

Institutional Support Portfolio Overview

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Institutional Support Summary

What is the problem?

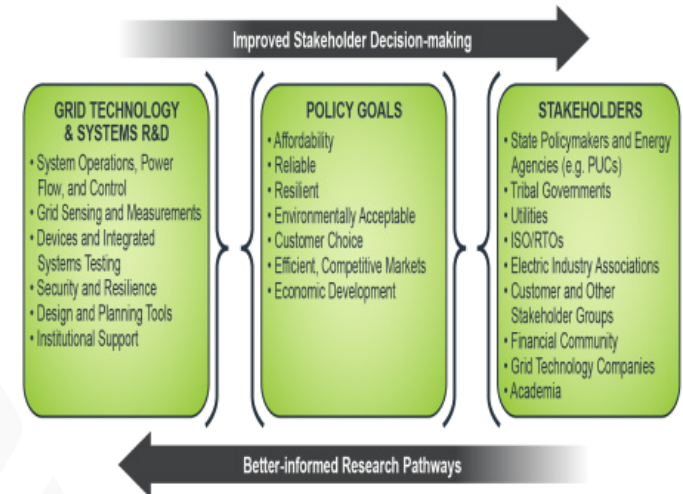
- Supporting and managing Institutional Change in a period of rapid (and potentially disruptive) technological innovation

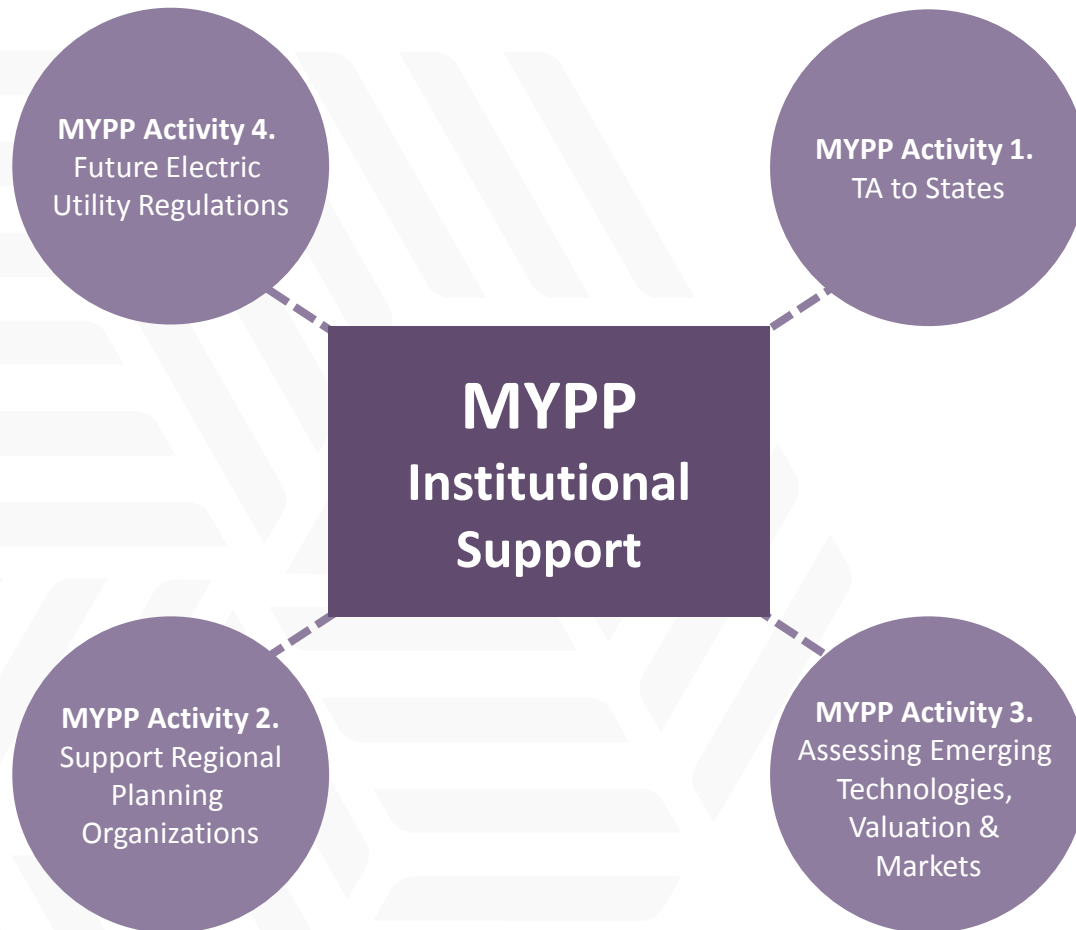
Expected Outcomes

- Address high priority grid modernization challenges and needs identified by electric power industry stakeholders, with particular emphasis on state policymakers and regional planning organizations

Federal Role

- 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 to highlight challenges and explore options for transforming the grid, focusing on key policy questions related to new technologies, regulatory practices, and market designs





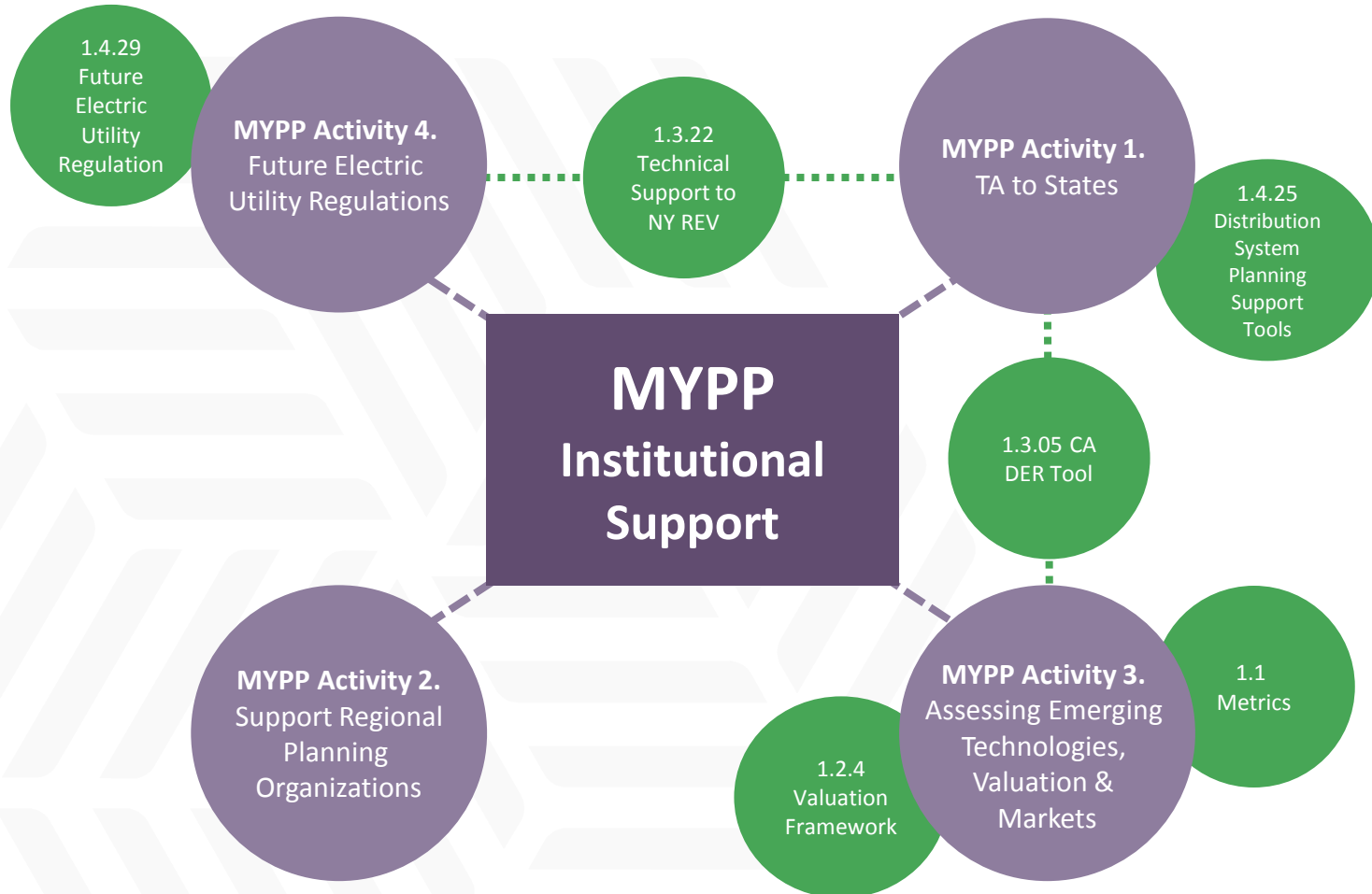
MYPP Activity 4.
Future Electric
Utility Regulations

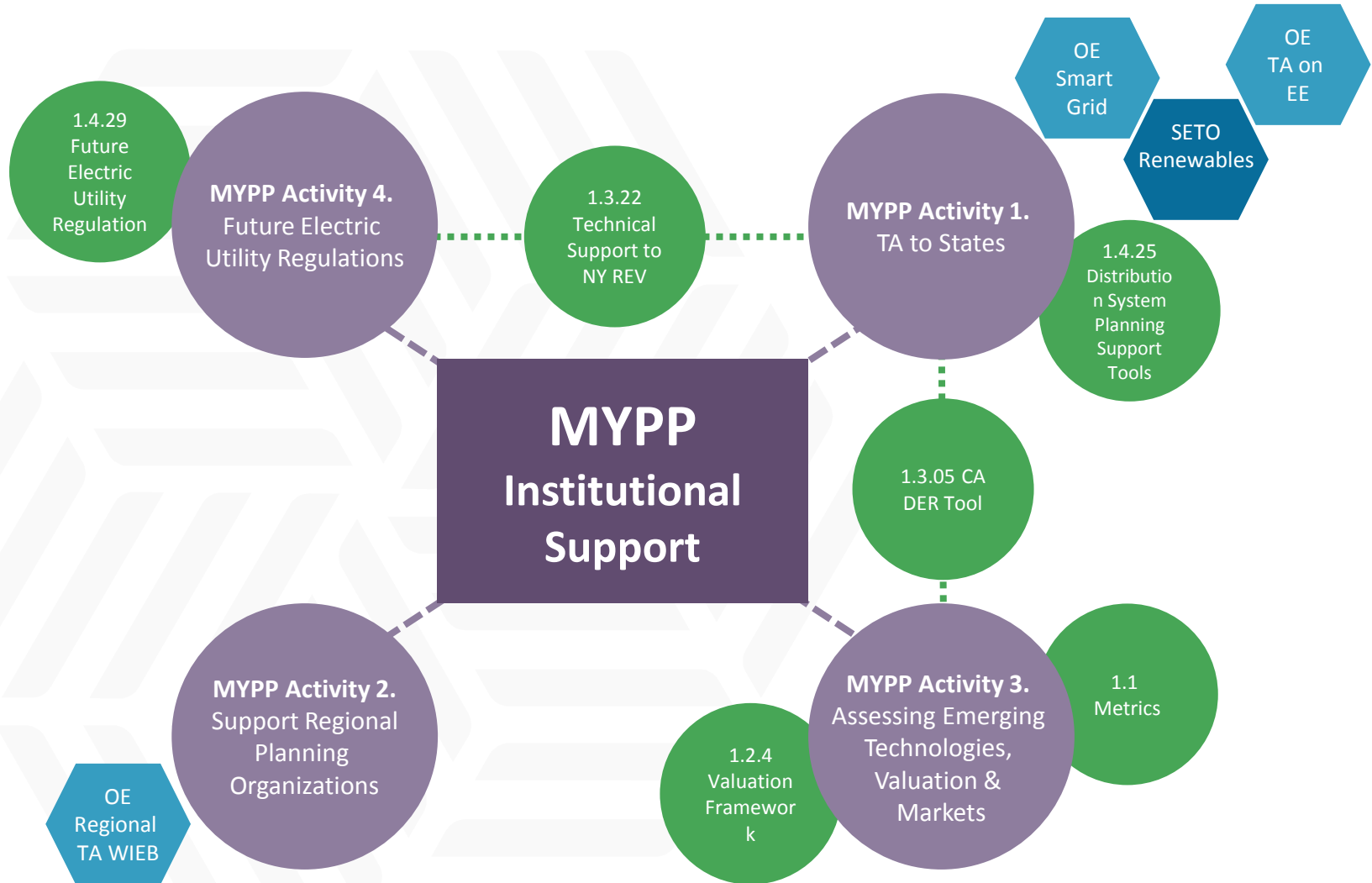
MYPP Activity 1.
TA to States

**MYPP
Institutional
Support**

MYPP Activity 2.
Support Regional
Planning
Organizations

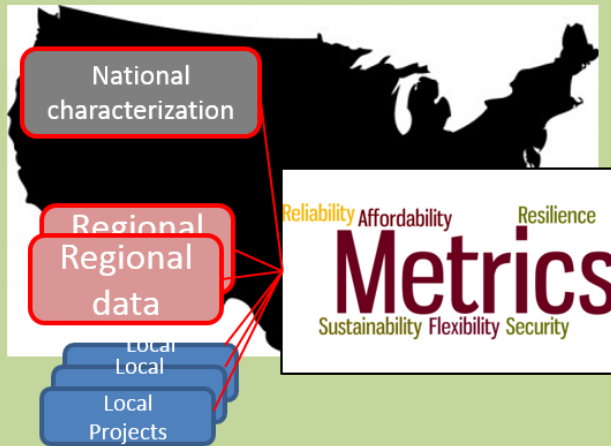
MYPP Activity 3.
Assessing Emerging
Technologies,
Valuation &
Markets



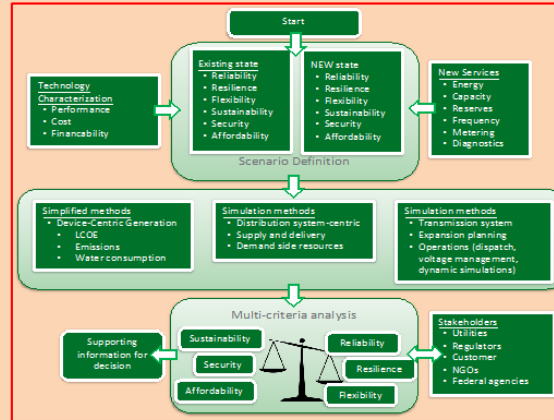


Institutional Support Projects

Metric Analysis



Valuation Framework Development



Distribution System Decision Planning



1.1 Metrics: Foundational Analysis for GMLC

- Work directly with *strategic* stakeholders to confirm the usefulness of *new and enhanced existing* metrics that will guide grid modernization efforts to maintain and improve: **reliability, resilience, flexibility, sustainability, affordability, and security**
- Definition, Validation and Adoption of metrics by leading industry stakeholders and regional partners

1.2.4 Grid Services and Technologies Valuation Framework Development

- Develop a **valuation framework** that will allow stakeholders to conduct, interpret, and compare valuation studies of existing/emerging grid technologies and services with high levels of consistency, transparency, repeatability, and extensibility
- Valuation drives investments

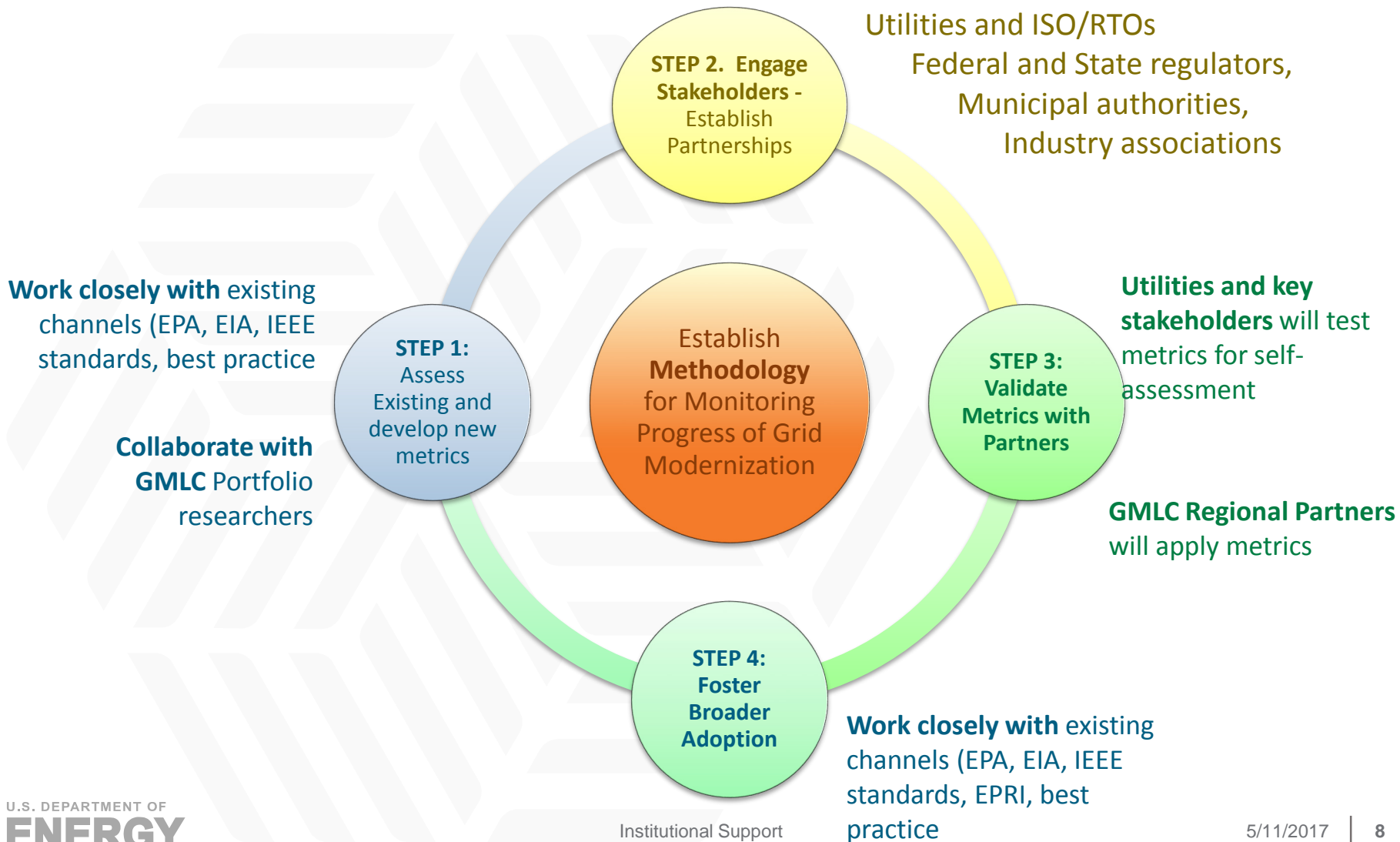
1.4.25 Distribution System Planning Support Tool

- Identify strategies and provide technical assistance (TA) to state PUCs and utilities on advanced electric distribution planning methods and tools, with a focus on incorporating deployment of DER
- Develop & conduct training course(s) for State PUCs on emerging issues in distribution system planning

1.4.29 Future of Electric Utility Regulation

- Provide TA, tools, and analysis on trends in utility regulation and business models
- States will have improved capability to consider alternative regulatory approaches to enable grid modernization investments that will better tie utility earnings to consumer value, economic efficiency and other policy goals

1.1: Metrics Analysis



1.2.4 Valuation Framework

Robust Stakeholder Advisory Group process



- ▶ Sectors
- ✓ 7 Regulators/
Legislators
- ✓ 4 Utilities
- ✓ 3 Regional
Coordinators
- ✓ 2 Suppliers
- ✓ 2 Customer/
Environmental
Groups
- ✓ 3 Technical Experts

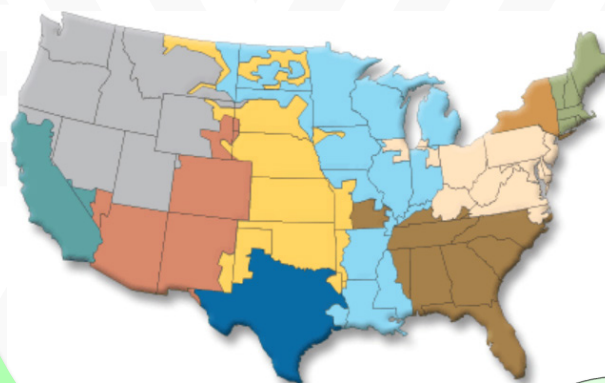
Organization	Name	Position
Maine Public Utilities Commission	Denis Bergeron	Director of Energy Program
North Carolina Utilities Commission	Ed Finley	Chairman
Minnesota Public Utility Commission	Matthew Shuerger	Commissioner
Iowa Public Utility Commission	Nick Wagner	Commissioner
Federal Energy Regulatory Commission	Ray Palmer	Chief, Energy Innovations
Washington State Legislature	Jeff Morris	Representative
Kansas State Legislature	Tom Sloan	Representative
Tennessee Valley Authority	Gary Brinkworth	Director of Technology Innovation
Electric Power Board, Chattanooga	Lilian Bruce	Strategic Research
Commonwealth Edison	Val Jensen	Senior VP of Customer Relations
Pacific Gas & Electric	Enrique Mejorada	Director of Energy Policy Modeling and Analysis
Western Electricity Coordinating Council	Michael Bailey	Senior Engineer, System Adequacy
Eastern Interconnection Planning Collaborative	David Whiteley	Director
Midcontinent ISO	J. T. Smith	Director, Policy Studies
American Wind Energy Association	Betsy Beck	Director, Transmission Policy
Solar City	Ryan Hanley; Alt. Rohan Ma	VP of Grid Engineering Solutions
Citizens Utility Board	David Kolata	Executive Director
Western Clean Energy Advocates	Ron Lehr	Consultant
Continental Economics	Jonathan Lesser	President
EPRI	Bernard Neenan	Technical Executive
Johns Hopkins University	Ben Hobbs	Director – Environment, Energy, Sustainability & Health Institute

Distribution System Decision Support Tool Development and Application

..... for a very diverse utility industry

- ~2000 municipal Utilities
- Average 2200 meters
- Serve 15% of market
- Own & maintain 7% of U.S. distribution feeders
- ~1300 municipals have a single substation!
- Most municipal utilities are very small, and distribution planning is less demanding

Municipal
Utilities
(APPA)



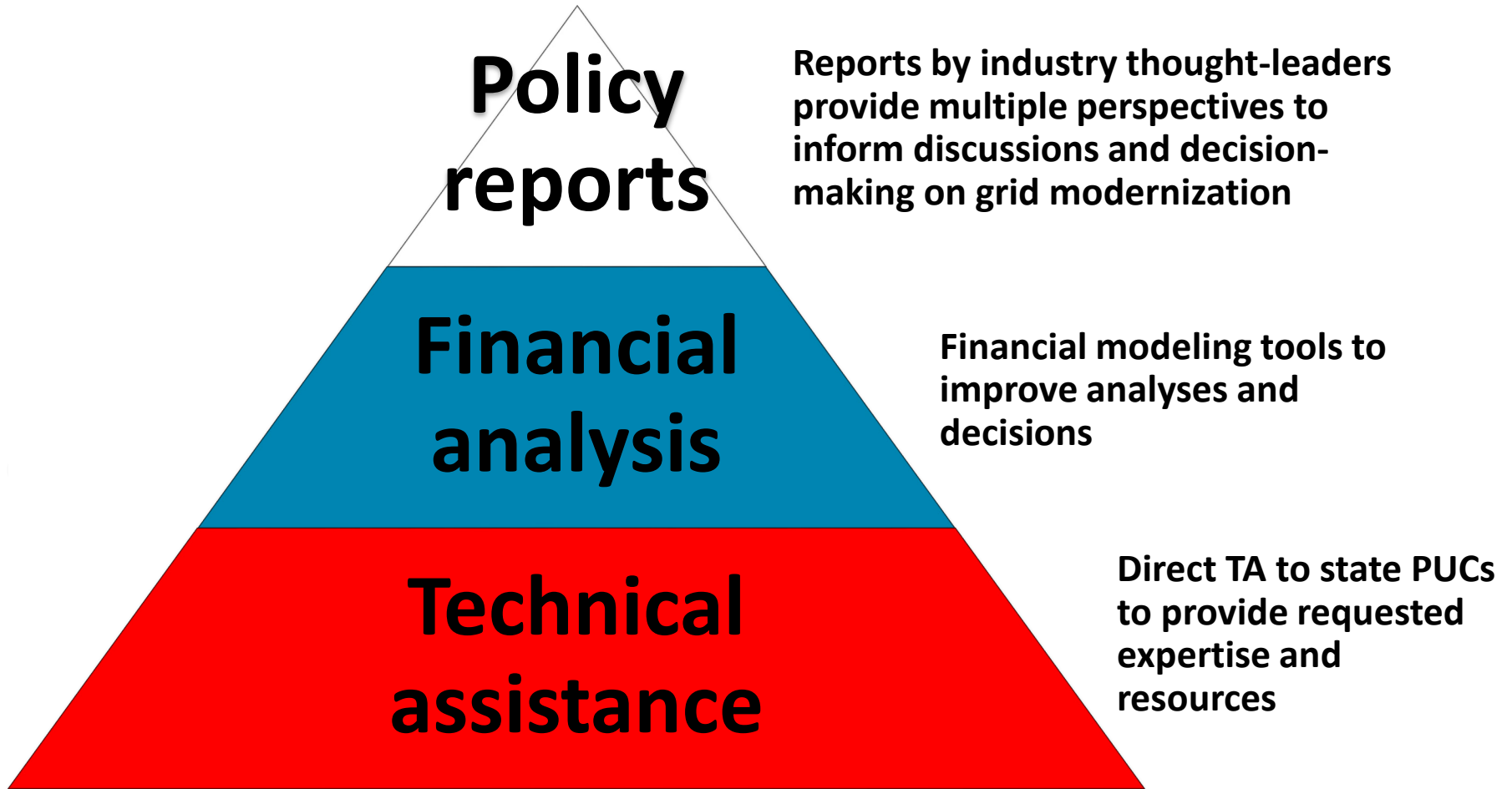
Cooperative
Utilities
(NRECA)

- ~900 cooperative utilities
- Average 13,000 meters
- Serve 12% of market
- Own & maintain 42% of U.S. distribution Feeders
- Many cooperatives leverage external partners for planning
- Work with NRECA

Investor-
Owned
Utilities

- ~210 investor-owned utilities (IOU)
- Average 400,000 meters per IOU
- Serve 73% of market
- Own & maintain 50% of U.S. distribution feeders
- Typically have large Electric Distribution Planning departments
- Regulated utilities, under new scrutiny in distribution planning

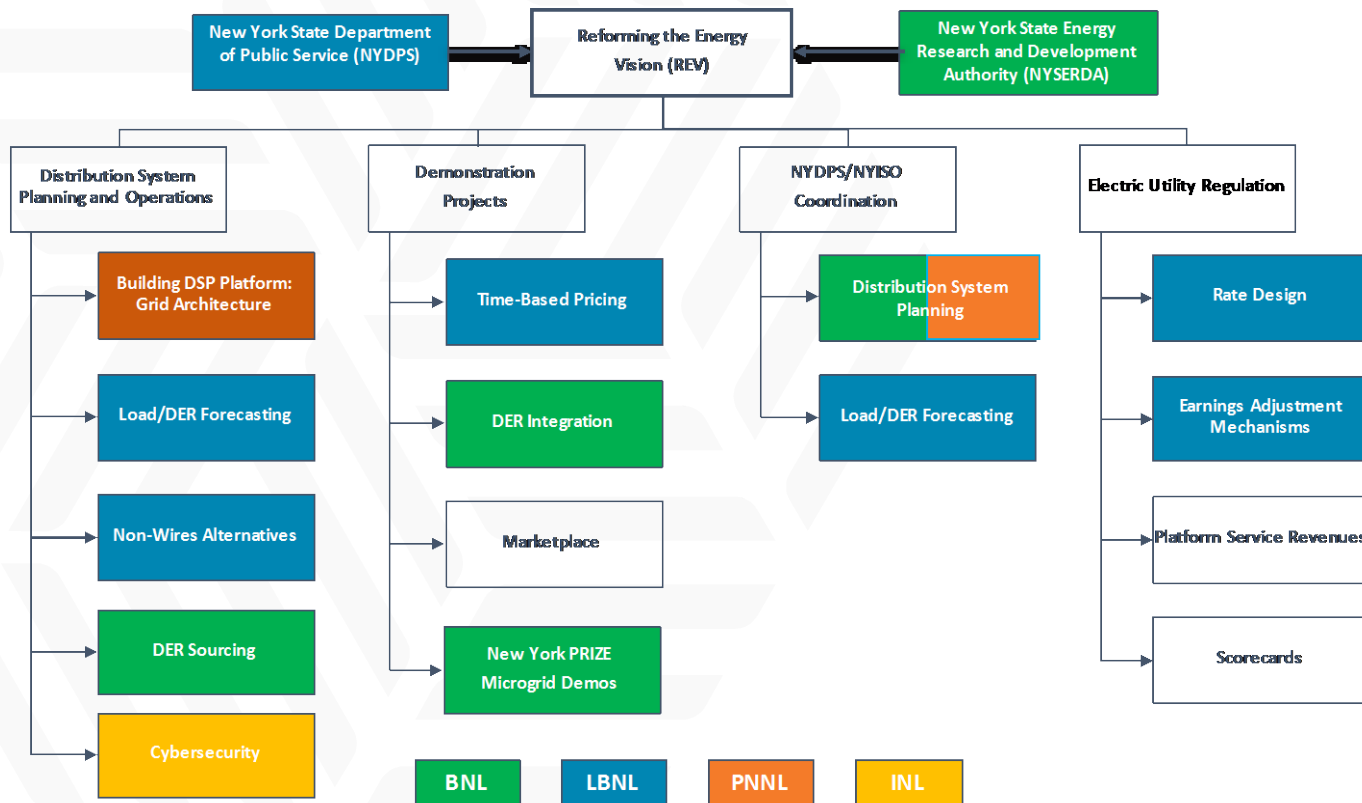
Future Electric Utility Regulation Approach



Regional Partnership Project:

1.3.22 - Technical Support to NY REV Initiative

- Providing technical support to NY State energy agencies (NYDPS and NYSERDA) to enable the REV vision
- Focus on creating Distributed System Platform (DSP), changes to utility regulation and business model, and DER demonstration projects.
- Leverage knowledge gained to support DOE's broader GMI; summarize lessons learned for other states



- ▶ Institutional Support analysis, tools and TA can significantly impact pace of Grid Modernization Investments
 - --- Appropriate DOE and GMLC team role in creating Effective Nudges
- ▶ Many key elements of the Multi-Year Program Plan included in GMLC-funded projects (and other DOE funded activities)
- ▶ Synergies across projects: some examples
- ▶ Increased coordination & team/capability-building across Labs: some examples
- ▶ Increased coordination across DOE offices interested in providing Institutional Support

Additional Slides



1.1: Metrics Analysis

High Level Summary

Project Objectives

Work directly with *strategic* stakeholders to confirm the usefulness of *new and enhanced existing* metrics that will guide grid modernization efforts to maintain and improve:

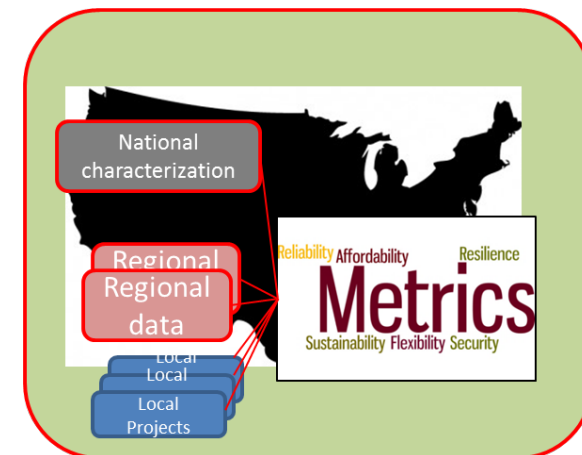
- **Reliability,**
- **Resilience,**
- **Flexibility,**
- **Sustainability,**
- **Affordability, and**
- **Security.**

Value Proposition

- ✓ Ensuring that all stakeholders understand how grid modernization investments will affect and benefit them
- ✓ Audiences: grid modernization technology developers and investors; utility and ISO technology adopters or sponsors; federal, state, and municipal regulatory or oversight authorities; **and electricity consumers** (i.e., the ratepayers)

Expected Outcomes

- ✓ Definition, Validation, and Adoption of metrics and analysis approaches by leading industry stakeholders and regional partners
- ✓ Better alignment of DOE R&D priorities with stakeholder and public-interest objectives



1.2.4 Valuation Framework

High Level Summary

Project Summary

Development a **valuation framework** that will allow electricity-sector stakeholders to conduct, interpret, and compare valuation studies of existing and emerging grid technologies and services with high levels of **consistency, transparency, repeatability, and extensibility.**

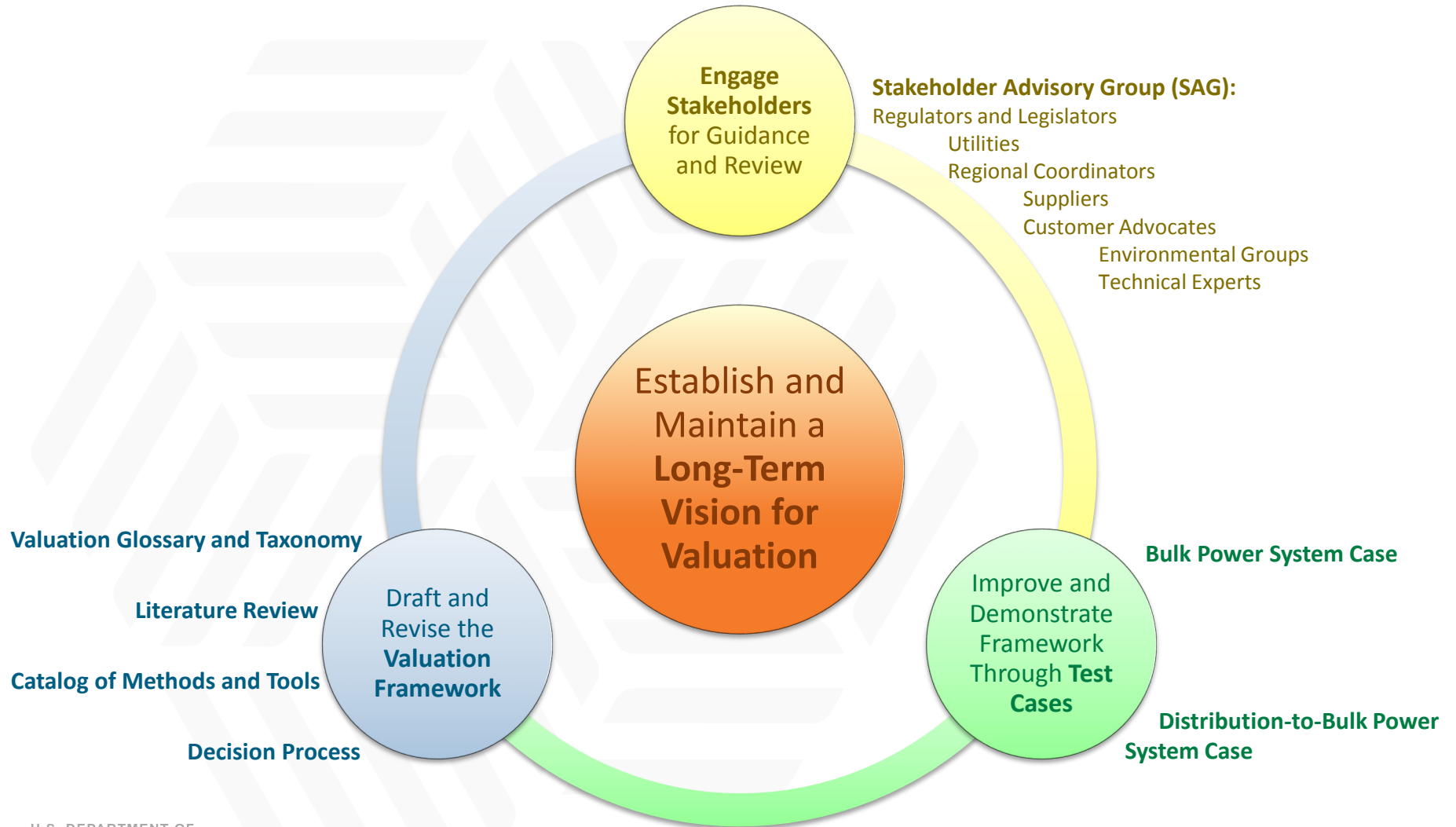
Value Proposition

- ✓ **Valuation drives investments**—from equipment purchases to rate-making to multi-billion dollar resource portfolios
- ✓ **But... current approaches are difficult to directly compare and reconcile**
- ✓ **Decision makers** need information they can **reliably interpret and compare**

Project Objectives

- ✓ **Produce a framework—not a new model:** a systematic approach to conducting, and interpreting valuation resulting in...
- ✓ ...increased **transparency in modeling assumptions and methods** used in evaluating grid technologies and services
- ✓ ...the ability of stakeholders to identify **value beyond monetary savings and costs** (sustainability, reliability, etc)
- ✓ ...**useful and used guidance** for the broad range of valuation applications
- ✓ ... the **foundation of reaching a long-term vision** of improved, broadly consistent valuation practices

1.2.4 Valuation Framework Approach

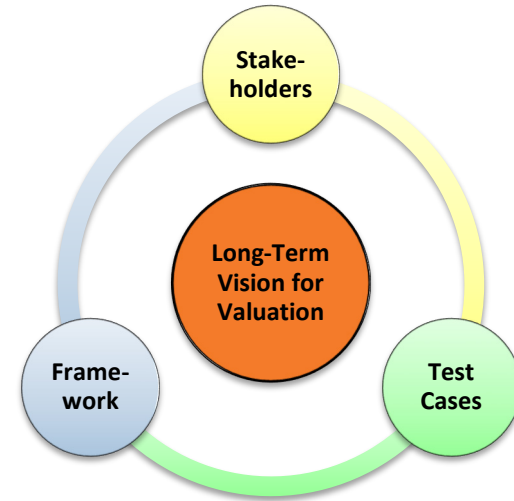


Valuation Framework

Defining Success; Ensuring Impact

Project Objectives

- ✓ Produce a **framework—not a new model**: a systematic approach to conducting, and interpreting valuation resulting in...
- ✓ ...increased **transparency in modeling assumptions and methods** used in evaluating grid technologies and services → A “better way” illustrated through test cases
- ✓ ...the ability of stakeholders to capture **value beyond monetary savings and costs** (sustainability, reliability, etc) → Checklist and other “simple” products in the hands of SAG and others
- ✓ ...**useful and used guidance** for the broad range of valuation applications → Framework itself used by SAG and others—second test case and beyond
- ✓ ... the **foundation of reaching a long-term vision** of improved, broadly consistent valuation practices → Modeling gaps identified; beginnings of “Generally Accepted Valuation Principles” taking shape



Project Description

Identify strategies and provide technical assistance to state regulators and utilities that focus on advanced electric distribution planning methods and tools, with a focus on incorporating emerging grid modernization technologies and the significant deployment of DER

Value Proposition

- ✓ The electric distribution systems are aging and in need of expensive upgrades
- ✓ Large amounts of DERs are being integrated to distribution systems in U.S.
- ✓ PUCs and decision makers have asked for assistance in understanding the distribution systems, and prioritizing upgrades

Project Objectives

- ✓ Provide technical assistance to state regulators in partnership with NARUC
- ✓ Identify gaps in existing and emerging planning practices & approaches
- ✓ Compile information on existing planning tools, identify gaps and necessary functions
- ✓ Provide technical assistance to electric utility industry and associated stakeholders

Future Electric Utility Regulation

Advisory group for report series



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)

Activities and Technical Achievements

MYPP Activity Description



Activity	Technical Achievements by 2020
1. Provide Technical Assistance to States and Tribal Governments	<ul style="list-style-type: none"> • Technical assistance to ALL states to inform their electricity policy decision making, accelerating policy innovation in at least 7 states • Technical analysis results to at least 10 states that allows them to enhance utility distribution system planning, including guidance on how to consider Non-Wires Alternatives, DER, and advanced grid components and systems • At least 10 other states have developed comprehensive energy system infrastructure plans
2. Support Regional Planning and Reliability Organizations	<ul style="list-style-type: none"> • Regional planning & reliability organizations develop institutional frameworks, standards, and protocols for integrating new grid-related technologies • Coordinated regional long-term planning process that uses standardized, publicly available databases of transmission and regional resource data and planning assumptions • Facilitated long-term regional planning in each U.S. interconnection
3. Develop Methods, Tools, and Resources for Assessing Grid Modernization	<ul style="list-style-type: none"> • New methods for valuation of DER technologies and services that are defined and clearly understood by stakeholders and enable informed decisions on grid investments and operations. • Analysis tools and methods that facilitate states' integration of emerging grid technologies into decision-making, planning, and technology deployment. • New Grid Modernization performance and impact metrics and data collection methods, which are used by states to track Grid Modernization progress.
4. Conduct Research on Future Electric Utility Regulation	<ul style="list-style-type: none"> • 3-5 states have adopted fundamental changes and 8-10 states have adopted incremental changes to their regulatory structure that better aligns utility interests with grid modernization and clean energy goals.

Accomplishments and Emerging Opportunities



Accomplishments

- ▶ **1.1** Reference document (v2.0) on approach and focus in each metric area (v2.0); Impressive engagement process (19 Working Partners)
- ▶ **1.2.4** Completed Draft Valuation Framework and Long-term Vision document
- ▶ **1.4.25** Completed report on distribution planning tools; Significant progress on training program for state PUCs
- ▶ **1.4.29** Provided TA to 5 states (MN, PA, MT, VT, CA) on regulatory/utility business models or and ratemaking; Completed two reports in Future of Electric Utility Regulation series
- ▶ **1.3.22** Review of Joint Utility Dist System Implementation Plan filings; TA on DER Demonstrations

Path Forward

- ▶ **1.1** Validation of metrics and approaches with Working Partners and Regional Partnership projects
- ▶ **1.2.4** Test two use cases applying valuation framework; “Generally Accepted Valuation Principals”
- ▶ **1.4.25** Conduct training course(s) for state PUCs on emerging issues in distribution system planning (summer 2017 and 2018)
- ▶ **1.4.29** Continue TA to state PUCs to support decision-making, linked with financial model/tool development and Future Electric Utility Regulation series
- ▶ **1.3.22** Support on Business Models (Design of Earning Adjustment Mechanism metrics; Summary report with insights learned from NY REV)