

FEDERAL UTILITY PARTNERSHIP WORKING GROUP SEMINAR

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Nashville, TN

Key Electric Industry Trends

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Hosted by:



Agenda

- Landscape of the Electric Industry
- EEI CEO Task Force on Military Resilience

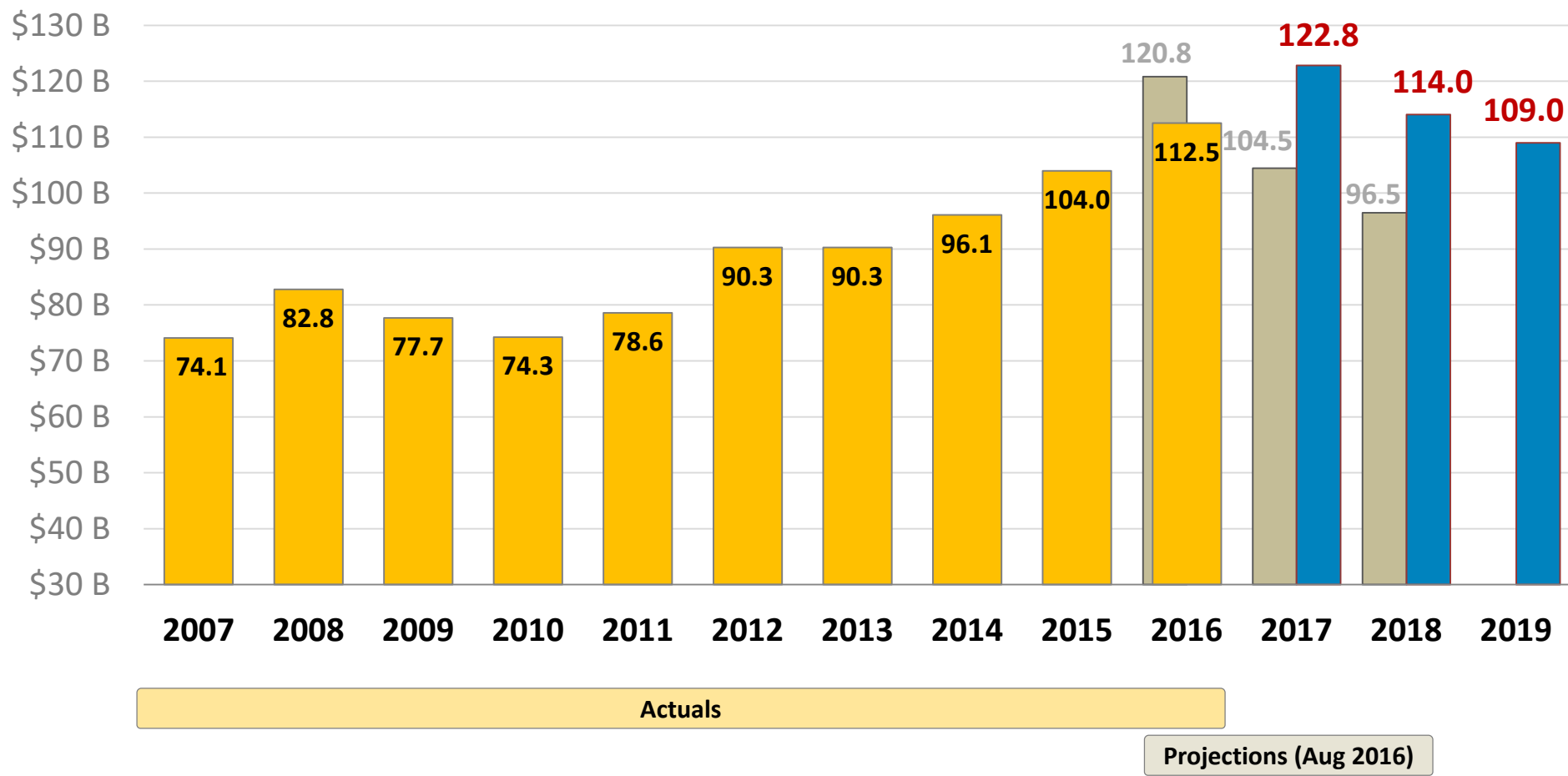
Industry Trends

Transformation of the Electric Power Sector

Drivers:

- Customers
- Technology
- Policy

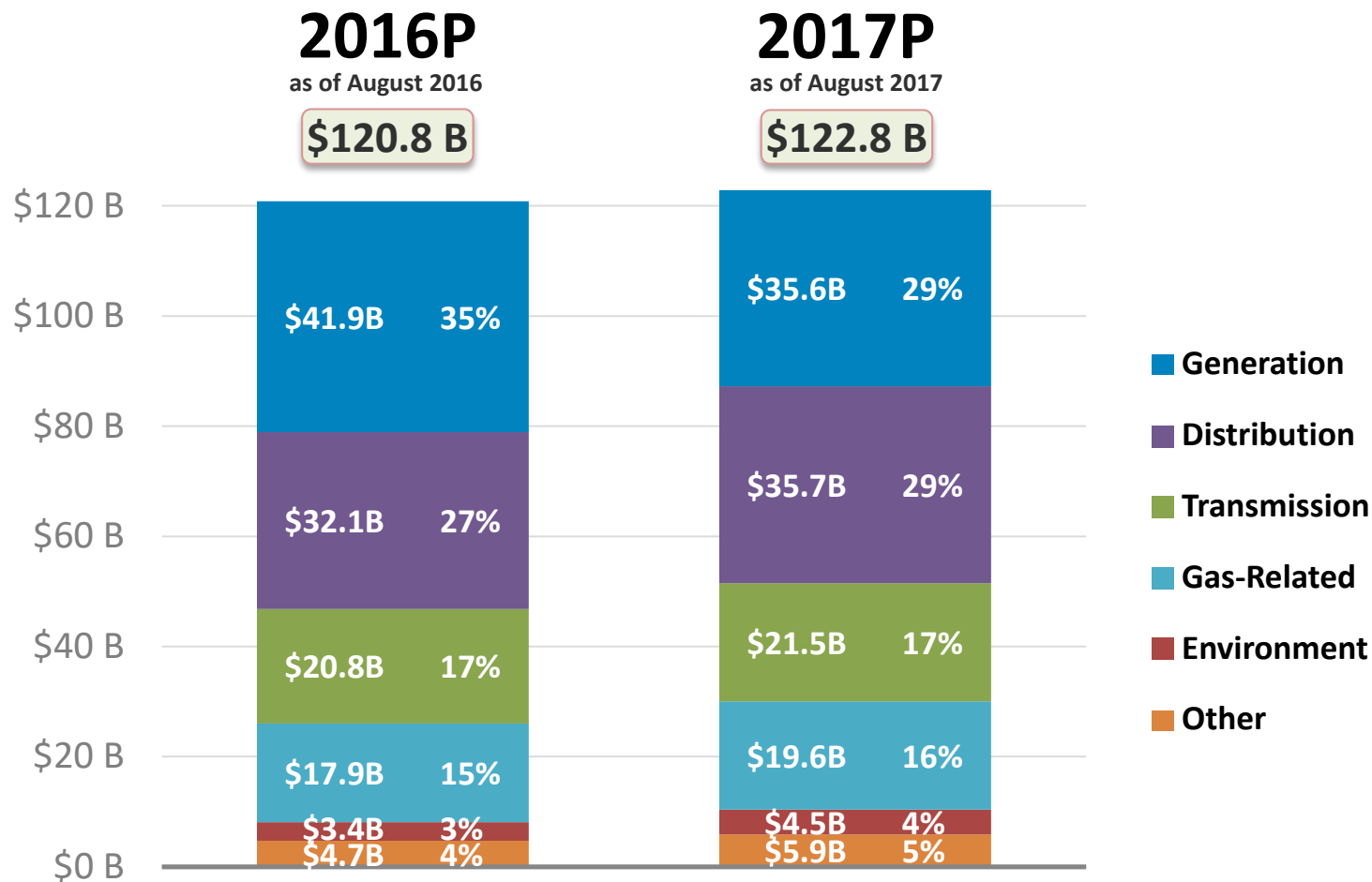
Industry Capital Expenditures



Notes: Total company spending of U.S. Investor-Owned Electric Utilities, consolidated at the parent or appropriate holding company. Projections based on publicly available information and extrapolated for companies reporting fewer than three projected years (0.1% and 2.5% of the industry for 2018 and 2019, respectively).

Source: EEI Finance Department, company reports, S&P Global Market Intelligence (August 2017).

Projected Functional CapEx

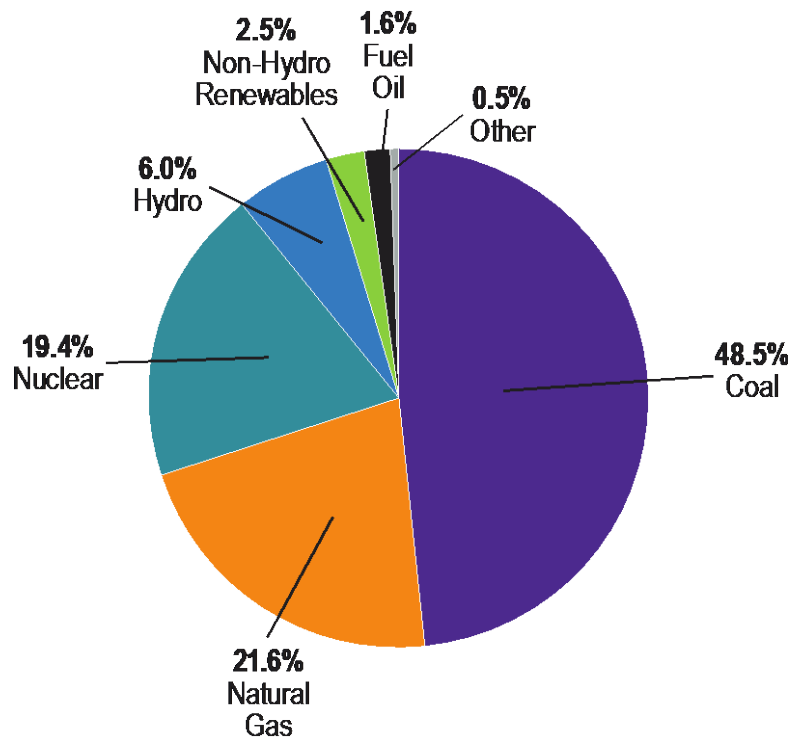


Notes:

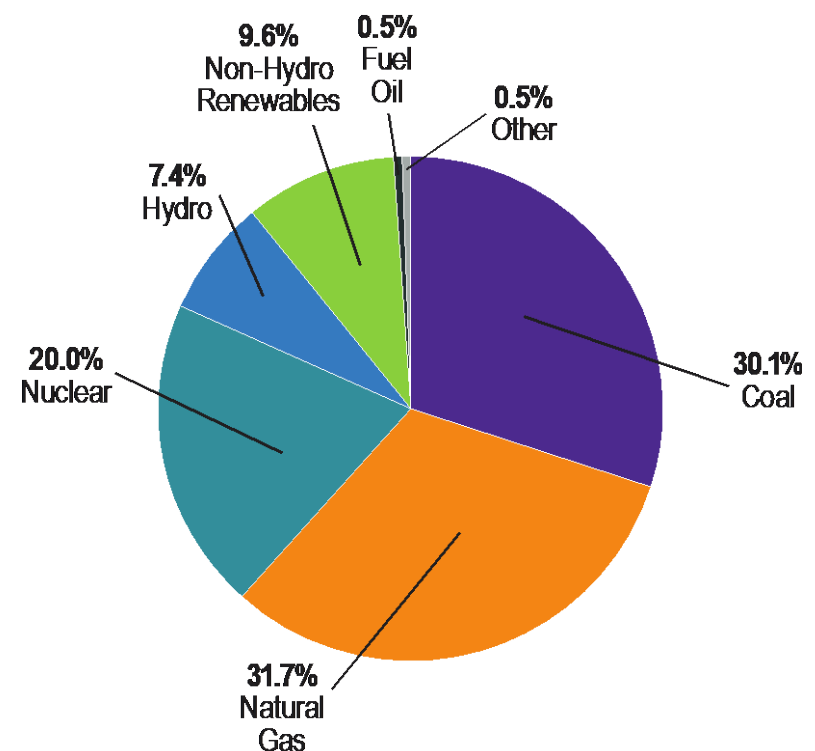
Total company functional spending of U.S. Investor-Owned Electric Utilities may not sum to 100% due to rounding error. Projections based on publicly available information and extrapolated for companies not reporting functional detail (0.7% and 0.9% of the industry for 2016 and 2017, respectively).

The Mix of Resources Used to Generate Electricity Is Changing Dramatically

2007 National
Energy Resource Mix



2017 National
Energy Resource Mix
(preliminary)



Source: Department of Energy, Energy Information Administration.

10 WAYS

Electric Companies Are Leading on Clean Energy

1



Investing more than \$100 billion each year to build smarter energy infrastructure and to **TRANSITION TO EVEN CLEANER ENERGY SOURCES.**

2

CO₂

REDUCING CARBON DIOXIDE EMISSIONS NEARLY 25 PERCENT BELOW 2005 LEVELS as of 2016, the lowest annual emissions level since 1988.

3

NO_x + SO₂

Decreasing emissions of **NITROGEN OXIDES** by **82 PERCENT** and **SULFUR DIOXIDE EMISSIONS** by **91 PERCENT**, while **ELECTRICITY USE GREW** by **36 PERCENT** (1990–2016).

4

1/3

Changing the energy mix: more than **ONE-THIRD OF THE NATION'S ELECTRICITY NOW COMES FROM ZERO-EMISSIONS SOURCES** (like nuclear, hydropower, and renewables).

5



Providing **VIRTUALLY ALL OF THE WIND, GEOTHERMAL, AND HYDROPOWER—and 64 PERCENT OF THE SOLAR**—in the U.S.

6



Driving the majority of demand for solar, accounting for **72 PERCENT OF INSTALLED SOLAR CAPACITY** in 2016.

7



Using **MORE THAN 90 PERCENT OF ALL ENERGY STORAGE** in the U.S.

8



Investing in energy efficiency programs that saved enough energy in 2015 to power **17.5 MILLION U.S. HOMES FOR A YEAR.**

9



Creating a nationwide initiative that **EXPANDED THE USE OF EVS** in our member companies' fleets by 18 percent in 2016.

10



Promoting widespread adoption of EVs that could **REDUCE GREENHOUSE GAS EMISSIONS** by the equivalent of removing 100 million conventional vehicles from the road.

We Are Adding More Non-Hydro Renewable Resources + Storage



Front-of-the-meter
KWs account for

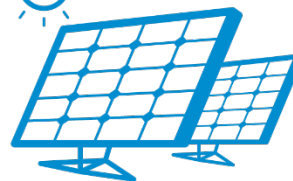
81%

of
total installed
battery storage

Our universal solar projects
accounted for

72%
of all

INSTALLED
U.S. SOLAR CAPACITY in 2016.



OUR SOLAR PV
had an average
cost of

\$1.06

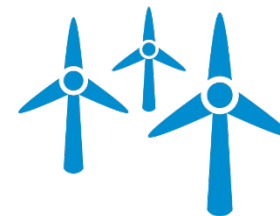
per watt in 2016

COMPARED TO

RESIDENTIAL
ROOFTOP SOLAR PV
had an average
cost of

\$2.89

per watt in 2016

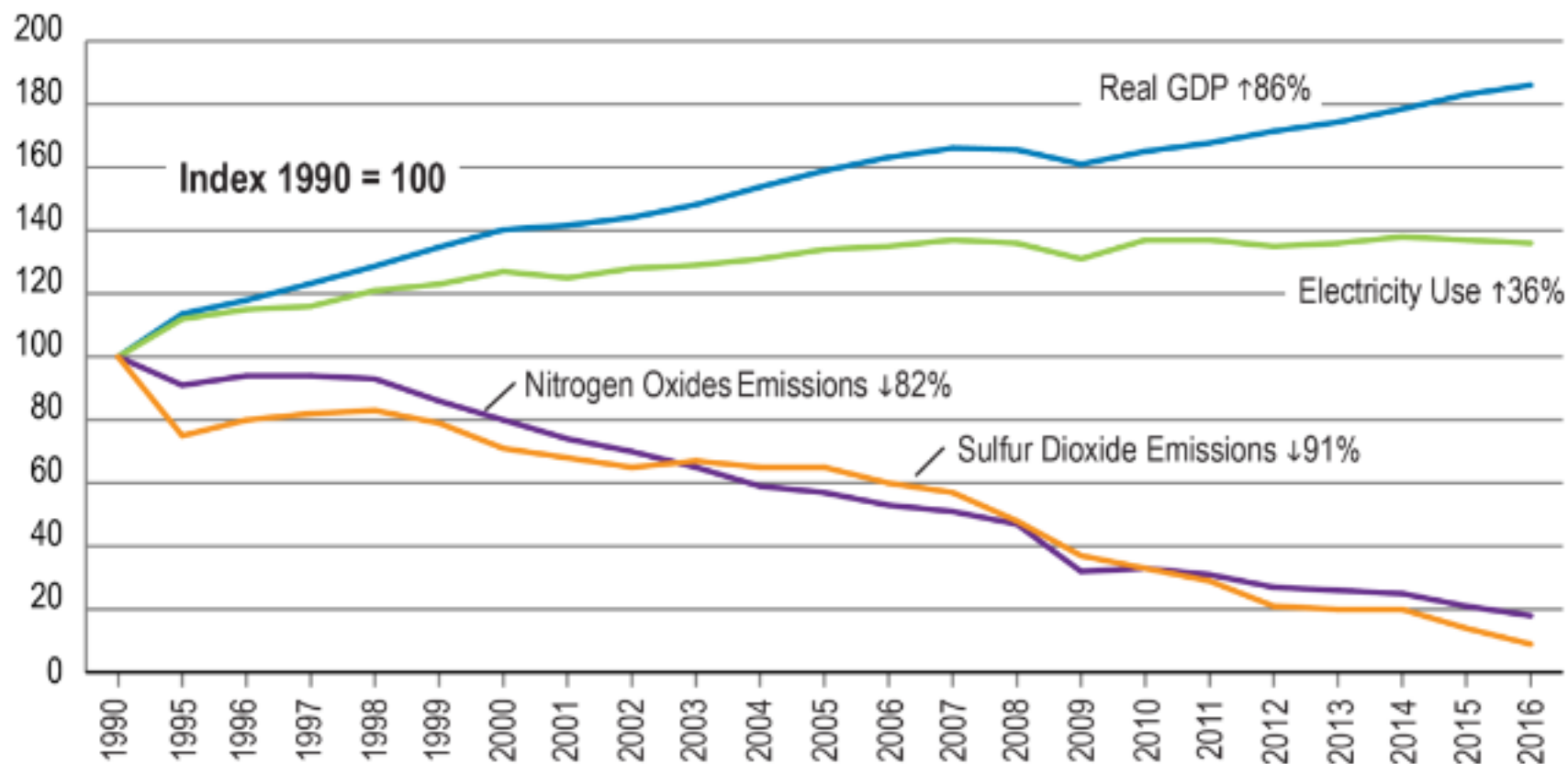


Our wind projects
provide almost

100%

of wind energy nationwide.

Power Plant Emissions Drop Significantly Since 1990

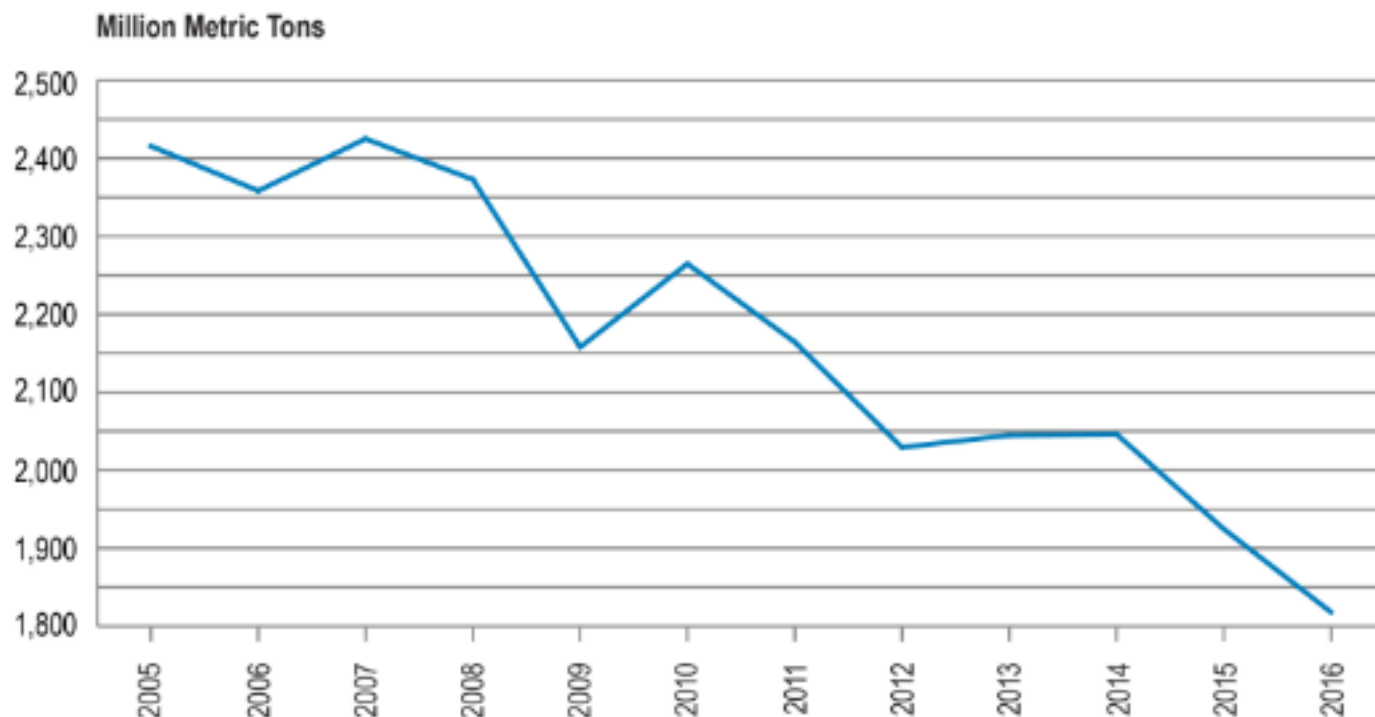


1990 represents the base year. Graph depicts increases or decreases from the base year.

Sources: U.S. Department of Energy, Energy Information Administration (EIA), U.S. Environmental Protection Agency (EPA), and U.S. Bureau of Economic Analysis.

U.S. Power Sector Carbon Dioxide Emissions Declining (2005-2016)

- § 1/3 of U.S. power generation comes from zero-emissions sources
- § As of 2016, industry CO₂ emissions were nearly 25 percent below 2005 levels
- § Trajectory will continue based on current trends



Source: Developed from U.S. Energy Information Administration, *Monthly Energy Review*, March 2017.

Smarter Energy Infrastructure

DRIVERS



1

**Customer
Wants &
Needs**

2

**Environmental
Goals**

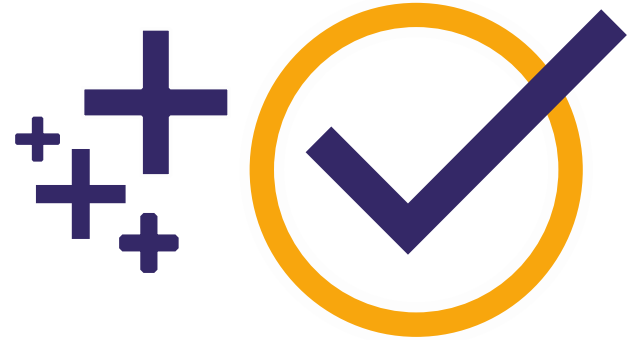
3

**Growth in
Distributed
Energy Resources**

4

**New
Technologies**

BENEFITS



1

**Enhanced
Reliability**

2

**Increased
Resiliency**

3

**Reduced Carbon
Emissions**

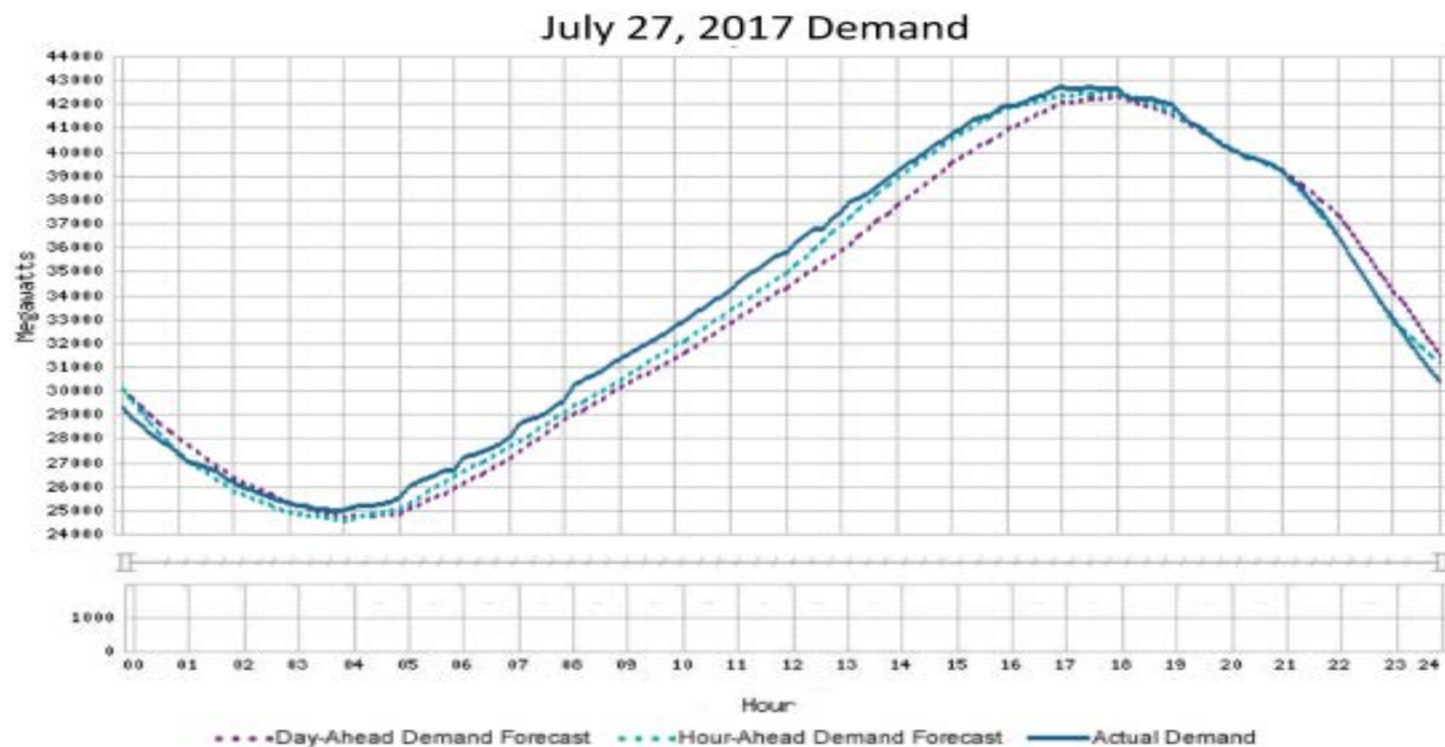
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**Empowered
Customers**

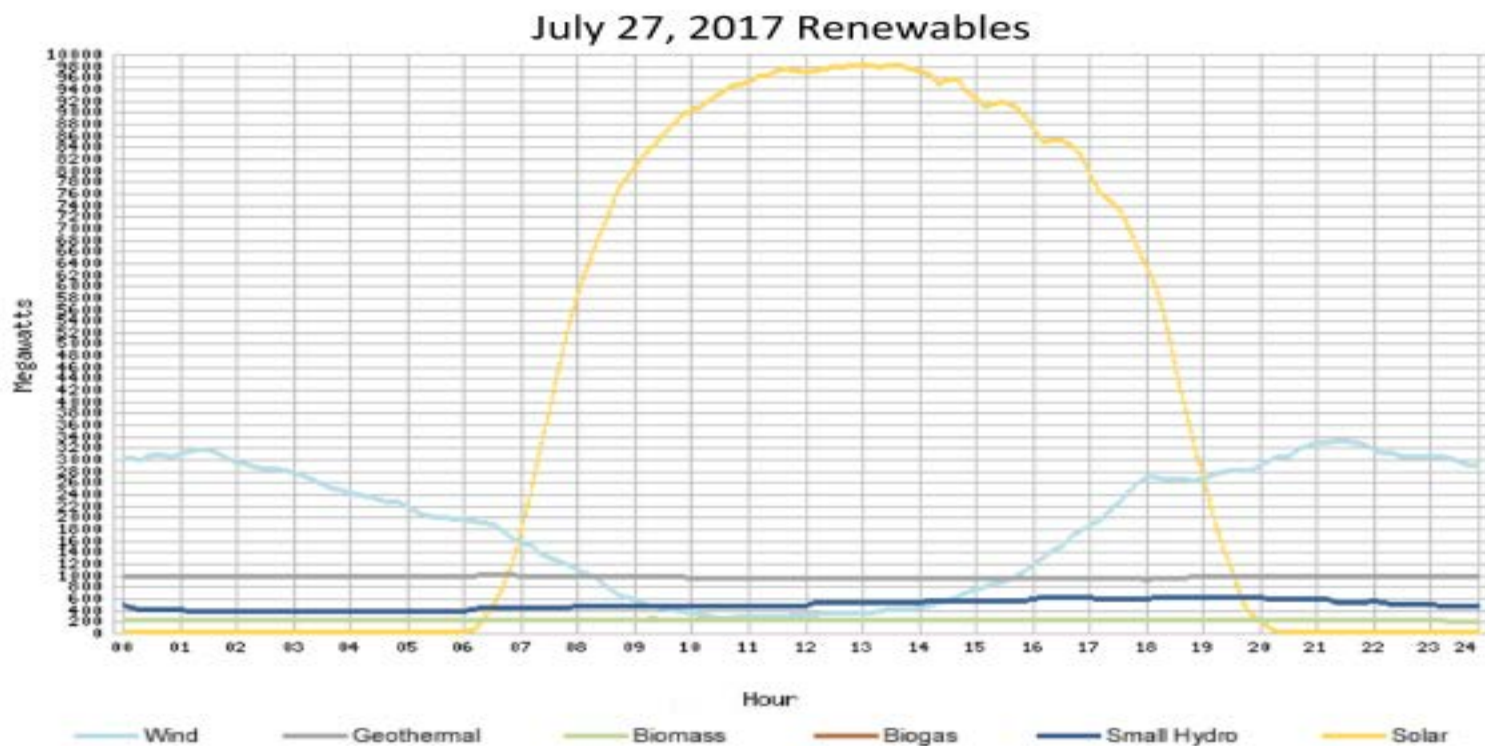
5

**Flexible & Responsive
Energy Grid Platform**

Changing Demand Curves

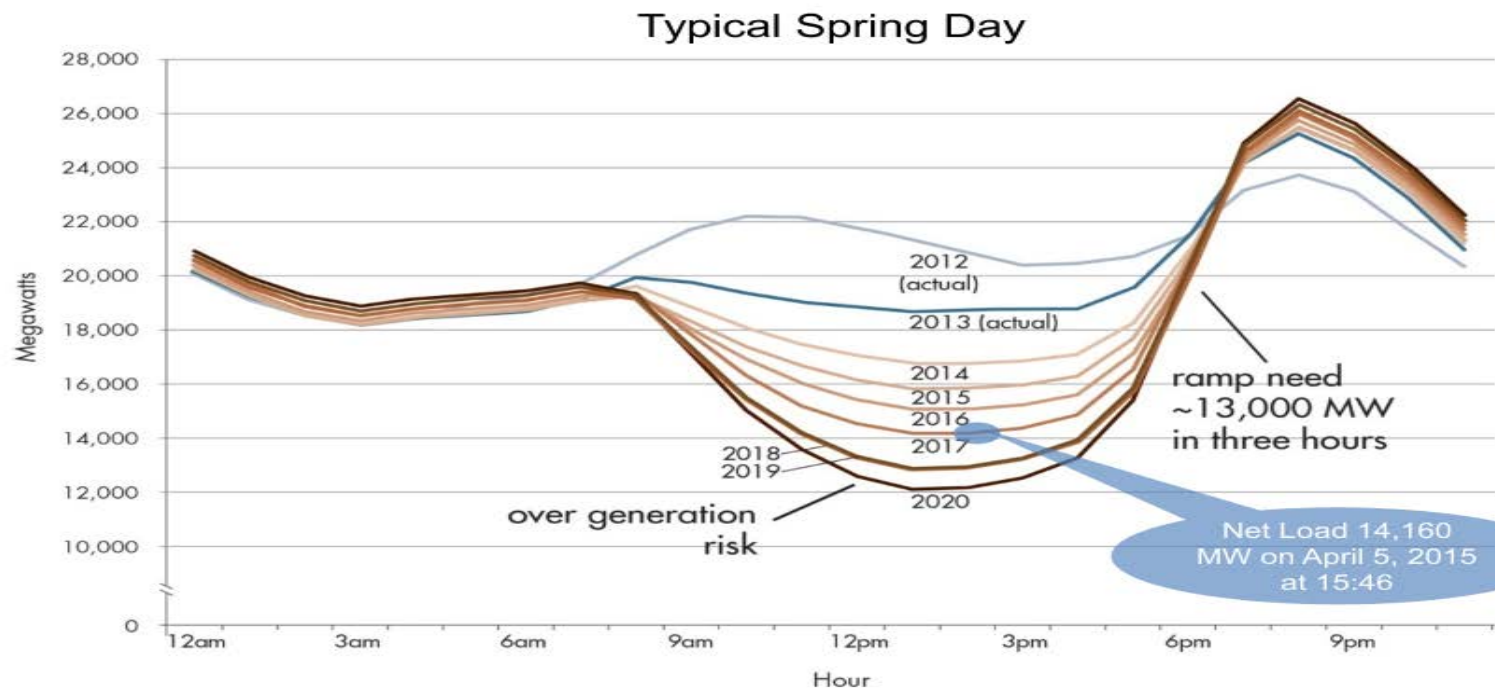


Renewable Generation



Peak Demand is Changing

Original estimate of net-load as more renewables are integrated into the grid



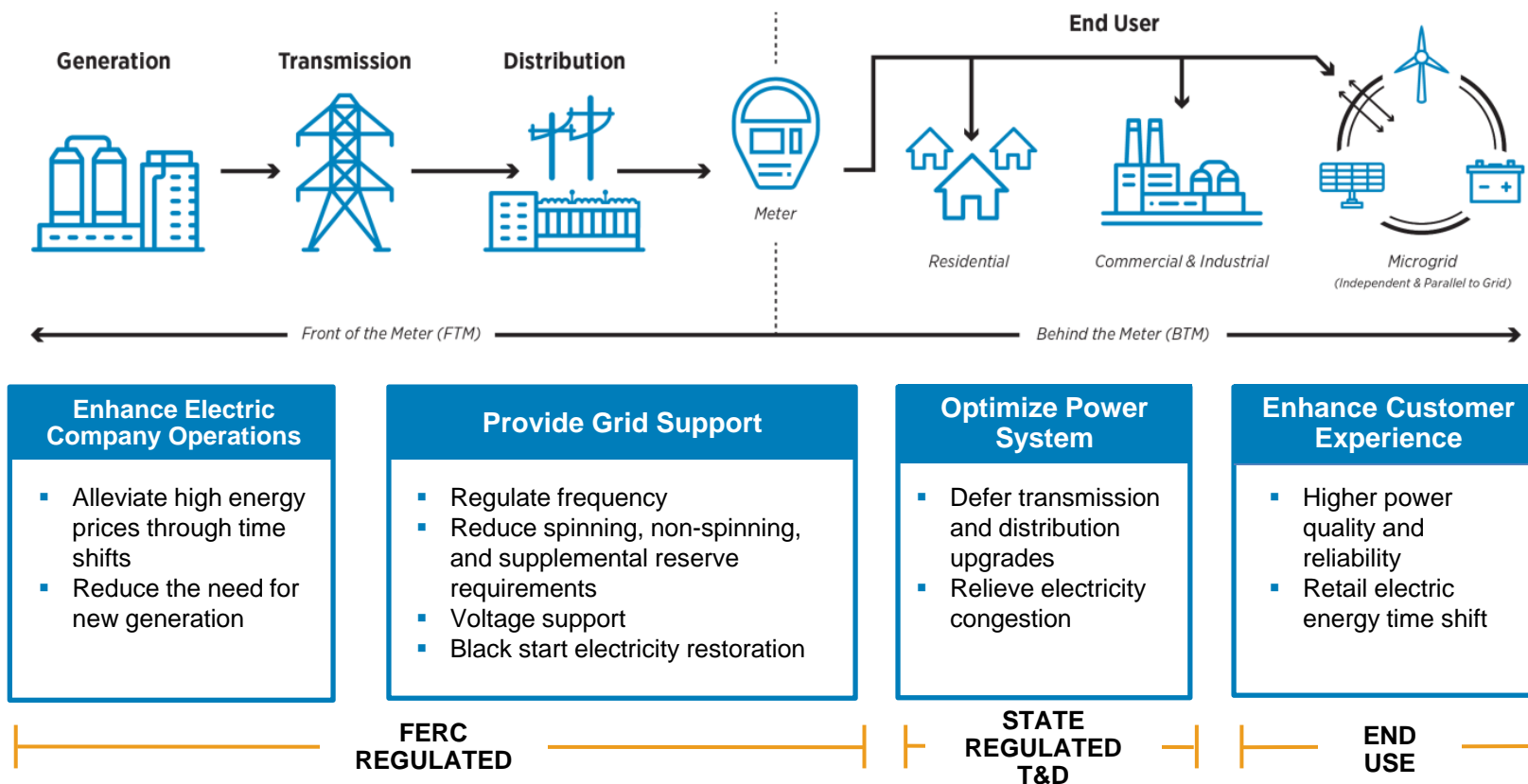
Flattening the Beast

- Dynamic Pricing (e.g. TOU, demand, customer charges for DER customers)
- Demand Response
- Beneficial Electrification
- Smart IT Hardware, Software, and Energy Analytics
- Energy Storage (batteries, TES, etc.)



Energy Storage

Energy storage can be deployed in all parts of the energy grid, and has applications in all parts of the value chain.

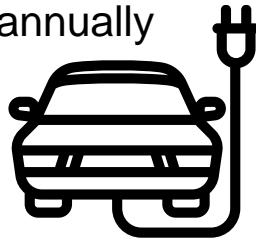


Electrification

In the last
6 years, more than
600,000
electric vehicles have
been sold in the U.S.

DID YOU KNOW?

Widespread adoption of electric vehicles could reduce greenhouse gas emissions by more than 550 million metric tons annually by 2050.



At least 70 electric
companies will invest
\$250 million
over the next five years
to increase the use of
electric vehicles in their fleets.

DID YOU KNOW?



That's equal to buying 125 million gallons of gas.

DoD CEO Task Force on Energy Resilience



Goals: Task Force on Military Resilience

- Engage new DoD leadership, looking broadly at inside the fence, outside the fence issues
- Set priorities for collaboration
 - Assist with DoD mapping exercises and vulnerability assessments
 - Develop/replicate electric company-installation energy resiliency collaborations
 - Address issues that hamper further collaboration
 - EEI member Fed agency/DoD account management teams continue to push issues/solutions uphill

Thanks

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