

Development of a Valuation Framework for Grid Services and Technologies

CHALLENGE

Across the electric power sector, stakeholders ranging from individuals to power producers, grid operators, regulators, and policy makers use different methodologies to value—estimate and catalog the impacts of—grid services and technologies. These valuations can be as simple as basic purchasing decisions to complex analyses supporting multi-million and billion-dollar capital investment or R&D portfolios. However, despite the importance of valuation, current approaches are difficult to directly compare and reconcile—because they rely upon differing, often opaque assumptions concerning economic and engineering inputs as well as time, geographic, and power system scales. This diversity and lack of transparency hampers informed decision making because the approaches to quantifying and monetizing costs and benefits—if quantification and monetization are even considered possible—can produce highly divergent results.

- Sustainability
- Resilience
- Security
- Flexibility
- Affordability
- Reliability



The Valuation Framework will guide power system stakeholders in quantifying and interpreting the diverse impacts and benefits associated with power system decisions.

APPROACH

To address this challenge, this three-year project will develop a comprehensive and transparent framework to value the services and impacts of grid-related technologies. This framework will create a systematic approach to defining and documenting the scale, scope, and assumptions that are the basis of any valuation or modeling activity. It is not another methodology for calculating values. Rather, it leverages existing processes to guide valuation studies so that stakeholders can conduct, interpret, and most importantly, compare analyses with high levels of consistency, transparency, repeatability, and extensibility.

Development of the framework involves an effort to systematically define the “valuation question” being asked and to map from that question to quantifiable metrics and ultimately a range of modeling approaches and tools suitable to the unique needs of each study and its stakeholders. To

At-A-Glance

PROJECT LEADS

- **Patrick O'Connor**
Oak Ridge National Laboratory
oconnorpw@ornl.gov
- **Michael Kintner-Meyer**
Pacific Northwest National Laboratory
Michael.Kintner-Meyer@pnnl.gov
- **Vladimir Koritarov**
Argonne National Laboratory
koritarov@anl.gov

PARTNERS

Stakeholder Advisory Group

Maine Public Utilities Commission • North Carolina Utilities Commission • Minnesota Public Utility Commission • Iowa Public Utility Commission • Federal Energy Regulatory Commission • Washington State Legislature • Kansas State Legislature • Tennessee Valley Authority • Electric Power Board, Chattanooga • Commonwealth Edison • Pacific Gas & Electric • Western Electricity Coordinating Council • Eastern Interconnection Planning Collaborative • Midcontinent ISO • American Wind Energy Association • Solar City • Citizens Utility Board • Western Clean Energy Associates • Continental Economics • Electric Power Research Institute • Johns Hopkins University

BUDGET

\$3 million

DURATION

April 2016 – October 2018

TECHNICAL AREA

Institutional Support

Lead: Chuck Goldman
Lawrence Berkeley National Laboratory
CAGoldman@lbl.gov

do so, the project will conduct a literature review of technology and grid services valuation studies and draw upon the cutting-edge approaches under development in other Grid Modernization Initiative projects.

Two Test Cases will be run to evaluate the completeness and efficacy of the valuation framework. The first—analyzing a topic of interest at the bulk-power system level—will exercise the valuation process and demonstrate transparency of all assumptions, while identifying initial gaps in the ability to model and value technologies and services using existing approaches. The second test case will

EXPECTED OUTCOMES

Ultimately the project is intended to produce credible reference material and products that move the power sector as a whole toward a more transparent paradigm of conducting and comparing valuation studies to support informed decision making for a changing grid.

To do so, the primary output is the “framework” concept and document itself, consisting of two components:

1. A set of Valuation Guidelines to inform the construction and interpretation of valuation studies—identifying the key choices with respect to metrics, methods, and assumptions that drive the outcomes of the valuation activities.
2. A Valuation Taxonomy and Valuation Methodology Catalog to support transparency and comparability between studies. The framework will be couched within standardized and systematically defined terminology to clearly communicate concepts.

evaluate a revised version of the framework to assess in more depth its capability to handle the complex, emerging issues associated with the value of distribution-scale technologies.

Critical feedback from the project’s diverse Stakeholder Advisory Group will help direct the project team and ensure the framework is of use to key power system stakeholders. The advisory group will assist in identifying and testing approaches and tools that can incorporate valuation in different regulatory and market contexts (e.g., resource planning, procurement processes, pricing), thereby facilitating the framework’s acceptance in the power sector community.

Additionally, the framework will catalog existing tools and methods for modeling value in the power system—identifying key gaps as they relate to valuing cutting-edge technologies and services.

Beyond the framework, discussions with the Stakeholder Advisory Group have indicated that additional practical outputs—such as a “checklist” of topics to choose from for consideration during a valuation study—would be of broad value to industry.

The project is scheduled to be completed by September 2018. Success in the three-year scope will mean that DOE has produced an industry-vetted and credible reference and education tool for stakeholders in the electric power sector. This project is intended to support a long-term vision of moving toward “Generally Accepted Valuation Principles” to create the transparency and consistency in valuation seen in more mature disciplines such as accounting.

LAB TEAM



Launched in November 2014 under the U.S. Department of Energy’s Grid Modernization Initiative, the GMLC is a strategic partnership between DOE Headquarters and the national laboratories, bringing together leading experts and resources to collaborate on national grid modernization goals. The GMLC’s work is focused in **six technical areas** viewed as essential to modernization efforts:

Devices and Testing | Sensing and Measurements | Systems Operations and Control
Design and Planning | Security and Resilience | Institutional Support