

# **Denali Commission Emerging Energy Technology Grant: Final Project Descriptions**

## **Alaska Sealife Center: Seawater Heat Pump Demonstration Project**

The Alaska SeaLife Center's overall goal for this project is to demonstrate a heat pump system that will "lift" latent heat from raw seawater and transfer the energy into building heat.

## **Cordova Electric Cooperative: Psychrophiles for Generating Heating Gas**

This research and application project will deploy the use of psychrophiles (cold loving microbes) to improve efficiency in biogas digestors for generating cooking and heating gas for Alaskan households. The first phase will compare the efficiencies of mesophiles (conventional digester microbes) and psychrophiles on common household and rural Alaska feedstock at various temperatures. The second phase will deploy digester(s) in practical household scale project(s) to operate appliance and an electrical generator to evaluate feasibility and sustainability in an applied setting for widespread use in Alaska.

## **Kotzebue Electric Association: Feasibility of Solar Hot Water Systems**

Assess the feasibility of solar hot water heating systems on residential units in the NANA region.

## **Kotzebue Electric Association: Flow Battery Energy Storage Systems**

Analyze and demonstrate flow battery systems and their potential for energy storage in rural wind systems.

## **Kotzebue Electric Association: Wales Diesel-Off High Penetration Wind System**

Retrofit the Wales Wind-Diesel Hybrid Power System by adding remote web access monitoring and control systems, getting the two Entegrety turbines back online and allowing for increased data logging capabilities and developing long term operations and maintenance strategies for replicating diesel-off configurations in other communities. Kotzebue Electric Association's overall goal for this project is to demonstrate diesel-off configuration for a remote wind-diesel hybrid power system through the retrofit of existing equipment and controls.

## **Ocean Renewable Power Corporation: Nenana Hydrokinetic Turbine**

Build, install and test the RivGen™ Power System, a hydrokinetic energy unit, at the Nenana hydrokinetic test bed, and analyze resource and technology results.

## **Sealaska Corporation: Commercial Scale Wood Pellet Fired Boiler**

This project will convert Sealaska's corporate headquarters building from a diesel fired boiler to a wood pellet fired boiler. The overall goal of this project is to demonstrate that wood heat can be cost effective and feasible for larger commercial, industrial, and municipal buildings, and has the potential to effect demand for Southeast Alaska second growth wood fiber.

## **Tanana Chiefs Conference: Organic Rankine Cycle Heat Recovery System**

Tanana Chiefs Conference's goal for this project is to demonstrate the potential improved fuel efficiency of the diesel power plant in a village in the TCC region through the use of an Organic Rankine Cycle (ORC) system for heat recovery from engine jacket water and exhaust.

## **University of Alaska Fairbanks, WiDAC: High Penetration Hybrid Power System**

The Wind Diesel Application Center will analyze state of the art power electronics to assess options for wind-diesel hybrid power systems to operate in a diesel-off mode.