2023 UTILITY TRANSFORMATION PROFILE

SEPA Utility Transformation CHALLENGE

Smart Electric Power Alliance

SEPA Utility Transformation CHALLENGE

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ABOUT SEPA

The Smart Electric Power Alliance (SEPA) is dedicated to helping electric power stakeholders address the most pressing issues they encounter as they pursue the transformation to a carbon-free energy system. We are a trusted partner providing education, research, standards, and collaboration to help utilities, electric customers, and other industry players across three pathways: Regulatory and Business Innovation, Grid Integration, and Electrification. Through educational activities, working groups, peer-to-peer engagements and custom projects, SEPA convenes interested parties to facilitate information exchange and knowledge transfer to offer the highest value for our members and partner organizations. For more information, visit sepapower.org.

ACKNOWLEDGEMENTS

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DISCLAIMER

SEPA'S *UTILITY TRANSFORMATION CHALLENGE*

SEPA Utility Transformation CHALLENGE

Key Findings

- **Uneven Transition.** The utility industry's transition to carbon-free energy is uneven. Despite significant challenges, many respondents have taken long strides toward decarbonization with 29% of respondents achieving an increase of 10 percentage points or more in their carbon-free energy supply from 2018 to 2021.
- **Improved Carbon Reduction Targets.** Leading utilities improved the strength, depth, and transparency of their carbon-reduction targets. Respondents expanded targets by including both direct and indirect "scope" emissions, and strengthened targets by developing action plans, incorporating interim targets and accelerating target dates. Sixty-two percent of respondents have developed a publicly available action plan to support their carbon-reduction target and 65% of respondents have incorporated at least one interim target into their goals.
- **Scope 3 Targets Defined.** Utility respondents have begun expanding their carbon-reduction targets to include Scope 3 emissions, or meaningful portions of Scope 3 emissions (i.e., emissions from purchased electricity sales to end-use customers). Fifteen percent of utility respondents include Scope 3 emissions in their targets.
- **Distribution System Visibility.** As customer-sited DERs proliferate, utility respondents are increasing their visibility into the distribution system operations to varying degrees, with advanced metering infrastructure (AMI) the most often-cited program or project (71%). However, advanced distribution (ADMS) and distributed energy resources management systems (DERMS) have been fully implemented by only 21% and 13% of utility respondents, respectively.
- **Transportation Electrification Plans.** Transportation electrification offers myriad business, grid, and energy equity opportunities, yet just 59% of respondents have established a plan to facilitate EV deployment in their service territory. Such plans are key to coordinating actions across multiple objectives and stakeholders. Long-term execution of effective plans may take mainstream EVs to the level of "just another" electrified end-use.
- **Climate Adaptation Strategy.** Utility respondents are assessing the impact of climate change on utility operations, developing climate-adaptation strategies to minimize the negative impacts of climate change on systems and communities, as well as developing climate-resilience strategies as part of long-range plans to further specify investment needs.
- **Utility Rate Pressure Mitigation.** Many elements of the energy transition put upward pressure on rates. At a time when energy costs are already a concern, utilities can best uphold the compact to provide affordable energy throughout the transition by using a combination of short-term bill assistance and management programs (offered by 87% of utility respondents today) and longer-term investments that empower durable savings (e.g., 64% of utility respondents offer energy-efficiency programs today).
- **Embedding Equity.** The journey to an equitable, carbon-free energy system requires utilities to assess and promote equity in many areas, including the foundational planning processes where utilities and stakeholders decide how and where the transition will unfold. However, 58% of respondents indicated that they have not assessed energy equity as part of any generation, transmission, and/or distribution planning activities. The federal Justice40 Initiative, Inflation Reduction Act of 2022 provisions, and decades of stakeholder-driven equity work can guide forward progress.

About the *Utility Transformation Challenge*

SEPA's *Utility Transformation Challenge* is an initiative to assess and present a holistic view of U.S. electric utilities' progress in transforming the energy system to a carbon-free system that is safe, affordable, reliable, resilient and equitable. The *Utility Transformation Challenge* explores the critical role utilities and their stakeholders play in addressing these opportunities and challenges.

In 2022, SEPA fielded its revised *Utility Transformation Survey* to collect extensive information from electric utilities of all types, sizes and geographic areas, about how they are rising to this challenge, as well as the innovations they are employing. Voluntary participation in this comprehensive survey, in which respondents self report their progress and actions across four dimensions of transformation, is summarized in Table 1.

Table 1. *Utility Transformation Survey* Participation Summary

Survey Participation	Complete Surveys	Complete + Partial Surveys
Number of Utilities	63	118
Percentage of U.S. Electric Customers Represented by Utility Respondents	34%	51%
States Represented	29	41

Source: Smart Electric Power Alliance, 2023.

Two distinct survey components comprised the 2022 *Utility Transformation Survey*: the **Organizational Leadership** portion was offered to investor-owned utility parent companies, single-entity investor-owned utilities, municipal utilities, cooperative utilities, and generation and transmission utilities and intended to capture information related to carbon-reduction targets and plans and other corporate sustainability initiatives. The **Operational Activities** survey portion was offered to individual operating companies and gathered information related to a wide range of utility operations, many of which may differ across states and jurisdictions.

SEPA made numerous changes to the *Utility Transformation Survey* for 2022, including:

- Expanded its scope to more holistically assess the electric utility industry
- Added topics to encourage participation from generation and transmission utilities

What's In This Report

Insights derived from the survey results form the basis of this report: the *Utility Transformation Profile*. Included is the 2023 Utility Transformation Leaderboard, which recognizes the electric utilities that demonstrated the greatest progress, based on the study's findings. The Insights into Transformation section expands upon and provides context for the key findings.

Together, these insights offer utilities and their stakeholders a resource for recognizing and sharing their successes, lessons learned, innovations and examples of leadership that can help inform their transformation journey. Additional information regarding the survey methodology and evaluation framework is included in Appendices A and B, respectively.

An Industry in Transition

The *Utility Transformation Challenge* explores the critical role utilities and their stakeholders play in addressing electric power system transition opportunities and challenges. For each utility, the path to a *carbon-free energy system* will take a different form and require different strategies. An individual utility's transformation path is also impacted by the need to meet core requirements (i.e., to provide safe, secure, affordable, reliable, resilient and equitable electric power). Furthermore, its efforts to transform are impacted by important variables, such as:

- **Utility type:** Investor-owned utilities (IOUs), public power utilities, electric distribution cooperatives, and generation and transmission utilities face different priorities, business models, processes, stakeholders, customer obligations and operating constraints.
- **Regulatory environment:** A utility's governing framework can restrict, enable, encourage or require actions that align with the transformation.
- **Geography & resource availability:** Utilities may have different levels of access to clean energy resources, and may face unique challenges based on their geography and service territory.
- **Market dynamics:** A utility's access to wholesale markets varies, while a utility's retail rates and broader, regional economic conditions can influence customers' energy usage and program participation.

The primary objective of the *Utility Transformation Challenge* is to help accelerate the transformation to a carbon-free energy system for utilities of *all* types, sizes and regions.

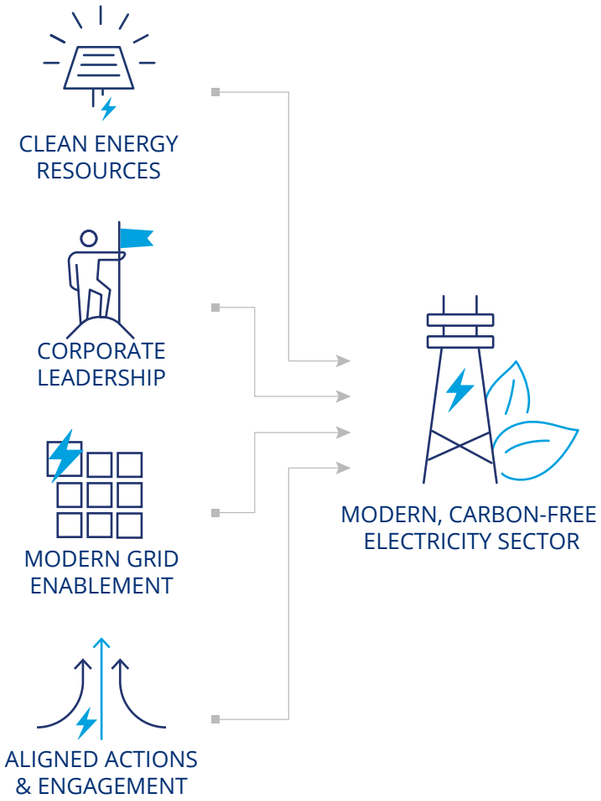
SEPA's Guiding Principles

- **Clean energy means carbon-free energy.** Energy generated with no carbon emissions (or with no net carbon emissions, in the case of biomass resources) from existing and new technologies is needed to achieve a carbon-free energy future.
- **Social equity.** Diversity, equity, inclusion and access for all are required for a fair and just carbon-free energy future.
- **A modern grid** that easily accommodates new, large-scale and distributed technologies, and facilitates the integration and use of clean energy, is foundational to achieving a carbon-free energy future.
- **The future is diverse.** Individual utility portfolio solutions will vary, but the aggregate industry portfolio will consist of a diverse mix of large-scale generation, distributed energy resources, energy efficiency, load management, demand flexibility and enabling technologies.
- **Utility solutions and strategies will vary.** Utilities and other providers will deploy diverse business models supporting carbon reduction that are impacted by policy, regulatory, market and geographic conditions.
- **Utilities do not operate in a vacuum** and are not in full control of their transformation. Success will require a deliberate, collaborative process and proactive engagement with customers, regulators and other industry stakeholders.
- **No favorites.** SEPA recognizes that many types of clean energy resources, technologies, initiatives, and approaches can help achieve the transformation to a carbon-free energy system.
- **Electrification.** Reductions in carbon emissions will occur as the transportation, building and industry sectors become more electrified.

Four Dimensions of Utility Transformation

This report examines the electric utility industry's transition to a modern, carbon-free electricity sector by exploring *Four Dimensions of Utility Transformation*:

- **Clean Energy Resources**—The procurement and deployment of carbon-free energy and the utilization of other carbon-reducing capabilities, including demand flexibility and energy efficiency, are key to transformation.
- **Corporate Leadership** explores how utilities are using their unique operational knowledge, expertise and influence to navigate change management and pursue strategic solutions to reach a carbon-free grid. The Corporate Leadership dimension integrates data from the SEPA Utility Carbon-Reduction Tracker and requests additional information regarding carbon-reduction target emissions scopes.
- **Modern Grid Enablement**—Transformation requires the integration of clean energy resources in ways that balance principles of grid flexibility, reliability, resilience, efficiency and affordability. The Modern Grid Enablement dimension assesses initiatives to build situational awareness, enhance grid management and coordination, advance integrated distribution planning and operational practices, and facilitate grid integration of new technologies. While this dimension includes common elements of grid modernization, it specifically features activities and processes that facilitate the transformation to clean energy.
- **Aligned Actions and Engagement**—Successful transformation involves elements outside a utility's scope of operations. Utilities rely on policy frameworks established by governing authorities, as well as support from a wide range of industry stakeholders to evaluate, procure and deploy new technologies and supporting operating practices. Through Aligned Actions (e.g., innovative customer programs) and Engagement (e.g., comprehensive partnerships and stakeholder processes), utilities can empower their customers and other stakeholders to fulfill their roles in the transformation.



Together, **these *Four Dimensions of Utility Transformation* form the basis of the evaluation of utility progress towards a carbon-free electricity system** in the *Utility Transformation Challenge*, and for the presentation of the results in this report.

INSIGHTS INTO TRANSFORMATION

UTILITY TRANSFORMATION LEADERBOARD

CLEAN ENERGY RESOURCES

CORPORATE LEADERSHIP

MODERN GRID ENABLEMENT

ALIGNED ACTIONS AND ENGAGEMENT

Utility Transformation Leaderboard

Leaderboard Utilities achieved the highest overall scores among all ***Utility Transformation Challenge*** participants (hereafter referred to as "respondents") and constitute the ***2023 Utility Transformation Leaderboard***. This recognition reflects these utilities' progress towards a modern, carbon-free electricity sector and their demonstrated leadership across the four dimensions. Leaderboard Utilities are presented in alphabetical order.

2023 Utility Transformation Leaderboard

(Alphabetical Order)

- Austin Energy
- Green Mountain Power
- National Grid
- Pacific Gas and Electric
- Palo Alto Utilities
- Portland General Electric
- Public Service Enterprise Group
- Seattle City Light
- Sacramento Municipal Utility District
- Snohomish County Public Utility District
- Southern California Edison
- Xcel Energy

Insights from Leaderboard Utilities

- Leaderboard Utilities **provide a substantial percentage of their total retail supply with clean energy resources** including energy efficiency and demand response/load management in addition to non-carbon emitting generation.
- Leaderboard Utilities **exhibit the strongest commitment to carbon reduction** through the *breadth* of their commitment by targeting both direct (Scope 1) and indirect (Scopes 2 and 3) emissions reductions, *urgency and strength* with accelerated final achievement years and interim targets, and *credibility and accountability* with science-based targets and action plans to achieve them.
- In addition to climate mitigation strategies, Leaderboard Utilities recognize the need to **develop transparent, publicly-available climate adaptation strategies** and assess the impacts of climate change and extreme weather on utility system operations, communities and customers.
- Leaderboard Utilities **strongly engage their customers**, making them a focal point of the utility's overall energy carbon-reduction strategy by linking customer clean energy programs to *specific* carbon-reduction strategies, thereby making a significant step forward in addressing Scope 3 emissions.
- Leaderboard Utilities **take specific actions to plan for an equitable clean energy transformation** across operations including integrated resource, reliability and resilience, distribution and transmission, and infrastructure planning.

Clean Energy Resources

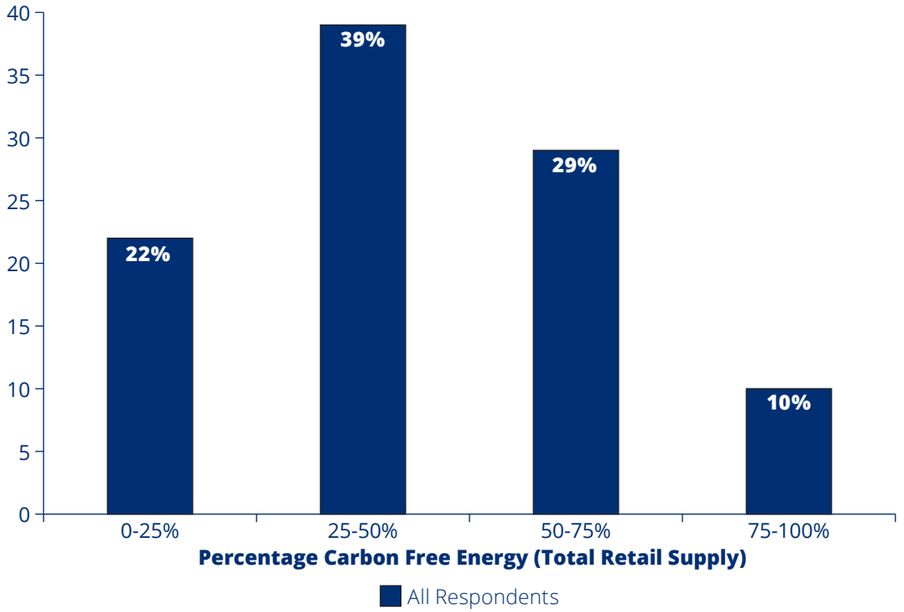
Three-quarters of U.S. electric customer accounts are served by a utility with a 100% carbon-reduction target, or by a utility owned by a parent company with a 100% carbon-reduction target.[1] To achieve these targets, a massive transformation of the electric utility industry is needed. The *Clean Energy Resources* dimension recognizes that this transformation will be founded on carbon-free energy that utilities supply to their customers as well as on flexible, load-shifting resources and programs that efficiently accommodate carbon-free energy.[2]

The Road to Carbon-Free is Unique for Every Utility

When considering the transition to a carbon-free energy supply, it is important to acknowledge that each utility has a different starting point and operates in a unique environment that impacts its options and path forward. Some utilities are just beginning the transition, with carbon-free energy providing no more than one-quarter of total retail supply for 22% of respondents.

At the other end of the spectrum, carbon-free energy provided at least three-quarters of total retail supply for 10% of respondents. While utilities have progressed in this area, the majority of utility survey respondents' carbon-free retail supply levels do not yet exceed 50%, leaving ample work—and ample opportunities—on the table.

Figure 1. Distribution of Utility Carbon-Free Retail Supply Levels in 2021



Source: Smart Electric Power Alliance, 2023. n=58. Open-ended question.

1 SEPA. (2023). Utility Carbon-Reduction Tracker. https://sepapower.org/utility-transformation-challenge/utility-carbon-reduction-tracker/

2 The foundation for the transition to a carbon-free energy system is built on a clean and diverse supply mix. In 2020, SEPA asked utilities to provide their overall energy supply generated by carbon-free and demand-side management (DSM) resources, to assess the progress utilities have made in the transition to a carbon-free energy system. In 2022, to better assess carbon-free resource interconnection and adoption, SEPA asked utilities to provide their total retail and wholesale supply, in megawatt-hours, from carbon-free and DSM resources.

The Utility Transformation to Carbon-Free Energy is Uneven

In 2022, SEPA expanded the scope of the *Utility Transformation Survey* to identify the change in a utility's carbon-free retail energy supply since SEPA's 2020 *Utility Transformation Survey*.[3] A large majority of utility respondents (80%) have carbon-reduction targets, and their paths to achieving these targets will be uneven. For most, achieving their carbon-reduction target will take decades, and utilities will need to navigate supply-chain disruptions, transmission and interconnection bottlenecks, the effects of natural disasters on resource acquisition, and costs.

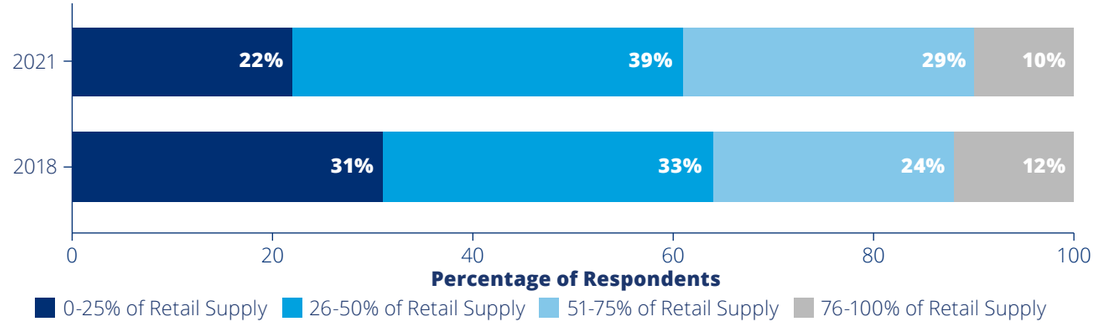
Figure 2 and Figure 3 illustrate that most utility respondents are making progress despite year-to-year fluctuations in total retail supply generated by carbon-free energy as utilities navigate these disruptions. Of the utility respondents that achieved increases in their total retail supply provided by carbon-free energy between 2018 and 2021, 29% achieved an increase of 10 percentage points or more during that period.

Utilities continue to grapple with disruptions created by the Covid-19 pandemic. Respondents cited labor and supply-chain shortages for delays in bringing new renewable energy projects online, contributing to an expected 40% decline in new utility-scale solar capacity from 2021 to 2022.[4] These challenges, combined with trade disputes, have forced some utilities to postpone or cancel renewable energy projects.[5] Citing reliability concerns, some utilities are responding to these supply-chain challenges by delaying the planned retirement of coal-fired power plants. Forty U.S. coal-fired power plants, totaling nearly 17 gigawatts (GW), will continue operating despite previous plans to retire them.[6]

Figure 2. A Majority of Respondents Have Increased Their Carbon-Free Retail Supply Since 2018

Source: Smart Electric Power Alliance, 2023. n=58. Open-ended questions.

Figure 3. Percent of Total Retail Supply Generated by Carbon-Free Resources in 2018 and 2021



Source: Smart Electric Power Alliance, 2023. n=59 (2021); n=58 (2018). Open-ended questions.

3 In 2020, SEPA asked utilities to provide data for calendar year 2018, as 2018 was the latest full year for which data was available at the time SEPA conducted the survey. In 2022, SEPA asked utilities to provide data both for calendar years 2018 and 2021, to recognize the utilities with the highest overall retail supply provided by carbon-free resources as well as the utilities that have made the most progress since the 2020 *Utility Transformation Survey*.

4 SEIA and Wood Mackenzie. (2022, December 13). *U.S. Solar Market Insight.* https://www.seia.org/us-solar-market-insight

5 Colorado Public Radio. (2022, September 30). *Industry shake-ups have delayed or canceled many utility solar projects in Colorado, but brighter days could be ahead.* https://www.cpr.org/2022/09/30/colorado-solar-energy-projects-delays/

6 Wade, W. (2022, November 1). *Dozens of US Coal Plant Closures Delayed as Green Energy Shift Slows.* Bloomberg. https://www.bloomberg.com/news/articles/2022-11-01/forty-us-coal-plant-closures-are-delayed-as-green-energy-transition-slows#xj4y7vzkg.

As utilities adapt to supply-chain disruptions, distributed energy resources (DERs) can offer vital grid flexibility and improve system reliability without compromising planned retirements of fossil generation. The aggregation of DERs can encourage a shift away from traditional fossil fuel plants to meet baseload power needs by enabling local resources to meet demand needs.

Utilities have also felt the crunch of interconnection and transmission bottlenecks on new renewable energy projects. Regional transmission organization PJM is working through a backlog that has prevented it from reviewing new interconnection requests until early 2026.[7] In order to address this backlog, PJM will embrace a first-ready, first-served review process, under which projects that pass interconnection studies receive expedited reviews. As more renewable and storage systems are interconnected, the nation will need to double or triple transmission capacity in order to accommodate those resources and achieve 100% clean electricity by 2035.[8] To help address this need, the Inflation Reduction Act of 2022 will provide nearly $3 billion in federal funding for transmission projects.[9]

Utility respondents also cited the effects of natural disasters—particularly droughts—on resource acquisition. Droughts in the U.S. West contributed to a 14% reduction in hydroelectric generation from 2020 to 2021.[10] Respondents indicated that lower hydro generation could continue to reduce the portion of their total retail supply that is generated by carbon-free resources, as medium- and long-term contract prices lead utilities to purchase more open-market, non-contractual power that is typically not carbon-free.

Hawaii's Clean Energy Transition

From 2018 to 2021, Hawaiian Electric and Kaua'i Island Utility Cooperative increased their total retail supply generated by carbon-free resources by 11 percent and 26 percent, respectively.[11] Despite delays in the development of new renewable energy projects, both utilities achieved this significant level of progress by turning to demand response, energy efficiency, and other DERs to support their investments in clean energy.[12] As both utilities move beyond coal, they are working with the U.S. Department of Energy's national labs to continue developing strategies to incorporate carbon-free resources safely and securely into the grid.[13]

7 Federal Energy Regulatory Commission. (2022, November 29). *Order Accepting Tariff Revisions Subject to Condition re PJM Interconnection.* https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20221129-3092&optimized=false

8 Denholm, P., Brown, P., Cole, W., et al. (2022). *Examining Supply-Side Options to Achieve 100% Clean Electricity by 2035.* National Renewable Energy Laboratory. NREL/TP6A40-81644. https://www.nrel.gov/docs/fy22osti/81644.pdf

9 The White House. (2022, November 18). *Fact Sheet: The Biden--Harris Administration Advances Transmission Buildout to Deliver Affordable, Clean Electricity.* https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/18/fact-sheet-the-biden-harris-administration-advances-transmission-buildout-to-deliver-affordable-clean-electricity/

10 U.S. Energy Information Administration. (2022). *Electricity Data Browser*. https://www.eia.gov/electricity/data/browser/#/topic/0?agg=2,0,1&fuel=05&geo=vvvvvvvvvvvo&sec=g&linechart=ELEC.GEN.HYC-US-99.A&columnchart=ELEC.GEN.HYC-US-99.A&map=ELEC.GEN.HYC-US-99.A&freq=A&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0

11 Hawai'i Public Utilities Commission. (2022). *Annual Renewable Portfolio Standard ("RPS") Status Reports (Electric, Docket 2007-0008).* https://puc.hawaii.gov/reports/energy-reports/renewable-portfolio-standards-rps-annual-reports/

12 Hawai'i State Energy Office. (2022). *Powering Past Coal Task Force.* https://energy.hawaii.gov/what-we-do/clean-energy-vision/powering-past-coal-task-force/

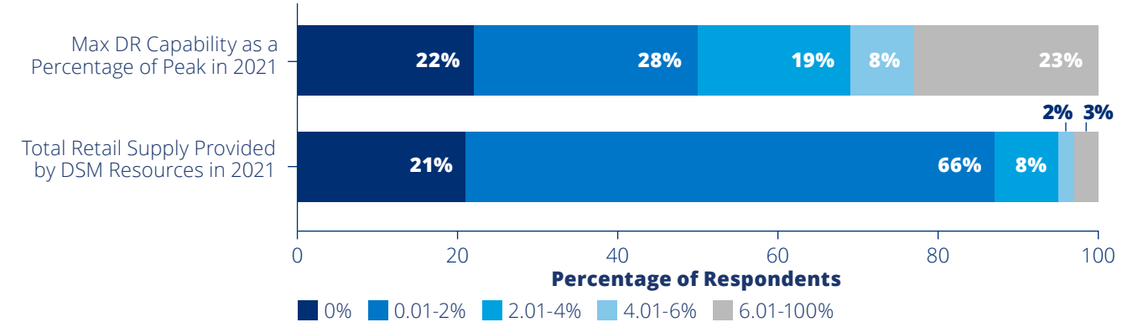
13 U.S. Department of Energy. (2021, August 6), *Hawaiian communities say 'aloha' to clean energy transition.* https://www.energy.gov/articles/hawaiian-communities-say-aloha-clean-energy-transition

Opportunities for Greater Load Flexibility

As utilities embark on the transformation to a carbon-free energy system, flexible resources will be key to incorporating variable carbon-free resources efficiently and in a way that supports utilities' key pillars of affordability, safety, resilience, reliability, equity and sustainability. Utilities can maximize the potential of clean energy resources connected to the grid by leveraging demand-side management (DSM) resources and creating demand flexibility programs. These resources and programs include energy efficiency, demand response, managed EV charging, and energy storage, and contribute to a utility's demand management and energy savings capabilities.[14] These programs also provide utilities an opportunity to engage customers and encourage them to play a key role in the transformation.

A 2019 study found that modernizing conventional demand response programs, introducing new programs, expanding transmission and distribution systems, and continuing to deploy smart infrastructure and renewable generation would yield nearly 200 GW of cost-effective load flexibility potential nationally by 2030.[15] This sum amounts to approximately 20% of the study's forecasted U.S. peak load in 2030. However, Figure 4 shows that in 2021, only 23% of respondents had a maximum demand response capability, expressed as a percentage of their annual peak demand, of more than 6%. Significant opportunities remain for utilities to meet the flexibility potential needed to modernize the grid and efficiently integrate carbon-free energy into the electricity system.

Figure 4. Utilities Are Not Maximizing the Capability or Potential Savings of Demand Response and DSM Resources



Source: Smart Electric Power Alliance, 2023. n=64 (max DR capability), n=61 (total retail supply by DSM). Open-ended questions.

14 Nearly all respondents continue to offer programs that incentivize demand-side management, including energy efficiency programs (89% of all respondents), demand response, demand flexibility, or load management programs (77%), electric vehicles and charging (58%), customer-sited solar (46%), battery storage (31%), and others.

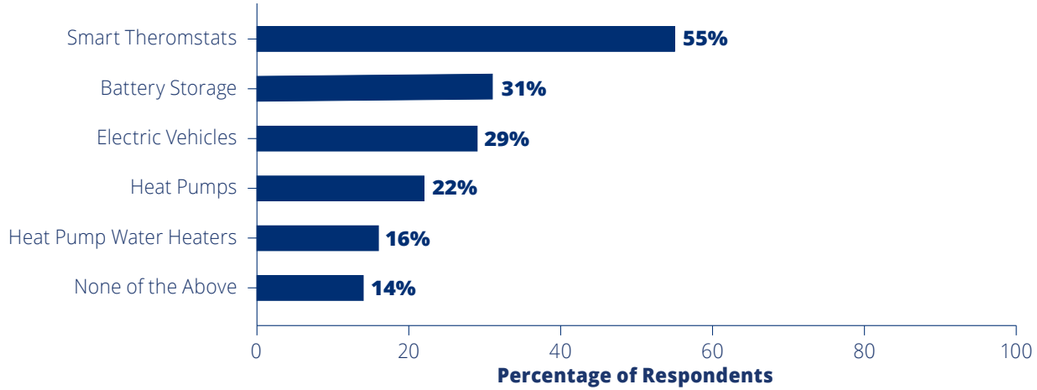
15 Hledik, R., Faruqui, A., Lee, T., & Higham, J. (2019). *The National Potential for Load Flexibility: Value and Market Potential Through 2030.* The Brattle Group. https://www.brattle.com/insights-events/publications/brattle-study-cost-effective-load-flexibility-can-reduce-costs-by-more-than-15-billion-annually/

Utilizing Emerging Resources to Respond to System Peaks

Reflecting the shifting landscape for DSM, respondents are positioning and combining their programs to more efficiently integrate carbon-free resources. Notably, results confirm industry interest in blended programs to facilitate load management in conjunction with energy efficiency, electrification and customer engagement.[16] Load-control switches and, more recently, smart thermostats have been mainstays of demand response programs, but nearly one-third of responding utilities are now also calling on customer-sited battery storage or electric vehicles for demand reduction (Figure 5).

Increasing the supply of clean energy is a primary indicator of utility transformation. From 2018 to 2021, leading utilities accelerated progress, while others made smaller gains or lost ground in the context of market and other pressures. Demand-side resources represent important tools to leverage customer assets and efficiently increase a utility's supply of clean energy. To maintain momentum in this uneven process, all levels of the energy industry must remain committed to forward progress.

Figure 5. Customer Equipment Enabling Demand Reduction and Customer Electrification



Source: Smart Electric Power Alliance, 2023 n=58. Multiple response question. Utilities were asked specifically about the five technologies shown in the table; many noted using additional approaches such as load-control switches.

Targeting System Peak Reductions through Battery Storage Incentives

Thirty-one percent of respondents incentivize customer-sited battery storage systems and leverage them for system peak demand reduction. Whether through direct load control or market signals, grid-connected battery storage systems can help manage a utility's grid and accommodate greater deployment of carbon-free resources. By recognizing the value of battery storage systems as DSM assets, utilities should continue to craft incentives for customers to install battery storage systems that can provide grid benefits, particularly when aggregated within a virtual power plant and dispatched strategically.

16 U.S. Department of Energy. (2021). *A National Roadmap for Grid-Interactive Efficient Buildings.* https://gebroadmap.lbl.gov/

Transparent Procurement Enabling Competitive Bidding

A transparent resource procurement process is key to establishing a level playing field for renewables, energy storage and DSM resources, allowing these resources to compete with fossil fuels. When regulators and/or utilities establish fair and objective procedures for evaluating bids, a resource-agnostic, all-source procurement can enhance transparency and competition in the bidding process.[17] All-source competitive solicitations (which can allow self-build proposals) also can improve the ability of renewables, storage and DSM resources to meet the needs of the solicitation. While some utilities do not procure generation, a majority of respondents that *do procure generation* conduct a competitive, all-source procurement process (60%), as shown in Figure 6.

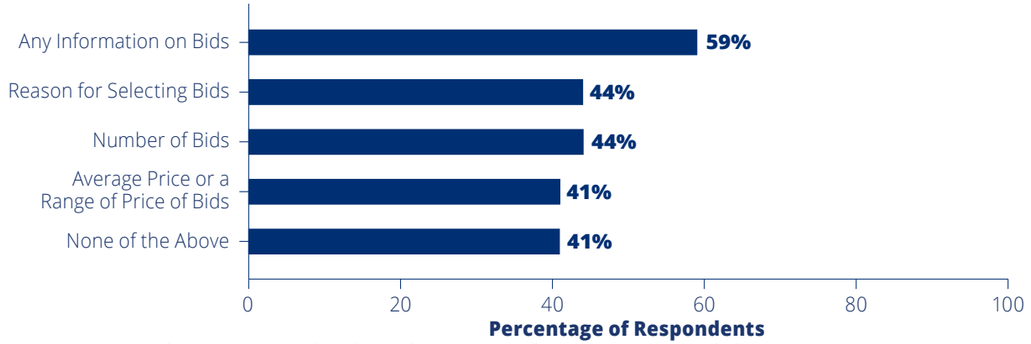
Transparent bid reporting further demonstrates a process that is fair and objective and provides regulators and the public assurances that procured resources are cost-effective. Figure 7 shows that 59% of responding utilities that conduct competitive all-source procurement release information on the price of bids received, number of bids received, reasons for selecting a bid, and/or types of technology or technologies proposed.

Regulators have a critical role to play by ensuring that the solicitation process is transparent and fair. Transparency can create processes that help utilities better compare DSM and renewable bids with more traditional types of generation bids and as that process is judged more impartially, bids with renewables, storage and DSM resources are more likely to be selected.

Figure 6. Utilities That Conduct Competitive, All-Source Procurement

Source: Smart Electric Power Alliance, 2023. n=62, utilities that procure generation. Single response question..

Figure 7. Information Publicly Reported in All-source Procurement RFP Bids



Source: Smart Electric Power Alliance, 2023. n=34 utilities that conduct competitive all-source procurement. Multiple response question.

17 Kahrl, F. (2021). *All-Source Competitive Solicitations: State and Electric Utility Practices.* Prepared for Lawrence Berkeley National Laboratory. https://emp.lbl.gov/publications/all-source-competitive-solicitations

Corporate Leadership

The *Corporate Leadership* dimension explores how utilities are navigating their evolving role in addressing the climate crisis through the lens of two areas of focus: carbon-reduction targets and corporate sustainability. The first area investigates key components and details of carbon-reduction targets, such as the establishment of interim milestones, the development of a strategic action plan to guide progress and the breadth of a utility's target. The second area includes topics ranging from emissions accounting, reporting and verification to climate change risk mitigation planning and executive compensation philosophy.

Enhanced Utility Carbon-Reduction Targets Signal Meaningful Change

The role of utility leadership in carbon-reduction planning has evolved considerably since SEPA published its first *Utility Transformation Profile* in April 2021. It is no longer a question of whether the electric industry will need to decarbonize but rather how soon it will happen and by what means. Voluntary utility commitments, along with compliance with state-level statutory requirements, have combined to add nearly 17 million U.S. electric customers to those covered under utility carbon-reduction targets since April 2021. Today, 83% of U.S. customer accounts are served by an individual utility with a carbon-reduction target, or a utility owned by a parent company with a carbon-reduction target.[18]

WHAT HAS CHANGED SINCE SEPA PUBLISHED ITS FIRST UTILITY TRANSFORMATION PROFILE IN 2021?

- Five states have established statutory 100% clean energy standards or net-zero requirements that apply to 98 electric utilities.[19]
- Utilities are expanding the breadth of their carbon-reduction targets to increase the impact of their emissions-reduction efforts.
- Utilities are establishing interim targets to infuse accountability and consistency into their emissions-reduction efforts.
- Utilities are publishing publicly available action plans that document how they propose to achieve their carbon-reduction targets.
- Utilities are partnering with third party organizations to verify that their carbon-reduction targets are in alignment with the emission-reduction pathways of the Paris Agreement.
- Utilities are accelerating the timelines of their carbon-reduction goals.
- Utilities are taking steps to standardize their emissions accounting and reporting processes.

As utility carbon-reduction targets have expanded in both quantity and substance, so has the industry's need to bolster the framework by which these targets are understood and evaluated. Through our survey, data analysis and supplemental research, SEPA has identified six key components that compose a robust carbon-reduction target.

18 SEPA. (2023). Utility Carbon-Reduction Tracker. https://sepapower.org/utility-transformation-challenge/utility-carbon-reduction-tracker/
19 Ibid. See Connecticut, Illinois, Maryland, Oregon, and Rhode Island.

SEPA Utility Transformation CHALLENGE

Key Components of Utility Carbon-Reduction Targets

TARGET TYPE

- Definition: The categorization of a carbon-reduction target; including, net-zero, carbon-neutral, carbon-free, GHG-free, relative emissions reduction, etc.
- Significance: The target type is an indicator of the actions a utility will take to decarbonization (e.g., a 100% renewable energy target does not include nuclear energy, a net-zero target will utilize offsetting, such as carbon sequestration or carbon credit trading, etc.).

TARGET BREADTH

- Definition: A measure of the emissions pool that a utility is including in its target (e.g. emissions from owned generation, emissions from purchased power, etc.).
- Significance: The breadth of a carbon-reduction target is a clear indicator of the emissions reduction impact the target will have.

ACHIEVEMENT YEAR

- Definition: The year by which a utility has committed to achieving its ultimate carbon-reduction target.
- Significance: Utilities are accelerating the final target years of their commitments, in some cases by ten plus years.

INTERIM TARGETS

- Definition: A near-term metric/milestone established to define the necessary intermediate progress needed to achieve the long-term target.
- Significance: A measure of accountability that defines progress towards a long-term target.

ALIGNMENT WITH SCIENCE (THIRD-PARTY VERIFICATION)

- Definition: Verification that a utility's target is in alignment with the emission-reduction levels needed to meet the Paris Agreement's goal of limiting global warming to "well below 2°C."
- Significance: Third-party verification of a target's alignment with science indicates a credible commitment to reducing emissions.

ACTION PLAN

- Definition: A detailed plan outlining the actions needed to achieve a utility's carbon-reduction target.
- Significance: Critical, accountability mechanism required to define the necessary planning framework needed to achieve a utility's carbon-reduction target.

To see the latest utility carbon-reduction commitments, visit the SEPA Carbon Reduction Tracker.

Key Trends

Utilizing the key components of utility carbon-reduction targets as evaluation criteria, SEPA identified a number of trends as utilities take meaningful action to commit to, plan for and achieve carbon-reduction targets.[20]

MORE UTILITIES SHOULD CONSIDER TARGETING INDIRECT, SCOPE 3 EMISSIONS

As the industry moves out of the "conceptual phase" of target-setting, utilities are defining target breadth more clearly, and are expanding the target impacts by addressing indirect emissions sources. Forty-one percent of the utility respondents utilize the GHG Protocol Corporate Standard to define the target scope emissions.[21] This emerging standardization of utilities' targets is a critical step in establishing a methodical and transparent approach to identify and target emissions across their value chain.

The proportion of utility-owned generation compared to purchased power contributing to a utility's retail supply and the carbon intensity of those two sources will impact the distribution of emissions across a utility's value chain—highlighting the importance for utilities to define the breadth of their targets. As Figure 8 illustrates, only 15% of utility respondents include Scopes 1, 2 and 3 emissions in their carbon-reduction target. This is significant considering that, as of 2019, Scope 3 emissions (e.g., emissions from the generation of purchased electricity consumed by end-use customers) accounted for 75% of the U.S. power sector's total carbon emissions.[22]

The GHG Protocol Corporate Standard[23]

Originally published in 2001, the GHG Protocol Corporate Standard is a well-established framework developed to provide guidance to companies constructing a GHG emissions inventory. Two primary objectives of the standard are to provide companies with information that can be used to develop an emissions reduction strategy, and to increase consistency and transparency with emissions accounting and reporting.

A key component of the GHG Protocol Corporate Standard is its use of Scopes 1, 2 and 3 emissions categories to define and delineate direct and indirect emissions sources. Examples of emission sources within these categories for electric utilities include:

- **Scope 1 (direct) emissions:** utility-owned generation, other sources of fuel combustion including company owned vehicles, etc.
- **Scope 2 (indirect) emissions:** purchased electricity used to power company facilities.
- **Scope 3 (indirect) emissions:** purchased electricity sold for end-use customer consumption, production of purchased materials, etc.

20 Operating companies with a parent company were surveyed as one entity for the Corporate Leadership dimension. Due to this survey structure, the number of respondents is lower compared to the other three dimensions.

21 Only includes utility and utility parent companies with distribution functions.

22 Mulder, B., & Winston, K S&P Global. (2022, March 29). *Feature: US power utilities begin adding Scope 3 emissions to climate goals.* S&P Global. https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/032922-feature-us-power-utilities-begin-adding-scope-3-emissions-to-climate-goals

23 World Business Council for Sustainable Development and World Resources Institute. (2004). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.* Revised Edition. https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

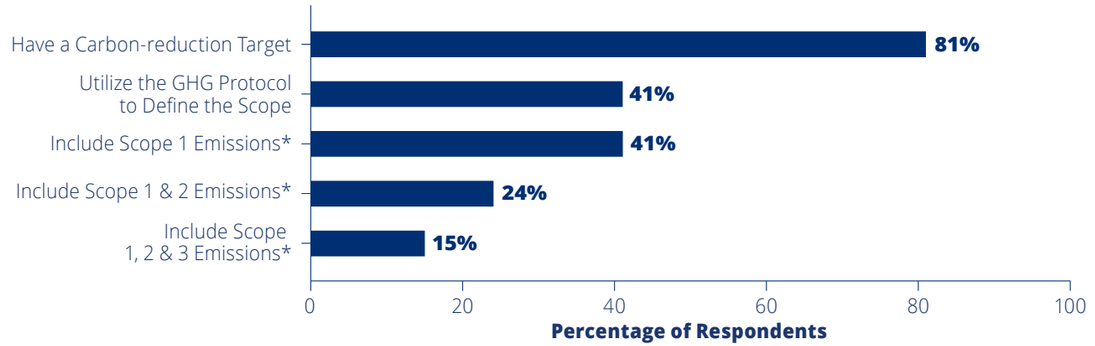
As the industry advances toward a carbon-free electricity system, it will be critical for utilities to expand their targets to include Scopes 1, 2 and 3 emissions. This is especially the case at utilities for whom a significant portion of their retail sales are derived from purchasing fossil fuel based electricity.

UTILITIES SHOULD ALIGN THEIR CARBON-REDUCTION TARGETS WITH CLIMATE SCIENCE

In 2015, world leaders at the United Nations Climate Change Conference in Paris adopted a legally binding climate treaty subsequently known as the Paris Agreement. The Paris Agreement established a climate mitigation framework with a goal of limiting global warming to "well below" 2°C above pre-industrial levels, in order to avoid the worst effects of climate change. Organizations such as the Science Based Targets initiative (SBTi) have established a framework for companies, including electric utilities, to define the decarbonization pathways needed to meet the goals of the Paris Agreement.[24]

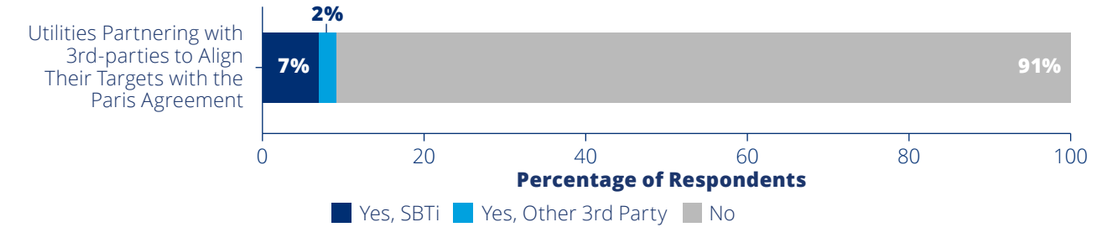
A small but growing number of utilities are partnering with third parties such as the SBTi to verify that their carbon-reduction commitments align with the emissions-reduction pathways consistent with the Paris Agreement's goal of holding the increase in the global average temperature to "well below" 2°C above pre-industrial levels. However, Figure 9 shows that 91% of utility respondents have not verified their carbon-reduction target's alignment with the Paris Agreement. Utilities should take this action to ensure they are planning for adequate emissions reductions on a timeline consistent with the emissions scenarios defined by the Intergovernmental Panel on Climate Change (IPCC).

Figure 8. Scopes 1, 2 & 3 Emissions in Utility Carbon-Reduction Targets



Source: Smart Electric Power Alliance, 2023. n=54. Categories are mutually-exclusive. *Includes both full and partial emissions scopes. Responses in figure apply only to utilities that define their carbon-reduction targets using the GHG Protocol Corporate Standard.

Figure 9. Leading Utilities Are Partnering with Third Party Organizations to Align Their Carbon-Reduction Targets with the Paris Agreement



Source: Smart Electric Power Alliance, 2023. n=44 utilities with a carbon-reduction target. Single response question. Responses in figure only apply to utility and utility parent companies with distribution functions.

24 Science Based Targets initiative (SBTi). (n.d.). *Science Based Targets: Driving Ambitious Corporate Climate Action*. https://sciencebasedtargets.org Accessed on December 1, 2022

ESTABLISHING INTERIM TARGETS CREATES AN ACCOUNTABILITY MECHANISM FOR UTILITIES

For the majority of utility respondents with a carbon-reduction target, the timeframe to achieve the ultimate target extends at least 20 years into the future. With such a long horizon, the establishment of interim targets is critical to providing additional accountability, and is an indication of the granularity of utility planning and how utilities are accounting for evolving technology and market factors that will affect their ability to meet the ultimate target.

Eighty-three percent of utility respondents with an achievement year of 2031 or later have established at least one interim target. Some utilities are going further, by establishing both near- and medium-term targets, citing the importance of consistent, transparent milestones in their decarbonization journeys. Twenty-five percent of utility respondents with a final target date of 2031 or later have established at least two interim targets (Figure 10).

Figure 10. Leading Utilities Are Setting Interim Targets

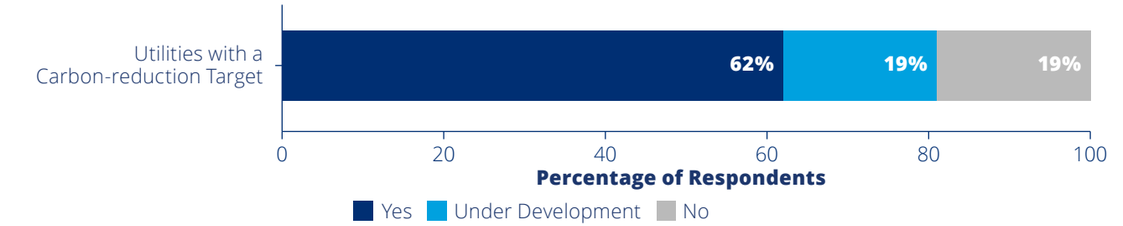
Source: Smart Electric Power Alliance, 2023. n=36. Multiple response question.

ACTION PLANS TAKE MULTIPLE FORMS AS UTILITIES PLAN FOR THEIR CARBON-REDUCTION TARGETS

In 2018, Xcel Energy became the first utility parent company in the U.S. to announce a goal to reach 100% carbon-free electricity by 2050.[25] This was a major milestone that led to the adoption of carbon-reduction targets by utility companies across the country. In their infancy, these targets were very much in the "visionary" stage, with many utilities signaling that plans to achieve these targets were in the pipeline. Today, utilities are focusing resources dedicated to developing actionable plans to support and guide progress towards their targets, with more than 60% of respondents having a published action plan (Figure 11).

Additionally, three states have approved legislation requiring electric utilities to file plans to meet decarbonization mandates. For example, in Washington, under the state's Clean Energy Transformation Act (CETA), electric utilities are required to file a clean energy implementation plan (CEIP) every four years. CEIPs must include plans for reaching the clean electricity

Figure 11. Utilities Develop Action Plans to Achieve Carbon-Reduction Targets



Source: Smart Electric Power Alliance, 2023. n=48 utilities with a carbon-reduction target. Single-response question.

25 State of Minnesota Our Minnesota Climate. (n.d.). *Xcel Energy commits to 100% clean energy by 2050.* https://climate.state.mn.us/xcel-energy-commits-100-clean-energy-2050

mandates set by the CETA, which include specific EE and DR targets as well as an overall target of achieving 100% renewable or zero-carbon power generation by 2045.[26]

Action plans can take a variety of forms. Some utilities include carbon-reduction plans as part of broader annual reports, such as corporate sustainability reports (CSR), or an integrated resource plan (IRP). However, other utilities publish stand-alone plans, often presenting more robust detail than when contained within CSRs or IRPs. These stand-alone plans often include details beyond the traditional decarbonization modeling scenarios, including information on community and stakeholder engagement, emerging technology implementation, risk mitigation strategies and customer affordability.

Setting and strengthening utility commitments to carbon reduction is just the beginning. Delivering on carbon-reduction commitments is an implementation challenge of unprecedented scale and complexity for an industry first built on carbon-based inputs. Utilities must consider a diverse set of strategies to enable decarbonization for not only their own operations but also for upsteam supplier and downstream consumer emissions.

Corporate Leadership Goes Beyond Carbon-Reduction Targets

Carbon-reduction targets are a strong signal of a utility leadership's commitment to achieving a carbon-free electricity system. Additional actions will strengthen that commitment. Leading utilities are taking a comprehensive approach to transforming company culture and their commitment to customers. These include actions such as tying executive compensation to reduced carbon emissions, establishing internal governance structures to manage climate change risks and improve climate resilience and improving company emissions accounting and reporting processes.

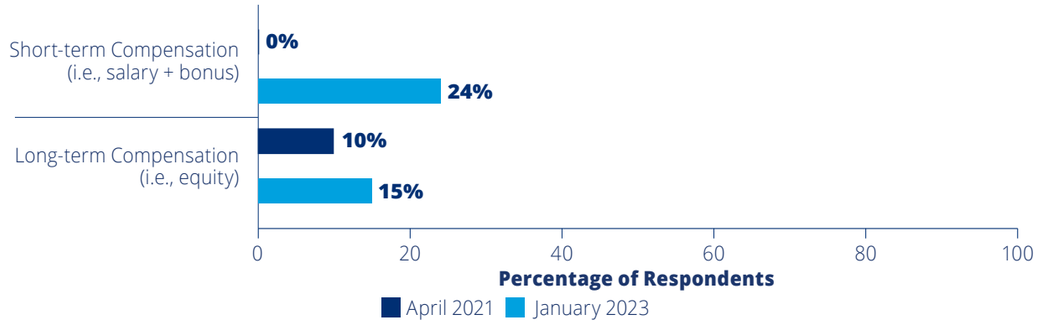
In 2014, Xcel Energy became the first utility parent company in the United States to tie executive compensation to reduced emissions.[27] As shown in Figure 12, over the past 21 months, the number of respondent utilities directly tying short-term compensation to reduced emissions has grown by nearly 25 percentage points. Also, the number tying long-term executive compensation to reduced emissions has grown by five percentage points. Such a compensation philosophy elevates the priority a utility places on shrinking its carbon footprint. However, while improvement has been made, survey results demonstrate that alignment of executive incentives with reduced emissions are still lacking.

The extreme weather events associated with climate change are posing significant challenges for electric utilities. In response, utilities are recognizing the importance of establishing clear governance structures and responsibilities related to climate change mitigation and adaptation.

26 Washington Utilities and Transportation Commission. (2022). Clean Energy Implementation Plans (CEIPs). https://www.utc.wa.gov/regulated-industries/utilities/energy/conservation-and-renewable-energy-overview/clean-energy-transformation-act/clean-energy-implementation-plans-ceips

27 Anderson, D., Kasper, M., Pomerantz, D., et al. (2020). *Pollution Payday: Analysis of executive compensation and incentives of the largest U.S. investor-owned utilities.* Energy and Policy Institute. https://www.energyandpolicy.org/wp-content/uploads/2020/09/Pollution-Payday-Analysis-of-executive-compensation-and-incentives-of-the-largest-U.S.-investor-owned-utilities.pdf

Figure 12. Executive Compensation Philosophies Begin to Shift as Utilities Prioritize Decarbonization Efforts



Source: Smart Electric Power Alliance, 2023. n=59. Multiple response question.

Utilities are incorporating climate change into their future modeling and planning processes to build an energy system that is resilient and adaptable to a changing climate (Figure 13).

SEPA's analysis of utility emissions reporting and accounting processes shows that leading utilities are not only reporting their emissions on an annual basis, but are also utilizing standardized reporting frameworks and submitting their emissions for external verification. Many of these leading utilities are utilizing the GHG Protocol Corporate Standard to account and report their emissions.

Accurate and standardized emissions data is the backbone of tracking and benchmarking progress towards carbon-reduction targets. However, as illustrated in Figure 14, only 36% of utility respondents annually submit their emissions for external verification.

Figure 13. Utilities Are Establishing Internal Governance Structures to Manage Climate Change Risks and Improve Climate Resilience

54% OF ALL RESPONDENTS

Established governance to **manage climate change risks**

41% OF ALL RESPONDENTS

Established governance to **improve climate resilience**

32% OF ALL RESPONDENTS

Established governance to **manage climate change risks and improve resilience**

Source: Smart Electric Power Alliance, 2023. n=59. Multiple response question.

Figure 14. Leading Utilities Take Steps to Standardize and Externally Verify Emissions Disclosures

66% OF ALL RESPONDENTS

Reported carbon emissions to a 3rd party on an annual basis

36% OF ALL RESPONDENTS

Submitted carbon emissions annually for external verification

Source: Smart Electric Power Alliance, 2023. n=59. Multiple response questions.

Utilities should consider tying executive compensation to carbon-reduction targets, establish internal governance to manage climate change risks and improve climate resilience, and standardize and submit carbon emissions for third-party verification on an annual basis.

Modern Grid Enablement

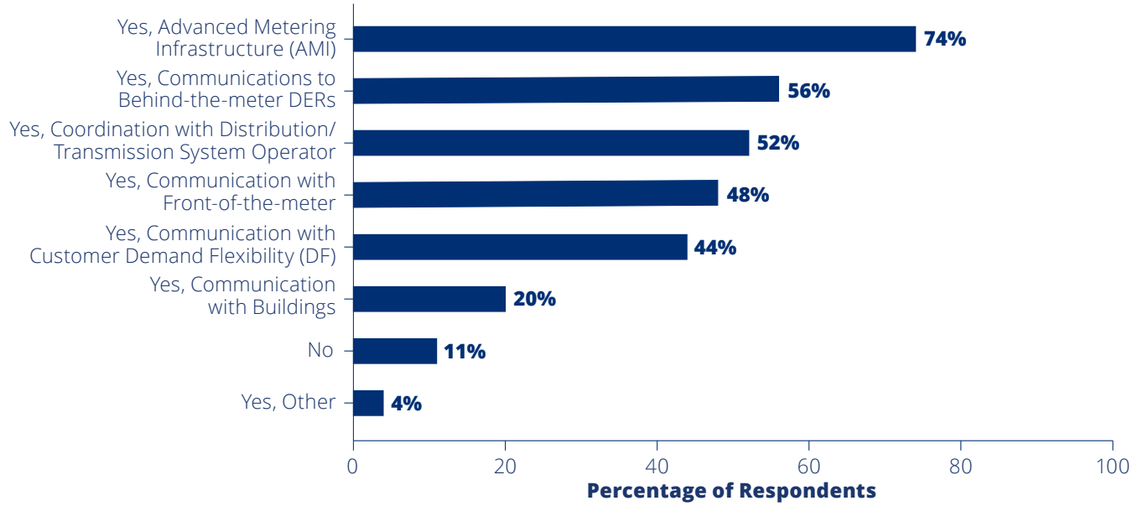
Advancing a modern, flexible and integrated grid underpins the transformation. Utilities' ability to achieve 100% carbon-reduction targets, adapt to climate risk, and respond to evolving customer needs will hinge on the grid's capabilities, design, planning and operations. For example, significant shifts in customer energy usage might be approaching faster than previously anticipated, with the passage of the Bipartisan Infrastructure Law in 2021 and the Inflation Reduction Act in 2022 driving increased adoption of DERs since SEPA's first Utility Transformation Profile. Projected DER growth and industry efforts to meet ambitious carbon-reduction targets are just two of many factors driving the evolution of how utilities plan for, operate and invest in the grid.

DER Management & Communication Capabilities

Increased digitalization is necessary for utilities to increase their visibility, efficiency and capabilities. Examples include: extending digital access to customers, expanding metering capabilities (e.g., advanced metering infrastructure, or AMI, distribution SCADA), digitizing and automating DER interconnection processes, and more broadly, obtaining more granular visibility into the electricity system and the actions of customers and technology and solution providers.

Increased DER penetration requires increased visibility into two-way power flows within the electric utility distribution system. Utilities are increasing their visibility into the distribution system operations to varying degrees. The vast majority (91%) of utility respondents have implemented at least one program or project to increase distribution system visibility. Figure 15 shows that advanced metering infrastructure (AMI) (74%) is the most often-cited program or project, followed by communications to behind-the-meter (i.e., customer-sited) DERs (56%).

Figure 15. Visibility into Distribution System Operations



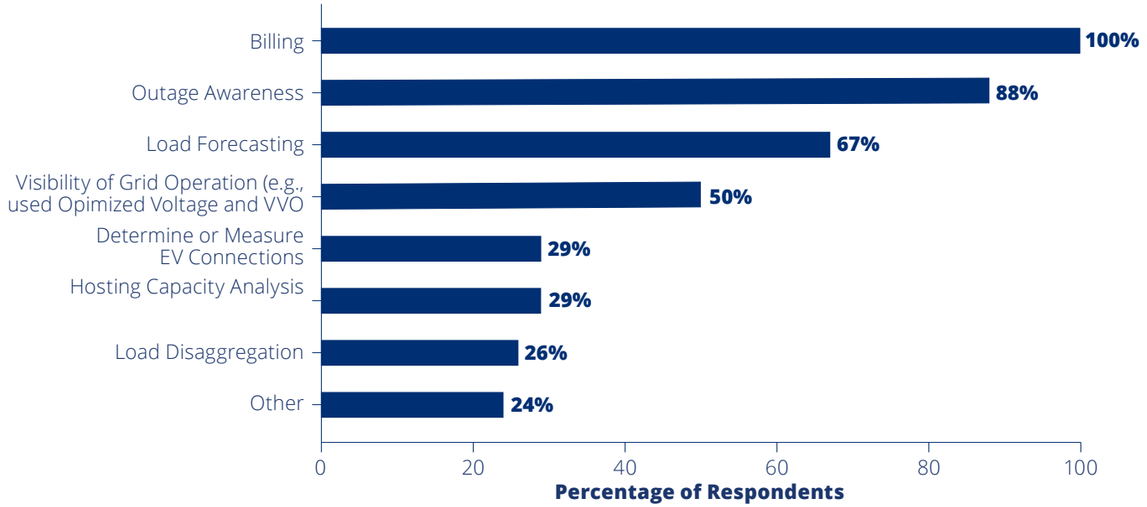
Source: Smart Electric Power Alliance, 2023. n=54 distribution utilities. Multiple response question. The AMI response rate includes utilities who answered fully deployed (60%) and partially deployed (14%) AMI.

AMI may become necessary to better monitor/model customer demand, enable load flexibility, as well as to enable monitoring/modeling of DER supply that does not require active supervisory control and data acquisition (SCADA) monitoring.[28]

Industry stakeholders have long viewed automated data—processed through technology such as AMI—as an important step in grid modernization. However, beyond billing efficiencies, most respondents are not maximizing their investments in data automation by supporting key, beneficial grid applications. Figure 16 shows that a majority of utility respondents reported using AMI data for outage awareness (88%) and load forecasting (67%) but far fewer rely on AMI data for hosting capacity analysis (29%) or load disaggregation (26%). More than 64% of the nation's electric meters are advanced.[29]

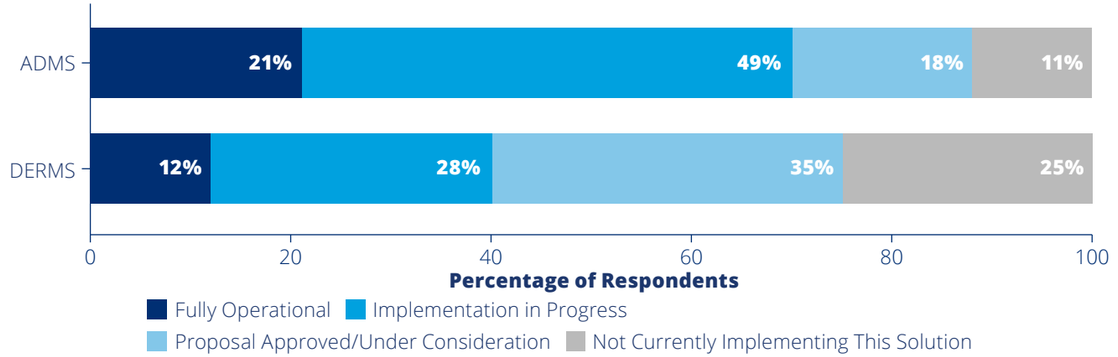
As DERs proliferate, utilities will likely require more powerful tools to increase visibility within their distribution systems. Examples of these include both advanced distribution management systems (ADMS) and distributed energy resource management systems (DERMS). Once deployed, these tools may increase distribution system automation and help solve power system issues by integrating various equipment, devices, and data into a centralized system. As Figure 17 shows, ADMS and DERMS have been fully implemented by only 21% and 12% of utility respondents, respectively.

Figure 16. Utilizing AMI Data



Source: Smart Electric Power Alliance, 2023. n=42 distribution utilities who indicated full AMI deployment; 60% of utility respondents reported full AMI deployment. Multiple response question.

Figure 17. Implementing ADMS and DERMS Solutions



Source: Smart Electric Power Alliance, 2023. n=61 distribution utilities. Single response question.

28 EPRI. (2022, January). *Enhancing Energy System Reliability and Resiliency in a Net-Zero Economy*. http://mydocs.epri.com/docs/public/EPRI-Report-EnhancingEnergySystemReliability-20210804.pdf

29 FERC. (2022). *2022 Assessment of Demand Response and Advanced Metering*. https://cms.ferc.gov/industries-data/electric/power-sales-and-markets/demand-response/reports-demand-response-and. Accessed on January 13, 2023.

Furthering the adoption of ADMS and DERMS represents a unique opportunity for utilities to increase their distribution management system capabilities. These capabilities include—but are not limited to—the following:

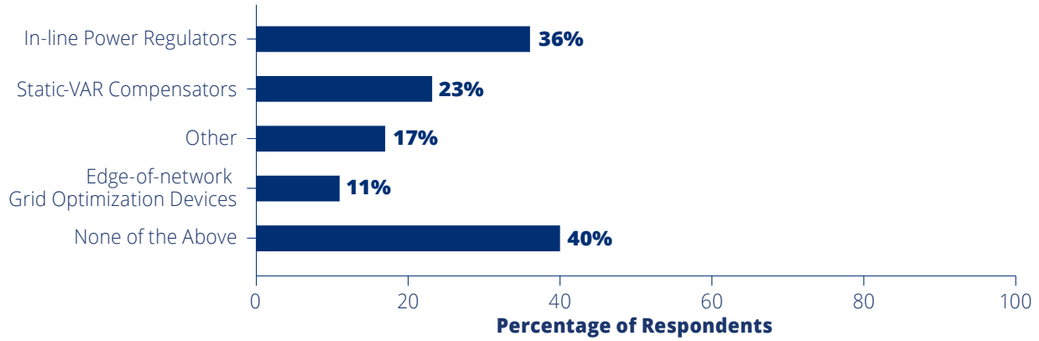
- ADMS
  - Fault location, isolation and service restoration on distribution circuits
  - Integration with volt-VAR optimization equipment
  - Smart faulted circuit indicator integration
- DERMS
  - Provides simplified data presentation of the granular details of DER assets
  - Automates individual and aggregated DERs
  - Provides operational information for individual or aggregated DER assets

Grid-Enabling Technology

As customer-sited DER penetration rises, utilities must choose between integrating customer-sited DERs as grid assets or leaving them as unintegrated customer assets. Responding utilities are demonstrating that partnerships with customers can encourage customers to invest in clean technologies to help manage the distribution system efficiently, and leverage these technologies for optimization and wider grid benefits.

Higher DER penetration levels also require maintaining grid stability by keeping voltage and frequency within acceptable limits. Newer technologies offer possible solutions by keeping voltages within acceptable limits, achieving desired power factor, and minimizing distribution losses. Forty percent of utility respondents have not yet employed any advanced volt-VAR control technologies; in-line power regulators (36%), static-VAR compensators (23%), and edge-of-network grid optimization devices (11%) have been deployed by less than half of utility respondents (Figure 18).

Figure 18. Advanced Volt-VAR Control Technologies



Source: Smart Electric Power Alliance, 2023. n=53 distribution utilities. Multiple response question.

NEW TECHNOLOGIES CAN HELP OPTIMIZE THE TRANSMISSION BULK POWER NETWORK

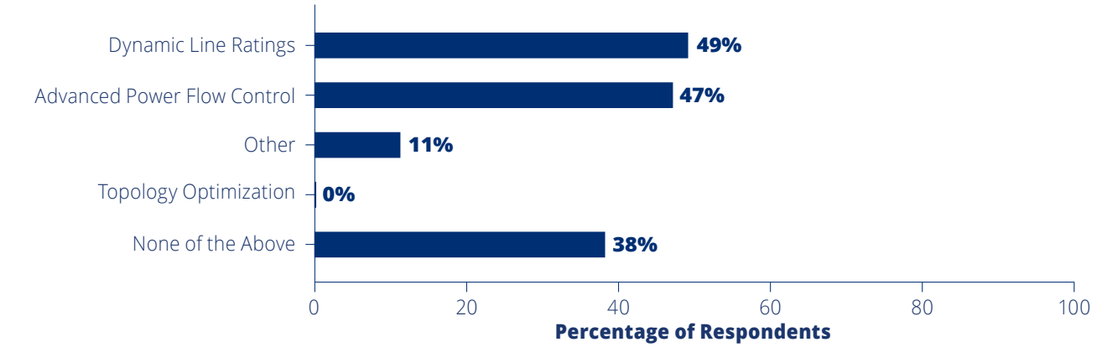
Transmission-owning utilities are adopting grid-enabling technologies to optimize the transmission bulk power network; however, as Figure 19 shows, significant opportunities remain as 38% of transmission-owning utility respondents have not adopted dynamic line ratings, advanced power flow control or topology optimization technologies. Among surveyed utilities, dynamic line ratings (49%) and advanced power flow control (47%) represent the most adopted transmission grid-enabling technologies.

Storage as a grid-enabling technology can increase the capacity, efficiency, or reliability of both transmission facilities and distribution systems (e.g., to enhance feeder-level system reliability and resiliency, and reduce the duration and frequency of customer outages).

Forty-eight percent of transmission-owning utility respondents indicated that they operate or plan to operate a front-of-meter (FTM) energy storage system (ESS) on the bulk transmission system (BTS) to provide either system relief and/or BTS upgrade deferrals (Figure 20). More distribution utility respondents indicated that they operate or plan to operate an FTM ESS on the distribution system (61%) compared with utilities who do not plan to deploy energy storage on the distribution system (39%).

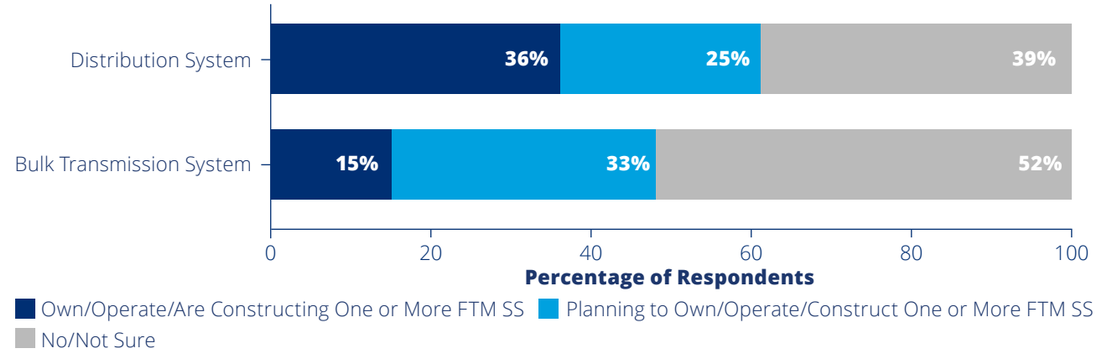
The Inflation Reduction Act of 2022 should catalyze energy storage as a grid-enabling technology by qualifying stand-alone energy storage for a 30% investment tax credit (ITC) over a 10-year fixed term.

Figure 19. Grid-enabling Transmission Technologies



Source: Smart Electric Power Alliance, 2023. n=45 transmission-owning utility respondents. Multiple response question.

Figure 20. Front-of-the-meter Energy Storage Systems



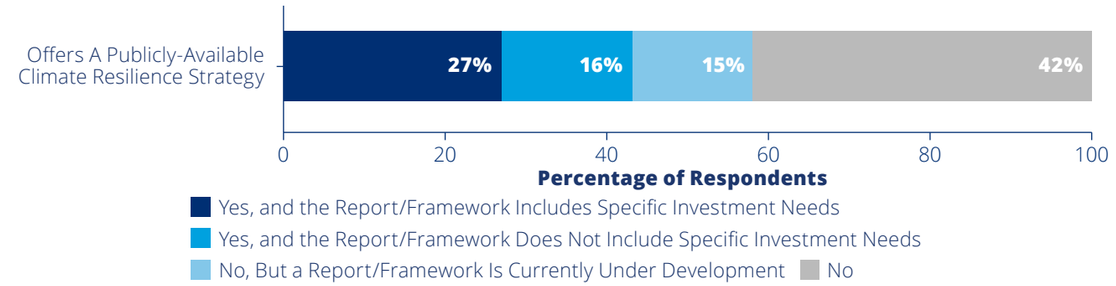
Source: Smart Electric Power Alliance, 2023. n=61. Single response question..

Reliability and Resilience

Leading utility respondents are developing climate resilience strategies to specify additional investment needs and align investment strategies with broader, long-range planning and resilience planning goals; however, Figure 21 shows that a majority of utilities have not published a climate resiliency strategy report or framework that includes specific investment needs; only 27% have.

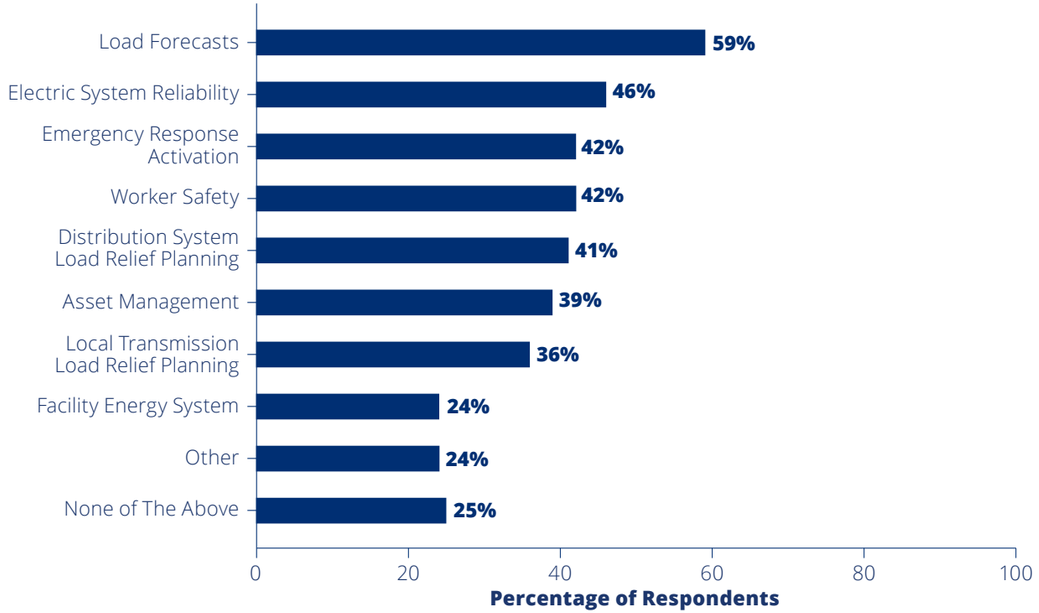
Adaptation strategies aim to minimize the negative impacts of climate change (e.g., sea level rise and increasing temperatures) on systems and communities. Figure 22 shows responding utilities' efforts to assess the impact of climate change on utility operations. Only 25% of responding utilities indicated that they do not consider the impact of climate change on operations.

Figure 21. Publicly-available Climate Resilience Strategy



Source: Smart Electric Power Alliance, 2023. n=67. Single response question.

Figure 22. Assessing Climate Change Impacts on Utility Operations



Source: Smart Electric Power Alliance, 2023. n=59. Multiple response question.

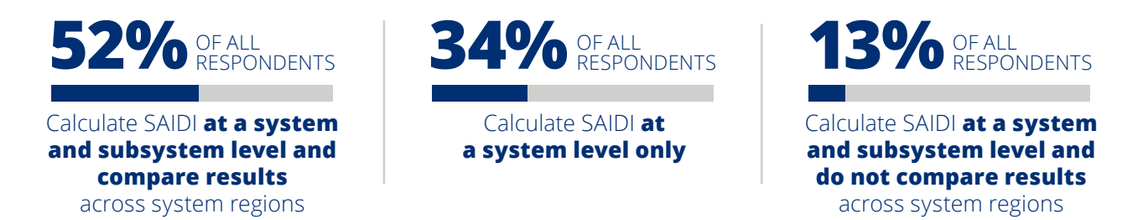
INTRA-SYSTEM RELIABILITY AND MINIMUM SERVICE LEVELS

Utilities calculate and report multiple system and customer reliability metrics including the system average interruption duration index (SAIDI). This metric provides visibility at both an overall distribution system and regional (i.e., sub-system) level and can be used to validate that system investments are impacting customers equitably. Consistent with the IEEE definition, SAIDI excludes major event days (MED), interruptions lasting 5 minutes or less in duration, and planned interruptions. Fifty-two percent of utility respondents calculated SAIDI at a regional (sub-system) level and compared results across system regions (Figure 23).

Customer minimum service level metrics focus on locational reliability, resiliency, and improvements for customers who have experienced repeat or long-duration outages. A metric addressing system performance for those customers whose performance does not meet reliability expectations ensures that no communities lag behind other areas of a utility's service territory. Only 10% of responding utilities indicated they have developed and calculated a utility-specific minimum customer service level of reliability.

SEPA encourages utilities and policymakers to review the reliability and resilience metrics established in Minnesota and Illinois as part of those states' performance-based ratemaking processes; these metrics go beyond those typically calculated by utilities and help provide additional measures of progress for improving reliability and resilience.

Figure 23. Intra-System Reliability



Source: Smart Electric Power Alliance, 2023. n=61. Single response question.

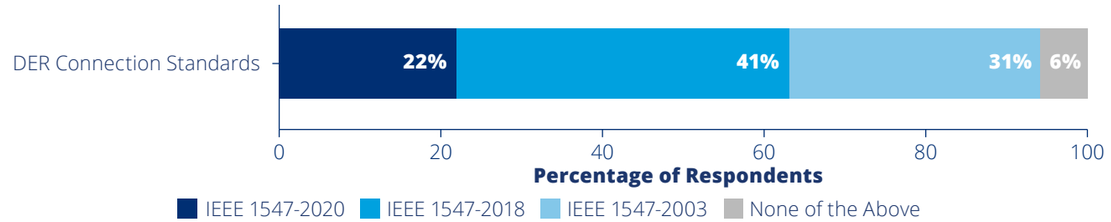
Distribution-level Interconnection Procedures and Processes

Important elements of an efficient interconnection process include offering different tiers of review, offering simpler processes for smaller systems, allowing e-submissions, including storage, and allowing an online portal for viewing application progress.

The vast majority of responding utilities offer differing tiers of review (97%) and simpler procedures for smaller projects (95%). A majority of utilities allow for e-submissions (75%) and include specific provisions for BTM battery storage (66%). However, only 47% of responding utilities indicated that they offer an online, automated interconnection process (Figure 25).

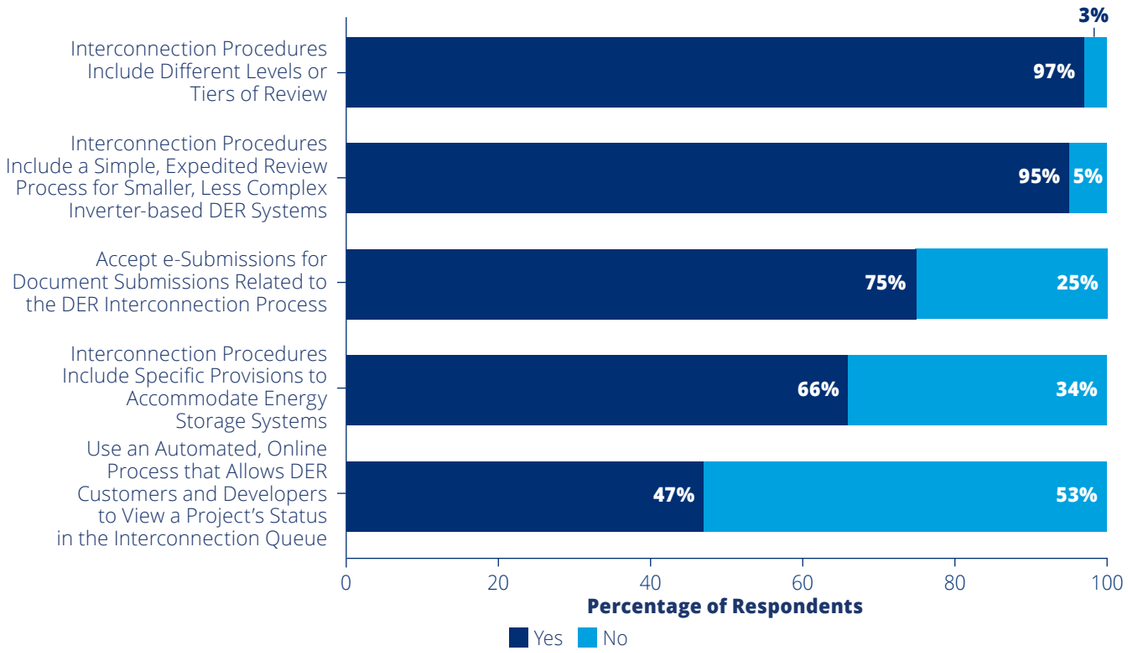
Incorporating the standard for IEEE 1547-2020 is a critical step towards creating a more modern distribution ecosystem for DERs. The standard enhances the performance and capabilities of DERs; requirements for DER interconnection submissions meeting this standard are indicative of utilities with more advanced and modernized distribution systems. Twenty-two percent of utility respondents have implemented IEEE 1547-2020; forty-one percent of utilities require IEEE 1544-2018 and 31% still require only the IEEE 1547-2003 standard (Figure 24).

Figure 24. DER Interconnection Standards



Source: Smart Electric Power Alliance, 2023. n=54. Single response question.

Figure 25. Interconnection Procedures and Processes



Source: Smart Electric Power Alliance, 2023. n=61. Single response questions.

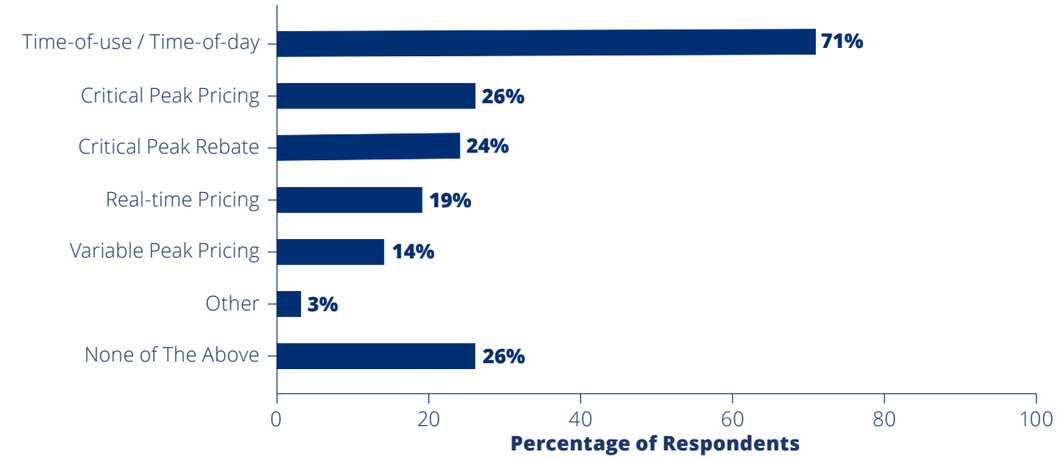
Rate Design Innovation & Affordability

Time-varying rates allow utilities to shape loads, which becomes increasingly important as additional DERs are added to utility systems. Figure 26 shows that time-of-use / time-of-day rates are by far the most popular time-varying rate offered to customers, with 71% of respondents indicating their offering. Twenty-six percent of utility respondents indicated that they do not offer any type of time-varying rate.

An emerging area of interest to electric utilities is the adoption of electric vehicles, as companies and individuals are increasingly switching to electric vehicles. This transition represents both a financial opportunity (via increased revenue from electricity sales) and a concern, as utilities must plan for the additional load which can be substantial, particularly for larger vehicles. As a result, many utilities are offering time-varying rates for electric vehicles to encourage off-peak charging. Although time-of-use rates for charging electric vehicles are offered by 42% of utility respondents, 44% indicated that they do not offer any type of time-varying rates for EVs, as of 2022 (Figure 27).

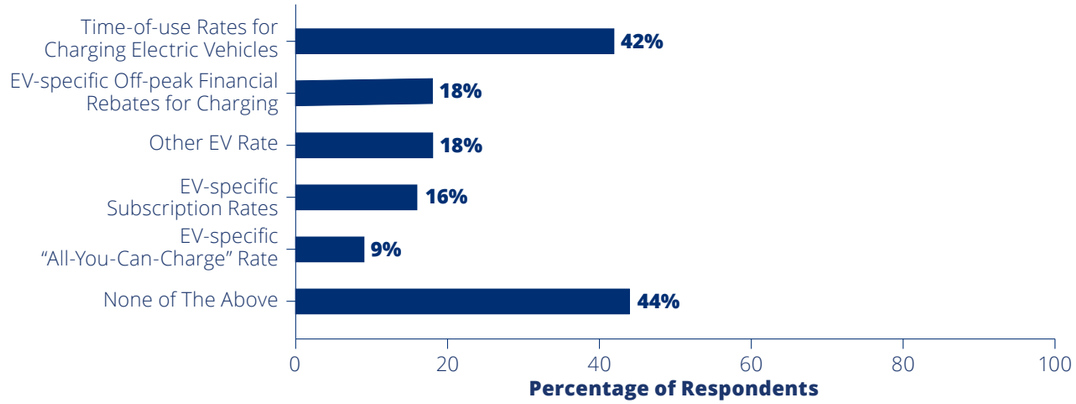
In addition to innovative rate design, affordability is another critical consideration for the energy transition, as many elements of the energy transition put upward pressure on rates. Combined with a general societal concern of creating an equitable energy transformation for all, many utilities are considering additional options to sustain energy affordability. Responding utilities offer a range of residential bill affordability and energy bill payment assistance programs and services, with donation programs (62%), arrearage management or forgiveness (57%) and bill or rate discounts based on income eligibility (51%) (Figure 28).

Figure 26. Time-Varying Rates



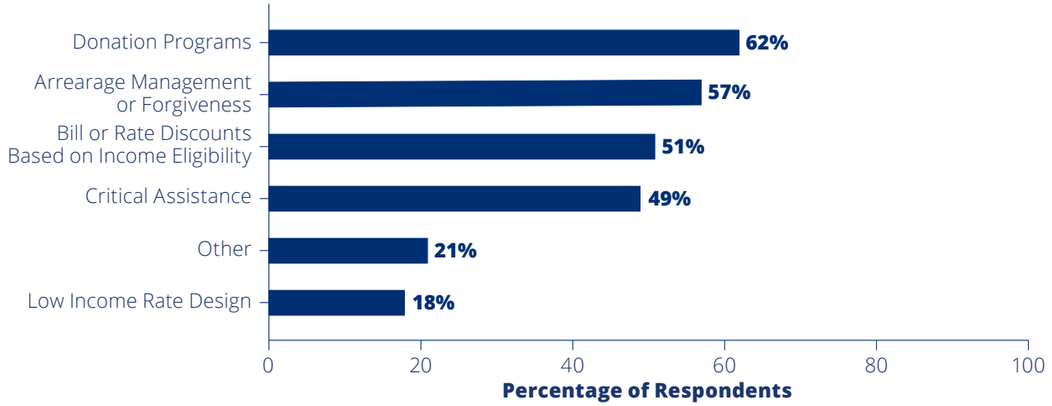
Source: Smart Electric Power Alliance, 2023. n=58 distribution utilities with retail customers. Multiple response question.

Figure 27. Electric Vehicle Time-Varying Rates



Source: Smart Electric Power Alliance, 2023. n=57 distribution utilities with retail customers. Multiple response question.

Figure 28. Residential Bill Affordability and Energy Bill Payment Assistance Programs and Service



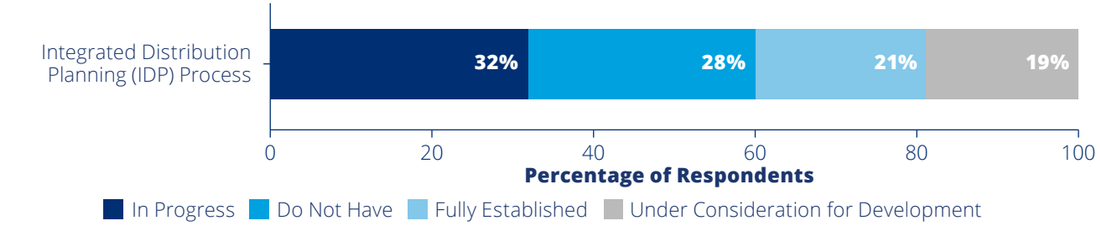
Source: Smart Electric Power Alliance, 2023. n=53 distribution utilities with retail customers. Multiple response question.

Utility Planning & Forecasting

As utilities incorporate increasing amounts of DERs into their systems, integrated distribution planning (IDP) becomes both necessary and important. Utility respondents indicated that integrated distribution system planning is still relatively nascent, with only 21% responding that an IDP is fully established. Utility respondents also indicated near-term improvements are likely, with 32% indicating that an IDP process is in progress and 19% of utility respondents are considering developing an IDP process (Figure 29).

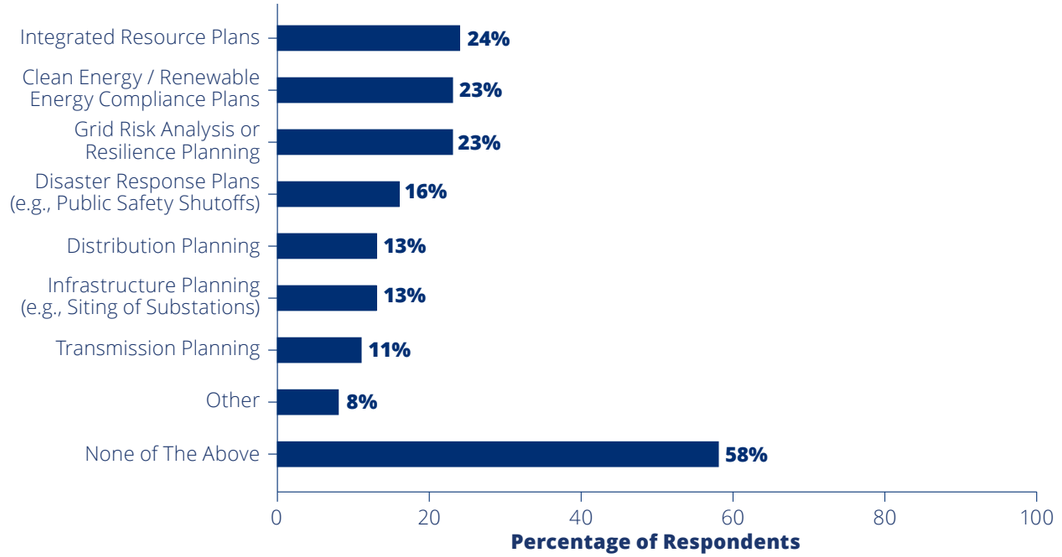
Utility respondents indicated that they are beginning to take steps to consider equity across utility planning activities. Respondents are beginning to use metrics and indicators to better understand equity within the context of utility integrated resource plans, clean/renewable energy compliance plans, and grid risk analysis or resilience planning, as Figure 30 shows. Yet, 58% of respondents reported that they have not considered equity as it relates to utility planning activities.

Figure 29. Integrated Distribution Planning



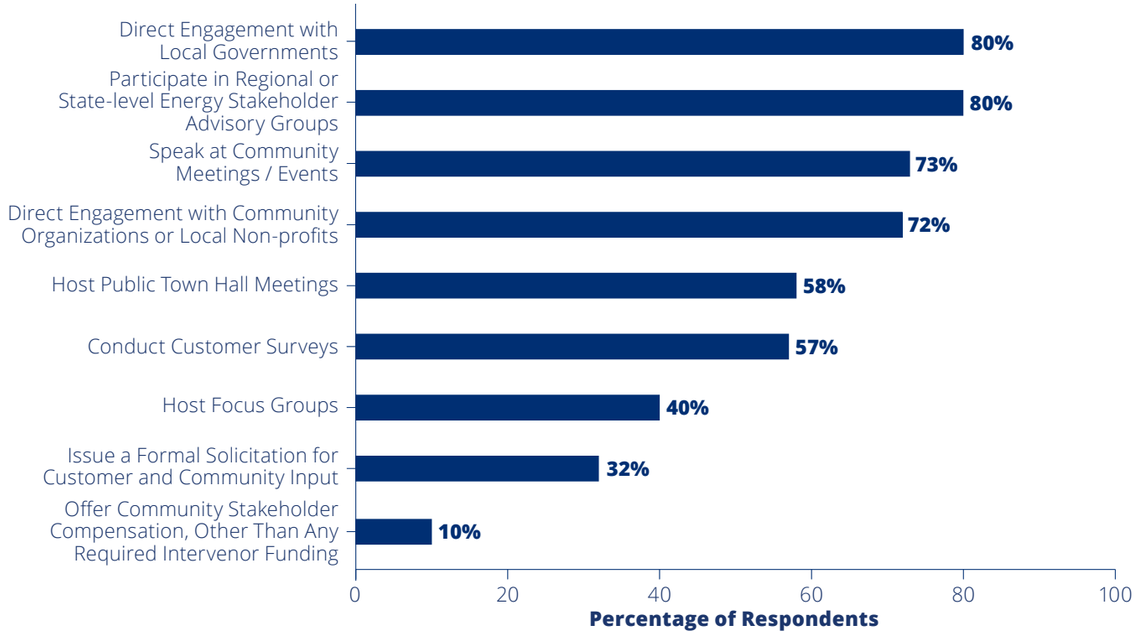
Source: Smart Electric Power Alliance, 2023. n=57 distribution utilities. Single response question.

Figure 30. Equity and Utility Planning Activities



Source: Smart Electric Power Alliance, 2023. n=67. 10% responded "Other." Multiple-response question.

Figure 31. Utility Respondents Take Varied Steps to Engage Community



Source: Smart Electric Power Alliance, 2023. n=67. Multiple response question. 10% responded "Other."

Utilities are steering much of the energy transition, and will be increasingly called to include stakeholders in setting priorities and measuring progress.[30] For example, respondents indicated that their most-used approaches for gathering community input on long-term planning include local and regional forums and advisory groups (Figure 31). To align with energy equity goals in the federal Justice40 Initiative,[31] the Inflation Reduction Act of 2022, and state policies, utilities will need to leverage—and expand beyond—these forums.

SEPA encourages policymakers to review the policy approaches deployed for carbon-free and utility system planning evolution in Oregon, Washington, Minnesota and elsewhere, particularly as it relates to robust engagement and capturing the multiple benefits of resilience, carbon reduction and community-sited infrastructure.

30 The Energy Equity Project. (2022). *Energy Equity Framework: Combining data and qualitative approaches to ensure equity in the energy transition.* University of Michigan – School for Environment and Sustainability (SEAS). https://energyequityproject.com/wp-content/uploads/2022/08/220174_EEP_Report_8302022.pdf

31 The White House. (n.d.). *Justice40: A Whole of Government Initiative.* https://www.whitehouse.gov/environmentaljustice/justice40/ Accessed on December 1, 2022

Aligned Actions and Engagement

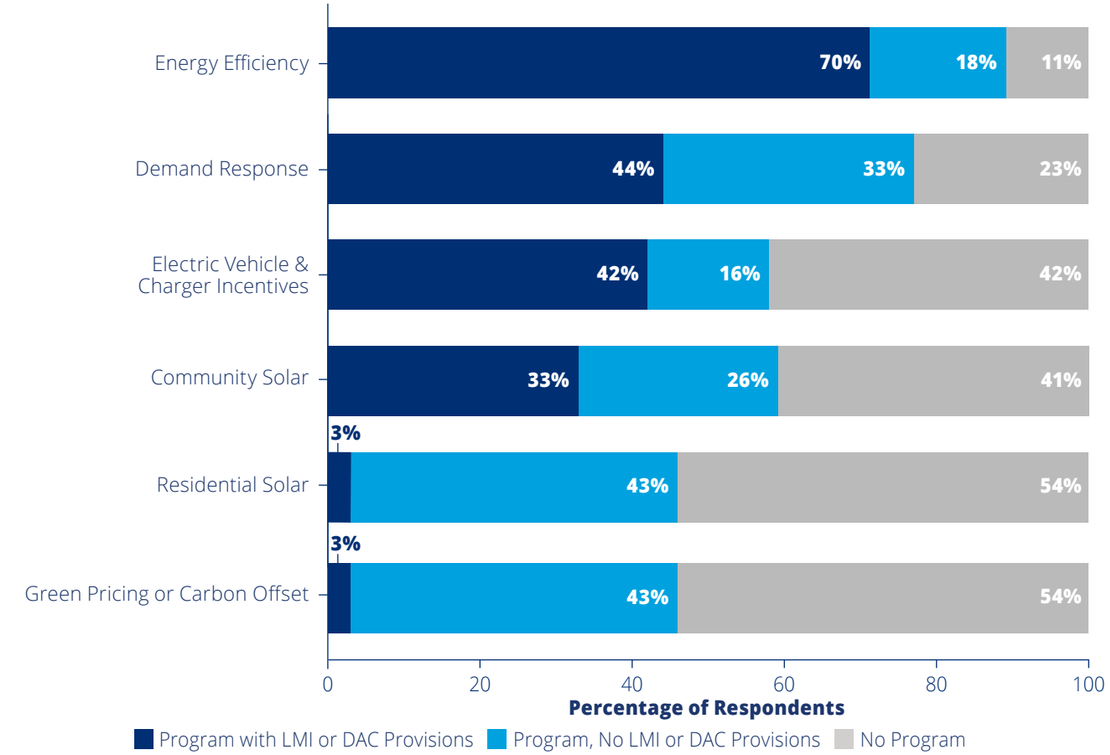
The path to a clean and modern grid runs through and beyond utility operations. Core to the transformation, utilities are equipped to help suppliers, customers, and communities fulfill their own roles in realizing the transformation. At the same time, utilities need the support of regulatory and business stakeholders to innovate and realign their actions with carbon-reduction. And, with greater social and economic attention on energy justice and climate change, utilities are increasingly pressed to focus on strategies that braid equity and resilience with safety, reliability, and affordability.

Customer Clean Energy Programs

Customer clean energy programs are instrumental in helping utilities and their customers achieve carbon-reduction targets. Forward-thinking utilities are reassessing their portfolio of customer programs and reconfiguring them to support deeper carbon reduction. They are blending typical offerings for energy efficiency, demand response/flexibility, renewable energy and beneficial electrification,[32] scaling pilot programs to bring new approaches to market faster, and listening closely to what customers need from their utility in an ever more connected energy system. Increasingly, utilities engage their customers as partners in both identifying and implementing solutions.

Most responding utilities offer their residential customers a complement of energy efficiency, DR, EV, solar, storage, and/or green pricing programs. Reflecting decades of energy efficiency

Figure 32. Utilities Taking Steps to Reach LMI Customers and Other Disadvantaged Communities Through Residential Programs



Source: Smart Electric Power Alliance, 2023. n=61 utilities with distribution customers.

32 SEPA. 2022. Accelerating Coordinated Utility Programs for Grid-Interactive Efficient Buildings: Practitioners' Perspectives. Prepared with support from the U.S. Department of Energy and Lawrence Berkeley National Laboratory.

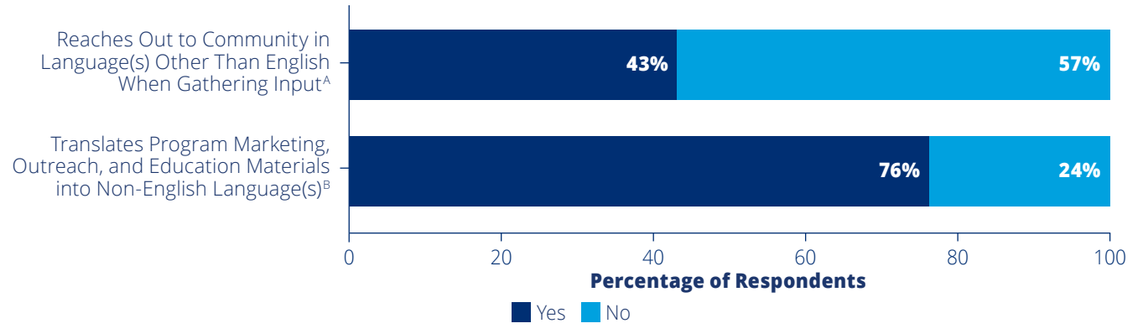
policy that has strived to include and benefit low- and moderate-income (LMI) customers, respondents most often reported taking extra steps to engage disadvantaged customers in their energy efficiency programs (Figure 32).

Despite these and other efforts by policymakers and program administrators, access to and engagement in energy- and cost-savings programs remains inequitable at a national level.[33,34] To ensure no community or region is left behind in the transition to carbon-free buildings and transportation, there is an immediate need to expand investment across all paths to residential carbon reduction. Such an expansion should emphasize solutions reflecting community needs and set goals for better reaching historically underserved communities.

Customer engagement has the potential to build the relationships that utilities will increasingly need to call upon when steering the transformation in the long term. Opportunities for more equitable engagement exist in every customer touchpoint. Increasing engagement often means adjusting processes to better meet customers where they are, via best-practices like locating meetings in the community, compensating community groups for their time and contributions, streamlining enrollment, and expanding translation and language access (Figure 33).

Cultivating a shared understanding of utilities' role in energy equity will take time and sustained effort. Region by region, utilities and stakeholders are contemplating matters including priorities, funding, implementation, valuation[35] and evaluation.

Figure 33. Utilities Can Expand Translation to Increase Access



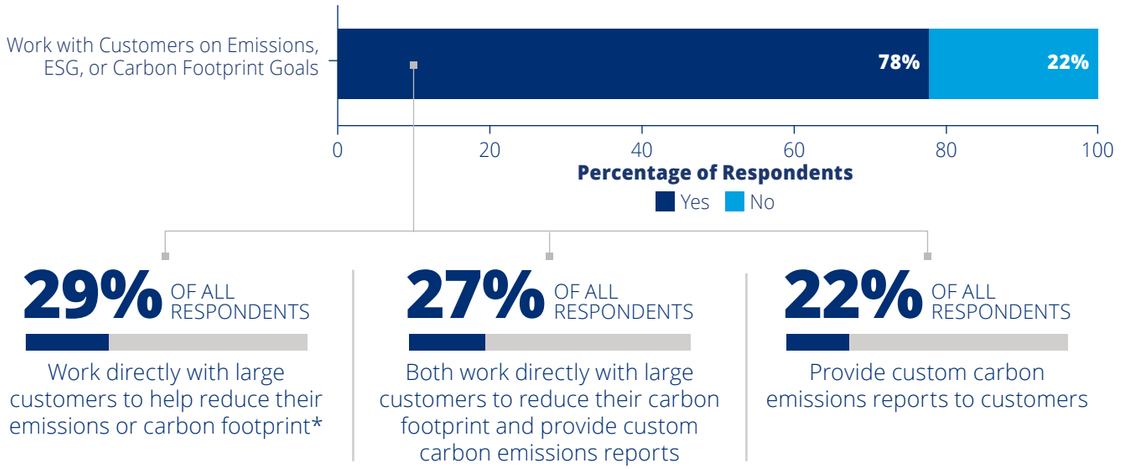
Source: Smart Electric Power Alliance, 2023. A: n=60 respondents asked about long-term planning. B: n=51 offering energy efficiency programs. Analysis of multiple response questions.

33 Morales, D., & Nadel, S. (2022). *Meeting the Challenge: A Review of Energy Efficiency Program Offerings for Low-Income Households.* American Council for an Energy-Efficient Economy. https://www.aceee.org/research-report/u2205
34 Forrester, S., Barbose, G. L., O'Shaughnessy, E., et al. (2022, November 1). *Residential Solar-Adopter Income and Demographic Trends: November 2022 Update.* Lawrence Berkeley National Lab. https://emp.lbl.gov/news/new-berkeley-lab-report-solar-adopter-2
35 For example, *Distributional Equity Analysis Advisory Committee* organized by Synapse Energy Economics, Lawrence Berkeley National Laboratory, and E4TheFuture. https://emp.lbl.gov/publications/distributional-equity-analysis

Engaging Larger Customers on High-Impact Actions

Utilities and commercial and industrial businesses may find that they have mutual interests in managing energy costs, increasing grid flexibility and resilience, and reducing emissions. If utilities fail to present their customers with a variety of attractive clean-energy options, customers may seek these options from other providers. Encouragingly, 78% of utility respondents engage large customers about emissions reduction, often in the context of helping customers meet their ESG commitments (Figure 34).

Figure 34. Utility Respondents Work with Large Customers on Emissions Reduction

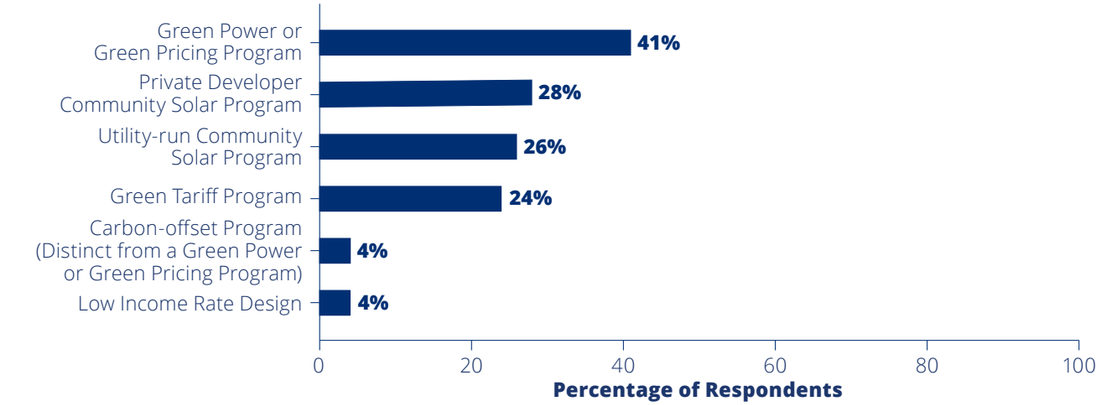


Source: Smart Electric Power Alliance, 2023. n=59. Multiple-response questions. *As part of or in addition to formal program options.

Compared to overall engagement on customer carbon footprints, fewer responding utilities provide non-residential customers with formal clean energy programs or tariffs (Figure 35), although we expect the sophistication of programs to soon increase. No respondents offered an approved 24/7 carbon-free energy program at the time of the survey, but respondents have since started filing proposals.

In addition to their own large, centralized generation or wholesale supply mix, utilities have signaled an increasing interest in owning and maintaining customer-sited distributed energy resources (DERs), and one-third of responding utilities offer them today (36%). Most offers pertain to EV charging infrastructure, or behind-the-meter solar and/or storage. To maximize grid benefits, several respondents have structured arrangements in which the utility may access the DER for demand response. Where approved, utility ownership of DERs is an opportunity

Figure 35. Clean Energy Programs for Non-residential Customers



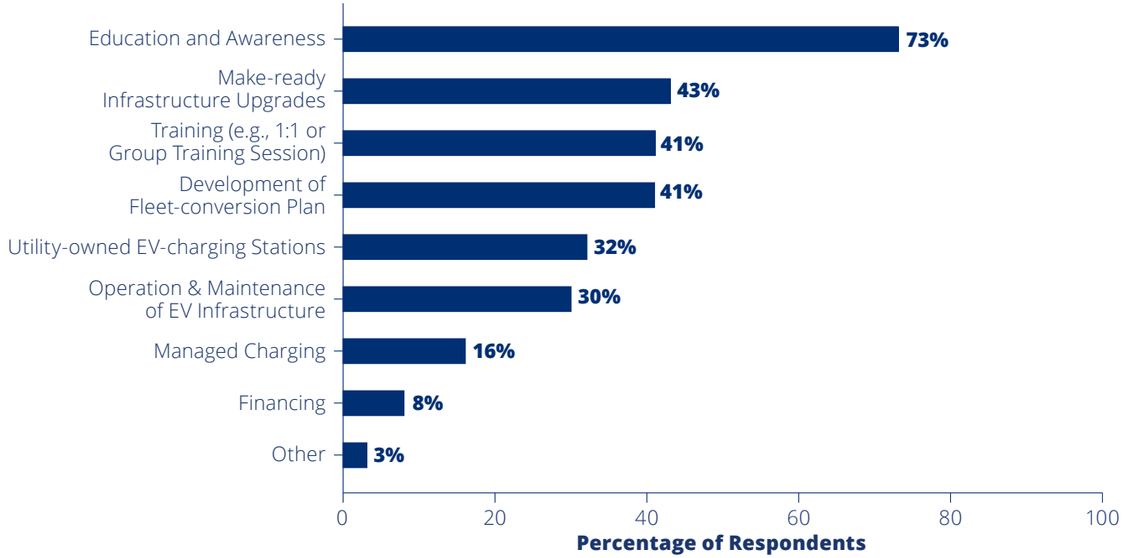
Source: Smart Electric Power Alliance, 2023. n=61. Multiple response question.

for utility business model innovation that aligns with broader utility carbon-reduction goals and expands market options for customers. In other areas, similar services are commonly available from technology vendors.

Similarly, respondents are moving to meet or anticipate demand with services for customers with fleet vehicles (Figure 36). Fleet services facilitate proactive, two-way communication with customers while providing utilities with the visibility needed to forecast and manage bulk interconnection requests typical of commercial fleet electrification.

Engaging key accounts on carbon reduction, demand flexibility, and opportunities to save energy and money provides an opening for utilities to strengthen customer relationships and improve customer satisfaction.[36]

Figure 36. Respondent Fleet Services Offerings Go Beyond Education



Source: Smart Electric Power Alliance, 2023. n=37 utilities offering fleet services. Multiple response question.

36 J.D. Power. (2022, November 16). *Business Customer Satisfaction with Electric Utilities Deteriorates as Rates Rise, J.D. Power Finds: Leading Utilities Find Ways to Offset Price Increases, Maintain Satisfaction with Relationship Management.* https://www.jdpower.com/business/press-releases/2022-electric-utility-business-customer-satisfaction-study

Preparing for Transportation Electrification

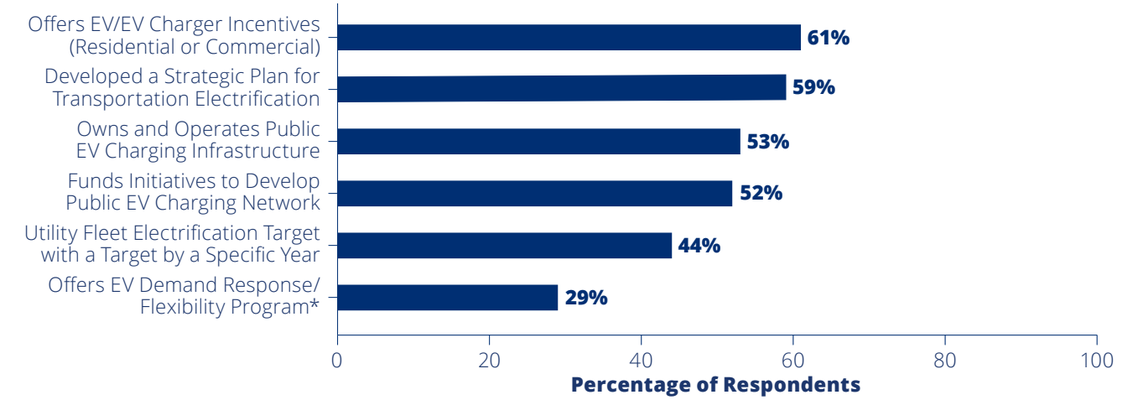
As markets for EVs evolve from niche to mainstream, utilities play an important role in meeting consumer demand from EV charging loads and have an opportunity to make use of EVs as a flexible and intelligent grid resource. At the same time utilities are meeting infrastructure demand, they must also constructively engage and build trust with end consumers. Four out of five responding utilities have established one or more formal transportation electrification programs or initiatives (Figure 37).

All utilities have a role in transportation electrification, whether they provide generation, transmission, and/or distribution. While utilities serving distribution customers can promote incentives for EV and charging equipment, all utilities can collaborate in regional strategy, such as establishing regional EV charging networks, and can demonstrate leadership by setting their own fleet electrification targets. Utilities of all types are staffing up accordingly: 58% of respondents with a strategic plan reported that they have the equivalent of at least one full-time staff working on transportation electrification for every 100,000 customers that they serve.[37]

Responding utilities also lead by example as they electrify their own fleets. Survey responses suggest electrification will continue, as 42% of respondents have adopted a public commitment to electrify a specific minimum percentage of their own light- and medium-duty fleet vehicles by a specific year.

As with other elements of the transition to a carbon-free energy system, utilities can best orchestrate these varied efforts by establishing a strategic plan for transportation electrification and dedicating the resources required to implement the plan. Many respondents (59%) have

Figure 37. Responding Utilities Engage Customers about Transportation Electrification



Source: Smart Electric Power Alliance, 2023. n=64 respondents except * which is based on n=58. Multiple response questions. 86% selected at least one action.

37 Among those with a plan and sharing data on transportation electrification resourcing. SEPA's *Utility Best Practices for EV Infrastructure Deployment* report (2020) includes best practices for developing an EV strategic plan and building a utility TE team, with case studies of small, medium, and large team structures. https://sepapower.org/resource/best-practices-for-utility-ev-infrastructure-deployment/

a strategic plan for transportation electrification, with more on the way. Strategic plans that are sufficiently detailed, transparent and accessible are crucial to align utility efforts with community needs and evolving consumer habits. However, more utilities should center community input and access through best practices such as those adopted by roughly one-half of responding utilities:

- Incorporate public input solicited by the utility (50% of respondents with a plan),
- Detail plans and actions to serve low- to moderate-income households and other underserved communities (60% of respondents with a plan), and
- Make the plan publicly available (60% of respondents with a plan).

These practices are just a starting point to sustain community engagement and craft programs that do not exacerbate the practical and economic burdens that vulnerable community members already face. SEPA's *Benchmarking Equity in Transportation Electrification* provides a toolkit for program managers to understand equity concerns and considerations, identify stakeholder roles, set benchmarks, evaluate program design, and measure progress.

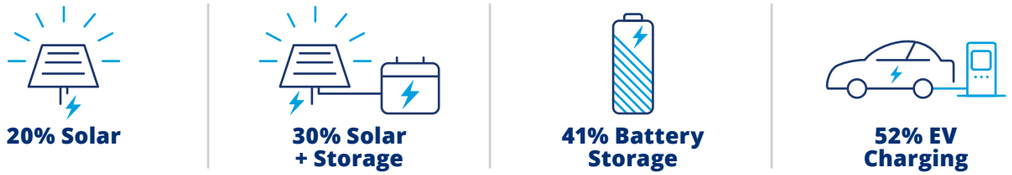
Survey respondents lead the way by electrifying light-duty fleets. Though only 1% of the 250 million U.S. cars, SUVs, and light-duty trucks on the road are electric,[38] a median of 5% of utility respondents have an electrified light-duty fleet.[39]

Leveraging Strategic Partnerships to Facilitate the Transformation

Now, more than ever, utility leaders find that external partnerships are critical to their organizations' transformation. This is particularly true for utilities pursuing the most ambitious carbon-reduction targets, which have a pressing need for innovative strategies, technologies, and customer services poised to achieve deep carbon reduction—including the final 10% to 20% of baseline emissions, commonly known as "the last mile."

The rapid growth of carbon-free generation, storage and facilitating technology expands the set of tools to pursue the energy transition. A variety of market-ready DERs already exist, and scaling up their adoption is important, in the near term. Fifty-nine percent of responding utilities are engaging corporate partners to increase deployment of at least one market-ready DER and electrification-enabling technology in their service territories (Figure 38).

Figure 38. Responding Utilities Engage with External Companies to Increase Behind-the-meter Use of DERs in Their Service Area



Source: Smart Electric Power Alliance, 2023. n=64. Multiple response question. Other: 3%.

38 Cage, F. (2022, February 7). *The long road to electric cars.* Reuters. https://www.reuters.com/graphics/AUTOS-ELECTRIC/USA/mopanyqxwva/; Blanco, S. (2022, August 8). *Electric Cars' Turning Point May Be Happening as U.S. Sales Numbers Start Climb.* Car and Driver. https://www.caranddriver.com/news/a39998609/electric-car-sales-usa/

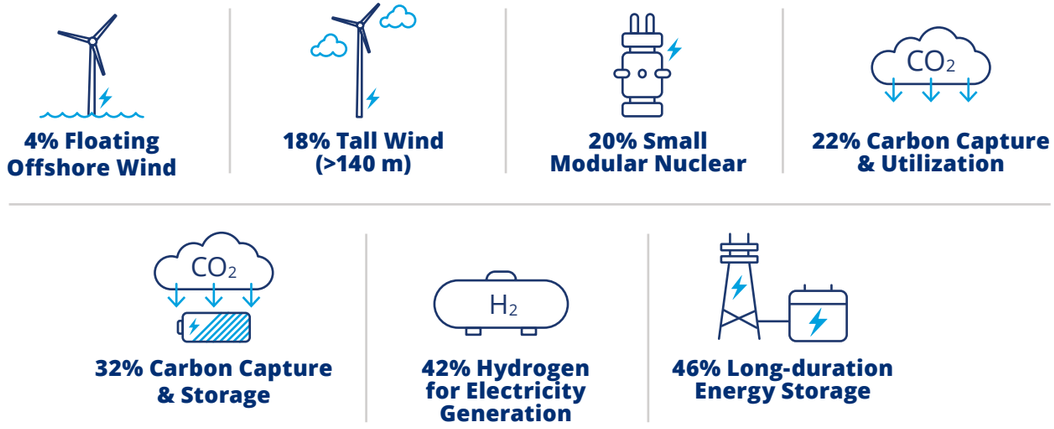
39 Smart Electric Power Alliance, 20232. Based upon reported percentages of fleet vehicles electrified per operating company in 2022 (range: 0% to 50%).

In the long term, the industry likely will need additional solutions deployed at increasing scale. Responding utilities recognize the need to test a variety of emerging carbon-free technologies to explore which can be scaled to facilitate achievement of the "last mile." Of respondents, 69% reported piloting or investing in at least one early-stage carbon-free technology.[40] Long-duration energy storage and hydrogen for electricity generation have attracted the widest interest among survey respondents (Figure 39).

Still, carbon-reduction forecasts highlight the need to pursue multiple paths.[41] Utility carbon-reduction plans are formally recognizing the need for utility investment in technology to facilitate the transition. Utilities leading the way on transformation understand that they must also collaborate with others to succeed. Top-scoring utilities have developed a robust network of research and development partners: they are engaged in an average of five activities to advance early-stage carbon-free technology compared to an average of one activity, among other respondents (Figure 40).

As Inflation Reduction Act implementation begins, smaller utilities, cooperatives and public power have new opportunities to pursue funding and demonstrate carbon-free technology suited to their territory and aligned with communities' carbon-reduction, climate change, health, and resiliency goals.

Figure 39. Responding Utilities Invest in Carbon-neutral Technology



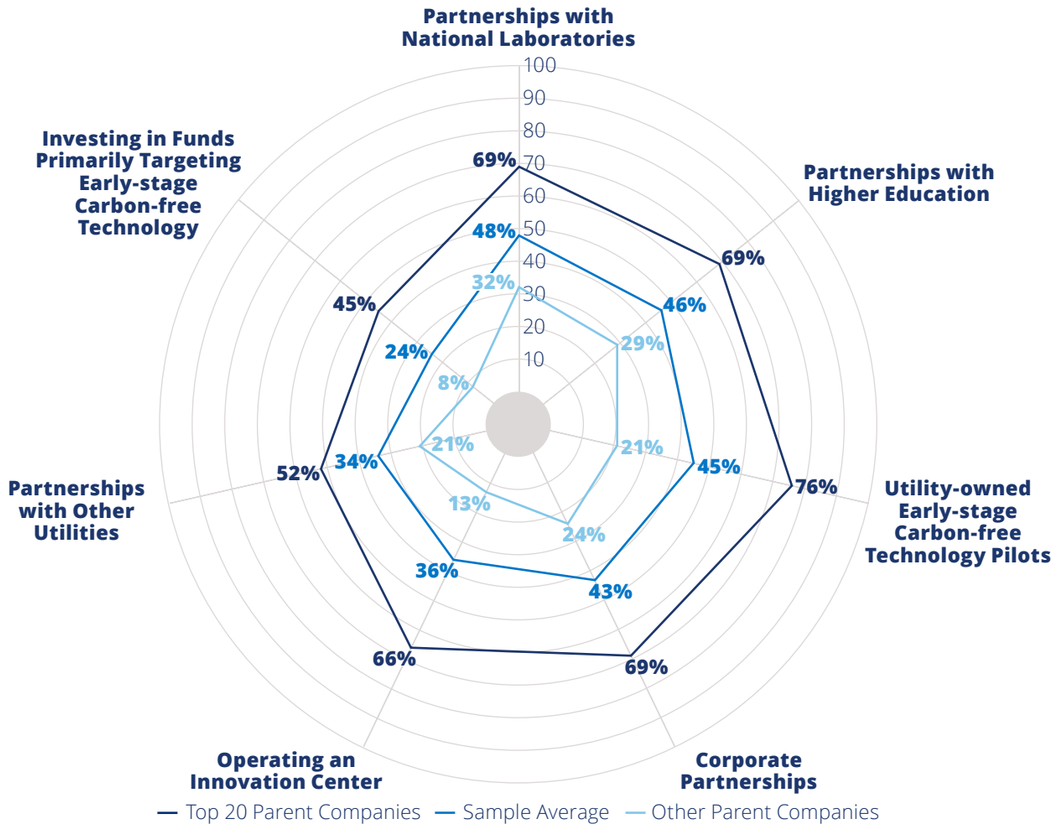
Source: Smart Electric Power Alliance, 2023. n=50. When asked to name the type of technology they are investing in, 66% of respondents investing in carbon-free technology named the type. Other: 20%.

To position themselves for long-term success, utilities need the support of regulatory and governing authorities and investors, the trust of their customers and communities, and a diverse and entrepreneurial workforce and network.

40 Includes direct investment, operating pilots, or operating demonstration projects.

41 E3. (2021, October) *Decarbonization Pathways to Meet New York's Emissions Targets.* https://www.ethree.com/e3-develops-decarbonization-pathways-to-meet-new-yorks-emissions-targets/; McKinsey (2021, October 14). *Net zero by 2035: A pathway to rapidly decarbonize the US power system.* https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/net-zero-by-2035-a-pathway-to-rapidly-decarbonize-the-us-power-system; Denholm, P., Brown, P., Cole, W., et al. (2022). *Examining Supply-Side Options to Achieve 100% Clean Electricity by 2035.* National Renewable Energy Laboratory. NREL/TP6A40-81644. https://www.nrel.gov/docs/fy22osti/81644.pdf

Figure 40. Leading Utility Respondents Collaborate to Innovate



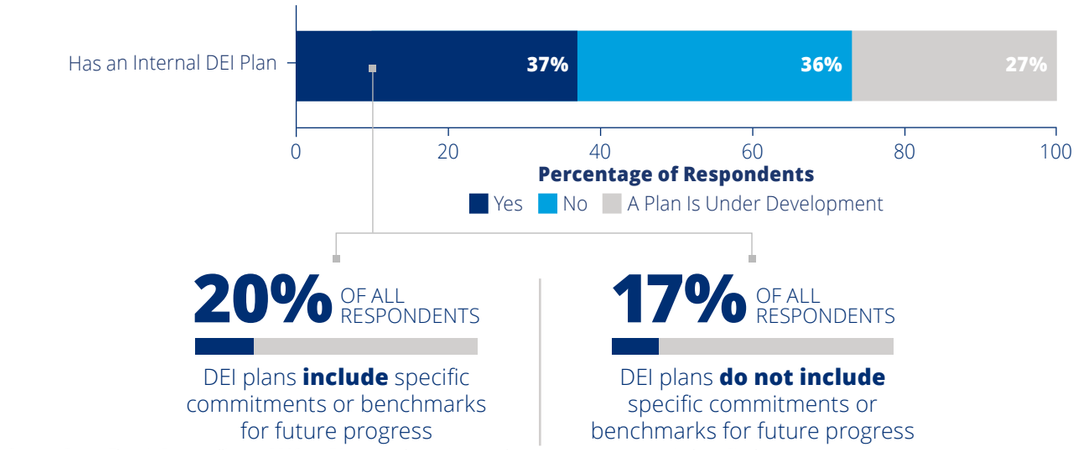
Source: Smart Electric Power Alliance, 2023. n=66 respondents. Multiple-response question. Respondents also support start-ups/incubators (10% overall) and other activities (4% overall). Several respondents take none of these steps (14% of the top utility respondents and 44% of others).

Internal and External Workforce Readiness

Utility transformation needs a robust workforce with individuals equipped to imagine, plan and ultimately construct, operate and maintain the grid of the future. Training and supporting utility staff will be a continuous and ongoing requirement.

Diverse and supportive workplaces promote creativity, innovation and inclusion—all of which are needed for utilities to advance in the energy transition. However, just 37% of respondents had published an organizational diversity, equity and inclusion (DEI) plan, and only half of these had set specific commitments or benchmarks for future progress (Figure 41). SEPA encourages the 27% of respondents developing plans to finalize them, include benchmarks, and dedicate the internal resources to achieve successful implementation.

Figure 41. Utility Respondents Developing Internal DEI Plans

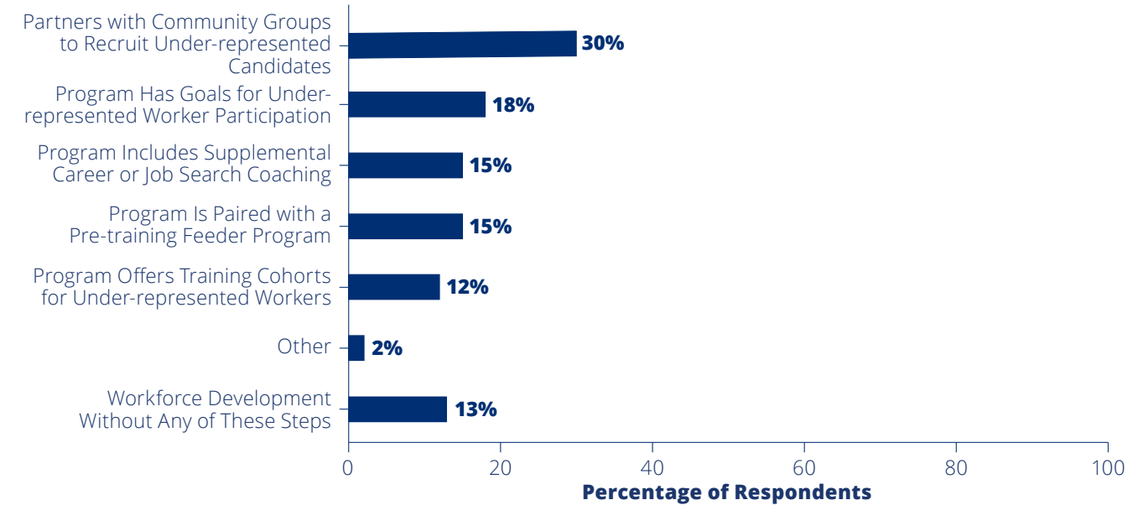


Source: Smart Electric Power Alliance, 2023. n=58 respondents. Assessed at parent company equivalent. Single response questions.

Beyond their staff, utilities rely on a skilled external workforce capable of designing, installing, and operating advanced technology and grid infrastructure. Just under half of respondents (44%) support external workforce development through direct financial support, support of training and certification, or provision of curriculum and equipment. Fewer respondents—just one in three—support workforce development in ways specifically designed to increase diversity, equity, and inclusion (Figure 42).

Looking ahead to the next two to three years, implementation of the Inflation Reduction Act of 2022 is expected to increase demand for well-trained renewable energy workers with apprenticeship experience. Although utilities cannot resolve workforce gaps and broader market inequities alone, study results highlight an opportunity for utilities to increase their involvement in workforce development to help meet this need.

Figure 42. Respondent Strategies to Promote Workforce Training Equity



Source: Smart Electric Power Alliance, 2023. n=60 utilities, including 34 with no workforce development program. Multiple response question. 33% selected at least one strategy.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

RECOMMENDATIONS

Conclusions

The findings presented in this report demonstrate how utilities are making meaningful progress toward achieving a carbon-free electricity system.

- Utilities' carbon emission levels—for both direct and indirect emissions—vary widely depending on a range of factors, including the portion of a utility's own generation that is carbon-free, and the share of a utility's retail supply that purchased power provides. Leading utilities target and report carbon emissions across the value chain.
- Transparent, publicly-available action plans to achieve carbon-reduction targets establish a critical accountability mechanism for meeting these targets. Leading utilities publish detailed action plans for public consumption.
- Accurate and standardized emissions data is the backbone for tracking and benchmarking progress towards carbon-reduction targets. Leading utilities submit emissions data for external verification annually.
- Climate change is heavily impacting utilities, prompting utilities to develop mitigation and adaptation strategies. Leading utilities are assessing and mitigating impacts on their operations, while developing adaptation strategies to minimize impacts on their systems and communities.
- Utilities cannot achieve a carbon-free system alone. Leading utilities establish external partnerships to facilitate and fund carbon-free technology development and engage in regulatory and stakeholder forums on regulatory and business innovations that facilitate an equitable transition to a carbon-free energy system.
- Leading utilities offer a wide range of customer clean energy programs to encourage energy savings and provide grid benefits and resilience. Such programs also help customers meet their own carbon-reduction goals and may help mitigate rate impacts of utilities' other carbon-reduction investments.
- Despite supply-chain disruptions, interconnection bottlenecks, and the effects of weather and climate disasters on resource acquisition, utilities are progressing in terms of the level of their retail supply that carbon-free energy provides.

Recommendations

SEPA offers recommendations for utilities as they pursue their transformation:

- Expand carbon-reduction targets to include both direct (Scope 1) and indirect emissions (Scopes 2 and 3), as defined by the GHG Corporate Protocol Standard.
- Establish interim carbon-reduction targets, issue a transparent, publicly available plan to achieve interim and ultimate targets, and work with third-party organizations (e.g., SBTi) to verify that targets are aligned with climate science.
- Establish transparent, standardized emissions tracking and submit for external verification annually in order to ensure transparency and maintain accountability as the industry transitions to a carbon-free electricity system.
- Create internal governance structures to manage climate change risks and improve climate resilience, specify additional investment needs and align investment strategies with broader, long-range planning and resilience planning goals, and assess climate change impacts on utility operations.
- Expand customer programs to help mitigate rate impacts, provide grid benefits and resilience, and engage all customers in carbon-reduction efforts.
- Integrate equity considerations and goals into efforts to ensure all customers and community members can participate in and benefit from the clean energy transformation.

APPENDICES

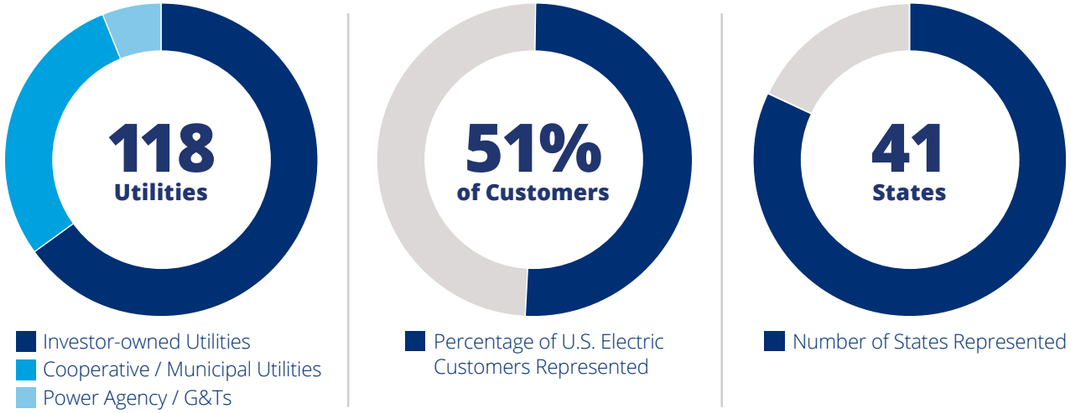
APPENDIX A: SURVEY METHODOLOGY

APPENDIX B: EVALUATION FRAMEWORK

Appendix A: Survey Methodology

The insights in this report represent an assessment of the actions that utilities have taken across the Four Dimensions of Utility Transformation to enable the transition to a carbon-free energy system. This second edition of the *Utility Transformation Challenge* focuses on U.S. electric utilities, including those that own any combination of generation, transmission, and/or distribution assets.

Figure 43. Utility Transformation Survey Participation Breakdown



Source: Smart Electric Power Alliance, 2023.

SEPA conducted the *Utility Transformation Survey* in the spring and summer of 2022. The survey consisted of two components and nearly 140 questions designed to capture progress across different industry areas. SEPA developed questions based on the four dimensions and collected data from utilities primarily via an online survey platform. SEPA reviewed and validated survey data collected.

Survey questions took multiple forms, including multiple choice questions with "select all that apply" options as well as "select one." Additional forms included numeric, fill-in-the-blank options and open-ended text response options. SEPA included definitions to clarify the meanings of key terms. When no timeframe was specified for a survey question, utilities were asked to respond based on the status of decisions, actions, processes, or practices that were approved and in effect when the survey was taken.

SEPA encouraged utility participation through marketing and direct outreach to individual utility contacts, and assured participating utilities that individual survey responses would be aggregated and anonymized. SEPA received responses from 118 individual utilities, representing 77.2 million customer accounts, or approximately 52% of all U.S. electric customer accounts.[42] Of these individual utilities, 68 completed both survey sections, representing 51.5 million customer accounts, or approximately 34% of all U.S. electric customer accounts.

42 Utilities with multiple service territories reported data for each service territory separately.

PARTICIPATION STATISTICS BY UTILITY TYPE

Table 2. All Respondents		
	All Survey Sections	Any Survey Section
Number of Utilities	68	118
Number of Customers	51,491,431	77,205,955

Table 3. IOU Respondents		
	All Survey Sections	Any Survey Section
Number of Utilities	37	83
Number of Customers	36,087,803	56,196,534

Table 4. Public Power Respondents		
	All Survey Sections	Any Survey Section
Number of Utilities	16	16
Number of Customers	7,189,525	7,189,525

Table 5. Distribution Cooperative Respondents		
	All Survey Sections	Any Survey Section
Number of Utilities	10	13
Number of Customers	834,772	925,924

PARTICIPATION STATISTICS BY REGION

Table 6. Participation Statistics by Region								
All Utility Respondents	West		Midwest		South		Northeast	
	All Survey Sections	Any Survey Section	All Survey Sections	Any Survey Section	All Survey Sections	Any Survey Section	All Survey Sections	Any Survey Section
Number of Utilities	22	30	13	24	19	41	14	23
Number of Customers	19,626,217	21,664,039	4,311,877	13,724,882	15,434,692	24,244,081	12,118,622	17,572,390

Source: Smart Electric Power Alliance, 2023.

Appendix B: Evaluation Framework

SEPA evaluated utilities based on their survey responses, which served as the quantitative basis for the evaluation framework in this report.[43] SEPA directly analyzed responses to many survey questions. Other responses yielded additional insight and background for contextual purposes. Table 7 provides a summary of the topic areas surveyed under each of the four dimensions.

For evaluation purposes, SEPA assigned individual survey questions a scoring weight. In order to measure an individual utility's progress, points awarded were totaled across each dimension to determine an overall score.

The scope of this evaluation offers a preliminary assessment of utility progress under each dimension, but importantly, it does not span the full breadth of industry activity within each dimension.[44]

Table 7. Representative Industry Topics Surveyed

Dimension	Scoring Category
Clean Energy Resources	Total Clean Energy Procured/Supplied
	Load Reduction Capacity
Corporate Leadership	Carbon-Reduction Targets
	Corporate Sustainability
Modern Grid Enablement	DER Management & Communication Capabilities
	Distribution Interconnection Procedures and Processes
	Grid-Enabling Technology
	Rate Design Innovation & Affordability
	Reliability and Resilience
	Utility Planning & Forecasting
Aligned Actions & Engagement	Customer Clean Energy Programs
	Customer Engagement
	Utility Innovation Initiatives
	Utility Transportation Electrification Strategy
	Workforce Development Initiatives

43 For utilities with multiple service territories, each operating company was analyzed as an individual utility, unless stated otherwise.

44 The survey data results presented in this report reflect the responses of participants and are not necessarily representative of all utilities, all utilities of a particular type, or the industry as a whole.

SEPA Utility Transformation CHALLENGE

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