

Best Practice Review: State of the Evolving Utility Sector

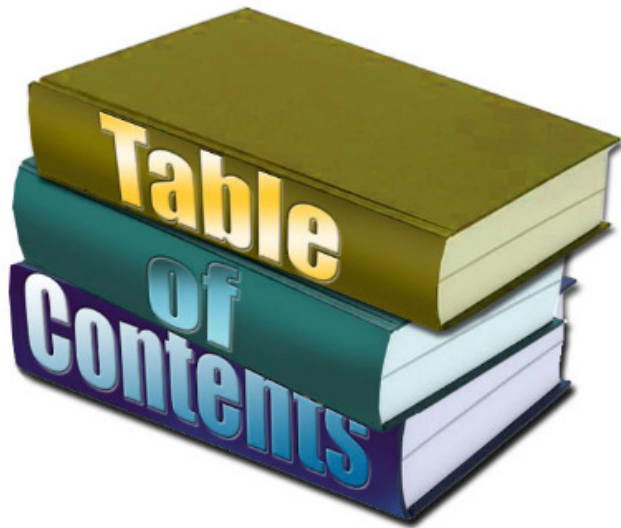
MAY 26, 2016
MIDWESTERN GOVERNORS ASSOCIATION



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Presentation Overview



1. **Statement of the Problem/Issue**
2. **State Responses to the Issue**
3. **Literature Review (optional)**



Best Practice Review: State of the Evolving Utility Sector



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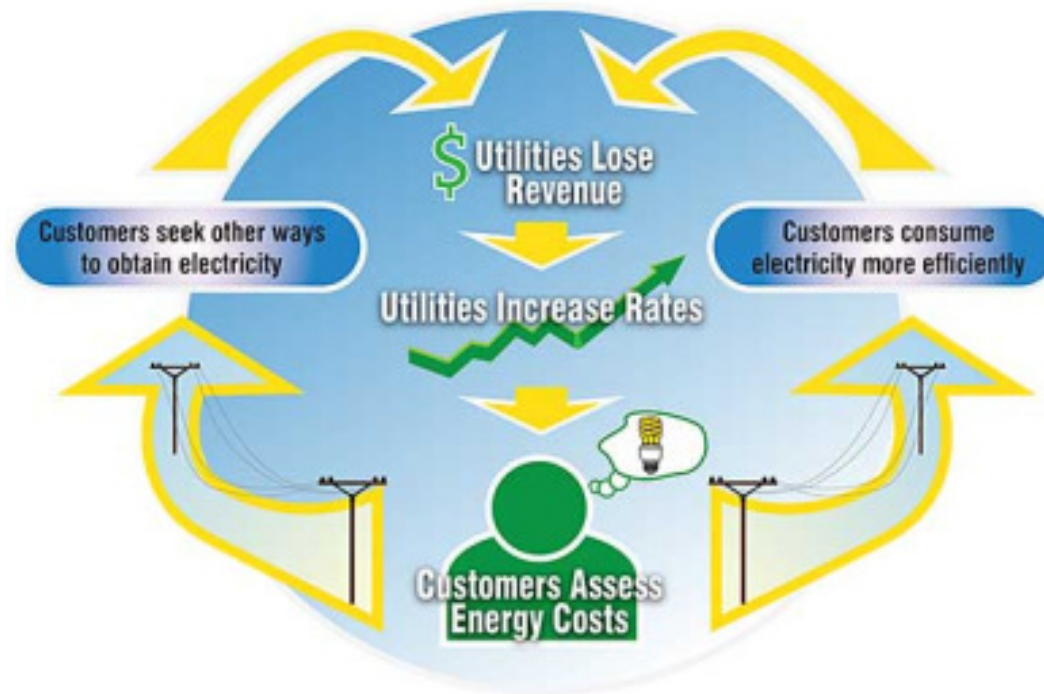
Why all the talk about utility business model reform?



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Disruptive Trends to the 100+ Year-Old Utility Model



"Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business," Edison Electric Institute, January 2013.



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COST OF SERVICE REGULATION

- Utilities spend prudently to maintain and operate the power system
- Utilities recover capital plus a return on equity
- Operational expenditures are a pass-through

- This incents capital investments and sales volume
- **A great structure for 20th century goals (meet growing demand, build new infrastructure, build universal service)**

NEW GOALS FOR THE POWER SYSTEM

Resilient & Even More Reliable

Clean

Customer-oriented

Affordable, Safe

TODAY: Utilities Earn Money By . . .

Building fixed assets



Selling more electricity (kWh)

Usually listed on the power cord. This is the rated power your appliance uses when turned on.

Time appliance is "on". If minutes or seconds, convert to hours first.

$$kWh = \frac{\text{Watts} * \text{Time (hrs)}}{1000}$$

kilo-Watt-hour. This is what you are billed for by the utility. Usually in the form of "cents/kWh". I pay 9 cents/kWh or \$.09/kWh.

Need to divide total by 1000, otherwise it would just be Wh, not 'kilo-Wh'.

The "Build More, Sell More Model"



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TOMORROW: Utilities Make Money By Delivering. . .



Reward the delivery of VALUE more than CAPITAL INVESTMENT



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**So, the question becomes how to change
a business model that has been around
for over a hundred years to incorporate
these new realities?**



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Utilities & States Have Responded Very Differently to the Emerging Pressures on the Existing Bus. Model

Utilities:

- 1) Continue current model; ask Commissions to compensate them for losses by increasing charges to remaining customers.
- 2) Adopt new customer-focused products/services & pricing platforms that generate enough revenue to cover costs and make a profit.
- 3) Utilities everywhere in-between.

States:

- 1) Take no action.
- 2) Address issues as they arise from rate cases
- 3) Undertake more comprehensive and lengthy processes to determine the future of the utility sector in their states.



New York, Minnesota & Other Larger State Processes



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KEY DRIVERS IN NEW YORK

Continuing to maintain the system of the past with business as usual practices will be too costly:

Cost to customers over 10 yrs
(maintain current grid)

Increase in average total
electricity bills since 2004

\$30 Billion

↑ 32%

Weather events have strained
the current system to its limits

Occurred despite a reduction
in commodity energy prices

NY REV GOALS

Engage customers
Animate markets
Achieve system wide efficiency
Have fuel and resource diversity
Increase reliability and resiliency
Reduce system emissions

New York's 2 Tracks

1. **Role of distribution utilities in enabling market-based deployment of DER** to promote load management & system efficiency, including peak load reductions;
2. **Changes in current regulatory, tariff, and market designs and incentive structures** to better align utility interests with achieving the Commission's policy objectives.



NY REV's Latest News

- [Order Adopting a Ratemaking and Utility Revenue Model Policy Framework.](#) (issued May 19, 2016)
- **Tying Utility Revenues to Performance**
- **Allowing New Revenue Streams for Operating a Platform**
- **Moving Toward More Granular Rates**

STATUS & TIMELINE

Date	Event	Additional Description
April, 2014	REV proceeding launched	
August, 2014	Staff Track 1 straw proposal issued	Regulatory policy issues and implementation plan
September, 2014	Technical conference	To present status report on regulatory reform and rate issues
January, 2015	MDPT working group launched	Market Design and Platform Technology (MDPT) Working Group formed
February, 2015	Regulatory Policy Framework & Implementation Plan Order adopted	On Track 1 Issues
June, 2015	BCA framework straw proposal issued	
July, 2015	MDPT draft report issued	Draft report which will identify and frame market design and platform technology issues
	Track 2 Staff Straw Proposal issued	
	Utilities submit demonstration project proposals	
	DSIP guidance provided	
August, 2015	MDPT final report issued	This report will be a resource for the development of the distribution system implementation plans (DSIPs).
Fall, 2015	Track 2 order expected	
January, 2016	DSIP's filed	

Source: REV Regulatory Policy Order

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e21—Developing a 21st Century Regulatory Framework in Minnesota



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That better aligns how utilities are compensated with new customer expectations & public policy goals



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After a year's worth of effort. . .

**Phase I report issued in December
2014**

**Followed by Xcel Energy's "e21
Letter" to the Commission**

**e21 proposes shifting toward a
performance-based utility business
model & regulatory framework**



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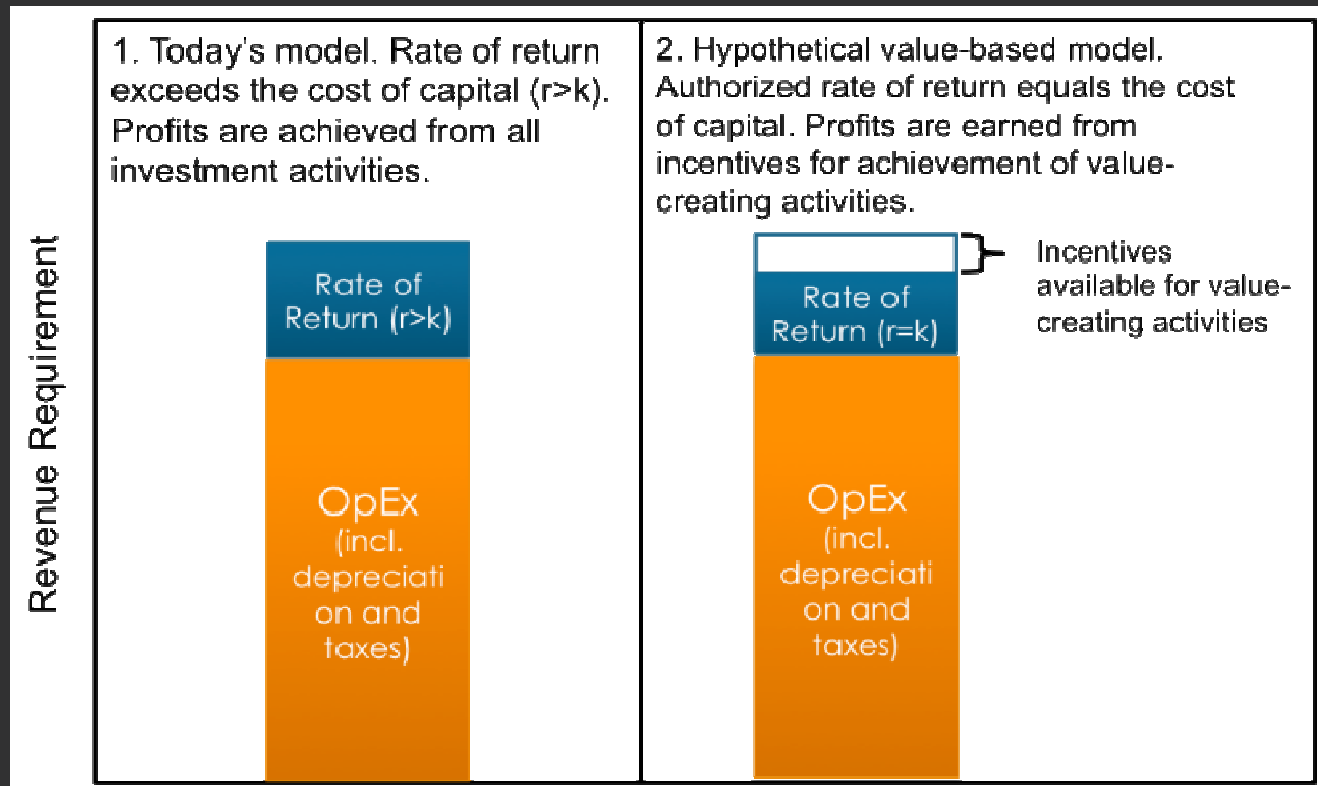
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e21 Guiding Principles

- Align an economically viable utility model with state and federal public policy goals.
- Provide universal access to electricity services, including affordable services to low-income customers.
- Provide for just, reasonable, and competitive rates.
- Enable delivery of services and options that customers value.
- Recognize and fairly value grid services and “distributed energy resource” services.
- Assure system reliability, and enhance resilience and security, while addressing customer privacy concerns.
- Foster investment that optimizes economic and operational efficiency of the system as a whole.
- Reduce regulatory administrative costs where possible (e.g., results in fewer rate cases or otherwise reduce the burden of the regulatory process).
- Facilitate innovation and implementation of new technologies.
- RED = Principles that build on existing framework



MOVING FROM COST OF SERVICE TO PERFORMANCE-BASED REGULATION



Other State Efforts

California's Goals:

- 1) Modernize the electric distribution system to accommodate two-way flows of energy, and energy services through IOU networks;
- 2) Enable customer choice of new technologies and services to reduce emissions and improve reliability in a cost efficient manner;
- 3) Animate opportunities for DERs to realize benefits through the provision of grid services.
- 4) Utilities required to develop Distribution Resource Plans

Hawaii's Goals

- 1) Effectively integrate DERs (some islands already at 10-20% rooftop solar penetration).
- 2) Achieve 100% renewable energy by 2045; 30% by 2020.
- 3) Two relevant Commission proceedings:
 - a) One consolidated the Hawaiian Electric Companies' power supply improvement plans to facilitate a comprehensive stakeholder review.
 - b) The other is to investigate the utilities' distributed energy resource policy plans.



Other State Efforts, Cont'd.

Massachusetts:

Each electric distribution company must submit a 10-year grid modernization plan. They must incorporate a short-term (five-year) plan that outlines:

- a) Planned capital investments, including the rollout of advanced metering functionality across the state.
- b) A new rate structure, adopted in the time varying rates proceeding, which requires time varying rates for customers on basic service.
- c) Customers will be placed on a tiered rate with special pricing during peak demand but have the ability to opt-out and choose a flat rate with a rebate for reducing consumption during times of peak demand.

Connecticut

Connecticut is poised to implement its own version of grid modernization.

- a) Department of Energy and Environmental Protection's biennial IRP assessment proposed plans to initiate **a proceeding on valuing distributed generation sources;**
- b) **And plans to increase incentives for distributed generation,** expand energy efficiency programs, and increase climate resilience.



Other Categories of Activity We See

1. Disputes over integration of DERs and Utility/Customer Compensation (~20 states debating this).
2. On-going net metering debate symptom of not having resolved this fundamental issue.
3. TOU rates
4. Community Solar / “Shared Renewables” (25 states with at least one community solar project on-line).



Other Categories of Activity We See

1. Microgrids (NY, Princeton University; at least 18 projects worldwide)
2. Green pricing & Green Tariffs
 - Nearly 60 percent of Fortune 100 and Global 100 companies plan to find ways to affordably fuel their facilities with renewable energy and reduce their greenhouse gas emissions—many with local renewable energy rather than RECs alone.
 - Existing green tariff pilots, such as the recently approved “Green Rider” in North Carolina, are structured so that utilities are primarily a broker between IPPs and a particular commercial or industrial customer.



Prepaid Power

1. Pay-as-you-go power has been emerging for some time, most often from municipal and cooperative utilities.
2. Georgia Power is one of the largest investor-owned utilities to move beyond the pilot phase and into a full offering for its customers.
3. Not just low-income consumers who appear interested.
4. Can lead to a drop-off in electric usage and reductions in the number of shut-offs in other jurisdictions.
5. Customers appear comfortable with the concept because they already pre-pay for many other services (e.g., phones, transit).
6. Prepayment allows consumers to have a better idea of how much energy they're using and budget throughout the month.

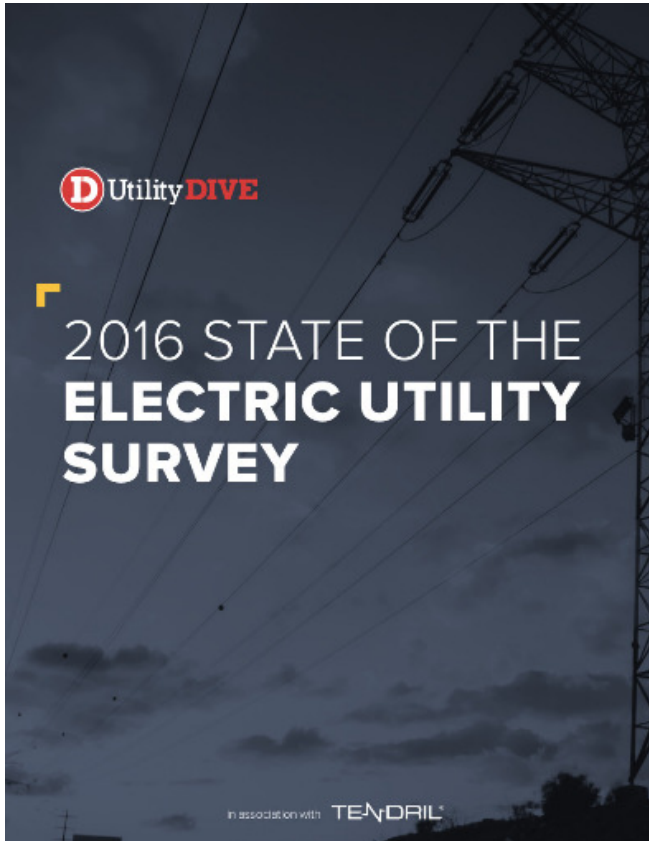




Most change around the country is incremental—changing a rate here, adding a charge there, or offering new products through pilots or on a limited scale. The kind of major changes contemplated by the processes in New York and Minnesota are not widespread, and the results from won't be known for some time.



Key Findings from Survey of 515 U.S. Utilities



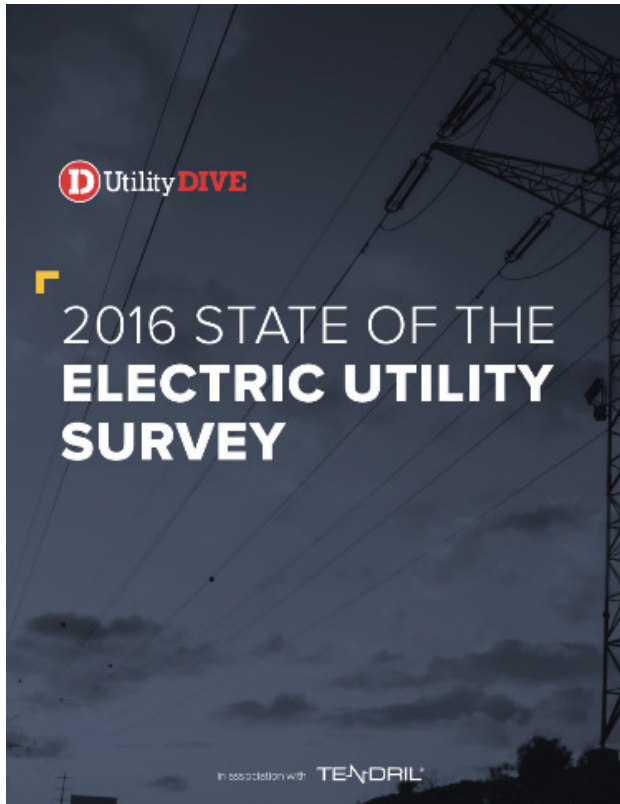
- Survey respondents: 61 % IOUs, 15% municipal power agencies, 14% Co-ops, 10% public power agencies
- Overarching Takeaway: “Transformation has arrived—but a standardized approach on how to adapt to it has not.”
- Only 3% of those surveyed indicate that no change is necessary



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Key Findings from Survey of 515 U.S. Utilities



- Biggest impediments to evolution of their business model:
- Regulatory System
- Internal Resistance to Change
- Technology Integration

- Pressing Challenges: Existing Utility model; aging workforce; aging infrastructure

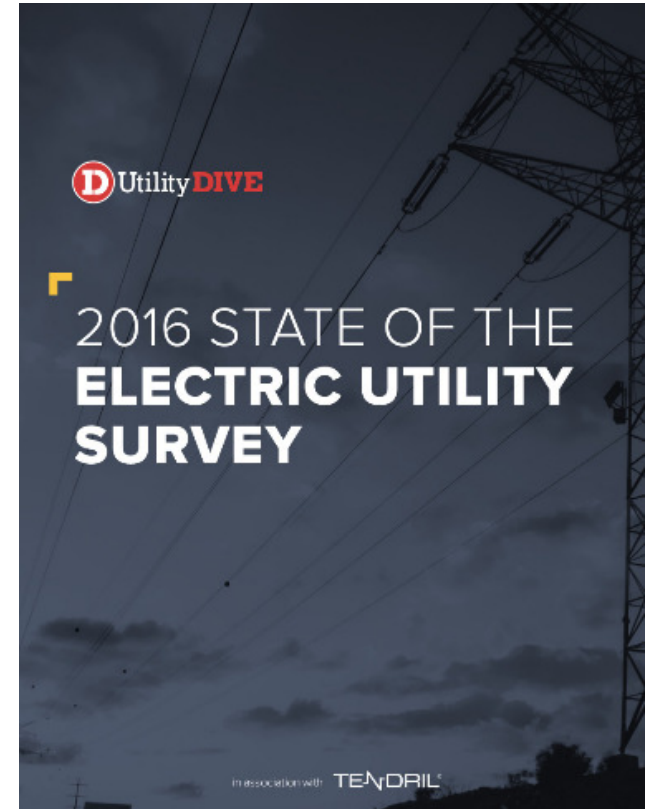


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Key Findings From Survey of 515 U.S. Utilities

- Emerging Revenue Streams:
- Energy Management
- Efficiency Services
- Community Solar
- Electric Vehicle Charging Infrastructure
- Green Pricing
- Rooftop Solar

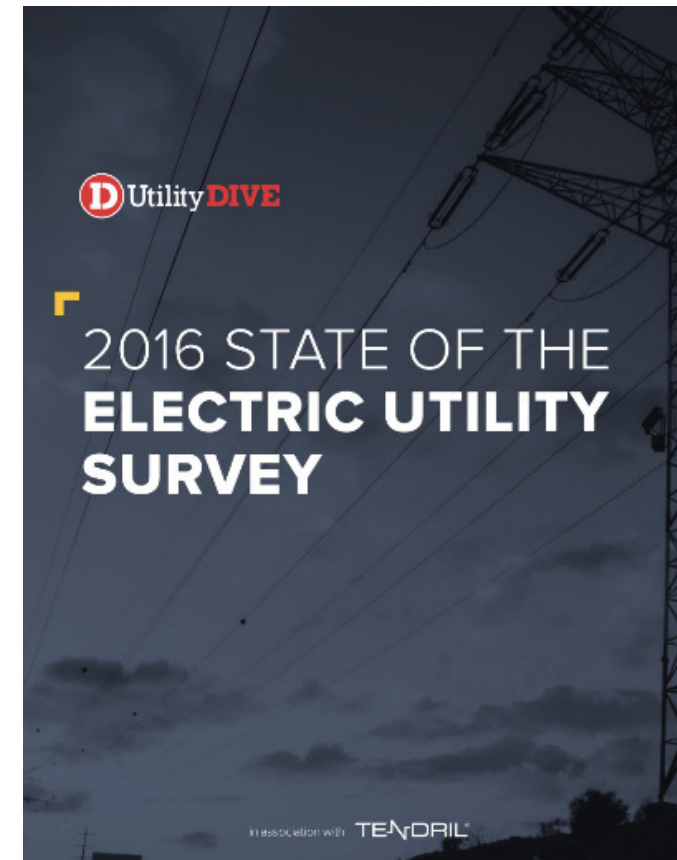


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Key Findings From Survey of 515 U.S. Utilities

- **Investment Opportunities Now:**
 - Utility-scale Renewable Energy
 - Demand Side Management
 - Distributed Generation
 - Natural Gas Plants
- **Investment Opportunities in the Future:**
 - Storage
 - Distributed Generation, Utility-scale RE



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What's Next?

- **Future Webinars**

- June 7—Deeper Look at NY, CA, MN
- June 16—Look at Technology Trends
- June 28—Analysis of Rate Options



- **In-Person Meeting**

- July 13-14 Overview of All Material, Next Steps



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- **Questions?**



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Thank You!

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Top “10” Literature List



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Electric Policy:

Risk Aware Planning and a New Model for the Utility-Regulator Relationship

Risk-Aware Planning and a New Model for the Utility-Regulator Relationship

The analytical tools for utilities and regulators to take more explicit account of risk, in an increasingly uncertain world, are at hand. What remains is the need for a more effective way to gauge and reward effective utility performance.

by Ron Binz and Dan Mullen

The US electric utility industry has entered what may be the most uncertain, complex and risky period in its history. Several forces are conspiring to make the next two decades especially challenging for electric utilities: large investment requirements, stricter environmental controls, decarbonization,

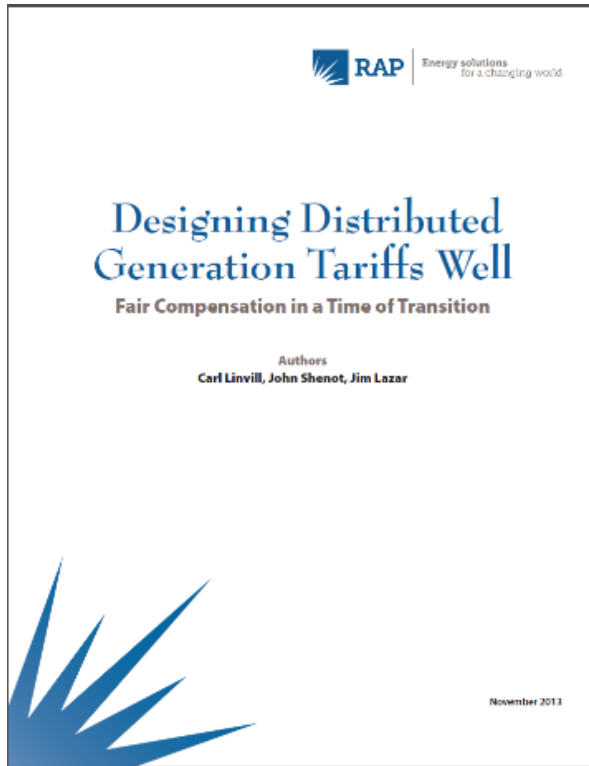
Ron Binz served as the Chairman of the Colorado Public Utilities Commission from 2007 until April 2011, during which time he led the commission in implementing many policy changes championed by Gov. Bill Ritter and the legislature to advance Colorado's "New Energy Economy."¹ He was an active member of the National Association of Regulatory Utility Commissioners, serving as Chair of NARUC's Task Force on Climate Policy, and as a member of both the Energy Resources and Environment and International Affairs Committees. Dan Mullen is Senior Manager for Core's Electric Power Programs, working to advance solutions that will enable the US electric utility industry to meet sustainably society's 21st century energy needs.

changing energy economics, rapidly evolving technologies and reduced load growth. Navigant Consulting recently observed that "the changes underway in the 21st century electric power sector create a level and complexity of risks that are perhaps unprecedented in the industry's history."²

It's often argued that the absence of a coherent federal energy and climate policy is an impediment to progress on the challenges facing the electric industry. That's true, but it's not the complete story. We think the failure of Congress to move in any direction on climate and energy policy increases

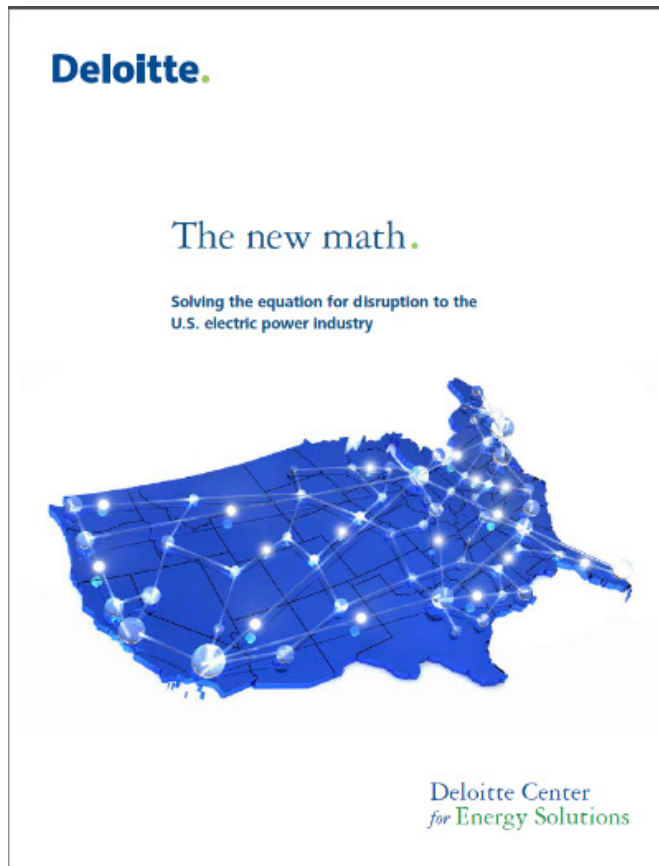
¹ Forrest Small and Lara Feuntra, *The 21st Century Electric Utility: Pathways for a Low-Carbon Future*, Navigant Consulting 26 (Boston, MA: Core, 2010).
<http://www.aces.org/resources/reports/the-21st-century-electric-utility-pathways-for-a-low-carbon-future-1>

RAP: *Designing Distributed Generation Tariffs Well*



- Paper lays out in depth costs and benefits of distributed generation (DG) and payment structures
- DG should be compensated to reflect all long term value that it will provide
- When creating a DG payment plan, do not extrapolate cost/value from anomalous events
- Tariffs should not be over complicated

Deloitte: *The new math*



New pillars of business

- Safety
- Reliability
- Affordability
- Environmental Responsibility

New market entrants:

- “up to the meter” – large scale renewables and storage
- “behind the meter” – small DG and renewables

Up to the meter strategies (low risk)

- Investments in large scale renewables designed to meet RPS
- Efficiency through load management and storage

Behind the meter strategies

- Distributed Generation
- Energy management technology

William Boyd:

Public Utility and the Low-Carbon Future

UCLA LAW REVIEW

Public Utility and the Low-Carbon Future

William Boyd



ABSTRACT

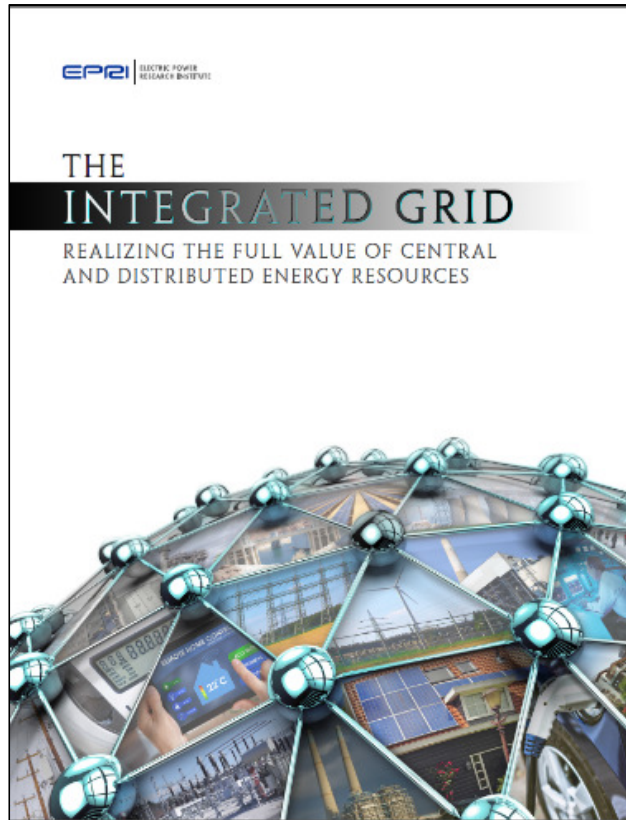
Substantial reductions in global power sector emissions will be needed by midcentury to avoid significant disruption of the climate system. Achieving these reductions will require greatly increased levels of financing, technological innovation, and policy reform. In the United States, the scale and complexity of the overall challenge have raised important questions regarding prevailing regulatory and business models, with much scrutiny directed at the traditional practice of public utility regulation. Recognizing the many valid criticisms leveled against public utility regulation and the important questions raised about the viability of traditional utility business models, particularly in the face of substantial growth in distributed energy resources, this Article argues that a revitalized and expanded notion of public utility has a critical role to play in efforts to decarbonize the power sector in the United States.

In making this argument, the Article looks back to an earlier, more expansive concept of public utility as articulated by Progressives, legal realists, and institutional economists in the early twentieth century. This earlier concept of public utility contains valuable insights for dealing with the current challenges of decarbonization. The Article shows how this broader concept of public utility was substantially diminished by a confluence of external challenges and a sustained intellectual assault mounted by economists and lawyers starting in the 1960s. The narrowed understanding of public utility that resulted, it is argued, has distorted our views regarding the role of markets and disruptive technologies in the sector. In fact, basic public utility principles continue to govern a significant amount of activity across the power sector, including in both wholesale and retail electricity markets. And there are important unrealized possibilities embedded within the public utility concept that hold considerable promise for reforming current regulatory and business models in the face of rapid technological change and growing decarbonization imperatives.

Such principles and possibilities are particularly important in ongoing efforts to increase renewable energy and finance large low-carbon generation projects. They also hold great promise for ongoing efforts to plan for and optimize the integration of increasingly large amounts of distributed energy resources such as rooftop solar, demand response, and energy storage. Indeed, when one looks at the overall scale, complexity, and sequencing of investments needed to decarbonize the power sector over the coming decades (however it comes to be organized), it is clear that the broad concept of public utility offers essential tools for planning and coordinating such investments over the long time horizons contemplated and for managing a system of increasing complexity. In all of these areas, a more expansive notion of public utility that draws from earlier understandings of the concept provides a normative foundation for efforts to govern a power system that is increasingly complex, participatory, and intelligent, and

61 UCLA L. Rev. 1614 (2014)

EPRI: *The Integrated Grid*



- Successful integration of distributed energy resources (DER) depends on existing electric grid
- Need to integrate DER in planning and operation of grid
- Germany and Hawaii case studies
- Action Plan
 1. Interconnection rules, communication technologies and standards
 2. Deployment of advanced distribution and reliability technologies
 3. Integrating DER with grid planning and operation
 4. Supportive policy and regulation

Energy Innovation / UFC: *New Regulatory Models*



Principles for Performance-based Ratemaking

1. Define goals and outcome
2. Clear **methodology for measuring performance**
3. Shift appropriate amount of performance risk to the utility in exchange for **longer-term regulatory certainty**
4. Long time horizon for investment decisions
5. Revenue sharing
6. Align incentives and simplify regulatory process
7. Single performance incentives can achieve multiple objectives
8. Mid-course correction with advanced notice
9. Customer and participant engagement to find out which outcomes matter
10. Learn from EE standards and incentive programs to apply strategies to other system goals

NYS DPS: *Reforming the Energy Vision*

REFORMING THE ENERGY VISION

NYS DEPARTMENT OF PUBLIC SERVICE
STAFF REPORT AND PROPOSAL

CASE 14-M-0101
4/24/2014

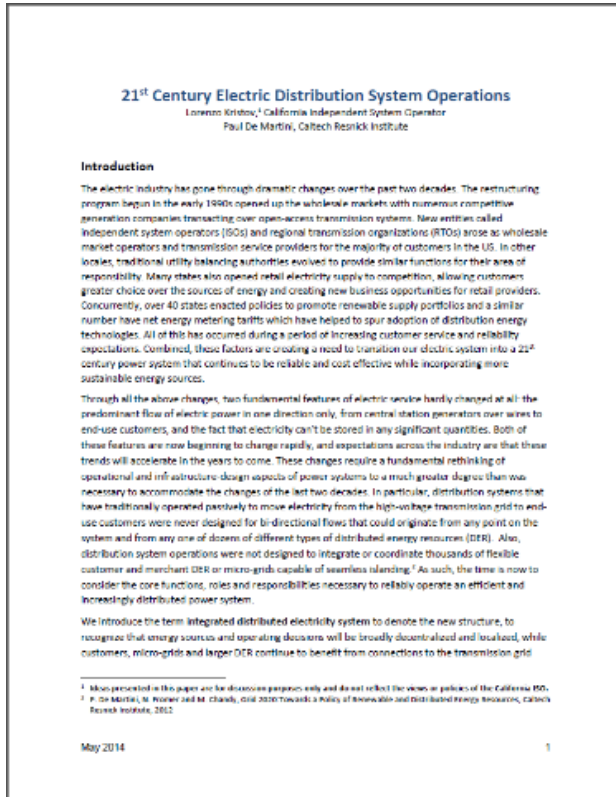
Policy objectives for NYS DPS:

- Customer knowledge and tools that support effective energy bill management
- Market animation and leverage of ratepayer contributions
- System wide efficiency
- Fuel and resource diversity
- System reliability and resiliency

Issues:

- Technology and system requirements
- Definition of utility roles vis-a-vis other market participants
- Benefit/cost standards for utility investment
- Realigning ratemaking incentives
- Creating a new transaction model for customer decisions, including markets and tariffs
- Addressing barriers and opportunities related to customer engagement
- Alignment of wholesale markets with distribution-level markets

Cal ISO: *21st Century Electric Distribution System Operations*



Two huge changes:

- Two-way flow of electricity
- Utility-scale energy storage

“Integrated distributed electricity system”

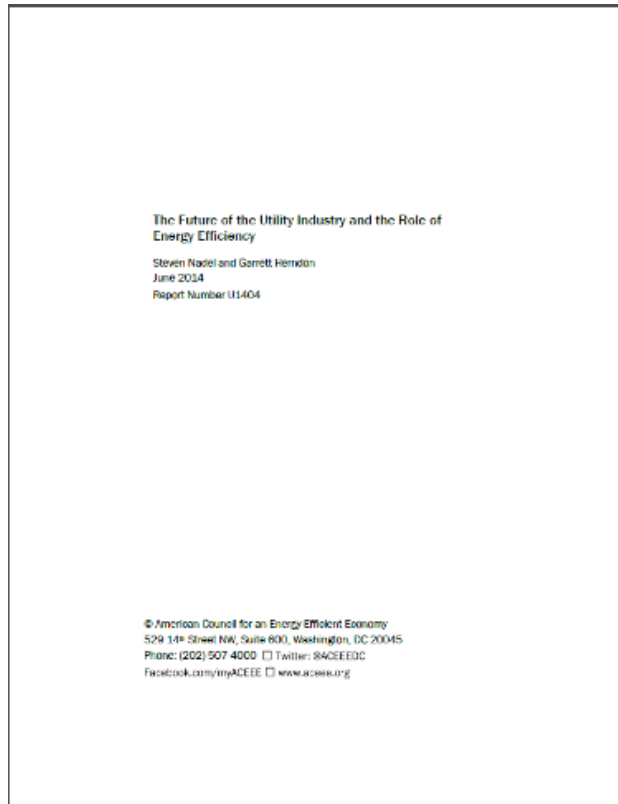
- Energy sources and decisions will be decentralized and localized
- Customers, micro-grids and DER benefit from connection to grid
- Grid operated by ISO/RTO balancing authorities (BAs)

- Presents guiding principles for system operators on interconnection and reliability

Development Roadmap for Integrated Electric System:

1. Operational Design and Research
2. Pilot Projects
3. Policy, Business and Regulation

ACEEE: *Future of the Utility Industry*



Short term:

- Reassess role of regulation
- Expand energy efficiency
- Institute decoupling and shareholder decoupling to meet EE goals
- Increase demand response and smart pricing
- Establish fair pricing for fixed costs without discouraging EE and DER
- Prioritize infrastructure needs with significant net benefits
- Experiment with new utility services
- Manage well
- Experiment with performance-based regulation (PBR)
- Manage a diverse grid with DER and variable resources
- Reduce uncertainty about environmental regulations by completing a variety of pending rulemakings that affect the power sector
- Think very carefully before building new generation

Medium Term:

- Develop and offer optional services
- Develop and implement new systems and capital plans for managing complex grid
- Establish best practices for performance based regulation

GridWise & DOE:

Future of the Grid



GRIDWISE ALLIANCE 



The Future of the Grid

Evolving to Meet America's Needs

National Summit
Pre-read Materials
June 26, 2014

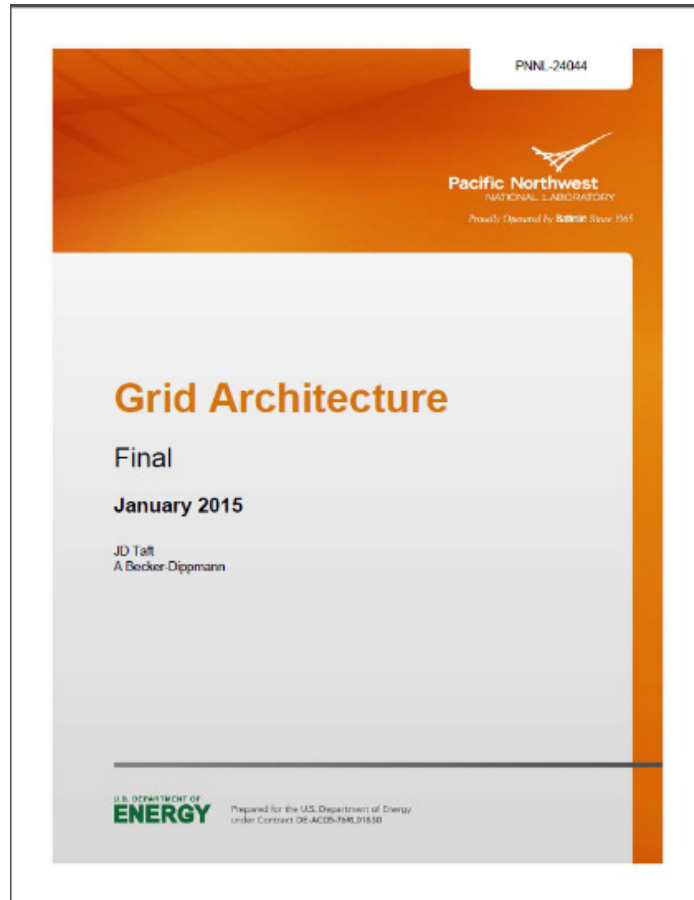
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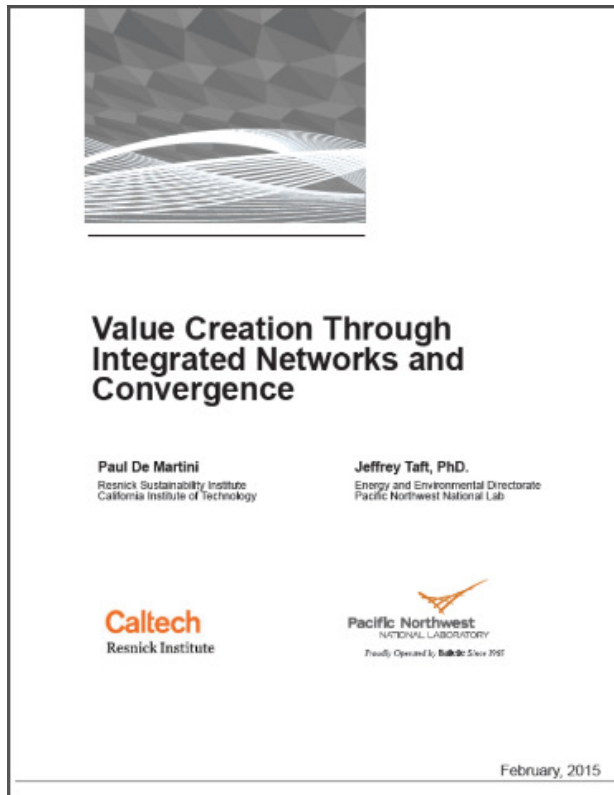
The cover features a collage of images: high-voltage power lines against a blue sky, the United States Capitol building, a wind turbine, and solar panels, all set against a background of yellow tulips.

PNNL: ***Grid Architecture***



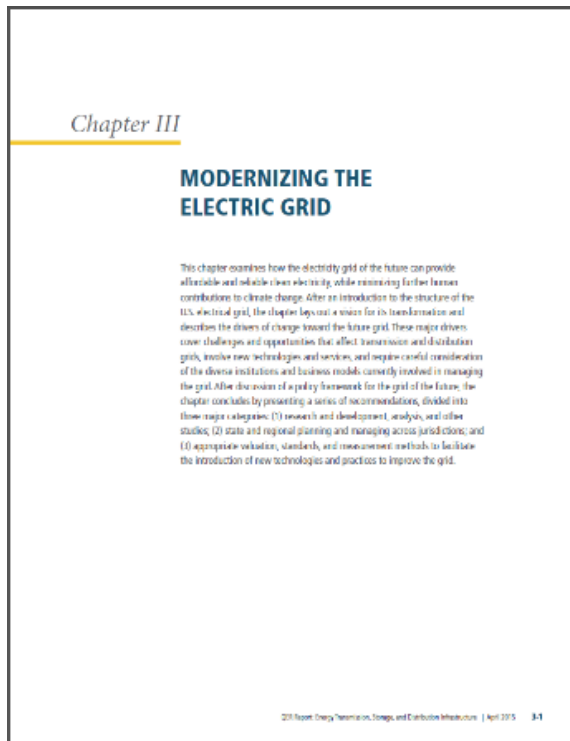
Caltech & PNNL:

***Value Creation Through
Integrated Networks and Convergence***



US DOE:

Modernizing the Grid (Quadrennial Energy Review)



Lorenzo Kristov:

***The Future History of
Tomorrow's Energy Network***

