Community Microgrids are the answer to utility power shutdowns

Last month, millions of Californians were left in the dark because their utility, Pacific Gas & Electric (PG&E), preemptively shut down power lines to avoid igniting wildfires.

That Public Safety Power Shutoff (PSPS) resulted in substantial economic losses for California residents and businesses — including include lost wages, lost revenues, spoiled food, and delayed production — with one economist estimating the losses at $2.5 billion. Not so easy to quantify are the disruptions to daily life and the more serious, sometimes fatal, consequences.

The best wildfire mitigation plan: Community Microgrids

With some of the most devastating wildfires in California history being attributed to the utilities' transmission and distribution lines, the state's investor-owned utilities (IOUs) are all taking the PSPS approach to wildfire mitigation.

Not surprisingly, Californians aren't happy about these shutoffs — nor is Governor Newsom, who called the situation "unacceptable." As they try to adapt to their new normal, many Californians are questioning whether PSPS are the best way to deal with increasing wildfire risks.

No silver bullet exists. A multi-pronged approach should include reducing the sprawl of residential development, trimming vegetation near power lines, and burying power lines. But these actions take time, money, and systemic changes.

A highly effective action we can take much faster is to deploy Community Microgrids — a new approach for designing and operating the electric grid. Community Microgrids are stacked with local renewables and staged for resilience, providing our communities with an unparalleled trifecta of economic, environmental, and resilience benefits.

What’s special about Community Microgrids

The PSPS got everyone talking about microgrids. While California has achieved the milestone of 1 million solar roofs, most of those sites are served by solar alone, which means the solar shuts down when the grid goes down. Adding energy storage, however, enables these sites to configure microgrids that can keep at least their most critical electric loads online — indefinitely if designed appropriately.

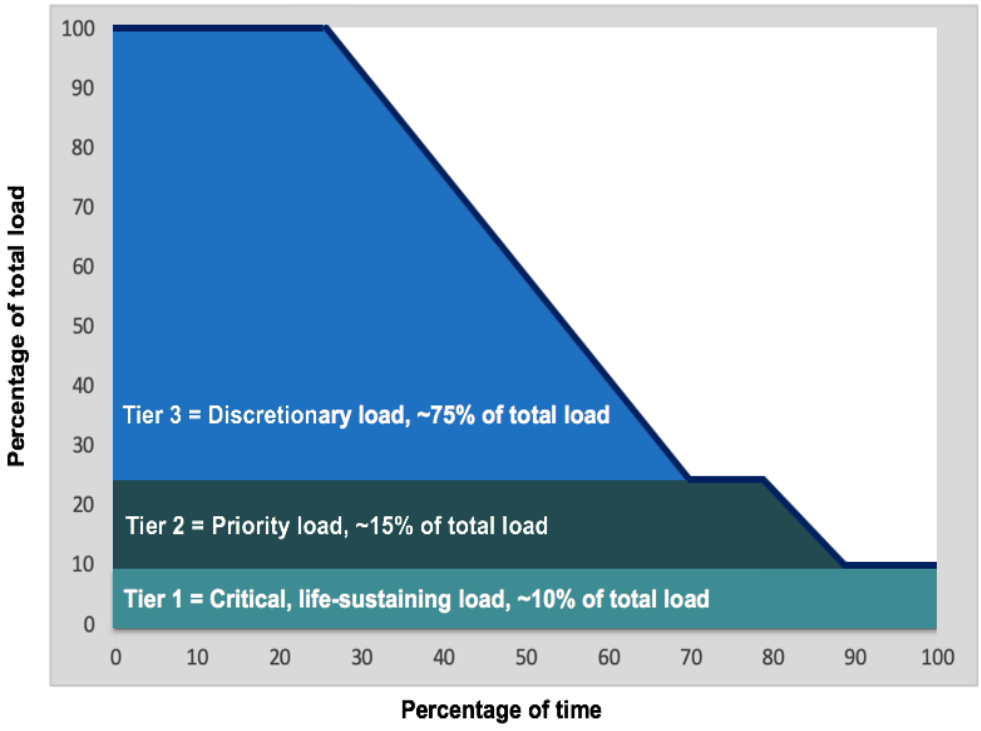
However, although the price of energy storage is decreasing rapidly, it’s still not economically viable for many individuals and businesses. Many homeowners and site managers do not want to be responsible for managing such technologies. And a standard microgrid is designed to protect just one home or business.

How can solar-driven resilience be achieved while addressing the barriers to site-specific deployments of energy storage? With Community Microgrids, which serve entire communities — not just those homes and businesses that can afford and have the sophistication to manage solar+storage.

Like standard microgrids, Community Microgrids can island from the larger grid and operate independently. Unlike standard microgrids, Community Microgrids serve an entire community by ensuring indefinite renewables-driven backup power for critical community facilities such as fire stations, water and communications infrastructure, hospitals, and emergency shelters.

Community Microgrids are deployed in targeted and coordinated local grid areas served by one or more distribution substations, a model that can be replicated in any utility service territory around the world. They feature high penetrations of local renewables and other distributed energy resources (DER) such as energy storage, demand response, and electric vehicle charging infrastructure.

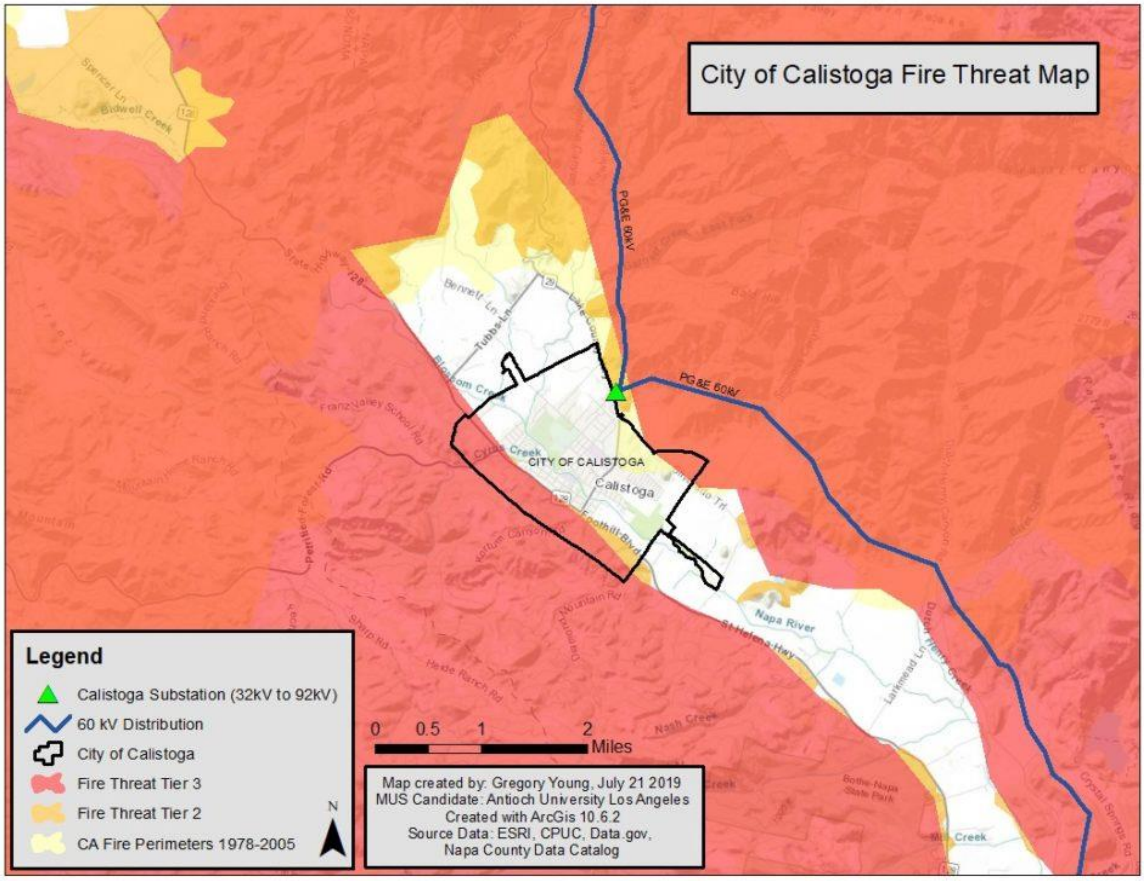
Community Microgrids can keep critical loads online indefinitely during power outages of any length — whether caused by a PSPS or by an actual disaster. Depending on battery storage sizing and the amount of sunshine, they can keep some portion of loads online indefinitely and all loads online some of the time. An average solar net zero community in California with two hours of energy storage (2 MWh of energy storage for each MW of solar) can keep 10% of its normal loads online indefinitely and 100% of normal loads online at least 25% of the time:



The Clean Coalition, a California-based nonprofit, is designing and staging Community Microgrids throughout the US. The motivation for many of these, such as the Goleta Load Pocket Community Microgrid in the Santa Barbara region, is to increase resilience in areas that have been affected by disasters such as wildfires and debris flows. The Clean Coalition's Long Island Community Microgrid was designed in response to Hurricane Sandy and has set the stage for substantial levels of local solar, energy storage, and even offshore wind to provide resilience to the east end of Long Island.

Calistoga responds to PSPS risk

Increasingly, the risk of a PSPS is motivating communities to seek the resilience provided by a Community Microgrid. The City of Calistoga reached out to the Clean Coalition after experiencing a 48-hour PSPS last year, which disrupted the City and led to substantial lost revenues. Surrounded by a high-fire-threat region that engulfs the transmission lines that serve it, Calistoga is preparing for frequent PSPS events (and actual disasters) by planning the Calistoga Community Microgrid.



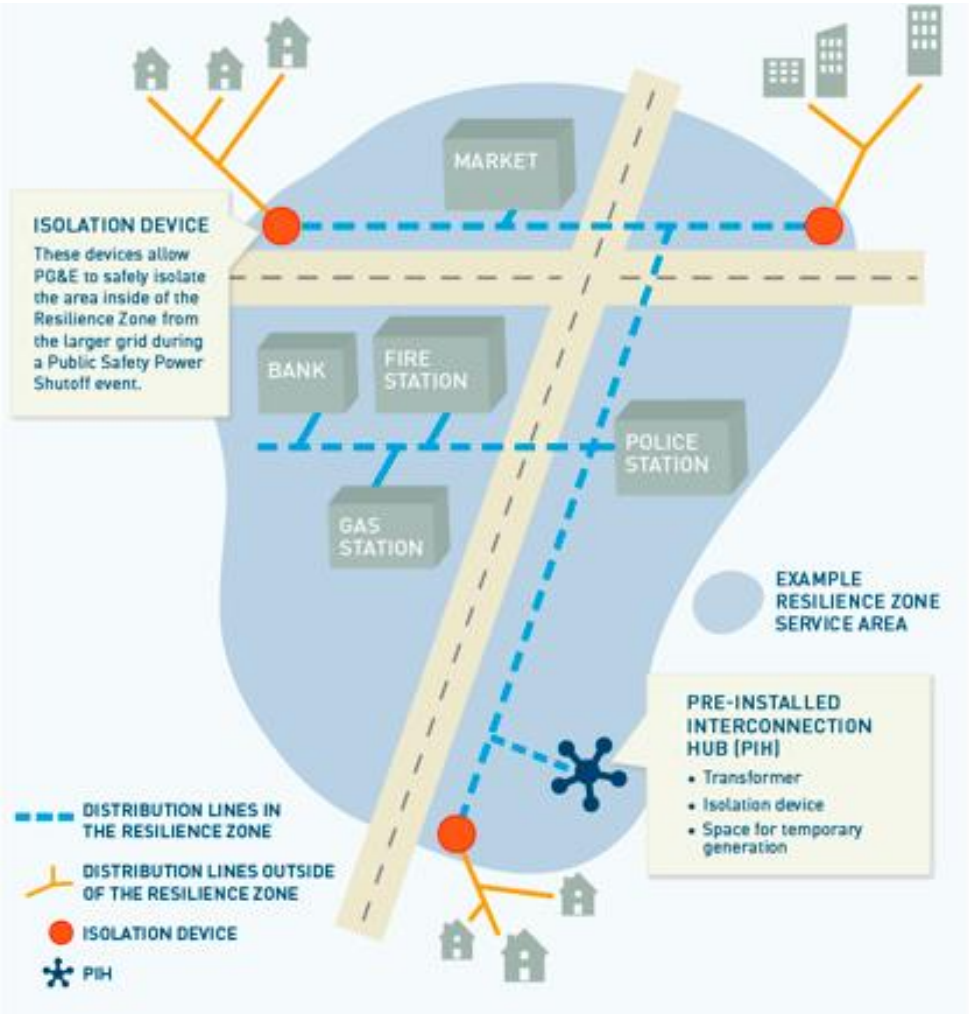
The Clean Coalition is conducting a feasibility study for Calistoga that will include functional designs for six target Critical Community Facility Microgrids. Starting with these separate microgrids at discrete locations, the ultimate goal is to develop a comprehensive Community Microgrid that serves the broader community.

Because Community Microgrids leverage portions of the distribution grid, deploying them requires collaboration from the local utility. The Clean Coalition is working with PG&E to

investigate protecting the most critical grid area in Calistoga during outages by combining local renewables+storage, grid isolation switches, and a preinstalled interconnection hub (PIH), a new concept for enabling mobile energy sources to be rolled in and interconnected during grid outages.

The grid isolation switches and the PIH set the stage for Community Microgrids by creating a targeted grid area that can be isolated from the larger grid.

Initially, the Calistoga PIH will probably be powered by diesel generators, which are heavy polluters, are expensive to operate and maintain, and may be impossible to replenish during major disasters. However, the PIH should eventually be powered by local renewables+storage to create a truly resilient and sustainable Community Microgrid.



Source: PG&E

The time is now for Community Microgrids

Community Microgrids should be the first step in mitigating the effects of PSPS events — and providing comprehensive resilience in the face of actual disasters.

California already has operational microgrids that kept power online during the PSPS for some facilities, including three Fremont fire stations. But we need broader deployment of comprehensive Community Microgrids.

What's stopping their proliferation? The technology exists for comprehensive Community Microgrids, but deploying them requires cooperation from utilities to allow DER to connect using portions of the distribution grid during outages. This cooperation has been slow to come, so the Clean Coalition is starting with the first building blocks in the form of behind-the-meter microgrids and ensuring these are designed to connect to larger Community Microgrids as available.

The Clean Coalition is also working to establish policies and market mechanisms that will help proliferate DER, including streamlining interconnection for wholesale distributed generation (WDG), usually commercial-scale solar; establishing effective procurement methods, such as a market-responsive Feed-In Tariff (FIT) with a Dispatchability Adder to incentivize energy storage; and ensuring full and fair valuation for WDG, which includes establishing a standardized Value of Resilience. It is also crucial to eliminate a massive market distortion in the way that transmission costs are allocated in California's IOU service territories and to make the single biggest market change that will motivate IOUs to pursue Community Microgrids: transmission divestment.

The recent PSPS highlights the urgency of protecting our communities, including our most vulnerable citizens, with Community Microgrids. We can't afford to wait; we must work to make Community Microgrids a reality now.