

# Do Utilities Have Right Incentives to Modernize Grid?

Billions in Investments at Issue

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lectric power is our most capital-intensive industry, with more than a hundred billion dollars invested each year on infrastructure, according to the Edison Electric Institute.<sup>1</sup> Investment needs are likely to grow. Utilities are looking to harden power systems to maintain reliability and resiliency in the face of cyber and physical security threats, deploy advanced digital technologies, and facilitate new services to meet expectations by some consumers for greater choice and control.

Grid modernization is a key part of this investment. New transmission and distribution technologies allow for greater visibility into utility operations, more control, faster healing, higher penetration of distributed energy resources, and an expanded role for customers as producers of electricity.

But do current regulatory approaches provide appropriate incentives for building a twenty-first century grid?

I asked three experts for their views: a financial analyst specializing in utility investment incentives, an expert in institutional frameworks for utility regulation, and a former public utility commission chair addressing broad policy issues.

### Investment Trends

First, some background on sector investment trends. Data from EEI show increasing grid investment by investor-owned utilities. They invested about \$52.8 billion in transmission and distribution infrastructure in 2016, more than twice the level of investment a decade ago.

According to Black and Veatch, sixty percent of the six million miles of U.S. distribution lines have surpassed their fifty-year life expectancy.<sup>2</sup> Further, the WIRES Group says seventy percent of large power transformers and transmission lines are twenty-five years or older, and sixty percent of circuit breakers are thirty years or older.<sup>3</sup>

Overall, The Brattle Group estimates that approximately one and one-half to two trillion dollars will be spent by 2030 to modernize the grid, simply to maintain reliability.<sup>4</sup>

Replacing this aging infrastructure is a big expense, but also an opportunity to move to more modern technologies.

### Additional Incentives Needed?

One key question for regulators is whether utility investments to modernize the grid require additional incentives or new regulatory approaches, or whether incentives in traditional cost-of-service regulation are all that is needed.

Our report, *Regulatory Incentives and Disincentives for Utility Investments in Grid Modernization*, provides three perspectives.<sup>5</sup>

Financial analyst Steve Kihm, of Seventhwave, says there is plenty of capital available to utilities to make investments. The real question is one of priorities.

“We are generally asking the wrong questions,” he said.

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“Can utilities raise capital for grid modernization from new investors? Of course, they can, and they all can do it at about the same cost, regardless of the return on equity the utility earns when it invests that capital. The more relevant question is whether that investment creates value for their current shareholders.”

He points to research by EEI illustrating that if return on equity is not high enough to overcome projects with longer lead times and higher risk, utilities are more likely to choose to invest in short-term options that are quicker and less risky.<sup>6</sup> Those may create more value for existing shareholders. Utility managers have an obligation to existing shareholders, rather than to potential new investors.

Traditional regulatory approaches can sometimes create a disincentive for grid modernization, Kihm says. He uses an example of a large substation investment versus a smaller investment that would enable distributed energy resources to deliver the same grid services.

He says that in some cases utilities will have an incentive to make the bigger investment, because it delivers more value for shareholders. That may be true even if it earns a lower return on equity. Yet in other cases, the smaller project with a higher return on equity might create more value.

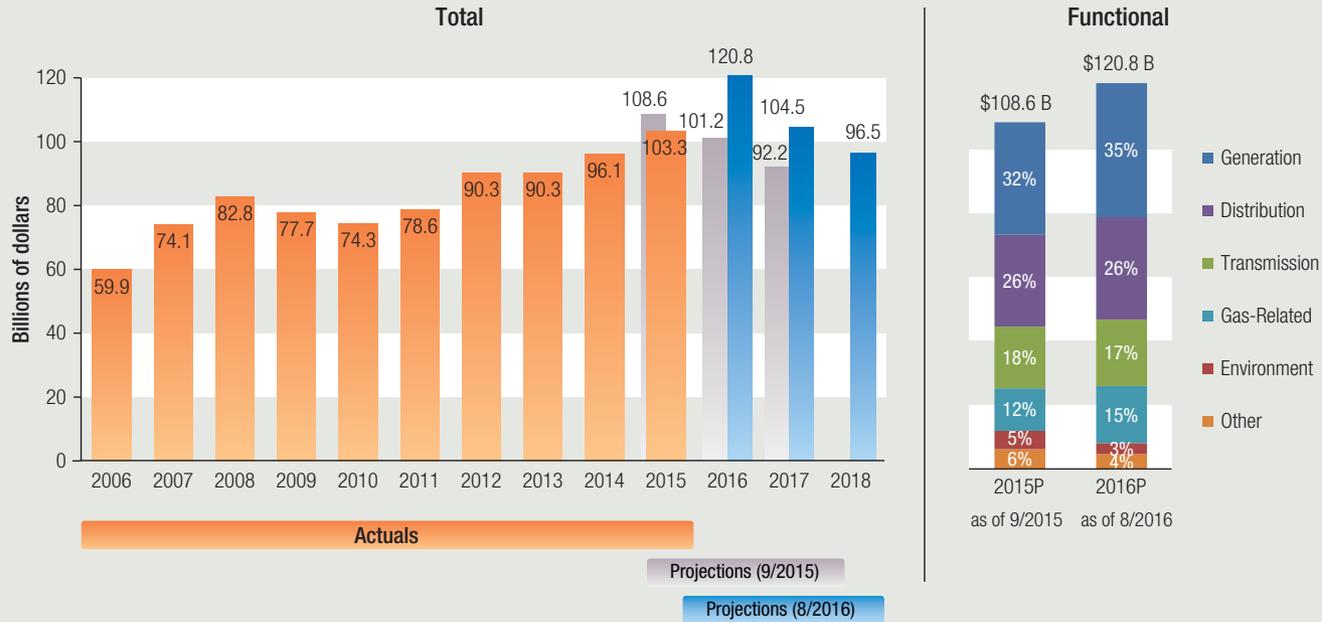
However, a higher return on equity might make the project less cost-effective for consumers. He stresses that we can’t address these issues in the abstract. The details matter when it comes to shareholder value creation and cost-effectiveness.

“It shows the dynamic tension between value and cost-effectiveness,” he says. “The utility should be doing the best thing for its customers and to meet policy objectives. But if they refuse to do [these things] since they aren’t a good value proposition, in the end, the regulator is in charge.”

**FIG. 1**

**INDUSTRY CAPITAL EXPENDITURES**

Source: EEC Finance Department, company reports, S&P Global Market Intelligence (August 2016)



Note: Total company spending of U.S. Investor-Owned Electric Companies, consolidated at the parent or appropriate holding company. Projections based on publicly available information and extrapolated for companies reporting fewer than three projected years (11% and 15% of industry for 2017 and 2018). 2015P total does not sum to 100% due to rounding.

Janice Beecher, director of the Institute of Public Utilities at Michigan State University, argues that the existing regulatory model provides ample incentives for utilities to pursue grid modernization investments, cost control, efficiency and even innovation.

“People call for a new paradigm, [saying] that the current regulatory model doesn’t fit with modernization,” she said. “So, you hear that we need ‘incentive regulation.’ But from my perspective, [regulation] is always about incentives. The dichotomy between traditional and incentive regulation is false.”

Importantly, whether grid modernization is justified depends on the specific investment and whether it meets the core goals of economic regulation, Beecher says. Realizing the promises of grid modernization depends on whether regulators are willing to use the powerful economic tools at their disposal to serve the public interest.

Further, Beecher warns about the potential for wealth transfers from regulatory approaches that rely on extraordinary incentives funded by ratepayers. Allowing a utility to rate-base electric vehicle charging stations, for example, imposes a cost on utility customers who don’t own electric cars.

“The regulatory compact is not set in stone,” she says. “It is a living and evolving

charter.” There are ways to condition it to meet contemporary goals.

“For grid modernization, we need a new prudence rather than a new paradigm.” Determining whether an investment is prudent is a core part of the art and science of regulation. Beecher says the concept of prudence can and should evolve over time.

“Without a doubt, what might have been considered prudent even a decade ago would not be considered prudent today, let alone for a utility of the future,” she says. The traditional framework of prudence reviews can handle many grid modernization questions, but both utilities and regulators have a myriad of new tools available for making and evaluating decisions.

“At a minimum,” she says, “prudence should be defined in

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— Lisa Schwartz



terms of enforceable standards and generally accepted utility practices, both of which can be substantially strengthened in light of technological advances and opportunities as well as dynamic supply and demand conditions.”

Ron Lehr, a clean energy consultant and former chair of the Colorado Public Utilities Commission, thinks many regulators are not keeping up with all the implications of new technology for grid regulation. One big transformation is the rise of the prosumers, customers with solar panels and batteries that can provide grid services.

“Return-on-equity incentives encourage utilities to invest in capital projects,” Lehr points out. “They lack equivalent incentives for operations and customer engagement – operating expenses rather than capital expenses. Only providing incentives to invest capital stands in the way of innovation.”

Energy efficiency programs have been effective for customer-facing utility operations, with incentives that impact operations, he says. They could be a model for policies and regulations for grid operation.

But other aspects may be less charted territory. Lehr points out that regulators have a century of experience dealing with incentives and motivations for monopolies, that is, single sellers in a market.

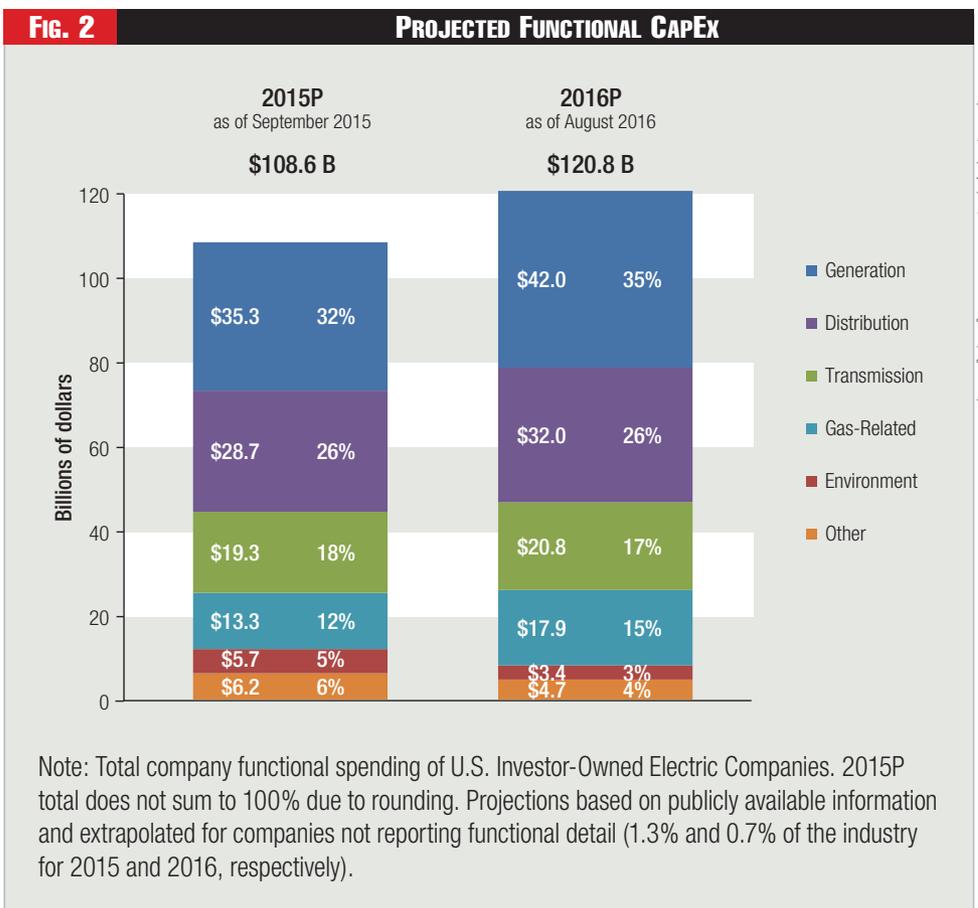
But as consumers become prosumers, and distributed energy technologies enable new market players and types of transactions, utility monopsony, referring to a single buyer in a market, is becoming more important. According to Lehr, monopsony regulation is less recognized and not as well practiced.

## Looking Forward

All three authors of the report see grid modernization as a big opportunity and a big challenge. But the right response from regulators depends on what the problem is.

“Is it that we’re not going fast enough, that we are not encouraging innovation?” Kihm asks. “The old model may need a little lubrication to get it to move a little faster.”

Lehr calls for more consensus-building outside formal regulatory proceedings. “We need to get together on where we’re going so we can set the functions first and then specify the tools,” he



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suggests. “Regulation can get us there, but it will be a long road if we just try to litigate our way there.”

“I think most states are changing to a more forward-looking approach,” says Beecher. “There are drivers here that are beyond the utilities. Just as in telecom, we saw new

technology and disruption. I don't think it's stoppable. I think there will be market forces at work and the smart utilities will behave strategically.” **PUF**

The report, a recorded webinar, and other reports in the Future Electric Utility Regulation series are available at [feur.lbl.gov](http://feur.lbl.gov). The U.S. Department of Energy funds the series, produced by Berkeley Lab.

## Endnotes

1. [www.eei.org](http://www.eei.org)
2. [www.bv.com](http://www.bv.com)
3. [www.wiresgroup.com](http://www.wiresgroup.com)
4. [www.eei.org](http://www.eei.org)
5. [www.lbl.gov](http://www.lbl.gov)
6. [www.energyenvironmentallawadviser.com](http://www.energyenvironmentallawadviser.com)