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LESSONS LEARNED FROM ELECTRICITY RESTRUCTURING

Transition to Competitive Markets Underway, but Full Benefits Will Take Time and Effort to Achieve





Highlights of GAO-03-271, a report to the Chairman, Subcommittees on Government Efficiency, Financial Management and Intergovernmental Relations and Energy Policy, Natural Resources and Regulatory Affairs, House Committee on Government Reform

Why GAO Did This Study

The electricity industry in the United States is undergoing major change, the outcomes of which will affect every consumer. The industry is restructuring from one where electricity prices are set by regulation to one in which competitive markets set the price. GAO was asked to report on the extent to which federal and state actions, to date, have achieved the goal of restructuring. GAO discusses lessons learned from efforts to date.

What GAO Recommends

To help Congress ensure that the fullest benefits are achieved from electricity restructuring, and to better understand what progress has been made, GAO recommends that the Federal Energy Regulatory Commission (FERC) (1) determine how restructured markets are performing across the country, and (2) report annually to Congress and the states on the status of these markets, including emerging issues and impediments to reaching its goal.

In commenting on the draft report, FERC agreed with GAO's findings, "lessons learned," and the recommendation for annual reporting. However, FERC said GAO's recommendation to determine how restructured markets are performing across the country is problematic because of the jurisdictional division between states and FERC. GAO revised the recommendation to clarify that it is not asking FERC to step outside of its jurisdictional boundaries.

www.gao.gov/cgi-bin/getrpt?GAO-03-271.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Jim Wells at (202) 512-3841 or wellsj@gao.gov.

LESSONS LEARNED FROM ELECTRICITY RESTRUCTURING

Transition to Competitive Markets Underway, but Full Benefits Will Take Time and Effort to Achieve

What GAO Found

The goal of restructuring the electricity industry is to increase the amount of competition in wholesale and retail electricity markets, which is expected to lead to a range of benefits for electricity consumers. These benefits include lower prices and access to a wider array of retail services than were previously available. Increasing competition, however, requires that structural changes be made to the electricity industry, such as allowing a greater number of sellers and buyers of electricity to enter the market.

The federal government has taken steps to bring about these changes by, among other things, promoting and opening access to regional wholesale markets and proposing to standardize a market design for these markets. In addition, about one-half of the states have taken steps to introduce competition in retail markets, including allowing customers to choose their own electricity supplier.

It is not possible to determine the extent to which the goal of restructuring—the development of competitive markets—has been achieved to date. Our review of studies, our own analysis, and our evaluation of monitoring activities of electricity markets indicate a mixed picture of how much progress the industry has made in developing competitive markets and the extent to which expected benefits have been achieved. While some progress has been made in introducing competition, it has proven difficult to measure the benefits of restructuring, and where measurement has been possible, the extent to which expected benefits of restructuring have been achieved is unclear. Recently, with the formation of its new Office of Market Oversight and Investigations, the Federal Energy Regulatory Commission has taken positive steps to look more broadly at the performance of electricity markets.

On the basis of our review, we identified five key issues and lessons learned that will require careful consideration as part of restructuring. The solutions to these lessons may prove contentious and addressing them will take time and effort. Unless addressed, the following four lessons will limit competition and thereby diminish the ability of electricity restructuring efforts to achieve their full expected benefits:

- Different rules apply to the various regional electricity markets.
- The Federal Energy Regulatory Commission has limited jurisdiction in wholesale markets.
- Wholesale and retail electricity markets have developed separately.
- Generation and transmission siting decisions are subject to federal, state, and local government jurisdiction.

In addition, a fifth lesson points out the need for better monitoring of market performance to determine how well restructured markets are functioning and the extent to which these markets provide consumer benefits.

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Abbreviations

EPACT	Energy Policy Act of 1992
ERCOT	Electric Reliability Council of Texas
FERC	Federal Energy Regulatory Commission
ISO	independent system operator
MW	megawatt
OASIS	Open Access Same-Time Information System
PJM	Pennsylvania, New Jersey, and Maryland independent system operator
PUHCA	Public Utility Holding Company Act of 1935
RTO	regional transmission organization



United States General Accounting Office
Washington, DC 20548

December 17, 2002

The Honorable Steve Horn, Chairman
Subcommittee on Government Efficiency, Financial Management
and Intergovernmental Relations
Committee on Government Reform
House of Representatives

The Honorable Doug Ose, Chairman
Subcommittee on Energy Policy,
Natural Resources and Regulatory Affairs
Committee on Government Reform
House of Representatives

As requested, we are reporting on efforts being taken to transition the electricity industry from one in which monopoly utilities generate and provide electricity to customers at regulated prices into one in which private companies compete to sell electricity in a market-based system, and the lessons learned from the experience to date. This report contains recommendations to the Chairman, Federal Energy Regulatory Commission (FERC), on (1) the need to develop a plan to collect and evaluate data and information in order to monitor how electricity restructuring is performing and to determine if the benefits of restructuring are being achieved and (2) the need for FERC to report to Congress and the states annually on, among other things, the progress being made in developing competitive wholesale electricity markets.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to other appropriate congressional committees as well as to the Chairman, FERC, and the Director, Office of Management and Budget. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions concerning this report, please call me at (202) 512-3841. Key contributors to this report are listed in appendix V.

A handwritten signature in black ink that reads "Jim Wells". The signature is written in a cursive style with a large, sweeping initial "J".

Jim Wells
Director, Natural Resources
and Environment

Executive Summary

Purpose

The electricity industry in the United States is undergoing major changes, the outcomes of which will affect every consumer. The industry is in the process of restructuring from one in which monopoly utilities generated and provided electricity to consumers at regulated prices to one in which numerous private companies are expected to compete to sell electricity in wholesale and retail markets at prices determined by supply and demand conditions. This restructuring effort, which began at the wholesale level in 1992, has increasingly come under scrutiny as a result of volatile prices, power shortages, and accusations of market manipulation. For example, in 1998 the Midwest experienced a short-term spike in electricity prices that resulted in the financial collapse of some electricity trading companies and disruptions for some electricity consumers. Further, in 2000, electricity markets in California experienced a prolonged period of high prices and power shortages—even blackouts, in some areas. GAO, academics, state government officials, and others have found that market participants contributed to the crisis through their efforts to raise prices. More recently, there have been accusations of market manipulation, concerns over the accuracy of financial reporting, widespread concern in the investment community over credit-worthiness of some energy companies, and significant declines in financial market valuation of several industry participants.

A number of studies and investigations are underway to respond to these concerns. FERC has launched several efforts to examine the operation of wholesale electricity markets and investigate complaints of market abuse and mismanagement. Similarly, states have undertaken examinations of the status of their efforts to promote competition in retail markets and undertaken investigations of complaints of market abuses. Congress has held hearings to investigate accusations of market abuses and to examine electricity markets in general. In addition, in each of the past several years, Congress has examined proposed legislation aimed at improving federal oversight of electricity markets and related matters. As such, Congress will continue to play an important role in restructuring the electricity industry.

In light of the importance of restructuring to consumers throughout the United States, and to assist Congress in evaluating the state of electricity restructuring, the Chairmen of the Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations and the Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs, House Committee on Government Reform asked us to determine (1) the goals of electricity market restructuring, (2) what actions federal and state agencies have taken to restructure the electricity industry, (3) to what extent these actions have achieved the goals of restructuring, and (4)

what lessons can be learned from electricity restructuring efforts made to date.

Background

Electricity is central to the lives and livelihoods of all Americans. Annual expenditures on electricity amount to about \$224 billion, and electricity provides the power to produce billions more in revenue in other industries. The electricity industry is based on four distinct functions: generation, transmission, distribution, and system operations. Once electricity is generated—whether by burning fossil fuels, through nuclear fission, or by harnessing wind, solar, or hydro energy—it is typically sent through high-capacity, high-voltage transmission lines to electricity distributors in local regions. Once there, electricity is transformed into a lower voltage and sent through local distribution wires for use by industrial plants, commercial businesses, and residential consumers. Because electric energy is generated and consumed almost instantaneously, the operation of an electric power system requires that a system operator constantly coordinate the balance between the generation and consumption of power. Absent such constant balancing, electrical systems would be highly unreliable, with frequent and severe outages.

Historically, most utility companies built their own systems of power plants and transmission and distribution lines to serve the needs of consumers in their local areas. This arrangement occurred because electricity service had long been considered a natural monopoly, wherein it was believed to be most efficient for one company to serve the entire needs of a local area. Over time, these individual company systems were connected with adjacent companies' systems in order to improve reliability and to facilitate trade across companies. In addition to these utilities, federally owned utilities and power marketing administrations (such as the Bonneville Power Administration, the Tennessee Valley Authority, and the Western Area Power Administration), publicly owned utilities (such as municipal authorities and public power districts), and cooperatively owned utilities also participated in these electricity systems. These interconnected systems ultimately evolved into three major networks: the Western Interconnect, the Eastern Interconnect, and the Texas Interconnect. Because utilities operated as monopolies, wholesale and retail electricity pricing was regulated by FERC and the states, respectively. Under the Federal Power Act of 1935, FERC is charged with overseeing the rates, terms, and conditions of wholesale sales and

transmission of electricity in interstate commerce. FERC does not directly regulate federally owned, publicly owned, or cooperatively owned utilities.¹ States retained regulatory authority over retail sales of electricity, electricity generation, construction of transmission lines, and intrastate transmission and distribution.

Throughout the 1970s and 1980s, a number of events occurred in the electricity industry—including rising electricity prices and advances in generating technologies—that began to encourage a shift towards a more competitive marketplace for wholesale power. In addition, many economists and public policy analysts had long advocated the advantages of competition over regulation and promoted the idea that competition could drive down costs and prices by reducing inefficiencies, as well as spur new technological innovations. Further, these advocates of competition claimed that actions by legislators and regulators to deregulate airlines, railroads, trucks, and barges had led to lower prices, better service, and improved safety. These factors encouraged legislators and regulators to examine the possibility of restructuring the electricity industry.

Results in Brief

Based on an extensive review of laws, federal regulations, and relevant literature, the goal of restructuring the electricity industry is to increase the amount of competition in wholesale and retail electricity markets. Increasing the amount of competition requires structural changes to the electricity industry, such as allowing a greater number of sellers and buyers of electricity to enter the market. Competition is expected to produce benefits for consumers, including lower prices and access to a wider array of retail services, by increasing the efficiency of wholesale electricity generation and by encouraging innovations in retail electricity services. Such efficiency gains and new services are expected to occur as a result of increased incentives for electricity suppliers to provide better service at lower prices.

¹ Federally owned electricity-producing entities, such as the Tennessee Valley Authority and the Bonneville Power Administration, are subject to Department of Energy and congressional oversight. Because publicly owned utilities, such as municipal systems, are owned by the people they serve, they are generally overseen by the city council or elected/appointed members of an operating board. Similarly, since cooperatives are also owned by the people they serve, they are generally overseen by a board of directors, or the equivalent, elected by the customers/owners. In their comments to a draft of this report, FERC pointed out that additional oversight of cooperatives may be provided by the Rural Utilities Service or by FERC.

Over the past 10 years, the federal government has taken a series of steps that have opened wholesale markets to competition, and nearly half the states have taken various steps toward introducing competition in retail markets. Federal efforts by FERC to promote competition have opened access to regional wholesale electricity markets. More recently, FERC has proposed to standardize a market design for all jurisdictional electric transmission providers. Twenty-four states and the District of Columbia have promoted competition in retail electricity markets in a variety of ways, such as allowing customers to choose a retail electricity supplier, while 26 states have not pursued restructuring efforts and continue to require retail customers to purchase electricity from the traditional utility operating in the customer's geographic region. More recently, a number of states have delayed or postponed their efforts to restructure.

It is not possible to fully determine the extent to which the development of competitive markets—the goal of restructuring—has been achieved to date. Our review of relevant studies indicates a mixed assessment of how far along the industry is in developing competitive markets and the extent to which expected benefits have been achieved. Most studies found that some progress has been made in introducing competition in wholesale electricity markets, but it has proven difficult to measure the benefits of restructuring for retail customers. Where measurement has been possible, there is disagreement about the extent to which expected benefits of restructuring have been achieved. Our own evaluation of the performance of restructuring was also inconclusive. With respect to the goal of increasing competition, restructuring efforts by the federal government and the states have broadened electricity markets by making them more regional and allowing new generation companies to participate. However, questions remain regarding the competitiveness of these markets. In addition, the extent to which restructuring has led to expected benefits is uncertain, in part because restructuring is in the early stages of development.

In determining the goals of electricity restructuring, reviewing actions the federal and state agencies have taken to restructure the industry, and determining whether those actions have achieved the goal of increased competition and the expected benefits of restructuring, we have identified five lessons learned from experience to date that relate to the structure of electricity markets and market oversight. These lessons involve (1) the existence of different rules in electricity systems, (2) FERC's limited jurisdiction in wholesale markets, (3) the separate development of wholesale and retail electricity markets, (4) federal, state, and local decisions on siting new power plants and the transmission infrastructure,

and (5) the importance of better monitoring of restructuring. With regard to monitoring, FERC has recently taken positive steps to look more broadly at the performance of electricity markets through the formation of its new Office of Market Oversight and Investigation. While these efforts may improve the situation, GAO is making recommendations to FERC to better monitor and report to Congress regarding the status of restructuring efforts.

In commenting on the draft report, FERC agreed with GAO's findings, "lessons learned," and the recommendation to report annually to Congress and the states. However, FERC said GAO's recommendation to determine how restructured markets are performing across the country was more problematic because of the jurisdictional division between states and FERC. In response, GAO has revised the recommendation to clarify that GAO is not asking FERC to step outside its jurisdictional boundaries.

Principal Findings

Goal of Restructuring Is to Increase Competition in Order to Provide Benefits to Consumers

Based on an extensive review of laws, federal regulations, and relevant literature, the goal of restructuring the electricity industry is to increase the amount of competition in wholesale and retail electricity markets. Increasing competition requires structural changes to the electricity industry, such as increasing the number of buyers and sellers of electricity, improving the availability and accuracy of price information, and allowing private companies to enter into competition with existing utilities freely and fairly. Economists and other policy analysts expect competition to lead to a range of benefits for consumers of electricity, including lower prices and access to a wider array of retail services than have been previously available. Based in part on success in other industries that have been restructured, competition is expected to achieve these benefits through improvements in the efficiency of wholesale electricity generation as well as innovations in retail electricity services. Generally, competition is expected to lead to greater efficiency and more innovations by improving the incentives for electricity suppliers to provide better and less expensive electricity service. Because of the importance of the electricity industry to the lives of all Americans, it is essential that any restructuring that does occur does not cause a deterioration in the reliability of the electricity system.

Federal and Some State Efforts Underway to Develop Competitive Markets

The federal government has taken a series of actions over the past decade that have promoted competition in wholesale electricity markets. The Energy Policy Act of 1992 (EPACT) (1) authorized FERC to require utilities, on a case-by-case basis, to provide other wholesale buyers and sellers access to their transmission lines and (2) created a new class of generators to further compete with traditional utilities. Beginning in 1996, FERC has issued a series of regulations to open up the transmission system to competitive generators of electricity and to promote the development of regional transmission organizations that can operate the transmission system more efficiently and reliably than traditional utilities. More recently, FERC has proposed mandating a standard market design for all jurisdictional electric transmission providers to allow sellers to transact easily across transmission boundaries and to allow customers to receive the benefits of lower cost and more reliable electricity supply.

To date, 24 states and the District of Columbia have enacted legislation and/or issued regulatory orders to restructure their retail electricity markets. Of these, 17 states and the District of Columbia continue to be active in implementing retail access, thereby allowing customers to choose their own electricity supplier. However, most of these states have fixed retail electricity prices at (or below) the regulated rate in place before the onset of retail competition and continue to allow customers who do not select an alternative service provider or whose competitive supplier has stopped offering service to be served by their traditional utility. The remaining 26 states have not enacted legislation and/or issued regulatory orders to implement retail access, and they continue to require retail customers to purchase electricity from their traditional utility at regulated rates.

The Extent to Which Markets Are Competitive Is Uncertain

It is not currently possible to fully determine the extent to which the goal of developing competitive markets has been achieved. Our review of studies related to measuring the performance of restructuring indicates a mixed assessment of how far along the industry is in developing competitive markets and the extent to which expected benefits have been achieved. While most studies found progress has been made in introducing competition in wholesale electricity markets, results at the retail level have been difficult to measure. Where measurement has been possible, there is disagreement about the extent to which the expected benefits of restructuring have been achieved. Our own evaluation indicates that federal and state restructuring efforts have broadened wholesale electricity markets by making them more regional and allowing new generation companies to participate. For example, several new regional

markets have emerged where buyers and sellers bid to buy and sell wholesale electricity. While it appears that markets are broadening, we could not determine, based on existing studies or our evaluation of available data, the extent to which the expected benefits of increased competition have been achieved. For example, while consumer prices have generally fallen since restructuring began—and more so in states that are restructuring than in nonrestructured states—the falling prices continue a trend that began prior to restructuring, making it difficult to determine the precise role restructuring has played in causing the price reductions.

Lessons Learned from Electricity Restructuring

We identified five lessons learned from experience to date regarding the structure of electricity markets and the need to monitor market performance. Collectively, these lessons demonstrate potential limitations to developing a national competitive electricity market and the expected benefits of restructuring, as well as the importance of information in monitoring restructuring progress.

Different rules in electricity systems limit the ability to achieve benefits from competition.

In its effort to promote competitive wholesale markets, FERC historically has approved a wide range of specific rules that govern the operation of individual transmission system operators and centralized wholesale markets under FERC's jurisdiction. Today, these different rules and operations in regional electricity systems and wholesale markets make it more costly for participants in different electricity markets to buy and sell from each other across electricity systems. This, in turn, limits the degree of competition and the expected benefits of restructuring.

FERC's limited jurisdiction in wholesale markets limits the ability to achieve benefits from competition.

FERC does not have regulatory authority over all entities in wholesale electricity markets, with large areas of the country operating primarily outside the scope of FERC's authority. Therefore, FERC has been unable to prescribe the same operating standards and access to markets for these entities as it has with entities subject to its jurisdiction. This situation limits the development of competitive wholesale markets by limiting the degree to which market participants can make electricity transactions across these jurisdictions. This, in turn, limits the ability of restructuring

efforts to achieve a truly national competitive electricity system and ultimately limits the expected benefits of restructuring.

Separate development of wholesale and retail electricity markets limits the ability to achieve benefits from competition.

Federal and state actions to restructure wholesale and retail markets have, for the most part, been undertaken separately. Federal actions have focused on promoting wholesale competition by increasing the direct interaction of buyers and sellers to determine price. However, most state actions at the retail level—to freeze prices or continue price regulation in areas not undertaking retail restructuring—have had the effect of limiting the degree to which retail consumers respond to changes in underlying wholesale prices. As a result, these actions place limits on the extent to which fully competitive markets can develop and, thus, will limit the expected benefits of restructuring.

Federal, state, and local decisions on siting new power plants and transmission lines limit the ability to achieve benefits from competition.

While restructuring has opened access to wholesale electricity markets, new market entry—through building new generating or transmission facilities—remains subject to federal, state, and local siting decisions. For example, state decisions on how and when to site new generation and transmission will, to a great extent, determine the availability of and access to new electricity supplies and, therefore, will affect the competitiveness of wholesale electricity markets. As a result, state actions that serve to delay or prevent the addition of new power plants or power lines have the effect of limiting market entry and, consequently, may limit FERC's ability to achieve a national market for competitive electricity and thus the expected benefits of restructuring.

Better monitoring of market performance is needed to determine how well restructured markets are performing and the extent to which expected benefits of competition are achieved.

To date, monitoring of restructuring efforts has not been comprehensive enough to fully assess how well restructured markets are performing nor the extent to which expected benefits of competition have occurred. Limitations in the authority to collect data and incomplete monitoring efforts by regulatory and monitoring entities have precluded a comprehensive effort to determine how far along the road to greater

competition we have come, and what remains to be done. To move forward, it is essential that FERC and other regulatory bodies and market monitors carefully watch for signs of problems and have the ability to make needed adjustments, such as recognizing potential barriers to needed investments in new generating or transmission facilities and acting to address them in a timely fashion.

Recommendations

To help ensure that the fullest benefits possible are achieved from electricity restructuring, and to better understand what progress has been made, GAO is recommending that the Chairman, FERC,

1. determine how restructured wholesale electricity markets are performing by developing and implementing a plan to collect necessary data and perform evaluative analysis. These data should be sufficient to allow evaluation of the competitiveness of these markets (including, but not limited to, the extent of market power, efficiency of the industry, and ease of market entry) and the expected benefits to retail consumers (such as lower retail prices and the availability of new products). Where possible and appropriate, FERC should work in concert with state and regional entities to take advantage of their knowledge, expertise, and access to important data relevant to the impacts of restructuring on consumers.
2. report annually to Congress and the states on the status of restructuring efforts, identify emerging issues and impediments to reaching FERC's goal of achieving national competitive wholesale electricity markets, and make recommendations to Congress and the states for changes that will improve the functioning of these markets.

Agency Comments

We provided FERC with a draft of this report for review and comment. FERC agreed with the report's principal findings and "lessons learned." In addition, FERC agreed with GAO's recommendation that FERC should report annually to Congress on the status of restructuring, noting that it plans to do so in spring 2003. However, FERC said that GAO's recommendation directing it to determine, in concert with the states and regional entities, how both wholesale and retail markets are performing is more problematic. FERC was concerned about this recommendation because of the jurisdictional division between states and FERC—states have jurisdiction over retail and FERC over wholesale electricity markets.

In addition, FERC stated that it does not have the resources or expertise to evaluate retail markets.

In response to FERC's concern, we clarified that we are not recommending that FERC step outside its jurisdictional boundaries or attempt to assume responsibility for the status and effectiveness of retail restructuring efforts. Further, we revised the language of our recommendation to state that FERC should evaluate the impacts of restructuring efforts in wholesale markets on retail electricity consumers. With regard to the issue of resources and expertise, we believe that FERC can supplement its own assets by drawing from many sources, including other federal agencies, expert panels, state agencies, and regional market monitoring entities.

FERC's written comments are presented in appendix III. Our evaluation of FERC's written comments are contained at the end of chapter 5. In addition, FERC provided us with some technical changes, which we incorporated into the report as appropriate.

Chapter 1: Introduction

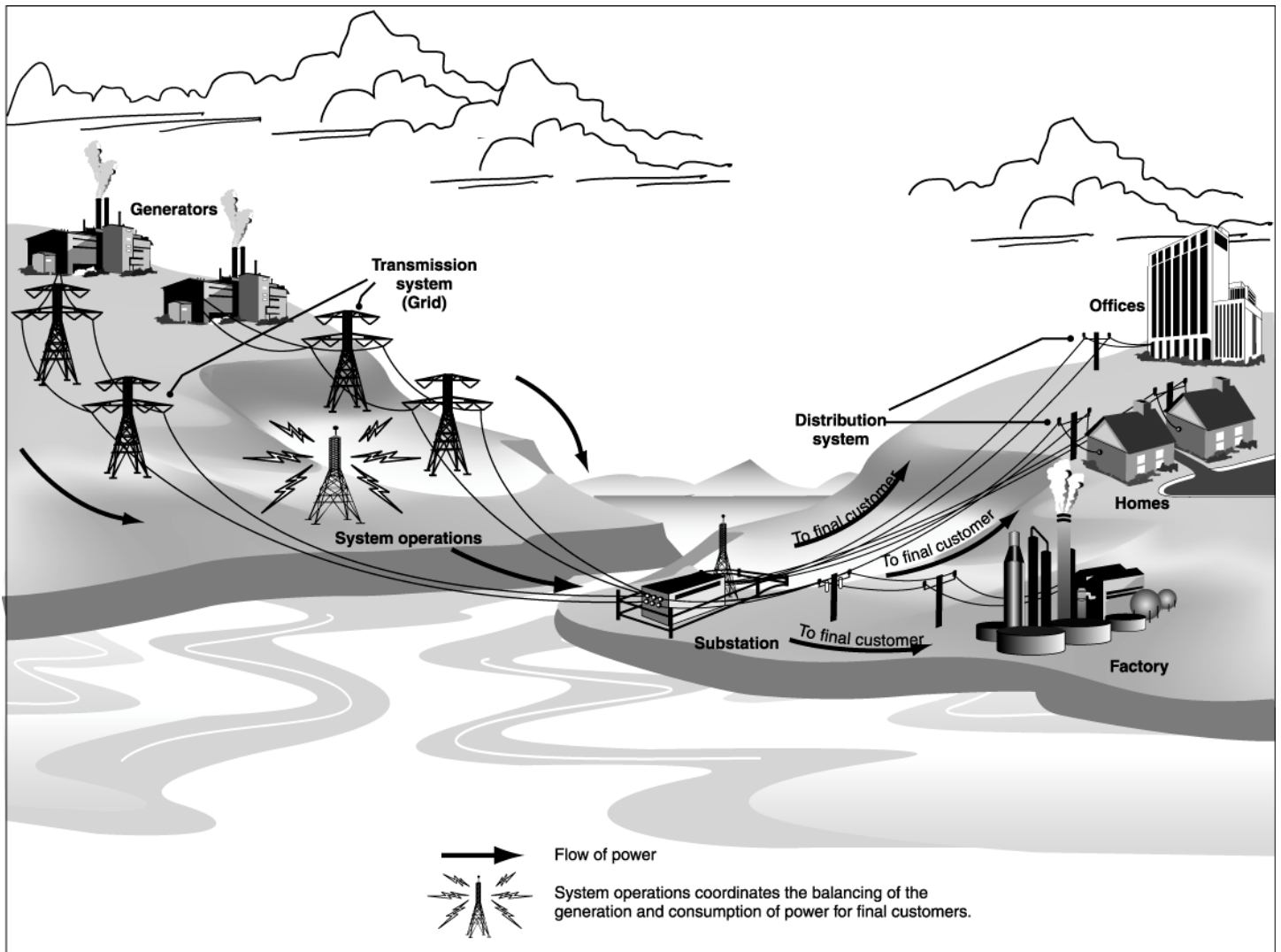
The electricity industry is an important and complex sector of our economy that is central to the lives of Americans. Historically, the U.S. electricity industry developed into a structure of localized monopoly utilities. Each of these monopoly utilities generated electricity to serve consumers in its local area. Within this localized structure, there was limited interaction among different utilities across wide geographic regions. Because of the complex nature of the electricity industry and its historical development, both federal and state entities are involved in overseeing and regulating the industry. Throughout the 1970s and 1980s, a number of events occurred in the electricity industry that began to encourage a shift toward more competitive electricity markets.

The Electricity Industry Is An Important and Complex Sector of the U.S. Economy

Electricity is central to the lives and livelihoods of all Americans. Annual expenditures on electricity amount to about \$224 billion, and electricity is an important input to production in many industries. For example, industrial customers—including companies engaged in manufacturing and assembling products—rely on electricity to power computers, tools, and machinery, as well as for lighting, heating, and cooling their plants and buildings. Similarly, commercial customers—including shopping malls, office buildings, individual stores, and financial and stock markets—also depend heavily on electricity for their day-to-day operations. In addition, residential customers rely on electricity for heating and cooling, lighting, cooking, and cleaning. Finally, with the expansion of Internet usage and the importance of information technologies for commerce, electricity has assumed an even greater role in the daily lives of Americans. As a result, the cost and availability of electricity have implications for the entire economy.

The electricity industry is based on four distinct functions: generation, transmission, distribution, and system operations. (See figure 1.) Once electricity is generated—whether by burning fossil fuels, through nuclear fission, or by harnessing wind, solar, or hydro energy—it is sent through high-voltage, high-capacity transmission lines to electricity distributors in local regions. Once there, electricity is transformed into a lower voltage and sent through local distribution wires for end-use by industrial plants, commercial businesses, and residential consumers.

Figure 1: Functions of the Electricity Industry



Source: GAO.

A unique feature of the electricity industry is that electricity is consumed at almost the very instant that it is produced. As electricity is produced, it leaves the generating plant, and travels at the speed of light through transmission and distribution wires to the point of use, where it is immediately consumed. In addition, electricity cannot be easily or inexpensively stored and, as a result, must be produced in near-exact quantities to those being consumed. Because electric energy is generated

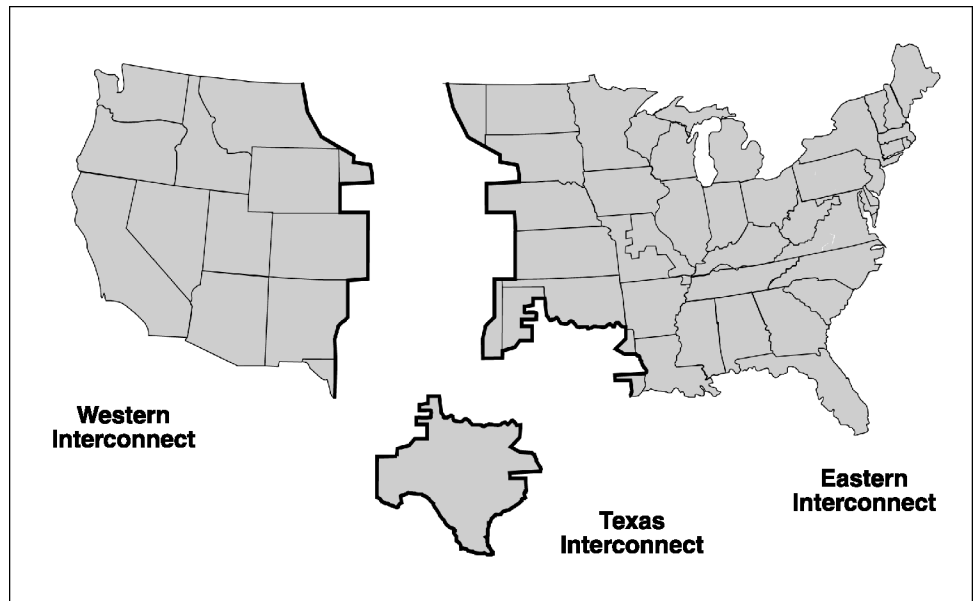
and consumed almost instantaneously, the operation of an electric power system requires that a system operator balance the generation and consumption of power. The system operator monitors generation and consumption from a centralized location using computerized systems and sends minute-by-minute signals to generators reflecting changes in the demand for electricity. The generators then make the necessary changes in generation in order to maintain the transmission system safely and reliably. Absent such continuous balancing, electrical systems would be highly unreliable, with frequent and severe outages.

The Development of a National Electricity Network

Historically, the electric industry developed initially as a loosely connected structure of individual monopoly utility companies, each building power plants and transmission and distribution lines to serve the exclusive needs of all the consumers in their local areas. Such monopoly utility companies were typically owned by shareholders and were referred to as investor-owned utilities. In addition to these investor-owned utilities, several types of publicly owned utilities, including rural cooperatives, municipal authorities, state authorities, public power districts, and irrigation districts, also began to sell electricity. About one-third of these publicly owned utilities are owned collectively by their customers and generally operate as not-for-profit entities. Further, nine federally owned entities, including the Tennessee Valley Authority and the Bonneville Power Administration, also generate and sell electricity—primarily to cooperatives, municipalities, and other companies that resell it to retail consumers.

Over time, the transmission and distribution systems owned by private, public, and federal utilities became interconnected with one another in order to improve reliability and to facilitate trade across companies. These interconnected systems ultimately evolved into three major networks: the Western Interconnect, the Eastern Interconnect, and the Texas Interconnect. Figure 2 shows the division of the country into the three major interconnected systems.

Figure 2: The Three Major Interconnections in the Continental United States



Source: Energy Information Administration.

Federal and State Regulatory Framework Developed to Oversee the Electricity Industry

Because the utilities operated as monopolies, wholesale and retail electricity pricing was regulated by the federal government and the states. The Public Utility Holding Company Act of 1935 (PUHCA) and the Federal Power Act of 1935 established the basic framework for electric utility regulation. PUHCA, which required federal regulation of these companies, was enacted to eliminate unfair practices by large holding companies that owned electricity and natural gas companies in several states. The Federal Power Act created the Federal Power Commission—a predecessor to FERC—and charged it with overseeing the rates, terms, and conditions of wholesale sales and transmission of electric energy in interstate commerce. FERC, established in 1977, approved interstate wholesale rates based on the utilities' costs of production plus a fair rate of return on the utilities' investment. States retained regulatory authority over retail sales of electricity, electricity generation, construction of transmission lines within their state's boundaries, and intrastate transmission and distribution. Generally, states set retail rates based on the utility's cost of production plus a rate of return.

In addition to federal and state regulation, some industry participants have also self-regulated in part by their voluntary participation in the North American Electric Reliability Council (NERC), an organization of

electricity industry entities that develops and maintains standards for operating the electricity systems in the United States. The need for such an organization to help coordinate operations of individual utilities became apparent as the transmission and distribution systems of the individual utilities became connected. Because small changes in supply and demand in one network can affect neighboring networks, it is necessary that all parties coordinate their operations. When coordination fails, the reliability of the system is in jeopardy, as was the case when blackouts occurred in the Northeast in 1965. NERC was formed in response to these blackouts and continues to play a role in facilitating coordination between different utilities' systems.

Changing Nature of the Electricity Industry Made Restructuring a Possible and Attractive Option

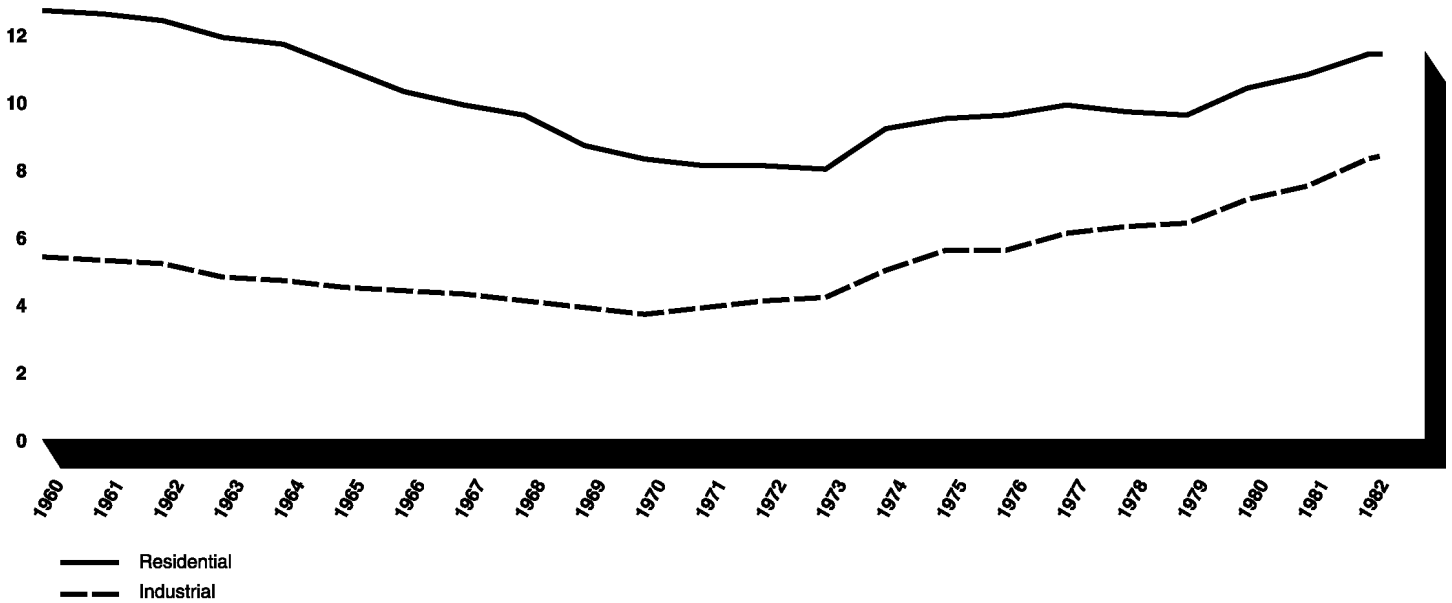
Throughout the 1970s and 1980s, a number of events occurred in the electricity industry that began to encourage a shift towards more competitive electricity markets. These events included rising electricity prices charged by utilities, changes in the technology of electricity generation, and a shift in regulatory thinking in the United States and other countries around the world that had begun to move toward the use of markets rather than governments to make decisions about investments to meet many public needs.

Between 1970 and 1982, average residential and industrial electricity prices increased by 37 percent and 124 percent respectively, after adjusting for inflation. As seen in figure 3, this sharp increase reversed a downward trend in prices over the previous decade.¹ These price increases were in part the result of investment decisions made by utilities and approved by state regulators to build numerous large-scale, costly electric power plants. These plants were built on the assumption that demand for electricity would increase steadily in the future. However, demand did not rise as quickly as anticipated, in part because of slower-than-expected economic growth. Regulators allowed companies to recover the high costs of building these new power plants through higher electricity rates.

¹ Prices are reported in cents per kilowatt-hour. A watt is a unit of electrical power. A kilowatt is 1,000 watts. One kilowatt used for one hour equals 1 kilowatt-hour.

Figure 3: Average Electricity Prices, 1960-1982

14 Real electricity prices (cents per kilowatt hour, in 2001 dollars)



Source: GAO analysis of data provided by the Energy Information Administration.

In addition to rising electricity prices, significant technological changes in both generation and transmission were occurring, which improved the efficiency of natural gas-fired power plants. These technological improvements made it possible to build smaller, more efficient plants, capable of producing electricity at lower cost than the prices charged by many of the existing utilities. In addition, advances in transmission capabilities also allowed electricity to be moved over longer distances, making it more readily available to a wider range of customers. As a result, electricity customers, particularly large industrial users, saw their electricity prices rising, while advances in technology promised lower-priced power, and they began to exert pressure on legislators and regulators to allow them to gain access to electricity at lower prices. Restructuring the industry to introduce competition was seen as a way to achieve this aim.

More generally, the evolution of regulatory thinking in the United States and other countries around the world shifted toward the use of markets rather than governments to make decisions about investments to meet many public needs. Economists and public policy analysts, believing in the advantages of competition over regulation, promoted the idea that markets

could drive down costs and prices by reducing inefficiencies and providing better incentives for companies to develop new innovations. Legislators and regulators passed laws and implemented rules that promoted competition across the U.S. economy. For example, during the 1970s and 1980s Congress passed laws deregulating the airline, railroad freight shipping, trucking, and barge shipping industries. Over the same period, several other countries—including New Zealand, Norway, Sweden, and the United Kingdom—restructured their electricity industries to introduce competition. Citing successes from other deregulation or restructuring efforts, many experts, industry participants, and other interested parties began to call for restructuring of the U.S. electricity industry.

Restructuring Occurs in a Legislative and Regulatory Environment Designed to Achieve Many Goals

Today, restructuring of the electricity industry is occurring within the context of a myriad of federal and state laws and regulations related to such issues as clean air, clean water, fish and wildlife management, recreational uses of waterways and parks, irrigation, flood control, and citizens' health and rights. Responsibility for implementing and enforcing these laws and regulations is distributed across a wide range of federal, state, and local agencies. The result is a natural tension between achieving the goals of restructuring the electricity industry and other existing laws and regulations.

Objectives, Scope, and Methodology

The Chairmen of the Subcommittee on Government Efficiency, Financial Management and Intergovernmental Relations and the Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs, House Committee on Government Reform, asked us to determine (1) the goals of electricity market restructuring, (2) what actions federal and state agencies have taken to restructure the electricity industry, (3) to what extent these actions have achieved the goals of restructuring, and (4) what lessons have been learned from electricity restructuring efforts made to date.

To answer these questions, we collected views of stakeholders and industry experts, including market participants; trade associations; and federal, state, and regional market monitors. We also reviewed relevant studies of restructuring, including reports by market monitors, trade associations, consumer interest groups, academics, and consultants. In addition, we conducted our own evaluation of data provided by the Energy Information Administration, FERC, and private sources. We conducted our work from November 2001 through November 2002 in accordance with

generally accepted government auditing standards. For a more detailed description of our methodology, see appendix I.

Chapter 2: Goal of Restructuring Is to Increase Competition in Order to Provide Benefits to Consumers

The goal of restructuring the electricity industry is to increase the amount of competition in wholesale and retail electricity markets, which is expected to lead to a range of benefits for electricity consumers, including lower prices and access to a wider array of retail services than were previously available. Increasing the amount of competition requires structural changes within the electricity industry, such as allowing a greater number of sellers and buyers of electricity to enter the market. Competition is expected to produce benefits for consumers by increasing the efficiency of wholesale electricity generation and by encouraging innovations in retail electricity services. Such efficiency gains are expected to occur as a result of improved incentives for electricity suppliers to provide better service at lower prices. Further, restructuring is expected to occur while maintaining or enhancing the reliability of the electricity system to consumers.

To Meet the Goal of Increasing Competition Requires Structural Changes to the Industry

Based on an extensive review of laws, federal regulations, other relevant literature, and discussions with numerous industry experts, there is a consensus that the goal of restructuring the electricity industry is to increase the intensity of competition in wholesale and retail electricity markets. Increasing competition requires that a number of conditions be met, including (1) increases in the number of buyers and sellers, (2) sufficient public information about electricity prices to enable buyers and sellers to make informed decisions, and (3) the ability of sellers to enter and exit markets in response to market information. Meeting these conditions will require that the traditional system of regulated local monopolies, which generated and provided electricity to retail consumers at regulated prices, be replaced by a market-based competitive system in which sellers and buyers interact to determine the price of electricity.

Competition Requires an Increased Number of Buyers and Sellers.

More buyers and sellers of wholesale electricity are needed to ensure that no single entity has the ability to influence the price of electricity in its favor. Under the regulated environment that preceded restructuring, utilities held local monopoly positions that encompassed generation, transmission, and distribution of electricity to consumers in each utility's area of control. While trading of wholesale electricity between separate utilities occurred prior to restructuring, this took place primarily between the existing monopoly utilities, thereby limiting the number of participants in the wholesale markets. Therefore, in order to increase the number of sellers, it is necessary for the monopoly owners of transmission and distribution systems—the wires that deliver electricity from generators to final customers—to provide access to these systems to new market

participants. Specifically, new sellers of wholesale electricity will have to be able to buy access to the transmission system at nondiscriminatory rates in order to sell wholesale electricity to buyers.

In addition, greater numbers of retail sellers are also needed to offer the many retail customers a choice of electricity provider and to encourage competition among those providers. Under the regulated retail environment, utilities were the sole suppliers of retail electricity to final consumers. Even if numerous wholesale sellers emerge, without changes in the structure of the retail side of the market, there will be few buyers—each utility will still be the sole provider of electricity to consumers in its area of control, and therefore the only buyer of wholesale electricity. Therefore, in order to increase the number of new buyers in the wholesale market, it may be necessary to make changes in the retail structure to allow more buyers to compete for electricity in the wholesale market. New buyers of wholesale electricity could either be private companies that would buy wholesale electricity and compete to sell it to retail consumers, or, in some cases, final consumers themselves may be able to purchase directly from wholesale suppliers. As in the wholesale market, retail competition will require that new participants have nondiscriminatory access to transmission and distribution systems. Changes in regulation will also be needed to allow consumers to deal directly with wholesale sellers or to allow competition among retail providers of electricity.

**Adequate market
information is needed.**

In order for buyers and sellers of wholesale electricity to make informed decisions, they must have access to sufficient information about relevant prices, including prices of electricity at locations near them and prices of transmission and other charges required to make transactions. Well-functioning competition requires that no single buyer or seller has better information about available prices of electricity than any other market participant. If such an information advantage exists, then those entities with superior information may be able to take advantage of other participants, thereby leading to undesirable outcomes, such as higher prices than would exist under competitive conditions. In addition to price information, experts have said that there must be adequate information about the volumes of trades, and a general increase in the volume of electricity traded. In most commodity markets, such information is readily and publicly available. However, it is less prevalent in the electricity market, and experts generally agree that structural changes are required to

make information more available. Specifically, experts point to a lack of sufficient numbers of transactions in some electricity markets to generate reliable information about prices and other market information.¹ In addition, there is concern that even in markets with many transactions, price and other relevant market data are not made publicly available. Academics and consumer advocates have stated that a lack of public data limits the ability of nonstakeholders to evaluate restructuring and has a detrimental effect on consumer confidence in the restructuring process.

**Freedom to enter and exit
the electricity industry is
needed.**

One of the foundations of a competitive market is the ability of market participants to freely enter and exit the electricity industry in response to information about opportunities in that and other industries. For example, if wholesale electricity prices in one region are high compared to other regions—leading to higher than normal profits for electricity sellers—this would indicate that new investment in either generation or transmission capacity is warranted. Similarly, if there were too much generation in a particular area, leading to prices too low to support normal profits, companies may wish to exit that area by shutting down power plants to avoid losing money. Under competitive conditions, where all participants have the same ability to enter or exit the industry, private companies can be expected to make new investments or to withdraw from a region, depending on market conditions. As a result, it is expected that restructuring will lead to more consistent prices across regions than under the previous regulated environment. More investment will be attracted to high-price regions, thereby causing prices there to fall relative to lower-price regions, while more trade between regions will also have the effect of bringing regional prices closer together. For potential participants to have freedom to enter and exit electricity markets, they must be able to gain access to existing power lines and associated facilities under terms that are consistent with their competitors. Therefore, owners of power lines must be required to provide access to new entrants at terms that do not discriminate compared to existing market participants.

¹ For electricity markets to be efficient and for market participants to have confidence in the prices, there must be sufficient liquidity, meaning that there must be many trades taking place between knowledgeable buyers and sellers.

Increased Competition Is Expected to Lead to a Range of Benefits

Increasing competition is expected to lead to benefits for consumers of electricity. In particular, experts believe that competition in wholesale markets will provide a way to reduce prices by improving the efficiency of producing and delivering electricity. Proponents of restructuring have stated that regulated companies and regulators made poor investment decisions that raised the average cost of electricity for consumers. These investments led to excess investment in electricity generation capacity, in part because utilities and regulators overestimated demand growth. Once this excess capacity was built, electricity prices had to rise to cover the costs to the utilities, even when generating units sat idle. In addition, economists and other industry experts argued that monopoly utilities had poor incentives to keep overall costs down because they were able to pass on all approved costs to consumers in their regulated rates. The experts also argued that regulation slowed the pace of technological innovation, because even if new cheaper generating units could be built, the regulators were still bound to allow the utilities to recover their investment costs for older more expensive generating units. Therefore, by introducing competition among wholesale suppliers of electricity, experts expect new, lower-cost generating plants to be built by nonutility companies, leading to greater efficiency in producing electricity and ultimately causing prices to fall. As an additional benefit, many newer generating plants are much less polluting than the older existing plants. Therefore, investment in new generating plants may facilitate improvements in air quality, if electricity produced by these cleaner-burning generators displaces electricity from older dirtier plants.

Restructuring of retail electricity markets is expected to (1) provide a mechanism for transferring the lower costs achieved through wholesale competition to consumers, (2) improve customer service, and (3) lead to the introduction of new products and services. Under the old regulatory environment, it was argued that monopoly utilities did not have sufficient incentives to continually seek ways to provide better and cheaper electricity and services to consumers. Introducing competition among retail electricity suppliers is expected to allow retail customers to choose a supplier on the basis of prices, products, and service. As a result, retail suppliers will have an incentive to offer electricity and services at prices consumers are willing to pay. Also, in order to compete for customers, retail suppliers are expected to develop and introduce new products and services.

Taken together, wholesale and retail competition could also provide a mechanism by which the financial risks associated with building new electricity generating plants can be transferred from consumers to private

companies and their shareholders. In the old regulatory environment, utilities built the bulk of new generating plants after first identifying an expected need for the new plants and after gaining approval from state regulators. Once approved and built, the cost of building and operating the new generators was passed on to consumers, because the utilities were allowed to capture these costs in the prices set by the regulators. Therefore, consumers bore the financial risk associated with investments made by utilities. In a competitive environment, owners of new generating capacity are not guaranteed recovery of their costs; therefore, they bear the risks of their decisions to build. In this environment, consumer prices are determined more by current market conditions than by historical investment decisions made by utilities and approved by regulators. For this reason, it is argued, technological innovations that lead to lower electricity costs will be adopted faster, leading to lower consumer prices.

Restructuring Expected to Occur While Maintaining or Improving System Reliability

Because reliability of the electricity system is so important to the economy, safety, and security of the country, it is essential that any restructuring that occurs does so without adversely affecting reliability. Historically, reliability has been maintained largely by utilities owning enough generating capacity to serve even the highest demand for electricity under conditions in which some of the capacity may be inoperable. As a result, some power plants operated only a few hours per year. Under restructuring, the total capacity required to maintain reliability could be reduced for three reasons. First, restructuring is expected to broaden electricity markets, which will allow individual local areas to draw electricity from power plants across a wider region, thereby reducing the amount of capacity the local area must own to meet its demand. Because different localities will have their highest demands at different times, idle power plants in one locality could serve other localities experiencing high demand and this reduces the total generating capacity necessary to maintain a reliable supply. Second, under restructuring, some consumers will have enhanced incentives to conserve power during peak demand periods when electricity prices are high. Such incentives will reduce the total consumption of electricity during the highest demand periods, thereby reducing the total capacity required to maintain reliability. Third, some consumers may enter contracts that allow the system operator to shut off their power in times of electricity shortage to

avoid more general supply disruptions. In return, these consumers would be compensated for the disruption.²

Conclusion

Developing competitive wholesale and retail electricity markets will not be easy. Among other things, it will require the creation of an environment that encourages new participants and the development of adequate and reliable information in order for these participants to make informed investment decisions, while maintaining reliability of the electricity system. In addition, restructuring is occurring within the context of other federal and state laws and regulations, including those related to clean air, clean water, and endangered species. Therefore, in developing competitive markets, it will take time to deal with these issues in a way that instills confidence in both market participants and consumers.

² Such contracts can and do also exist under the old regulated environment, but the incentives for such contracts are greater when electricity prices reflect the current levels of supply and demand, as would be the case under full restructuring, than when prices are generally fixed across most periods, as has generally been the case in the regulated environment.

Chapter 3: Federal and State Efforts Are Underway to Develop Competitive Markets

Federal efforts to promote competition have focused on promoting and opening access to regional wholesale electricity markets, including FERC's most recent proposal to create a standard market design for all electric transmission providers. Twenty-four states and the District of Columbia have enacted legislation and/or issued regulatory orders to allow customers to choose their retail electricity supplier. The remaining 26 states have not taken such actions and continue to require retail customers to purchase electricity from their traditional utility.

Federal Efforts Have Promoted Competition and Opened Access to Regional Wholesale Markets

The federal government has taken a series of actions over the past decade that has promoted competition in wholesale electricity markets.¹ The Energy Policy Act of 1992 (EPACT) allowed some nonutility companies to participate in wholesale markets without owning their own transmission lines, an opportunity that was previously limited.² EPACT also authorized FERC to require utilities, on a case-by-case basis, to provide other wholesale buyers and sellers access to their transmission lines. By making it easier for nonutility generators to enter the wholesale market for electricity, EPACT not only expanded competition, but also facilitated the shift in how electricity prices were set, since utilities could purchase electricity from nonutility wholesale generators and pay market-based prices, traditional cost-of-service prices, or a combination of both.

In April 1996, to remedy claims of undue discrimination in access to the transmission system, FERC issued Orders 888 and 889, opening the transmission systems of investor-owned utilities to all qualified wholesale buyers and sellers of electricity. Commonly known as the "open access rule," Order 888 required that transmission line owners offer transmission services to other transmission users under comparable terms and conditions that they provide for themselves. The vertically integrated nature of utilities in the past had not allowed independent electricity suppliers equal access to transmission systems. In promulgating the regulation, FERC found that by limiting the extent to which independent electricity suppliers could provide service to electricity customers, growth of competitive electricity generation markets had been hindered. Order 888 also required utilities to separate their generation and transmission

¹ Restructuring is not currently planned to introduce competition to the transmission or distribution of electricity.

² Prior to EPACT, this ability was limited to a small group of companies that generally produced electricity through cogeneration processes and/or the use of renewable energy.

businesses—a process referred to as unbundling—to prevent discriminatory practices in providing transmission services, such as denying competitors equal access to transmission lines. This unbundling was accomplished by requiring utilities to separate their transmission service functions from other business activities. Order 888 also encouraged utilities to form independent system operators (ISO),³ to which they could transfer operating control (but not ownership) of their transmission facilities, thereby satisfying the unbundling requirement contained in the order. Since Order 888 was issued, six ISOs have been formed and are operating, each with its own set of operating rules.⁴

FERC also found that to effectively ensure nondiscriminatory access to the transmission system, up-to-date information about transmission must be unrestricted and public to all transmission users. To meet this need, FERC issued Order 889, which required all privately owned utilities to participate in the Open Access Same-Time Information System (OASIS). OASIS is an interactive Internet-based database containing information on available transmission capacity, capacity reservations, and transmission prices. By providing timely access to all qualified users regarding transmission market information, the goal of OASIS was to facilitate the functioning of competitive electricity markets.

After passage of Orders 888 and 889, FERC found evidence that the traditional management of the transmission system was still inadequate to support the open access and efficient and reliable operation needed for the continued development of competitive electricity markets, and that continued discrimination in the provision of transmission services by vertically integrated utilities may also be impeding fully competitive electricity markets. In December 1999, FERC issued Order 2000, which

³ An ISO is an entity encouraged by FERC to manage the transmission system as the electric industry in the United States is restructured. An ISO is to control the power system or grid without special interest, and is to own no generation, transmission, or load. Therefore, the ISO is intended to run the system fairly, for the benefit of all market participants.

⁴ These ISOs are California ISO; ISO New England; Midwest ISO; New York ISO; Pennsylvania, New Jersey, and Maryland Interconnect (PJM); and Electric Reliability Council of Texas (ERCOT) ISO. ERCOT established an ISO in 1996 to satisfy the requirements of the Public Utility Commission of Texas for deregulating the wholesale electricity market in the state. The wholesale market in the ERCOT region is basically isolated from other U.S. markets because its transmission system has only minor interconnections to other U.S. transmission systems. FERC has limited jurisdiction over the region because the ERCOT market is essentially intrastate.

encouraged all privately owned utilities to voluntarily place their transmission facilities under the control of a broader market entity called a regional transmission organization (RTO). As a result, ISOs created under Order 888 would be supplanted by larger RTOs, which together would cover the entire nation. The rationale behind FERC’s approach to forming RTOs was that the nation’s transmission systems should be brought under regional control in order to eliminate the remaining discriminatory practices in use, better meet the increasing demands placed on the transmission system, improve management of system congestion and reliability, and achieve fully competitive wholesale power markets. Order 2000 did not specifically require RTO participation; however, if a utility opts not to join an RTO, it is required to explain why it is not doing so.

Since issuing Order 2000, FERC has approved one organization as an RTO and conditionally approved three with the provision that to receive full approval they take significant actions to further conform to RTO requirements described in Order 2000. These organizations operate in 21 states and the District of Columbia, and in Manitoba, Canada. (See table 1 for RTO approval decisions by FERC.)

Table 1: Status of RTOs Approved by FERC as of November 2002

Organization	Approval	Conditional approval^a	Area of operation^b
GridFlorida		X	Florida
GridSouth		X	North Carolina, South Carolina
Midwest ISO	X		Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Montana, North Dakota, Ohio, South Dakota, Virginia, Wisconsin, and Manitoba (Canada)
PJM		X	Delaware, District of Columbia, New Jersey, Maryland, Ohio, Pennsylvania, Virginia, West Virginia

Source: FERC.

^a Certain organizations that have received conditional FERC approval are not yet operational as RTOs, in part because FERC has overlapping jurisdiction with certain state regulatory authorities on the formation of RTOs and because some states are still in the process of reviewing RTO participation for their utilities.

^b Includes all or parts of listed states.

Despite these efforts, FERC has acknowledged that significant impediments remain to competitive wholesale markets. For example, according to FERC, recent events such as the collapse of Enron and the California electricity crisis reveal the need for clear, stable market rules

and overdue infrastructure investment in the U.S. wholesale electricity industry. As a result, in July 2002, FERC issued a notice of proposed rulemaking to provide a standard market design for all electric transmission providers. FERC's fundamental goal in this initiative is to create "seamless" wholesale electricity markets, nationwide, that allow sellers to transact easily across transmission boundaries and allow customers to receive the benefits of a lower-cost and more reliable electricity supply. Accordingly, FERC's standard market design proposal contains a wide range of rules to standardize the structure and operation of wholesale electricity markets and transmission services. Among other things, it (1) describes the rules for how a portion of the nation's electricity will be exchanged in organized markets, (2) defines a new transmission service, (3) establishes a congestion management system to ensure that the transmission system is managed effectively and that users recognize the true value of their actions, (4) lays out new rules to assure that all transmission owners and operators recover their costs, (5) establishes new market power mitigation and monitoring requirements, and (6) sets out long-term planning and resource adequacy requirements.

To date, the proposed standard market design rule has generated significant comments from numerous organizations reflecting concerns and reservations about the scope and details of the proposal. For example, the Chairman, FERC, has noted that one of the most widely voiced concerns about FERC's proposal is that it could cause low-cost states' electricity prices to rise as competition allows sellers of electric power in these states to sell to states with higher prices. In addition, others have stated that the western U.S. market has unique characteristics that may not readily lend itself to FERC's proposed standard market design. In response to these and other comments and concerns, FERC has extended the comment period to January 10, 2003, for all interested parties to file comments on certain features of its proposal. In addition, FERC has invited interested parties to comment on more than 70 specific issues described in its proposal and has convened a series of conferences to address its proposal. FERC estimates that a final rule could be published during the summer of 2003.

Some States Have Opened Retail Markets to New Sellers, While Others Have Not Pursued Restructuring Efforts

To date, 24 states and the District of Columbia have enacted legislation and/or issued regulatory orders to open their retail markets to competition by implementing retail access, thereby allowing customers to choose their own electricity suppliers.⁵ Of these, 17 states and the District of Columbia continue to be active in implementing retail access.⁶ Under retail access, the local distribution utility continues to provide transmission and distribution services. State restructuring legislation or regulatory orders have either required or encouraged utilities to divest generation assets, in part to encourage competition among generating companies. In addition, in some states, metering and billing are subject to competition, while in others these services are combined with distribution services.

Most of the 17 states that have begun to open their retail markets to competition have simultaneously frozen retail electricity prices at (or below) the regulated rate in place before the onset of retail competition. For example, in Michigan, the two largest utilities agreed to provide a 5 percent rate reduction to all residential customers. The reduction began in June 2001 and will extend through December 2003—after which the utilities may still not increase rates until either December 2013 or until the Michigan Public Service Commission determines that certain conditions are met. In addition, most of these states usually allow customers who choose not to select an alternative service provider or whose competitive supplier has stopped offering service to continue to be served by their local distribution utility.

The remaining seven states that have enacted legislation and/or issued regulatory orders have either delayed or suspended implementation of retail access. Six of these states—Arkansas, Montana, Nevada, New Mexico, Oklahoma, and West Virginia—have delayed implementation of retail access by, for example, choosing a new date to move forward. One state, California, suspended its retail-access program in September 2001

⁵ These states are Arizona, Arkansas, California, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Michigan, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Texas, Virginia, and West Virginia.

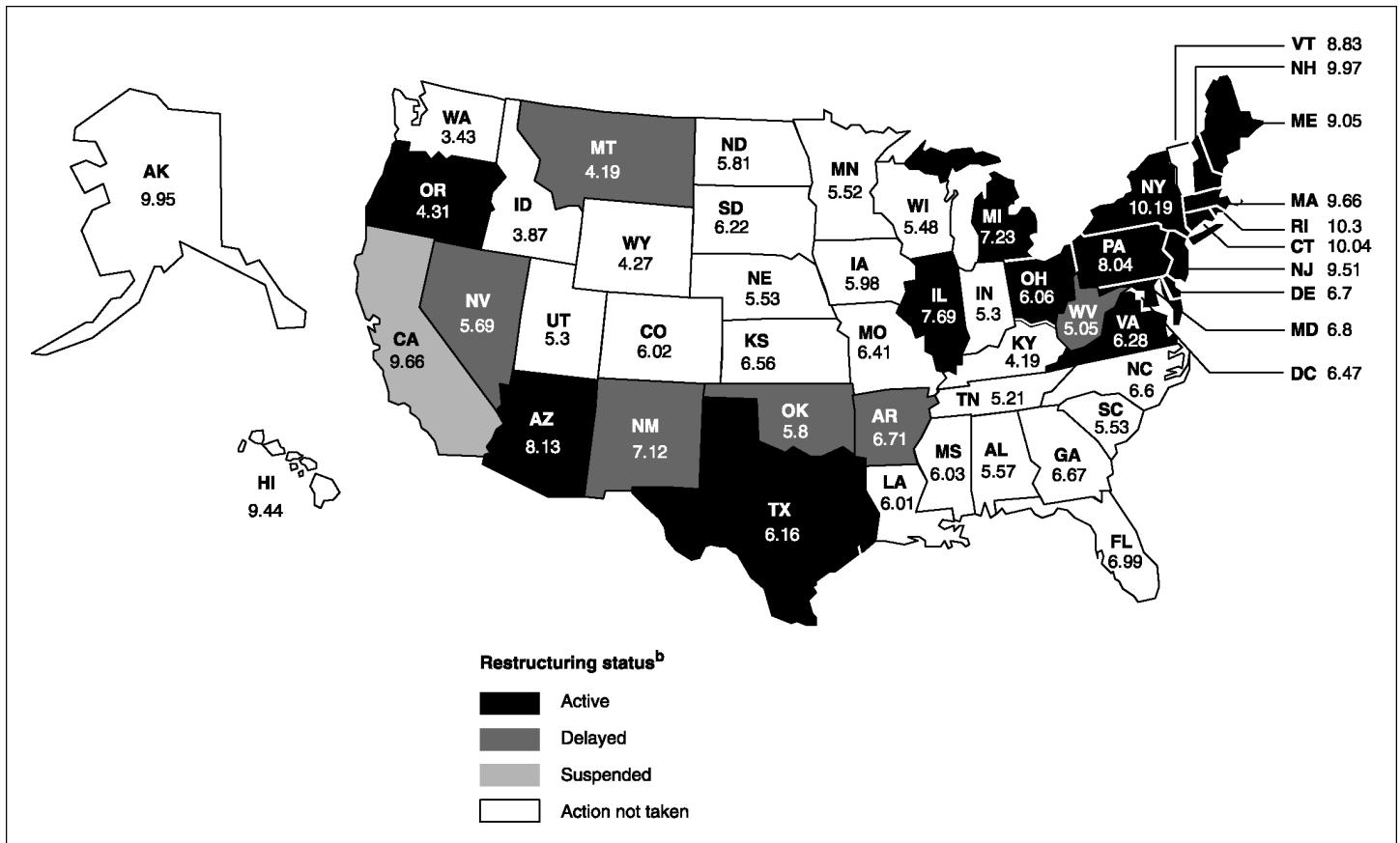
⁶ These states are Arizona, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Texas, and Virginia. Note: Retail access in these states is either currently available or will soon be available; each state's retail access schedule varies according to its legislative mandates or regulatory orders. In Oregon, for example, no customers are currently participating in the state's retail access program, but the law allows nonresidential customers access.

after experiencing a prolonged period of high prices and power shortages but has not repealed its overall plans to restructure.

The remaining 26 states have not enacted legislation or issued regulatory orders to implement retail access, and they continue to require retail customers to purchase electricity from their traditional utility.⁷ Of these states, 8 continue to study the issue of restructuring, while 18 have decided that electricity restructuring is not in their best interest at this time and are not actively considering it, according to a recent report by the National Regulatory Research Institute. These states see little benefit from opening their electric industries to competition anytime soon, since most of these states have relatively low electric rates compared with the rest of the nation. In contrast, states that have opened their retail electricity markets to competition, such as Pennsylvania, New York, and most of New England, have historically had higher than average U.S. retail electricity prices. Figure 4 shows the status of state electricity restructuring activity as of November 2002, as well as average retail electricity prices in 1992, when widespread wholesale restructuring began with the passage of EPACT.

⁷ These states are Alabama, Alaska, Colorado, Florida, Georgia, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, South Carolina, South Dakota, Tennessee, Utah, Vermont, Washington, Wisconsin, and Wyoming.

Figure 4: Status of State Electricity Restructuring Activity as of November 2002 and Average Prices as of 1992^a



Source: Energy Information Agency.

^aAverage prices are in units of cents per kilowatthour, in 1992 dollars.

^bStates that took legislative and/or regulatory action have some degree of shading. States not taking such actions are shown in white.

Conclusion

Despite FERC's efforts, significant impediments remain to the development of competitive wholesale markets. FERC's efforts to develop regional transmission organizations and standardize rules between them are in the early stages of development, with a number of contentious issues to still be resolved. Further, while nearly half of the states moved forward to restructure their retail markets, some states—when faced with the uncertainties that accompany restructuring—decided to delay or suspend their efforts. Continuing to address these restructuring issues will take considerable time and effort on the part of FERC and the states.

Chapter 4: The Extent to Which the Goal of Competitive Electricity Markets Has Been Achieved Is Uncertain

It is not possible to determine fully the extent to which the development of competitive markets—the goal of restructuring—has been achieved to date. Our review of studies related to measuring the performance of restructuring indicates a mixed assessment of how far along the industry is in developing competitive markets and the extent to which expected benefits have been achieved. While most studies found progress has been made in introducing competition in wholesale electricity markets, results at the retail level have been difficult to measure, and, where measurement has been possible, there is disagreement about the extent to which expected benefits of restructuring have been achieved. Our own evaluation of the performance of restructuring was also inconclusive. With respect to the goal of increasing competition, restructuring efforts by the federal government and the states have broadened electricity markets by making them more regional and allowing new generation companies to participate. However, we could not determine the extent to which expected consumer benefits have been achieved, in part because restructuring is in its early stages, but also because of a lack of data necessary to measure key benefits.

Review of Studies Indicates a Mixed Picture of Competition and Uncertainty Regarding Benefits

In our review of more than 30 studies that examined the performance of the electricity industry since restructuring began, we found general agreement that some progress has been made in developing more competitive wholesale electricity markets.¹ For example, the development of ISOs and the beginning of RTO formation is cited as having caused greater numbers of sellers and buyers to have access to electricity over wider geographic regions than was previously possible. Some of these studies also conclude that this increase in competition has led to lower prices for retail electricity customers. However, other studies dispute the claim that retail electricity customers are better off under restructuring and point to episodes of high prices, including the crisis of 2000 and 2001 in California and the West, as evidence that flaws in restructuring have led to undesirable outcomes. A number of studies also pointed to continuing problems with the scope of restructuring, including the fact that most retail electricity customers are insulated from changes in wholesale prices. As such, these customers typically pay a fixed price, regardless of changes in the underlying cost of acquiring the electricity in wholesale markets. Therefore, these customers do not respond to periods of high wholesale prices by reducing their consumption of electricity as they might if they

¹ A bibliography of studies can be found in appendix IV.

had to pay those higher prices directly. As we recently reported, there is general agreement among economists and other experts that the absence of price-responsive customers may enable electricity sellers to charge higher than competitive prices.²

GAO Evaluation Indicates Some Progress Made in Developing Competitive Markets but Questions Remain

The combined efforts of the federal government and some states have broadened electricity markets, expanding their scope in many cases from a local to a regional focus. Along with this broadening of the markets have come increases in the number of buyers and sellers entering the wholesale electricity markets. Broader markets may also be improving the availability and quality of electricity pricing information, but there are indications, such as a lack of transparent electricity transactions, that the industry is still lacking in this area. There has also been a great deal of investment in new power plants, indicating that entry into the industry has occurred.

Early restructuring efforts have led the electricity industry to experience a significant change in the way power is sold across state lines. Four ISOs—California, PJM, New York, and New England—currently operate centralized power markets in which electricity suppliers and buyers submit bids to sell and buy power. Sellers from across these regions and states compete together in these centralized markets, expanding the geographic scope of the markets. In addition to operating power markets, the ISOs manage the generation and transmission of electricity to maintain reliability of the system.

In addition to the introduction of more regional wholesale electricity markets, private electricity trading hubs have emerged, expanding the scope of markets even further and improving the ability of buyers and sellers to manage risk. Specifically, these trading hubs provide a market for buying and selling electricity, as well as for trading electricity futures and various derivatives outside centralized regional wholesale markets.³ Simply put, a trading hub is a location on the power grid representing a delivery point where ownership of electric power changes hands, although

² U.S. General Accounting Office, *Restructured Electricity Markets: California Market Design Enabled Exercise of Market Power*, [GAO-02-828](#) (Washington, D.C.: June 21, 2002).

³ Derivatives are financial products—for example, options, futures, and other contracts—the value of which is derived from underlying instruments, such as company stocks, electricity and natural gas commodities, or other financial instruments.

the actual trades may take place in numerous locations. The emergence of trading hubs is an important development in the process of developing competitive electricity markets because hubs provide market participants a way to trade a standardized increment of electricity. However, of the 10 major hubs that have been developed to date, only a few account for the bulk of power trading. Furthermore, there are indications that the future is somewhat cloudy. For example, the New York Mercantile Exchange recently announced that it was discontinuing trading of electricity futures, citing a lack of trading volume. It remains unclear whether these types of hubs will reemerge and become viable in the future electricity industry environment.

Similarly, development of Internet-based trading systems, such as EnronOnline, Dynegydirect, and Intercontinental Exchange, has further changed the ways in which electric power is sold. Such systems provide an additional market for both physical energy (electricity and natural gas products) and energy derivatives to be bought and sold. Experts say that in other commodity markets the existence of multiple markets has resulted in improvements in the quality and availability of price information. Recently, in the electricity industry, there have been accusations that large market participants who had superior market information manipulated these systems, and some companies such as Enron have stopped such Internet-based trading.

Increases in the number of wholesale electricity sellers—one of the key structural changes required to implement competition—has accompanied the opening of regional wholesale electricity markets, trading hubs, and Internet-based trading systems. The introduction of ISOs and RTOs has allowed more market participants to compete effectively and allowed all the suppliers in the region to compete in a broader marketplace. In addition, since 1992 FERC has granted authority to 850 companies to charge “market-based” rates, which enables them to participate in competitive wholesale markets. FERC’s approval to charge market-based rates enables these companies to participate as sellers in the various wholesale markets that have emerged. If these companies are not granted authority to charge market-based rates they can only sell power in interstate wholesale markets at regulated rates, based on their costs, which must also be approved by FERC.

In addition to an increase in the number of wholesale sellers, some states are witnessing an increase in the number of retail sellers who are competing with utilities to sell electricity to consumers. For example, one study, conducted by the National Regulatory Research Institute, found that

in the 18 states that have operated restructured retail markets, there were 75 companies competing with these states' utilities to sell electricity to retail customers. These companies must either buy their electricity from the wholesale markets or generate it themselves, and when they buy electricity from the wholesale market, this increases the number of wholesale buyers as well, another key structural change needed to implement competition. In providing technical comments on a draft of this report, FERC stated that most states that have implemented retail competition fear that too few new retailers have entered the market to support effective retail competition.

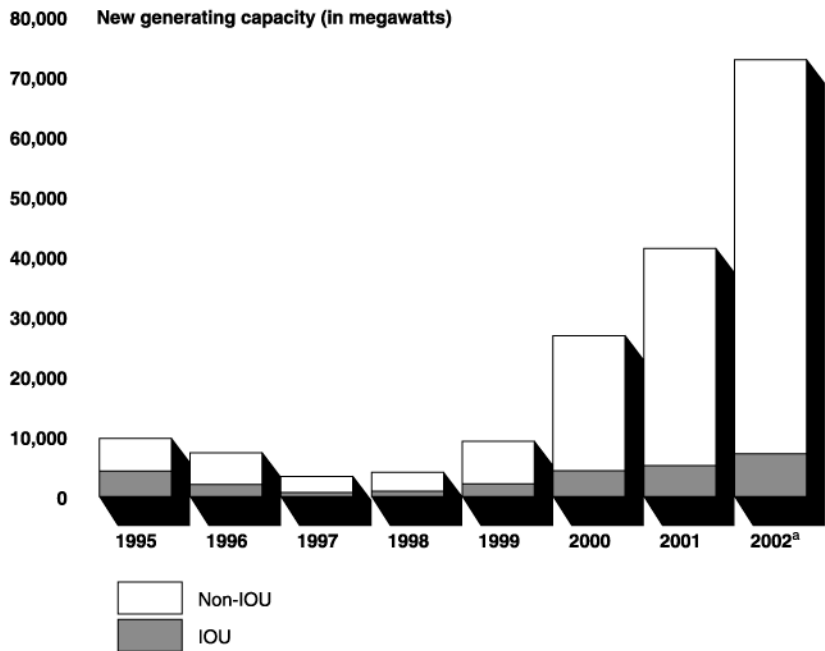
There have also been improvements in the availability and reliability of price and other market information—another requirement of competitive markets. Increased numbers of transactions, whether executed through institutions such as ISOs or RTOs, through private trading hubs, or through other types of transactions, provide a critical means of developing price information and making it available. While the development of broader electricity markets has contributed to the availability and quality of price data, there are indications that the electricity industry is still in the early stages of development in this area. For example, in a recent FERC conference on market monitoring, several conference participants stated that there is still not enough trading in many markets across the country to ensure confidence that the prices observed in those markets are accurately representative of the prices at which electricity is generally trading there. In addition, recent concerns by FERC and others that some market participants may have misreported price information used in various publications have raised questions about the reliability of publicly available information.

Another indication of the emergence of competition is that new suppliers are able to enter the market. In recent years, there has been a large increase in the amount of new generating capacity that has been built. Specifically, from 1995 through July 2002 there has been about 175,000 megawatts (MW) of new generating capacity built in the United States, with most of this capacity added since 1998.⁴ These new generating plants added about 23 percent to the total generating capacity that existed in 1995. In addition, nonutility companies own most of the new generating capacity built in recent years, which has served to increase in the number

⁴ A megawatt is a measure of electric power equal to 1,000,000 watts. One megawatt of generating capacity can serve the needs of about 750 homes.

and capabilities of these new types of electricity sellers in wholesale markets. Specifically, nonutilities accounted for about 148,000 MWs of generating capacity, or about 85 percent of the 175,000 MWs added from 1995 through July 2002. Investor-owned utilities (IOUs) accounted for the remaining 15 percent. Figure 5 shows the new investments in generating capacity from 1995 through July 2002.

Figure 5: Generating Capacity Added, 1995 through July 2002



Source: GAO analysis of PowerDAT data provided by Platt's/RDI.

^a 2002 reflects data through July.

The growth rate of generating capacity over these years has been far higher than the average growth rate of demand, meaning that new generating plants will likely displace some generation from existing facilities. This is especially likely because most of the new generating units burn natural gas and employ technology that is currently less costly per unit of electricity generated than many older generating plants, making the former more economically competitive and able to sell power profitably at lower prices. Any displacement of older plants powered by fossil fuel by power plants that burn natural gas would have a positive effect on air quality because, in addition to running at lower cost, the newer plants create far fewer emissions per unit of electricity generated than the older

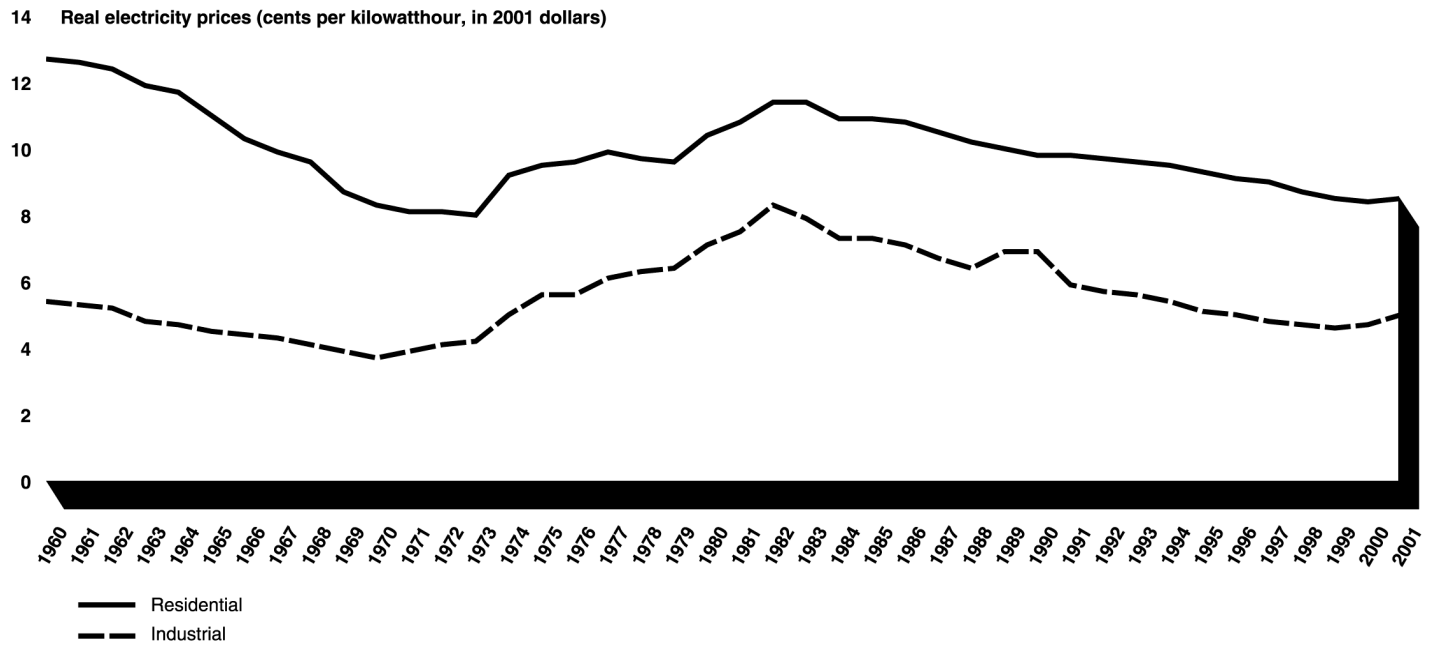
plants. However, over the past year, a large number of proposed power plants have been canceled, in part as a result of poor market conditions, including tighter credit requirements from banks and investors, slower economic activity, and the financial difficulties of several large energy companies.

Restructuring's Impact on Prices and Other Expected Benefits Remains Unclear

Available data and information do not allow a determination of the extent to which restructuring efforts to date have led to the expected benefits for consumers of lower electricity prices and a wider array of services. While electricity prices have generally fallen since restructuring began in the 1990s, it is not clear how much of the decline was attributable to, or simply coincided with, restructuring efforts. Further, periods of higher prices have also occurred in some places and during some periods of time. Similarly, new electricity products have emerged, both in restructuring and nonrestructured states, making it difficult to conclude that these new products are the direct result of restructuring efforts. In addition, while operating efficiency for power plants appears to have increased since restructuring began, this is a continuation of a trend that began prior to restructuring, and it is therefore not clear how much of the improvement can be attributed to, or is simply coincident with, restructuring.

Throughout the 1990s—the period during which restructuring began at the national level and expanded to individual states—average retail prices for electricity fell, after adjusting for inflation. Specifically, from 1990 through 1999, average retail prices for residential customers fell by about 14 percent, and prices for industrial customers fell by about 23 percent. However, in 2000, retail prices for industrial customers rose, and, in 2001, prices rose for both industrial and residential customers. Over the entire period from 1990 through 2001, retail residential and industrial prices fell by about 13 and 15 percent, respectively. As shown in figure 6, the decrease in prices throughout the 1990s continues a trend that began in 1983.

Figure 6: Average Electricity Prices, 1960-2001



Source: GAO analysis of data provided by the Energy Information Administration.

To try to determine the effect of restructuring efforts on retail prices, we examined these price changes in the context of state restructuring status, distinguishing between (1) states that implemented restructuring plans, (2) states that made restructuring plans but delayed their implementation, and (3) states that did not develop restructuring plans.⁵ In addition, we focused on the years from 1997 through 2001, which encompass the period during which individual states began restructuring their retail markets. In so doing, we found that those states that implemented some restructuring efforts generally experienced decreases in residential retail prices while

⁵ For the purpose of this analysis, we modified the Energy Information Administration’s classification of states’ restructuring status as of November 2002 by grouping California, which is currently listed as “suspended,” with the 17 “active” states. We did this because California had an active retail access program from April 1998 until September 2001. Using this modified classification, 18 states and the District of Columbia have implemented restructuring plans, 6 states made restructuring plans but delayed their implementation, and 26 states did not develop restructuring plans. All prices have been adjusted for inflation and are expressed in terms of 2001 dollars. In addition, the average prices we report are a simple average across states, as opposed to an average weighted by the volumes of electricity consumed in each state.

prices generally increased in states that did not implement restructuring during the same period. For example, over the entire 4-year period, average residential prices fell by about 4 percent in states that implemented restructuring, but rose by 4 percent in states that delayed and by 3 percent in states that made no restructuring plans. Over the same 4-year period, overall retail prices for industrial customers generally rose, but we found that the price increases were generally smaller for states that implemented some restructuring efforts compared to states that either delayed or made no restructuring plans. Specifically, we found that on average, restructuring states witnessed almost no change in average retail industrial prices over the entire four year period from 1997 through 2001, while states that delayed their restructuring plans or did nothing had 24 and 5 percent price increases, respectively. As discussed previously in this report, residential retail prices rose in 2001, and industrial retail prices rose in both 2000 and 2001.⁶

While restructuring may have contributed to the overall reduction in retail prices in the 1990s, and may account in part for the greater decreases in restructuring states in the period from 1997 through 2001, there are other factors that could have affected prices. For these and other reasons, we were unable to determine the effect of restructuring on retail prices. For example, this period also witnessed reductions in the prices of natural gas, coal, and other fuels used to generate electricity, as well as the introduction of cost-saving technologies at new and existing power plants, all of which may have led to price reductions. We also found that states that restructured generally reduced and froze retail prices at the time they restructured in the expectation that restructuring would lead to lower prices overall and to ensure that their retail customers benefited immediately. Therefore, the greater price reductions observed in these restructured states may reflect state regulator's expectations, rather than what restructuring actually achieved.

Expert opinion is also mixed on the impact of restructuring on retail prices. Some experts attribute lower retail prices in part to restructuring and increased competition in wholesale and retail markets, while others, citing periods of higher prices, point to flawed restructuring as the cause,

⁶ The data used in figure 6 differ from those used in the calculations of prices from 1997 through 2001. The data used to generate the figure include prices from utilities, as well as energy service providers selling to retail customers, while the data used to calculate changes from 1997 through 2001 only reflect utility prices—state-by-state data for energy service providers were not available.

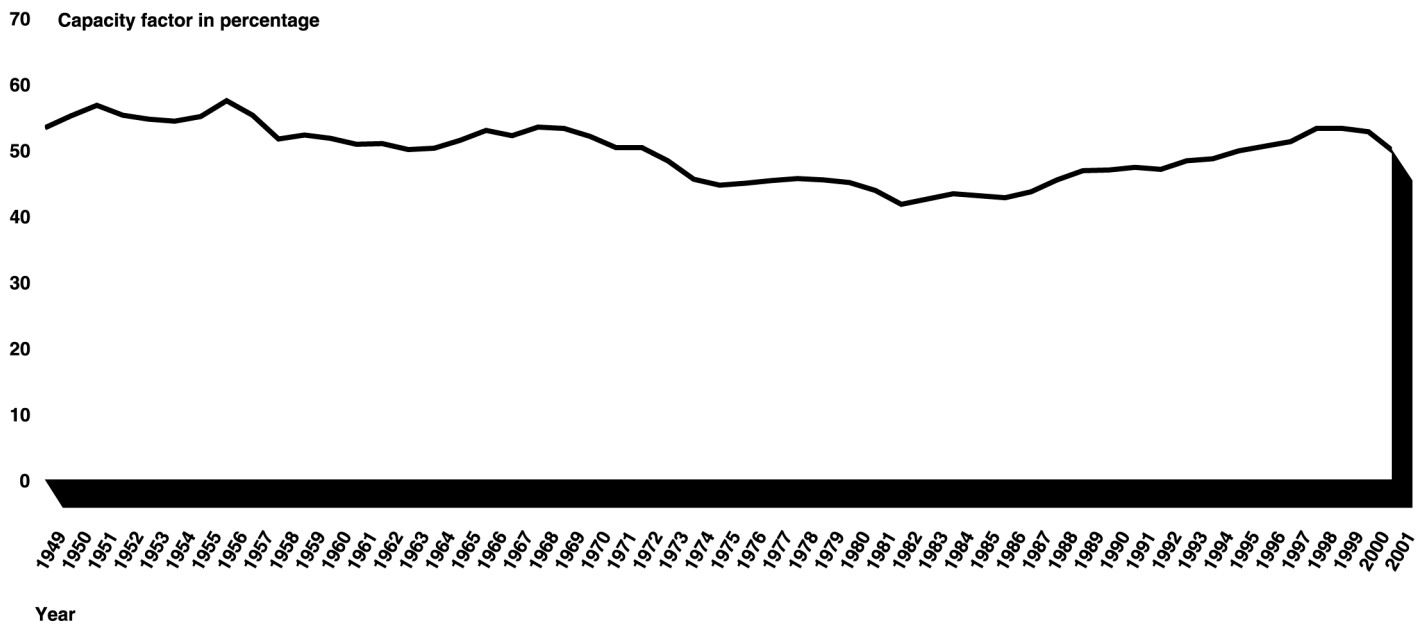
claiming that the electricity industry cannot be made to behave competitively. Still others have stated that flaws in restructuring efforts, including frozen retail rates that made it difficult for new sellers to compete with existing utilities, have reduced what impact restructuring could have had on lowering retail prices. Finally, because electricity frequently crosses state borders as generators in one state sell to buyers in another, prices in any single state will often affect prices in adjacent states. This further complicates the picture, making it difficult to sort out the effect of restructuring on overall retail electricity prices.

Another expected benefit of restructuring, new electricity products, has become available in recent years, but new products have occurred in both restructured and nonrestructured states. These products include green power (electricity produced by renewable resources), electricity sold at a price that varies according to time of use or market conditions, and energy service contracts that provide additional services to consumers, such as energy audits or energy efficiency improvements. For example, in several states, green power has emerged as a product for which consumers are willing to pay more. One recent study found that in 18 states that had actively pursued retail restructuring, companies were offering their customers 49 different ways to buy electricity generated by renewable sources. New products are also emerging in nonrestructured states. For example, in Colorado—a state that has not restructured—the local monopoly utility has also offered to sell electricity generated by renewable sources to its customers. Because new products have emerged in both restructured and nonrestructured states, and because there is no central source of data on the development of new products, we were unable to determine what effect restructuring has had on the development of these products.

While it appears that there have been efficiency gains in the operation of electricity generating plants, another expected benefit of restructuring, we find that it is not possible to determine whether restructuring caused or simply coincided with these gains. In promoting restructuring, experts believed it would improve efficiency by, among other things, reducing the amount of excess generating capacity required to maintain a reliable electricity system. Throughout the 1990s, power plants did experience increases in their intensity of use—reducing excess capacity during these years. However, this was a continuation of a trend that began in 1983, prior to restructuring. In addition, the upward trend in intensity of power plant use was reversed in 2000 and 2001. Some experts attribute part of the overall efficiency gains to restructuring, stating that increased competition improves incentives for using existing power plants more intensively. They

also attribute the fall in intensity of power plant use in 2000 and 2001 in part to the large number of new plants that began operation during those years and to the fact that overall demand grew more slowly than expected. Overall, due to data limitations, we were unable to determine the impact of restructuring on the efficiency of power plant operations. Figure 7 shows the average capacity factor for power plants from 1949 through 2001. The capacity factor for generating plants shown in the figure measures the proportion of total generating capacity that is actually produced during each year.

Figure 7: Overall U.S. Capacity Factor, 1949-2001



Source: GAO analysis of data provided by the Energy Information Administration.

Conclusion

Competitive electricity markets are clearly in the early stages of development. While restructuring efforts have broadened electricity markets and increased the number of market participants (both buyers and sellers), the extent to which expected benefits have been achieved is uncertain. Because the development of competitive markets and the expected benefits from competition are central to restructuring efforts, understanding how far along the road to greater competition we have come and what remains to be done in moving forward is important.

Chapter 5: Lessons Learned from Electricity Restructuring and Recommendations

In determining the goals of electricity restructuring, reviewing actions that federal and state agencies have taken to restructure the industry, and determining whether those actions have achieved the goal of increased competition and the expected benefits of restructuring, we have identified key lessons learned from experience to date that relate to the structure of electricity markets and market oversight. The lessons presented here point out potential limitations to the extent of competition in electricity markets and to the expected benefits of restructuring. In addition, we discuss the need for improved monitoring of restructured electricity markets.

Experience with Restructuring to Date Provides Five Lessons Learned

Different rules in electricity systems limit the ability to achieve benefits from competition

In its effort to promote competitive wholesale markets, FERC has historically approved a wide range of specific rules that govern the operation of individual transmission system operators and centralized wholesale markets under its jurisdiction. FERC has acknowledged the lack of a single set of rules for transmission access or wholesale market operations. Furthermore, FERC has stated that the absence of consistent rules has permitted (1) rules that can be used to discriminate and lead to increased transmission costs and system reliability problems and (2) various design flaws in wholesale markets and transmission services that have created operational problems within and between wholesale markets. For example, a variety of inconsistent rules governing the operation of power plants in PJM, New York ISO, and ISO New England have made it more costly for participants in these electricity markets to buy and sell from each other. Overall, the presence of different rules and operations limits the extent of possible competition between these markets. Limiting the extent of competition between wholesale markets will, in turn, limit the expected benefits from restructuring.

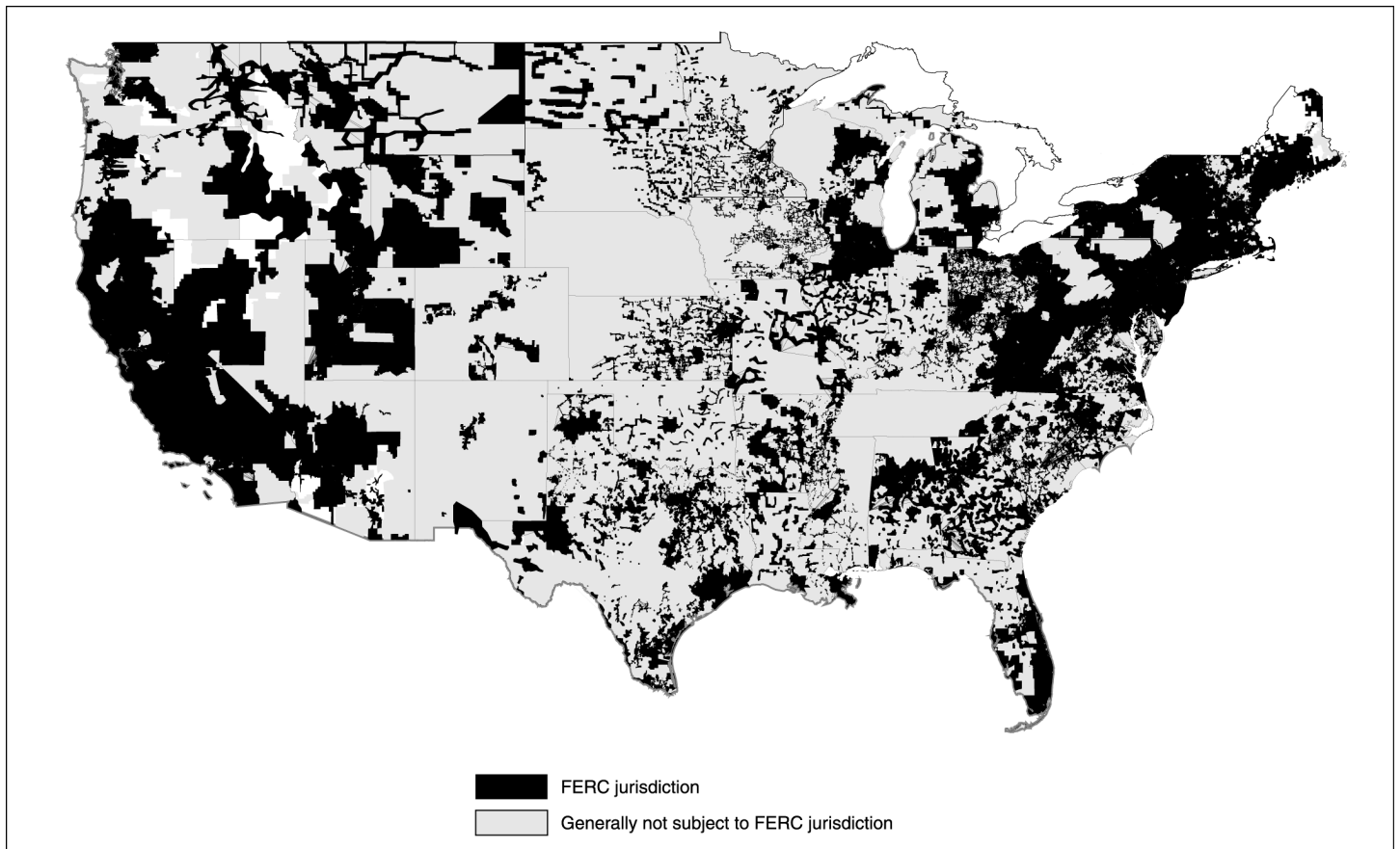
Recently, FERC's proposed standard market design rulemaking was developed largely to address the variations in rules and operating procedures for the wholesale markets and transmission services. Through its proposal, FERC plans to bring a level of standardization to market rules and procedures that will remedy these problems and provide a level playing field for all entities that seek to participate in wholesale electricity markets.

**FERC's limited jurisdiction
in wholesale markets
limits the ability to achieve
benefits from competition**

FERC does not have regulatory authority over all entities in wholesale electricity markets. Specifically, FERC does not have jurisdiction over power sales by federally owned entities (e.g., the Bonneville Power Administration, the Tennessee Valley Authority, and the Western Area Power Administration), publicly owned utilities, or most cooperatively owned utilities. For example, the electricity needs of Nebraska are entirely served by municipal, cooperative, and other suppliers not explicitly subject to FERC oversight. As a result, a patchwork of rules has developed governing both restructured and nonrestructured jurisdictions, with large areas of the country operating primarily outside the scope of FERC's authority.

While many of these nonjurisdictional entities are smaller than many investor-owned utilities, taken together they serve large areas of the country and provide service to about 25 percent of the nation's demand for electricity. As shown in figure 8, the areas served by entities not under FERC jurisdiction cover a wide area, especially in the Southeast, Midwest, and West.

Figure 8: Areas Served by Entities Subject to FERC Jurisdiction, 2002



Source: GAO analysis of PowerMap data provided by Platt's/RDI.

Notes:

Areas served by entities generally not subject to FERC jurisdiction include areas served by publicly owned entities such as municipal utilities, cooperative utilities, and others.

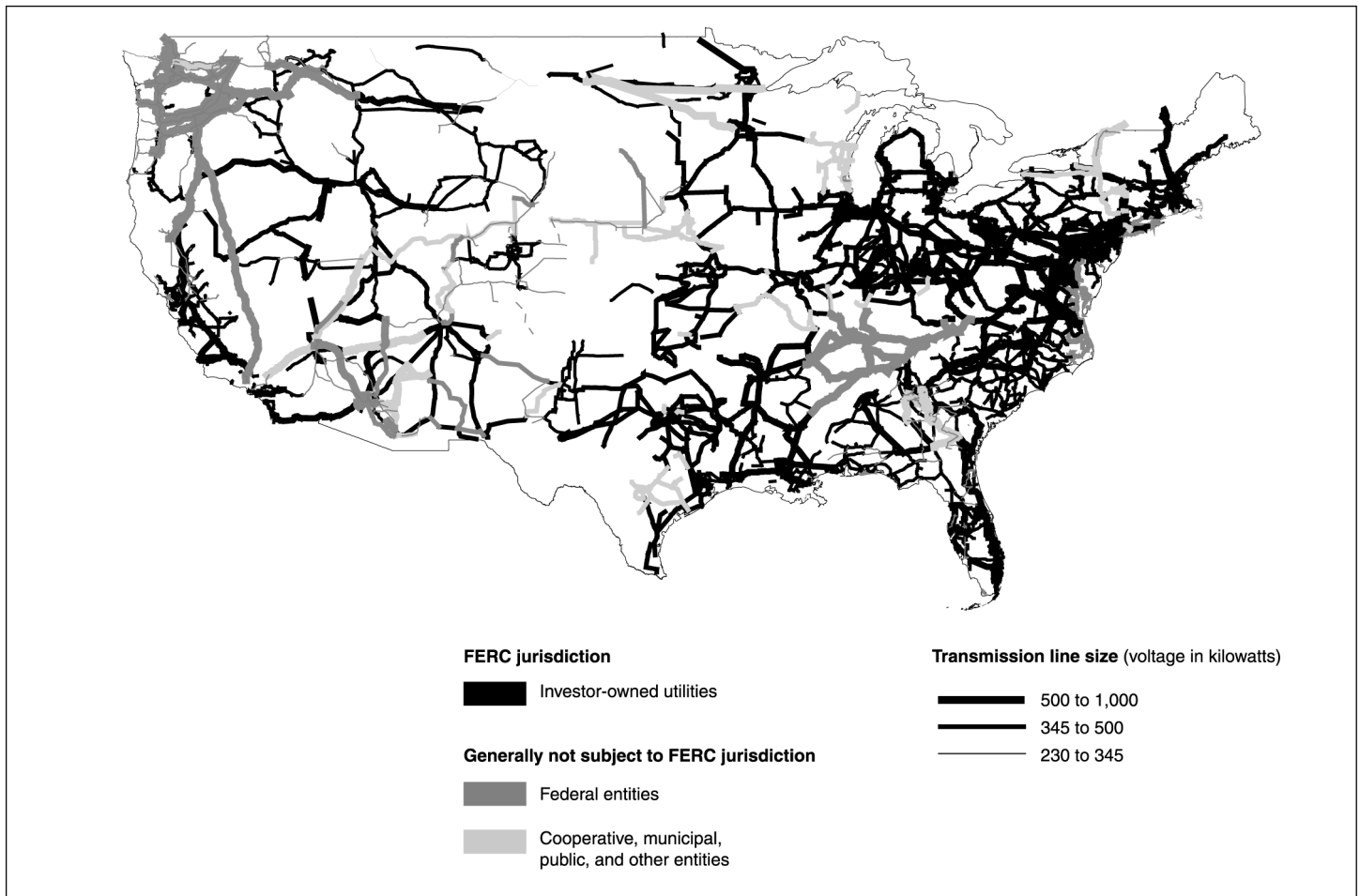
Data on service territories include some overlaps, indicating that some areas are served by both entities subject to FERC jurisdiction and entities not generally subject to FERC jurisdiction, particularly some areas in Pennsylvania, Michigan, Wisconsin, and Iowa. Data reflected above depict those areas of overlap as not generally subject to FERC jurisdiction.

Unshaded portions of the map indicate either that no electric service is provided or the service area is very small.

In addition to covering wide areas of the country, these nonjurisdictional entities also own about 30 percent of the transmission lines nationwide. FERC has only limited jurisdiction over the transmission services of such entities. As shown in figure 9, the lines owned by nonjurisdictional entities are prominent in the West and South, including lines owned by federal

entities such as the Bonneville Power Administration, the Western Area Power Administration, and the Tennessee Valley Authority. Many of the lines owned by these nonjurisdictional entities are high-voltage transmission lines, capable of carrying large volumes of electricity over long distances. These types of lines may offer opportunities to facilitate transactions between regions.

Figure 9: Ownership of Large Transmission Lines by Entities Subject to FERC Jurisdiction, 2002



Source: GAO analysis of PowerMap data provided by Platt's/RDI.

Notes:

Data for transmission lines reflect primary ownership—some lines may have multiple owners.

Federal entities include the Bonneville Power Administration, the Tennessee Valley Authority, the Western Area Power Administration and others.

High voltage transmission lines are generally capable of moving higher volumes of electricity over greater distances with fewer losses, than lower voltage lines.

As a result of the lack of jurisdiction across wide regions of the country and over significant transmission lines connecting some areas of the country, FERC has not been able to prescribe the same standards of open access to the transmission system. This situation, by limiting the degree to which market participants can make electricity transactions across these jurisdictions, will limit the ability of restructuring efforts to achieve a truly national competitive electricity system and, ultimately, will reduce the potential benefits expected from restructuring.

FERC's proposed standard market design rulemaking does not address the issue of its jurisdiction and authority regarding federally owned entities, cooperatives, and municipalities. Nonetheless, there have been several legislative proposals in the 107th Congress to address FERC's limited jurisdiction, though none has been enacted.

**Separate development of
wholesale and retail
electricity markets limits
the ability to achieve
benefits from competition**

Federal and state governments each have regulatory authority for overseeing the electricity industry—federal over wholesale and state over retail markets. As a result, the actions taken to restructure wholesale and retail markets have, for the most part, been undertaken separately. For example, to promote competition in wholesale markets, FERC has taken actions to allow prices to be established by direct interaction between buyers and sellers. However, most state actions at the retail level have in fact served to freeze retail prices, thereby limiting the degree to which buyers can respond to changes in underlying wholesale prices. Specifically, states have imposed frozen retail prices in restructured markets or continued to regulate prices in areas not undertaking retail restructuring, both of which limit the ability of consumers to respond to changes in wholesale prices. There is general agreement among industry experts that the absence of a significant demand response has a negative impact on the functioning of wholesale electricity markets, causing prices to be higher and more volatile and facilitating the exercise of market power by electricity sellers. As a result, these state actions place limits on the extent to which competitive markets can develop and, thus, reduce the potential benefits expected from restructuring.

Because FERC does not generally have authority over retail electricity markets, FERC's standard market design proposed rulemaking does not directly address the issue of making electricity consumers responsive to prices. However, the proposed rulemaking does reference and comment

on the value and need for a better link between supply (wholesale) and demand (retail) to help create improved supply planning and a more efficient competitive environment. Further, according to FERC, the proposed rulemaking would require market operators to receive demand reduction bids if states allow retail customers to make such bids.

Federal, state, and local decisions on siting new power plants and transmission lines limit the ability to achieve benefits from competition

Federal, state and local entities all have authority over key decisions that affect new investment in generation and transmission facilities. Decisions made by private investors on how and when to site new generation facilities will influence the availability of new electricity supplies. Further, although transmission increasingly serves regional needs, state and local governments make many of the decisions on whether and where to site new lines. Therefore, the investments necessary to maintain adequate supplies of electricity and a reliable electricity system are critically dependent on how federal, state, and local regulatory bodies exercise their authority over these new investments. For example, adding a transmission line that crosses several state boundaries and passes through federal lands requires multiple permits and approval processes involving numerous regulatory entities charged with, among other things, environmental protection and land use planning issues. Similarly, investments in new generating facilities, while typically involving a single state, generally require approval from multiple regulatory entities to address state and local environmental, zoning, and energy policy issues.

While recognizing the importance of the regulatory approval process, many market participants have stated that the lack of a unified and consistent regulatory environment across states creates a potential barrier to investment that leads to uneven and, in some cases, insufficient investment in new generating or transmission facilities. For example, as we have previously reported, states' power plant siting decisions affect companies' perceived risk of entering a given market, which may, in turn, result in more or less investment.¹ As restructuring creates markets that are more regional in scope, less than needed investment in new plants in one state may have implications for neighboring states—resulting in the need for additional plants to be built in adjacent states or contributing to higher market prices. As a result, state actions that serve to delay or

¹ U.S. General Accounting Office, *Restructured Electricity Markets: Three States' Experiences in Adding Generating Capacity*, GAO-02-427 (Washington, D.C.: May 24, 2002).

prevent additions of new power plants or power lines could limit FERC's ability to achieve a national market for competitive electricity and, thus, limit the expected benefits of restructuring.

FERC's standard market design proposal does not directly address the siting processes for electricity power plants or for transmission lines. However, the standard market design proposal does encourage regional cooperation and state and federal collaboration on generation and transmission system planning.

Better monitoring of market performance is needed to determine how well restructured markets are performing and the extent to which expected benefits of competition have occurred

FERC, the states, and other market monitors are not fully monitoring the overall performance of all wholesale and retail markets nor collecting sufficient data to do so. As a result, cross-regional comparison of the performance of markets is generally not possible. FERC has recently proposed changes to the design of electricity markets, which include plans to improve monitoring efforts.

Until recently, FERC has not actively monitored market performance in a general sense. As reported earlier this year, FERC's previous efforts to directly oversee the market have been incomplete or ineffective.² Specifically, FERC staff told us that in the past their monitoring efforts were largely undertaken on a case-by-case basis in response to specific problems. For example, FERC has been actively investigating several complaints of market manipulation and violations of market rules over the past year, many stemming from the western U.S. electricity crisis that began in 2000. Further, FERC has limited authority to compel market participants to provide proprietary data needed for more comprehensive monitoring. For example, FERC has identified difficulties in getting data on individual power plant operations that it needs in order to evaluate the functioning of the transmission system. Senior FERC officials told us that, in general, FERC's authority to collect data from market participants is predicated on developing a specific legal argument that the data support a specific investigation, rather than for more general monitoring of market performance. In some cases, according to FERC, this is due to the requirements of the Paperwork Reduction Act.

² U.S. General Accounting Office, *Energy Markets: Concerted Actions Needed for FERC to Confront Challenges that Impede Effective Oversight*, [GAO-02-656](#) (Washington, D.C.: June 14, 2002).

State efforts to monitor the electricity industry have declined since the mid-1990s. According to experts, the ability of state public utility commissions to monitor restructured electricity markets is limited because oversight has shifted from the states to FERC. They further stated that state commission access to data from market participants is more limited under restructuring than under the previous regulated environment in which they had authority over setting electricity rates for the utilities in their states and, therefore, access to most of the relevant industry data. In addition, a survey of public utility commissions, currently in process by the National Regulatory Research Institute, indicates that only 23 of the 40 states that responded had a formal standard on electricity reliability and service quality.

As required by FERC, all ISOs or RTOs currently operating wholesale electricity markets have market-monitoring units that evaluate the conduct of their participants and some measures of market performance. However, the primary focus of the monitors has been to identify and mitigate the exercise of market power by electricity sellers, rather than measuring how well their overall design is working or whether these markets are delivering benefits to consumers. Market monitors we spoke with said that their efforts to evaluate market power have generally focused on comparing estimates of the costs of producing electricity to the prices received from the market. In most specific cases of day-to-day monitoring, monitors share their results in nonpublic reports with the management of the ISO and sometimes with FERC. In addition, the market monitors develop periodic reports, which evaluate the performance of their markets and are often made public. However, the authority and scope of each of these market monitors to collect data from market participants is limited by the boundaries of their individual markets. As a result, investigations undertaken by these entities are inherently limited because some key information may not be reviewed if it involves transactions with entities located outside the monitors' jurisdiction or involves transactions about which the monitor has no detailed information. In addition, because several of the market monitors rely on different methods to evaluate market power, there is a lack of uniformity in what data are collected, how they are analyzed, and what is reported, making cross-market comparisons difficult.

Recently, with the formation of FERC's new Office of Market Oversight and Investigations, FERC has begun to look more broadly at the performance of electricity markets and is in the process of studying what measures of market performance to evaluate on a regular basis. As part of this effort, the Office of Market Oversight and Investigations has begun to

produce weekly reports on market conditions for the commissioners and staff, although at this point the reports offer only limited coverage. In addition, FERC's efforts to implement its proposed standard market design may improve market monitoring by standardizing the markets and improving the ability to make cross-market comparisons. As part of its proposed standard market design, FERC intends for each region to set up market monitoring units that would report to FERC regularly. FERC would also require that some of the data collected by the regional market monitors follow comparable protocols to facilitate cross-market comparisons. Using these reports and data received from the market monitors and other sources, FERC intends to regularly monitor electricity markets and take corrective actions in the event that problems emerge in wholesale electricity markets.

While FERC's recent efforts may improve the situation, key issues remain unresolved, and, unless addressed, will prevent full and consistent monitoring of restructured markets from going forward. Among the issues identified by recent participants in a FERC sponsored conference on market monitoring are (1) the lack of consistency in what data are collected and what evaluations are made, which makes cross-market comparisons difficult; (2) the unavailability of data needed by the public and researchers to evaluate restructuring; (3) the unavailability of key data to market monitors, such as information about bilateral trades between buyers and sellers outside the ISO-run markets; and (4) concern and reluctance on the part of market participants that the proprietary data they provide to market monitors may be revealed in such a way that it impedes their ability to compete effectively. As a result, no entity can currently conduct a comprehensive evaluation of restructuring across different states and electricity markets to determine how restructuring is doing with respect to overall performance and the delivery of consumer benefits.

Conclusion

Because the transition to greater competition will take considerable time, it is possible that bad outcomes for consumers, such as rising retail prices in the aftermath of the electricity crisis in the western United States from summer 2000 to spring 2001, could occur again. It is essential, therefore, that FERC and other regulatory bodies or independent monitors carefully watch for signs of problems and be able to make needed adjustments in a timely fashion. Further, better monitoring of electricity markets would also help to ensure that the goal of increasing competition in electricity markets and the expected benefits associated with this greater competition are achieved. Without a concerted effort to improve monitoring of wholesale markets and their impact on consumers, FERC

will lack key information needed to make informed regulatory decisions and to report to Congress about the status and progress of restructuring.

Recommendations for Executive Action

To help Congress ensure that the fullest benefits possible are achieved from electricity restructuring, and to better understand what progress has been made, GAO is recommending that the Chairman, FERC,

1. determine how restructured wholesale electricity markets are performing by developing and implementing a plan to collect necessary data and perform evaluative analysis. These data should be sufficient to allow evaluation of the competitiveness of these markets (including, but not limited to, the extent of market power, efficiency of the industry, and ease of market entry) and the expected benefits to retail consumers (such as lower retail prices and the availability of new products). Where possible and appropriate, FERC should work in concert with state and regional entities to take advantage of their knowledge, expertise, and access to important data relevant to the impacts of restructuring on consumers.
2. report annually to Congress and the states on the status of restructuring efforts, identify emerging issues and impediments to reaching FERC's goal of achieving national competitive wholesale electricity markets, and make appropriate recommendations to Congress and the states for changes to improve the functioning of these markets.

Agency Comments

In its written comments, FERC agreed with our report's "lessons learned" and principal findings. In addition, FERC agreed with our second recommendation that FERC should report annually to Congress on the status of restructuring, noting that it plans to do so in spring 2003. However, FERC said that our recommendation directing it to determine, in concert with the states and regional entities, how both wholesale and retail markets are performing is more problematic. While FERC agreed that it should evaluate and report on wholesale markets under its jurisdiction, it stated two reasons for its concern about evaluating retail markets in concert with state entities. First, because retail markets are under state jurisdiction, while FERC oversees wholesale markets, FERC is sensitive to this division of jurisdiction and is hesitant to monitor the status and effectiveness of retail competition unless Congress specifically directs it to do so. Secondly, FERC states that it does not currently have the expertise or resources to evaluate the multiplicity of retail markets.

We are sensitive to the separation of jurisdiction over retail and wholesale electricity markets. For this reason, we are not recommending that FERC step outside its jurisdictional boundaries or attempt to assume responsibility for the status and effectiveness of retail restructuring efforts. However, we believe that in order for FERC to fully evaluate and understand the effectiveness of its actions to implement competition in wholesale markets, it must examine the status of restructuring in wholesale markets as well as the impact of this restructuring on consumers of electricity. FERC's Order 888, issued April 24, 1996, points out that FERC's actions are "...designed to remove impediments to competition in the wholesale bulk power marketplace and to bring more efficient, lower cost power to the nation's electricity consumers." Because lower electricity prices to consumers are an expected benefit from more competitive wholesale markets, we believe it is reasonable that FERC, Congress, and the states should know if lower prices are occurring as the basis for possible future policy actions.

With regard to the issue of resources and expertise, we believe that FERC can supplement its own assets by drawing from many sources to assist it in evaluating retail impacts. Among these sources are (1) other federal agencies—including the Energy Information Administration—and private companies that collect data on consumer electricity prices and other related information; (2) market monitoring units of regional or state independent system operators or other entities that operate wholesale electricity markets; (3) expert panels, such as the panels recently brought together to assist FERC with its market monitoring plans in FERC's proposed standard market design; and (4) state agencies that have historically tracked consumer issues as part of their oversight over retail electricity markets—as we previously reported, there is precedent for FERC obtaining input on its studies from state public utility commissions.³ We also believe that FERC is in a unique position to be able to make a nationwide assessment of restructuring because, as the primary federal agency responsible for overseeing wholesale electricity markets, it is the only entity that currently has access to key information from all its jurisdictional markets and market participants. In addition, in the process of formulating its proposed standard market design, FERC has consulted with state and regional entities, in part to formulate plans to monitor the

³ U.S. General Accounting Office, *Energy Markets: Concerted Actions Needed for FERC to Confront Challenges that Impede Effective Oversight*, GAO-02-656 (Washington, D.C.: June 14, 2002). See page 43 for reference to obtaining input from state public utility commissions for FERC studies.

performance of markets under the standard design. We believe that such coordination between FERC, the states, and regional entities is necessary and should extend to evaluating the impacts of wholesale restructuring on consumers.

In order to make it clear that we are not asking FERC to overstep its jurisdictional boundaries, we have revised the language of our recommendation to state that we recommend FERC evaluate the impacts of restructuring efforts in the wholesale markets on retail electricity consumers. However, because of the importance of state and regional involvement in restructuring of the electricity industry more generally, we continue to encourage FERC, where possible and appropriate, to work in concert with state and regional entities to develop this analysis.

In a related comment, FERC also noted that while the report distinguishes between wholesale and retail markets, it does not recognize or clearly articulate the significant differences between the two markets and the impacts of and motivations for competition at each level.

We agree that there are significant differences between retail and wholesale markets, but we believe the report appropriately reflects these differences and therefore we made no change in response to this comment. More importantly, retail and wholesale markets are closely linked through the actions of buyers and sellers; for this reason, an evaluation of one of these markets without considering its effect on the other market is incomplete and could be misleading. For example, federal actions to restructure wholesale electricity markets are expected to ultimately reduce electricity prices for retail consumers through improvements in efficiency brought on by restructuring. It is equally true that actions at the retail level have an impact on the functioning of competitive wholesale markets. For example, as we previously reported, there is wide agreement among industry experts and academics that the absence of consumer response to sharply higher prices in western wholesale electricity markets was a contributing factor to the financial and

energy crisis in the West during 2000 and 2001.⁴ These examples illustrate the need for FERC to make a periodic nationwide assessment of restructuring that includes an evaluation of the impacts of wholesale restructuring on expected retail consumer benefits.

⁴ U.S. General Accounting Office, *Restructured Electricity Markets: California Market Design Enabled Exercise of Market Power*, [GAO-02-828](#) (Washington, D.C.: June 21, 2002).

Appendix I: Scope and Methodology

To address the objectives overall, we interviewed and obtained documentation from a wide range of stakeholders to the issue including federal and state government officials, industry officials, academic experts, and various other special interest groups and organizations. We interviewed officials at FERC, the Department of Energy's Energy Information Agency, the Congressional Research Service, the Maryland Energy Administration, the California Energy Commission, the Western Interstate Energy Board, and the National Association of Regulatory Utility Commissioners. Of particular note, we interviewed representatives from the existing ISOs in the United States to understand the structure and performance of their markets. These ISOs include California ISO, ISO New England, Midwest ISO, New York ISO, PJM ISO, and the Electric Reliability Council of Texas. We also talked with representatives of organizations that are in the process of creating ISOs to run their wholesale electricity markets, including Regional Transmission Operator West and the Southeastern Transmission System. We also interviewed noted economists. In addition, we talked to the Edison Electric Institute, the Electric Power Supply Association, the National Energy Marketers Association, the Electricity Consumers Resource Council, and the Consumer Energy Council of America, and Public Citizen. We also spoke with representatives from a number of research organizations, including EPRI, the National Regulatory Research Institute, the Tellus Institute, Resources for the Future, and the Regulatory Assistance Project.

In addition to gathering the views of experts and stakeholders, we reviewed numerous appropriate documents from outside sources, including academic books and articles on restructuring and reports from the Energy Information Administration, the North American Electric Reliability Council, the Congressional Research Service, the Congressional Budget Office, various ISOs, and electricity industry experts. Furthermore, we reviewed prior GAO work on the electricity industry.

To better understand the basis for and nature of electricity restructuring in the world community, specifically, we interviewed selected representatives and reviewed readily available reports and information on the restructuring experiences of several foreign countries, including the Great Britain, Norway, Sweden, Australia, and New Zealand.

To develop an understanding of the goals and guiding principles of restructuring, we conducted legislative and regulatory searches as well as an extensive literature search, supplemented by interviews with government and industry officials, experts, ISO officials, and other stakeholders. We reviewed information on federal legislation, FERC

orders, FERC proceedings and other documents related to restructuring, and court orders related to FERC regulations. This included reviews of FERC's notice of proposed rulemaking on standard market design, staff research papers, congressional testimony by FERC Chairman Pat Wood, and speeches by other FERC officials.

To identify actions that federal and state agencies have taken to restructure the electricity industry, we reviewed documents related to federal and state restructuring laws and regulations. We also interviewed numerous officials from federal and state regulatory agencies and the staff of all the ISOs.

To determine to what extent federal and state actions achieved the goals of restructuring, we reviewed numerous studies of restructuring; collected views of experts and market participants and interviewed officials from FERC, state regulatory agencies, and trade groups, as well as the staff of the ISOs. In addition, we collected publicly available data, including wholesale and retail electricity prices, generating capacity, electricity consumption, investment in new generating plants, and information about the transmission system. We evaluated this data to try to determine whether statistical methods could be used to estimate the extent to which restructuring has achieved expected consumer benefits. However, we found that the publicly available data were generally insufficient to allow such statistical methods to be used in light of the transitional nature of restructuring. For example, we were unable to collect comprehensive data on the operations of electricity generating plants, and these data are necessary to determine how the efficiency of operations may vary according to the restructuring status of the states in which these generating plants are situated. Because we had to rely, instead, on more aggregated and less comprehensive data, we were unable to determine whether generating plants in restructured markets operate more efficiently than do plants in regions that are still regulated traditionally.

We conducted our work from November 2001 through November 2002 in accordance with generally accepted government auditing standards.

Appendix II: Related GAO Reports

Restructured Electricity Markets: California Market Design Enabled Exercise of Market Power. [GAO-02-828](#). Washington, D.C.: June 21, 2002.

Energy Markets: Concerted Actions Needed by FERC to Confront Challenges That Impede Effective Oversight. [GAO-02-656](#). Washington, D.C.: June 14, 2002.

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Appendix III: Comments from the Federal Energy Regulatory Commission

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426

December 5, 2002

OFFICE OF THE CHAIRMAN

Mr. Jim Wells
Director, Natural Resources and Environment
United States General Accounting Office
Room 2T23
441 G Street, NW
Washington, DC 20548

Dear Mr. Wells:

Thank you for the opportunity to comment on your report, *Lessons Learned from Electricity Restructuring: Transition to Competitive Markets Underway, But Full Benefits Will Take Time and Effort To Achieve*. I congratulate you on your effort and appreciate the opportunity to comment on this report.

I agree with the report's identified "Lessons Learned" and "Principal Findings." I also agree with the report's second recommendation that the Commission should report annually to the Congress and the states on the status of wholesale markets, including emerging issues and impediments to reaching its goal. This is something we are already planning to do.

However, the report's first recommendation that the Commission should determine in concert with states and regional entities how both restructured retail and wholesale markets are performing across the country is more problematic. Retail and wholesale markets are very different and the Commission does not currently have the expertise or resources to effectively evaluate the multiplicity of retail markets.

I note the report's finding that separate development of wholesale and retail electricity markets limits the ability to achieve benefits from competition. I agree; however, there are deep seated, historical reasons underlying the separation of wholesale and retail markets. I do not see the Commission currently being in a position to bridge this gap. States have jurisdiction over retail markets and control the choice of whether to move to retail competition.

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While the report distinguishes between wholesale and retail markets, it does not recognize and clearly articulate the significant differences between the two markets and the impacts of and motivations for competition at each level. Competitive wholesale markets provide economic efficiency, liquidity, price transparency and risk hedging through forward, bilateral, day ahead and real-time markets for generators, wholesale traders and retail suppliers. Competitive retail markets can provide lower prices over time, enhanced services, flexible billing and individual customer choice of suppliers and retail energy products. The key linkage between wholesale and retail markets is that healthy wholesale competition is a necessary precondition for healthy retail service with or without retail competition. FERC's statutory mandate is to oversee wholesale electricity markets and it has promoted competition and restructuring in wholesale markets. States may or may not adopt retail restructuring. The FTC's September 2001 report *Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform: Focus on Retail Competition* offers a good description of the issues faced in retail and wholesale competition (see pages 6-12).

The Commission is taking a number of steps to make competition work in wholesale electricity markets, consistent with the mandates of the FPA. We appreciate the report's recognition that the Commission's efforts in Standard Market Design are going in the right direction. The Commission has undertaken other important initiatives such as standard interconnection agreements that will also benefit competitive markets. As your report indicates, the Commission has already taken positive steps to look more broadly at the performance of electricity markets with the formation of its new Office of Market Oversight and Investigations (OMOI), which began operations in August 2002. The Office reports directly to me and is charged with being "the cop on the beat," overseeing and assessing the operations of wholesale electricity and natural gas markets and enforcing Commission rules and regulations. As part of its mission, OMOI analyzes market data, measures market performance, recommends market improvements and prepares reports detailing the status of the electricity and natural gas markets. There are a number of initiatives well underway to ensure the Commission has the needed data and methodologies in place to evaluate wholesale market performance. OMOI staff reports to the Commission every two to three weeks in closed session on the status of gas and electricity markets, including investigations and enforcement activities.

In reference to the report's second recommendation, FERC plans to report annually to Congress on the status of wholesale electricity and natural gas markets. In the past, we have prepared a *State of the Markets Report* and have scheduled the next report for Spring 2003. This report will provide a comprehensive look at natural gas and electricity wholesale markets, identifying where improvements have been achieved and targeting areas of concern, which may require infrastructure or rule changes. This report will be

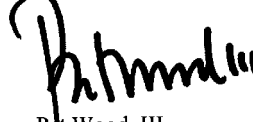
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made available to the states and the public. OMOI staff is also preparing semi-annual assessments of relevant energy markets as we enter the heating and cooling seasons.

While there is widespread agreement that competitive wholesale markets are appropriate public policy and a clear mandate for the federal government, there is less agreement that retail access is needed. Implementation of retail access has slowed in the past two years, and is clearly a state jurisdictional issue. If it is Congress' will that we do so, this agency will be happy to work with states to monitor the status and effectiveness of retail competition. Regardless of retail action, we will continue working closely with the states to implement competition in wholesale markets, attempting to minimize conflicts and maximize the benefits for all customers.

Thank you again for the opportunity to comment on your report. I appreciate GAO's attention and assistance to the Commission to oversee and investigate wholesale electricity markets and hope it will further the goal of well-functioning electricity markets for all customers.

Best regards,



Pat Wood, III
Chairman

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Appendix V: GAO Contacts and Staff Acknowledgments

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