

## United States

In 1996, the United States had a population of 265,179,411 and a total electricity generating capability of 775,872 megawatts comprising 709,942 megawatts of utility capability and 65,930 megawatts of nonutility capability. The largest portion of utility capability in the country is fueled by coal. The largest plant, Grand Coulee of the Bureau of Reclamation, is a hydroelectric plant on the Columbia River in Washington. The largest utility in the country is the Tennessee Valley Authority (TVA), which provides electricity to seven southeastern States.<sup>1</sup> Although investor-owned utilities accounted for over three-quarters of U.S. retail electricity sales, both Grand Coulee and TVA are Federally-owned. The average price of electricity for the United States in 1996 was 6.86 cents per kilowatthour.

The Clean Air Act Amendments of 1990 (CAAA90) specified a number of utility plants to begin compliance with stricter emissions standards for sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) in 1995. These units included 130.9 gigawatts of nameplate capacity at 110 plants in 21 States. In 1986, SO<sub>2</sub> emissions from the electric power industry were 15.5 million tons. By 1996, the national emissions total had dropped to 12.2 million tons. Emissions of NO<sub>x</sub> and carbon dioxide (CO<sub>2</sub>) on the other hand, both increased over the 11 years examined in this report. NO<sub>x</sub> went from 6.1 million tons in 1986 to 7.1 million tons in 1996. CO<sub>2</sub> emissions increased from 1.8 billion tons in 1986 to 2.1 billion tons in 1996. Congress established the Ozone Transport Commission (OTC)<sup>2</sup> as part of the CAAA90 to coordinate the regional development of control plans for ground-level ozone in the Northeast and mid-Atlantic States. The OTC has developed the NO<sub>x</sub> Budget Program, which will utilize market-based emissions trading. Implementation of this program is to begin in May 1999.

In 1986, utility coal units represented 42.1 of United States generating capability and slightly over half of the

country's net generation. In 1996, the coal share of capability had fallen to under 40 percent while the generation share also declined, although the status as majority generator was maintained. The nonutility share of capability more than doubled from 1986 to 1996, so that in 1996 nonutilities provided almost 9 percent of the total. Although the share of utility gas capability increased, the share of net gas-fired generation declined. Nuclear capability and generation both increased over the period; in 1996 almost one-fifth of electricity was generated at nuclear plants. Capability and generation from oil and hydropower and other renewable sources declined over the 11-year period examined in this report.

There has been a surge of activity in the legislatures and public utility commissions in most of the States to examine retail competition. Some States have moved faster than others by passing restructuring legislation and instituting retail pilot programs. States with high electricity rates, such as California and those in the Northeast, had compelling reasons to promote competition in the hope of making lower rates available to their consumers. In fact, California, which has been the pathfinder through the unexplored world of direct retail access, ushered in full direct access for all customers beginning March 31, 1998. Currently, 12 other States have active pilot programs or direct access programs.<sup>3</sup>

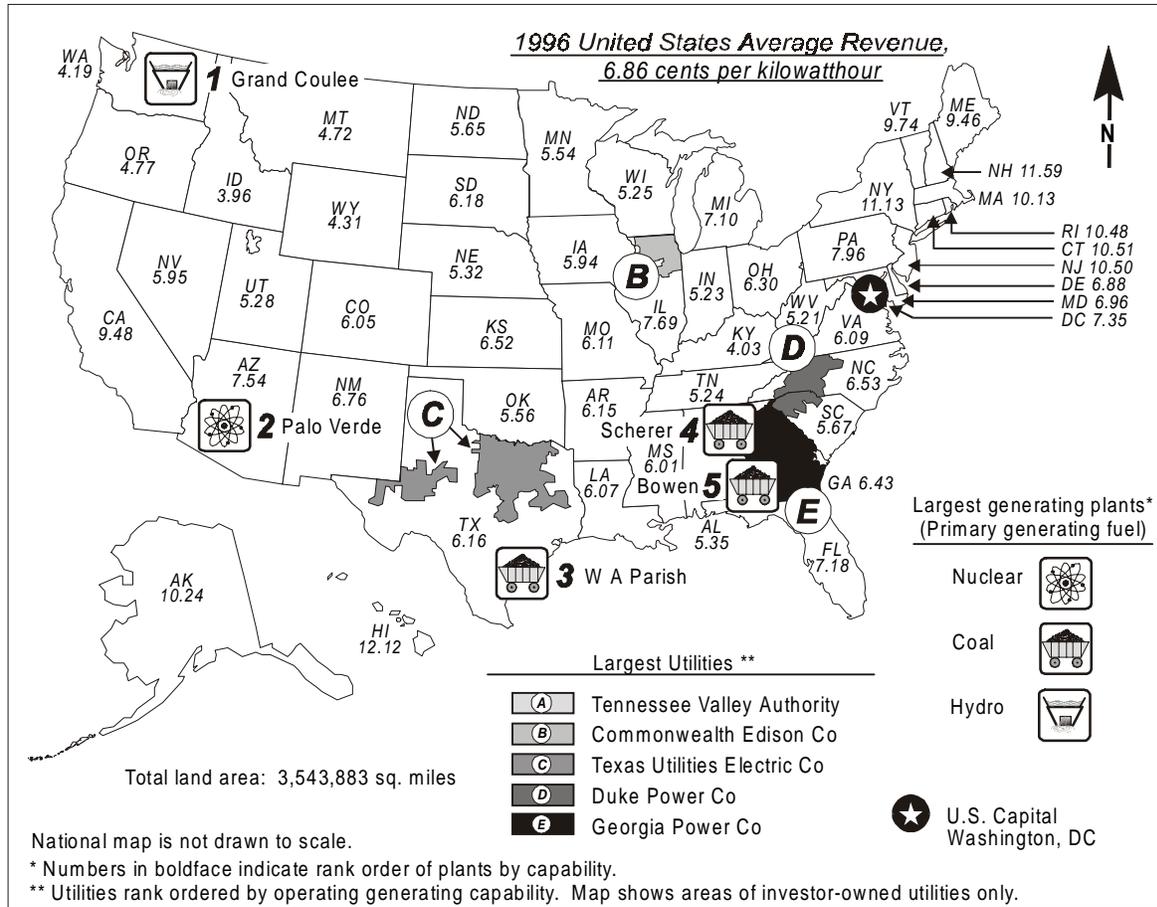
Legislation introduced in the 105<sup>th</sup> Congress covers diverse spheres of restructuring activity. Some bills are comprehensive—expanding on initiatives in the Energy Policy Act of 1992 and building on Federal Energy Regulatory Commission actions—to facilitate retail competition by a certain date. Others focus on a variety of selected issues. The Administration released its Comprehensive Electricity Competition Plan in March 1998. The plan advances legislative changes which aim to provide customer choice, enhance competition, and diversify generation sources.<sup>4</sup>

<sup>1</sup>The seven States are Tennessee, Mississippi, Alabama, Georgia, North Carolina, Virginia and Kentucky.

<sup>2</sup>The Ozone Transport Commission comprises Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, the northern counties and independent cities of Virginia, and the District of Columbia.

<sup>3</sup>Energy Information Administration, Status of State Electric Utility Deregulation Activity, [http://www.eia.doe.gov/cneaf/electricity/chg\\_str/tab5rev.html](http://www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html).

<sup>4</sup>Energy Information Administration, *The Changing Structure of the Electric Power Industry: Selected Issues, 1998*, DOE/EIA-0562(98) (Washington, DC, July 1998), pp. xi and 97.



**Table 1. 1996 U.S. Summary Statistics**

Item	Value	Highest	Lowest
Primary Generating Fuel	Coal	--	--
Population (as of 7/96)	265,179,411	CA	WY
Average Revenue(cents/kWh)	6.86	HI	ID
<b>INDUSTRY</b>			
Capability (MWe)	775,872	TX	DC
Generation (MWh)	3,446,993,735	TX	DC
Capability/person (KWe/person)	2.93	WV	RI
Generation/person (MWh/person)	13.00	WV	DC
Sulfur Dioxide Emissions (Thousand Short Tons)	12,208	OH	VT
Nitrogen Oxide Emissions (Thousand Short Tons)	7,061	TX	DC
Carbon Dioxide Emissions (Thousand Short Tons)	2,067,214	TX	DC
Sulfur Dioxide/sq. mile (Tons)	3.45	OH	VT
Nitrogen Oxides/sq. mile (Tons)	2.00	IN	ID
Carbon Dioxide/sq. mile (Tons)	584.37	IN	AK
<b>UTILITY</b>			
Capability (MWe)	709,942	TX	RI
Generation (MWh)	3,077,442,152	TX	DC
<b>NONUTILITY</b>			
Capability (MWe)	65,930	CA	DC
Percentage Share of Capability	8.5	RI	DC
Generation (MWh)	369,551,583	CA	DC
Percentage Share of Generation	10.7	RI	DC

-- = Not applicable.

**Table 2. Five Largest Utility Plants, 1996**

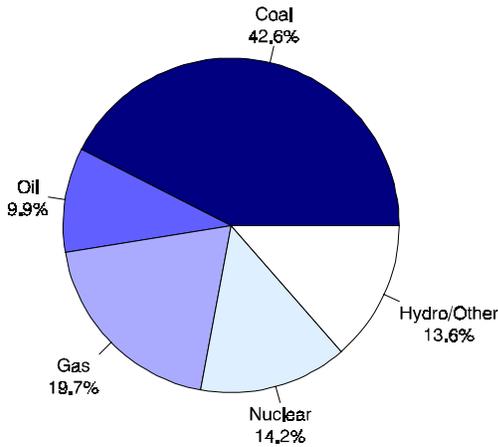
Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Grand Coulee .....	Hydro	Bureau of Reclamation	6,494
2. Palo Verde .....	Nuclear	Arizona Public Service Co	3,751
3. W A Parish .....	Coal/Gas	Houston Lighting & Power Co	3,614
4. Scherer .....	Coal	Georgia Power Co	3,352
5. Bowen .....	Coal	Georgia Power Co	3,248

**Table 3. Top Five Utilities with Largest Generating Capability, and Type, 1996**  
(Megawatts Electric)

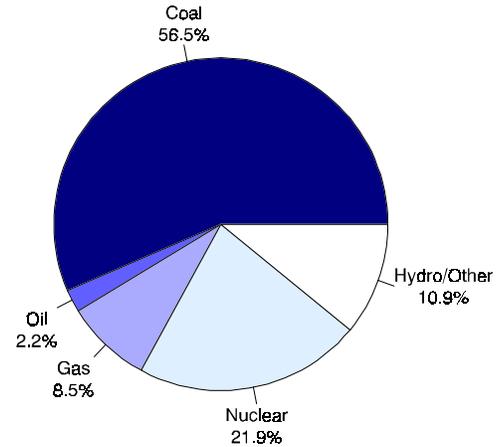
Utility	Net Summer Capability	Net Coal Capability	Net Oil Capability	Net Gas Capability	Net Nuclear Capability	Net Hydro/Other Capability
A. Tennessee Valley Authority . . . .	28,268	14,903	1,096	840	6,540	4,889
B. Commonwealth Edison Co . . . . .	21,942	6,450	1,600	2,210	11,679	3
C. Texas Utilities Electric Co . . . . .	21,355	5,825	20	13,080	2,430	--
D. Duke Power Co . . . . .	19,234	7,699	599	1,200	7,054	2,682
E. Georgia Power Co . . . . .	19,183	12,832	1,228	341	3,950	832
Total . . . . .	109,982	47,709	4,543	17,671	31,653	8,406
Percentage of Industry Capability	14.2	--	--	--	--	--

-- = Not applicable.

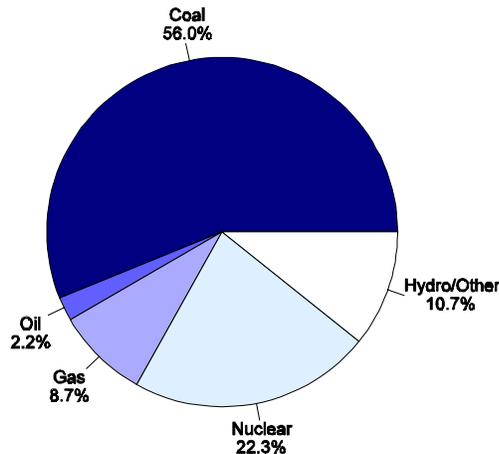
**Figure 1. Utility Generating Capability by Primary Energy Source, 1996**



**Figure 2. Utility Generation by Primary Energy Source, 1996**



**Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996**



**Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996**  
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	290,506	299,611	302,420	42.1	40.6	39.0
Oil	78,262	72,598	70,405	11.3	9.8	9.1
Gas	119,456	127,157	140,021	17.3	17.2	18.0
Nuclear	85,305	99,589	100,785	12.3	13.5	13.0
Hydro/Other	91,282	94,062	96,315	13.2	12.7	12.4
Total Utility	664,809	693,017	709,942	96.4	93.9	91.5
Total Nonutility	24,934	45,384	65,930	3.6	6.1	8.5
Industry	689,743	738,401	775,872	100.0	100.0	100.0

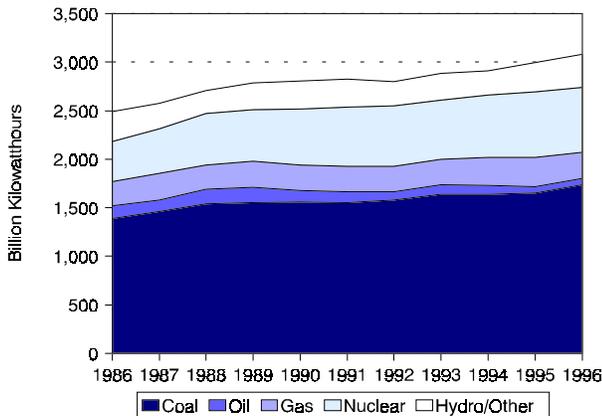
**Table 5. Electric Power Industry Generation of Electricity by Primary Energy Source, 1986, 1991, and 1996**  
(Thousand Kilowatthours)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	1,385,831,452	1,551,166,838	1,737,453,477	52.8	50.6	46.9
Oil	136,584,864	111,462,979	67,346,095	5.2	3.6	1.9
Gas	248,508,431	264,171,598	262,729,781	9.5	8.6	7.3
Nuclear	414,038,064	612,565,087	674,728,546	15.8	20.0	18.7
Hydro/Other	302,347,016	285,656,363	335,184,253	11.5	9.3	9.0
Total Utility	2,487,309,827	2,825,022,865	3,077,442,152	94.7	92.1	83.7
Total Nonutility	138,481,523	243,006,343	369,551,583	5.3	7.9	16.3
Industry	2,625,791,350	3,068,029,208	3,446,993,735	100.0	100.0	100.0

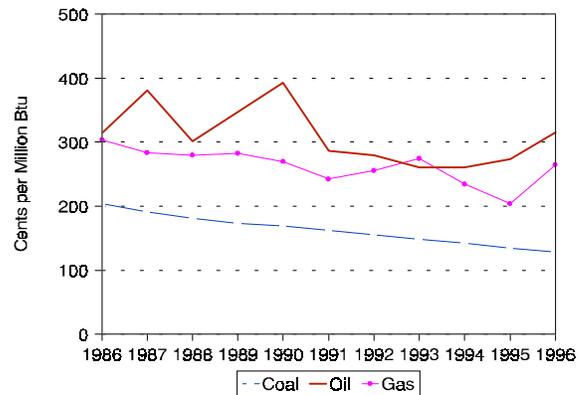
**Table 6. Electric Power Industry Consumption by Primary Energy Source, 1986, 1991, and 1996**  
(Quadrillion Btu)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	14.427	16.040	18.004	48.4	46.9	46.9
Oil	1.445	1.166	0.712	4.8	3.4	1.9
Gas	2.698	2.870	2.799	9.0	8.4	7.2
Nuclear	4.471	6.579	7.168	15.0	19.2	18.7
Hydro/Other	3.158	2.957	3.453	10.6	8.6	9.0
Total Utility	26.192	29.598	32.115	87.8	86.6	83.7
Total Nonutility	3.633	4.595	6.250	12.2	13.4	16.3
Industry	29.825	34.193	38.364	100.0	100.0	100.0

**Figure 4. Utility Generation of Electricity by Primary Energy Source, 1986-1996**



**Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996**  
(1996 Dollars)



**Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996**  
(Cents per Million Btu, 1996 Dollars)

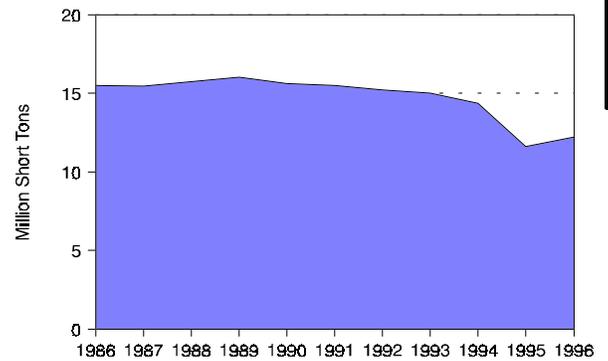
Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal . . . . .	203.9	162.6	128.9	-4.5
Oil . . . . .	314.7	286.4	315.7	(s)
Gas . . . . .	303.8	242.3	264.8	- 1.4

(s)=Nonzero percent less than 0.05.

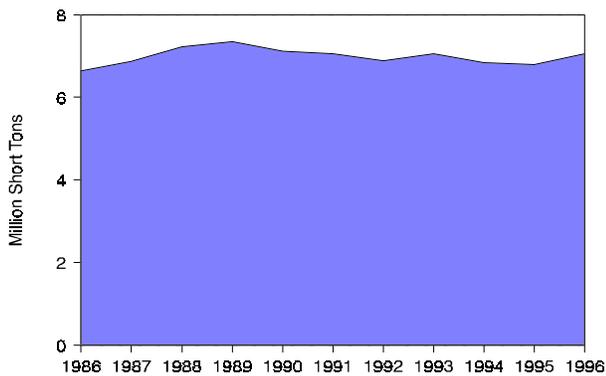
**Table 8. Electric Power Industry Emissions Estimates, 1986, 1991, and 1996**  
(Thousand Short Tons)

Emission Type	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Sulfur Dioxide	15,502	15,505	12,208	-2.4
Nitrogen Oxides <sup>d</sup> . . . .	6,631	7,048	7,061	0.6
Carbon Dioxide <sup>d</sup> . . . .	1,763,780	1,914,286	2,067,214	1.6

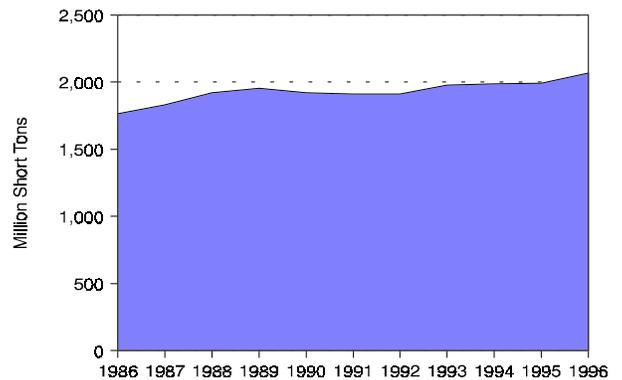
**Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996**



**Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996**

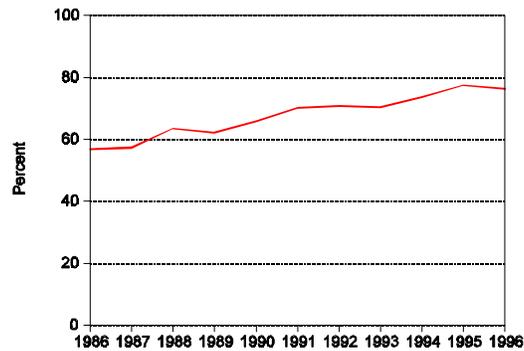


**Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996**



**Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996**  
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential	819,088,319	955,417,350	1,082,490,541	2.8	34.6	34.6	34.9
Commercial	630,519,597	765,663,613	887,424,657	3.5	26.6	27.7	28.6
Industrial . . .	830,530,504	946,583,391	1,030,356,028	2.2	35.1	34.3	33.3
Other . . . . .	88,614,629	94,338,686	97,538,719	1.0	3.7	3.4	3.1
Total . . . . .	2,368,753,062	2,762,003,040	3,097,809,945	2.7	100.0	100.0	100.0

**Figure 9. Nuclear Power Capacity Factor  
1986-1996**

**Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996**

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	240	1,928	6	905	3,079
Number of Retail Customers	78,244,422	14,116,618	24,311	10,375,164	102,760,515
Retail Sales (MWh)	1,821,460,746	335,844,917	45,353,680	166,093,719	2,368,753,062
Percentage of Retail Sales	76.9	14.2	1.9	7.0	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	156,513,576	23,734,303	1,628,999	14,594,801	196,471,679
Percentage of Revenue	79.7	12.1	0.8	7.4	100.0
<b>1991</b>					
Number of Utilities	223	1,944	6	891	3,064
Number of Retail Customers	84,973,630	15,304,087	29,700	11,708,848	112,016,265
Retail Sales (MWh)	2,110,528,121	393,448,324	52,943,716	205,082,879	2,762,003,040
Percentage of Retail Sales	76.4	14.2	1.9	7.4	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	165,882,853	26,020,444	1,479,079	15,901,401	209,283,776
Percentage of Revenue	79.3	12.4	0.7	7.6	100.0
<b>1996</b>					
Number of Utilities	210	1,953	7	873	3,043
Number of Retail Customers	90,299,048	16,398,233	31,148	13,273,664	120,002,093
Retail Sales (MWh)	2,342,808,015	450,927,720	45,626,484	258,447,726	3,097,809,945
Percentage of Retail Sales	75.6	14.6	1.5	8.3	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	166,795,617	27,098,025	1,152,025	17,408,907	212,454,574
Percentage of Revenue	78.5	12.8	0.5	8.2	100.0