# **Energy Allies** Communities and Utilities

Building Resilience Together





## Introduction

In recent decades, utilities and communities have witnessed how the combination of aging electric grid infrastructure and increasingly extreme weather leads to <u>more frequent and longer power outages</u>. The costs have been steep—up to <u>\$150 billion annually</u> for U.S. homes and businesses. Beyond the economic impacts, communities suffer health and safety threats when residents lose heating or cooling, and emergency services become strained.

It is increasingly clear that communities and utilities must strengthen their energy systems to ensure these impacts are minimized or avoided. So, what defines strengthening an energy system? There are a variety of terms used to describe this, but what do they each mean and why are they important to utilities and communities? Understanding the distinctions between these measures is crucial, as they are slightly different but equally important.

Energy Reliability	Energy Security	Energy Resilience
The <u>technical and</u> <u>operational ability</u> of the electric grid to consistently deliver power to customers, even when power plants trip offline or instability emerges on sections of the transportation and distribution grid.	Reliable, long-term access to affordable energy sources. Whether because of supply bottlenecks or weather-related issues like storms, heat waves, floods or wildfires, some regions struggle to keep the resources on hand to meet electricity demand, particularly during peak periods.	Energy reliability and security are both components of resilience, which is the ability of a grid, community, building or energy system to withstand and rapidly recover from any challenge— be it high electricity demand, an extreme weather event, disruption to a source of energy supply or an infrastructure failure.

This whitepaper from Energy Changemakers presented in partnership with Ameresco examines how successful partnerships among communities, utilities, and energy service providers can improve the grid and achieve mutually beneficial outcomes. We also explore case studies demonstrating how these types of partnerships have driven meaningful gains in energy resilience to benefit five communities.



## **Electric Grids Face Emerging Challenges that Require Action**

While the overall impact of each challenge differs from community to community, electric grids across the U.S. generally share three common challenges.

#### Grid challenge 1: Aging grid infrastructure

Much of the U.S. electric grid was built in the 1960s and 1970s, and this infrastructure is approaching the end of its expected life cycle. In the U.S. Department of Energy's <u>words</u>:

"Our aging infrastructure is struggling to meet our modern electricity needs, such as renewable energy resources and growing building and transportation electrification."

#### Grid challenge 2: Extreme weather

Since 1980, the National Oceanic and Atmospheric Administration <u>reports</u> there have been 403 weather and climate disasters in the United States in which overall costs exceeded \$1 billion. More than 25% of those events –115 – have occurred in just the last five years. More than 60% – 246 – happened in the last 15 years. A <u>2023 Climate Central report</u> found that 80% of all major U.S. power outages reported from 2000 to 2023 were because of weather-related events, and the U.S. experienced about two times more weather-related outages from 2014-2023 than from 2000-2009.



#### Frequency of weather and climate events in the United States

Grid challenge 3: Rising demand

Electricity demand has begun to rise across the U.S. for the first time in decades and is <u>forecast to</u> <u>continue growing</u> for years to come. Not only is electricity becoming more central to everyday lives through transportation and building electrification, but rapid growth in <u>Al computing</u>, <u>data centers</u> <u>and technology manufacturing</u> is quickly pushing the electric demand needle up in many areas.

This triad of challenges is only intensifying. The options are to either invest in solutions or accept a world in which electricity is less dependable. However, in reality, utilities and communities cannot and will not accept the latter option.

Fortunately, technologies have emerged in recent years that can help to address the challenges head-on by creating a system of more flexible and dynamic energy supply and demand. The grid is most vulnerable during periods of high demand. Flexible demand technologies such as intelligent building systems and smart energy controls allow customers or utilities to shift demand to times when the grid is not under stress. Battery energy storage systems (BESS), microgrids and other distributed generation systems also provide localized energy solutions that enhance grid resilience and reliability during disruptions.





#### **Considerations When Investing in Energy Resilience**

Utilities and communities want secure, reliable and resilient energy for their customers and residents. However, implementing solutions to improve energy resilience requires navigating a few obstacles:

#### Regulatory approvals

Securing approval for resilience-building projects can look quite different from traditional reliability-building investments.

#### Financing sources

The evolving landscape offers new methods to value grid resilience, presenting an opportunity to explore diverse funding sources. The National Association of Regulatory Utility Commissioners reported that understanding the broader benefits of resilience investments can attract investors, policymakers, and regulators.

#### Development hurdles

These come in the form of permitting delays, public opposition such as NIMBYism, and long interconnection queues.

Quantifying the value of grid resilience in particular remains a challenge that can exacerbate regulatory, financing, and development obstacles. They need better empirical evidence to garner political support and funding for resilience-building initiatives.

Despite the challenges facing the electric grid and obstacles to resilience-building projects, there are a myriad of solutions and partnership opportunities to help utilities and communities work together to build resilience.



## **Tools to Build Resilience Together**

Navigating the challenges to deliver resilient and reliable energy often starts with a successful partnership between utilities, communities, and a trusted energy solutions provider. Together, they can best pursue the right mix of intermittent and firm energy sources, access diverse funding structures, and successfully navigate the development process. The solutions these partnerships facilitate include:

#### **Distributed Energy Resources (DERs)**

This catchall term includes a number of grid-edge resources that can be located at businesses or homes and work alone or in concert — including on-site solar systems, fuel cells, BESS, diesel generators, combined-cycle natural gas generators and others. In addition to serving as new energy supply to meet growing demand, utilities and communities can use these technologies' unique attributes to improve grid stability, avoid or reduce the scale of blackouts and shift the timing of energy supply and demand into better balance.

#### **Energy Efficiency**

For decades, energy efficiency projects such as building weatherization, HVAC improvements, and high-efficiency lighting have helped keep electricity demand <u>relatively flat</u> in the U.S. As energy demand grows, reducing large consumers' loads is more important than ever. Efficiency efforts reduce strain on the grid, allow customer- and community-owned DERs to be properly sized, and create revenue opportunities through participation in demand-side management programs.

#### **Flexible Financing Structures**

There are a variety of financing and contracting structures available today to support the implementation of resilience projects: designbuild using traditional loans, power purchase agreements (PPAs), energy savings performance contracts (ESPCs) and grant funding. Partnering with an energy solutions provider can facilitate diverse funding options and identify those that are best suited for an entities' fiscal goals and restraints.

In a design-build contract model, for example, the customer outsources development and implementation but owns the resource and the energy solutions provider may continue to provide operations and maintenance service after completing the project. Alternatively, the energy partner can own the project and sell energy to the customer via a PPA or similar contract. The energy partner and customer could also enter into an ESPC, which makes energy projects budget-neutral. Essentially, the energy solutions provider guarantees that energy savings from a project will pay for improvements. The customer pays little or nothing upfront and the energy partner recoups the investment over time as the savings are realized.

On the financing front, energy partners can help customers tap private sector financing and partnerships to reduce dependence on capital or taxpayer funding.

#### **Funding and Incentives**

Energy solutions providers can also help customers identify and seek federal, state and local sources of public funding and relevant tax incentives made available to help utilities and communities pursue grid resilience. In these dynamic times, partnering with an experienced adviser who is adept in the eligibility criteria is key for navigating these funding opportunities.

#### **Project Development**

Every resilience project will have its share of regulatory and development challenges that add obstacles during development. Community leaders are often not well versed in the developmental and regulatory steps required to steward a resilience project to completion. It's in their best interest to collaborate with a utility and independent energy solutions partner with experience developing energy projects for customers.

A reliable partner will work collaboratively to understand the challenges faced by various stakeholders in any resilience project. They bring a unique background to bridge the gaps between utilities, municipalities, regulators, constituents, etc. They also bring expert compliance teams to support their partners' projects.



## Partnerships Demonstrating the Benefits of Resilience-Building

The benefits of grid resilience to municipalities and utilities become clear when examining real-world projects. They demonstrate how communities are implementing solutions that unlock resilience benefits such as less grid downtime and improved public health and safety as well as far-reaching community benefits including:

- Economic growth opportunities such as:
  - Increased access to local energy for constituents.
  - Employment opportunities for the local workforce to install, operate and maintain DERs.
- Renewables integration to support decarbonization targets.
- Enhanced sense of community thanks to investment in critical infrastructure.
- Improved access to resources be it everyday electricity or emergency services.

## Here are five Ameresco projects highlighting how effective partnerships are delivering resilience projects with quantifiable benefits:

#### Kūpono Solar Project



In O'ahu, Hawaii, Hawaiian Electric (HECO), the U.S. Navy and the O'ahu community partnered with an energy solutions partner to develop the largest solar and BESS facility on the island. Located at Joint Base Pearl Harbor-Hickam, it delivers 42 MW of renewable energy to the local grid. The Kūpono Solar Project enables the island to reduce its dependence on imported fossil fuels and supports energy resilience, reliability, security, and affordability on the island. Community and customer benefits include stabilized cost of energy for HECO customers, reduced carbon emissions, progress supporting Hawaii's renewable energy goals, and creation of local jobs.

#### **United Power BESS Installation**



United Power, Colorado

Colorado-based electric cooperative <u>United Power</u> collaborated with an energy solutions partner to design, build, own, and operate eight battery energy storage systems (BESS) co-located at its substations. The eight BESS total 78 MW of capacity and 313 MWh of storage, enabling United Power to optimize energy resources, enhance grid resilience, and ensure a reliable electricity supply for members. The systems help United Power balance loads, offset system peaks, integrate renewable resources seamlessly, and generate new revenue.



#### City of Edmundston SOLSTICE Project



Edmundston, New Brunswick, is developing a renewable energy and microgrid project that includes 1 MW of solar and a 2 MWh BESS specifically designed to enhance grid resilience and meet peak energy demands. The project supports the city's environmental action plan and provides backup power for essential community facilities. The SOLSTICE project will integrate with Edmundston's energy management systems to reduce dependence on traditional power sources and help manage peak demand.

#### Roseburg Urban Sanitary Authority (RUSA) Energy Savings Project



Oregon-based <u>RUSA</u> signed an energy savings performance contract to enhance its infrastructure resilience, reduce costs, and foster community engagement. RUSA secured nearly \$2.9 million in grant funds from the Oregon Department of Energy for an 800 kW solar system to offset energy use from RUSA's wastewater treatment plant, a 50 kW solar system to offset energy use at RUSA's administrative offices, and 400 kW of floating solar to offset energy usage from RUSA's natural treatment system. Through the contract, energy savings are guaranteed from the completed systems and optimal system performance. RUSA said the partnership helps it serve the public effectively by reducing costs and strengthening resilience.

#### Town of Wayland Solar, Efficiency & Resilience Project



Wayland, Massachusetts implemented energy conservation measures, four solar installations and a resiliency initiative to ensure the local middle school – which serves as an emergency shelter – has power during grid outages. The capital upgrade and critical infrastructure project helped the town progress toward its goal of decreasing energy consumption by 20% and reducing its greenhouse gas emissions. It delivered energy cost savings while also improving the town's ability to provide critical services during emergencies.





Roseburg Urban Sanitary Authority (RUSA), Oregon

### Conclusion

Aging grid infrastructure, extreme weather, and rising electricity demand require ambitious responses to ensure energy resilience. As discussed, there are obstacles – financial, regulatory, and developmental – to navigate when taking action.

But these obstacles are *not* insurmountable. Utilities, municipalities, businesses, and other community groups can tap into the power of partnership to make meaningful progress toward upgrading infrastructure and creating a more resilient grid, unlocking benefits like cost savings and reduced emissions.

Ameresco is a leading energy solutions provider dedicated to helping customers upgrade infrastructure, reduce costs, enhance resilience, and achieve sustainability goals. Ameresco can partner with your municipality or organization in diverse ways to map a path to energy resilience with meaningful benefits.

Contact us to help build energy resilience together.

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