

Pennsylvania

Pennsylvania ranks fifth nationally in population and, in 1996, fourth in generating capability. Over half of generating capability is coal-fired, as is the largest plant in the State, Bruce Mansfield. Until the 1950s, Pennsylvania was the leading producer of coal in the United States and has ranked among the leading coal producers since then.¹ Proximity to coal, the resultant low transportation costs, and a lack of environmental restrictions made coal an attractive fuel for electricity generation. Nuclear plants represent about a quarter of Pennsylvania's generating capability. The first nuclear plant in the Nation, Shippingport (no longer operating), was in Pennsylvania. Pennsylvania ranks second highest in the Nation in nuclear capability. Three of the four largest plants are nuclear.

Together, coal and nuclear plants produce over 96 percent of all electricity produced by the industry in Pennsylvania; the remainder is from small hydroelectric, gas, and oil-fired plants. Nuclear generation has displaced some of the coal generation since 1986 as Beaver Valley 2 and Limerick 2 began operation. In 1996, net generation from coal units at utilities represented 52.5 percent, down from 64.7 percent in 1986. Nuclear generation went from 26.3 percent to 35.8 percent. Nuclear plants in Pennsylvania increased their capacity factor to 87.5 percent, well above the national average capacity factor of 76.4 percent. Generation from nonutilities has more than quadrupled since 1986 and currently represents about 9 percent of total generation.

The Clean Air Act Amendments of 1990 specified some plants in Pennsylvania to begin compliance with stricter emissions standards for sulfur dioxide (SO₂) and nitrogen oxides (NO_x). These units include 7,674 megawatts of nameplate capacity at nine plants. Emissions of SO₂ were second only to Ohio, accounting for 8 percent of all SO₂ emissions in the Nation. Carbon dioxide and NO_x emissions both ranked fourth in the Nation. After 1990, SO₂ and NO_x emissions have declined and are currently less than in 1986.

Most of Pennsylvania is included in the Pennsylvania-New Jersey-Maryland Interconnection (PJM). In 1998,

PJM began operating as an independent system operator and power exchange. PJM has assumed control of the transmission systems within its borders and the generators are selling wholesale power through the power exchange. The price of retail electricity in Pennsylvania exceeded the national average in 1996. At 7.96 cents per kilowatt-hour, it was the 12th most costly in the United States. Higher prices for electric power have been a catalyst for moving toward competitive markets for electricity. Pennsylvania is a leading State for the deregulation of electricity generation and allowing competition at the retail level.

The Commonwealth of Pennsylvania enacted a comprehensive law in December 1996 to restructure its electric power industry. Competition among electric generation suppliers began in November 1997 with a pilot program for 5 percent of each utility's load. By January 1999, two-thirds of consumers, and by January 2000 all consumers, will be allowed retail access. High interest and participation in the program is making Pennsylvania the national leader for a retail competitive electricity market. As required by the restructuring legislation, investor-owned utilities in Pennsylvania filed restructuring plans with the Pennsylvania Public Utility Commission (PPUC). The plans detail how retail competition will be implemented throughout the utilities' service territories and the amount of and time period for recoverable stranded costs.

The seven major investor-owned utilities in the State will be allowed to collect a total of approximately \$12.5 billion in stranded costs, although less than they requested. Stranded costs will be recovered via competitive transition charges that will be billed to customers in the service territories of the respective distribution companies. Duquesne Light has filed a plan with the PPUC to divest its generation assets, including its nuclear plants. GPU Energy has sold its fossil-fueled and hydro-generating capability and announced the sale of its nuclear capability at Three Mile Island, pending approval by State and Federal regulators. Three Mile Island will be among the first nuclear plants sold in the Nation.²

¹ Energy Information Administration, *State Coal Profiles*, DOE/EIA0576 (Washington, DC, January 1994), p. 79.

² Energy Information Administration, Status of State Electric Utility Deregulation Activity, http://www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html.

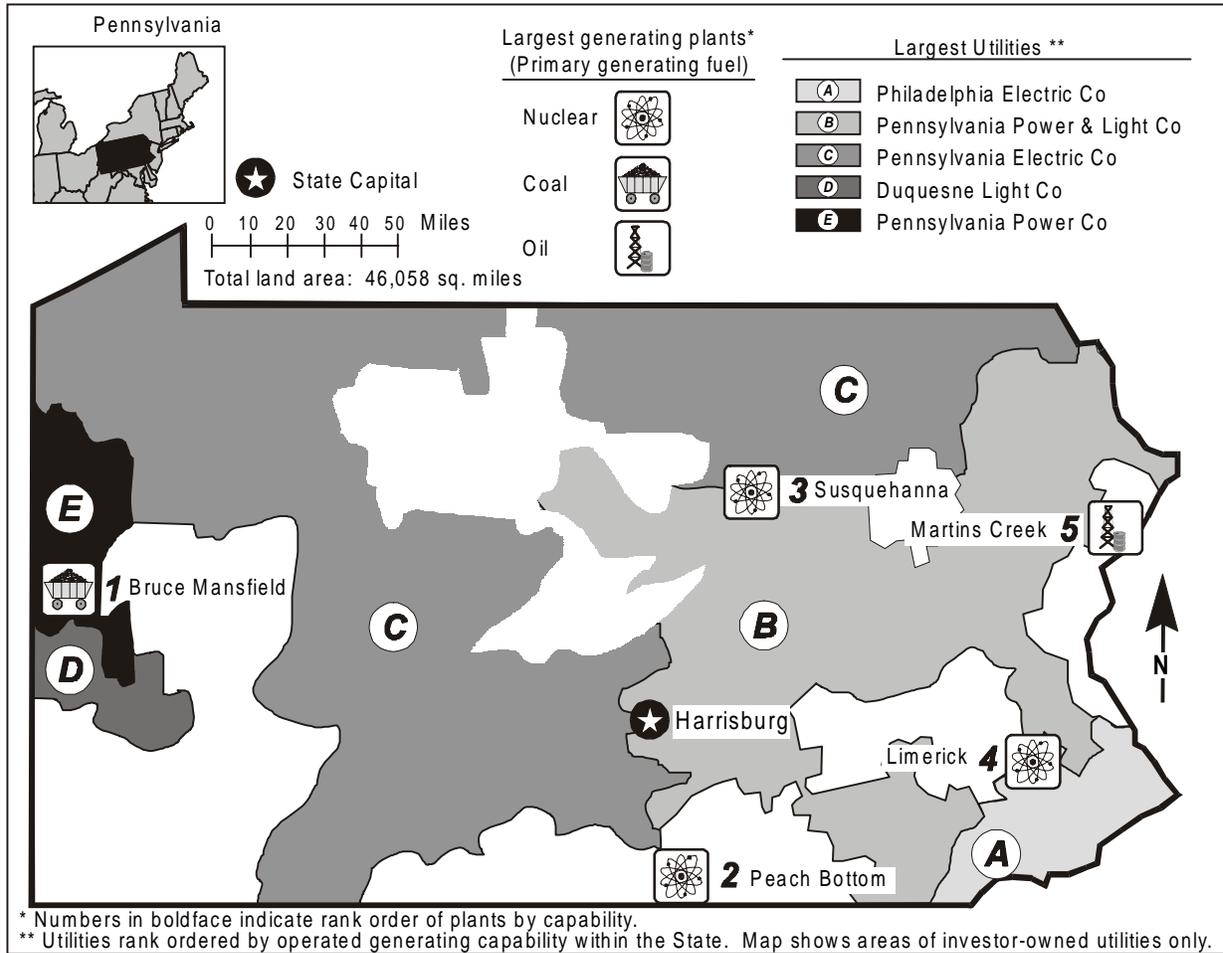


Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		ECAR/MACC	Utility		
Net Exporter or Importer		Exporter	Capability (MWe)	33,723	4
State Primary Generating Fuel		Coal	Generation (MWh)	175,022,081	2
Population (as of 7/96)	12,040,084	5	Average Age of Coal Plants	29 years	
Average Revenue (cents/kWh)	7.96	^a 40	Average Age of Oil-fired Plants	25 years	
Industry			Average Age of Gas-fired Plants	35 years	
Capability (MWe)	36,439	^b 4	Average Age of Nuclear Plants	15 years	
Generation (MWh)	192,030,229	^b 2	Average Age of Hydroelectric Plants	33 years	
Capability/person (KWe/person)	3.03	^b 21	Average Age of Other Plants	--	
Generation/person (MWh/person)	15.95	^b 15	Nonutility^c		
Sulfur Dioxide Emissions (Thousand Short Tons)	1,072	2	Capability (MWe)	2,716	9
Nitrogen Oxide Emissions (Thousand Short Tons)	380	4	Percentage Share of Capability	7.5	22
Carbon Dioxide Emissions (Thousand Short Tons)	124,475	4	Generation (MWh)	17,008,148	8
Sulfur Dioxide/sq. mile (Tons)	23.27	6	Percentage Share of Generation	8.9	18
Nitrogen Oxides/sq. mile (Tons)	8.25	9			
Carbon Dioxide/sq. mile (Tons)	2,702.58	9			

-- = Not applicable.

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Bruce Mansfield	Coal	Pennsylvania Power Co	2,371
2. Peach Bottom	Nuclear	Philadelphia Electric Co	2,186
3. Susquehanna	Nuclear	Pennsylvania Power & Light Co	2,184
4. Limerick	Nuclear	Philadelphia Electric Co	2,170
5. Martins Creek	Oil/Coal	Pennsylvania Power & Light Co	1,949

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. Philadelphia Electric Co	8,215	725	2,047	207	4,356	880
B. Pennsylvania Power & Light Co ..	7,968	3,638	2,000	--	2,184	146
C. Pennsylvania Electric Co	6,737	6,159	84	76	--	418
D. Duquesne Light Co	3,336	1,346	360	--	1,630	--
E. Pennsylvania Power Co	2,793	2,787	6	--	--	--
Total	29,049	14,655	4,497	283	8,170	1,444
Percentage of Industry Capability	79.7	--	--	--	--	--

-- = Not applicable.

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

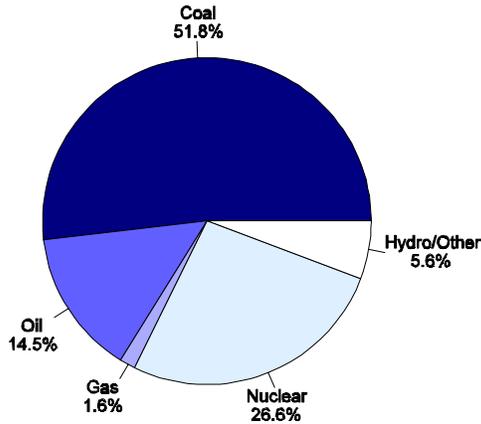


Figure 2. Utility Generation by Primary Energy Source, 1996

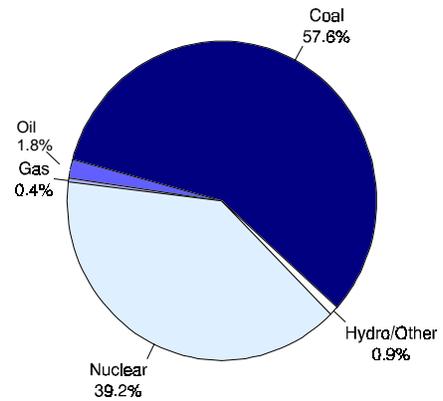


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

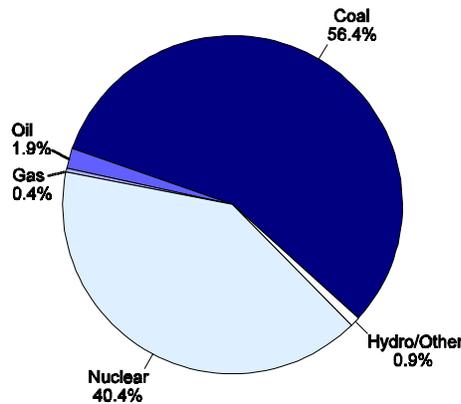


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	17,636	16,894	17,463	54.5	48.0	47.9
Oil	4,990	4,962	4,881	15.4	14.1	13.4
Gas	311	873	534	1.0	2.5	1.5
Nuclear	6,833	8,731	8,956	21.1	24.8	24.6
Hydro/Other	1,870	1,877	1,888	5.8	5.3	5.2
Total Utility	31,640	33,337	33,723	97.7	94.8	92.5
Total Nonutility	738	1,837	2,716	2.3	5.2	7.5
Industry	32,378	35,174	36,439	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	97,729,919	100,359,157	100,857,561	64.7	58.2	52.5
Oil	8,522,432	3,713,606	3,212,502	5.6	2.2	1.7
Gas	61,190	162,793	641,242	(s)	0.1	0.3
Nuclear	39,820,377	57,475,671	68,672,038	26.3	33.3	35.8
Hydro/Other	1,451,810	655,648	1,638,738	1.0	0.4	0.9
Total Utility	147,585,729	162,366,875	175,022,081	97.7	94.1	91.1
Total Nonutility	3,537,159	10,219,723	17,008,148	2.3	5.9	8.9
Industry	151,122,888	172,586,598	192,030,229	100.0	100.0	100.0

(s) = Nonzero percentage less than 0.05.

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	0.998	1.005	1.018	58.7	54.0	48.3
Oil	0.090	0.038	0.034	5.3	2.0	1.6
Gas	0.001	0.002	0.007	(s)	0.1	0.4
Nuclear	0.430	0.617	0.730	25.3	33.2	34.6
Hydro/Other	0.015	0.007	0.017	0.9	0.4	0.8
Total Utility	1.534	1.669	1.806	90.1	89.7	85.7
Total Nonutility	0.168	0.192	0.302	9.9	10.3	14.3
Industry	1.702	1.861	2.107	100.0	100.0	100.0

(s) = Nonzero percentage less than 0.005.

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

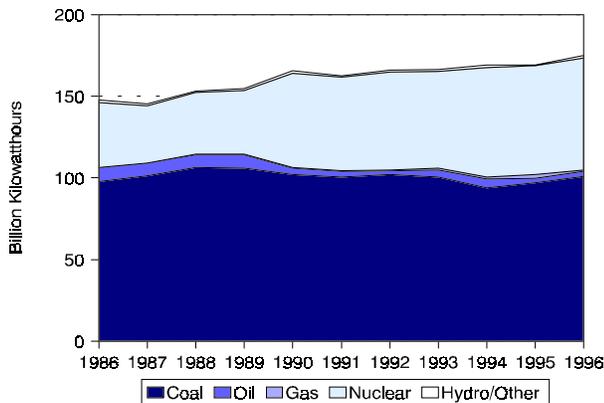


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

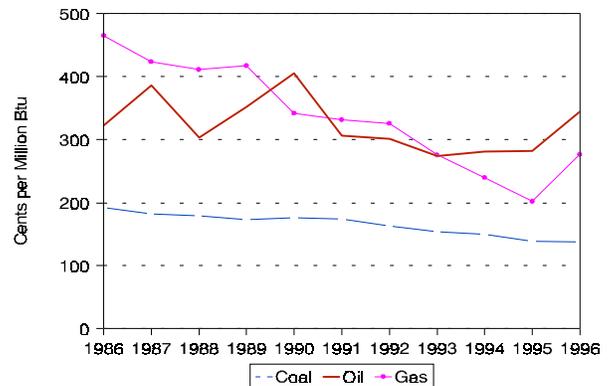


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	192.7	173.8	138.2	-3.3
Oil	322.7	306.6	345.2	0.7
Gas	465.5	332.0	276.9	-5.1

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	1,218	1,256	1,072	-1.3
Nitrogen Oxides ^d . .	391	429	380	-0.3
Carbon Dioxide ^d . . .	110,455	120,896	124,475	1.2

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

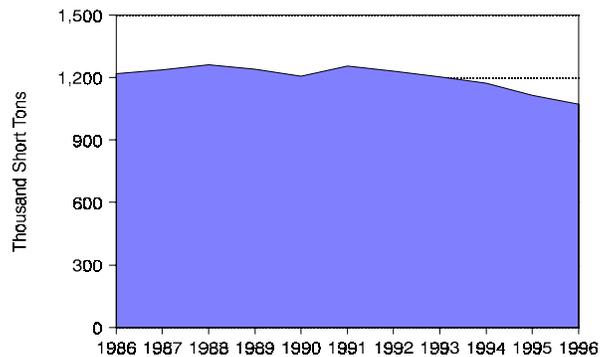


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

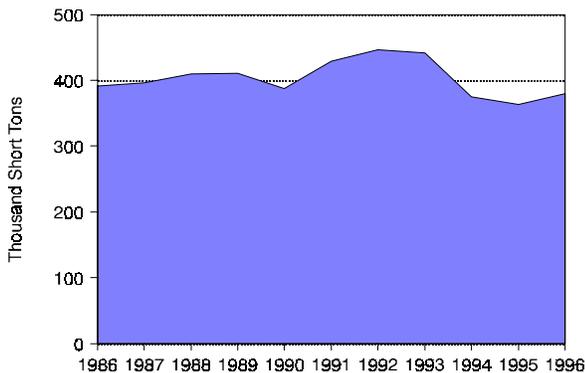


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

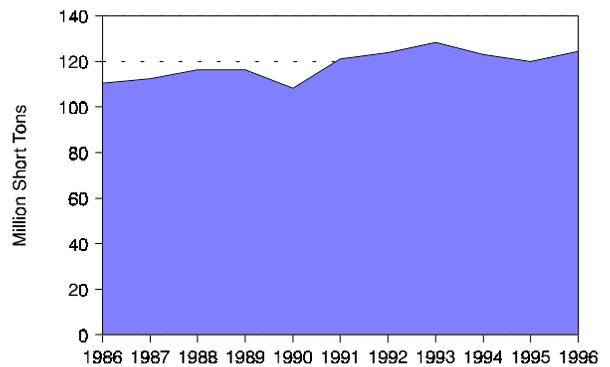


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential . .	34,240,753	39,597,640	43,644,620	2.5	33.4	34.0	34.2
Commercial	24,796,178	30,552,517	35,396,258	3.6	24.2	26.3	27.7
Industrial . . .	42,019,961	44,728,178	47,207,540	1.2	41.0	38.4	37.0
Other	1,470,415	1,458,663	1,374,608	-0.7	1.4	1.3	1.1
Total	102,527,301	116,336,998	127,623,026	2.2	100.0	100.0	100.0

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

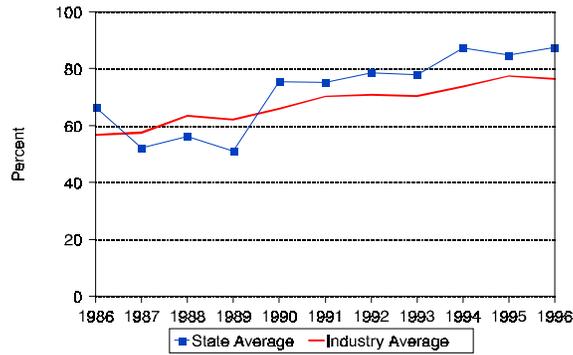


Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	12	34	--	13	59
Number of Retail Customers	4,697,887	72,083	--	166,678	4,936,648
Retail Sales (MWh)	99,943,402	1,030,678	--	1,553,221	102,527,301
Percentage of Retail Sales	97.5	1.0	--	1.5	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	9,600,989	88,772	--	182,438	9,872,198
Percentage of Revenue	97.3	0.9	--	1.9	100.0
1991					
Number of Utilities	11	34	--	12	57
Number of Retail Customers	4,997,209	74,427	--	175,458	5,247,094
Retail Sales (MWh)	113,434,288	1,176,038	--	1,726,672	116,336,998
Percentage of Retail Sales	97.5	1.0	--	1.5	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	10,173,789	98,271	--	192,992	10,465,053
Percentage of Revenue	97.2	0.9	--	1.8	100.0
1996					
Number of Utilities	11	34	--	13	58
Number of Retail Customers	5,191,427	78,201	--	189,389	5,459,017
Retail Sales (MWh)	124,303,036	1,303,279	--	2,016,711	127,623,026
Percentage of Retail Sales	97.4	1.0	--	1.6	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	9,851,596	96,525	--	206,879	10,155,000
Percentage of Revenue	97.0	1.0	--	2.0	100.0

-- = Not applicable.