to purchase power from a competitive provider. To this effect, it specifically prohibits "protection from competition" through direct or indirect subsidies and/or exit fees, other than those agreed to in a service contract.[188] The bill does, however, allow for the implementation of a nondiscriminatory access charge if related to "the continuation of service to residential customers unable to afford electric energy service . . ."[189]

To create a level playing field among competitors, states would be prohibited from establishing certification requirements that discriminate among electric service providers.[190] Moreover, if consumers do not select an electric service provider, those consumers are to be assigned to electric service providers on a nondiscriminatory basis.[191] The DeLay Bill also places duties on electric service providers to make certain information available to the system operator in order to maintain the reliability of the power sector. Consistent with recent FERC orders, it mandates open access to the transmission grid on a nondiscriminatory basis.[192] The DeLay bill does not address the issue of stranded investment.

The DeLay Bill attempts to clarify those areas where states will retain authority. Section 4(f) of the bill lists the following as within state authority:

1. The continuation of universal service;
2. Conservation programs and initiatives;
3. Consumer choice with regard to renewable energy;
4. Research and development programs and initiatives; and
5. Any other matter deemed appropriate by a State or local government.

[188] *Id.* at §3(b).

[189] *Id.* at §4(b).

[190] *Id.* at §4(c).

[191] *Id.* at §4(d).

[192] *Id.* at §5.

Finally, like the Schaefer Bill, the DeLay Bill would repeal PUHCA and Section 210 of PURPA as to those utilities that show the following:

1. If each state in which the utility is providing electric services "determines that the retail customers served by such utility have the ability to purchase electric energy service" in accordance with the Act; and
2. The FERC is notified of these state determinations.[193]

[193] *Id.* at §7.

X. BENEFITS OF COMPETITION

An examination of electric industry restructuring would not be complete without a discussion of the benefits of competition. The anticipated categories into which benefits should fall are straight forward. Basic economic theory and experience in other industries help to point out the expected types of benefits. Quantifying the anticipated benefits of competition and restructuring is another matter. As competition is only now emerging and the outcomes of specific industry restructuring proposals are speculative, at best, there are few market outcomes available for observation and measurement. Quantifying the benefits of competition must, therefore, rely on *ex ante* estimates and analyses. Although several such studies have been reviewed by the Commission Staff, the methodologies and approaches of these studies vary considerably, and in some cases follow a rather blunt approach. None of the studies reviewed by Staff is a likely indicator of the benefits of competition and restructuring in Texas. More general studies of the deregulation experience in the overall U.S. economy in the past two decades show quite favorable returns to the general economy.[1]

Despite the scarcity of quantitative estimates that can be used to gauge the magnitude of the possible benefits of electric restructuring in Texas, a general idea of the benefits can be obtained from the results of restructuring in other regulated industries, and to some extent, on the early results of electricity restructuring outside of Texas. It is worthy to note, however, that discussions with commission staffs in states that are moving rapidly ahead toward retail competition indicate that these other states have not relied on quantified estimates of the benefits of competition to support their restructuring efforts. Rather, a belief in the ability of markets to outperform

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[1] See for example Winston, Clifford, "Economic Deregulation: Days of Reckoning for Microeconomists," *Journal of Economic Literature*, Vol. XXXI at 1263 - 1289 (September 1993). Winston's review concludes that "Society has gained at least $36 - $46 billion (1990 dollars) annually from deregulation, primarily in the transportation industries . . . [which] amounts to a 7 - 9 percent improvement in the part of GNP affected by regulatory reform."

government, and the application of accepted rules of economics were generally cited as the support behind the movement to competition.[2]

From an economic standpoint, the promise of competition and regulatory restructuring is the creation of economic efficiencies. As is discussed in Chapter IV, traditional cost-of-service regulation preserves significant incentives for *less than* efficient provision of goods and services. This chapter reviews the potential for increased efficiency and provision of other benefits to society from moving to a more competitive industry structure. Section A briefly discusses the benefits most frequently cited by advocates of competitive markets, while the methods for achieving those benefits are described in Section B. Section C presents the available quantitative estimates of the benefits and costs of moving to competition in the electric industry. Finally, the implications of evidence of the benefits of competition for Texas are reviewed in Section D.

A. The Basic Benefits of Competition

The overriding benefit of a competitive market is greater economic efficiency. Enhanced economic efficiency can mean *substantial financial benefits to the* citizens of Texas. Just how large the benefits can be is a central part of the benefits question. The anticipated benefits of competition generally fall into three categories:

1. *Lower costs and prices:* The drive for lower prices is one of the principal reasons for moving from a regulated electric industry to a competitive market. The interplay of efficiency and technological improvements can be seen behind many of the price reductions that have occurred as other regulated industries embraced greater competition. Trend data presented in Chapter III show that average electric prices for industrial customers, those with the greatest number of choices, have been headed downward for several years.
2. *Customer choice:* The current regulated utility industry offers consumers few choices among suppliers and services. Providing an array of choices to consumers in their suppliers and/or the services available to them will boost consumer satisfaction. (Expanded service choices are the subject of Chapter VI.) In addition, the ability of customers to choose between different suppliers imposes the discipline of competition on suppliers.

[2] Discussions were held with staff from utility commissions in the following states: California, Massachusetts, New Hampshire, Rhode Island, and Wisconsin.

3. *Innovation:* One of the key benefits of competition is the incentives provided for innovation. The creativity behind innovation, while contributing to lower prices and increased customer choice, is a distinct benefit that provides the foundation for productivity growth. Technological innovations have also led to momentous changes in the industry. In the current market for electricity, one of the driving forces behind competition is innovations in natural gas-based generation technologies, which are lowering the cost of building new generation and increasing the flexibility with which new units can be brought on line. Innovation benefits are not limited to technological improvements; product, service, and marketing innovations resulting from competitive forces may also enhance customer satisfaction.

B. SOURCES OF COMPETITIVE BENEFITS

The benefits of competition—lower prices, customer choice, and innovation—all contribute to greater economic efficiencies. Although the direct monetary value of various benefits may be difficult to isolate and identify, in sum, greater efficiencies can mean substantial savings to Texas citizens and businesses.

1. Contributions to Productive Efficiency

As discussed in Chapter IV, productive efficiency is economic efficiency in the manufacture or provision of products and services. The optimal use of resources and the related minimization of production costs are key methods of achieving productive efficiency. Additionally, innovations in supply-side technologies can provide a significant competitive edge.

a) Incentives and Production Costs

Chapter II of this report includes a brief discussion of the incentives associated with the current regulated industry structure. Economists have long noted that regulation creates incentives for excessive investment in capital and capital-intensive facilities. Fuel recovery mechanisms also create incentives encouraging fuel-intensive investment and may provide insufficient incentives to keep fuel costs low. Electric industry restructuring and the introduction of competition can reorient the incentive structure of the industry, leading to more efficient ways to satisfy customer demand.

Firms in industries not subject to rate and service regulations are free to find the lowest cost means to satisfy demand for their goods and services. Freeing utilities from regulatory constraints by restoring market-based incentives will allow electric utilities to lower costs. Efficiencies unleashed by eliminating regulatory constraints promise equal or greater output at lower cost.

Unbundled services and open access would make it possible for non-traditional firms to enter into the electricity marketplace, injecting competitive pressures to reduce costs. Without the prospect of competing firms with lower costs capturing markets from incumbent firms, utilities cannot be expected to achieve the lowest operating costs.

When using traditional technologies to generate electricity, one of the most significant costs is the cost of fuel. The use of fuel factors for fuel cost recovery, by placing fuel price risk on the customer, offers little incentive for utilities to optimize fuel use and investment behavior. In a competitive environment, it can be expected that the risk for fuel price volatility will be shared more equally between customers and producers. This shift should encompass a corresponding increase in the use of financial instruments for hedging fuel prices, as well as changes in production that will minimize the use of high-priced fuels.

b) Supply-side Technologies

Cost reductions produced by technological improvement are another way in which lower prices result from a competitive environment.[3] Technologies involved in supplying electricity are referred to as supply-side technologies. These technologies include generation technologies ranging from large scale power plants to small scale distributed generation units. Supply-side technologies also include those used in transmitting power, such as conducting and flow control technologies.

The advent of combined-cycle combustion turbine (CCCT) technologies, as discussed in Chapter II, is a clear example of a new technology that is lowering the cost of providing electricity. CCCT technology advanced significantly under the competitive

[3] Siddiqi, Riaz, and John Woodley, Real-Time Pricing's Hidden Surprise, *Fortnightly* at 36 (March 1, 1994).

leverage provided by PURPA in 1978, when utilities were first required to purchase power from qualifying facilities (QFs).[4] The addition of greater competitive pressures under EPAct, which authorized exempt wholesale generators (EWGs) and power marketers to sell electricity at wholesale without regulatory approval, can be expected to increase the impetus for innovation in generation technologies.

The widespread deployment of distributed generation technologies may be closely tied to the implementation of pricing practices that tie prices more closely to costs. For example, some alternative technologies that are currently more costly than conventional generation on a year-round basis, e.g., solar photovoltaics, could become more economical when competing with conventional supply options if pricing is based on both season and time-of-day. Time-specific pricing is also encouraging research and development into electricity storage devices.

Subsequent to the enactment of EPAct, various FERC decisions have begun to transform the transmission grid to common carrier status, and further technological advances are likely. Existing technologies for optimizing the use of the grid, some of which are currently not in widespread use due to cost factors, may become more widely used as the complexity of coordinating grid traffic increases. Some of these technologies include: conducting technology, such as superconductors; and flow control technologies, such as advanced thyristors and phase-shifting technology. Grid management and transmission constraints may also encourage development of improved energy storage technologies.

c) Innovations in Electric Services

Competitive pressures can also be expected to give rise to innovative providers and combinations of electric services. Just as nontraditional alliances have developed in telecommunications, resulting in the sale of telecommunications services by such

[4] PURPA created such strong incentives for investment in innovative technologies that PURPA is also *blamed* for promoting *in*efficient production technologies. These so-called "PURPA machines" were at times designed and constructed at costs well above the competitive cost of new generation using existing technologies.

unrelated firms as insurance companies[5] and multi-level marketing organizations,[6] the electric industry may witness similar changes.

Creativity in locating new market niches has been a key to success for many small businesses. New products, new services, repackaged products marketed to a new market segment, new combinations of products and services are just some of the ways that innovation may arise given the proper incentives.

2. Contributions to Allocative Efficiency

As discussed in Chapter IV, allocative efficiency is economic efficiency from the consumers' perspective, in which consumers allocate their limited income between available products and services. The availability of options and choices and the related information provided by pricing signals are keys to achieving greater customer savings and satisfaction.

a) Customer Choice and Pricing Signals

Options in choice of energy provider and/or services can increase customer satisfaction. Without choices, consumers have no reason to adapt behavior in ways that can save money or provide other benefits. Economists quantify the seemingly vague changes in "satisfaction" by measuring "consumer surplus." In introducing competition and adopting regulatory restructuring, improvements in consumer satisfaction may be the largest quantifiable category of benefits. Lower prices for existing services and new service options will lead to increases in consumer surplus. When customers are given price signals tied to marginal costs—rather than the average cost price signals under cost-of-service regulation—their consumption patterns will begin to change to reflect these relative prices. Some customers will shift consumption, at least partially, to times when prices are lower and away from times when prices are higher. Some of the rate designs that may be used more frequently in a competitive electric industry include:

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[5] USAA sends its customers incentives to sign up for long-distance service from Sprint.

[6] Multi-level marketing firms aggregate customers and resell long-distance services purchased at wholesale from telecommunications companies like AT&T. A discussion of this and other telecom marketing techniques can be found in "AT&T is Being Bitten on the Ankles," *Business Week* at 19 - 20 (August 5, 1996).

- Time-of-use pricing;
- Real-time pricing;
- "Green" pricing;
- Fixed contract pricing; and
- Interruptible rates.

The impact of these pricing and service options is to allow customers greater choice in the allocation of their incomes among electricity, electric services, and other goods at prices that more accurately reflect the costs of the services. Consumers facing a broader set of choices at prices tied more closely to costs can therefore raise their level of satisfaction.

Unbundling services under a competitive framework would allow customers to choose separately among various aspects of electricity generation, transmission, and distribution. Different types of generation may be demanded by some customers. Some may want electricity generated from the currently inexpensive combined-cycle gas turbines, others may want the "green" electricity that can be generated with wind or solar energy even if it is more expensive currently than some other sources.

One of the potential drawbacks to increased customer choice is that the proliferation of information available to customers will also increase customer transaction costs. The time involved in collecting sufficient information to comparison shop before making purchases may increase significantly. This can cause confusion for some consumers and leave those who are least prepared to handle the information explosion at a disadvantage.

b) Demand-side Technologies

Demand-side technologies allow users to manage their energy use by changing the amount of timing of energy consumption. The basic idea behind demand-side techniques and technologies is that leveling out the loads on the system can make system operations more efficient, resulting in cost savings that can be passed on to consumers.

More accurate price signals resulting from regulatory restructuring may promote the use of traditional demand-side management (DSM) options and spur the development of DSM innovations. Distributed generation may become more common in conjunction with end-use equipment that must be run at times of system peak. Aggregators are expected to pool together customers with different load patterns, coordinating the removal of these customers from the system in times of need.[7]

While it is difficult to anticipate all the innovations that might arise under a newly competitive environment, a number of devices currently available for DSM will probably witness increased usage and technological refinement:

- Time-of-use metering;
- "Smart" buildings and programmable equipment;
- Duty cycling equipment; and
- Electricity storage devices (e.g., batteries, thermal storage, compressed air storage, and superconducting magnetic energy storage).

3. Contributions to Dynamic Efficiency

Dynamic efficiency refers to efficiencies arising over time, particularly, from investment decisions that balance long-term capital costs against recurring operating expenses. Such investments include both the efficiency of utility investments in long-lived capital plant and equipment, and consumers' balancing of capital and operating costs in their own purchases. If rate regulation creates incentives for excess investment in capital-intensive plant and equipment, dynamic efficiency is likely to be reduced. When consumer prices are based on average costs of electric service rather than marginal costs, consumers' investments may be distorted (e.g., leading a consumer to choose an electric drier instead of a gas dryer—or vice versa—at a higher total resource cost to society). Regulatory restructuring and ensuing competition that eliminates inaccurate price signals and distortionary incentives favoring specific types of investments are likely to contribute to greater dynamic efficiency.

[7] Demand-side aggregation is already done on a small scale around the country in response to demand-side solicitations from utility companies. Planergy, Inc. is an example of a company that offers coordinated voluntary interruptions of customers not normally considered "interruptible."

C. EVIDENCE OF THE BENEFITS OF COMPETITION

The quantification of benefits of competition in the electric industry is not straightforward. Few rigorous analytical studies have undertaken this task. Some insights can be gained from changes in other industries and from recent changes in the electric industry in other countries and states. A more detailed discussion of these other industries and jurisdictions is presented in Chapter IX. The most relevant conclusions are presented below. In addition, a review of the literature on the benefits of restructuring the electric industry yielded two studies performed at the national level, and one for the Texas industry, summaries of which are also presented.

1. Competitive Benefits in Other Restructured Industries

To fully assess the benefits of competition may require a variety of types of measures of efficient performance, including cost, quality of services, and choice of services.[8] As a result, available studies often use different measures, even when looking only within one industry. Some of the most prominent findings from deregulation of the airlines, telecommunications, and natural gas industries are summarized below.

a) Airline Industry

Recall from Chapter IX that after deregulation, average air fares declined at a faster rate than occurred before deregulation, with an average decline of 2.57 percent in the post-deregulation period from 1976 to 1993, compared to 2.45 percent for the pre-deregulation period of 1960 to 1976.[9] Furthermore, overall productivity increased for U.S. airlines after deregulation, while the productivity of regulated airlines in other countries *decreased* during the same period. The decrease in air fares and increase in productivity are particularly noteworthy given the significant cost reductions that occurred before 1976 as a result of the jet engine and computer technology innovations. In addition, the advent of pricing flexibility, which allowed airlines to

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[8] Linder, Kenneth P., and Eric T. Ackerman, "Moving Toward Innovative Regulation in a More Competitive Electric Utility Industry," *Reinventing Electric Utility Regulation*, edited by Gregory B. Enholm and J. Robert Malko, Vienna, VA: Public Utilities Reports, Inc. at 399 - 411 (1995).

[9] Arkin, Zander, "Benefits of Competition," Harvard Electricity Policy Group, Cambridge, MA: John F. Kennedy School of Government, Center for Business and Government at 10 (January 8, 1995).

offer restricted discount fares, resulted in a significant welfare gain because passengers received many more flight and pricing options and because passengers who would not have flown otherwise took advantage of discounted fares. Airlines increasingly altered fares during capacity-constrained periods, allowing the airlines to better manage travel load. The more efficient allocation of airline service capacity from new pricing systems contributed to the increased load factor after deregulation.[10]

Innovation in the airline industry after deregulation resulted in widespread use of hub-and-spoke networks. This allowed the airlines to exploit scale economies by using larger airplanes, combining traffic to major destinations. Network management thus contributed to higher load at less cost.[11]

The quality of service and quantity of service options in air travel have improved since the initial transition period to a competitive market. The number of complaints has shown a declining trend, as has the number of passengers "bumped" from their scheduled flights. The variety of price and service options has expanded, with customers who could previously only choose between first class and coach now able, in some cases, to choose among first class, business class, economy class, and no frills service. More variety in audio and video programming, use of telecommunications devices in flight, and food service options have also become available. Chapter IX also showed that a number of new airlines now provide services in specific regions or market niches.

One of the negative consequences sometimes attributed to deregulation of the airline industry has been the industry concentration that resulted from the bankruptcies, mergers, and acquisitions occurring during the 1980's. While industry concentration

[10] *Id.* at 10 - 11.

[11] *Id.* at 9.

has been shown to result in higher air fares at more highly concentrated airports,[12] it is not clear how much of the price differences are a direct result of deregulation.[13]

b) Telecommunications Industry

The AT&T divestiture in 1984 marked the beginning of wide-scale deregulation and restructuring in the telecommunications industry. Prior to that time, there was widespread cost-shifting from local service to interstate long distance. Since divestiture, decreased cost-shifting and increased competition from new competitors have dramatically reduced long distance rates. The declines have been much greater in the interstate market, in which only AT&T has been regulated, compared to the intrastate market, which is regulated by states.[14]

Other benefits from the restructuring of the telecommunications industry include the expansion of customer choice in rates and services, as well as the enhancement of the telecommunications infrastructure. The rate reductions in the long distance market have resulted in increased consumption of long distance telecommunications services and allowed customer phone use to expand considerably. Interstate long distance consumption, as measured in dial equipment minutes per household, has increased by over 25 percent between 1980 and 1991.[15] These increases in customer choice, infrastructure development, and consumption indicate an increase in consumer welfare. With the ongoing implementation of the federal Telecommunications Act of 1996, both local and long distance service are expected to become much more competitive.

c) Natural Gas Industry

The natural gas industry has witnessed a series of regulatory reforms which began in 1978 with the passage of the Natural Gas Policy Act. Previously, the interstate gas markets had witnessed several years of increasing supply shortages, curtailments, and

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[12] Government Accounting Office, *Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports* at 1 - 14 (1993).

[13] Arkin, *supra* at 13.

[14] See Crandall, Robert W., *After the Breakup: U.S. Telecommunications in a More Competitive Era*, Washington, DC: The Brookings Institution (1991).

[15] Arkin, *supra* at 23.

high prices. The development of open access to pipeline transportation services facilitated the development of an active spot market and a natural gas futures contract market. The competitive spot market has assisted in keeping prices low, and has also provided accurate price signals to consumers and producers. In addition, the futures market has provided tools for mitigation of risk in the volatile spot market.[16] Studies indicate that natural gas prices have decreased for industrial and utility customers. However, while many residential customers have also witnessed price decreases, some have experienced modest increases in price.

New flexibility in contracts has resulted from competition in the natural gas industry. The once common "take-or-pay" clauses have given way to "swing" clauses that allow customers some variation in buying additional supplies to meet unforecasted demand, "take-or-release" clauses that allow the supplier to cancel the contract or reduce volume if the purchaser cannot accept delivery of the specified amount, and "diversion" clauses that allow suppliers to divert gas from one buyer to another in emergencies while some customers rely on alternative fuels during the diversion. These types of contract innovations have increased reliability and allocative efficiency, as evidenced by the absence of supply shortages since the mid 1980's despite dramatic increases in gas use.

The variety of services offered by pipeline companies has been unbundled into its component parts. The advent of competition has made storage services increasingly important. Storage has been shown to be a cost-effective way for both buyers and sellers to hedge against seasonal price swings as well as general price risk. High volume storage has resulted in increased utilization of production capacity from 70 percent in 1985 to 87 percent in 1993.[17]

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[16] *Id.* at 28 - 29.

[17] *Id.* at 30 - 31.

2. Competitive Benefits of Electric Restructuring in Other Countries

Electric restructuring in Great Britain has progressed further than in most other countries. Evidence of changes in the British industry indicate that labor productivity has gone up much more rapidly in the deregulated parts of the industry. The impact on electric prices in Britain are mixed, however, and it is unclear exactly how the lessons apply to Texas. Following restructuring, two companies initially owned almost 80 percent of the generation capacity. Thus, supply competition was limited, and the British electric industry regulator found that the two companies had manipulated the power pool price between August 1991 and January 1992.[18] Other pool pricing anomalies have been observed and are under investigation by the British regulator.

The more general price trends in Great Britain are somewhat mixed.[19] Most large industrial customers experienced real price reductions through the end of 1992. Some of the largest industrial customers experienced price *increases* following the elimination of special terms enjoyed before privatization. Prices for residential and commercial customers rose somewhat although service remained under partial controls. Given the differences in the British industry before privatization from that currently in Texas and the particular type of regulation for residential and commercial customers following privatization, these initial price changes cannot be directly translated to a Texas context.

Although price declines after restructuring in Norway have not been constant, Norway experienced net decreases in prices over three years. While the greatest decreases have been at the wholesale level, some decreases have also been experienced by retail commercial and residential customers.

[18] Littlechild, Stephen, "Competition, Monopoly and Regulation in the Electric Industry," *From Regulation to Competition: New Frontiers in Electricity Markets*, Michael A. Einhorn editor, Boston, MA: Kluwer Academic Publishers at 132 (1994).

[19] *Id.* at 139 - 142.

Argentina has witnessed a dramatic decrease in wholesale prices since restructuring. It appears that much of this decline is the result of increased operational efficiency of existing generating plants.

3. Evidence of Competitive Benefits from Other States

Although a number of states are moving rapidly to a more competitive environment, none are far enough into this venture to provide clear-cut results. However, the retail access pilot project in Manchester, New Hampshire has resulted in a contract with Green Mountain Energy that will provide a 20 percent savings to consumers there compared to rates that customers are paying without retail access.[20] However, it is unclear whether results from the New Hampshire pilot can be extrapolated to other situations in other areas of the country.

It has been expected that utilities will increasingly seek to implement declining rates in the face of pending competition. According to a recently published report, there is some evidence that this is beginning to happen in other parts of the country. San Diego Gas & Electric Company (now Enova) and MidAmerican Energy Company have both asked their state regulatory commissions for permission to cut electric rates.[21] While this is more anecdotal evidence than measurable results, it is nevertheless suggestive of the tangible price reductions resulting from competition.[22]

4. Analytical Studies of Dollar Savings and Price Changes in the Electric Industry

Below is a description of the three analytical studies which purport to estimate the net benefits resulting from competition in the electric industry. The first two are national studies while the third focuses specifically on Texas. These summaries are accompanied by a brief evaluation of the results of each study.

[20] "Manchester, NH to Aggregate Load for Savings Under Pilot," *The Electricity Daily* at 1 (July 8, 1996).

[21] "Will Competition Lower Rates?" *Electrical World* at 7 (July 1996).

[22] In comments on the draft report, CSW, *supra* at 9 notes "that even under traditional cost-of-service regulation, rates will decline substantially as rate bases are depreciated and amortized, potential stranded costs recovered, and excess capacity is absorbed."

a) Fernando, et al.: Unbundling the U.S. Electric Power Industry

In a study funded by Enron Capital & Trade Resources, Fernando, et al., examine unbundling as a means of restructuring the U.S. electric power industry.[23] The study presents a rough estimate of the quantifiable benefits to a restructured competitive industry, noting that "the benefit calculations represent a 'back of the envelope' approach and should be interpreted accordingly."[24]

Using the traditional net benefits measure, i.e., that net benefits equal consumer surplus plus producer surplus, the authors estimate the components of the net benefits separately. Consumer surplus is divided into two components: benefits due to price reductions and those due to improvement in services. Producer surplus is also divided into two components: benefits due to operational efficiency and increased revenues that result from new services.

The net benefits to consumers and producers can be summarized as follows: $60 billion annually in consumer surplus in the form of price reductions resulting from competition in supply; producer surplus of $6 to $10 billion in reduced capital expenditures; producer surplus of $9 to $12 billion in reduced costs due to increased productivity; and $0 to $20 billion[25] from new services. The total net benefit is therefore estimated at $80 to $100 billion annually.[26] This range is compared to a worst-case estimate of stranded investment equal to $300 billion from which the authors conclude that competitive benefits could pay for stranded investment in only three years.

As noted by the authors, the results are based on crude estimates. The consumers surplus estimate is based on an assumed 2¢ per kWh savings for total national retail sales of 3 trillion kWh. The producer surplus values assume a 10 percent decrease in

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[23] Chitru Fernando, Paul Kleindorfer, Richard D. Tabors, Fred Pickel, and Sandra J. Robinson, *Unbundling the US Electric Power Industry: A Blueprint for Change* (March, 1995).

[24] *Id.* at 44.

[25] This estimate is a residual derived by subtracting the other components of net benefits reported by the authors from the total.

[26] *Id.* at 49.

production costs leading to savings of $9 to $12 billion. Savings in capital expenditures are drawn from the lower costs of gas technologies when compared to coal and nuclear and an assumed annual turnover of the generating stock equal to 2 percent. The remaining category of producer benefits from new services is extremely speculative.

The direct application of these estimates to restructuring in Texas is unclear. The benefits values are difficult to relate specifically to Texas or to specific restructuring policies. The key point of this analysis may be to reinforce the idea that cost reductions that lead to consumer and/or producer savings can yield large benefits to the general economy. The magnitude of any such cost savings is among the most uncertain outcomes of any restructuring program, and this study sheds little light on that issue.

b) Citizens for a Sound Economy Foundation

Maloney, et al, in a study sponsored by the Citizens for a Sound Economy Foundation, examined the potential benefits of moving to retail competition in the U.S. electric industry.[27] The study predicts that consumers will receive a benefit of $107.6 billion annually. The net benefit, nationwide, after accounting for lower prices received by producers for each kWh sold, is projected at $24.3 billion annually.[28]

The study notes that at present, capacity in the electric industry is substantially underutilized, in the range of 25 percent. Capacity is especially underutilized on a seasonal basis, with peak usage in July and August and lower utilization in other months. The study further notes that in periods of slack capacity, the appropriate economic cost of electricity should be the marginal operating cost of production; however, under regulation, rates are based on average costs. Thus in slack periods, current rates are too high because the average rate is above marginal operating cost, and in peak periods, current rates are too low because the average rate is below the

[27] Maloney, Michael T., Robert E. McCormick, and Raymond D. Sauer, *Customer Choice, Consumer Value: An Analysis of Retail Competition in America's Electric Industry*, Washington, DC: Citizens for a Sound Economy Foundation (1996).

[28] *Id.* at x.

cost of production including a capacity component. As a result, off-peak consumption is too low and on-peak consumption is too high. These conclusions are widely recognized outcomes of average cost ratemaking, discussed in Chapter II.

In their analysis of changes in a competitive market, the authors assume that seasonal and time of day variations in electricity price and consumption will be *smoothed out*, leading to relatively steady electricity production. The study therefore assumes that production will increase to utilize slack capacity. Electric prices are assumed to fall in the short-run, on average for all customer classes, by at least 0.9¢ per kWh and by as much as 1.8¢ per kWh. In the long-run, when taking account of new capacity additions, the study assumes that the average price for all customers at all times will fall to 3.9¢ per kWh. For average residential consumers, this is a drop of about 3¢ per kWh.

As a result of this drop in price, the study predicts that total electricity consumption will *increase* by 43 percent.[29] The increase accounts for smoothing out production at all times of the day and seasons of the year. Based on these changes in price and consumption, the authors developed their estimates of benefits to consumers and net benefits to the economy.

Commission Staff economists have reviewed the study by Maloney, et al., and find that several of the assumptions are unsubstantiated, and indeed, unlikely. In particular, Staff finds that the study's conclusions about future production do not incorporate a realistic view of the consumer demand for electricity. It is difficult to imagine that consumption will smooth out such that demand in off-peak periods will equal demand in peak periods. Consider a Texas residential electricity consumer. Consumption in the hot summer months exceeds consumption at other times of year because of demand for conditioned air for cooling. In the non-summer months, the need for air conditioning,

[29] The link between changes in electricity and changes in consumption is the responsive of consumer behavior to changes in price, which economists typically refer to as "elasticity." The study assumes that the elasticity of electricity consumption with respect to changes in price is equal to one. In other words, a 1 percent change in the price of electricity will lead to an equal 1 percent change in the quantity consumed (or in this case, a 43 percent decline in the price of electricity will lead to a 43 percent increase in electricity consumption).

and thus electricity, is low. Thus the assumption that production in off-peak months will change to equal production in peak months ignores fundamental demand conditions.

The study also assumes that consumers will be extremely responsive to price changes. This conclusion appears to be at odds with the prevailing research in economics about the responsiveness of electricity consumers to changes in prices.[30] Residential consumers are likely to be less responsive to price changes than either commercial or industrial customers. The study does not appear to make any such distinction.

In sum, the study from Maloney et al., is not a valid indicator of the benefits of competition to electric consumers in Texas. The study makes assumptions about electricity demand that are not consistent with casual observation about the basis for usage patterns in the State, and it assumes that consumers are much more responsive to price increases than is likely to be the case.

c) Association of Electric Utility Companies of Texas

Texas Perspectives, Inc./MGT of America, Inc. has evaluated the impacts of retail competition in Texas for the Association of Electric Utility Companies of Texas.[31] The study concludes that there will be significant economic costs to retail wheeling. Texas Perspectives reports that monthly electric bills for residential consumers would initially increase, with a peak increase of about $28 per month in the fourth year after implementation of retail access. Thereafter, household bills would begin to decline. As a result of the initial decrease in disposable income from higher electric bills, the study forecasts significant economic costs to the Texas economy, predicting that Statewide employment would suffer for the first nine years after the advent of retail access, recovering in the tenth year after retail access is implemented.

[30] For a survey of the literature on the elasticity of demand in the electricity industry, see Berndt, Ernst R., *The Practice of Econometrics: Classic and Contemporary*, Reading, MA: Addison-Wesley Publishing Co. at 328 - 335 (1991). The bulk of the formal economic studies of the elasticity of demand find that demand is much less responsive—particularly in the short-run—than the value used in the study.

[31] Texas Perspectives, Inc./MGT of America, Inc., *The Potential Economic Impacts of Retail Competition in the Electric Utility Industry in Texas*, Austin, TX, Submitted to the Association of Electric Utility Companies of Texas (June 26, 1996).

Economic Perspectives estimates the impact of retail wheeling by predicting future prices of electric service for each customer class under current regulatory conditions and under a hypothetical retail wheeling scenario. The price impacts of the two scenarios are compared to determine the price increases arising from retail wheeling. The study then uses an "Economic Impact Analysis Module," which they describe as a network of interconnecting models, including an econometric forecasting model which includes over 100 exogenous variables,[32] and a regional input/output model to account for relationships among industries to predict statewide economic impacts.

In the base case scenario, retail prices of electricity for residential/small commercial, large commercial, industrial, and other customers were projected through the year 2007. The study assumes that prices will rise at or below the predicted inflation rate for each customer class: residential at a 3 percent annual inflation rate; commercial at 2.8 percent, somewhat below the inflation rate to reflect slower commercial growth; and industrial at 1 percent annually, reflecting the lower costs now available to some industrial customers.

The projected prices in the alternative scenario are based on changes on historic price data from the telecommunications industry following the breakup of AT&T. Using this price data, the study projects that future prices for residential customers in a retail wheeling scenario would rise at 4.7 percent annually from 1996 to 2007, approximately 57 percent higher than the predicted residential price in the baseline scenario. This value, 4.7 percent, is the approximate average increase in the cost of *local* telephone service from 1984 to 1994.[33] The study also projects that prices for large commercial customers will *fall* at 1.6 percent annually, and that industrial prices will *fall* at 3.6 percent annually.

The study presents no evidence that residential electric bills will follow the same average price path as local telephone bills. The study simply notes that "the capital

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[32] These include population demographics, fiscal and monetary policy parameters, and international economic factors.

[33] *Id.* at T. 4.

intensity of the industry, along with the potential for cost shifting, means residential and small business customers are likely to experience price pressures should retail wheeling be permitted."[34] During this same time interval, Texas Perspectives reports that the costs of all telephone services, including local and long distance, rose at less than the rate of inflation. If Texas Perspectives instead based its residential price projections on the costs of all telephone services rather than just local service, the study would have shown a cost *savings* for residential customers rather than an increase.

The study discusses some differences between conditions in local telephone service and current conditions in the residential electric market. In particular, prior to the introduction of competition in the long distance telephone market, local service was heavily subsidized by long distance service. Elimination of the subsidy led to substantial increases in the cost of local telephone service in the years immediately after the breakup. The study notes, however, that "cross-subsidization is not an issue for the electric industry . . ."[35] As such, it is unlikely that the price path of local telephone service is an appropriate proxy for the future price of electric service in a competitive retail market. A number of other arguments could be made about the differences between local telephone service prices following the breakup of AT&T and a hypothetical competitive retail electric market. In particular, local telephone service remains *un*competitive, it is therefore inappropriate to use the price path of a regulated monopoly service as a model for prices in a competitive electric market.

The conclusions of the Texas Perspectives study about the consequences for the Texas economy are entirely dependent upon the assumptions about future electric prices. As the assumed prices are unjustified, it is difficult to accept the study's broader conclusions without further justification.

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[34] *Id.* at 28.

[35] *Id.*

d) Applicability of Estimates to Texas' Restructuring

As can be seen from the summaries above, it is not a straightforward matter to estimate the impacts of competition. Each of the three studies cited above used a different approach and made assumptions that are questionable or overly simplistic, at best. The resulting estimates are highly dependent on the assumptions and methodologies used; the results of each study are directly dependent upon the assumptions regarding the future price path of electricity services. None of the studies, however, conducted a rigorous analysis of future electric prices, instead relying on loose comparisons and rules of thumb. Furthermore, the first two studies, being national in scope, lack the specificity necessary to apply their estimates directly to the Texas situation. The substantial variations that exist in industry costs, current electricity prices, and regional electricity consumption patterns are sufficient to limit the direct applicability of these estimates to Texas.

D. SUMMARY

In the absence of rigorous, reproducible estimates of the benefits of competition and regulatory restructuring, Texas is left in much the same position as the state commissions cited at the opening of this chapter. Most states that are aggressively pursuing electric competition and restructuring have based their restructuring efforts on determinations that generation of electricity can no longer be considered a natural monopoly and faith in competitive markets, combined with a much reduced regulatory rule, to keep costs under control. Although hard data from other industries and countries are sporadic, general studies of deregulation in the United States have shown positive economic benefits. Most observers agree that restructuring and competition will lead to net positive economic benefits for the State of Texas in the form of lower prices, customer choice, and innovation.

XI. PROVIDING SYSTEM BENEFITS IN A RESTRUCTURED INDUSTRY

Despite its widespread use in restructuring debates, the term "system benefits" has not been defined rigorously. Typically, the term is used to refer to a diverse grab bag of services and programs that are currently provided under the regulated electric industry structure, but that may not be provided to the same degree (if provided at all) in a more competitive electric market. Because there is no simple, all-encompassing justification for the provision of all categories of current services, there will not be a single public policy solution which will ensure the provision of all such benefits in a competitive market.

The first step in discussing system and related benefits is to define the terms of the discussion. Once defined, the characteristics of each category of service or program can be examined, along with the question of whether that specific service would be at risk in a competitive market. Some services may continue to be provided in a competitive market without the necessity of regulatory intervention. In other cases, the competitive market can be used to provide services through creation of economic incentives. Other services may only be sustained if they are mandated through legislative or regulatory action.

This chapter begins in Section A with definitions of system and related benefits. Section B identifies a preliminary set of services and programs, categorizing each in the context of the definitions in Section A. Section C discusses services that are being provided today. Section D reviews each service, discussing the likelihood that it will be provided in a competitive electric market. To help frame the debate, Section D raises the economic reasons why services would not be provided in a competitive market. The types of programs that can be used to provide these services are discussed in Section E, followed in Section F by a discussion of which benefits may become stranded in a restructured industry. Section G reviews funding, allocation, and performance measures.

A. SYSTEM, SOCIAL, AND STRANDABLE BENEFITS DEFINED

The Commission held a workshop on May 28, 1996, to discuss system benefits. In preparation for that workshop, Commission Staff requested that parties recommend definitions of system (and related) benefits. A review of the comments submitted by various parties indicated that definitions of system benefits varied widely, as did the types of services each defined as a system benefit. To provide common terms and definitions, Staff proposed at the workshop definitions similar to the following:

- *System Benefits:* Benefits to customers—and the electric system itself—which are currently derived from the physical operation of the electric system.
- *Social Benefits:* Benefits to customers—and society at large—from services associated with the electric system, which are currently provided through the electric system in accordance with public policy goals and/or mandates.
- *Strandable Benefits:* System or social benefits that will not be provided—or will be underprovided—in a competitive electric market.

The terms "system" and "social" benefits draw a distinction based on who receives the benefit and the source from which the benefit arises. In the case of system benefits, utility customers *and the system itself* benefit. These benefits arise through the operation of the system. As an example, reliability is classified as a system benefit because the interconnections incorporated in the electric system contribute to its reliability.

On the other hand, social benefits contribute to society at large but not necessarily the electric system itself. Although social benefits are currently associated with the electric system, social benefits do not arise from the physical operation of the system. An example is low-income programs currently provided by utilities. Low-income programs are provided by utilities in fulfillment of important public policy goals, but do not provide a distinct benefit to the electric system. Funding support for low-income individuals can be provided outside of the electric system itself (e.g., programs offered by social services agencies).

In many discussions of electric restructuring, the term strandable benefits is often used interchangeably with system and/or social benefits. However, strandable benefits are distinct; if a system or social benefit will not be provided at an appropriate level in a competitive market, it can be defined as strandable. If the benefit is still provided in a competitive electric market, it will not be stranded, and there is no specific requirement for regulatory intervention. Only to the extent that a system or social benefit becomes stranded would regulatory intervention be appropriate.

The difference between system and social benefits is more than just a difference in semantics. The distinction between the two categories raises questions about the means by which different categories of strandable benefits should be provided in a restructured market. Because system benefits enhance the efficiency and operation of the electric system, the system itself should ensure the preservation of strandable system benefits. Continuing with the example of reliability—because reliability is so integral to the electric system, the system should naturally be the source of any funding required to ensure its own reliability. On the other hand, social benefits are provided to fulfill broader social goals. Although the electric system has been used to provide these services in the past, in a competitive market, policy makers will be called upon to determine the appropriate services and programs to meet social goals and whether the electric system is the most appropriate vehicle to provide strandable social benefits.

B. Identification and Classification of System and Social Benefits

At the Commission's Workshop on Project No. 15000 held on February 14 and 15, 1996, Ralph Cavanagh of the Natural Resources Defense Council (NRDC) suggested that parties consider four essential categories of potentially strandable benefits: environmental protection, energy efficiency, research and development (R&D), and low-income programs.[1] For the Commission's subsequent Workshop held on May 28,

[1] See Cavanagh, Ralph, "Restructuring for Sustainability: Toward a New Electric Services Industry," presented to the Public Utility Commission of Texas, Project No. 15000, Transcript of Workshop on Electric Industry Restructuring, Restructuring Experiences and Applications for Texas (February 14 - 15, 1996).

1996, Commission Staff asked interested parties to identify specific system, social, and stranded benefits. Following review of the written comments and discussion at the Workshop, Staff compiled the following list of system and social benefits that could be stranded in a competitive electric market.[2] Note that with the exception of research and development, these categories are all represented in the consensus goals and principles adopted by the interested parties in Texas.[3]

Table XI–1: Proposed Classification of Strandable System and Social Benefits

Benefit Category	System Benefit	Social Benefit	Characteristics of Both
System reliability and safety	X		
Research and development	X		
Universal service			X
Resource diversity and renewables			X
Energy efficiency			X
Environmental protection		X	
Low-income programs		X	
Consumer protections		X	

Note: Staff classification based on review of written comments submitted by interested parties and discussions at Commission Workshops.

In the classification of system and social benefits, both safety and system reliability and R&D fall under the system benefits heading as contributing directly to the electric system. Environmental protection, low-income programs, and consumer protections are all programs that benefit electric consumers, and the public at large, but do not provide direct benefit to the electric system. Universal electric service, energy efficiency, and resource diversity and renewables combine characteristics of both system and social benefits. Each category is discussed in more detail below.

[2] Any classification system such as that presented in Table XI–1 incorporates the informed judgment of those making the assignments. It could reasonably be argued that some alternative assignments are appropriate. Nevertheless, in the context of policy making in Texas, Staff believed that these assignments are the most productive classification.

[3] See Chapter VII and the Staff paper on goals and principles, *Proposed Goals and Principles for Electric Industry Restructuring*, Project No. 15000 (April 4, 1996).

C. CURRENT LEVELS OF SERVICES PROVISION

System and social benefits are provided through a variety of mechanisms. Some benefits are provided through the current regulated structure, e.g., under PURA95 requirements. Other benefits, particularly environmental restrictions, are provided pursuant to State and federal laws. In some cases, utilities provide benefits through utility sponsored programs.

Little comprehensive information is available on the scope of current provision of system and social benefits and the funding levels for specific categories. The utilities in Texas were unable to determine for the Commission how much each spends on these programs and services.[4] Only Entergy reported a dollar figure for its expenditures; it spends $4.5 million annually on strandable benefits, although Entergy did not identify the specific programs included in this figure or the level of funding of individual programs and services.[5] TU Electric and CSW noted that funding is incorporated in total system costs and could not be broken out separately.[6] The discussion in Section F of this chapter presents available information on the current provision of system and social benefits.

D. WHY BENEFITS MAY BECOME STRANDED UNDER COMPETITION

System and social benefits become "stranded" benefits if they are underprovided or not provided at all in a competitive market. These benefits are provided today, either because they are a fundamental part of the industry structure or because they are required to be provided by the Legislature and Commission. If system and social benefits become stranded in a competitive market, no single reason will be the cause. System and social benefits may become stranded for several reasons; the first four listed below are described in Chapter IV under the heading "market failure:"

[4] A request for comments issued by Staff prior to the May 24th Workshop asked interested parties: "What is the current level of funding for [system, social, and stranded] benefits?"

[5] *Entergy Inc.'s Comments for System Benefits*, Project No. 15000 at 2 (May 20, 1996).

[6] *Comments of Texas Utilities Electric Company Concerning the Commission's Workshop on System Benefits*, Project No. 15000 at 5 (May 20, 1996). *Central and South West's Comments*, Project No. 15000 at 5 (May 20, 1996).

1. *Externalities:* An externality arises from a breakdown of private markets in which the price of a good does not reflect the complete costs and/or benefits of the production and/or consumption of the good.[7] Because the price does not reflect the full costs, an inefficient amount (either too much or too little) of the good is consumed.
2. *Public goods:* Public goods are also associated with a breakdown of private markets in which too little of a good or service is produced because an individual's private production incentive does not reflect the larger benefit to the public. Individuals also face an incentive to be a "free rider;" by relying on others to finance the good, the free rider can pay nothing but receive the same benefit.
3. *Information failure:* Information failure occurs when the marketplace provides insufficient information for producers and/or consumers to make efficient investment and buying decisions.
4. *Destructive competition:* Destructive competition involves competitive practices that can ultimately lead to economically undesirable outcomes (e.g., excessive cost cutting that endangers safety).
5. *Income insufficiency:* Income insufficiency—for lack of a better term—simply refers to the inability of some members of society to be able to afford crucial services. Many low-income, elderly, disabled, and rural residents face income constraints that make tradeoffs between electricity and other essential services a particular concern.

Note that there is a significant difference between the first four categories and the final category, which is labeled here "income insufficiency." The first four categories arise from failures of competitive markets to satisfy the efficiency conditions discussed in Chapter IV. Income insufficiency is an outcome of properly functioning markets, which ration scarce goods among consumers on the basis of their ability to pay for those goods. When individuals are unable to afford electricity, a fundamental social goal may be unfulfilled, even though this outcome is a normal and expected result of competitive markets. This distinction is stressed here to reinforce the point that strandable benefits arising for different underlying reasons may require (or allow for) different solutions. If a system or social benefit is stranded because of one of the four market failures listed above, the solution may be to address the specific shortcoming in the market. On the other hand, if someone is simply too poor to afford adequate

[7] For a formal set of economic definitions, see Baumol, William J. and Wallace E. Oates, *The Theory of Environmental Policy*, 2nd edition, Cambridge, England: Cambridge University Press at 15 - 18 (1988).

electric services, the answer will not lie in some market correction, but must lie in a support mechanism or in-kind program.[8]

Each of the system and social benefits discussed throughout this chapter can be classified according to these five criteria. A preliminary classification is presented in Table XI–2. Some of the system and social benefits share characteristics of several categories, but in the table, only the most evident characteristics are noted.

Table XI–2: Causes of Insufficient System and Social Benefits Provision in a Competitive Market

Benefit Category	Externalities	Public Goods	Information Failure	Destructive Competition	Income Insufficiency
Safety and system reliability				X	
Research and development		X			
Universal service		X			X
Resource diversity and renewables	X	X			
Energy efficiency			X		
Environmental protection	X				
Low-income programs					X
Consumer protections			X	X	

Note: Staff classification based on review of written comments submitted by interested parties and discussions at Commission Workshops.

E. MECHANISMS FOR PROVIDING SYSTEM AND SOCIAL BENEFITS

In discussions of system and social benefits associated with electric industry deregulation and restructuring, some type of "wires" charge is typically offered as a solution to the problem of potentially strandable benefits.[9] A wires charge is a cost

[8] The concern for low-income individuals is deeper than just their ability to pay for electricity. At the Commission's Workshop, Nieves Lopez of the Texas Department of Housing and Community Affairs noted that low-income households may forego other essentials, for example, adequate nutrition, to pay for electricity, which may be considered the highest priority among the items commonly labeled necessities. See Project No. 15002, Workshop Transcript at 143 (May 24, 1996).

[9] In the Commission's Workshop on February 14 and 15, 1996, much of the discussion on the issue of system and social benefits focused on the means of financing system benefits. In his presentation, Ralph Cavanagh of the Natural Resources Defense Council proposed a "universal system benefits charge," to provide funding for stranded benefits. Upon first consideration at the Workshop, many of the participants agreed that a mechanism akin to a universal system benefits charge would be an appropriate means to fund stranded benefits.

imposed on distribution and/or transmission services that would be used to fund system and social benefits. Based on the argument that everyone benefits from the provision of the services funded through the charge, wires charges spread the costs of providing system and social benefits across all customers. Wires charges are referred to as "nonbypassable" charges because any electricity user connected to the transmission and/or distribution grid would be subject to the charge. However, no such charge will be absolutely nonbypassable. Self-generators may be able to avoid the charge by operating outside of the transmission and/or distribution system. It is unlikely that a customer will opt to self-generate simply to bypass the charge.

Although a wires charge is a relatively simple means of providing support for potentially strandable benefits, it is unclear that any single approach is indeed the appropriate means for addressing *all* potentially strandable system and social benefits. The preceding section points out that system and social benefits may not be sufficiently provided in a competitive market for a variety of economic reasons. Although a simple wires charge could be collected to fund all sorts of stranded benefits, the goal of economic efficiency would suggest developing a set of more targeted solutions. In particular, inefficiencies arising from market failures may call for solutions that more closely mimic a properly functioning competitive market. A selection of the common alternative approaches include the following (specific approaches are matched with categories of system and social benefits in the next section):

1. *Regulatory standards:* Establishment of a regulatory standard is perhaps the most common means used to address various market failures. Most environmental laws that impose performance standards (e.g., emissions must remain below some fixed rate) fall under this heading. Any of the potentially stranded benefits could be addressed through regulatory requirements; however, regulatory standards are often economically inefficient. The lack of flexibility from imposing uniform requirements on all companies may preclude some companies from enacting truly cost-minimizing solutions.
2. *Incentive measures:* Incentive measures include taxes, tax exemptions, and market mechanisms. The latter category, market mechanisms, includes emission cap and trading programs that have been applied

recently under the federal acid rain program.[10] Several examples of market failure, particularly externalities and public goods, are candidates for economic incentive measures. Such measures are designed to overcome breakdowns of private markets, (e.g., exclusion of environmental costs from energy prices). Economic incentive measures are likely to be the most economically efficient alternatives for specific categories of stranded benefits. (However, incentive measures must be designed carefully to preclude creating unintended incentives.)

3. *Public provision:* In some extreme cases, public provision has been found to be the most successful means to provide services, particularly for public goods. As noted in Chapter IV, both libraries and highways are provided by governments because private market incentives may be insufficient to ensure adequate services.

4. *Financial support:* Direct financial support has been provided in the case of public goods and to supplement insufficient incomes. For example, the federal government subsidizes research and development, a public good. The State also provides subsidies for low-income electricity consumers. Providing a subsidy is at the heart of recommendations for a universal system benefits, or wires, charge.

5. *Information access and dissemination:* Certain potentially strandable benefits may be due to insufficient information in the hands of consumers or information disparities among various parties, (e.g., customers versus sellers). Information failure can be overcome by requirements for equal access to information, information dissemination, and educational services. Addressing information failure may be a low-cost means to an economically efficient solution.

6. *Pooling:* Pooling involves combining large numbers of high risk customers under the anticipation that the individual risks will be spread across the entire risk pool. Pooling is common in the insurance industry where individual claims are financed through the contributions of the remaining members of the pool.

Depending upon the particular circumstances, these mechanisms for addressing stranded benefits can be applied individually or in combination. Various mechanisms could be used in conjunction with the universal system benefits charge typically discussed.

[10] The federal acid rain program is found in Title IV of the Clean Air Act Amendments of 1990.

F. Which Benefits Become Stranded in a Competitive Market

In a competitive electric market, some system and social benefits may become stranded, while others may continue to be provided. In some cases, regulators may be able to take advantage of market solutions to provide stranded benefits, with only a limited amount of regulatory intervention. This section provides a background discussion on each category of system and social benefits to help evaluate whether the category may be stranded and the appropriate means to provide stranded benefits in a competitive market.

1. System Reliability and Safety

Standards of service for electric utilities in Texas are established under §2.155 of PURA95. Utilities are required to provide "safe, adequate, efficient, and reasonable" service and facilities. The resource planning requirements of PURA95, §2.051(a) also highlight reliability as a preeminent goal of the planning process. ERCOT and the other reliability councils operating in Texas set reserve margin standards to ensure generation reliability. But perhaps most important in the traditional regulated industry, rate of return regulation provides a strong incentive for firms to make investments that contribute to system reliability and safety.

System reliability and safety is classified as a *system benefit*. Clearly, the assurance of reliability and safety benefits electricity customers and enhances the operations of the physical system. Different aspects of electric service should be considered; the reliability concerns with respect to the transmission system are not identical to those of generation.[11]

Ongoing expenditures on safety and system reliability may include both operating and maintenance costs and capacity investments. These types of expenditures are funded as a part of the utility's cost of service, and as such are incorporated in the utility's rates. Under new Commission rules for unbundled pricing,[12] the reliability and safety costs of

[11] See the discussion of ensuring quality of service in a competitive market included in Chapter XII.

[12] P.U.C. SUBST. R. 23.67(o).

generation, transmission, and distribution will be allocated to each function, but will remain in the utility's rates. Short of a detailed proceeding, perhaps approaching a general rate case, it would be difficult to identify the actual costs a utility expends on this particular aspect of service.

Safety and system reliability is primarily of concern in a competitive market due to destructive competition, which could lead individual providers—in their quest to become more competitive—to cut maintenance and investment costs to the point where reliability and safety are threatened. It is unlikely that firms would completely ignore reliability and safety, but possible that they could *underprovide* it. The issue of system reliability in an increasingly competitive—and interconnected—market has become a high profile issue recently with the multiple shutdowns of portions of the western power grid. Some observers have hypothesized that competitive pressures contributed to the power outages.[13] Competition could be responsible for two reasons: excessive cost cutting (i.e., destructive competition)[14] and increasing complexity (and interconnection) as more and different users access the grid.

To ensure adequate provision of transmission reliability and safety in a competitive generation market, the Legislature and/or the Commission could impose specific performance standards on transmission and distribution companies. The drawback of this approach is that it could become very regulation-intensive in that the Commission could be required to address safety in minute detail (e.g., specific dispatch criteria or setting specific standards for how many trees must be trimmed, how far from power lines, and on what schedule).

A more structural approach to transmission system reliability and safety is placing greater responsibility in the hands of an independent system operator (ISO). This approach addresses both of the possible causes for reliability lapses that could be

[13] See for example, Holden, Benjamin A., "Did Competition Spark Power Failures?" *Wall Street Journal* at B1 (August 19, 1996).

[14] It appears that inadequate maintenance of right of way around high voltage electric lines is at least partially responsible for the two recent outages. If reductions in budgets for maintenance (e.g., tree trimming) are the result of cost cutting pressures, destructive competition could be to blame.

attributable to greater competition, cost cutting and increased interconnection. By being independent of profit-making utilities, the ISO would not share the same incentives for excessive cost cutting. The ISO also addresses the risks from the increasing complexity and interconnection of the system by offering a clearinghouse for information/communications that should centralize and speed the information flow about system operations. First steps toward establishing an ISO in ERCOT have already been completed by the Commission.[15] The ISO will be fully operational in early 1997.

Reliability in the utilities' generation function may be at risk in a competitive generation market if utilities cut costs by reducing reserve margins or delaying investments for needed capacity. It is possible that changes in power pricing and service options (e.g., time-of-use rates) could offset the need for additional capacity if consumers smooth the peaks of their electricity demand over the day or season. Other service choices, such as interruptible rates, which allow utilities to interrupt service temporarily at peak use times should also contribute to reliability. Nevertheless, the Legislature and/or the Commission may find it necessary to impose standards, e.g., minimum reserve requirements, to ensure that adequate reliability is provided in a competitive market.

Ensuring adequate system reliability and safety could require additional funding to countermand the utilities' incentive under competition to cut costs excessively. As system reliability and safety is a *system* benefit, it is especially appropriate to use the system itself as a funding source. Thus, the recommendation for a nonbypassable universal systems or wires charge could best be applied in this case. It should be noted, however, that any funds awarded a company for additional reliability and safety measures could be used by the company to displace in-house expenditures. (An ISO would not share this incentive.)

[15] At its Open Meeting of August 23, 1996, the Commission unanimously adopted the proposal for an ISO in ERCOT (Project No. 16018).

2. Research and Development

Currently, research and development (R&D) is carried out by individual utilities, through organizations collectively funded by utilities (most notably the Electric Power Research Institute or EPRI), the Department of Energy (DOE) and other government agencies (including the national energy laboratories), at universities, and by technology providers. R&D expenditures are classified as a system benefit because technological and operational advances may provide significant benefits to the physical system. Because R&D encompasses a very broad set of issues and technologies, benefits will be provided to consumers as well (e.g., advances in fuel use and emission controls that reduce environmental pollution).

In a competitive market, R&D may be underprovided due to the public goods nature of R&D spending. Even though every firm in the electric industry benefits to some degree from technology advances provided by R&D investments, it would be relatively easy for any firm to minimize its own investment in R&D, hoping instead to benefit from the investments of other firms. The long-standing practice has been for regulated utilities jointly to fund (and help conduct) long-term research under the auspices of EPRI, with the substantial costs of EPRI membership passed through to captive customers in electric rates. However, in a competitive market, companies may be compelled to cut their overall costs—including their R&D budgets—and may no longer be willing to fund joint R&D without the assurance that such costs can be recouped through competitive prices. Robert W. Fri noted recently that the incentives for companies to invest in R&D are changing under electric restructuring, and will have a significant impact on R&D:

> *[T]he move to a more competitive industry undermines the premise on which electric industry R&D has rested for the past 20 years. The existing research system rests on the inability of individual regulated electric companies to capture the benefits of research.*[16]

[16] Fri, Robert W. ". . . But Whither Research," *The Electricity Journal* at 74 (December 1995).

In a competitive marketplace, generating companies may not be able to pass along research costs if competitors are not paying a comparable research bill. Thus, all generators have an incentive to *underprovide* research funding. Recent trends in EPRI membership and funding appear to substantiate this result. Government sponsored funding is also likely to continue (although the total budget has been falling), as is research by equipment manufacturers.

Table XI–3 presents federal budgeted expenditures on energy R&D for 1992 through 1997 In fiscal year 1996, total funding equaled over $1.5 billion, a reduction of over 17 percent from 1992. The table also indicates a decided shift in the types of energy

Table XI–3: Federal Energy R&D Budgets FY 1992 - 97 (millions)

R&D Category	1992	1993	1994	1995	1996	1997
Clean coal technologies	$410.1	$0.0	$221.5	$36.3	$150.0	$0.0
Fossil energy						
Coal	225.6	186.3	165.9	144.5	121.3	102.6
Petroleum	56.5	61.6	74.3	75.2	55.7	52.5
Gas	63.2	79.5	94.8	109.5	112.2	103.7
Other fossil	69.1	70.7	73.9	76.9	70.9	60.1
Energy Conservation						
Transportation	109.3	138.6	176.9	191.1	176.6	221.3
Utility	4.7	4.9	6.7	8.7	0.0	0.0
Industry	96.7	111.7	123.9	138.0	115.7	159.4
Buildings	43.1	47.7	49.9	95.3	77.8	125.2
Policy and management	2.7	3.6	4.7	17.8	13.4	17.3
Renewable resources						
Solar	174.3	186.2	242.3	259.2	192.3	263.3
Geothermal, hydrogen, hydro, superconductivity & storage systems	65.5	66.6	77.9	95.8	82.2	82.7
Policy	1.9	2.9	3.8	18.8	14.0	17.3
Nuclear	218.5	209.7	105.3	194.6	137.6	137.8
Fusion	332.2	335.2	328.6	137.6	227.4	255.6
Total energy R&D budget	1,873.4	1,505.2	1,750.4	1,599.3	1,547.1	1,598.8

Source: U.S. Department of Energy, Energy R&D: Shaping our Nation's Future in a Competitive World, Final Report of the Task Force on Strategic Energy Research and Development at A-6–A-10 (June 1995); U.S. Department of Energy, FY 1997 Congressional Budget Request (October 1996), retrieved from http://www.cfo.doe.gov/budget/intdocs/stat97.htm.

Note: 1995 values include recisions. 1997 values are from appropriations bill.

R&D funded by DOE. R&D funding for clean coal technologies, fossil energy, and nuclear energy have been reduced substantially, by over 36 percent from 1992 to 1996, with an even larger shift planned for 1997 with the elimination of funding for the Clean Coal Technology program. Funding for energy conservation and renewable resources rose almost 65 percent in the same interval, but was reduced in 1996. A large increase in energy conservation and renewables expenditures is planned for fiscal 1997. Of the energy conservation expenditures, only a very small portion is directed to specific utility issues; 1995 energy conservation in the utility area equaled $8.7 million—all dedicated to integrated resource planning. This account was eliminated in the 1996 budget. Of the funding directed to fossil fuels, the great majority is allocated to advanced generation technologies and to fuel exploration and production; little, if any, is directed to electricity transmission and distribution systems.

Federal priorities for R&D expenditures shifted dramatically for the 1996 fiscal year as federal R&D expenditures on renewables were cut back. The budget at the federal government's National Renewable Energy Laboratory fell over 32 percent from $247 million in 1995 to $167 million in 1996.[17] At Oak Ridge National Laboratory, the renewables budget dropped about 22 percent from $18.7 million in 1995 to $14.6 million in 1996, and the research program into transmission and distribution was discontinued.[18] Although R&D expenditures by utilities are difficult to track, a recent industry study reports that electric utility R&D expenditures at 110 electric utilities decreased 19 percent in 1995 to $498 million.[19]

Recall that R&D may be underprovided in restructured market because it qualifies as a public good. In many policy contexts, government provision is used to compensate for public goods. The federal government currently plays a large role in energy R&D.

[17] Schuler, Joseph F. Jr., "Research and Renewables: Funding at the National Energy Labs," *Public Utilities Fortnightly* at 25 (August 1996).

[18] *Id.*

[19] The TECC Group, as reported in "Utility R&D Plummets by 19 percent," *The Electricity Daily*, Vol. 7(32), (August 15, 1996).

That role could be extended by further public provisions (e.g., expenditures on the national energy laboratories) or greater financial support for outside research (e.g., grants to education and research institutions). Regulatory standards that require utilities to conduct R&D could also be applied. An alternative approach that relies less on government sponsorship is the creation of economic incentives encouraging R&D.[20]

As a system benefit, additional funding needed to sustain R&D should be collected through the electric system. Like system reliability and safety, a wires charge could be used to supplement utility funded R&D. However, by providing supplemental funds, companies will have an incentive to attempt to substitute public funding for privately generated resources.

3. Universal Service

Universal service refers to the opportunity for all customers, particularly residential customers, to receive essential electric services. Universal service is currently provided as a fundamental component of the regulated utility industry structure. Under §2.259 of PURA95, a holder of a CCN is required to "serve every consumer within a certified area . . ." Thus universal service is guaranteed by the very *non*competitive market structure under which vertically integrated utilities operate. There are two separate components of universal service—*access* to the distribution system and *delivery* of energy over the system. Currently, this distinction is blurred by the integration of energy and distribution services within a single service provider. However, if universal service is stranded in a competitive market, this distinction will become more evident, and each component could be addressed by separate means. The discussion in the remainder of this section focuses on universal access to the distribution system. Energy delivery is discussed under low-income programs.

Universal service shares the characteristics of both system and social benefits. Universal access is a system benefit because the network nature and the breadth of the system enhances system operations and stability. Universal service also extends the

[20] See Chapter XII for a discussion of incentive regulation (i.e., performance-based regulation) and its application to performance measures.

scope of the marketplace. It has long been a societal goal that electric service be extended to all residents, as demonstrated by the goal of the rural electrification program to electrify the nation. Universal service makes an important contribution in facilitating commerce, generally; the more widespread the scope of the electric system, the greater the opportunities for communications and commerce.

As in the case of safety and system reliability, the costs of providing universal service are difficult to distinguish from the overall cost of service. Costs of providing electric service to an individual customer may vary based on location and other factors. Such cost variations are not reflected in the electric services provided under average rates.

Universal access is currently provided through the State's requirement that utilities provide service to every customer in their service territories, although customers may be required to pay a substantial portion of the costs of extending electric lines to areas not already receiving service. In a restructured market, the obligation to provide access should remain with the local distribution company. If transmission and distribution remain monopoly functions, provision of universal access should be unaffected by a competitive generation market. As long as distribution companies are required to serve all customers in their territories, universal access would likely continue to be provided much as it is today.[21] As a system benefit, it is reasonable to support the robustness of the distribution network by funding universal access through the network; hence, it is appropriate to continue to fund universal access through distribution cost of service.

4. Resource Diversity and Renewables

Until 1996, resource planning in Texas has been conducted under the provisions of the 1983 amendments to PURA requiring electric utilities to consider conservation, alternative power sources, and pooling arrangements in their planning processes.[22] PURA95 requires a detailed set of planning procedures (formalized in the

[21] If distribution becomes competitive and/or is no longer regulated as a monopoly, new standards for providing universal service may be required.

[22] In part, diversity decisions were driven by the requirements of the Fuel Use Act and other influences described in Chapter II.

Commission's 1996 rules on Integrated Resource Planning (IRP)).[23] According to the new rules, utilities must conduct all-source competitive bidding with limited Commission oversight. Utilities must consider a broad range of resource alternatives—including resources offered in bids by third parties—and must incorporate public participation from customers, competitors, and non-customers. As the planning requirements have only just been adopted, the associated costs utilities will incur under IRP processes have not yet been identified.

Resource diversity and renewables is both a system and social benefit. Overcommitment to a single resource type leaves the system vulnerable to supply disruptions and catastrophic events. The natural gas crisis of the early 1970s, described in Chapter II, is one such example. Much like an investment portfolio spreads the risk of each individual security over the entire portfolio, diversifying the generation resource portfolio spreads the risk of specific resource types by improving the robustness of system operations and reducing fuel cost volatility. Diversity and renewables also contribute to broader social goals. In many different surveys and forums, large numbers of utility customers have indicated a preference for including renewable resources in the generation mix, even though adding renewables may be more expensive than relying entirely on fossil fuel-fired and nuclear power.[24] Some renewable resources also provide a social benefit by avoiding the adverse environmental costs associated with fossil fuel-fired generation.

Currently in Texas, renewable resources, including hydroelectric resources, make up only a small fraction of the State's generating resources, less than 1 percent. Installed capacity in hydroelectric plants is 395 MW, or 0.7 percent or the total installed capacity of the State. Installed capacity in wind generation is less than 1 MW.

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[23] P.U.C. SUBST. R. 23.34.

[24] In deliberative polls™ conducted by CPL and WTU under the new IRP process, participating customers indicated a willingness to pay higher utility bills for inclusion of renewable resources in the utilities' resource mix. In the June 1 - 2, 1996 poll conducted by CPL in Corpus Christi, customers were willing to add, on average, $5.56 to their monthly electric bills for inclusion of renewables (post deliberation results). At the August 9 - 10, 1996 poll conducted in Abilene by WTU, the average willingness to pay was $7.83.

Diversity and renewables embody characteristics of both externalities and public goods. Resource decisions made by companies may exclude (or undervalue) consideration of the environmental costs associated with the resource.[25] Thus, resource decisions could result in the selection of generating facilities that emit a larger quantity of pollutants than would be the case if the cost of those pollutants were borne by the firm and hence incorporated into planning decisions. Resource diversity also entails public goods characteristics. All citizens would benefit from the risk reductions included in a more diverse resource mix. However, since the benefits are enjoyed broadly rather than just by the company, individual firms may have insufficient incentives to invest in a diverse array of resources if diversity carries a sufficiently high price tag.

There are several means to address the public goods issue with respect to planning and diversity. (The externality issue is discussed below under environmental protection.) One method is a portfolio requirement, a minimum renewables purchase requirement for each utility in the State. Alternatively, a portfolio requirement could mandate that retail aggregators and/or distribution companies buy a minimum portion of their power requirements from renewable resources. A Bill recently introduced in the U.S. House of Representatives by Representative Schaefer of Colorado—H.R. 3790, the Electric Consumers' Power to Choose Act—also includes a portfolio requirement. The renewables requirement would be fulfilled by presentation of a sufficient number of "Commission Renewable Energy Credits." Each electric generator would be required to hold these credits for up to 2 percent of its electric generation. In 2005, the minimum percentage rises to 3 percent, and to 4 percent in 2010. The credits could be traded among companies, thus reducing the overall cost burden for constructing renewable facilities. This approach has been compared to the cap and trade system adopted in the Clean Air Act Amendments of 1990 for control of sulfur dioxide emissions from power plants that lead to acid rain.

[25] Current methods of resource planning and diversity may also incorporate information failure as consumers often lack information on resource options and prices.

As a means of ensuring a diverse resource mix, a portfolio requirement would affect all suppliers (or distributors) equally. The costs of financing renewables would be included in generation charges, and it would be difficult to bypass a properly designed portfolio requirement, except through self- or co-generation.

Another approach to providing a diverse portfolio mix is institution of a market-based approach, including tax incentives. One notable example of a market approach would create incentives for greater renewables through customers' desires to receive so-called "green" power. As described in Chapter VI, green pricing allows customers to *choose* to purchase power from suppliers offering renewable (or green) resources as a source of supply. With customer choice, the market will likely offer these incentives for fuel diversity through renewables, but it is unclear how extensive demand for green power would be (and how large the price premium could be). Green pricing options also reflect public goods characteristics, because customers pay individually for a benefit shared by all. Thus, a portfolio requirement, or a more broadly based market mechanism like tax incentives, may overcome the public good problem more successfully than simply relying on green pricing. Information dissemination may also play on important role an providing resource diversity and renewables, particularly with respect to consumer input in utility planning and service options like green pricing.

As a system benefit, a wires charge could also be an appropriate means to fund additional resource diversity.[26] Because resource diversity and renewables also shares characteristics of a social benefit, a more broadly based funding mechanism (i.e., a mechanism not tied to the electric system) would be appropriate if resource diversity becomes elevated to a statewide policy goal. In sum, a variety of approaches could be used to ensure a sufficiently diverse mix of generation resources.

[26] In the electric industry restructuring legislation recently adopted by California, utilities are directed to fund renewable resources above a minimum level. A specified quantity of funds drawn from the State's nonbypassable distribution charge will be allocated to spending on qualifying renewables projects.

5. Energy Efficiency/Conservation

Energy efficiency refers to goods and services that reduce the use of energy without reducing desired productivity or comfort levels. Examples of energy efficiency goods may include highly efficient power plants or home energy appliances that reduce electricity consumption. Energy efficiency services refer to a broad class of services (some of which are discussed in Chapter VI), but can include load and price-risk management. Energy efficiency investments may occur in either the supply or demand (i.e., end-use) markets. Supply-side efficiency investments include power plant efficiency improvements, co-generation, and renewable resources. End-use energy efficiency is often referred to as demand-side management (or DSM), and includes conservation and load management.

Energy efficiency goods and services are provided through a variety of mechanisms. In some cases, utilities have sponsored DSM programs. Starting in 1981, TU Electric and HL&P initiated the rebate program approach in Texas with a focus on cooling efficiency. A customer rebate was used to encourage purchases of more efficient air conditioners. In some cases, utilities provide opportunities for consumers to manage their demand efficiently be offering time and location differentiated tariffs. Energy efficiency services are also provided by independent, private providers, sometimes known as "Escos." On the supply side, utilities may invest in energy efficient plants or take actions to make existing operations more efficient. The costs of utility investments are recovered in their rates.

The level of utility activity in energy efficiency is relatively small in comparison to overall utility revenues. Utility expenditures on DSM have ranged from 0 to 2 percent of total revenues, with a median of about 0.4 percent of revenues. These expenditures include promotional activities in addition to conservation and DSM. Estimates of expenditures in supply-side efficiency programs are difficult to make because many of the routine activities and expenditures are related to improvements in generating unit heat rates and efficiencies, and as such, cannot be allocated specifically to energy efficiency.

Energy efficiency incorporates characteristics of both system benefits and social benefits. Simply put, energy efficiency can reduce system-wide waste. Consumers pay lower electric bills because they consume less electricity, and society as a whole is able to reduce expenditures on fuel and capital for new plants. Saved resources are preserved for other, more valuable uses. Energy efficiency also provides greater social benefits by reducing environmental pollutants, for the simple reason that using less electricity burns less fuel, leading to reduced emissions.

From an economic perspective, it is important to note that there is an optimal quantity of investment in energy efficiency technology and services. If too *little* energy efficiency investment is undertaken, society's resources would be better allocated with greater expenditures; conversely, if too *much* investment is undertaken, resources would be put to better use by cutting back on energy efficiency expenditures. How should the appropriate amount of energy efficiency services be determined? A decision maker, such as an energy consumer, has a financial incentive to invest in energy efficiency as long as the energy saved is worth more than the costs of saving it. Economic logic would indicate that the optimal amount of energy efficiency investment is the amount provided in a private market operating with complete information and without externalities.

Many observers believe that energy efficiency is currently underprovided. Energy efficiency is underprovided because of both externalities and information failure. Externalities are of greater concern with respect to the efficiency of supply-side resources, while information failure is more relevant to energy consumption.

Information failure is a concern for consumers' investments in energy efficiency. Consumers may lack information of several different types:

- Lack of information on costs of alternatives;
- Lack of information on efficiency of alternatives; and

- Inability to perform complex cost comparison.[27]

Without access to accurate information on the range of choices, the costs of those choices, and the efficiency of each, it is impossible for consumers to make informed comparisons. In addition, consumers may be unable to make efficient choices when comparisons involve complex mathematical calculations. An extensive body of economics literature describes consumers' inability to make complex efficiency comparisons involving large current expenditures and returns occurring over a long period.[28]

To ensure provision of the appropriate amount of energy efficiency in a competitive market, the most economically efficient approach is to address the market failures and let the market allocate energy efficiency services and investments. Information failures can be addressed directly by ensuring information is provided to consumers on choices, the costs of choices, and the efficiency consequences of those choices. Information can be provided by the utilities themselves (under appropriate guidelines)[29] or through some other public means. Information dissemination is not enough, however, if the problem lies in consumers' inability to *process* that information and make informed

[27] In addition to these economic failures, consumer energy efficiency choices may be ***economically*** inefficient because of the distortionary pricing signals faced by electricity consumers taking electric service under cost of service rates. See Chapters II and IV for a discussion.

[28] A lengthy economics literature has investigated consumer market failure in the choice of energy efficient appliances. To determine whether consumers make rational energy efficiency investments, economists have looked at the discount rates implicit in consumer decisions. A discount rate similar to the prevailing interest rate indicates rational consumer decision making, while elevated discount rates indicate information (or information processing) failure. Jerry Hausman reported in 1979 that consumers purchasing home room air conditioners incorporated discount rates with a mean value of 26.4 percent, with a range from 5.1 to 89 percent, depending upon the household income level. Hausman, Jerry, "Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables," *Bell Journal of Economics* Vol. 10 at 33 (1979). In a follow-up study, Dermot Gately analyzed consumer choices of household refrigerators, for which he found that discount rates could be as high as 300 percent. Gately, Dermot, "Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables: Comment," *Bell Journal of Economics* Vol. 11 at 373 (1980). At the time, these authors recommended adoption of appliance standards and information dissemination to overcome the information failure. More recently, Jeffrey Dubin found similar discount rates for consumer choices on the type of home heating technology and for home water heaters. Dubin, Jeffrey A. "Will Mandatory Conservation Promote Energy Efficiency in the Selection of Household Appliance Stock?" *The Energy Journal*, Vol. 7 at 99 (1986). Other studies have found discount rates as high as 800 percent for choices of electric water heaters. Riderman, Henry, Mark D. Levine, and James E. McMahon, "The Behavior of the Market for Energy Efficiency in Residential Appliances Including Heating and Cooling Equipment," *The Energy Journal*, Vol. 8 at 101 (1987).

[29] Electricity bill inserts have been suggested as a ready means to disseminate information to electricity customers.

comparisons. Additional education, training, and assistance may be required to assist customers in processing efficiency information.

Other means of providing energy efficiency assistance are available, and some alternative sources are in use today. However, these alternatives are all likely to be less economically efficient than addressing the information failure. Energy efficiency mandates can be imposed on generators to address supply-side efficiency or on distributors as a means of addressing the demand side. On the supply side, the inefficiencies of a mandate could be blunted by implementing a portfolio requirement similar to that discussed above under resource planning and diversity. If efficiency requirements of some sort were to be applied, the coverage should be as broad as possible to minimize competition from sources that are not subject to the costs accompanying the requirements.

A competitive environment may be inconsistent with energy efficiency *mandates*. Such mandates may inhibit operations in a competitive market, preventing companies from cutting costs where possible. Mandates are of particular concern when only one segment of the market is subject to the requirements. For example, if traditional electricity generators are required to provide a specific amount of energy efficiency, but alternative suppliers (e.g., independent power producers and power marketers) are not, the regulated portion of the market will not be able to compete on an equal footing with the unregulated providers. As a result, the market may be neither competitive nor efficient.

6. Environmental Protection

A number of sources provide protection of the environment and public health from exposure to pollutants emitted by power plants and associated sources. The Commission plays only a limited role in those protections. The Commission has virtually no role in the protection of the environment with respect to the operation of *existing* generating units. In the construction of new generating units, the Commission's limited role stems from the requirement for approval of a CCN, and in the addition of new resources in the formal competitive bidding process required under the Commission's IRP process.[30]

Table XI–4: Partial List of Local, State, and Federal Environmental Requirements for Power Plants

Oversight Category	Program Type	Jurisdiction	Authority
Air emissions	New sources	Federal/State	CAAA Title I, TCAA
	Non-attainment areas	Federal/State	CAAA Title I
	Acid rain program	Federal	CAAA Title IV
	Federal operating permits	Federal/State	CAAA Title V, TCAA
	Emission monitoring and reporting	Federal/State	TRI, CAAA Title IV, TCAA
Water quality	Release permitting	Federal/State	CWA, WQCA
Siting and land use	Siting requirements	Local	Various
	Certificate of convenience and necessity	State	PURA95 §§ 2.251-2.264
	Integrated resource planning	State	PURA95 §2.051
	Wetlands protection	Federal	CWA
	Endangered species	Federal	ESA
Solid and hazardous wastes	Waste treatment and disposal	Federal/State	RCRA, SARA, SWDA
Water use	Water rights	State	WQCA

Notes: CAAA—Clean Air Act Amendments of 1990; TCAA—Texas Clean Air Act; TRI—Toxic Release Inventory; CWA—Clean Water Act; WQCA—Texas Water Quality Control Act; ESA—Endangered Species Act; RCRA—Resource Conservation and Recovery Act; SARA—Superfund Act Reauthorization Amendments; SWDA—Texas Solid Waste Disposal Act. Texas Natural Resources and Conservation Commission regulations appear at 30 TAC.

Table XI–4 includes a partial list of environmental standards and programs relevant to the location and operation of power plants. Federal, State, and local requirements impose restrictions on utility siting, design, and operations. Most siting oversight is provided at the State level—in the IRP process and the award of CCNs—and under local zoning and land use restrictions; however, some federal requirements (e.g., wetlands, endangered species, and federal lands) may also be involved. Plant design can be influenced by State and federal restrictions on fuel use and by emission requirements, either of which could lead a utility to choose one plant technology over

[30] See PURA95 §2.051.

another. Air and water emissions and solid waste practices are regulated under State and federal laws, and may come under some local planning and licensing restrictions.

Environmental protection is classified as a social benefit because environmental measures protect the public health and reduce environmental degradation. Environmental protections provide little or no specific benefit to the operation of the electric system.

As noted briefly above, environmental protection is the classic case of an externality. To achieve efficiency in economic decision making, all the goods and services exchanged must have transparent market prices. In building or operating a power plant, the prices of most goods—like land, fuel, cement, and financing—are well known. But goods like public health and environmental quality do not carry transparent prices (or costs). It is this inability to "internalize" the costs of health and environmental goods in economic decisions that may lead to the overproduction of pollutants (and underinvestment in pollution minimization and/or abatement). Environmental standards like those presented in Table XI–4 may internalize partially environmental and public health damages associated with power plants, but are unlikely to provide an economically efficient degree of protections.

Current environmental rules and restrictions may in some cases *reduce* economic efficiency if different market participants are subject to different requirements, a situation generally known as the "piecemeal problem."[31] As a pertinent example, electric utilities in Texas are required to receive CCNs prior to construction of a power plant; however, a non-utility (e.g., a self-generator, co-generator, or EWG) can construct a plant without a CCN, although the non-utility may be subject to other State and federal restrictions. The piecemeal problem arises if the necessity of receiving a CCN prevents a regulated utility from constructing a facility that is instead constructed

[31] The piecemeal problem is an illustration of the more general economic concept known as the "theory of the second best," which explains that in an economy in which more than one condition for perfect competition does not hold, restoring a limited number of competitive conditions will not necessarily improve efficiency. See Lipsey, R. G. and K. Lancaster, "The General Theory of Second Best," *Review of Economic Studies*, Vol. 24 at 11 - 32 (1956 - 1957).

by a *less efficient* non-utility. The non-utility may be less efficient because its facility is more costly, produces larger emissions, exposes more individuals to pollutants, or affects sensitive ecosystems. Like the CCN requirements, any regulations incorporating environmental restrictions that apply only to one segment of the market, and not to others, *may* reduce efficiency.

As the electric market becomes more competitive, but utilities remain under regulation, the piecemeal problem may become more pronounced. If in the partially regulated market, a customer switches from a utility supplier to a non-regulated supplier with lower prices *but higher environmental impacts*, total social costs may increase. Thus, the current state of the electric market that leaves it *partially* regulated may lead to greater environmental damages and lower economic efficiency than either a fully regulated market or a fully competitive market.

Whether environmental protections will be stranded in a competitive market is not entirely clear. In some visions of a restructured generation market, firms may no longer be required to receive CCNs nor participate in the Commission's IRP process. In that case, the Commission would lose its influence over resource choices and its ability to influence generation plant siting decisions. As a result, some environmental protections could be stranded. On the other hand, the existing CCN and IRP requirements introduce the piecemeal problem, and all of the other environmental requirements listed in Table XI–4 will remain in place. On balance, it is unclear whether introduction of a competitive market will leave environmental protections stranded.

The dimensions of the environmental protection issue are larger than the degree to which protections will be stranded in a competitive market. A number of interested parties in Texas have suggested that the Commission and/or Legislature should focus not only on the environmental consequences of electric industry competition and restructuring, but that in addition, *industry restructuring provides an opportunity for the State aggressively to pursue broader environmental goals*. In particular, it has been suggested that restructuring provides an opportunity to retire older, "dirtier" coal-fired power plants, and that the State can use the recovery of stranded investments as a lever or bargaining chip in exchange for greater environmental protections.[32]

As noted in Chapter VII, environmental protection was one of the consensus goals adopted by interested parties in Texas early in the Project No. 15000 process; however, parties were unable to agree on a more specific framing of the environment goal.[33] Some parties suggested that competition and restructuring should not be allowed to degrade environmental protections, while others advocated using restructuring efforts as a means to improve the environment.

Thus, depending upon the goal for environmental protection, environmental protections should be maintained or extended in any industry restructuring. The Commission Staff emphasizes that whichever goal is pursued, environmental and public health protections should be addressed by measures that incorporate economic decision making with environmental protections. One of the promises of competition and restructuring is enhanced economic efficiency—more money in the pockets of the citizens of Texas with less waste. Any associated environmental protections should further enhance economic efficiency, not offset it.

A variety of measures can be used to pursue environmental goals. Because environmental and public health concerns arise under externality conditions, market measures will address environmental concerns with the greatest likelihood of improving economic efficiency. Other, non-market measures include increased energy efficiency requirements, renewable resource requirements, and information dissemination. Some observers have suggested that all generation sources be required to provide customers with standardized information on the environmental impacts associated with the generators' specific resource mix. Such information could be included as an insert in utility bills. Providing such information can help consumers make decisions about

[32] See for example, Smith, Tom ("Smitty"), Commission Workshop on Industry Restructuring—Market Structure I, Generation, Transcript at 39 - 40 (April 1, 1996).

[33] See the discussion in *Proposed Goals and Principles for Electric Industry Restructuring*, Project No. 15000 (April 4, 1996).

alternative suppliers and green marketing options. Any measures that are adopted, however, should apply as broadly as possible because limited applicability raises the prospect of the piecemeal problem.

7. Low-income Programs

Aid to low-income residential customers is provided by the utilities, by State and federal government programs, and through charitable organizations outside of the electric system. Some utilities offer special rates for low-income customers, and provide programs that allow other customers to supplement the bills of low-income customers. The State provides low-income energy assistance through the Texas Department of Housing and Community Affairs.[34] Using mostly federal money from the Departments of Energy and Health and Human Services, the State administers utility and weatherization assistance through community action agencies in each county. The Utility Comprehensive Energy Assistance Program provides co-payments for families, along with budget counseling and energy conservation education. The program also provides utility bill assistance for elderly and disabled residents, emergency assistance (typically weather related), and equipment repair, tune-up, and replacement. The program is needs-based, with an annual funding cap of $1,000 per participant. The Department of Housing and Community Affairs also reported that it is working with some Texas utilities, including TU Electric and SPS, to provide weatherization services.

Low-income programs are classified as a social benefit, and as such, alternative future funding sources should not necessarily be restricted to the utility system. Low-income programs differ from the other potentially strandable benefits discussed in this chapter. The source of each of the other system and social benefits can be tied to a category of "market failure." Inability to afford electric services is a natural market outcome. Thus, the appropriate approaches to proving low-income assistance differ from other categories of strandable benefits because there is no specific market failure that can be

[34] Lopez, Nieves, Texas Department of Housing and Community Affairs, Presentation to the Commission Workshop on System Benefits, Project No. 15000, Transcript at 29 (May 28, 1996).

addressed, thereby restoring the stranded services. Low-income programs must be funded with rate discounts, subsidies, or in-kind benefits like weatherization services.

Low-income programs can be provided by various mechanisms, however, including:

- Direct provision by the distribution provider;
- Direct subsidy from local, State, and federal programs;
- Pooling customers into groups served by private aggregators;[35] and
- Provision by generation and/or distribution providers funded through a wires charge.

Low-income assistance programs should be designed with a broader focus than just the funding to pay electric bills. As noted above, some low-income customers may forego other essentials in order to pay for electric service. Looking only at electric bill payment history could overlook suitable candidates for assistance.

8. Consumer Protections

Some types of consumer protections are provided today, at least in part, through the integrated and *non*competitive nature of the industry. Because retail customers do not have choices among power providers, they are less susceptible to fraud, false advertising, and invasive and deceptive marketing tactics that can occur in competitive and partially competitive markets. In addition, because utility expenditures for customer services can be passed through to customers in rates; utilities are under less pressure than competitive, unregulated companies to cut costs for consumer protections. Consumer safeguards are also the subject of Commission rules giving consumers protections that are more specific than in many industries.

Consumer protections are classified as a social benefit. The well-being of electric utility consumers is an important social concern, but does not necessarily benefit the electric system itself. Customer protections may be at risk in a competitive

[35] Pooling low-income customers is analogous to pooling of high risk drivers for automobile insurance. For low-income programs, the government could subsidize the private supplier in exchange for providing the service, private providers could be funded through a wires charge, or the risk pool could be presented for bids from private companies.

environment because of destructive competition and information failure. In the past, as customers of monopoly providers, customers have not been called upon to make choices between different types of services and service providers. Because customers faced few choices, their information needs were small. Few advertisements beckoned consumers to choose particular products or providers. Beyond verifying that their consumption and billing information is accurately determined, customers have had little need for competitive information. Energy efficiency programs are an exception. Where available to consumers, information may have been an important determinant in their abilities to make appropriate energy efficiency investments.

A competitive electric sector could change radically the need for consumer protections. Consumers in a competitive market will require accurate information about their available options and the costs of those options. Several anecdotal examples from the deregulation of the telecommunications industry illustrate customers' needs for information and competitive protections:

- *Repair and billing confusion:* In the period following the breakup of AT&T, many customers complained about not knowing who to call in the event of a disruption of their telephone service. Many customers were also unaware that certain types of service calls would involve charges.
- *Excessive payment for telephone rental:* Telephones are now commonly sold directly to consumers. Previously, telephones were leased from the local service provider. Many customers were unaware that continued telephone leasing from their local service provider could be substantially more expensive, over time, than purchasing a telephone.
- *Slamming:* More recently, destructive competition has been witnessed in the practice of telephone service slamming. Slamming can involve tricking a customer into switching his/her service provider or changing the provider without the customer's authorization.

The examples are provided by way of illustration of types of practices that could occur in a restructured electric market.[36]

[36] Also of concern is excessive (or predatory) telemarketing. Commission Staff involved in Project No. 15000 consistently report from their informal conversations with members of the public that the public is extremely concerned about the potential proliferation of electricity-related telemarketing.

The primary means of providing consumer protections include regulatory standards and information access and dissemination. The Legislature and/or the Commission can impose standards of conduct on electric utilities and alternate providers to ensure adequate consumer safeguards.[37] Slamming and telemarketing are appropriate candidates for regulatory standards. Comprehensive and comparable information standards can be imposed to ensure that consumers have adequate information on which to base decisions about competitive alternatives. The Commission and the utilities in Texas may also have an important role in educating the public—particularly residential and small commercial customers—about electricity restructuring and the implications of restructuring for ratepayers. As a social benefit, a broadly based mechanism to provide any necessary funding would be appropriate.

G. Allocation and Funding for Stranded Benefits

The preceding sections review some of the circumstances through which system and social benefits may become stranded in a restructured electric industry, as well as a discussion of appropriate mechanisms for providing or supplementing system and social benefits. Table XI–5 presents a summary of the mechanisms discussed for each category. As noted in the table, regulatory requirements can be imposed in each case, but such an approach is not necessarily the most appropriate policy. Other mechanisms, e.g., economic incentives or information dissemination, may more directly address the specific market failures discussed in Section D.

As noted earlier in this chapter, funding for system and social benefits can be provided through the system or through broader measures, e.g., taxes and subsidies. For system benefits—those that provide benefits to the electric system—sources tied to the electric system are most appropriate. For social benefits—those that benefit society, but not necessarily the physical electric system—broader funding sources may be appropriate. The most commonly discussed mechanism for providing benefits tied to the electric

[37] Consumer safeguards are also discussed in the "Code of Conduct" section of Chapter XII.

Table XI–5: Alternative Methods for Providing and/or Supplementing System and Social Benefits following Restructuring

Benefits Category	Regulatory Standards	Incentive Measures	Public Provision	Financial Support	Information	Pooling
System reliability and safety	X		X			
Research and development	X	X	X	X		
Universal service						
Access	X			X		
Distribution	X			X		X
Resource diversity and renewables	X	X			X	
Energy efficiency	X	X		X	X	
Environmental protection	X	X				
Low-income programs	X			X		X
Consumer protections	X				X	

Note: Staff classification based on review of written comments submitted by interested parties, discussions at Commission Workshops, review of trade literature, and other resources.

system is an access charge, also know as a "wires charge," a "universal service charge," or a "distribution charge."

Any access or wires charge should incorporate two key design characteristics.[38] The charge should be nonbypassable and competitively neutral. A nonbypassable charge is designed to prevent individual customers from escaping responsibility for paying the charge. Thus, the moniker a "wires" charge, since any customer that receives electricity over transmission and/or distribution wires would be subject to the charge. Only those customers completely independent of the electric system could escape the charge.[39] A competitively neutral access charge will be designed to minimize economic distortions resulting from the charge. Ensuring that the charge applies to all customers equally is the key to competitive neutrality.

[38] This discussion draws extensively from The Regulatory Assistance Project, "System Benefits Charge," *Issues Letter*, Gardiner, Maine (September 1995).

[39] This will include only a limited number of self-generators, as self-generators may remain connected to the grid in the event that backup power is required.

An access charge could be linked to either the transmission system or the distribution system. Applying a charge to the transmission system should be easier to administer because a more limited number of transmission suppliers would be involved. In addition, some industrial and large commercial customers take their power at transmission voltage without using the provider's distribution facilities. Thus a distribution-level charge must be designed carefully to capture these transmission-only customers. A transmission-level charge may raise jurisdictional complications for non-ERCOT transmission facilities, due to FERC jurisdiction over the transmission grid outside of ERCOT.

An access charge may be structured on a volumetric basis (i.e., the size of a customer's charge is linked to the kWh consumed), based on capacity, or as a fixed charge. For stranded system benefits, a charge based on volume or capacity, or some combination, is most appropriate. Since system benefits contribute to the system—thereby benefiting customers on the system—a volumetric or capacity charge links the charge to the quantity of power and have the size of the benefit received by that customer. For social benefits, either a volumetric/capacity charge or a fixed charge could be appropriate. An access charge could also be designed with more than one component, for example a volumetric/capacity element that funds stranded system benefits and a fixed charge that funds stranded social benefits.

Whether the charge is based on usage or is a fixed charge may affect consumption behavior. Any charge that raises the cost of electricity may lead customers to reduce consumption. A fixed charge will apply to all customers equally, but would be a larger share of the total electricity budget of a small customer than of a large customer. Thus, a fixed charge may have a larger *relative* effect on consumption of a small customer. A volumetric charge may lead some customers to reduce the total kWh of electricity consumed. Customers taking more power will pay more, but the relative effect on consumption would be equal for large and small customers. A capacity charge is most appropriate for large customers that demand varying amounts of electricity. Those customers must have capacity available for peak demand periods, but demand at any one time may be high or low. A capacity charge may lead customers to shift consumption from peak to nonpeak periods, thereby reducing the total capacity necessary to serve the customer.

The access charge could be identified as a separate item on customers' bills or could be bundled into the distribution or transmission charges on the bill. Each component of the access charge could be identified on the bill individually.

Once collected, the access charges must be allocated to provide (or supplement) the stranded benefits of interest. Allocation involves two separate decisions: which programs will be funded at what amounts and who will be awarded the collected funds for distribution. The funds can be collected and expended directly by the distribution utility, or collected and reallocated to providers by an independent, third party panel. One alternative is to distribute funds through the distribution companies in accordance with the allocation priorities expressed by the independent panel. Using the distribution companies for awards may ease administration and implementation, but is not essential. The panel could also request bids on the services funded by the access charges. The lowest bidder for a given set of services would receive the collected access charges and be responsible for implementation.

To provide low-income benefits and guarantee the distribution function of universal access, a financing pool could be adopted. Much like insurance pools aggregate low and high risk insurance customers, a pool could be established that aggregates low-income and otherwise difficult to serve customers. A pool would allow the provider to spread the costs of providing services to these customers with a set of low-cost customers. The Commission or an independent third-party panel could be responsible for allocating the customers in the pool among alternative suppliers. The Commission could require that all distribution companies serve a share of the pool, or could put service to the pool up for auction to the lowest bidder.

A final key element of providing for stranded system and social benefits is establishing performance measures designed to determine whether the categories are (or remain) stranded. If it is determined that specific categories of system or social benefits are provided adequately in a restructured industry, fees or regulations should be revised accordingly.

XII. MANAGING REGULATION IN THE TRANSITION TO COMPETITION

In the interim period between today's electric market and the arrival of a fully competitive market, a number of special issues must be addressed to ensure that all parties and concerns are able to share in the benefits of a competitive market. In the transition period, the operating rules will be incomplete and firms and customers will be acting with different levels of speed and sophistication in moving from the old world to the new. Not all market outcomes can be anticipated, and as a result, regulators must anticipate and react to unexpected challenges.

The most challenging issue in the transition period will be the allocation and recovery of stranded investments. These issues are examined in detail in the Stranded Investment Report, which is a companion to this volume. The analytical results of the Stranded Investment Report show that over time, stranded investment diminishes as plant and equipment depreciate and utilities continue to collect revenues at regulated rates, paying down the booked value of their assets. Because stranded investment diminishes over time (in real dollar terms), it could be tempting to defer any action on stranded investment allocation and recovery, relying on time to eliminate a portion of the concern. However, this approach would not solve the problem, because to defer action entirely is an implicit allocation decision, providing 100 percent recovery to the electric utilities from electric users without competitive options. Deferring a decision on stranded investment will also defer the potential economic efficiencies of industry restructuring.

Despite the overwhelming attention to stranded investments, other issues must not fall out of focus. Changing incentives and rules during the transition from traditional regulation to a partially competitive, partially regulated structure could have negative consequences: consumer protections may be diminished; excessive cost cutting could lead to degradation of service quality; and new industry arrangements and competitors could lead to customer or competitive abuses.

This chapter focuses on a number of transition issues. Section A discusses quality of service issues, such as the technical issues involved in ensuring quality service and protecting consumers from substandard service. Section B discusses the potential for market power and the limited means available to the Commission to address it. Section C discusses adoption of a code of conduct to address cross-dealing. Codes of conduct can also be developed to provide limited protections from market power abuse. Section D discusses issues related to providing information to consumers and the Commission. Section E discusses performance-based ratemaking (PBR) and the potential for using PBR in place of cost-of-service regulation for transmission and distribution services. Section F discusses the potential for cost shifting in rate discount policies. Finally, Section G discusses alternative methods for treating fuel expenses during the transition period.

A. Quality of Electric Service

Maintaining or improving the existing high quality of electric service provided to all the citizens of Texas is critical as the electric industry becomes competitive. Quality of service is a measurement of the utility's ability and commitment to provide safe, reliable, and timely electric services at the lowest reasonable cost. Components of this measure include service reliability, power quality, and adequacy of customer services.

This section discusses the ways that quality of service has been ensured in the past and the issues for service quality in an increasingly competitive market. It also describes the Commission's ongoing project to monitor the quality of electric service in Texas, and presents alternate ways to address quality of service concerns.

1. Quality of Service as a Priority

Historically, the quality of a customer's electric service has been measured by the reliability of the service. In other words, do the lights come on when the customer flips the switch? Consequently, the design, construction, maintenance, and operation of the electric system reflect the high priority that utilities place on reliability. As the electric industry has matured, the concept "quality of service" has expanded to include power quality and customer service, as well as reliability.

The electric utilities in Texas place a high priority on providing the highest quality, most dependable electric service possible. In responses to a Commission survey of service quality practices, electric utilities expressed a continuing commitment to maintain the high level of service quality:

> *[Central and South West System companies are] committed to providing quality electric service which is dependable and timely, and which meet the present and future needs of its customer at the lowest reasonable cost.*[1]

> *It is TU Electric's policy to be recognized as being in the top percentile nationally of investor-owned electric utilities when comparing reliability measurements.*[2]

> *It is the [Houston Lighting and Power] Company's policy to strive to provide continuous and reliable electric service to its customers at the lowest reasonable cost.*[3]

In the current regulatory environment that sets rates based on investment, economic incentives may encourage utilities to provide highly reliable electric service. Because capital investments are recovered in the utility's rates, reliability investments may contribute to company profits. For example, electric substations that are served by only one transmission line (radial lines) are susceptible to more frequent and longer interruptions than those substations served by multiple transmission lines. When an outage occurs on a radial transmission line, service is interrupted to all of the distribution customers served from the substation. If the substation is served by two transmission lines, one of the lines can be taken out of service without interrupting power delivery to customers. Although the first line can provide enough capacity to meet customers' needs, the second line will improve reliability while increasing the

[1] Central Power and Light Company, Southwestern Electric Power Company, West Texas Utilities, "Responses to Utility Survey Questions," Project No. 15013, Public Utility Commission of Texas Staff (1995).

[2] Texas Utilities Electric Company, "Responses to Utility Survey Questions," Project No. 15013 (1995).

[3] Houston Lighting and Power Company, "Responses to the Commission's Utility Survey Questions," Project No. 15013 (1995).

utility's rate base and profit potential. Virtually all reliability problems experienced by customers are due to problems with transmission and distribution, rather than any failure of generation. It is likely that since transmission and distribution will remain regulated, even after full wholesale and retail competition is attained, with some continuing incentive to invest in capital equipment to ensure system reliability.

2. Quality of Service in a Competitive Environment

In a more competitive environment, the economic incentive to increase electric plant to improve service reliability will be diminished. If the profits of a utility are controlled by market forces instead of a fixed rate of return applied to the rate base, incremental reliability-driven plant investments may not appear as attractive to a utility interested in limiting expenditures. Plant maintenance is another area where the economic pressures of a competitive environment can adversely affect the quality of electric service. In transmission and distribution, cost-cutting measures may lead to a reduction in the expenditures for preventative maintenance, such as tree trimming around electric lines. Inadequate tree trimming has been blamed for extensive power outages in other states and can cause small, localized outages.[4] The frequency of interruptions can also increase when there are cuts in the amount of system replacement or when there is a reduction in the number of employees responsible for maintaining and replacing the electric facilities. The duration of interruptions will likely increase if there is a reduction in the number of employees available to respond to outages. A reduction in resources or staffing for customer relations can also have an adverse effect on perception of service quality. Customers of some utilities in Texas have complained that local service offices have been closed in order to cut costs. Some customers believe that this has made it more difficult for them to do business with their utility, and has increased the time it takes the utility to respond to their problems.[5]

[4] "California PUC OKs Interim Rules To Speed Up Utility Tree Trimming At Overhead Lines," *Utility Environment Report*, McGraw Hill Companies, Inc. at 4 (September 27, 1996).

[5] Records of the Public Utility Commission, Office of Consumer Affairs, concerning contacts by customers of Texas Utilities Electric Company (July 1995), Entergy/Gulf States Utilities (August 1995), and Central Power and Light Company (September 1996).

The Commissioners have recognized these potential problems in discussions at Commission Open Meetings. Commissioner Walsh stated, "I hope that these companies . . . are not going to be cutting costs where quality of service is concerned,"[6] and "I think the issue of quality of service should be something we take seriously into consideration."[7]

Referring to the expansion of competition in the electric industry, Chairman Wood questioned, "Is service being degraded or is it being enhanced?"[8] He also stated that it is the responsibility of the Commission ". . . to make sure that, despite the economies and the efficiencies . . . competition brings, that quality of service doesn't degrade."[9] Commissioner Gee has also addressed quality of service, noting, "I would encourage and I would support any effort by us to . . . maintain quality of service . . ."[10]

3. The Commission's Quality of Service Project

In response to these concerns, the Staff initiated the Quality of Service Project (Project No. 15013), with the goal of identifying the existing level of service reliability, examining power quality issues, investigating the needs and desires of the customer in a competitively structured electric industry and determining appropriate measures, best practices, and reliability benchmarks. In December of 1995, the Staff sent a survey to the Texas electric utilities on their current policies and practices pertaining to outages and outage response, maintenance and operations procedures, emergency operations plans, power quality, and general customer service. Project No. 15013 addresses the three quality of service issues: reliability, power quality, and consumer issues.

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[6] Administrative Proceedings Transcript, Agenda Item No. 30, Discussion and Possible Action on Project Assignments, Correspondence, Staff Reports and Agency Administrative Procedures at 234 (April 24, 1996).

[7] Administrative Proceedings Transcript, Agenda Item No. 14, Discussion and Possible Action Regarding Staff Report on El Paso Electric Company Quality of Service Issues at 293 (November 9, 1995).

[8] Administrative Proceedings Transcript, Agenda Item No. 28, Discussion and Possible Action on Project Assignments, Correspondence, Staff Reports and Agency Administrative Procedures at 237 (May 22, 1996).

[9] Administrative Proceedings Transcript, Agenda Item No. 28, Discussion and Possible Action on Project Assignments, Correspondence, Staff Reports and Agency Administrative Procedures at 238 (May 22, 1996).

[10] Administrative Proceedings Transcript, Agenda Item No. 20, Discussion and Possible Action on Project Assignments at 293 (November 9, 1995).

a) Reliability

Reliability is the uninterrupted delivery of electricity. To avoid interrupting service to customers when an electrical system component fails, electric systems are designed with many redundancies. Redundancy enhances reliability at all levels of the electric system—generation, transmission, and distribution.

There are many references in the Commission's rules to "reliability." Most do not refer to specific standards or performance requirements; most references direct that certain actions of the Commission or utilities shall "preserve the reliability of electric service." Under current Commission rules for continuity of service, utilities are required to "make all reasonable efforts to prevent interruptions of service," and are required to "make reasonable provisions to meet emergencies."[11] The rule also requires utilities to keep a complete record of all interruptions, except for momentary interruptions due to automatic equipment operations. In the event of an interruption in service affecting the entire system or any major division of the system, the rule requires utilities to notify the Commission in writing.

i) Reliability Councils Establish Generation Practices

Electric reliability councils have established guidelines that prescribe the practices of their members, including non-utility generators, regarding the operation of generation facilities. The members of ERCOT have adopted operating guides that address both generation and transmission operations within ERCOT, consistent with the North American Electric Reliability Council (NERC) Operating Manual Principles.[12] The ERCOT guides require generating entities in ERCOT to maintain a total responsive reserve of 2,300 MW.[13] This immediately available reserve, and other planning and operating guidelines, prevent major system disruptions or service interruptions in the event of the loss of even one of the largest generation units on the system.

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[11] P.U.C. SUBST. R. 23.48.

[12] Electric Reliability Council of Texas, *ERCOT Operating Guides* (October 1996).

[13] Responsive reserve is the sum of the responsive spinning reserve, interruptible responsive reserve, and the hydroelectric responsive reserve. The majority of the sum comes from the spinning reserve, i.e., the net generation capability on line that is not loaded but could be loaded.

ERCOT's operating guides have been revised to incorporate the duties and responsibilities of the independent system operator (ISO). The ISO will maintain continuous surveillance of operating conditions and act as central information collection and dissemination points for the individual control areas. Current ERCOT by-laws allow non-utility generators to be members.

ii) Transmission and Distribution Reporting Requirements

In response to the concern that competition-motivated cost-cutting may adversely affect reliability of the transmission and distribution systems, the Staff is proposing the adoption of reporting requirements for distribution and transmission utilities in Project No. 15013. The data collected from these reports will enable the Commission to measure the current level of reliability and will establish a benchmark for tracking reliability as Texas moves toward a more competitive electric industry.

In June of 1996, the Staff distributed a draft Electric System Service Quality Reporting Form for utility comment. The filing form is proposed in accordance with Commission rules stating that "[s]ervice quality reports shall be submitted quarterly on a form prescribed by the commission."[14] Once a form is adopted by the Commission, all electric utilities operating within Texas will file service interruption data for transmission and distribution systems. Staff proposes that service reliability indices be calculated monthly and filed quarterly.

The Institute of Electrical and Electronics Engineers (IEEE) and others, have developed reliability indices that are generally accepted by the electric industry for measuring the frequency and duration of service interruptions. These indices are calculated monthly and/or annually, and can be calculated for an entire electric system, or for an operating division, or even an individual circuit. To monitor interruptions on the transmission and distribution systems, Staff has adapted two of the IEEE standards.[15]

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[14] P.U.C. SUBST. R. 23.11(m).

[15] To monitor interruptions on the transmission system, Staff has adapted the IEEE Standard 859-1987, *Standard Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities.*

If these indices are to be used in quality of service incentive (or penalty) mechanisms, it is imperative that reporting be consistent. To establish any target levels for these indices will require comprehensive definitions, for example: how long is service out before it is counted as an interruption? what exactly is a "severe storm"? It would be unreasonable to establish a single statewide target for any of the reliability indices. It is likely that reliability problems and overall performance will vary markedly between utilities and within utilities. For example, customers in east Texas may expect more momentary interruptions, or blinks, due to tree limbs contacting the distribution line than would a customer in mostly treeless west Texas. Utilities may even expect variations in the acceptable values of the indices from circuit to circuit. On a radial circuit, a customer can expect longer interruption durations than a circuit that is fed from two sources. On the other hand, areas that are served by upgraded or newly constructed distribution systems would likely experience a reduction in the frequency of outages, and should expect a lower index value.

Once full retail access is achieved, and T&D systems serve as common carriers for retail energy providers, allocating responsibility for reliable service will be more complex. Some questions to be explored include:

- Who should be responsible for unreliable electric service, the retail provider or the T&D provider?
- When reliability problems occur, how can a T&D utility provide competitively neutral restoration and support services for multiple retail service providers and their customers?
- Should reliability standards differ for the grid common carrier versus the retailco, or by type of retailco?
- Are minimum service reliability standards appropriate if reliability is used as a product attribute (e.g., as for interruptible rates)?

To answer these and other questions, regulators should attempt to transfer lessons learned from telephone local service interconnection experiences.

To monitor interruptions on the distribution system, Staff has adapted IEEE draft standard P1366, *Trail Use Guide for Electric Power Distribution Reliability Indices.*

b) Power Quality

Early electric service to homes and businesses typically supplied power primarily for lighting and pumping. For these applications, the primary concern with the quality of service was whether the power was "on" or not. With the emergence of computers, computer-operated equipment, and electronic motor controls, the *quality* of the power becomes more important. The term "power quality" refers to a wide variety of electromagnetic phenomena that characterize the voltage and current at a given time and location on the power system.[16]

Currently, Commission rules address voltage and frequency variations. For residential and commercial service, the voltage variation shall be plus or minus 5.0 percent of the adopted standard.[17] Each utility must adopt a standard frequency of 60 cycles per second maintained within 0.1 cycle per second above and below the standard.[18] These rules were adopted when the primary loads in homes and businesses were lighting, heating, and cooling. Though these rules may be adequate for typical systems of the past, the prevalence of computers and other sensitive electronics may require more sophisticated power quality rules.

c) Consumer Issues

In addition to dependability of electric service and the possibility of power quality problems, "quality of service" is a measurement of the customer's satisfaction with their electric service provider. As the number of choices of services available to customers expands, their satisfaction with the service provider becomes an important factor in the decision process. If a customer has a choice of electric providers, the fact that electric service is available 99.99 percent of the time may not outweigh a bad experience with a utility's customer service department or field personnel.

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[16] Institute of Electrical and Electronics Engineers Inc., ***Recommended Practice for Monitoring Electric Power Quality*** at 9 (1995). Electromagnetic phenomena include: transients, impulsive, and oscillatory; short duration variations, instantaneous, momentary, and temporary; long duration variations, interruption, undervoltages, and overvoltages; voltage imbalance; waveform distortion; voltage fluctuations; and power frequency variations.

[17] P.U.C. SUBST. R. 23.62(f).

[18] P.U.C. SUBST. R. 23.62(g).

An important part of monitoring quality of service is communicating with customers.[19] Many utilities hire consultants to survey the level of customer satisfaction. Utilities survey residential, commercial, and industrial customers randomly as well as customers who have recently contacted the utility. Some utilities offer 'training' seminars for commercial and industrial customers. These seminars address issues like power quality and transmission services. Several utilities have established working groups with customers to assess customer satisfaction. Commission Staff plans to explore the type of service choices that customers desire and the issues that matter to customers.

4. Regulation Alternatives

In the responses to the initial quality of service survey, most utilities stated their belief that the marketplace will "regulate" the quality of electric service. The response of TU Electric Company is representative of those utilities that do not believe that additional quality of service rules will be necessary in a competitive market:

> *Current requirements in this Commission's Rules and requirements of reliability councils, such as the Electric Reliability Council of Texas, are adequate to ensure satisfactory quality of service. Those suppliers that perform poorly and fail to deliver a superior quality of service will be losers in the competitive arena.*[20]

In Project No. 15002, interested parties filed comments on the subject of reliability and safety. Southwestern Public Service Company summarized the position of a number of the utilities in its comment that:

> *A competitive market works well at creating benchmarks for reliability and safety. The market will determine the appropriate level of safety and reliability for generation providers.*[21]

Other interested parties had a different view. TIEC stated that "Safety and reliability should be mandated as they are today with strict penalties if they are not met by

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[19] Responses to Survey of Electric Utilities in Texas Concerning Quality of Service, Project 15013 (1995).

[20] Texas Utilities Electric Company, "Responses to Utility Survey Questions," Project No. 15013 (1995).

[21] Southwestern Public Service Company, *Comments on System Benefits*, Project No. 15002 (May 1996).

suppliers."[22] Texas ROSE stressed maintaining safety and reliability standards through monitoring and enforcement.[23] Enron argues that safety and reliability ". . . issues may become the primary focus of [future] Commission activities."[24] Consumers Union emphasized that "Standards should be set, and should not be reduced from current levels."[25]

In today's partially competitive wholesale market, reliability is the primary service quality concern at the generation level. The issues of power quality at the generation level are reduced to voltage, frequency, and synchronization with the power grid. These concerns are currently addressed by reliability council guidelines, and will be addressed in the future by ISO requirements. Since the competitive generation market is currently limited to the wholesale market, customer service issues that relate to retail customers are not a primary concern. It may be reasonable to expect that the competitive market will provide the appropriate performance standards in the generation portion of the industry, and wholesale contracts will likely include provisions for penalties based on poor performance. This "self-regulating" aspect of the generation market combined with the oversight of the ISO may be sufficient to address the quality of the service provided by producers.

Most utilities and many other interested parties recognize that the transmission and distribution portions of the industry—the segments most relevant for service quality—will continue to be monopolies, and therefore continue to be regulated to some degree. It will be critical for the Commission to better understand customer's concerns for reliability and customer service and how to define and measure performance in a restructured industry.

[22] Texas Industrial Energy Consumers, *Response to Questions Regarding System Benefits*, Project No. 15002 (May 1996).

[23] Texas Ratepayers' Organization to Save Energy, Inc., *Comments on System Benefits*, Project No. 15002 (May 1996).

[24] Enron Capital & Trade Resources, *Comments on System Benefits*, Project No. 15002 (May 1996).

[25] Consumers Union, *Comments on System Benefits Workshop*, Project No. 15002 (May 1996).

B. Identifying and Addressing Market Power

Proponents of electric industry restructuring argue that retail access and rate deregulation should lead to lower prices. However, if generating companies have the ability to extract a higher price than would exist in a competitive market, the potential consumer benefits of competition and restructuring could be lost. Market concentration has led to electricity prices above competitive levels in Britain, as well as prices above competitive levels in the U.S. long distance telecommunications industry.[26] The potential impact of market concentration was evaluated in a report filed by OPC in Project No. 15000.[27] That report found that if retail competition was enacted in Texas under a Poolco structure, TU Electric and HL&P would be able to use their market power to artificially inflate pool prices, and that under a bilateral contracting model, TU Electric would be able to exert market power to obtain above market prices for electricity.[28] Any restructuring proposal should address the potential for market concentration in the relevant markets within Texas.

Under the traditional regulatory structure, the Commission has had little need for concern with market power and antitrust issues. The market and regulatory environment granted electric utilities a high degree of market concentration as a means of realizing economies of scale and scope. As markets became more concentrated, costs per unit output were thought to decrease. Moreover, because the Commission determined the prices that a utility could charge, there was little concern that the utility could use its market power to obtain monopoly profits.

The introduction of wholesale competition in PURA95 has made market power a cause for concern. In a restructured market, the Commission would not have the ratemaking authority to regulate rates as a means to protect customers from a firm's exertion of market power. Thus, the Commission faces a two part challenge—develop tools to

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[26] See Chapter IX of this report for a detailed discussion of restructuring in other industries, countries, and states.

[27] J. Kennedy and Associates, Inc., *Electric Utility Restructuring Issues for ERCOT: Prices, Market Power and Market Structure* (October 1996).

[28] That report has not been endorsed by Commission Staff; neither the methodology nor the data used in that report have been evaluated by the Commission Staff.

identify market power and develop new powers to restrict market power when it is identified. As noted in Chapter IV, market power can be categorized in two types—horizontal and vertical market power. Horizontal market power arises from excessive concentration, e.g., a single firm owns a high proportion of the generation resources. Vertical market power may occur when a firm controls different services, e.g., fuel supply, generation, and distribution. Vertical market power can be used to cross-subsidize between a company's regulated and nonregulated activities. A regulated firm attempting to inhibit potential competition could attempt to sell products below cost in the competitive market while seeking to offset the lost revenues with overearnings in the regulated market.[29]

1. Overview of Existing Antitrust Law and Regulation

Antitrust laws are intended to limit market concentration so competitive forces can thrive. Utility regulation, on the other hand, is implemented when it is decided that workable competition is either not possible or would not obtain a desired result. Under the state action doctrine, utilities are exempt from many federal antitrust provisions because they are actively price-regulated by state agencies. If price regulation is discontinued, generating utilities may lose this protection.

This overview will address three principal statutory sections: Sherman Act Section One;[30] Sherman Act Section Two;[31] and Clayton Act Section Seven.[32]

a) Sherman Act Section One

Sherman Act Section One is violated when there is some form of concerted action between two or more firms to unreasonably restrain trade. Most restraints are judged

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[29] Baumol, William J. and J. Gregory Sidak, *Toward Competition in Local Telephony*, Cambridge, MA: MIT Press at 83 (1994).

[30] 15 U.S.C. §1. It states in relevant part that, "Every contract, combination in the form of a trust or otherwise, or conspiracy, in a restraint of trade of commerce among the several states, or with foreign nations, is hereby declared to be illegal. . . ."

[31] 15 U.S.C. §2. It states in relevant part that, "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several states, or with foreign nations, shall be deemed guilty of a felony. . . ."

[32] 15 U.S.C. §13(a).

by a "rule of reason" test, which allows a defendant to show that the restraint is based on a legitimate business interest and does not unduly restrain trade. However, a *per se* violation will be found if a restraint of trade is based on one of the following methods:

- Price fixing;
- Group boycotts; or
- Allocating territories/customers between competitors.

The *per se* rule may also be applicable to tying arrangements.[33] A tying arrangement in the electric industry could involve bundling generation, transmission, and distribution services. If, for example, a customer agrees to accept distribution services from a retail provider, that customer must also take generation and transmission services from that utility because the services are "tied" together.

b) Sherman Act Section Two

There are two legal actions under Sherman Act Section Two—monopolization and attempted monopolization. The Sherman Act is not violated if a party obtains a monopoly by competitive means in a way that benefits the social welfare, i.e., superior product, business acumen, or historic accident. However, possession of monopoly power that was willfully acquired or maintained is in violation of Sherman Act Section Two.[34] Attempted monopolization is shown when it is proven that the defendant:

1. Engaged in predatory or anticompetitive conduct;
2. Had a specific intent to monopolize; and
3. Had a dangerous probability of achieving monopoly power.[35]

A monopolist can violate Sherman Act Section Two if it refuses to cooperate with a competitor if such cooperation is necessary for competition. Such a refusal to deal may be significant in network-oriented industries such as the electric industry and the

[33] See e.g., Trotter, Donald T., "Overview of Antitrust Law and Regulation," Presented at the 38th Annual NARUC Studies Program at 5 (August 7, 1996).

[34] *United States v. Grinnell Corp.*, 348 U.S. 563, 570 - 571, 86 S.Ct. 1698, 1704 (1966).

[35] *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 113 S.Ct. 884, 890 - 891 (1993).

telecommunications industry, i.e., access to transmission and distribution facilities in the electric industry. A monopolist must allow competitors use of its facilities when:

1. The facility is essential and controlled by the monopolist;
2. The facility cannot be reasonably duplicated; and
3. It is feasible to provide use of the facility.[36]

There are a number of ways a monopolist can limit the ability of competitors to enter a market. While some of these methods may be antitrust violations, many of them are considered to be based on legitimate business purposes. For example, predatory pricing is generally considered to be conduct that could lead to an antitrust violation.[37] However, a company's refusal to share new research and development or construction of excess capacity in anticipation of demand growth, are generally not conduct that would support an antitrust violation.[38]

c) Clayton Act Section Seven

Clayton Act Section Seven pertains to business combinations that create market power. Mergers and acquisitions are evaluated under Department of Justice (DOJ) Merger Guidelines.[39] The guidelines are intended to avoid market structures that significantly increase the likelihood that market power can be wielded. The DOJ will measure the horizontal market concentration to determine whether a business combination should be closely scrutinized.

The DOJ also reviews vertical mergers under Clayton Act Section Seven to determine whether the combination will tend to create market power. With respect to public utilities, the DOJ Vertical Merger Guidelines provide a first look at whether a business

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[36] *MCI Communications Corp. v. AT&T*, 708 F.2d. 1081 (7th Cir.), *cert. denied*, 464 U.S. 891 (1983).

[37] PURA95 §2.001(b) makes predatory pricing in Texas wholesale power contracts and tariffs illegal. PURA95 §2.052(b) makes predatory pricing in Texas discounted retail tariffs illegal.

[38] Meeks, James E., *Antitrust Concerns in the Modern Public Utility Environment*, Columbus, OH: National Regulatory Research Institute at 35 (1996). Modern cases have rejected the notion that building excess capacity to exclude competition violates the antitrust laws. One case that found a violation under this circumstance is *United States v. ALCOA*, 148 F.2d 416 (2nd Cir., sitting in lieu of the Supreme Court, 1945).

[39] 57 *Fed. Reg.* 41,552 (1992).

combination may provide the combined entity with the realistic potential to abuse market power in violation of the Act.[40]

The applicability of the DOJ's merger guidelines to the electric industry during a transition to competition has been called into question. First, consolidating utilities have argued that their consolidation is intended to maximize economies of scale and scope, not to gain market power.[41] Other commentors have pointed out that if the greater economies of scale and scope are in the areas of transmission and distribution, the utility could consolidate these portions of its business while divesting itself of generation assets.[42] This approach would allow for the efficiencies of consolidation in transmission and distribution service while avoiding generation market power.

2. Market Power and Regulation in a Partially Competitive Market

Whether these legal remedies can effectively control the exercise of market power in an increasingly competitive electric market is not entirely clear. These remedies are primarily designed to address explicit restraint of trade, monopolization, and anticompetitive mergers. The potential problem in Texas is somewhat different. As the market is deregulated and becomes competitive, some firms may have the ability to dominate markets by their size, access to information, and/or the ability to cross-subsidize operations. The antitrust laws are rather blunt tools when brought to bear from this perspective.

Also of concern is the prospect of *increased* vertical integration resulting from mergers between electric utilities and natural gas distribution companies. These mergers raise the prospect that affiliated generating utilities could receive a lower price for natural gas supplies. Such mergers could also restrict customer choices by offering fewer gas and electric options to customers. For some purposes, e.g., home heating, natural gas

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[40] The DOJ Vertical Merger Guidelines are located at 49 *Fed. Reg.* 26,834 (1984).

[41] Michaels, Robert J., "Mergers and Market Power: Should Antitrust Rule?" *Public Utilities Fortnightly* at 42 - 44 (October 15, 1996).

[42] See, e.g., Pierce, Richard J. Jr., "Antitrust Policy in the New Electricity Industry," *Energy Law Journal*, Vol. 17(29) at 29 - 58 (1996).

may be a competitive alternative to electricity. In 1996, at least four major mergers involving a Texas-based electric or natural gas company have been proposed.

As one of its primary responsibilities in the transition period (or even in anticipation of a transition), the Commission should investigate the prospects for market power and its abuse in Texas, including transmission constraints that could contribute to isolated geographic markets in portions of the State. Given a thorough market power investigation and appropriate statutory authority, the Commission could take steps necessary to limit market power before it is abused. In this regard, the Commission's role would differ from that of the DOJ. Under the Sherman Antitrust Act, the DOJ seeks remedial action after an abuse has taken place. With a proactive role, the Commission could protect consumers before the public interest is harmed.

3. Market Consolidations Affecting Texas

A number of business combinations affecting Texas energy companies have taken place in the past year, such as CSW's purchase of Seeboard PLC, a British regional electric company; the proposed merger between SPS and Public Service of Colorado; Texas Utilities' (TU) acquisition of Enserch, parent company of Lone Star Gas; Houston Industries' (HI) acquisition of Nor Am Energy Corp., parent company of Entex, Corp.; and Enron's acquisition of Portland General Electric Corp. (PGE), the largest electric utility in Oregon. This section elaborates on the acquisitions by TU, HI, and Enron and the implications for Texas' future competitive markets.[43]

a) Transaction Summaries

TU agreed to acquire Enserch, the parent company of Lone Star Gas, for approximately $1.7 billion.[44] The combined entity would be both the largest electric utility and gas utility in the State. Because most of Lone Star Gas' service territory is

[43] See also *Comments of Enron Capital & Trade Resources on Regulatory Restructuring*, Project No. 15000 at 3 - 4 (June 7, 1996). Enron suggests that the Commission "be given explicit authority to identify and limit potentially anti-competitive behavior and to take regulatory action, upon complaint by any affected person, to prevent the exercise of market power by any market participant."

[44] Oppel, Jr., Richard A. and Gregg Jones, " TU Plans to Acquire Gas Utility," *Dallas Morning News* at A1 (April 16, 1996).

within TU Electric's service territory, executives from TU Electric and Lone Star Gas argue that the combined entity will be able to reduce costs by eliminating duplication.[45] For example, both companies currently send people to the same locations to read meters. Once the companies are combined, in all likelihood, only one meter-reader will be needed per location.

HI agreed to acquire Nor Am, the parent company of Entex, Corp. (Entex), for $2.4 billion. Entex is the gas utility serving Houston. HL&P, a subsidiary of HI, is the electric utility serving Houston. As with the TU/Enserch business combination, it is believed that HI will realize cost savings by owning both HL&P and Entex. Additionally, Nor Am owns gas utilities in other states. It is thought that HI will be well positioned for retail wheeling in the electric industries in those states because it can develop a customer base through the Nor Am gas utilities.

Enron's acquisition of PGE is the first major acquisition of an electric utility by an unregulated entity since the passage of PUHCA in 1935. The $2.1 billion acquisition provides Enron with four vital assets.

1. It is acquiring PGE sales staff and operations, giving it the hands-on experience needed to excel as a retail electricity competitor.
2. It is acquiring PGE's 25 percent ownership of the line capacity into the California-Oregon border interconnect.
3. It is acquiring a service territory in which new energy-related products and services can be tested.
4. It is acquiring the ability to enter into the information/communications industry through PGE's unregulated subsidiary that owns a large amount of fiber optics in the Portland area.

b) Potential Impact on Competition

It is difficult to evaluate the full impact of these business combinations on competition. Although none of these mergers has the effect of concentrating electric generation in Texas, the TU and HI acquisitions create the potential for horizontal market power in the area of energy services. For retail customers, whether a customer chooses gas

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[45] *Id.*

services, electric services, or a combination of the two, the customer must buy from the same company after the acquisition. In Houston, for example, HL&P and Entex have historically competed for customers, as HL&P touted the benefits of all-electric homes and Entex urged Houstonians to cook and heat with gas.[46] It is unlikely that this level of competition will continue in the overlapping service territories.

In Texas, these mergers create additional problems since electric utilities and gas utilities are not regulated by the same State agency. It is possible that the combined entity will use the gas utility to subsidize the electric utility or use the electric utility to subsidize the gas utility. In either case, one of the utilities could get an unfair competitive advantage potentially at the expense of the ratepayers of the other utility. It is the duty of the regulatory agencies involved to prohibit cross-subsidies; however, it may be difficult to observe the existence of cross-subsidies due to split regulatory jurisdiction.

C. Code of Conduct for Affiliate Transactions

Independent of the design of any particular restructuring plan, establishing conditions for fair competition is a concern. For example, if an incumbent utility is allowed to subsidize the activities of its non-regulated affiliate, a competitive market may not result, and customers may end up paying more for power. Some proponents of restructuring have argued that a "code of conduct" which governs the relationship between a regulated utility and its non-regulated subsidiary could alleviate this concern.[47] A code of conduct could also provide a limited tool for addressing some market power concerns arising from vertical integration.

[46] de Rouffignac, Ann, "HL&P, Entex Merger Signals Market Change," *Houston Business Journal* at 1 (August 16, 1996).

[47] *Public Citizen's Legislative Comments*, Project No. 15000 at 7 - 8 (September 11, 1996). For a discussion concerning the pricing of products sold to competitors in the telecommunications industry, see Baumol and Sidak, *supra* at 93 - 116.