



Show Me the Value: Meeting Increased Customer Expectations In a Time of Transformation

Sue Kelly
CEO, American Public Power Association
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Public Power

- 2,000 utilities serving 48 million customers
- Retail service in 49 states
- 14.4% of all sales to electric customers



Typical Public Power Utility

- State or community owned, not-for-profit
- Median size: 2,000 customers
- Range from small towns to large urban centers
- Cost-based, bundled service
- Regulated in most cases by city council or independent board, which sets and reviews rates, service policies
- Have generally retained the obligation to serve their customers; many do integrated resource planning

Public Power (and the Rest of the Utility Industry!) Is Entering a Time of Great Change

Four factors driving this change:

- Evolving customer preferences
- New technologies
- Increasing regulation
- Utility workforce issues



APPA 2016-2018 Strategic Initiatives

- Communicate the value of public power
- Public Power Forward
- Address adverse impacts of federal regulation
- Improve cyber and physical security
- Focus on research and development
- Help meet utility workforce challenges

Public Power FORWARD



What Is Public Power Forward?

Helping public power utilities prepare for a new era in retail electric service through

- Research
- Education
- Advocacy
- New tools & technologies



Why Public Power Forward?

- Utilities in the past stayed on their side of the meter; main customer interface was the bill
- Retail electric customers now have more choices with new technologies (on both sides of the meter)
- New industry entrants — can be both competitors and service provider partners
- Public power utilities strive to be the service providers of choice in their communities

Member Toolbox



- **Policy research and analysis:** What DOE, states, and other utilities/sectors are doing on distributed generation, demand response, energy efficiency
- **Education & tools:** Options, case studies, best practices, resources
- **Advocacy:** Ensure policymakers and thought leaders understand public power's views
- **Communication toolkits:** Educate retail customers, community stakeholders and policymakers

Tools from APPA, Decisions by Members

Members need to decide whether, when and how to revise services, rate structures and operations/infrastructure to:

- Offer retail customers more options
- Modernize utility operations
- Ensure interests of all customers are protected and financial viability of the utility is maintained (many funded by municipal debt)



Innovation

Public power customers, even in small communities that you would think are remote from the frontlines of electric restructuring, are very interested in new technologies and green energy



Central City Solar Garden Earns Project of the Year Award

“NMPP Energy awarded the City of Central City, Neb., with a Project of the Year Award for its Community Solar Garden at its 41st Annual Meeting and Conference in Grand Island, Neb., March 30. The City began working cooperatively with a local businessman in 2014 to develop the solar garden, which currently has a total electric generating capacity of 200 kilowatts and is the state’s first community solar project. Plans are for an additional 500 kilowatts to be installed this summer with the goal of reaching a total electric generating capacity of two megawatts during 2017. The City adopted Virtual Net Metering to allow individuals and businesses to own solar panels at the facility, rather than installing panels on individual rooftops or property. Currently, the City owns panels along with seven other businesses.”

https://www.nmppenergy.org/view_article?article_id=2138

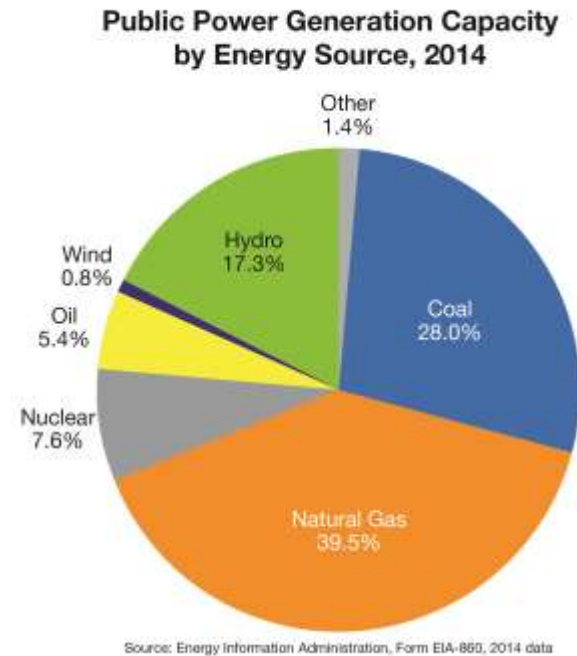
There Are Limitations...

Public power utilities are very interested in creative micro-projects, but are less able to support original research and development and large-scale pilot projects; they are not making rate based investments for the return they generate; spending their customers' money!

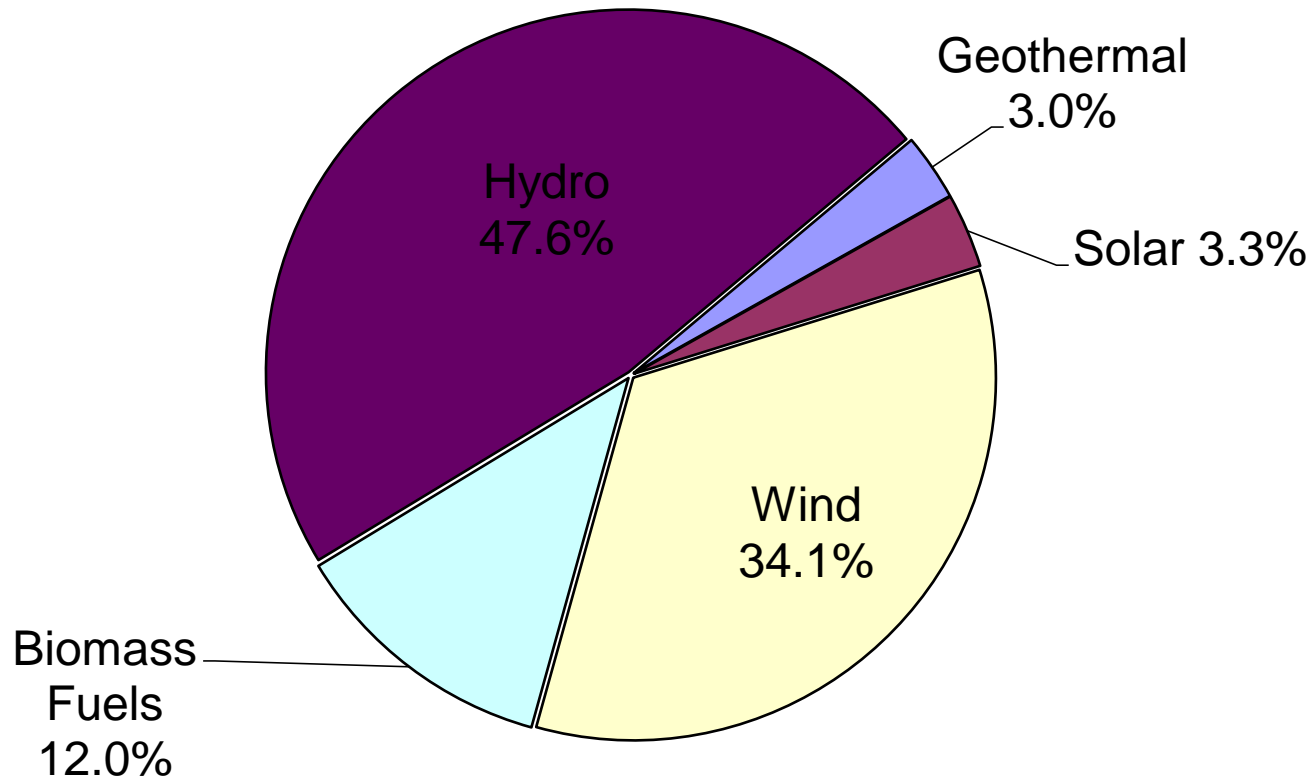
Many smaller public power utilities are only now modernizing their IT and OT, and customer interface/metering infrastructures

Public Power Generation Mix

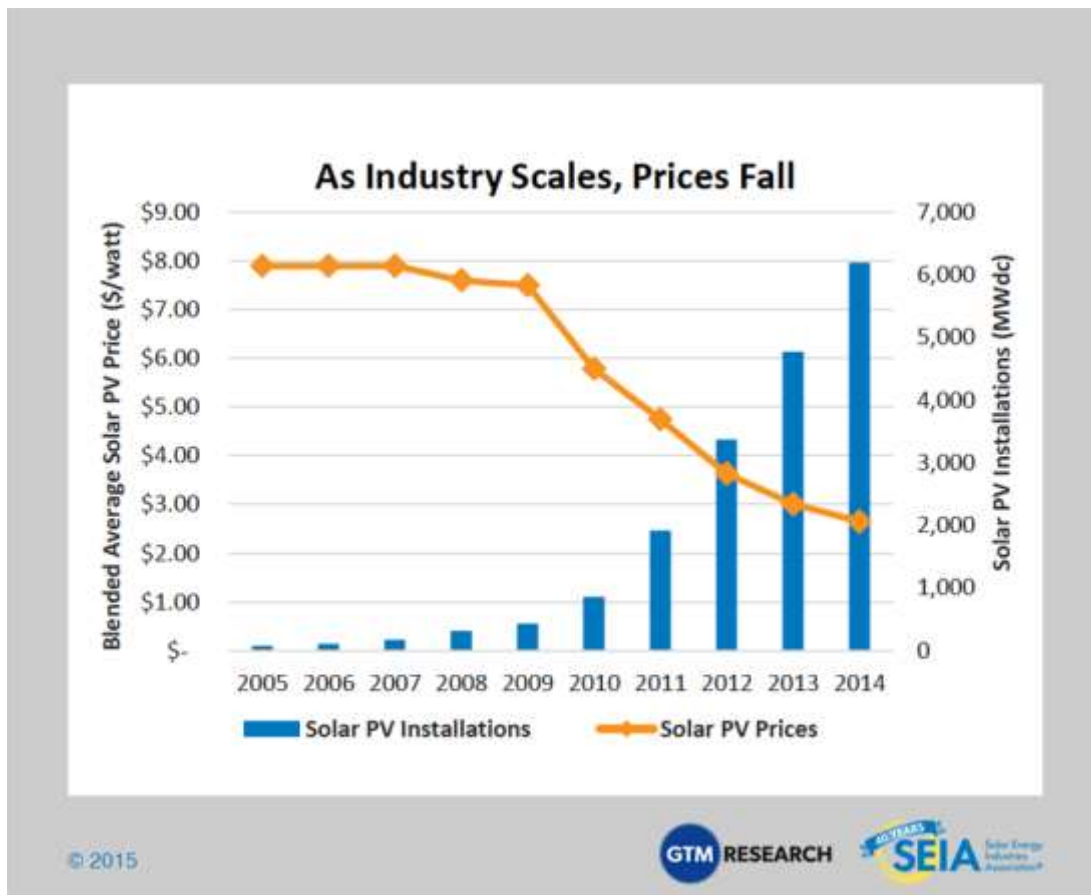
- 1/3 own generation and 2/3 buy
- Many have diverse portfolios, with hydropower, nuclear, natural gas, coal, renewables
- Renewables include wind, biomass (landfills!), solar, geothermal, run of river hydro



U.S. Renewable Generation by Fuel Type

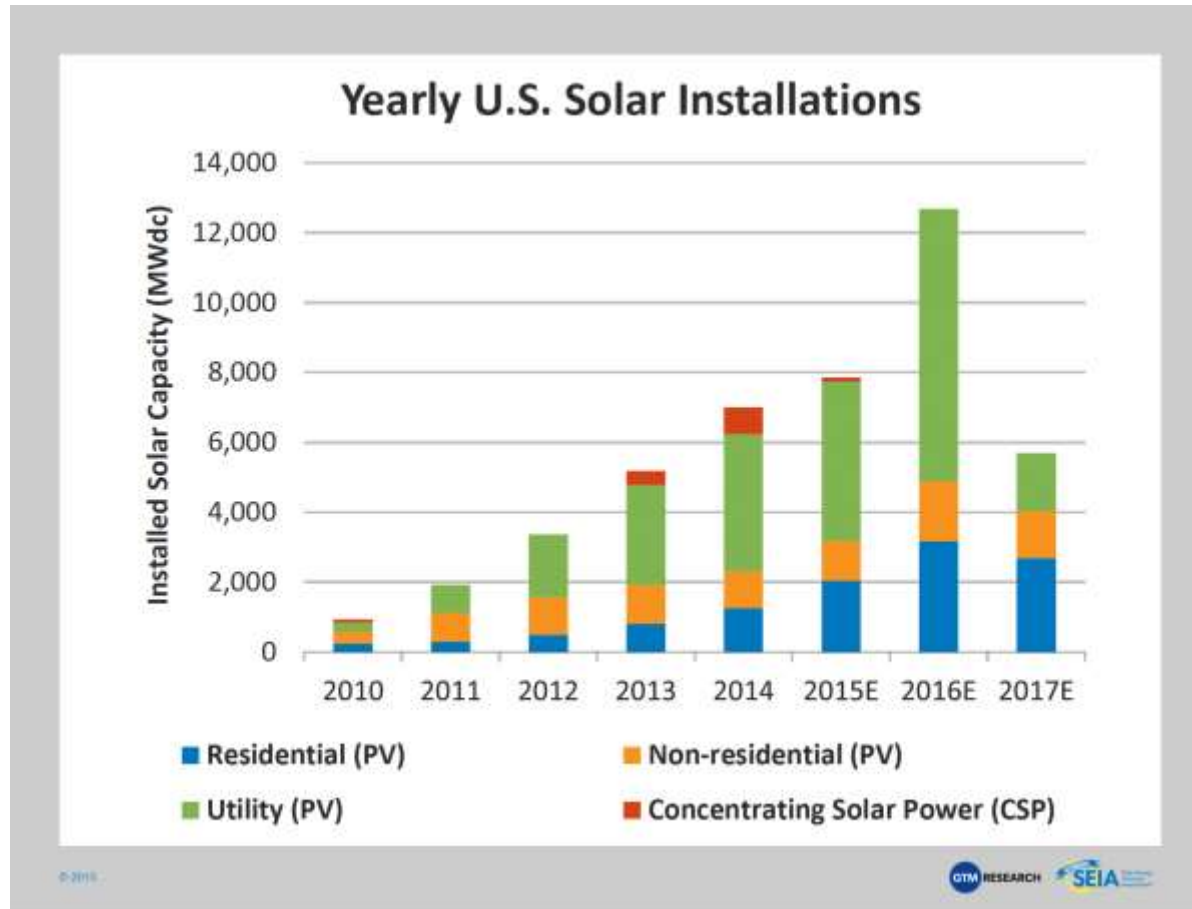


U.S. Solar Prices Are Falling



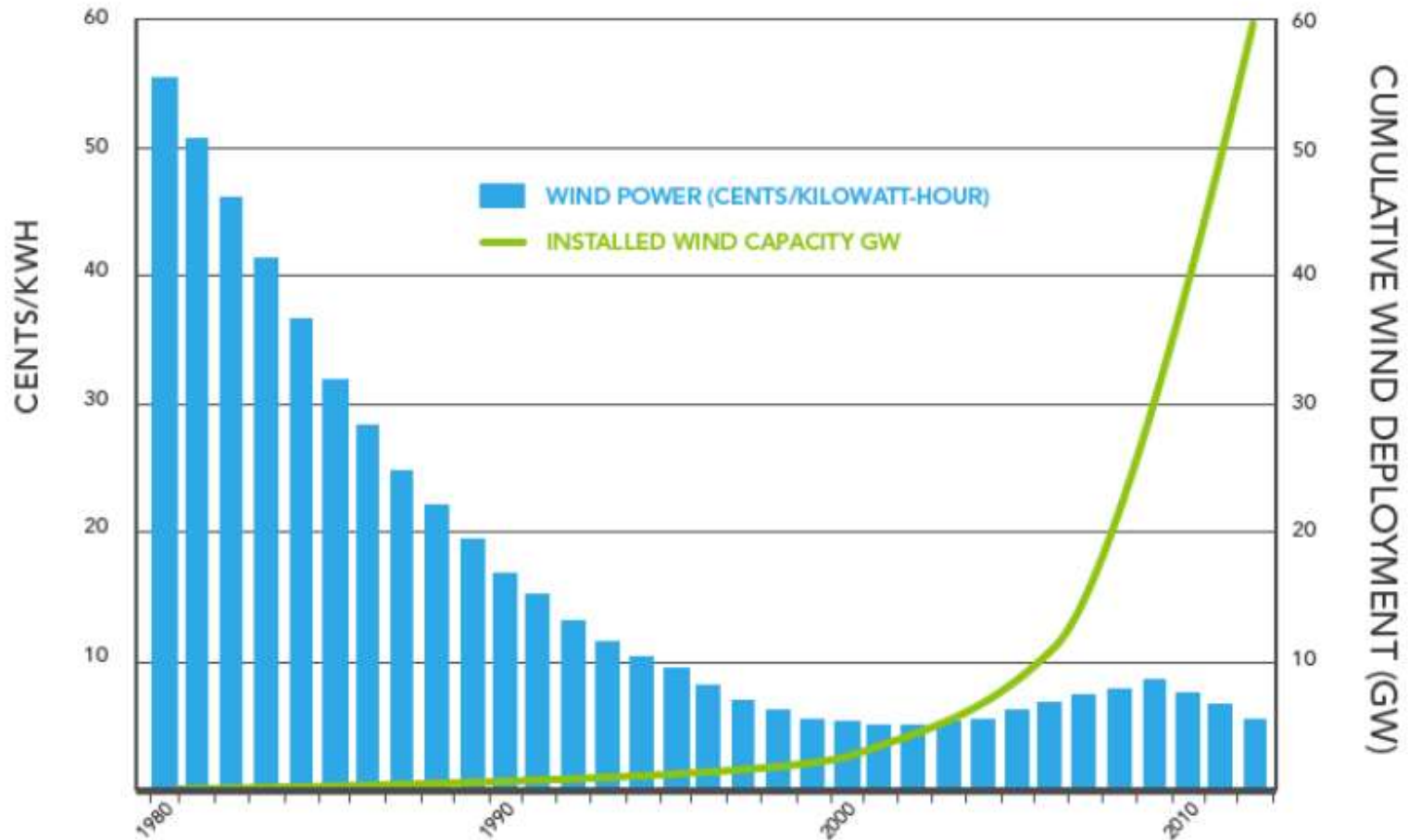
Source: Solar Energy Industries Association

U.S. Solar Installations Are Rising



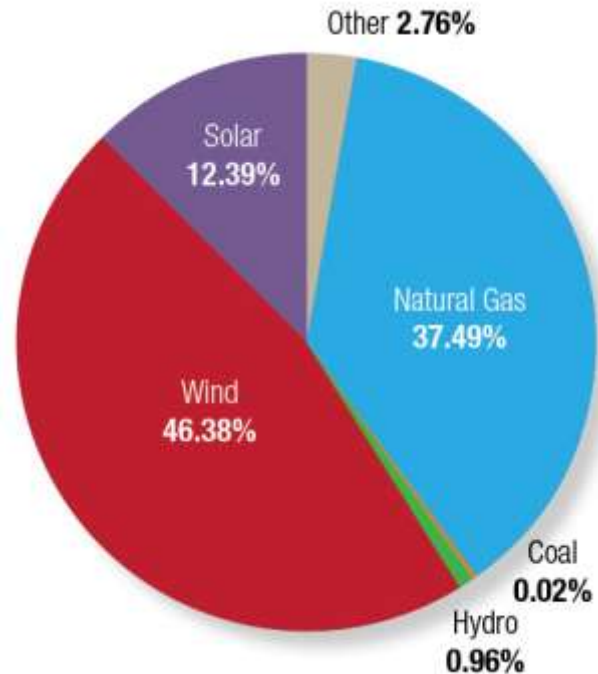
Source: Solar Energy Industries Association

U.S. Wind Installations Are Rising

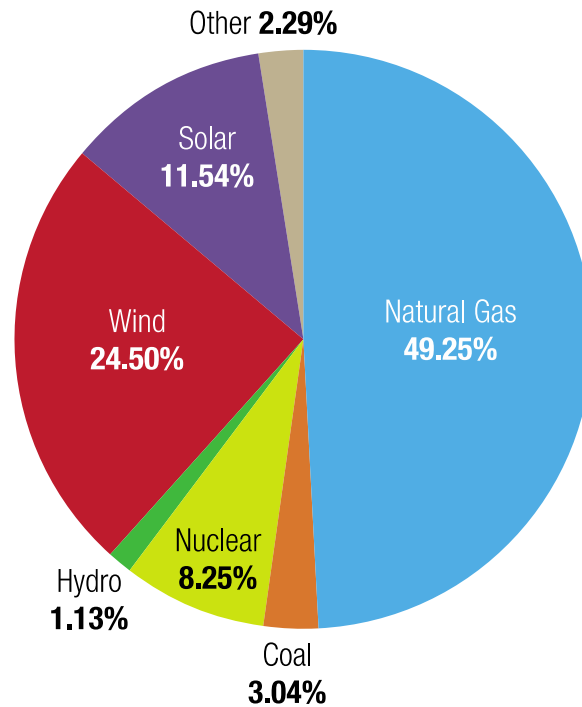


Source: American Wind Energy Association

U.S. Generation Capacity Additions by Fuel Type, 2015

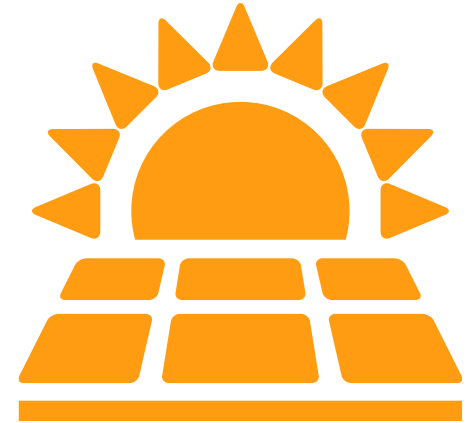


Future U.S. Capacity: Plants Under Construction and Permitted



Public Power and Solar

- Dramatic growth since 2014
 - Direct ownership
 - Utility-scale purchased power
 - Non-utility generation
 - Community solar
- 1,169 MW solar capacity in public power communities
- Nearly 8 percent of total installed U.S. solar capacity as of June 2015



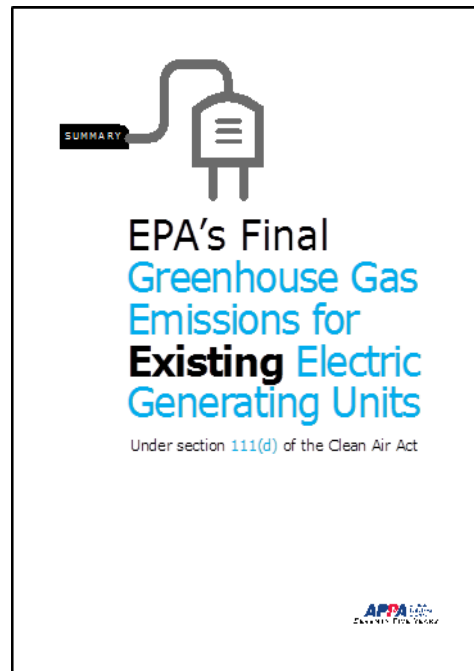
Solar Considerations

- Solar amounts to 2% of U.S. installed generation capacity (yet to reach substantial market share in most states)
- Natural gas still the most competitive source of new generation (but how to predict the future fuel price?)
- Rooftop solar costs are higher than utility/community solar on per kW hour basis, but residential rate design, tax credits, etc. can create incentives for individual customers that favor rooftop option

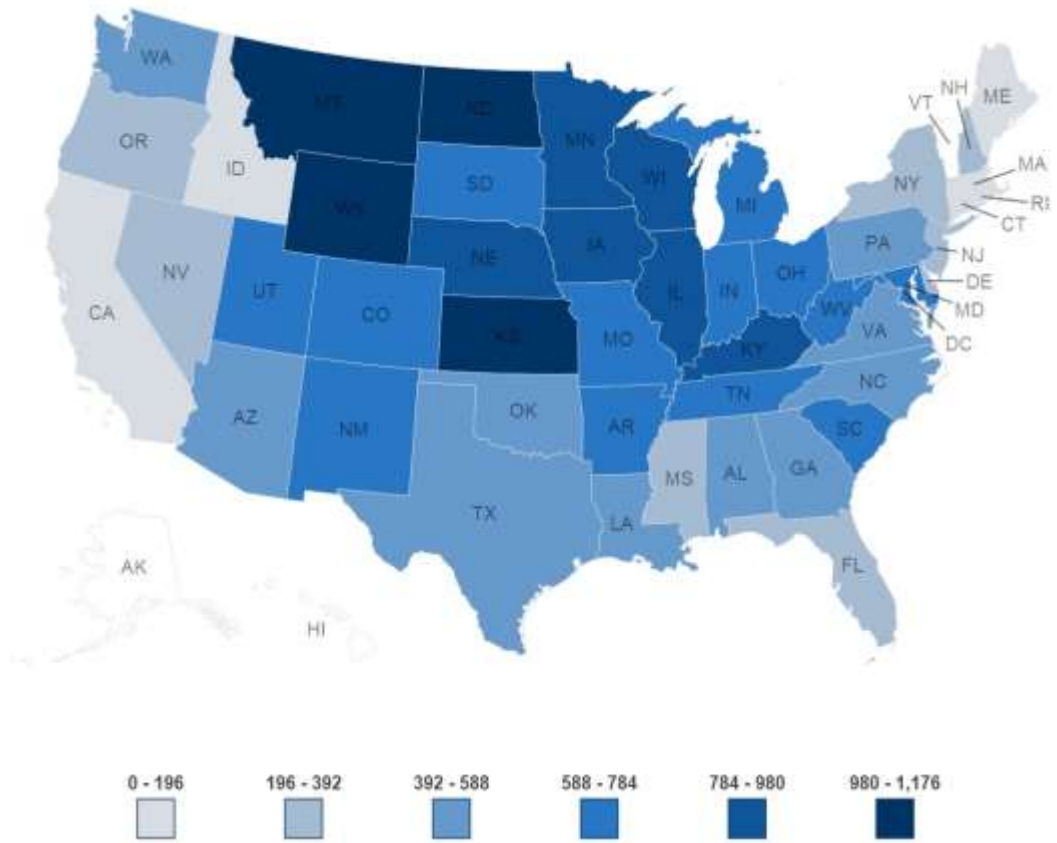
Factors Driving Future Transition

- Renewables poised for significant growth
- Energy storage and other technologies not yet commercially viable (but coming!)
- Emerging suite of conventional and advanced customer-side technologies
 - smart thermostats and grid-connected appliances (e.g. water heaters) *that can*
 - save customers money *and*
 - make more efficient use of the grid

One Big Challenge/Opportunity: EPA's Clean Power Plan



Final Emission Rate Reduction (in lb/MWh) for States Set by EPA in the CPP



The Supreme Court Deep Freeze

- Final CPP under review in United States Court of Appeals for the D.C. Circuit in *West Virginia v. EPA*, No. 15-1363
- As the whole world knows, the Supreme Court stayed the CPP rule on 2/9/16, by a 5-4 vote—but now only 8 justices, and who knows when the 9th seat will be filled and by whom....
- The DC Circuit hears arguments on June 2-3; opinion by Fall????—then on to the Supreme Court

What to Do Now?

- Some states have stopped work on CPP compliance; others are still moving ahead
- Given change in Supreme Court, can't assume CPP will be reversed, even though a stay was granted (one of the factors in getting a stay is "likelihood of success on the merits")
- While the CPP itself might not survive, it is prudent to assume that some sort of CO2 regulation (or equivalent) will happen, and to prepare for it ("no regrets" strategy)
- Renewables, distributed energy resources (DER), energy efficiency are all possible responses

Transition Steps for Public Power

- Develop sustainable business practices and strong customer relationships through education
- Pilot programs on DER integration, storage, other new distribution-level technologies
- Offer renewable options such as community solar; diversify wholesale power supply portfolios
- Review service options and accompanying rates to ensure fair treatment of all customer classes, sufficient revenue recovery for bondholders

Distributed Energy and Grid Modernization

DER's and Grid Modernization Strategy



The New Utility Business Model: The Continuum...

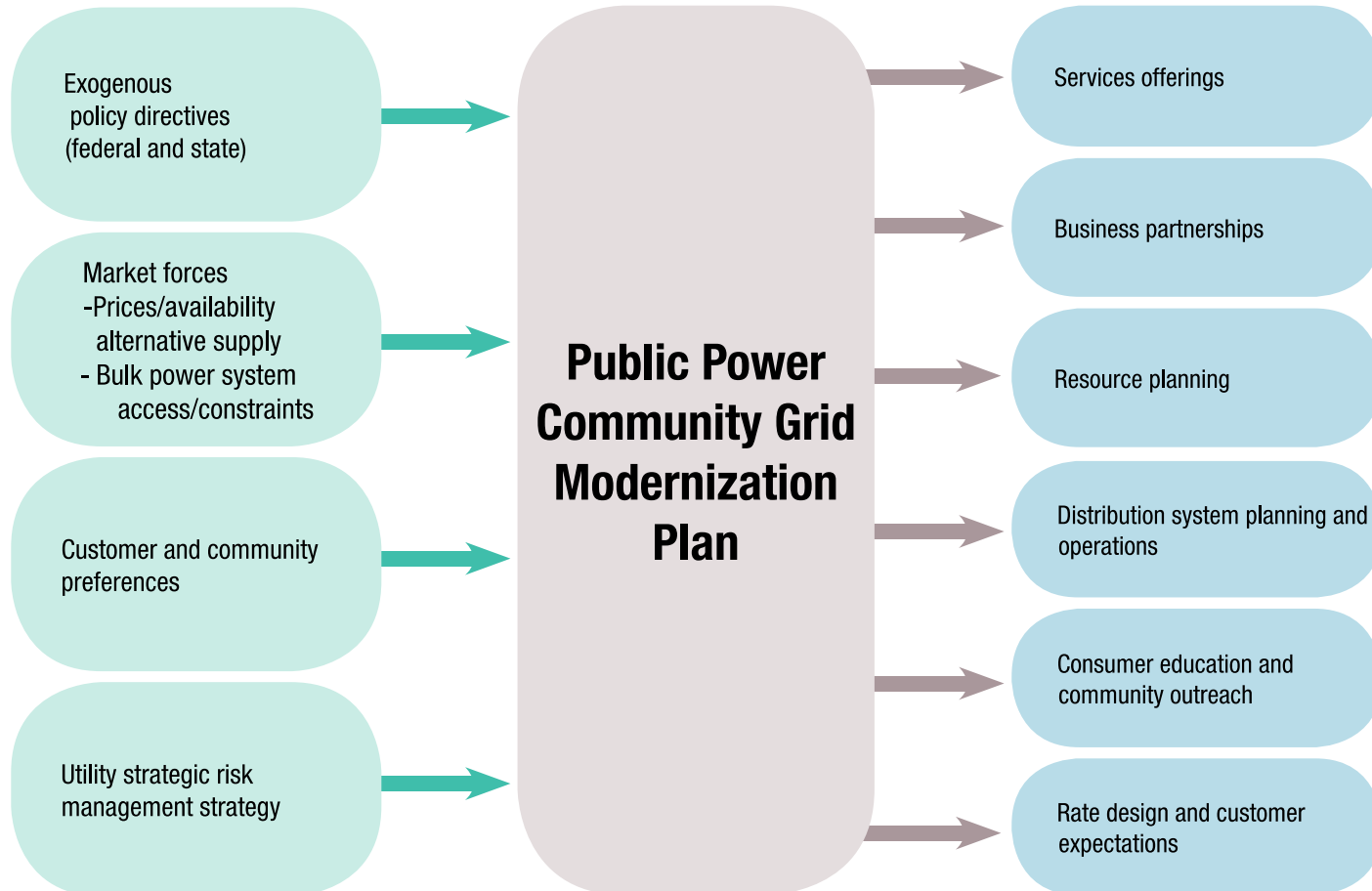
The new utility business model				
	Today	Model 1	Model 2	Model 3
Business model	Centralized, cost-of-service model	Full service provider	Platform provider	Poles & wires business
Customer relationship	<ul style="list-style-type: none"> • Largely 1-way • Some net metering for solar 	<ul style="list-style-type: none"> • Driver of DER (selling & procuring) • Customized energy solutions 	<ul style="list-style-type: none"> • Facilitate connecting DER providers with customers 	• N/A
Services	<ul style="list-style-type: none"> • Energy, transmission, distribution planning and operations • Traditional utility incentive programs • Low income and med rates/programs 	<ul style="list-style-type: none"> • Same as today, plus: • Distribution grid operations (dispatching, balancing) • DER integration • Full service bundling 	<ul style="list-style-type: none"> • Grid planning and operations (dispatching, balancing) • DER integration 	• N/A
Assets	<ul style="list-style-type: none"> • Central generation • Poles & wires 	<ul style="list-style-type: none"> • Central generation • Poles & wires • DER 	<ul style="list-style-type: none"> • Poles & wires 	<ul style="list-style-type: none"> • Poles & wires
Revenue sources	<ul style="list-style-type: none"> • Traditional energy and demand payments with some fixed charges 	<ul style="list-style-type: none"> • Energy & capacity payments (rates/price signals) • DER sales 	<ul style="list-style-type: none"> • Transaction fees • Integration service fees 	<ul style="list-style-type: none"> • Fixed distribution charges (asset rent)

3rd party vendor-driven investment, value & revenue potential

Utility-driven investment, value & revenue potential



The Public Power Forward Strategy



Future State Strategy: Goals

- Align customer, utility, and third-party supplier interests at grid-edge
- Capture benefits of DERs and other new technologies through integration into operations
- Deploy new utility business and operations technologies
- Reflect real economic costs and risks in rates and service offerings
- Manage financial, operational, and enterprise risks

Future State Strategy: Actions

- Product offerings with well-supported pricing
- DER deployment based on grid value
- Advanced IT/OT platforms
- Balanced portfolio of utility scale, community and customer-side resources
- Coordinated operations across bulk power, distribution utility and customer interfaces
- New business standards and practices
- Manage risk exposure in wholesale markets