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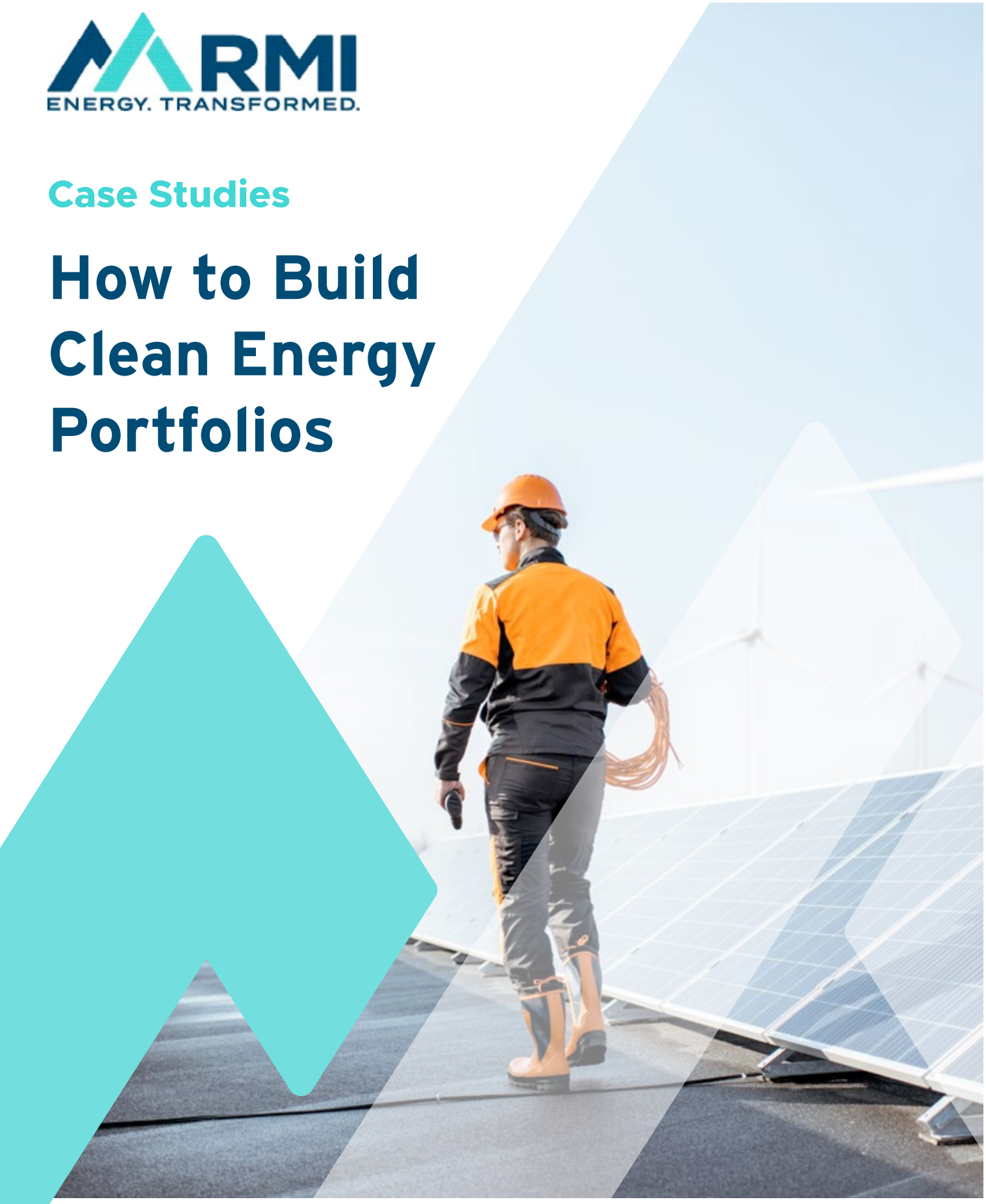
How to Build Clean Energy Portfolios



Chapter 3 from *How to Build Clean Energy Portfolios* report

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NOTES

For endnote references, please refer to full report.

ABOUT US

ABOUT REGULATORY ASSISTANCE PROJECT

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.

ABOUT RMI

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.

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

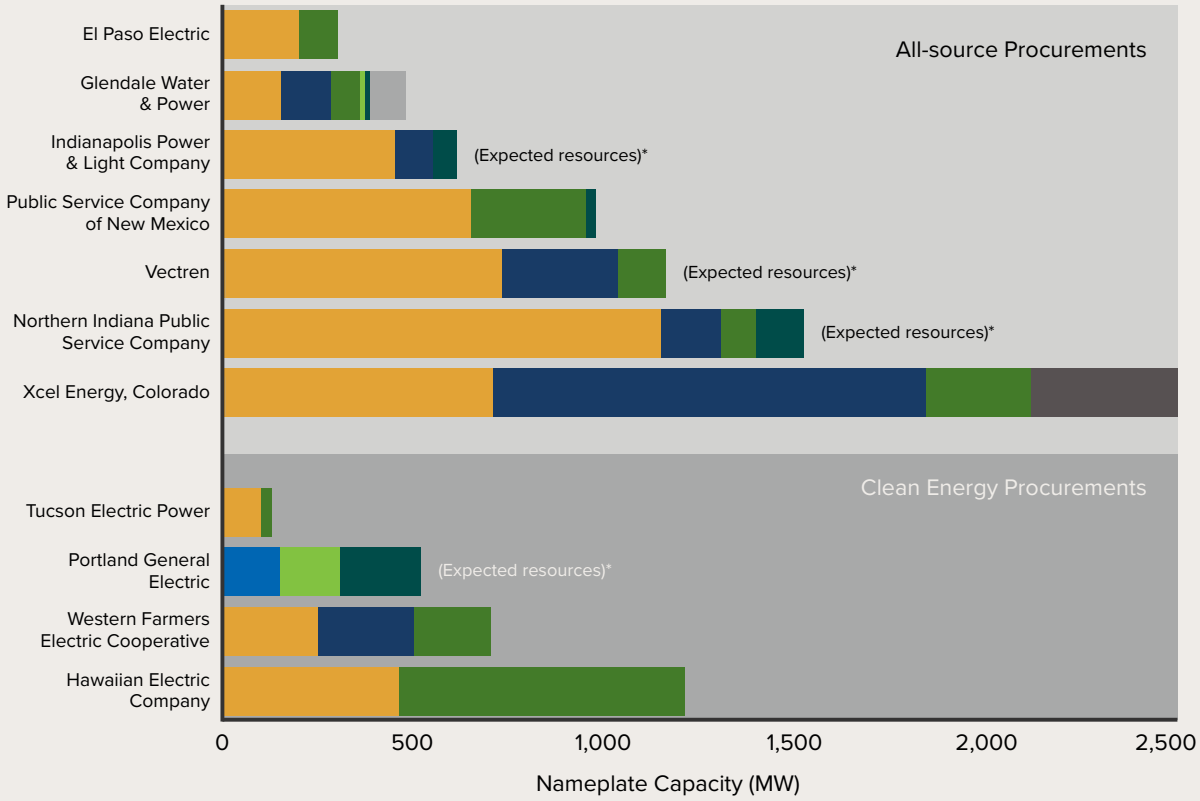
DIVERSE RESOURCE PORTFOLIOS

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



Total: 10,096 MW

Solar	Wind	Unspecified Renewables	Storage	Energy Efficiency	Demand Flexibility	New Gas	Existing Gas
4,846 MW	2,068 MW	150 MW	1,948 MW	171 MW	437 MW	93 MW	383 MW
48 %	20 %	2 %	19 %	2 %	4 %	1 %	4 %

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

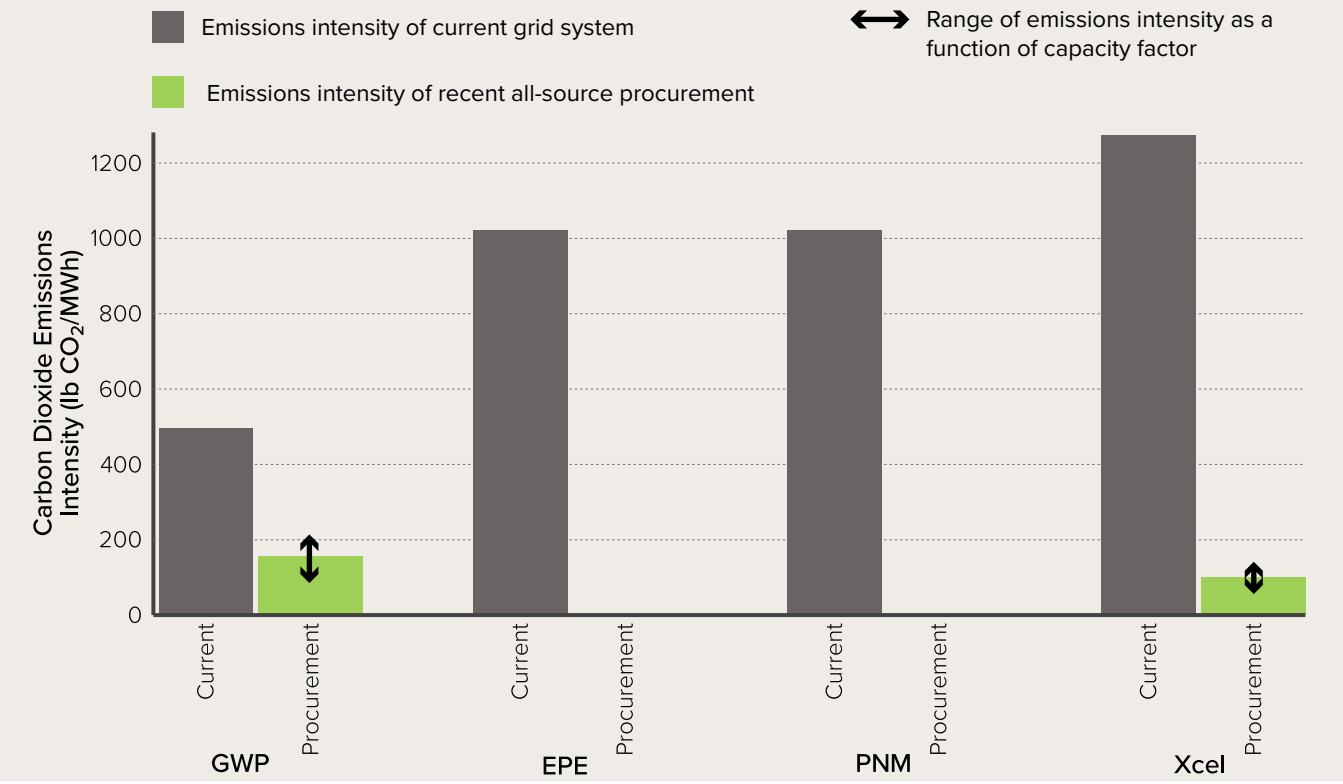
Utility	Results
Tucson Electric Power, 2017, Arizona	100 MW of solar and 30 MW of storage in a solar-plus-storage procurement
Western Farmers Electric Cooperative, 2018, Oklahoma	700 MW hybrid project with 250 MW of solar, 250 MW of wind, and 200 MW of storage
Hawaiian Electric Company, 2019, Hawaii	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]

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