

Grid Services and Technologies Valuation Framework Development

CHALLENGE

Across the electric power sector, stakeholders ranging from individuals to power producers, grid operators, regulators, and policy makers use different methodologies to value 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—relying 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 quantify and monetize costs and benefits—if quantification and monetization are even considered possible—can produce highly divergent results.

APPROACH

To address this challenge, this project aims to develop guidelines to enable regulators to design, conduct and/or oversee studies to compare and value the services and impacts of grid modernization approaches. The project will provide guidance for a systematic approach to defining and documenting the scale, scope, assumptions, risk assessment, and analysis methods that are the basis of any valuation or modeling activity. It is not another methodology for calculating values. Rather, it focuses on quality assurance of the *process* 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 choice of alternatives to be considered, impacts of metrics to characterize the consequences of grid modernization alternatives, and identification of analysis suitable to the information needs of the decision makers and stakeholders.



Multi-Criteria Analysis

The Valuation Framework will guide power system stakeholders in quantifying and interpreting the diverse costs and benefits associated with power system investments

At-A-Glance

PROJECT LEADS

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PARTNERS

Stakeholder Advisory Group

National Association of Regulatory Utility Commissioners (NARUC) • 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 – May 2019

TECHNICAL AREA

Institutional Support

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Two *Test Cases* were run to evaluate the completeness and efficacy of the valuation framework. The first—analyzing the outcomes of various states’ policies for nuclear power plants— exercised the general decision process and transparency elements of the framework and identified initial gaps in the ability to model and value technologies and services from existing approaches.

The second test case looked at costs, metrics, and other issues related to implementing a microgrid. Architecture. Industry advisors and reviewers applied the framework’s guidelines to a grid modernization technology of current interest and evaluate its applicability to handle complex and loosely-defined objectives, such as resilience.

OUTCOMES

The valuation guidelines are intended to move the power sector towards a more transparent paradigm of conducting and comparing valuation studies to support informed decision making for a changing grid.

To do so, the project’s primary output is the “framework” concept and guidance to ensure the valuation process and its analyses actually result in impact assessments and comparisons that are relevant to the objectives of decision-makers and other stakeholders. Key aspects of the guidelines are:

1. Clearly stating the problem/issue and the basis upon which the ultimate choice will be made.
2. Considering all relevant alternatives, not just “traditional” options.
3. Engaging stakeholders meaningfully and constructively in all aspects of the valuation process, including choice of alternatives, identification of desired outcomes, and tradeoffs among metrics.
4. Being deliberate in the choice of metrics and impacts to be evaluated and ensuring they align

LAB TEAM



Under the leadership of the National Association of Regulatory Utility Commissioners (NARUC), the project’s 25-person *Stakeholder Advisory Group* (SAG), drawn from diverse organizations – regulators, utilities/ISOs, consultants, research organizations, trade associations – helped direct the project team and ensure the framework will be useful to regulators. The advisory group was instrumental in focusing on the need to *assure the quality of the valuation process, rather than selecting the “optimal” grid model*. The SAG also directed the project team to expand the focus of valuation studies to include analysis of all impacts relevant to the decision – such as economic development – rather than limiting the technical assessment to grid-related metrics.

with the study’s basic goal and decision-makers’ objectives.

5. Comprehensively identifying uncertainties and being deliberate and transparent in how to address the risks associated with them.
6. Choosing analysis methods, tools or models that will actually calculate the desired metric/impact estimates, within the study’s schedule and budget.

SAG review and input, and NARUC’s involvement, have been essential. The guidelines have been reviewed by about 40 industry organizations. They have been presented at NARUC’s 2019 winter Meeting and as a webinar of NARUC’s Center for Partnerships and Innovation (CPI).

This project is intended to support a long-term vision of moving towards “Generally Accepted Valuation Principles” to create transparency and consistency in the process of valuing grid modernization alternatives as seen process quality assurance methods and requirements developed in other disciplines such as aviation, medical procedures, and building commissioning.

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