

Connecticut

The Connecticut General Assembly gave a charter to the Hartford Electric Light Company in April 1881. The first hydroelectric station in the East was built in 1890 on the Farmington River near Poquonock.¹ Today, most of Connecticut's electricity is generated at nuclear plants; the largest plant in the State, Millstone, is a nuclear plant. Connecticut's largest utility is the Northeast Nuclear Energy Company, which operates the Millstone plant. Connecticut is also very reliant on oil-fired generation. The State had one of the Nation's highest levels of nonutility generation in 1996, at 22 percent. The average price of electricity in Connecticut, 10.51 cents per kilowatt-hour, was fourth highest in the Nation.

In 1996, Connecticut's electricity generator emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) ranked thirty-ninth and fortieth highest, respectively, and emissions of carbon dioxide (CO₂) ranked fortieth highest nationally. However, the concentration levels per square mile were higher due to its small size. These rankings were eighteenth, sixteenth, and tenth, respectively, for SO₂, NO_x, and CO₂. It is likely that Connecticut will need to design a State implementation plan (SIP) 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. Connecticut is also part of the Ozone Transport Commission (OTC).² Each of the 13 OTC members 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 large industrial boilers and all electricity generating facilities with a rated output of 15 megawatts or more.

In 1986, oil-fired utility capability represented well over two-fifths of Connecticut's total generating capability and over a third of total net generation. In 1996, the oil share of capability fell to just over two-fifths while the net generation share fell to just over a quarter. The nonutility share of net generation climbed from under 1 percent of the total in 1986 to over 20 percent in 1996.

In 1986, utility nuclear net capability and generation were 45.1 percent and 57.6 percent, respectively. By 1996, nuclear shares had fallen to 37.7 percent and 30.8 percent, respectively. The steep decline in nuclear generation was the result of the permanent shutdown of the Connecticut Yankee Atomic Power Company's Haddam Neck plant and the shutdown of the Northeast Nuclear Energy Company's (NEC) Millstone plant in 1995. NEC has recently restarted Millstone 3 and is currently working on restarting Millstone 2. The company, however, has decided to permanently shut down its 660 MWe Millstone Unit 1. The company will proceed with decommissioning Unit 1 upon receiving regulatory approval.³ The cost of decommissioning the unit is expected to be \$640 million (1997 dollars).

Connecticut has been one of the leaders in the move toward a deregulated environment for electricity. In April 1998, legislation was signed by the governor. The law allows retail competition for generation suppliers for 35 percent of consumers by January 2000 and for all consumers by July 2000. Utilities will be required to sell non-nuclear generation assets by January 2000 and nuclear assets by January 2004, making Connecticut the first State to require divestiture of nuclear assets. The bill also provides for the creation of an independent system operator, public interest program funding, renewable energy funding, environmental protections, and a 20 percent rate reduction beginning in January 2000.³

¹ Glenn Weaver, *The Hartford Electric Light Company*, The Hartford Electric Light Company (Hartford, CT, 1969), p. 65.

² 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.

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

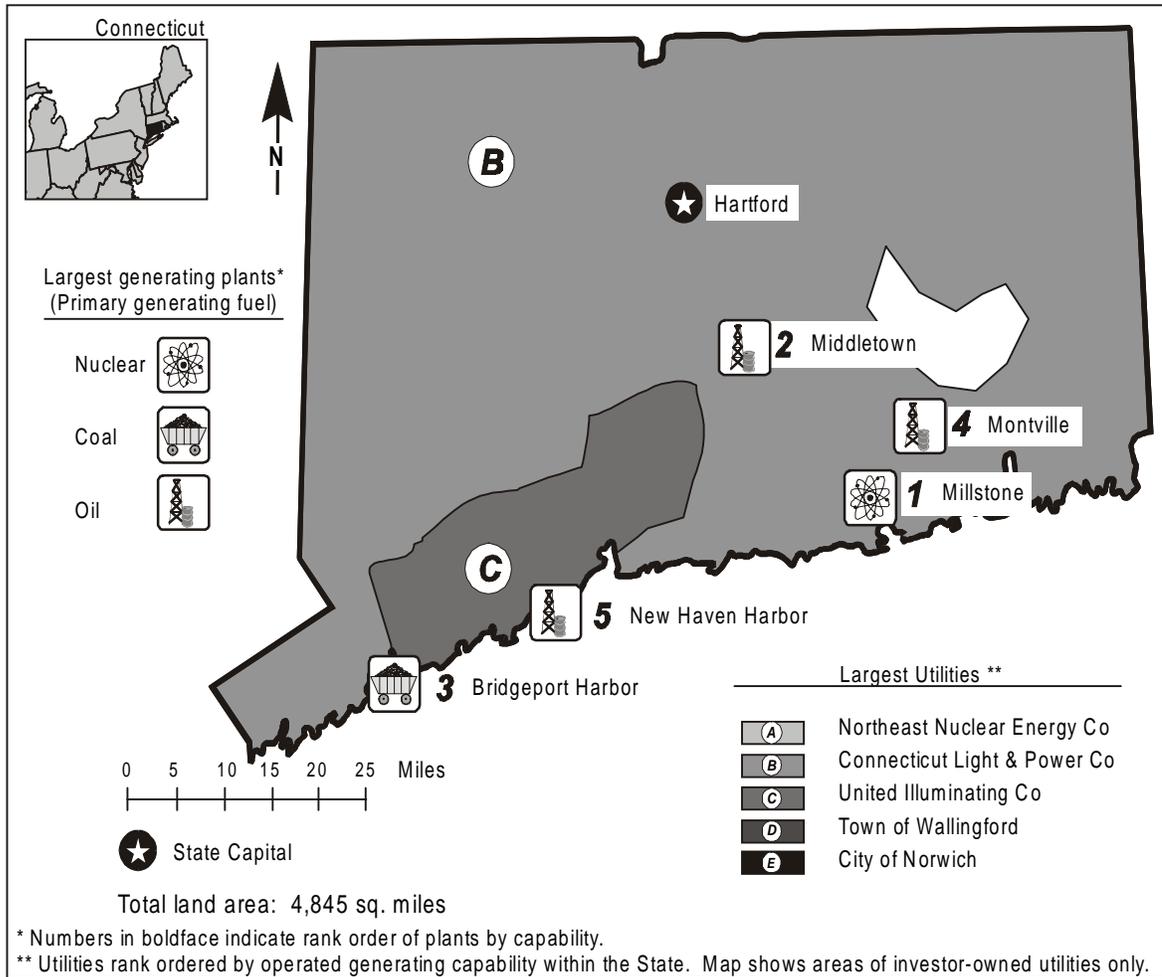


Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		NPCC	Utility		
Net Exporter or Importer		Exporter	Capability (MWe)	6,321	34
State Primary Generating Fuel		Nuclear	Generation (MWh)	15,773,738	41
Population (as of 7/96)	3,267,293	28	Average Age of Coal Plants	28 years	
Average Revenue (cents/kWh)	10.51	^a 48	Average Age of Oil-fired Plants	29 years	
Industry			Average Age of Gas-fired Plants	22 years	
Capability (MWe)	6,982	^b 31	Average Age of Nuclear Plants	17 years	
Generation (MWh)	20,211,086	^b 35	Average Age of		
Capability/person			Hydroelectric Plants	63 years	
(KWe/person)	2.14	^b 35	Average Age of Other Plants . . .	--	
Generation/person			Nonutility^c		
(MWh/person)	6.19	^b 42	Capability (MWe)	661	23
Sulfur Dioxide Emissions	37	39	Percentage Share of Capability	9.5	16
(Thousand Short Tons)			Generation (MWh)	4,437,348	18
Nitrogen Oxide Emissions	23	40	Percentage Share of		
(Thousand Short Tons)			Generation	22.0	9
Carbon Dioxide Emissions			-- = Not applicable.		
(Thousand Short Tons)	12,810	40			
Sulfur Dioxide/sq. mile (Tons)	7.54	18			
Nitrogen Oxides/sq. mile (Tons)	4.75	16			
Carbon Dioxide/sq. mile (Tons)	2,643.98	10			

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. Millstone	Nuclear	Northeast Nuclear Energy Co	2,631
2. Middletown	Oil	Connecticut Light & Power Co	837
3. Bridgeport Harbor	Coal/Oil	United Illuminating Co	654
4. Montville	Oil	Connecticut Light & Power Co	489
5. New Haven Harbor	Oil	United Illuminating Co	447

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. Northeast Nuclear Energy Co . . .	2,631	--	--	--	2,631	--
B. Connecticut Light & Power Co . . .	2,451	--	1,988	338	--	125
C. United Illuminating Co	1,174	385	789	--	--	--
D. Town of Wallingford	23	--	23	--	--	--
E. City of Norwich	18	--	15	--	--	3
Total	6,297	385	2,815	338	2,631	128
Percentage of Industry Capability	90.2	--	--	--	--	--

-- = Not applicable.

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

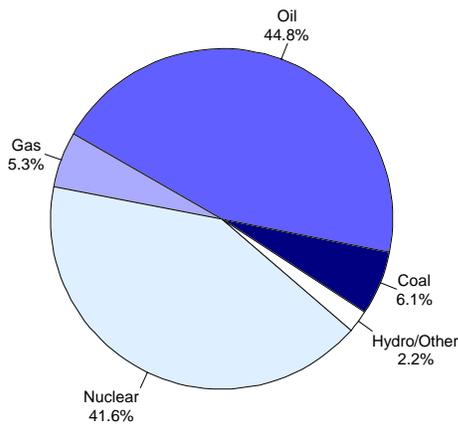


Figure 2. Utility Generation by Primary Energy Source, 1996

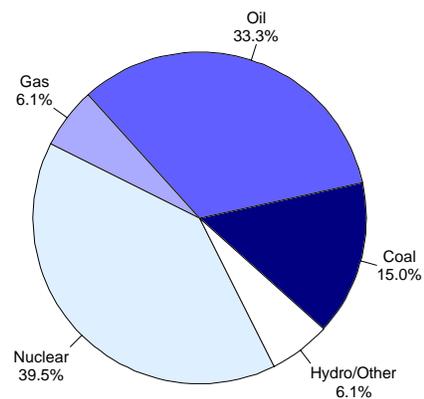


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

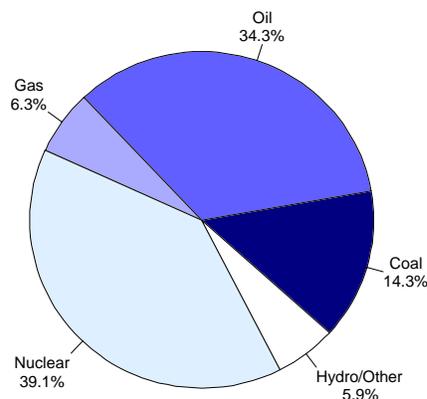


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	375	385	385	5.3	5.1	5.5
Oil	3,347	3,263	2,831	46.9	42.9	40.5
Gas	(s)	(s)	338	--	--	4.8
Nuclear	3,222	3,212	2,631	45.1	42.2	37.7
Hydro/Other	141	201	136	2.0	2.6	1.9
Total Utility	7,085	7,060	6,321	99.3	92.8	90.5
Total Nonutility Industry	53	549	661	0.7	7.2	9.5
	7,138	7,609	6,982	100.0	100.0	100.0

(s) = Nonzero value less than 0.05. -- = Not applicable.

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	1,985,418	2,117,781	2,367,889	6.1	7.8	11.7
Oil	11,103,042	7,890,483	5,255,050	34.2	29.2	26.0
Gas	65,007	467,997	958,819	0.2	1.7	4.7
Nuclear	18,667,143	12,242,911	6,225,233	57.6	45.3	30.8
Hydro/Other	367,061	832,910	966,747	1.1	3.1	4.8
Total Utility	32,187,671	23,552,082	15,773,738	99.3	87.2	78.0
Total Nonutility Industry	234,833	3,456,157	4,437,348	0.7	12.8	22.0
	32,422,504	27,008,239	20,211,086	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	0.020	0.022	0.024	5.3	7.5	10.5
Oil	0.116	0.082	0.058	30.5	27.9	25.1
Gas	0.001	0.005	0.011	0.2	1.6	4.6
Nuclear	0.202	0.131	0.066	53.1	44.4	28.6
Hydro/Other	0.004	0.009	0.010	1.0	2.9	4.3
Total Utility	0.342	0.250	0.169	90.1	84.4	73.0
Total Nonutility Industry	0.037	0.046	0.062	9.9	15.6	27.0
	0.379	0.296	0.231	100.0	100.0	100.0

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

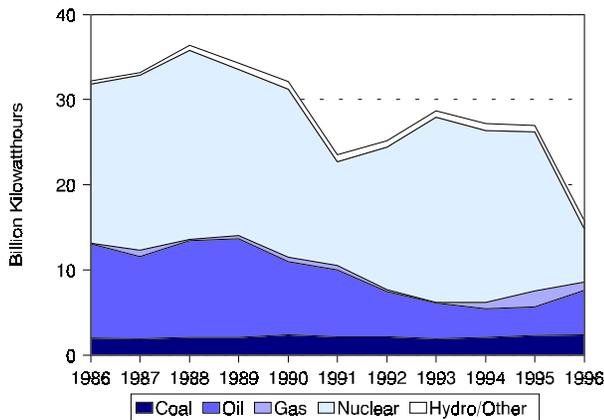


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

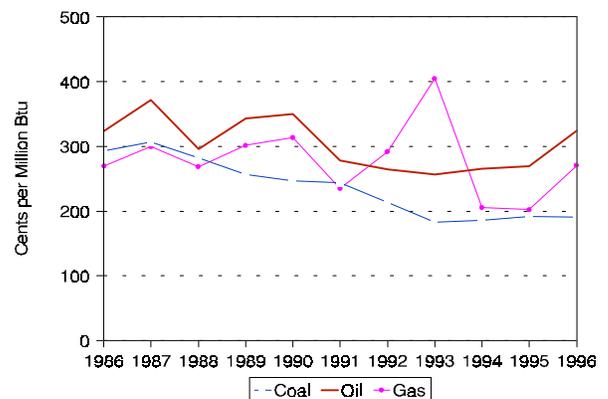


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Growth Rate 1986-1996 (Percent)
Coal	293.2	243.4	191.0	-4.2
Oil	323.8	278.1	324.1	(s)
Gas	269.7	235.0	270.7	(s)

(s) = Nonzero percentage 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	58	50	37	-4.5
Nitrogen Oxides ^d	20	28	23	1.3
Carbon Dioxide ^d	11,653	13,686	12,810	1.0

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

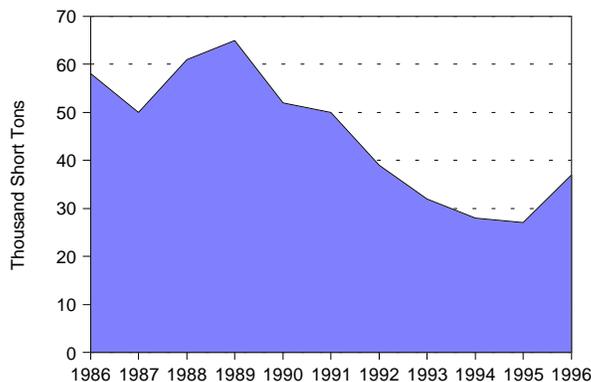


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

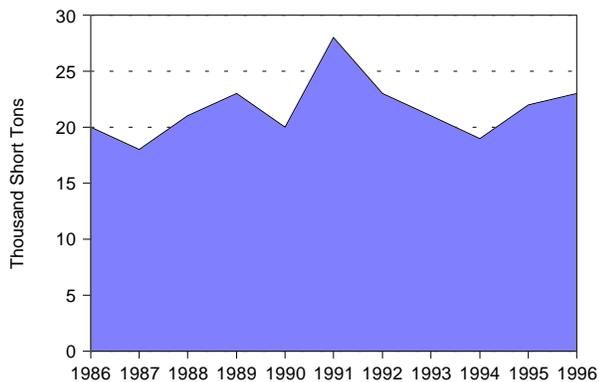


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

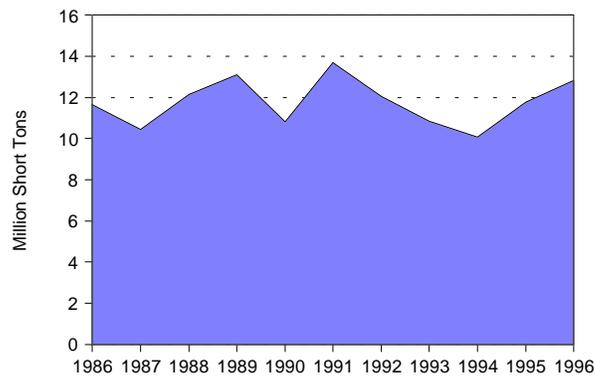


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential	9,080,279	10,440,510	10,942,903	1.9	37.0	38.4	38.5
Commercial	8,886,191	10,544,097	11,171,958	2.3	36.2	38.8	39.3
Industrial	6,178,081	5,822,464	5,928,241	-0.4	25.2	21.4	20.9
Other	381,084	364,334	373,843	-0.2	1.6	1.3	1.3
Total	24,525,637	27,171,405	28,416,945	1.5	100.0	100.0	100.0

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

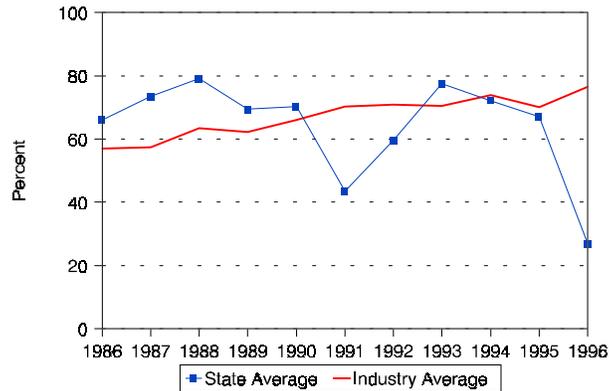


Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	5	6	--	--	11
Number of Retail Customers	1,281,877	59,063	--	--	1,340,940
Retail Sales (MWh)	23,152,716	1,372,921	--	--	24,525,637
Percentage of Retail Sales	94.4	5.6	--	--	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	2,525,996	126,289	--	--	2,652,286
Percentage of Revenue	95.2	4.8	--	--	100.0
1991					
Number of Utilities	5	6	--	--	11
Number of Retail Customers	1,377,818	62,910	--	--	1,440,728
Retail Sales (MWh)	25,625,915	1,545,490	--	--	27,171,405
Percentage of Retail Sales	94.3	5.7	--	--	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	2,789,614	142,866	--	--	2,932,480
Percentage of Revenue	95.1	4.9	--	--	100.0
1996					
Number of Utilities	3	7	--	--	10
Number of Retail Customers	1,409,794	68,373	--	--	1,478,167
Retail Sales (MWh)	26,597,120	1,819,825	--	--	28,416,945
Percentage of Retail Sales	93.6	6.4	--	--	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	2,850,933	136,489	--	--	2,987,422
Percentage of Revenue	95.4	4.6	--	--	100.0

-- = Not applicable.