

Virginia

The Commonwealth of Virginia had the twelfth largest population and the twentieth largest utility generating capability in 1996. The Virginia Power Company owns and operates over 65 percent of the generating capability, including the Commonwealth's five largest plants. Of the top five plants, the largest is the Bath County hydroelectric plant; also included in the top five are the only two nuclear plants in the State, North Anna and Surry; a coal-fired plant, Chesterfield; and an oil-fired plant, Possum Point. Nonutility generating capability in the Commonwealth increased from 3 percent in 1986 to nearly 20 percent in 1996. The nonutility generating capability share was the fourth largest in the Nation in 1996. Virginia is a net importer of electricity; in 1996, the retail sales total was almost 31 percent greater than net generation within the Commonwealth. In 1996, the average revenue per kilowatt-hour for all sectors (residential, commercial, and industrial) was 6.09 cents per kilowatt-hour, slightly below the national average of 6.86 cents per kilowatt-hour.

Approximately 42 percent of the electricity generated at utilities in the Commonwealth of Virginia in 1996 came from coal-fired power plants. Roughly 50 percent of the coal used for electricity generation is mined in Virginia. Virginia's coal deposits are located in three separate areas: the Eastern field, consisting of two basins located west of the Richmond; the Valley fields, comprising narrow coal-bearing areas in the west-central part of the State; and the Southwest field, which is part of the Appalachian coal basin. The Southwest field contains most of Virginia's coal reserves and is the source of virtually all the Commonwealth's coal production.¹ About 39 percent of the electricity generated in Virginia in 1996 came from the North Anna and Surry nuclear plants. They are among the most efficiently operated nuclear plants in the Nation, and, during the period from 1986 to 1996, with the exception of 1989, they operated at a capacity factor above the industry average. Since 1986, most of the net generation that was being produced by oil-fired plants was displaced with nonutility generation.

Nationally, emissions of sulfur dioxide, nitrogen oxides (NO_x), and carbon dioxide from Virginia's generators ranked twentieth, twenty-eighth, and twenty-second, respectively. Emissions of all three pollutants increased from 1986 to 1996. Although no Virginia generators were mentioned in Title IV of the Clean Air Act Amendments of 1990, it is likely that Virginia's Department of Environmental Quality will need to design a State implementation plan for reducing groundlevel ozone in response to a proposal released by the Environmental Protection Agency (EPA) in October 1998. The EPA proposal does not mandate which sources must reduce pollution. However, the EPA states that utilities would be one of the most likely sources of NO_x emissions reductions. Virginia is also part of the Ozone Transport Commission (OTC).² Each of the thirteen States of the OTC is responsible for enacting regulations in order to achieve region-wide NO_x reductions in a consistent, enforceable manner, and for allocating its NO_x Budget Program allowances among NO_x sources in the State. The targets in this program are all electricity generating facilities with a rated output of 15 megawatts or more and large industrial boilers.

In April 1998, a law to restructure the electric power industry in Virginia was enacted. The law requires competition at the retail level to begin in 2002 and be available to all consumers by 2004. The details of implementation of retail competition have been left to the State Corporation Commission and the legislature to develop over the next several years. The restructuring law calls for creation of an independent system operator to operate the transmission lines, allows for recovery of stranded costs by utilities, and provides for public interest programs, such as low-income assistance and energy efficiency programs. The investor-owned utilities in the State must file plans for restructuring and pilot programs. Recently, Virginia Power agreed to \$920 million in refunds and rate reductions over the next five years. This was the biggest rate adjustment in the Commonwealth's electricity industry history, as Virginia Power has improved efficiencies and is preparing for a more competitive environment in the future.³

¹Energy Information Administration, *State Coal Profiles*, DOE/EIA-0576 (Washington, DC, January 1994), P. 95.

²The Ozone Transportation Region comprises the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, the northern counties of Virginia, and the District of Columbia.

³Energy Information Administration, Status of State Electric Utility Deregulation Activity, http://www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html.

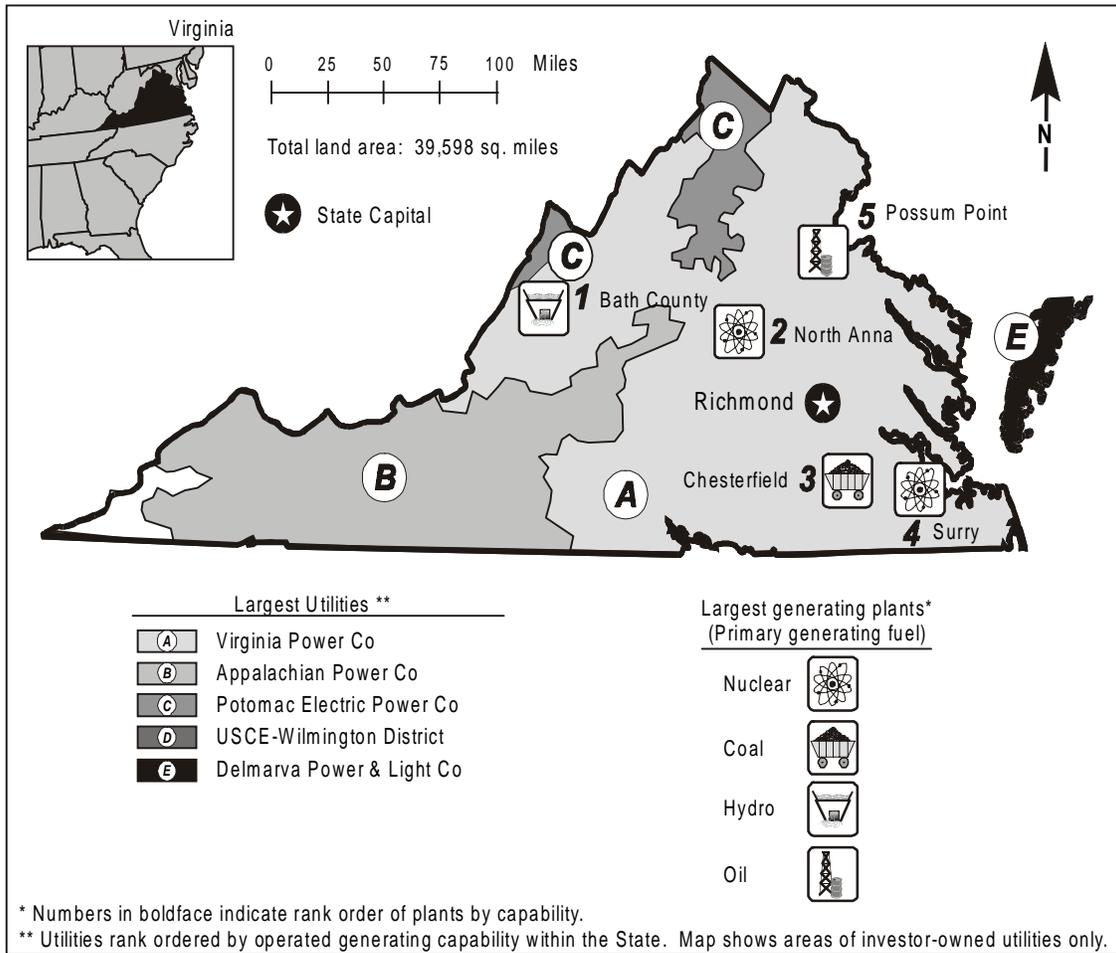


Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)	ECAR/SERC/MAAC		Utility		
Net Exporter or Importer		Importer	Capability (MWe)	14,806	20
State Primary Generating Fuel		Coal	Generation (MWh)	56,532,918	21
Population (as of 7/96)	6,666,167	12	Average Age of Coal Plants	31 years	
Average Revenue (cents/kWh)	6.09	^a 23	Average Age of Oil-fired Plants	24 years	
Industry			Average Age of Gas-fired Plants	6 years	
Capability (MWe)	18,401	^b 15	Average Age of Nuclear Plants	20 years	
Generation (MWh)	67,031,106	^b 19	Average Age of Hydroelectric Plants	20 years	
Capability/person (KWe/person)	2.76	^b 27	Average Age of Other Plants	11 years	
Generation/person (MWh/person)	10.06	^b 33	Nonutility^c		
Sulfur Dioxide Emissions (Thousand Short Tons)	215	20	Capability (MWe)	3,595	5
Nitrogen Oxide Emissions (Thousand Short Tons)	114	28	Percentage Share of Capability	19.5	4
Carbon Dioxide Emissions (Thousand Short Tons)	41,493	22	Generation (MWh)	10,498,188	9
Sulfur Dioxide/sq. mile (Tons)	5.44	22	Percentage Share of Generation	15.7	13
Nitrogen Oxides/sq. mile (Tons)	2.88	25			
Carbon Dioxide/sq. mile (Tons)	1,047.85	24			

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Bath County	Hydro	Virginia Power Co	2,100
2. North Anna	Nuclear	Virginia Power Co	1,791
3. Chesterfield	Coal/Gas	Virginia Power Co	1,647
4. Surry	Nuclear	Virginia Power Co	1,602
5. Possum Point	Oil/Coal	Virginia Power Co	1,329

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

Utility	Net Summer Capability	Net Coal Capability	Net Oil Capability	Net Gas Capability	Net Nuclear Capability	Net Hydro/Other Capability
A. Virginia Power Co	12,210	3,602	2,115	992	3,392	2,109
B. Appalachian Power Co	1,763	1,015	--	--	--	748
C. Potomac Electric Power Co	482	482	--	--	--	--
D. USCE-Wilmington District	252	--	--	--	--	252
E. Delmarva Power & Light Co	38	--	38	--	--	--
Total	14,745	5,099	2,153	992	3,392	3,109
Percentage of Industry Capability	80.1	--	--	--	--	--

-- = Not applicable.

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

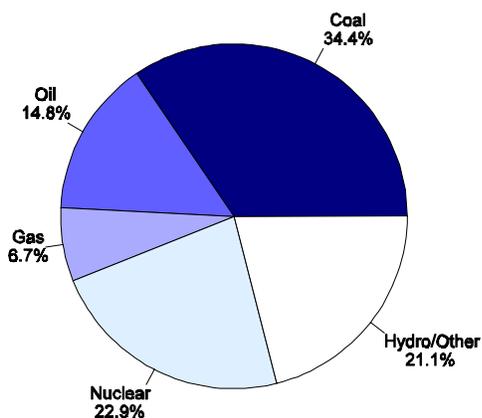


Figure 2. Utility Generation by Primary Energy Source, 1996

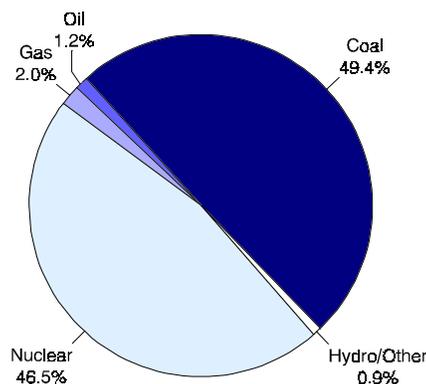


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

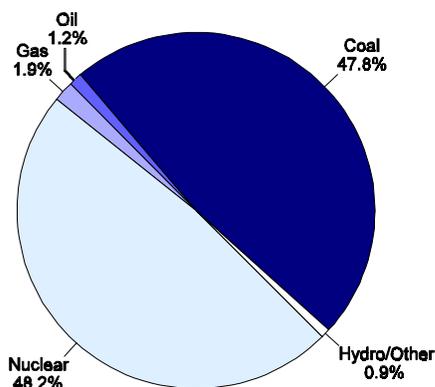


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	4,018	4,210	5,099	30.2	27.2	27.7
Oil	2,376	2,753	2,192	17.9	17.8	11.9
Gas	4	198	994	(s)	1.3	5.4
Nuclear	3,392	3,382	3,392	25.5	21.9	18.4
Hydro/Other	3,042	3,109	3,130	22.9	20.1	17.0
Total Utility	12,832	13,652	14,806	96.6	88.3	80.5
Total Nonutility	458	1,805	3,595	3.4	11.7	19.5
Industry	13,290	15,457	18,401	100.0	100.0	100.0

(s) = Nonzero percentage less than 0.05.

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	18,131,714	21,939,027	27,930,011	39.5	40.3	41.7
Oil	3,175,949	2,036,478	683,363	6.9	3.7	1.0
Gas	73,047	1,104,440	1,123,697	0.2	2.0	1.7
Nuclear	21,214,556	23,886,268	26,286,283	46.2	43.9	39.2
Hydro/Other	47,488	-25,558	509,564	0.1	--	0.8
Total Utility	42,642,755	48,940,655	56,532,918	93.0	89.9	84.3
Total Nonutility	3,226,268	5,478,227	10,498,188	7.0	10.1	15.7
Industry	45,869,023	54,418,882	67,031,106	100.0	100.0	100.0

-- = Not applicable.

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	0.188	0.218	0.277	30.1	33.0	34.3
Oil	0.031	0.020	0.007	4.9	3.0	0.9
Gas	0.001	0.010	0.011	0.1	1.5	1.3
Nuclear	0.229	0.257	0.279	36.6	38.8	34.6
Hydro/Other	(s)	(s)	0.005	0.1	(s)	0.6
Total Utility	0.450	0.504	0.579	71.8	76.2	71.7
Total Nonutility	0.176	0.158	0.229	28.2	23.8	28.3
Industry	0.626	0.662	0.808	100.0	100.0	100.0

(s) = Nonzero value less than 0.0005 or nonzero percentage less than 0.05.

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

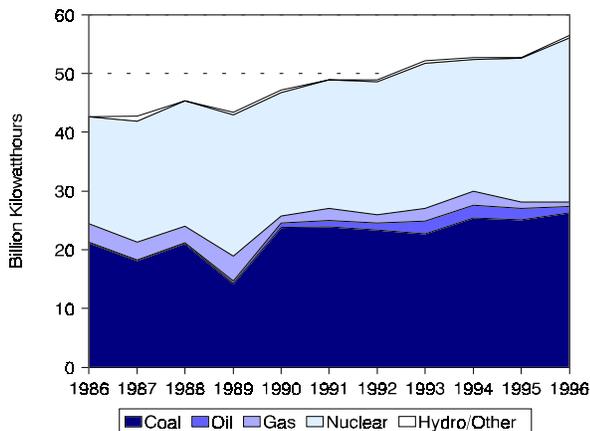


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

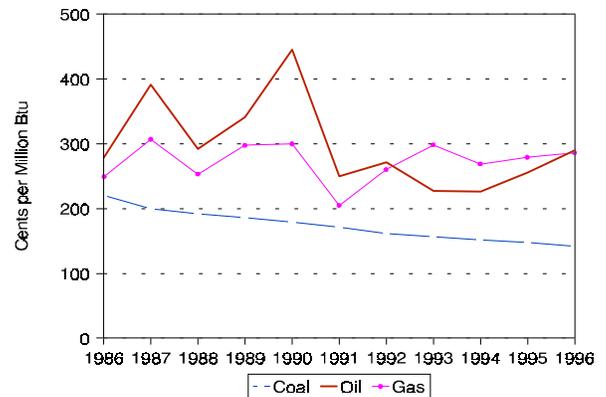


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	220.3	171.1	141.8	-4.3
Oil	278.4	250.3	290.0	0.4
Gas	249.1	204.8	281.6	1.2

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	146	216	215	4.0
Nitrogen Oxides ^d . .	66	94	114	5.6
Carbon Dioxide ^d . . .	21,566	32,882	41,493	6.8

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

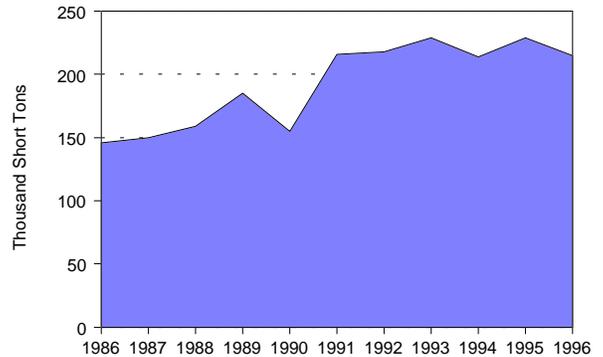


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

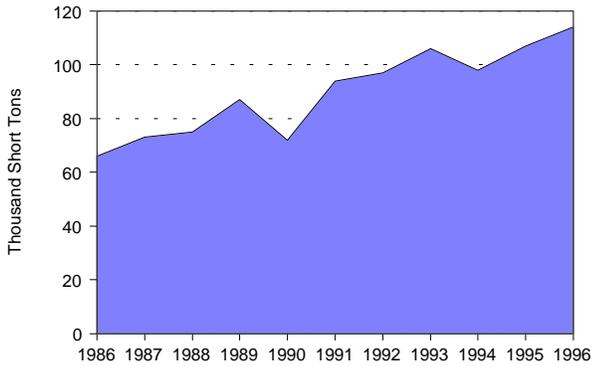


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

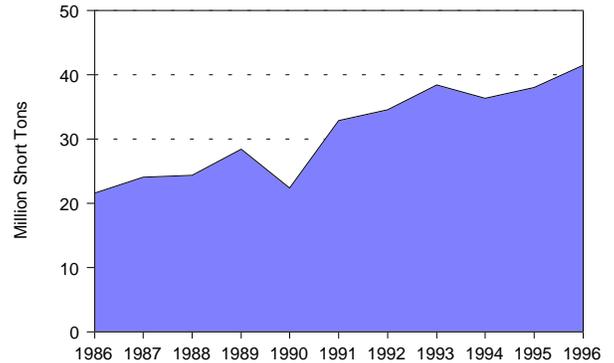


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential . .	25,235,405	29,607,347	34,650,534	3.2	39.9	39.4	39.6
Commercial	16,540,876	21,230,493	24,564,931	4.0	26.1	28.3	28.0
Industrial . . .	14,448,556	16,028,804	19,020,734	2.8	22.8	21.3	21.7
Other	7,040,504	8,244,504	9,359,444	2.9	11.1	11.0	10.7
Total	63,265,338	75,111,148	87,595,643	3.3	100.0	100.0	100.0

Figure 9. Nuclear Power Capacity Factor Comparison, 1986-1996

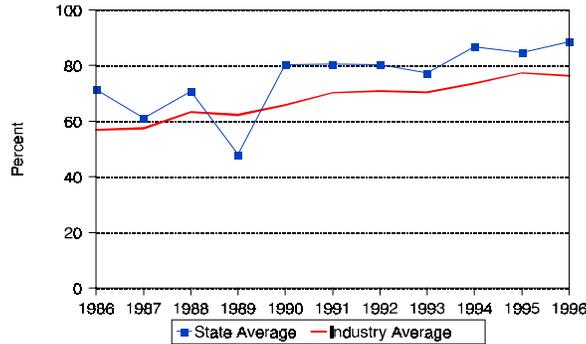


Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	6	18	--	13	37
Number of Retail Customers	1,967,440	126,406	--	239,167	2,333,013
Retail Sales (MWh)	56,366,034	2,766,953	--	4,132,351	63,265,338
Percentage of Retail Sales	89.1	4.4	--	6.5	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	4,132,513	200,562	--	348,978	4,682,053
Percentage of Revenue	88.3	4.3	--	7.5	100.0
1991					
Number of Utilities	4	16	--	13	33
Number of Retail Customers	2,205,027	141,452	--	293,544	2,640,023
Retail Sales (MWh)	66,190,487	3,487,849	--	5,432,812	75,111,148
Percentage of Retail Sales	88.1	4.6	--	7.2	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	4,487,301	215,464	--	440,668	5,143,433
Percentage of Revenue	87.2	4.2	--	8.6	100.0
1996					
Number of Utilities	5	16	--	13	34
Number of Retail Customers	2,418,406	149,304	--	335,820	2,903,530
Retail Sales (MWh)	76,725,069	4,142,217	--	6,728,357	87,595,643
Percentage of Retail Sales	87.6	4.7	--	7.7	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	4,601,784	226,928	--	505,476	5,334,188
Percentage of Revenue	86.3	4.3	--	9.5	100.0

-- = Not applicable.