

# Vermont

Vermont is the only State that has a plant among its five largest that is not a coal, gas, oil, nuclear, or hydroelectric plant. The J.C. McNeil plant, Vermont's third largest, is a wood-fired plant. Vermont had both the third smallest population and utility generating capability in 1996. Most of the utility electricity is generated at the Vermont Yankee nuclear plant, which is operated by the largest utility in the State, the Vermont Yankee Nuclear Power Corporation. In September 1998, the New England Electric System, the parent of the New England Power Company, the second largest utility in Vermont, sold the utility's generating assets to the U.S. Generating Company of Bethesda, Maryland. New England Power operated two of the five largest plants in Vermont in 1996: S.C. Moore and Bellows Falls. In addition to nuclear power, Vermont is also reliant on hydroelectric generation. There are no coal or gas utility units. The average price of electricity in Vermont, 9.74 cents per kilowatthour, was ninth most expensive in the Nation. Vermont is a net exporter of electricity.

Emissions of sulfur dioxide (SO<sub>2</sub>) from Vermont generators were the lowest in the Nation in 1996. Nitrogen oxide (NO<sub>x</sub>) and carbon dioxide (CO<sub>2</sub>) emissions both were second lowest in 1996. The concentrations of SO<sub>2</sub> and NO<sub>x</sub> per square mile were the lowest in the Nation and Vermont's CO<sub>2</sub> emissions concentration was sixth lowest. SO<sub>2</sub> emissions were less in 1996 than in 1986. Emissions of CO<sub>2</sub> and NO<sub>x</sub>, however, increased substantially over the eleven-year period examined in this report. Vermont is part of the Ozone Transport Commission (OTC).<sup>1</sup> Each of the 13 States of the OTC is responsible for enacting regulations in order to achieve region-wide NO<sub>x</sub> reductions in a consistent, enforceable manner and for allocating its NO<sub>x</sub> Budget Program

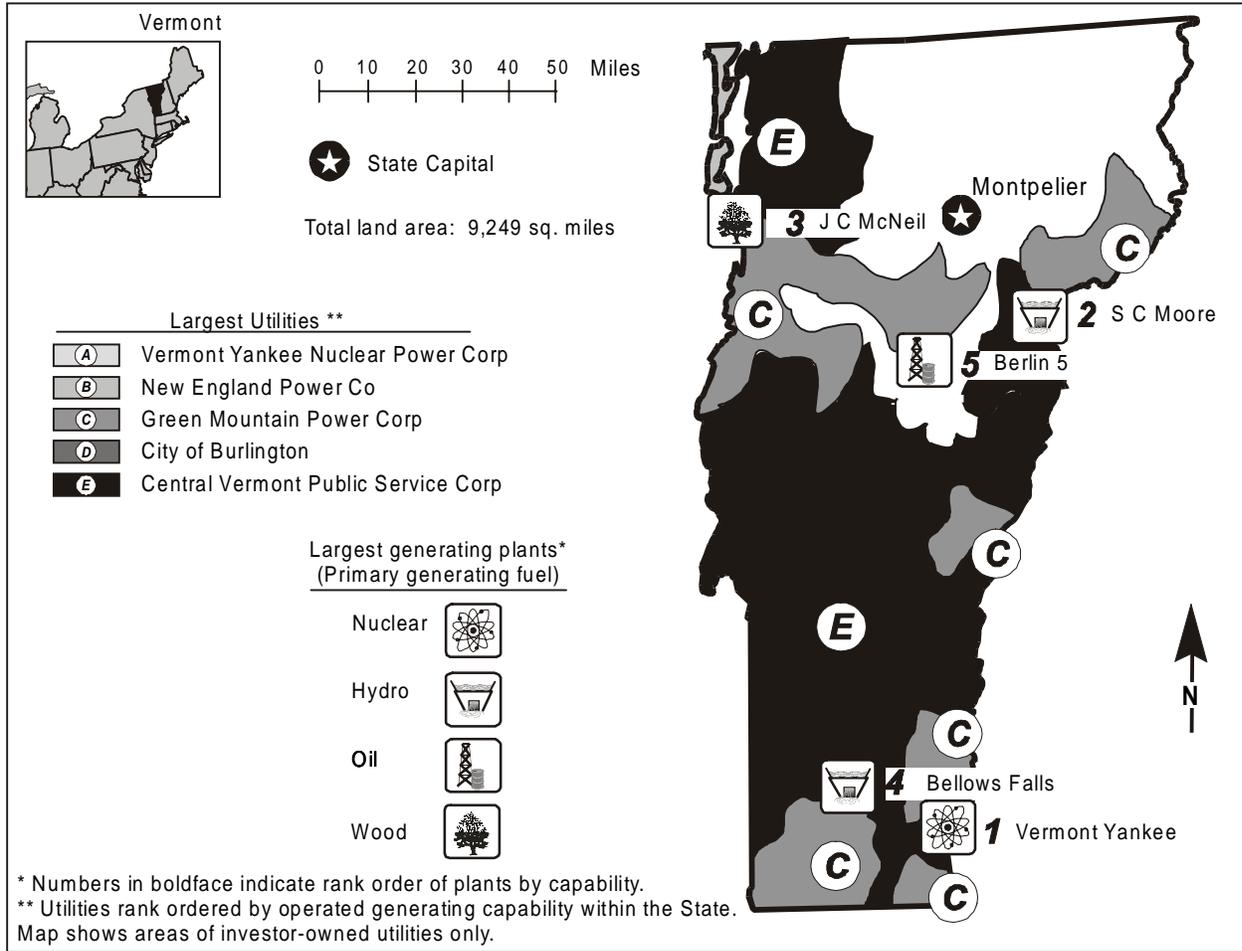
allowances among NO<sub>x</sub> sources in the State. The targets in this program are large industrial boilers and all electric generating facilities with a rated output of 15 megawatts or more. As of November 1998, Vermont had not issued its rulemaking for the NO<sub>x</sub> Budget Program.

In 1986, the nuclear share of utility capability in Vermont was 44.6 percent, and the net generation share was 65.4 percent. In 1996, the nuclear share of capability rose to 45.4 percent, while the net generation share rose to 75.9 percent. Oil capability and generation were 11.6 percent and 0.5 percent, respectively, in 1986. By 1996, the oil shares had fallen to 10.9 percent and 0.1 percent, respectively.

In December 1996, the Vermont Public Services Board (PSB) issued a final plan for restructuring the State's electric power industry and allowing retail competition. The PSB plan called for retail choice for all consumers by 1998. Large investor-owned utilities would have to separate the generation, distribution, and transmission functions. Stranded costs would be recoverable through a non-bypassable competition transition charge collected by the distribution companies through 2012. Cooperatives, municipals, and small investor-owned utilities would have to provide retail choice and could seek recovery of stranded costs, but would not have to functionally unbundle distribution from generation. All competitive power suppliers would have to maintain a quota of renewable energy. The plan would need legislation to enact its provisions. In April 1998, legislation was passed by the Vermont Senate, but the House did not act on it, citing the need for more study of the issues. Legislation is expected to be addressed again in the 1999 legislative session.<sup>2</sup>

<sup>1</sup>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.

<sup>2</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).



**Table 1. 1996 Summary Statistics**

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		NPCC	<b>Utility</b>		
Net Exporter or Importer		Exporter	Capability (MWe)	1,092	49
State Primary Generating Fuel		Nuclear	Generation (MWh)	5,004,219	48
Population (as of 7/96)	586,461	49	Average Age of Coal Plants	--	
Average Revenue (cents/kWh)	9.74	<sup>a</sup> 43	Average Age of Oil-fired Plants	28 years	
<b>Industry</b>			Average Age of Gas-fired Plants	--	
Capability (MWe)	1,165	<sup>b</sup> 43	Average Age of Nuclear Plants	24 years	
Generation (MWh)	5,387,318	<sup>b</sup> 44	Average Age of Hydroelectric Plants	53 years	
Capability/person (KWe/person)	1.99	<sup>b</sup> 39	Average Age of Other Plants	12 years	
Generation/person (MWh/person)	9.19	<sup>b</sup> 36	<b>Nonutility<sup>c</sup></b>		
Sulfur Dioxide Emissions (Thousand Short Tons)	(s)	51	Capability (MWe)	73	42
Nitrogen Oxide Emissions (Thousand Short Tons)	(s)	50	Percentage Share of Capability	6.3	24
Carbon Dioxide Emissions (Thousand Short Tons)	565	50	Generation (MWh)	383,099	41
Sulfur Dioxide/sq. mile (Tons)	0.01	51	Percentage Share of Generation	7.1	23
Nitrogen Oxides/sq. mile (Tons)	0.05	49			
Carbon Dioxide/sq. mile (Tons)	61.11	47			

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

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

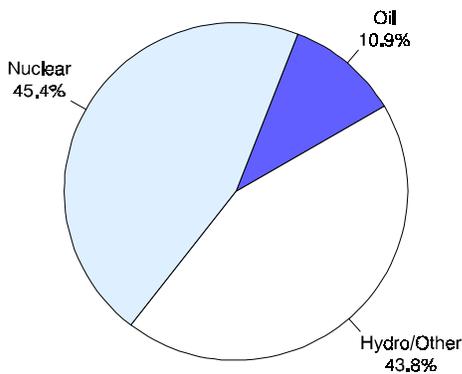
Plant Name	Type	Operating Utility	Net Capacity (MWe)
1. Vermont Yankee .....	Nuclear	Vermont Yankee Nuc Pwr Corp	496
2. S C Moore .....	Hydro	New England Power Co	192
3. J C McNeil .....	Other	City of Burlington	50
4. Bellows Falls .....	Hydro	New England Power Co	49
5. Berlin 5 .....	Oil	Green Mountain Power Corp	41

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

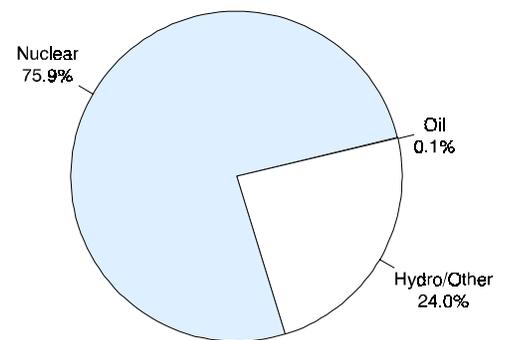
Utility	Net Summer Capability	Net Coal Capability	Net Oil Capability	Net Gas Capability	Net Nuclear Capability	Net Hydro/Other Capability
A. Vermont Yankee Nucl Pwr Corp	496	--	--	--	496	--
B. New England Power Co .....	310	--	--	--	--	310
C. Green Mountain Power Corp .....	94	--	61	--	--	32
D. City of Burlington .....	69	--	19	--	--	50
E. Central Vermont Pub Serv Corp	63	--	23	--	--	40
Total .....	1,032	--	103	--	496	432
Percentage of Industry Capability	88.6	--	--	--	--	--

-- = Not applicable.

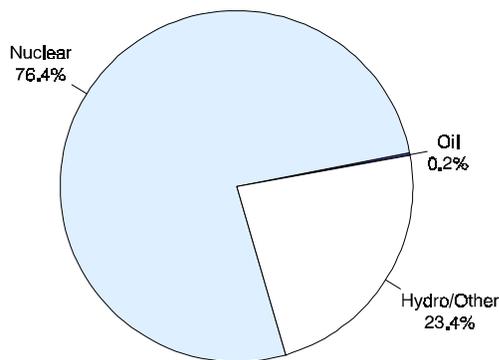
**Figure 1. Utility Generating Capability by Primary Energy Source, 1996**



**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	--	--	--	--	--	--
Oil	129	117	119	11.6	10.7	10.9
Gas	--	--	--	--	--	--
Nuclear	496	496	496	44.6	45.5	45.4
Hydro/Other	486	477	478	43.7	43.7	43.8
Total Utility	1,111	1,091	1,092	100.0	100.0	100.0
Total Nonutility	18	W	73	--	--	--

-- = Not applicable. W = Withheld.

**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	16,638	--	--	0.5	--	--
Oil	14,717	5,244	3,428	0.5	0.1	0.1
Gas	140	95,341	97	(s)	1.8	(s)
Nuclear	2,058,426	4,108,314	3,798,790	65.4	78.1	75.9
Hydro/Other	1,059,091	1,049,930	1,201,904	33.6	20.0	24.0
Total Utility	3,149,012	5,258,829	5,004,219	100.0	100.0	100.0
Total Nonutility	83,369	W	383,099	--	--	--

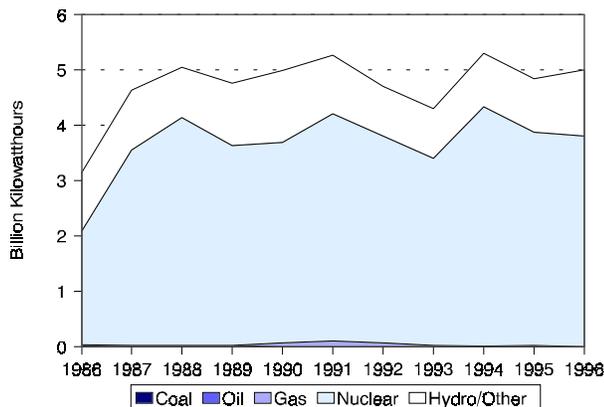
-- = Not applicable. (s) = Nonzero percentage less than 0.05. W = Withheld.

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

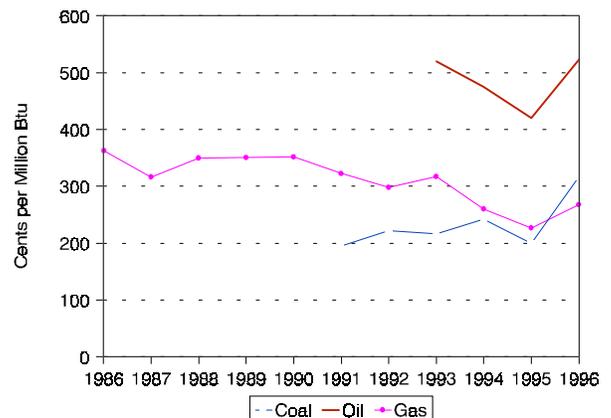
Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	(s)	--	--	0.8	--	--
Oil	(s)	(s)	(s)	0.8	0.2	0.2
Gas	(s)	0.001	(s)	--	1.9	--
Nuclear	0.022	0.044	0.040	65.7	78.6	76.4
Hydro/Other	0.011	0.011	0.012	32.7	19.4	23.4
Total Utility	0.034	0.056	0.053	100.0	100.0	100.0
Total Nonutility	(s)	W	0.003	--	--	--

-- = Not applicable. (s) = Nonzero value less than 0.0005. W = Withheld.

**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 . . . . .	--	--	--	--
Oil . . . . .	--	--	523.8	--
Gas . . . . .	--	195.6	317.5	--

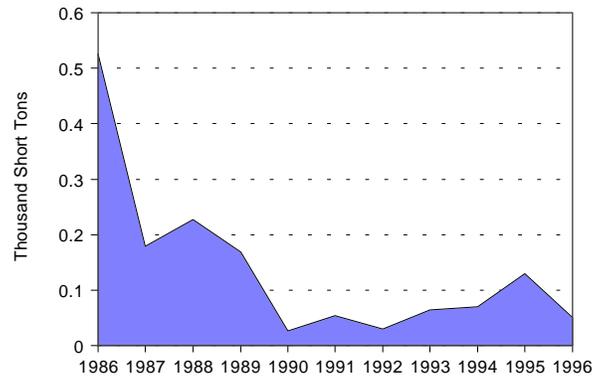
-- = Not applicable.

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

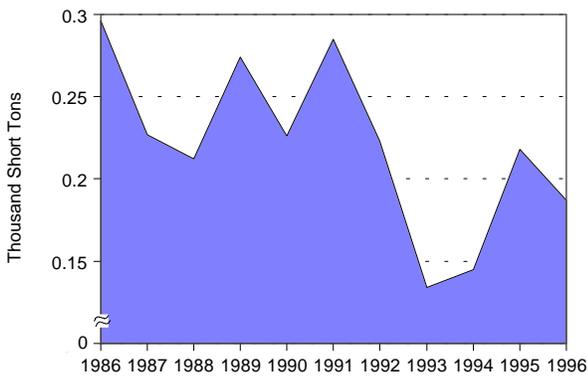
Emission Type	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Sulfur Dioxide . . . .	1	(s)	(s)	-19.8
Nitrogen Oxides <sup>d</sup> . .	(s)	(s)	(s)	3.8
Carbon Dioxide <sup>d</sup> . .	217	294	565	10.0

(s) = Nonzero value less than 0.05

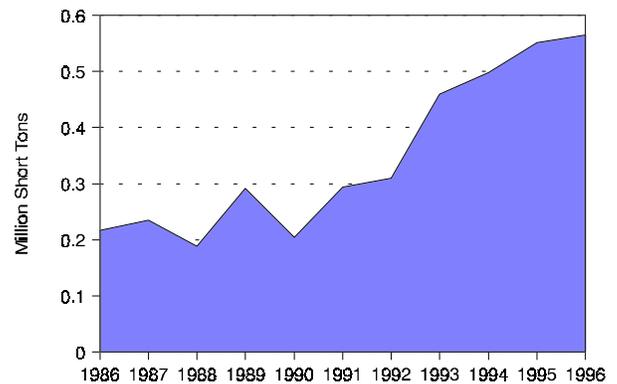
**Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996**



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



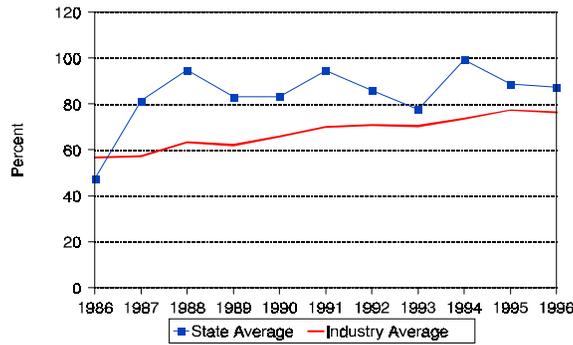
**Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996**



**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 . .	1,156,107	1,783,451	2,006,213	5.7	31.0	37.9	38.3
Commercial	851,538	1,491,488	1,648,630	6.8	22.8	31.7	31.5
Industrial . . .	1,575,736	1,389,670	1,537,130	-0.2	42.3	29.5	29.3
Other . . . . .	143,874	39,848	47,519	-10.5	3.9	0.8	0.9
Total . . . . .	3,727,253	4,704,457	5,239,492	3.5	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	8	15	--	2	25
Number of Retail Customers	206,854	42,576	--	17,747	267,177
Retail Sales (MWh)	2,979,099	586,703	--	161,451	3,727,253
Percentage of Retail Sales	79.9	15.7	--	4.3	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	311,735	60,602	--	20,659	392,996
Percentage of Revenue	79.3	15.4	--	5.3	100.0
<b>1991</b>					
Number of Utilities	7	15	--	2	24
Number of Retail Customers	229,327	46,786	--	21,207	297,320
Retail Sales (MWh)	3,838,501	690,341	--	175,615	4,704,457
Percentage of Retail Sales	81.6	14.7	--	3.7	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	366,440	69,462	--	20,298	456,200
Percentage of Revenue	80.3	15.2	--	4.5	100.0
<b>1996</b>					
Number of Utilities	6	15	--	2	23
Number of Retail Customers	242,578	48,918	--	23,316	314,812
Retail Sales (MWh)	4,336,205	713,301	--	189,986	5,239,492
Percentage of Retail Sales	82.8	13.6	--	3.6	100.0
Revenue from Retail Sales (thousand 1996 \$) <sup>e</sup>	417,777	70,202	--	22,539	510,518
Percentage of Revenue	81.8	13.8	--	4.4	100.0

-- = Not applicable.