

Five Power Industry Trends to Watch in 2018

Policies Set in Motion that Will Define the Year, from Batteries to Power Markets

Industry Insight

Over the past five years, the power industry has evolved at a faster pace because of several simultaneous trends reflecting a broader shift from coal to natural gas and renewables. The **changing fuel mix, growth in renewables, and evolution of distributed energy resources** are among the key causes catalyzing this transformation. In 2018, most of these trends are expected to continue or accelerate.

The **spread of renewables** will likely continue unabated. The market has matured along with growing demand from consumers. Utilities, on their part, have made commitments towards clean energy and resiliency, and renewables help meet both. Renewables will grow hand in hand with investments in **energy storage** to address intermittency and other integration challenges.

In the recent years, the U.S. **nuclear** fleet has seen a wave of closures amid weak sales and low prices due to an influx of cheap natural gas. Meanwhile, cost overruns and the bankruptcy of Westinghouse have plagued the few new builds. The federal and several state governments have striven to support nuclear, and advanced technologies promise some hope for the industry, but their combined impact remains to be seen.

The penetration of **distributed energy resources** - namely, distributed generation (DG), energy storage, energy efficiency, demand response, microgrids, and electric vehicles - has made utilities reconsider their strategies and planning processes. Net energy metering, a billing mechanism that allows customers with grid-connected DG to exchange excess generation for kWh and/or financial credits, has prompted a flurry of activity as utilities seek to reduce rates or add charges to avoid shifting grid maintenance costs to non-DG customers. Utilities have also taken issue with the avoided cost that must be paid to small independent power producers under the federal Public Utilities Regulatory Policies Act (PURPA) of 1978 considering the significant decline in renewable energy costs in recent years.

All these trends have also affected the grid operators who must manage a higher share of renewable generation, accommodate state policy requirements with **wholesale markets**, and enhance price formation to improve market signals.

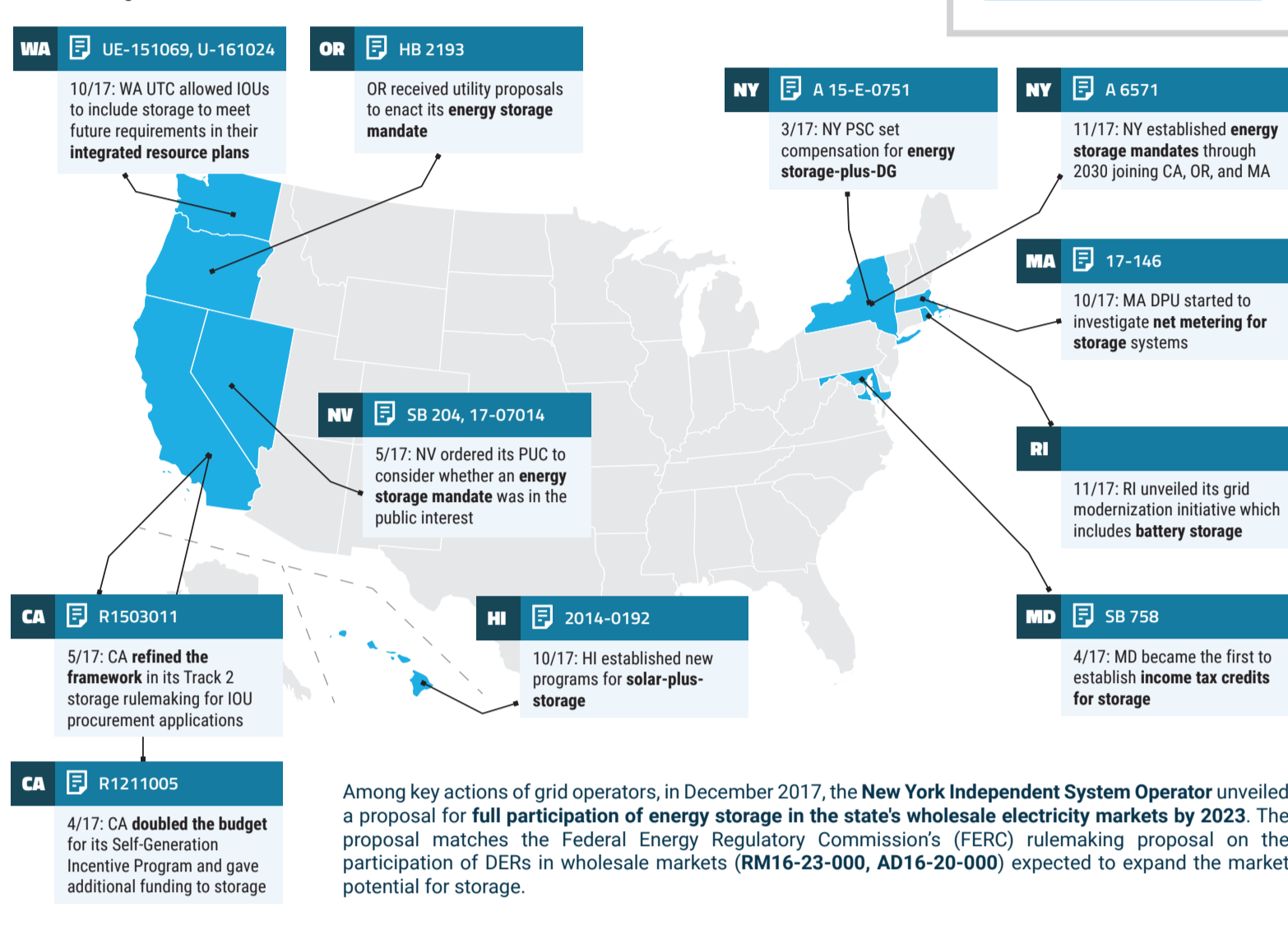
Here is a roundup of five important trends that will impact the power industry this year.

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#1: Growing Momentum for Energy Storage

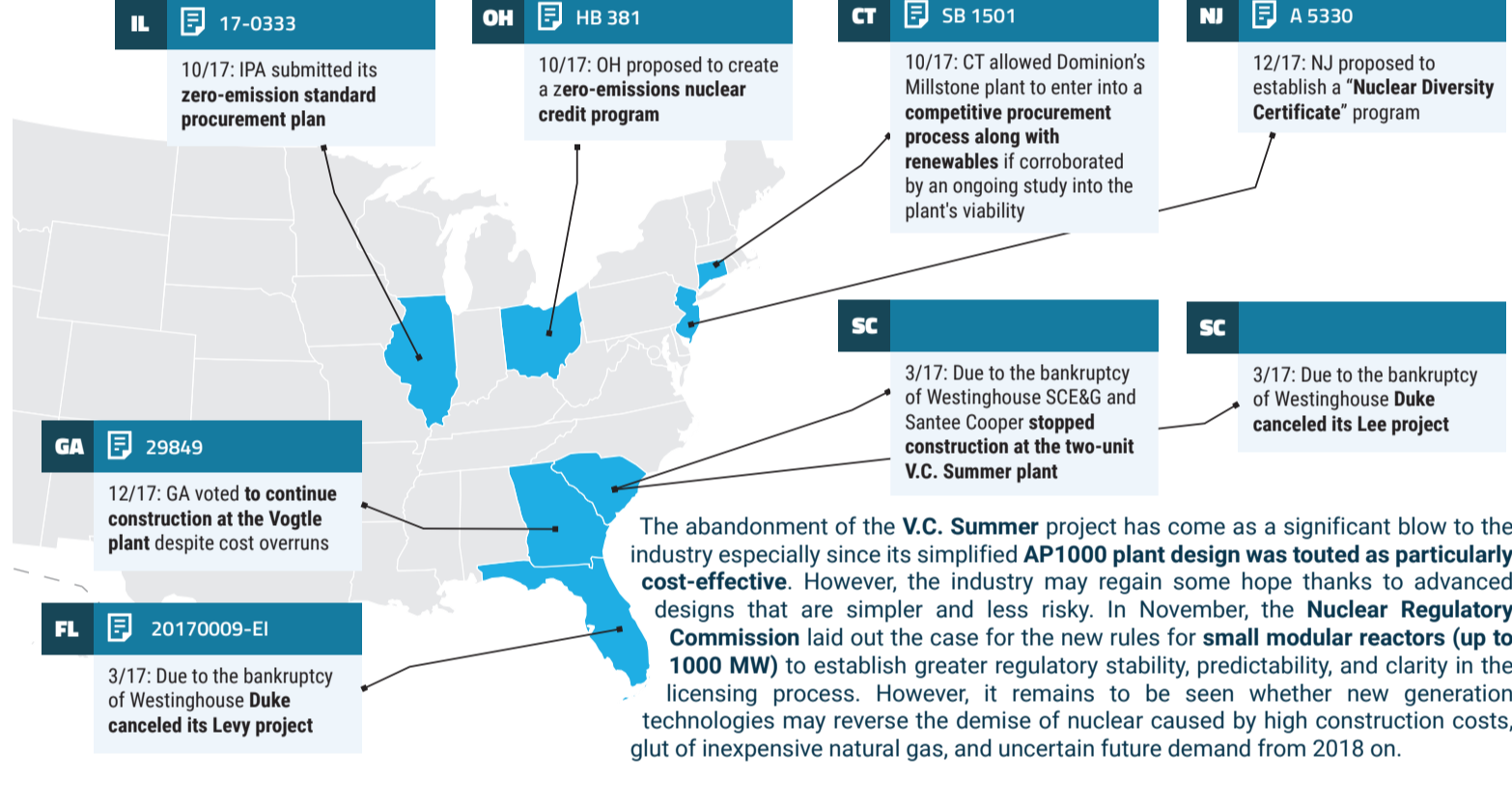
Interest in energy storage is accelerating as policymakers, grid planners, and utilities recognize storage as an important tool to **firm up intermittent generation, flatten the load curve, and offer ancillary services**. While the spread of renewables remains a major driver for the growth of energy storage, grid resiliency needs, especially in the wake of weather disasters, provide another avenue for growth in the industry. According to the U.S. Energy Storage Monitor, **41.8 MW of storage were deployed across the U.S. in the third quarter of 2017**, representing a **46 percent growth year-over-year**. In the policy realm, **governments have used mandates, tax incentives, streamlined permitting processes, and research and development programs to support storage**. The numerous policies enacted in 2017 will set the tone for 2018 in storage.



#2: Intensifying Debate over the Future of Nuclear

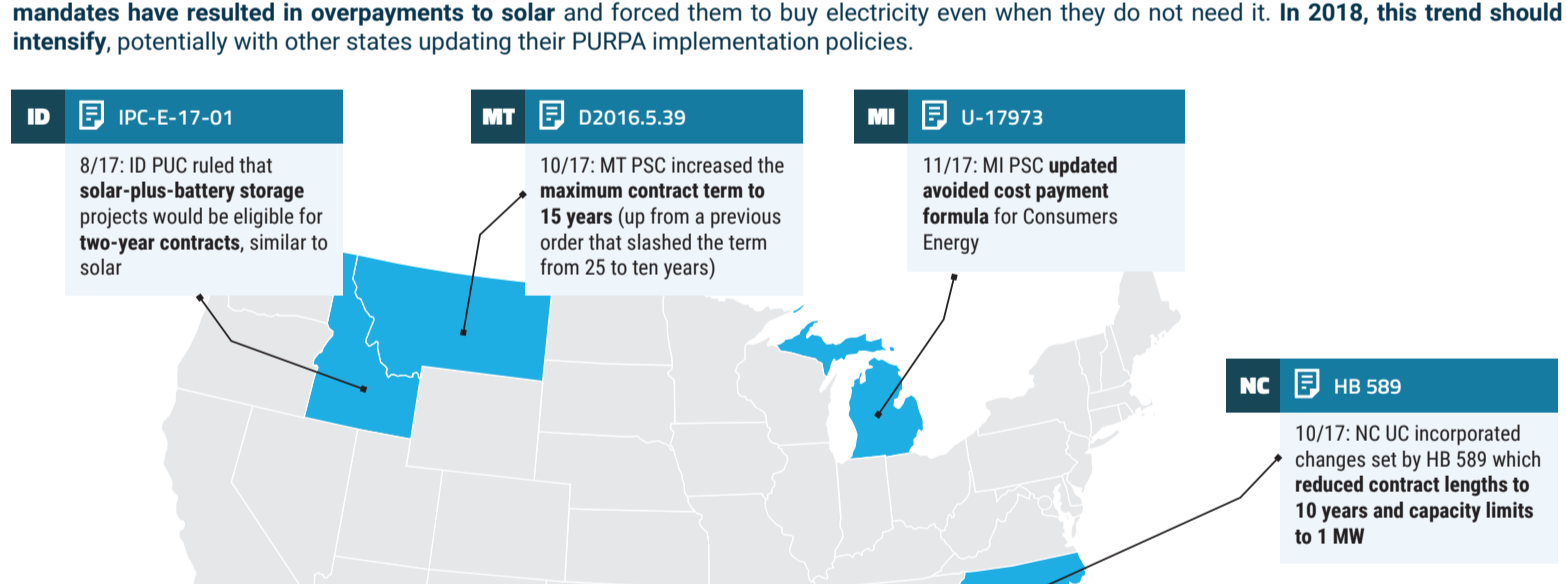
Low natural gas prices have pushed down the wholesale electricity prices **squeezing the margins of nuclear plants**. Consequently, a number of nuclear plants have found themselves at the **risk of premature closure** due to their inability to compete with natural gas plants in wholesale markets. The wave of closures has prompted the Nuclear Regulatory Commission (NRC) to consider new rules for decommissioning nuclear plants to make the process more efficient and reduce the need for exemptions from existing regulations. According to the Energy Information Administration (EIA), the U.S. has successfully decommissioned ten commercial nuclear reactors as of November 2017, and another **20 are currently in different stages of the costly and lengthy decommissioning process** paid for through a fund that plant operators create during construction.

Multiple states have chosen to support nuclear as a low-carbon baseload electricity source to maintain its share in the energy portfolio. **New York (15-E-0302 and 16-E-0270)** and **Illinois (SB 2814)** were first to **enact programs in 2016 to compensate eligible nuclear plants for every MWh of carbon-free electricity they generate**. Both programs which sparked a national debate over nuclear subsidies have survived legal challenges. However, the outlook for new nuclear reactors remains grim due to the bankruptcy of the reactor designer Westinghouse Electric and spiraling capital costs.



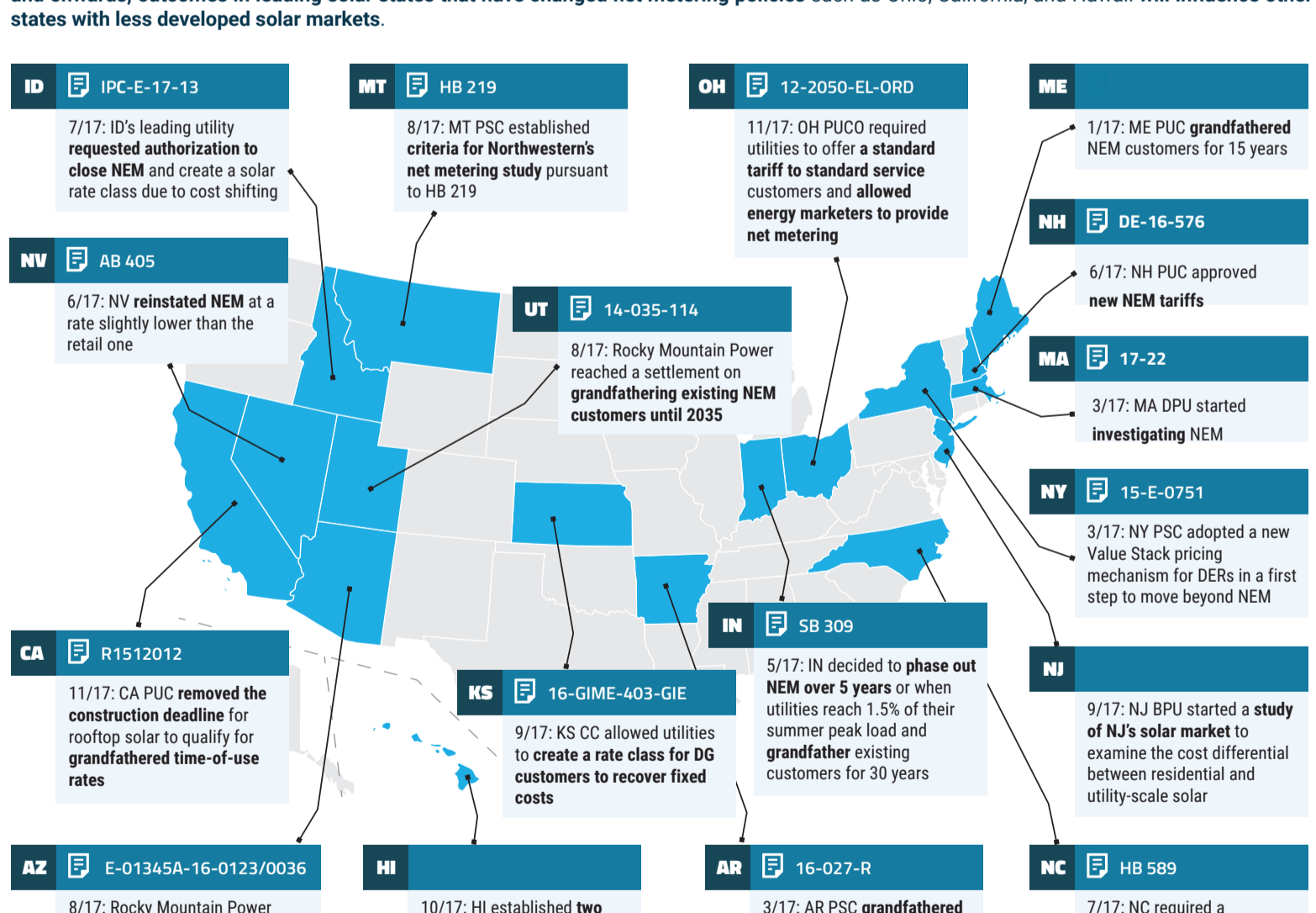
#3: Growing Relevance of PURPA

PURPA has gained relevance in recent years due to the **significant decline in renewable energy costs** which has made **solar and wind increasingly cost-competitive**. In a bid to promote small renewable energy and cogeneration facilities, known as qualifying facilities, **PURPA requires utilities to purchase electricity from these facilities at the rate of the utility's avoided cost**, which is the cost incurred by the utility if it chose to generate the power by itself or purchase it from non-qualifying facilities. Much has changed since the enactment of PURPA in 1978 given the development in wholesale markets and retail competition and the shift from coal to natural gas and renewables, driven by economic forces and technological advancement. Furthermore, some initial contracts entered into during the 1980s and 1990s are expiring, and new entities are exploring the avoided cost methodologies. The declining cost of new generation has sparked a **debate over avoided costs**, prompting **utility complaints that PURPA mandates have resulted in overpayments to solar** and forced them to buy electricity even when they do not need it. In 2018, this trend should intensify, potentially with other states updating their PURPA implementation policies.



#4: Changes to Net Energy Metering Rules

The **changing net metering landscape** has called for discussions among utilities, consumers, renewable energy companies, and regulators on improving the existing policies. With evolving consumption patterns, utilities want rate structures that **address cross-subsidies and help recover costs**. Even states with relatively small solar capacity, such as Idaho and Montana, have sought to **solve these challenges proactively**. In 2018 and onwards, **outcomes in leading solar states that have changed net metering policies** such as Ohio, California, and Hawaii **will influence other states with less developed solar markets**.



#5: Wholesale Market Reforms

The glut of cheap natural gas and the spread of renewables have rendered coal and nuclear power plants less economical for markets to **price signals in wholesale electricity markets**. Discussions on wholesale markets and state policies have centered on **market designs that value various resource attributes**. So far, wholesale markets have been **agnostic to resource types and environmental externalities, causing states to address them on their own**. PJM Interconnection and the Electric Reliability Commission of Texas (ERCOT) are examining reforms to price formation issues while in California, generators are tackling increased instances of negative pricing and curtailment, also suggesting a need for market reform.

DOE

Perhaps the most closely watched issue for 2018 will be the Department of Energy's **grid resiliency rule** proposed in September 2017 to provide reasonable rates for fuel-secure generators such as coal and nuclear units. While the proposal reviewed some options in the two industries, a broad range of other stakeholders have raised numerous issues.

FERC

In May 2017, the FERC held a technical conference to determine whether **state policies and objectives can be achieved through market mechanisms in the Eastern RTOs/ISOs**. Reforms, if passed, would likely address market mechanisms to **value resource attributes and internalize carbon costs within wholesale electricity prices**. However, stakeholder discussions have remained **inconclusive** so far, making this issue a **key one to follow in 2018**.

PJM

Among other initiatives to watch in 2018, in November 2017, PJM Interconnection proposed to **expand the eligibility criteria for setting energy market prices for inflexible resources** that have so far been excluded from the process. PJM explained that all resources scheduled to serve demand should have the opportunity to set prices and earn competitive returns in the markets.

ERCOT

In October 2017, the Public Utility Commission of Texas requested comments on its project to **assess price formation rules in the ERCOT energy-only market** to respond to persistently low prices. The outcome of ERCOT proceeding will likely have a **significant impact on wind energy in Texas**, which tops the nation in wind production.

NYISO/NY DPS

In August 2017, the New York Independent System Operator and the Department of Public Service initiated a process to **examine the potential for carbon pricing in the wholesale energy market** to further the state's energy policy goals.

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