

California

The first central generating station for the distribution of electricity to customers began operation in San Francisco. The California Electric Light Company, which was incorporated on June 30, 1879, was the first electric utility for public service.¹ In 1996, California had the largest population and the second largest utility generating capability. Historically, California has been reliant on hydropower. Since pioneer days, California has turned to water because of the lower cost of operation on streams of the Sierra.² The State had the largest non-utility capability in the Nation in 1996 and ranked sixth in percentage share of nonutility capability. Most of the utility electricity is generated today at hydroelectric plants although none of the five largest plants in the State is a hydroelectric plant.

California is also reliant on nuclear power. San Onofre, operated by Southern California Edison, the largest utility in the State, and Diablo Canyon, operated by Pacific Gas and Electric, are the two largest plants in California and the only nuclear plants in the State. There is no utility coal-fired capability or generation in California. Coal-fired plants are historically the most heavily polluting plants and California has many of the toughest environmental regulations in the Nation. The average price of electricity, 9.48 cents per kilowatt-hour, was tenth most expensive in the Nation. There are discrepancies between prices in Northern and Southern California, however. The average price of electricity for all consumers in the City of Los Angeles was 9.07 cents per kilowatt-hour in 1997, while in San Francisco the average price for all sectors was 5.34 cents per kilowatt-hour. This difference is at least partly attributable to the fact that Northern California utilities import cheaper

power from the Northwest while companies in Southern California do not.

California has been on the forefront of the move toward a deregulated environment for electricity. In September 1996, legislation was enacted to restructure the State's electric power industry. The law included provisions for the creation of an independent system operator and a competitive transition charge for recovery of stranded costs from 1998 through 2002. A 10-percent rate reduction was included, as was the continuance of energy efficiency programs financed with rate surcharges. In April 1998, the Public Utility Commission issued a final order that opened the electricity market to competition as of March 31, 1998. In June 1998, a coalition of consumer advocates challenged the restructuring law. The coalition succeeded in placing an initiative, Proposition 9, on the November 1998 ballot that would have shifted the burden of stranded costs to shareholders and given consumers a 20-percent rate reduction.³ Proposition 9 was defeated in the 1998 general election, however.

Nationally, California's electricity generators emitted the forty-first highest level of sulfur dioxide (SO₂), the twenty-second highest of nitrogen oxides (NO_x), and the seventeenth highest amount of carbon dioxide (CO₂). Its concentrations for the three pollutants per square mile, however were seventh, tenth, and fourteenth lowest, respectively. California's emissions of SO₂ from electricity generators increased over three-fold from 1986 to 1991. Both its emissions of NO_x and CO₂ increased from 1986 to 1991; however, CO₂ declined in 1996, although not nearly to 1986 levels.

¹ Charles M. Coleman, *The Centennial Story of Pacific Gas and Electric Company*, Pacific Gas and Electric of California (San Francisco, 1952), p. 5.

² *Ibid.*, p. 333.

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

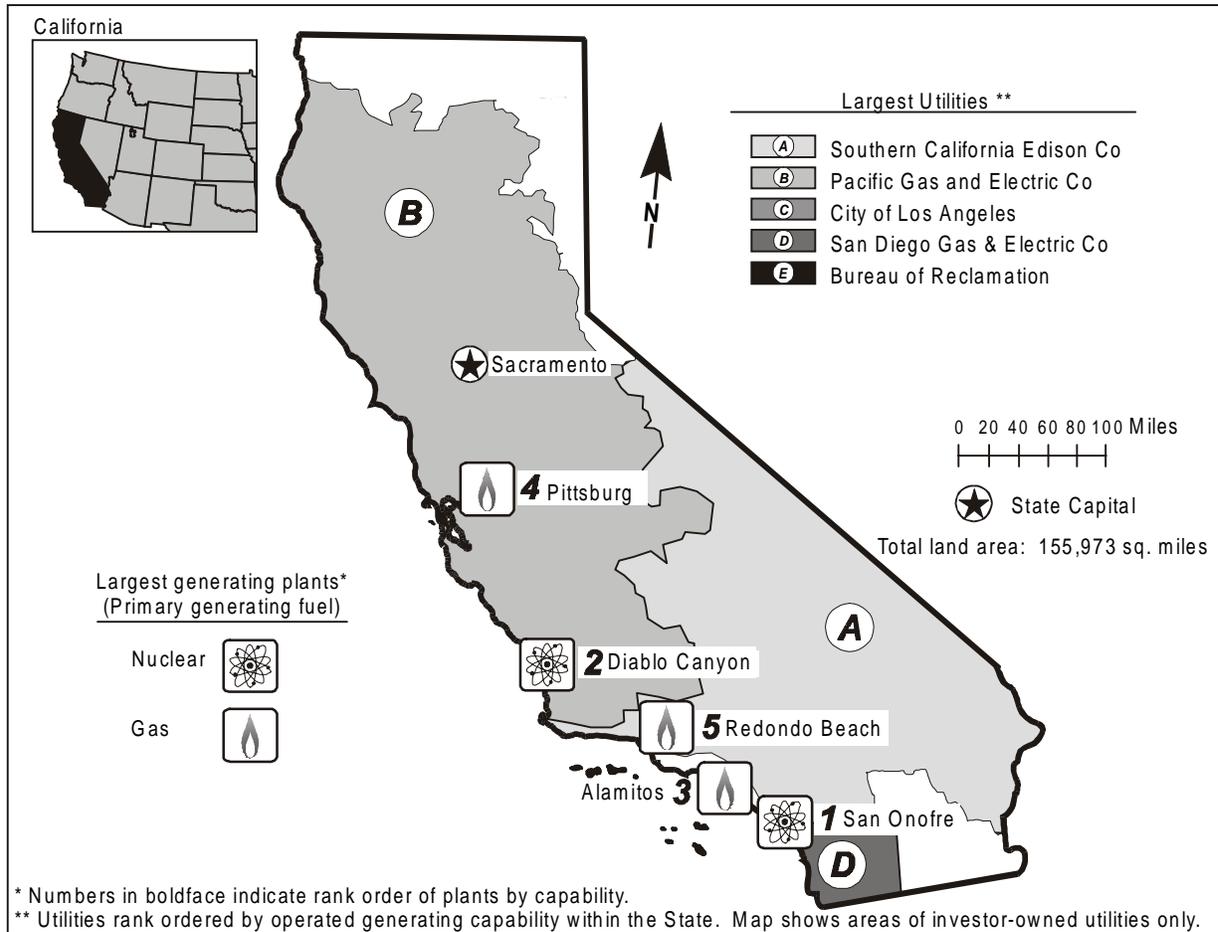


Table 1. 1996 Summary Statistics

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		WSCC	Utility		
Net Exporter or Importer		Importer	Capability (MWe)	43,934	2
State Primary Generating Fuel		Hydro	Generation (MWh)	114,706,047	7
Population (as of 7/96)	31,857,646	1	Average Age of Coal Plants	--	
Average Revenue (cents/kWh)	9.48	^a 42	Average Age of Oil-fired Plants	30 years	
Industry			Average Age of Gas-fired Plants	30 years	
Capability (MWe)	54,156	^b 2	Average Age of Nuclear Plants	13 years	
Generation (MWh)	176,961,921	^b 3	Average Age of Hydroelectric Plants	32 years	
Capability/person			Average Age of Other Plants	16 years	
(KWe/person)	1.70	^b 43	Nonutility^c		
Generation/person			Capability (MWe)	10,222	1
(MWh/person)	5.56	^b 43	Percentage Share		
Sulfur Dioxide Emissions			of Capability	18.9	6
(Thousand Short Tons)	32	41	Generation (MWh)	62,255,874	1
Nitrogen Oxide Emissions			Percentage Share of Generation	35.2	5
(Thousand Short Tons)	148	21			
Carbon Dioxide Emissions			-- = Not applicable.		
(Thousand Short Tons)	59,189	17			
Sulfur Dioxide/sq. mile (Tons)	0.20	45			
Nitrogen Oxides/sq. mile (Tons)	0.95	42			
Carbon Dioxide/sq. mile (Tons)	379.48	38			

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. San Onofre	Nuclear	Southern California Edison	2,586
2. Diablo Canyon	Nuclear	Pacific Gas and Electric	2,160
3. Alamos	Gas	Southern California Edison	2,083
4. Pittsburg	Gas/Oil	Pacific Gas and Electric	2,022
5. Redondo Beach	Gas	Southern California Edison	1,602

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. Southern California Edison Co . .	14,046	--	149	10,155	2,586	1,157
B. Pacific Gas and Electric Co	13,603	--	1,069	5,237	2,160	5,137
C. City of Los Angeles	5,062	--	--	3,298	--	1,764
D. San Diego Gas & Electric Co	2,203	--	284	1,919	--	--
E. Bureau of Reclamation	1,972	--	--	--	--	1,972
Total	36,886	--	1,502	20,609	4,746	10,030
Percentage of Industry Capability	68.1	--	--	--	--	--

-- = Not applicable.

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

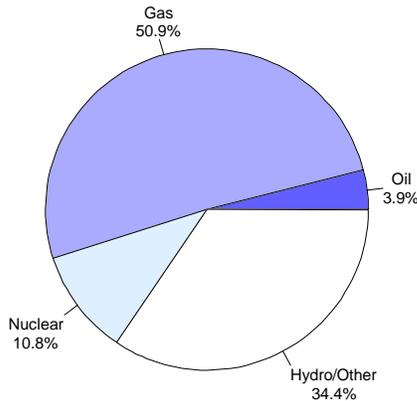


Figure 2. Utility Generation by Primary Energy Source, 1996

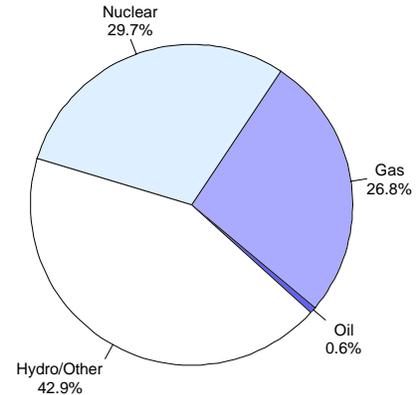


Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996

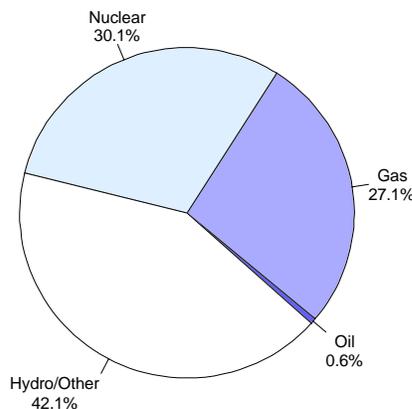


Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	--	--	--	--	--	--
Oil	3,216	2,874	1,692	6.7	5.4	3.1
Gas	21,716	21,673	22,365	45.1	41.1	41.3
Nuclear	5,611	4,746	4,746	11.7	9.0	8.8
Hydro/Other	13,733	14,305	15,132	28.5	27.1	27.9
Total Utility	44,276	43,599	43,934	92.0	82.6	81.1
Total Nonutility	3,870	9,189	10,222	8.0	17.4	18.9
Industry	48,146	52,788	54,156	100.0	100.0	100.0

-- = 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	--	--	--	--	--	--
Oil	2,976,097	598,489	674,899	2.1	0.4	0.4
Gas	41,049,503	43,940,427	30,768,135	29.1	28.0	17.4
Nuclear	26,215,288	31,541,799	34,096,860	18.6	20.1	19.3
Hydro/Other	51,624,435	28,887,223	49,166,153	36.6	18.4	27.8
Total Utility	121,865,323	104,967,938	114,706,047	86.5	66.9	64.8
Total Nonutility	19,076,615	51,950,241	62,255,874	13.5	33.1	35.2
Industry	140,941,938	156,918,179	176,961,921	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	--	--	--	--	--	--
Oil	0.035	0.006	0.007	1.9	0.4	0.4
Gas	0.464	0.462	0.326	24.7	28.0	17.6
Nuclear	0.283	0.339	0.362	15.1	20.5	19.5
Hydro/Other	0.539	0.299	0.506	28.7	18.1	27.3
Total Utility	1.321	1.106	1.202	70.4	67.0	64.7
Total Nonutility	0.556	0.544	0.656	29.6	33.0	35.3
Industry	1.877	1.650	1.858	100.0	100.0	100.0

-- = Not applicable.

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

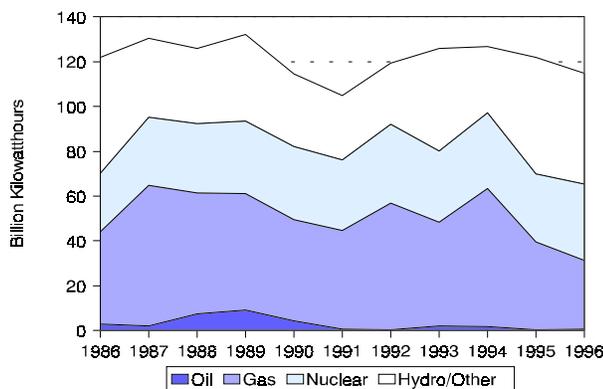


Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996
(1996 Dollars)

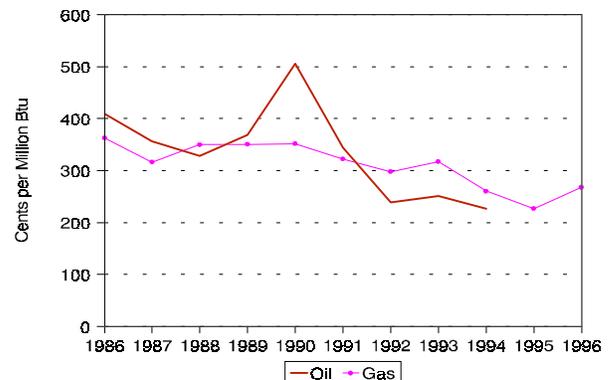


Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	--	--	--	--
Oil	408.7	344.2	--	--
Gas	362.8	322.5	267.9	-3.0

-- = 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	7	24	32	24.0
Nitrogen Oxides ^d . .	66	132	148	8.0
Carbon Dioxide ^d . .	29,324	62,299	59,189	7.4

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

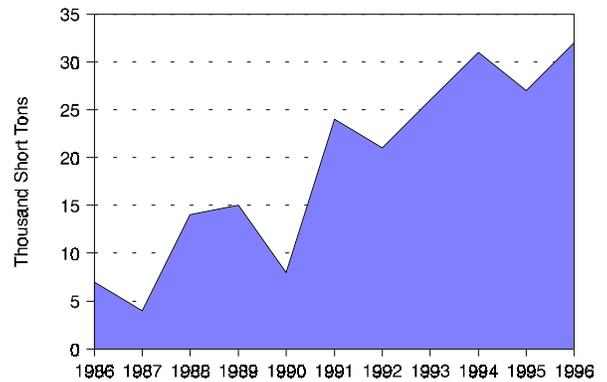


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

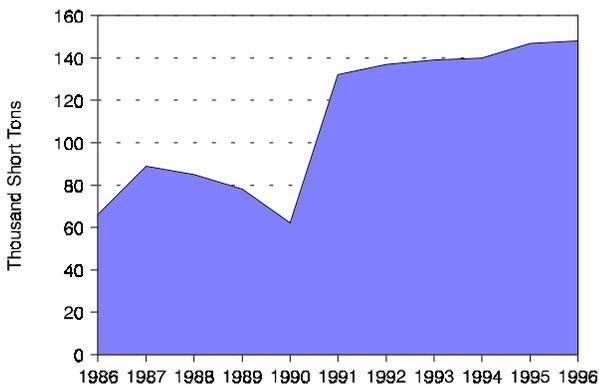


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

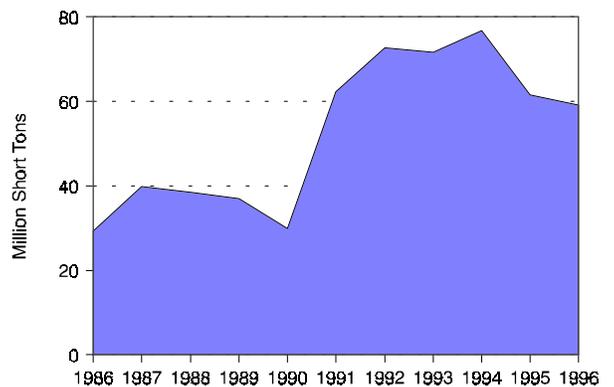


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential	57,542,286	66,016,700	71,396,104	2.2	31.0	31.6	32.7
Commercial	63,082,512	78,424,653	83,391,860	2.8	34.0	37.6	38.2
Industrial	52,884,177	56,191,047	57,682,712	0.9	28.5	26.9	26.4
Other	11,910,157	8,018,089	5,641,809	-7.2	6.4	3.8	2.6
Total	185,419,127	208,650,489	218,112,485	1.6	100.0	100.0	100.0

Figure 9. Nuclear Power Capacity Factor Comparison, 1985-1996

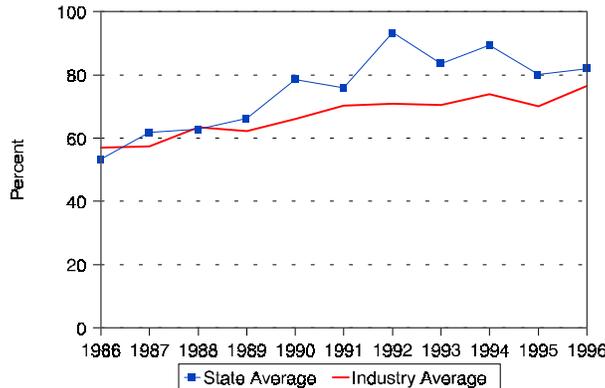


Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	7	33	3	5	48
Number of Retail Customers	8,369,579	2,419,356	255	10,393	10,799,583
Retail Sales (MWh)	134,251,192	44,647,973	6,365,747	154,215	185,419,127
Percentage of Retail Sales	72.4	24.1	3.4	0.1	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	14,809,664	3,796,442	82,778	13,802	18,726,775
Percentage of Revenue	79.1	20.3	0.6	0.1	100.0
1991					
Number of Utilities	6	34	1	4	45
Number of Retail Customers	9,485,519	2,707,466	94	11,923	12,205,002
Retail Sales (MWh)	155,088,784	49,314,953	4,051,493	195,259	208,650,489
Percentage of Retail Sales	74.3	23.6	1.9	0.1	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	17,600,705	4,399,602	72,994	16,776	22,099,128
Percentage of Revenue	79.6	19.9	0.4	0.1	100.0
1996					
Number of Utilities	6	34	1	4	45
Number of Retail Customers	9,901,823	2,756,678	61	12,969	12,671,531
Retail Sales (MWh)	164,507,081	51,539,469	1,830,983	234,952	218,112,485
Percentage of Retail Sales	75.4	23.6	0.8	0.1	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	16,264,353	4,342,303	42,976	18,677	20,668,309
Percentage of Revenue	78.7	21.0	0.2	0.1	100.0