



March 21, 2013

The Honorable Alan Austerman
Co-Chair, House Finance Committee
State Capitol, Room 505
Juneau, AK 99801-3100

The Honorable Bill Stoltze
Co-Chair, House Finance Committee
State Capitol, Room 515
Juneau, AK 99801-3100

RE: Emerging Energy Technology Fund

Dear Representatives Austerman and Stoltze:

During the March 20, 2013 House Finance Committee meeting, Representative Les Gara asked for additional information on the Emerging Energy Technology Fund. Created through the Alaska Sustainable Energy Act (Senate Bill 220) the Emerging Energy Technology Fund is administered by the Alaska Energy Authority (AEA) (AS 42.45.375).

Together with a matching grant from the Denali Commission, the fund made \$8.9 million available to developing emerging energy technologies in Alaska that can be brought to commercialization within five years.

Priority is given to Alaska businesses, utilities, non-profits, tribal or local governments and other organizations to test emerging technologies or methods of conserving energy or to improve or deploy an existing technology that has not been demonstrated in Alaska.

Through a Request for Applications, AEA solicited abstracts for the first round of the project selection. Seventy proposals were received and evaluated by the Emerging Energy Technology Fund Advisory Committee. Pursuant to AS 42.45.375, the committee consists of seven members of technical experts, appointed by the governor to three-year terms.

All applicants gave presentations and were interviewed by the Emerging Energy Technology Fund Advisory Committee. The committee then scored the applications and made recommendations to AEA, who selected projects for funding and determined funding levels. The complete list of received proposals is available online at AKEnergyAuthority.org.

In November 2012, 16 projects were selected to receive grant funds, including projects to increase energy efficiencies for diesel generators, developing hydrokinetic resources, enhancing wind power and storage capabilities, heat pumps and biomass across the state. A complete list of the selected projects and the award amounts is attached.

Federal funds are not expected to match the FY 14 request. If funded, we anticipate following the same successful process in the first round of Emerging Energy Technology Fund solicitation and review.

Please contact me if you have any questions.

Sincerely,

ALASKA ENERGY AUTHORITY



Sara Fisher-Goad *for*
Executive Director

CC: Karen Rehfeld, Office of Management and Budget
JoEllen Hanrahan, Office of Management and Budget



2012 Emerging Energy Technology Fund Projects

Alaska Applied Sciences, Inc.: Solid State Ammonia Synthesis Pilot Plant

Location: Juneau

Project Type: Energy Storage

Anticipated Award Amount: \$750,000

Project Summary:

Alaska Applied Sciences, Inc. proposes to produce ammonia to serve as fuel to provide energy storage and stability to the Alaska Electric Light & Power electrical grid.

As intermittent sources of renewable electricity generation like wind power grows, it becomes a challenge to incorporate them into the grid while maintaining power stability. Energy storage is used to smooth out the peaks and valleys in renewable generation.

This project reduces the energy required to produce the ammonia, suggesting that it will be more economic than traditional methods.

Alaska Division of Forestry: Biomass Reforestation for Boreal Forests

Location: Fairbanks

Project Type: Biomass

Award Amount: \$45,000

Project Summary:

The Alaska Division of Forestry proposes to demonstrate forest regeneration after a biomass harvest by planting un-rooted poplar tree stem-cuttings. Although less energy-dense than other biomass fuel stocks, poplars have much faster growth rates. Stems will be collected in the winter and replanted in the spring.

Biomass is a renewable energy source that can be used to generate electricity or converted into biofuels.

Arctic Sun, LLC: Arctic Thermal Shutters & Doors

Location: Fairbanks

Project Type: Energy Efficiency

Award Amount: \$136,000

Project Summary:

Arctic Sun, LLC proposes improving the energy efficiency of homes in colder climates through arctic doors, arctic shutters and blown-in insulation shutters.

Maintaining climate control in arctic high-efficiency housing has been challenging because of high condensation on doors and windows.

-continued on the next page-

The technological improvements proposed by Arctic Sun include improving R-values in the arctic doors; creating exterior arctic shutters that are controlled by an electric drive and use air-tight weather stripping; and shutters for retrofitted fixed-pane windows that can be automatically filled and emptied with insulating beads.

Genesis Machining and Fabrication: Ultra-Efficient Generators and Diesel-Electric Propulsion

Location: Kodiak

Project Type: Diesel Efficiency

Award Amount: \$247,036

Project Summary:

Genesis Machining and Fabrication proposes to demonstrate low-cost diesel electric-power generation and propulsion technology.

The project will demonstrate that a modification to existing motors leads to an increased power density. The proposal also includes novel power electronics designs that can be used in boats for both marine propulsion and to power onboard generators. The two technologies will be demonstrated in phases, initially in a bus and later installed in a former tug boat.

Cold Climate Housing Research Center: Cold Climate Heat Pump Demonstration

Location: Fairbanks

Project Type: Heat Pump

Award Amount: \$119,467

Project Summary:

The Cold Climate Housing Research Center is working to demonstrate the potential for ground source heat pumps (GSHPs) as an efficient and economic heat source in colder climates. This technology has not typically been used in arctic environments.

This project will install a GSHP at the Cold Climate Housing Research Center's research and testing facility in Fairbanks in a narrow band of thawed ground. Several different surface treatments will be modeled and tested to maximize surface heat capture during summer months and to prevent winter heat loss.

Institute of Northern Engineering, UAF: Enhanced Condensation for Organic Rankine Cycle

Location: Fairbanks

Project Type: Heat Recovery

Award Amount: \$166,044

Project Summary:

The University of Alaska Fairbanks seeks to increase the efficiency of an Organic Rankine Cycle (ORC) system by increasing the heat transfer rate of the condenser. The condenser is used to condense vapor into liquid and to remove heat from fluids.

ORCs allow heat recovery from lower temperature sources, like biomass, industrial waste heat, geothermal heat and solar ponds. The low-temperature heat can be converted into electricity.

Institute of Northern Engineering, UAF: Safe and Efficient Exhaust Thimble**Location:** Fairbanks**Project Type:** Energy Efficiency**Award Amount:** \$87,889**Project Summary:**

The University of Alaska Anchorage's Institute of Northern Engineering proposes to demonstrate a new design of ventilated exhaust thimbles for wood stoves, oil-fired furnaces, diesel generators and other high-temperature exhaust-generating sources.

Stove thimbles prevent wood framing from igniting from the hot exhaust as it passes through the chimney. In this project, the traditional thimble will be replaced with one that relies on thermal siphoning for passive cooling. The new design eliminates heat loss that accompanies traditional thimbles by maintaining integrity of the building's envelop.

Altaeros Energies, Inc.: High Capacity Airborne Wind Turbine**Location:** Delta Junction**Project Type:** Wind**Award Amount:** \$740,115**Project Summary:**

Altaeros Energies, Inc. proposes to demonstrate a 30 kilowatt (kW) wind turbine suspended 1,000 feet above ground by a helium-filled shell.

The project seeks to take advantage of higher and more consistent wind speeds and to demonstrate an energy capacity factor potentially two times greater than tower-mounted wind turbines.

By tethering to a portable trailer, a substantial decrease in installed capital costs is expected. Altaeros plans to commercialize both 30 and 100 kW models.

Oceana Energy Company: Oceana In-Stream Hydrokinetic Device Evaluation**Location:** Nenana**Project Type:** Hydrokinetic**Anticipated Award Amount:** \$1,230,945**Project Summary:**

Hydrokinetic projects attempt to tap the energy of moving water (kinetic energy) into power. Oceana Energy Company proposes to demonstrate a hydrokinetic device that is designed to capture more energy.

The device will be suspended from a barge during demonstration and testing will occur during the summer months at ACEP's hydrokinetic test bed in the Tanana River at Nenana.

ORPC Alaska, LLC: RivGen Power System Commercialization Project**Location:** Nikiski, Igiugig**Project Type:** Hydrokinetic**Award Amount:** \$1,491,750

Project Summary:

ORPC proposes to demonstrate the RivGen hydrokinetic device that is mounted on a pontoon support structure, floated to the deployment location and then submerged.

Hydrokinetic projects attempt to tap the energy of moving water (kinetic energy) into power. The RivGen device is submerged to capture the energy in the river current. It is scaled down from the 150 kW device currently operating in Maine and planned for the Cook Inlet in 2014. This project will be demonstrated at Nikiski and then again on the Kvichak River at Igiugig for one summer season.

Hatch: Application of Composite Flywheels

Location: Fairbanks

Project Type: Energy Storage

Anticipated Award Amount: \$672,500

Project Summary:

Hatch is proposing the demonstration of a high-efficiency and lightweight flywheel to provide more stability in wind-diesel systems. Flywheels are rotating mechanical devices that are used to store energy.

As intermittent sources of renewable electricity generation like wind power grows, it becomes a challenge to incorporate them into the grid while maintaining power stability. This project has the potential to integrate more wind power into wind-diesel systems.

Intelligent Energy Systems: Small Community Self-Regulating Grid

Location: Tuntutuliak

Project Type: Wind, energy storage

Anticipated Award Amount: \$465,634

Project Summary:

IES proposes to provide power grid stability through an advanced control system that uses electrical heating units.

As intermittent sources of renewable electricity generation like wind power grows, it becomes a challenge to incorporate them into the grid while maintaining power stability. High winds produce more power and as a result supply can outpace demand resulting in an increased electrical frequency in the power grid. This project would provide grid stability and could facilitate higher rates of wind penetration in rural communities like Tuntutuliak.

Intelligent Energy Systems: Wind-Diesel Battery Hybrid for Kwigillingok

Location: Kwigillingok

Project Type: Wind, energy storage

Award Amount: \$1,025,750

Project Summary:

IES proposes to demonstrate the use of high-performance lithium ion batteries, similar to those found in vehicles, to provide short-term energy storage.

-continued on the next page-

As intermittent sources of renewable electricity generation like wind power grows, it becomes a challenge to incorporate them into the grid while maintaining power stability.

This project will attempt to maximize the use of wind to displace diesel fuel in Kwigillingok by providing valuable energy storage. Diesel fuel savings are expected to exceed 50 percent for wind-diesel system operations without storage and 10 to 15 percent for diesel-battery system operations.

Boschma Research, Inc.: BRI Cyclo-Turbine Energy Production

Location: Nenana, Igiugig

Project Type: Hydrokinetic

Award Amount: \$728,630

Project Summary:

Hydrokinetic projects attempt to tap the energy of moving water (kinetic energy) into power. Boschma Research, Inc. proposes a river-bottom mounted cyclodial turbine hydrokinetic device on the Kvichak River. Cyclodial turbines are effective in compact sizes.

This device also includes a debris guard and technologies enabling use in slower currents. The 5kW unit will be tested over the course of two field seasons in the Kvichak River at Igiugig during summer months.

Marsh Creek, LLC: High-Efficiency Diesel Electric Generator Set

Location: Fairbanks

Project Type: Diesel Efficiency

Award Amount: \$677,508

Project Summary:

March Creek, LLC proposes increasing fuel efficiency for diesel electrical generation.

A permanent magnet "soft torque" coupling will allow the diesel engine to operate at significantly lower rotational speed when power demand is low, increasing fuel efficiency.

Northwest Arctic Borough: Arctic Field Testing and Power Curve Verification of the Renewegy VP-20 Wind Turbine

Location: Kotzebue

Project Type: Wind

Award Amount: \$293,300

Project Summary:

The Northwest Arctic Borough proposes to demonstrate the cold weather capabilities of a 25 kW in Kotzebue. The turbine will be installed on a tilt-up tower that uses a winch for installation in place of a crane.

The tipping mechanism eliminates the need for a crane or tower climbing during installation or maintenance