All-Source Competitive Solicitations: State and Electric Utility Practices

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Agenda

- About the Future Electric Utility Regulation series
- Presentation
- Q&A

Draft report available on request: lcschwartz@lbl.gov

Final report will be posted at https://emp.lbl.gov/projects/feur/

Future Electric Utility Regulation Series

- A series of reports from Berkeley Lab taps leading thinkers to grapple with complex regulatory issues for the electricity sector
- Unique multi-perspective approach highlights different views on the future of electric utility regulation and business models and achieving a reliable, affordable, and flexible power system to inform ongoing discussion and debate
- Funded by U.S. Department of Energy's Grid Modernization Laboratory Consortium
  - Office of Electricity
  - Office of Energy Efficiency and Renewable Energy - Solar Energy Technologies Office
- Expert advisory group provides guidance and review (next slide)

Advisory Group

- **Chair Jeffrey Ackermann**, Colorado Public Utilities Commission
- **Janice Beecher**, Institute of Public Utilities, Michigan State University
- **Ashley Brown**, Harvard Electricity Policy Group
- **Paula Carmody**, Maryland Office of People's Counsel
- **Ralph Cavanagh**, Natural Resources Defense Council
- **Steve Corneli**, consultant
- **Tim Duff**, Duke Energy
- **Jordy Fuentes,** Arizona Residential Utility Consumer Office
- **Scott Hempling**, attorney
- **Steve Kihm,** Slipstream
- **Lori Lybolt**, Consolidated Edison
- **Jeff Lyng**, Xcel Energy
- **Sergej Mahnovski**, Edison International
- **Kris Mayes,** Arizona State University College of Law/Utility of the Future Center
- **Jay Morrison,** National Rural Electric Cooperative Association
- **Kristin Munsch,** National Grid
- **Delia Patterson,** American Public Power Association
- **Commissioner Jennifer Potter,** Hawaii PUC
- **Karl Rábago,** Pace Energy & Climate Center, Pace University School of Law
- **Rich Sedano,** Regulatory Assistance Project
- **Chair Sally Talberg,** Michigan Public Service Commission
- **Chair Ted Thomas,** Arkansas Public Service Commission
- **Jordan White,** Western Electricity Coordinating Council

Other Reports in the Series

Distributed Energy Resources (DERs), Industry Structure and Regulatory Responses

Distribution Systems in a High DER Future: Planning, Market Design, Operation and Oversight

Performance-Based Regulation in a High DER Future

Distribution System Pricing With DERs

Recovery of Utility Fixed Costs: Utility, Consumer, Environmental and Economist Perspectives

The Future of Electricity Resource Planning

The Future of Centrally-Organized Wholesale Electricity Markets

Regulatory Incentives and Disincentives for Utility Investments in Grid Modernization

Value-Added Electricity Services: New Roles for Utilities and Third-Party Providers

The Future of Transportation Electrification

Utility Investments in Resilience of Electricity Systems

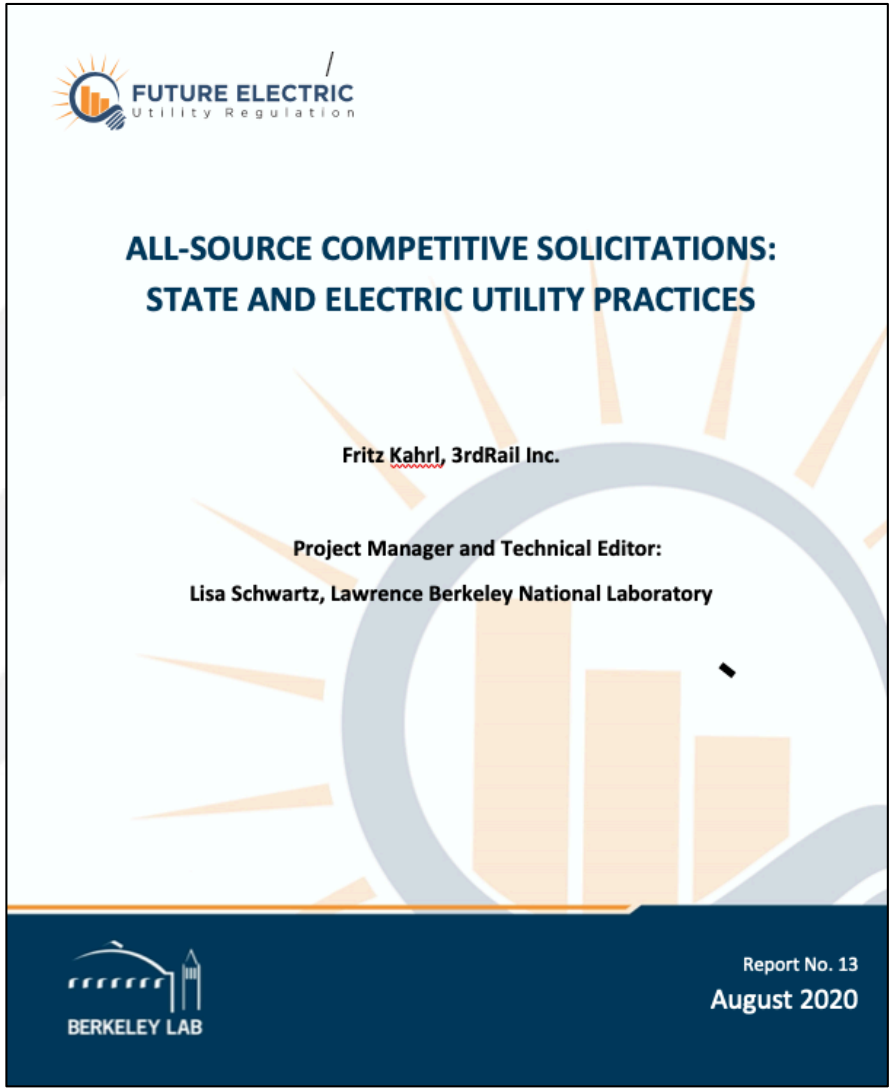
Renewable Energy Options for Large Utility Customers

Reports, webinar slides and recordings at feur.lbl.gov

Additional reports forthcoming

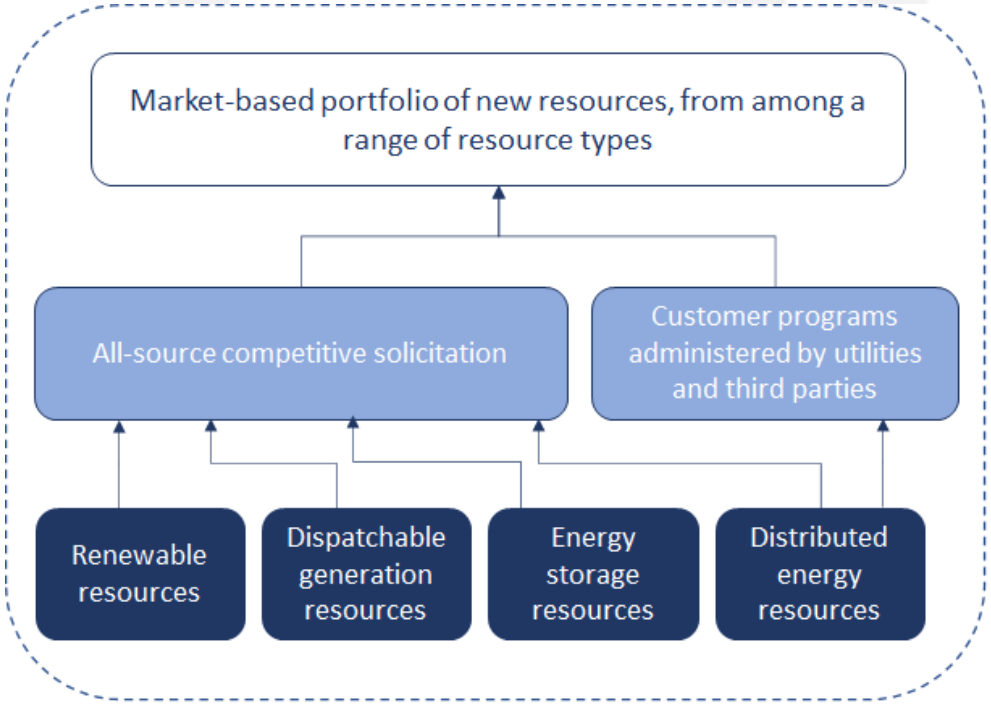
Report Overview

- Describes principles, practices, and emerging issues in all-source competitive solicitations by vertically integrated utilities
  - Includes utilities that participate in markets run by regional transmission organization/independent system operator and those that do not
    - Does not cover publicly owned utilities or rural coops
- Focuses on procurement to meet bulk power system needs
- Also describes competitive solicitation practices for non-wires alternatives for distribution system needs
  - Needs identification, procurement process, evaluation and project selection, and outcomes from recent solicitations

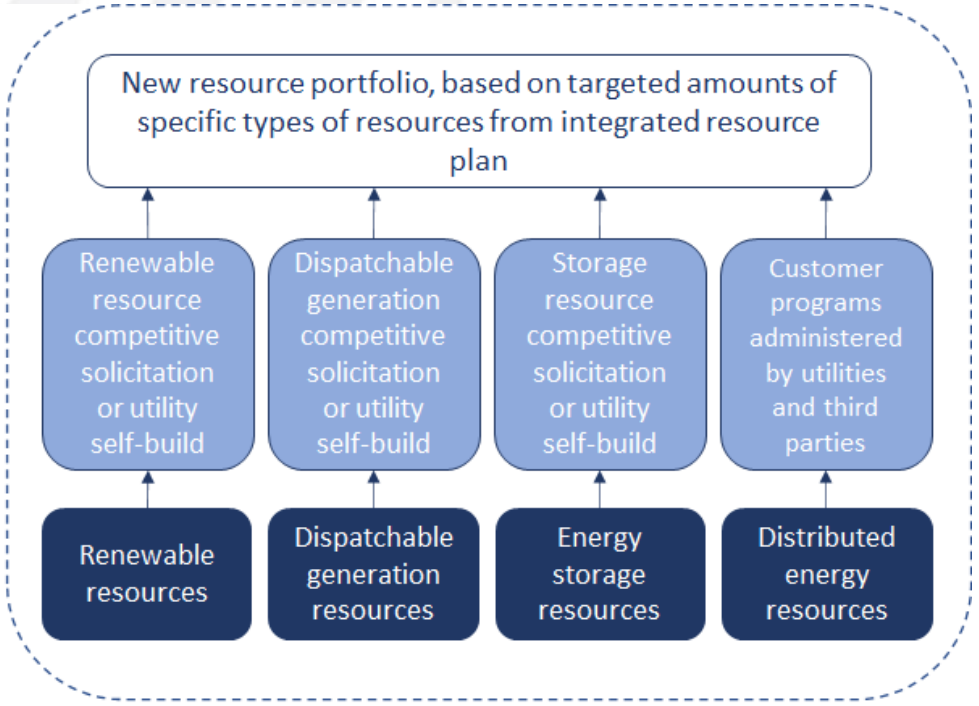


All-Source Competitive Solicitations

- **All-source**: All potential resources can participate in the solicitation
- **Competitive**: All sellers meeting minimum eligibility criteria, including utilities and their affiliates, can participate in the solicitation
- *Report does not seek to adjudicate what is and is not "all-source" or "competitive"*



All-Source Competitive Procurement



Limited-Source Resource Acquisition

Key Takeaways (1)

- **State PUCs play a critical role in building confidence in the fairness and integrity of the solicitation process.** Achieving a competitive process with innovative offers requires thoughtful design and implementation.
- **Utility resource plans provide a foundation for all-source solicitations.** It's important to consider how resource plans and all-source procurement will interact.
- **All-source competitive procurement can complement state energy policies.** Moving to technology-neutral procurement is not intended to supersede state energy goals.
- **Net value is a more important metric than cost in evaluating bids.** Utility resource evaluations must compare technologies with very different operating characteristics.
- **Ongoing efforts are needed to improve bid evaluation methods.** Methodological challenges include capacity credit, value of real-time flexibility, congestion management, transmission and distribution (T&D) deferral, and natural gas price risk.

Key Takeaways (2)

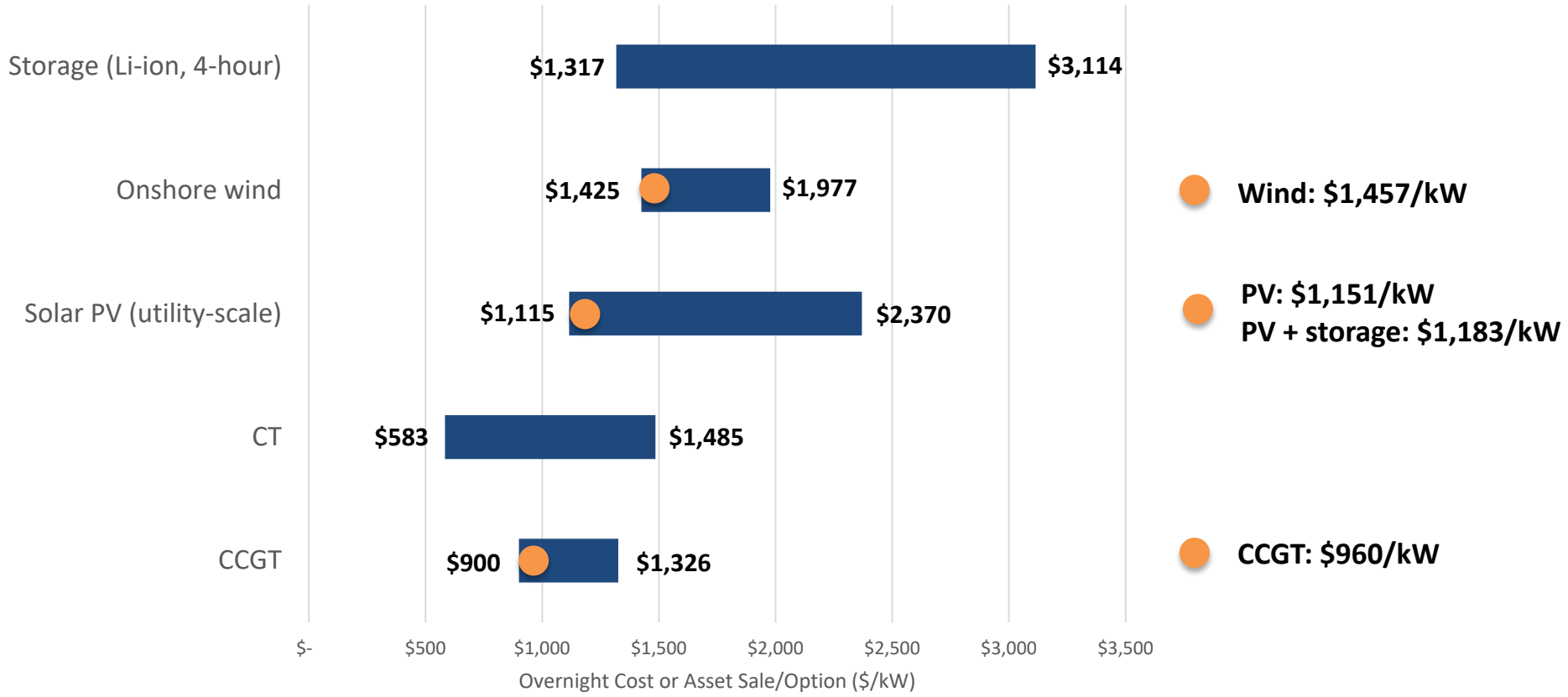
- **New opportunities are emerging for participation of distributed energy resources (DERs) in all-source solicitations.** Still, utility DER programs will remain an important procurement mechanism.
- **Unique evaluation challenges for energy storage warrant systematic analysis by utilities.** States can require utilities to ensure they are capturing the full benefits of storage.
- **Ensuring comparable evaluation between utility-owned and non-utility-owned resources presents ongoing challenges for public utility commissions.** Three key challenges to creating a level playing field are debt equivalence, development and performance risks, and contract length.
- **For investor-owned utilities, independent evaluators (IEs) play essential roles in all-source solicitations.** IEs help ensure that solicitation and selection processes are objective and impartial.

Historical Perspective and Current Trends

- All-source competitive procurement first emerged in the 1980s, as a response to the federal Public Utility Regulatory Policies Act (PURPA).
- Some states have required utilities to use all-source competitive solicitations for decades.
- Recent increased interest in all-source competitive solicitations is driven by rapid technological change:
  - Technology cost uncertainty
  - Steep declines in solar, wind, and battery costs
  - Portfolio effects of wind, solar, and energy storage
  - Renewed interest in demand-side resources

Trends: Addressing Uncertainty in Technology Costs

Range of cost estimates based on a screening study for Northern Indiana Public Service Company's (NIPSCO's) 2016 IRP (blue bars) and average bid prices for asset sale/ option in NIPSCO's 2018 all-source competitive solicitation (orange dots)



Trends: Adapting to an Evolving Market

Responses to requests for proposals (RFPs) for Public Service Company of Colorado's (PSCo's) all-source solicitations in 2013 and 2017. The 2017 results illustrate the emergence of solar PV, storage, and innovative hybrid resources—pairings with storage.

2013 all-source competitive solicitation

Technology	Number of Bids	Nameplate Capacity (Rounded to the Nearest 50 MW)
Gas-Fired	14	2,750
Wind	26	7,000
Solar (PV and Thermal)	14	750
Dispatchable Storage	1	50

2017 all-source competitive solicitation

Generation Technology	# of Bids	Bid MW	# of Projects	Project MW	Median Bid Price or Equivalent	Pricing Units
Combustion Turbine/IC Engines	30	7,141	13	2,466	$ 4.80	$/kW-mo
Combustion Turbine with Battery Storage	7	804	3	476	6.20	$/kW-mo
Gas-Fired Combined Cycles	2	451	2	451	[redacted]	$/kW-mo
Stand-alone Battery Storage	28	2,143	21	1,614	11.30	$/kW-mo
Compressed Air Energy Storage	1	317	1	317	[redacted]	$/kW-mo
Wind	96	42,278	42	17,380	$ 18.10	$/MWh
Wind and Solar	5	2,612	4	2,162	19.90	$/MWh
Wind with Battery Storage	11	5,700	8	5,097	21.00	$/MWh
Solar (PV)	152	29,710	75	13,435	29.50	$/MWh
Wind and Solar and Battery Storage	7	4,048	7	4,048	30.60	$/MWh
Solar (PV) with Battery Storage	87	16,725	59	10,813	36.00	$/MWh
IC Engine with Solar	1	5	1	5	[redacted]	$/MWh
Waste Heat	2	21	1	11	[redacted]	$/MWh
Biomass	1	9	1	9	[redacted]	$/MWh
Total	430	111,963	238	58,283		

Sources: PSCO's 2013 All Source Solicitation 20-Day Report; 2017 All Source Solicitation 30-Day Report

Storage: An Emerging Resource

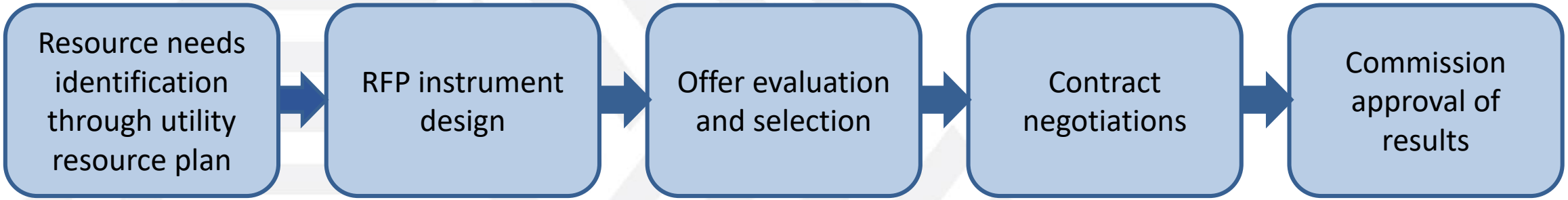
- Storage is not new to utility planning and procurement.
  - Pumped storage and, to a lesser extent, flywheels and compressed air energy storage
- Recent interest is driven by declining battery costs and expanding functionality.
- Storage, especially batteries, has unique characteristics.
  - Short lead time, modularity, siting flexibility, operational flexibility, T&D substitute, energy limits
- Storage functionality and value are not always well captured in utility resource evaluations.
- Hybrid resources are creating new evaluation challenges.

Example Storage Values

Energy arbitrage	- Traditional energy price arbitrage - Day-ahead and real-time price arbitrage - Congestion management - Renewable energy integration
Ancillary services	- Frequency regulation - Operating reserves
Capacity	- System resource adequacy - Local/zonal resource adequacy - Distribution - Transmission
Reliability and resilience	- Backup generation

Overview of All-Source Competitive Procurement

- All-source competitive procurement process generally has five main steps.



- Commission requirements guide the process
  - Use of independent evaluators, stakeholder review, when utilities must use competitive procurement, timelines and deadlines for procurement process, requirements for RFP documents, and evaluation procedures and methods
- Design of all-source competitive solicitations involves multiple tradeoffs.
  - Including flexibility, transparency, timeline, and bidder requirements

Resource Needs Identification

- Resource need in all-source solicitations is technology-neutral.
  - Capacity, energy, reserves
  - Other needs are difficult to meaningfully define *ex ante.*
- Capacity is typically the binding constraint.
  - Interpretation of capacity varies
  - Load-resource balance, including retirements
- Additional information may be helpful to bidders
  - Location
  - Drivers of need
- Actual procurement may differ from identified needs
  - Some flexibility is helpful

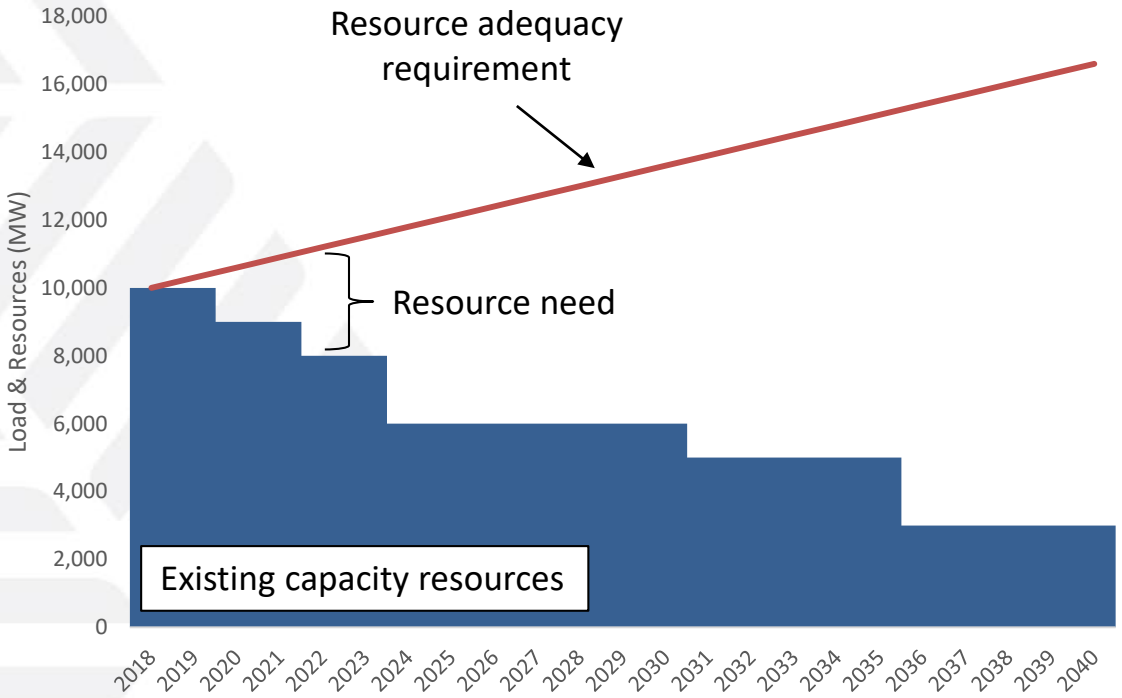


Illustration of load-resource balance

RFP Instrument Design

- RFP instrument refers to the process, documents, and communications used to solicit resource offers
- Key elements of RFP instrument design include:
  - Documents and information for bidders
  - Process and timeline
  - Eligibility requirements
  - Products solicited
  - Confidentiality
- Many elements require careful design and consideration.
  - Practices in other states can be a useful reference.
- Key considerations for all-source competitive solicitations include:
  - Products — defining resource categories
  - Eligibility — minimum size and types of DERs

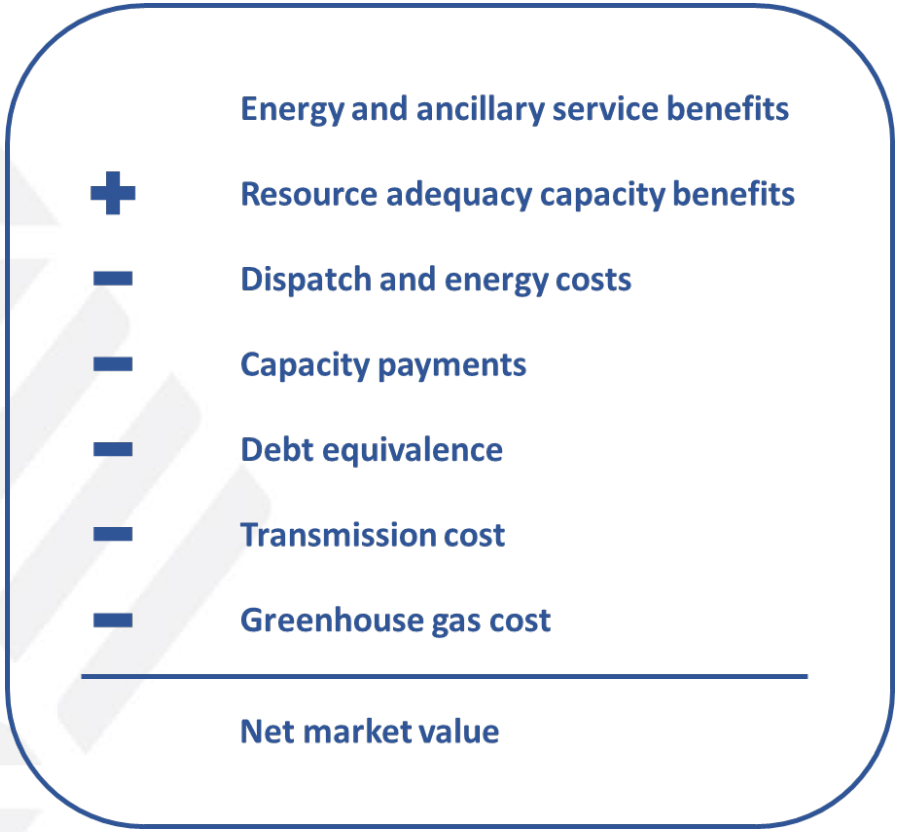
Offer Evaluation and Selection (1)

- Utilities consider price and non-price factors in evaluating bids.
  - Non-price factors may include development and contract risk, bidder financial viability, technology viability, policy compliance benefits, resource diversity, transmission system impact, resilience, environmental impact, and utility financial impact.
- Economic evaluation is a key challenge in all-source solicitations because of potential diversity of bids.
  - Different ownership structures and contract lengths
  - Resources with different operating characteristics
  - Different combinations of resources within the same bid (hybrids)
  - Bids for resources that are shaped or firmed with energy storage or energy market purchases
- Need for flexibility and judgment in evaluation is a key reason for using IEs.

AES Corporation

Offer Evaluation and Selection (2)

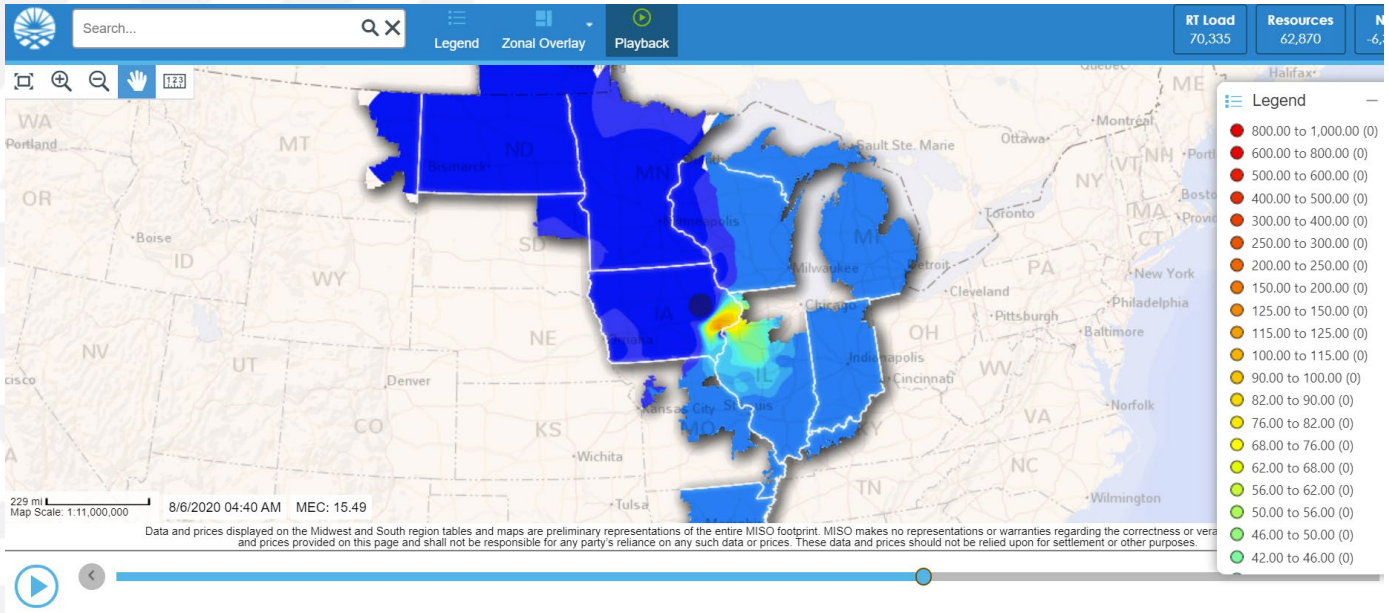
- Evaluating bids for resources with different operating characteristics requires a way to compare benefits and costs on an equivalent basis.
- Net value (benefits – costs) is a more meaningful metric than cost.
  - Utility models may already capture net value.
- Two general approaches to modeling net value
  - Portfolio expansion
  - Net value evaluation



Net market value framework used in Southern California Edison's 2013 all-source solicitation

Offer Evaluation and Selection (3)

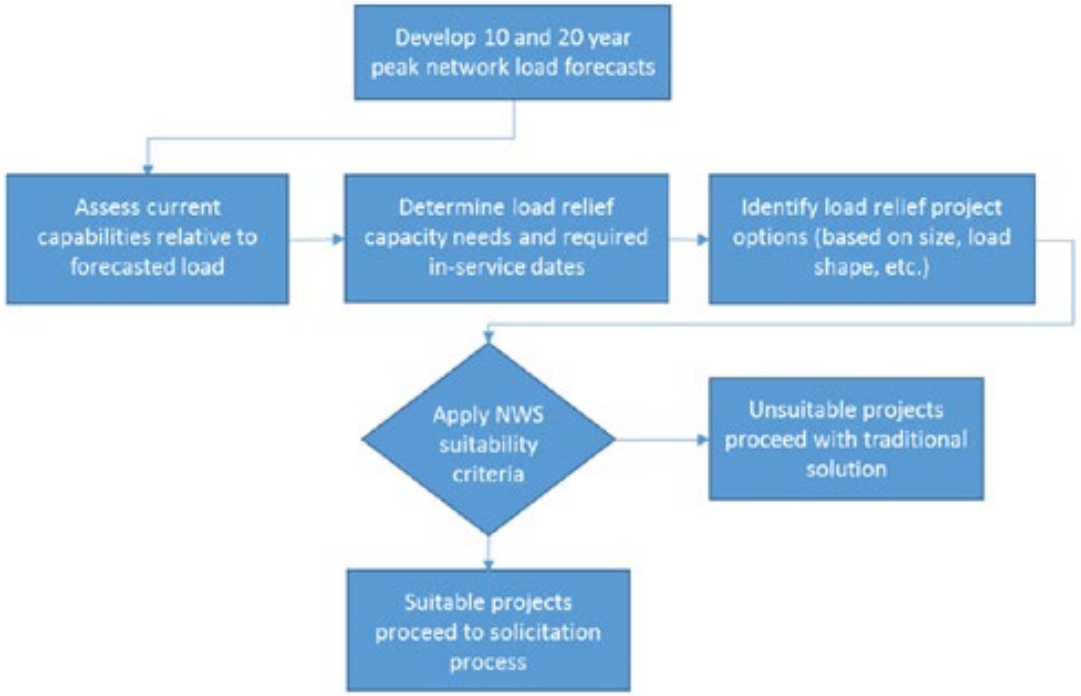
- Models used in bid evaluations need ongoing enhancements to accurately capture the benefits and costs of emerging resources.
- Increasing emphasis on capturing value of energy storage
  - Focus on real-time prices, congestion, T&D capacity value
- Capturing variable energy generation requires higher spatial/temporal granularity in models, new approaches to assessing, and managing capacity value risk.
- Level of transparency for analysis of utility fuel price risk varies.
  - Balance between physical and financial hedging



Real-time market prices in MISO on 8/6/20

Procurement of Non-Wires Alternatives for Distribution Systems

- Targeted procurement of DERs may defer or avoid some distribution system capital expenditures.
  - DERs must be located at specified locations on the distribution system and operate at specified times.
- Solicitations for NWAs are typically all-source.
  - Eligible resources include all types of DERs: energy efficiency, demand response, distributed generation, and distributed energy storage.
- Ideally, NWA procurement is fully integrated into the distribution planning process.
- At scale, NWA procurement will interact with bulk system resource procurement.
  - Affects loads and resource values



Consolidated Edison's capital planning process for non-wires solutions

Source: Consolidated Edison's *Distributed System Implementation Plan* (2018)

Key Lessons from Non-Wires Procurement

- Growing number of utilities have held all-source solicitations for non-wires alternatives
  - Utilities in California, New York, Rhode Island
- Actual procurement (MW) is still small but may grow with electrification; battery cost declines may create new opportunities
- Non-wires procurement requires ongoing enhancements:
  - Improved distribution system data, forecasts, and time-sensitive values of DERs
  - New methods and tools for evaluating need and resource values
  - Better matching of solicitation process and developer lead times
  - More standardized contracts with greater clarity on performance risks and incentives
  - Support for DER aggregation
  - Better integration of non-wires resources into utility operating practices and procedures
- Overlapping federal and state jurisdictional issues remain unresolved—for example, dual participation of DERs as NWAs for utility distribution systems and as resources bid into centrally organized wholesale electricity markets.

Conclusions

- Interest in all-source competitive solicitations is growing across the U.S.
  - Can help to reduce cost uncertainty and discover competitive pricing across a range of resources
  - Enables integrated procurement of resources that have interactive effects (e.g., wind, solar, and storage)
  - Can facilitate coordination between bulk power system resources and DER procurement
- All-source competitive solicitations are complex.
  - Require thoughtful process design and implementation
  - Involve trade-offs between stakeholder participation, transparency, time, flexibility, and discretion
- Evaluation is the central challenge of all-source competitive solicitations.
  - Methods must be able to compare different resources on an equivalent basis.
  - Models need ongoing improvements.
- Independent evaluators play essential roles in all-source solicitations.
  - IEs help ensure that solicitation and selection processes are objective and impartial.
- At the distribution level, NWA procurement shows promise but requires continued improvements.

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