

1. The Context for Change in the Electric Power Industry

In 1997, residential, commercial, and industrial consumers spent \$215 billion on electricity, making the market for electricity larger than those for telecommunications, trucking, or airline transportation services. Unlike other network industries that have been opened to competitive market forces over the past two decades, retail electricity markets have continued as regulated monopolies. However, recent advances in generating technology and the successful, if limited, participation of nonutility generators on the grid have made the traditional characterization of electricity generation as a “natural monopoly” increasingly tenuous. Experience in wholesale electricity markets and other formerly regulated sectors of the economy suggests that increased reliance on competition could bring significant tangible benefits to all electricity consumers (residential, commercial, industrial, and government) and to the economy at large.

A clear understanding of the current situation in the electricity industry provides the necessary foundation for the analysis of restructuring proposals and the likely impact of competition on electricity markets in the future. This chapter provides a short overview of recent industry data, drawing on standard sources that are in turn based on information filed with the Energy Information Administration (EIA) and the Federal Energy Regulatory Commission (FERC). The focus is on matters relevant to consideration of Federal restructuring legislation. These data, together with a review of the current status of State-level efforts to bring competition to retail electricity markets and a discussion of issues that can be addressed only through Federal action, provides the context for the analysis of the Administration’s restructuring proposal presented in this report.

Electricity Sales and Prices by Customer Class and Type of Utility

The U.S. electric power industry consists of four main types of entities that generate and transmit power for public use:

- **Investor-owned utilities** (IOUs) are for-profit companies that are regulated primarily by the States, with some aspects of IOU operations subject to Federal regulation. In 1997, there were 242 IOUs, which together accounted for 76 percent of all electricity sales to final consumers, valued at \$169 billion.
- **Publicly owned utilities** (commonly referred to as municipal utilities) are mostly nonprofit agencies of State and local governments that provide electric service at cost.² Most municipal utilities focus exclusively on the distribution of power purchased on the wholesale market, but some of the larger ones are also involved in generation and transmission. In 1997, there were 2,013 non-Federal publicly owned utilities in the United States, which together accounted for 15 percent of total electricity sales to final consumers, valued at \$28 billion.
- **Electric cooperatives** are consumer-owned organizations incorporated under State law that provide service mostly to members only. In 1997, there were 922 rural electric cooperatives (RECs), which together accounted for 8 percent of all electricity sales to final consumers, valued at \$18 billion. There are two distinct types of cooperatives—distribution cooperatives and generation and transmission (G&T) cooperatives. Distribution cooperatives, which directly serve final consumers, obtain power from G&T cooperatives, from Federal power projects at

²Several municipal utilities have traditionally sold electricity above cost and at a profit, paying over all or a portion of the profit to the sponsoring government.

cost-based rates, and from other suppliers on the wholesale market. Generation and transmission (G&T) cooperatives, which are owned by the distribution cooperatives (and hence indirectly by the distribution cooperatives' customers) generated power equivalent to 70 percent of REC sales in 1996.³

➤ **Federal utilities** are involved in the industry primarily as producers and wholesalers of electricity. The Tennessee Valley Authority generates more power than any other utility in the United States, and the Department of Energy's Power Marketing Administrations play a significant role in the respective regions of the country in which they operate. While Federal utilities (together with the Bureau of Reclamation and the Army Corps of Engineers) accounted for 9 percent of total utility generation in 1997, they accounted for only 1.4 percent of sales to ultimate users (approximately \$1 billion), reflecting their limited role in retail power markets.

Tables 1 and 2 present summary data on electricity sales and revenues for each type of customer and each type of utility. Table 3 presents average revenue per kilowatt-hour, a measure of the electricity price paid by each class of consumer at each type of utility. On a national average basis, customers of IOUs pay the highest prices. Direct customers of Federal utilities—primarily large industrial entities—pay the lowest prices. Setting aside Federal utilities, which account for less than 1.4 percent of sales to ultimate users, IOUs have the highest prices to all classes of customers. RECs have higher average prices to residential and commercial customers than municipal utilities but lower average prices to industrial customers.

Figure 1, which summarizes State-level data on average electricity prices for all consumers, provides another perspective on the starting point for

proposals to restructure the electricity sector. Significant disparities in electricity prices across the States are readily apparent from the figure. The average price in the five lowest-cost States is less than half the average price in the five highest-cost States. The difference among the starting points for the individual States suggests that a “one size fits all” approach is unlikely to meet the needs of consumers in all areas.

Electricity Cost Components

Table 4 provides a breakdown for IOUs of the costs associated with the three primary functions of the electric power industry: generation, transmission, and distribution. The generation function produces electricity, the transmission function moves it over high-voltage lines from generators to the distribution function, which in turn delivers it to homes and businesses. For IOUs, the average delivered cost of electricity in 1995 was 7.1 cents per kilowatt-hour. The generation function, which accounts for almost two-thirds of the total delivered cost of electricity, is the main focus of proposals for restructuring and open competition. The transmission and distribution functions (the latter defined here to include customer-related costs) account for 7 and 27 percent of total delivered costs, respectively.⁴ The transmission and distribution functions are, for the most part, still considered to be natural monopolies and would remain regulated under virtually all current restructuring proposals.⁵

Electricity Generation by Fuel Type

U.S. generating capability totaled 778 gigawatts at the end of 1997, with utilities accounting for 92 percent of the total capability. Total net utility generation was 3,123 billion kilowatt-hours, and nonutility generation, which is reported on a gross basis, was 385 billion kilowatt-hours. Figure 2 summarizes the fuel mix for utility and nonutility generation. Coal is

³U.S. Department of Agriculture, *1996 Statistical Report: Rural Electric Borrowers*, Informational Publication 201-1.

⁴Table 4 also provides a separate breakout of the customer-related costs of service, including customer accounts (meter reading, customer records, and collection), customer service and information (customer assistance and informational and instructional expenses), and customer sales expenses (advertising, demonstration, selling). Customer-related costs represent 0.26 cents of the delivered cost of electricity per kilowatt-hour, or 3.6 percent of the total cost.

⁵For instance, the customer-related segment of the business is being unbundled and opened to competition in California.

Table 1. Electricity Sales to Ultimate Users by Utility Type and Customer Class, 1997
(Billion Kilowatthours)

Utility Type	Customer Class			
	Residential	Commercial	Industrial	Total ^a
Investor-Owned	767.6	748.0	795.2	2,373.2
Municipal ^b	156.2	132.8	141.9	460.1
Cooperative	152.7	47.5	57.1	263.2
Federal.	0.3	0.2	38.4	43.3
All Utilities	1,075.7	928.5	1,032.7	3,139.8

^aIncludes public streets and highways and other sales.

^bIncludes State-owned and municipals.

Source: Energy Information Administration, Form EIA-861, "Annual Electric Utility Report."

Table 2. Revenue from Sales to Ultimate Users by Utility Type and Customer Class, 1997
(Million Dollars)

Utility Type	Customer Class			
	Residential	Commercial	Industrial	Total ^a
Investor-Owned	68,553	58,561	37,038	168,701
Municipal ^b	10,617	8,567	6,485	27,744
Cooperative	11,504	3,345	2,332	17,583
Federal.	19	12	917	1,035
All Utilities	90,694	70,486	46,772	215,063

^aIncludes public streets and highways and other sales.

^bIncludes State-owned and municipals.

Source: Energy Information Administration, Form EIA-861, "Annual Electric Utility Report."

Table 3. Average Revenue per Kilowatthour by Utility Type and Customer Class, 1997
(Cents per Kilowatthour)

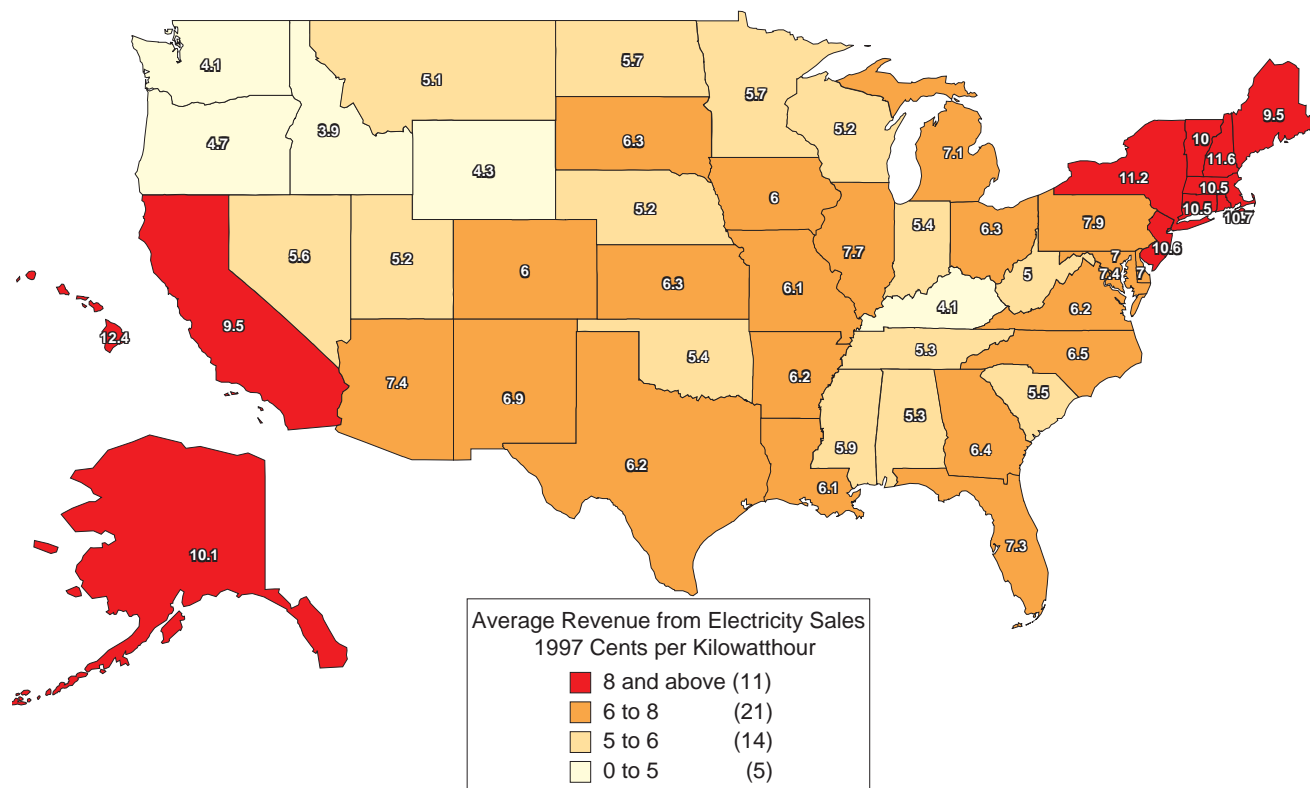
Utility Type	Customer Class			
	Residential	Commercial	Industrial	Total ^a
Investor-Owned	8.94	7.83	4.66	7.11
Municipal ^b	6.80	6.45	4.57	6.03
Cooperative	7.53	7.04	4.09	6.68
Federal.	6.47	6.81	2.39	2.39
All Utilities	8.43	7.59	4.53	6.85

^aIncludes public streets and highways and other sales.

^bIncludes State-owned and municipals.

Source: Energy Information Administration, Form EIA-861, "Annual Electric Utility Report."

Figure 1. Electricity Prices by State, 1997



Source: Energy Information Administration, *Electric Power Annual 1997*, Volume II, DOE/EIA-0348(97/2) (Washington, DC, October 1998).

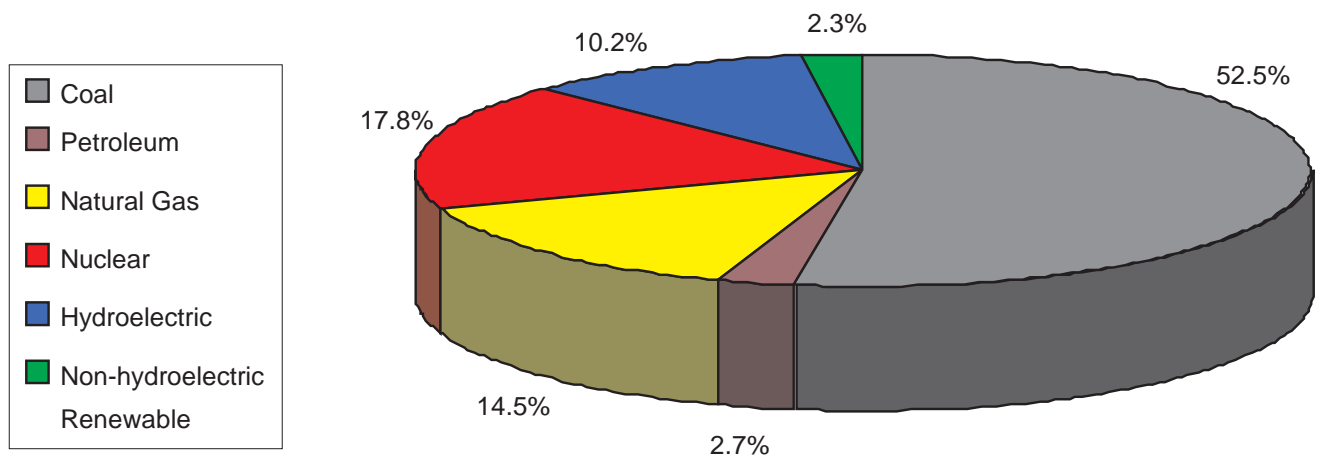
Table 4. Investor-Owned Utility Components of Price, 1995

Price Component	Cents per Kilowatt-hour	Million Dollars
Total Price	7.13	162,280.840
Production	4.71	107,190.582
Purchased Power ^a	0.53	12,131.671
Fuel	1.27	28,991.852
Nonfuel O&M	0.76	17,184.115
Capital Related	1.87	42,637.734
A&G Allocation	0.27	6,245.210
Transmission	0.51	11,620.095
O&M	0.09	2,151.254
Capital Related	0.39	8,821.811
A&G Allocation	0.03	647.030
Distribution	1.91	43,470.163
O&M	0.26	5,841.949
Capital Related	1.12	25,404.979
Customer Related	0.26	5,860.025
A&G Allocation	0.28	6,363.210

^aNet of wholesale revenues.

Source: Calculation based on FERC Form 1 filings for 1995.

Figure 2. Utility and Nonutility Generation by Fuel Type, 1997



Source: Energy Information Administration, *Annual Energy Review 1997*, DOE/EIA-0384(97) (Washington, DC, July 1998).

the dominant fuel source, accounting for approximately 53 percent of generation. Nuclear energy, hydroelectric power, and natural-gas-fired generation accounted for 18, 10, and 14 percent of generation, respectively, with the remainder coming from a variety of other sources. The fuel mix for utility generation alone was 57 percent coal, 20 percent nuclear, 10 percent hydropower, 9 percent natural gas, and 3 percent oil.

The Role of Non-hydroelectric Renewables

While utilities provide the vast majority of electricity generation overall, nonutility generators are the predominant providers of electricity from non-hydroelectric renewable energy resources, such as wind, geothermal energy, solar energy, and biomass. Consideration of nonutility providers, as well as careful accounting for renewable fuels such as landfill methane and the biomass input to municipal waste combustors, is essential for an accurate assessment of the current role of non-hydroelectric renewables in the total electricity fuel mix.

Table 5 summarizes non-hydroelectric renewable generation in 1997 from all utility and nonutility sources, using a definition of non-hydroelectric renewables consistent with the definition of renewables eligible to meet the renewable portfolio standard (RPS) included in the Administration’s proposed Comprehensive Electricity Competition Act. The bottom line shows that RPS-eligible generation in 1997 totaled 71 billion kilowatthours,

equivalent to 2.3 percent of retail electricity sales to all customers in that year.

Status of State-Level Restructuring Efforts

The introduction of retail competition into electricity markets has been receiving considerable attention at the State level, as summarized in Figure 3. As of April 1999, 21 States had enacted legislation or promulgated regulations establishing retail competition programs. Most of the remaining States have the matter under active consideration.

The progress of State action to implement competition has led some to question the need for Federal legislation. State action also raises issues for the analysis of restructuring on a national basis. If State-level action to introduce retail competition could be shown to make all the potential benefits available to consumers within that State’s borders, none of the projected gains from competition within States that are already moving down the road to competition could be ascribed to Federal action. However, the following discussion suggests that this is not the case—Federal action will provide important benefits to consumers even in areas where State governments have already acted. Indeed, for some issues, such as preserving the reliability of the interconnected electricity system, State-level action to implement competition is likely to increase the urgency and the projected benefits of Federal action.

Table 5. Non-hydroelectric Renewable Generation, 1997
(Billion Kilowatthours)

Generation Source and Fuel	Total	Counted for RPS
Utility Generation		
Geothermal	5.5	5.5
Municipal Solid Waste and Landfill Gas ^a	1.0	0.7
Wood and Other Biomass	0.9	0.9
Solar	0.0	0.0
Wind	0.0	0.0
Total	7.4	7.1
Nonutility Generation		
Geothermal	9.1	9.1
Municipal Solid Waste and Landfill Gas ^a	17.4	11.9
Wood and Other Biomass	38.4	38.4
Solar	0.9	0.9
Wind	3.4	3.4
Total	69.3	63.7
Total RPS renewable generation	76.6	70.8
Total Electricity Sales		3,140
RPS percent in 1997		2.3%

^a100 percent of landfill gas and 61 percent of municipal solid waste are considered renewable fuels.

Source: Energy Information Administration, *Renewable Energy Annual 1998*, DOE/EIA-0603(98) (Washington, DC, December 1998).

Issues for Federal Action

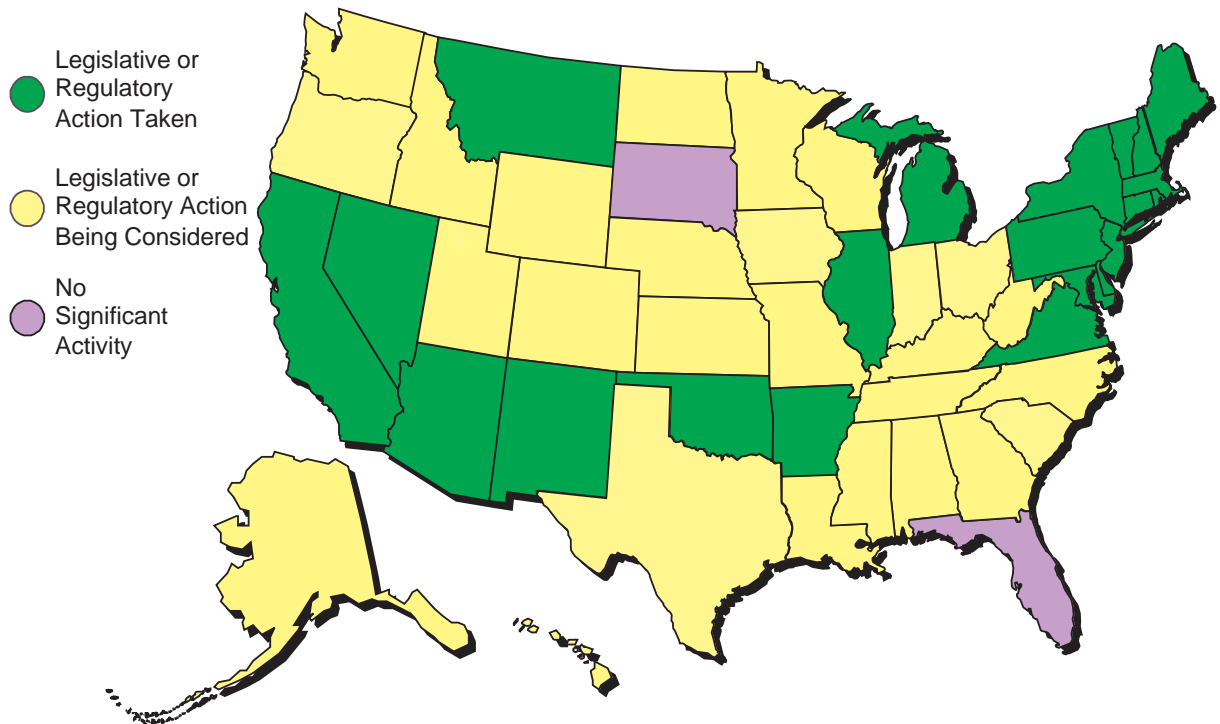
Market Access and Participation. Competitive electricity markets are inherently regional in nature. In accord with the laws of physics, electricity flows do not respect State borders. As States remove the constraints of monopoly franchise territories, the market opportunities available to consumers within those territories will be affected by issues of transmission and supplier access, which depend on the Federal regime for regulating interstate power markets. The issues that can be addressed only by Federal action include: 1) provision of a level playing field that subjects all transmission operators to comparable rules, 2) removal of Federal tax law and other statutory impediments to the participation of municipal utilities and utility holding companies in competitive markets, and 3) changes to allow Federal power entities, such as the Tennessee Valley Authority and the Power Marketing Administrations to operate in a fashion that is compatible with competitive markets.

Reliability. The electric utility industry, through a tradition of voluntary self-regulation and

cooperation, has performed admirably in maintaining reliability over the past 30 years. In the competitive market environment that is already being created by actions taken at the State level, however, a different mix of incentives will be at work. There are pressures to cut costs and use transmission facilities more intensively to squeeze as much economic value out of them as possible. Moreover, since many transmission owners are also in the power generation and marketing business, there is also an incentive to exercise strategic control over the transmission system for economic purposes, perhaps using reliability concerns as a pretext. Only Federal legislation can establish a framework for reliability that will build upon and maintain the electric industry's tradition of self-regulation, but require all users of the grid to comply with mandatory reliability standards.

Updating Federal Laws That Hamper Competition. Much of the framework of Federal electricity law is over 60 years old and is premised on State-regulated monopolies rather than competitive regional markets. Some key provisions of the statutes can inhibit the development of competitive

Figure 3. Status of State Electricity Restructuring Efforts as of May 1999



Note: California, Pennsylvania, Massachusetts, and Rhode Island have retail competition in effect as of May 1999.
 Source: U.S. Department of Energy.

markets. For example, while Federal and State regulators should have access to the books and records related to affiliated transactions in order to protect consumers, the Public Utility Holding Company Act of 1935 could potentially hinder competition and hurt consumers by limiting utility holding companies—which are potentially strong competitors outside their traditional service territories—from competing in newly opened markets.

The Public Utility Regulatory Policies Act of 1978 (PURPA) also impedes competition while failing to serve its intended purpose in the newly emerging market environment. PURPA fostered the commercialization of renewable energy through its requirement (Section 210) that a utility purchase power from cogenerators and renewable energy qualifying facilities (QFs), at the utility’s avoided cost. In competitive markets, however, the market access protections for QFs provided by Section 210 of PURPA are no longer needed to ensure fair opportunities for nonutility power producers. Moreover, it is unreasonable to apply a “must buy” requirement to electric utilities in a competitive market, where

they no longer have captive customers required to pay for that power.

Obtaining the Full Private and Public Benefits of Competition. The States alone cannot obtain the full economic and environmental benefits of competition for American consumers. Without comprehensive Federal electricity restructuring legislation, neither State nor Federal regulators will have the necessary tools to ensure that regional electricity markets are truly competitive and operate efficiently. Only Federal action can provide market power remedies applicable in interstate markets, offer support for renewable electricity technologies using policies compatible with competition, and provide encouragement for States to maintain important public benefits, such as low-income assistance, energy efficiency programs, and research and development, in a competitive market environment.

In sum, ongoing efforts by the States to implement competition in retail electricity markets do not obviate the need for Federal action to update the statutory framework for the Nation’s electricity sector.

For the reasons outlined above, it is clear that the full benefits of competition will not be realized in those States, let alone throughout the Nation, without new Federal legislation. The Administration's plan demonstrates that Federal restructuring

legislation can be implemented in a manner that builds on and complements, rather than disrupts, the actions of States that are in the process of implementing retail competition.