Smart grid primer

A look at energy grid modernization and an overview of smart grid legislation

August 13, 2018

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What is the smart grid?

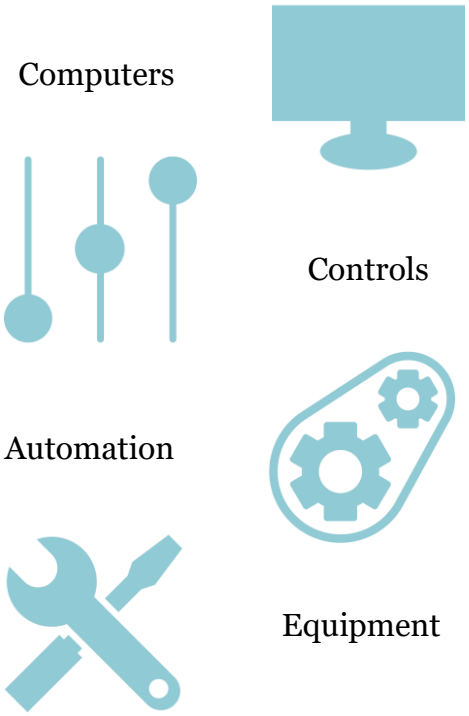
Background

- The US electric grid was built in the 1890s
- The grid has more than 9,200 electric generating units
- Its generating capacity is more than 1 million megawatts
- It has more than 300,000 miles of transmission lines

What makes a grid smart?

- Digital technology
- Two-way communication between a utility and its customers
- Sensors along transmission lines

Like the internet, the smart grid will involve different technologies and mechanisms working together to respond digitally to quickly changing electrical demand



Sources: "What is the Smart Grid?" Smartgrid.gov

What does a smart grid do?

Quicker restoration of electricity after power disturbances

More efficient transmission of electricity

Reduced operations and management costs for utilities

Reduced peak demand, which will also help lower electricity rates

Increased integration of large-scale renewable energy systems

Better integration of customer-owner power generation systems and renewable energy systems

Improved security

More resilient to disruptions due to weather and natural disasters

Sources: “What is the smart grid?” Smartgrid.gov.

Consumer benefits of the smart grid

Smart meters

- "Smart meters" will let customers see how much electricity they use, when they use it and the cost
- The meters will come with real-time pricing
- They will allow customers to save power when electricity is most expensive

In-home generators

- In-home generators will allow consumers to save money by generating their own power
- This will help them manage their electricity usage with greater autonomy, saving money

Economics

National security

Renewable energy goals

Cheaper electricity

Sources: "Consumer engagement," Smartgrid.gov.

Plug-in electric vehicles could function as a distributed source of energy

"Vehicle to Grid"

- PEVs will play an important part in balancing the smart grid by serving as a distributed source of stored energy
- By drawing on batteries plugged in throughout the smart grid, a utility can inject extra power into the grid at critical moments
- This has the potential to reduce brownouts or rolling blackouts
- PEVs can keep parts of the grid operating during blackouts
- They can also help integrate wind and solar power into the grid

Sources: Plug-in electric vehicles," Smartgrid.gov.

The smart home will give consumers greater control over their home energy use

Home energy management systems

- Smart meters will allow for interface between consumers and their energy providers
- These can help consumers cut energy costs, and provide real-time updates about how much energy consumers are using

Smart appliances

- Appliances will be networked together in the smart home, which will help consumers keep track of how much energy all their appliances are using at all times
- Smart appliances will also respond to signals from energy providers to avoid using energy during times of peak demand, reducing stress on the grid

Home power generation

- Rooftop solar electricity systems, wind turbines, and small hydropower systems are just some of the ways that consumers will be able to generate power at home using the smart grid

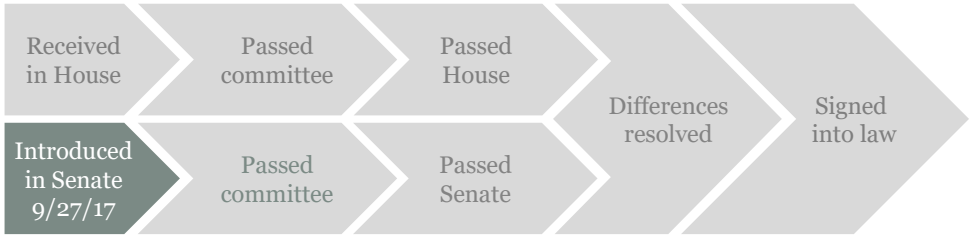
Sources: "The Smart Home," Smartgrid.gov.

Smart grid legislation to watch

S. 1874: Distributed Energy Demonstration Act of 2017

Sponsor: Ron Wyden (D-OR)

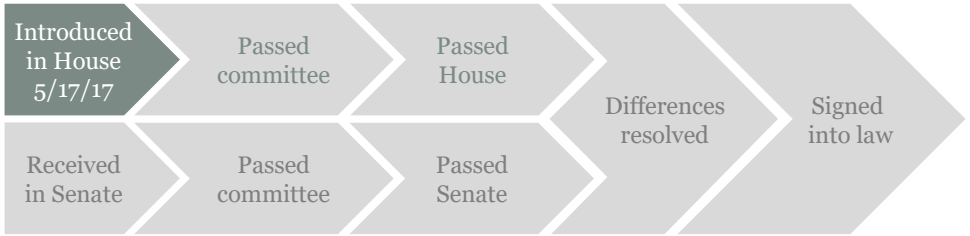
- Reauthorizes the DOE's grant program for smart grid investments through FY2025



H.R. 2479: Leading Infrastructure for Tomorrow's America Act

Sponsor: Frank Pallone, Jr. (D-NJ)

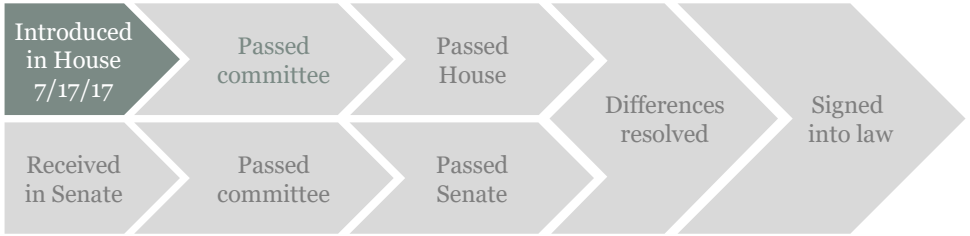
- Authorizes appropriations to improve infrastructure, with provisions for modernizing the energy grid



H.R. 3275: Water and Energy Sustainability Through Technology Act

Sponsor: Jerry McNerney (D-CA)

- Begins a smart energy and water efficiency pilot program that makes use of smart meters



Sources: National Journal research; Congress.gov.

Slide last updated on August 7, 2018