

Pennsylvania Electricity Update



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The Independent Fiscal Office (IFO) publishes this research brief to provide a general overview of the Pennsylvania electricity market. According to data from the U.S. Energy Information Administration (EIA), Pennsylvania is the top exporter of electricity in the country by a significant margin.

Table 1 - Electricity Exports by State (2020)

State	Net Generation				Total	Total Consumption	Net Exports
	Nat. Gas	Coal	Nuclear	Other			
Pennsylvania	120.3	23.8	76.5	10.3	231.0	151.8	79.1
West Virginia	50.2	2.8	--	3.8	56.8	34.0	22.8
Connecticut	23.5	0.0	15.7	2.0	41.2	29.5	11.6
New Jersey	30.7	0.9	26.7	3.1	61.5	77.1	-15.6
North Carolina	41.7	20.8	42.3	19.1	124.0	139.7	-15.8
New York	53.0	0.1	38.5	40.4	132.0	148.8	-16.8
Virginia	62.1	3.8	30.1	6.3	102.3	124.8	-22.5
Maryland	14.0	3.4	15.1	3.6	36.1	62.0	-25.9
Ohio	52.6	45.0	18.2	5.3	121.1	149.2	-28.1
Massachusetts	14.0	--	--	4.4	18.4	53.0	-34.6

Note: Amounts in millions of megawatt hours. Total consumption includes 2019 amounts for direct use and line losses, which are not yet available for 2020.

Source: U.S. Energy Information Administration.

Table 1 shows net electricity generation by fuel source, total electricity consumption and net exports for Pennsylvania and other regional states. Net generation is broken down into electricity generated from natural gas, coal, nuclear and other sources. Other sources include hydroelectric, wind, solar and other renewable sources. Total consumption is the sum of (1) retail sales of electricity to all sectors (residential, commercial, industrial, transportation) within the state, (2) direct use electricity and (3) estimated line losses. Net exports are equal to net generation less total consumption.¹

For 2020, Pennsylvania exported more megawatts of electricity than any other state. The state's net exports were 46.3% higher than Alabama (not shown), the second-largest exporter of electricity. Among regional states, Pennsylvania is the largest producer and net exporter of electricity. Nearly all other states shown in Table 1 (except West Virginia and Connecticut) are net importers of electricity. Pennsylvania exported 34.1% of the electricity it generated in 2020, behind only West Virginia (40.1%) among regional states.

Table 2 (next page) shows recent trends in average electricity prices for residential customers in Pennsylvania and regional states. The table shows the average price in 2016, the average price in 2021 (through June), and the ratio of other states' prices to the Pennsylvania price. The residential price in Pennsylvania declined by 4.6% from 2016 to 2021. That trend is due to increasing natural gas production that provided a relatively low-cost input for electricity generators in the state. Moreover, the share of total electricity generation from Pennsylvania plants that use natural gas increased from 28% to 52% during that period. For the New England states, New York and New Jersey, prices were higher than Pennsylvania

¹ This computation generally follows the EIA methodology used to compute net interstate trade.

Table 2 - Residential Electricity Price

State	2016	2021	2016 Ratio	2021 Ratio
Connecticut	20.01	22.21	1.44	1.68
Massachusetts	19.00	22.09	1.37	1.67
New York	17.58	18.83	1.27	1.42
New Jersey	15.72	16.10	1.13	1.21
Pennsylvania	13.86	13.26	--	--
Maryland	14.23	12.62	1.03	0.95
Ohio	12.47	12.38	0.90	0.93
West Virginia	11.44	12.00	0.83	0.91
Virginia	11.36	11.98	0.82	0.90
North Carolina	11.03	11.37	0.80	0.86

Note: Cents per kilowatt hour. Prices for 2021 are through June.
Source: U.S. Energy Information Administration.

in 2016, and the differential widened through 2021. The average residential price in states located south or west of Pennsylvania were lower in 2016 (i.e., the price ratio was below 1.0), and the relative price differential narrowed over time. Maryland is the sole exception to these trends.

Table 3 uses net generation and carbon dioxide emissions from electricity generators to calculate carbon emissions per kilowatt hour for the same states for 2010 and 2019

(latest data available, new data to be released December 2021). During that period, Pennsylvania generation did not change, but carbon emissions declined by 37.0%. All states except Connecticut, New Jersey, Massachusetts and West Virginia recorded a per-unit emissions reduction of one-third or more. For 2019, the data show that carbon emissions per unit was lowest in northern states such as New York and Connecticut. Pennsylvania's emission rate was comparable to Virginia, Maryland and North Carolina.

Table 3 - Electricity Generation Carbon Dioxide Emissions

State	Generation		Emissions		Emissions per Unit	
	2010	2019	2010	2019	2010	2019
New York	137.0	131.6	41.6	24.8	0.30	0.19
Connecticut	33.4	40.1	9.2	9.5	0.28	0.24
New Jersey	65.7	71.0	19.2	18.9	0.29	0.27
Virginia	73.0	96.8	39.7	30.0	0.54	0.31
Maryland	43.6	39.3	26.4	13.1	0.60	0.33
Pennsylvania	229.8	229.0	122.8	77.4	0.53	0.34
North Carolina	128.7	131.2	73.2	47.4	0.57	0.36
Massachusetts	42.8	21.5	20.3	8.5	0.47	0.40
Ohio	143.6	120.0	122.0	68.1	0.85	0.57
West Virginia	80.8	63.9	74.3	56.8	0.92	0.89

Note: Generation in million megawatt hours. Emissions in million metric tons.
Source: U.S. Energy Information Administration.

Staff Acknowledgments

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