ENERGY CUSTOMER PRIORITIES FOR MEETING RESOURCE ADEQUACY NEEDS

JANUARY 2024

CEBA
Clean Energy Buyers Association

INTRODUCTION

Commercial and industrial energy customers collectively use over half of the electricity generated in the United States and drive significant demand for clean energy, as more corporate and institutional energy customers of all sizes and from multiple economic sectors set ambitious goals to use clean energy to power their operations and facilities. Roughly half of all Fortune 500 companies have climate and clean energy goals, and over 250 businesses have committed to using 100% renewable energy.

Commercial and industrial energy customers announced a record-breaking 16.9 gigawatts (GW) of new clean energy deals in 2022. Since 2014, more than 180 companies have announced utility-scale clean energy deals. In the years ahead, Fortune 1000 companies may represent as much as 85 GW of renewable energy demand through 2030.

VISION: The Clean Energy Buyers Association (CEBA) is a business trade association that activates a community of energy customers and partners to deploy market and policy solutions for a carbon-free energy system. CEBA's more than 400 members represent more than $7 trillion in annual revenues and 14 million employees and include institutional energy customers of every type and size — corporate and industrial companies, universities, and cities — as well as energy and service providers.

Our aspiration is to achieve a 90% carbon-free U.S. electricity system by 2030 and to cultivate a global community of energy customers driving clean energy. Deep decarbonization can unleash incredible economic growth and opportunity, and well-designed and well-implemented organized wholesale markets are a critical lever in achieving this vision.

APPROACH: Robust resource adequacy frameworks are key to advancing CEBA's vision and goals. Resource adequacy, as a concept, considers whether the current or projected resource mix is sufficient to meet future capacity and energy needs for a particular grid area under all but the most unusual scenarios. The design and implementation of resource adequacy frameworks can have profound impacts on considerations important to energy customers, including reliability, cost, and the level of clean energy adoption that can be achieved.

Regionally cohesive resource adequacy frameworks that address emerging grid challenges can provide significant cost, societal, and environmental benefits and are mission-critical for energy customers.

COST SAVINGS

Resource adequacy frameworks influence resource development, procurement, and pooling. When opportunities to pool resources are limited, they typically result in over-procurement by individual utilities. This results in significant inefficiencies and unnecessary costs that are ultimately passed on to customers.

SOCIETAL BENEFITS

Electric outages pose a significant risk for human health and public safety and disproportionately impact vulnerable and low-income communities. Resource adequacy could become more tailored so customers could determine how to best use power from the grid, ensuring critical facilities have their needs met first and others are compensated for their demand response or on-site generation.

ENVIRONMENTAL IMPACTS

Resource adequacy frameworks can influence which types of resources are developed and how they are utilized, affecting states and large energy customers with decarbonization goals. More accurate estimates of the contributions clean resources provide to the grid would help ensure their optimization in planning scenarios.

While roles and approaches for resource adequacy vary across the United States, they often involve multiple entities working together to assess future needs, set targets for resource development to meet a specific level of reliability, and then develop or purchase resources to meet those needs. Significant benefits can be achieved by ensuring planning entities adhere to minimum standards for resource adequacy planning and work to remove barriers to regional-level planning and power sharing.

In the past, resource adequacy assessments were straightforward, forecasting peak demand over time and then making sure enough resources could meet that demand plus a margin of error. Today, increasing frequency of extreme weather events as well as demand variability, evolving energy resource mixes, and changes to seasonal loads are necessitating evolution of resource planning to meet new needs.

The integration of low-cost, low-carbon, but more variable energy resources such as wind and solar power requires examination of new hours of reliability risk beyond the peak hour. Given the macrotrends impacting the energy industry, evolving resource adequacy planning will impact all large energy customers seeking low-cost and reliable clean energy supply.

The following customer priorities for resource adequacy planning provide an overview of challenges that must be addressed across the United States. These priorities were based on individual interviews with resource adequacy experts, presentations at the Clean Energy Buyers Institute's (CEBI's) 2023 Resource Adequacy Convening, and additional review of current literature.

CUSTOMER PRIORITIES FOR RESOURCE ADEQUACY

1

RESOURCE ADEQUACY PLANNING MAXIMIZES BENEFITS WHEN IT IS DONE WITH A REGIONAL VIEW AND UTILIZES A COMMON LANGUAGE.

Regional resource adequacy frameworks can better capture resource, weather, and load diversity than individual utility balancing area planning, due to the regional frameworks' expansive footprints. To fully assess adequacy or maximize power pooling, regional program participants must use consistent metrics and capacity accreditation methodologies.

Areas without a regional transmission organization (RTO) should explore new regionally focused resource adequacy programs or market functions with the broadest footprint possible, to maximize diversity and pooling potential. State leaders can be essential in considering how to maximize interactions between regional frameworks and utility planning.

When multiple entities work in parallel to support resource adequacy, they should utilize regionally consistent and transparent methodologies, such as reliability standards that establish planning reserve margins and resource accreditation methods. This consistency would aid power pooling and facilitate accurate and fair resource accounting. Regional and utility-based frameworks operating on different timescales (short-term compliance requirements versus long-term planning) should be coordinated to ensure near-term purchases are sufficient and align with long-term strategies.

RTOs and independent system operators (ISOs) can and should maximize synergies between resource adequacy, energy markets, and transmission planning and utilization.

2

RESOURCE ADEQUACY FRAMEWORKS SHOULD MEET MINIMUM PLANNING STANDARDS WHILE PROACTIVELY EVOLVING TO MEET FUTURE GRID NEEDS.

At minimum, resource adequacy frameworks should include probabilistic or stochastic modeling[1] to assess resource needs and generation performance under a wide range of potential scenarios. This modeling should be used to establish resource adequacy requirements and a planning reserve margin to maintain reliability.

1 A stochastic model is a method for predicting statistical properties of possible outcomes by accounting for random variance in one or more parameters over time. For a selected duration, the random variance is typically based on variations found in historical data using standardized techniques.

Resource adequacy requirements should be based on a transparent, quantifiable metric, which usually is a 1 in 10 loss of load expectation (LOLE).[2] To address the macrotrends impacting the electricity sector, grid planners should explore workable approaches to better model resource adequacy needs.

System planners will need metrics that better capture system stress. Changing resource and load profiles have altered grid conditions; no longer is there one well-defined period of peak load when risk is highest. A grid may have several periods of risks that may change seasonally. Modeling these risks will lead to a robust resource adequacy standard.

Resource adequacy planning should reflect the reality that not all outages (loss of load) have the same impact. One outage in 10 years is simply an average and does not provide insight into the magnitude of events. Planners may need additional metrics to quantify the size, frequency, and duration of outages. Some metrics to consider are loss of load hours and unserved energy.

Resource adequacy planning should incorporate more advanced methods of accounting for the contributions of resources (capacity accreditation) to better measure the contributions of each resource and how they perform collectively within a portfolio and under different circumstances. Renewable resource counting is particularly challenging, and methods vary widely across jurisdictions. Capacity accreditation is crucial because it signals the resource adequacy value of new and existing resources in helping avoid a loss of load event.

Capacity accreditation must be consistent and nondiscriminatory, considering its potential impacts on resource selection and compensation as well as risks to reliability. Planners should aim to use consistent methods in long- and short-term planning.

3

RESOURCE ADEQUACY PLANNING REQUIRES EXPANDED WEATHER DATA AND MODELING.

Weather is increasingly impacting both electricity demand and supply. Extreme temperatures can result in higher or lower demand for heating and cooling or change the seasonal pattern of electricity demand. Weather impacts on resource adequacy are complex, with multiple compounding and competing effects on generation, load, transmission, and distribution.

2 A 1 in 10 loss of load expectation (LOLE) is the primary reliability metric used worldwide for electric grid resource planning and indicates the expected number of times in one or more years where supply will be unable to meet demand, with an expectation of one power loss event over a 10-year period.

Uncertainty as well as a lack of forecasting data about future weather and climate are often correctly cited as priority issues. Planners also lack sufficient historical weather data to fully understand possible supply and demand outcomes with more weather-dependent loads and increasing generation from wind and solar. Planners must understand the broader climate and its interactions with the electricity system, including transmission and distribution.

Resource adequacy planners should consider the limitations of their current weather assumptions, including how well the available data allow them to understand resource adequacy challenges in systems where generation is now weather dependent. Planners must also think beyond data representing the past climate and collaborate with others in the power sector to develop forward-looking projections on asset operation. Changing climate should also be incorporated into projections of future loads and resource performance.

Producing sufficiently granular historical and forward-looking weather datasets is challenging. It requires complex modeling and access to as much data as possible to power the models and validate their output. Well-considered data collection and sharing policies must be developed as soon as possible. Further, a federally managed and curated national weather database designed to provide data for analysis of modern power systems would provide resource adequacy planners with access to necessary data and knowledge.

RTOs/ISOs can provide performance data from capacity shortfall events to share lessons, better predict needs, and use emerging resources, including storage and demand response. Resource adequacy planners would benefit from retrospective evaluation of adequacy performance to inform planning.

Historical resource adequacy methods no longer suffice for capturing the risks associated with more correlated outages for all resource types during extreme weather events. Areas that depend on a particular fuel type are especially at risk for correlated outages.

4

TRANSMISSION OPTIMIZATION AND EXPANSION CAN BE A CRITICAL TOOL FOR SUPPORTING RESOURCE ADEQUACY AND RELIABILITY.

Transmission is an enabler of resource adequacy because it allows generation to be delivered across broader geographies, time zones, and weather patterns. Both optimization of existing transmission and expansion of regional and interregional transmission will support resource adequacy.

Optimization of the transmission system is the most cost-effective and least time-consuming opportunity to create additional transfer capacity. Regional and state planners should consider the important interactions between resource adequacy and transmission and take steps to remove transmission planning barriers.

Resource adequacy planning should include enhanced modeling of transmission line derates (a line's operation at less than its rated maximum capability), as well as strengthened integration between generation and transmission expansion.

5

BETTER LINKAGES ARE NEEDED BETWEEN WHOLESALE POWER PLANNING AND DEMAND-SIDE RESOURCES.

As customer-sited power generation increases across the grid, understanding the impact of these resources on the wholesale-level power grid will improve resource adequacy planning. In addition, customers can provide value to the grid by dispatching their generation resources to the grid and by curtailing demand during grid stress events. Resource adequacy could become more tailored so customers could determine how to best use power from the grid, ensuring critical facilities have their needs met first and others are compensated for their demand response or on-site generation.

Customer-owned energy supplies are not being cataloged and modeled. Grid planners should refine their treatment of demand-side resources within resource planning and better capture the flexibility benefits those resources could provide to the grid.

Programs that benefit from customer-sited resources or demand should fairly compensate customers for these contributions and consider costs of the projects, potential degradation of storage resources, and lost production value from shifting core business operations. This requires planners to understand any limitations on demand-side resources and to develop an accurate view of when and how resources will be available.

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