

Massachusetts

Boston's first central station for the production of electricity began its operation in February 1886 under the name of the Edison Electric Illuminating Company of Boston. In 1996, the Commonwealth of Massachusetts had the thirteenth largest population and the twenty-ninth largest utility generating capability. Four of the five largest power plants in the Commonwealth are on the coast. The largest share of electricity generated in Massachusetts comes from coal-fired plants like Brayton Point, the largest plant in the Commonwealth. Massachusetts is also very reliant on oil, gas, and nuclear plants, with each category generating more than ten percent of the State's total. The largest utility in terms of generating capability in 1996 was the New England Power Company. There has recently been a massive sale of generating assets, including Brayton Point and Salem Harbor, the fifth largest plant in the Commonwealth, by the New England Electric System, New England Power's parent company, to the U.S. Generating Company of Bethesda, Maryland. (However, in 1996, it is accurate to report New England Power as the largest operating utility in the Commonwealth.) The average price of electricity in Massachusetts, 10.13 cents per kilowatt-hour, was sixth most expensive in the Nation. Massachusetts has more of a nonutility share of generating capability than all but six States.

The concentrations of electricity generator emissions of sulfur dioxide, nitrogen oxides (NO_x) and carbon dioxide all ranked in the top ten nationally in 1996. It is likely that Massachusetts will need to design a State implementation plan for reducing ground-level 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, EPA states that utilities would be one of the most likely sources of NO_x emissions

reductions. Massachusetts is also part of the Ozone Transport Commission (OTC).¹ 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 large industrial boilers and electric generating facilities with a rated output of 15 megawatts or more. Massachusetts is one of the seven States that has issued its final rule for complying with the NO_x Budget Program.

In 1996, the oil share of utility capability was just over a third while the net generation share was just under one-sixth. In 1996, the utility coal capability share was slightly under one-sixth while the generation share of the total was just under one-third. Over the 11-year period examined in this report, the nonutility generation share of the total increased from 4.1 percent to over one-quarter of the total.

Massachusetts has been among the leaders in the move toward a deregulated environment for electricity. In November 1997, legislation was enacted to restructure the industry. The law required retail access by March 1998. However, in February 1998 a referendum to repeal the November legislation was successfully added to the November 1998 ballot. The referendum was soundly defeated.²

The Boston Edison Company, the second largest utility in the Commonwealth and owner of Massachusetts' only operating nuclear plant, Pilgrim, put the plant up for sale in April 1998. If sold, Pilgrim would be the first ownership transfer of a nuclear plant in a competitive electric market.³

¹ The Ozone Transport 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.

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

³ John O'Keefe, *The Patriot Ledger*, (August 6, 1998), p. 1.

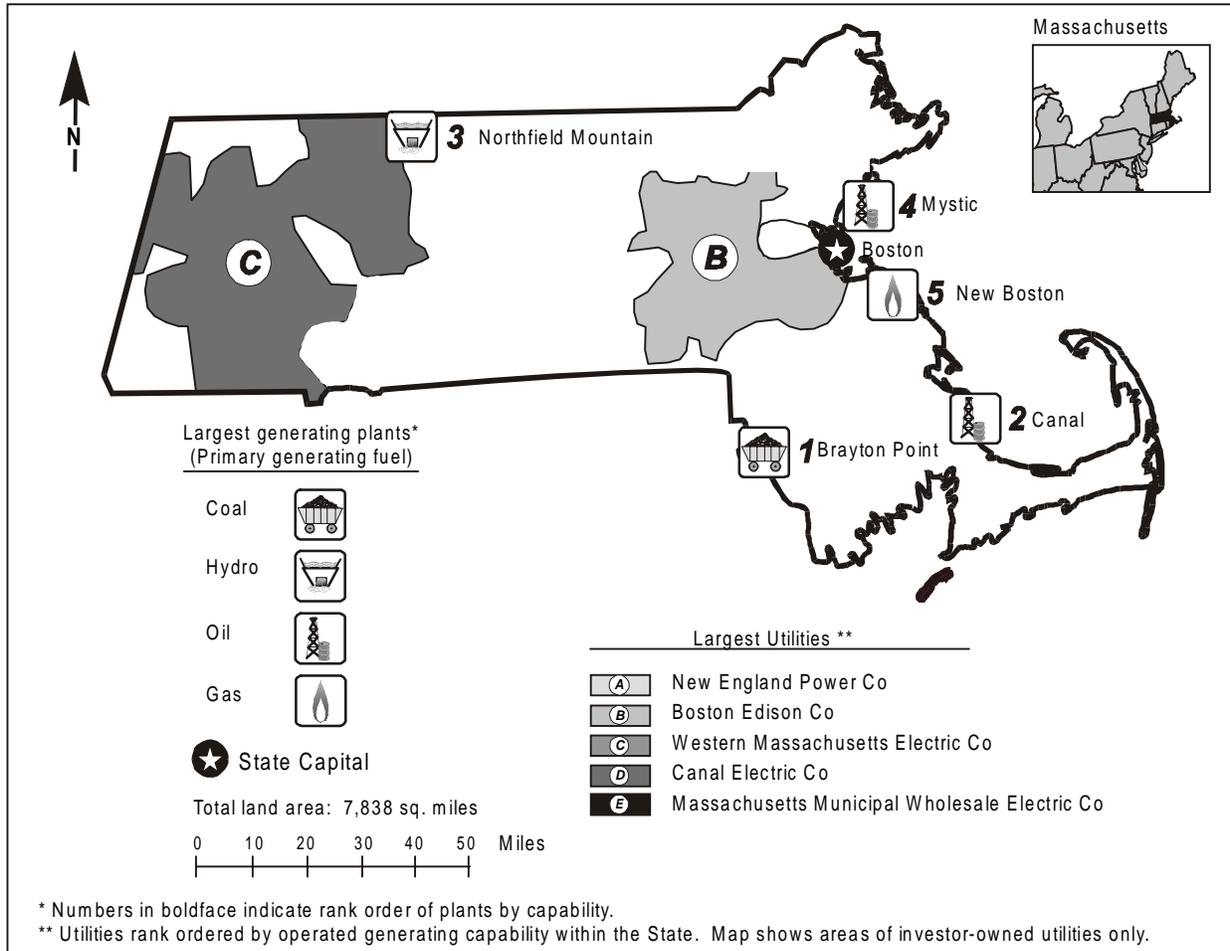


Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		NPCC	Utility		
Net Exporter or Importer		Importer	Capability (MWe)	9,365	29
State Primary Generating Fuel		Coal	Generation (MWh)	27,758,877	36
Population (as of 7/96)	6,085,395	13	Average Age of Coal Plants	33 years	
Average Revenue (cents/kWh)	10.13	^a 44	Average Age of Oil-fired Plants	25 years	
Industry			Average Age of Gas-fired Plants	26 years	
Capability (MWe)	11,204	^b 25	Average Age of Nuclear Plants	24 years	
Generation (MWh)	38,049,471	^b 27	Average Age of Hydroelectric Plants	27 years	
Capability/person (KWe/person)	1.84	^b 42	Average Age of Other Plants	12 years	
Generation/person (MWh/person)	6.25	^b 41	Nonutility^c		
Sulfur Dioxide Emissions (Thousand Short Tons)	106	25	Capability (MWe)	1,839	11
Nitrogen Oxide Emissions (Thousand Short Tons)	61	37	Percentage Share of Capability	16.4	7
Carbon Dioxide Emissions (Thousand Short Tons)	28,183	33	Generation (MWh)	10,290,594	10
Sulfur Dioxide/sq. mile (Tons)	13.58	8	Percentage Share of Generation	27	6
Nitrogen Oxides/sq. mile (Tons)	7.84	10			
Carbon Dioxide/sq. mile (Tons)	3,595.63	5			

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Brayton Point	Coal/Oil	New England Power Co	1,543
2. Canal	Oil	Canal Electric Co	1,143
3. Northfield Mountain	Hydro	Western Massachusetts Elec Co	1,080
4. Mystic	Oil	Boston Edison Co	990
5. New Boston	Gas	Boston Edison Co	749

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. New England Power Co	2,928	1,404	900	--	--	624
B. Boston Edison Co	2,600	--	1,182	749	669	--
C. Western Massachusetts Elec Co	1,342	--	157	--	--	1,184
D. Canal Electric Co	1,143	--	1,143	--	--	--
E. Massachusetts Mun Whls Elec Co	425	--	325	100	--	--
Total	8,438	1,404	3,707	849	669	1,808
Percentage of Industry Capability	75.3	--	--	--	--	--

-- = Not applicable.

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

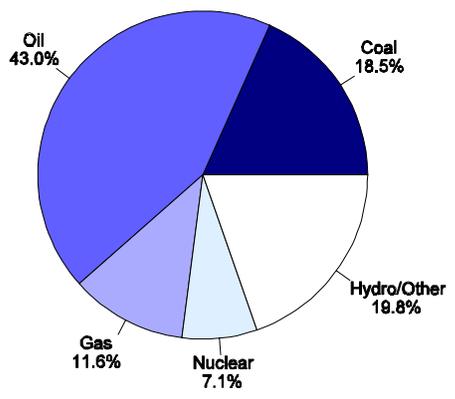


Figure 2. Utility Generation by Primary Energy Source, 1996

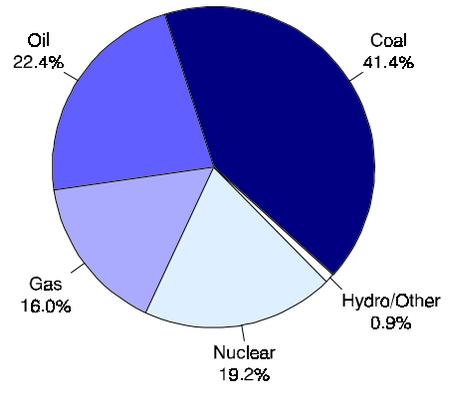


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

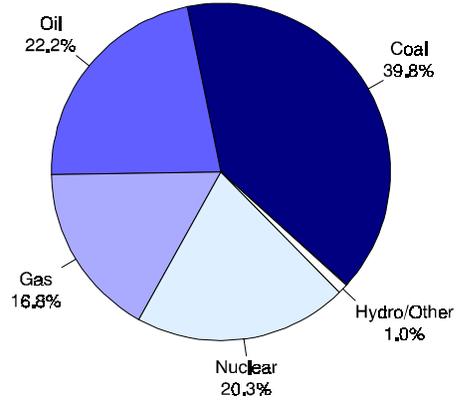


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	1,756	1,692	1,730	17.2	15.7	15.4
Oil	5,343	5,070	4,030	52.3	46.9	36.0
Gas	127	330	1,082	1.2	3.1	9.7
Nuclear	834	830	669	8.2	7.7	6.0
Hydro/Other	1,775	1,849	1,854	17.4	17.1	16.5
Total Utility	9,835	9,771	9,365	96.3	90.4	83.6
Total Nonutility	377	1,034	1,839	3.7	9.6	16.4
Industry	10,212	10,805	11,204	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	9,754,912	11,861,344	11,500,536	27.1	29.0	30.2
Oil	20,664,914	15,612,257	6,221,378	57.5	38.2	16.4
Gas	1,311,432	3,679,433	4,449,799	3.6	9.0	11.7
Nuclear	2,420,252	4,416,611	5,324,341	6.7	10.8	14.0
Hydro/Other	329,462	232,713	262,823	0.9	0.6	0.7
Total Utility	34,480,972	35,802,358	27,758,877	95.9	87.7	73.0
Total Nonutility	1,489,084	5,039,761	10,290,594	4.1	12.3	27.0
Industry	35,970,056	40,842,119	38,049,471	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	0.095	0.113	0.111	23.4	26.6	28.2
Oil	0.209	0.156	0.062	51.6	36.5	15.7
Gas	0.015	0.041	0.047	3.8	9.5	11.9
Nuclear	0.026	0.047	0.057	6.5	11.1	14.4
Hydro/Other	0.003	0.002	0.003	0.9	0.6	0.7
Total Utility	0.348	0.360	0.279	86.1	84.2	70.9
Total Nonutility	0.056	0.067	0.114	13.9	15.8	29.1
Industry	0.404	0.427	0.393	100.0	100.0	100.0

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

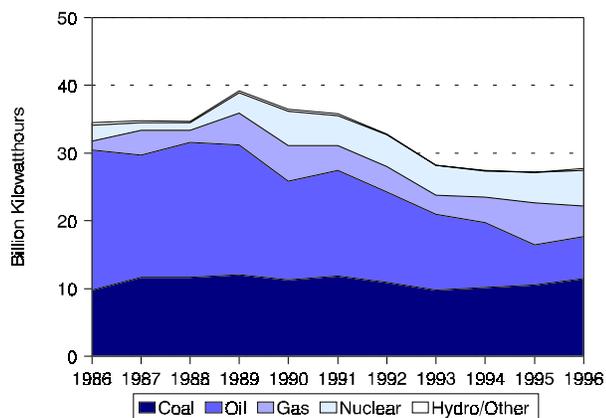


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

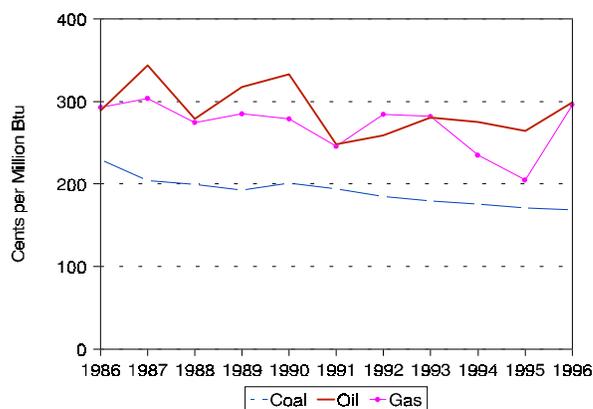


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	229.5	193.9	168.8	-3.0
Oil	288.9	248.4	299.2	0.4
Gas	292.9	245.5	296.2	0.1

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	264	241	106	-8.7
Nitrogen Oxides ^d	67	79	61	-0.8
Carbon Dioxide ^d	27,824	32,474	28,183	0.1

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

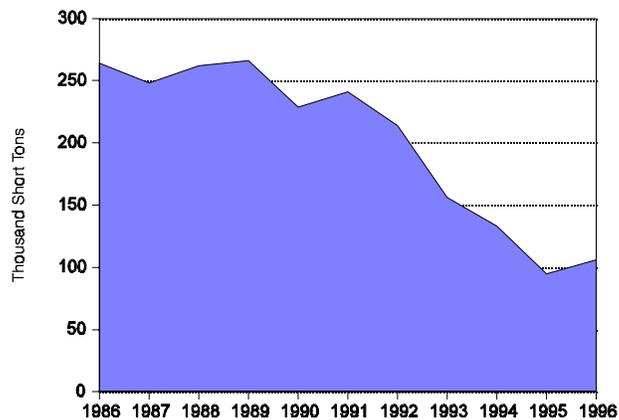


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

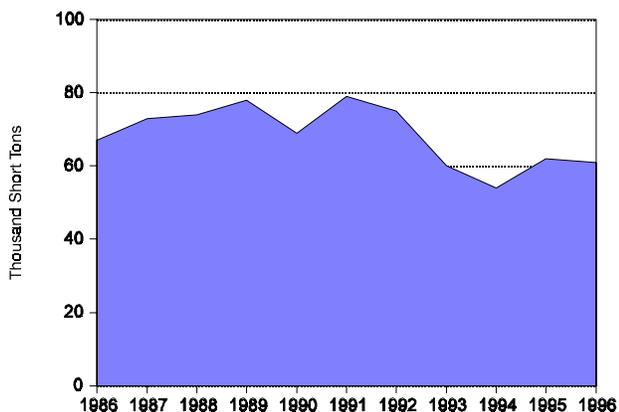


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

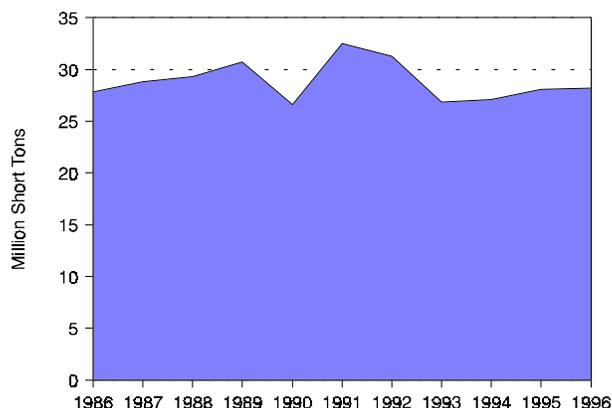


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential	13,607,844	15,379,421	16,255,780	1.8	34.0	34.3	34.4
Commercial	15,832,316	18,516,906	20,345,620	2.5	39.5	41.3	43.0
Industrial	9,682,305	9,793,513	10,085,167	0.4	24.2	21.9	21.3
Other	919,763	1,106,947	607,206	-4.1	2.3	2.5	1.3
Total	40,042,234	44,796,787	47,293,773	1.7	100.0	100.0	100.0

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

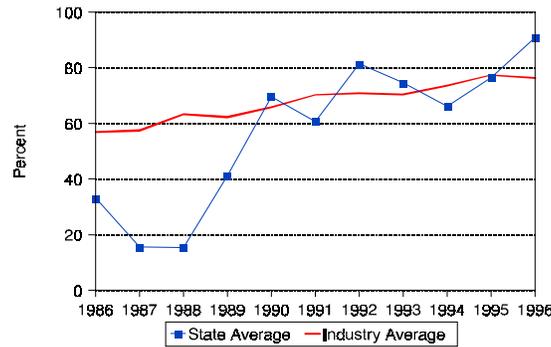


Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	10	40	--	--	50
Number of Retail Customers	2,123,348	314,239	--	--	2,437,587
Retail Sales (MWh)	34,968,007	5,074,227	--	--	40,042,234
Percentage of Retail Sales	87.3	12.7	--	--	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	3,480,589	521,712	--	--	4,002,301
Percentage of Revenue	87.0	13.0	--	--	100.0
1991					
Number of Utilities	10	40	--	1	51
Number of Retail Customers	2,304,702	339,937	--	2,867	2,647,506
Retail Sales (MWh)	38,867,017	5,895,662	--	34,108	44,796,787
Percentage of Retail Sales	86.8	13.2	--	0.1	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	4,159,668	636,922	--	3,407	4,799,997
Percentage of Revenue	86.7	13.3	--	0.1	100.0
1996					
Number of Utilities	10	40	--	--	50
Number of Retail Customers	2,388,091	357,736	--	--	2,745,827
Retail Sales (MWh)	40,862,198	6,431,575	--	--	47,293,773
Percentage of Retail Sales	86.4	13.6	--	--	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	4,203,913	585,261	--	--	4,789,174
Percentage of Revenue	87.8	12.2	--	--	100.0

-- = Not applicable.