

An Introduction to Resilience Hubs

Resilience hubs are community facilities equipped to support residents and coordinate resource distribution and services before, during, and after a power outage. Solar combined with energy storage (solar+storage) can provide clean and reliable backup power to resilience hubs during emergencies.

Communities can establish a resilience hub anywhere:

Community Centers • Community Gardens • Food Banks • Local Businesses
Houses of Worship • Libraries • Recreation Centers • Schools • And More!

The Impacts of Energy Insecurity

Weather-related power outages [increased by 78 percent](#) over the past two decades. In a world facing more frequent and severe weather events, reliable access to electricity is increasingly important for maintaining public health. Extreme heat is responsible for more weather-related deaths than any other weather event.

- Extreme heat is the leading cause of [weather-related death](#). Most cooling systems shut down during a power outage because they run on electricity.
- There are currently [about 14.5 million households](#) in the United States that rely on electricity to power medical devices such as oxygen concentrators and motorized wheelchairs.
- The [FDA advises](#) that refrigerators will keep food cold for only 4 hours in the event of a power outage. [Over 20 million households reported an outage of 6 hours or more](#) within the past year, leading to spoiled food. [Temperature-regulated medication](#) like insulin is also at risk.

Resilience Hubs Power Critical Community Services

In the event of a power outage, solar+storage-powered resilience hubs provide critical community services. These services are often an extension of those offered by community organizations during regular times, such as a food pantry distributing food or a health center providing outlets to charge medical equipment. For other facilities, being a resilience hub means remaining open and operational throughout an outage so that community services can continue without interruption. Resilience hubs can provide a safe space where people can convene and access necessities such as water, heating and cooling, and electrical outlets.

If you are debating what types of services your facility could provide as a resilience hub in the event of an outage, consider:

Publicly accessible indoor spaces	→	Shelter from extreme weather, access to heating or cooling during extreme temperatures
Electrical outlets	→	Charge phones and electricity-dependent medical equipment
Refrigerators/freezers	→	Store food and/or temperature-sensitive medicine
Kitchens	→	Prepare and distribute food

Solar+Storage Can Provide Clean, Affordable and Reliable Backup Power

Solar power can be installed on roofs, on a canopy over a parking lot, or as a free-standing ground-mounted array. Solar is becoming increasingly affordable as technology prices steadily decrease. There are many ways to pay for solar power systems, including tax credits, rebates, grants, leases, and power purchase agreements.

Battery storage recharges and stores energy from other sources, such as solar panels or the electric grid, to be discharged and used at a later time. During power outages, battery storage systems can provide backup power. During regular grid operations, battery storage systems have the potential to generate cost savings. One of the most common battery storage chemistries is lithium-ion. There are many commercially available batteries sized to power individual homes and businesses.

Solar+storage: Without a battery, solar panels can only provide power when the sun is shining and the grid is operating normally. When paired with energy storage, solar power generated during the day can be stored and dispatched when needed, like in the evening or when the main power grid goes down. Compared to diesel or natural gas generators, solar+storage is emissions free, more reliable, and can provide year-round economic benefits.

- Clean Energy Group produced a 2-minute video explaining how solar+storage systems can provide backup power to community facilities in the event of a power outage – [watch it here](#).
- For a more comprehensive introduction to solar+storage, see Clean Energy Group's publication, [Understanding Solar+Storage: Answers to Commonly asked Questions About Solar PV and Battery Storage](#), available in English and Spanish.
- To learn more about developing a solar+storage project, visit Clean Energy Group's [Resilient Power Project Toolkit](#).

Building Beyond Energy Resilience

Resilience hubs represent an efficient and effective way to strengthen communities before, during, and after emergencies and natural disasters, such as hurricanes, extreme heat events, water main breaks, or gas line leaks. To prepare for a disrupting event, community-serving facilities that have yet to install a resilient backup power system can evaluate what critical services they might be able to provide in the event of an outage, such as coordinating logistics with aid groups and emergency management teams, distributing information and resources to the surrounding neighborhood, and providing access to basic health and medical supplies.

To learn more about the concept of resilience hubs, view the Urban Sustainability Director's Network [Guide to Developing Resilience Hubs](#).



Photo Credit: U.S. Department of Energy / Josh Moore

Models of Energy Resilience

Solar+storage can be designed to serve communities in a variety of ways.

- **Schools** could continue or expand free lunch programs during power outages, and other spaces within the school, like the gymnasium, could be opened to the public as cooling shelters or information hubs.
- **Community Gardens** increase access to fresh produce for community members. Solar+storage could ensure continuous operation of irrigation systems, refrigerators, and artificially heated or cooled greenhouses.
- **Food Banks** often use on-site refrigerators or freezers. Keeping these running is especially important during prolonged power outages, as patrons may not have access to safely refrigerated food at home.
- **LGBTQ+ Centers** are vital community hubs. In the event of an outage, solar+storage could ensure that community programming continues uninterrupted. On-site health clinics can continue to offer essential health services and avoid losing refrigerated medications.

The following case studies overview how communities across the country have successfully developed solar+storage resilience hubs.



Project partners on the roof of the A.B. Ford Community Center.
Photo Credit: Clean Energy Group

The A.B. Ford Community Center in Detroit, MI

After five damaging floods in 10 years, the Federal Emergency Management Agency (FEMA) designated Detroit's Jefferson Chalmers neighborhood as a flood zone in 2021. When the City of Detroit began designing a new community center in the neighborhood, residents embraced the idea of making the center a "resilience hub" where they can safely gather in a disaster. Opened in 2023, the A.B. Ford Community Center is a hub

of daily community activities. During a power outage, the community center's solar+storage system provides reliable backup power, enabling the center to stay open during a crisis—providing lifesaving access to food and water, heat, or cooling.

Learn more: www.cleangroup.org/initiatives/technical-assistance-fund/featured-installations/a-b-ford-resilience-hub



Year
2024




Solar
68 kilowatts



Battery Storage
220 kilowatt hours



Cost
\$477,871

 Funded by private funding, a power purchase agreement, and the California SGIP Incentive.

Maycroft Apartments: Multifamily Affordable Housing in Washington, DC

Maycroft Apartments installed solar+storage to support an onsite resilience center in 2019. The backup power system supports the building's hallways and stairwell lighting and powers a community room where residents can come to charge their phones and medical devices, access refrigerators, and use the television or microwave. By participating in Washington, DC's community solar program, Maycroft residents save an average of \$40 every month on utility bills.



Rooftop solar array at Maycroft Apartments.
Photo Credit: New Partners Community Solar

Learn more: www.cleangroup.org/initiatives/technical-assistance-fund/featured-installations/maycroft-apartments



Year
2019



Solar
62 kilowatts



Battery Storage
56 kilowatt hours



Cost
\$330,000

 Partially funded by a grant.

The California Indian Museum and Cultural Center in Santa Rosa, CA



Solar array on the rooftop of the California Indian Museum and Cultural Center. Photo Credit: CIMCC

As wildfires and extreme heat events surge in California, so do power outages. The California Indian Museum & Cultural Center (CIMCC), which serves a community including 24 Tribes and over 25,000 Native American people, installed solar+storage to power the building's air filtration system, air-conditioning units, and public areas. The center's community room can shelter up to 125 people and includes a kitchen. CIMCC worked with the county to receive cooling

center designation, ensuring people know the cultural center will be open to the public during heatwaves. **Learn more:** www.cleanegroup.org/initiatives/technical-assistance-fund/featured-installations/ca-indian-museum-cultural-center



Year
2023




Solar
76 kilowatts



Battery Storage
220 kilowatt hours



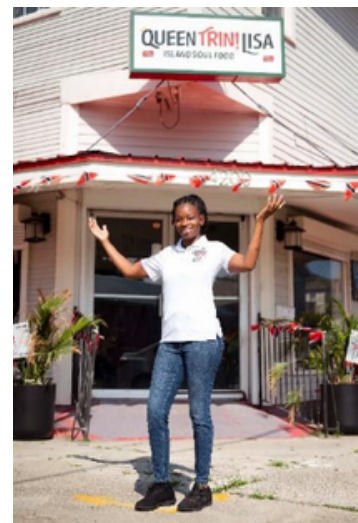
Cost
\$669,000

 Funded by a grant. The system is saving the center between 15-20% on its monthly electric bills.

GET LIT STAY LIT:

Supporting Locally Owned Restaurants in New Orleans

During a power outage, many restaurants are forced to close and throw away spoiled food due to a lack of refrigeration. Feed the Second Line, a nonprofit organization dedicated to supporting the culture bearers in New Orleans, established the GET LIT STAY LIT program to provide access to solar+storage for small, locally owned restaurants. Solar+storage ensures that food remains refrigerated and available to the community, while also allowing the restaurants to remain open and operational. The restaurants also become cooling centers, cell phone charging sites, and food distribution sites for their neighborhoods.



Solar+storage provides backup power to Queen Trini Lisa, a locally owned restaurant in New Orleans. Photo Credit: Katie Sikora