PRIMER—

RESILIENCE IN CLEAN ENERGY PROCUREMENT: FRAMEWORKS AND APPROACHES FOR ENERGY CUSTOMERS

PART II OF THE BEYOND THE MEGAWATT RESILIENCE SERIES

CEBI
Clean Energy Buyers Institute

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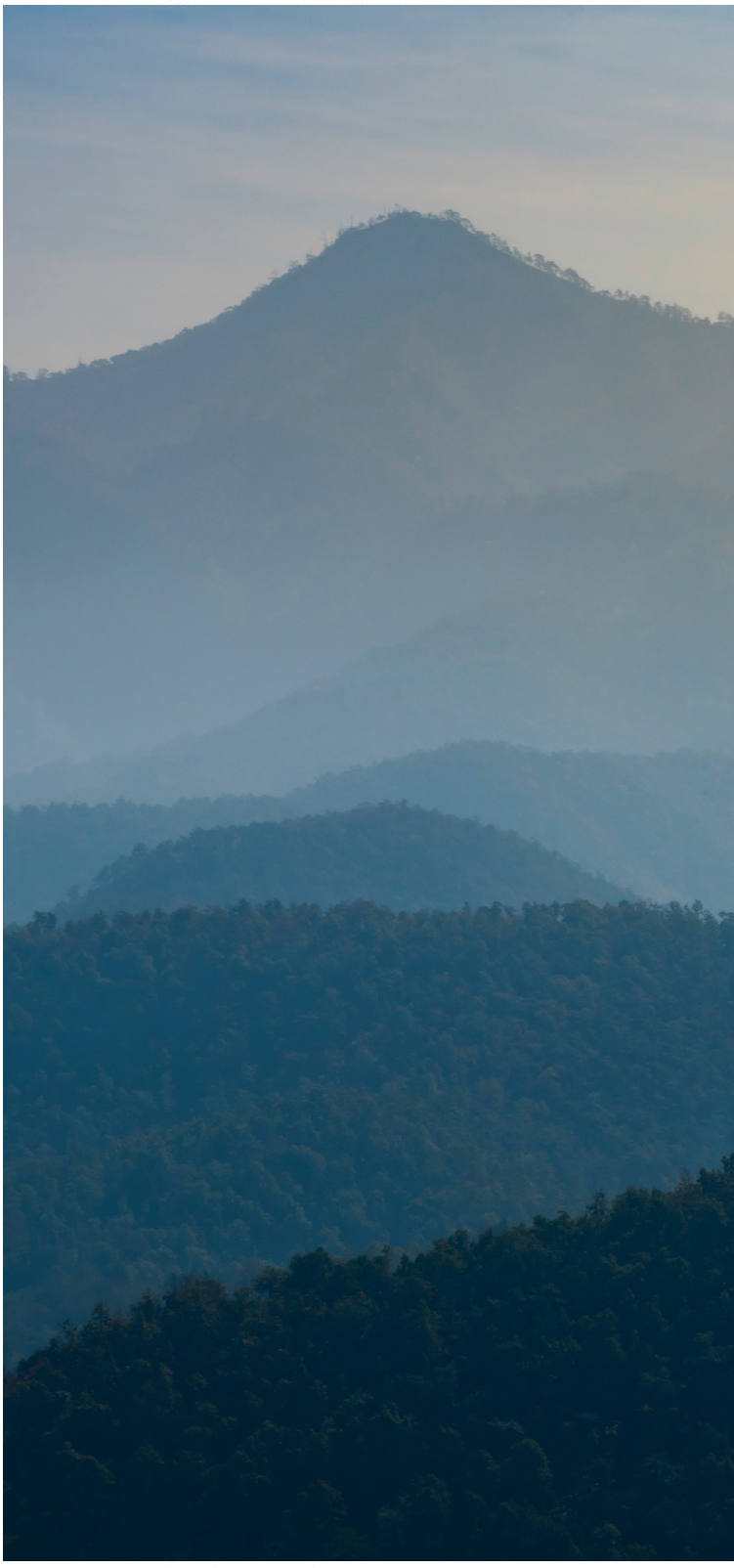
OVERVIEW

Energy customers are actively facing the effects of climate change-driven extreme weather events and man-made hazards on our energy systems. The U.S. has experienced 89 billion-dollar disasters over the past five years alone, totaling approximately $788.4 billion in costs. A 2016 study estimated that the average total cost per minute of an unplanned outage for data centers in the United States grew from $5,617 in 2010 to $8,851 in 2016—a nearly 58% increase in six years. Manufacturers, meanwhile, can incur more than $5 million in costs with one hour of downtime.

This primer dives into the specifics of how energy customers can use their clean energy procurement strategies to support energy resilience for their business, their communities, and their partners. It proposes four resilience impact areas to help customers focus their strategies:

- **Facility or campus resilience.** Enabling critical operations to stay up and running during energy disruptions by, for example, providing backup power
- **Community resilience.** Providing direct support to community lifeline services (e.g., shelter, food, fuel, and safety) or investing a share of project revenues in community resilience projects
- **Grid resilience.** Participating in programs and markets that support distribution and transmission system reliability, engaging with utility partners around project planning and siting, and procuring grid-scale storage alongside clean energy generation
- **Generation asset resilience.** Encouraging or requiring clean energy power plants to be designed, sited, and installed in a way that minimizes the risk of damage from natural or manmade hazards



THE OBJECTIVES OF THIS PRIMER ARE TO:

- **Ground resilience within the context of clean energy procurement.** The primer outlines the ways energy customers can positively impact the energy resilience of their operations, their communities, and the grid through their clean energy purchases.
- **Offer a framework for integrating resilience into corporate clean energy strategy.** This primer defines a framework for thinking through the positive energy resilience impacts that energy customers can achieve and defines different energy resilience pathways for customers to consider and pursue (see Table 1).
- **Provide examples of successful corporate energy resilience projects.** The primer presents real-world examples and use cases of energy customers that are supporting resilience at the facility, community, grid, and power plant levels.
- **Ask questions and start a dialogue.** This primer can be used to start discussions about the positive energy resilience impacts that customers want to achieve and the pathways by which to do so. The primer also introduces sample questions that customers can use to shape their clean energy procurements.

INTENDED AUDIENCE:

- Energy customers of all types, sizes, and experience levels can benefit from reading this primer, as it defines different energy resilience pathways for all customers to consider and pursue. Energy and service providers are also encouraged to read the primer as a means to continue building strong partnerships in the clean energy procurement space.

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ABOUT THE BEYOND THE MEGAWATT RESILIENCE PROGRAM

CEBI launched the Beyond the Megawatt (BTM) initiative in May 2022 to help energy customers develop more purpose-driven energy procurement practices by integrating three "pillars" of impact: resilience, equity, and environmental sustainability. Since then, a dedicated working group of energy customers, developers, academics, and service providers has met monthly for focused discussions on how to integrate resilience into corporate energy procurement. Those discussions led to the publication of this primer as well as its predecessor, "An Introduction to Energy Resilience" (January 2023).

The Beyond the Megawatt Resilience Series provides clean energy customers with a fundamental understanding of energy resilience and the key stakeholders responsible for ensuring continuity of business operations in the face of increased hazards. The series discusses strategies for strengthening resilience within an organization and aligning resilience with clean energy procurement goals.

FRAMING RESILIENCE SOLUTIONS FOR ENERGY CUSTOMERS

Corporate energy customers have accelerated the clean energy transition by committing to offset their operations with clean power. They have pioneered innovative procurement models, such as virtual power purchase agreements (VPPAs) and green tariffs, to purchase cost-effective clean energy. But not all clean energy projects have an equal effect on advancing energy resilience. With the maturation of clean energy markets, customers have begun to assess how their purchases can create even more value for the clean energy transition.

At the same time, extreme weather, intentional attacks on the power grid, supply shortages, and other threats are prompting energy customers of all sizes to question the security of their energy investments and supporting infrastructure. These market and environmental dynamics are increasing energy customers' interest in energy resilience investments to prepare for long-duration power outages, minimizing their impact when they occur, and restoring critical organizational functions quickly if they fail.

There are several areas where clean energy customers can focus their procurement in support of resilience. These include:

- **Facility or campus resilience**. Enabling critical operations to stay up and running during energy disruptions by, for example, providing backup power

- **Community resilience**. Providing direct support to community lifeline services (e.g., shelter, food, fuel, and safety) or investing a share of project revenues in community resilience projects
- **Grid resilience**. Participating in programs and markets that support distribution and transmission system reliability, engaging with utility partners around project planning and siting, and procuring grid-scale storage alongside clean energy generation
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IDENTIFY THE RIGHT PATHWAY FOR YOUR ORGANIZATION

Energy customers can address resilience across several impact areas. Energy customers who are interested in exploring how to integrate resilience into their clean energy procurement strategies may consider the following questions to identify the right pathway for their organization.

RESILIENCE IMPACT AREAS FOR CORPORATE ENERGY CUSTOMERS

IMPACT AREA 1 FACILITY OR CAMPUS RESILIENCE

Does my organization need to operate critical functions independent of the grid (e.g., by using backup power solutions like generators or solar+storage)? How long does my organization need to "island" from the grid?

IMPACT AREA 2 COMMUNITY RESILIENCE

***Direct Support**. Can my project support local community lifelines during power outages?*

***Financial Support**. Can a share of clean energy project revenue be used to support community resilience and help meet our environmental, social, and governance goals?*

IMPACT AREA 3 GRID RESILIENCE

***Market Participation**. Does my organization participate in energy market programs (e.g., demand response) to reduce grid stress in my region?*

***Grid-Friendly Assets**. Does my organization leverage its buying power to enhance grid resilience?*

IMPACT AREA 4 GENERATION ASSET RESILIENCE

Are the clean energy assets that my organization invests in built to withstand extreme weather conditions in the future?

The use of clean energy procurement to support energy resilience is new, and standard business models are still emerging. Clean energy projects that support energy resilience can be distinguished by:

- Whether they are sited on-site or off-site
- Whether they are owned and operated by the customer or by a third party
- Whether the customer is purchasing energy as a commodity, energy-as-a-service, or financial instruments (e.g., a hedge)
- How the project is interconnected to the energy system

The project profiles in the following sections were selected for their diversity of business models, deal structures, technologies, and geography.

IMPACT AREA 1

FACILITY OR CAMPUS RESILIENCE

KEY QUESTIONS: ***DOES MY ORGANIZATION NEED TO OPERATE CRITICAL FUNCTIONS INDEPENDENT OF THE GRID (E.G., BY USING BACKUP POWER SOLUTIONS LIKE GENERATORS OR SOLAR+STORAGE)? HOW LONG DOES MY ORGANIZATION NEED TO "ISLAND" FROM THE GRID?***

Power outages can cost organizations millions of dollars in lost revenue. Even split-second outages can disrupt sensitive equipment and incur expensive delays and restart costs. Many organizations install backup power as a business decision to protect their operations and save money, while some types of organizations are legally mandated to do so. Hospitals are required to install backup power to protect patient safety, for example, and the U.S. Department of Defense requires facilities that support critical missions to operate independent of the grid for 7 to 14 days.

Many organizations install diesel generators on-site since they are a familiar source of backup power with low up-front costs, but even beyond their high carbon footprint, diesel generators face major reliability issues in practice. For example, diesel generators have high failure rates during major events, especially if they are not maintained regularly, and can also face fuel supply bottlenecks during periods of extended operation.

Clean energy backup systems can augment or replace fossil fuel generators, lowering fuel supply risk and air emissions. These systems can also generate savings and revenue under normal operating conditions, unlike many conventional backup power systems. Organizations can purchase clean energy for backup power outright or under "as-a-service" contracts. Examples of recent clean energy backup power deals include:

EXAMPLE: PRODUCERS RICE MILL

Producers Rice Mill in Stuttgart, Arkansas, is one of the largest rice mills in the United States. Producers purchased a microgrid consisting of a 20 megawatt (MW) solar photovoltaic (PV) system and a 41 megawatt-hour (MWh) battery. The microgrid is scheduled to begin operations in the fall of 2023. The utility that serves Producers periodically calls on the mill to curtail its load to alleviate peak demand on the grid, which requires expensive production shutdowns. The plant is also located in a section of the grid that experiences power quality issues. The microgrid will power close to 70% of the facility's on-site load and allow the mill to continue production during curtailment events and power outages. The microgrid will also help manage power quality variances and protect sensitive equipment. The project was developed by Scenic Hill Solar and CS Energy, using microgrid controls and storage from KORE Solutions.

EXAMPLE: CHICK-FIL-A AND SOLMICROGRID

American restaurant chain Chick-fil-A is piloting a microgrid at one of its restaurant locations in Stockton, California, in response to the rising risk of blackouts and cost of electricity in the state (which can jump as much as 70% in the summer). The microgrid includes on-site solar panels and battery storage systems that work with predictive analytics and artificial intelligence (AI) to optimize the amount of power that the restaurants draw from the grid, as opposed to their on-site systems, maximizing energy savings at the sites. The systems also include natural gas generators, which are activated only during grid outages, to support the resilience of the restaurant. Chick-fil-A's developer partner is SolMicroGrid, backed by Morgan Stanley Energy Partners. Because the partnership is structured as an energy-as-a-service model, the restaurant will pay for the microgrid through a long-term contract, rather than through high up-front costs.

EXAMPLE: EATON

Eaton is a power management company with operations around the world. Eaton has a target to reduce the carbon emissions of its operational footprint by 50% by 2030. Following Hurricane Maria in Puerto Rico, Eaton partnered with Enel to install a microgrid at the company's manufacturing plant in Arecibo, Puerto Rico. The system integrates 5 MW of solar PV and a 1.1 MW/2.2 MWh battery, with the manufacturing plant's existing 8 MW of backup generation. Enel will build, own, and operate the system on behalf of Eaton, while Eaton will supply the microgrid controller and electrical distribution equipment. Eaton and Enel are installing an additional 5 MW PV and 1.1 MW/2.2 MWh battery microgrid at Eaton's Las Piedras manufacturing facility. Both the Arecibo and Las Piedras plants are built to the updated 2018 building code in Puerto Rico and designed to withstand Category 5 hurricane-force winds.

IMPACT AREA 2

COMMUNITY RESILIENCE

KEY QUESTION: *CAN MY PROJECT SUPPORT LOCAL COMMUNITY LIFELINES DURING POWER OUTAGES?*

Direct Support for Community Resilience

In addition to providing backup power, clean energy projects can create resilience benefits for the communities that host them. These benefits can take the form of direct (on-site) support for community lifelines or financial (off-site) support for community resilience priorities. This section highlights examples of both direct and financial support for community resilience.

During power outages and other disasters, communities strive to ensure access to critical services, such as medical care, food, water, shelter, fuel, communications, public safety, and emergency response. These services are collectively referred to by emergency management agencies as "community lifelines." Clean power customers have a range of options for supporting community lifelines. For those whose core business is related to community lifelines, procuring backup power for their own retail operations can enhance community resilience. This can be particularly beneficial for historically marginalized communities, who are disproportionately affected by power outages in the United States, and whose ongoing socioeconomic stressors multiply the damaging effects of power outages and other climate disasters.

Examples of these projects are highlighted below. In addition to supporting their own operations with on-site power and storage, clean power customers can explore other emerging opportunities to support community lifelines. These can include, for example:

- Participating in community microgrids or directly connecting critical community facilities to on-site backup power systems
- Providing community or first responder access to charging sites for vehicles, communications, and life safety equipment during emergencies
- Staging mobile backup power (e.g., mobile batteries or electric vehicles charged by clean power) to support community needs during blackouts

EXAMPLE: STOP & SHOP

Stop & Shop has 400 grocery stores throughout the northeastern United States. In 2020, Stop & Shop worked with Bloom Energy to install microgrids at 40 of its stores in New York and New England. The microgrids use fuel cells that convert biogas or natural gas into electricity without combustion. The total combined capacity of the fuel cell microgrids is 10 MW. In addition to saving an estimated $300,000 to $900,000 in avoided produce spoilage per outage, the stores are also able to continue to provide food, emergency items, and prescription medicines to customers.

EXAMPLE: ALLTOWN FRESH SERVICE STATION

The Alltown Fresh Service Station in Ayer, Massachusetts, is one of 1,700 gas stations and convenience stores owned and operated by Global Partners. Global Partners worked with Enel to install a microgrid at Alltown Fresh consisting of an 87 kilowatt (kW) rooftop PV system, an 87 kW/174 kWh battery, and a 50 kW direct current (DC) fast-charging station. The microgrid, which was completed in 2022, can power both the conventional gas pumps and the fast-charging station during power outages. The Alltown Fresh station is also able to supply food, water, Wi-Fi, and other services to first responders, utility crews, and the public during emergencies. The microgrid was completed with support through the Massachusetts Clean Energy Center's Resilient Service Stations Challenge.

KEY QUESTION: *CAN A SHARE OF CLEAN ENERGY PROJECT REVENUE BE USED TO SUPPORT COMMUNITY RESILIENCE?*

Financial Support for Community Resilience

Clean energy customers can also use their purchasing power to financially support community resilience for host communities or historically marginalized communities in any location. Aside from providing community resilience co-benefits from their own backup operations, customers can fund solar and storage systems in community centers, commonly known as "resilience hubs," and support efforts that advance passive survivability[1] measures in residences. Energy efficiency upgrades can allow residents to shelter in place for longer when power outages occur during periods of extreme temperatures. A recent report from the national labs found that bringing building envelopes up to code can increase habitability by 50% during extreme cold events and 40% during extreme heat events.

Microsoft and Volt Energy Utility recently published a report on their efforts to use renewable energy procurement to support environmental justice. A key finding from the report is that clean energy customers can include a "community fund rider" in their power purchase agreements (PPAs) to share project revenues with organizations that advance environmental justice. Community fund riders and related efforts, such as Community Benefits Agreements (CBA) and Enel's Creating Shared Value (CSV) model, can be used to channel clean energy project revenue into community resilience investments.

INFRASTRUCTURE & IMPACT PPA

Microsoft is committed to becoming carbon negative by 2030. Sol Systems has partnered with Microsoft to couple renewable energy procurement and investment with community impact through a 500 MW PPA that includes a $50 million Community Investment Fund. The partnership is supporting the development of solar and storage resilience centers in Baltimore, Maryland — work led by Groundswell. Through this infrastructure and impact PPA, Microsoft and Sol Systems have already started funding community-led organizations that support educational programs, job and career training, habitat restoration, and initiatives that support access to clean energy and energy efficiency in under-resourced areas.

[1]Passive survivability is defined as a building's ability to maintain critical life-support conditions in the event of an extended disruption to utilities. Passive survivability practices can include natural ventilation, high levels of insulation, high-performance building envelopes, and natural daylight.

INTEGRATED CLEAN ENERGY INVESTMENT AND PROCUREMENT STRATEGY

Google has set a goal to run its global operations on 24/7 carbon-free energy by 2030. As part of this effort, Google and Sol Systems developed a renewable infrastructure investment strategy in North and South Carolina. The strategy will support 225 MW of new solar energy projects and 18 MW of battery storage while investing in residential energy efficiency and critical home health and safety repair projects in low- and moderate-income communities. The residential energy programs will be managed by rural electric cooperative and nonprofit partners based in the Carolinas. The programs aim to upgrade homes to be safe and energy-efficient to create bill savings and reduce energy burdens for participating households. Additionally, where applicable, the programs will electrify home appliances and drive value in efficiency and energy consumption, as well as improve air quality and health. The solar and storage projects are being developed by Pine Gate Renewables.

COMMUNITY SOLAR RESILIENCE IN MASSACHUSETTS

Massachusetts passed a law in 2021 that allows utilities to own and operate solar energy and storage projects. The projects must create resilience benefits for communities with environmental justice populations and must be sited on utility company property. The utilities are exploring using the projects to create both direct and financial resilience benefits for communities. In its filings to the Massachusetts Department of Public Utilities, for example, Eversource projected that solar and storage projects at two sites would generate close to $500,000 in additional revenue annually by participating in the wholesale energy and capacity markets and in the Commonwealth's renewable energy and Clean Peak Standards. Eversource has proposed using these revenues to create community grants or to make energy efficiency and energy affordability investments. Offshore of Massachusetts, the Vineyard Wind project is providing financing to the Vineyard Power Development Fund under a CBA with the Vineyard Power Cooperative. The fund specifically supports solar and storage for backup power at public, nonprofit, and tribal facilities to enhance community resilience.

IMPACT AREA 3

GRID RESILIENCE

KEY QUESTION: *DOES MY ORGANIZATION PARTICIPATE IN ENERGY MARKET PROGRAMS (E.G., DEMAND RESPONSE) TO REDUCE GRID STRESS IN MY REGION?*

Market Participation

Clean energy customers can leverage their deals to directly support the reliability and resilience of the power grid itself. This section focuses on data center examples since data centers have large loads and their rapid increase in number and size may have significant implications for grid reliability.

Clean energy projects can provide demand flexibility, reliability, and resilience services to the grid by participating in programs and markets such as:

- **Demand response programs,** which involve consumers decreasing their noncritical loads during periods of grid stress
- **Capacity markets,** which compensate power producers for making resources available during peak electricity demand
- **Regulation markets,** which allow system operators to increase or decrease output or consumption in response to second-by-second variations in demand and system frequency

While clean energy projects may be eligible to receive compensation for participating in these types of markets and programs, the features of available markets and programs vary widely across the country. When deciding which options to participate in, clean energy customers need to assess factors like:

- **Eligibility.** What technologies and project types are eligible for participation?
- **Performance requirements.** Would the technical requirements for participation allow a project to support both on-site resilience and grid resilience concurrently?
- **Bankability.** Are the revenues from program participation certain or predictable? Are there penalties for not delivering electricity or services as planned?

Clean energy customers and their partners in many parts of the country are successfully navigating questions such as these to support grid resilience and unlock additional revenue streams. In California, Microsoft has entered into an energy-as-a-service agreement for a microgrid to provide on-site resilience while also supporting grid resilience during peak demand events.

EXAMPLE: MICROSOFT SAN JOSE DATA CENTER

Microsoft has a rapidly expanding fleet of hyperscale data centers, which demand a lot of energy. Microsoft is actively exploring innovative clean energy systems that can provide backup power and support grid resilience for its facilities. As part of its effort to achieve low-carbon resilience, Microsoft entered into an energy-as-a-service agreement with Enchanted Rock for a 60 MW renewable natural gas microgrid for its San Jose, California, data center. Enchanted Rock will finance, install, own, and operate the system under a service contract. The microgrid is configured to provide grid stability services back to the utility (PG&E) when not providing backup power support to the data center. The microgrid participates in PG&E's Base Interruptible Program, under which customers provide load reduction in response to curtailment notices from the California Independent System Operator. Enchanted Rock centrally manages its fleets of microgrids to optimize grid and facility resilience concurrently. During 2021's Winter Storm Uri in Texas, for example, Enchanted Rock microgrids provided backup power at more than 140 sites while microgrids at 100 additional sites supplied emergency power into the grid.

KEY QUESTION: *DOES MY ORGANIZATION LEVERAGE ITS BUYING POWER TO ENHANCE GRID RESILIENCE?*

Grid-Friendly Assets

Beyond participating in utility and wholesale market programs, some clean energy customers are also exploring how to proactively align their power purchases with grid reliability by directly engaging utility industry partners in their project planning and procurement processes. Siting a new solar field at the end of an already-congested transmission line, for example, is less positive for grid resilience than a location with adequate transmission capacity. In New Mexico, Meta is partnering with its local utility to procure grid-scale storage in tandem with its green power purchases to support capacity and reliability.

EXAMPLE: META LOS LUNAS DATA CENTER

Meta, the parent company of Facebook, set and achieved a goal to supply its global operations with 100% renewable energy in 2020, and the company is working to sustain that target as its data center fleet expands. Meta partnered with its local utility, Public Service Company of New Mexico (PNM), to purchase the energy from 240 MW of solar PV plants under a 20-year green tariff. The green tariff is specifically intended to meet the clean energy demand of Meta's data center in Los Lunas, New Mexico. In addition to the solar PV contract, Meta has signed a 20-year PPA for a 50 MW battery storage facility. The battery facility is colocated with one of the solar PV plants, so both systems were eligible for the 30% federal investment tax credit. The battery storage is not configured to provide backup power to the data center. Instead, the battery is designed to be dispatched by PNM to provide capacity and maintain grid reliability. PNM's application to issue PPAs for the solar and battery projects was approved by the New Mexico Public Regulation Commission in July 2021.

IMPACT AREA 4

GENERATION ASSET RESILIENCE

KEY QUESTION: *ARE THE CLEAN ENERGY ASSETS THAT MY ORGANIZATION INVESTS IN BUILT TO WITHSTAND EXTREME WEATHER CONDITIONS TODAY AND IN THE FUTURE?*

Clean energy customers will not achieve their climate, energy, and resilience objectives if the physical power plants they invest in fail. More frequent and severe extreme weather events pose an increased threat to both fossil fuel and renewable energy generators. Energy customers are well positioned to work with energy developers and engineers to establish basic parameters for energy resource availability for newly constructed assets. Recent examples of generation assets that could not withstand extreme weather include:

- In 2019, the 178 MW Midway Solar project in Pecos County, Texas, incurred $70 million to $80 million in insured losses when 400,000 out of 685,000 panels were damaged by hail.
- In 2021, Winter Storm Uri caused a collapse in the Texas grid as a result of capacity shortfalls. One of the drivers of these shortfalls was that natural gas, coal, and wind power plants failed because their owners had not invested in sufficient winterization.

Clean energy customers can strengthen energy resilience by encouraging the use of high-performance standards throughout the phases of project development and by focusing on strategies that harden projects against relevant hazards. Some codes and guidelines dictate where and how generation can be installed. FEMA, for example, requires microgrids that seek funding as backup power sources to conform to higher flooding risk and structural design standards. Standards such as these, however, represent minimum requirements and do not “future-proof” power generation against extreme weather. The lack of forward-looking standards for ensuring long-term clean energy performance in the face of climate change remains an industry gap.

Clean energy customers that want to increase resilience for their generation assets can use resources such as the new General Services Administration (GSA) Severe Weather technical specifications, the Federal Energy Management Program (FEMP) Technical Specifications for On-site Solar Photovoltaic Systems, or the FM Global Property Loss Prevention Data Sheets for solar, wind, and batteries as benchmarks. For contracts with owners and operators in storm-prone areas, energy customers can also consider operations and maintenance requirements, such as the National Renewable Energy Laboratory (NREL) pre-storm solar PV checklists. This section profiles two solar PV systems that have been built with hardened designs based on recently created guidelines for federal renewable energy purchases.

EXAMPLE: COAST GUARD TRAINING CENTER PETALUMA

The Coast Guard Training Center (TRACEN) Petaluma is the Coast Guard's largest West Coast training center and home to the Chief Petty Officer Academy. TRACEN supports 3,500 students, 360 permanent staff, and 500 family housing residents each year. During the 2019 Kincade wildfire, TRACEN lost power for five days. TRACEN worked with Ameresco to develop a microgrid that includes a 5 MW solar system and an 11.6 MWh battery storage system under a 23-year energy savings performance contract. The microgrid is capable of sustaining TRACEN's full operations independent of the grid for 10 days. TRACEN employed portions of FEMP's updated severe weather technical specifications when procuring the PV system. TRACEN required that the racking system, fasteners, and the PV modules themselves meet specific technical requirements to harden the system against future weather extremes.

EXAMPLE: GSA ALMERIC L. CHRISTIAN FEDERAL BUILDING

In 2017, the 469 kW ground-mounted solar PV system located at the Almeric L. Christian Federal Building in Christiansted, Saint Croix, in the U.S. Virgin Islands was destroyed during Hurricane Maria. The PV system was built to code but failed at wind speeds below what it was designed to withstand. This failure highlights that current building codes may not be sufficient when applied to PV systems. Postmortem analysis of the system also found there were structural deficiencies, such as inadequate clamp fastener use and improperly selected electrical enclosures, that hastened the system's collapse. The PV system has since been redesigned and rebuilt with support from the U.S. Department of Energy's NREL to incorporate leading-edge practices related to structural engineering and high-wind survivability. These include design elements, such as front and rear support posts, locking fasteners, a 12-degree tilt angle, and a lower array height. Until codes, standards, and installation practices for renewable energy are improved, projects such as this one can serve as a benchmark or template for clean energy procurements.

Looking Ahead to Procurement Guidance

CEBI is creating guidance for energy customers on questions that could be used to improve resilience outcomes during procurement of carbon-free energy projects. The guidance provides example questions that could be integrated into different types of procurements and solicitations. The questions are crafted using informational, preferential, and specification language.

Table 1 contains examples of these questions. The forthcoming CEBI resource will provide additional questions and more detailed procurement guidance, including sections on community resilience and grid resilience, and other aspects of generation asset resilience.

Table 1. Preview of Future CEBI Resource on Procurement Guidance

	Description	Example
Informational Request Questions	Indicate an interest in advancing resilience and ask for documentation.	Please provide information on any resilience co-benefits of the proposed project.
Preferential Language Questions	Indicate preferential treatment for projects demonstrating better resilience outcomes.	Is the project site located on an area that: 1. Is designated as a flood zone? 2. Regularly faces exposure to wildfires? 3. Faces extreme winter conditions such as low temperatures, high wind speeds, etc.? 4. Is prone to frequency or capacity challenges?
Specification Questions	Lay out specifications and requirements for projects as they relate to resilience.	All bidders are required to demonstrate that: 1. Solar PV fasteners will provide adequate long-term support under projected increase in extreme weather conditions. 2. Inverter heights are adequate for potential flooding as projected through historical regional analysis and expected increase in extreme weather.

CONCLUSION

This document provides guidance to energy customers to embed resilience in clean energy procurement and to maximize environmental and social outcomes of the clean energy transition. Key takeaways for energy customers are:

- Investing in resilience depends on an entity's needs and goals, and could include on-site or off-site generation, or a combination of both.
- Participating in market opportunities like demand response programs can be as or more impactful for regional grid resilience as new capacity.
- New projects can contribute to increasing energy justice and community resilience either directly (through on-site capacity/storage [e.g., as a resilience hub]) or indirectly (e.g., through a community fund rider).
- Current construction standards for new solar and wind projects are not always adequate for increasingly extreme weather, and energy customers can work with their developer partners to set higher standards for new infrastructure.

CALL TO ACTION FOR ENERGY CUSTOMERS

- **Consider** which impact areas are most relevant for your organization and contact CEBI for additional assistance and resources.
- **Begin** thinking about the value of resilience to your organization. How much damage could extreme weather have on your facilities, products, or workforce? What range of financial consequences might result? Tools like the FEMP Customer Damage Function Calculator can help you estimate some of your potential resilience costs.
- **Speak** with a service provider or experienced project developer about assessing your resilience needs and developing a resilience portfolio. The Clean Energy Buyers Association (CEBA) community includes many experienced service providers and developers whom you may contact.

BTM RESILIENCE NEXT STEPS

This primer was the second in the CEBI Beyond the Megawatt Resilience Series. Future guidance may focus on topics such as:

- **Corporate EV Fleets and Vehicle-to-Everything (V2X):** What benefits could corporations face by committing to V2X and managed charging capabilities in their EV fleets?
- **Supply Chain Resilience:** How can we protect energy supply chains from economic and geopolitical shocks?
- **Industry Standards:** How can we work more closely with national laboratories, the insurance industry, and other stakeholders to improve generation asset resilience?
- **Resilience and Accounting:** How can we encourage project resilience under PPAs without exerting operational control over site design, which may raise additional accounting considerations?
- **Approaching Corporate Leadership:** What are some tools and strategies for making the case for a resilience investment to company leadership?
- **Working with Utilities:** How can we communicate with utilities before and during energy disruptions?
- **Transmission, Equity, and Resilience:** How can we take an equitable approach to transmission build-out that simultaneously addresses resilience gaps?
- **Valuing Resilience:** How do we bring resilience onto the balance sheet and communicate it to leadership?
- **Policy and Market Levers:** What combination of policy and market mechanisms can best support a pivot to resilient energy systems?

The CEBI Beyond the Megawatt Resilience Pillar acknowledges the need for industry collaboration around resilience in clean energy procurement. To learn more about the Resilience Pillar and join the Resilience Working Group, visit https://cebi.org/programs/beyond-the-megawatt or contact Erin Brousseau at ebrousseau@convergestrategies.com and Ornella Nicolacci at onicolacci@cebuyers.org.

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