



Benchmarking Air Emissions

Of the 100 Largest Electric Power Producers in the United States

July 2016

Summary Presentation

Full Report at: www.mjbradley.com

Report Authors:

Christopher Van Atten
Amlan Saha
Lauren Slawsky
Clement Russell

Contributors:



2016 Benchmarking Report: Key Findings

- In 2014, power plant SO₂ and NO_x emissions were 80 percent and 75 percent lower, respectively, than they were in 1990 when Congress passed major amendments to the Clean Air Act.
- In 2014, power plant CO₂ emissions were 14 percent higher than they were in 1990. However, in recent years, from 2008 through 2014, power plant CO₂ emissions decreased by 12 percent. Some of the factors driving this trend include slow economic growth, energy efficiency improvements, and the displacement of coal generation by natural gas and renewable energy resources.
- Mercury emissions from power plants have decreased 55 percent since 2000, and will decline further as the first-ever federal limits on mercury and other hazardous air pollutants from coal-fired power plants went into effect in 2015.

BENCHMARKING AIR EMISSIONS

OF THE
100 LARGEST
ELECTRIC POWER
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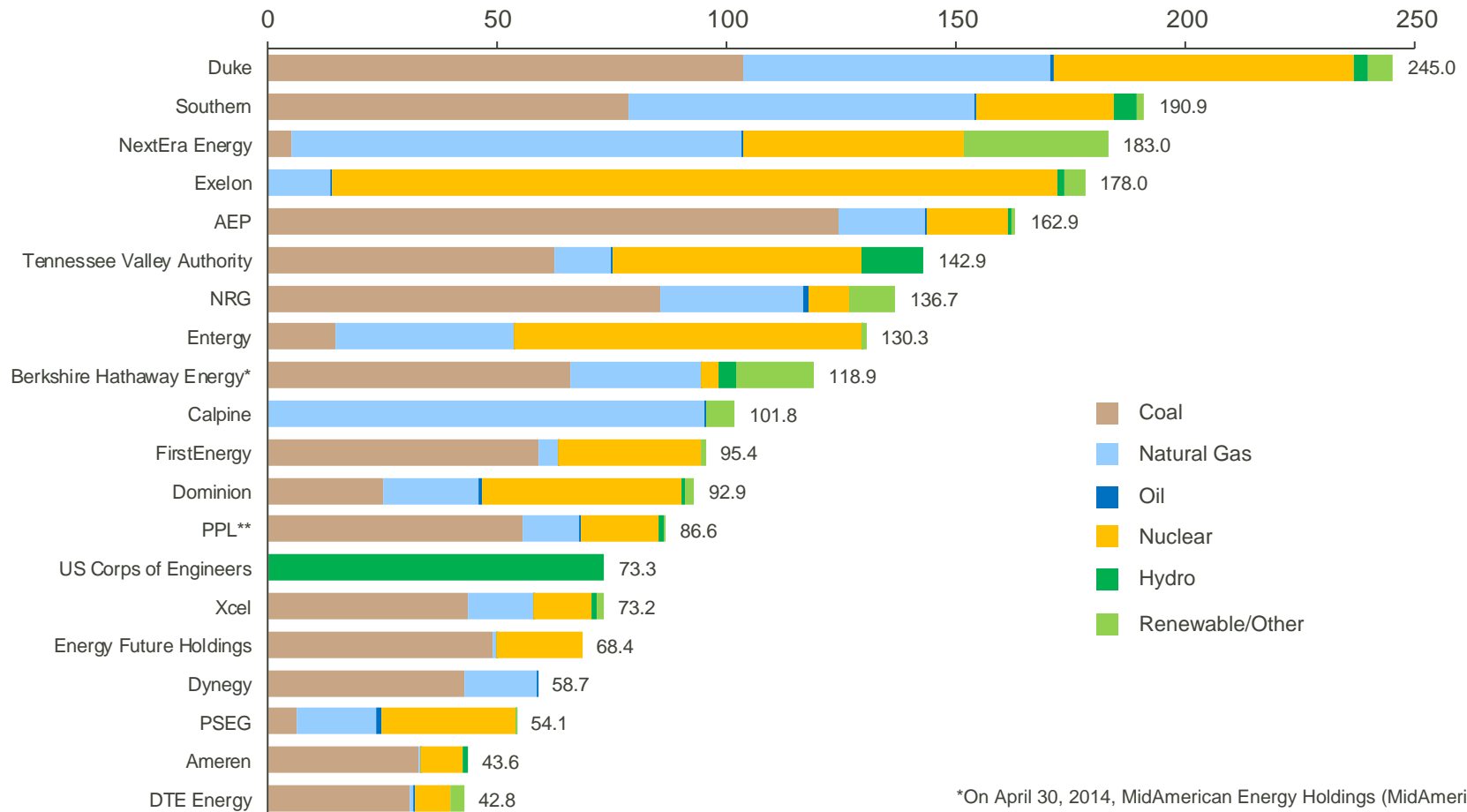


Download the full 2016 Benchmarking Air Emissions report and plant level data at: www.mjbradley.com

2016 Benchmarking Report: Rankings by Generation

Generation

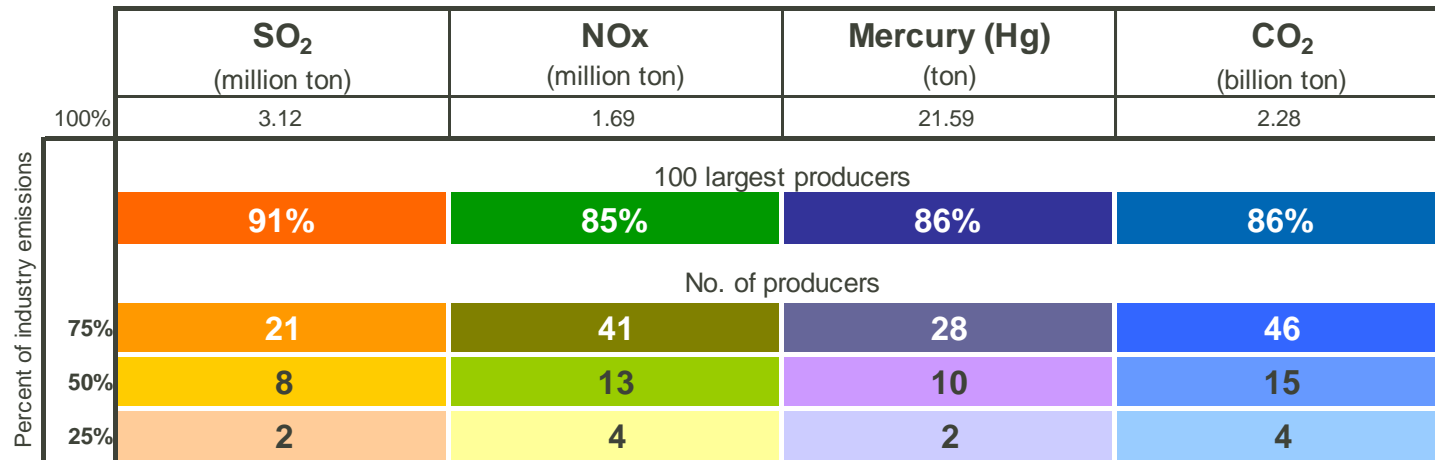
(million MWh; Top 20 Power Producers Shown)



*On April 30, 2014, MidAmerican Energy Holdings (MidAmerican) changed its name to Berkshire Hathaway Energy.

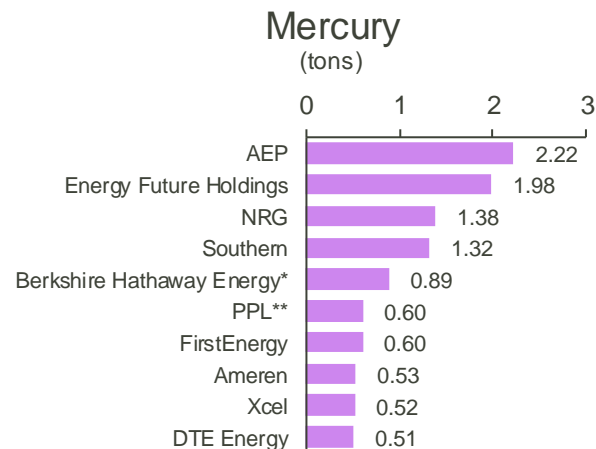
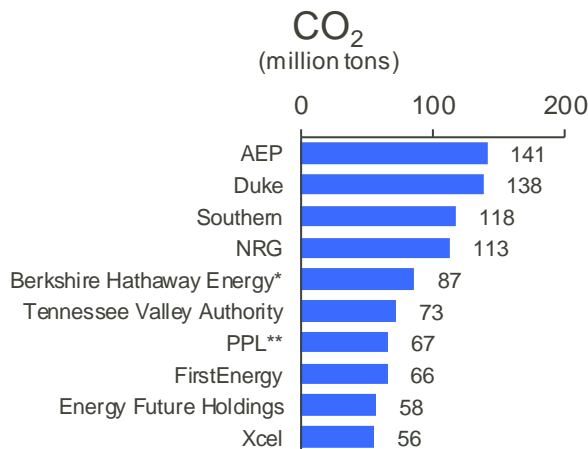
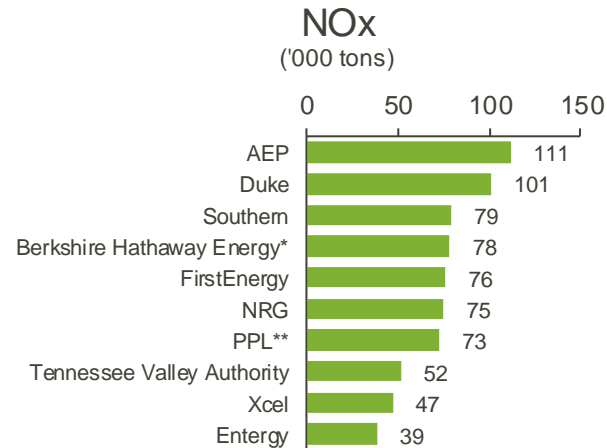
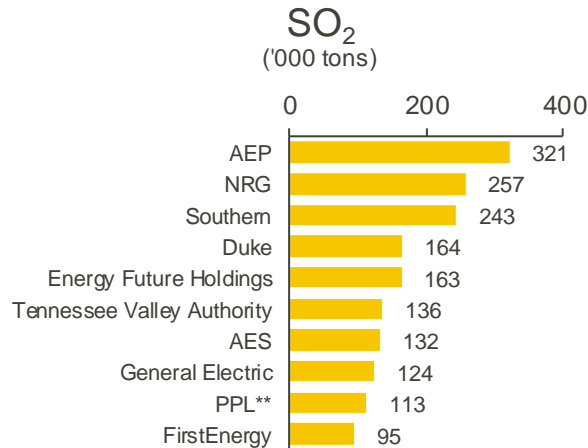
**On June 1, 2015, PPL completed its spin-off into Talen Energy.

2016 Benchmarking Report: Emission Contributions



Air pollution emissions from power plants are highly concentrated among a small number of producers. For example, nearly a quarter of the electric power industry's SO₂ and CO₂ emissions are emitted by just two and four top 100 producers, respectively.

2016 Benchmarking Report: Rankings by Total Emissions



Note: Only the top 10 for each category shown.

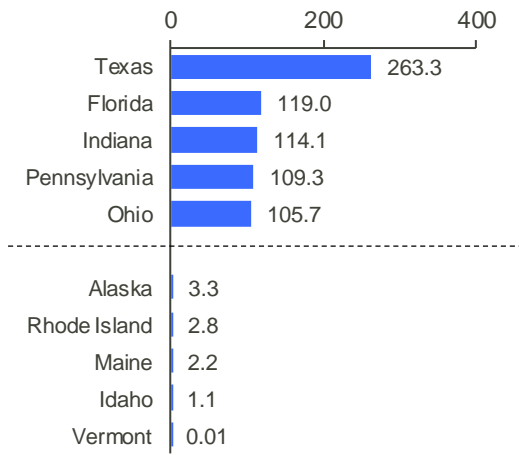
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2016 Benchmarking Report: State-by-State CO₂ Emissions

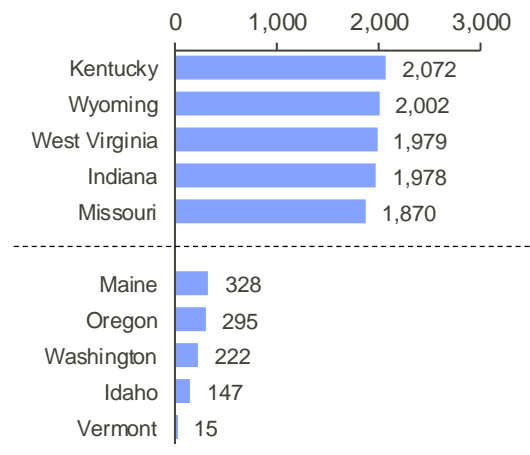
Total CO₂ Emissions by State

(million tons; top 5 and bottom 5 are shown)



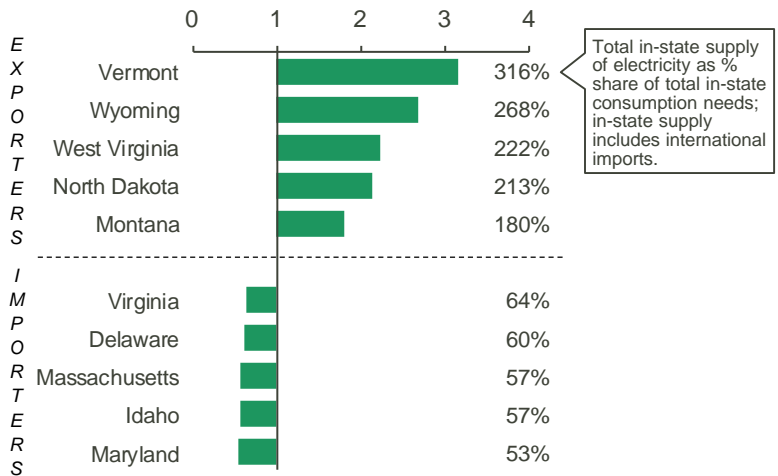
All Sources – CO₂ Emission Rate

(lb/MWh; top 5 and bottom 5 are shown)



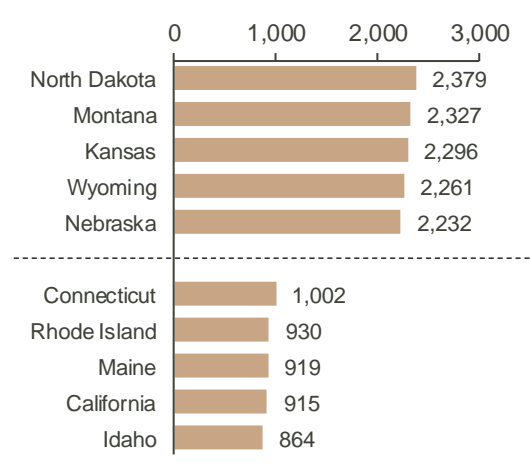
Electricity Exporters/Importers

(2013 Net Trade Index; top 5 exporters and importers are shown)



Fossil – CO₂ Emission Rate

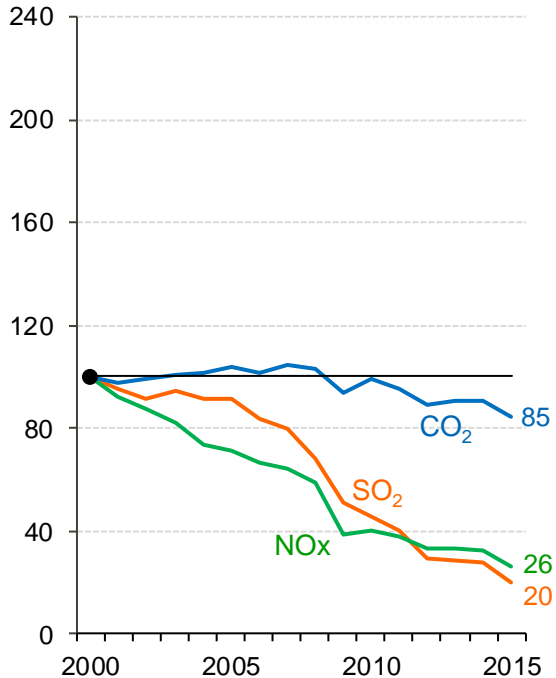
(lb/MWh; top 5 and bottom 5 are shown)



2016 Benchmarking Report: Annual Trends

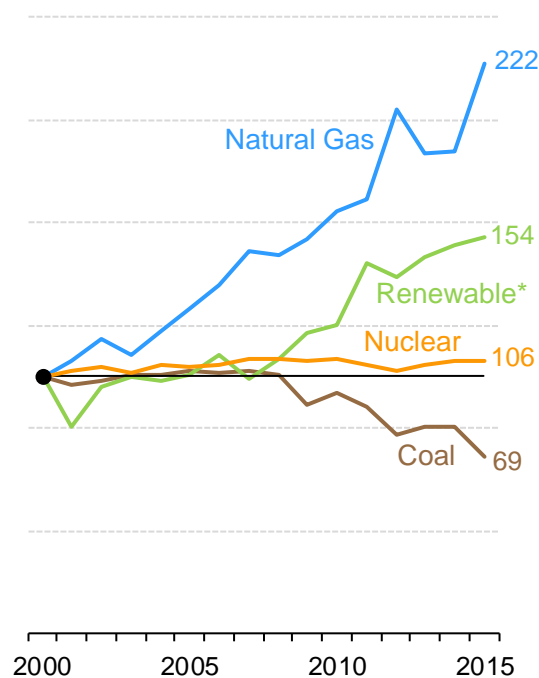
Electric Sector Emissions

(Indexed; 2000 = 100)



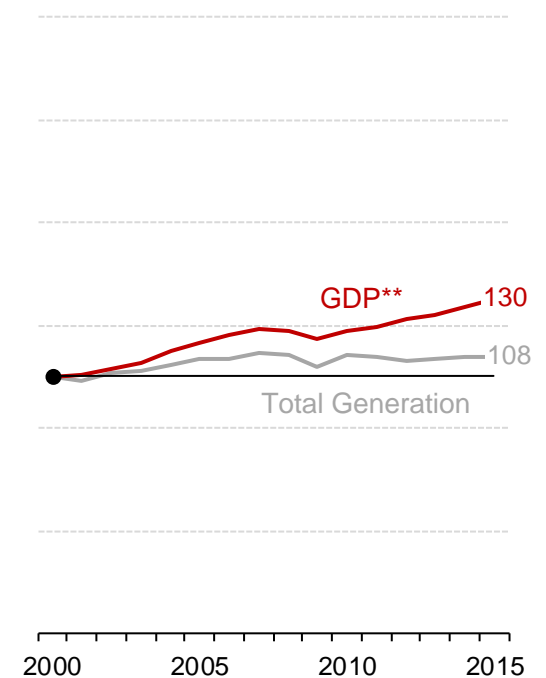
Generation Fuel Mix

(Indexed; 2000 = 100)



Macroeconomic Indicators

(Indexed; 2000 = 100)



*Includes hydroelectric, wind, solar, biomass, geothermal and other renewable sources.

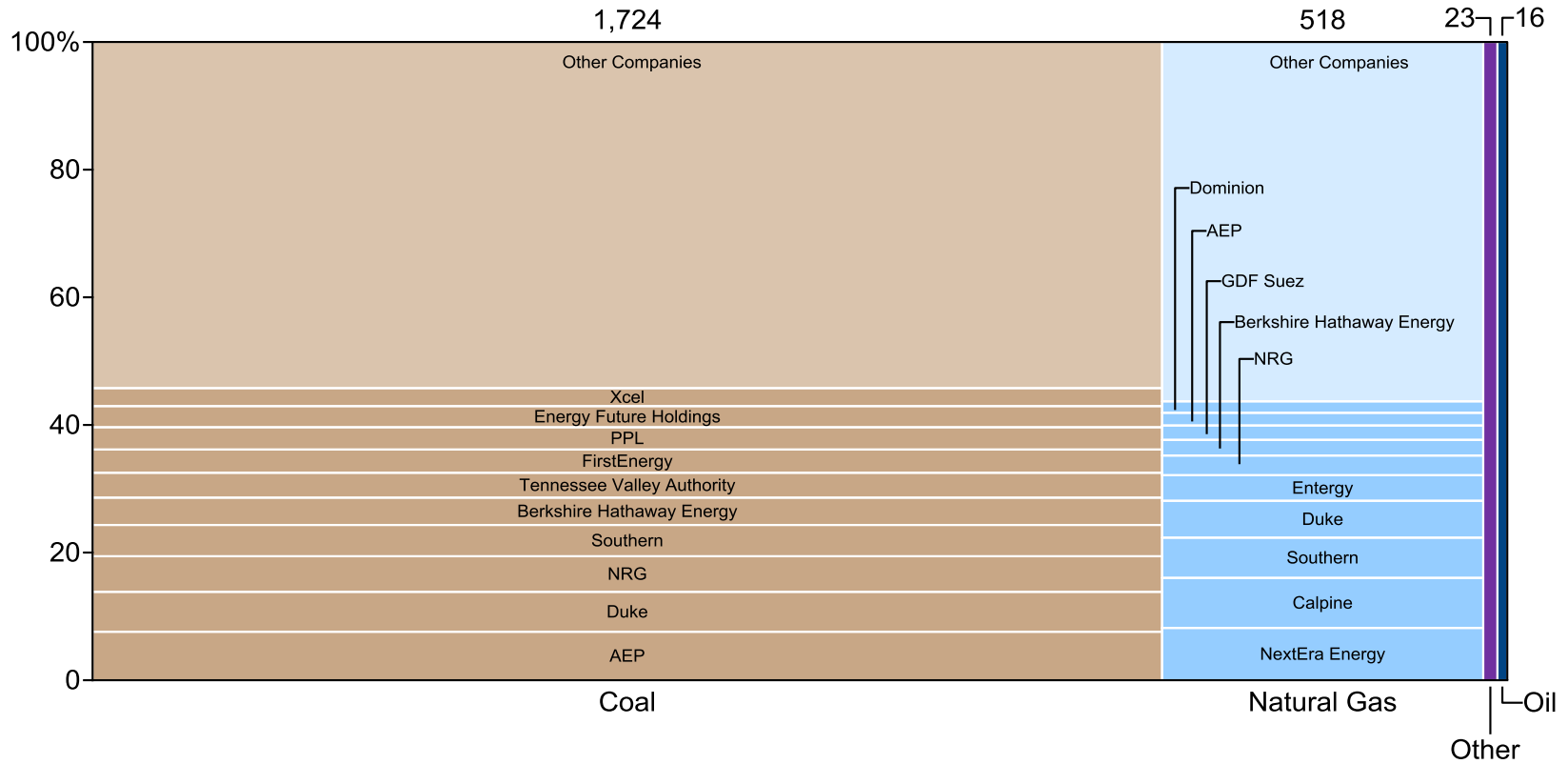
**GDP in chained 2009 dollars.

The electric power sector has made significant progress in terms of reducing its NO_x and SO₂ emissions over the past decade.

2016 Benchmarking Report: CO₂ Emission Shares

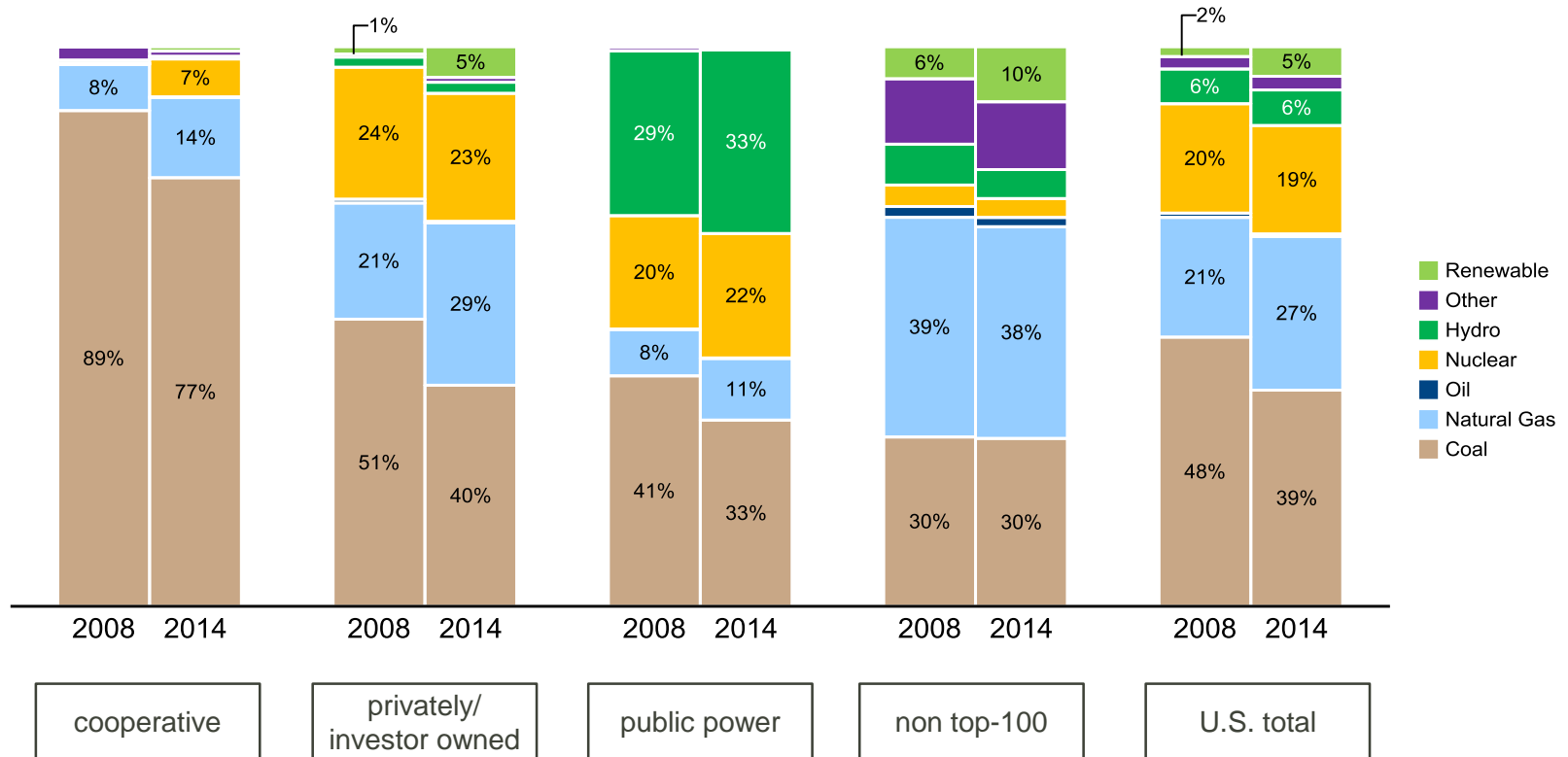
CO₂ Emissions
(million short ton; Top 10 Companies by Fuel Type Shown)

% Share of Emissions



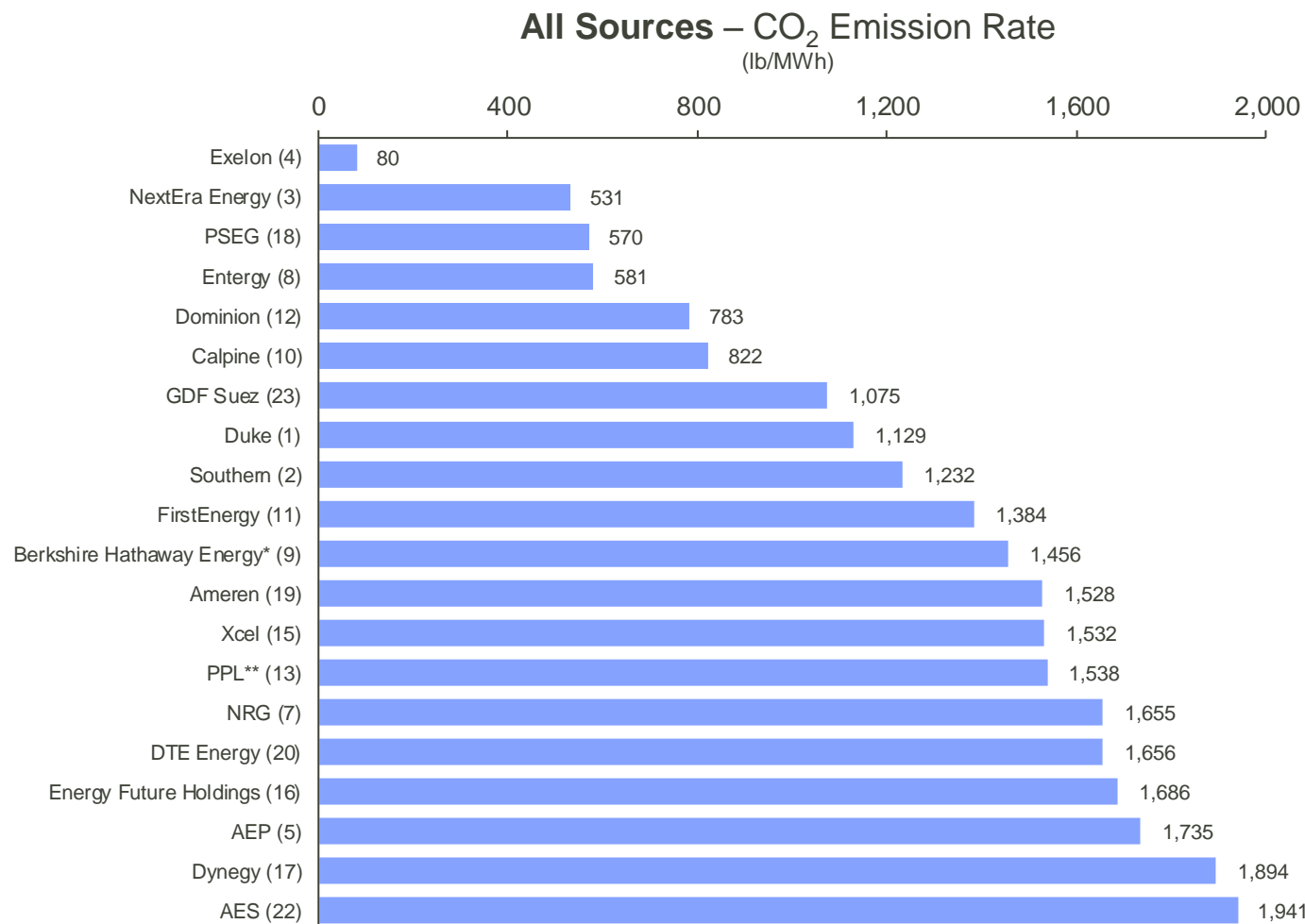
2016 Benchmarking Report: Change in Portfolio Mix by Ownership Type

% Share of Total Generation



Coal-fired generation decreased between 2008 and 2014 for most types of producers while electricity from natural gas and renewable energy resources increased. Smaller producers outside the top 100 saw less change across their generation portfolios.

2016 Benchmarking Report: Rankings by CO₂ Emission Rate (Top 20 Privately/Investor Owned Power Producers)



Note: Ranking by total generation shown in parentheses next to power producer name.

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