

# ENVIRONMENTAL PERFORMANCE METRICS

## 2018 Electricity Generated and Generation Capacity<sup>1</sup>

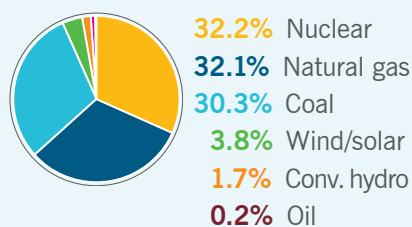
	Electricity Generated (net megawatt-hours)		Generation Capacity (megawatts)	
	MWh (thousands)	Percent	MW	Percent
<b>Total Carbon-Free</b>	<b>84,596</b>	<b>37.7%</b>	<b>13,515</b>	<b>25.1%</b>
Nuclear	72,262	32.2%	8,854	16.4%
Wind	6,782	3.0%	2,312	4.3%
Conventional hydro	3,774	1.7%	1,364	2.5%
Solar	1,778	0.8%	985	1.8%
<b>Total Lower-Carbon</b>	<b>72,048</b>	<b>32.1%</b>	<b>19,903</b>	<b>37.0%</b>
Natural gas	72,048	32.1%	7,780	14.4%
Natural gas/oil <sup>2</sup>			12,123	22.5%
<b>Total Higher-Carbon</b>	<b>68,457</b>	<b>30.5%</b>	<b>18,276</b>	<b>33.9%</b>
Coal	67,964	30.3%	16,998	31.6%
Oil	493	0.2%	1,278	2.4%
Pumped-storage hydro <sup>3</sup>	(492)	(0.2)%	2,150	4.0%
<b>Total</b>	<b>224,609</b>	<b>100.0%</b>	<b>53,844</b>	<b>100.00%</b>
<b>Purchased Renewables</b> (Solar, Wind, Hydro, Biomass)	<b>8,519</b>	<b>Equivalent to 3.8%</b>	<b>3,872</b>	<b>Equivalent to 7.2%</b>

- All data, except for purchased renewables, based on Duke Energy's ownership share of generating plants as of December 31, 2018. Totals may not add up exactly because of rounding.
- Uses nearly all natural gas. Oil can be used as a backup fuel.
- Pumped-storage hydro helps meet peak demand and, like other storage technologies, consumes more energy than it produces.

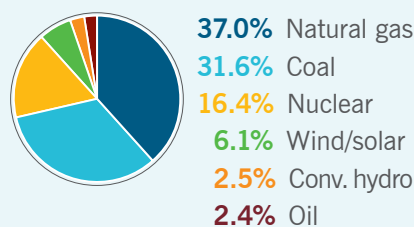
## 2018 electricity generated and generation capacity

Duke Energy has a diverse, increasingly clean generation portfolio. Almost 38 percent of the electricity we generated in 2018 was from carbon-free (nearly zero carbon emissions) sources, including nuclear, wind, hydro and solar. Over 32 percent was from lower-carbon natural gas, which emits about half as much carbon dioxide as coal when used for electric generation. About 30 percent was from higher-carbon coal and oil. Taken together, owned and purchased renewables are equivalent to over 9 percent of our generation. Duke Energy Renewables sells the electricity and/or Renewable Energy Certificates (RECs) it generates to its customers.

### 2018 Electricity Generated<sup>1</sup>



### 2018 Generation Capacity<sup>1</sup>



- Excludes pumped-storage hydro.

## Fuels Consumed For Electric Generation<sup>1</sup>

	2008	2016	2017	2018
Coal (million tons)	63.1	31.7	31.1	29.3
Oil (million gallons)	230.6	29.5	30.1	64.9
Natural gas (billion cubic feet)	163.4	545.2	496.6	610.3

- All data based on Duke Energy's ownership share of generating assets as of the end of each calendar year.

## Fuels consumed for electric generation

Since 2008, the use of coal and oil as generation fuels has significantly decreased. These fuels are being replaced by natural gas and renewables.

# ENVIRONMENTAL PERFORMANCE METRICS

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## Water Withdrawn and Consumed for Electric Generation

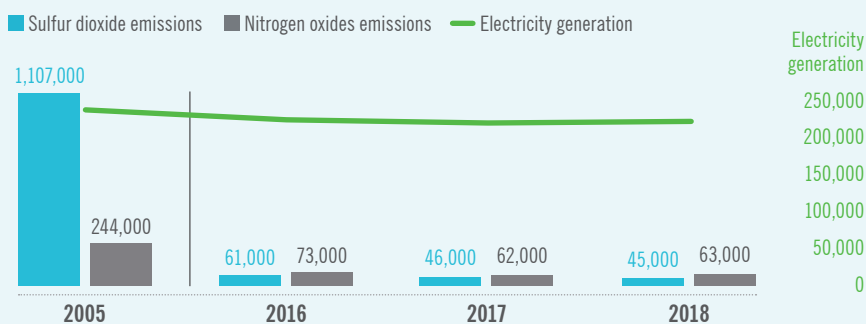
(billion gallons)

	2011	2016	2017	2018
<b>Withdrawn</b>	5,900	5,341	5,293	<b>4,991</b>
<b>Consumed</b>	105	74	71	<b>84</b>
<b>Consumption intensity</b> (gallons per MWh generated)	456	337	324	<b>374</b>

## Emissions From Electric Generation<sup>1</sup>

	2005	2016	2017	2018
<b>CO<sub>2</sub> emissions</b> (thousand tons)	153,000	108,000	105,000	<b>105,000</b>
<b>CO<sub>2</sub> emissions intensity</b> (pounds per net kWh)	1.29	0.97	0.96	<b>0.94</b>
<b>SO<sub>2</sub> emissions</b> (tons)	1,107,000	61,000	46,000	<b>45,000</b>
<b>SO<sub>2</sub> emissions intensity</b> (pounds per net MWh)	9.3	0.6	0.4	<b>0.4</b>
<b>NO<sub>x</sub> emissions</b> (tons)	244,000	73,000	62,000	<b>63,000</b>
<b>NO<sub>x</sub> emissions intensity</b> (pounds per net MWh)	2.1	0.7	0.6	<b>0.6</b>
<b>CH<sub>4</sub> emissions</b> (CO <sub>2</sub> equivalent) (thousand tons)	420	236	230	<b>218</b>
<b>N<sub>2</sub>O emissions</b> (CO <sub>2</sub> equivalent) (thousand tons)	731	402	391	<b>369</b>

## Sulfur Dioxide and Nitrogen Oxides Emissions (tons)<sup>2</sup> and Electricity Generation (thousand net megawatt-hours)



## Methane Emissions from Pipeline Operations

(thousand tons)<sup>3</sup>

	2015	2016	2017	2018
<b>CH<sub>4</sub> emissions</b> (CO <sub>2</sub> equivalent)	184	184	248	<b>264</b>

1 All data based on Duke Energy's ownership share of generating assets as of December 31, 2018. Totals may not add up exactly due to rounding.

2 SO<sub>2</sub> and NO<sub>x</sub> reported from Duke Energy's electric generation based on ownership share of generating assets.

3 Piedmont Natural Gas is included beginning in 2017.

## Water withdrawn and consumed for electric generation

*Water withdrawn* is the total volume removed from a water source, such as a lake or a river. Because of the once-through cooling systems on many of our coal-fired and nuclear plants, over 98 percent of this water is returned to the source and available for other uses. *Water consumed* is the amount of water removed for use and not returned to the source.

## Emissions from electric generation

Many factors influence emissions levels and intensities, including generation diversity and intensities, demand for electricity, weather, fuel availability and prices, and emissions controls deployed. Since 2005, our carbon dioxide (CO<sub>2</sub>) emissions decreased by 31 percent, sulfur dioxide (SO<sub>2</sub>) emissions decreased by 96 percent and nitrogen oxides (NO<sub>x</sub>) emissions decreased by 74 percent. These decreases are primarily due to addition of pollution control equipment, decreased coal generation, increased natural gas generation and replacement of higher-emitting plants.

## Methane emissions from pipeline operations

Methane (CH<sub>4</sub>) is the primary component of natural gas, and is a greenhouse gas. We work to minimize methane emissions, but some is released during pipeline operations and maintenance. Duke Energy is a founding partner of the U.S. EPA's Natural Gas Star Methane Challenge program, which is aimed at cost-effective technologies and practices that improve operational efficiency and reduce methane emissions.

## ENVIRONMENTAL PERFORMANCE METRICS

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### Sulfur Hexafluoride Emissions from Electric Transmission and Distribution Operations

(thousand tons)<sup>1</sup>

	2015	2016	2017	2018
SF <sub>6</sub> emissions (CO <sub>2</sub> equivalent)	291	570	552	574

### Toxic Release Inventory

(thousand pounds)<sup>2</sup>

	2007	2015	2016	2017
Releases to air	97,969	10,396	6,074	5,226
Releases to water	257	145	212	174
Releases to land	22,052	9,666	9,738	9,728
Off-site transfers	155	1,363	2,628	2,211
<b>Total</b>	<b>120,434</b>	<b>21,570</b>	<b>18,652</b>	<b>17,338</b>

### Waste

	2015	2016	2017	2018
Solid waste				
■ Total generated (thousand tons) <sup>3</sup>	88	102	109	104
■ Percent recycled	72%	76%	80%	79%
Hazardous waste generated (tons) <sup>4</sup>	317	1,195	126	281
Low-level radioactive waste (Class A, B and C) generated (cubic feet) <sup>5</sup>	200,667	193,996	148,188	—

### Reportable Oil Spills<sup>6</sup>

	2015	2016	2017	2018
Spills	23	23	18	28
Gallons	3,425	3,970	728	507

### Environmental Regulatory Citations<sup>7</sup>

	2015	2016	2017	2018
Citations	9	9	10	17
Fines/penalties (dollars)	\$114,585,735	\$7,114,090	\$19,797	\$533,776

1 SF<sub>6</sub> emissions fluctuations are due to maintenance, replacement and storm repair needs.

2 Data pertain to electric generation facilities Duke Energy owns or operates and where Duke Energy is the responsible reporting party. Totals may not add up exactly due to rounding.

3 Weights are estimated based on volumes where necessary. Excludes Duke Energy Renewables, which has smaller volumes, and large nonreplicable projects such as plant demolitions. Piedmont Natural Gas is included beginning in 2017.

4 Excludes Duke Energy Renewables. Hazardous waste generation fluctuates mainly due to maintenance projects.

5 Total of Class A, B and C waste disposal as reported to the Nuclear Regulatory Commission. Crystal River Unit 3 is not included in these statistics, because it is not part of the operating fleet, and is retired. Data for 2018 will be available later in 2019.

6 Excludes Piedmont Natural Gas.

7 Includes international and U.S. federal, state and local citations and fines/penalties.

### Sulfur hexafluoride emissions

Sulfur hexafluoride (SF<sub>6</sub>) is an insulating gas used in high-voltage electric transmission and distribution switchgear equipment, and is a greenhouse gas. We work to minimize SF<sub>6</sub> emissions, but some is released during transmission and distribution operations and maintenance.

### Toxic Release Inventory (TRI)

Duke Energy's TRI releases for 2017 were down nearly 86 percent from 2007, primarily due to the significant investments we've made in environmental controls for our power plants, and decreased coal generation. (Data for 2018 will be available in August 2019.)

### Waste

We came in just below our goal to recycle 80 percent of our solid waste, and are working on strategies to meet this goal in the future. (This goal excludes Duke Energy Renewables, which has a relatively small waste stream.)

### Reportable oil spills

Oil spills include releases of lubricating oil from generating stations, leaks from transformers, or damage caused by weather or by third parties (typically because of auto accidents).

### Environmental regulatory citations

Fines/penalties were relatively large in 2015 because of the May 2015 coal ash enforcement agreement; and in 2016 because of a 2014 oil spill at the Beckjord Station in Ohio, and a 2014 coal ash spill. See the "Legal Cases Resolved" article in the 2015 Sustainability Report.