



## THE HARVARD PROJECT ON AMERICAN INDIAN ECONOMIC DEVELOPMENT

HARVARD KENNEDY SCHOOL • HARVARD UNIVERSITY  
ASH CENTER FOR DEMOCRATIC GOVERNANCE AND INNOVATION

### ENERGY LIFELINE SECTOR RESILIENCE: LOW-CARBON MICROGRIDS

#### Blue Lake Rancheria

*Community development efforts benefit from clean, reliable, and reasonably priced energy, especially in rural areas where fuel supply uncertainties and high costs jeopardize essential governmental operations. Responding to such concerns, Blue Lake Rancheria established a utility authority and built two award-winning microgrids that supply power to local residents and businesses and reduce the government's carbon footprint.*

#### FREQUENT POWER OUTAGES

Nestled in the ancestral territory of the Wiyot People in northwestern California, Blue Lake Rancheria was established in 1908 as a refuge for homeless Indians. Terminated by the US federal government in 1953, Blue Lake Rancheria regained its status as a federally recognized Native nation in 1983. Today, Blue Lake Rancheria owns 100 acres along *Baduwa't* (the Mad River), five miles inland from the Pacific Ocean, near the city of Arcata. The Rancheria prioritizes rebuilding government institutions, economic interests, generational climate action, and community connections. A variety of successful tribal nation-owned enterprises—a casino, hotel, event center, fuel stop with a convenience store, and restaurants—support the tribal economy and help finance governmental functions.

Unfortunately, the region is susceptible to earthquakes, landslides, wildfires, flooding, and other natural disasters. Climate change and extreme weather have increased the frequency of these events—especially wildfires, which now occur outside the historical season and locales. The regional utility, Pacific Gas and Electric, relies on planned outages to manage fire risks and spikes in demand, leaving all—families, enterprises, governmental departments, and emergency services—in the dark.

Blue Lake Rancheria initially responded to outages with backup generators—but these temporary fixes created unacceptable levels of air pollution and at times failed, and each single-point failure caused additional problems. Without power, the government could not operate and was forced to suspend many community services; citizens faced concerns ranging from spoiled food to a lack of access to medical care; and desperate officials resorted to keeping a list of people at risk of dying so that staff could personally check in on them. Even though Blue Lake Rancheria shares some geography and jurisdiction with Humboldt County, until the most recent decade, the

county did not include the nation in its emergency preparedness plans, worsening Blue Lake Rancheria's isolation and vulnerability.

Compounding these issues, it was not uncommon for Pacific Gas and Electric to raise year-on-year prices by seven to ten percent. Rising energy costs strained tribal government budgets, drained businesses' profits, and threatened plans for further economic expansion. Blue Lake Rancheria's leaders concluded that any endeavor toward greater self-sufficiency would first require finding a lower-pollution, secure energy supply.

## **PLANNING AND PARTNERSHIPS**

Planning for increased self-reliance and resiliency began by identifying five key policy and infrastructure areas of focus, or "lifeline sectors": energy, water, food, transportation, and communications/information technology. Among these, energy stood out as the first priority because it supports all of the other sectors and could mean the difference between life and death during emergencies. In 2009, Blue Lake Rancheria adopted its Strategic Energy Plan, prioritizing the establishment of a clean, reliable energy supply and net zero greenhouse gas emissions by 2030.

To advance this goal, Blue Lake Rancheria sought help from industry experts. It partnered with the Schatz Energy Research Center at California Polytechnic University at Humboldt (Cal Poly Humboldt), which helped the nation determine a system sufficient for the community's needs: two microgrids that combine solar electric power, battery energy storage, and existing diesel generators as deep emergency backup.

Next, Blue Lake Rancheria concentrated on financing, feasibility planning, management, design, and construction. It pursued—and received—financial support from numerous federal and state agencies, including the US Department of the Interior, the US Department of Energy, the US Department of Agriculture, and the California Electric Program Investment Charge, a California Energy Commission research and development fund. Tribal monies established the Blue Lake Rancheria Utility Authority, the governing body responsible for managing its energy infrastructure. The partnership with Schatz Energy Research Center's engineers and scientists continued throughout the development phase. The Schatz Center managed the project, coordinating subcontractors, vendors, and numerous technical partners. One partner, the multinational corporation Siemens, modeled power flows and designed a novel computerized microgrid controller for equipment integration.

Completed in 2017 and 2018, the microgrids consist of 1,600 solar panels, 2,100-kilowatt hours of lithium-ion battery storage, and several legacy diesel generators. Under normal conditions, Blue Lake's microgrids connect to the regional grid and provide 20 to 40 percent of the electricity needed for tribal operations. If the regional grid shuts down, the microgrids disconnect and switch into "island mode," supplying power directly to designated critical infrastructure sites within the community.

Blue Lake Rancheria estimates the microgrids have generated savings of at least \$200,000 annually by supplying electricity at approximately half the price of the regional grid. In addition to outage response, the microgrids can be islanded to help relieve stress on the larger electrical grid during times of high demand, and also contribute to the nation's climate change mitigation goals by reducing its greenhouse gas emissions by an estimated 200 tons per year. To date, the installations have a perfect reliability record in supplying power to critical infrastructure during grid stress, outages, wildfire damage, and other emergencies. From 2017-2022, the microgrids detached more than 35 times from the regional grid, providing electricity for a few hours to several days. The system even helped save four lives by running essential medical equipment during a multi-day power outage.

The innovative microgrids have been recognized as winners and finalists for several awards, including the Federal Emergency Management Agency's Whole Community Preparedness Award and DistribuTECH's Project of the Year for Distributed Energy Resources. Blue Lake Rancheria has hosted hundreds of government officials, tribal governments and staff, researchers, and commercial entities interested in learning more. The success convinced the nation to develop two additional microgrids, which are anticipated to break even financially within their first five years of operation.

## **ENERGY SELF-RELIANCE**

When the US federal government terminated its government-to-government relationship with Blue Lake Rancheria in the 1950s, the Rancheria lost title to its land, many citizens moved away, and the fabric of nationhood frayed. In the decades since reinstatement, the nation has worked tirelessly to ensure community stability and governmental self-sufficiency so that its status can never again be threatened. While the microgrids are a significant achievement from a technical perspective, their impact on Blue Lake Rancheria's sovereignty is even more remarkable. Blue Lake Rancheria reduced its dependence on outside energy providers and increased control over

power production and distribution decisions, including which government functions and business interests will receive power during emergencies.

As the nation's strategic planners projected, greater energy self-sufficiency also created opportunities to strengthen other lifeline sectors, including reliability for the rapid expansion of electrified vehicles and charging systems, the tribe's food sovereignty program, and its computer-controlled "smart" water system.

Recognizing the destabilizing effects of climate change in the region, Blue Lake Rancheria is committed to adapting to current realities and adopting mitigation measures that minimize greenhouse gas emissions. The nation now includes assessments of the environment's capacity to withstand human activity in its decision-making process on all new initiatives. From this standpoint, improved environmental stewardship is another benefit of the microgrids. The partnership with Schatz Energy Research Center provided reliable data regarding the climate-friendliness of power generation options and the cost-effectiveness of large-scale power storage. This information, coupled with a previous stand-alone solar power success, pointed Blue Lake Rancheria toward solar photovoltaics, battery storage, and local microgrids as an environmentally sound alternative to existing emergency diesel generators, and redundancy with the local grid. Today, Blue Lake Rancheria's clean energy know-how is taking the nation even further as it supports a multimillion-dollar business incubator and workforce training campus dedicated to climate resilience.

Energy self-reliance also transformed Blue Lake Rancheria's relationships with other governments and communities. The nation presents at national energy industry and climate conferences, participated in the California Climate Action Summit, and joined a Federal Emergency Management Agency task force. Reversing past trends, Blue Lake Rancheria is an integral player in the region's emergency preparedness plans. During power outages, the Rancheria's facilities serve as a regional service provider, as needed, American Red Cross-certified shelters for any evacuees, and as alternative emergency command centers for many non-tribal government emergency response agencies, including Humboldt County, the US Coast Guard, and the California Highway Patrol. Through these intergovernmental commitments, Blue Lake Rancheria has generated goodwill beyond its borders. As just one example, high-risk wildfires in the fall of 2019 led the regional utility to cut power to millions of customers. The Rancheria opened centers where *all* area residents and wildfire evacuees could get warm, obtain food, do homework, charge devices, and access the Internet. In addition to reducing its carbon emissions,

the microgrids enable sustained continuity of operations (COOP) of economic enterprises and government services including emergency response.

Guided by its land stewardship values and commitment to rebuilding an effective government for its people, Blue Lake Rancheria transitioned from being underserved by the energy infrastructure to becoming a key player in regional power generation and climate-resilient emergency planning.

## **LESSONS**

1. Tribal nations can simultaneously increase self-governance and strengthen economies by investing in climate-resilient energy self-sufficiency policies and infrastructure.
2. Innovative strategic partnerships can increase the capacity of tribal governments by providing expert analysis to help decision-makers effectively evaluate potential options.
3. Culturally informed strategic planning is a critical step in the process of implementing sound policy and achieving a tribal government's goals.