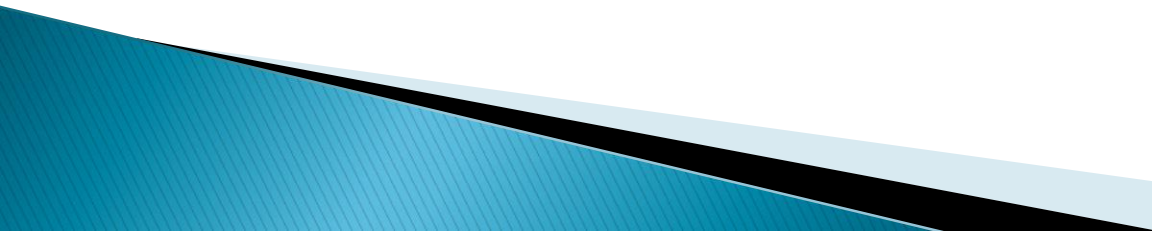


Radical Change Confronts the US Electric Utility Sector

A presentation to the IEA–EPRI Task Force by
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Outline of presentation

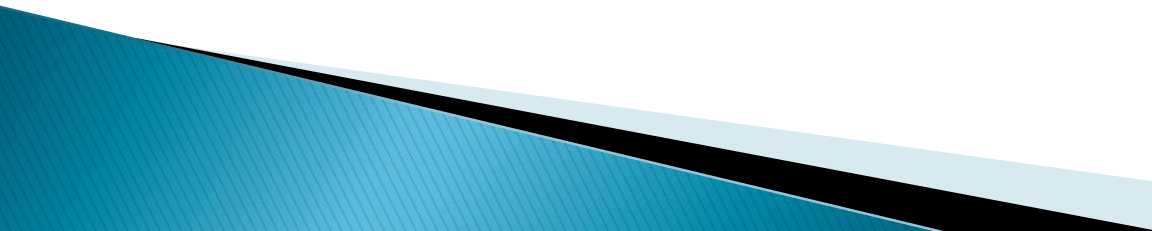
- ▶ The question is not where we need to go, but how to get there
 - ▶ Several drivers make US utility sector restructuring inevitable
 - ▶ The necessity of decarbonization adds political complications
 - ▶ Examples of what is going on at present:
 - At the state level – in particular, the New York REV Process
 - At the company level
 - ▶ Conclusions
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The future is certain – but how to get there is uncertain

▶ We know:

- We must decarbonize electricity generation if we are going to avoid catastrophic climate change
- A destabilizing combination of technological and market forces is transforming the electric utility sector in the US (and probably worldwide)

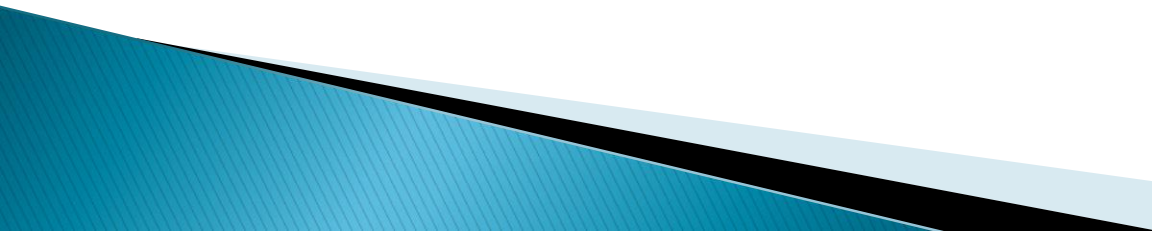
▶ We don't know:

- What policies to adapt to these forces are both politically viable and substantively effective
 - How to ensure cooperation among federal, state, and local authorities
 - Whether these policies will preserve an economically viable electric utility industry that can make the necessary investments and offer reliable and universal service
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The transformation of the US utility sector is already well under way

- ▶ The advent of **new technologies** for electricity generation and use is enabling:
 - Improved efficiency in electricity use
 - Consumer responsiveness to cost and time of use
 - New and distributed forms of electricity generation
 - The first practical forms of electricity storage
- ▶ Consumers are choosing and installing many of these technologies, but utilities will be required to integrate and coordinate them, requiring major system investments

The transformation of the US utility sector is already under way

- ▶ The increasing economic importance of electricity is creating new demands for electric service **reliability and resiliency**:
 - A digital economy requires uninterrupted power
 - The duration of outages from hurricanes Katrina, Rita, and Sandy and the East Coast Derecho was seen as unacceptable
 - Exposed utility systems face risks of cyber- and physical attack
 - ▶ Responding to these concerns will require major additional system investments
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The transformation of the US utility sector is already under way

- ▶ **Meaningful competition to electric utilities** is arising both for generation and for distribution services:
 - Independent power producers
 - Building-mounted solar PV with innovative financing
 - 3rd party building management and efficiency services
- ▶ Utilities may lose the financial protection derived from regulated monopoly status for more of their business lines

The transformation of the US utility sector is already under way

- ▶ Traditional **cost-of-service rates for utilities will not adequately compensate** necessary investments and services
 - Load is flat or declining, traditional rates are largely volumetric
 - Passing investment through to consumers based on their electricity usage may drive them to competitive alternatives such as self-generation, demand response, further efficiency
 - Renewable power has high capital cost, but low variable cost, and when available undercuts both dispatchable natural gas plants and baseload coal and nuclear plants


Consensus emerging for “performance-based” rates

- ▶ **New rate designs are needed to compensate utilities based on their performance**
- ▶ **Key unanswered questions:**
 - Should competition be welcomed in all potentially contestable utility services, or should the utilities retain a legal monopoly to ensure adequate revenues, universal access and adequate reliability?
 - How can consumers be included as performance evaluators?
 - How quickly can a transition be managed in light of state-by-state regulation and century-old statutory and judicial precedents?
 - **Will the resulting revenue flow to utilities be sufficient to support the necessary system investments and allow a return that will attract low-cost capital?**

The US electricity sector is complicated by divided regulatory jurisdiction:

- ▶ **Investor-owned utilities** (about 200 in the US, serving 80% of consumption) are **regulated by the states**
- ▶ **Municipal utilities** (about 2,200, including some large cities – Los Angeles, Sacramento, Seattle, Memphis, San Antonio – serving 10% of consumption) are **regulated by city governments**
- ▶ **Cooperative utilities** (about 800, serving 10% of consumption) are **regulated by their own Boards of Directors**
- ▶ **Federal regulation** extends only to federal hydropower systems, regional grids, interstate transmission rates, and rates for wholesale bulk power sales
- ▶ **As a result, there will be many different regulatory approaches to this transition**

Decarbonization is complicating the transition for the electricity sector

- ▶ Electric power generation is the largest single source of US greenhouse-gas emissions (40 percent)
 - ▶ EPA has proposed a rule under Section 111(d) of the Clean Air Act to subject existing utility generators to regulation for carbon dioxide emissions
 - ▶ **The federal role in regulating decarbonization will bring federal regulators into policy and investment decisions that would otherwise be state or local**
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The US policy response to date has been mixed and uncertain

- Electric utilities and their trade associations (EEI, APPA, NRECA, and EPRI) are well aware of the transition and wrestling with its implications
- Utilities are now proposing to increase fixed costs to recover system costs, reduce payments for customer-generated energy, and decrease support for efficiency investments in order to protect revenues
- The financial industry has begun to downgrade utility stocks and debt ratings in the face of the increasing risks to investments and profits
- **Decarbonization will pose new challenges for market design**
- Some states and regions (California, RGGI) have cap-and-trade systems to reduce carbon emissions; 29 states have renewable portfolio standards
- There is no chance of a new federal law establishing carbon emissions standards or pricing in the next two years, leaving EPA “the only game in town”

What US States are doing...

The New York REV (“Reforming our Energy Vision”) process – the leading example at present:

Goals:

- ▶ Enhanced customer knowledge and bill management
- ▶ Greater system-wide efficiencies
- ▶ Greater fuel and resource diversity
- ▶ Greater system reliability and resiliency
- ▶ Reduced carbon emissions

Motivations:

- ▶ Increased perception of extreme weather risks
 - ▶ Desire to encourage distributed energy resources (DER)
 - ▶ Desire for greater system efficiency
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The New York REV approach

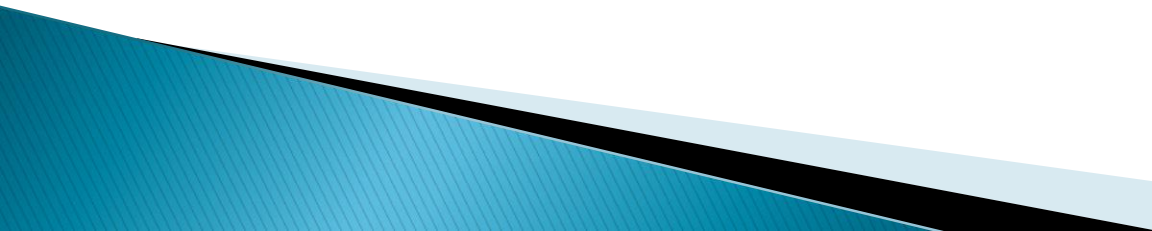
- ▶ Utilities could take on additional roles as a “Distributed System Platform Provider” (DSP), or a new DSP entity could be created
- ▶ The goal of decarbonization is to be reached through greater use of clean DER and incentives for system-wide efficiency, not through specific standards or mandates

Utility and DSP Roles and Responsibilities	Utility	DSP	Utility and DSP Roles and Responsibilities	Utility	DSP
Market Functions			System Operations and Reliability		
Administer distribution-level markets including:			Monitor real-time power flows	X	X
- Load reduction Market		X	Emergency Demand Response Program	X	X
- Ancillary services		X	Ancillary Services	X	X
Match load and generator bids to produce daily schedules		X	Supervisory Control and Data Acquisition	X	X
Scheduling of external transactions		X	System Maintenance	X	
Real-time commitment, dispatch and voltage control		X	Engineering and Planning		
Economic Demand Response		X	Engineering	X	
Demand and Energy Forecasting	X	X	Planning / Forecasting	X	X
Bid Load into the NYISO	X		Capital Investments	X	
Aggregate Demand Response for sale to NYISO	X	X	Interconnection	X	X
Purchase Commodity from NYISO	X		Emergency Response		
Metering	X		Outage Restoration / Resiliency	X	X
Billing	X	X			
Customer Service	X	X			

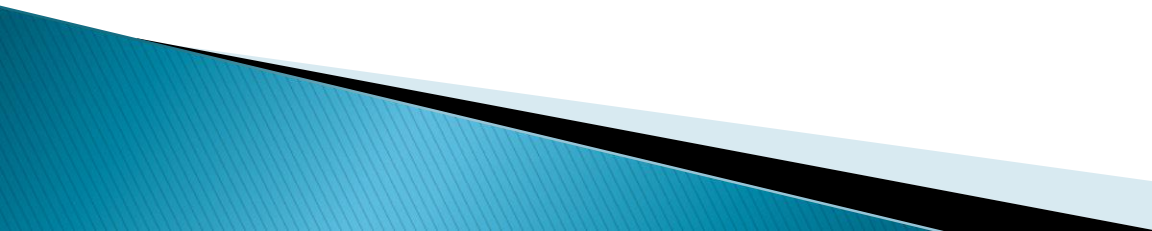
The New York REV process

- ▶ New York PSC order instituted proceeding April 2014; technical conferences held through summer 2014; straw proposal issued August 2014. Now a two-track proceeding:
 - **Track 1:** Collaborative process to examine the role of distribution utilities in enabling market-based deployment of distributed energy resources to promote load management and greater system efficiency, including peak load reductions
 - **Comments submitted; reply period open until October 24**
 - **Track 2:** Examine changes in current regulatory, tariff, and market designs and incentive structures to better align utility interests with the Commission's policy objectives
 - **Staff straw proposal to be issued January 30; comments until March 20**
 - **Commission Decision on Track 1 – early 2015**
 - **Commission Decision on Track 2 – late 2015**

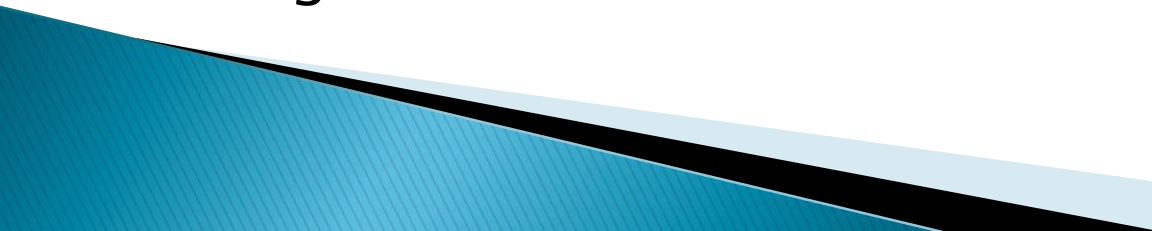
What other US States are doing...

- California's latest steps
 - Texas, the US renewable energy and competitive utility leader
 - Maryland, responding to the Derecho and a major merger proposal
 - Ohio, reversing course on utility energy efficiency and renewable energy standards
 - Other states doing something...
 - Many states doing nothing...
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What US utility companies are doing...

- ▶ Bold steps by some individual utility companies:
 - NRG, represented here by Steve Corneli, has been perhaps the most visible US utility in facing up to these challenges, advising investors that the old utility model cannot survive
 - Other progressive utilities include Public Service Electric & Gas in New Jersey, Xcel Energy in Colorado, and the California utilities
 - Other utilities appear to be “digging in,” resisting efforts to move actively into energy efficiency programs or clean energy programs, such as First Energy in Ohio
 - Most utilities are trying to preserve their current status
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Conclusions – 1

- A **multi-faceted transition** to a different electric utility structure in the United States is beginning and inevitable, but has not advanced very far
 - The **compensation scheme for utilities must change** from a volume-driven approach in light of flat or declining electric demand and increasing costs and investments
 - The current **consensus appears to favor performance-based rates**, but many questions remain to be answered in designing such rates
 - In the US system, where **individual states have principal regulatory authority over electric utilities**, New York and a few other states are trying innovative approaches, while others are resisting any changes
 - Some utilities are stepping forward into the future, but most are focused on trying to preserve their current status with support from their regulators
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Conclusions – 2

- **Decarbonization of the electric system is one of the key factors driving the transition, with significant influence on the necessary investments and technologies that will be required**
 - **However much uncertainty remains regarding the outcome of climate policy debates in the US and internationally**
 - **Decarbonization will be of great importance to the evolving economics of the electric sector, and therefore to the emergence of a new compensation scheme, but the split in jurisdiction between federal and state/local governments over emissions and utility regulation will complicate the process in the US**
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