How to Build Clean Energy Portfolios

A Practical Guide to Next-Generation Procurement Practices

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The Regulatory Assistance Project (RAP)® is an independent, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future. Building on peer-to-peer relationships, RAP helps energy and air quality decision-makers and stakeholders navigate the complexities of power sector policy, regulation, and markets.

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RMI is an independent nonprofit founded in 1982 that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

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EXECUTIVE SUMMARY

A PIVOTAL DECADE FOR ELECTRICITY RESOURCE INVESTMENT

The decade between 2020 and 2030 is poised to reshape the US power sector in ways rarely seen in any industry. Several trends are emerging and compounding to prompt an unprecedented realignment of how electricity is generated and delivered to US customers:

- **Supply-side changes:** The fossil fuel fleet is aging and becoming increasingly uneconomic, while renewable energy and storage technologies continue to decline in cost.
- **Demand-side changes:** Although growth was flat or modestly increased over the past decade, electrification of vehicles, buildings, and industrial end uses may result in significant load growth over the next decade. Distributed energy resources are gaining market share and increasingly interacting with traditional supply-side utility resources. Catastrophic fires, hurricanes, and other disasters are drawing attention to electricity's role in supporting critical services and highlighting the need for a greater focus on resilience.
- **Climate policy drivers:** As of 2020, 68% of customers in the United States are served by a utility with a climate goal. Leading utilities and policymakers are setting science-based emissions reduction targets. These targets make evident the importance of halving economy-wide emissions by 2030 to limit global temperature rise to 1.5°C and stave off the worst impacts of climate change. Recognizing that decarbonizing the electricity sector is central to reducing economy-wide emissions, these policymakers and utilities prioritize 65%–80% carbon-free electricity in the United States by 2030, compared with 37% in 2019.

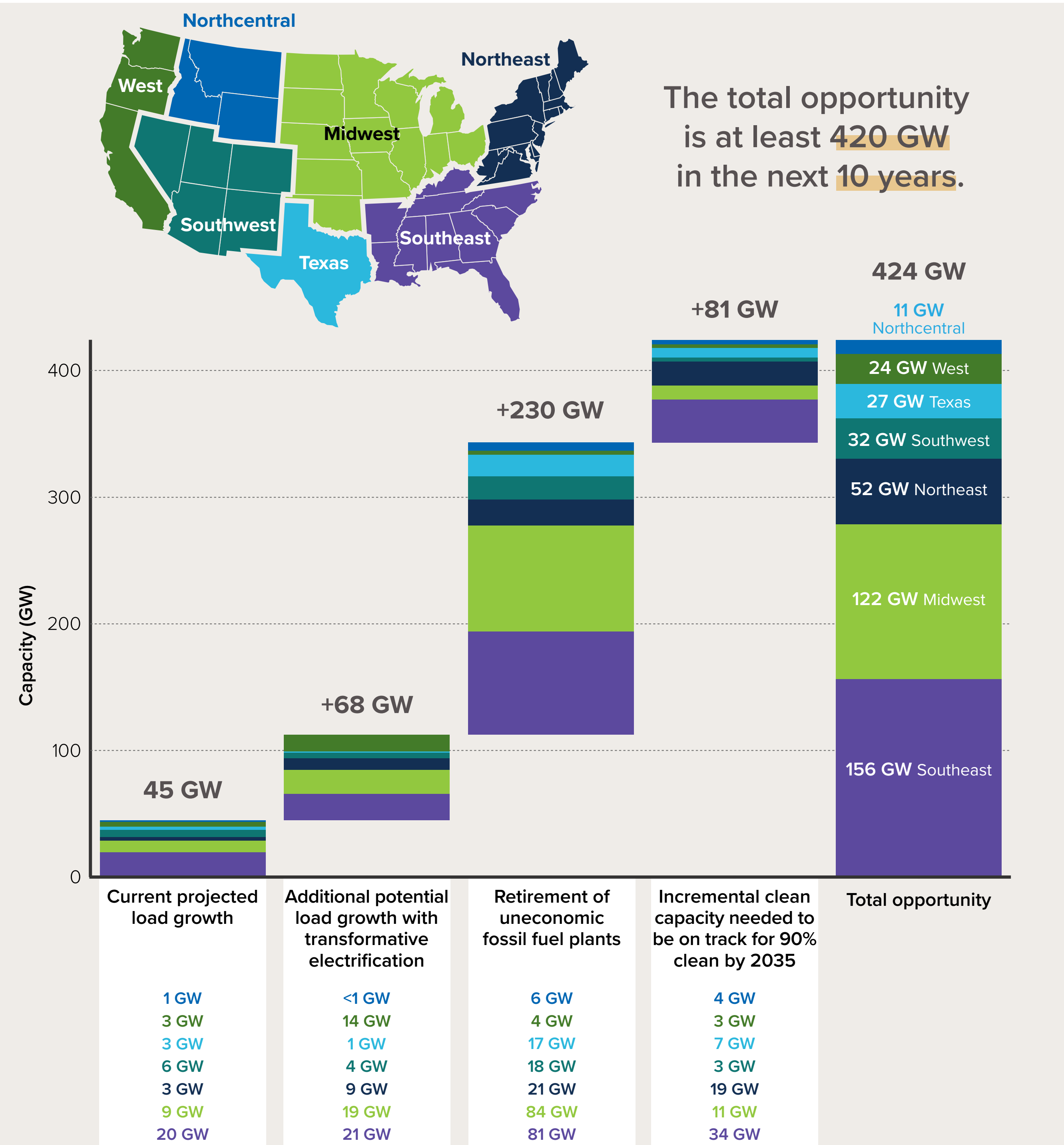
Across much of the United States, vertically integrated utilities (VIUs) are responsible for making investments in electricity resources in the face of these growing trends. By virtue of their business models, utilities are accustomed to making massive capital investments. For example, US utilities have invested approximately $260 billion of capital in generation projects since 2010. And in the coming decade, the industry's "business-as-usual" forecasts suggest capital spending by investor-owned utilities (IOUs) on the order of $300 billion for generation projects. Taking into account the trends facing the industry, however, the opportunity is likely much larger.

Economically driven supply- and demand-side changes indicate an opportunity for approximately 700 GW of new generation investment across the United States, with at least 420 GW of that opportunity within VIUs' service territories. Clean energy policies could contribute at least 170 GW to the nationwide total, with 80 GW in VIU territories. At prevailing prices for electricity resources, this provides an opportunity for up to $750 billion dollars of investment by VIUs through 2030.

Exhibit 1 shows the estimated market size for procurement of electricity supply resources in states with VIUs from 2020–2030, broken down by region, including supply-, demand-, and clean energy policy-driven investments.

EXHIBIT 1

Market Size for New Supply- and Demand-side Resource Procurement by VIUs, 2020–2030

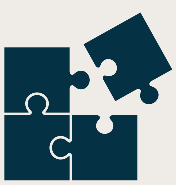


Source: RMI analysis of data from NREL, EIA, and the *2035 Report* (see Appendix A)

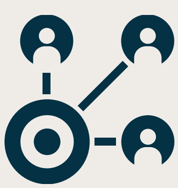
A NEW APPROACH TO RESOURCE PROCUREMENT

As the industry prepares to spend between $300 and $750 billion in the next decade on electricity resources, there is a pressing need to use that money wisely. Legacy processes and tools will result in procurement decisions that reflect past conditions, not emerging trends and requirements. Given the scale of likely investment, the industry has an important opportunity to update the processes used for procuring new resources and to ensure that investments are prudent and in the customers' best interests.

This study presents recommendations for updated electricity resource procurement processes that meet the challenge of the coming decade. We begin by laying out three principles that define the leading edge of resource procurement:



All-source, to select portfolios of optimal utility-scale and distributed energy resources (DERs) and capture the value of interaction between resources



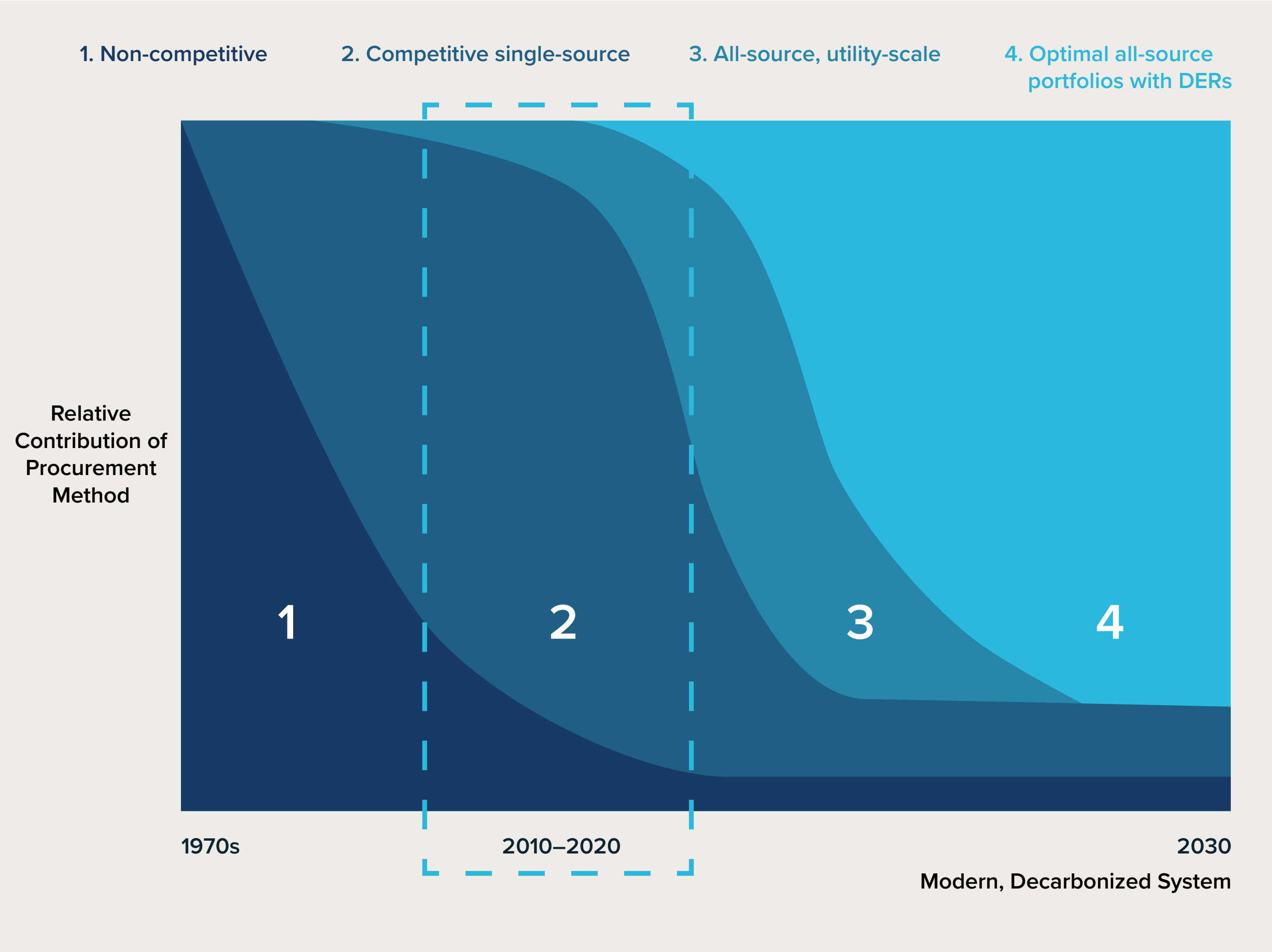
Objective-aligned, to enable investments to address diverse, jurisdiction-specific values (e.g., resilience, decarbonization, local economic development) that stakeholders seek

Least-regrets, to limit the risks of greater-than-anticipated costs for meeting system needs by capturing benefits of competition and declining costs of new technologies

To meet these principles, utilities must continue the ongoing transition away from noncompetitive, utility self-build, fossil-oriented procurements, and toward processes that open up participation from different developers, technologies, and solutions on both the supply side and demand side. Exhibit 2 illustrates the industry's progression from its early days of noncompetitive procurement, through the growing trend of competitive solicitations, toward a future of procurement that levels the playing field to provide opportunities for all technologies and suppliers.

EXHIBIT 2

Historic Progression of Utility Procurement



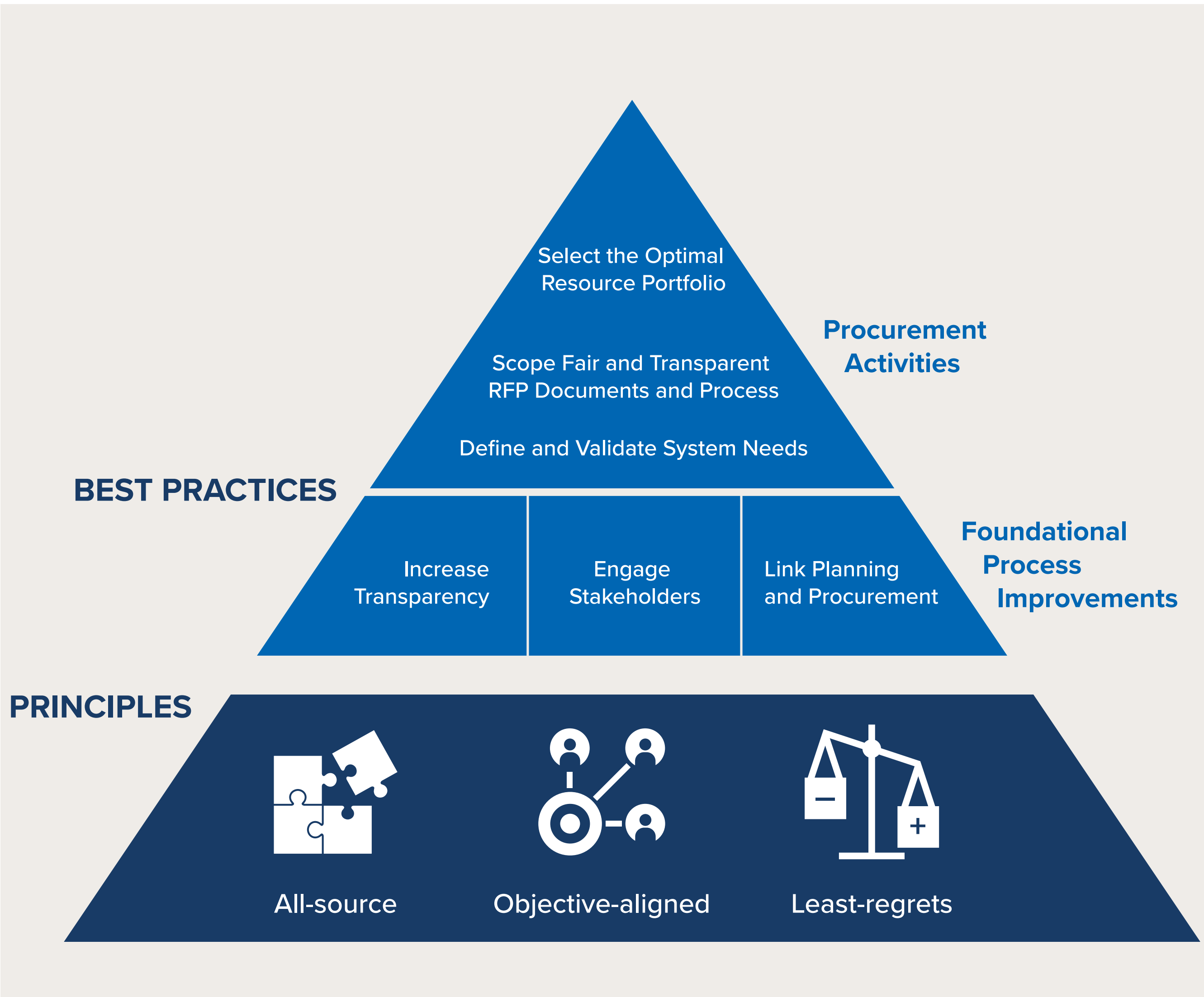
In light of the emerging trends reshaping the US electricity industry, utilities across the country have already made progress along the continuum represented in Exhibit 2, using updated procurement processes that better reflect needs of the coming decade. Over the past few years, at least 11 utilities serving nearly 6 million customers have completed or opened all-source solicitations for a total of 11 GW of new capacity, demonstrating tangible shifts toward, and helping to define, emerging best practices.

EMERGING BEST PRACTICES IN RESOURCE PROCUREMENT

Exhibit 3 introduces the framework by which we lay out recommendations for best practices in this study.

EXHIBIT 3

Summary of Process Improvements and Activities that Support Next-Generation Procurement Principles



First, we lay out best practices that can underpin all-source, objective-aligned, least-regrets procurement processes:

Increase transparency

With increased transparency into system needs and modeling assumptions, bidders can provide competitive solutions that meet utilities' solicitation objectives. Stakeholders and regulators should have the information they need to validate utility assumptions or propose alternatives.

Engage stakeholders

Stakeholders can help validate utility decisions by offering their own assumptions on the need and market and can elucidate how modeling and bid evaluation can be accomplished fairly and efficiently. They can also support a solicitation to be all-source by identifying barriers to participation and can provide feedback about whether state and local policy objectives are reflected in planning, solicitations, and the solicitation outcomes.

Link planning and procurement

Tightening links between planning outcomes and procurement decisions clarifies system needs for all participants and enables utilities to holistically consider all resource options, including DERs and nonprocurement pathways, in the context of longer-term planning objectives and their relative costs and risks. With defined relationships and strong links between planning and procurement, it should become clearer for all stakeholders how planning will translate into procurement of new resources.

Second, we lay out recommended improvement to three specific activities within procurement processes:

Define and validate a system need

In many procurement proposals, it is not always clear why, specifically, a utility is seeking to procure new resources. In implementing new procurement practices, utilities and regulators have an opportunity to:

1. **Write solution-agnostic statements of need that support participation from all resources.** This type of description can form the basis of a process that generates many diverse and competitive bids. For example, Xcel Energy in Colorado demonstrated through its all-source solicitation in 2017 that a solution-agnostic needs description can elicit many bids and record-low bid prices for renewable energy and hybrid resources.

2. **Validate needs through stakeholder engagement, independent analysis, and regulatory approval.** Validating the need with external parties that engage in resource planning can provide assurance that a wide range of options can participate in procurement. For example, in New Mexico, stakeholders demonstrated the value of validating needs using utility data and models by modeling alternatives to the Public Service Company of New Mexico's (PNM) San Juan replacement portfolio—and presenting the Commission with reliable, lower-carbon options that the Commission ultimately approved for investment.

Scope fair and transparent request for proposal (RFP) documents and process

New technologies, business models, and financing structures, along with rapidly improving economics for renewables and energy storage, have expanded resource choices for utility procurement. To effectively support participation by all resources, utilities and regulators can:

1. **Enable DERs, including energy efficiency and demand flexibility, to help meet the need within or in parallel to a solicitation.** DERs can be a critical component in least-cost clean energy portfolios and should be able to participate directly in a solicitation or in concurrent deployment through programs. For example, Glendale Water & Power (GWP) in California demonstrated that procuring a portfolio including local DERs could cost-effectively reduce the size of a large gas repowering project.

2. **Minimize provisions in the solicitation that are likely to constrain participation and provide flexible options to maximize bidder competition and creativity.** Limiting size minimums and caps; ensuring solicitation categories are inclusive; providing multiple ownership, timing, and location options; and leaving contract terms open for proposed modification by bidders can reduce barriers to participation. Bidders may be able to offer additional services or creative business models that decrease costs or increase project value.

Select the optimal resource portfolio

Historically, electricity resource solicitation responses have been evaluated primarily based on least cost within resource categories. To prioritize investments that provide the greatest overall value for the electricity grid and other stakeholder priorities, utilities and regulators can:

1. **Select portfolio options using a value-based approach to optimization that includes both grid and societal values.** Utilities can define evaluation criteria beyond cost that align procurement decisions with policy objectives such as decarbonization, resilience, environmental justice, or economic development and select a portfolio that provides the greatest value.

2. **Ensure the solicitation, evaluation, and approval processes are clear and transparent to bidders and the public.** Making evaluation criteria transparent to stakeholders prior to the solicitation enables bidders to have confidence that their solutions will be fairly evaluated. After a procurement process is underway or completed, release of nonproprietary or aggregate data regarding solicitation bids can move the market forward. For example, release of aggregate data by utilities such as Xcel and Northern Indiana Public Service Company (NIPSCO) from their solicitation processes has proven the value of all-source procurement for other utilities and allowed them and their customers to reap the benefits.

RECOMMENDATIONS

Moving procurement toward a future that is all-source, objective-aligned, and least-regrets requires participation from all stakeholders. In particular, legislatures, regulators, and utilities each have unique roles to play.

To create an environment that unlocks next-generation competitive procurement, **state legislatures** can:

1. **Ensure the state has a participative planning process that links planning outcomes to procurement decisions, and that state policy objectives are included in system planning.** For some states, this might mean setting up a planning process. For others it might mean requiring Commission approval of utility plans or requiring consideration of stakeholder participation or comments. Or, it might involve revisiting planning and procurement rules and asking whether the current process results in policy-aligned

procurement. Regulators may need explicit direction to consider objectives beyond reliability, affordability, and safety.

2. **Ensure utilities are adequately incentivized to consider DERs, including energy efficiency, as resources to meet identified needs.** DERs can be valuable in lowering customer costs and providing system flexibility within a resource portfolio. Assess the treatment of DERs in planning and procurement and consider other ways to bring DERs online, such as energy efficiency resource standards and performance-based regulation.

3. **Ensure the state has rules that encourage or require competitive procurement and a commission that can support them.** Legislatures should consider statutes that require utilities to issue all-source solicitations. In states that do not currently have a statute requiring competitive procurement, the legislature could first consider adopting one to reduce costs for ratepayers and encourage clean energy companies to participate in the state's economy. In all cases, it is important that the commission be adequately resourced to effectively monitor procurement processes.

State commissions can play a major role in ensuring that procurement processes and outcomes are in service of the public interest. Specifically, regulators can:

1. **Ensure that the need to procure new resources is well-defined, transparent, and linked to findings from a well-vetted resource planning process.** A need for new resources may arise from emerging electric system reliability requirements, from changing economics of resource options, or from public policy goals that reflect environmental, equity, economic development, and resource priorities. Modeling assumptions and tools should be as transparent as reasonably possible and accessible to all stakeholders, and resource planning scenarios should be specified and evaluated in consultation with a diverse group of stakeholders so that those needs are well understood and validated.

2. **Ensure that all resource providers have opportunities to offer the capabilities from each of the resource options they bid.** Bidding should be open to all resource providers who meet reasonable bidding requirements, and bidders should be allowed to submit bids that include all resource types, to enable portfolios that use combinations of supply- and demand-side resources. If the incumbent utility or its affiliate is allowed to bid, codes of conduct should be established to ensure competitive providers are not disadvantaged.

3. **Ensure that the bidding process is open, transparent, and evaluated fairly.** Evaluation criteria used to select bids should be transparent and communicated clearly to bidders prior to bid submission deadlines. A third-party, independent evaluator should be considered to supervise utility bid evaluation to ensure that it follows published criteria. Portfolios including the best bids should be brought to the Commission for consideration. The Commission should consider trade-offs among bids and additional modeling of resource options if one portfolio is not clearly superior to other finalists.

Utilities can lead the way in sourcing and delivering least-regrets resource portfolios. In particular, utilities can:

1. **Proactively bring stakeholders into the analysis of needs and defining the evaluation process for selecting portfolios.** Stakeholders can help verify assumptions early in the procurement process rather than contesting them further down the road.

2. **Use cost and operational data from competitive bids, not internal estimates, to inform planning and procurement activities.** Bids returned in all-source solicitations have continued to surprise utilities and outperform previous estimates. With

increased uncertainty and volatility of resource costs, issuing an RFP to seek bids prior to selecting a portfolio for procurement can ensure that decisions are based on accurate pricing.

3. **Work with bidders prior to, during, and after solicitations to understand what data they need to give their best bids.** To support bidders to deliver diverse and competitive solutions, the utility must be available for questions, document and publish all bidder questions and utility answers, and be open to modifying the solicitation and proposed contract terms before issuance if they can expand the field of competitive solutions.

4. **Consider whether evaluation criteria for selecting the optimal resource portfolio are aligned with public policy outcomes.** Stakeholders are increasingly concerned about alignment between procurement and public policy objectives, including resilience, equity, and decarbonization. In addition to covering these priorities in other activities (e.g., integrated resource planning), utilities should carefully evaluate how well their solicitation processes support them in concert with regulators.

VIUs in the United States are on track to spend up to $750 billion through 2030 on new electricity resources in response to economic trends and decarbonization targets. With an improved approach to resource procurement, the industry has a once-in-a-generation opportunity to ensure that this money is spent in ways that leverage the market, support diverse stakeholder priorities, and minimize risks going forward. The alternative—continuation of legacy processes and approaches to resource investment—risks squandering capital and locking in customer costs and carbon for decades to come. The best practices laid out in this study serve as guideposts for utilities, regulators, and legislators to navigate these uncertain times and make investment decisions in the best interests of electricity consumers and society at large.

I INTRODUCTION

CHAPTER 1 The Opportunity for New Procurement Practices

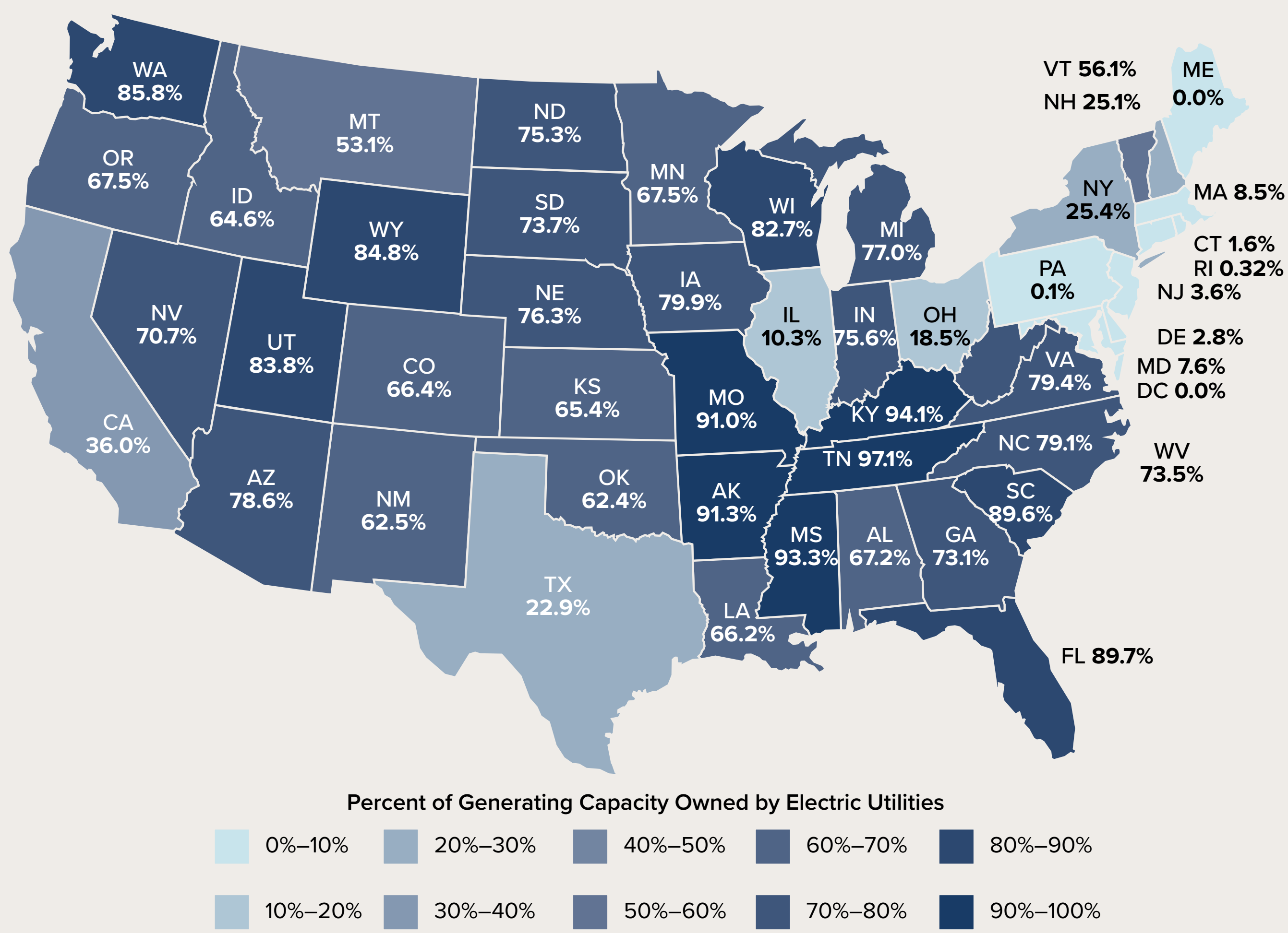
VERTICALLY INTEGRATED UTILITIES' ROLE IN RESOURCE PROCUREMENT

Across much of the United States, covering more than half the nation's electricity generation capacity, vertically integrated utilities (VIUs) play a dominant role in procuring, owning, and operating the electricity generation resources used to serve their customers' electricity demand.[1] These VIUs can be owned by investors, municipalities and other public jurisdictions, or cooperatives, and their territories cover a majority of the land area of the United States.

The percentage of generating capacity owned by electric utilities, including investor-owned utilities (IOUs), municipal utilities, and other publicly owned utilities, is shown in Exhibit 4. The balance is owned by independent power producers or individual customers. Given their market share and geographic scope, these utilities will play an important role in defining the future of electricity generation and consumption across the country.

EXHIBIT 4

Percentage of Generating Capacity Owned by Electric Utilities in Each State

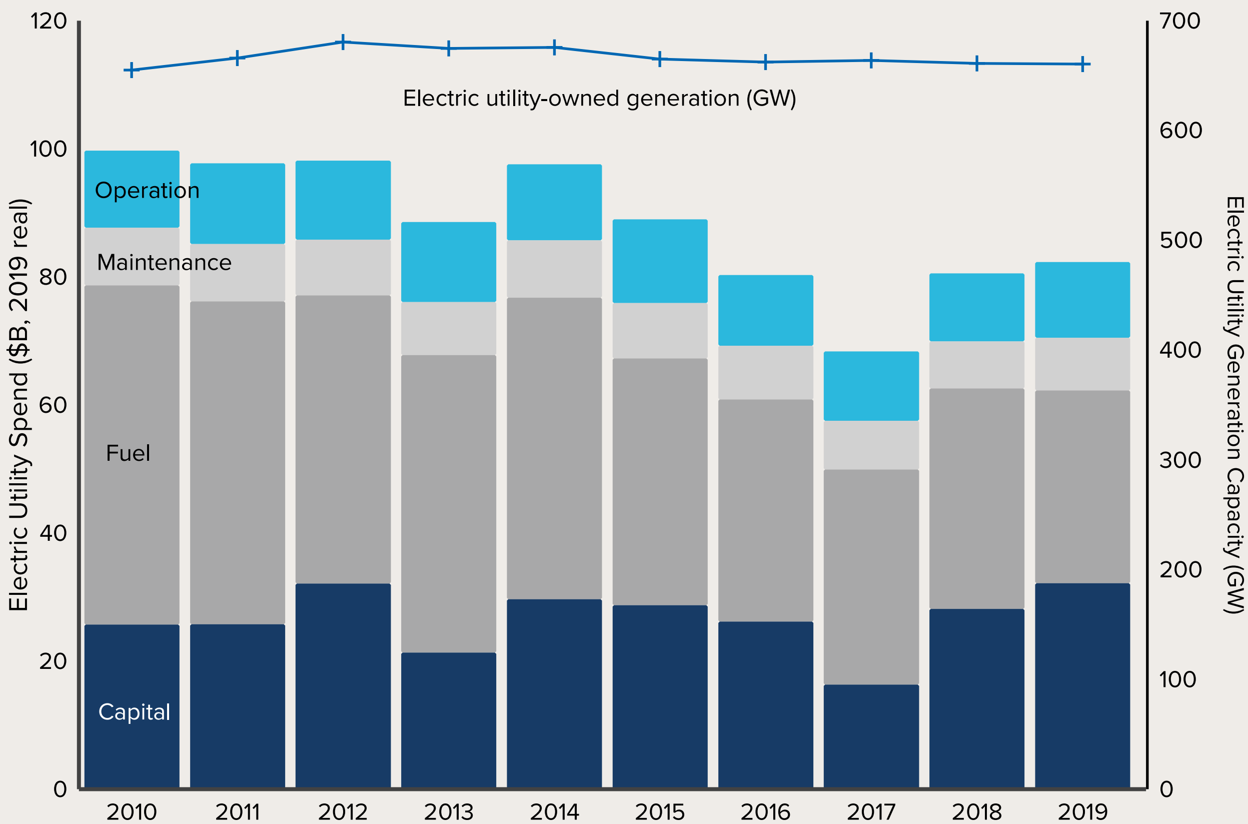


Note: The exhibit is based on RMI's analysis of Form EIA-860M data from July 2020 (https://www.eia.gov/electricity/data/eia860m).

A defining characteristic of the business model that underpins VIUs is the procurement of utility-scale supply-side resources, and sometimes distributed energy resources (DERs), to meet customers' needs. In other words, these utilities are designed and organized to deploy capital to invest in electricity resources. In the past decade, even as total electricity demand has plateaued, utilities have spent nearly $1 trillion on electricity generation, including $266 billion of capital expenditures (Exhibit 5).[i]

EXHIBIT 5

Utility Spending on Generation, including Investment and Operations, and Total Capacity Owned by Electric Utilities, 2010–2019



Note: The exhibit is based on RMI's analysis of FERC Form 1 data from 2010-2019 (https://www.ferc.gov/industries-data/electric/general-information/electric-industry-forms/form-1-electric-utility-annual) and EIA Form 860 Annual Electric Power Annual.

i Based on RMI's analysis of Federal Energy Regulatory Commission (FERC) Form 1 data.

A PIVOTAL DECADE FOR THE POWER SYSTEM

VIUs, given their market share and fundamental business model, are poised to continue mobilizing investment in electricity resources for the coming decade. But a number of emerging trends are affecting the future of procurement:

Supply-side trends

- **Legacy asset retirement:** As of mid-2020, electric utilities across the United States had announced 45 GW of pending fossil retirements prior to 2030. Nearly an additional 200 GW of remaining utility-owned fossil generators will be 40-plus years old by 2025,[ii] with much of that aging capacity already more expensive to continue operating than to procure new, low-cost resources.

- **Falling costs of clean energy:** Utility-scale wind and solar projects fell in price by 70% and 90%, respectively, from 2009 through 2019.[2] Prices for lithium-ion battery storage packs have fallen nearly 90% since 2010,[3] with growing industry scale and many other emerging battery and other storage technologies on the horizon promising further cost declines.[4]

- **Global uncertainty:** Costs and timelines for deployment of all resources have faced new uncertainty and disruption due to the global pandemic and recession.[5]

Demand-side trends

- **Load growth:** Across VIU territories, approximately 45 GW of new supply- or demand-side resources are required by 2030 to meet forecast peak demand growth due to population growth, demographic shifts, and other trends as depicted in Exhibit 6. However, the global pandemic and recession are creating significant uncertainty around the timing and magnitude of this growth.

- **Electrification:** As electrification of vehicles, buildings, and industrial end uses accelerates, US load could grow as much as 17% by 2030 (1.5% annual growth) to accommodate those end uses,[iii] or even higher (34% total growth) under aggressive electrification scenarios to achieve deep decarbonization.[6]

- **DER uptake:** DERs, including distributed generation, behind-the-meter storage, energy efficiency, and demand flexibility, are gaining market share and increasingly interacting with traditional supply-side utility resources, affecting planning and procurement outcomes either through direct integration or indirectly (e.g., changes to load forecasts).

- **Climate impacts and resilience:** Catastrophic fires, hurricanes, and other disasters are drawing attention to electricity's role in supporting critical services and highlighting the need for a greater focus on resilience.

Climate policy impacts

- **State renewable energy and emissions reductions policies:** About 73 GW of renewables may be procured to comply with existing state renewable portfolio standard (RPS) requirements across the United States.[7] Leading state-level climate policies, which enforce economy-wide limits on carbon emissions, will further bolster renewable energy growth, given the cost-effectiveness of combining zero-carbon electricity and end-use electrification to reduce emissions from the building and transportation sectors.[iv]

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ii Based on RMI's analysis of Form EIA-860M data, July 2020 (https://www.eia.gov/electricity/data/eia860m/).

iii The "high scenario" in the NREL Electrification Futures Study (https://www.nrel.gov/docs/fy18osti/71500.pdf).

iv For example, see New Jersey's 2019 Energy Master Plan (http://www.rmi.org/NJEMP).

- **Utility emissions reduction commitments:** Across the United States, 68% of customers are now served by a utility with a carbon or emissions reduction goal.[8] Leading utilities and policymakers are setting science-based emissions reduction targets. These targets make evident the importance of halving economy-wide emissions by 2030 to limit global temperature rise to 1.5°C and stave off the worst impacts of climate change.[9] Recognizing that decarbonizing the electricity sector is central to reducing economy-wide emissions, these policymakers and utilities prioritize 65%–80% carbon-free electricity in the United States by 2030, compared with 37% in 2019.[10]

- **Local and corporate climate commitments:** Cities continue to set climate targets and take action accordingly, including procurement of renewable energy to meet clean energy targets.[11] Corporations continue to set climate targets and procure renewable energy to meet emissions targets.[12]

Responding to these trends, utilities are projecting an increase in capital expenditures over the next decade. Over the next three years, IOUs plan to spend $120 billion per year across generation resources and grid improvements.[13] If capital expenditure continues apace for the rest of the decade, it would amount to $1.2 trillion by the end of 2030. Based on recent investment history, about 25%–30% of that forecast total ($300–$360 billion) would likely be spent on new generation.

However, it is likely that the trends noted above over the next decade will require significantly more investment than the industry has projected in a combination of supply-side (e.g., renewables, fossil, storage) and demand-side (e.g., energy efficiency, demand flexibility) electricity resources. We estimate that within the jurisdiction of VIUs, there is an opportunity for at least 420 GW of resource procurement by 2030.

"There are trillions of dollars, and billions of tons of CO_2 emissions at stake in VIUs' procurement decisions in the next decade."

Exhibit 6 summarizes the impacts of these trends on the capacity need, and the regional differences in resulting procurement opportunities. The greatest drivers for new resource investment exist in the Southeast, Midwest, and Western United States, where the potential for load growth and asset retirement is greatest. The methodology for analysis in Exhibit 6 is provided in Appendix A.

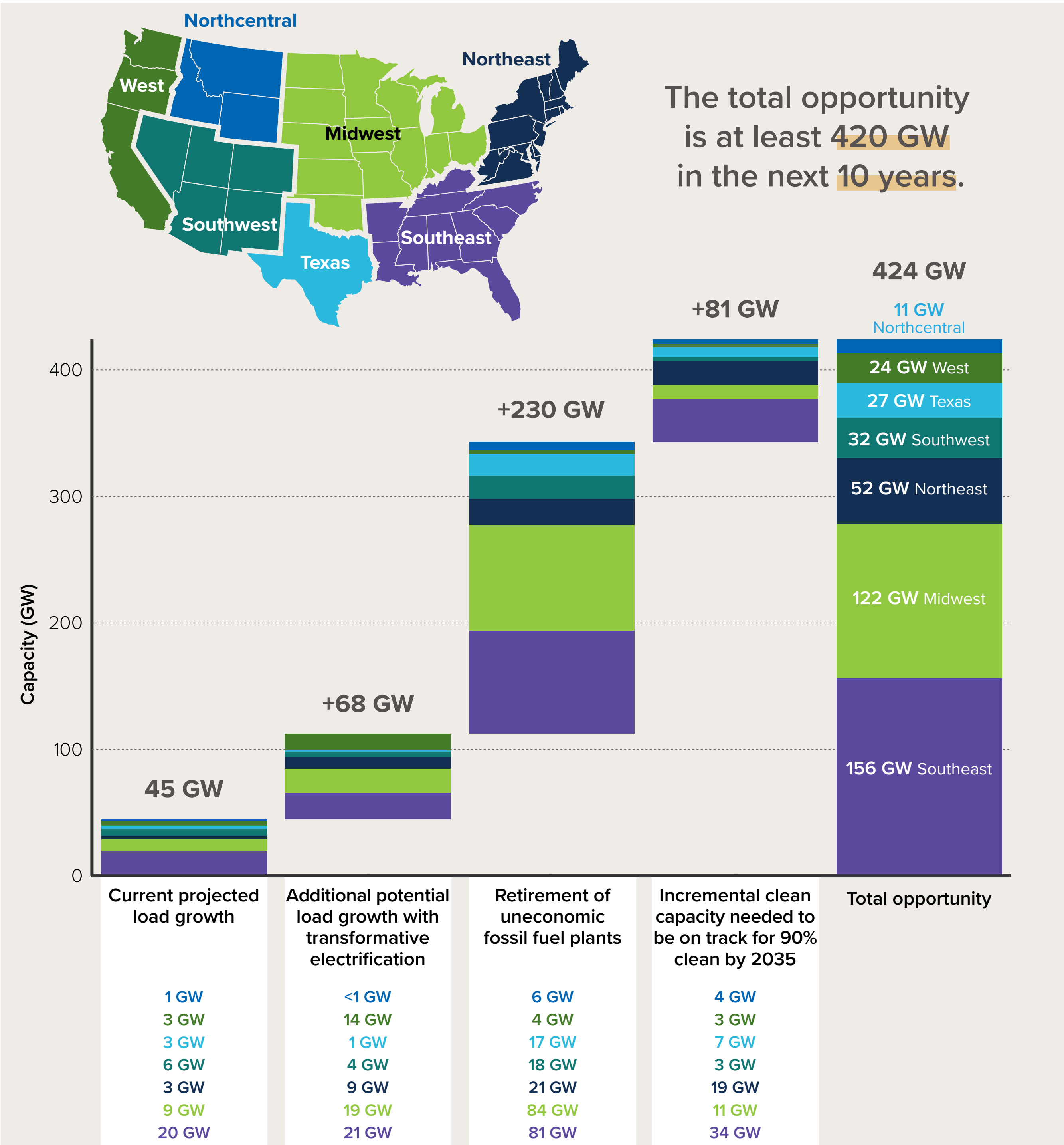
The 420 GW investment needed in VIU territories over the next 10 years represents a once-in-a-generation opportunity. The total capital required for this level of resource deployment is on the order of $420 billion (for relatively low-capital cost technologies, including gas turbines and solar photovoltaics [PVs])[14] to over $750 billion (e.g., for higher-capital cost but lower-levelized cost clean energy portfolios[15]).[v]

After accounting for operation and maintenance costs for those $420–$750 billion in new resources through their lifetimes, and the transmission and distribution infrastructure necessary to support them, there are trillions of dollars, and billions of tons of CO_2 emissions,[16] at stake in VIUs' procurement decisions in the next decade. Given the lasting economic and climate impacts of decisions in this decade, it is essential that utilities' procurement processes lead to resource portfolios, and associated cost and climate outcomes, aligned with the public interest.

v Total capital is expressed here as the gross sum of investment over the 2020–2030 time period, in constant dollars.

EXHIBIT 6

Market Size for New Supply- and Demand-side Resource Procurement by VIUs, 2020–2030



Source: RMI analysis of data from NREL, EIA, and the *2035 Report* (see Appendix A)

THE CHANGING LANDSCAPE OF RESOURCE INVESTMENT

VIUs' procurement processes have evolved over many decades characterized by resource options generally limited to large, central-station generators, and three main planning objectives: affordability, safety, and reliability. But today, both the range of utility-scale and DER options and the set of objectives considered for procurement are expanding (Exhibit 7).[vi]

Even as utilities are faced with more technology options for procurement than ever before, a host of new priorities from policymakers, regulators, and other stakeholders are increasingly influencing procurement processes and outcomes. Together, the emerging set of resource options and expanded objectives for resource procurement is increasing the complexity of procurement in an unprecedented way. Meeting this complexity requires new procurement practices.

EXHIBIT 7

Historic and Emerging Set of Resource Options and Procurement Objectives

	RESOURCE OPTIONS	PROCUREMENT OBJECTIVES
Historic	Fossil fuel and nuclear generators Utility-scale hydro and pumped storage Energy efficiency	Affordability Reliability Safety
Emerging	Distributed solar Utility-scale wind and solar Distributed energy storage Hybrid power plants Utility-scale energy storage Demand flexibility	Environmental performance and decarbonization Resilience Customer choice Local economic development Innovation Environmental justice

vi This list is largely aligned with the list of objectives for revenue regulation presented in RMI's *Navigating Utility Business Model Reform*, https://rmi.org/insight/navigating-utility-business-model-reform/.

WHY CHANGING PROCUREMENT PRACTICES IS CRITICAL NOW MORE THAN EVER

Economic uncertainty in 2020 has emphasized the importance of modernizing electricity resource procurement as described in this study.

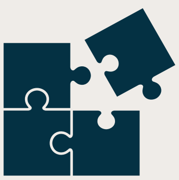
Economic uncertainty may accelerate timelines for procuring new assets. Retirement of uneconomic plants is accelerating, as aging coal plants were the first to reduce output during periods of low load due to early 2020 declines in economic activity.[17] While the pace of beneficial electrification and deployment of DERs may have slowed in the economic downturn, it may accelerate during recovery if stimulus packages include funding focused on investing in green infrastructure or if utilities and end-users make investments using extremely low costs of capital.[18]

Affordability is front of mind—and so are policy objectives such as creating jobs, supporting public health and reducing air pollution, and enhancing community resilience to crises. During economic downturn and unprecedented unemployment, regulators have issued disconnection moratoria for customers unable to pay their bills—highlighting the criticality of electricity as a service and the affordability challenges that many Americans face.[19] The public health crisis has highlighted how air pollution has led to worse outcomes for people who have contracted COVID-19.[20] Procurement decisions can be designed to support objectives that address this and future crises, such as job creation, reducing air pollution, and enhancing resilience.

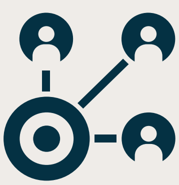
Resource costs are uncertain. Assigning values to commodity prices during 2020 has become even more challenging as fluctuating price levels for oil,[21] gas, and demand erosion have created more uncertainty. As a result, assumptions made in integrated resource plans (IRPs) written in 2019 about resource costs likely cannot form the basis for investment decisions in 2020. A key recommendation in this report is to use current market costs and capabilities, revealed in contemporaneous competitive bids, as close in time to the point of decision as is possible, to determine optimal resource portfolios. With greater uncertainty, it is even more critical to verify assumptions about resource costs with the market before making long-term investments. Customers bear the risk of increasing fuel costs and of paying for long-life capital assets in their rates.

PRINCIPLES FOR NEXT-GENERATION PROCUREMENT

To meet evolving needs and to leverage the changing set of technologies available to grid planners, utilities' procurement practices must evolve along with the rest of the industry. In this study, we lay out considerations for modern resource procurement practices that are:



All-source, to select portfolios of optimal utility-scale and distributed energy resources (DERs) and capture the value of interaction between resources



Objective-aligned, to enable investments to address diverse, jurisdiction-specific values (e.g., resilience, decarbonization, local economic development) that stakeholders seek

Least-regrets, to limit the risks of greater-than-anticipated costs for meeting system needs by capturing benefits of competition and declining costs of new technologies

All-source

Utility resource procurements over the past 20 years have commonly defined system need by describing a generation technology that could meet the need—often a gas-fired generator. Needs have become more dynamic with changing customer preferences, new public policies, declining resource costs, and rapidly changing resource mixes. Yet, common practices for procurement retain an antiquated representation of system needs that are tied to the characteristics of legacy technologies.

In contrast, an all-source approach to procurement can increase competition and enable utilities to select an optimal resource portfolio from a set of diverse and interactive resource options.[22] Using a portfolio approach that enables multiple resources to participate concurrently can enable emerging energy technologies, especially renewables, batteries, and demand-side management (DSM), to reach their full market potential.

Objective-aligned

Regulators and utilities have historically considered a limited range of objectives in planning and procurement: meeting electricity demand safely, while balancing affordability and reliability. In the 20th century, providing universal service was a key policy objective that necessitated deliberate incentives and consideration within the utility business model. Today, at the brink of unprecedented change in our power system, there is an opportunity to internalize evaluation of the objectives of the 21st century—often considered externalities—within planning and procurement processes (Exhibit 7). Regulators and state policymakers can help determine, prioritize, and define how these objectives are applied to procurement decisions.

Failure to align planning and procurement with emerging objectives can lead to under-procurement of resources needed to advance societal goals and excess costs at the system level if such resources (e.g., energy efficiency, demand flexibility, renewables) are not effectively integrated into power system planning. And while utility planning processes have started to consider emerging objectives, procurement presents an opportunity to consider them at a more local level.

For example, once bids are received for projects, local impacts such as air quality, environmental justice, and job creation can be assessed for potential host communities and factored into decision-making. A good procurement process will be able to create portfolios of options that address the practical need to meet supply with demand over time, without impeding progress toward or increasing the cost of state and local policy objectives.

Least-regrets

"Least-cost" is a common criterion imposed by public utilities commissions (PUCs) for resource planning and investment across the United States. But given the rapid pace of technology advancement, a narrow interpretation of least-cost planning might lead to increased future costs borne by customers, if near-term investments do not properly account for uncertainty in future technology costs and adoption.

For example, recent research by RMI (RMI) found that 90% of new combined cycle gas generators proposed for construction as of 2019 would be uneconomical to continue operating by 2035 due to competition from clean energy resources.[23] This could lead to tens of billions of dollars tied up in uneconomic assets that must either be recovered through customer rates or otherwise represent a loss for investors. Accounting for policy to limit carbon emissions would only accelerate the pace at which these financial risks arrive.

A "least-regrets" procurement process can address this kind of financial risk by explicitly accounting for the changing economics of clean energy and future uncertainty in technology, fuel, and emissions costs. Utility planning processes commonly use scenario-based or stochastic analysis to inform investments under uncertainty. These risk assessment techniques and their outcomes can be carried through in the procurement process to inform a least-regrets procurement process and resulting portfolio that are robust to future uncertainty and that limit the financial exposure of captive customers and investors.

AN IMPERATIVE FOR CHANGE

Even as the electricity industry undergoes a seismic shift in technology and policy drivers, utilities' procurement processes look much the same as they have for the past century. Such legacy processes, if left in place, risk precluding opportunities to reduce customer costs and risks, reduce emissions, and meet public policy goals.

In this study, we lay out best practices and recommendations for policymakers, regulators, and utilities to redefine resource procurement and prioritize processes that are all-source, objective-aligned, and least-regrets. The rest of the study is organized as follows:

- An overview of utilities' procurement processes (Chapter 2)
- A snapshot of leading examples from across the country (Chapter 3)
- Best practices, including improvements to the process and structure of procurement (Chapter 4 and Chapter 5)
- Analytic case studies illustrating the importance of adhering to best practices (Chapter 6)
- Conclusion and Recommendations (Chapter 7)

CHAPTER 2

The Role of Procurement Processes in Utility Resource Investment

Resource procurement processes, shaped by long-term planning and a broad array of market and policy drivers, are a final step before investment in new demand- and supply-side assets to serve utility customer needs.

Procurement is influenced by a broader context of factors (as depicted in Exhibit 8) within a state or utility, including:

- **State and local policy:** RPSs, statewide or local decarbonization goals, air pollution regulations, and energy efficiency resource standards, for example, are powerful drivers of resource procurement.
- **Market structure and rules**: Across the spectrum of VIUs, there remain significantly different opportunities to participate in organized markets. VIUs within the footprint of MISO, SPP, and CAISO participate in wholesale energy markets, while those located in the Southeast do not.

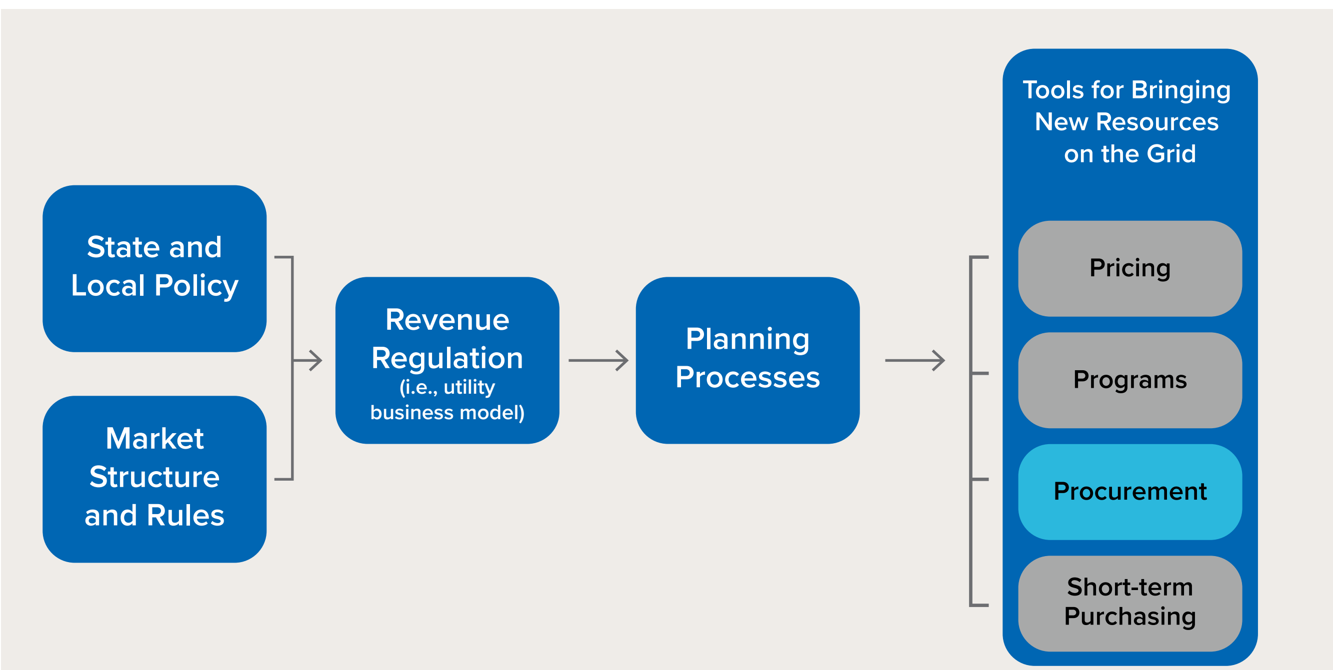
DEFINITIONS

Planning: In this paper, "planning" typically refers to integrated resource planning. This is the process by which many vertically integrated utilities forecast long-term load; plan for resources needed to serve future loads; identify future grid and system operations needs; and analyze potential portfolios of supply-side, demand-side, and storage resources that could cost-effectively meet those needs.

Procurement: In this paper, "procurement" typically refers to competitive solicitation processes by which vertically integrated utilities ask supply-side, demand-side, or storage providers to submit bids with the intent to develop a project or a portfolio of projects to meet an identified need.

EXHIBIT 8

Factors Influencing Procurement by VIUs



Wholesale market rules and resource adequacy requirements will influence whether investing in a specific resource is economically attractive for a utility or third party and whether there are options to purchase power from the market rather than building new resources.

- **Revenue regulation:** The state's regulatory framework determines a utility's business model and incentives for pursuing different resource options.[24] In states with decoupling, for example, utilities may be more likely to pursue demand-side solutions because they will not directly erode profits. Likewise, some states have shared-savings mechanisms or performance incentive mechanisms (PIMs) that encourage utilities to contain costs or earn revenue by procuring demand-side resources.[25] States may also have PIMs that incentivize resource-specific acquisition, greenhouse gas (GHG) reductions, system net benefits, or other metrics that encourage deployment of clean energy and DERs.

- **Planning processes:** Most states with VIUs require regulated utilities to conduct an integrated resource planning process to project long-term load and determine preferred resource portfolios to meet long-term needs.[26] Some states (e.g., California, Minnesota, New York) conduct a parallel process for distribution system planning that determines emerging needs on the lower-voltage system.[27] Some states with VIUs are beginning to integrate resource planning with distribution planning to assess grid needs across the transmission-distribution system interface.[28]

- **Pricing, programs, and short-term purchasing:** Procurement is not the only means of bringing new resources onto the grid, especially customer-sited resources. Rate design (e.g., time-of-use rates), compensation for distributed resources (e.g., net metering, feed-in-tariffs), and customer programs (e.g., smart air conditioning demand flexibility programs) can also be used to realize desired portfolios. VIUs with access to a market also have options of short-term purchasing, either bilaterally or in central markets, for energy and capacity.

Throughout this paper, we will focus primarily on how changes to procurement practices alone can improve resource investment outcomes. However, alignment of these regulatory and policy influences can create a more supportive environment for procurement and support all-source, objective-aligned, and least-regrets principles.

GEOGRAPHIC SCOPE OF THIS STUDY

Directly applicable geographies

Recommendations and best practices in this paper are most applicable to procurement in **jurisdictions where VIUs or load-serving entities are responsible for planning and procuring new resources, with regulator or board approval for cost-recovery** (see Exhibit 4).

- **California**, where the state's IRP and long-term procurement plans result in utility procurement
- The rest of the West, including the **Pacific Northwest, Northcentral, and Southwest**
- The **Midwest**, including utilities within MISO and SPP that conduct resource planning and procure resources with state commission oversight
- The **Southeast**
- Any VIUs within markets that are otherwise restructured (e.g., **Virginia** in PJM; nonretail competition areas within **Texas**)

The recommendations in this report are directly applicable to cooperatively owned utilities responsible for procurement of generation in all geographies. Likewise, these recommendations can be applied directly to procurement processes run by generation and transmission cooperatives (G&Ts). Member-owned distribution cooperatives that purchase the majority of their power from a G&T may be able to run procurement for the portion of generation that they are contractually allowed to self-procure. Otherwise, member-owned cooperatives will have to work with their G&Ts to align on objectives for procurement.

The recommendations are also directly applicable to municipally owned utilities in all geographies. Similar to working with G&Ts, municipally owned utilities that are served by a public power entity may have to work with that entity to align on objectives for procurement. For both municipal and cooperatively owned utilities, there may be fewer formal structures or adjudicated processes in place for stakeholders to drive accountability toward these best practices.

Indirectly applicable geographies

Findings may not be directly applicable to large parts of Texas, the Northeast, and the Mid-Atlantic, where procurement decisions are primarily driven by market rules in ERCOT, NYSIO, ISO-NE, and PJM, respectively.

However, there are many parallel conversations happening in wholesale markets about how rules can be better designed to enable all-source, least-cost, objective-aligned portfolios to participate. Defining the need in a vertically integrated context is analogous to defining market products, and determining the applicable resources in a vertically integrated context is analogous to determining the specific eligibility rules for each market product.

The debate on how to create least-cost, all-source, objective-aligned markets is playing out most visibly and contentiously in PJM around its recent Minimum Offer Price Rule (MOPR), which changes the minimum bid requirements for participation in its capacity market. Stakeholders have leveled similar critiques at the MOPR to those that might be seen in a VIU's procurement or planning processes. For example, they have argued that the MOPR will not result in least-cost outcomes for customers and does not provide an even playing field for all resources in PJM.[29] Furthermore, states like New Jersey do not believe the MOPR will result in a mix of resources aligned with their objective for 100% carbon-free energy.[30]

Utilities and states that primarily obtain generation through competitive wholesale markets often also still conduct procurement, for which recommendations in this report are applicable. States or utilities may run procurement for emerging technologies or to meet state policy targets. New York, for example, has run procurement for offshore wind.[31] Likewise, utilities and regulators can take a least-cost, all-source, objective-aligned approach to evaluating investment in solutions meant to meet transmission and distribution system needs in addition to generation needs.[32]

CURRENT PLANNING AND PROCUREMENT PRACTICES OVERVIEW

Objectives of resource planning

Planning has historically been conducted in most states through integrated resource planning that requires long-term forecasting of projected electric system needs and identification of a resource mix to meet those future needs.

Exhibit 9 shows a typical IRP process, with load forecasts and existing resources and goals being used together to define the need for new resources. These plans are typically conducted every two to five years, with a time horizon of 10–20 years or more, and are reviewed by PUCs. In some states, PUC review results in a decision that authorizes either an investment or procurement, whereas in other states the filing of the plan is reviewed and acknowledged by the PUC without any formal authorization for utility investment. In some states, PUCs do not even acknowledge IRPs.

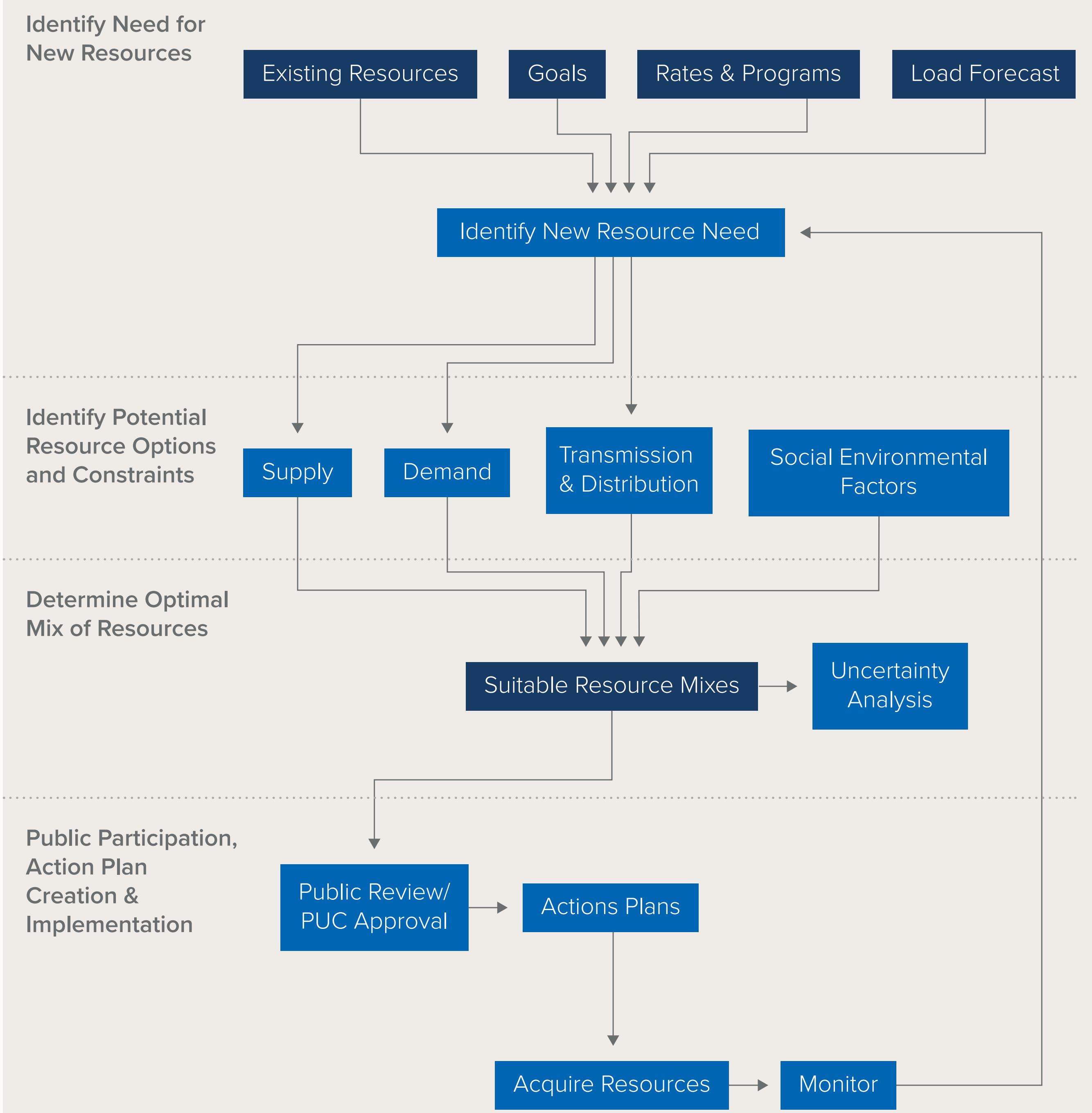
Although utilities have made plans to meet future needs as long as utilities have existed, IRP was introduced in the late 1970s in response to volatile and rising electricity prices, considerations around conservation and the "demand side," and concerns over the viability and cost-effectiveness of planned nuclear resources.[33]

At this time, resource plans became "integrated" in two respects. First, they more closely coordinated electricity and natural gas planning in those utilities with both functions. Second, they began the work necessary to allow consideration of load management and conservation as a cost-effective option alongside supply-side generation resources like hydropower, coal, oil, gas, and nuclear power. In theory, IRP is the central place today where VIUs consider the needs and the full suite of supply- and demand-side options, though the options considered vary considerably among different states.

Today, IRP goals include traditional values—ensuring safe, reliable, and affordable electricity for all customers within the utility's franchise service territory—as well as some newer goals. Goals in many states now include policy requirements like RPS goals, carbon reduction goals, specific resource goals (like storage goals), and energy efficiency resource standards.

EXHIBIT 9

Illustrative IRP Process



Source: *Best Practices in Electric Utility Integrated Resource Planning*, Figure 1, The Regulatory Assistance Project, **https://www.raponline.org/wp-content/uploads/2016/05/rapsynapse-wilsonbiewald-bestpracticesinirp-2013-jun-21.pdf**.

The rise of competition in procurement

In the early years of IRP, all utilities were vertically integrated, and competitive generation providers were rare. As a result, essentially all resources were built and owned by utilities. With the passage of the Public Utility Regulatory Policies Act in 1978, and with further electric industry restructuring, competitive generation companies proliferated, and utility commissions transitioned from presumptively assuming generation would be utility-built to considering whether the public interest was better served by competitive procurement.

Procurement today

Procurement today is conducted in many different processes driven by diverse requirements.[34] Specification of a resource or a bundle of resource attributes for procurement today often—but not always—flows from a utility's IRP. For example, sometimes reliability needs emerge outside of IRP cycles and procurements are authorized without a fulsome updated IRP evaluation of system needs. Similarly, a legislatively mandated renewable procurement may happen in parallel with an IRP process.

Furthermore, while IRP usually involves stakeholder input and provides opportunities for information exchange between stakeholders and utilities, procurement has typically been conducted without public interaction. Whatever the specifics of solicitations, utilities are ultimately responsible for presenting a case of need to their regulatory commissions. Commissions are then responsible for determining whether utility investment or procurement was prudently undertaken and obtained at a just and reasonable cost.

As depicted in Exhibit 10, state statutes and administrative codes (references in Appendix B) contain different requirements for competitive procurement by regulated utilities:

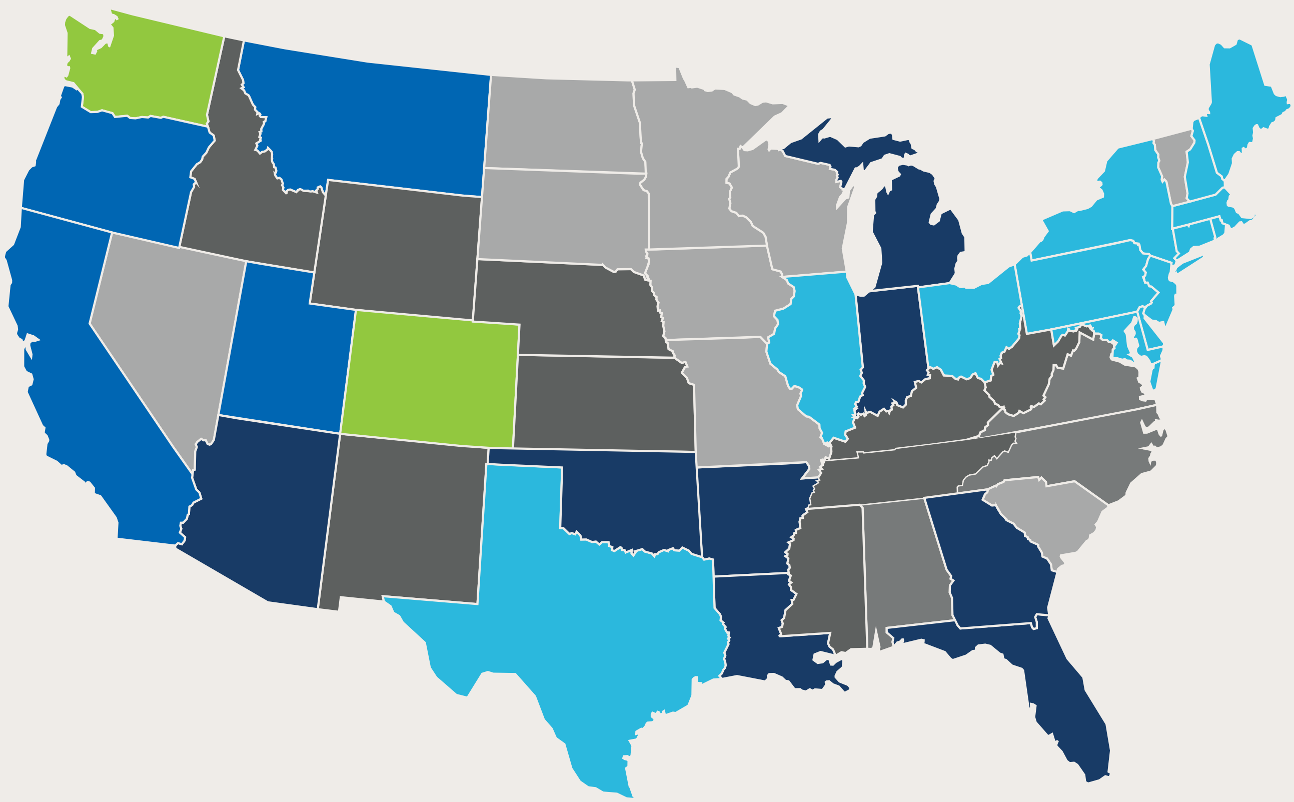
- To date, Colorado and Washington have requirements for all-source procurement in state statute or administrative code.
- Four states (CA, OR, UT, MT) require competitive procurement for resource acquisition and mention or encourage an all-source approach in statute or commission rules.
- Eight additional states (AZ, MI, IN, OK, AR, LA, GA, FL) require the use of competitive procurement by regulated utilities for resource acquisition above specific resource size or cost thresholds.
- Of the states with no formal requirement for competitive procurement, eight (NV, ND, SD, MN, WI, IA, MO, SC) require, in statute or through rules, a formal comparison to alternative options prior to resource acquisition.
- Of the states with no formal requirement for competitive procurement, three (NC, VA, AL) have requirements for specific competitive procurement programs for renewables.

Despite what is codified in statute and administrative rules, application in practice varies across states. Florida, though it has a requirement for competitive procurement, also allows regulated utilities to compete with their own self-build options. Historically, these utility self-build options have won.[35] Nevada has no formal requirement for competitive solicitations, but utilities have used them extensively to procure record-low solar and storage projects.[36] Idaho, though it has no formal requirement for competitive solicitations, has previously required Idaho Power to comply with bidding guidelines defined in Oregon's rules, because it also serves customers in Oregon.[37]

Similarly, states where procurement is primarily driven by market competition often still have rules that govern competitive procurement of generation outside of the market. In Maine and New Jersey, for example, the commission itself runs competitive solicitations for resources required to meet state policy goals. Similarly, in New York, Rhode Island, and Connecticut, state energy offices play this role.

EXHIBIT 10

Summary of Competitive Procurement Provisions in State Statutes and Commission Administrative Rules



Less Competitive → More Competitive

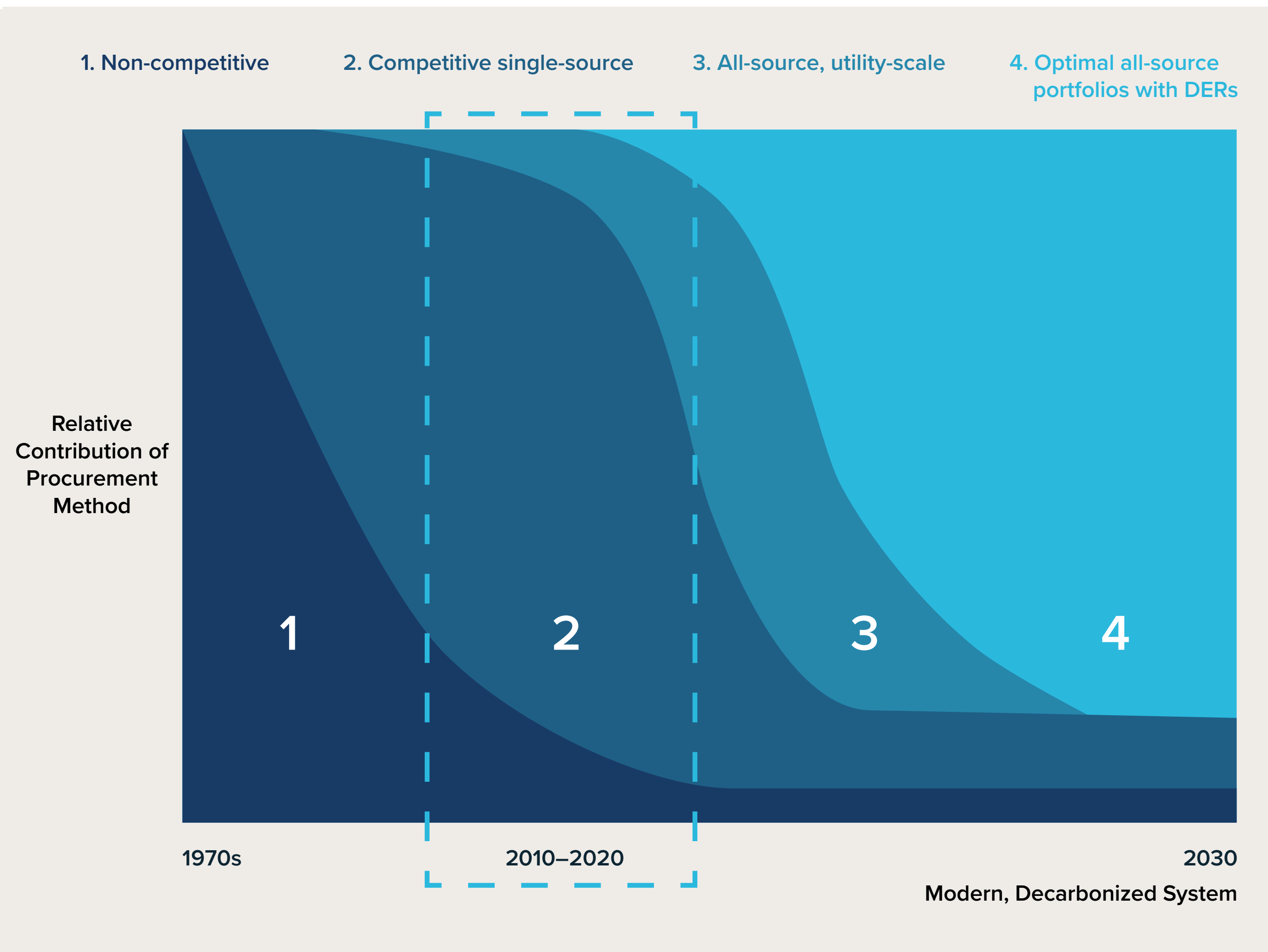
- No Formal Requirement for Competitive Solicitations
- No Formal Requirement for Competitive Solicitations (requirement for limited competitive procurement of renewables)
- No Formal Requirement for Competitive Solicitations (requirement for demonstrated comparison of alternative options prior to resource aquisition)
- Requirement for Competitive Solicitations
- Requirement for Competitive Solicitations (statute or rules encourage all-source procurement)
- Requirement for All-Source Solicitations
- Procurement Primarily Driven by Market Competition

THE FUTURE EVOLUTION OF RESOURCE PROCUREMENT

As US utilities transition toward a more modernized, decarbonized grid, options for how they might conduct procurement are changing. Historically, when a vertically integrated utility needed a new power plant, it built one, but today a utility has at least four possibilities to procure generation resources, depicted in Exhibit 11. These are (1) noncompetitive utility self-build, (2) single-source competitive solicitations for utility-scale generation, (3) all-source solicitations for utility-scale generation, and (4) all-source solicitations that enable optimal portfolios of utility-scale resources and DERs. Over time, as the United States moves toward an increasingly decarbonized and modern grid, procurement can evolve along this continuum to better accommodate all resource types and deliver on the promise of competition to lower costs and risks for electricity customers.

EXHIBIT 11

Evolutionary Pathway for Procurement



Options depicted in Exhibit 11 are:

1. **Noncompetitive utility self-build:** VIUs today can build and own generation. This option provides utilities with the most control over what types of assets they are building, the timing for doing so, and terms and conditions for utility investments. Today, utilities in Florida can use this option for procurement of power plants under 75 MW, and they have used this pathway to procure several gigawatts of solar over the past few years.[38]

2. **Single-source or "comprehensive single-source"[vii] competitive solicitations for utility-scale generation:** In a single-source competitive solicitation for utility-scale generation, a utility issues an RFP for a specific resource, with contract terms specific to that resource and its operational capabilities. Single-source solicitations may also be "comprehensive" if a bundle of solicitations is released at one time with specific capacity targets for each resource type.[39]

   In Georgia, for example, utilities are required to conduct an RFP process for each block of resources identified in the IRP. In a single-source, or comprehensive single-source, solicitation, bids are evaluated within (not across) resource "bins." In many states, such as Georgia, utilities or their affiliates still have opportunities to participate in competitive solicitations, and the utility can submit a "self-build proposal" for all or part of the need.[40] Today, most VIUs across the country are issuing single-source or comprehensive single-source competitive solicitations to meet their needs.

3. **All-source solicitations for utility-scale resources:** All-source procurement today describes a solicitation issued for a portfolio that meets a utility's needs, that is agnostic to which supply-side and storage resources will be selected. Bids are evaluated as a portfolio. As highlighted in Exhibit 10, Colorado's rules for resource planning state that a competitive acquisition process used to acquire new utility resources should "afford all resources an opportunity to bid … (i.e., an all-source solicitation)."[41] Several utilities, noted in Chapter 2, have moved toward approaches that can be characterized as all-source.

4. **All-source solicitations that enable optimal portfolios of utility-scale resources and DERs:** Few utilities to date have issued solicitations that attempt to enable participation by both utility-scale resources and DERs, including demand-side resources. Barriers to achieving this outcome, and the best practices that have supported participation from DERs and demand-side resources, are discussed in Chapter 4.

vii Terminology from *Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement* (**https://cleanenergy.org/wp-content/uploads/All-Source-Utility-Electricity-Generation-Procurement-Best-Practices_4.16.20.pdf**).

In this articulation of the future of procurement, in the near term, utilities are likely to use a greater proportion of all-source procurement that enables selection of a portfolio of different types of utility-scale resources, provided that:

- Utilities and regulators continue to understand how to operate, measure, and quantify large-scale renewables and storage value
- Changes to planning and procurement processes and rules require utilities to issue regular solicitations to meet their energy, capacity, and flexibility needs as an outcome of IRPs
- Market participants gain experience in translating a resource-agnostic need into energy solutions

In the longer term, utilities might move toward solicitations that enable selection of an optimal portfolio of utility-scale resources and DERs that can efficiently meet the flexibility needs of a deeply decarbonized grid.

In Exhibit 11, single-source solicitations remain an option in the longer term to procure emerging technologies that still require pilots or demonstrations and to meet technology-specific policy targets such as RPSs or statewide storage mandates.[42] Likewise, noncompetitive utility self-build remains an option for needs that, when tested, still cannot be met with market solutions.

Many of the best practices from leading utilities described in Part II are designed to move procurement toward the right on Exhibit 11. Chapter 4 provides recommendations that can move procurement toward all-source, objective-aligned, least-regrets outcomes no matter the starting point.

CHAPTER 3

Market Snapshot

REAL-WORLD EXAMPLES OF NEW PROCUREMENT PRACTICES

Leading utilities have begun to demonstrate that emerging best practices in procurement can improve investment outcomes and lead to greater and more cost-effective adoption of clean energy resources. In this chapter, we look at a subset of recent examples of VIUs that have conducted:

- **All-source procurement:** solicitations issued to select an optimal portfolio of utility-scale resources, and in some cases, DERs
- **Clean energy procurement:** solicitations issued specifically for single or limited sources of renewable energy and hybrid projects, which demonstrate cost-effectiveness of clean energy portfolios compared to fossil fuel-based solutions

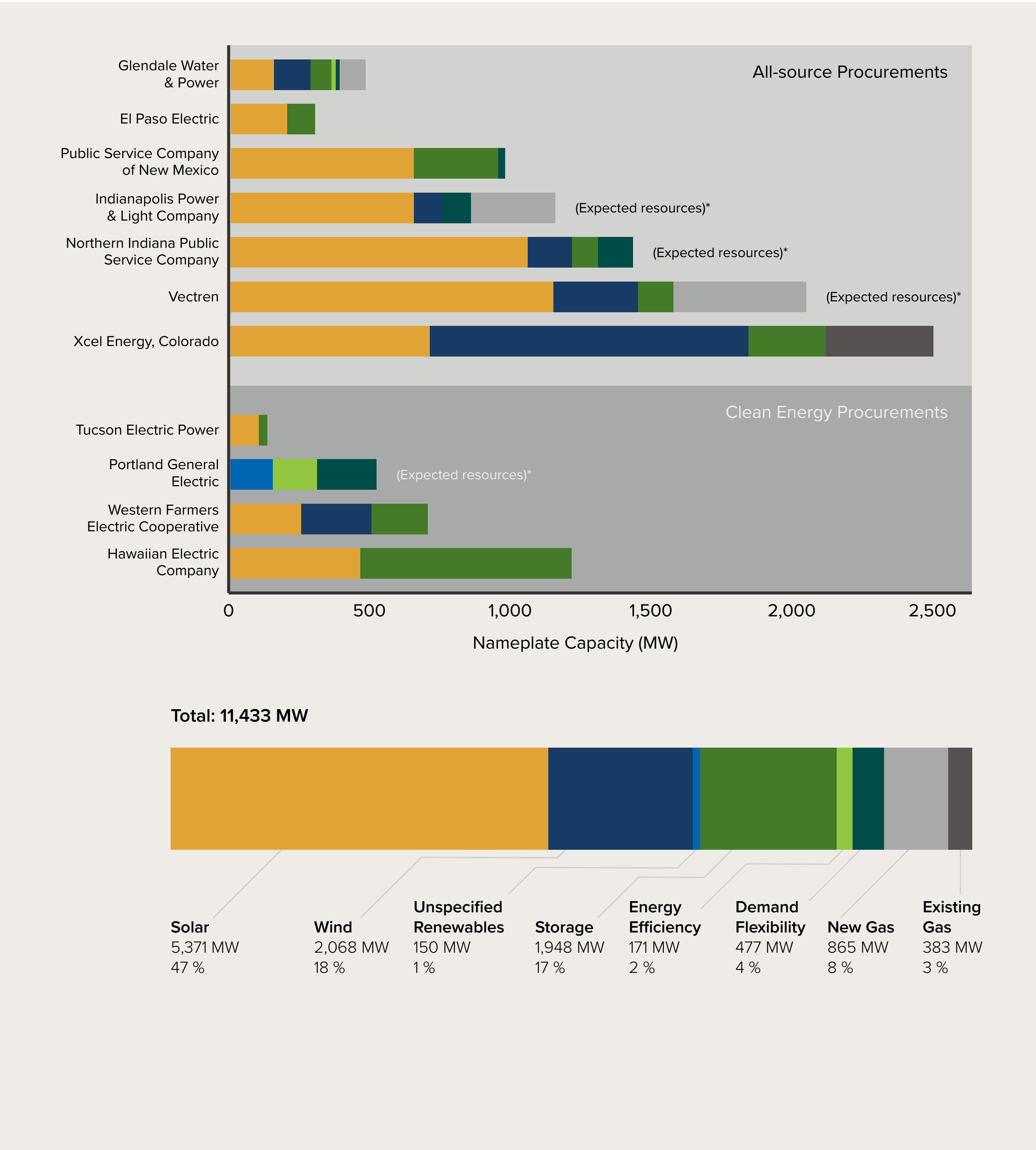
DIVERSE RESOURCE PORTFOLIOS

As a result of emerging procurement practices, utilities have procured or plan to procure diverse portfolios including both utility-scale resources and DERs. Exhibits 12 and 13 depict procurement examples from VIUs (IOUs, municipal utilities, and electric cooperatives) across the country. Solar, wind, and storage make up the majority of these procurements, while DERs like energy efficiency and demand flexibility are less present across these examples. In some cases, efficiency and demand flexibility have not been included in solicitations but may have been deployed by utilities outside of procurement through customer programs to support meeting identified needs.

In Exhibit 12, we present recent capacity additions by resource type from 11 all-source and clean energy procurements from around the country. In the table that follows, we explain further the context, structure, and results of each all-source procurement example. More information about each clean energy procurement example can be found in Appendix C.

EXHIBIT 12

Resource Mixes of Recent and Planned Resource Procurements by Utilities



ALL-SOURCE PROCUREMENT STRUCTURES AND RESULTS

Several utilities have taken an all-source approach to procurement,[viii] with notable results:

EXHIBIT 13

Utility Procurement Structures and Results

Xcel Energy, 2017, Colorado	
Procurement Structure	**Results**
– In 2017, Xcel Energy's Colorado subsidiary—the Public Service Company of Colorado—completed an all-source supply-side procurement as a requirement of its electric resource plan (ERP) process.[43] – Xcel's solicitation was open to bids from dispatchable, semi-dispatchable, and renewable supply-side resources over 100 kW, with options for company ownership or power purchase agreements (PPAs). – Xcel assessed its resource needs in four areas: reliability, compliance with the state renewable electricity standard, flexible generation, and compliance with the US Environmental Protection Agency Clean Power Plan. – Xcel did not include demand-side resources in this solicitation but does procure energy efficiency and demand response (DR) in processes separate from its all-source solicitation.	– Xcel's all-source procurement yielded 417 bids and ended with a selected portfolio of 1,131 MW of wind, 707 MW of solar, 275 MW of battery storage, and 383 MW of existing gas combustion turbines. – Xcel's 2017 procurement is a strong example of a least-cost procurement. The utility's competitive RFP yielded market-leading prices on renewables and storage and will save customers over $200 million when compared to Xcel's original preferred portfolio from its planning phase.[44]

Glendale Water & Power, 2018, California	
Procurement Structure	**Results**
– In 2018, municipal utility GWP ran an all-source RFP seeking alternatives to repowering the existing Grayson gas power plant after the Glendale City Council directed the utility to seek cleaner alternatives.[45] – The RFP was open to both utility-scale resources and DERs and enabled both types of technologies to participate. – California's RPS, the state's cap-and-trade program, and customer preference for renewables were all listed as key factors driving the utility to consider clean energy alternatives to the Grayson repowering project.[46]	– GWP's procurement yielded $125 million in cost savings through a diverse portfolio of clean energy resources.[47] – GWP received 34 bids for resources and selected a portfolio that included 28 MW of DSM, 75 MW of battery storage, 153 MW of solar, and 130 MW of wind. The final portfolio included 93 MW of new gas-fired internal combustion engines, a significantly smaller gas procurement than the original proposal of repowering 250 MW.

viii Procurements in this table considered all utility-scale resources, but did not necessarily all consider DERs.

El Paso Electric, 2017, Texas and New Mexico	
Procurement Structure	**Results**
– In 2017, El Paso Electric (EPE) ran an all-source RFP for 370 MW of capacity.[48] – Bids were solicited for supply-side energy and capacity through a PPA or utility ownership, and load management resources including distributed generation. – EPE's need for new capacity by 2023 was driven by increasing load and retirements of 196 MW of gas units.	– EPE received 81 bids and selected a preferred portfolio of 200 MW of solar, 100 MW of battery storage, and 228 MW of new gas peakers. – The procurement returned market-leading prices for new solar and solar-plus-storage at $14.99/MWh and $20.99/MWh, respectively.[49] – The New Mexico Public Regulation Commission (PRC) has since denied EPE's request to build the 228 MW gas-fired power plant on the basis that the plant is not aligned with the public interest or state policy.[50]

Public Service Company of New Mexico, 2017, New Mexico	
Procurement Structure	**Results**
– In its 2017 IRP,[51] PNM determined that retiring the coal-fired San Juan Generating Station (SJGS) would result in cost savings and issued an all-source RFP to replace the plant's capacity. – In 2019, after receiving initial results from its 2017 RFP, PNM requested that the PRC approve a replacement portfolio of renewables, storage, and new natural gas. – Advocates including the Coalition for Clean Affordable Energy (CCAE) contested the proposal and suggested a series of alternative portfolios to replace SJGS that did not include fossil fuels.[52] – Since issuing the RFP, both PNM and the state of New Mexico have committed to ambitious decarbonization goals.[53] In March 2019, New Mexico committed to 100% carbon-free energy by 2045, and in April, PNM committed to be carbon-free by 2040. The development of the preferred replacement portfolio has been influenced by these goals. – Community transition and economic development are other needs that were considered in the selection of a replacement portfolio.	– In July 2020, the PRC approved CCAE's clean energy portfolio as the resource portfolio that will provide the needed energy, capacity, and flexibility services given the SJGS retirement. The replacement portfolio consists of 650 MW of solar, 140 MW of wind, 300 MW of storage, and 24 MW of additional DR.[54] – The PRC's approval of CCAE's clean energy portfolio in place of the hybrid fossil-and-clean portfolio originally put forth by PNM marks a key win for clean energy advocates and demonstrates the importance and value of stakeholder engagement in electric resource planning and procurement processes. – CCAE's portfolio was selected as the PRC's preferred replacement portfolio in part because of the local economic benefits associated with much of the portfolio's resources being located in the same community as SJGS. The portfolio also performs well by reliability, cost, and carbon metrics. – PNM received 345 bids in its initial RFP and 390 in a supplemental storage RFP.

Northern Indiana Public Service Company, 2018, Indiana	
Procurement Structure	**Results**
– In May 2018, NIPSCO ran an all-source RFP concurrent to its planning process based on needs identified in its previous IRP.[55] The RFP enabled broad participation of renewables, storage, DSM, market purchases, and existing fossil fuel assets. – RFP results were used in the IRP analysis to inform recommendations NIPSCO set forth in its IRP, which was filed in October 2018. – In 2016, NIPSCO's parent company NiSource set a GHG emissions reduction goal of 50% by 2025. This goal informed NIPSCO's planning objectives.	– In 2019, NIPSCO opened three separate RFPs targeting 300 MW of wind, 2,300 MW of solar, and economic opportunities for nonspecified capacity resources. Procurement contracts are expected to be signed by the end of 2020. – By 2023, NIPSCO plans to procure 1,053 MW of solar, 92 MW of solar-plus-storage, 157 MW of wind, 125 MW of DSM, and 50 MW of market purchases. By 2028, NIPSCO plans to procure an additional 295 MW of solar and 114 MW of DSM and to retire its remaining 2,094 MW of coal assets. – Implementation of NIPSCO's IRP will result in $4 billion in long-term cost savings. The 2018 all-source RFP returned bids on new renewables that yielded per-megawatt-hour savings of up to 50% on the utility's existing coal generation.[56] – In addition to cost savings and planned procurements, the 2018 IRP drove NiSource to set an even more ambitious 2018 goal of 90% reductions by 2028.[57]

Indianapolis Power & Light Company, 2019, Indiana	
Procurement Structure	**Results**
– In 2019, Indianapolis Power & Light Company (IPL) issued an all-source RFP for 200 MW of capacity.[58] The solicitation resulted from its 2019 IRP.[59] – According to the IRP, a key driver of the need for new generation is to replace 630 MW of coal assets that will retire by 2023.	– In its IRP, IPL identified a lowest-cost replacement portfolio across a wide range of risk scenarios of wind, solar, storage, and demand-side energy efficiency programs. – As presented in the IRP, IPL's preferred portfolio calls for procurements of 650 MW of solar, 103 MW of DSM, and 100 MW of wind by 2025. A portion of these capacity additions may be filled by its current all-source RFP. – IPL expected to have completed the process by the end of 2020.

Vectren, 2020, Indiana	
Procurement Structure	**Results**
– In June 2019, Vectren issued an all-source solicitation for 10–700 MW of supply- and/or demand-side resources to provide capacity and energy.[60] – The RFP coincided with the beginning of its IRP process, and the utility used bid results to inform assumptions and modeling inside the IRP process.	– By 2025, Vectren plans to procure 300 MW of wind, 1,146 MW of solar, 126 MW of storage, energy efficiency totaling 2% of energy sales, and 472 MW of gas peaking plants as it retires or exits 730 MW of coal capacity.[61] A portion of these capacity additions may be filled by the all-source RFP. – In its IRP, Vectren estimates that its preferred portfolio will save the company $320 million over 20 years versus continuing its current portfolio and will reduce emissions 75% from 2005 levels by 2035. – Vectren is currently negotiating agreements with bidders from its 2019 RFP and planned to finalize procurement in late 2020.

There are also examples of utilities that have conducted all-source procurement to meet a transmission or distribution system need as part of a non-wires alternative project. These procurements are described in a 2018 RMI report and a forthcoming Lawrence Berkeley National Laboratory report.[62]

While not necessarily conducted using an all-source approach, many utilities have conducted procurements for clean energy portfolios that demonstrate their competitiveness against incumbent generation. These examples are described in detail in Appendix C: *Examples of Clean Energy Procurement.*

EXHIBIT 14

Examples of Clean Energy Procurement

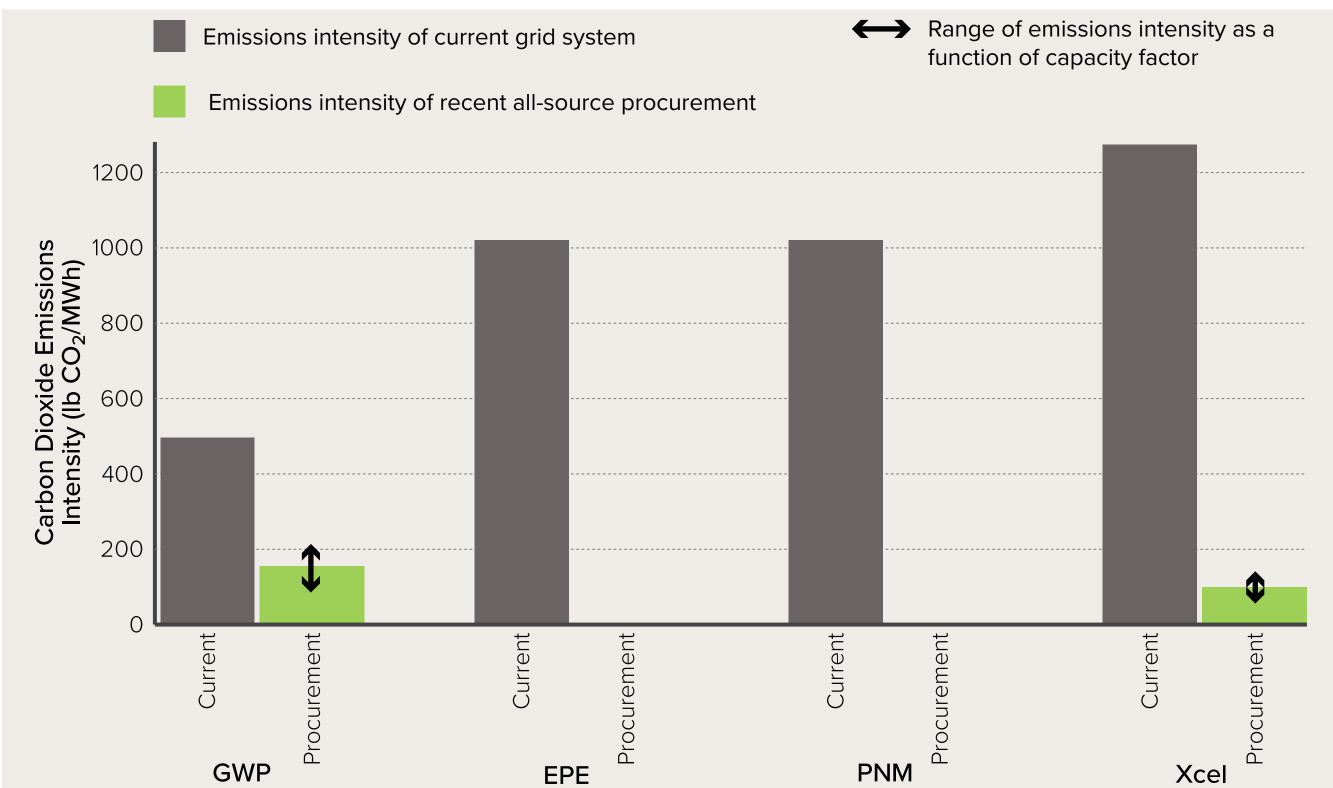
Utility	Results
Tucson Electric Power, 2017, Arizona	100 MW of solar and 30 MW of storage in a solar-plus-storage procurement
Western Farmers Electric Cooperative, 2018, Oklahoma	700 MW hybrid project with 250 MW of solar, 250 MW of wind, and 200 MW of storage
Hawaiian Electric Company, 2019, Hawaii	460 MW of solar and 3 GWh (750 MW 4-hour equivalent) of storage in a clean energy procurement
Portland General Electric, 2020, Oregon	Planned procurements of 157 MW of energy efficiency, 211 MW of DR, and 150 MW of renewables

CLIMATE BENEFITS OF LEADING EXAMPLES

Recent procurements using an all-source approach have selected portfolios that are overwhelmingly cleaner than current grid systems. In Exhibit 15, we compare the carbon dioxide intensity of four portfolios that have been procured by utilities.[ix] Recent procurements have emissions intensities that are between 25% and 100% lower than emissions intensities of each respective grid region.

EXHIBIT 15

Emissions Intensity of Resources Selected by All-Source Procurements Compared with Current Grid System



ix We compare the emissions intensity of the grid subregion in which each utility operates to the emissions intensity of its recent all-source procurement. We use EPA's eGRID data set (https://www.epa.gov/energy/egrid) to find emissions rates of each grid subregion. We calculate emissions intensity of procured portfolios assuming zero carbon emissions for all non-fossil resources, a carbon dioxide emissions intensity for natural gas-generated electricity of 920 lbs. CO_2/MWh (per the US Energy Information Administration; **https://www.eia.gov/tools/faqs/faq.php?id=74&t=11**), a 10%–30% capacity factor for gas-fired combustion turbines, and a 25%–75% capacity factor for combined cycle plants. The arrows in the figure represent a range of emissions intensities for each procurement given the modeled range of gas plant capacity factors.

SUPPORTING RESILIENCE, LOCAL ECONOMIC DEVELOPMENT, AND EQUITY

In addition to decarbonization, there are emerging examples of how utilities have considered some of the expanded sets of objectives in Exhibit 7 in resource procurement.

Resilience

In 2019, four community choice aggregators (CCAs) in Northern California (East Bay Community Energy, Silicon Valley Clean Energy, Peninsula Clean Energy, and Silicon Valley Power) issued an RFP for 32.7 MW of "Distributed Resource Adequacy Capacity."[63] This RFP was issued largely in response to widespread Public Safety Power Shutoffs to mitigate risks of utility equipment starting wildfires. The RFP is designed to procure distributed solar-plus-storage to provide resilience for residential and commercial customers, and contribute to meeting CCAs' requirements for resource adequacy. By combining these two objectives, CCAs can use resource adequacy requirements and revenues to reduce costs of providing solar and storage to their customers.

Local economic development

In PNM's solicitation for replacing the coal-fired SJGS, supporting the local school district tax base and transition for displaced workers were additional procurement criteria considered in portfolio evaluation. These criteria were legal obligations of the plant's retirement, as described in the Energy Transition Act: "projects shall be ranked based on their cost, economic development opportunity and ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility."[64]

Xcel's Clean Energy Plan (CEP) specifically included more storage and solar projects sited in Pueblo, Colorado—a coal community that would be impacted by early retirements of the Comanche units recommended in the plan. Intervenors Pueblo's Energy Future and Pueblo County recommended approval of the CEP portfolio in part "to reduce harmful emissions and improve public health benefits for disadvantaged communities."[65] In addition to siting more projects within the affected community, a solar project was developed as a partnership between Xcel and a local steel producer to stabilize its rates, provide a clean source of energy, and maintain jobs within Pueblo.[66]

Equity and environmental justice

California has started to consider equity and environmental justice as criteria for planning. Each load-serving entity's IRP must now include an analysis of the disadvantaged communities served, air quality impacts of potential portfolios, and resources planned for procurement in disadvantaged communities. The IRPs must also include a summary of outreach and evaluation criteria that will be used in procurement of generation and storage located in disadvantaged communities.[67]

II BEST PRACTICES PLAYBOOK

BEST PRACTICES PLAYBOOK

To redesign procurement to be all-source, objective-aligned, and least-regrets, best practices can be applied across all activities typically conducted within a procurement process, and to improvements for the process itself. To identify and begin to characterize these best practice opportunities, we lay out a framework in Exhibit 16 for both foundational process improvements and specific best practices for procurement activities that will guide the structure of this chapter and the resulting recommendations.

EXHIBIT 16

Summary of Process Improvements and Activities that Support Next-Generation Procurement Principles

CHAPTER 4

Foundational Process Improvements

Three foundational process improvements have been applied by leading utilities to support achieving the complexity of all-source, objective-aligned, least-regrets outcomes (Exhibit 17).

EXHIBIT 17

Three Applied Foundational Process Improvements

Foundational Process Improvements	All-source, objective-aligned, least-regrets outcomes
Increase Transparency	– Bidders obtain the information they need to propose competitive solutions that meet solicitation objectives and reduce the likelihood of bids falling through. – Stakeholders and regulators can access information they need to validate utility-claimed need and how the need is specified, and evaluate alternative solutions to build confidence in outcomes.
Engage Stakeholders	– Stakeholders may propose alternative specifications of the need or portfolio options that the utility did not consider. – Stakeholders can provide feedback about whether state and local policy objectives are adequately reflected in a solicitation's scope and evaluation criteria, and build public support for outcomes. – Stakeholders and bidders can identify barriers that may limit participation in the solicitation. – Consistent engagement with bidders can reduce perceived risk, result in more competitive bids from a diverse set of resources, and support market maturation.
Link Planning and Procurement	– Utilities, regulators, and stakeholders can holistically consider all resource options, including DERs and nonprocurement pathways, and assess the need for procurement in the context of longer-term planning objectives and risks. – Utilities can use actual price and operational capability information from bids to inform planning decisions.

THREE PROCUREMENT PROCESS EXAMPLES

Because no two procurement processes are the same, we describe three examples of procurement processes that reflect this diversity of approaches and demonstrate how utilities have applied foundational process improvements. Each of these approaches has benefits and trade-offs.

In Colorado, requiring an all-source RFP to be approved as part of the planning process ensures that procurement is based on market information and long-term planning objectives.

In Colorado, the electric resource plan (ERP) process includes both planning and procurement. The ERP process requires an all-source solicitation to be developed and approved based on the needs identified through planning in Phase I. Thus, assumptions, selection criteria, and contract terms are proposed and vetted by stakeholders and the Commission prior to issuance. By linking the planning process (which is traditionally more open), with procurement (traditionally not open), with a formal commission process and approval, transparency is increased throughout.

In addition, stakeholder input in the planning process is used for actual procurement decisions (see Exhibit 18; for a detailed treatment of the Colorado ERP process and similar timeline, see *Making the Most of the Power Plant Market*[68]). A key tradeoff of Colorado's process is that it is long, which can present challenges for developers trying to hold on to bid prices, and it requires concerted, long-term effort from involved stakeholders, utility, and commission staff.[69]

In Indiana, NIPSCO conducted an RFP concurrent with its planning process and used bid data to inform planning.

In Indiana, NIPSCO conducted an all-source solicitation to meet the needs identified in its prior RFP near the beginning of its resource planning process (see Exhibit 19). Conducting the all-source RFP amid resource planning provided NIPSCO with up-to-date pricing and capability information, with a much smaller range of uncertainty, to use in its planning decisions.[70] The key tradeoff of NIPSCO's process is that there is uncertainty around the requirement to procure resources as a result of its solicitation, which creates risk for bidders. NIPSCO selected bids from its all-source RFP to cover a portion of the resource requirement and subsequently issued single-source RFPs to meet the balance of its need.

In Glendale, California, local DERs procured through an all-source solicitation allowed for a cost-effective resource plan that avoided full repowering of an aging gas-fired power plant.

In Glendale, California, the City Council directed GWP to issue an all-source solicitation to challenge the results of its 2015 IRP requiring a full repowering of the gas-fired Grayson Power Plant (see Exhibit 20). As a result of the solicitation, GWP's preferred portfolio included storage, local DERs, and imported wind and solar to greatly reduce the size of gas generation needed.

EXHIBIT 18

Public Service Company of Colorado's Most Recent ERP Process

Planning

May 2016

Xcel filed resource plan: Xcel began Phase 1 of its ERP process, filing its ERP in May 2016

Commission authorized determination of need: In May 2017, the Comission authorized the determination of need for an RFP to fill a range of four scenarios between "zero-need" and the "Clean Energy Plan," which included early coal retirements.

Stakeholders and Commission reviewed RFP documents: RFP documents were reviewed within Phase 1 of the ERP process. Bid categories include Company Owned, Dispatchable, Semi-Dispatchable, and Renewable.

Procurement

RFP issued: In August 2017, Xcel issued the All-Source RFP, which initiated Phase 2 of the ERP. Bids were received by November 2017.

Bids evaluated: 160 of 417 bids were advanced to portfolio modeling. In December 2017, Xcel filed a 30-day status report with a summary of bid results, including median prices.

Proposed portfolio filed and approved: At 120 days, Xcel filed its proposed portfolio. The Commission approved the Phase 2 decision in September 2018 and Xcel started contract negotiations.

Certificates of Public Convenience and Necessity (CPCNs) filed: In December 2018, Xcel filed CPCNs for utility-owned facilities. Most were filed and granted by early 2020.

Projects underway: In April 2020, Xcel published a map and update showing projects underway around the state.

April 2020

EXHIBIT 19

NIPSCO's Recent Planning and Procurement Processes

Procurement

March 2018

NIPSCO shared RFP overview: NIPSCO presented an overview of the all-source RFP design to stakeholders at first advisory meeting in March 2018 and solicited feedback. The RFP was based on need identified in NIPSCO's prior IRP.

RFP launched: RFP was launched May 4, 2018, and closed on June 19, 2018.

Planning

RFP results integrated into IRP modeling: Three more stakeholder meetings were held (July, September, October) to share results and discuss integration into IRP analysis.

IRP filed: NIPSCO filed its IRP, including data from its all-source RFP, on October 31, 2018.

Procurement

RFPs launched for renewables: NIPSCO ran three RFPs in October–November 2019 for wind/wind + storage (300 MW), solar/solar + storage (2,300 MW), thermal/other capacity.

WInd projects approved: NIPSCO requested and received IURC approval from three wind projects to meet resource requiremens.

November 2019

EXHIBIT 20

Glendale Water and Power's Recent Planning and Procurement Processes

Procurement

2015

Proposed repowering in 2015 IRP: In its 2015 IRP, Glendale Water and Power (GWP) proposed repowering Grayson Power Plant.

City council directed GWP to seek alternatives: In April 2018, the Glendale City Council directed GWP to seek clean energy alternatives to the proposed gas plant repowering.

Planning

Clean Energy RFP issued: In May 2018, GWP issued its "Clean Energy RFP," seeking solutions that would allow it to maximize use of low-carbon energy and minimize fossil fuel generation. The RFP was technology inclusive.

Bid received: In August 2018, GWP received 34 bids to its solicitation.

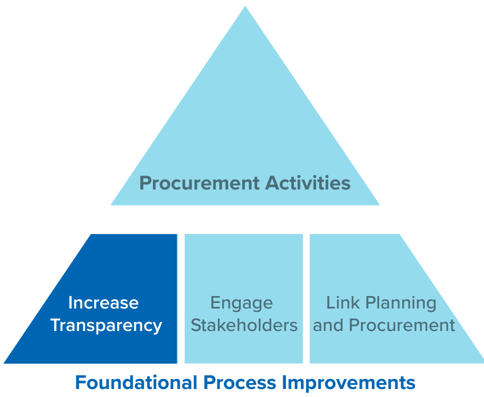
Portfolio outlined in 2019 IRP: In 2019, GWP's IRP recommended 75 MW of energy storage, 23 MW of distributed PV+S, 28 MW of residential and commercial EE/DR, 130 MW of imported wind, 130 MW of imported solar, and 93 MW of new gas internal combustion engines as its preferred portfolio.

Procurement

IRP approved: In July 2019, City Council approved GWP's 2019 IRP.

July 2019

INCREASE TRANSPARENCY



The following transparency improvements have been applied by leading utilities and regulators to support a successful all-source procurement process:

Commission rules establish as much transparency as possible from the perspective of stakeholders, third-party evaluators, and the regulator. Rules that require transparency of data about utilities' characterizations of identified system needs and transparency of data about utilities' current systems increase intervenors' and stakeholders' understanding of and support for needs and potential alternatives. It may be necessary for some information and data to be held confidential to protect system security, protect competitively sensitive information, and deter anticompetitive activity. Information that cannot be made public can be made available with appropriate confidentiality protections to those who need the information to fairly participate in or evaluate procurement activity.

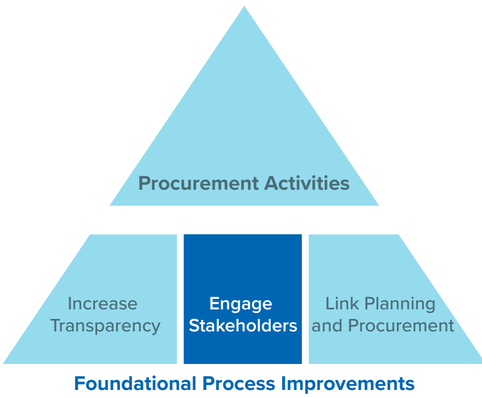
Commission rules ensure that all bidders are provided with equal information. Transparency can reduce bidders' risks, making them more likely to bid and provide competitive prices. Particularly in jurisdictions where affiliates or utility-self-build options are allowed to compete alongside third-party bids, regulators have sought to identify information asymmetries that might disadvantage participants.

Improvements to transparency of distribution system information support DERs to effectively participate in meeting defined procurement needs. Many states are undertaking efforts to provide the public with more access to customer energy data and distribution system data.[71] For example, utilities in Minnesota, Colorado, Hawaii, the District of Columbia, New York, and California have created public hosting capacity maps. These maps provide information about where on the grid DERs might interconnect to the greatest advantage to the distribution grid (e.g., by improving power quality or voltage issues), without approaching reliability constraints.[72]

An ongoing process for communication with utilities throughout procurement processes complements data transparency. In addition to data access, leading utilities have provided opportunities for dialogue with stakeholders. Outside of formal pre-solicitation workshops, stakeholders might have specific questions about modeling runs or assumptions from utility staff. At a minimum, it has become standard practice to provide an email address for questions, that the utility then posts on an FAQ page. A more robust approach includes open dialogue between stakeholders and utility staff, including meetings, overviews of modeling runs and results, and opportunities for stakeholders to request additional modeling or access to modeling software.

Utilities have also provided feedback to bidders who were not selected to help them develop stronger bids in the future, thus providing support to market maturation. For example, Xcel provided bids that did not move onto computer modeling in its all-source solicitation with reasons for its decision.[73] Xcel also challenges short-listed bidders to "sharpen their pencils" by amending their bids prior to selecting the final bids that are used to create portfolios for negotiating contracts.

ENGAGE STAKEHOLDERS



More substantive stakeholder engagement than has been conducted in traditional procurement processes may be necessary to ensure that solicitations reduce risks for bidders and are designed to be all-source, objective-aligned, and least-regrets. Typical participants in such a process are outlined in Exhibit 21.

Many utilities and regulators have decided to use an independent evaluator or administrator to increase confidence in the process and outcomes of procurement. If used, their roles and conduct must be clearly defined. In some cases, stakeholders have expressed that independent evaluation may also pose a risk with respect to transparency, and a preference to work directly with the utility and commission to validate results.

There are several ways these stakeholders have been asked to contribute to utilities' procurement processes. The following questions can help to assess whether a procurement process is incorporating emerging best practices for stakeholder engagement:

EXHIBIT 21

Key Stakeholders in a Procurement Process

Independent Administrator or Evaluator
Issuing or evaluating the solicitation for new resources, if present

Utility or Load-Serving Entity
Issuing the solicitation for new resources

Regulator or Oversight Board
The regulatory commission, member-elected board, or local government with a role in structuring and approving the solicitation and outcomes

Environmental groups
Typically intervenors, who are interested in seeing solicitations aligned with environmental outcomes

Potential bidders
Supply- and demand-side solution providers who may bid into the solicitation

State and local interests
State and local officials and community groups may be interested in seeing outcomes of solicitations that provide local economic development or other benefits

Large customers
Universities, cities, and large commercial and industrial groups that have interest in seeing solicitations aligned with their goals

Consumer advocates
Consumer representatives that have interest in keeping rates affordable

Questions to assess if stakeholder engagement supports all-source, objective-aligned, least-regrets procurement:

1. **Is the stakeholder engagement process sufficiently independent to support fairness and transparency?**
   - Will stakeholder engagement for procurement be conducted by the commission as part of a proceeding?
   - Has the commission provided guidance on how to conduct stakeholder engagement in support of a solicitation, including use of an independent administrator?
   - If an independent administrator is conducting stakeholder engagement, are rules in place that clearly define the independent administrator's role and conduct?
   - If the utility is conducting stakeholder engagement, are there rules in place that clearly define the utility's role and conduct? Are stakeholders adequately resourced (e.g., time, technical expertise, transparency) to hold the utility accountable?
   - Is an independent evaluator responsible for selecting optimal resource portfolios?

2. **Is there sufficient opportunity for collaboration between stakeholders before the solicitation is released?**
   - Did stakeholders have an opportunity for feedback on utility assumptions about the need and objectives for procurement, structure of the solicitation, and criteria for evaluation?
   - Have stakeholders been empowered and adequately resourced to propose alternative definitions of need, objectives, structure, or criteria for evaluation?
   - Have prospective bidders had an opportunity to identify potential barriers to their participation?
   - Has the need for procurement been subject to commission review and approval?
   - Did the utility or commission provide an explanation of how stakeholder input resulted in changes to the final decision or design of the procurement?

3. **Once the solicitation is opened, are there adequate opportunities for communication with the utility or independent administrator?**
   - Is there an opportunity for Q&A to fortify stakeholder and bidder understanding and enable their participation?
   - Do bidders have clear instructions and timelines for the actions they need to take?
   - Is there a commitment to provide bidders feedback or allow them to update assumptions prior to final portfolio selection?

4. **After evaluation, are stakeholders adequately briefed on results and outcomes?**
   - Have stakeholders been provided with timely, balanced, and objective information about how and why decisions were made?
   - Are bidders and stakeholders provided timely updates during negotiation and implementation?

The three solicitation processes highlighted above demonstrate how leading utilities have structured stakeholder engagement to support all-source procurement in practice.

Colorado's ERP process is conducted through formal commission proceedings, providing opportunities for intervenors to participate through comments, discovery, testimony, and cross examination of witnesses on a public record. Designing an all-source solicitation is a component of the planning process in Colorado, and intervenors have opportunities to investigate, comment on, and provide alternatives supported by expert witness testimony concerning solicitation assumptions and structure, terms and conditions, and evaluation methods prior to commission approval.

Stakeholders can assess and shape planning scenarios and the procurement need addressed in the Phase II solicitation. The stakeholder testimony and position are formally adjudicated by the commission. Once Phase II of Colorado ERP process was initiated and the solicitation was released, Xcel supported a dialogue with bidders through a pre-bid conference and posted ongoing questions and answers on its website.[74]

EXHIBIT 22

Selected Representative Feedback from NIPSCO's All-Source RFP Review

Summary of feedback received and incorporated	Summary of feedback received but not incorporated
– Ensure RFP is truly all-source – Ensure transparency by sharing RFP results as much as possible – Allow DR contracts with a term of one year and clarify DR rules – Added May 16, 2018, webinar for potential bidders to introduce RFP and answer questions at the front end of the timeline – Include bid requirements to filter out high-risk, speculative projects	– Provide more than 45 days and/or adjust pre-bid conference timing – Include flexibility (frequency, time, and size of irreversible decision) as an evaluation criterion – Include full life-cycle assessments and annual carbon intensity – Require assets to demonstrate advanced dispatch capabilities – Eliminate potential for fossil resources

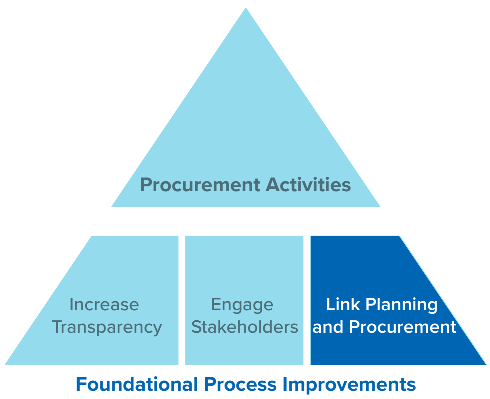
Note: This table does not represent the comprehensive feedback provided in the IRP Appendix A, pp. 272–273, but has been selected by the authors as representative.

NIPSCO held five public advisory stakeholder meetings as a part of its 2018 IRP update process, which included its all-source solicitation. NIPSCO outlined key questions and goals for each meeting.[75] All materials and notes were posted on NIPSCO's public website. Additionally, NIPSCO provided an email address to solicit questions and feedback from stakeholders throughout the process.

Although traditionally stakeholders have been informed of utility needs and invited to ask questions about solicitations after they are issued, NIPSCO created an opportunity for stakeholders to provide feedback prior to issuing the RFP to ensure that resources could participate without facing prohibitive risk. At a subsequent meeting, NIPSCO provided an update on feedback it had received and incorporated, as well as feedback it had received and not incorporated (Exhibit 22; see also IRP Appendix A, pp. 272–273). After the RFP, NIPSCO shared the results and how they would be incorporated into IRP modeling.[76]

In Glendale, after RFP responses were received and as GWP was finalizing its preferred portfolio, the utility hosted four community workshops and two focus groups using RMI as an independent facilitator. Community workshops included utility content presentations, small-group breakout discussions, and facilitated feedback. These workshops served to inform Glendale stakeholders about the RFP process and outcomes and related IRP processes, address questions from community members, and generate feedback on lessons learned and improvements to make going forward.

LINK PLANNING AND PROCUREMENT



Clearer alignment of planning and procurement can support decisions that are all-source, objective-aligned, and least-regrets. Defining a need for procurement, evaluating nonprocurement options, and weighing procurement objectives ideally will take place in a utility's planning process—but there is an opportunity in most states to more clearly define how procurement can best be conducted to meet planning outcomes. Additionally, there is an opportunity to ensure that procurement informs planning by bringing up-to-date cost and capability data into the selection of long-term resource portfolios.

In Colorado, **stakeholders have certainty that outcomes determined from planning processes will translate into procurement decisions.** Increasingly, stakeholders such as cities and large corporate energy consumers are viewing the utility planning process as an opportunity to ensure their utility's future purchases are aligned with their own preferences and local policy priorities. Creating an explicit link between planning and procurement such as Colorado has done can enable those stakeholders to have a better line-of-sight into what their utility is buying to achieve planning outcomes. If a need is a reasonable outcome identified in Colorado's ERP, the all-source solicitation is used to verify the plan's results.

Utilities can use data from bids to an all-source solicitation to increase the accuracy of resource costs and capabilities in planning processes. If utilities inaccurately characterize resource costs or capabilities when determining portfolios they would like to procure, they may inadvertently limit resource options. Assumptions about resource costs can be contentious among utilities and their stakeholders, especially if they are drawn from opaque internal estimates. Utilities are increasingly being required to ask for bids before determining what optimal, final resource portfolios look like. If planning and procurement are more formally integrated, bids can be collected as part of the IRP process.

NIPSCO issued an all-source solicitation based on the need from its 2016 IRP near the beginning of its 2018 IRP process and integrated bid results into its 2018 IRP to inform capital cost assumptions and analyze its preferred plan. **Vectren**, also in Indiana, issued an all-source solicitation in 2019 and used the results to inform its 2020 IRP, which Vectren states will save customers $320 million over the planning period and include nearly two-thirds of energy from renewables.

In contrast, **DTE Energy in Michigan** faced pushback from stakeholders because it did not conduct a competitive solicitation to collect market-based data in its 2019 IRP—which was required by a 2016 statute establishing the IRP process. The administrative law judge and the commission concluded that DTE's IRP did not comply with the statute, and they recommended that competitive solicitations be used to acquire resources in accordance with needs defined through the IRP.[77]

Linking planning and procurement can result in more effective consideration of DERs, including efficiency and DR. While DERs often are not considered as a part of a procurement process, most states are required to include energy efficiency and other DERs in planning. The results of **Glendale Water and Power's** solicitation demonstrate that demand-side solutions and distributed resources can play a valuable role in meeting a system need and can participate in a portfolio with utility-scale solutions. While participation by DERs, including energy efficiency, in all-source solicitations remains limited (see Chapter 3), planning processes can be used to ensure that these resources play a meaningful role in an overall portfolio, even if they are brought online by means other than direct competition in a solicitation.

Similarly, linking planning and procurement can **create an opportunity to better assess long-term risks of near-term decisions and support more discussion of nonprocurement solutions.** Planning takes an inherently long-term view. Procurement is usually designed to address a near-term need. By the time a procurement has been structured and released, a utility has concluded that new resources are the best option for meeting the need. Tightening relationships between planning and procurement can help reveal opportunities to test assumptions about whether procurement is the right pathway before it occurs. For NIPSCO, actionable bids for projects were assessed through the process of integrated resource planning and were evaluated alongside nonprocurement decisions in the IRP, such as coal retirement pathways, and policy sensitivity such as carbon prices.

Other nonprocurement options that can affect the need for procurement include:

- New rates, tariffs, and customer programs
- Transmission expansion
- Market purchases and evolution of wholesale markets, rules, and products
- Retirement pathways for existing assets, including accelerated retirement
- Seasonal operation of fossil fuel assets
- "Slack resources" such as expiring PPAs and newly free transmission capacity as a result of retirements
- Local capacity constraints

CHAPTER 5 Key Procurement Activities

There are three main activities (Exhibit 16) within the procurement process that can be designed to enable procurement that is all-source, objective-aligned, and least-regrets:

- Define and validate system needs
- Scope fair and transparent RFP documents and processes
- Select the optimal resource portfolios

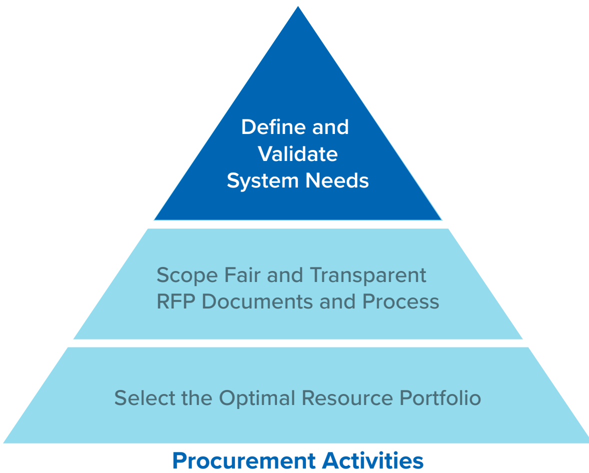
In many procurement processes, these activities are conducted iteratively. Likewise, it is increasingly common that these activities cross boundaries between "planning" and "procurement," as shown in the example process diagrams in Exhibits 18, 19, and 20. Leading utilities and regulators have started to define key strategies that support next-generation procurement practices within their respective procurement activities, summarized in Exhibit 23.

EXHIBIT 23

Strategies for Design of Procurement Activities that Support Next-Generation Procurement Principles

Procurement activity	Strategies that support all-source, objective-aligned, least-regrets outcomes
Define and validate system needs	**1.** Write solution-agnostic statements of need that support participation from all resources. **2.** Validate needs through stakeholder engagement, independent analysis, and regulatory approval.
Scope fair and transparent RFP documents and processes	**1.** Enable DERS, including energy efficiency and demand flexibility, to help meet the need within or in parallel to a solicitation. **2.** Minimize provisions in the solicitation that are likely to constrain participation and provide flexible options to maximize bidder competition and creativity.
Select the optimal resource portfolios	**1.** Select portfolio options using a value-based approach to optimization that includes both grid and societal values. **2.** Ensure that the solicitation, evaluation, and approval processes are clear and transparent to bidders and the public.

DEFINE AND VALIDATE SYSTEM NEEDS



Defining needs for procurement is the foundation of a solicitation. For any procurement, stakeholders and regulators have come to expect a clear explanation of what will be procured, why it is being procured, and a data-based justification to support the explanation.

There are two main tactics that leading jurisdictions have used when defining needs to support successful least-cost, all-source, objective-aligned procurement:

1. Write solution-agnostic statements of need that support participation from all resources.

KEY CONSIDERATIONS

Striking the right balance between specificity and inadvertently limiting bids: Describing needs for procurement is foundational to an all-source approach. Details such as the types of services that are needed, the shape and duration, and the timing have enabled bidders to better define competitive bids. Describing uncertainties and drivers of needs has enabled stakeholders to better understand the reasons for procurement.

Questions to assess if a needs description supports all-source, objective-aligned, least-regrets procurement:

Does the statement of needs:

- Describe the binding system needs in terms of energy, capacity, or flexibility?
- Describe where the need located? Is grid data included that can support bidders to determine if a project can meet the needs?
- Describe when, where, and for how long the system has this need?
- Describe the primary drivers of this need and the associated uncertainty and risks?

A statement of needs may not be written to support all-source, objective-aligned, least-regrets procurement if:

CAUTION: A need is described for a specific resource or set of resources, but there is no justification for restricting solutions

RED FLAG: No description of needs is provided to justify procurement of specific resources

EXAMPLES IN PRACTICE

EPE provided a description of needs, including timing (seasonality, time of day, and online date), and a qualitative description of drivers:

> "Proposals may be for supply-side or demand-side resources ("resources"). Through initial resource planning studies, EPE has determined that it requires approximately 50 MW by 2022 and 320 MW by 2023 for a total of 370 MW of additional resources for summer peak (May–September, 1:00 p.m.–6:00 p.m. MST) to (i) meet increasing load requirements on the EPE system, and (ii) replace loss of capacity due to local unit retirements.[78]"

In Colorado, Xcel Energy provided a needs description, including timing, drivers, and associated uncertainty, in its all-source solicitation:

> "This RFP is part of a Solicitation process whose purpose is to acquire sufficient resources to meet the Company's forecasted electric demand (plus reserves) over the resource acquisition period ("RAP") of 2016–2023. Through this Solicitation, the Company seeks power supply bids that could be utilized to fill a range of resource capacity needs from a low of zero MW per Commission Decision C17-0316 section 45, up to over 1,100 MW which could result from Commission approval of the Colorado Energy Plan Portfolio. Table 2 illustrates the general range and timing of resource need by scenario.
>
> The Company may seek to replace some, none, or all of Comanche 2 capacity (e.g., up to 1,114 MW inclusive of the Comanche 2 capacity) through this RFP. It is the Company's expectation that any portion of Comanche 2 capacity not filled in this RFP will be addressed in the 2019 ERP process.[79]"

Xcel complemented its description of need with data describing its current system's transmission injection capabilities to help bidders identify locations where their resources might provide the most value.[80]

2. Validate needs through stakeholder engagement, independent analysis, and regulatory approval.

KEY CONSIDERATIONS

Choosing the venue that best supports needs validation: Thoroughly validating needs through stakeholder engagement, independent analysis, or regulatory review has helped leading jurisdictions improve confidence in outcomes and minimize challenges once optimal portfolios have been selected. A formal proceeding may require much more effort and time on behalf of all parties but result in more confidence in results. Independent analysis or robust stakeholder engagement can be key opportunities in the absence of a formal proceeding. Validating the need should happen prior to issuing the solicitation, ideally through a planning process.

Questions to assess if needs validation supports all-source, objective-aligned, least-regrets procurement:

Is the statement of needs:

- Accompanied by sufficient data for stakeholder and commission evaluation? Have stakeholders been encouraged and assisted to provide their analysis?
- Validated by stakeholders and the commission through a public record?
- Supported by analysis conducted by an independent planning entity (e.g., state energy office, commission, or regional planning council)?

Needs validation may not be sufficient to support all-source, objective-aligned, least-regrets procurement if:

CAUTION:

- Data is provided only in graphic format and has not been released as machine-readable (e.g., CSV, Excel)
- Needs are defined in an IRP that has not yet been approved

RED FLAG:

- No data has been released to justify the utility need or proposed solution
- Need is determined by company only

EXAMPLES IN PRACTICE

In states where planning and procurement are explicitly linked, needs for procurement are validated through stakeholder participation in the IRP process.

- In **Colorado**, stakeholders and the commission validate the need for procurement through formal participation in the Phase I proceeding.
- In **Minnesota**, administrative rules for resource planning explicitly authorize stakeholders to propose alternative resource plans with a quantitative explanation of changes that deviate from the utility's plan.[81]

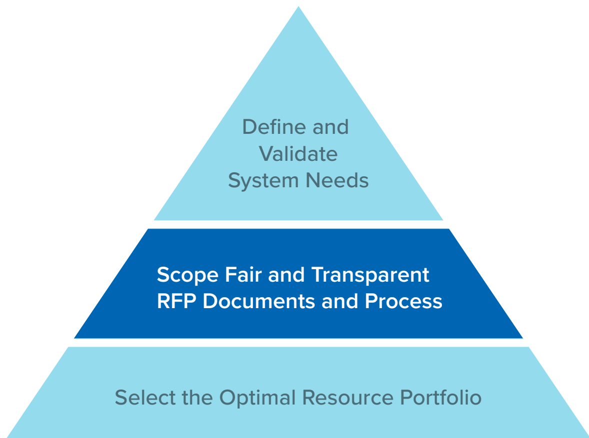
In some states, planning is either fully or partially conducted by an independent planning entity through a collaborative stakeholder-driven process. Results from these processes may be used to validate a utility's proposed plans.

- In **California**, the California Energy Commission's load forecasts and scenarios are adopted by individual load-serving entities in their planning.
- In the **Pacific Northwest,** the Northwest Power Planning Council defines needs across the region that are the primary basis for procurement of generation by the Bonneville Power Authority and that influence procurement outcomes for other regional utilities.

Stakeholders with technical expertise can also participate in validating utilities' planning assumptions. For them to effectively participate, planning assumptions can be accompanied by access to the utility's data, transparency about methods for analysis, and support for addressing questions. Ideally, this access could be provided prior to a solicitation, but an example from New Mexico where access was provided to intervenors after a solicitation was completed demonstrates the potential power of using stakeholders to validate needs—and the risks of not doing so early in the process.

In **New Mexico, PNM** was ordered to provide stakeholders with access to utility modeling tools and utility staff to verify assumptions about portfolios for replacing the coal-fired SJGS. As a result, intervenors in the proceedings were able to model their own portfolios to directly compare with the utility's. This approach required significant resources (staff and modeling licensing) on behalf of the utility and required intervenors with technical expertise in operating planning software. However, allowing intervenors to directly modify assumptions and present comparable alternative options was an unprecedented level of transparency that should be considered for large procurement decisions. The Commission ultimately adopted the intervenors' alternative portfolio.[82]

SCOPE FAIR AND TRANSPARENT RFP DOCUMENTS AND PROCESS



Procurement Activities

Scoping fair and transparent RFP documents requires a balance between ensuring an RFP is broad enough for all resources to participate and specific enough for bidders to structure their bids to be competitive, with confidence in how they will be evaluated. Two components of scoping RFP documents have been critical to enabling resources to participate:

1. Enable DERS, including energy efficiency and demand flexibility, to help meet the need within or in parallel to a solicitation.

KEY CONSIDERATIONS

DERs can provide flexibility needed in a portfolio to balance a deeply decarbonized grid and can reduce the costs of deploying a clean energy portfolio.

Choosing the right pathway to enable DERs to meet the need: To date, there have been few solicitations that enable participation of both utility-scale resources and DERs, and there is significant debate over whether they can and should be brought online through procurement.[83] More commonly today, decisions around DER adoption take place within the planning process, in parallel proceedings around DERs, or in statewide policy conversations.

Enabling DERs to participate in a competitive solicitation: There are challenges to effectively enabling DERs to participate in an all-source solicitation. Aggregated DR, which is dispatchable and measurable, has seen the most success in participating in solicitations alongside utility-scale supply-side resources (see the examples in Chapter 3). Aggregated distributed solar and storage have successfully competed in solicitations where there are local resource capacity constraints (e.g., Glendale), where bulk system and customer values can be stacked (e.g., Sunrun's 20 MW aggregation that won an ISO-NE capacity market contract[84]), and where societal values such as resilience are driving the solicitation (e.g., the CCA RFP described in Chapter 3).

Energy efficiency faces challenges associated with measurement, verification, and valuation that need to be addressed to be included in a solicitation. More data and experimentation may be required to define best practices on integrating energy efficiency into all-source solicitations. To address these challenges, there are many examples to learn from of all-source solicitations for non-wires solutions that have included DERs and demand-side resources for distribution deferral opportunities.[85]

Ensuring that DERs contribute to meeting the need outside of competitive procurement: Outside of solicitations, there is still an opportunity to shift mindsets toward DERs as a critical component of a resource portfolio and to accelerate deployment through other levers. Policy decisions outside of planning and procurement processes influence utility and customer deployment of DERs, including demand flexibility, energy efficiency, and distributed solar and storage.

Policy decisions may result in nonprocurement pathways such as energy efficiency resource standards that set concrete energy savings targets for utilities,[86] or changes to utility business models such as PIMs and decoupling. Likewise, customer energy efficiency and demand-response programs, and changes to customer rate structures or net metering rules can drive adoption of behind-the-meter solar and storage.

Questions to assess if participation of DERs supports all-source, objective-aligned, least-regrets procurement:

If DERs are enabled to participate in the RFP:

- Is the RFP structured such that DERs are eligible to participate contemporaneously with utility-scale supply resources?
- Are the unique values of DERs reflected in the bid evaluation process?

If DERs are not eligible to participate in the RFP:

- Is there evidence that solicitation needs have been structured with parallel plans for deployment of all cost-effective energy efficiency, DR, and other DERs through customer programs and other pathways?
- Have stakeholders and the commission verified assumptions about adoption of demand-side and distributed resources in load forecasts?
- Do DER potential studies reflect synergies between different resources (e.g., total lifetime savings and cost-effectiveness improve when weatherproofing and efficient AC units are deployed as a package)? Do they reflect the realities of the policy environment (e.g., reflective of cost-tests being used for program approval and potential opportunities to realign tests with state policy priorities)?[87]
- Will energy efficiency resource standards or utility performance incentives exist that will result in substantial deployment of energy efficiency?
- Do customer programs or rate structures support substantial adoption of DERs?

DER participation may not be sufficient to support all-source, objective-aligned, least-regrets procurement if:

CAUTION: Demand-side resources have been analyzed through a potential study within or alongside the IRP, but links between this analysis and decisions to pursue procurement are unclear

RED FLAG: There is no evidence that demand-side resources and their role in meeting needs have been considered

EXAMPLES IN PRACTICE

Few utilities have taken a portfolio approach that includes DER participation in procurement alongside utility-scale supply-side resources to date. GWP and other utilities with transmission constraints that have considered local resources have issued solicitations that offer a glimpse of what a portfolio approach that includes DERs might look like in the future.

In **Glendale, California**, a 2018 solicitation that enabled DERs to participate will save customers $125 million over its 2015 plans to repower a gas-fired generator. In its Clean Energy RFP, GWP solicited a portfolio of resources to provide 234 MW of additional capacity and 200,000–600,000 MWh of energy on an annual basis.[88] Portfolios GWP considered to meet its need included four categories of resources: clean energy and load reduction (including residential DER and DER in public spaces, and residential and commercial efficiency and DR), imported solar and wind, battery storage, and conventional generation. Its solicitation resulted in the procurement of approximately 50 MW of DERs.[89]

Many utilities have structured solicitations based on a preceding decision that energy efficiency and demand-side resources will meet a significant portion of the overall need through customer programs or pricing.

In **Oregon**, for example, **Portland General Electric's** 2019 IRP identified needs to replace capacity and energy from a retiring coal plant. In its IRP, PGE details its plans to meet these needs by first deploying all economic energy efficiency (157 MW) and DR (211 MW) before issuing a procurement for 150 MW of renewables to meet the remainder of the need.[90]

2. Minimize provisions in the solicitation that are likely to constrain participation and provide flexible options to maximize bidder competition and creativity.

KEY CONSIDERATIONS

How a solicitation is scoped and written, and which provisions are included, can affect the ability of all resources to participate. Utilities that have issued solicitations that support all-source, objective-aligned, least-regrets procurement have defined categories inclusive of all resources and typically provided a variety of ownership options.

Including contract terms: Contract terms are often provided with solicitations to provide bidders with understanding of how the utility expects to own, operate, and compensate their resource. These terms can be valuable in submitting a competitive proposal; however, without the opportunity to request modifications to these contract terms, bidders will not be able to offer additional value or creative business models that may better serve both parties.

Setting inclusive timelines: Different resources also require different timelines to respond to solicitations, which can affect their ability to participate with competitive bids. The lead time for a solicitation may determine which resources can participate effectively. Solar and wind projects, for example, may require time for site identification and land acquisition. DR, and distributed solar and storage may require customer acquisition.

Determining and describing evaluation criteria: Finally, including clear descriptions of the evaluation process, analytical tools for evaluation, and evaluation criteria in the RFP has been critical to supporting robust participation in all-source procurements to date. More prescriptive criteria, such as quantification of qualitative factors, can increase transparency in outcomes but may skew bids toward specific resources or operational strategies and limit the diversity of options if they are overly prescriptive.

Questions to assess if all-source solicitation provisions might constrain participation:

Does the solicitation:

- Use categories that are inclusive of all resources, including "hybrid" resources (comprised of solar and storage, wind and storage, wind and solar, or other combinations of resources behind the same meter) and different durations of storage?
- Include multiple ownership options (PPAs, asset purchases)?
- Include an option for bidders to propose modified contract terms or additional values?
- Contain resource size minimums or resource caps that unnecessarily constrain bids?
- Provide enough time for all types of resources to respond effectively (online date and response time)?
- Contain provisions that might constrain bidder business models, such as prohibiting sale of additional energy to other customers?

Does the description of the evaluation process:

- Include clear codes of conduct for utility affiliate bids or evaluation of utility self-build options?
- Include quantitative and qualitative evaluation criteria that capture the unique attributes and values of all resources?
- Describe the analytic tools and process that will be used to evaluate bids?
- Include a process for communicating with bidders if anything changes about the evaluation process midstream?

Solicitation provisions might constrain resource participation if:

CAUTION:
- Contract terms disclosed in advance are not open for modification and were not previously socialized with bidders
- Solicitation has size caps that are inconsistent with resources available in the market

RED FLAG:
- Solicitation is open only to utility-owned options
- Contract terms are available only through a nondisclosure agreement and not open for modification

EXAMPLES IN PRACTICE

PSCo in Colorado created categories of resources in its solicitation so that it could provide example contract terms for different ownership options and resource types. It provided an explanation of the types of projects that might fall within each RFP, but it left language open to all supply-side resources.

> "Examples of the types of projects which would be applicable to each RFP are shown in Table 1 below. This non-comprehensive list is intended to provide guidance as respondents develop their proposals … Respondents who are uncertain as to which RFP would apply to their project should contact the RFP Project Manager for clarification."

EXHIBIT 24

Categories of Resource Types within Excel's 2017 All-Source RFP

RFP Document	Resource Type	Commercial Structure
2017 Company Ownership RFP	– New or existing simple cycle gas turbines – New or existing wind or solar	– Build-Own Transfer (BOT) – Existing Resource Sale – Company Self-Build
2017 Dispatchable Resources RFP	– Simple cycle gas turbines – Combined cycle gas turbines – Stand-alone storage projects	PPA
2017 Semi-Dispatchable Renewable Capacity Resources RFP	– Solar thermal with thermal storage or fuel back-up – Any other intermittent resource with storage or fuel backup	PPA
2017 Renewable Resources RFP	– Wind – Solar without storage or fuel backup – Hydroelectric – Geothermal – Biomass – Recycled Energy	PPA

Source: Colorado's 2017 All-Source RFP, Xcel Energy (Accessed September 2020)

Arizona Public Service has also evolved its procurement processes to support bidder creativity. One solar and storage project intended to provide capacity during peak hours, for example, was able to compete on cost with traditional gas peaking capacity because the developer was allowed to sell excess energy outside of peak hours. This example will be further explored in Chapter 5.

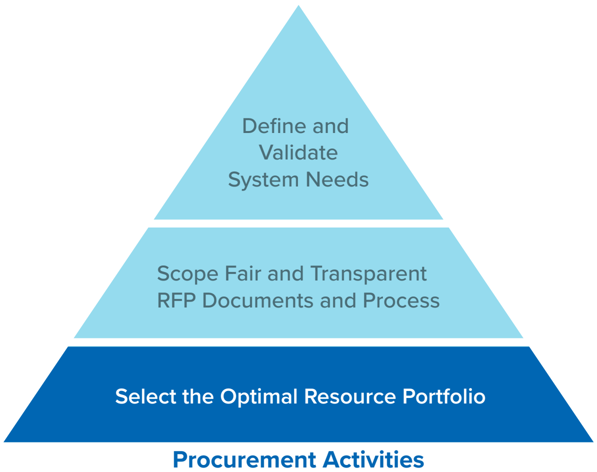
Caps on the overall quantity of one type of resource or size minimums or maximums within modeling software can constrain bids. Instead of including size caps that are likely to limit bids, a utility can determine the optimal quantity and size of resources during the portfolio optimization.

In **PNM's** RFP to replace the SJGS, it stated a preference for utility ownership of batteries. Additionally, PNM limited the size of storage facilities during the evaluation phase to between 10–40 MW, and limited the total percentage of storage across their service territory to 2%–5% of peak load. PNM received pushback from stakeholders, who testified that they believed these limits were unsubstantiated and that portfolios not constrained by these limitations could provide higher benefits than the one selected.[91] If a valid constraint on a resource type had been identified during the bid evaluation stage, this could have been communicated to bidders with the opportunity to adjust.

Some solicitations have inadvertently limited competition and created additional risk for bidders by not providing enough time for all types of resources to respond effectively (online date and response time).

In a **Minnesota Power** RFP meant to be a part of its 2017 EnergyForward Resource Package, the solicitation for DR received only one bid. Stakeholders filed testimony stating concerns that requiring DR to provide 800 hours per year of capacity was a high risk for bidders, and that bidders may have been given insufficient time to respond to the RFP.

SELECT THE OPTIMAL RESOURCE PORTFOLIO



Once a utility determines needs and resource options and scopes and issues its RFP, it must then evaluate bids to select an optimal, final resource portfolio. As noted above, the evaluation criteria should be included in the RFP so that bidders can develop bids to best meet needs and address any constraints.

Best practices to determine an optimal portfolio, discussed in more detail below, include:

1. Select portfolio options using a value-based approach to optimization that includes both grid and societal values.

KEY CONSIDERATIONS

A utility is best able to select an optimal resource portfolio when it takes a value-based approach to portfolio optimization, rather than solely selecting least-cost bids. In determining metrics used to evaluate bids, and within bid evaluation processes, utilities can include factors to ensure that they are choosing the best fit both for near- and long-term priorities and goals. This approach stands in contrast to a traditional RFP, which may outline an immediate need, but not outline the factors that reveal the portfolio's overall value in meeting system needs and goals.

Including the full stack of grid values: The first set of values that can be considered in a portfolio approach to optimization are grid values: the full stack of services offered by a portfolio, such as the portfolio's ability to offer flexibility and ancillary services, including frequency and voltage regulation. New resource technologies—battery storage, for example—can offer numerous capabilities that can add greater value than is recognized when looking at just the capacity added by the resource.

Determining the modeling approach to bid evaluation: Today, capacity constraints driven by resource adequacy are often what is driving procurement, but the grid may need different services from its portfolio in the future. As a result, utilities using a portfolio approach have moved beyond a pure focus on firm capacity as a procurement target. When evaluating the grid value of a portfolio from bids, utilities now typically use capacity expansion and production cost modeling or something similar to understand the interaction between proposed portfolios and current resources. One challenge in using capacity expansion models has been ensuring that they are able to incorporate the diverse set of operational parameters and products received in bids.

Including societal values: Utilities can also consider societal values in a portfolio approach to optimization, including consideration of how well a portfolio will position the utility to achieve state policy priorities, non-cost factors such as resilience and equity, and utility and consumer risks. State goals regarding the reduction of GHG emissions, for example, should necessarily inform whether a portfolio is the best option to meet a resource need. An option that appears to be the least-cost option in the short term may not be if it will make it more difficult to meet state goals. This situation could occur either because the resource itself emits GHGs and its acquisition locks the utility into those emissions, or because incorporating the resource into the utility's generation stack will make integrating other resources, including demand-side resources, more expensive or complicated.

Including consideration of societal values in portfolio selection also allows utilities to evaluate non-energy factors such as resilience and equity. As extreme weather events and wildfires become more frequent and severe, utilities and regulators are recognizing that electric systems must be resilient as well as reliable. Adding resilience to the system does not happen on its own; taking it into account during procurement processes provides utilities an opportunity to consider this goal in the context of portfolio evaluation. Concerns about equity are also front and center as utilities grapple with the legacy impacts of existing systems and consider replacement resources in the context of economic opportunities for different communities.

Evaluating portfolio risks: Finally, utilities using a value-based approach to portfolio optimization can consider downside risks of different portfolios to ensure that the approach chosen is not unnecessarily setting the utility or its customers up for unwanted surprises. Because many states have fuel pass-through clauses that place this risk on customers rather than the utility, utilities have not always adequately factored in fuel costs risks. Portfolio diversity, inherent in the all-source approach to procurement, is a fundamental principle for managing risks.

Questions to assess if the portfolio selection process is using a value-based approach to portfolio optimization:

Does the portfolio selection process include comprehensive and accurate portfolio evaluation of grid values, such as:

- Full stacks of portfolio services and values?
- Portfolio diversity that may exceed one-for-one replacement?
- Analysis using capacity expansion modeling to understand interaction with existing resources and interaction across different portfolios of bids?

Does the portfolio selection process include factors for portfolio evaluation beyond grid need that align portfolio evaluation with societal needs and values, such as:

- State and utility goals and priorities?
- Non-cost factors such as resilience, equity, and economic development?
- Risks to the utility and customers?

The portfolio selection process may not support a value-based approach if:

CAUTION:

- Values other than least-cost are used for portfolio evaluation, including alignment with state policy goals, but not all values are considered
- Input on non-cost factors is allowed, but it is not clear how they will be prioritized in comparison to least-cost criteria

RED FLAG:

- Portfolio selections are based on only short-term costs
- Resource values are limited to one attribute (capacity, energy, RPS compliance, etc.)

EXAMPLES IN PRACTICE

EPE came to a resource procurement process with a determination that it needed 370 MW of generating capacity. An all-source procurement led EPE to select a mix of resources, including an energy purchase of 200 MW of utility-scale solar resources, 100 MW of battery storage, and the construction of a 226 MW natural gas combustion turbine-generating unit.[92]

Although EPE's use of an all-source RFP allowed it to consider numerous resources to meet its need, it failed to capture the full potential of its all-source RFP by not giving full value to renewable resources. Specifically, El Paso did not take advantage of more up-to-date modeling that revealed how the combination of resources, including wind and solar, could provide greater benefits to the system than the sum of the value of each individual resource. As a result, EPE chose to rely heavily on gas resources when renewable resources may have satisfied the need at lower cost.[93] In their subsequent review, the New Mexico PRC ruled that EPE did not adequately weight state policy as an objective in its evaluation of this gas-heavy portfolio and rejected the proposed gas plant.

WHAT DOES DECARBONIZATION-ALIGNED PROCUREMENT LOOK LIKE?

Many states, cities, and utilities are conducting modeling to understand economy-wide pathways to meet their decarbonization objectives (e.g., New Jersey's Energy Master Plan).[94] In these deep decarbonization pathways, a low-carbon electricity system is the foundation for economy-wide transition of the transportation, buildings, and industry sectors. If jurisdictions are to achieve these policy objectives, utility investment must be aligned with what is needed to support economy-wide decarbonization. There are several options for how utilities can consider decarbonization as an objective in procurement:

- **Constrain emissions and asset operations in procurement decisions in line with targets.** For example, when modeling a portfolio considered for procurement, ensure that emissions-producing assets ramp down over time in line with emissions targets—and analyze their economics according to those operational assumptions. The California Energy Commission's most recent set of scenarios, which the state's utilities use for resource planning, are centered on three main carbon targets by 2030 consistent with the state's 2045 zero-carbon goal. This should enable the state to assess whether procurement decisions are aligned with decarbonization targets.[95]
- **Include a carbon price in the optimal selection of resource options.** In the April 2020 Virginia Clean Economy Act, for example, the Commission is required to consider the social cost of carbon for new applications to construct generation.[96] Several states, such as Minnesota, Colorado, and Nevada, require the use of a carbon price in resource planning that informs procurement decisions.
- **Incorporate assumptions around economy-wide electrification into planning that informs procurement and analyze load flexibility.** Nova Scotia Power's 2020 IRP assumptions recognize a need to include scenarios with high electrification of other sectors to meet 2050 targets. In California, one of the sensitivities modeled is a high-electrification scenario, and optimization modeling includes flexibility of electric vehicle (EV) charging loads.[97]

2. Ensure that the solicitation, evaluation, and approval processes are clear and transparent to bidders and the public.

KEY CONSIDERATIONS

Providing transparency around the process the utility uses to solicit, evaluate, and approve bids from developers can limit confusion, enable developers to provide their best bids, and avoid conflicts around the ultimate portfolio selection.

Communicating with bidders: A pre-bid conference should be made available to bidders by the utility to answer bidder questions. Bidders should have as much access as possible to the data and assumptions that will be used in the evaluation of competing bids. Bidders should also understand the evaluation criteria that will be applied to their bid so that they have the opportunity to optimize their project or portfolio of projects relative to the criteria.

Using an independent evaluator: Bidders should have confidence that codes of conduct are in place to protect against the utility having any embedded competitive advantage in submitting its own bid, if a utility or its affiliate is allowed to bid. The bidder should know that an independent evaluator will be reviewing all bids and that the regulator will have the opportunity to fully review the independent evaluator's scoring and recommendations.

The independent third-party evaluator should have access to all the data, assumptions, and tools necessary to fully evaluate the submitted bids against the specified evaluation criteria. The regulator should have confidential access to the independent evaluator's analysis. The independent evaluator should be encouraged to bring forward multiple bids for regulator evaluation if non-cost criteria indicate trade-offs among potential projects. Determining whether a project or portfolio is objective-aligned may involve a qualitative assessment that should be left to the regulator who is charged with protecting the public interest.

Sharing and protecting data: Whenever possible, aggregated solicitation bids should be made public. Protecting the proprietary information of individual bidders is essential, but aggregated information on solicitation outcomes is helpful to bidders, regulators, and the public.

Enabling early input by stakeholders and the regulator: The evaluation process can be improved if stakeholders and the regulator are allowed to provide input before the solicitation is issued. Public vetting is helpful to ensure that the data, assumptions, and evaluation criteria are well-aligned with solicitation and public policy objectives. For example, it may be appropriate to evaluate submitted bids against a number of possible future scenarios given resource, technology, and climate uncertainties, and stakeholders can be useful in ensuring that a robust set of scenarios are considered. Regulators and stakeholders should be equipped with the tools necessary to assess how the proposed resources and portfolios will be evaluated.

Questions to assess if the portfolio evaluation and selection process is clear and transparent to bidders and the public:

Does the solicitation process:

- Enable stakeholders and the regulator to review and provide input to evaluation criteria before the RFP is issued?
- Include a pre-bid conference where the data, assumptions, and process for bid evaluation are shared with bidders?
- Have codes of conduct in place to protect against the utility having any embedded competitive advantage in submitting its own bid, if a utility or its affiliate is allowed to bid?
- Use an independent evaluator to develop portfolio options and ensure that they have access to all the data, assumptions, and tools necessary to fully evaluate the submitted bids against the specified evaluation criteria?
- Require aggregated solicitation bids to be made public?

The solicitation evaluation and selection process may not be clear and transparent if:

CAUTION:

- Some important data to be used in evaluating bids is not visible to bidders
- Evaluation criteria to be used in bid evaluation are described vaguely in the solicitation
- A regulator-approved independent evaluator either is not used or is used but receives vague directions on the bid evaluation process and criteria

RED FLAG:

- The evaluation is conducted with important data that is not visible to stakeholders, bidders, or regulators
- Evaluation criteria are not disclosed to bidders prior to bid submission
- The utility has the sole authority to reject bids without sharing all bid results with the regulator or a regulator-approved independent evaluator

EXAMPLES IN PRACTICE

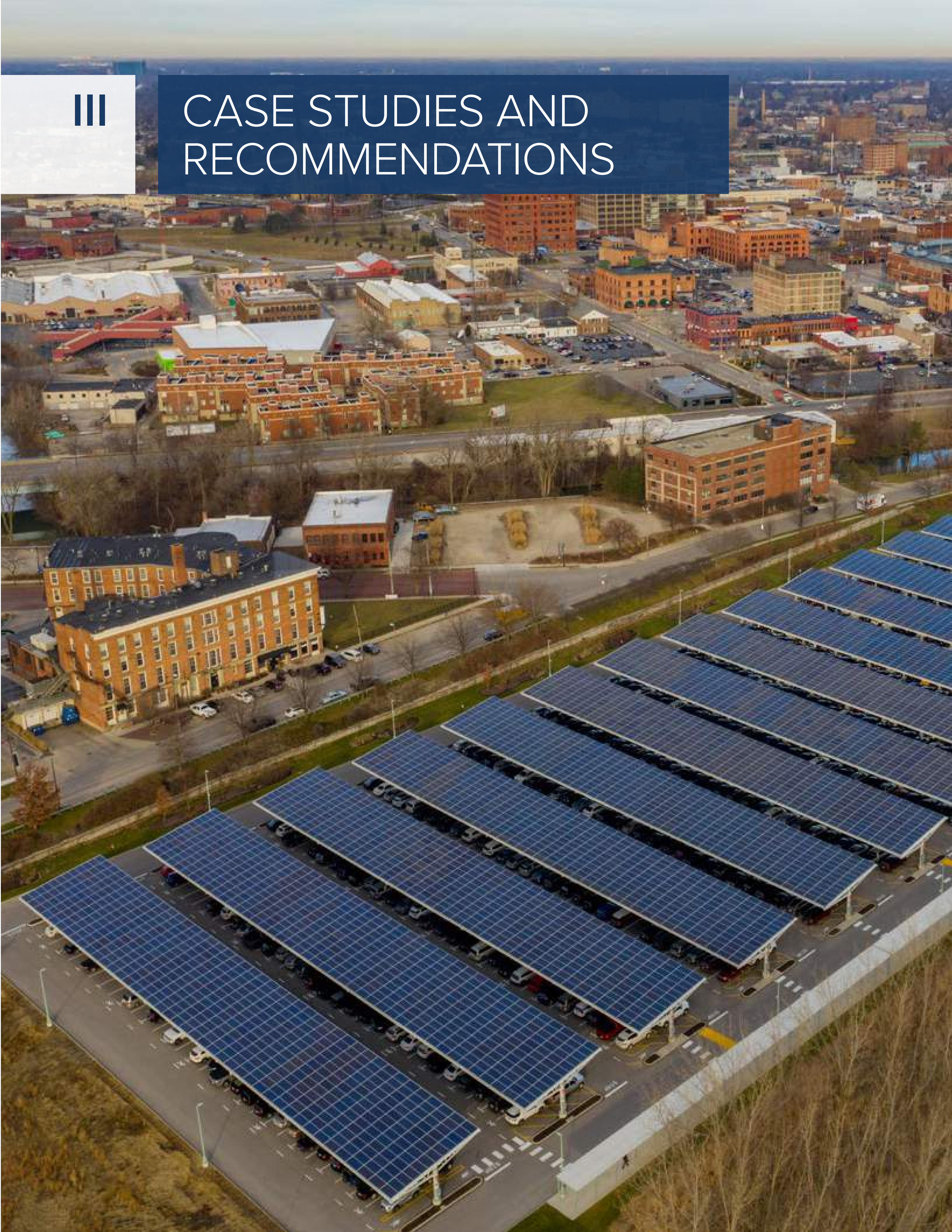
Several states have rules that have encouraged transparency for stakeholders with respect to nonproprietary data, assumptions, process, and criteria. This data is ideally made transparent to stakeholders prior to the solicitation, and proprietary data is made available in aggregated form when possible.

States like California, Colorado, Minnesota, and Oregon provide bidders with greater clarity by associating procurements with resource planning outcomes. Efforts that tie procurement to resource planning and open up utility modeling assumptions and tools to stakeholder scrutiny and input help to produce a solicitation that clearly conveys system need to bidders.

There are several examples of utilities and states that use an independent evaluator to build confidence for decision makers and stakeholders alike.

States like Colorado, Minnesota, and Oregon have an active and engaged independent evaluator. These evaluators provide confidence that the procurement processes are fairly evaluating submitted bids.

III CASE STUDIES AND RECOMMENDATIONS



CHAPTER 6 Analytic Case Studies

This chapter presents quantitative case studies that illustrate the economic value of adhering to each of the best practices described in the playbook. Each of the three case studies centers on one of the three procurement activities laid out in Chapter 5. We define "high risk" and "best practice" scenarios for each procurement activity and assess the impact of each scenario on procurement results.

Each case study was prepared using the following methodology:

1. **Define a resource procurement opportunity** based on regional conditions and investment drivers.
2. **Choose a procurement activity** and define best practice, caution, or red flag versions of this activity.
3. **Optimize candidate clean energy portfolios** to meet the system needs identified, using RMI's CEP analytical tool. For the full CEP methodology, see the appendix of our 2019 report.[98]
4. **Assess the cost-effectiveness and value** of each candidate clean energy portfolio and compare against a gas-fired power plant.[x]

x We define the metric **net levelized cost of energy (LCOE)** as the total lifetime cost of the asset divided by the total lifetime energy of the gas plant. We assign a value of $15/MWh for the energy the CEP generates in excess of the required amount, and subtract the total value of excess energy from the CEP's total lifetime cost (hence, the "net" in "net LCOE").

DEFINE AND VALIDATE SYSTEM NEEDS: ELECTRIC HEATING LOADS IN THE MIDWEST

Accurate definition of system needs can lower overall system cost of resource procurement and unlock more value from a clean energy portfolio.

Procurement Opportunity

This case study presents a hypothetical example in which a utility in the Midwest is procuring resources to support near-term electrification of buildings across the entire region. To approximate the procurement implications of near-term building electrification, we model the impact of a 5% increase in residential and commercial electric heating loads region-wide and infer from this increase monthly energy and peak capacity needs.

The marginal need is for 1,280 GWh/y of energy, mostly in the winter months, and 500 MW of peak capacity in the winter. Since demand in the Midwest peaks in the summer, the additional heating loads do not increase system peak and create a capacity shortfall. Therefore, there is no explicit capacity need in this scenario. We assume this 5% increase in heating loads has been identified in the utility's planning process through a holistic assessment of load and generation.

Procurement Activity

This case study focuses on best practices in how to define and validate system needs. We compare a "Red Flag" system need definition with a "Best Practice" system need definition to understand the impact on cost and portfolio selection.

Red Flag (combined cycle gas turbine [CCGT]): This scenario is effectively a single-source solicitation for a new gas plant. Rather than describing the need with respect to its marginal energy and capacity needs, it describes the characteristics of a traditional fossil fuel plant that would be required to meet the need.

Best Practice (CEP): A resource-neutral need definition, meaning clean energy resources are eligible to compete in the solicitation and the need is described in terms of services needed.

Scenario

Red Flag: Resource-specific need definition

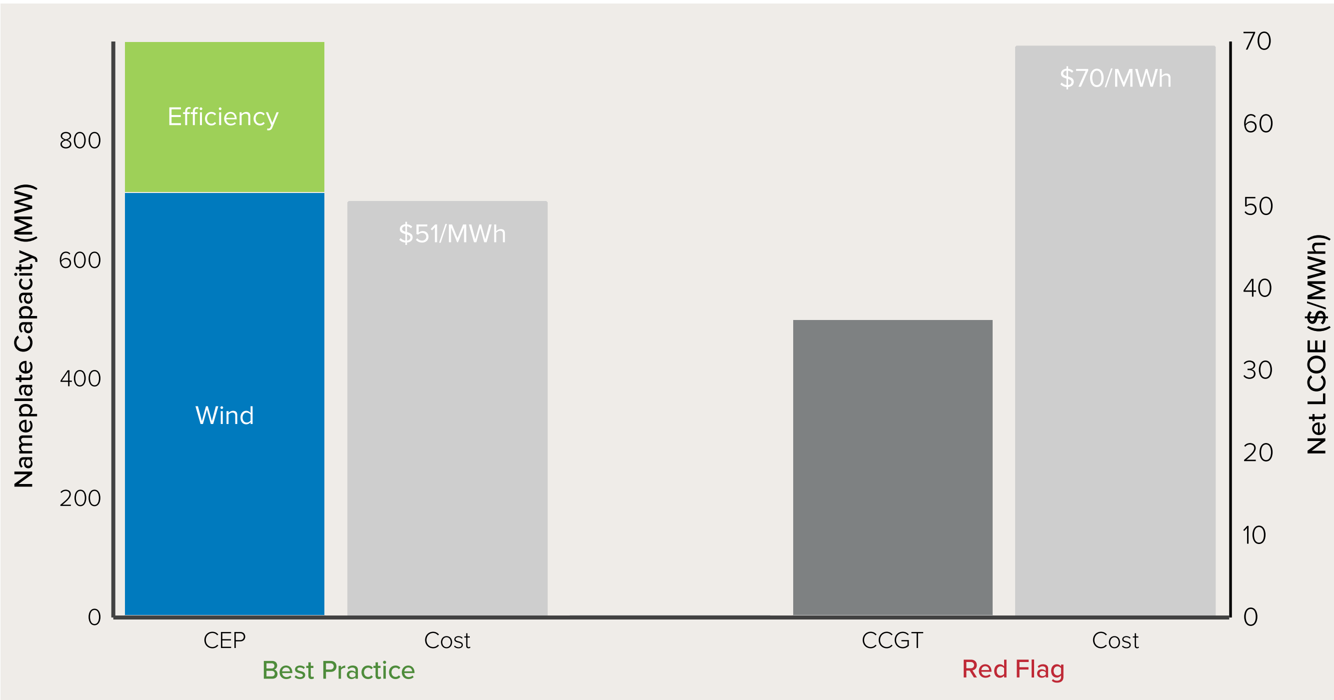
The marginal energy needs from a 5% increase in electric heating loads results in an energy need of 1,280 GWh/y during the winter months and increases winter peak load by 500 MW, though the system peak does not increase. A high-risk need definition describes the characteristics of the gas plant that would be needed to serve the load: 500 MW of capacity that can serve 1,280 GWh/y of annual energy. Defining the need in capacity terms may disadvantage many resources from participating in the solicitation.

Best Practice: Resource-neutral need definition

The best practice need definition is solution-agnostic in that it does not restrict the solicitation to a single resource type. Instead, this definition is written in terms of the specific monthly energy need, including qualitative description of drivers and timing. This need definition invites competition from all resources to provide the monthly energy needed to meet marginal needs from the 5% increase in electric heating loads, 1,280 GWh/y.

EXHIBIT 25

Resource Mix and Cost to Meet Electric Heating Loads in the Midwest



Results

Best Practice (CEP)

A portfolio of clean energy resources is a lower-cost solution to meeting the need definition than a CCGT. In this scenario, because the statement of need includes only marginal energy demand in colder months, the optimal CEP does not include capacity resources like battery storage or DR, which would be required if annual system peak was expected to increase. Instead, 713 MW of wind and 253 MW of energy efficiency provide the energy needed to meet a 5% increase in electric heating loads.

Red Flag (CCGT)

In this scenario, a 500 MW natural gas combined cycle plant is presupposed to be the optimal solution to address the statement of need. This procurement option is nearly 40% more expensive than the best practice CEP.

Implications

A need definition that is solution-agnostic can lead to lower-cost solutions to meet near-term procurement needs (e.g., building electrification).

Defining system needs by including a qualitative or quantitative assessment of the driver of need, and in terms of both capacity and other energy services needed, can enable lower-cost procurement options. Data and process transparency on energy and load forecasts, available procurement options, and the capabilities of the existing resource mix are essential for enabling independent validation of system need.

SCOPE FAIR AND TRANSPARENT RFP DOCUMENTS AND PROCESS: ELECTRIC VEHICLES IN COLORADO

Including DSM in a portfolio of resources to meet system needs can lead to cost savings.

Procurement Opportunity

In 2015, the state of Colorado published the Electric Vehicle Market Implementation Study, which forecasts up to 940,000 EVs on the road in Colorado by 2030.[99] In response, Colorado's power sector would need to supply new energy and capacity services to support EV fleet charging.

Procurement Activity

This case study focuses on best practices in how to **scope fair and transparent RFP documents and processes.** We compare a **Red Flag** RFP scope and process with a **Best Practice** RFP scope and process to understand the impact on cost and portfolio selection.

- **Red Flag (CCGT and CEP):** This scenario assumes that EV charging load is inflexible and requires the procured resources to deliver 1,000 MW of peak load and 3,600 GWh/y of energy. The gas plant option assesses a 1,000 MW CCGT. For the CEP, only supply-side resources, like wind, solar, and storage, contribute to meeting the need.

- **Best Practice (CEP):** This scenario enables DSM to contribute to meeting the need. The scope includes managed charging of EVs as a DSM resource in its clean energy portfolio. Enabled by smart chargers that can shift charging loads to off-peak hours, EVs function as demand flexibility resources in this scenario.

Results

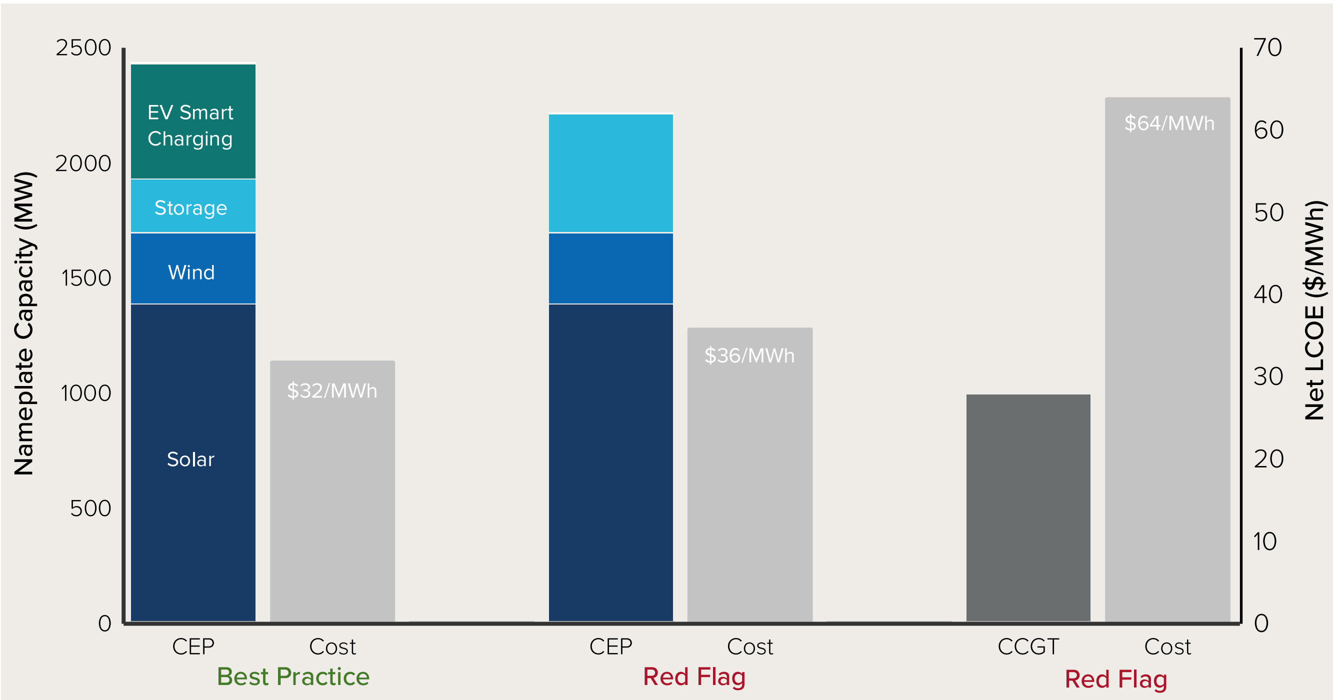
Best Practice (CEP)

This is the least-cost procurement option. In this scenario, demand flexibility from smart, managed EV charging provides 500 MW of capacity services by reducing the evening peak. The inclusion of this resource reduces the amount of battery storage required from 510 MW to 230 MW. Solar and wind meet the monthly energy requirement. These favorable results for the CEP are aided by projected cost declines for battery storage by 2030 and by affordable upgrades to smart chargers.[xi,100]

xi We assume a cost of $50 per vehicle to enable smart charging, for a net present cost of $13 million. In exchange, the needed battery storage is greatly reduced, resulting in $90 million in savings compared to the high-risk CEP.

EXHIBIT 26

Resource Mix and Cost to Support EV Charging in Colorado



Red Flag (CEP)

For this CEP, 1.4 GW of solar and 300 MW of wind provide all energy services for the CEP and work with 510 MW of battery storage to provide 1,000 MW of peak capacity services. This CEP, which does not include DSM, is 13% more expensive than the "best practice" CEP.

Red Flag (CCGT)

Since energy needs are substantial, 1,000 MW of natural gas combined cycle (NGCC) is the business-as-usual solution to address the statement of need. This is the least competitive procurement option at 200% the cost of the "best practice" CEP.

Implications

DSM resources, including smart, managed charging of EVs, can enable lower-cost solutions than a portfolio constrained to supply-side resources only.

In practice, designing and administering a successful EV smart charging program would require coordinated planning between the utility, state and local government, and utility customers, often in advance of a utility RFP. For this reason, DSM resources and emerging clean technologies should have their unique values reflected in both the planning and procurement processes.

SELECT THE OPTIMAL PORTFOLIO: THE VALUE OF SURPLUS ENERGY IN ARIZONA

A fair and transparent solicitation that uses a value-based approach to portfolio optimization can make lower-cost resource options available to the utility.

Procurement Opportunity

In this case study, we present a scenario that reflects a request for peaking capacity opened by Arizona Public Service (APS) in 2018.[101] APS's RFP solicited 400–800 MW of peaking capacity during the summer months. In this analysis, we assess options to meet a solicitation for 600 MW of peaking capacity in the summer in Arizona.

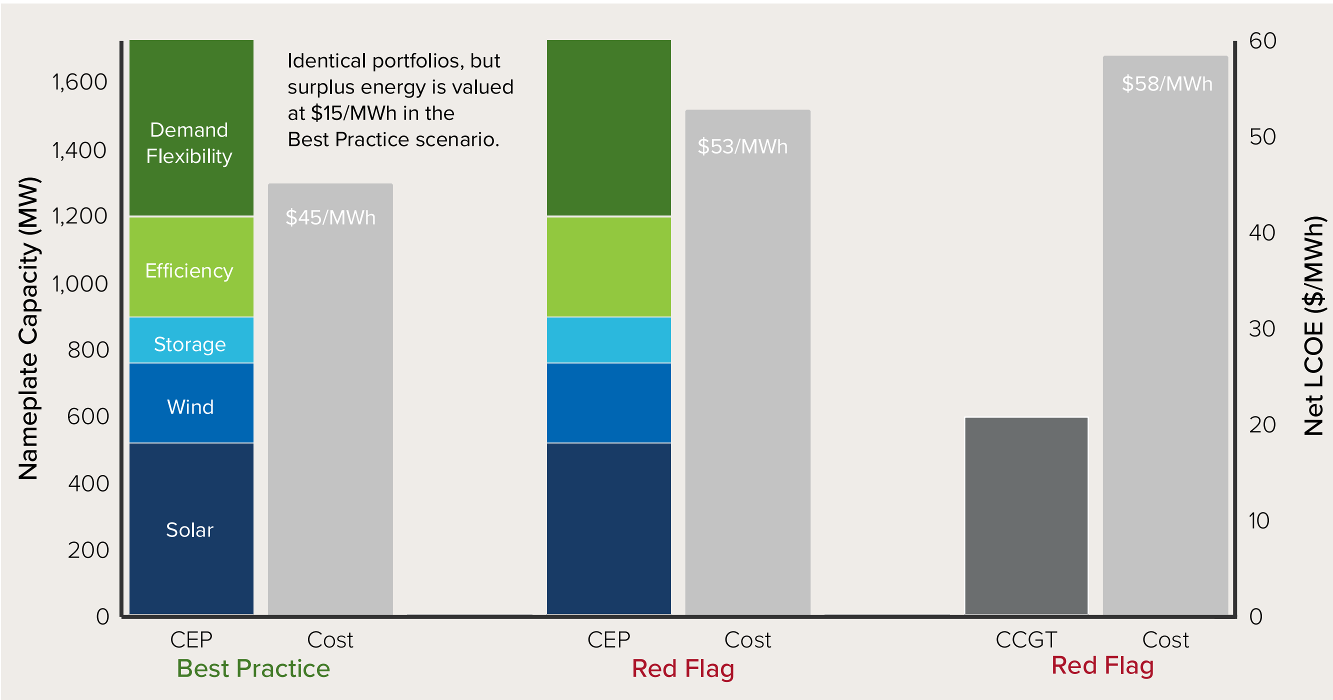
Procurement Activity

This case study focuses on best practices in how to select the optimal portfolio. We compare a **Red Flag** resource selection approach with a **Best Practice** resource selection approach to understand the impact on cost and portfolio selection.

- **Red Flag (CCGT and CEP):** This scenario does not allow resources to capture value for services provided outside of the solicitation. A 600 MW CCGT is taken as the gas plant option for meeting the procurement opportunity because it is the lowest-cost gas plant option on an LCOE basis. In this scenario, the energy that the CEP produces in excess of the gas plant alternative is valued at zero.
- **Best Practice (CEP):** This scenario does not restrict the ability of resources to capture additional value outside of the solicitation. In this scenario, the energy that the CEP produces in excess of the gas plant is valued at $15/MWh. The value of this excess energy is netted against the CEP's total cost, thereby enabling a lower-cost solution. This is reflective of APS's approach in its 2018 procurement, in which the utility did not restrict the developers' ability to sell off-peak energy to third-party buyers.[102]

EXHIBIT 27

Resource Mix and Cost to Meet Peak Load in Arizona



Portfolios

Best Practice (CEP):

By allowing the CEP to sell energy it produces in excess of the marginal summer need for $15/MWh and crediting this against the total cost, the cost of the CEP drops 15%. In the best practice scenario, the CEP outcompetes the NGCC on cost by 22%. The CEP is composed of 520 MW of solar, 240 MW of wind, 137 MW of battery storage, 300 MW of energy efficiency, and 525 MW of demand flexibility.

Red Flag (CEP):

When the CEP is not allowed to capture value for services it could provide outside of the solicitation, it costs $53/MWh, edging out the gas plant on cost by $5/MWh.

Red Flag (CCGT):

In this case, a 600 MW CCGT is taken to be the business-as-usual solution to address the statement of need. As shown in the chart above, this is the most expensive procurement option.

Implications

Utilities should use a value-based approach to portfolio optimization so that resources can capture the full value of the services they provide. The utility should ensure that the evaluation process is clear and transparent to bidders and should use solicitation frameworks that enable participation and provide flexible options to maximize bidder creativity.

CHAPTER 7 Conclusions and Recommendations

SUMMARY RECOMMENDATIONS FOR LEGISLATURES, REGULATORS, AND UTILITIES

Moving procurement toward a future that is all-source, objective-aligned, and least-regrets requires participation from all stakeholders. In particular, legislators, regulators, and utilities each have unique roles to play.

To create an environment that unlocks next-generation competitive procurement, **legislators** can:

1. **Ensure that the state has a participative planning process that links planning outcomes to procurement decisions and that state policy objectives are included in system planning.** For some states, this might mean setting up a planning process; for others, it might mean requiring Commission approval of utility plans that require consideration of stakeholder participation or comments, or revisiting planning and procurement rules and asking whether the current process results in policy-aligned procurement. Regulators may need explicit direction to consider objectives beyond reliability, affordability, and safety.

2. **Ensure utilities are adequately incentivized to consider DERs, including energy efficiency, as resources to meet identified needs.** DERs can be valuable in lowering customer costs and providing system flexibility within a resource portfolio. Assess the treatment of DERs in planning and procurement, and consider other ways to bring DERs online, such as energy efficiency resource standards, performance-based regulation, or use of a third-party implementer to accelerate deployment.

3. **Ensure your state has rules that encourage or require competitive procurement, and a commission that can support them.** Legislatures should consider statutes that require utilities to issue all-source solicitations. In states that do not currently have a statute requiring competitive procurement, the legislature could first consider adopting one to reduce costs for ratepayers and encourage clean energy companies to participate in the state's economy. In all cases, it is important that the commission be adequately resourced to effectively monitor procurement processes.

State commissions can play a major role in ensuring that procurement processes and outcomes are in service of the public interest. Specifically, regulators can:

1. **Ensure that the need to procure new resources is well-defined, transparent, and linked to findings from a well-vetted resource planning process.** A need for new resources may arise from emerging electric system reliability requirements, changing economics of resource options, or public policy goals that reflect environmental, equity, economic development, and resource priorities. Modeling assumptions and tools should be as transparent as reasonably possible and accessible to all stakeholders, and resource planning scenarios should be specified and evaluated in consultation with a diverse group of stakeholders so that those needs are well understood and validated.

2. **Ensure that all resource providers have opportunities to offer all capabilities from each of the resource options they bid.** Bidding should be open to all resource providers who meet reasonable bidding requirements, and bidders should be allowed to submit bids that include all resource types, to enable portfolios that use combinations of supply- and demand-side resources. If the incumbent utility or its affiliate is allowed to bid, codes of conduct should be established to ensure competitive providers are not disadvantaged.

3. **Ensure that the bidding process is open, transparent, and evaluated fairly.** Evaluation criteria used to select bids should be transparent and communicated clearly to bidders prior to bid submission deadlines. A third-party, independent evaluator should be considered to supervise utility bid evaluation to ensure that it follows published criteria. Portfolios including the best bids should be brought to the Commission for consideration. The Commission should consider trade-offs among bids and additional modeling of resource options if one portfolio is not clearly superior to other finalists.

Utilities can lead the way in sourcing and delivering least-regrets resource portfolios. In particular, utilities should:

1. **Proactively bring stakeholders into the analysis of needs and the evaluation process for selecting portfolios.** Stakeholders can help to verify assumptions early in the procurement process rather than contesting them farther down the road.

2. **Use cost and operational data from competitive bids, not internal estimates, to inform planning and procurement activities.** Bids returned in all-source solicitations have continued to surprise utilities and outperform previous estimates. With increased uncertainty and volatility of resource costs, issuing an RFP to seek bids prior to selecting a portfolio for procurement can ensure that decisions are based on accurate pricing.

3. **Work with bidders before, during, and after solicitations to understand what data they need to give their best bids.** Supporting bidders to deliver diverse and competitive solutions requires the utility to be available for questions, document and publish all bidder questions and utility answers, and be open to modifying the solicitation and proposed contract terms prior to issuance if they can expand the field of competitive solutions.

4. **Consider whether evaluation criteria for selecting the optimal resource portfolio are aligned with public policy outcomes.** Stakeholders are increasingly concerned about alignment between procurement and public policy objectives, including resilience, equity, and decarbonization. In addition to covering these priorities in other activities (e.g., integrated resource planning), utilities should carefully evaluate how well their solicitation processes support them in concert with regulators.

CONCLUSION

VIUs in the United States are on track to spend up to $750 billion through 2030 on new electricity resources in response to economic trends and policy drivers. With an improved approach to resource procurement, the industry has a once-in-a-generation opportunity to ensure that this money is spent in ways that leverage the market, support diverse stakeholder priorities, and minimize risks going forward. The alternative—continuation of legacy processes and approaches to resource investment—risks squandering capital and locking in customer costs and carbon for decades to come. The best practices laid out in this study serve as guideposts for utilities, regulators, and legislators to make investment decisions in the best interests of electricity consumers and society at large.

IV APPENDICES

APPENDIX A Methodology for Procurement Market Sizing

To quantify the regional opportunity for all-source procurements, we used data from several studies to calculate the potential capacity need for each state due to four key drivers: (1) current projected load growth by 2030, (2) additional potential load growth due to transformative electrification by 2030, (3) retirement of uneconomic fossil fuel plants, and (4) incremental clean capacity by 2030 required to be on track for 90% clean by 2035. The sources and methodology for determining state-by-state capacity need under each driver are described in detail below, followed by the methodology for mapping state data to regions.

1. **Current projected load growth by 2030**
 - **Primary Source:** The National Renewable Energy Laboratory (NREL) Regional Energy Deployment System Model (ReEDS) is our source for current projected load growth by 2030.[103]

 - **Analysis:** We mapped the busbar peak demand data under the 2019 Standard Scenarios Mid-Case to each state to determine state-by-state peak demand in 2030 compared to 2019 peak demand.

2. **Additional potential load growth due to transformative electrification by 2030**
 - **Primary Source:** *NREL's Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States* is our source for 2030 load growth due to transformative electrification.[104]

 - **Analysis:** We used the publicly available raw data from Figure 7.9 of the report to determine state-by-state peak hour demand in 2050 under the high electrification, moderate technology advancement scenario.[105] We calculated peak hour load in 2030 under this scenario by assuming linear growth from the baseline 2015 peak hour demand to the 2050 peak hour demand. Current projected load growth by 2030 (see the methodology above) was subtracted from the calculated 2030 peak hour load growth under transformative electrification to determine the electrification load growth additional to current projected load growth by 2030.

3. **Retirement of uneconomic fossil fuel plants**
 - **Primary Source:** US Energy Information Administration (EIA) Form 860M for July 2020 is our source for retirement of uneconomic fossil fuel plants.[106]

 - **Analysis:** We used 860M for July 2020 to filter for all utility-owned fossil fuel generators that will be 40-plus years old by 2025. For the purpose of this analysis, we assume that all of those aged fossil fuel plants are likely to retire by the end of the decade.

4. **Incremental clean capacity by 2030 required to be on track for 90% clean by 2035**
 - **Source:** UC Berkeley and GridLab's *The 2035 Report* is our source for incremental clean capacity by 2030 required to be on track for 90% clean by 2035.[107]

 - **Analysis:** We used publicly available report data to determine state-by-state total capacity additions by 2030 under the 90% clean by 2035 scenario. For each state, we summed capacity need due to the other three drivers and subtracted the total from the total capacity additions by 2030 to determine incremental clean capacity needed. This means that we assume all other replacement capacity—from drivers' (1) current projected load, (2) additional load due to transformative electrification, and (3) retirement of uneconomic fossil fuel plants—is met with clean resources. The incremental clean to be on track for 90% by 2030 is, therefore, what might be needed to serve even more fossil fuel retirements beyond what is reflected in (3) or additional load growth to align with decarbonization goals.

Scaling to represent VIUs:

- For each state, we determined the current percentage of capacity owned by electric utilities (Exhibit 4) using EIA Form 860M for July 2020.

- We scaled the state totals of (1) current projected load, (2) additional load due to transformative electrification, and (4) incremental clean capacity by 2030 by the respective states' percentage of generation owned by electric utilities. This is used as a proxy for the proportion of potential procurement by VIUs. This proxy is used rather than a binary classification of states to account for the fact that some states have a large proportion of generation owned by VIUs despite being in the footprint of wholesale markets or being restructured. Likewise, some states have a large proportion of municipal and cooperatively owned utilities that would not be captured by a binary classification based on restructuring or presence of wholesale markets.

- Driver (3) already accounted for only utility-owned generation and was not scaled.

APPENDIX B Sources for Procurement Status Map

States categorized as "procurement primarily driven by market competition" in Exhibit 9:

- Are almost or entirely within the footprint of a wholesale market
- Have a majority of generation owned by non-utility entities (see Exhibit 4)

Categories for the remaining states were determined using the following sources:

EXHIBIT B1

Sources for Procurement Status Map

State Code	Summary	Source
AL	No formal requirement for competitive solicitations (requirement for limited competitive procurement of renewables)	– **Code of Alabama, Title 37, Chapter 4:** http://alisondb.legislature.state.al.us/alison/codeofalabama/1975/coatoc.htm – **Alabama Public Service Commission (PSC) Rules and Regulations:** http://psc.alabama.gov/Administrative/AccountingRules_01_10_05.pdf – **Requirements for competitive bidding for renewable energy:** State of Alabama Public Service Commission, Informal Docket No. 32382
AR	Requirement for competitive solicitation	– **Arkansas Public Service Commission Rules and Regulations:** http://www.apscservices.info/rules.asp?group=electric – **Arkansas Public Service Commission Resource Planning Guidelines for Electric Utilities, Section 4.6:** http://www.apscservices.info/Rules/resource_plan_guid_for_elec_06-028-R_1-7-07.pdf
AZ	Requirement for competitive solicitation	– **Arizona Administrative Code, Title 14, Chapter 2, R14-2-705:** https://apps.azsos.gov/public_services/Title_14/14-02.pdf
CA	Requirement for competitive solicitation (statute or rules encourage all-source procurement)	– **California Public Utilities Commission, Integrated Resource Plan and Long Term Procurement Plan (IRP-LTPP):** https://www.cpuc.ca.gov/irp/
CO	Requirement for all-source solicitation	– **Code of Colorado Regulations, Public Utilities Commission, Rules Regulating Electric Utilities, 4 CCR 723-3, Section 3611:** https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8835&fileName=4%20CCR%20723-3

State Code	Summary	Source
FL	Requirement for competitive solicitation	– Florida Administrative Code and Florida Administrative Register, Rule 25-22.082 Selection of Generating Capacity: https://www.flrules.org/gateway/ChapterHome.asp?Chapter=25-22 – 2019 Florida Statutes, Title XXIX Public Health, Chapter 403 Environmental Control, Part II Electrical Power Plant and Transmission Line Siting: https://flsenate.gov/Laws/Statutes/2019/Chapter403/PART_II
GA	Requirement for competitive solicitation	– Rules and Regulations of the State of Georgia, Subject 515-3-4 Integrated Resource Planning: http://rules.sos.state.ga.us/gac/515-3-4
IA	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– Iowa Code 2020, 476.53: https://www.legis.iowa.gov/docs/code//476.pdf – Iowa Administrative Code, 199.40.1-2: https://www.legis.iowa.gov/docs/iac/rule/05-28-2003.199.40.1.pdf; https://www.legis.iowa.gov/docs/iac/rule/05-28-2003.199.40.2.pdf – 2017 review of competitive bidding rules: https://efs.iowa.gov/cs/idcplg?IdcService=GET_FILE&dDocName=1633552&allowInterrupt=1&noSaveAs=1&RevisionSelectionMethod=LatestReleased
ID	No formal requirement for competitive solicitations	– Case No. IPC-E-17-11, Order No. 33983, Before the Idaho Public Utilities Commission: In the Matter of Idaho Power Company's 2017 Integrated Resource Plan: https://puc.idaho.gov/Fileroom/PublicFiles/ELEC/IPC/IPCE1711/OrdNotc/20180209final_order_no_33983.pdf – Case No. IPC-E-10-03 (Previous Case No. GNR-E_08-03), Order No. 30999, Before the Idaho Public Utilities Commission: In the matter of the development of request for proposal (RFP) guidelines for the procurement of supply-side resources by Idaho Power Company: https://puc.idaho.gov/fileroom/PublicFiles/elec/GNR/GNRE0803/ordnotc/20100209NOTICE_OF_CASE_DOCKET_ORDER_NO_30999.PDF – Case No. IPC-E-10-03 (Previous Case No. GNR-E_08-03), Order No. 32745, Before the Idaho Public Utilities Commission: In the matter of the development of request for proposal (RFP) guidelines for the procurement of supply-side resources by Idaho Power Company: https://puc.idaho.gov/Fileroom/PublicFiles/ELEC/IPC/IPCE1003/OrdNotc/20130212final_order_no_32745.pdf

State Code	Summary	Source
IN	Requirement for competitive solicitation	– Indiana Code IC 8-1-8.5-5: http://iga.in.gov/legislative/laws/2020/ic/titles/008#8-1-8.5-5
KS	No formal requirement for competitive solicitations	– Kansas Corporation Commission Rules: https://kcc.ks.gov/images/PDFs/statutes-regulations/4_082_82-Corporation_Commission_2009_KAR_Vol_4.pdf – Kansas Statute, Chapter 66, Article 1: http://www.kslegislature.org/li/b2019_20/statute/066_000_0000_chapter/066_001_0000_article/
KY	No formal requirement for competitive solicitations	– Kentucky Administrative Rules, 807 KAR 5:058 Integrated resource planning by electric utilities: https://apps.legislature.ky.gov/law/kar/807/005/058.pdf – Kentucky Statute 278.020: https://apps.legislature.ky.gov/law/Statutes/statute.aspx?id=48756
LA	Requirement for competitive solicitation	– Louisiana IRP rules: https://www.entergy-louisiana.com/userfiles/content/irp/LPSC_General_Order_R30021.pdf – Updates to "General Order": http://lpscstar.louisiana.gov/Star/portal/lpsc/PSC/PSCDocumentDetailsPage.aspx?DocumentId=e55f6fba-915e-45bc-a5ef-ab4c818f43ac&Class=Order – 2008 updates to Market Based Mechanism General Order: https://spofossil.entergy.com/ENTRFP/SEND/2016ELLRenewableRFP/Documents/MBM%20Order.pdf
MI	Requirement for competitive solicitation	– Michigan Compiled Laws, Section 460.6t: https://www.legislature.mi.gov/(S(bl0tvymb2dokqrgj31rv13uv))/mileg.aspx?page=getObject&objectName=mcl-460-6t – Order Approving a Contested Settlement Agreement, Before the Michigan Public Service Commission, In the matter of the application of Consumers Energy Company for approval of its integrated resource plan pursuant to MCL 460.6t and for other relief, Case No. U-20165: https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000005HSSrAAO
MN	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– Minnesota Statute 216B.2422: https://www.revisor.mn.gov/statutes/cite/216B.2422 – Minnesota Administrative Rules 7849.0250 Proposed LEGF and Alternatives Application: https://www.revisor.mn.gov/rules/7849.0250/

State Code	Summary	Source
MO	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– Missouri Rules of Department of Commerce and Insurance, Division 4240 Public Service Commission, Chapter 22 Electric Utility Resource Planning: https://www.sos.mo.gov/CMSImages/AdRules/csr/current/20csr/20c4240-22.pdf – Missouri Rules of Department of Commerce and Insurance, Division 4240 Public Service Commission, Chapter 20 Electric Utilities: https://www.sos.mo.gov/CMSImages/AdRules/csr/current/20csr/20c4240-20A.pdf
MS	No formal requirement for competitive solicitations	– Mississippi Public Service Commission, Chapter 29 Integrated resource Planning and Reporting: https://www.psc.state.ms.us/InSiteConnect/InSiteView.aspx?model=INSITE_CONNECT&queue=CTS_ARCHIVEQ&docid=645594 – Mississippi Public Utilities Rules of Practice and Procedure: https://www.psc.ms.gov/sites/default/files/2019-06/Procedural%20Rules%206-11-19%20with%20TOC%20fixed.pdf
MT	Requirement for competitive solicitation (statute or rules encourage all-source procurement)	– Administrative Rules of Montana, Rule 35.5.2010, Competitive Resource Solicitations: http://www.mtrules.org/gateway/ruleno.asp?RN=38%2E5%2E2010 – Montana Code Annotated 2019, 69-3-1207: https://leg.mt.gov/bills/mca/title_0690/chapter_0030/part_0120/section_0070/0690-0030-0120-0070.html
NC	No formal requirement for competitive solicitations (requirement for limited competitive procurement of renewables)	– North Carolina Utilities Commission Rules of Practice and Procedure, Rule 8-71: https://www.ncuc.net/ncrules/ncucrules.pdf – North Carolina Statute Chapter 62 Public Utilities: https://www.ncleg.net/enactedlegislation/statutes/html/bychapter/chapter_62.html
ND	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– North Dakota Century Code, 49-22-04 (Ten-Year Plans): https://www.legis.nd.gov/cencode/t49c22.pdf#nameddest=49-22-04 – North Dakota Century Code, 69-06-04 (Certificate of Site Compatibility): https://www.legis.nd.gov/information/acdata/pdf/69-06-04.pdf – North Dakota Century Code, 49-22.1 (Energy Conversion and Transmission Facilities): https://www.legis.nd.gov/cencode/t49c22-1.pdf#nameddest=49-22p1-08

State Code	Summary	Source
NE	No formal requirement for competitive solicitations	– Nebraska Power Review Board, Application for authority to construct or acquire an electric generation facility(ies) and/or related facility(ies): https://powerreview.nebraska.gov/sites/powerreview.nebraska.gov/files/doc/PRB%20Gen.app%20c.dot – Nebraska Power Review Board, Revised Rules of Practice and Procedure: https://powerreview.nebraska.gov/sites/powerreview.nebraska.gov/files/doc/nprbregs.pdf – Nebraska Revised Statute 66-1060: https://nebraskalegislature.gov/laws/statutes.php?statute=66-1060
NM	No formal requirement for competitive solicitations	– New Mexico Administrative Code, Chapter 9 Electric Utilities: http://164.64.110.134/nmac/T17C009 – New Mexico Statute, Chapter 62 Electric, Gas, and Water Utilities: https://laws.nmonesource.com/w/nmos/Chapter-62-NMSA-1978#!fragment//BQCwhgziBcwMYgK4DsDWszIQewE4BUBTADwBdoByCgSgB-pltTCIBFRQ3AT0otokLC4EbDtyp8BQkAGU8pAELcAS-gFEAMioBqAQQByAYRW1SYAEbRS2ONWpA
NV	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– Nevada Administrative Code, Chapter 704: https://www.leg.state.nv.us/NAC/NAC-704.html#NAC704Sec937
OK	Requirement for competitive solicitation	– Oklahoma Administrative Code and Register, 165:35-34-1: http://www.oar.state.ok.us/oar/codedoc02.nsf/frmMain?OpenFrameSet&Frame=Main&Src=_75tnm2-shfcdnm8pb4dthj0chedppmcbq8dtmmak31ctijujrgcln50ob7ckj42tbkdt374obdcli00_
OR	Requirement for competitive solicitation (statute or rules encourage all-source procurement)	– Oregon Administrative Rules Chapter 860, Division 89, Resource Procurement for Electric Companies: https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=4519

State Code	Summary	Source
SC	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– South Carolina Code of Laws, 53-37 Energy Supply and Efficiency: https://www.scstatehouse.gov/code/t58c037.php – South Carolina Code of Laws, 58-33 Utility Facility Siting and Environmental Protection: https://www.scstatehouse.gov/code/t58c033.php
SD	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– South Dakota Administrative Rules, Rule 20:10:21:02 Ten-year plans: https://sdlegislature.gov/rules/DisplayRule.aspx?Rule=20:10:21:02 – South Dakota Administrative Rules, Rule 20:10:22:30 Alternate energy resources: https://sdlegislature.gov/rules/DisplayRule.aspx?Rule=20:10:22:30
TN	No formal requirement for competitive solicitations	– Rules of Tennessee Public Utility Commission, Chapter 1220-04-04 Regulations for Electric Companies: https://publications.tnsosfiles.com/rules/1220/1220-04/1220-04-04.20180427.pdf
UT	Requirement for competitive solicitation (statute or rules encourage all-source procurement)	– Utah Code, 54-17-201: https://le.utah.gov/xcode/Title54/Chapter17/54-17-S201.html – Utah Administrative Code Rule R746-420: https://rules.utah.gov/publicat/code/r746/r746-420.htm
VA	No formal requirement for competitive solicitations (requirement for limited competitive procurement of renewables)	– Code of Virginia, Title 56 Public Service Companies, Chapter 23 Virginia Electric Utility Regulation Act: https://law.lis.virginia.gov/vacodefull/title56/chapter23/ – Code of Virginia, 56-598 Contents of Integrated Resource Plans: https://law.lis.virginia.gov/vacode/56-598/ – Code of Virginia, 56-46.1 Commission to consider environmental, economic and improvements in service reliability factors in approving construction of electrical utility facilities; approval required for construction of certain electrical transmission lines; notice and hearings: https://law.lis.virginia.gov/vacode/title56/chapter1/section56-46.1/ – Code of Virginia, 56-585.5 Generation of Electricity from renewable and zero-carbon sources: https://law.lis.virginia.gov/vacode/title56/chapter23/section56-585.5/

State Code	Summary	Source
WA	Requirement for all-source solicitation	– Washington Administrative Code 480-100-238, Integrated Resource Planning: https://apps.leg.wa.gov/wac/default.aspx?cite=480-100-238 – Washington Administrative Code 480-107 Purchases of Electricity: https://app.leg.wa.gov/wac/default.aspx?cite=480-107 – General Order R-602; Order Amending, Adopting, and Repealing Rules Permanently. Filing UE-190837. https://www.utc.wa.gov/docs/Pages/DocketLookup.aspx?FilingID=190837
WI	No formal requirement for competitive solicitations (requirement for demonstrated comparison of alternative options prior to resource acquisition)	– Public Service Commission of Wisconsin and Wisconsin Department of Natural Resources, Application Filing Requirements Electric Generation Projects: https://psc.wi.gov/SiteAssets/2017PowerPlantAFR.pdf – Wisconsin Administrative Code, Chapter PSC 111: http://docs.legis.wisconsin.gov/code/admin_code/psc/111
WV	Requirement for competitive solicitation (statute or rules encourage all-source procurement)	– West Virgina Code, Chapter 24, Article 2: http://www.wvlegislature.gov/WVCODE/ChapterEntire.cfm?chap=24&art=2&section=1D#2
WY	No formal requirement for competitive solicitations	– Wyoming Administrative Rules, Public Service Commission (023), Chapter 3: Electric, Gas Water, and Pipeline Utilities: https://rules.wyo.gov/Search.aspx?mode=1 – Wyoming Commission Guidelines Regarding Electric IRP: https://drive.google.com/file/d/1NtVrumEp4kc42niq3QS1DJDFIncoZYj9/view

APPENDIX C

Examples of Clean Energy Procurement

EXHIBIT C1

Examples of Clean Energy Procurement

Utility	Procurement Structure	Results
Tucson Electric Power, 2017, Arizona	– In 2017, Tucson Electric Power (TEP) ran an RFP for solar projects to help meet its goal of 30% renewable sales by 2030. – The solicitation was intended for solar but allowed vendors options to offer bids for resources like battery storage to provide additional value. – Through its open solicitation, TEP learned that storage technologies had emerged as cost competitive with natural gas peaking units.[108] The procurement structure enabled price and technology discovery for TEP.	– TEP procured 100 MW of solar PVs paired with 30 MW of battery storage for $45/MWh, making the news for market-leading prices.[109] – In its 2019 preliminary IRP, TEP announced that renewable generation would hit 28% by 2021, driven by increasingly competitive prices on clean energy.[110] In its 2020 IRP, the utility announced its plans to add 476 MW of new renewables by 2021 and 3,400 MW of renewables by 2035.[111] – Recognizing the value of market competition, TEP has committed to procuring future resources through all-source solicitations. – The utility also plans to increase its ambition on its decarbonization goals and work with the University of Arizona to develop climate-aligned carbon reduction targets.
Western Farmers Electric Cooperative, 2018, Oklahoma	– In 2018, Western Farmers Electric Cooperative (Western Farmers) issued an RFP for a hybrid clean energy resource: a colocated wind, solar, and storage project. – Western Farmers identified need for 400 MW of capacity by 2025 to meet its resource adequacy obligations. – The cooperative's own analysis found that a hybrid resource would likely be cheaper and more operationally valuable than a gas peaker.	– In 2019, Western Farmers Electric Cooperative signed a deal with NextEra to develop the "largest co-located wind, solar, and energy storage project in the U.S."[112] – In total, 250 MW of wind are set to come online in 2019, and 250 MW of solar and 200 MW of 4-hour battery storage in 2023. With these additions, 50% of Western Farmers' generating capacity will be renewables.
Hawaiian Electric Company, 2019, Hawaii	– In 2019, HECO announced that it would procure approximately 900 MW of renewables and energy storage to replace retiring generation through a series of competitive solicitations. – A key driver of HECO's efforts to procure clean energy is the state's ambitious 100% carbon neutral energy goal, the first such policy in the United States.[113] – Concurrently, HECO has developed an integrated grid planning (IGP) process to address generation, distribution, and transmission system planning holistically.[114]	– In its most recent tranche of procurements, HECO selected 460 MW of solar and 3 GWh of energy storage.[115] – In the future, HECO expects to open additional solicitations for resources through its IGP process.

Utility	Procurement Structure	Results
Portland General Electric, 2019, Oregon	– In its 2019 IRP, PGE identified a future capacity shortfall from a coal plant retirement and load growth due to vehicle electrification.[116] – To meet capacity and energy needs over a five-year planning horizon, PGE will initiate a series of staged procurements. By 2025, PGE plans to acquire all cost-effective energy efficiency and demand flexibility that is currently available. In 2020, the utility planned to open a clean energy procurement and in 2021 it plans to open an all-source procurement to meet any remaining system needs. – PGE used independent consultants to assess and verify aggregated energy efficiency and DR resource potentials.	– PGE had not yet finalized its clean energy procurements at the time of publication. – PGE expects to implement 157 MW of new energy efficiency, 211 MW of DR, and 150 MW of unspecified renewables. – By 2025, the utility expects to avoid an additional 0.7 million metric tons of carbon dioxide-equivalent emissions annually (MMT CO_2e/y) from new energy efficiency and 0.6 MMT CO_2e/y from new renewables. These reductions are aligned with the utility's long-term decarbonization goal of 80% emissions reductions from 2010 levels by 2030.[117]

APPENDIX D Example Language from Xcel Energy's All-Source RFP

Links to solicitation text and regulatory approval:

- Original filing from May, 2016: **https://www.xcelenergy.com/staticfiles/xe/PDF/Attachment%20AKJ-3.pdf**
- Updated solicitation text from January 2017 (Attachment AKJ-3): **http://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_728992&p_session_id=**
- Colorado Public Utilities Commission Decision C17-0316: **http://www.dora.state.co.us/pls/efi/EFI_Search_UI.Show_Decision?p_dec=24048&p_session_id=**

Define and validate system needs

Xcel provided a description of the drivers and timing of the need. The need was defined through extensive modeling and stakeholder engagement during Phase I of the ERP process. The need is technology agnostic and described with timing and uncertainty:

> "This RFP is part of a Solicitation process whose purpose is to acquire sufficient resources to meet the Company's forecasted electric demand (plus reserves) over the resource acquisition period ("RAP") of 2016-2023. Through this Solicitation, the Company seeks power supply bids that could be utilized to fill a range of resource capacity needs from a low of zero MW per Commission Decision C17-0316 section 45, up to over 1,100 MW which could result from Commission approval of the Colorado Energy Plan Portfolio. Table 2 illustrates the general range and timing of resource need by scenario.
>
> The Company may seek to replace some, none, or all of Comanche 2 capacity (e.g., up to 1,114 MW inclusive of the Comanche 2 capacity) through this RFP. It is the Company's expectation that any portion of Comanche 2 capacity not filled in this RFP will be addressed in the 2019 ERP process. (Company Ownership, pp. 3–4)"

Scope fair and transparent RFP documents and process

Xcel segmented resources to be able to provide differentiation in contract terms for different ownership options and resource service offerings. It provided an explanation of the types of projects that might fall within each RFP, but left language open to all resources:

> "Examples of the types of projects which would be applicable to each RFP are shown in Table 1 below. This non-comprehensive list is intended to provide guidance as respondents develop their proposals1; more detailed information may be found in the specific RFP documents. Respondents who are uncertain as to which RFP would apply to their project should contact the RFP Project Manager (Section 1.4) for clarification. (Dispatchable Resources, p. 1)"

EXHIBIT D1

Example Resource Types for the Various RFPs

RFP Document	Resource Types	Commercial Structure
2017 Company Ownership RFP	– New or existing simple cycle gas turbines – New or existing wind or solar	– Build-Own Transfer (BOT) – Existing Resource Sale – Company Self-Build
2017 Dispatchable Renewable Capacity Resources RFP	– Simple cycle gas turbines – Combined cycle gas turbines – Stand-alone storage projects	– PPA
2017 Semi-Dispatchable Renewable Capacity Resources RFP	– Solar thermal with thermal storage or fuel back-up – Any other intermittent resource with storage or fuel backup	– PPA
2017 Renewable Resources RFP	– Wind – Solar without storage or fuel backup – Hydroelectric – Geothermal – Biomass – Recycled Energy	– PPA

Definitions are provided for each of these categories:

"Through this Dispatchable Resources RFP, the Company seeks proposals from facilities that can provide non-intermittent, firm generation capacity to the system during peak load periods at the nameplate rating of the facility. Non-exclusive examples of potential eligible non-intermittent firm generation technologies include gas-fired combustion turbines and gas-fired combined cycles. (Dispatchable Resources, p. 4)"

"Through this Renewable Resources RFP, the Company is requesting proposals for renewable resources that would achieve commercial operation no later than May 1, 2023. (Renewable Resources, p. 4)"

"Through this Semi-Dispatchable Renewable Capacity Resources RFP, the Company seeks proposals from facilities that utilize intermittent eligible energy resources and employ an integral, supplemental technology that serves to lessen the intermittency effects of the energy source. The supplemental technology may allow energy production to be shifted to hours of greater value to the Company and/or may provide generation capacity to the system during peak load periods at a level significantly closer to the nameplate rating of the facility. Examples of eligible technologies include solar with storage or solar thermal with fuel backup/hybridization. (Semi-Dispatchable Resources, p. 4)"

Select the optimal resource portfolio

Details are provided on the process for analysis and bid evaluation (Company Ownership, p. 21, Section 5.1). In particular, Xcel outlines seven steps for bid evaluation, and Steps 2, 5, and 6 provide detail to bidders on the process for portfolio analysis, including the order of operations for software modeling. The seven steps provided by Xcel are:

- Step 1 – Bid Eligibility Screening
- Step 2 – Interconnection Assessment and Initial Economic Evaluation
- Step 3 – Non-Price Factor Analysis
- Step 4 – Bidder Notification
- Step 5 – Computer-Based Modeling of Bid Portfolios
- Step 6 – Evaluation of Bids Between 100 kW and 10 MW
- Step 7 – Phase II Report to Commission

In Step 2, the initial economic screening is described as such:

> "The primary purpose of the initial economic screening is to rank each bid by technology so that the most promising bids can be forwarded to the subject matter experts for their review as quickly as possible and to identify those bids likely to be moved forward for computer modeling of bid portfolios. The initial economic screening consists of calculating an "all-in" levelized cost of energy ("LEC"). Calculations are shown on the "LEC" tab of the bid forms. (Company Ownership, p. 22)"

In Step 3, Xcel lists a robust list of non-price factors for evaluation but does not provide insight into how non-price factors will be used to evaluate bids. The list of non-price factors provided are:

- Financial strength of the respondent
- Financing plan, including ability to utilize tax advantages
- Development, construction, and operation experience
- Generator technology, availability, and warranties
- Environmental permitting and compliance
- Land use permitting and zoning
- Other permitting
- Real property acquisition/site control progress and plan
- Project operational characteristics
- Scale of the project
- Community support for the project
- Transmission access plan feasibility and arrangements
- Transmission upgrade schedule assessment
- Construction and equipment supply plans and arrangements
- Project execution planning
- Accreditability of capacity to meet reliability needs
- Accounting assessment (Company Ownership, p. 23)

In Step 4, bidders are notified whether their bid has been advanced to modeling. Of note, Xcel also states that it will provide bidders with feedback if their bids are not advanced.

> "Pursuant to rule 3613(a), within 45 days after bids are received the Company will email each bidder and indicate whether its bid has or has not been advanced to computer-based modeling of bid portfolios and provide each bidder the modeling inputs and assumptions that reasonably relate to that potential resource or to the transmission of electricity from that facility to the Company.14 For those bids not advanced to computer modeling, the Company will provide the reason(s) why the project will not be evaluated further. (Company Ownership, pp. 23–24)"

In Steps 5 and 6, detail the computer modeling process for bidders:

> “Step 5 – Computer-Based Modeling of Bid Portfolios
>
> The costs and operational characteristics of any Company self-build proposal and each remaining bid equal to or greater than 10 MW will be input into the Company's Strategist™ planning model.
>
> Strategist™ will be utilized to develop portfolios that minimize the net present value of revenue requirements through 2054. The model will also be used to develop alternative resource portfolios that represent the costs and benefits from increasing amounts of renewable technologies and/or Section 123 resources. Portfolios will be developed in accordance with the scenario analysis directives of the Commission.
>
> …This iterative process will be followed until no incremental bids employing that generation resource type are selected in the least-cost portfolio. (Company Ownership, p. 24)”

> “Step 6 – Evaluation of Bids Between 100 kW and 10 MW
>
> In general, bids between 100 kW and 10 MW (“Small Bids”) will be evaluated after the computer-based portfolio modeling step. …
>
> For each generation type selected, the Company will determine the all-in levelized energy cost of the most expensive bid. These all-in levelized energy costs will set the price against which Small Bids with similar generation technologies will be compared. The Company will include in all portfolios presented to the Commission each Small Bid with an all-in levelized energy cost less than the most expensive bid with similar technology selected in the least-cost portfolio.
>
> A final check will be made to ensure that the inclusion of all cost-effective Small Bids does not provide excess capacity credit to the least-cost portfolio through the RAP to such an extent that it could replace another source(s) of capacity selected through the Strategist modeling. (Company Ownership, pp. 24–25)”

> “Step 7 – Phase II Report to Commission”

Xcel gave potential respondents a clear timeline with nearly three months of lead time. This lead time can be important to competitive renewables projects, which can require site selection and/or customer acquisition.

Details of the RFP were defined with stakeholders through the ERP process in Phase I, but a pre-bid conference was held to inform stakeholders and bidders about RFP instructions and answer remaining questions. There are clear instructions for how Xcel will answer questions and provide accessibly for those unable to attend:

> “Public Service will webcast the meeting and will provide means for remote, electronic participation by potential RFP respondents. Public Service will post information concerning webcast access and remote participation on the RFP website once confirmed18. Interested parties are encouraged to provide written questions to the Company's RFP Project Manager by email prior to the pre-bid meeting. A summary of the bid conference proceedings, including submitted questions and answers, and answers to any question remaining unanswered at the end of the meeting will be prepared by the Company and posted on the RFP website. (Dispatchable Resources, p. 19)”

EXHIBIT D2

Solicitation Schedule

Activity	Date
RFP Issued	30 August, 2017
Pre-Bid Conference	28 September, 2017
Notice of Intent to Respond Due	29 September, 2017
Proposals Due	28 November, 2017
120-Day Report to Commission	28 March, 2018
Commission Phase II Decision	26 June, 2018

The Commission and Independent evaluator will review the portfolios:

"Within 30 days following the Company's 120-day report filing, the IE will report to the Commission its analysis of whether the Company conducted a fair bid solicitation and bid evaluation process, with any deficiencies specifically reported.

Within 90 days of the Company's filing of its 120-day report, the Commission will issue a written decision approving, conditioning, modifying, or rejecting the Company's preferred cost-effective plan. The Company is required to complete this RFP process within 18 months after the receipt of bids unless the Company can show good cause for a requested deadline extension. (Dispatchable Resources, pp. 26–27)"

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