NARUC CENTER FOR PARTNERSHIPS AND INNOVATION

INNOVATION WEBINAR SERIES

AUGUST 15, 2018

GRID VALUATION FRAMEWORK GUIDELINES

WHAT IS NARUC

- The National Association of Regulatory Utility Commissioners (NARUC) is a non-profit organization founded in 1889.
- Our Members are the state regulatory Commissioners in all 50 states & the territories. FERC & FCC Commissioners are also members. NARUC has Associate Members in over 20 other countries.
- NARUC member agencies regulate electricity, natural gas, telecommunications, and water utilities.

WHAT IS NARUC'S CENTER FOR PARTNERSHIPS AND INNOVATION?

- Grant-funded team dedicated to providing technical assistance to members.
- CPI identified emerging challenges and connects state commissions with expertise and strategies.
- CPI builds relationships, develops resources, and delivers trainings.

NARUC CPI Topical Areas

Energy Infrastructure & Technology Modernization

Electricity System Transition

Critical Infrastructure, Cybersecurity, Resilience

Emerging Issues

www.NARUC.org/CPI

GRID VALUATION FRAMEWORK GUIDELINES

MODERATOR:

TOM SLOAN, FORMER KANSAS STATE REPRESENTATIVE

PANELISTS:

CHRIS IRWIN, U.S. DEPARTMENT OF ENERGY

LARRY MARKEL, OAK RIDGE NATIONAL LABORATORY (ORNL)

MARK RUTH, NATIONAL RENEWABLE ENERGY LABORATORY (NREL)

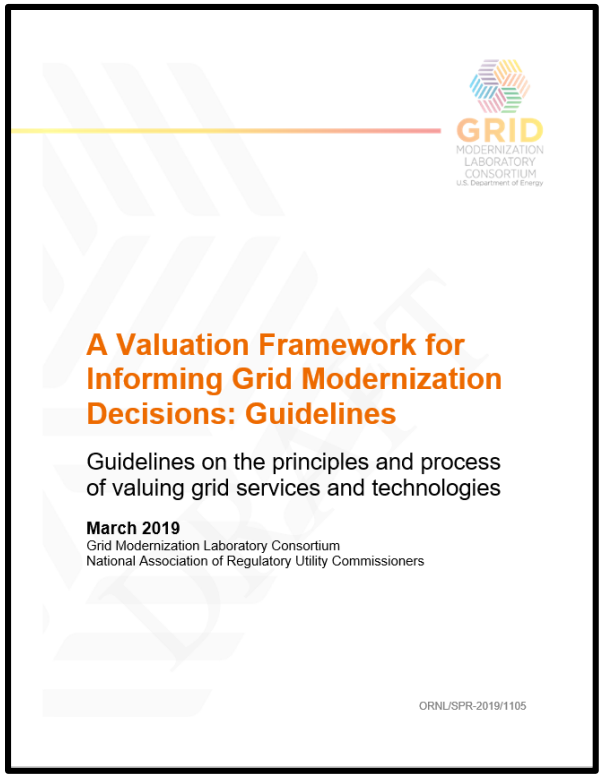
Welcome, Objectives, Introductions

Welcome

- **Tom Sloan, moderator**
- **Chris Irwin, U.S. Department of Energy**

Objectives:

- **Present need for a more consistent and transparent studies to compare alternatives**
- **Introduce the Valuation Framework and associated Guidelines**
- **Present a brief example for applying the Guidelines**

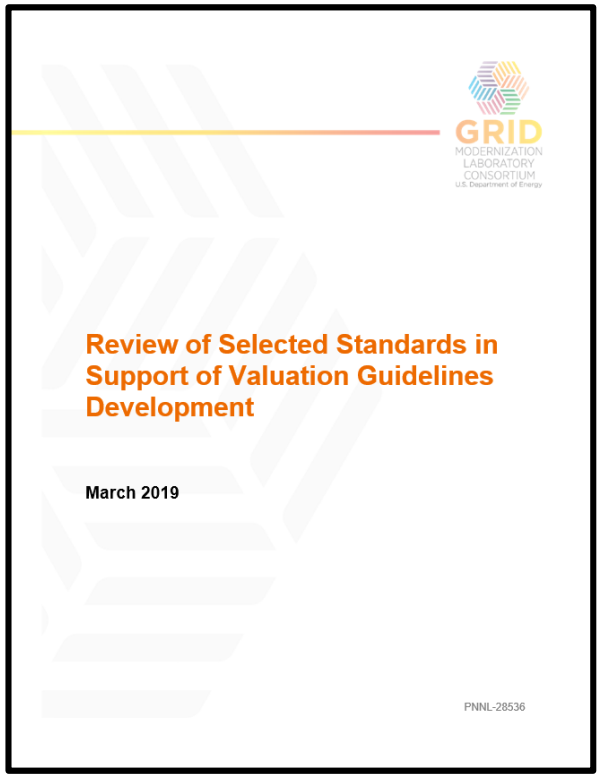


A Valuation Framework for Informing Grid Modernization Decisions: Guidelines

Guidelines on the principles and process of valuing grid services and technologies

March 2019
Grid Modernization Laboratory Consortium
National Association of Regulatory Utility Commissioners

ORNL/SPR-2019/1105



Review of Selected Standards in Support of Valuation Guidelines Development

March 2019

PNNL-28536

Webinar Agenda

Welcome, Objectives, Introductions

Valuation Framework and Guidelines

- What is a Valuation Study & Why Were the Guidelines Developed?
- Overview of Guidelines: Phases, Steps & Key Elements

Q & A, Comments

Brief Walk-through Exercise: What's for lunch?

More Information & Follow-Up

Attendees are muted.
Send questions and comments through the chat box at anytime.

We will (slowly) unmute attendees during the Exercise. Please mute yourself.

After the webinar, contact Kerry Worthington at KWorthington@naruc.org

GMLC 1.2.4 Valuation Framework

Overview of Valuation Framework Process

Larry Markel, ORNL

- What is a valuation study of grid alternatives?
- Shortcomings of current valuation studies
- Can we formulate minimum requirements and/or best practices for a valuation study?
- Overview: A Valuation Framework for Informing Grid Modernization Decisions

What is a valuation study?

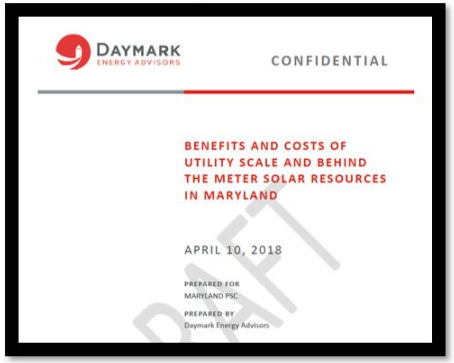
- A valuation study compares the relative value(s) of different alternatives in order to chose a course of action.
  - one alternative may be “business as usual”.
- Today’s available choices among technologies, market/ownership models, grid architectures do not lend themselves to simple decisions.
- Objectives – often competing – can involve electricity cost, land use, environmental quality, reliability, resilience, economic development…
- Metrics are often hard to quantify and not easily compared.
- Studies considered were more complex and less defined than least-cost planning (LCP) or integrated resource planning (IRP).

Shortcomings of current valuation studies

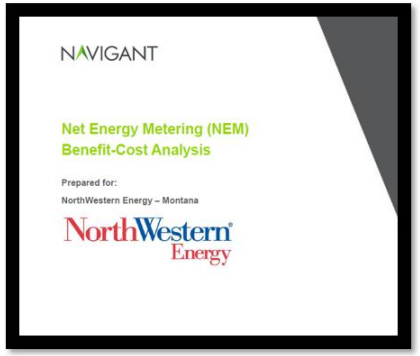
- Many studies have shortcomings in options, participation, or analysis.
- Valuation studies are not consistent and often don't provide the actionable information for regulators to make their decision.
- Alternatives now available for investments in grid can no longer be evaluated by historical cost-emissions-reliability metrics. Nor can major decisions be made through closed analysis without consideration of the stakeholders.
- Over-reliance on models, with consultants employing familiar – not necessarily appropriate – models.

Valuation studies often do not actually inform the decision

Maryland



Montana



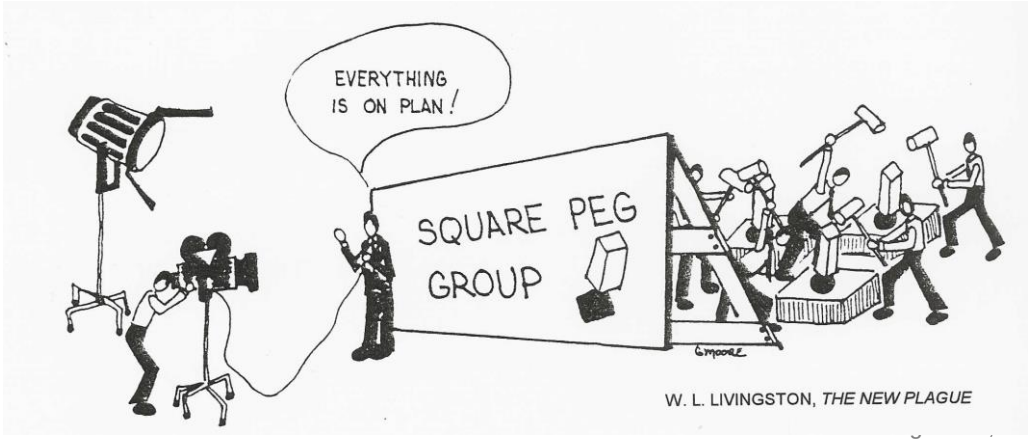
UTILITY DIVE

DEEP DIVE

How two value-of-solar studies add up to no clear value of solar

Is rooftop solar really worth 90% less in Montana than in Maryland?

Why did 2 studies come up with a 10:1 difference in value for the same technology?



The Valuation Framework & Guidelines Were Developed with Industry Collaboration

- **Stakeholder Advisory Group (SAG)**
  - ~25 people: regulators, legislators, utilities, universities, research organizations, NGOs, public interest groups, trade associations
  - Annual meetings, periodic webinars, reviews of documents
  - SAG members participated in Test Case #2
- **NARUC involvement**
  - Members of project team
  - Liaison with SAG and other regulators
  - Several reviews of document & drafts of guidelines
- **Test Cases**
  1. "Table top exercise" to test the Framework's usefulness for interpreting, comparing, and contrasting studies. Examined assessments of potential state support for existing nuclear generators that are economically at-risk (NY, IL, OH) **2017**
  2. Interactive exercises (with SAG members) to consider a more complex valuation: microgrid vs. conventional system expansion, considering the value of improved resilience in addition to power production economics. **2018**
- **About 40 external reviewers of draft guidelines**
- **Interactive session at NARUC February 2019 Winter Meeting**
  - ~40 participants, mostly commissioners & commission staff
  - 3 scenarios

Scenarios at NARUC Session

High penetrations of rooftop PV

Distribution system reinforcement through microgrid

Locally-owned generation for a Rural Electric Coop or municipal power distribution utility

Can we formulate minimum requirements and/or best practices for a valuation study?

- Objective: allow electricity-sector stakeholders to **conduct, interpret, and compare valuation studies** of existing and emerging grid services and technologies with high levels of **consistency, transparency, repeatability, and extensibility.**
- Not a new method for valuation studies – the Framework & Guidelines address the quality, rigor and consistency of the process.

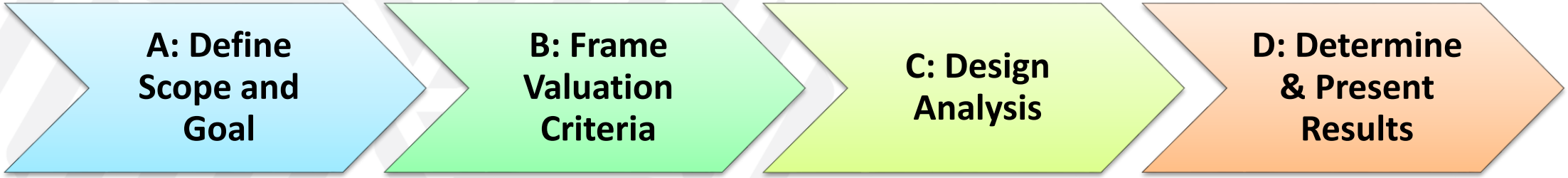
Key Principles/Practices:

1. Be clear and precise in stating the purpose of the study.
2. What will be the basis for making your decision?
3. Consider non-traditional alternatives (from a variety of viewpoints – involve stakeholders).
4. Identify stakeholders and involve them in the process as appropriate.
5. What impacts & metrics do you need to for your decision? Be consistent with #2.
6. How will you compare outcomes characterized by multiple metrics that can easily be equated, traded off, and/or quantified with each other?
7. Uncertainties represent risks of “bad” decisions. Identify them and determine explicitly how to deal with them.
8. Chose analysis methods and models that actually give you the information you need: consistent with #2, 4, 5, 6,7. Be mindful of budget and schedule.

Quality Assurance and best practices have been applied in other disciplines with impressive results:

- Aviation checklists
- ASHRAE Standard 202 Commissioning
- Medical procedure checklists
- ISO 14000 & ISO 9000

Valuation Framework Process has 4 Phases



Each process has multiple steps:
Phase A sets the overall scope of the initial study

Phase A: Define Scope and Goal

- Document the Valuation Context and Purpose
- Identify Range of Alternatives
- Plan and Initiate Stakeholder Engagement

Result: Scope & Goal Documentation

- Why are you doing the study?
- Consider "non-traditional" ways to meet your goals.
- Who are the stakeholders? What are their objectives? Which can be involved constructively? Are there alternatives they want considered?

Phase B frames the valuation criteria by identifying key metrics and means to weigh or present these metrics

Phase B: Frame Valuation Criteria

- Prioritize Key Impact Metrics for Valuation
- Determine Multi-Criteria Integration Approach

Result: Valuation Criteria Framework

- On what basis will you choose among alternatives?
- What specific types of information inform this decision? Are they quantifiable?
- How do you characterize alternate futures? How do you compare and choose among them?

Phase C designs the analysis to be conducted, setting the stage to conduct the analysis

GRID MODERNIZATION LABORATORY CONSORTIUM
U.S. Department of Energy

Phase C: Design Analysis

- Determine Approach to Address Uncertainties
- Select Assessment Methods and Tools
- Develop Assumptions and Input Data

Result: Analysis/Assessment Design

- Uncertainty represents a risk – identify & quantify it
- The consequence of over- vs under-estimation are asymmetric

Uncertainty	Type of uncertainty	Magnitude of uncertainty	Impact of uncertainty (low/med/high)	Method(s) to address uncertainty	Comments/ reasoning

- Stakeholder engagement may be crucial for these steps.
- Choose appropriate models & analysis method -consistent with the metrics & impact information you actually need. Develop a map of information flows.
- Do not limit metrics & analysis methods to grid models.
- Document assumptions and data; make sure they are consistent with your goals, assumptions, and analysis methods.

Phase D conducts analyses, calculates the relative values of alternatives, and presents results

Phase D: Determine and Present Results

- Assess Impacts for Each Alternative
- Calculate Integrated Values for Each Alternative
- Compare Values, Document Analysis and Report Findings

Result: Report and Interpret Results

- Previous steps provide guidance for presenting and characterizing results/impacts.
- Effective stakeholder engagement can frame the debate over alternatives in a manner compatible with compromise.
- Goal of consistency, transparency, repeatability, comparability and extensibility.

Iteration can occur between or within phases

Phase A: Define Scope and Goal

- Document the Valuation Context and Purpose
- Identify Range of Alternatives
- Plan and Initiate Stakeholder Engagement

Result: Valuation Analysis Plan

Phase B: Frame Valuation Criteria

- Prioritize Key Impact Metrics for Valuation
- Determine Multi-Criteria Integration Approach

Result: Valuation Criteria Framework

Phase C: Design Analysis

- Determine Approach to Address Uncertainties
- Select Assessment Methods and Tools
- Develop Assumptions and Input Data

Result: Analysis /Assessment Design

Phase D: Deter-mine & Present Results

- Assess Impacts for Each Alternative
- Calculate Integrated Values for Each Alternative
- Compare Values, Document Analysis and Report Findings

Result: Report and Interpret Results

Workbook – help a user apply the framework

examples for steps 2 & 3

GRID MODERNIZATION LABORATORY

Guided questions and considerations for each step.

Step 2. Identify the Range of Alternatives

Objective: *To identify and select which alternatives to analyze and compare*

Specify baseline or business-as-usual case (for comparison against alternatives)	***Questions to consider*** • *Are the alternatives feasible?* • *Why consider these alternatives (as opposed to other possibilities)?* ***Notes*** • *Budget constraints may limit the number of alternatives that can be considered.* • *This step begins to specify bases for comparison among alternatives.* • *Stakeholder engagement can play an important role in identifying and selecting among alternatives.* ***Document choices and rationale***
Alternatives to consider in valuation (and the boundaries on those alternatives)	

Step 3. Plan and Initiate Stakeholder Engagement

Objectives: *To identify the stakeholders to be involved in the valuation study, define their roles, and develop a stakeholder engagement plan*

List of stakeholders to be involved in valuation	***Questions to consider*** • *What stakeholders to include – and to what extent – in the grid-related decision-making process?* • *What stakeholders should be involved because they can influence or delay a decision?* • *How might each stakeholder's objectives, authorities, and responsibilities affect the selection of, and trade-offs among, metrics?* ***Notes*** • *Engaging with stakeholders, or anticipating stakeholder objectives or concerns is a part of every step.* ***Document choices and rationale***
Stakeholder engagement plan (specifying stakeholders' areas of expertise and roles; how stakeholder input shall be solicited and incorporated into the analysis; and how to handle potential differences or conflicts among stakeholders' perspectives)	
Plan for interacting with stakeholders	

Summing Up and Questions

*Send questions and comments through the **chat box** at anytime.*

"Raise hand" if you would like to be unmuted to contribute to the Exercise.

After the webinar, contact Kerry Worthington at KWorthington@naruc.org

Example of applying the Guidelines

"Let's do lunch!"

- Problem/Issue: I'm hungry, and I didn't bring my lunch.
- I could go get a sandwich, but it would be nice to eat with some friends.
- What do I do?

Lunch – Phase A: Define Scope & Goal

1.Context & Purpose

Purpose(s)

- Nourishment
- Stress relief (get fresh air)
- Social interaction
- Team building at work

Scope

- Small group (usual folks)
- Larger team
- Efficiency vs “event”
- Time considerations

2. Alternatives

- Order delivery
- Take out
- Dine out
  - Informal
  - Somewhat formal
  - Large vs small tables
- Type of food
  - Fast
  - Ethnic
  - Cooked-to-order

3. Stakeholders

Who

- Me
- Small group
- Large Group

Engagement

- Ask them
- E-mail poll
- We’re doing this. Want to join?

Decision process

- Consensus
- Majority
- Strong preferences/objections?
- Hard constraints (e.g., dietary)

Do we need to re-examine the alternatives?

Lunch – Phase B: Frame Valuation Criteria

4. Metrics

- Cost
- Speed
- Can group fit at 1 table?
- Food quality
  - Taste
  - Type
  - Nutrition
  - Inspector rating
- Restaurant ambience
- Distance to restaurant
- Difficulty deciding (large group)

5. Multi-Objective Decision

- Cost vs. Time vs. Quality vs. Group Opportunity
- Time & effort needed to weigh all criteria & inputs
- Stakeholder considerations
  - Bonding opportunity vs. disappointment with choice
  - “Joe never comes with us”
  - “Ed always complains”
  - The restaurant is having a labor dispute
- Hard constraints (e.g., dietary)

Lunch – Phase C: Design Analysis Tools & Process

6. Uncertainties

- How crowded/busy?
- Daily special?
- Never been there before
- How many will participate?
- Will it rain while we're walking?

What are the consequences of a poor outcome?

7. Assessment Methods/Tools

- We need to decide before 11:30
- Open vote
- Sense consensus (voice vote)
- Offer limited choices
- Google restaurant ratings
- Anecdotal ratings

What selection method/choice is most likely to achieve original purpose & objectives [1] and which metrics [4, 5] will be best determinants of this?

How will participants react? Feelings of those who decide not to participate [3, 5]?

8. Assumptions & Inputs

- Which restaurants did we consider?
- How many people did we assume would accept invitation?
- Can we estimate metrics for all alternatives considered in #2?

Are the alternatives considered likely to meet objectives? Do we need to look at more alternatives because none of those in #2 meet all decision criteria?

Lunch – Phase D: Determine & Present Results

- Decide
- How to you present the decision to enlist stakeholders (i.e., those you want to join you for lunch)?
  - Do you present the options considered?
  - Do you explain how/why you made your decision?
  - Do these answers change if someone objects? Asks??

Summing Up and Next Steps

- Tom Sloan
- Larry Markel, ORNL
- Mark Ruth, NREL
- Chris Irwin, U.S. DOE
- Kerry Worthington, NARUC

NARUC INNOVATION WEBINAR SERIES

Hosted on Thursdays each month from 3:00 p.m. to 4:00 p.m. ET

- **September 19, 2019:** Nature vs. Infrastructure.
- **October 10, 2019:** The Volkswagen Settlement: An Electrifying Opportunity for EV Charging.
- **November 7, 2019:** Using Energy Efficiency to Meet Peak Demand.
- **December 12, 2019:** Dream Machine: The U.S. Energy Research & Development (R&D) Ecosystem.

www.naruc.org/cpi

NARUC thanks the U.S. Department of Energy

Thursday, August 22nd, 2019
3:00-4:30pm EDT

Delinquencies and Disconnections:
Connecting Challenges with Data Collection Opportunities

This webinar is the third in the series hosted by the NARUC Committee on Consumers in the Public Interest, National Association of State Utility Consumer Advocates, and NRRI on the topic of data collection for utility disconnections and delinquencies. The purpose of this series is to provide a greater understanding of the data collection processes in use throughout the country in order to make recommendations for a data collection model related to utility disconnections and delinquencies.

This webinar will use a TED talk format where the speakers will highlight success stories related to standardized data collection processes and best practices for reducing delinquencies and disconnections.

To register, please visit: https://www.naruc.org/nrri/

THANK YOU

KWORTHINGTON@NARUC.ORG

HTTP://WWW.NARUC.ORG/CPI