NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Photo courtesy of the Department of Energy

Advancing Energy Solutions in Alaska

The U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) provides objective, data-driven support to aid decisionmakers in Alaska as they deploy advanced energy technologies and reduce energy burdens across the nation's largest state. NREL's technical assistance, research, and outreach activities are providing the catalyst for transforming the way Alaska uses energy.

Broad Technical Support Builds Capacity, Moves Energy Projects Forward

NREL has provided energy-related technical support to Alaska communities since the mid-1990's, when the Laboratory furnished technical support for early wind development in the community of Kotzebue and with the Alaska Village Electric Cooperative (AVEC). NREL continued ongoing technical assistance by hosting the Alaska Wind Working Group, Wind-Diesel conferences, and the Alaska Rural Energy Conference through the next decade with the support of the DOE Wind Energy Technology Office.

Since 2012, NREL has supported the DOE Office of Indian Energy in delivering direct technical assistance to a total of 49 Alaskan communities. NREL's contractors in Alaska have provided support for an additional 61 technical assistance requests.

NREL's wide-ranging technical assistance includes strategic energy planning, resilience planning, energy efficiency assessments, renewable energy resource feasibility, planning and integration studies, and village energy optimization analysis.

NREL's work with Alaskan Native villages typically encompasses three stages. First, a village seeks Power Cost Equalization (PCE) support to immediately reduce energy costs. Then, the village seeks strategic energy planning or resilience planning assistance to set a long-term energy vision and actionable goals. Finally, the village seeks in-depth technical assistance related to one or more of the goals outlined in the energy planning phase.

To streamline this process, NREL begins its work with communities by gathering relevant energy data and analyzing resource options, to inform the facilitated energy planning sessions that follow.

NREL has also provided long-term technical guidance to the communities of Arctic Village, Hoonah, Huslia, Kake, Kokhanok, Kongiganak, Koyukuk, Kwethluk,

Alaska's Abundant Resource Potential

Alaska's oil and gas resources are well known, but equally prodigious is Alaska's renewable energy potential. Wind energy—particularly in the Yukon–Kuskokwim Delta— and throughout coastal Alaska—is able to greatly reduce the need for imported energy in many isolated communities. And NREL analysis shows that solar energy in Alaska (shown below) is comparable to that of Germany.

Combined with extensive hydro, biomass, and other renewable energy sources this incredible potential, coupled with the highest energy costs in the United States, has prompted increased adoption of energy efficiency and renewable generation technologies throughout rural Alaska. Isolated microgrids across Alaska are working to go "diesel-off" to save on imported fuel and reduce the energy burden on local residents. In the process, these communities are pushing the limits of technology for high renewable contribution grids to new levels and becoming world leaders in grid integration of renewable energy.

Kwinhagak, Minto, Shishmaref, Shungnak, Teller, Venetie, and Yakutat. These one- to two-year engagements allow NREL staff to work directly with village counterparts to solve energy challenges, while also building local capacity to design and deploy future energy projects.

Greatly Reducing the Need for Imported Energy

Understanding that outside technical assistance is not always feasible, in 2016 NREL began its leadership of the DOE Grid Modernization multi-laboratory initiative, known as the Alaska Microgrid Partnership. The Partnership has developed a model, streamlined process through which communities can address the overall energy needs of their communities. This process, conducted in collaboration with a host of Alaskan organizations, has allowed communities to greatly reduce their dependence on high-cost, imported energy. Generic technical and economic plans have been produced for the communities of Shungnak, Chefornak and Kokhanok, the results of which are now documented in the Alaska Data Gateway.

Expanding Knowledge and Workforce Development

Working in partnership with multiple federal organizations, NREL has also worked to expand information on renewable energy and workforce development across Alaska. By supporting efforts such as the Islanded Grid Resource Center, Wind for Schools, REPowering Schools, Collegiate Wind Competition, and providing ongoing strategic guidance to the Alaska Center for Energy and Power, NREL has long helped Alaskans take advantage of their vast local renewable resources.

Energy Efficiency Measures Cut Community Energy Use

NREL staff and contractors have completed numerous energy audits of residential, commercial, and community buildings in Alaska, and have identified many actionable opportunities for increasing village energy efficiency. These solutions can range in complexity from simple thermostat set-backs, to creating a waste-heat loop from the local powerhouse for use in a laundry facility. A recently completed project in Huslia leveraged NREL technical assistance and contractor support, with Tanana Chiefs Conference funding, for a full-village lighting retrofit. The result will be energy cost savings of an estimated $24,000 annually.

Disaster Recovery and Resilience Support Helps Galena Rebuild Sustainably

In 2013 the Yukon River overflowed its banks, damaging 90% of the homes and businesses in the remote community of Galena. To help Galena recover, and guard against future floods, NREL received funding from the Federal Emergency Management Agency (FEMA) to identify energy-efficient rebuilding solutions, including measures to increase the efficiency and resiliency of the city's power plant. NREL staff joined FEMA and other agencies for an energy summit in Galena, which identified energy-related challenges and potential energy efficiency opportunities as the community recovered and rebuilt from the devastation. NREL conducted on-site assessments to analyze the potential for both water and energy efficiency measures, as well as appropriate on-site renewable energy generation. The result was a comprehensive strategy for achieving sustainability, efficiency, and renewable energy goals, all as part of Galena's recovery efforts.

NREL Research and Analysis Informs Alaska on What's Possible

Over the years, NREL's portfolio of work in Alaska has created a deeper understanding of the state's broader energy challenges and solutions, and a suite of tools and platforms to better address Alaska-specific energy issues. One recent example is NREL's just-released, publically available Tribal Energy Atlas tool, which assesses the technical potential of various renewable energy technologies for Alaska Native Villages.

Our Partners in Alaska

NREL's work in Alaska relies heavily on the lab's outstanding partnerships across the state. Alaska's networks of intertribal organizations, Native Corporations, Native Associations, and stakeholder groups such as the Renewable Energy Alaska Project are key partners in energy planning and deployment. State agencies, organizations, and utilities, including the Alaska Energy Authority, Alaska Housing and Finance Corporation, and Alaska Village Electric Cooperative (AVEC) play vital roles getting projects in the ground. And research partners such as Alaska Center for Energy and Power (ACEP), Launch Alaska, Intelligent Energy Systems, and Cold Climate Housing Research Center (CCHRC) provide input in designing and carrying out projects that inform the future of energy deployment in the state. In addition to DOE, NREL also partners with other federal agencies including the U.S. Department of the Interior and the U.S. Department of Defense.

For More Information

To learn more about NREL's efforts to address Alaska's energy challenges, visit **nrel.gov/technical-assistance/** or contact Gail Mosey at **Gail.Mosey@nrel.gov**.

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • www.nrel.gov

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

NREL/FS-6A42-71617 • May 2018