



The Edison Foundation

INSTITUTE for
ELECTRIC INNOVATION

IEI National Dialogue

Digital & Distributed Grid

Key Takeaways
August 2016

IEI National Dialogue Series Meeting – Digital & Distributed Grid Key Takeaways

IEI HELD ITS FIRST NATIONAL DIALOGUE SERIES MEETING at American Electric Power headquarters in Columbus, OH, on July 20, 2016. Roughly two dozen electric and technology company executives met to discuss both challenges and opportunities as electric companies take advantage of rapid advancement in technology and digitization of the power grid to better serve their customers.

The U.S. electric power grid – the largest machine on the planet – is undergoing a massive technology upgrade. As the physical infrastructure used to deliver electricity – poles, wires, and substations – is enhanced by a digital layer of sensing and communicating devices, automation controls, and data analytics, the grid is transforming into a dynamic, multi-directional network that delivers electricity and information among customers, the electric company, and other suppliers.

As more and more customers are installing private solar on their rooftops, purchasing electric vehicles, and connecting energy storage systems and other devices to the grid, electric companies are investing in software and analytics aimed at greater visibility into the distribution system and seamless integration of customer-sited and distributed energy resources (DERs).

One key to a successful power sector transformation is clearly articulating to regulators why technology and software investments make sense for today's customers and for the power grid; the other is collaborating with technology partners.

The July 20th dialogue focused on the drivers behind a more digital and distributed grid, how the growth in DERs is changing the role of the grid, and what the future might look like. As a result, IEI identified 10 key takeaways, and questions for the future, which are summarized below.

Assessing the Digital Grid Transformation

- *This is an evolution.* Grid digitization is not a one-off technology project, but an iterative transformation. Electric companies are in different places in investing in the digital grid and new technologies to develop capabilities that create operational efficiencies and deliver value to customers.
- *Collaboration is critical.* Electric companies and technology companies are increasingly collaborating and it is effective for them to jointly talk with regulators. In addition, within electric companies, supporting cross-functional coordination is important to further the digital grid transformation.
- *Electric companies need regulatory flexibility to respond to the rapidly changing technology landscape.* The technology development cycle continues to outpace the electric company adoption cycle. In order to be prudent and proactive, electric companies need flexibility to modernize and digitize, and to work with technology companies to create new service arrangements that allow for a “try-and-buy” option. Flexibility and room for experimentation will allow for an efficient transition to a hybrid grid.

Reforming Regulation

- *Articulating a clear vision to regulators is a top priority.* When seeking cost recovery for grid and technology investments, it is vital that electric companies make clear to regulators how these investments benefit the customer and deliver value. Concerns around stranded investments can have a paralyzing effect on future investments.
- *Deliver the value proposition simply and avoid complexity.* The electric grid is a national asset that powers the economy, integrates clean energy resources, and delivers choice, convenience, and comfort to millions of customers. Electric companies must better communicate the digital transformation story by telling a simple story that focuses on why it matters, value, and benefits.
- *Properly designed retail electric rates will incent the efficient location of resources.* Accurate price signals are an effective mechanism in siting customer-owned DERs where they are needed most on the grid.
- *Properly designed retail electric rates will incent optimized DER response.* Accurate price signals are an effective mechanism for utilizing all DERs efficiently.

Deriving Value from the Digital Grid

- *Electric companies require visibility into the grid edge.* Electric and technology companies are partnering to develop end-to-end grid management platforms that enable real-time, system-wide visibility and prediction capabilities. Today, the definition of the

grid edge is subjective and the behind-the-meter vs. in-front-of-the-meter delineation is limiting. As electric companies gain 360-degree visibility, their offerings can be designed to deliver better value to both customers and the grid when the location is unrestricted.

- *Planning for a future of exponential DER growth is critical.* Electric and technology companies are working together to prepare for a hybrid grid where customer load is a significant resource. The appropriate technologies and standards (e.g., smart inverters, interoperability requirements, etc.) can make customer-sited or grid-edge DERs far more valuable.
- *Data needs to be actionable.* We are at the very beginning stages of figuring out how to operationalize the massive amounts of data generated from networked devices on the grid. Investing in processes to verify and validate this data is essential, as is leveraging data to create real value for both the customer and the grid.

Today's energy grid is becoming increasingly digitized and distributed, and will continue to evolve. From enhancing resiliency to enabling the connection of DERs and other devices, a digital grid is critical for enabling and providing new energy products and services. Both customer choice and rapidly declining technology costs are major drivers. Electric companies are playing a central role as the grid managers, optimizers, and resource enablers and integrators in this transition.

Electric companies have an opportunity to develop a digital grid that delivers new customer services, achieves clean energy goals, and increases the value of DERs. Regulatory policies that support: a digital and distributed power grid; the technologies that can make that happen; and the siting of resources in the most useful locations are key to a safe, reliable, increasingly clean, and affordable energy future.

Questions for the Future

- What is the digital grid transformation story and how do we tell it?
- How do we incent investments in DERs at specific locations?
- How are utilities extracting value and intelligence from data?
- In what ways must rate-making change to allow for increased experimentation?
- How do we move from unique, electric company-specific solutions to rapidly scalable, standardized solutions?

Meeting Participants	
<i>Electric Companies</i> Ameren Corporation American Electric Power CenterPoint Energy Commonwealth Edison DTE Energy Duke Energy Florida Power and Light Co. Pepco Southern California Edison Southern Company	<i>Technology Companies</i> Comverge Current powered by GE Enbala Power Networks Oracle Utilities Sensus Silver Spring Networks Stem TROVE Predictive Data Science <hr/> Edison Electric Institute Institute for Electric Innovation

Upcoming IEI Dialogue: Data Analytics & Access. September 27, 2016

IEI's next National Dialogue Series meeting will be held on September 27th in Houston, Texas, and hosted by CenterPoint Energy. This dialogue will focus on how electric and technology companies are leveraging customer and operational data to enable individualized energy solutions and enhance grid operations, while ensuring customer privacy. The discussion will dive into the specifics around how electric companies are using data today for actionable intelligence to deliver customer value and improve distribution system operations and plans for the future.

About the Institute for Electric Innovation

The Institute for Electric Innovation focuses on advancing the adoption and application of new technologies that will strengthen and transform the power grid. IEI's members are the investor-owned electric companies that represent about 70 percent of the U.S. electric power industry. The membership is committed to an affordable, reliable, secure, and clean energy future.

IEI promotes the sharing of information, ideas, and experiences among regulators, policy makers, technology companies, thought leaders, and the electric power industry. IEI also identifies policies that support the business case for the adoption of cost-effective technologies.

IEI is governed by a Management Committee of electric industry Chief Executive Officers. In addition, IEI has a Strategy Committee made up of senior electric industry executives and a select group of technology companies on its Technology Partner Roundtable.

About the Edison Foundation

The Edison Foundation is a 501(c)(3) charitable organization dedicated to bringing the benefits of electricity to families, businesses, and industries worldwide. Furthering Thomas Alva Edison's spirit of invention, the Foundation works to encourage a greater understanding of the production, delivery, and use of electric power to foster economic progress; to ensure a safe and clean environment; and to improve the quality of life for all people. The Edison Foundation provides knowledge, insight, and leadership to achieve its goals through research, conferences, grants, and other outreach activities.



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