**Project Description**
Provide technical assistance and analysis for public utility commissions (PUCs) and a series of reports with multiple perspectives on evolving utility regulation and ratemaking, utility business models and electricity markets:
- Adapting to new technologies and services
- Assessing potential financial impacts on utility shareholders and customers
- Engaging consumers
- Addressing utility incentives to achieve grid modernization goals

**Value Proposition**
- Modernizing grids requires utilities to make large investments in the face of rapid change and increasing risk and uncertainty.
- This project helps PUCs and utilities explore regulatory changes to deploy needed capital.

**Project Objectives**
- States will have improved capability to consider alternative regulatory and ratemaking approaches to enable grid modernization investments.
- Approaches will better tie utility earnings to consumer value, economic efficiency, and other policy goals.
- Ultimately, states will provide utilities with regulatory guidance and incentives to efficiently deploy capital to achieve grid modernization goals.
Project Participants and Roles

- LBNL – Project manager; modeling and state technical assistance (TA); Future Electric Utility Regulation report series; performance-based regulation technical report
- NREL – Plus one; modeling and state TA
- NETL – Modeling and state TA
- SNL – State TA
- PNNL – State TA
- National Association of Regulatory Utility Commissioners – Outreach

<table>
<thead>
<tr>
<th>PROJECT FUNDING</th>
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<tbody>
<tr>
<td>Lab</td>
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<td>LBNL</td>
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<td>NREL</td>
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<td>TBD (Task 1 modeling FY18)</td>
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Future Electric Utility Regulation
Relationship to Grid Modernization MYPP

7.0 Institutional Support

7.1 Provide Technical Assistance to States and Tribal Governments

Task 7.1.1 Provide TA to all states

7.2 Support Regional Planning and Reliability Organizations

7.3 Develop Methods and Resources for Assessing Grid Modernization

7.4 Conduct Research on Future Electric Utility Regulations

- Enhance utility financial analysis modeling tools
- Provide TA to state PUCs and utilities
- Support industry dialogues with concept papers

MYPP vision for Institutional Support area

► Leverage technical expertise, analytical tools, models and data to support and manage institutional change in a period of rapid and potentially disruptive technological innovation
► Directly address high priority grid modernization challenges and needs
► Convene key grid stakeholders as an honest-broker for collaborative dialogues on grid modernization
► Create an over-arching suite of grid-related “institutional” analysis, workshops and dialogues
Future Electric Utility Regulation Approach

Policy reports

Reports by industry thought-leaders provide multiple perspectives to inform discussions and decision-making on grid modernization.

Financial analysis

Financial modeling tools to improve analyses and decisions.

Technical assistance

Direct TA to state PUCs to provide requested expertise and resources.
### Milestone (FY16-FY18)

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Upgrade financial modeling tools (FY16 &amp; FY17); characterize utility in region targeted for state TA using FINDER model</td>
<td>Complete/on schedule</td>
<td>10/1/16, 10/1/17</td>
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<tr>
<td>Develop list of targeted states and topics for state TA</td>
<td>Complete</td>
<td>10/1/16</td>
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<tr>
<td>Provide status report on value of modeling for state TA</td>
<td>Complete</td>
<td>12/31/16</td>
</tr>
<tr>
<td>Complete 2 reports in Future Electric Utility Regulation series</td>
<td>1st complete; 2nd on schedule</td>
<td>4/1/17, 5/15/17</td>
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<tr>
<td>Publish technical report on performance-based regulation (PBR) with case studies and results of productivity and incentive power research</td>
<td>On schedule</td>
<td>5/15/17</td>
</tr>
<tr>
<td>Provide TA on financial impacts to 3-4 states each year</td>
<td>On schedule</td>
<td>10/1/17, 10/1/18</td>
</tr>
<tr>
<td>Provide TA on PBR, distribution markets, and energy services pricing to 2-4 states each year</td>
<td>On schedule</td>
<td>10/1/17, 10/1/18</td>
</tr>
<tr>
<td>Complete 4 additional reports in Future Electric Utility Regulation series</td>
<td>On schedule</td>
<td>4/1/18, 10/1/18</td>
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Future Electric Utility Regulation
Highlights of Accomplishments to Date

1. **Technical assistance (TA) to state PUCs**
   - Two types of TA
     - Incremental changes to cost of service regulation
     - Broader visionary questions about alternative forms of regulation
   - Focus on financial impacts to utility shareholders and utility customers
   - State TA plan identifies approaches for targeting TA
   - TA to date on the following topics:
     - Alternative cost recovery mechanisms for demand response (MN)
     - Cost recovery approaches for grid resiliency and security investments (PA)
     - Revenue decoupling (MT)
     - Impacts of tariff changes on financial performance of solar PV systems (Puerto Rico)
     - Performance-based regulation (VT)
     - Utility investor valuation framework and shareholder incentives (CA)
Future Electric Utility Regulation
Highlights of Accomplishments to Date

2. Financial analysis of impacts to utility shareholders and ratepayers
   • LBNL’s FINancial impacts of Distributed Energy Resources (FINDER) model quantifies financial impacts of DERs
   • FY16 model enhancements & analysis quantified:
     o Combined effects of aggressive 10-yr ramp-up of energy efficiency and distributed solar PV
     o Financial impacts for utility and customers — by class, participants vs. non-participants
   • Final report on findings for prototypical NE utility
     o Hourly impacts and shifts in timing of utility system peak
     o Impacts on utility costs, revenues, earnings, return on equity and customer rates
     o Impact of mitigation approaches — e.g., alternative revenue collection mechanisms such as demand charges and increased fixed customer charges
3. Future Electric Utility Regulation reports

- Innovative series of reports taps industry thought leaders to grapple with complex electricity issues
- Unique multiple-perspective approach highlights different views on the future of utility regulation and business models and achieving a reliable, affordable, and flexible power system to inform ongoing discussion and debate
- Advisory group* provides guidance
  - Recognized experts — state regulators, utilities, stakeholders and academics
  - Helps identify and prioritizes topics
  - Reviews drafts, assists with outreach

*See backup slides

New reports under GMI:
- The Future of Centrally-Organized Wholesale Electricity Markets (March 2017)
- Regulatory Incentives for Utilities to Invest in Grid Modernization (under peer review)
- Value-Added Electricity Services: New Roles for Utilities and Third Parties (underway)
Recommendation:
Show how this effort is distinct from previous regulatory and analytical efforts.

Response:
• Activities are focused on DOE’s *comprehensive* vision of a modern grid, rather than individual technologies or institutional components.
• We expanded modeling tools to improve financial analysis of the impacts of a suite of new technologies on utility shareholders and customers and implications for regulation and ratemaking.
• The project includes analysis and technical assistance for state PUCs on new topics, including performance-based regulation (multiyear rate plans with rewards and penalties related to target performance metrics), and markets and pricing for distribution system services.
• Under the GMI, the Future Electric Utility Regulation report series moved into new areas, such as:
  o Electricity markets
  o Incentives for utilities to make grid modernization investments under traditional and innovative forms of regulation
  o Ways states can foster competition for value-added electricity services while allowing utilities to play new roles
Example stakeholder communications (beyond Advisory Group):

► Western Conference of Public Service Commissioners (5/25/16)
► Clean Energy States Alliance webinar (10/11/16)
► *Public Utilities Fortnightly* article (November 2016)
► Annual meeting of National Association of State Utility Consumer Advocates (11/14/16)
► National Governors Association’s Policy Academy on Power Sector Modernization (January 2017)
Future Electric Utility Regulation
Next Steps and Future Plans

- **Continue state TA** to support decision-making
- **Modeling** activities in FY17 linked to state TA
  - LBNL will assess financial impacts of distribution network investments to accommodate two-way power flows at high levels of distributed energy resources penetration and under various grid modernization scenarios.
  - NREL will address impacts of: 1) time of use rates with peak periods defined to encourage consumption mid-day and 2) two-way rates on consumer grid exports.
- **Future Electric Utility Regulation series**
  - *Regulatory Incentives and Disincentives for Utilities to Invest in Grid Modernization*
  - *Value-Added Electricity Products and Services: New Roles for Utilities and Third Parties*
- **Upcoming presentations**
  - National Conference of Regulatory Attorneys – 5/10/17 panel on *Regulatory Incentives* report, combined impacts of high levels of energy efficiency and solar PV on utility shareholders and utility customers, and putting rate impacts of solar PV in context, *plus* presentation on PBR report
  - Western Conference of Public Service Commissioners – 5/23/17 innovation panel
State Utility Regulators
Commissioner Lorraine Akiba, Hawaii
Commissioner Travis Kavulla, Montana
Chair Nancy Lange, Minnesota
Commissioner Carla Peterman, California
Chair Audrey Zibelman, New York*

Utilities
Doug Benevento, Xcel Energy
Tim Duff, Duke Energy
Val Jensen, Commonwealth Edison
Lori Lybolt, Consolidated Edison
Sergej Mahnovski, Edison International
Jay Morrison, NRECA
Delia Patterson, APPA
Peter Zschokke, National Grid

Academics and Other Experts
Janice Beecher, MSU Institute of Public Utilities
Ashley Brown, Harvard Electricity Policy Group
Steve Corneli, consultant
Peter Fox-Penner, Boston University Questrom School of Business
Scott Hempling, attorney
Steve Kihm, Seventhwave
Kris Mayes, Arizona State University College of Law/Utility of the Future Center
Karl Rábago, Pace University School of Law
Rich Sedano, Regulatory Assistance Project

Consumer or Environmental Advocates
Paula Carmody, MD Office of People’s Counsel
Ralph Cavanagh, NRDC
Sonny Popowsky, former consumer advocate (PA)

*Recently left PSC