



UPDATE: ALTERNATIVE ENERGY & ENERGY EFFICIENCY

Conferences:

August 13

Alaska Renewable Energy Fair
Anchorage, Alaska

September 27-29

Alaska Rural Energy Conference
Juneau, Alaska

Alaska Energy Authority - Alternative Energy & Efficiency Update - Summer 2011

Displacing Diesel with Alternatives

AEA's Alternative Energy and Energy Efficiency program promotes the use of renewable resources as alternatives to fossil fuel-based power and heat, and measures to improve energy production and end use efficiency.

In rural areas the program may

support developing local sources of coal and natural gas as diesel alternatives.

This program currently manages projects and initiatives totaling \$188 million in state and federal funding and is divided into eight separate program areas:

The Alaska Energy Inventory, Biomass Energy, Combined Heat and Power, Energy Efficiency & Conservation, Geothermal Energy, Hydroelectric Energy, Ocean and River Energy, and Wind Energy.

AEA projects seek to lower the cost of power and heat in Alaska, with a focus on rural communities.

A Message from the Deputy Director

Peter Crimp



Alaska Energy Authority and its partners are working hard to meet the goals of 50% renewable power by 2025 and 15% increase in energy efficiency by 2020.

As this newsletter indicates AEA has substantially ramped up its efficiency programs that focus on community, commercial, and

industrial facilities and is working closely with its partners through the new Energy Efficiency and Conservation Working Group.

The Renewable Energy Fund is supporting 133 renewable energy projects with \$150 million in grants. We estimate that by the end of 2013, RE Fund construction projects will be saving more than the equivalent of 6 million gallons of diesel fuel per year. At a total of approximately \$190 (half funded through the Fund) these construc-

tion projects are a good investment by any measure.

Much work remains to be done. Over the next year AEA will continue to identify new projects through regional energy plans in the Interior, Lower Yukon-Kuskokwim, and Southeast. At the same time we will be looking to demonstrate promising new energy technologies through the newly established Emerging Energy Technology Fund.

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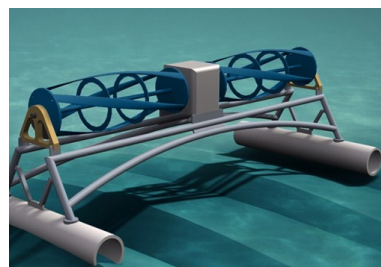
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Ocean and River

Barbara Triplett

Alaska's long coastline and extensive river networks provide potential to meet some of the state's energy needs. Most hydrokinetic technologies are not yet commercially available; however, AEA is funding feasibility and pilot studies to progress this energy development in Alaska.

Ocean and river energy projects convert the kinetic energy of the moving water into electricity via hydrokinetic devices.



RivGen™ by Ocean Renewable Power Company for Nenana Site

Hydrokinetic power is supplied by the tidal waters, waves, and river flow. AEA and the National Ocea-

nic and Atmospheric Administration have recently partnered to model the Cook Inlet's tidal energy potential.

A state-wide Alaska river assessment is being completed by the University of Alaska Anchorage. In-river devices provide smaller scale energy potential for inland Alaskan communities. Ocean wave energy can also be harnessed, with perhaps the best Alaskan site at Yakutat, the "surfing capital of Alaska."

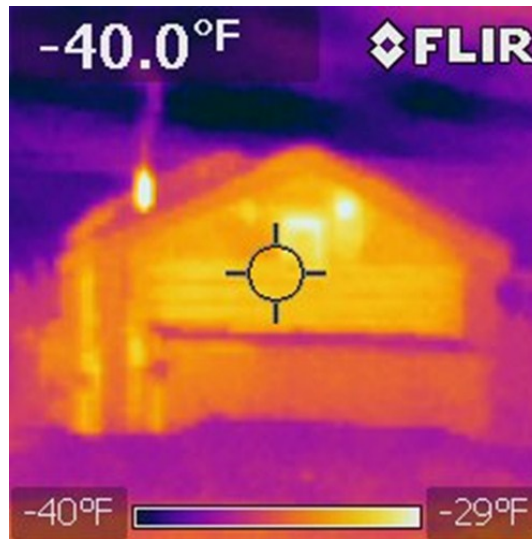
Energy Efficiency and Conservation

Sean Skaling, Katie Conway and Rebecca Garrett

Alaska's Energy Efficiency and Conservation Working Group (EECWG) seeks to coordinate efforts that promote the adoption of greater end-use energy efficiency measures and energy conservation behaviors in Alaska.

Ultimately, through information sharing and integrated planning, EECWG hopes that Alaska may become the most energy efficient state in the nation.

The Working Group has goals to reach 15% improvement in both electrical and heating energy efficiency between 2010 and 2020 and to promote modern, efficient, and sustainable transportation options. The Energy Efficiency & Conservation program focuses on reducing energy use in larger facilities such as schools, community buildings, water treatment plants and commercial buildings.



A tribal building in Ft. Yukon. Ambient outside temperature was -55°F while the inside temperatures was $+65^{\circ}\text{F}$.

Current initiatives include the federally-funded: Energy Efficiency and Conservation Block Grants, the Village Energy Efficiency Program, industrial ener-

gy audits, a building energy monitoring pilot project, and a statewide public education and outreach program.

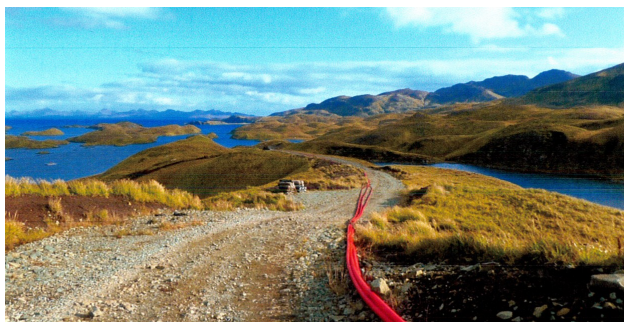
In addition to "end use efficiency" programs, AEA also works on "supply side" energy efficiency, which improves the efficiency of power generation and transmission.

The City of Chignik previously operated two independent power generation and distribution systems—one for the east side of the community and one for the west side. Now, thanks to AEA's Rural Power System Upgrades program, residents of this Alaska Peninsula community get their power from one common generation plant. The scope of this project includes a new powerhouse module along with an extensive new distribution system.

The installation of modern diesel technology for Chignik has produced an average power generation efficiency gain of more than 40 percent.

Hydroelectric

Doug Ott and Audrey Alstrom



Laying transmission lines for the Atka hydro project, fall 2010.

The Hydroelectric program provides technical assistance through staff and contractors for hydro feasibility assessment. This program also manages public funding for project construction.

With 33 active grants from RE Fund rounds I through III, and

26 applications reviewed and recommended for round IV, the Hydroelectric program seeks to continue support for the existing hydro grants statewide and to provide support for large projects scheduled to begin this year, such as the large Susitna Dam.

The City of Atka (pop: 61) on the Aleutian Islands is currently installing a small run-of-the-river hydro project on Chuniisax Creek that will supply 283 kW of renewable energy for the community. Construction began in September 2010 with the installation of transmission lines and will resume in June 2011 to build the impoundment, intake structure, penstock, and control system.

Once complete, the project will effectively displace all of the diesel used for electrical generation for the community! Funding came from a variety of sources including Fed-

eral entities, the City of Atka, and AEA.

The Atka hydroelectric project will likely produce more energy than the community requires, and plans are currently underway to use that excess energy to heat the school and community buildings.



Powerhouse for Atka hydro project.

Wind Energy

James Jensen and Rich Stromberg

With 35 active wind projects, AEA's wind program assists utilities and communities in resource evaluation, training, environmental assessment, regional development, conceptual design, and economic feasibility of rural wind-diesel systems. On the Railbelt, the program assists with energy resource planning and wind integration studies.

Seeking to avoid a boom-and-bust situation, the wind program wants to fund feasibility and final design work now so that the projects are ready for construction in future years once the projects currently in construction are complete.

Additional goals are completing the Chaninik Wind Group projects and to set up a public, web accessible database

that will automatically populate with operational performance data from wind projects operating across the state.

Unalakleet, located on Norton Sound, now has six 100 kW wind turbines operating on a hillside near the community. This Renewable Energy Fund project is expected to generate more than 1 million

kWh per year and reduce diesel consumption by more than 50,000 gallons annually.

During periods of strong winds, the turbines generate more energy than the community power system can absorb. This excess wind energy is used to add heat to a diesel heat recovery loop that provides heat to nearby community facilities.



Six Unalakleet wind turbines.

Photo credit: Deborah Mercy, Marine Advisory Program

Geothermal

Barbara Triplett

Alaska has substantial geothermal resources, and through the Renewable Energy Fund, AEA is currently funding geothermal exploration and research.

Geothermal resources can be used to generate electricity or for direct use (e.g. district heating, greenhouses, and swimming pool heating).

Studies from the 1980s suggested that Hot Springs Bay Valley, on Akutan Island, was a promising site for future geothermal development. In 2010, with the support of grants funds from AEA, the City of Akutan drilled exploratory wells at the site and found 359°F water at a depth of 585 feet. These results are encouraging and the



Geothermal resource assessment at Akutan.

Photo credit: AK Geothermal Consulting

city is continuing to pursue a large-scale geothermal project, potentially a 10-12 MW facility. Pilgrim Hot Springs is also being assessed for potential geothermal development. Further ground studies and temperature gradient holes are slated for Summer 2011.

two locations in Juneau, AK: the Juneau Airport and the Dimond Aquatic Center. The GSHP portion of both of these projects are complete, and the Dimond Aquatic Center will open to the public in June 2011.

Additionally, the Sea Life Center in Seward, AK is installing a Seawater Heat Pump project to offset heating and electrical demands. The sea water pump commissioning is set to be completed in the July of 2011.

Ground source heat pumps (GSHP) use the relatively constant temperatures of the earth (or underground water) to heat or cool buildings. Using AEA Renewable Energy Funds, GSHP technology has been installed at

AEA is also partnering with several other entities across the state to assess the potential for GSHP across the state. The Statewide Assessment Report will be available in June 2011.

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Biomass

Devany Plentovich

AEA's Biomass Energy program develops projects using wood, sawmill residue, fish processing waste, and municipal wastes for energy. They are also working with the public and private sectors to develop the supply chain for biomass feedstocks and to assure a sustainable supply to the state's biomass projects.

Seeking to turbocharge the pro-



Gasification of Alaskan woody biomass demonstration at UAF.

duction of projects this upcoming year, AEA biomass has goals to foster pellet manufacturing in Southeast Alaska. Additionally, they will be proactively conducting feasibility studies for biomass projects, searching for viable biomass locations and resources in the instance that federal grant money becomes available for new project development. Several projects have already undergone feasibility studies and are ready to respond as soon as funding becomes available for construction.

In Tok school, a new wood boiler project was funded through the Renewable Energy Fund and was planned, designed and constructed within budget. The 5.5 million BTU/hr wood chip-fed boiler heats the 75,000 square foot school and is expected to displace approximately 60,000



Tok School wood-fired boiler.

gallons of heating oil annually. The Tok School Project is a great example of how a Renewable Energy Fund project came to life with community support. In addition to displacing thousands of gallons of heating oil, this project's use of a locally available, renewable fuel supply helps deter severe forest fire hazards in the area.

Spring 2011 Gifted Mentorship Program

The AEA staff offers their congratulations to Amber and Morgan Weimer for the completion of their spring 2011 mentorship

The Anchorage School District offers a Gifted Mentorship program for talented high school 11th and 12th grade students who have excelled in their academics and are interested in pursuing independent study in a professional field.

Throughout the semester, Morgan and Amber interviewed all of the program managers in the Renewable Energy and Energy Efficiency group to understand the status of AEA's programs and gain insight into different careers. Based on these interviews, they compiled much of the text for this newsletter. A highlight of their



Morgan and Amber touring the Eklutna hydro plant.

experience were two field trips: a visit to the Eklutna Hydroelectric Project and a tour of UAF's biomass research lab in Palmer.

Both Amber and Morgan will be attending the Colorado State University this fall, considering careers in Natural Resource Management and Engineering.