

**App # 800      West Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Borough & Municipality of Skagway

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Project Description

The Municipality of Skagway (Municipality) proposes to construct the West Creek Hydroelectric Project (Project) located on West Creek, approximately seven miles west of Skagway and adjacent to the small community of Dyea. The primary purpose of the Project would be off-setting diesel generation by cruise ships that dock in Skagway from May through September each year. Up to five cruise ships per day dock in Skagway for 12-15 hours and continuously operate their diesel plants to provide for on-board electricity consumption. The continuous stack emissions spread a blue haze at about the 1,500 foot elevation where vegetation has been noticeably affected. The Project will improve air quality and save vegetation in the area (there may be other unknown environmental benefits). To emphasize how serious the air quality of the area is being taken, the National Park Service, Municipality of Skagway, and Alaska Power & Telephone Company (AP&T) have a cooperative agreement to place and maintain equipment at AP&T's Dewey Lakes Hydro project site to monitor this pollution. Preliminary results of this monitoring are attached as an appendix. A secondary purpose of the Project is to provide winter energy to the local utility when they have a shortfall of hydro energy from their hydroelectric projects (2011 - Dewey Lakes Hydro, Lutak Hydro, Goat Lake Hydro, Kasidaya Creek Hydro) as well as to sell winter energy to the Yukon Territory, Canada through their generation company Yukon Energy. The Alaska Power Authority had a feasibility study conducted for the Project by R. W Beck and Associates in 1981-82. That study focused on a development that would meet the electricity needs of Skagway and Haines rather than the nascent cruise ship industry. It recommended an installed capacity of 6.0 MW and a 20,000 acre-foot reservoir formed by a 120-foot high concrete-faced rockfill dam. The proposed Project will be significantly different than proposed by Beck in that the installed capacity will be greater and the reservoir storage will also be greater. Nevertheless, the Beck study provides an excellent starting point for the proposed reevaluation of the site, and therefore the Municipality believes that a Phase I reconnaissance study is not necessary. West Creek drains from an ice field into the Taiya River. The Municipality has already requested the Project site land from the State as Municipal Entitlement Land. Since the stream is glacial, flows are very high in the summer, which is also when the cruise ships are active. Preliminary analysis indicates that a Project with a capacity to serve one large cruise ship could be operated on a run-of-river basis. Increasing the capacity so the Project could serve two or three cruise ships is possible and a storage reservoir would be required to make the generation dependable. The costs and benefits of these capacity/storage alternatives will be a primary focus of the proposed Phase II studies.

**AEA Review Comments and Recommendation** **Full Funding**

The Borough and Municipality of Skagway proposes feasibility and conceptual design of a 6-26 MW hydro project at West Creek to be connected to the Upper Lynn Canal (Haines-Skagway) grid. The estimated cost of this project \$140 million. The primary purpose of the project is to offset diesel generation by cruise ships that dock in Skagway from May to September. The secondary purpose is to supply power to the local grid during periods of shortfall and to the Yukon Territory grid in the winter. The BMS applied for a similar project in round 2 (#262). AEA recommended the project for partial funding and stated that an integrated resource energy plan would be needed to assess the project in the context of other potential projects. Due to limited funding, however, the project did not receive funding.

The economic analysis performed for this project is based solely on cruise ship load over a period of 50 years. It estimates a B/C ratio of 1.5 to 2.1 assuming an average electrical consumption of 18,900 to 27,000 MWh/yr.

The BMS states that a major benefit of the project is the reduced air emissions from diesel generation by the cruise ships.

AEA has the following concerns about this project:

1. AEA has already committed funding for Connelly Lk, Schubeek Lk, and Burro Cr reconnaissance and feasibility assessment. These projects would compete to meet the same loads as the proposed project.
2. Given that the chief aim of the project is to supply the shore-based cruise ship load, AEA questions the amount of public benefit to be received versus the high capital cost and high technical, business, and regulatory risks of the proposed project.
3. Since the project would affect the waters of the Klondike Gold Rush National Park, there is significant permitting risk.

Based on the additional information that BMS provided regarding potential benefits of the project, AEA has reconsidered its original recommendation against funding. The additional information more thoroughly explained the benefits the projects would accrue from reduced cruise ship emissions and a potential intertie to BC.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.22 /kWh

**Energy Region:**  
Southeast

<b>Project Cost:</b>	\$140,000,000
<b>Requested Grant Funds:</b>	\$236,000
<b>Matched Funds Provided:</b>	\$59,000
<b>Total Potential Grant Amount:</b>	\$295,000
<b>AEA Funding Recommendation:</b>	<b>\$236,000</b>

**App # 800      West Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Borough & Municipality of Skagway

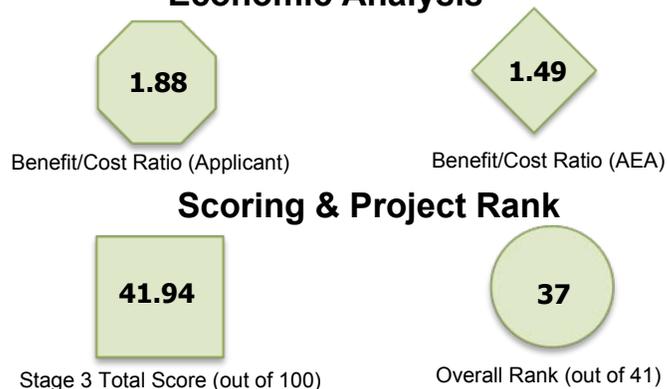
**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	9.90
4) Project Readiness (Max 5)	1.00
5) Benefits (Max 15)	8.50
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	1.17

## Economic Analysis



## DNR/DMLW Feasibility Comments

Municiple conveyance survey underway, but Skagway has management authority at this time.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Project is ~20 km away from Chilkat river segment of the Denali fault. See general DGGS comment.

**App # 801      Jack River Hydro Project Phase II**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Native Village of Cantwell

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

## Project Description

The Native Village of Cantwell wishes to improve the reliability and lower the cost of the community of Cantwell's power system. Currently, they obtain power from the line between MEA and GVEA (Alaska Intertie System). To accomplish this, they propose to build a hydroelectric project on the Jack River, a short distance from Cantwell. The installed capacity of this plant will be in excess of 1 MW. It will be comprised of a dam and a short tunnel. A feasibility design and scoping are required to provide the parameters of the project.

**AEA Review Comments and Recommendation** **Not Recommended**

The Village of Cantwell proposes feasibility and conceptual design of a storage hydro project in excess of 1 MW, with a power tunnel on the Jack River.

The Village and AEA have recently executed a grant funded in round 4 (#606) for reconnaissance assessment of the project and has installed a stream gauge. Recon work is scheduled to be completed in June 2013. Therefore AEA believes that further funding for feasibility and conceptual design is premature.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$200,000

**Requested Grant Funds:** \$190,000

**Matched Funds Provided:** \$10,000

**Total Potential Grant Amount:** \$200,000

**AEA Funding Recommendation:**

**App # 801     Jack River Hydro Project Phase II**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Native Village of Cantwell

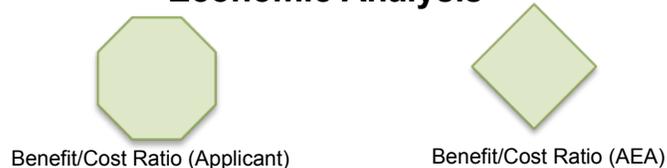
**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

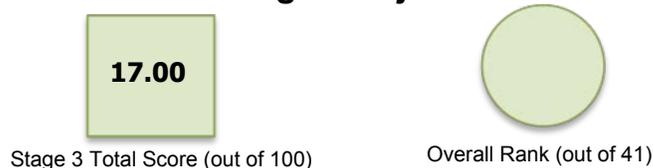
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	8.75
2) Matching Resources (Max 15)	5.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No exact location. May involve state land or state selected land. Authorizations would be required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Located near Denali fault and associated thrust faults. Dam should be designed with considerations for strong ground motions based on a seismic hazards assessment. A detailed site specific geotechnical investigation should be performed to insure that no previously unrecognized faults extend through the dam site.

**App # 802 Petersburg Public Library Geothermal Heat Pump Construction**

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** City of Petersburg

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

## Project Description

The City of Petersburg is proposing construction (Phase IV) of a hybrid ground source heat pump system to serve the heating needs at the City of Petersburg's new public library facility. The new Petersburg Public Library is a 9,770 sq. ft. facility to be located in downtown Petersburg. It will serve primarily Petersburg residents, as well as visitors and temporary workers in our community. Construction of the facility is scheduled to begin in the spring of 2012 and be completed in the summer of 2013. The City of Petersburg Administration, Community Development and Public Library Departments are directly involved with the design and construction of the facility. The hybrid system consists of a ground source heat pump system to meet the facility's heating needs and a supplemental electric heat system serving as a back up. The use of a hybrid ground source heat pump system in lieu of conventional oil or electric heat systems at the new Petersburg Public Library facility is supported by the City of Petersburg Administration, Community Development, and Public Library Departments, and the City of Petersburg City Council. The Renewable Energy Fund Grant request herein is for the additional construction cost for the ground source heat pump system. This funding request is only for the costs associated with the ground source heat pump portion of the hybrid system; the costs associated with the supplemental electric boiler and water heaters are excluded from this request.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Petersburg proposes to construct a hybrid ground-source heat pump (GSHP) at the new public library that is being designed and constructed. The closed loop GSHP would consist of six 315' deep wells and have a 10-ton capacity. The expected coefficient of performance (COP) is 3.

The new public library Construction for the GSHP is expected to begin in Fall 2012 and be completed and commissioned in June 2013. Since Petersburg is powered by hydroelectric, the GSHP would be a very efficient use of electricity. The project team stated that it was committed to the project and would likely seek other funding to complete the project if not supported by the RE Fund

The application provides a life-cycle economic assessment of a conventional electric boiler, ground source heat pump, and air source heat pump. The assessment does not include a comparison of what AEA regards as the baseline alternative—a conventional fuel oil system. Given only approximately 3,100 gallons of fuel that would be displaced and the high capital costs of the heat pump alternatives, the economics of heat pumps appears poor in this case (benefit/cost is less than 0.6) when compared against a conventional oil-fired system.

The RE Fund has provided grants to two larger GSHPs in Southeast (the Juneau Airport and Dimond Aquatic Center). Economics appear more favorable due to the larger amount of fuel displacement.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$264,400

**Requested Grant Funds:** \$186,400

**Matched Funds Provided:** \$46,600

**Total Potential Grant Amount:** \$233,000

**AEA Funding Recommendation:**

**App # 802 Petersburg Public Library Geothermal Heat Pump Construction**

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** City of Petersburg

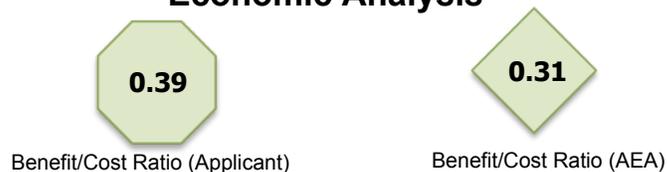
**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

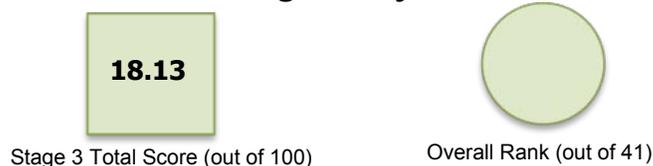
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.38
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No State land or easement interest

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 803      Pillar Mtn High Penetration Wind Project**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Kodiak Electric Association

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

The Pillar Mountain High Penetration Wind Project is the integration and installation of three General Electric (GE) 1.5 megawatt (MW) wind turbines along with an energy storage system that allows the stable integration of high wind penetration rates onto KEA's isolated grid. This project is the next step in a series of KEA's renewable energy developments aimed at displacing the use of diesel fuel for electric generation which will allow KEA to achieve its vision to endeavor to produce 95% of energy sales with cost effective renewable power solutions by the year 2020. The energy storage system will regulate system frequency on a short-term basis as the wind resource unpredictably comes and goes. Terror Lake will provide the long-term, macro-energy storage of wind energy on an annual basis. Therefore, the Pillar Mountain High Penetration Wind Project is not simply a wind turbine construction effort, but an innovative demonstration of how high generation rates of wind can be stably integrated onto an isolated electric grid through the installation of a energy storage system that bridges Pillar Mountain's variable wind energy resource with the Terror Lake hydroelectric Project's dispatchable hydropower.

**AEA Review Comments and Recommendation** **Partial Funding**

Kodiak Electric Association requests \$8 million for 1) installation of three additional GE 1.5 MW SLE turbines and 2) addition of a 1 MWh energy storage system.

KEA is requesting funding for construction and commissioning of the proposed project. The project is expected to cost \$23,150,000, of which \$8,000,000 would come as matching funds provided by KEA. An additional \$7,150,000 will be spent by KEA but will be ineligible for match as the money will be spent prior to July 1, 2012. KEA received \$4 million from a RE Fund round 1 grant (#103) for the construction and commissioning of three GE 1.5 MW SLE turbines.

KEA's wind turbines have been the highest wind energy producers in the State. The proposed system changes will boost wind and hydro penetration to almost 100% and displace approximately 780,000 gallons of diesel per year.

Under the round 5 solicitation KEA is eligible for a total of \$8 million in cumulative funding for the wind project.

The proposed battery system, estimated to cost \$3.8 million, will provide system stability and a bridge between the more variable wind generation and KEA's Terror Lake Hydro project. The proposed battery system will increase the renewable output of the wind-hydro system. Although the battery system is proposed in the current application, AEA believes that the battery system is not solely a component of the wind system, and is therefore not subject to the \$8 million wind system funding cap. AEA notes that KEA has received \$4 million in RE Fund grants for upgrades to the hydro system (#401 and 653). In round 5 the total allocation of the wind and hydro system, including the battery system, should not exceed \$16 million.

Recommend partial funding of \$7.8 million (\$4 million for the wind system and \$3.8 million for the battery system).

## Funding & Cost

Cost of Power: \$0.18 /kWh

**Energy Region:**  
Kodiak

**Project Cost:** \$23,150,000

**Requested Grant Funds:** \$8,000,000

**Matched Funds Provided:** \$8,000,000

**Total Potential Grant Amount:** \$16,000,000

**AEA Funding Recommendation:** \$7,800,000

**App # 803 Pillar Mtn High Penetration Wind Project**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Kodiak Electric Association

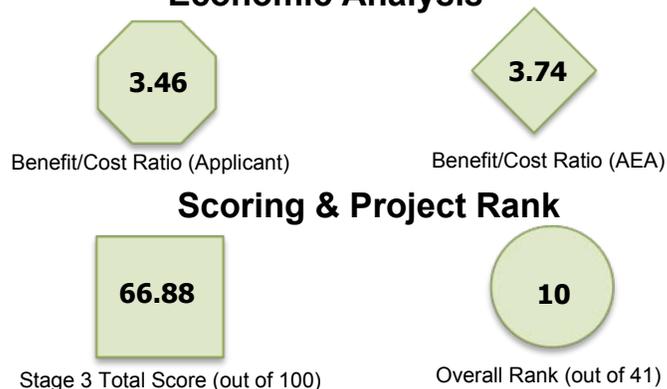
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.88
2) Matching Resources (Max 15)	15.00
3) Project Feasibility from Stage 2 (Max 20)	18.00
4) Project Readiness (Max 5)	4.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

Project itself not on state land, but an extension of the road authorized in ADL 229859 would be required to access the project area.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 804      Transmission Line to Renewable Energy Resources (Mount Spurr)**

**Resource:** Transmission

**Proposed Project Phase:** Design

**Proposer:** Chugach Electric Association

**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

## Project Description

Chugach is proposing to continue the process of permitting and design for a new transmission line linking a geothermal project being developed on the west side of Cook Inlet to the existing Chugach system. The specific proposal for a Round V renewable energy grant is the design of the substations at each end of the transmission line. One substation would be at Ormat's facility and the other at Beluga Power plant. Ormat Nevada, Inc. (Ormat), a wholly-owned subsidiary of Ormat Technologies, Inc (NYSE "ORA"), secured 15 geothermal leases on Mt. Spurr from the State of Alaska in 2008 and has since embarked on a multi-phased exploration and development plan, with a goal to explore and build a utility scale 50-100 MW geothermal plant to be connected to the Railbelt power grid around 2016. Ormat has built over 1,600 MW of geothermal plants during the last 3 decades all over the western United States and several locations internationally. Ormat's Mt. Spurr project is progressing with the drilling this summer of a 3,500' deep core hole. They recently announced drilling results for this well and the results were not as positive as hoped or expected. While Ormat assesses its future development plan, Chugach is moving forward with this grant application to stay on a parallel path with Ormat. Chugach's proposed project would include one or more high voltage transmission lines which would connect to the existing substation and transmission lines at Beluga. The line would be built for a maximum operating voltage of 230 kV but could initially be operated at a lower voltage to match first stage development of 50 MW of the geothermal project. The line would cover a distance of at least 40 miles, depending on the routing. Chugach received a Round IV renewable energy grant which will soon be used for the route selection phase of this project. The plan is for Round V renewable energy grant funds to be for the design of substations at each end of the line. Subsequent phases of the project would be for final design and permitting of the transmission line and for construction.

**AEA Review Comments and Recommendation      Not Recommended**

Chugach Electric proposes final design, surveying, geotechnical assessment, and permitting of substations and switchyards associated with the transmission for the potential Mt. Spurr geothermal project. AEA has budgeted funding for RE Fund round 4 feasibility and route selection for the transmission project (#615). That work is underway at the time of this review.

Currently Mt. Spurr geothermal developer Ormat remains in the resource assessment phase and AEA expects a report of the results of 2011 field work by the end of 2011.

Since the resource at Mt. Spurr is not yet proven and the Rd 4 feasibility and route selection remains to be completed, AEA believes that it is premature to support final design and permitting work for the transmission line.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$61,780,000

**Requested Grant Funds:** \$1,150,000

**Matched Funds Provided:** \$110,000

**Total Potential Grant Amount:** \$1,260,000

**AEA Funding Recommendation:**

**App # 804      Transmission Line to Renewable Energy Resources (Mount Spurr)**

**Resource:** Transmission

**Proposed Project Phase:** Design

**Proposer:** Chugach Electric Association

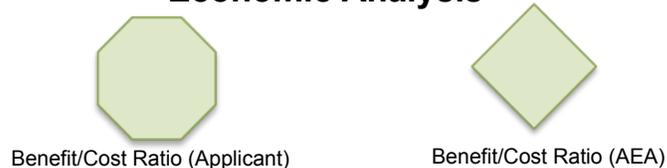
**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

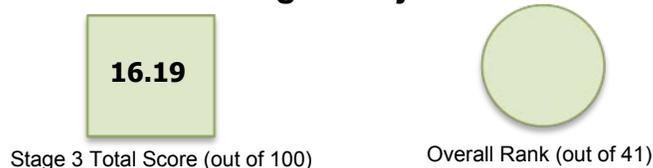
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	5.69
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Additional 38.05 authorizations required for the described project.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 805      Black Bear Lake Hydro Project Storage Increase**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Power & Telephone Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

The Applicant proposes to construct a 17-foot-high by 100 feet long rockfill dam and spillway at the outlet of Black Bear Lake (BBL) to raise the lake 12 feet and increase the active storage by 2,420 acre feet (from 2,870 acre-feet to 5,290 acre-feet). The storage increase will provide for additional generation during the winter and spring when diesel generation is often required currently due to low lake inflows during those periods. In addition, the storage increase will allow the Applicant to more easily meet the minimum instream flow requirements of the FERC license for the project, which has become difficult with normal operation. The incremental average annual generation is estimated to be 1,264 MWh/yr.

**AEA Review Comments and Recommendation** **Not Recommended**

Alaska Power Company requests funding to complete reconnaissance assessment, feasibility analysis, and permitting and final design to construct a 17' high x 100' long rockfill dam and spillway at the outlet of Black Bear Lake to raise the lake by 12' and increase active storage from 2870 to 5290 acre-ft. APC asserts that the project would add 1.26 GWh per year in annual generation by reducing spillage from BBL from 26 to 24%. The project will require a FERC amendment. The total development and construction cost is estimated at \$3,040,000.

AEA is concerned that there may not be adequate market for hydropower on Prince of Wales after the 5 MW Reynolds Cr Hydro project is constructed. APC is one of the three partners of Haida Energy that is developing the Reynolds Cr project. In its application, APC stated it would provide a study in fall of 2011 to determine how much additional firm generation will be available from Reynolds Creek and whether the BBL storage increase is justifiable when Reynolds Creek is constructed. AEA requested a copy of the study and was informed it was not available due to other APC staff commitments. Thus there is no confirmation of the need for power from this project.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.28 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$3,040,000

**Requested Grant Funds:** \$318,000

**Matched Funds Provided:** \$79,500

**Total Potential Grant Amount:** \$397,500

**AEA Funding Recommendation:**

**App # 805      Black Bear Lake Hydro Project Storage Increase**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Power & Telephone Company

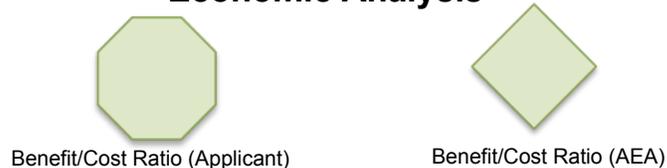
**AEA Program Manager:** Ott

**Applicant Type:** Utility

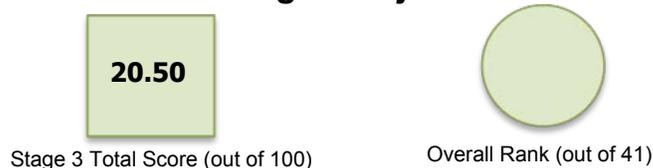
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	12.25
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Increase in water elevation will affect private and possibly USFS land

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

No known active faults near proposed project. See general DGGS comment.

## App # 806 Upper Tanana Area Intertie Project

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The Project is to interconnect communities reliant on diesel generation to Tok where a renewable energy project will be constructed in the next 3-4 years. By beginning the interconnection during the summer of 2012, completion of the distribution lines will coincide closely with the startup of the renewable energy project. There would be two stages for this project: Stage 1: Would consist of a 25 mile 34.5 kV distribution line on wood pole structures to Tok from the APC closed grid that currently connects Slana, Chistochina, and Mentasta. These communities are on the Tok Cutoff of the Glenn Hwy, south of Tok. Stage 2: Would consist of a 40 mile 34.5 kV distribution line on wood pole structures to Tok from the APC closed grid that currently connects Northway, Northway Junction, and Northway Village. These communities are located southeast of Tok along the Alaska Highway.

### AEA Review Comments and Recommendation

**Not Recommended**

AP&T proposes design and construction of transmission to link the hub community of Tok to Slana, Chistochina, Mentasta, Northway, Northway Junction, and Northway Village. Currently AP&T is funded through RE Fund round 4 to assess feasibility of a 2 MW wood-fired combined heat and power system in Tok (#665). AP&T had partial funding through RE Fund round 3 (#438) to construct the 1.5 MW Yerrick Creek hydro project, but decided not to proceed.

AEA recognizes the benefits of tying these communities together in a grid.

However AEA has the following concerns with this proposal:

1. The Tok wood-fired CHP is beginning the feasibility phase, while the Yerrick Creek Hydro project is on hold. Thus no renewable energy production is pending. Transmission of renewable energy is required for this project to be considered eligible for funding under the RE Fund.
2. Economics of this project appear marginal given the distances and low loads to be tied in.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.56 /kWh

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Project Cost:**

\$9,546,005

**Requested Grant Funds:**

\$7,636,804

**Matched Funds Provided:**

\$1,909,201

**Total Potential Grant Amount:**

\$9,546,005

**AEA Funding Recommendation:**

**App # 806 Upper Tanana Area Intertie Project**

**Resource:** Transmission

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Power Company

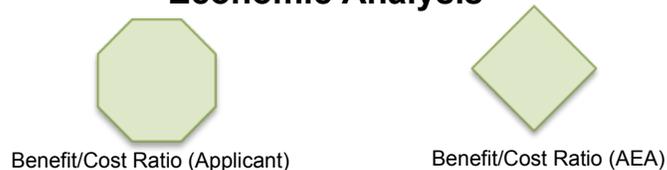
**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.50
2) Matching Resources (Max 15)	11.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Mostly within DOT R/W. If not may need a DNR r/w authorization. Project description does not provide enough detail to determine if any of the power lines will run on state land. Project as described should only require coordination with DOT easements. However, if any of the powerlines should cross state land outside of existing easements of ROWs, then coordination with DNR may be required for additional permits or easements.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 807 Connelly Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

Connelly Lake is an 85-acre alpine lake and drains into the Chilkoot River. The Project facilities will include a dam at the lake outlet, a penstock about 6,200 feet long, a 12.0 MW powerhouse with two generating units, a 14-mile-long 34.5 kV transmission line and a 14-mile long access road. Field studies, permitting and final design for this Project will be completed during Phase III. The Project will be developed by the Applicant to provide additional generation to its interconnected Haines and Skagway electrical systems, to possibly provide summer power to cruise ships moored at Haines, and to provide backup renewable power to Haines, should the submarine cable fail. The Project will be on state and private land, including the Haines State Forest and Chilkat Bald Eagle Preserve.

### AEA Review Comments and Recommendation

Partial Funding

APC proposes final design and permitting activities for a potential 12 MW storage hydro project at Connelly Lake. AEA and APC entered into a grant agreement for \$585,000 to support feasibility and conceptual design for the project under round 4 application (#627).

Current funded work includes concept optimization, preliminary FERC notice of intent and preliminary application document, FERC scoping activities (documents and study plans), field studies (stream gauge installation; seismic refraction surveys; fish, wildlife, botanical, wetland, and heritage surveys; water quality testing); and the final feasibility report. This work is currently scheduled for completion in December 2012.

AEA believes that this schedule is optimistic and that funding for final design and permitting is premature.

AP&T has requested reconsideration of AEA's initial recommendation of no funding. AP&T states that "we agree with AEA that funding of the final design activities (i.e., the last three of ... [the proposed] ...tasks) is premature. However, the other five tasks are basically continuation of our current work." AEA agrees with this observation and recommends partial funding to cover the following feasibility phase tasks: additional environmental studies, permit preparation and processing, post-license activities, and additional stream gauging data collection.

Recommend partial funding of \$448,000.

### Funding & Cost

Cost of Power: \$0.39 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$46,100,000

**Requested Grant Funds:** \$1,452,000

**Matched Funds Provided:** \$363,000

**Total Potential Grant Amount:** \$1,815,000

**AEA Funding Recommendation:** \$448,000

## App # 807 Connelly Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Power Company

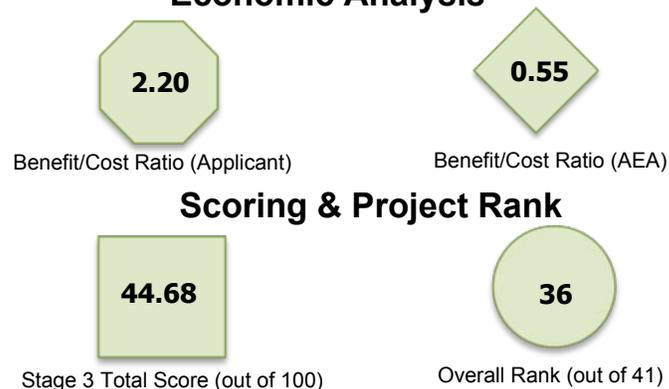
**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	17.06
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	8.87
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	1.25
6) Local Support (Max 5)	1.00
7) Sustainability (Max 5)	3.00

### Economic Analysis



### DNR/DMLW Feasibility Comments

Application for easements, ADL 107601/107792, portions in Haines State Forest & Chilkat Bald Eagle Preserve

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

Located in the vicinity of the eastern Denali fault (Chilkoot River section) and the Chatham Strait fault. See general DGGS comment.

## App # 808 Reynolds Creek Hydro Transmission Line

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

### Project Description

The overall 34kV power line route is approximately 12 miles long. Approximately 0.9-mile of the westernmost section is an existing APC 2kV distribution line that will be overbuilt. The line will cross Hetta Inlet via Jumbo Island. The route primarily follows existing logging roads. The power line will begin at a point along Hydagurg Road about 0.45 miles northeast of the town. It will continue northeast along the existing logging road passing north of Deer Bay and intersecting Hetta Inlet opposite Jumbo Island. This section is adjacent to private forested land with a small section of Muskeg and is 7.0 miles long. The logging roads are mostly mild to moderate cut sections with a few rock cuts. The first 0.9 miles of this section is an existing APC corridor adjacent to the road established for a 2kV line. The water crossing over Hetta Inlet will be accomplished with 3 multi-pole structures with one on each side of the inlet and one at the pinnacle of Jumbo Island. Jumbo Island slopes steeply toward the water on both sides and is heavily forested. A new corridor will need to be established. The structure on the island will likely be set by helicopter. This crossing is 0.9 miles across. The power line will continue in a new corridor for 0.3 mile to the east until it intersects an existing logging road. Approximately 1500 feet of temporary or permanent access road spurs will need to be constructed to access 2 line structures along this section. The line route then turns south and follows existing logging roads 3.8 miles southeast to the powerhouse/switchyard location near Copper Harbor. This section is adjacent to private, recently harvested forest land with very steep and rocky terrain prone to slides. The logging road is primarily full bench construction with several rock cut sections. There are danger trees (and boulders) above the power line route on the eastern side slopes that may need to be removed/secured to protect the power line.

### AEA Review Comments and Recommendation

**Not Recommended**

Alaska Power Company (APC), a subsidiary of Alaska Power and Telephone (AP&T) proposes funding for the transmission portion of the 5 MW Reynolds Creek hydropower project. Haida Energy, a joint venture of AP&T and Haida Corp, would own the project and sell power on a wholesale basis to APC, the certificated utility on Prince of Wales (PoW) Island. The project is a component of Reynolds Creek Hydro Project, which received \$2M (App #104) in grant funding already. In Round 3, an application (#439) was submitted for transmission line construction for Reynolds Creek. Although AEA recommended the project for funding there was insufficient funding appropriated to fund this project.

The following grant allocations totaling \$6.1 million have been made for the Reynolds Creek project:

- 1) \$100,000 of Denali Comm funds to Haida Corp through the Denali Commission / AEA alternative energy RFP
- 2) \$1 million in RE fund round 1 funds to Haida Corp (#104)
- 3) \$1 million in RE fund round 1 funds to Haida Power, a joint venture between APC and Haida Corp
- 4) \$2 million in legislative appropriation to Southeast Conference
- 5) \$2 million in RE Fund round 4 to APC (#629)

The project will be dispatched in conjunction with AP&T's existing Black Bear Lk and South Fork hydro projects. Previous applications state that Reynolds Creek hydro will only be used after the existing hydro projects are fully dispatched. An extension of PoW transmission to the northern portion of island to serve Coffman Cove and Naukati has been funded by the Denali Commission and RE Fund round 1.

AEA has the following concerns about this application:

1. The application provides a cost estimate of \$18.6 million for the hydro project, including transmission. However the most recent budget information available to AEA indicates a total project cost of \$27.6 million.
2. While AEA agreed to reimburse up to \$2 million in order to begin construction and preserve the FERC license, it was with the condition that Haida Energy provide an acceptable power sales agreement and finance plan prior to additional reimbursement. Haida Energy submitted a finance plan with a Power Project Loan Fund (PPLF) application to AEA for \$20 million, at the limit authorized by the Legislature. However, AEA has rejected the proposed loan terms and asked Haida Energy to revise and resubmit with terms that conform to the PPLF statutes.

### Funding & Cost

Cost of Power: \$0.28 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$3,840,000

**Requested Grant Funds:** \$1,200,000

**Matched Funds Provided:** \$240,000

**Total Potential Grant Amount:** \$1,440,000

**AEA Funding Recommendation:**

## App # 808 Reynolds Creek Hydro Transmission Line

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

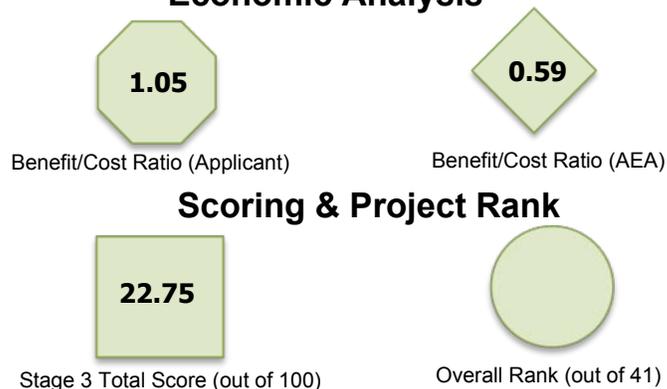
**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	12.25
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

### Economic Analysis



### DNR/DMLW Feasibility Comments

Application for easement, ADL 106437 for portion over State tide & submerged land

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 809 SEAPA Phase I Wind Site Recon Study

**Resource:** Wind

**Proposed Project Phase:** Recon

**Proposer:** Southeast Alaska Power Agency

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

### Project Description

The Southeast Alaska Power Agency (SEAPA) requests funding of \$72,630 from Round V of the Renewable Energy Fund, with a matching contribution from SEAPA of \$8,070 for a total cost of \$80,700, for a Phase I (reconnaissance) wind site assessment along transmission line paths owned by Southeast Alaska Power Agency, which extend from the City of Ketchikan, Alaska, located on the western coast of Revillagigedo Island, near the southernmost boundary of Alaska, to the City of Petersburg, located on the north end of Mitkof Island in Southeast Alaska. SEAPA is the grantee and Dave Carlson, CEO, has overall authority for the project. Eric Wolfe, Director of Special Projects, will be the primary contact representing SEAPA and has day-to-day responsibility to ensure that the project is on schedule and within budget. The project seeks funding for analyzing the raw wind data and preparing a wind assessment report. Based on the wind assessment results/report, a subsequent proposal may be submitted for a Phase II feasibility analysis and conceptual design. The study will also analyze the potential impacts to existing and migrating avian species. The study is proposed to determine if it is feasible to use wind power to supplement the energy needs and conserve water used for hydropower for the communities serviced by SEAPA, which include Ketchikan, Petersburg, and Wrangell, with the long-term objective and goal of serving the power needs of additional communities, including Kake.

### AEA Review Comments and Recommendation

Full Funding

SEAPA proposes reconnaissance of wind development along the Ketchikan-Petersburg transmission corridor (#809).

Wind development may be attractive on this grid since it can be used to displace valuable, dispatchable, storage hydro generation.

Wind energy is planned to be part of the Southeast Integrated Resource Plan, identified as a resource that needs reconnaissance work.

Recommend full funding for reconnaissance assessment along the Ketchikan-Petersburg intertie corridor. Before grant is issued, the proposed scope needs to be revised to better match wind reconnaissance standards.

### Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$80,700

**Requested Grant Funds:** \$72,630

**Matched Funds Provided:** \$8,070

**Total Potential Grant Amount:** \$80,700

**AEA Funding Recommendation:** \$72,630

**App # 809 SEAPA Phase I Wind Site Recon Study**

**Resource:** Wind

**Proposed Project Phase:** Recon

**Proposer:** Southeast Alaska Power Agency

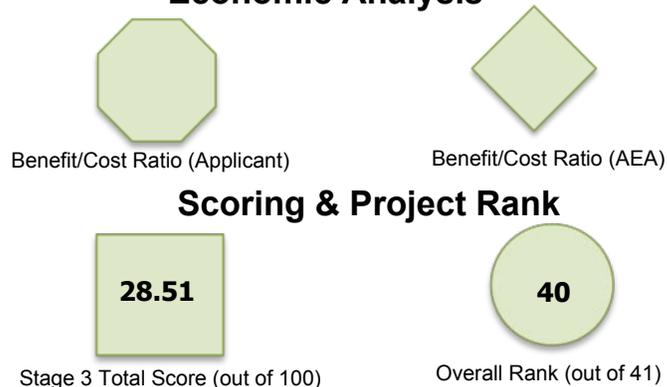
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.38
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	8.47
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	1.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	1.67

## Economic Analysis



## DNR/DMLW Feasibility Comments

Potential to use State land within existing SEAPA transmission line corridor, ADL 106442

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 810 SEAPA Wind Resources Assessment & Economic Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Southeast Alaska Power Agency (SEAPA)

Feasibility

Recon

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

## Project Description

The Southeast Alaska Power Agency (SEAPA) requests funding of \$72,630 from Round V of the Renewable Energy Fund, with a matching contribution from SEAPA of \$8,070 for a total cost of \$80,700, for a Phase I (reconnaissance) wind site assessment in Ketchikan and the region surrounding High Mountain on Gravina Island, and funding of \$142,500 from Round V of the Renewable Energy Fund, with a cash contribution from SEAPA of \$7,500, for a total cost of \$150,000 for Phase II (feasibility analysis and conceptual design/permitting) from Round V of the Renewable Energy Fund. The total project cost for both phases is projected to be \$230,700. SEAPA is the grantee and Dave Carlson, CEO, has overall authority for the project. Eric Wolfe, Director of Special Projects, will be the primary contact representing SEAPA and has day-to-day responsibility to ensure that the project is on schedule and within budget. SEAPA, or its retained contractor, will install a wind-measuring meteorological ("met") tower and complete geotechnical work to solidify the options of installing wind turbines at or near Ketchikan. The work will include conducting an initial site assessment, obtaining a letter of non-objection for placement of a wind tower and geotechnical fieldwork, permitting, purchasing, transporting, and installing a met tower, studying the wind resource for one year and conducting a geotechnical investigation to determine the soil conditions and needed engineering at the site. A conceptual design will be created based on the outcome of the met tower recordings and geotechnical investigation. This design will address the current hydropower and distribution system to identify any upgrades that are needed to integrate wind power. A variety of wind turbine models and quantity configurations will be considered. The study is proposed to determine if it is feasible to use wind power to supplement the energy needs and conserve water used for hydropower for the communities it services, which include Ketchikan, Petersburg, and Wrangell, with the long-term objective and goal of serving the power needs of additional communities, including Kake.

**AEA Review Comments and Recommendation Not Recommended**

SEAPA proposes feasibility of wind development in the Ketchikan area, including a meteorological tower on Gravina Island and permitting and environmental analysis. SEAPA is also requesting funding for a more general reconnaissance study of wind development along the Ketchikan-Petersburg transmission corridor (#809).

Wind development may be attractive on this grid since it can be used to displace valuable dispatchable storage generation.

However AEA is concerned that site selection is not based on a systematic, reconnaissance-level approach. This work is proposed under application #809 and should precede the work proposed in this application.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**  
Southeast

### Project Cost:

**Requested Grant Funds:** \$215,130

**Matched Funds Provided:** \$15,570

**Total Potential Grant Amount:** \$230,700

**AEA Funding Recommendation:**

**App # 810 SEAPA Wind Resources Assessment & Economic Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** Southeast Alaska Power Agency (SEAPA)

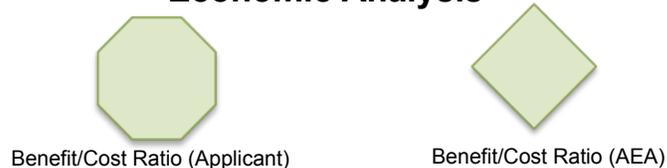
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

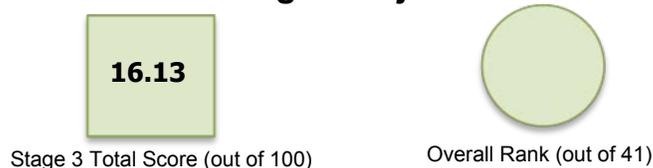
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.38
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No State land or easement interest

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 811      Kake-Petersburg Inter-Connection Engineering**

**Resource:** Transmission

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Southeast Alaska Power Agency (SEAPA)

**AEA Program Manager:**

**Applicant Type:** Government Entity

## Project Description

Power deliveries from SEAPA to Kake across the proposed Kake to Petersburg Intertie would affect the voltage profile across the SEAPA network if new supplementary equipment is not installed in Petersburg and possibly Wrangell, Alaska. Additionally, changes to existing equipment located in either Petersburg or Wrangell may be necessary as a result of the proposed Kake - Petersburg line. Since the May 2009, Kake-Petersburg Intertie Report (D. Hittle & Associates), substantial load growth has occurred in Petersburg, Wrangell and Ketchikan. This project consists of engineering analysis and preliminary design work that will identify the effects on the SEAPA system that result from power deliveries to Kake. The engineering analysis will determine existing equipment changes, and new equipment rating, new equipment location, and estimations for new equipment life cycle costs. Cost estimates will include: final design, site specification, procurement, installation, commissioning, ongoing O&M costs, and future replacement costs. A final report will organize the analysis results by proposed KPI path (route). Previous electrical engineering studies such as the Kake-Petersburg Intertie. Study Update by D. Hittle & Associates for the Southeast Conference, and SEAPA's internal studies (power flow and power transient) will be used as reference works.

**AEA Review Comments and Recommendation** **Not Recommended**

Southeast Alaska Power Authority proposes feasibility and conceptual design to assess impacts of delivering SEAPA power to Kake.

Currently there are three sources of funding for the 50-mile Kake-Petersburg Intertie focused on completing final design and permitting: 1) \$2.99 million from RE Fund Round 1 (#29), 2) \$500,000 grant from a 2008 legislative appropriation, and 3) \$2 million grant from an additional legislative appropriation. Currently work under the KWETICO (Kwaan) grant has consisted of conceptual design and environmental field studies for the two primary routes under consideration. An MOU between SEAPA, KWETICO, IPEC and AEA establishes ownership, maintenance, and operation responsibilities for the project. AEA, the grantees, and SEAPA will enter into a project management agreement.

AEA believes that the work proposed under this grant will advance the Kake-Petersburg Intertie. However, AEA believes that the current work proposed can be accomplished using current project funding. Existing grants require a project management agreement. AEA will require that SEAPA take the lead on this work under that agreement. AEA will work with its partners to ensure that the proposed scope of work is accomplished as proposed.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.28 /kWh

**Energy Region:**  
Southeast

<b>Project Cost:</b>	\$30,000,000
<b>Requested Grant Funds:</b>	\$66,300
<b>Matched Funds Provided:</b>	\$11,700
<b>Total Potential Grant Amount:</b>	\$78,000

**AEA Funding Recommendation:**

**App # 811      Kake-Petersburg Inter-Connection Engineering**

**Resource:** Transmission

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Southeast Alaska Power Agency (SEAPA)

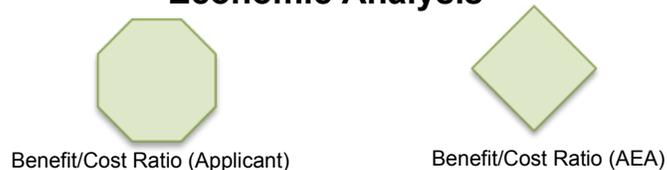
**AEA Program Manager:**

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	12.25
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not a project but an analysis of the feasibility of what and where

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 812 AVTEC Hydroelectric Training Facility**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Vocational Technical Center

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

## Project Description

AVTEC will partner with the City of Seward to renovate, refurbish, and upgrade the City's existing Marathon Hydroelectric plant, which is currently unused. The plant will become an educational and training tool that supports AVTEC's Hydro Power Plant Operator training program, sponsored by the Alaska Energy Authority. The intent is to return the plant to productive use and maximize the training benefits it can provide.

**AEA Review Comments and Recommendation Not Recommended**

AVTEC proposes to renovate, refurbish and upgrade the City's existing Marathon Hydro plant, currently unused. The application is largely the same as #657 in round 4. For that application AEA recommended partial funding of \$67,000 for final design and permitting. AEA and AVTEC entered into a grant agreement in July 2011 for this work, but little work has been completed to date.

Since the design and permitting work is not yet completed, the scope of work, cost estimate, and schedule cannot be verified, and there is not sufficient basis to recommend funding at this time.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$723,138

**Requested Grant Funds:** \$639,050

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$639,050

**AEA Funding Recommendation:**

**App # 812 AVTEC Hydroelectric Training Facility**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Vocational Technical Center

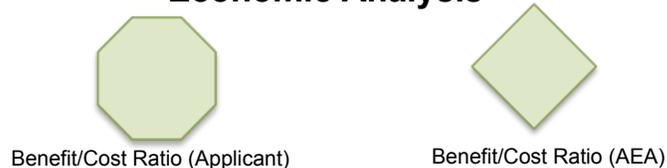
**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

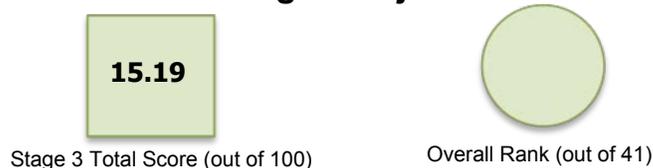
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.44
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	1.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Possible permit authorization required (insufficient location information to determine).

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 813      Whitman Lake Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Ketchikan dba Ketchikan Public Utilities

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

The Whitman Lake Project will install 4.6 MW of hydropower generating capacity at an existing dam, supporting near-term capacity demand increases in the Ketchikan area and displacing diesel generation as the existing Tyee Lake (SEAPA) resource becomes fully utilized. It will also replace the aging water supply system of the SSRAA Whitman Lake hatchery, providing increased water quantity, reliability and redundancy to a facility that is critical to the region's commercial fishing, seafood processing and sportfishing industries.

**AEA Review Comments and Recommendation** **Not Recommended**

Ketchikan Public Utilities requests funding for construction of the 4.6 MW Whitman Hydro project. The project would benefit the local fish hatchery owned by the SSRAA by providing a new water supply. Prior grants include a RE Fund round 1 (#37) for final design and permitting of \$1.3M and a round 4 grant for construction (#620) of \$700,000. The Legislature provided \$1 million in 2010, and \$8.025 million in 2011. Total state funding available for construction is \$8.73 million. KPU has obtained authority to issue a \$15 million revenue bond for construction.

Recently the cost estimate for the project was adjusted upwards from \$16.5 million to \$26.5 million due to FERC licensing conditions and escalation of costs over time.

AEA has recently learned that KPU must obtain an amendment to its power purchase agreement with SEAPA, without which KPU will be legally unable to use energy from the Whitman Lake project for its ratepayers. At the time of this evaluation, this matter remains unresolved.

At a SEAPA board meeting in November SEAPA staff presented an analysis showing that under the latest load forecast (the SEIRP reference case) a substantial amount of energy from the combined hydro systems would be spilled, thus significantly limiting public benefit.

AEA believes that additional funding for this project is unwarranted at this time.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$27,050,000

**Requested Grant Funds:** \$3,300,000

**Matched Funds Provided:** \$20,050,000

**Total Potential Grant Amount:** \$23,350,000

**AEA Funding Recommendation:**

**App # 813      Whitman Lake Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Ketchikan dba Ketchikan Public Utilities

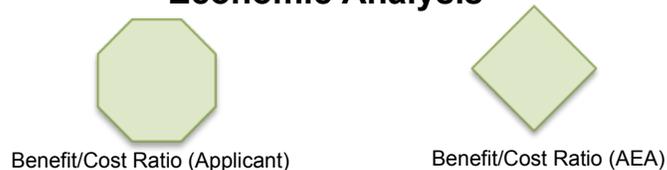
**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.38
2) Matching Resources (Max 15)	15.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	1.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

State Land - EEA issued, ADL 107151

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Strong ground shaking from earthquakes is not considered in the environmental issues identified in the EA and FEA. The project site is ~214 km from the Queen Charlotte fault. Low to moderate ground shaking should be considered in engineering design. The Canoe Passage fault is listed as a Neogene fault on the Neotectonic Map of Alaska, however, little is known about it. Although it may not be a major issue, the applicant should search for any studies done for other projects that may have assessed this structure. See general DGGS comment.

## App # 814 Glennallen School Campus Biomass Heating Project

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Copper River School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

This Project is for the installation of a biomass boiler system to provide heat and hot water for the Glennallen School Facilities ( Glennallen High School/Elementary School Building, Vocational Training Building, District Office/Distance Learning/Rural Cap Building) of the Copper River School District. The system will utilize a Messersmith Boiler System similar to those already employed at the Tok School and Delta High School and will use readily available chips in the Copper Valley. Glennallen Campus Biomass Heating Project will be a similar system to that of the Tok and Delta Schools. This project is a result of regional biomass planning and collaboration between government agencies, local businesses and regional stakeholders.

### AEA Review Comments and Recommendation

**Full Funding**

The Copper River School District in collaboration with the Copper River Development Association proposes conceptual design, final design, and construction of a biomass boiler system that will heat the Glennallen High School, the Elementary School, the Vocational Training Buildings, the District Office, and both Distance Learning and Rural Cap. The system will displace approximately 63,350 gallons of fuel oil each year. The system would use approximately 1000 green tons of chips per year.

The project has begun conceptual design, and the application includes a conceptual cost estimate.

This project proposes to utilize the same boiler system as the Tok School and Delta Greely School, projects funded through the Renewable Energy Fund. Forest inventories have been completed for the Glennallen area, and the required timber volumes for this project appears within the sustainable harvest limits. The local sawmill operator has signed a letter of commitment for the chip supply for this project.

The project team includes engineers with experience developing the Tok and Delta projects with the intent of standardizing the design. The proposal shows excellent community support. However the proposal does not include a match.

Given the standardized approach AEA is comfortable with recommending full funding with required approval of development phases.

AEA is concerned that long-term fuel supply for this 20-year project needs to be better established. As part of the completion of the feasibility and conceptual design AEA will require preparation of a fuel supply plan. The final design phase should include a long-term fuel supply contract with a contingency plan. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding, with requirement of AEA acceptance of feasibility and final design phases.

### Funding & Cost

Cost of Power: \$0.22 /kWh

**Energy Region:**

Copper River/Chugach

**Project Cost:**

\$3,244,897

**Requested Grant Funds:**

\$3,244,897

**Matched Funds Provided:**

\$0

**Total Potential Grant Amount:**

\$3,244,897

**AEA Funding Recommendation:**

**\$3,244,897**

## App # 814 Glennallen School Campus Biomass Heating Project

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Copper River School District

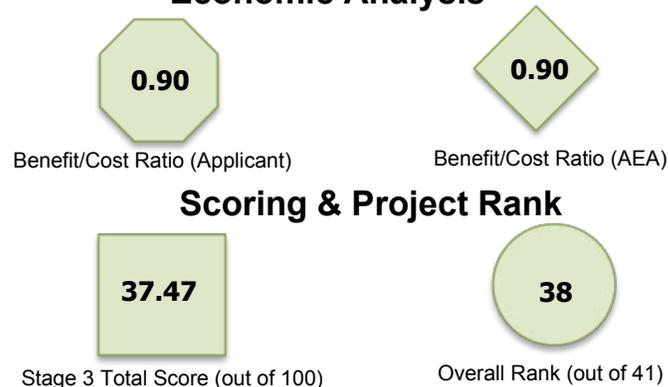
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	12.30
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	3.87
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.67

### Economic Analysis



### DNR/DMLW Feasibility Comments

Possible Forestry or DNR authorization for fuel collection, depending on the proposed access and method of harvest.

### DNR/DOF Feasibility Comments

"This project is for a proposed wood chip heating system for Glennallen School Facilities. The system would utilize a Messersmith Boiler System similar to the ones constructed in Tok and Delta. The project proposal states that the system would displace 1,266,300 gallons over a 20 year period or about 63,300 gallons per year. It is estimated that 1,007 green tons of biomass would be required annually for the boiler. An important positive aspect to this proposal is a letter of support from the local sawmill that states a commitment to provide wood chips at \$80 per ton. The Division of Forestry's Glennallen forest inventory indicates that within a 30 mile distance from the town center there is an estimated 4,400 tons of biomass annually available on a sustainable basis. An average of 11.37 net tons per acre of volume is present. The 1,007 tons needed annually for the boiler would equate to approximately 89 acres per year. In light of biomass availability, which doesn't factor in additional supply potentially available from Ahtna and BLM lands, the project appears quite sustainable."

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 815      Wave Energy/ Sequestration Technology (WEST)**

**Resource:** Ocean/River

**Proposed Project Phase:** Construction  
Design

**Proposer:** Atmocean, Inc.

**AEA Program Manager:**

**Applicant Type:** IPP

## Project Description

(Hydrokinetic) Atmocean proposes to deploy 600 of our Wave Energy/Sequestration Technology (“WEST”) devices about 1-2 miles off Cannon Beach near Yakutat, Alaska to generate up to 90% of Yakutat’s annual kWh, at projected fuel cost savings of 44%. Payback for this project is estimated at about 4 years. WEST devices convert wave energy into hydraulic pressure which is transmitted by seafloor hose then onshore pipe or hose (as appropriate) to hydraulic motors driving existing electrical generators – avoiding the high cost of seafloor electrical cable, and utilizing existing onshore generation, transmission, and distribution. Using this hybrid system architecture, WEST provides primary generation and the existing diesel system provides backup and peak generation.

**AEA Review Comments and Recommendation** **Did Not Pass Stage 1**

## Funding & Cost

Cost of Power:                      /kWh

**Energy Region:**  
Southeast

<b>Project Cost:</b>	\$4,962,965
<b>Requested Grant Funds:</b>	\$4,885,610
<b>Matched Funds Provided:</b>	\$77,355
<b>Total Potential Grant Amount:</b>	\$4,962,965

**AEA Funding Recommendation:**

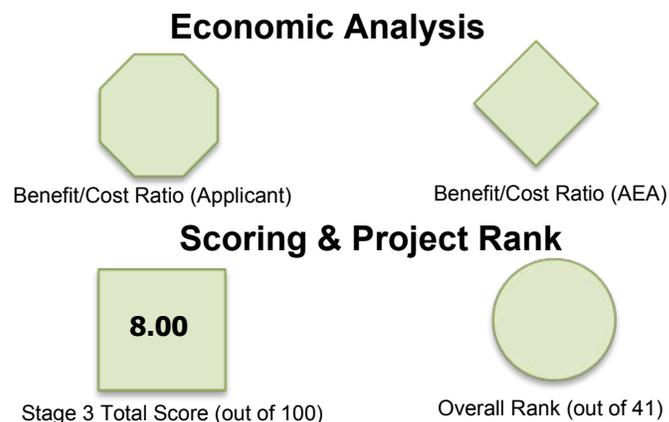
**App # 815 Wave Energy/ Sequestration Technology (WEST)**

**Resource:** Ocean/River  
**Proposer:** Atmocean, Inc.  
**AEA Program Manager:**

**Proposed Project Phase:** Construction Design  
**Applicant Type:** IPP

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	



### DNR/DMLW Feasibility Comments

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

**App # 816 Allison Creek Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Copper Valley Electric Association, Inc. (CVEA)

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

The Allison Creek Project is a run of the river (ROR) alternative involving construction of a diversion structure on Allison Creek at elevation 1,300 feet. Water will be diverted from the creek into a 42 inch surface / buried penstock to a 6.5 megawatt powerhouse near tidewater. Attachment A is the Final Feasibility Study which provides details on this project as presented and approved by the CVEA Board of Directors.

**AEA Review Comments and Recommendation Not Recommended**

Copper Valley Electric proposes funding for construction of the 6.5 MW run-of-river hydro project on Allison Creek, estimated to cost \$38,804,000. Specifically CVEA requests funds to purchase long lead items. To date CVEA has been awarded \$13,288,000 in various state grants. By SB 46 language, CVEA is limited in the amount of state funds to 50% of the project costs.

CVEA submitted a license application to FERC in August 2011. Currently the project is in the final design and permitting stage. Final design and permitting is scheduled for completion in early 2013.

Based on the work to date, the project appears to offer significant benefits, including

1. Substantial displacement of diesel generation--approximately 1.1 million gallons per year in fuel savings. CVEA's hydro generation would increase from 52 to 68% hydro.
2. Substantial monetary savings in relation to the installed cost (high benefit/cost ratio).
3. Ability to supply hydro generation to seasonal industrial loads, such as the new expansion of the PetroStar refinery.

However, since final design and permitting will not be completed until 2013 at the earliest, AEA believes that it is premature to allocate additional construction funds to this project. Currently CVEA has \$10 million of fy12 state capital funds that may be made available for long lead time items.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.22 /kWh

### Energy Region:

Copper River/Chugach

**Project Cost:** \$38,804,000

**Requested Grant Funds:** \$6,114,000

**Matched Funds Provided:** \$6,114,000

**Total Potential Grant Amount:** \$12,228,000

**AEA Funding Recommendation:**

**App # 816 Allison Creek Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

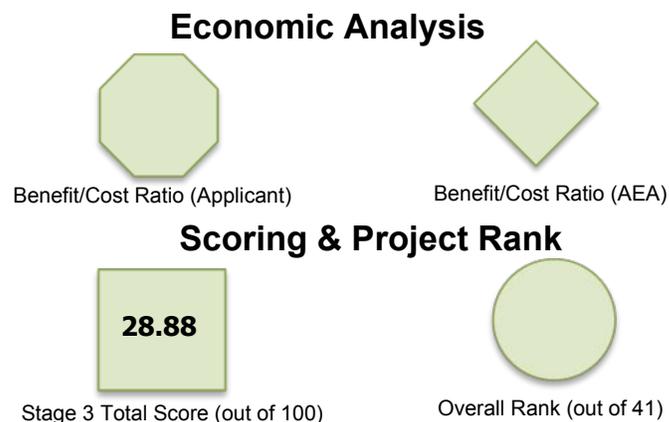
**Proposer:** Copper Valley Electric Association, Inc. (CVEA)

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	14.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

Site selected all on DNR lands. Full spectrum of authorizations required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

There are no known active faults at the project site. See general DGGS comment.

## App # 817 Solomon Gulch unit 2 Efficiency Upgrade

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Copper Valley Electric Association, Inc. (CVEA)

**AEA Program Manager:**

**Applicant Type:** Utility

### Project Description

CVEA is currently in the process of purchasing a new runner for Unit 2 at the Solomon Gulch hydroelectric facility. This project will increase CVEA's renewable energy capacity. The new runner will be manufactured utilizing state of the art flow analysis which will result in efficiency gains of approximately 10%. The installation of the runner along with the overhaul of Unit 2 will occur in late fall 2012.

### AEA Review Comments and Recommendation

Did Not Pass Stage 1

Did not pass Stage 1

### Funding & Cost

Cost of Power: \$0.22 /kWh

**Energy Region:**

Copper River/Chugach

**Project Cost:**

\$2,440,000

**Requested Grant Funds:**

\$687,700

**Matched Funds Provided:**

\$687,700

**Total Potential Grant Amount:**

\$1,375,400

**AEA Funding Recommendation:**

## App # 817 Solomon Gulch unit 2 Efficiency Upgrade

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Copper Valley Electric Association, Inc. (CVEA)

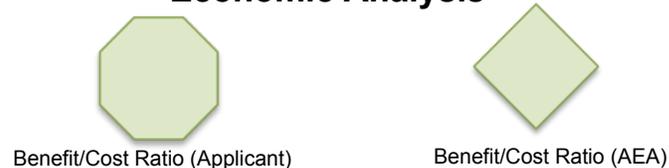
**AEA Program Manager:**

**Applicant Type:** Utility

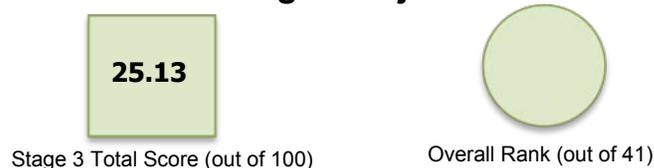
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	13.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Upgrades to existing lease. No additional authorizations needed.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

There are no known active faults at the project site. See general DGGS comment.



**App # 818      Gulkana Village Biomass Fuels Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Gulkana Village Council

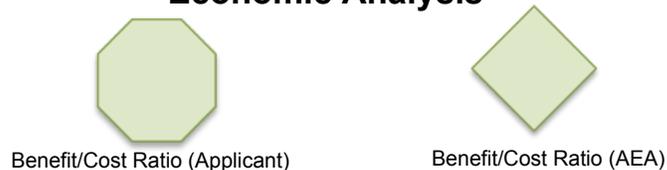
**AEA Program Manager:**

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

**App # 819      Stetson Creek Diversion/ Cooper Lake Dam Facilities Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design

**Proposer:** Chugach Electric Association

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

As a condition of the Federal Energy Regulatory Commission (FERC) relicensing of the Cooper Lake plant in 2007, Chugach agreed to construct a project to divert water from Stetson Creek into the Cooper Lake reservoir and a related structure to release water into Cooper Creek. The project will enhance fish habitat and add water to Cooper Lake which will result in additional hydroelectric energy generation. Most importantly, constructing this project allows the license for the Cooper Lake hydro facility to be renewed for 50 years.

**AEA Review Comments and Recommendation** **Partial Funding**

Chugach Electric requests funding to complete final design and construction of a project to divert water from Stetson Creek into the Cooper Lake Reservoir and a related structure to release environmental flows into Cooper Creek as a part of the FERC re-licensing of Cooper Lake hydro project in 2007. CEA agreed to spend up to \$12.5 million (2009\$) to construct this project in order to enhance fish habitat in Cooper Creek by raising the stream water temperature. CEA received funding from the RE Fund (#674) for feasibility and permitting/final design in Round 4. The cost of final design has increased, and the current proposal requests half of the funding for the increase.

In support of the relicensing effort CEA has funded a substantial amount of feasibility-level work. In 2007 the project was estimated to cost about \$11 million. However, following a 2009 constructability review, the capital cost estimate increased to \$24 million due to requirements for tunneling and control structures for the diverted water and for the environmental flows.

The main benefit of the proposed project would be the continued operation of the 19.4 MW Cooper Lake project. In addition the diversion adds water to Cooper Lake, resulting in a net increase in hydropower. For the purposes of the economic analysis prepared for evaluating this application, only the additional costs of the diversion and benefits of the incremental hydropower are considered.

By formal notice, CEA has to have design drawings completed and forwarded to FERC by August 2012. A schedule submitted with the application shows final design and permitting to be completed by end of September 2012, with FERC approval by October 2012. Construction is to be bid by December 2012 and the construction contract award by May 2013.

An August 2010 CEA board resolution caps the CEA commitment to construction at \$12.5 million. CEA would need to offset the balance with grant funds.

Before RE Fund funding is allocated to construction, it is reasonable for CEA to 1) complete feasibility, permitting, and final design and 2) identify remaining project financing.

Recommend partial funding of \$49,781 to complete final design.

## Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**  
Railbelt

<b>Project Cost:</b>	\$23,900,000
<b>Requested Grant Funds:</b>	\$3,453,920
<b>Matched Funds Provided:</b>	\$17,793,920
<b>Total Potential Grant Amount:</b>	\$21,247,840
<b>AEA Funding Recommendation:</b>	<b>\$49,781</b>

**App # 819      Stetson Creek Diversion/ Cooper Lake Dam Facilities Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction Design

**Proposer:** Chugach Electric Association

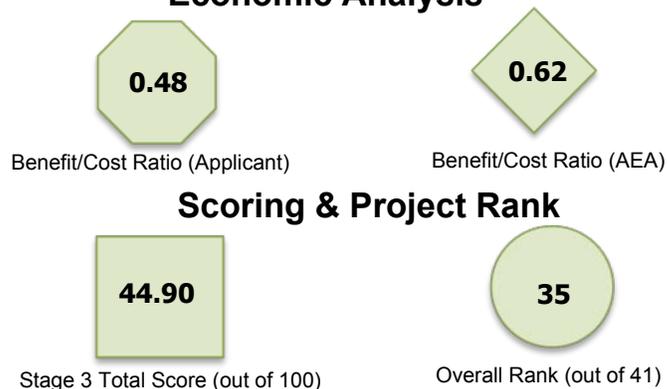
**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	5.69
2) Matching Resources (Max 15)	15.00
3) Project Feasibility from Stage 2 (Max 20)	11.97
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	1.25
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	5.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

USFS land, but possible water permit needed.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

There are no known active faults at the project site. See general DGGS comment.

## App # 820 Design & Construction of Wood Heating Projects in Interior Alaska Communities

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Interior Regional Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

The project will design and construct wood heating systems in three Interior Alaska communities. IRHA is currently conducting feasibility assessments including forest inventories and wood harvest assessments in eight Interior Communities. Once the assessments are complete, three out of the eight communities will be selected for design and construction of high efficiency, low-emission biomass boiler systems. Projects will be selected based on the highest likelihood of successful project implementation. Factors considered will include the amount of fuel oil displaced, cost savings to the community, commitment by the community and facility personnel and a reliable and consistent supply of fuel. IRHA will partner with ANTHC and the individual tribes for the project.

### AEA Review Comments and Recommendation

Full Funding

The Interior Regional Housing Authority (IRHA) requests funding to build three community wood heating systems to serve community facilities. Through funding from Round 4 of the Renewable Energy Fund, IRHA is currently conducting a feasibility assessment of eight villages: Hughes, Ruby, Koyukuk, Nulato, Kaltag, Nikolai, Anvik, and Holy Cross. All of these communities were identified for wood heating in the Alaska Energy Pathway. Following the assessments, three candidates will be selected.

For this analysis, a surrogate project, based on the Village of Huslia, was developed to model potential costs, savings, and biomass requirement. Actual capital costs will vary with any of the three final candidate villages.

The project has the potential to benefit 3 remote communities with some of the highest cost of energy in the state while utilizing a wood supply from wildfire mitigation activities. IHRA has assembled a team with a strong background in biomass projects. The project may use a modular wood-fired boiler, thus providing demonstration benefits.

AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding with the requirements that 1) A wood resource analysis must be completed and reviewed by AEA and Alaska Division of Forestry to assure the sustainable supply of wood for each chosen community; 2) AEA must accept the recommendations from the feasibility analyses of the three communities that will advance to design and construction, and 3) the economic analysis B/C ratios of the chosen communities should average greater than 1.25 (the ratio that was assumed for the purpose of analysis).

### Funding & Cost

Cost of Power: \$0.63 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Project Cost:**

\$1,215,224

**Requested Grant Funds:**

\$1,215,224

**Matched Funds Provided:**

\$173,771

**Total Potential Grant Amount:**

\$1,388,995

**AEA Funding Recommendation:**

\$1,215,224

**App # 820    Design & Construction of Wood Heating Projects in Interior Alaska Communities**

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Interior Regional Housing Authority

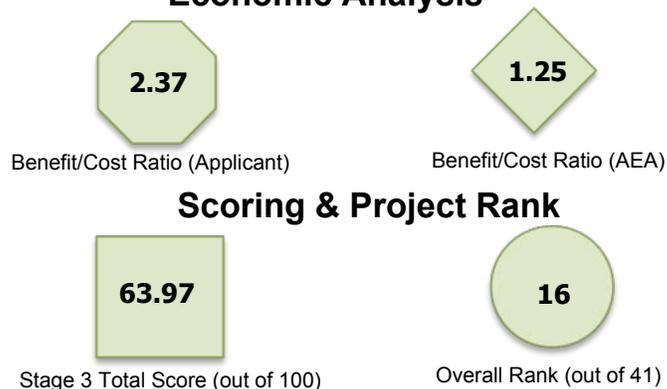
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	27.56
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	12.20
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	8.37
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	1.83

## Economic Analysis



## DNR/DMLW Feasibility Comments

Assume biomass is from corporation lands. Possible Forestry or DNR authorization for fuel collection, depending on the proposed access and method of harvest.

## DNR/DOF Feasibility Comments

This project would design and construct wood heating facilities in three Interior Alaska communities out of a total of eight that are currently conducting feasibility assessments. The ongoing studies include forest inventories and wood harvest assessments. The selection process will also look at village capacity to help ensure a particular project's success. It is likely that the wood heating systems will be similar to the village of Tanana which utilizes Garn boilers. Many of these villages are within forested areas along the Yukon River. A sustainable supply of wood is generally thought to be available for the scale of these projects.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 821 Huslia Water System & Clinic Wood Boiler Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Huslia Traditional Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

The project will design and construct a manual cordwood wood energy system in the community of Huslia, Alaska. The wood energy system will provide heat for the community water plant, washeteria and health clinic. The project is projected to save approximately \$41,516 annually in fuel costs for the three facilities out of a total fuel expenditure of \$30,416/year. The water plant and washeteria are co-located and are adjacent to the health clinic. All three facilities will be served by a common wood-fired heating plant consisting of two Gam WHS 2000 boilers and a fuel storage building. The biomass resource will be purchased from residents of the community by the Huslia Traditional Council.

**AEA Review Comments and Recommendation Partial Funding**

The Huslia Traditional Council in collaboration with ANTHC and IHRA is proposing the design and construction of a biomass heating system for the water treatment facility and the clinic. The project is estimated to replace 21,736 gallons of fuel oil. The water treatment plant operator will be responsible for the operation and maintenance of the wood heating system. The project will use approximately 254 cords per year.

AEA has the following concerns about the proposal:

1. The application mentions that current residents supply cordwood for \$350 per cord, but there is no mention of letters of intent to supply the wood resource.
2. There is no mention of a wood inventory analysis to guarantee a sustainable wood supply. State Forestry notes that land availability for harvest is not established.
3. Although a reconnaissance assessment has been prepared, there is not a comprehensive feasibility assessment of fuel availability and project alternatives.

Despite these concerns, economics appear favorable and AEA believes that partial funding is warranted to advance the project through final design.

AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend partial funding of \$50,000 for completion of feasibility and final design, including fuelwood inventory and supply plan with the requirement that AEA accept the feasibility report before funding is made available for final design.

## Funding & Cost

Cost of Power: \$0.52 /kWh

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Project Cost:** \$478,892

**Requested Grant Funds:** \$398,331

**Matched Funds Provided:** \$80,650

**Total Potential Grant Amount:** \$478,981

**AEA Funding Recommendation:** \$50,000

**App # 821 Huslia Water System & Clinic Wood Boiler Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Huslia Traditional Council

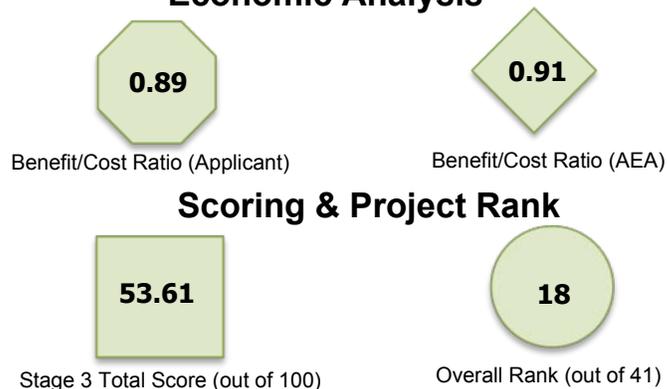
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.75
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	8.90
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	2.88
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.33

## Economic Analysis



## DNR/DMLW Feasibility Comments

No permits or easements required for the construction of the actual facility.

## DNR/DOF Feasibility Comments

The resource supply analysis for Huslia’s two Garn boiler system would identify specific areas to be harvested and utilize Tanana Chiefs Conference Forestry Program’s GIS system along with other existing regional forestry and Native allotment inventories conducted Tanana Chiefs Conference Forestry Program and others. A preliminary feasibility assessment prepared by the Juneau Economic Development Council confirms that driftwood can be a significant source of wood. This project will require approximately 254 cords of fuel wood which equals about 125 cords per year for each Garn unit to displace approximately 21,736 gallons of #1 fuel oil. This resource supply analysis would assist in determining if Huslia has sufficient accessible harvest areas.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 822 Wood Heating Feasibility in Public Facilities, Interior Region**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Interior Regional Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

The seven communities named in this proposal: Northway, Tanacross, Nenana, Circle, Eagle, Stevens Village, and Minto, have all participated in energy planning meetings with Interior Regional Housing Authority (the applicant), Tanana Chiefs Conference, Alaska Native Tribal Health Consortium, Denali Commission, Alaska Energy Authority, and others, and have identified wood heating in public facilities as a key opportunity to displace fuel oil, reduce energy costs, utilize locally available renewable resources, and create local employment. This proposal calls for feasibility assessments that include study of public facilities where wood heating might be applicable, pre-engineering analysis of the size and type of boilers that would be required (including the "Garn-in-a-box" option), estimated fuel displacement and cost savings, capital cost and payback period, and forest inventory and wood harvest plan. The applicant proposes a three-pronged approach: (1) subcontract with a qualified biomass energy specialist (e.g., Thomas Deerfield, who is presently evaluating wood heating feasibility in eight Interior villages with a RE Fund-Round 4 grant) to conduct 1- to 2-day site visits in each community and prepare feasibility assessments for each, (2) subcontract with Alaska Native Tribal Health Consortium for staff engineer with expertise in water and sewer systems to conduct site inspection and prepare feasibility assessment for those systems, and (3) subcontract with Will Putman, head forester for Tanana Chiefs Conference (TCC) to conduct forest inventory and wood harvest planning. Following the completion of these reports, project staff Kim Carlo of Interior Regional Housing Authority (IRHA) will continue to communicate with residents of the communities and facilitate their internal planning processes to determine whether each community wants to move forward with final design and construction phases of the respective wood-heating projects, pending available funding. It bears mentioning this proposal is identical in scope to one submitted by IRHA under Round 4 of the RE Fund for wood heating feasibility work in eight other Interior communities. This represents a deliberate approach whereby the applicant is proceeding in stages with conducting feasibility work prior to conceptual design, final design, and construction. It is anticipated that the phased approach will allow IRHA to conduct full assessments for most communities in the region.

**AEA Review Comments and Recommendation Partial Funding**

The Interior Regional Housing Authority (IRHA) in collaboration with ANTHC requests funding for feasibility assessments and forest inventories in 7 communities to evaluate the potential use of biomass systems for heating. This is the 2nd application for feasibility assessments. A project for 8 communities was funded through Round 4. The proposed communities for this round are: Northway, Tanacross, Nenana, Circle, Eagle, Stevens Village, and Minto.

IRHA has assembled a strong team with a biomass energy and resource experience. AEA believes that the proposed approach is well-conceived.

AEA requested further information regarding why this project cost significantly more than a similar round 4 project (#637) that cost \$154,477. IRHA replied that 1) they are hiring ANTHC to conduct water and sewer energy efficiency and biomass feasibility analyses at a cost of approximately \$88,000, and 2) they under-budgeted cost of resource analysis by Tanana Chiefs last time. However end use energy efficiency work is not an eligible activity under the Renewable Energy Fund and has other sources of support. For the purposes of our recommendation AEA will assume that 50% of the ANTHC work can be supported by the RE Fund (\$44,172). AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend partial funding of \$279,525 (requested amount \$323,696 - \$44,172) for feasibility and biomass energy resource assessment.

## Funding & Cost

Cost of Power: \$0.58 /kWh

### Energy Region:

Yukon-Koyukuk/Upper Tanana

### Project Cost:

**Requested Grant Funds:** \$323,696

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$323,696

**AEA Funding Recommendation:** \$279,525

**App # 822 Wood Heating Feasibility in Public Facilities, Interior Region**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Interior Regional Housing Authority

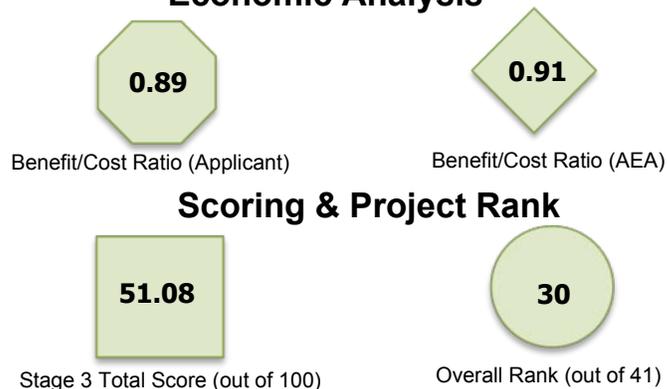
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.38
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	12.83
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	3.38
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

Assume biomass is not from state lands.

## DNR/DOF Feasibility Comments

This project will provide feasibility studies for additional Interior villages. The project is essentially a continuation of last year's project # 637 proposal. It will provide for a feasibility study of seven Interior villages and for pre-engineering analysis of the size and type of boilers required. The studies will examine the use of proposed cordwood fueled Garn boiler heating systems similar to the facility in use for the village of Tanana but, the analyses are not limited to these systems. The proposal seeks to acquire forest inventory data from TCC's existing village forest inventory projects in the region. Two villages, Nenana and Tanacross are also adjacent to State Forest lands. Inventory data for the Tanana Valley State Forest is available that provides data for additional wood source areas. This project will continue work to determine an operable sustainable biomass resource supply for individual communities within the region.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 823 Tatitlek Heat Recovery Project

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** Tatitlek Village IRA Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity  
Utility

### Project Description

This project proposes to add waste heat recovery heat exchangers by connecting the Tatitlek Generator system to the adjacent Tatitlek Community Center thereby providing the majority of the heating and domestic hot water needs. This project was fully engineered and designed as an alternate additive to a renovation project of the building in 2006; the plans will need to be updated and a new fire marshal permit received for the project to be ready for construction. The generator system was originally designed by Alaska Energy Authority to utilize waste heat recovery and the community center mechanical system was designed and replaced so that it will be able to utilize the generator waste heat to heat the entire building with an oil fired boiler as a back-up and/or supplemental system. Oil heat is the current heating system. Program objectives:

- Reduce heating costs within the community.
- Recover wasted energy
- Reduce barging requirements into the community and conflicts between generator requirements and homeowner fuel needs.
- Provide more reliable heating systems
- Reduce total community energy cost

### AEA Review Comments and Recommendation

**Full Funding**

The Tatitlek Tribal Council proposes updating a 2006 mechanical design plan and construction of a diesel heat recovery system that will supply the Tatitlek Community Center, which houses the Village IRA Council administrative offices, from the power plant, 50 feet away. The generating station and admin building were designed to accommodate this application when the power plant was refurbished in 2006, and the only phase remaining for this project is construction and installation. The original designer would manage design and construction.

The cost estimate was developed based on an AEA field visit in July 2011. The project is estimated to displace 6,000 gallons of fuel oil. The technology is proven and the construction complexity will be low. The operation and maintenance of the system will be performed by the current operator.

AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding with requirement that AEA accept the final design cost estimate prior to releasing funds for construction.

### Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Copper River/Chugach

**Project Cost:** \$295,800

**Requested Grant Funds:** \$265,000

**Matched Funds Provided:** \$30,800

**Total Potential Grant Amount:** \$295,800

**AEA Funding Recommendation:** \$265,000

## App # 823 Tatitlek Heat Recovery Project

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction Design

**Proposer:** Tatitlek Village IRA Council

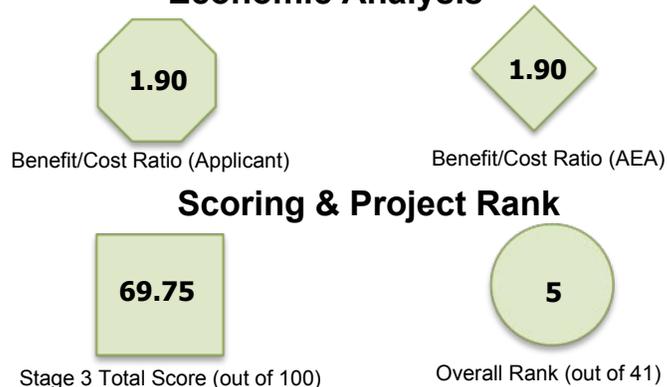
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	16.73
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	11.88
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.83

### Economic Analysis



### DNR/DMLW Feasibility Comments

Not DNR land

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 824      Anaktuvuk Pass Geothermal Feasibility Study**

**Resource:** Geothermal

**Proposed Project Phase:** Recon

**Proposer:** North Slope Borough

**AEA Program Manager:**

**Applicant Type:** Utility  
Local Government

## Project Description

The North Slope Borough (NSB) envisions a combination of geothermal energy and waste heat recovery to enhance district space heating for residential use. Existing waste heat includes the power plant and warm processed wastewater from the treatment plant. This reconnaissance study is intended to determine if known underground resources are capable of providing geothermal energy in combination with waste heat recovery to support space heating of residential homes, commercial and public buildings. The study will include collection of existing data, identification of additional resources, and analysis to prepare recommendations.

**AEA Review Comments and Recommendation** **Not Recommended**

The North Slope Borough proposes to conduct a feasibility study to explore the possibility of using ground-source heat pumps (GSHP) and waste heat from the Anaktuvuk Pass's diesel gensets for district heating. The applications basic design for the GSHP is a 4,000 foot long trench, 3-4 feet wide, and 12-15 feet deep.

No previous work has been done on the GSHP side of the project. Waste heat recovery is currently being used to heat the Public Works building and fire station. The proposed project would begin in August 2012 and be completed by the end of 2013.

AEA has the following concerns with this project:

1. We question the likelihood of achieving the expected coefficient of performance (COP) of 3 due to the very cold ground expected at Anaktuvuk Pass.
2. The electricity to power the GSHP would come from diesel gensets that are generating at around 30% efficiency. This indicates that little if any diesel would be offset by the project.
3. The cost of the feasibility assessment (~\$187,000) is very high.

AEA believes that a more systematic, statewide approach for GSHP feasibility would be more efficient and less costly. This work was started by AEA, UAF and CCHRC and should be continued.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**  
North Slope

<b>Project Cost:</b>	\$2,100,000
<b>Requested Grant Funds:</b>	\$169,960
<b>Matched Funds Provided:</b>	\$16,996
<b>Total Potential Grant Amount:</b>	\$186,956
<b>AEA Funding Recommendation:</b>	

**App # 824 Anaktuvuk Pass Geothermal Feasibility Study**

**Resource:** Geothermal

**Proposed Project Phase:** Recon

**Proposer:** North Slope Borough

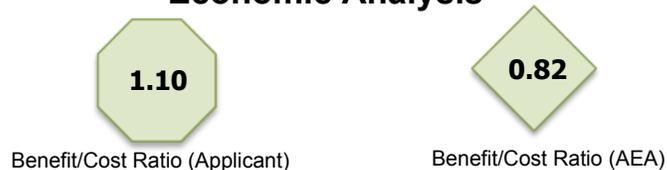
**AEA Program Manager:**

**Applicant Type:** Utility  
Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	6.56
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	5.50
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	12.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

The project proposes to seek warm (40°F) ground water to be utilized for a geothermal heat pump system. The proposal refers to Anaktuvuk Pass as being near one of four distinct geothermal regions, citing AEA's 2011 Renewable Energy Atlas of Alaska. The nearest identified hot springs is over 150 miles away to the southwest of Anaktuvuk Pass. Because there are no known nearby geothermal springs, specific details that provide their rationale behind this aspect of their proposal, and the methodology used to conduct a reconnaissance study on potential geothermal resource opportunities within the vicinity of Anaktuvuk Pass, should be provided. This is essentially a heat pump proposal, although the area is well north of areas of successful heat-pump utilization. Because of the lack of thermal springs in the area, it is likely that 40F water would need to be produced from ~2000-foot wells. The cost of drilling, and the significant risk of not finding a reservoir at depth with sufficient capacity, need to be considered along with heat-pump economics.

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 825 and 827 Thayer Lake Hydropower Development Transmission/Generation Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Kootznoowoo, Inc.

**AEA Program Manager:** Strandberg

**Applicant Type:** IPP

### Project Description

Thayer Lake Hydropower Development consists of a 1 +MW run of the river hydropower project located in the Tongass Forest within the Admiralty Island National Monument based on a proposal that Kootznoowoo submitted in March 2000 which is described more full in the Angoon Hydrologic Project Feasibility Evaluation Report currently on file with the AEA (Project). The development would be located on Thayer Creek approximately 6 miles north of Angoon. Thayer Creek flows out of Thayer Lake (64 square mile reservoir) at a gentle grade through a broad forested valley then steepens for 6,800 feet through a narrow forested canyon and finally flattens again for 2000 feet before flowing into Chatham Strait. The development will tap the energy potential in the steep section of the stream and will avoid any impact on anadromous fish that use the lower portion of the creek. The average flow of Thayer Creek is approximately 370 cfs and can vary from 25 cfs during the coldest periods of the winter to over 2000 cfs during storms in the fall and winter. The generating facility has a head of 250 feet which is approximate because of the wording of the Forest Service Record of Decision (ROD) requiring maintenance of fish habitat. An additional restriction set forth in the ROD which is not considered in the HDR proposal requires the overland transmission line be buried where feasible along the access road to the community of Angoon. The generating facilities funding will be submitted in a separate companion application for Round V funds.

### AEA Review Comments and Recommendation

Full Funding

Kootznoowoo Inc. proposes construction of a 1+ MW run-of-river hydroelectric project and 6.7 mi transmission project to supply the community of Angoon. Kootznoowoo has supplied separate applications for each of the projects (#825 and 827). AEA is combining the two project proposals together for the purposes of evaluation.

AEA has a Round 4 (#670) grant to Kootznoowoo in the amount of \$1,060,500 for permitting and final design with equal match from DOE. Although the application indicates that design and permitting will be complete by September 2012, AEA believes this schedule is overly optimistic and that it is premature to allocate construction funds to this project.

AEA initially recommendation against funding this project due to concerns that Kootznoowoo would not be able to complete design and permitting by September 2012. Kootznoowoo requested reconsideration of this recommendation on the basis that ten months is sufficient time for them to complete design and permitting. In response AEA is willing to recommend funding for construction, with the requirement that no construction funds will be granted until AEA accepts final design, Kootznoowoo completes current grant activities, and the project team demonstrates that all permits have been issued and that project financing and power sales agreements are in place.

Full funding recommended with the above special provisions.

### Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$30,402,216

**Requested Grant Funds:** \$7,000,000

**Matched Funds Provided:** \$2,156,402

**Total Potential Grant Amount:** \$9,156,402

**AEA Funding Recommendation:** \$7,000,000

## App # 825 and 827 Thayer Lake Hydropower Development Transmission/Generation Project

Resource: Hydro

Proposed Project Phase: Construction

Proposer: Kootznoowoo, Inc.

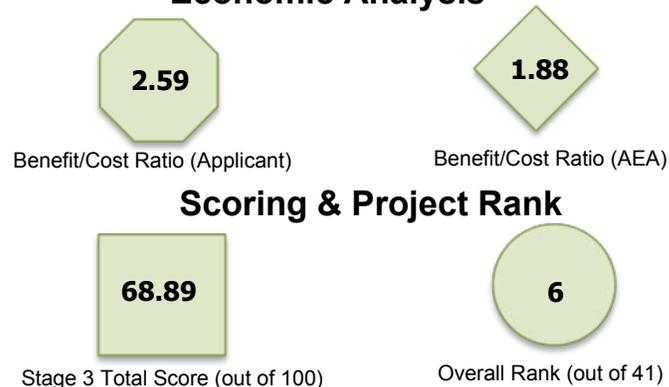
AEA Program Manager: Strandberg

Applicant Type: IPP

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	12.75
3) Project Feasibility from Stage 2 (Max 20)	11.37
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	12.38
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.33

### Economic Analysis



### DNR/DMLW Feasibility Comments

State tide & submerged land - submarine cable portion of transmission line & marine access facility

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

There are no known active faults in the project area. See general DGGS comment.

**App # 826      Wrangell Electrical Capacitor Bank**

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Design

**Proposer:** City & Borough of Wrangell/Wrangell Municipal Light & Power

**AEA Program Manager:** Strandberg

**Applicant Type:** Local Government

## Project Description

The City & Borough of Wrangell in conjunction with Trident Seafood's proposes to purchase and install a capacitor bank that will offset fish processing reactive power demands and voltage instability over the Tyeec Transmission System.

**AEA Review Comments and Recommendation** **Not Recommended**

Wrangell Light & Power requests funding for design and construction of a capacitor bank to correct voltage delivery issues in Wrangell.

The applicant asserts that the project would result in improved power quality and greater system stability, there is no indication in the proposal that renewable energy production is increased. Instead the proposal appears to add system components to address operational issues.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.11 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$81,973

**Requested Grant Funds:** \$74,985

**Matched Funds Provided:** \$6,988

**Total Potential Grant Amount:** \$81,973

**AEA Funding Recommendation:**

**App # 826      Wrangell Electrical Capacitor Bank**

**Resource:** Transmission

**Proposed Project Phase:** Construction Design

**Proposer:** City & Borough of Wrangell/Wrangell Municipal Light & Power

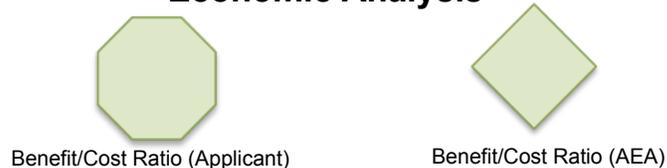
**AEA Program Manager:** Strandberg

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.81
2) Matching Resources (Max 15)	5.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No State land or easement interest

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 828 Metlakatla-Ketchikan Intertie

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Design

**Proposer:** Metlakatla Indian Community

**AEA Program Manager:** Strandberg

**Applicant Type:** Government Entity

### Project Description

The proposed Metlakatla-Ketchikan Intertie is a 34.5-kV transmission line that will interconnect the electric systems of Metlakatla Power & Light (MP&L) and Ketchikan Public Utilities (KPU). The Intertie will include 14 miles of overhead wood pole transmission line to be constructed on Annette Island between Metlakatla and Walden Point and an approximate three mile submarine cable crossing of Revillagiedo Channel between Walden Point and KPU's Mountain Point Substation. The project will also include control system upgrades to allow for the integrated operation of the interconnected systems' generating plants. Final design of the Metlakatla – Ketchikan Intertie is underway. Construction of the line began in June 2010 and approximately three miles of the overhead line is complete. The control system upgrades were completed in July 2011.

### AEA Review Comments and Recommendation

**Not Recommended**

Metlakatla Indian Community proposes construction of an intertie that connects Metlakatla to Ketchikan. AEA is providing \$2 million in RE Fund rounds 1 and 4 (#20 and 656). Additionally there is another \$2 million in grant funds from the state.

Currently the RE Fund round 4 grant is not in place. Conditions of the grant will include the following as per the round 4 AEA comments: (1) Before any grant funds can be disbursed, MIC is to submit to AEA for its review and approval, a power sales agreement between MIC and KPU which clarifies the terms, conditions, rates and amount of power for this intertie; (2) MIC must demonstrate completion of all preconstruction activities including final design documents and final construction cost estimate; and (3) MIC must demonstrate project site control, including required easements and Rights-of-way, NEPA requirements and all permits needed to construct have been issued.

AEA is assisting MIC in complying with these conditions; however this work remains in process. AEA believes it is premature to allocate additional construction funds.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$12,725,000

**Requested Grant Funds:** \$8,225,000

**Matched Funds Provided:** \$4,500,000

**Total Potential Grant Amount:** \$12,725,000

**AEA Funding Recommendation:**

**App # 828 Metlakatla-Ketchikan Intertie**

**Resource:** Transmission

**Proposed Project Phase:** Construction Design

**Proposer:** Metlakatla Indian Community

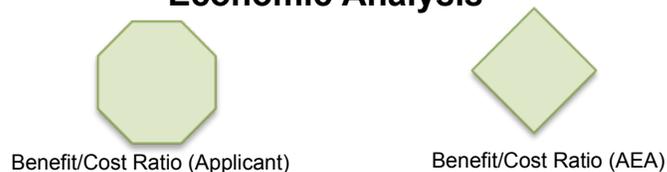
**AEA Program Manager:** Strandberg

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	4.38
2) Matching Resources (Max 15)	12.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

State tide & submerged land - submarine cable portion of intertie

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 829 Walker Lake Feasibility Study

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Inside Passage Electric Cooperative

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

IPEC proposes to use Renewable Energy grant funds to perform a feasibility study of a small hydroelectric project at Walker Lake. Walker Lake is located close to existing distribution facilities for the Chilkat Valley, Klukwan Village, and the 10 Mile Haines Highway interconnection point with AP&T's Haines/Skagway communities. The feasibility study will include an alternative analysis and selection of a preferred alternative. A stream gage will be installed to measure flow. A reconnaissance level geotechnical investigation will also be made. The results of these tasks will be presented in a report which will include a written project description, energy generation estimate, cost estimate, cost of energy calculation, a description of licensing and permitting issues and conceptual design drawings.

### AEA Review Comments and Recommendation

**Not Recommended**

IPEC requests grant funds to assess feasibility study of a 1 MW storage or run-of-river hydro project at Walker Lake. The primary purpose of the project would be to supply IPEC's Chilkat Valley system with hydropower. IPEC is in the process of purchasing the 600 kW Ten-Mile hydro project. IPEC currently purchases hydropower from AP&T's Upper Lynn Canal grid. Thus, currently all of Chilkat Valley's power is from hydro sources.

The economic analysis performed for this project assumes that the project will displace diesel generation of 1,950 to 2,800 MWh per year. Based on this assumption it estimates a B/C ratio of 2.7 to 3.9. However, AEA believes that little to no diesel will be displaced by this project.

Alaska Power Authority prepared a reconnaissance assessment for Walker Lake in 1988 and Sealaska Corporation updated the assessment in 2005. Both studies concluded that the project feasibility was marginal to poor.

AEA has the following concerns with this project:

1. AEA has already committed funding for Connelly Lk, Schubeck Lk, and Burro Cr reconnaissance and feasibility assessment. These projects would compete to meet the same loads as the proposed project.
2. Permitting conditions are adverse. The project would require a 6-8 mile transmission line to interconnect to Upper Lynn Canal grid passing through the Chilkat Bald Eagle Preserve. The site has geotechnical issues. FERC would likely have jurisdiction due to salmon issues.
3. This project would not displace diesel generation.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.38 /kWh

**Energy Region:**  
Southeast

#### Project Cost:

**Requested Grant Funds:** \$160,000

**Matched Funds Provided:** \$10,000

**Total Potential Grant Amount:** \$170,000

**AEA Funding Recommendation:**

**App # 829 Walker Lake Feasibility Study**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Inside Passage Electric Cooperative

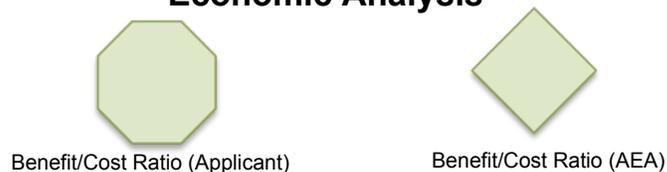
**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	16.63
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Within Haines State Forest - Classified Public Recreation

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

The project is close to the Chilkat River segment of the Denali fault. See general DGGS comment.

## App # 830 Multi Disciplinary Combined Facility Primary Care Center Biomass Feasibility

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Copper River Native Association (on behalf of native Village of

**AEA Program Manager:**

**Applicant Type:** Government Entity

### Project Description

This project is to help ascertain the feasibility of using biomass and/or other wood-based alternative energy source to provide long-term sustainable energy sources for a 30,000 s.f. Multi-Disciplinary Combined Facility (“MDCF”) in the Copper River Valley region. The planned facility located in Tazlina, AK, has already been accepted as a Phase II Site Selection and Evaluation Report (“SSER”) schematic approved eligible Joint-Venture Project by the Indian Health Service. The results of such an analysis will help determine if alternative energy sources can reduce long term operating costs over the life of this planned primary care facility, help to ascertain if an expansion of existing CVEA power facilities utilizing biomass sources nearby Glennallen is warranted, or, if separate, stand-alone biomass-based power units housed within or attached to separate facilities is a more efficient business model.

### AEA Review Comments and Recommendation

Partial Funding

Copper River Native Association requests funding for studying feasibility of wood-fired heating or combined heat and power to supply a planned “multi-disciplinary combined facility” (MDCF) to be funded by the BIA.

AEA and economics contractors were unclear on a number of issues including:

1. Status of the MDCF
2. Source, cost, and volume of biomass
3. The scale of the envisioned project—facility or grid-connected power system.
4. Clarification of the estimated project cost.
5. How the project fit with the Copper Valley Electric Association’s goals for renewable power generation and the Glennallen school’s proposed heating project.

These issues should have been addressed in a reconnaissance-level assessment that has not been done to AEA’s knowledge. The information was requested in two separate email messages, but there was no response from the applicant.

In response to AEA's initial recommendation for no funding due to lack of response, CRNA requested reconsideration. Based on CRNA's recent clarification that the proposed project is feasibility of a wood pellet-fired thermal system, AEA has concluded that it is reasonable to recommend the project for funding.

From the application, the equipment cost for the pellet boilers is estimated at \$200,000. Based on previous projects, a feasibility study of this magnitude should cost approximately \$30,000.

Recommend partial funding of \$30,000, with the requirement that AEA will work with CRNA to developed the revised scope.

### Funding & Cost

Cost of Power: \$0.22 /kWh

**Energy Region:**

Copper River/Chugach

**Project Cost:**

\$2,012,000

**Requested Grant Funds:**

\$132,523

**Matched Funds Provided:**

\$10,840

**Total Potential Grant Amount:**

\$143,363

**AEA Funding Recommendation:**

\$30,000

**App # 830 Multi Disciplinary Combined Facility Primary Care Center Biomass Feasibility**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Copper River Native Association (on behalf of native Village of

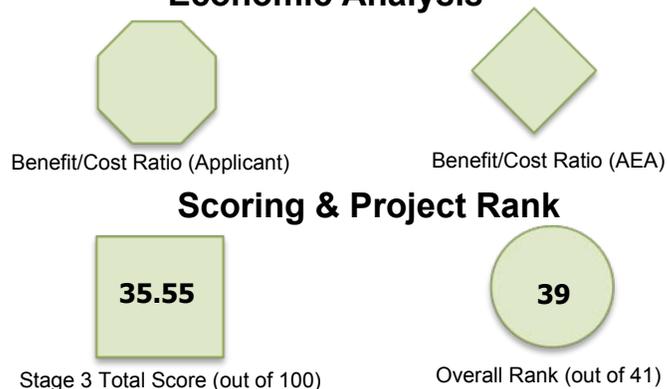
**AEA Program Manager:**

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	10.80
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	1.13
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

As proposed, project only for a regional feasibility study, and not a specific on the ground project.

## DNR/DOF Feasibility Comments

This project is for a feasibility study to utilize biomass to provide sustainable energy for a 30,000 square foot public health center in Tazlina. The study would seek to determine if the biomass would be better utilized by existing Copper Valley Electric Association facilities or as stand-alone biomass power units within individual facilities such as the health center itself. The project proposal lists the volume availability from the Division of Forestry's Glennallen inventory report and then applies the sustained yield ratio to total volume to Ahtna forested lands. This method provides a good starting point on volume availability. The project proposal further states that operability will affect the final volume availability amount. It should be noted that the Division of Forestry is currently conducting volume assessments on Gulkana, Gakona and Tazlina areas of Ahtna lands. The Glennallen inventory will be applied to timber type acres within the three villages. This data will be useful in the final analysis of sustainability and wood sourcing.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.



**App # 831      Juneau Super Critical Water Oxidation Sewage Sludge to Energy**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Lammergeier CleanTech (A Subsidiary of Juneau BioFuels)

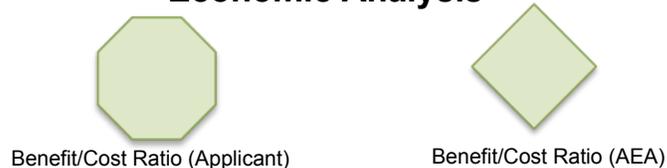
**AEA Program Manager:**

**Applicant Type:** IPP

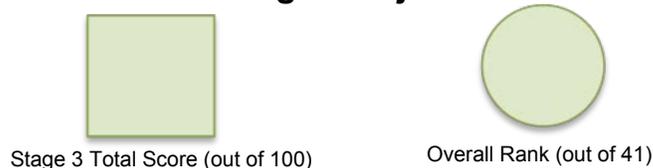
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments



## App # 832      **Kake Pellet Boiler System**

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Kake City School District

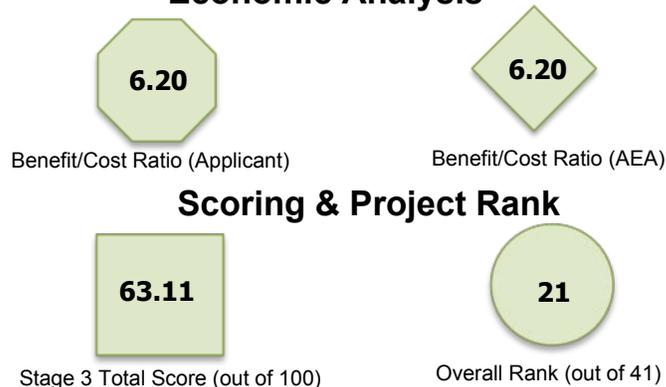
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	14.97
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	13.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.83

### Economic Analysis



### DNR/DMLW Feasibility Comments

No State land or easement interest

### DNR/DOF Feasibility Comments

The project is for the replacement of an oil fired boiler with a pellet boiler to provide heat for Kake City School District buildings. Pellets would be provided by Sealaska Corporation and shipped from Juneau to Kake in bulk quantities. A silo would house the pellets in Kake. This fuel delivery model is similar to what is employed in Juneau to provide pellets to the Sealaska corporate building. Kake estimates \$80,000 per year in fuel savings through the conversion to pellets. This project appears to be well thought out and likely to be successful given the fact that the Sealaska Corporation already is utilizing a significant amount of pellets with a proven fuel delivery system.

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 833 Grant Lake Hydroelectric Facility**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Kenai Hydro LLC

**AEA Program Manager:** Ott

**Applicant Type:** IPP

## Project Description

The Grant Lake Hydroelectric Facility would consist of 5 MW of installed capacity with an average annual output of 20,600 MWh of energy, installed on the Grant lake watershed near Moose Pass, Alaska. The proposed Project is comprised of a diversion dam at the outlet to Grant Lake (under consideration), an intake structure in Grant Lake, a tunnel, a surge tank, a penstock, a powerhouse, a tailrace detention pond, a switchyard with disconnect switch & step-up transformer, and an overhead or underground transmission line. The intake would be in Grant Lake near its outlet. Water would be conveyed from the intake through a 3200' penstock to a powerhouse containing two Francis-type turbines. The powerhouse would be located near the bank of Grant Creek and would discharge through a second penstock into Grant Creek. A transmission line would connect the facility to the Railbelt grid near Moose Pass. Please see the attached Project Description that was filed with FERC on August 13th, 2010. Kenai Hydro LLC, whose sole member is the Homer Electric Association (HEA), was created in 2008 to evaluate and possibly develop this site as a low impact hydroelectric facility.

**AEA Review Comments and Recommendation** **Not Recommended**

Kenai Hydro LLC, a wholly-owned subsidiary of Homer Electric Association, proposes final design and construction of a 4.5 MW hydro facility at Grant Lake. Recognizing that this project would provide a significant amount of renewable energy to the Railbelt grid, AEA has previously granted Kenai Hydro \$100,000 for reconnaissance assessment in the alternative energy RFP and \$816,000 in RE Fund round 1 (#34) and \$1,184,000 in round 4(#635). The balance of the estimated \$35,000,000 project would be financed and possibly include some public funds.

AEA has the following concerns about this project:

1. Final design funding would not be needed until March 2014 at the point anticipated for FERC licensing. For this reason it appears that final design funding is premature.
2. There is significant public opposition to the project.
3. It will likely cost more to mitigate impacts of features not yet anticipated in the cost estimate, such as i) relocation of the roadway and transmission line due to presence of Iditarod Commemorative trail (currently permitted and under development), and ii) the cost of constructing a new tailrace pond.
4. We expect that in the FERC licensing process, there will be constraints on the operation of the project that will significantly impact the amount of energy that can be produced. For instance, energy output will be reduced in order to maintain environmental stream flows and lake levels necessary to mitigate impact on fisheries.
5. KHL does not demonstrate site control at this time.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$35,392,921

**Requested Grant Funds:** \$4,000,000

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$4,000,000

**AEA Funding Recommendation:**

**App # 833 Grant Lake Hydroelectric Facility**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Kenai Hydro LLC

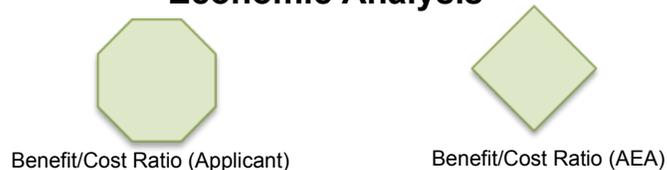
**AEA Program Manager:** Ott

**Applicant Type:** IPP

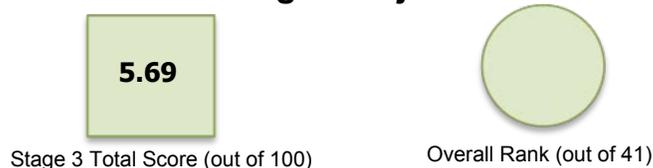
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	5.69
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

All facilities on DNR land. Will need full spectrum of authorizations. Also: within KRSMA, potentially conflicts with existing DNR easement to the USFS, and may affect a national historic trail. There is substantial public interest on whether this project should be done in this location.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Primary seismic hazard is strong ground motions from subduction zone earthquakes. See general DGGS comment. See general DGGS comment.

## App # 834 Seward Schools Biomass Heating System

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kenai Peninsula Borough School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The proposed project will finalize the feasibility and conceptual design, build, and install a wood-fired hydronic heating system in three Seward schools. Phase I, Reconnaissance Study was completed in July, 2011. (See attached reports) This proposed Seward Schools Biomass Heating System project will implement the following multi-phased process:

- Phase II, Finalize Feasibility Analysis and Conceptual Design.
- Phase III, Final Design of a wood-fired hydronic heating system to heat the combined Seward High, Middle and Elementary School campus with woody biomass fuel.
- Phase IV, Construction, Commissioning, and Operation of the heating system and follow up reporting on operation and maintenance.

The project is designed to proceed without the delay of additional grant year cycles. Reports from a 2011 preliminary feasibility assessment and a 2011 District energy evaluation will serve as the reference documents for this project.

### AEA Review Comments and Recommendation

**Full Funding**

The Kenai Peninsula Borough School District is proposing to feasibility, final design and installation of pellet-fired boiler systems to heat three Seward schools – the elementary, middle, and high school. This project is estimated to displace a total of 120,600 gallons per year of fuel oil.

The project has completed reconnaissance phase work. Given proximity of the three buildings the feasibility analysis will consider a district heating system to supply all three buildings.

The application includes substantial support from the community, USFS, and the local tribal council. This project will develop an anchor tenant for pellet supply in the Southcentral Alaska region and will potentially support the development of pellet manufacturing infrastructure.

Given the proven performance of pellet systems and commercial availability of pellet fuel AEA is comfortable with recommending full funding with required approval of development phases. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding, with requirement of AEA acceptance of feasibility and final design phases.

### Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$1,476,485

**Requested Grant Funds:** \$1,436,517

**Matched Funds Provided:** \$39,968

**Total Potential Grant Amount:** \$1,476,485

**AEA Funding Recommendation:** \$1,436,517

## App # 834 Seward Schools Biomass Heating System

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kenai Peninsula Borough School District

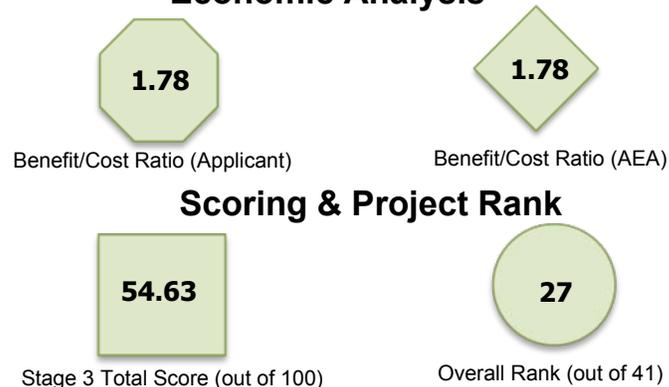
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.44
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	17.40
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	13.13
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.67

### Economic Analysis



### DNR/DMLW Feasibility Comments

On KPB land and requires no land authorizations from DNR.

### DNR/DOF Feasibility Comments

This project will provide final feasibility and conceptual designs, build, and install of a wood-fired hydronic heating system for the three Seward schools. It is estimated that 80% of the annual fuel oil consumption could be replaced by wood for an annual savings of approximately \$239,000. Pre-feasibility reports have been prepared by USDA Forest Service, State and Private Forestry. A wood pellet system that replaces the oil fired boilers appears to be cost effective with a reasonable simple payback time period. Pellets would be shipped to Seward either from in state or out of state suppliers depending on price and availability. Given that the Interior's Superior Pellet Fuels is located near the Alaska Railroad a potential to ship pellets to Seward by rail may exist.

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 835 Mahoona Hydroelectric Dam Replacement

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Ouzinkie

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

### Project Description

The City of Ouzinkie ("City") proposes to replace an existing timber buttress dam at Mahoona Lake, located approximately 1.5 miles east of the City on Spruce Island near Kodiak, Alaska. Funds requested in this Renewable Energy Grant application are needed to perform a feasibility analysis and conceptual design for a proposed replacement dam located downstream of the existing wooden dam. The feasibility analysis will include evaluation of the existing 6,000 foot, 18-inch diameter PVC penstock, a 1.5 mile access road, and a (125 kW) hydroelectric powerhouse. The replacement dam will be designed to allow for an increase of holding capacity from a current 400 acre-feet, to a post-construction capacity of 600 acre-feet. This 50% increase in capacity will provide uninterrupted use of the hydroelectric generators, a potential increase in power production capacity, and eliminate the need for supplemental diesel-generated power. The scope of this project will be consistent with the requirements of Phase II Feasibility Analysis, Conceptual Design, as set forth in Section 2.4 of the Round V grant application instructions dated 1 July 2011.

### AEA Review Comments and Recommendation

Full Funding

The City of Ouzinkie proposes feasibility study and conceptual design to replace the existing timber buttress dam at Ouzinkie with a new facility that can impound 50% more water, thus enabling the diesel generators to be shut off. The existing dam serves as a source for hydroelectric generation and for the community's water supply.

For the proposed project (which does not include repair of the existing project), the City proposes permitting and environmental review, geotechnical investigations and surveying, and engineering evaluations of access road, penstock saddle dike and powerhouse with a final report.

In the near term, the City has stated it will spend \$410k for repairing the old dam. This includes a DNR Periodic Dam Inspection, permitting and design for dam repairs, performing the dam and access road repairs. As part of the project review, AEA requested information on the status of the repair. The City replied that they are working on improving the road to the project, but to date they have not obtained funding for the repair.

AEA is concerned that the proposal does not address the tradeoff between repairing the existing timber buttress dam and building a new, expanded project. It is not clear that a new, expanded project is justified if the existing project is repaired.

The economic review indicates marginal economics given limited market for energy from the expanded project. AEA is concerned that the cost of the proposed feasibility work is high. The feasibility work may indicate that it makes more sense to repair the existing project instead of replacing and upgrading the dam.

Recommend full funding with requirement that the City prepare a preliminary report acceptable to AEA on the outcome of tasks 1-3 that addresses the issues of repair versus replacement and sizing before proceeding to geotech field investigations and conceptual design.

### Funding & Cost

Cost of Power: \$0.39 /kWh

**Energy Region:**  
Kodiak

**Project Cost:** \$5,882,000

**Requested Grant Funds:** \$467,500

**Matched Funds Provided:** \$60,000

**Total Potential Grant Amount:** \$527,500

**AEA Funding Recommendation:** \$467,500

## App # 835 Mahoona Hydroelectric Dam Replacement

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Ouzinkie

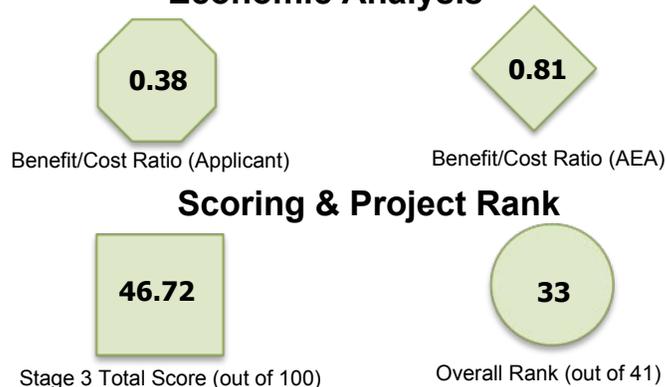
**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	17.06
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	11.03
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	1.38
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### DNR/DMLW Feasibility Comments

There are serious deteriorating conditions on the existing dam. It is in a non-failure emergency status and there will most likely be required measures to prevent full failure. This funding is obviously essential for both hydroelectric and water supply issues for Ouzinkie. Appropriate design approval would be required for replacement.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

Strong ground motions from the Aleutian subduction zone and Narrow Cape faults are the primary seismic hazards at the site. See general DGGS comment.

**App # 836      Packer's Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chignik Lagoon Village Council

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

## Project Description

The proposed project is a high head run-of-river hydroelectric power plant on Packers Creek in Chignik Lagoon with an installed capacity of 177 kW. Project will include a 9-foot tall concrete dam, 3,260 foot long 18- inch and 16-inch diameter penstock and access trail; 400 square foot power house; 1,550 foot long access road with a bridge across Packers Creek to the powerhouse; and a 1,750 foot long overhead power line extension to the existing distribution system and 3,000 foot long control connection to the existing diesel power plant.

**AEA Review Comments and Recommendation** **Full Funding**

Chignik Lagoon Village Council requests funds to construct a 177 kW hydroelectric project on Packers Creek. The project would displace 89% of the community's electrical energy. An RE Fund round 1 grant was made for permitting and final design (#14) for \$150,000. The project would consist of a 9' concrete dam penstock and powerhouse on Packer Creek and a 1,800 feet transmission line to connect to community power system.

AEA has reviewed the final design documents and has identified some additional work to be completed, including flood elevations and bridge foundations. Additionally site control has not been obtained as of date of this review, although a letter from the village corporation indicates this will be provided. Water rights from ADNR, the Borough development permit, and the ADF&G fish habitat permit remain to be issued. Integration of hydro with existing diesel power plant is not discussed in application. Discussion of interruptible power to heat the school is mentioned but not designed or budgeted for in the project estimate. The construction manager is not identified. Given all these unresolved issues, AEA believes the cost estimate for this construction project is low.

Despite these shortcomings, technical and economic feasibility of this project appear favorable, and the project has high potential for meeting most of community electrical needs. The community's distribution system was upgraded in 2003, while the power system was upgraded in the mid-1990s.

Recommend full funding with requirement that AEA must approve final design, permitting, financing plan, and construction manager before construction cost reimbursement.

## Funding & Cost

Cost of Power: \$0.40 /kWh

**Energy Region:**  
Bristol Bay

<b>Project Cost:</b>	\$2,516,496
<b>Requested Grant Funds:</b>	\$1,993,496
<b>Matched Funds Provided:</b>	\$523,000
<b>Total Potential Grant Amount:</b>	\$2,516,496
<b>AEA Funding Recommendation:</b>	<b>\$1,993,496</b>

**App # 836     Packer's Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chignik Lagoon Village Council

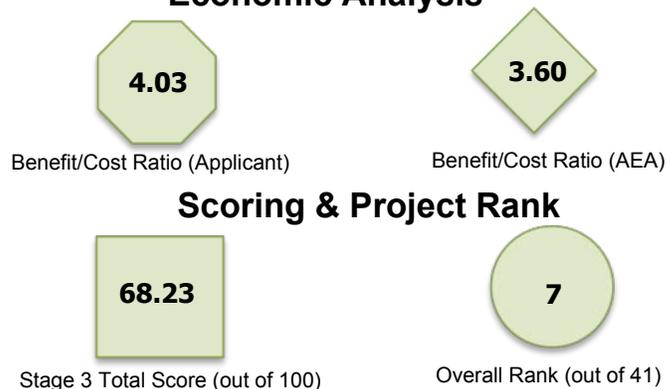
**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	17.50
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	15.73
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

Packer's Creek DNR 35.05 authorizations may be required depending on location of this project and whether it affects tidally influenced portion of Packer's Creek. Additionally, the mouth of the creek occurs within a DOT/PF managed ILMA for the airport.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Tsunami and strong ground motions from Aleutian subduction zone earthquakes are the primary seismic hazards at the site. See general DGGS comment.

**App # 837 Hunter Creek Hydroelectric Project Feasibility Study**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Eklutna, Inc.

**AEA Program Manager:**

**Applicant Type:** IPP

## Project Description

The Hunter Creek Hydroelectric Project is a potential hydroelectric resource in the Matanuska-Susitna Valley with an estimated installed capacity of 6.5 MW and annual energy generation of 34,100 MWh. The preliminary estimated project cost is \$25 million, and estimated benefit-cost ratio is 3.29. This proposed feasibility study is contingent upon the favorable outcome of a reconnaissance study that is scheduled to start in August 2011. In the event the reconnaissance study determines that the project is not viable, Eklutna Inc. intends to withdraw this application from consideration.

**AEA Review Comments and Recommendation** Withdrawn

9/21/2011 application withdrawn

## Funding & Cost

Cost of Power: /kWh

**Energy Region:**  
Railbelt

<b>Project Cost:</b>	\$25,000,000
<b>Requested Grant Funds:</b>	\$289,710
<b>Matched Funds Provided:</b>	\$52,190
<b>Total Potential Grant Amount:</b>	\$341,900

**AEA Funding Recommendation:**

## App # 837 Hunter Creek Hydroelectric Project Feasibility Study

Resource: Hydro

Proposed Project Phase: Feasibility

Proposer: Eklutna, Inc.

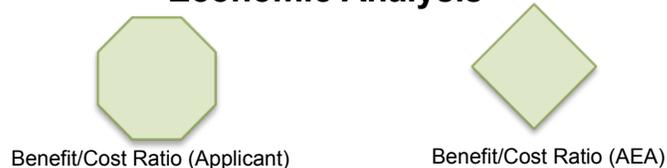
AEA Program Manager:

Applicant Type: IPP

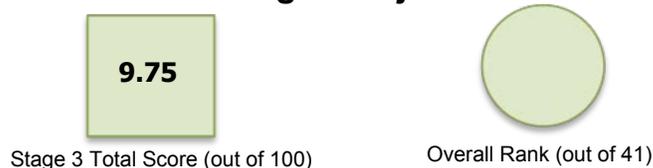
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

**App # 838 Chickaloon Solar Thermal and Biomass Project**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Chickaloon Village Traditional Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

The proposed project is to build and install a Combined Wood Pellet Boiler and Solar Thermal System that would provide heat for both a 3,200 sq ft shop/office building and a 1,160 sq ft administrative building. This project includes construction of a building addition to house the boiler system, purchase and installation of the solar thermal and pellet boiler, and focused monitoring and evaluating of the project. This project would be used as a demonstration project for the community to learn about solar thermal and wood pellet boiler systems and to encourage the use of local renewable resources for heating.

**AEA Review Comments and Recommendation Full Funding**

The Chickaloon Village Traditional Council proposes construction of a pellet and solar heating system to supply heat to the shop and administrative building. The system would include a solar thermal panel, a 200 MBH wood pellet-fired boiler, and an 8 x 12' addition to one of the buildings.

The applicant is requesting construction; however, a detailed final design has not been completed. Upon AEA request the applicant provided a rough conceptual design. Chickaloon's submittal did not include a final layout of the system, a detailed heating load assessment, a schematic of the control system, or other site-specific detail.

AEA supports the initiative for developing a heating project for Chickaloon Village Traditional Council. However, AEA is concerned about the high cost of the project as currently configured, the relatively low fuel displacement, and marginal project economics.

Despite the lack of an acceptable final design, AEA recognizes that the proposed system is relatively simple. Before any state funds are disbursed, AEA believes that it is reasonable to for Chickaloon to assess options to lower the cost of the project, increase amount of fuel displaced by supplying more loads, or do both.

Recommend full funding with requirement that Chickaloon provide a final design that is acceptable to AEA before any funds are disbursed.

## Funding & Cost

Cost of Power: \$0.14 /kWh

**Energy Region:**

Railbelt

**Project Cost:** \$161,702.92

**Requested Grant Funds:** \$127,065

**Matched Funds Provided:** \$34,637.92

**Total Potential Grant Amount:** \$161,702.92

**AEA Funding Recommendation:** \$127,065

**App # 838 Chickaloon Solar Thermal and Biomass Project**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Chickaloon Village Traditional Council

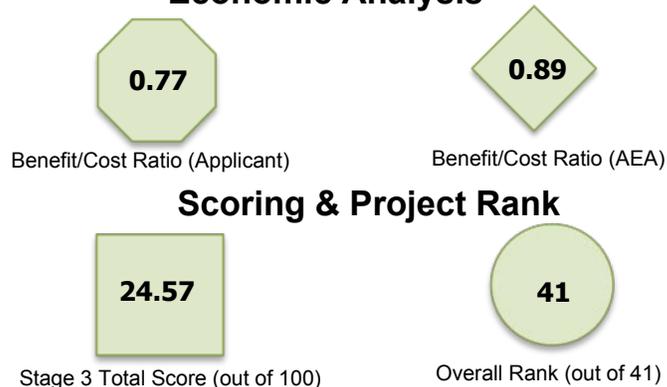
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	6.13
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	7.20
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

No obvious DNR land authorization indicated. Development may affect Section Line Interest depending on how improvements are placed.

## DNR/DOF Feasibility Comments

This project will provide final feasibility and conceptual designs, build, and install of a wood-fired hydronic heating system for the three Seward schools. It is estimated that 80% of the annual fuel oil consumption could be replaced by wood for an annual savings of approximately \$239,000. Pre-feasibility reports have been prepared by USDA Forest Service, State and Private Forestry. A wood pellet system that replaces the oil fired boilers appears to be cost effective with a reasonable simple payback time period. Pellets would be shipped to Seward either from in state or out of state suppliers depending on price and availability. Given that the Interior's Superior Pellet Fuels is located near the Alaska Railroad a potential to ship pellets to Seward by rail may exist.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 839 and 898 Nome Renewable Energy Expansion/Optimization Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of Nome dba Nome Joint Utility System (NJUS)

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

This is a combination of applications 839 and 898. The 839 project involves the expansion of NJUS' awarded REF Round I wind power project (installation of a 900 kW wind turbine) through the installation of a second 900 kW wind turbine at the planned project site. The project aims to take advantage of economies of scope to incorporate the installation of a second wind turbine generator during the construction of NJUS' Round I awarded project. At this time, conceptual design and feasibility studies have been completed and the project is ready to continue with final design, permitting, and construction activities. The 898 project seeks to optimize existing installations and in-progress wind projects in the community. NJUS is utilizing REF-Round I funding to install a 900 KW wind turbine in summer 2012. Another REF-Round I project allowed NJUS to construct a power transmission line to Banner Wind, an independent power producing facility privately owned by Sitnasuak & Bering Straits Native Corporations, from which NJUS purchases wind power under a contract. Through installation of a new wind integration control system and modification of the diesel generation system at NJUS' Power Plant, the project focuses on the optimization of existing diesel generation equipment within the community in order to maximize benefits from renewable energy supplies. Under the scope of this project smaller, peaking diesel generator sets will be integrated into Nome's Power Plant and plant controls will be reconfigured to provide system wide benefits of reduced operating costs, greater stability, and improved efficiency. In the event NJUS or Banner Wind expands wind generation capacity in the future, the community can potentially recognize additional benefit from the project.

### AEA Review Comments and Recommendation Partial Funding

Nome Joint Utility System proposes the design, permitting, construction and commissioning of a second EWT 900 turbine at the Banner Wind Farm.

In a second proposal (#898) NJUS requests funding to integrate existing 1875 kW and 3660 kW units into Nome's Power Plant and reconfigure plant controls to reduce operating costs, provide greater stability, and improve efficiency. The second proposal scope includes relocating the 1875 kW unit from a different building. AEA believes that this work is not consistent with the intent of the RE Fund, therefore not eligible. Only the integration of a secondary load controller and resistive dump boiler, estimated to cost \$325,000, are consistent with the objectives of the RE Fund and eligible for funding.

For the purposes of review AEA will consider proposal #839 and the eligible portion of #898 as one application.

NJUS's original proposal (#52) was for the construction of a 3 MW wind farm at a project cost of \$13.5 million. The project was partially funded at \$4 million and the scope reduced to the installation of a single EWT 900 turbine. Of this cost, \$69,000 is for conceptual design and feasibility, while \$3,931,000 is for final design and construction. A RE Fund round 1 grant is in place for the design, permitting, construction and commissioning of a single EWT 900 turbine. A conceptual design report, which includes analysis of a wind-diesel system with both one and two EWT 900 turbines, has been accepted by AEA.

NJUS is requesting funds for the design, permitting, construction and commissioning of the proposed project. The project is expected to cost \$4,115,000, of which \$411,500 would come as matching funds provided by NJUS. NJUS is requesting \$3,703,500 from the RE Fund in proposal #839.

The combined proposed project (#52, 839, 898) has a relatively low price per installed kilowatt and can lead to a significant drop in diesel usage for electricity in the community.

AEA is concerned that the current diesel configuration is oversized for the community and especially so for the installation of significant wind power. Integrating the smaller generators will help to address this situation.

Recommend funding of \$4,069,000 (\$8,000,000 cap - \$3,931,000 from the round 1 grant) with the requirement that 1) AEA accept final design and permitting, and 2) NJUS reconfigures the existing diesel generators, (including the non-RE Fund eligible work) before construction funds are released.

### Funding & Cost

Cost of Power: \$0.36 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:** \$6,736,891

**Requested Grant Funds:** \$6,103,500

**Matched Funds Provided:** \$611,500

**Total Potential Grant Amount:** \$6,715,000

**AEA Funding Recommendation:** \$4,069,000

**App # 839 and 898 Nome Renewable Energy Expansion/Optimization Project**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** City of Nome dba Nome Joint Utility System (NJUS)

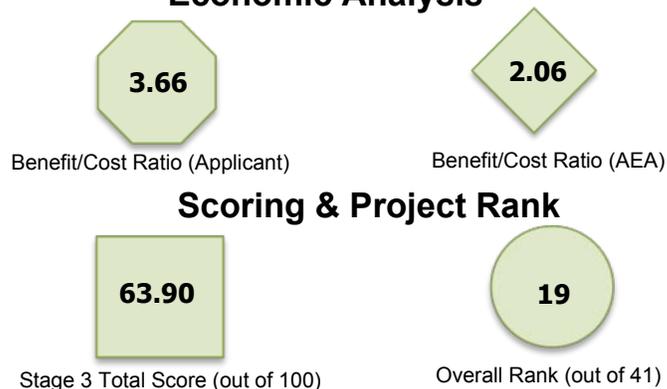
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	15.75
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	16.57
4) Project Readiness (Max 5)	4.00
5) Benefits (Max 15)	11.75
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.83

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 840      Kobuk Biomass Design & Construction Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of Kobuk

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

The City of Kobuk seeks to incorporate a biomass boiler system in their water treatment plant facility. This project will provide design and construction for a wood burning boiler system in Kobuk, Alaska. The intent for this project is to increase the use of locally available, biomass energy for thermal heating. This project will include:

- System Design
- Right of way and Survey requirements • Construction Permitting
- Installation of a wood burning boiler system (Gam unit proposed)
- Construction of a covered wood splitting and storage shed
- Gravel Pad/Foundation
- Perimeter fencing
- Hydronic piping and other mechanical components • Electrical Controls
- Harvesting and Processing Equipment (Saws, wood splitters, etc.)
- Freight and travel costs.

**AEA Review Comments and Recommendation** **Full Funding**

Applicant proposes final design and construction of a cordwood –fired heating system to supply the water treatment plant facilities. Assessment for wood heating in Ambler, Shungnak, and Kobuk was funded under two earlier projects: 1) Feasibility in round 1 (# 59) and 2) final design in round 4 to NW Inupiat Housing Authority (NWIHA) (#668). Work includes fuel supply plan, business plan, and technology assessment.

The project would consume 35 cords of year harvested from NANA lands. A letter from NANA states its support. The system would operated through the Alaska Rural Utility Collaborative and represents their first wood-fired system.

AEA is concerned that the economics appear marginal. They could be improved by identifying ways of reducing capital cost and/or increasing diesel displacement during the design phase.

AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

AEA is also concerned that the Kobuk Valley Electric is not participating regularly in the PCE program.

Recommend full funding with requirements that 1) The City must coordinate with NWIHA and their consultant in developing the project, 2) AEA must accept final design before construction funding is disbursed and 3) wood supply contracts for 5 years must be in place before construction funding is disbursed.

## Funding & Cost

Cost of Power: \$0.87 /kWh

**Energy Region:**  
Northwest Arctic

**Project Cost:** \$401,873

**Requested Grant Funds:** \$356,424

**Matched Funds Provided:** \$45,449

**Total Potential Grant Amount:** \$401,873

**AEA Funding Recommendation:** \$356,424

**App # 840    Kobuk Biomass Design & Construction Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** City of Kobuk

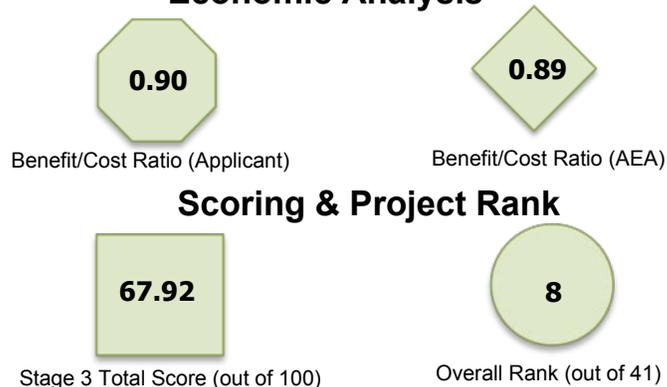
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	35.00
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	12.63
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	2.37
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	1.67

## Economic Analysis



## DNR/DMLW Feasibility Comments

Assume biomass is from corporation lands. Some state selected lands about 5 miles away.

## DNR/DOF Feasibility Comments

This project is for design and construction of a Garn boiler system to heat Kobuk's water treatment plant building. It is estimated that 35 cords per year would be required for the facility. The fuel source would be purchased at \$259.50 per cord. A total of 4,200 gallons of diesel would be displaced by the wood boiler. A pre-feasibility report examined the available wood resources near the village and stated that more than adequate resources were available to support a larger multi-building biomass system rated at 183 cords per year. At this time due to some uncertainty in resource access and operability which was mentioned in the resource assessment, a 35 cord annual use appears sustainable. This is a good first step for a remote village to utilize woody biomass in its area.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 841      City of Kake Hydroelectric Resource Analysis**

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Kake

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

## Project Description

The City of Kake Hydroelectric Resource Analysis study will review the potential hydroelectric energy sources within or near the community of Kake, Alaska. The proposed project will complete a resource (feasibility) analysis of the potential, readily accessible hydroelectric resources available to the community and will provide a conceptual design for the selected hydroelectric alternative. Traditional hydroelectric turbines and infrastructure and low head, hydrokinetic technologies including Archimedes Screws will be considered as a part of this resource analysis. Alternatives that could potentially be retrofitted to the existing Gunnuck Creek Dam will be considered as a part of this resource analysis. Previous hydroelectric studies for the Kake area will be reviewed and incorporated into this analysis, which will include updated estimated capital and annual operation and maintenance costs. The resource analysis will compare the alternative project costs and will determine the most feasible alternative to offset some or all of Kake's diesel-driven electrical supply. A conceptual design of the preferred alternative will be prepared as part of the resource analysis.

**AEA Review Comments and Recommendation** **Not Recommended**

City of Kake is requesting funding for feasibility and conceptual design to evaluate various hydro resource alternatives at Kake dam and Cathedral Falls. The dam in Kake provides for the city's water supply and supplies the fish hatchery. The City would use ANTHC for study lead with assistance from the firm Hatch.

AEA has the following concerns:

1. The City has not prepared a reconnaissance assessment that identifies a single alternative for the feasibility and conceptual design funding request.
2. Several previous studies have reviewed hydro resources near Kake and recommended no further pursuit of this type of resource. Kake receives roughly 1/4 of Ketchikan's annual precipitation, so its hydro prospects are not compelling.
3. Funds are being requested by SEAPA for an engineering study of transmission to Kake in Rd V app # 811.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Southeast

**Project Cost:** \$168,000

**Requested Grant Funds:** \$150,000

**Matched Funds Provided:** \$18,000

**Total Potential Grant Amount:** \$168,000

**AEA Funding Recommendation:**

**App # 841 City of Kake Hydroelectric Resource Analysis**

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Kake

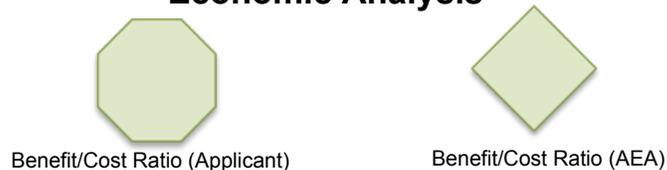
**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

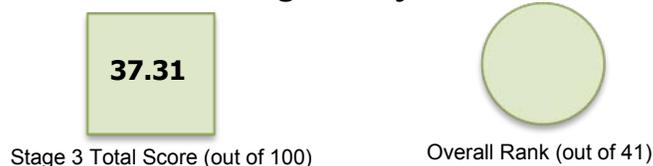
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Resource feasibility analysis - no specific project identified

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

The project is located ~17 km northeast of the Chatham Strait segment of the Denali fault, however this structures activity is unknown. See general DGGS comment.

## App # 842 Golovin Wind Feasibility Study

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Golovin

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity  
Local Government

### Project Description

The City of Golovin in partnership with the Alaska Native Tribal Health Consortium (ANTHC) is seeking to determine the feasibility of installing wind turbines in the community for heating the water treatment facilities. Golovin currently stores approximately 2 million gallons of treated water to provide safe drinking water to community residents. In addition, Golovin's water storage is due to increase to approximately 3 million gallons in two years with the construction of a new water storage tank, which will serve homes that currently do not have running water. This stored water, as well as the community piped water distribution system, is heated using multiple oil-fired boilers. The energy requirement and fuel consumption to keep this water from freezing each year is extremely high, and escalating fuel price have the potential to limit Golovin's ability to provide adequate sanitation services to its residents due to prohibitive heating costs. The City of Golovin now seeks to determine the feasibility of utilizing wind turbines for capturing wind energy to provide heat and electricity for the existing water treatment plant, water storage and water distribution system. The feasibility study project will:

- determine the available wind resources around the water treatment plant,
- estimate the long-term viability of the proposed project based on expected load growth,
- provide a conceptual level system design,
- prepare a conceptual level cost estimate for the construction effort and the operations and maintenance of the proposed system,
- identify easements and permits required, prepare a comprehensive economical analyses of alternatives,
- update the utility business plan, • make a recommendation to move forward with the project design activities,
- Evaluate the potential uses of wind turbines to convert wind energy to heat.

### AEA Review Comments and Recommendation

**Not Recommended**

The City of Golovin, in partnership with Alaska Native Tribal Health Consortium proposes to assess feasibility of utilizing wind turbines to generate power to provide heat for the existing water treatment plant, water storage and water distribution system. AEA followed up with questions regarding the efficiency of the boilers, fuel consumption, heating season, and amount of water that needed to be heated.

AEA has the following concerns about this proposal:

1. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost, wind resource from high-resolution map, fuel displacement or revenue streams. Data provided were not sufficient to perform even a very rough economic analysis. The proposal did not address whether or not there was an existing diesel heat recovery system to tie into.
2. Economics appear poor based on AEA modeling for heat only. Assuming a class 4 wind resource, offsetting 4000 gallons/yr of diesel, \$5.00/gal fuel cost and the lowest possible cost of a remanufactured 65 kW wind system benefit/cost was 0.5 to 0.6. This reflects that the value of replacing heat is much less than the value of displacing electrical energy.

A combined heat and electric system would appear to be a better option for a cost-effective solution. AEA recommends that the City use a comprehensive approach for identifying cost-reduction options through a regional energy plan for the Bering Straits region.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.57 /kWh

**Energy Region:**  
Bering Straits

#### Project Cost:

**Requested Grant Funds:** \$96,700

**Matched Funds Provided:** \$18,300

**Total Potential Grant Amount:** \$115,000

**AEA Funding Recommendation:**

**App # 842 Golovin Wind Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Golovin

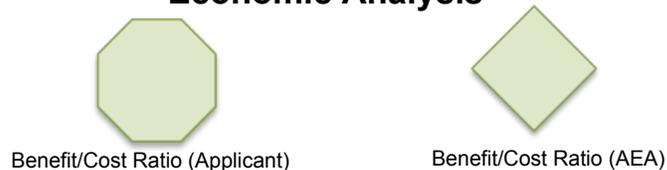
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity  
Local Government

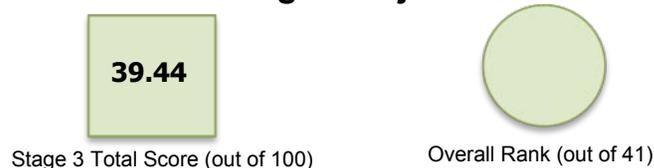
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.94
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 843      Atmautluk Washeteria/ Power Plant Waste Heat Recovery Project**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** Atmautluk Traditional Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government  
Government Entity

## Project Description

The Atmautluk washeteria, the only sanitation facility community owned by Atmautluk Traditional Council, has high energy costs for heating water for use in washers, showers, and building heat. This facility includes the water treatment plant. Safe drinking water is made here and used by local residents. This project will provide recovered heat for the washeteria. This project will be combined with an Indian Health Service (IHS) project rehabilitating the washeteria to meet the community's water needs and reduce the associated costs. This project will construct an enclosure (utilidor) for the sewage force main and recovered heat lines and move heat from the power plant to the sewage lift station and washeteria. The IHS project will repair the washeteria foundation and make internal improvements to effectively use the recovered heat.

**AEA Review Comments and Recommendation** **Full Funding**

The Atmautluk Traditional Council in collaboration with ANTHC is proposing the design and construction a waste heat recovery system to connect recovered heat from the community power plant to the refurbished washeteria. This project is estimated to displace 4395 gallons of fuel oil.

The AEA-managed power plant replacement for the community is in the conceptual design phase with funding targeted for 2012. The power plant replacement is not required for this project to be successful, but it could enhance the availability of recovered heat.

The feasibility study for this project was completed in 2011. AEA notes that the application narrative states that final design funding is requested for 2011, although funding would not be available until July 2012. The budget form gives a later timeframe.

AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.70 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:** \$338,578

**Requested Grant Funds:** \$298,078

**Matched Funds Provided:** \$40,500

**Total Potential Grant Amount:** \$338,578

**AEA Funding Recommendation:** \$298,078

**App # 843 Atmautlauk Washeteria/ Power Plant Waste Heat Recovery Project**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction Design

**Proposer:** Atmautlauk Traditional Council

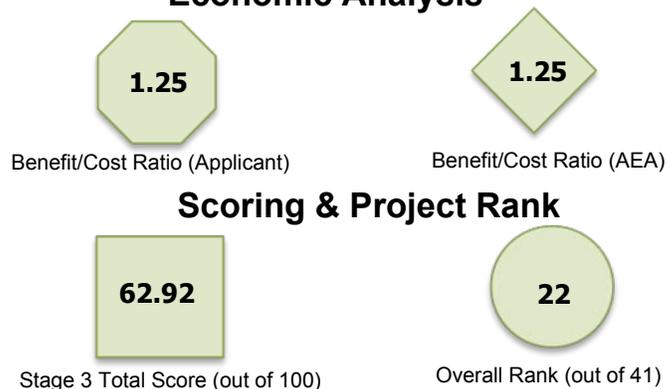
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government  
Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	30.63
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	15.50
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	6.63
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.17

## Economic Analysis



## DNR/DMLW Feasibility Comments

No apparent DNR land authorization is required based on information provided

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 844      Russian Mission Heat Recovery System**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** Russian Mission

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity  
Local Government

## Project Description

This project will provide the design and construction of a heat recovery system that will utilize waste heat from the existing Alaska Village Electric Cooperative (AVEC) power plant for use at the WTP and three L YSD teacher housing units in Russian Mission, Alaska. The design will be developed based on recommendations from the Russian Mission, Alaska Heat Recovery Study (see attached) that was completed by Alaska Energy and Engineering, Inc. (AE&E). The construction scope will include retrofitting the AVEC generators and installing a waste heat transmission line, circulation pumps, heat exchangers, and other system appurtenances. The proposed project will involve coordination with the AVEC, the City, L YSD, the Alaska Native Tribal Health Consortium (ANTHC), as well as the Alaska Rural Utility Collaborate (ARUC).

**AEA Review Comments and Recommendation** **Full Funding**

City of Russian Mission, in cooperation with Alaska Native Tribal Health Consortium, proposes final design and construction of a heat recovery system that will supply the school and teacher housing. The project will include a marine jacket retrofit on the prime genset, thus doubling available recoverable heat..

The project will displace approximately 12,000 gallons of diesel per year.

A feasibility and conceptual design has been completed. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.50 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

<b>Project Cost:</b>	\$582,000
<b>Requested Grant Funds:</b>	\$555,000
<b>Matched Funds Provided:</b>	\$32,000
<b>Total Potential Grant Amount:</b>	\$587,000
<b>AEA Funding Recommendation:</b>	<b>\$555,000</b>

**App # 844 Russian Mission Heat Recovery System**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** Russian Mission

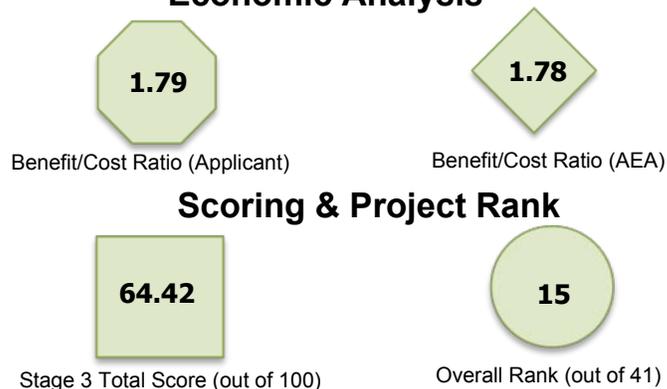
**Applicant Type:** Government Entity  
Local Government

**AEA Program Manager:** Plentovich

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	21.88
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	15.83
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	8.63
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.33

## Economic Analysis



## DNR/DMLW Feasibility Comments

No apparent DNR land authorization is required based on information provided

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 845      Noorvik Heat Recovery System Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Noorvik

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity  
Local Government

## Project Description

The City of Noorvik in partnership with the Alaska Native Tribal Health Consortium (ANTHC) is seeking to determine the feasibility of installing a heat recovery system in the community for heating the community water treatment, water storage and water distribution systems. The City of Noorvik seeks to determine the feasibility of capturing excess heat energy from the existing AVEC generator plant and utilizing it to provide heat for the existing water treatment plant and water distribution system and other community buildings. The feasibility study project will: • determine the amount of excess heat energy available for reuse,

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Noorvik, in cooperation, with Alaska Native Tribal Health Consortium, proposes to assess feasibility of recovering heat from the community power system to supply the water treatment, storage and distribution system.

While AEA believes that heat recovery projects have much merit, we are concerned that

1. The proposal does not include sufficient reconnaissance level information, including estimated fuel displacement, a rough capital cost, and other heat users, such as the school or other community buildings for AEA to review the application.
2. Based on AEA's experience the grant request is high in relation to the amount of work that is required.

AEA believes that a systematic, uniform approach for identifying and assessing potential heat recovery projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.58 /kWh

**Energy Region:**  
Northwest Arctic

**Project Cost:**

**Requested Grant Funds:** \$96,700

**Matched Funds Provided:** \$18,300

**Total Potential Grant Amount:** \$115,000

**AEA Funding Recommendation:**

**App # 845 Noorvik Heat Recovery System Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Noorvik

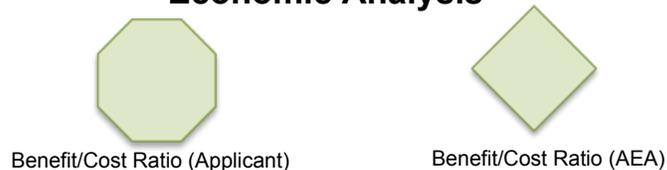
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity  
Local Government

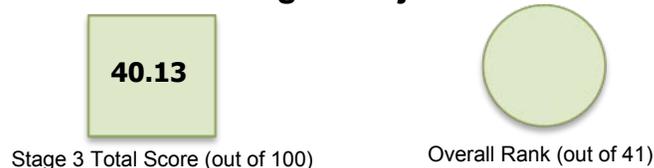
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.38
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved. As the project is proposed to take place on municipality lands, no land permits are required from DMLW. Also since this is only a feasibility study, no permits are required if no part of the project is on state land.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 846 Kotlik Wind Generator Study

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** City of Kotlik

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity  
Local Government

### Project Description

This project will determine the feasibility of a small wind farm to provide electricity and heat for the City-owned water treatment plant and sewer vacuum station. Kotlik is classified as a Class 4 to 5 Wind Power site in the Renewable Energy Atlas of Alaska. The National Renewable Energy Laboratory (NREL) considers Class 5 sites to be "excellent" for harnessing wind power. The estimated annual electricity cost to operate the Kotlik water treatment plant and vacuum station is about \$35,000.

### AEA Review Comments and Recommendation

**Not Recommended**

The City of Kotlik proposes feasibility assessment of wind-powered heat and power for the city water and wastewater facility.

AEA has the following concerns about this proposal:

1. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost, fuel displacement or revenue streams. The proposal did not address whether or not there was an existing diesel heat recovery system to tie into.
2. The class 4-5 wind resource is not indicated on the latest high-resolution wind map.
3. Economics of the project appear marginal even though the economist report assumes no boiler cost. Estimated cost of the feasibility work is half of the estimated construction cost.

A combined heat and electric system would appear to be a better option for a cost-effective solution. AEA recommends that the City use a comprehensive approach for identifying cost-reduction options through the regional energy plan for the Yukon-Kuskokwim region, currently underway.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.51 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:**

**Requested Grant Funds:** \$45,000

**Matched Funds Provided:** \$5,000

**Total Potential Grant Amount:** \$50,000

**AEA Funding Recommendation:**

**App # 846      Kotlik Wind Generator Study**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** City of Kotlik

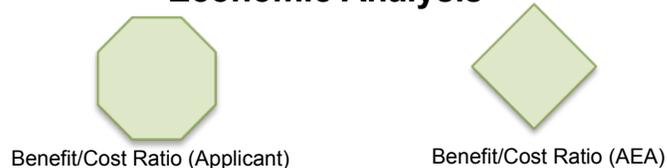
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity  
Local Government

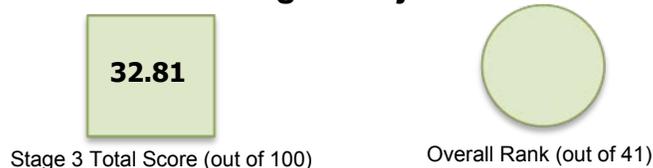
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.31
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Insufficient info to determine if a DNR authorization is required. Application indicates land ownership has not been evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 847 Scammon Bay Hydro Design & Engineering

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** City of Scammon Bay

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

### Project Description

AVEC records from 2007 show that approximately 127,463 gallons of diesel fuel were consumed for power generation in Scammon Bay to generate 1,651,855 kW of electricity. This project will displace 1,031,865 kWh per year (Scammon Bay Feasibility Study 2003) equating to a net 82,549 gallons of displaced fuel or \$569,829.27 per year at a current retail price of \$7.23/gal. This project will be able to produce power at a rate significantly lower than the cost of present electrical generation, resulting in reduced cost of power for residents. Paying for basic power generation has become much more of a challenge, and reduction of the power costs to the consumer will provide an economic boost to individuals trying to make ends meet for their families. Reducing the cost of power will also be a boon to economic development in the community. Any project providing stimulation to the economy cannot be cost effective without going hand-in-hand with a reduction in utility rates to help generate revenue. Other benefits to the Alaskan Public: The anticipated benefits of installation of the wind turbines include reducing the negative impact of the cost of energy by providing a renewable energy alternative. This project could help stabilize energy costs and provide long-term socioeconomic benefits to village households. Locally produced, affordable energy will empower community residents and could help avert rural to urban migration. This project would have many environmental benefits resulting from a reduction of hydrocarbon use.

These benefits include:

- Reduced potential for fuel spills or contamination during transport, storage, or use (thus protecting vital water and subsistence food sources)
- Improved air quality
- Decreased contribution to global climate change from fossil fuel use
- Decreased coastal erosion due to climate change.

### AEA Review Comments and Recommendation

Partial Funding

The City of Scammon Bay requests funding for feasibility, permitting and final design of a hydroelectric project at Scammon Bay. AVEC participated in two reconnaissance and two feasibility studies were completed in the 1980s for a river in Scammon Bay that also serves as the domestic water supply for the village. That site was found to be infeasible.

This application is based upon a 2003 feasibility study by Polarconsult of a 331 kW run-of-river hydro plant on Ekashluak Creek. This creek originates in the Askinuk Mountains and is located 11 miles west of Scammon Bay and is inaccessible except by boat or snowmachine. AVEC commissioned that study and concluded the long distance to the village made the site unattractive. The City proposes partner with ANTHC for project management; Hatch will be retained for the design of the hydro plant. The power system at Scammon Bay is owned and run by AVEC. AVEC would eventually own the plant and AVEC has submitted a letter of support for the project.

There is limited discussion of the issues associated with integration of a new hydro plant in the existing diesel system. The application mentions new wind in several places; a Rd IV grant will study wind generation at SB. There is mention of significant undersea cable required to connect an alternate hydro source on Ekashluak Creek, and the project appears be located in a wildlife refuge. There is no mention of associated fish issues in this creek in the application or in the attached 2003 feasibility study, but there appears to be the potential for fish habitat impact. The licensing jurisdiction is not identified, whether federal (FERC) or state. Given the uncertainty associated with these issues, AEA believes it is premature to allocate funds for final design and permitting.

Recommend partial funding of \$80,723 for feasibility and conceptual design (tasks 1-3) with requirement that grantee and AEA will revise scope and budget before grant is issued.

### Funding & Cost

Cost of Power: \$0.55 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Project Cost:**

\$5,936,570

**Requested Grant Funds:**

\$399,786

**Matched Funds Provided:**

\$13,833

**Total Potential Grant Amount:**

\$413,619

**AEA Funding Recommendation:**

\$80,723

**App # 847 Scammon Bay Hydro Design & Engineering**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** City of Scammon Bay

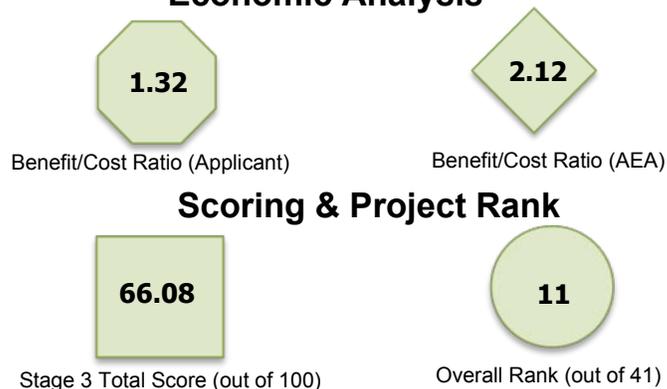
**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	5.25
3) Project Feasibility from Stage 2 (Max 20)	13.77
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	12.50
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

Insufficient info to determine if a DNR authorization is required. Application indicates land ownership has not been evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

There are no known active faults in the project vicinity. See general DGGS comment.

**App # 848      Sleetmute Heat Recovery - Power Plant to Water Plant**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** Sleetmute Traditional Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

Currently, Middle Kuskokwim Electric is not utilizing the jacket heat from its diesel engines. This project will recover heat from the engines at the Middle Kuskokwim Electric plant and send it to the water treatment plant to heat the building, the circulated water loops, and the water storage tank. The Middle Kuskokwim Electric power plant and the Sleetmute water treatment plant are located in Sleetmute. A feasibility study has been done for this project as part of an energy audit of the water treatment plant, and the design will be completed soon with other funds. Funds are being requested for construction only.

**AEA Review Comments and Recommendation** **Full Funding**

Sleetmute Traditional Council, in collaboration with ANTHC, proposes to construct a waste heat recovery system to connect waste heat from the Middle Kuskokwim Electric generating station to the water treatment plant.

The project will displace approximately 1,779 gallons of diesel per year according to a 2010 Heat Recovery Analysis.

A feasibility and conceptual design has been completed. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.92 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:** \$133,350

**Requested Grant Funds:** \$126,682

**Matched Funds Provided:** \$6,667

**Total Potential Grant Amount:** \$133,349

**AEA Funding Recommendation:** \$126,682

**App # 848 Sleetmute Heat Recovery - Power Plant to Water Plant**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** Sleetmute Traditional Council

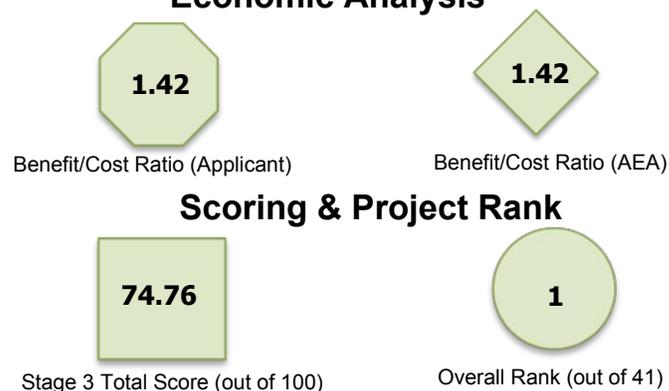
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	35.00
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	15.97
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	8.63
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.17

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 849 Selawik Wind Feasibility Study

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Selawik

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

### Project Description

This project will provide a site specific wind study to determine the feasibility of installing wind turbines at the vacuum sewer plant in Selawik, Alaska. Specifically, the feasibility study will include the following scope items: Equipment purchase; Initial site visits and equipment setup; Monitoring and Data collection; Report Development; Equipment Demobilization; Presentation to Community. The report development will focus on site assessment; conceptual electrical and civil engineering recommendations; financial evaluations; and review of required permits.

### AEA Review Comments and Recommendation

**Not Recommended**

Applicant proposes wind study to assess feasibility of wind-powered heating for the community sanitation facility.

AEA has the following concerns about this proposal:

1. AVEC is funded in round 4 (#647) to assess feasibility of replacing the existing four AOC 65 kW turbines. Heat production from new turbines can be considered through this work.
2. Performance of the existing system indicates a class 2 wind resource.
3. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost, fuel displacement or revenue streams. The proposal did not address whether or not there was an existing diesel heat recovery system to tie into.
4. With class 2 winds in the region, economics of a wind-for-heat project will be poor.

The proposal mentions that the dampers on the oil-fired system are missing or not operating correctly. These problems should be fixed before adding wind to the system. AEA recommends that the City use a comprehensive approach for identifying cost-reduction options through a regional energy plan for the Northwest region.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.59 /kWh

**Energy Region:**  
Northwest Arctic

#### Project Cost:

**Requested Grant Funds:** \$40,000

**Matched Funds Provided:** \$8,500

**Total Potential Grant Amount:** \$48,500

**AEA Funding Recommendation:**

## App # 849 Selawik Wind Feasibility Study

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Selawik

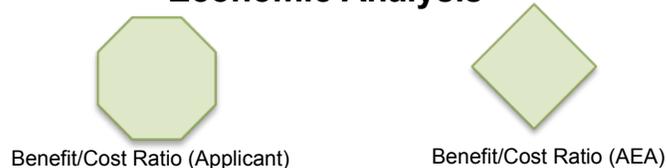
**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

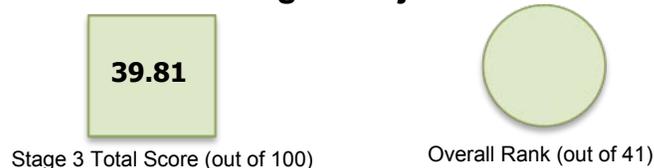
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.81
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

As the project is proposed to take place on municipality lands, no land permits are required from DMLW. Also since this is only a feasibility study, no permits are required if no part of the project is on state land. Note that if the project location gets moved, permits or easements may be required for MET towers, access roads, etc. Also, if material is required for the project and none is available within the city, then the city will need to apply for a material sale contract.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 850      Water Plant Biomass System Feasibility Study**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** City of Lower Kalskag

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

The proposed project will complete a feasibility study to review the potential for a biomass heating system for the City of Lower Kalskag (City) water treatment plant (WTP). Specifically, the feasibility study will include the following scope items: 1. Site Visit to assess facilities to be served 2. Land use assessment 3. Forest inventory and harvest assessment (Subcontract) 4. Report Development 5. Presentation to Community. The report development will focus on site assessment; conceptual mechanical and civil AEA 12-001 Application 7/1/2011 engineering recommendations; financial evaluation; and review of required permits. A new WTP for the City is currently being designed by the Alaska Native Tribal Health Consortium (ANTHC) through a cooperative project agreement (CPA) with the City. Currently, the design for the WTP is 65% complete and is projected to be completed in mid-2012. Following the completion of design activities, the City and the ANTHC will apply for construction funding for the WTP improvements and it is anticipated that construction activities will commence in 2013. If the feasibility study shows that the biomass boiler is a viable renewable energy resource, then the City will also apply for funding for design and construction of a new biomass boiler system for the WTP. This will be during the same time frame that the application for the rest of the improvements associated with the new WTP are. The new biomass system would be used to heat the WTP in addition to supplying heat to any fixtures that require it which may include heat add systems, etc. This project will involve coordination with the City and the ANTHC via a CPA.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Lower Kalskag, in cooperation, with Alaska Native Tribal Health Consortium, proposes to assess feasibility of using biomass to heat the water treatment plant.

While AEA believes that biomass projects have potential merit, we are concerned that the proposal does not include sufficient reconnaissance level information, including biomass resource availability and cost, estimated fuel displacement, a rough capital cost, and presence of other heat users, such as the school or other community buildings for AEA to review the application.

AEA believes that a systematic, uniform approach for identifying and assessing potential biomass projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.51 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:**

**Requested Grant Funds:** \$50,000

**Matched Funds Provided:** \$14,000

**Total Potential Grant Amount:** \$64,000

**AEA Funding Recommendation:**

**App # 850 Water Plant Biomass System Feasibility Study**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

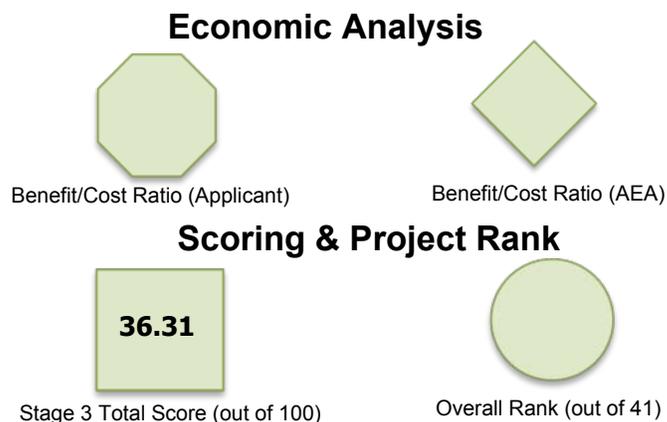
**Proposer:** City of Lower Kalskag

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.31
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

Insufficient info to determine if a DNR authorization is required.

## DNR/DOF Feasibility Comments

This project is for a feasibility study to review the potential for a biomass heating system for the City of Lower Kalskag water treatment plant. The project proposal doesn't state what system it is in favor of or the potential fuel oil offset. If a Garn boiler system similar to Kobuk were installed, then a likely scenario would be a wood demand of about 35 cords per year. The feasibility study will include a forest data and harvest assessment to determine the extent to which biomass could be potentially utilized. An assessment of forest resources in this area would ensure that the proposed project is sustainable. In 2004 the Tanana Chiefs Conference conducted a Native allotment forest inventory for the Bureau of Indian Affairs along the lower Kuskokwim River including the Lower Kalskag area. This data could provide some valuable on the ground per acre timber volume estimates to assist in the forest data assessment.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 851 Toksook Bay Heat Recovery Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Toksook Bay

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

This project will determine the feasibility of capturing excess heat energy from the existing Alaska Village Electric Cooperative (AVEC) power generation plant in Toksook Bay and utilizing it to provide heat for community buildings. The project will: • Determine the amount of excess heat energy available for reuse, • Estimate the long-term viability of the proposed project based on expected load growth, • Provide a conceptual-level system design, • Prepare a conceptual-level cost estimate for the construction effort and the operations and maintenance of the proposed system, • Identify easements and permits required • Prepare a comprehensive economical analyses of alternatives, • Update the utility business plan, • Make a recommendation to move forward with the project design activities, and • Evaluate the potential uses of waste heat.

**AEA Review Comments and Recommendation Not Recommended**

The City of Toksook Bay, in cooperation with Alaska Native Tribal Health Consortium, proposes to assess feasibility of recovering heat from the community power system to supply the water treatment, storage and distribution system.

While AEA believes that heat recovery projects have much merit, we are concerned that

1. The proposal does not include sufficient reconnaissance level information, including estimated fuel displacement, a rough capital cost, and other heat users, such as the school or other community buildings for AEA to review the application.
2. Based on AEA's experience the grant request is high in relation to the amount of work that is required.

AEA believes that a systematic, uniform approach for identifying and assessing potential heat recovery projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.51 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

### Project Cost:

**Requested Grant Funds:** \$30,800

**Matched Funds Provided:** \$6,200

**Total Potential Grant Amount:** \$37,000

**AEA Funding Recommendation:**

**App # 851 Toksook Bay Heat Recovery Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Toksook Bay

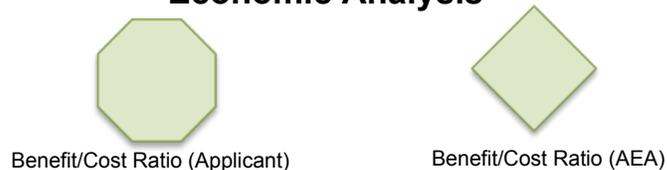
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

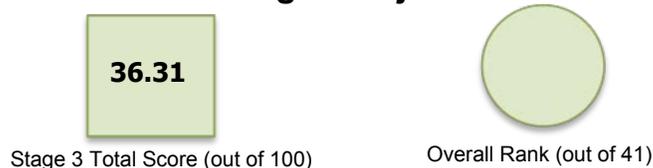
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.31
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required. Application indicates land ownership has not been fully evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 852 New Stuyahok Heat Recovery Study

**Resource:** Heat Recovery

**Proposed Project Phase:** Feasibility

**Proposer:** City of New Stuyahok

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

This project will determine the feasibility of constructing a heat recovery system and/or an excess wind energy electric boiler to supplement the heat used to serve the City of New Stuyahok owned water utility. A new Alaska Village Electric Cooperative (AVEC) power plant is being built in an area approximately 1 mile from town, adjacent to the newly constructed school and a new water storage tank that is under construction. The school currently has an agreement with AVEC to purchase recovered heat from the new power plant. AVEC plans to construct an electrical intertie with Ekwok in the near future, providing electricity from the New Stuyahok electric plant. When this occurs, it is possible that recovered heat will be in excess of the school's needs, leaving some available to heat the adjacent water storage tank. AVEC also anticipates installing some wind turbines in this location, making the availability of excess wind energy to operate an electric boiler at the large tank likely, which is another potential source of water tank heating this study will investigate.

### AEA Review Comments and Recommendation

**Not Recommended**

The City of New Stuyahok, in cooperation with Alaska Native Tribal Health Consortium, proposes to assess feasibility of recovering heat from the community power system to supply the water treatment, storage and distribution system.

While AEA believes that heat recovery projects have much merit, we are concerned that

1. The proposal does not include sufficient reconnaissance level information, including estimated fuel displacement, a rough capital cost, and other heat users, such as the school or other community buildings for AEA to review the application.
2. Based on AEA's experience the grant request is high in relation to the amount of work that is required.

AEA believes that a systematic, uniform approach for identifying and assessing potential heat recovery projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.57 /kWh

**Energy Region:**

Bristol Bay

**Project Cost:**

**Requested Grant Funds:** \$45,000

**Matched Funds Provided:** \$5,000

**Total Potential Grant Amount:** \$50,000

**AEA Funding Recommendation:**

**App # 852      New Stuyahok Heat Recovery Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Feasibility

**Proposer:** City of New Stuyahok

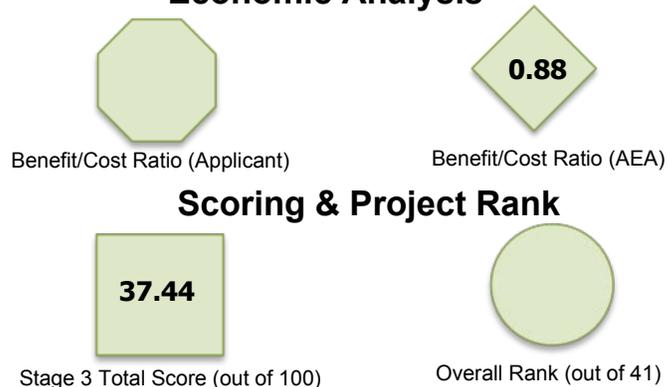
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.94
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required. Application indicates land ownership has not been fully evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 853      White Mountain Heat Recovery Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of White Mountain

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

This project will study the feasibility of a heat recovery system to displace fuel oil heat used by the city water utility. This study will look at the heat available from the electric power plant and the heat demand of the water distribution and storage system. An estimate of the energy savings and cost savings to the utility will be developed. This project will provide a recommendation based upon energy savings, benefits/cost, and other criteria.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of White Mountain, in cooperation with Alaska Native Tribal Health Consortium, proposes to assess feasibility of recovering heat from the community power system to supply the water treatment, storage and distribution system.

While AEA believes that heat recovery projects have much merit, we are concerned that

1. The proposal does not include sufficient reconnaissance level information, including estimated fuel displacement, a rough capital cost, and other heat users, such as the school or other community buildings for AEA to review the application.
2. Based on AEA's experience the grant request is high in relation to the amount of work that is required.

AEA believes that a systematic, uniform approach for identifying and assessing potential heat recovery projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.72 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:**

**Requested Grant Funds:** \$27,000

**Matched Funds Provided:** \$3,000

**Total Potential Grant Amount:** \$30,000

**AEA Funding Recommendation:**

**App # 853      White Mountain Heat Recovery Feasibility Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of White Mountain

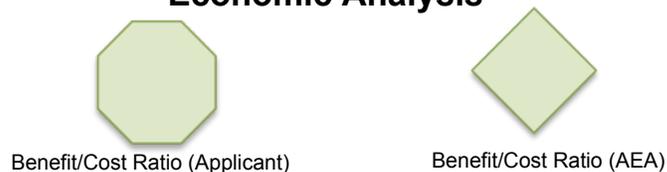
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

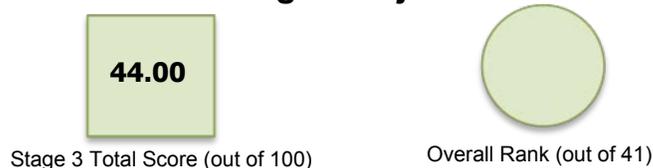
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	31.50
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 854      Klawock Biomass Boiler System Feasibility Study**

**Resource:** Biomass

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Klawock

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

This project will complete a study to determine the feasibility of a biomass fuel system for the existing water treatment plant (WTP) and wastewater treatment plant (WWTP) in Klawock, Alaska. It is proposed that a biomass heating system will be used to heat the WWTP buildings and supply heat to other ancillary building components that require a heat source. Resources for the City to supply the proposed biomass system are readily available in and around the community of Klawock and throughout Prince of Wales Island, on which Klawock is located. This study will demonstrate the cost savings that will be associated with the implementation of a biomass fuel system at the City's WTP and WWTP. The project will complete the following tasks:

- Determine the amount of energy required for both facilities;
- Estimate the long-term viability of the proposed project based on expected load growth;
- Provide a conceptual-level system design;
- Prepare a conceptual-level cost estimate for the construction effort and the operations and maintenance of the proposed system;
- Identify easements and permits required;
- Prepare a comprehensive economical analyses of alternatives for selection by the City;
- Update the utility business plan; and
- Make a recommendation to move forward with the project design activities.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Klawock, in cooperation, with Alaska Native Tribal Health Consortium, proposes to assess feasibility of using biomass to heat the water and wastewater treatment plants.

While AEA believes that biomass projects have potential merit, we are concerned that the proposal does not include sufficient reconnaissance level information, including biomass resource availability and cost, estimated fuel displacement, a rough capital cost, and presence of other heat users, such as the school or other community buildings for AEA to review the application.

AEA believes that a systematic, uniform approach for identifying and assessing potential biomass projects for water and sewer systems will be more effective and less expensive. AEA will work with ANTHC and other stakeholders to develop a process to support this work through the statewide heat recovery program and regional energy plans.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.21 /kWh

**Energy Region:**  
Southeast

**Project Cost:**

**Requested Grant Funds:** \$100,000

**Matched Funds Provided:** \$12,000

**Total Potential Grant Amount:** \$112,000

**AEA Funding Recommendation:**

## App # 854 Klawock Biomass Boiler System Feasibility Study

**Resource:** Biomass

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Klawock

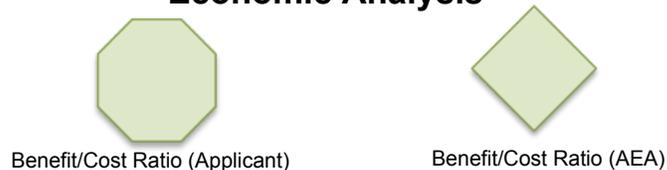
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

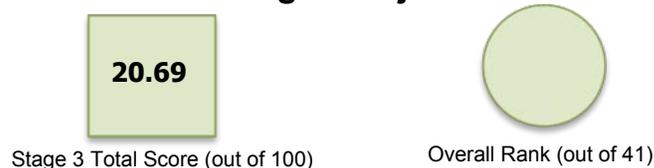
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.19
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

No State land or easement interest

### DNR/DOF Feasibility Comments

This project will complete a study to determine the feasibility of a biomass fuel system for the existing water treatment and wastewater treatment plants. It is unknown in the project proposal what system is favored or information about the known raw material resource. The project proposal states that Klawock is surrounded by forests and that biomass supply sources are readily available in and around the community and throughout Prince of Wales Island. The proposal does mention the benefits of Craig's wood biomass system. This chip based system sourced from sawmill waste could include wood chip deliveries to Klawock.

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 855 Old Kasigluk Wind Feasibility Study

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Native Village of Kasigluk

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

### Project Description

This project will provide a feasibility study to determine the benefits of installing a wind turbine system in Old Kasigluk. The wind turbines will be used to convert wind energy to heating and electrical energy that will be used to heat and power the water treatment and washeteria facility located in Old Kasigluk. The project will:

- Determine the feasibility of installing a wind turbine system for heating and electricity needs
- Estimate the long-term viability of the proposed project based on expected load growth,
- Provide a conceptual level system design,
- Prepare a conceptual level cost estimate for the construction effort and the operations and maintenance of the proposed system,
- Identify easements and permits required,
- Prepare a comprehensive economical analyses of alternatives,
- Update the utility business plan, and
- Make a recommendation to move forward with the project design activities.

### AEA Review Comments and Recommendation

Not Recommended

AEA has the following concerns about this proposal:

1. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost or installed wind capacity.
2. There is a diesel and wind waste heat recovery system in use with lines stubbed out at the new water treatment facility. This was not addressed in the application.
3. AVEC operates a 300 kW wind system in Kasigluk. The application make no reference to the AVEC system or the possibility of increasing the size of that system to produce both heat and power.
4. Economics appear poor based on AEA modeling for heat only. Assuming a class 6 wind resource, offsetting 4800 gallons/yr of diesel, \$4.30/gal fuel cost and the lowest possible cost of a remanufactured 65 kW, a wind system benefit/cost was 0.4. This reflects that the value of replacing heat is much less than the value of displacing electrical energy.

A combined heat and power wind-diesel system would appear to be a better option for a cost-effective solution. AEA recommends that the City use a comprehensive approach for identifying cost-reduction options through the regional energy plan for the Yukon-Kuskokwim region, currently underway. No funding recommended.

### Funding & Cost

Cost of Power: \$0.53 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

#### Project Cost:

**Requested Grant Funds:** \$46,000

**Matched Funds Provided:** \$4,000

**Total Potential Grant Amount:** \$50,000

**AEA Funding Recommendation:**

**App # 855 Old Kasigluk Wind Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

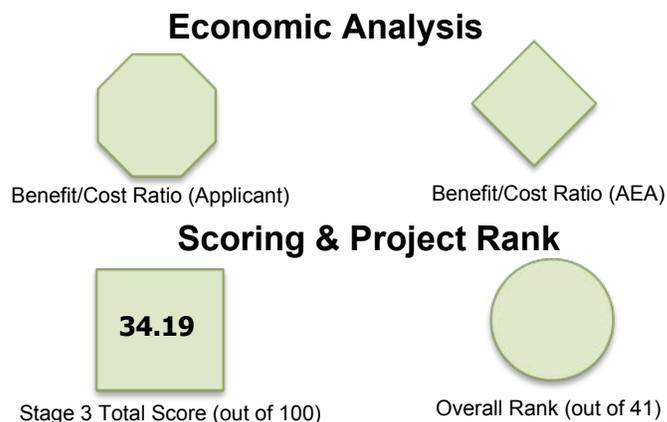
**Proposer:** Native Village of Kasigluk

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	23.19
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required. Application indicates land ownership has not been fully evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 856 Shishmaref Heat Recovery Project

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of Shishmaref

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The City of Shishmaref proposes to design construct a heat recovery system in the community in accordance with the findings and recommendations of a heat recovery study conducted by Alaska Energy and Engineering Inc. The project will recover available jacket water heat from diesel generators that produce electricity at the Alaska Village Electric Cooperative (AVEC) power plant and convey the heat to core city facilities. The heat currently produced by the generators is released to the atmosphere via radiators. This project is estimated to reduce the annual diesel heating fuel consumption of nearby community buildings by about 7,900 gallons/year. The construction scope will include the installation of the waste heat transmission line, pumps, heat exchanger, and other system appurtenances. This project will involve coordination with the City of Shishmaref (City), AVEC, and the Alaska Native Tribal Health Consortium (ANTHC).

### AEA Review Comments and Recommendation

Full Funding

The City of Shishmaref, in collaboration with ANTHC, proposes to construct a waste heat recovery system to connect waste heat from the AVEC generating station to the clinic, city office, and the water treatment plant.

The project will displace approximately 7,900 gallons of diesel per year.

A feasibility and conceptual design has been completed. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding.

AEA will work with the grantee to ensure that building energy efficiency are addressed in conjunction with this project.

### Funding & Cost

Cost of Power: \$0.60 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:** \$327,201

**Requested Grant Funds:** \$310,841

**Matched Funds Provided:** \$16,360

**Total Potential Grant Amount:** \$327,201

**AEA Funding Recommendation:** \$310,841

**App # 856 Shishmaref Heat Recovery Project**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction Design

**Proposer:** City of Shishmaref

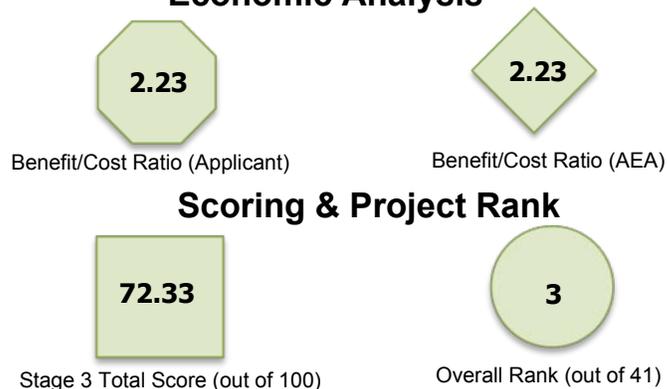
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	26.25
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	16.50
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.83

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 857      Savoonga Heat Recovery - Power Plant to Water Plant**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** City of Savoonga

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

Currently, AVEC is not utilizing either the jacket heat from its diesel engines or the heat generated by the electric boiler installed to dispose excess wind energy. This project would recover heat from both sources at the AVEC plant and send that heat to the water treatment plant to heat the building, the circulated water loops, and the water storage tank. The AVEC power plant and the Savoonga water treatment plant are located next to each other in Savoonga. A feasibility study has been done for this project and the design will be completed in the near future with other funds. Funds are being requested for construction only.

**AEA Review Comments and Recommendation** **Full Funding**

City of Savoonga in collaboration with ANTHC, proposes construction of a diesel heat recovery system that would supply the water storage, treatment and distribution systems. The system would displace approximately 8,800 gallons of diesel per year.

The application includes a conceptual design and feasibility assessment for the project. A design is in progress.

AEA has the following concerns about this proposal.

1. The study was done only considering the 499 kW Cummins unit instead of the Detroit Diesel, which is more efficient and the generator of choice with the wind system.
2. According to PCE figures, the existing wind farm has a capacity factor of 21%—less than the assumed 30% capacity factor from the wind report.

The final design should address these issues. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding with requirement that AEA accept final design before construction funds are disbursed.

## Funding & Cost

Cost of Power: \$0.44 /kWh

**Energy Region:**  
Bering Straits

<b>Project Cost:</b>	\$317,305
<b>Requested Grant Funds:</b>	\$301,440
<b>Matched Funds Provided:</b>	\$15,865
<b>Total Potential Grant Amount:</b>	\$317,305
<b>AEA Funding Recommendation:</b>	<b>\$301,440</b>

**App # 857    Savoonga Heat Recovery - Power Plant to Water Plant**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** City of Savoonga

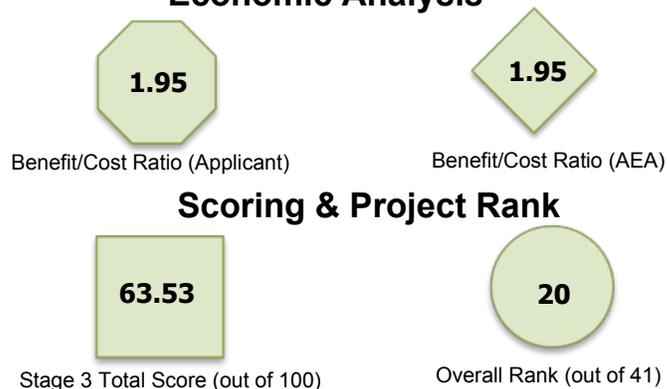
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	19.25
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	15.87
4) Project Readiness (Max 5)	2.33
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.33

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 858 Togiak Waste Heat Recovery Project

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of Togiak

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

This project will provide a heat recovery system to support the heating requirements of five City operated and owned buildings in Togiak. The objective of this project is to reduce the consumption of expensive heating fuel by utilizing available recovered heat. There are several community buildings within a 500 foot radius of the Alaska Village Electric Cooperative (AVEC) power plant, offering an excellent opportunity to capture a maximum amount of waste heat from the plant for hydronic heating. A detailed Heat Recovery Analysis was completed for the City of Togiak and Alaska Native Tribal Health Consortium (ANTHC) in June 2010 by Alaska Energy and Engineering, Inc. (Report Attached). The findings and preferred alternatives developed by this analysis will be used as the basis for the project proposed in this application. The proposed project will design and construct a heat recovery system between the AVEC power plant and the following end-user community buildings: 1) Water treatment Plant, 2) Clinic, 3) Police Station, 4) City Office, and 5) "Old School" Community Activity Building. The new system will capture jacket water heat generated by the AVEC plant that is currently wasted to the atmosphere by power plant radiators. The recovered heat will be transferred by insulated glycol piping to the end-users. The new system will tie into the end-users' heating systems using heat exchangers, control mechanisms and any required upgrades to the existing building hydronic systems.

### AEA Review Comments and Recommendation

**Full Funding**

City of Togiak, in collaboration with ANTHC, proposes to construct a waste heat recovery system to connect waste heat from AVEC's generating station to the water treatment plant, clinic, police station, City Office, and the "Old School" Community Activity Building.

The project will displace approximately 13,700 gallons of diesel per year according to a 2010 Heat Recovery Analysis.

A feasibility and conceptual design has been completed. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.58 /kWh

**Energy Region:**  
Bristol Bay

**Project Cost:** \$486,180

**Requested Grant Funds:** \$443,030

**Matched Funds Provided:** \$43,150

**Total Potential Grant Amount:** \$486,180

**AEA Funding Recommendation:** \$443,030

**App # 858 Togiak Waste Heat Recovery Project**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction Design

**Proposer:** City of Togiak

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.38
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	16.80
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.67

## Economic Analysis



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required. Application indicates land ownership has not been fully evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 859      Goodnews Bay Wind Generator Study**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** Native Village of Goodnews Bay

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

## Project Description

This project will determine the feasibility of a small wind farm to provide electricity and heat for the Native Village of Goodnews Bay water treatment plant. Goodnews Bay is classified as a Class 5 Wind Power site in Appendix B of the Alaska Rural Energy Plan. The National Renewable Energy Laboratory (NREL) considers Class 5 sites to be "excellent" for harnessing wind power. Between electricity and fuel, the annual energy cost to operate the water treatment plant is approximately \$21,000. Conservatively, it is estimated that electrical usage can be reduced by 75% and fuel consumption by 30% through the use of renewable energy.

**AEA Review Comments and Recommendation** **Not Recommended**

AEA has the following concerns about this proposal:

1. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost.
2. The proposal assumes a class 5 resource, while the proposed location is a class 3.
3. AVEC is proposing a feasibility study (#874) for a larger-scale project that could also assess viability of providing heat to the water treatment plant.
4. Economics appear poor based on AEA modeling for heat only.

A larger combined heat and power wind-diesel system would appear to be a better option for a cost-effective solution. AEA has recommended funding for AVEC's feasibility study with the requirement that AVEC work with the City and ANTHC to assess feasibility of providing heat to the water treatment plant. It is recommended that the City use a comprehensive approach for identifying cost-reduction options through the regional energy plan for the Yukon-Kuskokwim region, currently underway.  
No funding recommended.

## Funding & Cost

Cost of Power: \$0.47 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:**

**Requested Grant Funds:** \$45,000

**Matched Funds Provided:** \$5,000

**Total Potential Grant Amount:** \$50,000

**AEA Funding Recommendation:**

**App # 859      Goodnews Bay Wind Generator Study**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** Native Village of Goodnews Bay

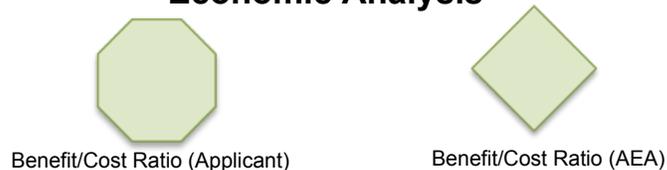
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

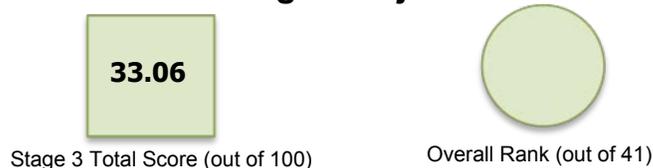
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	20.56
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required. Application indicates land ownership has not been fully evaluated.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 860      City of Angoon Wind to Energy Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Angoon

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

## Project Description

The City, in partnership with the Alaska Native Tribal Health Consortium (ANTHC), is seeking funding to determine the feasibility of installing wind turbines at the community water treatment plant (WTP) to offset electrical costs with a renewable energy source. The City seeks to analyze the feasibility of utilizing wind turbines for capturing wind energy to provide electricity for the existing WTP. The feasibility study will, at minimum, complete the following activities: • Determine the available wind resources around the WTP site; • Estimate the long-term viability of the proposed project based on expected load growth; • Provide a conceptual-level system design; • Prepare a conceptual-level cost estimate for the construction effort and the operations and maintenance of the proposed system; • Identify easements and permits required; Prepare a comprehensive economical analyses of alternatives; • Provide recommendations to move forward with the project design activities; and • Evaluate the potential uses of wind turbines to convert wind energy to electricity.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Angoon, in partnership with ANTHC, proposes feasibility assessment of windpower supplying the water treatment plant.

AEA has the following concerns about this proposal:

1. The proposal does not include sufficient reconnaissance-level information, such as rough capital cost, installed capacity, wind resource, or fuel savings.
2. The high-resolution map indicates a class 1 (poor) wind resource.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Southeast

**Project Cost:**

**Requested Grant Funds:** \$40,000

**Matched Funds Provided:** \$8,500

**Total Potential Grant Amount:** \$48,500

**AEA Funding Recommendation:**

**App # 860 City of Angoon Wind to Energy Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Angoon

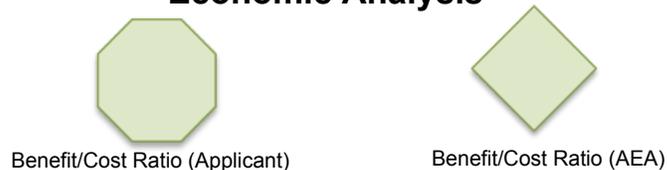
**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

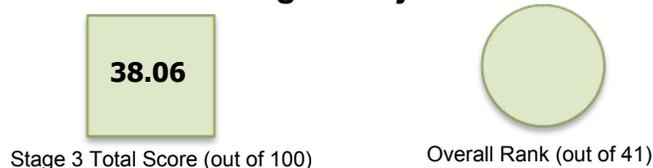
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No State land or easement interest

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 861      Saint Michael Renewable Energy Reconnaissance Study**

**Resource:** Transmission

**Proposed Project Phase:** Recon

**Proposer:** City of Saint Michael

**AEA Program Manager:**

**Applicant Type:** Local Government

## Project Description

This project will conduct a reconnaissance study of potential renewable energy sources for use by the community of St. Michael to support our water and sewer utility and major community structures. Our water and sewer utility has very high per capita energy use, and we need a more cost-effective energy source to help sustain this utility. This study will identify potential renewable energy sources and examine their associated utilization methods, technical and economic feasibility, and other potential benefits, such as energy cost savings and reduced operation and maintenance expenses.

**AEA Review Comments and Recommendation** **Did Not Pass Stage 1**

## Funding & Cost

Cost of Power: /kWh

**Energy Region:**  
Bering Straits

**Project Cost:**

**Requested Grant Funds:** \$40,500

**Matched Funds Provided:** \$4,500

**Total Potential Grant Amount:** \$45,000

**AEA Funding Recommendation:**

**App # 861 Saint Michael Renewable Energy Reconnaissance Study**

**Resource:** Transmission

**Proposed Project Phase:** Recon

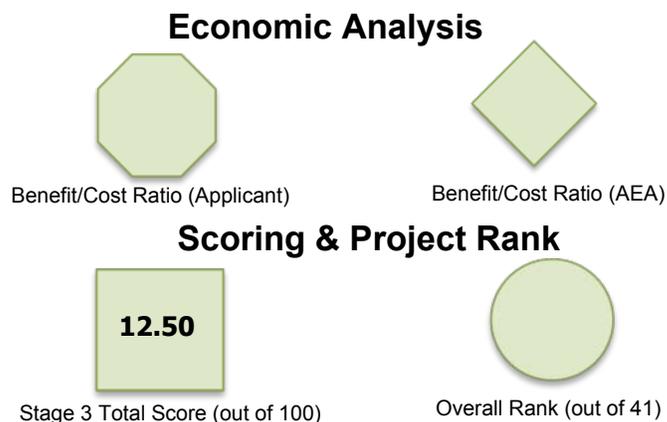
**Proposer:** City of Saint Michael

**AEA Program Manager:**

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

## App # 862 False Pass Tidal Energy Study

**Resource:** Ocean/River

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of False Pass Electric Utility

**AEA Program Manager:**

**Applicant Type:** Local Government

### Project Description

False Pass is currently dependent on diesel fuel for all of its electrical generation and heat production. This project will perform a reconnaissance and feasibility study to determine if tidal energy can be economically harnessed to provide electrical and perhaps heating loads to the community. The reconnaissance phase of the project will include gathering existing energy usage data, including leveraging existing AEA funded efforts to assess the viability of tidal energy power at False Pass, preliminary geophysical data on ocean current velocities, and conducting modeling efforts to determine if a feasibility study is warranted. The feasibility phase of the project will involve geophysical data collection including more rigorous current velocity and bathymetric data collection to locate a viable deployment area. This data will be utilized to initiate consultations with permitting agencies and to perform an economic analysis of a conceptually designed project utilizing one or more of Ocean Renewable Power Company's (ORPC's) TidGen Power Systems to determine if a tidal energy project is economically, environmentally and technologically feasible at False Pass.

### AEA Review Comments and Recommendation

**Not Recommended**

The City of False Pass Electrical Utility proposes to perform a reconnaissance and feasibility Tidal Energy Study to determine the viability of installing and operating a 150 kW ORPC TidGen hydrokinetic device. The Aleutians East Borough will manage the project for the city utility.

No previous work has been done on this project. The project would perform a resource assessment of the strait off Unimak Island by creating a circulation model and deploying acoustic Doppler current profilers (ADCP). Using the resource data and acquired economic information about the system and the local community, a decision would be made to determine if the project was economically viable.

The project is expected to begin in September 2012 and be completed by the end of March 2014.

AEA recognizes that a number of strong entities with experience in Alaska have agreed to partner on the reconnaissance and feasibility project.

AEA's concern is that tidal power technology is still in a very early stage of development. The most recent cost estimates through 2030 for tidal energy by the UK's Carbon Trust range from \$0.24-0.80/kWh in UK waters. Projects in remote parts of Alaska would be expected to have significantly higher costs. Results of ORPC's demonstration in Cook Inlet should be examined before further project development work is pursued in more remote areas. AEA will consider further extensive resource assessment similar to work being supported with NOAA in Cook Inlet through the hydrokinetic program.

Not recommended for funding.

### Funding & Cost

Cost of Power: \$0.53 /kWh

**Energy Region:**  
Aleutians

#### Project Cost:

**Requested Grant Funds:** \$218,900

**Matched Funds Provided:** \$78,000

**Total Potential Grant Amount:** \$296,900

**AEA Funding Recommendation:**

**App # 862 False Pass Tidal Energy Study**

**Resource:** Ocean/River

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of False Pass Electric Utility

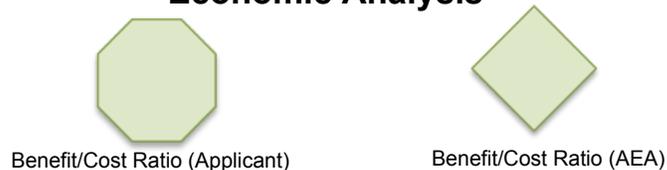
**AEA Program Manager:**

**Applicant Type:** Local Government

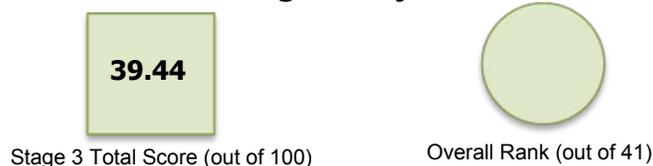
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	23.19
2) Matching Resources (Max 15)	11.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Authorizations from DNR are expected, but insufficient information to identify how many and what type.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 863      Community of Elim Geothermal Resource Assessment**

**Resource:** Geothermal

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of Elim

**AEA Program Manager:**

**Applicant Type:** Local Government

## Project Description

The City of Elim and its partners, the Native Village of Elim, Elim Native Corporation, and the University of Alaska Fairbanks are proposing a Resource Assessment (Reconnaissance) / Feasibility Analysis of potential geothermal sites near the community. A number of known moderate temperature hot springs as well as other identified thermal anomalies, based on local knowledge, are located in the area surrounding Elim offering potential energy sources for the community. Known sources include Kwiniuk/Elim Hot Springs (41°C at 22 gpm), and Clear Creek Hot Springs (65°C at 230 gpm). No significant geothermal exploration has occurred at Elim to date, although the Alaska Energy Authority identified geothermal energy, along with wind, and wood, as potential energy options for Elim in the 2010 Energy Pathway. This project will combine low cost airborne and ground-based reconnaissance and mapping techniques to develop a conceptual model of the system, and complete a preliminary design and cost analysis to refine the numbers included in the Pathway.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Elim proposes a reconnaissance and feasibility study of the geothermal resources near the city. The UAF's Alaska Center for Energy and Power (ACEP) would be contracted to perform the reconnaissance and feasibility work.

The nearest hot springs to Elim are Kwiniuk Hot Springs (41°C, 22gpm) and Clear Hot Springs (65°C, 230gpm). Kwiniuk can be accessed by a 16-mile road (estimated to take 1.5 hours), but is 8 miles straight distance from Elim. Clear Hot Springs is not currently road accessible and is located 16 miles via a straight path.

No previous work has been performed on this project by ACEP or the City of Elim. The project is expected to begin in August 2012 and be completed by July 2013. Funded by AEA's geothermal program in 2009, HDL assessed the cost of a potential project installed in Elim at \$38 to 52 million. However, the current proposal makes the case that the resource is more similar to that at Manley Hot Springs and estimates an installed cost of \$15 to 37 million.

DNR notes that the reconnaissance study approach is reasonable: Thermal imaging (utilizing techniques being used by ACEP at the Pilgrim Hot Springs project site), ground-based reconnaissance (geological mapping, soil & water sampling), the creation of a conceptual reservoir model, and development of a preliminary design and cost.

AEA is concerned that, even if a geothermal resource were located, economics appear poor. Assuming a mid-point cost of the system at \$26 million and O&M costs of \$312,000/yr the benefit/cost ratio is 0.14. Assuming a cost of \$15 million and no O&M, the benefit/cost ratio is only 0.54.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.54 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:**

**Requested Grant Funds:** \$415,871

**Matched Funds Provided:** \$112,037

**Total Potential Grant Amount:** \$527,908

**AEA Funding Recommendation:**

**App # 863 Community of Elim Geothermal Resource Assessment**

**Resource:** Geothermal

**Proposed Project Phase:** Feasibility Recon

**Proposer:** City of Elim

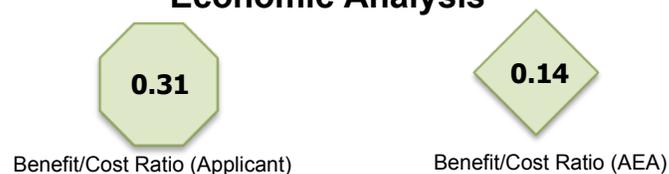
**AEA Program Manager:**

**Applicant Type:** Local Government

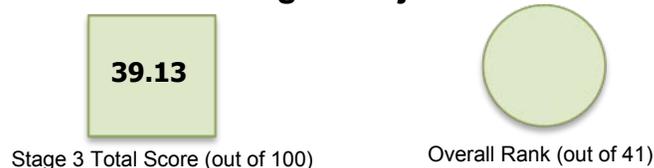
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	23.63
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

The proposal seeks to explore near the village of Elim for low to moderate temperature geothermal resources to determine their potential for binary (Organic Rankine Cycle - similar to Chena Hot Springs) electrical power generation for the community. The 4 stage approach appears to be reasonable (1. Thermal Infrared Mapping and Analysis; 2) Ground Based Reconnaissance-water chemistry and geologic mapping. 3) Develop a Conceptual Model of the System; and 4) Preliminary Design Analysis and Cost. The proposal recognizes the need to locate both a nearby source and of sufficient temperature to be economically viable to generate electricity using a binary system.

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 864      Net-Zero Training and Administration Center (TAC)**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Construction

**Proposer:** Alaska Gateway School District

**AEA Program Manager:**

**Applicant Type:** IPP  
Government Entity

## Project Description

The project will include extending a new hot water heating / return loop from the recently completed Biomass Heating Plant to a new 10,000 square foot net-zero Training and Administration Center (TAC). The TAC would benefit from heat from the biomass boiler, surplus heat created as a byproduct of the electrical generation process of the Combined Heat and Power (CHP) system, and would also benefit from the electrical generation of the CHP. The heating loop will connect to the Tok School Biomass Plant that was completed in the Fall of 2010. (The Tok School Biomass Plant was developed using AEA Round I Grant Funding. The project consisted of a Biomass heating facility that contained an automated biomass heating system that now provides heat to the existing K-12 School.) Since the completion of the Tok School Biomass Plant, a steam turbine and electrical generation system will be added to create a combined heat and power (CHP) system. The original biomass boiler was sized to allow for the CHP expansion and the additional load of the multipurpose building and Zamboni garage. The CHP project will be completed the fall of 2011. The TAC will be a net-zero facility. The facility will reduce utility demands through low energy building practices, such as super insulation, location on site, natural ventilation, and day lighting. The TAC will also incorporate incorporating energy efficient building technologies such as high efficiency lighting, communication, and back up HVAC systems.

**AEA Review Comments and Recommendation** **Did Not Pass Stage 1**

## Funding & Cost

Cost of Power:                      /kWh

**Energy Region:**  
Yukon-Koyukuk/Upper Tanana

<b>Project Cost:</b>	\$3,113,750
<b>Requested Grant Funds:</b>	\$3,007,750
<b>Matched Funds Provided:</b>	\$106,000
<b>Total Potential Grant Amount:</b>	\$3,113,750

**AEA Funding Recommendation:**

**App # 864    Net-Zero Training and Administration Center (TAC)**

**Resource:** Heat Recovery

**Proposed Project Phase:** Design  
Construction

**Proposer:** Alaska Gateway School District

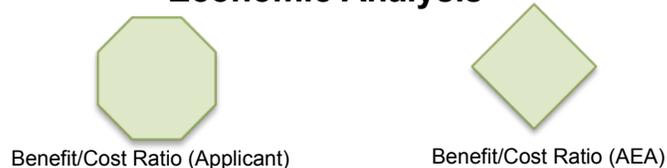
**AEA Program Manager:**

**Applicant Type:** IPP  
Government Entity

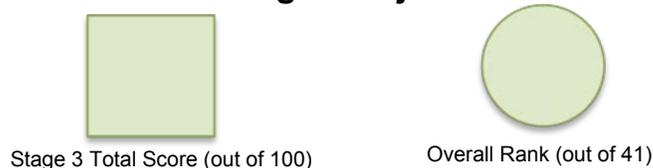
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

**App # 865      Greenhouse and Processing Facility utilizing surplus heat**

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Feasibility

**Proposer:** Alaska Gateway School District

**AEA Program Manager:**

**Applicant Type:** Government Entity

## Project Description

The project will include extending a new hot water heating / return loop from the recently completed Biomass Heating Plant to a new 24'-0" x 100'-0" greenhouse and 20'-0" x 30'-0" processing facility on the Tok School Campus. The greenhouse and processing facility would only use surplus heat from the Biomass Plant and would benefit from the electrical generation of the Combined Heat and Power (CHP) system. Prodcue would initially be used to supplement the schools Food Service Program, providing fresh vegetables to student who otherwise would not have access. The Biomass Plant has capacity to support additional greenhouses in the future if the demand for local produce in the region exceeds the anticipated yield capacity of the first greenhouse.

**AEA Review Comments and Recommendation** **Did Not Pass Stage 1**

## Funding & Cost

Cost of Power: /kWh

**Energy Region:**  
Yukon-Koyukuk/Upper Tanana

<b>Project Cost:</b>	\$139,825
<b>Requested Grant Funds:</b>	\$135,825
<b>Matched Funds Provided:</b>	\$4,000
<b>Total Potential Grant Amount:</b>	\$139,825

**AEA Funding Recommendation:**

**App # 865      Greenhouse and Processing Facility utilizing surplus heat**

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Feasibility

**Proposer:** Alaska Gateway School District

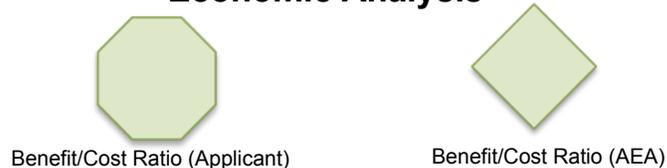
**AEA Program Manager:**

**Applicant Type:** Government Entity

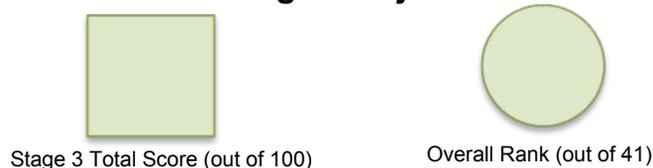
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

**App # 866      Extension of Heating Loop**

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Gateway School District

**AEA Program Manager:** Plentovich

**Applicant Type:** IPP  
Government Entity

## Project Description

The project will include extending a new hot water heating / return loop from the recently completed Biomass Heating Plant to two (2) additional buildings on the Tok School Campus and will include the required integration work within the two buildings. The first building is the multipurpose building which houses an ice hockey rink and shooting range. The intent is to use the biomass plant to heat the shooting range and toilet group portion of the multipurpose building, approximately 10,000 square feet. The second building is the Zamboni garage which would approximately 1,400 square feet. The heating loop will connect to the Tok School Biomass Plant that was completed in the fall of 2010. (The Tok School Biomass Plant was developed using AEA Round I Grant Funding. The project consisted of a Biomass heating facility that contained an automated biomass heating system that now provides heat to the existing K-12 School.) Since the completion of the Tok School Biomass Plant a steam turbine and electrical generation system have been added to create a combined heat and power (CHP) system. The original biomass boiler was sized to allow for the CHP expansion and the additional load of the multipurpose building and Zamboni garage. The CHP project will be completed the fall of 2011. When the CHP system is operational it will generate a substantial amount heat as a byproduct. The heat created will surpass the required heat demand of the existing K-12 School. The intent is to recover the surplus heat and supply it to meet the heating demand of additional buildings mentioned above. The cost for maintenance and operation as well as for biomass fuel will be negated for this project due to the planned operation of the CHP system.

**AEA Review Comments and Recommendation** **Full Funding**

Alaska Gateway School District proposes adding on a heat loop off the newly-completed wood-fired heating system at the Tok School to provide heat to the detached multipurpose buildings that house a hockey rink, shooting range and Zamboni garage. The project team would revise the existing design and construction documents prior to construction.

The application is largely the same as a round 4 submittal (#617) that was not recommended due to poor economics. Since last year the project team has reduced the capital cost from \$754,651 to \$629,000 by decreasing mobilization and construction costs. At the same time the projected cost of fuel over the life of the project has increased. These changes have improved the projected benefit/cost ratio from 0.47 to 0.85.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.39 /kWh

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Project Cost:** \$625,000

**Requested Grant Funds:** \$625,000

**Matched Funds Provided:** \$4,000

**Total Potential Grant Amount:** \$629,000

**AEA Funding Recommendation:** \$625,000

## App # 866 Extension of Heating Loop

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Gateway School District

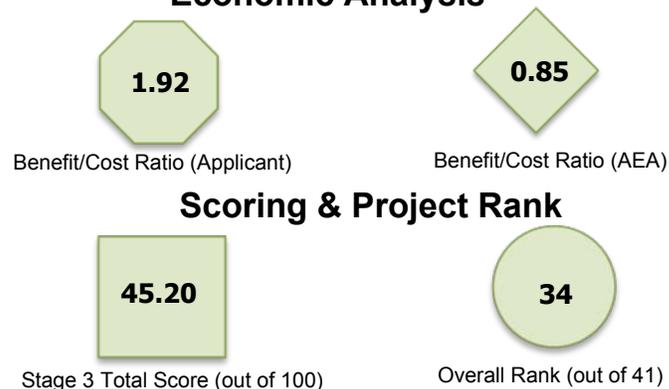
**AEA Program Manager:** Plentovich

**Applicant Type:** IPP  
Government Entity

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	17.06
2) Matching Resources (Max 15)	2.25
3) Project Feasibility from Stage 2 (Max 20)	13.13
4) Project Readiness (Max 5)	4.00
5) Benefits (Max 15)	1.75
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### DNR/DMLW Feasibility Comments

Project as described does not involve state land. Therefore, no land permits or easements from the state are required. Please note however, that if any of the recovery lines cross state land or follow existing Rows, then a permit may be required, or discussion with DOT may be required.

### DNR/DOF Feasibility Comments

This project will extend a new hot water heating and return loop from the recently completed Tok biomass heating plant to two additional buildings. A combined heat and power system will be added to the biomass heating plant and completed in the fall of 2011. When this CHP system is operational it will generate waste heat as a byproduct. The intent is to recover the surplus heat and supply it to the additional two buildings. This project was reviewed last year in the Round 4 applications and it has been revised slightly this year. Estimated biomass fuel use for the entire facility including electrical generation and heating the additional buildings is stated between 25 and 35 acres per year. There would also be hazard fuel reduction material and sawmill waste material available as a biomass fuel source. The acreage required for the facility is well within the sustained yield estimates for the Tok Management Area. The 2010 Tanana Valley Inventory Update indicates the Tok Management Area can sustain an annual harvest of 984 acres within existing poletimber and sawtimber types. This does not account for additional acreage available through in-growth of reproduction types and burned timber salvage which would increase this amount.

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 867      Reconnaissance Study of the Geothermal Potential for the Ivanoff Bay Region

**Resource:** Geothermal

**Proposed Project Phase:** Recon

**Proposer:** Ivanoff Bay Tribal Council

**AEA Program Manager:**

**Applicant Type:** Local Government

### Project Description

The purpose of this project is to investigate the geothermal potential of the Ivanof Bay area. The region is located at the base of the Kupreanof Volcano and there are reports of hot springs in the general area of Stepovak Bay. Active volcanic systems such as Kupreanof volcano, and deep fracture and fault systems create favorable settings for development of geothermal systems. Previous studies on geothermal resources of the Aleutian Arc have not identified a known hot springs or geothermal source however three areas of fumaroles have been reported in the Stepovak Bay consisting of a chain of five volcanoes that includes Kupreanof (Wilson, 1990). The first area is at the head of Big River and is located near the center of the Kupreanof volcanic edifice (Yount and others, 1985). The second, 5.5 miles southwest, was observed by Eakins (1970) on the southeast side of volcano 4, at the head of an unnamed stream that flows into Ramsey Bay. At the time of the study, steaming fumaroles were visible at the west end of a sulfur deposit at about 2,950 foot elevation. The third, an unverified fumaroles field, is inferred from 1940 air photos of unnamed volcano 1, north of Clark Bay (Wilson, 1990). These sites are about 28 miles east of Port Moller and 14 miles northwest of the Kupreanof Peninsula. Kupreanof's latest activity was an ash/steam eruption in 1987 (Wilson, 1990). In addition to the surface manifestations, a wildcat well drilled by Philips Petroleum in 1976-1977, Big River A-01 encountered high temperatures at depth. The well was advanced approximately 7 miles west, northwest of Ivanof Bay, in the general area of the observed sulfur deposits. The well chips/core is available for study. We request funding for a reconnaissance study of the region with a planned timeline of approximately 16 months. The study will include the necessary fieldwork, the permitting and environmental analysis, preliminary design analysis, market analysis, simple economic analysis, and a final report. The fieldwork will include mapping, remote sensing, aerial and ground based geophysics, and geochemical sampling of soils and waters. In addition, we will obtain samples from the Big River A-01 Well in order to conduct additional petrographic analysis of the core. This is the complete scope of work we are requesting funding for with this grant, but if this work is successful and promising, future work would include the drilling necessary to confirm and develop the resource, necessary permitting, and power plant and infrastructure construction.

## AEA Review Comments and Recommendation

Not Recommended

The Ivanof Bay Tribal Council proposes to perform a reconnaissance study to explore the geothermal potential of the Ivanof Bay region. The plan proposes a stepwise approach: geological field work (geological mapping, geochemical sampling, Geophysical surveys, sampling of the Big River) to determine if there are any developable geothermal resources in the Ivanof Bay region. The known geothermal resources referenced in the application—Port Moller, Kupreanof, and Aniakchak—are all at great distances from the communities of Perryville, Chignik, Chignik Lagoon, and Chignik Lake (between 28 and >70 miles).

HDL provided cost estimates geothermal development at a number of known geothermal sites in Alaska. HDL's Port Moller estimate ranged between \$47 and \$92 million for a 1 MW plant. Total electricity generation of the communities of Perryville, Chignik, Chignik Lake, and Chignik Lagoon equals approximately 1.6 million kWh per year. Using this as the yearly energy consumption, the levelized cost of energy would be \$2 to \$3.50/kWh assuming no operation and maintenance cost, a 25-year life, and a 3% real discount rate.

The project is expected to begin in August 2012 and be completed by December 2013.

DGGS comments are as follows: "The proposal seeks to investigate the geothermal potential of the Ivanof Bay area and is based on fumaroles fields related to Kupreanof Volcano and a deep oil and gas exploration well drilled in 1976-1977, the Big River A-01. The proposal will gather literature and thermal satellite images, and proposes to test geothermal prospecting and exploration techniques including geochemical sampling, shallow temperature surveys using thermal probes, gravity and/or magnetotelluric surveys in select locations and evaluate the Big River A-01 core. The proposal could be improved by providing a map showing the locations of the communities, fumarole fields, oil and gas well and be more specific in delineating the areas where geothermal exploration will be conducted. The resource proposed for study is distant from the Chignik communities (~90 km, with at least some FWS Refuge land in between). Although the Big River well encountered geothermally interesting temperatures (~190F) the depth was great (~12,000') and the drilling log mentions significant hydrothermal mineralization which would presumably have a large negative impact on reservoir characteristics. Significant spring systems suggestive of a shallower, more accessible, hydrothermal system do not exist."

AEA's is concerned that

1. Due to the great distances to the known geothermal resources and the low likelihood of finding an unknown geothermal resource, the proposal carries significant risks for finding a suitable resource.
2. Were a resource identified, the cost of developing it would be prohibitively high.

No funding recommended.

<b>Funding &amp; Cost</b>	<b>Project Cost:</b>	\$45,000,000
Cost of Power:    \$0.80 /kWh	<b>Requested Grant Funds:</b>	\$911,400
	<b>Matched Funds Provided:</b>	\$50,000
<b>Energy Region:</b> Bristol Bay	<b>Total Potential Grant Amount:</b>	\$961,400
<b>AEA Funding Recommendation:</b>		

**App # 867    Reconnaissance Study of the Geothermal Potential for the Ivanoff Bay Region**

**Resource:** Geothermal

**Proposed Project Phase:** Recon

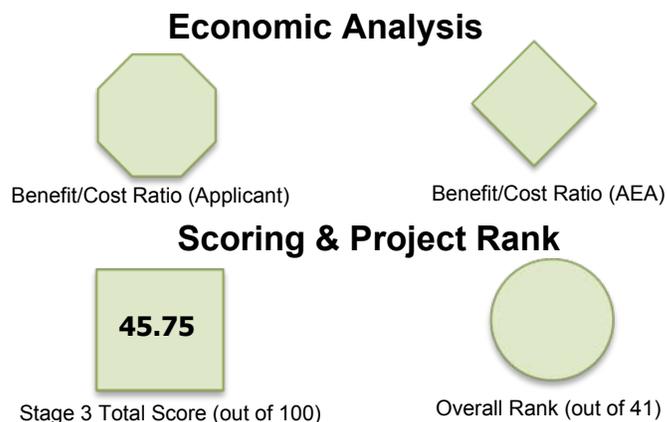
**Proposer:** Ivanoff Bay Tribal Council

**AEA Program Manager:**

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	35.00
2) Matching Resources (Max 15)	6.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

Insufficient information to determine if a DNR authorization is required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

The proposal seeks to investigate the geothermal potential of the Ivanof Bay area and is based on fumaroles fields related to Kupreanof Volcano and a deep oil and gas exploration well drilled in 1976-77, the Big River A-01. The proposal will gather literature and thermal satellite images, and proposes to test geothermal prospecting and exploration techniques including geochemical sampling, shallow temperature surveys using thermal probes, gravity and/or magnetotelluric surveys in select locations and evaluate the Big River A-01 core. The proposal could be improved by providing a map showing the locations of the communities, fumarole fields, oil and gas well and be more specific in delineating the areas where geothermal exploration will be conducted. The resource proposed for study is distant from the Chignik communities (~90 km, with at least some FWS Refuge land in between). Although the Big River well encountered geothermally interesting temperatures (~190F) the depth was great (~12,000') and the drilling log mentions significant hydrothermal mineralization which would presumably have a large negative impact on reservoir characteristics. Significant spring systems suggestive of a shallower, more accessible, hydrothermal system

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 868      TidGen™ Array Project**

**Resource:** Ocean/River

**Proposed Project Phase:** Construction

**Proposer:** ORPC Alaska, LLC

**AEA Program Manager:**

**Applicant Type:** IPP

## Project Description

ORPC Alaska, LLC, a wholly owned subsidiary of Ocean Renewable Power Company, LLC (collectively, ORPC), develops technology and projects generating emission-free electricity from water currents. Its technology includes the proprietary TidGen™ Power System, which includes one or more TidGen™ devices connected to an on-shore station with power and data cables. In ORPC's Cook Inlet TidGen™ Project, ORPC will install a four-device TidGen™ Power System with a rated generating capacity of 600 kW in a 6-knot current. AEA Round 4 funding to ORPC will help fund a single-device TidGen™ Power System. This Round 5 project, called the TidGen™ Array Project, will expand the system to a four-device TidGen™ Power System, by adding an array of three TidGen™ devices.

**AEA Review Comments and Recommendation** **Not Recommended**

ORPC Alaska 2, LLC, proposes the installation of three additional 150-kW TidGen power systems for the TidGen Array project at East Foreland, near Nikiski in June 2014. The proposal is to fund the second stage of the tidal energy project that was funded under Round 4 of the RE Fund. ORPC received \$2 million for the deployment of the first 150 kW TidGen power system at the site. The four devices are expected to have a peak capacity of 600 kW.

ORPC has been active in Alaska for several years working on reconnaissance and feasibility projects at several sites around the state, including Cook Inlet. ORPC has received several Department of Energy grants to perform research vital for their Alaska projects, including on Beluga whales and bearings that will survive the inlet's high sediment load. The Round 4 project is expected to begin in January 2013, with installation of the first tidal turbine in June 2013. The technology is still under development. The first full-scale deployment of the 150 kW unit is expected in summer 2012 in Maine with support of a USDOE grant.

The East Foreland site is estimated to have very fast tidal currents (12 knots, or 6 m/s maximum velocities), making it highly energetic and technically challenging. If the initial deployment is successful in 2013, the next stage, proposed in this application, is expected to begin in January 2014, with the installation of the next three turbines expected in June 2014.

ORPC's proposal includes letters of support from the university, Homer Electric Association, contractors, Kenai Peninsula Borough, Homer Electric Association and others. The application makes a strong case that development of the project in Alaska will have significant employment, economic, and technology impacts in the state. HEA has signed a letter of intent with ORPC to participate in the project.

However, given the State's previous investment of \$2 million through the Round 4 RE Fund and the pre-commercial nature of the technology, AEA believes that it is too early for the State to invest further funds until more information is gained from the installation in Maine and the first turbine funded under Round 4 grant.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**

Railbelt

**Project Cost:** \$8,696,494

**Requested Grant Funds:** \$2,000,000

**Matched Funds Provided:** \$6,696,494

**Total Potential Grant Amount:** \$8,696,494

**AEA Funding Recommendation:**

**App # 868    TidGen™ Array Project**

**Resource:** Ocean/River

**Proposed Project Phase:** Construction

**Proposer:** ORPC Alaska, LLC

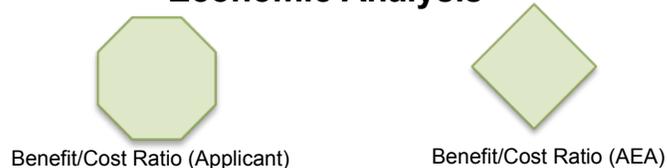
**AEA Program Manager:**

**Applicant Type:** IPP

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.44
2) Matching Resources (Max 15)	14.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Authorizations from DNR are expected, but insufficient information to identify how many and what type.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 869      St. Mary's/Pitka's Point Wind Construction and Commissioning**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

AVEC proposes to complete construction, erection, startup, and commissioning of three Wind turbines and Secondary Load Controls (SLC) to supplement the existing power generation system for currently intertied communities of St. Mary's and Pitka's Point. As a part of this project, AVEC would upgrade the electrical distribution line between St. Mary's and Pitka's Point to a three phase line.

**AEA Review Comments and Recommendation** **Full Funding**

AVEC proposes construction of a 300 kW wind farm to supply the St. Marys-Pitkas Point grid. The work would also upgrade the existing power line to the wind farm site from single to three-phase. The wind resource appears to be class 6.

AVEC received \$275,554 in round 4 of the REF for completing feasibility and final design and permitting (#645). Currently AEA is working with AVEC to put the grant in place. The current application only includes the foundation design and electrical drawings for the turbine interconnect and transmission line. There is no geotech final report (only preliminary). A special provision of the round 4 grant is that "before final design funds are disbursed AEA accepts the feasibility and conceptual design report".

In round 3 AVEC proposed final design, permitting, and construction of a 900 kW wind project and intertie to serve the communities of St. Marys, Mountain Village, Pitkas Point, and Pilot Station (#516). In round 2 AVEC requested funding for feasibility assessment for this project (#298). AEA recommended both proposals for funding; however there was not sufficient funding for either.

AVEC noted presence of icing during the met tower studies resulting in tower collapse in two locations.

Based on the work to date it appears that a wind farm to serve the St. Marys grid is viable. AEA believes that it is reasonable for AVEC to consider its original concept of tying in Mountain Village and Pilot Station and upsizing the wind generation capacity.

Recommend full funding with requirement that round 4 work needs to be completed and accepted by AEA. Round 4 work should address the potential for tying the communities together.

## Funding & Cost

Cost of Power: \$0.58 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Project Cost:** \$4,443,244

**Requested Grant Funds:** \$3,998,920

**Matched Funds Provided:** \$444,324

**Total Potential Grant Amount:** \$4,443,244

**AEA Funding Recommendation:** \$3,998,920

**App # 869 St. Mary's/Pitka's Point Wind Construction and Commissioning**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

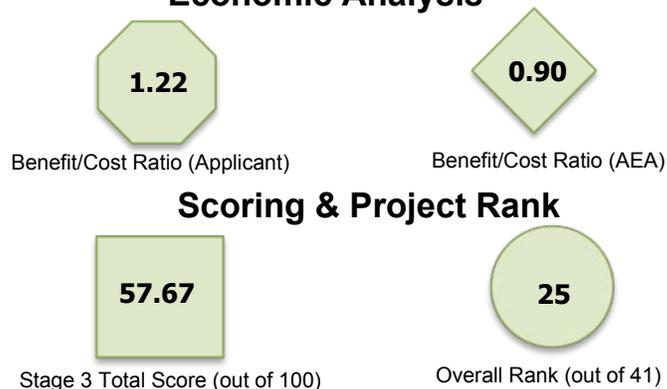
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.38
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	10.80
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	2.50
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 870      Surplus Wind Energy Recovery for Mekoryuk Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

A detailed feasibility study has been completed. This analysis has clearly shown that the project is both feasible and cost effective. These next two phases of the project (design and construction) will build on the work that has been done to date. AVEC has already implemented electric boilers within its facilities in several villages. These efforts have clearly demonstrated the ability to integrate the electric boilers into the existing systems. The challenge of this project will be to demonstrate that the electric boiler technology and controls can be successfully used to provide heat to the various use points at the water treatment plant on an interruptible basis. The availability of the water tank for thermal storage greatly reduces any risks. Currently, AVEC's two wind turbines (Northern Power Systems 100A models) in Mekoryuk generate in excess of community requirements when there is moderate to heavy wind and when the community load is light. Much of this excess is not captured, since there is no economic way to store the energy. AVEC, together with Alaska Native Tribal Health Consortium Alaska Village Electric Cooperative, Inc. Mekoryuk Water System Surplus Wind Energy Recovery Renewable Energy Fund Grant Application Round 5 AEA 12-001 Grant Application Page 3 of 138/26/2011 (ANTHC) with input from the City of Mekoryuk, are planning to design and construct a secondary load installation to capture the excess energy to power space heating at the water treatment plant, drinking water storage tank heating, and washeteria hot water heating and clothes drying. Design of the proposed equipment would be based on AVEC's other secondary load projects adapted to installation into the water treatment plant.

**AEA Review Comments and Recommendation** **Full Funding**

Alaska Village Electric Cooperative (AVEC), with Alaska Native Tribal Health Consortium, proposes to install a secondary load installation to capture the excess energy created by Mekoryuk's existing 200 kW wind system funded in RE Fund round 12 (#72). The recovered energy would be used for the water treatment plant space heating, drinking water loop circulation heating, and water storage tank heating.

AVEC is requesting funding for design and construction of the proposed project. This phase is expected to cost \$278,378, of which \$123,919 (5%) would come as a match provided by ANTHC, provided through project labor and rest of the amount, \$264,459, is requested from the RE Fund.

The project would result in a substantial amount of fuel displaced at the water treatment plant. The proposal represents a solid partnership between AVEC and ANTHC.

The highest benefit for wind power is to displace diesel generator fuel before heating oil. Based on HOMER modeling, AEA is concerned that, under the current system configuration, only 49% of the wind turbine output can be used to offset generator fuel, while 51% of the output is excess power and available for offsetting heating fuel. Including a smaller genset in the diesel system will result in significantly greater amount of generator fuel being saved according to AEA's modeling. Although the proposed project will result in economic payback, additional savings could be achieved by optimizing the diesel generator configuration.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.59 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:** \$278,378

**Requested Grant Funds:** \$264,459

**Matched Funds Provided:** \$13,919

**Total Potential Grant Amount:** \$278,378

**AEA Funding Recommendation:** \$264,459

**App # 870      Surplus Wind Energy Recovery for Mekoryuk Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

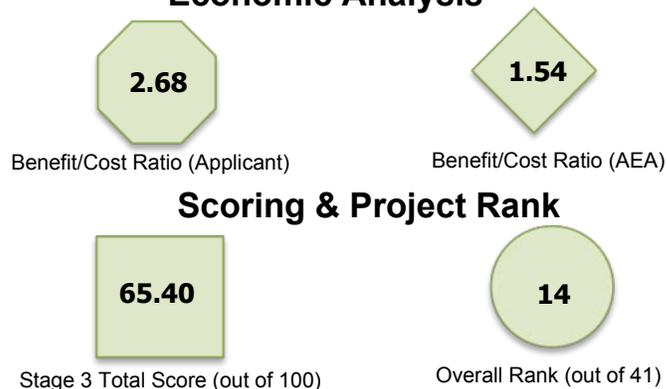
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.81
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	14.97
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	9.12
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 871 Shaktoolik Surplus Wind Energy Recovery for Shaktoolik Water System Heat

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Village Electric Cooperative

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

AVEC's two wind turbines (Northern Power Systems 100B models) in Shaktoolik when started up later this year will generate in excess of community requirements when there is moderate to heavy wind and when the community load is light. Much of this excess will not be used, since there is no economic way to store the energy. AVEC, together with Alaska Native Tribal Health Consortium, with input from the City of Shaktoolik, are planning to design and construct a secondary load installation to capture the excess energy to power water treatment plant space heating, drinking water storage tank heating, and circulation loop heating. Design of the proposed equipment would be based on AVEC's other secondary load installations and adapted to installation into the water treatment plant.

### AEA Review Comments and Recommendation

Full Funding

Alaska Village Electric Cooperative (AVEC), with Alaska Native Tribal Health Consortium, proposes to install a secondary load installation to capture the excess energy created by Shaktoolik's existing 200 kW wind system funded in RE Fund round 2 (#303). The recovered energy would be used for the water treatment plant space heating, drinking water loop circulation heating, and water storage tank heating.

The round 2 grant included a 260 kW electric boiler as a secondary load to be installed in the power plant.

AVEC is requesting funding for design and construction of the proposed project. This phase is expected to cost \$252,905, of which \$12,645 (5%) would come as an in-kind match provided by ANTHC, provided through project labor and rest of the amount, \$240,260, is requested from the RE Fund.

The project would result in a substantial amount of fuel displaced at the water treatment plant. The proposal represents a solid partnership between AVEC and ANTHC.

The highest benefit for wind power is to displace diesel generator fuel before heating oil. Based on HOMER modeling, AEA is concerned that, under the current system configuration, only 44% of the wind turbine output can be used to offset generator fuel, while 56% of the output is excess power and available for offsetting heating fuel. Including a smaller genset in the diesel system will result in significantly greater amount of generator fuel being saved according to AEA's modeling. Although the proposed project will result in economic payback, additional savings could be achieved by optimizing the diesel generator configuration.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:** \$252,905

**Requested Grant Funds:** \$240,260

**Matched Funds Provided:** \$12,645

**Total Potential Grant Amount:** \$252,905

**AEA Funding Recommendation:** \$240,260

**App # 871    Shaktoolik Surplus Wind Energy Recovery for Shaktoolik Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Village Electric Cooperative

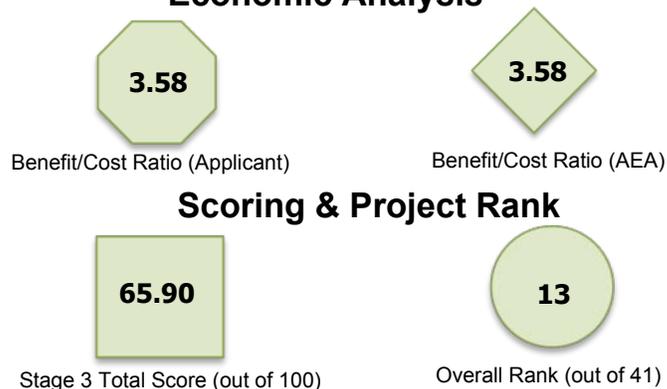
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	15.97
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	11.37
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 872 Mountain Village Wind Energy Construction

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

AVEC proposes to complete erection, startup, and commissioning of two NW100 wind turbines to supplement the existing power generation system for Mountain Village. AVEC would also upgrade the switchgear and add remote control to the system.

### AEA Review Comments and Recommendation

**Not Recommended**

AVEC proposes final design and construction of a 200 kW wind farm to serve the community of Mt. Village. The project would include 5-7 miles of transmission between the turbine site and the Mountain Village system.

The completion of this project would benefit the community through stabilized energy costs. AVEC would also improve the switch gear and add remote control to the system. The wind resource appears to be very good, a class 5.

AVEC's proposal included a HOMER model that assumed 100% turbine availability and 100% utilization of turbine generation at 35% capacity factor. Excess wind energy is not addressed.

AEA has the following concerns about this project:

1. AVEC's assumptions on wind generation and utilization appear overly optimistic.
2. Given a high project cost of \$4.2 million (\$21,000/kW), which includes the transmission, economics are poor (B/C = 0.6 to 0.9). Benefit/cost may improve if the system is tied to the St. Mary's grid.)
3. AVEC does not provide a feasibility analysis and conceptual design with the proposal.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.51 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:**

\$3,795,575

**Requested Grant Funds:**

\$3,795,575

**Matched Funds Provided:**

\$421,731

**Total Potential Grant Amount:**

\$4,217,306

**AEA Funding Recommendation:**

**App # 872 Mountain Village Wind Energy Construction**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

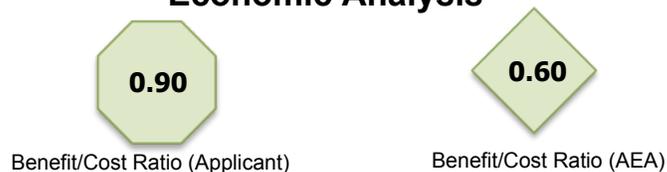
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.31
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 873 Shishmaref Wind Energy Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

AVEC proposes to install a wind meteorological (met) tower and complete geotechnical work to determine the feasibility of installing wind turbines in Shishmaref. The work will involve obtaining a letter of non-objection from the land owner for the placement of the met tower, geotechnical field work, permitting, transporting and installing a met tower at this location, studying the wind resource for one year, and conducting a reconnaissance - level geotechnical investigation to determine the soil conditions and needed engineering at the site. A conceptual design will be created based on the outcome of the met tower recordings and geotechnical investigation. This project will also consider other turbines that can be relocated, if the village decides to move to another location.

### AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes assessing feasibility of a wind-diesel system in Shishmaref. Wind resource is estimated as a class 5 based on the high-resolution wind map.

This application is one of two wind feasibility projects that AVEC is proposing in round 5. AVEC has received funding in rounds 2-4 for feasibility assessment in 10 other communities. All of the proposals include standardized descriptions of feasibility tasks—including project development/scoping and contractor solicitation, detailed energy resource analysis (met tower wind resource assessment), identification of land and regulatory issues, permitting and environmental analysis, detailed analysis of existing and future energy costs and markets, conceptual business and operations plans, assessment of alternatives, detailed economic and financial analyses, conceptual design analysis and cost estimate, and final report and recommendations. Given the similar tasks among multiple projects, AEA thinks that it is reasonable that, if AVEC receives funding for multiple projects, the utility may be able to reduce costs through coordinated procurement and management of these projects.

Due to severe coastal erosion the community of Shishmaref is considering moving.

Recommend full funding with requirement that before grant is finalized, AVEC will prepare budgets for both round 5 wind feasibility projects with the goal of identifying opportunities to reduce costs.

### Funding & Cost

Cost of Power: \$0.60 /kWh

**Energy Region:**  
Bering Straits

**Project Cost:**

\$2,500,000

**Requested Grant Funds:**

\$142,500

**Matched Funds Provided:**

\$7,500

**Total Potential Grant Amount:**

\$150,000

**AEA Funding Recommendation:**

\$142,500

## App # 873 Shishmaref Wind Energy Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

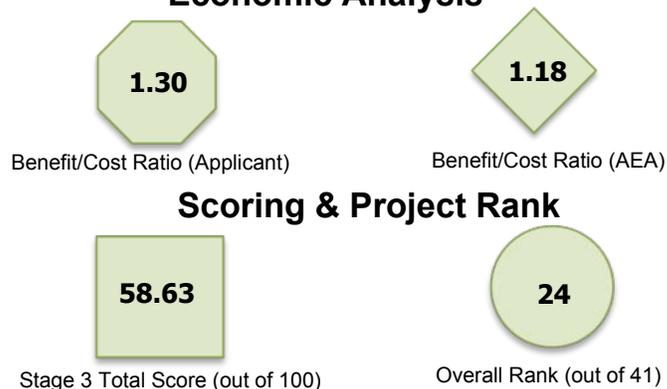
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	26.25
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	12.47
4) Project Readiness (Max 5)	1.00
5) Benefits (Max 15)	5.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.67

### Economic Analysis



### DNR/DMLW Feasibility Comments

No state land involved.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 874 Goodnews Bay Wind Energy Feasibility

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

The primary financial benefit from this project would be to determine whether the wind resources are suitable to provide power to the community and to prepare a conceptual design of a wind facility. Assuming installation of one NW100 turbine, it could produce 230,000 kWh annually. The possible displacement of diesel fuel used for village power generation in Goodnews Bay could be 13,000 gal/yr (HOMER simulation, assuming 80% turbine availability, Tab G). This project could save about \$72,400 during the first year of operation (2014). See the detailed project benefits in Section 5.0.

### AEA Review Comments and Recommendation

Full Funding

AVEC proposes assessing feasibility of a wind-diesel system in Goodnews Bay. Wind resource is estimate as a class 4 based on the high-resolution wind map. AEA notes an area of class 5 resource near Goodnews.

The City of Goodnews Bay, in cooperation with ANTHC, has proposed generating wind power to heat the water treatment plant and the washeteria (#859). Although AEA is recommending against funding the City's project, the current proposal provides a way of addressing the City's proposed assessment.

This application is one of two wind feasibility projects that AVEC is proposing in round 5. AVEC has received funding in rounds 2-4 for feasibility assessment in 10 other communities. All of the proposals include standardized descriptions of feasibility tasks—including project development/scoping and contractor solicitation, detailed energy resource analysis (met tower wind resource assessment), identification of land and regulatory issues, permitting and environmental analysis, detailed analysis of existing and future energy costs and markets, conceptual business and operations plans, assessment of alternatives, detailed economic and financial analyses, conceptual design analysis and cost estimate, and final report and recommendations. Given the similar tasks among multiple projects, AEA thinks that it is reasonable that, if AVEC receives funding for multiple projects, the utility may be able to reduce costs through coordinated procurement and management of these projects.

Recommend full funding with requirement that before grant is finalized, 1) AVEC will prepare budgets for both round 5 wind feasibility projects with the goal of identifying opportunities to reduce costs, and 2) work with the City and ANTHC to include scope of work that addresses feasibility of heating the water treatment plant and washeteria.

### Funding & Cost

Cost of Power: \$0.47 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:**

\$1,200,000

**Requested Grant Funds:**

\$142,500

**Matched Funds Provided:**

\$7,500

**Total Potential Grant Amount:**

\$150,000

**AEA Funding Recommendation:**

\$142,500

**App # 874      Goodnews Bay Wind Energy Feasibility**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

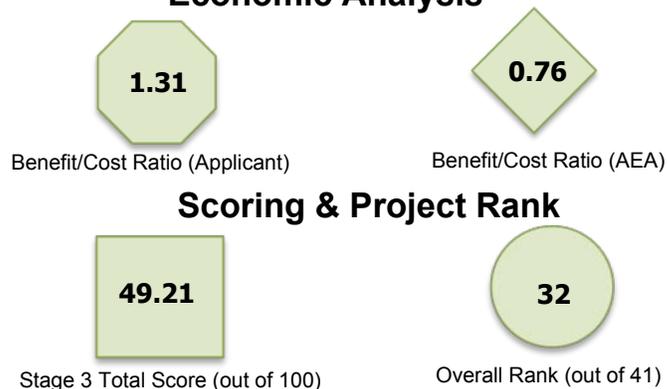
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	20.56
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	11.40
4) Project Readiness (Max 5)	1.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

Not on DMLW land - no DMLW land permit required for installation. Cross-country travel permit may be required for access.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 875      Chevak Surplus Wind Energy Recovery for Chevak Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

Currently, AVEC's four wind turbines (Northern Power Systems 100B models) in Chevak generate in excess of community requirements when there is moderate to heavy wind and when the community load is light. Much of this excess energy is not captured, since there is no economic way to store the energy. AVEC, together with Alaska Native Tribal Health Consortium with input from the City of Chevak, are planning to design and construct a secondary load installation to capture the excess energy to power space heating at the water treatment plant and drinking water storage tank heating. Design of the proposed equipment would be based on AVEC's other secondary load installations adapted to installation into the water treatment plant.

**AEA Review Comments and Recommendation** **Full Funding**

Alaska Village Electric Cooperative (AVEC), with Alaska Native Tribal Health Consortium, proposes to install a secondary load installation to capture the excess energy created by Chevak's existing 400kW wind system. The recovered energy would be used for the water treatment plant space heating, drinking water loop circulation heating, and water storage tank heating.

AVEC is requesting funding for design and construction of the proposed project. This phase is expected to cost \$252,905, of which \$12,645 (5%) would come as an in-kind match provided by ANTHC, provided through project labor and rest of the amount, \$240,260, is requested from the RE Fund.

The project would result in a substantial amount of fuel displaced at the water treatment plant. The proposal represents a solid partnership between AVEC and ANTHC.

The highest benefit for wind power is to displace diesel generator fuel before heating oil. Based on HOMER modeling, AEA is concerned that, under the current system configuration, only 61% of the wind turbine output can be used to offset generator fuel, while 39% of the output is excess power and available for offsetting heating fuel. Including a smaller genset in the diesel system will result in significantly greater amount of generator fuel being saved according to AEA's modeling. Although the proposed project will result in economic payback, additional savings could be achieved by optimizing the diesel generator configuration.

Full funding recommended.

## Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

<b>Project Cost:</b>	\$252,905
<b>Requested Grant Funds:</b>	\$240,260
<b>Matched Funds Provided:</b>	\$12,645
<b>Total Potential Grant Amount:</b>	\$252,905
<b>AEA Funding Recommendation:</b>	<b>\$240,260</b>

**App # 875      Chevak Surplus Wind Energy Recovery for Chevak Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

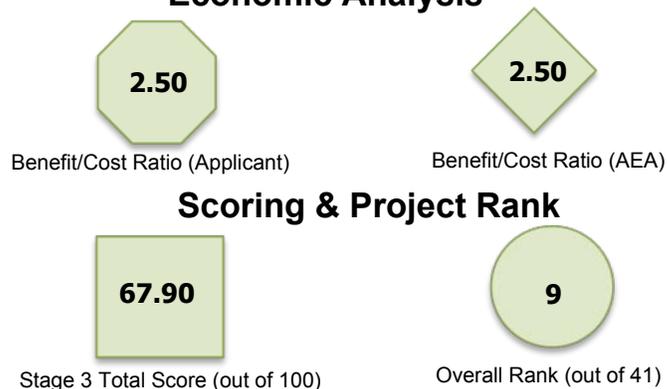
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	15.97
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	11.37
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

Not on DMLW land - no DMLW land permit required for installation. Cross-country travel permit may be required for access.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 876      Gambell Surplus Wind Energy Recovery for Gambell Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

Currently, AVEC's three wind turbines (Northern Power Systems 100A models) in Gambell generate in excess of community requirements when there is moderate to heavy wind and when the community load is light. Much of this excess is not captured, since there is no economic way to store the energy. AVEC, together with Alaska Native Tribal Health Consortium with input from the City of Gambell, are planning to design and construct a secondary load installation to capture the excess energy to power water treatment plant space heating, drinking water loop circulation heating, and water storage tank heating. Design of the proposed equipment would be based on the secondary load installations and adapted to installation into the water treatment plant.

**AEA Review Comments and Recommendation** **Full Funding**

Alaska Village Electric Cooperative (AVEC), with Alaska Native Tribal Health Consortium, proposes to install a secondary load installation to capture the excess energy created by Gambell's existing 300 kW wind system. The recovered energy would be used for the water treatment plant space heating, drinking water loop circulation heating, and water storage tank heating.

AVEC is requesting funding for design and construction of the proposed project. This phase is expected to cost \$252,905, of which \$12,645 (5%) would come as an in-kind match provided by ANTHC, provided through project labor and rest of the amount, \$240,260, is requested from the RE Fund.

The project would result in a substantial amount of fuel displaced at the water treatment plant. The proposal represents a solid partnership between AVEC and ANTHC.

The highest benefit for wind power is to displace diesel generator fuel before heating oil. Based on HOMER modeling, AEA is concerned that, under the current system configuration, only 55% of the wind turbine output can be used to offset generator fuel, while 45% of the output is excess power and available for offsetting heating fuel. Including a smaller genset in the diesel system will result in significantly greater amount of generator fuel being saved according to AEA's modeling. Although the proposed project will result in economic payback, additional savings could be achieved by optimizing the diesel generator configuration.

## Funding & Cost

Cost of Power: \$0.53 /kWh

**Energy Region:**  
Bering Straits

<b>Project Cost:</b>	\$252,905
<b>Requested Grant Funds:</b>	\$240,260
<b>Matched Funds Provided:</b>	\$12,645
<b>Total Potential Grant Amount:</b>	\$252,905
<b>AEA Funding Recommendation:</b>	<b>\$240,260</b>

**App # 876    Gambell Surplus Wind Energy Recovery for Gambell Water System Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

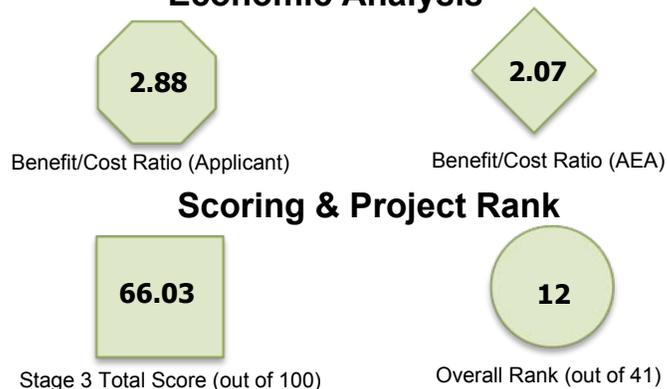
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	23.19
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	15.97
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	11.37
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 877 Upper Kalskag Solar Construction

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

AVEC proposes to install a 10 kWh solar array in Upper Kalskag. The array would be installed on the side of the existing power plant facility that is owned and operated by AVEC. Work would involve shipping materials to the community, installing, integrating, testing, and commissioning the array. A small solar array in Upper Kalskag would help AVEC evaluate the benefits of solar arrays installed at power generating facilities.

### AEA Review Comments and Recommendation

**Not Recommended**

AVEC proposes to install a 10 kW solar array on the side of the existing power plant in Upper Kalskag. AVEC estimates an annual savings of 9,096kWh and 673 gallons of diesel fuel per year to offset operating costs and station service. This equates to a capacity factor of 12.5%.

The proposed project is similar to the Kaltag Solar project that is funded from REF 4 (#877). That project scope mounts the PV array on a CONEX container instead of the AVEC building. The CONEX model allows for lower costs through construction in Fairbanks with only minor assembly in Upper Kalskag. The Conex can be optimally oriented to capture the most solar gain as opposed to the powerhouse orientation.

Economics appear marginal. AEA believes that the Kaltag project, which was funded as a demonstration project, should be on line long enough to assess performance and economics before further funds are allocated to similar projects.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.51 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:** \$100,000

**Requested Grant Funds:** \$90,000

**Matched Funds Provided:** \$10,000

**Total Potential Grant Amount:** \$100,000

**AEA Funding Recommendation:**

**App # 877 Upper Kalskag Solar Construction**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

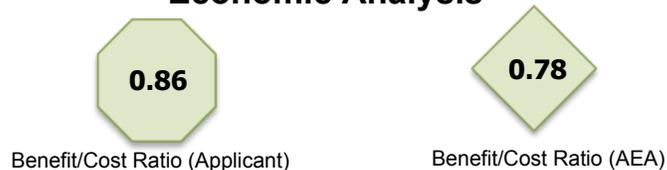
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.31
2) Matching Resources (Max 15)	7.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land - no DMLW land permit required for installation. Cross-country travel permit may be required for access.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 878      Emmonak/Alakanuk Phase 2 Wind Energy Construction**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

This project would add two additional NW100B turbines to the existing wind farm (consisting of our NW100B turbines) in Emmonak to complete the originally planned wind farm serving the communities of Emmonak and Alakanuk.

**AEA Review Comments and Recommendation** **Not Recommended**

AVEC proposes to add two NW100 turbines to their 400 kW Emmonak wind farm, boosting capacity to 600 kW.

Although the first project was awarded in Round 1, a wind resource analysis report was not published until August 2010. This wind resource report estimates a capacity factor of only 18.7% for a NW100B at 80% turbine availability. This is substantially less than AVEC's estimate (23.8% capacity factor corresponding to a total of 1,250,000kWh). Neither AEA nor AVEC were aware at the time of the Round 1 proposal and award that the wind resource would result in the low capacity factors and wind power densities actually seen at this site.

Depending on energy production assumptions, the benefit/cost ranges from 0.61 to 0.69, thus appearing to be marginal at this point. A more accurate assessment of production will be available after a year or so of operation of the existing 400kW wind system.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.52 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Project Cost:**

\$2,676,273

**Requested Grant Funds:**

\$2,408,646

**Matched Funds Provided:**

\$267,627

**Total Potential Grant Amount:**

\$2,676,273

**AEA Funding Recommendation:**

**App # 878      Emmonak/Alakanuk Phase 2 Wind Energy Construction**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

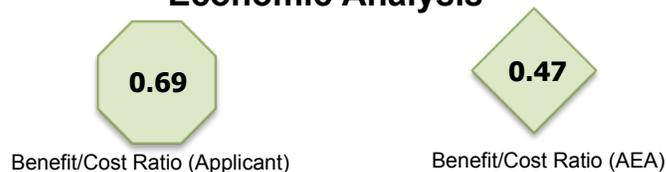
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.75
2) Matching Resources (Max 15)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Not on DMLW land - no DMLW land permit required for installation. Cross-country travel permit likely required for access, as such permits were acquired for previous installations at this site.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 879 St. Michael / Stebbins Wind Energy Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

### Project Description

AVEC is proposing to complete final design and permitting for four wind turbines to supplement the existing power generation systems in St. Michael and Stebbins. Work under this grant will also be used to design controls for the power generation system at a power plant in Stebbins. AVEC has completed the design and obtained permits for the intertie between St. Michael and Stebbins. Once work done under this grant is completed, AVEC will seek funding to construct turbines and an intertie to serve both communities.

### AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes final design and permitting for four wind turbines that would supplement existing power systems in St. Michael and Stebbins. The grant also includes designing controls for the power system in Stebbins. Additionally, AVEC has completed design and permitting for an intertie between St. Michael and Stebbins. If this grant is approved, AVEC will seek funding for construction of the turbines and the intertie. Currently AVEC is working on feasibility and conceptual design of the St. Michael/Stebbins wind system with an expected completion of December 2012.

The wind resource completed in Aug. 2011 shows class 5 winds. Turbulence is low at this site. Average system penetration would be 29%.

Given the very good wind resource, AEA believes that it is reasonable to allocate funding for the next phase of project development.

Recommend full funding with requirement that AEA accept feasibility and conceptual design before finalizing the round 5 grant agreement.

### Funding & Cost

Cost of Power: \$0.54 /kWh

**Energy Region:**

Bering Straits

**Project Cost:**

\$8,000,000

**Requested Grant Funds:**

\$223,250

**Matched Funds Provided:**

\$11,750

**Total Potential Grant Amount:**

\$235,000

**AEA Funding Recommendation:**

\$223,250

## App # 879 St. Michael / Stebbins Wind Energy Design

Resource: Wind

Proposed Project Phase: Design

Proposer: Alaska Village Electric Cooperative, Inc.

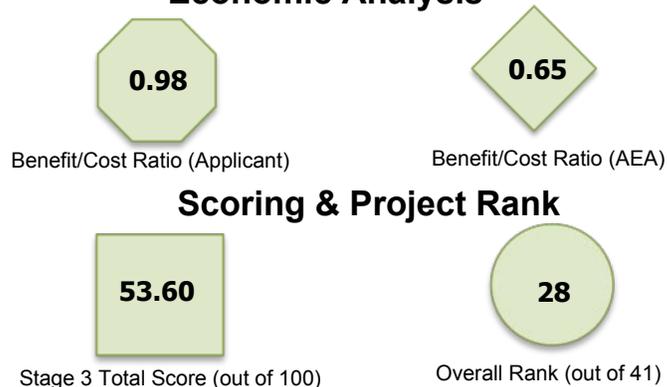
AEA Program Manager: Stromberg

Applicant Type: Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	23.63
2) Matching Resources (Max 15)	6.00
3) Project Feasibility from Stage 2 (Max 20)	11.60
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	1.38
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### DNR/DMLW Feasibility Comments

No state land involved.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 880      Tanana Solar Thermal Public Facilities Heating Project**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** City of Tanana

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

## Project Description

The Tanana Solar Thermal Public Facilities Spacing Heating Project seeks to demonstrate and implement the market transformative benefits of combining biomass space heating technologies currently being installed at Tanana’s public facilities with solar thermal collectors. During the winter months the heat energy generated by the biomass boilers offsets a substantial amount of the fuel oil normally required. The cordwood fuel source also allows many of the operating costs to remain in the community since the supply of the cordwood and manpower required to feed and boilers is local. During the summer the biomass boilers are a less desirable alternative. The focus and energies of the community are diverted to essential traditional cultural activities. The solar thermal, which is a passive heat energy source that can operate largely unattended, allows those activities to continue uninterrupted. Thus it is an excellent companion to the biomass and can contribute substantially to the heat energy requirement for at least nine months of the year. The combination of the two heat energy sources virtually eliminates the dependency on fuel oil as the heat energy source.

The City believes that the integration of solar thermal is essential to the continued development and expansion of the biomass program in Alaska. The resulting combination system is more compatible with the life styles and cultural activities of people in rural Alaska, further reduces the ongoing operational costs of the heat energy system, and reduces the long term impact on the area biomass resource due to the system operation. For this project, the City of Tanana has selected four buildings in Tanana that have biomass systems – the washeteria, the tribal complex, the teacher housing duplex, and a single residence teacher housing unit. This mix represents a good cross section of both commercially and residentially oriented systems. Due to the highly variable temperatures found in the biomass systems, the City has selected indirect, glycol based evacuated tube collectors with variable speed circulation pumps and supplemental heat storage tanks for the solar thermal systems. In the washeteria, the integral storage of the GARN boilers will be utilized. In the other facilities that are utilizing Econoburn gasification boilers with limited internal storage capacity, supplemental storage tanks will be installed in conjunction with the solar thermal.

**AEA Review Comments and Recommendation** **Not Recommended**

City of Tanana proposes funding for adding solar thermal to the existing wood-fired systems that supply the washeteria, tribal complex, and teacher housing buildings. The combined solar and wood projects will meet most of the heating requirements of four public facilities.

The project includes \$79,000 for system performance monitoring for demonstration purposes.

Although the project appears technically feasible, economics are poor to marginal with AEA’s standard assumption of a 20-year project life, even if the \$79,000 cost is removed.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.67 /kWh

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Project Cost:** \$459,000

**Requested Grant Funds:** \$359,000

**Matched Funds Provided:** \$100,000

**Total Potential Grant Amount:** \$459,000

**AEA Funding Recommendation:**

**App # 880      Tanana Solar Thermal Public Facilities Heating Project**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** City of Tanana

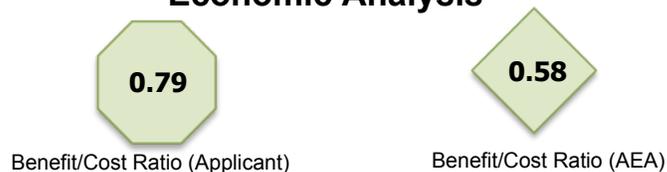
**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

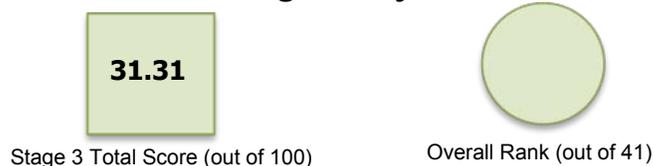
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	29.31
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Project as described does not involve state land. Therefore, no land permits or easements from the state are required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 881      Tanacross Woody Biomass Community Facility Space Heating Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Tanacross Village Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

Tanacross' predicament, as is the case for most of rural Alaska, is its dependence on imported expensive petroleum heating oil for space heating of essential community facilities and infrastructure which support the provision of valuable social, health and safety services to residents of Tanacross. This Project will construct one centrally located woody biomass space heating plant to substitute for expensive, imported heating oil use and will heat 80% of Tanacross' public facilities with high efficiency bio-mass (wood-fired) heating. Tanacross' community facilities are centrally located and can be serviced by one woody biomass heating plant strategically located adjacent to Tanacross' clustered public facilities (see Map Attachment). Tanacross Village Council is requesting AEA Round 5 in the amount of \$420,000. Tanacross Village Council will contribute \$170,000 of in-kind building materials to this exciting Project. Combined, Tanacross Village Council will construct a single woody biomass plant to heat four (4) community facility which is estimated to displace 26,500 gallons of imported heating oil and create local wood-harvesting employment/small business opportunities.

**AEA Review Comments and Recommendation** **Full Funding**

Tanacross Village Council proposes final design and construction of a three-Garn wood boiler system to supply a small district heating system consisting of the multi-use facility, water/sewer heating loop, fire station, and the community hall. The system would consume approximately 260 cords per year and displace 25,300 gallons of fuel oil per year—90% of the facility loads.

Reconnaissance assessment through the Alaska Wood Energy Development Task Group indicates a viable project. TVC is supplying match including materials for a boiler building and arctic pipe system.

AEA is concerned by the lack of a specific fuel supply plan for the project. However, we recognize the existing fuelwood market in the Tok area. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding with requirement that Tanacross provide a fuel supply plan and final design acceptable to AEA before construction funds are disbursed.

## Funding & Cost

Cost of Power: \$0.37 /kWh

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Project Cost:** \$590,000

**Requested Grant Funds:** \$420,000

**Matched Funds Provided:** \$170,000

**Total Potential Grant Amount:** \$590,000

**AEA Funding Recommendation:** \$420,000

**App # 881 Tanacross Woody Biomass Community Facility Space Heating Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Tanacross Village Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	16.19
2) Matching Resources (Max 15)	12.00
3) Project Feasibility from Stage 2 (Max 20)	14.40
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	11.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	2.50

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land involved. Assume biomass is from corporation lands.

## DNR/DOF Feasibility Comments

This project is for construction of three centrally located Garn boilers to heat four clustered community buildings. It is expected that about 26,000 gallons of heating oil will be displaced by the project. At a price of \$5.00 per gallon, \$126,500 is spent annually on fuel oil purchases. Based on the village of Tanana's experience in operating the Garn boilers, one cord of seasoned fuel wood is roughly equivalent to 100 gallons of fuel oil. Thus this conversion equates to an annual wood requirement for Tanacross of about 260 cords or 87 cords per boiler. This amount of wood stoking may be somewhat optimistic given that the village of Tanana is burning between 35 and 50 cords per Garn unit. However, this depends on the number of times per day each Garn boiler is fired. Cordwood can be purchased for \$200 per cord for a total price of \$52,000.

A large fire burned in the Tanacross area in 2010 which contains significant dead material suitable for firewood. In addition Tanacross has identified hazard fuel reduction areas of 1,800 acres that would also be a supply of firewood. The 2010 Tanana Valley Inventory Update indicates the Tok Management Area averages about 14 cords per acre. Tanacross would then need to harvest approximately 19 acres per year to supply the Garn boilers. This amount appears to be sustainable based on the number of forested acres within the State Forest and Tanacross Inc. lands and with the additional burned over lands. An appropriate harvest schedule would need to be developed to plan access to these areas.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 882      Mentasta Woody Biomass Community Facility Space Heating Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Mentasta Traditional Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

Mentasta's predicament, as is the case for most of rural Alaska, is its dependence on imported expensive petroleum heating oil for space heating of essential community facilities and infrastructure which support the provision of valuable social, health and safety services to residents of Mentasta. This Project will construct one centrally located woody biomass space heating plant to substitute for expensive, imported heating oil use and will heat 80% of Mentasta's public facilities with high efficiency bio-mass (wood-fired) heating. Mentasta's community facilities are centrally located and can be serviced by one woody biomass heating plant strategically located adjacent to Mentasta's clustered public facilities (see Map Attachment). Mentasta Traditional Council is requesting AEA Round 5 in the amount of \$400,000 and will construct a single woody biomass plant to heat five (5) community facility which is estimated to displace 10,800 gallons of imported heating oil and create local wood-harvesting employment/small business opportunities.

**AEA Review Comments and Recommendation** **Full Funding**

Mentasta Village Council proposes final design and construction of a three-Garn wood boiler system to supply a small district heating system consisting of the multi-use facility, council building and post office, fire station, clinic and the community hall. The system would consume approximately 110 cords per year and displace 10,800 gallons of fuel oil per year—90% of the facility loads.

Reconnaissance assessment through the Alaska Wood Energy Development Task Group indicates a viable project. MVC is not supplying a match.

AEA is concerned by the lack of a specific fuel supply plan for the project. However, we recognize the existing fuelwood market in the Tok area. AEA will work with the grantee to ensure that building energy efficiency is addressed in conjunction with this project.

Recommend full funding with requirement that Mentasta provide a fuel supply plan and final design acceptable to AEA before construction funds are disbursed.

## Funding & Cost

Cost of Power: \$0.62 /kWh

**Energy Region:**

Copper River/Chugach

**Project Cost:** \$400,000

**Requested Grant Funds:** \$400,000

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$400,000

**AEA Funding Recommendation:** \$400,000

**App # 882      Mentasta Woody Biomass Community Facility Space Heating Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Mentasta Traditional Council

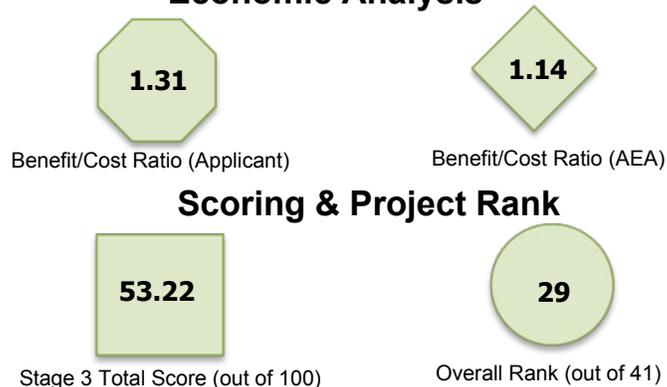
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	27.13
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	12.47
4) Project Readiness (Max 5)	2.00
5) Benefits (Max 15)	6.63
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	3.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

No state land ownership.

## DNR/DOF Feasibility Comments

This project is similar in scope to the above Tanacross project # 881. It is for the construction of three centrally located Garn boilers to heat five clustered community buildings. It is expected that about 10,800 gallons of heating oil will be displaced by the project. The annual wood requirement is 110 cords of seasoned fuel wood at \$220 per cord. The Mentasta Community Wildfire Protection Plan calls for 1,200 acres of forest managed for hazard fuel reduction. Based on the Tok Management Area's average of 14 cords per acre, a significant amount of volume could be available from the hazard fuel reduction clearings. Fuel wood is also available for purchase from Tok at the delivered price of \$220.00 per cord.

The Tanana Chiefs Conference forestry program conducted a forest inventory for Mentasta Village Lands in 1989. In the report a spruce allowable harvest of 106 acres per year was calculated yielding over 2,000 cords. Thus, the annual wood requirement for this project appears sustainable even if the wood resource was mostly sourced from village lands.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 883      Transmission Line from Fire Island Wind Project**

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Chugach Electric Association, Inc.

**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

## Project Description

Cook Inlet Region, Inc. (CIRI), created a special purpose entity called Fire Island Wind, LLC (FIW) to develop a wind farm on Fire Island. The Fire Island Wind Farm ("the Wind Farm") is a utility-scale wind generation facility under development, ultimately planned to have a nameplate capacity of 52.8 MW and to be comprised of 33 wind turbine generators. Pursuant to a recently completed Power Purchase Agreement (PPA), Chugach, as Buyer, has agreed to purchase the electrical output from Phase I of the Wind Farm, which will be comprised of 11 General Electric ("GE") 1.6MW type XLE turbines for a total Phase I of 17.6 MW. The Project that is the subject of this grant application includes the construction of the transmission line, which will interconnect the Fire Island Wind Farm (as well as a few retail electric customers on Fire Island), with Chugach's 34.5kV system at the International Substation. The Wind Farm will initially consist of 11 -1.6MW OE wind turbines that will be consolidated into a single 34.5kV feeder. The feeder will be routed to a collector yard. The collector yard will connect to a double-circuit 34.5kV overhead transmission line running approximately 2.8 miles to the northeast coast of Fire Island. At that point, it will be connected to two 34.5kV 3 phase submarine cables. The submarine cables will run approximately 3.2 miles under the Cook Inlet to the mainland coast near Point Campbell and Anchorage International Airport. At Point Campbell, the conductors will be separated into single conductors and buried in a trench. The transmission lines will then continue approximately 6.2 miles to the International Substation and connect to the 34.5kV bus at the International Substation. Portions of underground mainland section will be installed in conduit. Splice cabinets will be required at various points on the underground section of the project. A map and drawing outlining the wind farm site and transmission Project is attached as Appendix 1.

**AEA Review Comments and Recommendation** **Full Funding**

Chugach Electric proposes funding for construction of dual 34.5 kV transmission from the International Substation in Anchorage to Fire Island to transmit the power generated by the 17.6 MW Fire Island Wind Farm to the Chugach Electric system.

A special-purpose entity, Fire Island Wind LLC, a subsidiary of CIRI, will design and build the transmission line. Following completion and commissioning line ownership of the line will be transferred to Chugach.

In processing the \$25 million legislative grant for the project, AEA has reviewed the power sales agreement and approved the construction work plan for the project. The project appears to be technically and economically viable.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$36,795,000

**Requested Grant Funds:** \$4,000,000

**Matched Funds Provided:** \$25,000,000

**Total Potential Grant Amount:** \$29,000,000

**AEA Funding Recommendation:** \$4,000,000

**App # 883      Transmission Line from Fire Island Wind Project**

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Chugach Electric Association, Inc.

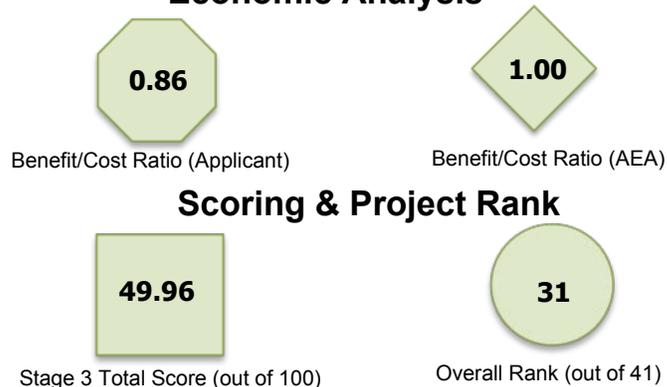
**AEA Program Manager:** Strandberg

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	5.69
2) Matching Resources (Max 15)	13.50
3) Project Feasibility from Stage 2 (Max 20)	13.90
4) Project Readiness (Max 5)	5.00
5) Benefits (Max 15)	1.88
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

## Economic Analysis



## DNR/DMLW Feasibility Comments

Requires authorizations from DMLW for submerged ROW and potentially for construction.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 884      Nenana's Solar-Powered Student Living Center**

**Resource:** Solar

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of Nenana/Yukon River Inter-Tribal Watershed Council

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

## Project Description

The Nenana Student Living Center (NSLC) is a 27,000 sq ft student dormitory in Alaska's Interior village of Nenana that houses and feeds 88 students and 10 staff members during the school year. The building is owned by the City of Nenana, but operating costs are paid by the Nenana School District. This building has in-floor radiant heating across approximately 20,000 square feet. Due to the architecture of the building (1-story, view from above looks like a U) there is more than 11,000 square feet of exterior wall. Over a typical year, the building burns 27,000-30,000 gallons of heating fuel, consuming 150-200 gallons each day during the coldest parts of the Interior Alaskan winter. Operating costs are passed directly onto the already burdened school district. Integrating a large solar hot water array with heliodyne flat-plate solar collectors, a large solar hot water storage tank, dual coil DHW tank, forced air heating preheat loops and already planned insulation upgrades we can offset up to 30% of the building's heating costs. With heating fuel at \$3.50 gal coming into this winter that will save \$30,000 in the first year alone.

**AEA Review Comments and Recommendation** **Not Recommended**

Yukon River Inter-Tribal Watershed Council proposes to integrate a large solar hot water array with Heliodyne flat-plate solar collectors and related components to help offset about 20% of the current heating costs for the student dormitory. The applicant is requesting \$300,000 from Round V funding. The total cost of the project is estimated at \$340,000, \$300,000 of which is capital costs. In-kind resources total \$40,000.

Following initial review of this application AEA requested additional information regarding 1) solar energy availability and heating load that supports the estimate that the project would displace 5,841 gallons of fuel oil per year, 2) performance data from the existing solar thermal panels, and 3) timing of design work to justify eligible match amount.

In response YRITWC submitted information indicating that 1) they assume that 100% of the heat available from the panels could be used to heat the building since the project would include thermal storage and 2) data from the existing project is unreliable and contractor ABS was not able to get access to other data.

Since feasibility and conceptual design are not yet complete AEA believes that there is insufficient information available to conclude that the system is economically feasible. YRITWC is not able to provide information on the operation of the existing solar thermal panels. AEA notes that a separate solar thermal project in McKinley Village funded in round 1 (#108) that was substantially complete in 2009 has not provided data that confirms expected savings.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$340,000

**Requested Grant Funds:** \$300,000

**Matched Funds Provided:** \$40,000

**Total Potential Grant Amount:** \$340,000

**AEA Funding Recommendation:**

**App # 884    Nenana's Solar-Powered Student Living Center**

**Resource:** Solar

**Proposed Project Phase:** Construction Design

**Proposer:** City of Nenana/Yukon River Inter-Tribal Watershed Council

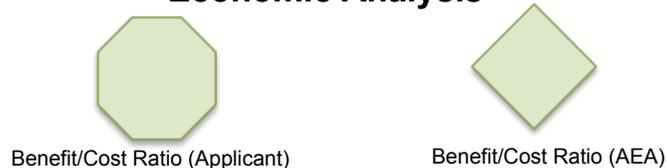
**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

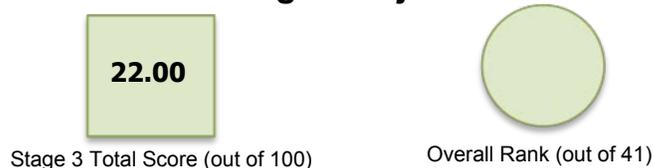
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	8.75
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Project as described does not involve state land. Therefore, no land permits or easements from the state are required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 885 High Penetration Wind Diesel Power and Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Kipnuk Light Plant

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

## Project Description

The proposed project is a high penetration wind diesel system for the community of Kipnuk. Kipnuk is located at the western mouth of the Kuskokwim River, and has a population of 690 permanent residents. The project will be owned and operated by the Kipnuk Light Plant and the community of Kipnuk and will consist of three Northwind 100 wind turbines. These turbines are to be integrated into the current power system through the use of a control module and two heat recovery boilers. The control module will house new switchgear, metering, and controls. The module will be designed to interface with the existing and proposed new diesel power plants, as well as provide space and electrical connections for future energy storage system options such as a battery or a flywheel system. The control module will be located nearby the existing and proposed future diesel plant. The wind turbines will connect to the existing power grid through a 5 pole, 12470 volt 3 phase power line extension. Wind diesel power will be regulated using two controlled 200 kW electric boilers - one located in the community center and one located in the newly commissioned washeteria/water plant. The wind turbines are well proven in Alaska and the control and integration method is well understood. Geotechnical investigations have already been conducted and the wind turbines, power poles and power/control module will be placed on driven piles. Property has been provided by the community for the installation of up to 5 wind turbines. Kipnuk's electrical load has grown by nearly 30% since the commissioning of the new water system in December of 2010. A new school is being constructed in Kipnuk during the winter of 2012/2013. This new school will increase the average electrical load from 50 to 75 kW with a commensurate increase in heating fuel usage estimated at over 20,000 gallons. Construction of the school in Kipnuk is scheduled to begin the Fall 2012 and continue through 2013. Coordination with the school construction could result in cost savings sufficient to install a 4th wind turbine. Significant savings would result from the day rental of heavy equipment such as cranes, loaders and pile drivers, and specialized personnel that will be mobilized for the school construction. The control and integration capacity in the proposed design can accommodate up to 5 wind turbines. Power produced from a possible fourth wind turbine would result in additional fuel savings of up to 18,000 gallons. Cost savings would result from unburdening the wind project from carrying the full cost of heavy equipment mobilization, rental, and over-wintering from the Fall of 2012 to the Spring of 2013. This wind diesel system architecture is scalable through the addition of wind turbines, new diesel gensets, and energy storage. Kipnuk is a productive wind site in which each Northwind 100 turbine has the potential to annually produce 300,000 kWhrs of electricity. This equates to a per turbine potential fuel displacements of 18,000 to 20,000 gallon of diesel fuel and a total displacement for 3 turbines of upwards of 55,000 gallons.

**AEA Review Comments and Recommendation Not Recommended**

Kipnuk Light Plant proposes the design, permitting, construction and commissioning of a high penetration wind-diesel system in Kipnuk. The project would include three Northern 100 turbines, a five pole transmission line, secondary loads and a control module containing switchgear, metering and controls. The secondary loads would supply heat to the community center and the new washeteria/water plant.

The proposed project is located in a possible class 5-6 wind regime and follows a community wide approach at addressing rising energy demands.

AEA notes that the power system will not support integration of wind turbines in its current state. Recently, in order to address reliability issues, AEA has provided two diesel gensets and repaired the foundation of the powerhouse. Generation efficiency appears poor—11 kWh/gal in FY09 and 6 kWh/gal in FY10. AEA plans a statewide condition assessment of rural power systems in early 2012 and expects that Kipnuk will rank high in priority for upgrade.

Kipnuk has received a \$1.2 million in a legislative grant that is available for the proposed work, including conceptual design.

AEA has the following concerns:

- 1) A meteorological tower study and wind resource assessment has not been completed at the proposed turbine location.
- 2) An acceptable conceptual design report that covers the diesel and wind generation and distribution systems has not been prepared prior to the proposed final design and permitting.
- 3) While some upgrades to the existing power plant are progressing, a new power plant is needed and has been proposed by the community. This new power plant and any other required system upgrades should be included in the system design through the conceptual design report process.

AEA will offer the community a met tower in 2012 through the state anemometer loan program.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.50 /kWh

**Energy Region:**  
Lower Yukon-Kuskokwim

<b>Project Cost:</b>	\$3,886,450
<b>Requested Grant Funds:</b>	\$2,686,450
<b>Matched Funds Provided:</b>	\$1,000,000
<b>Total Potential Grant Amount:</b>	\$3,686,450

**AEA Funding Recommendation:**

**App # 885 High Penetration Wind Diesel Power and Heat**

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Kipnuk Light Plant

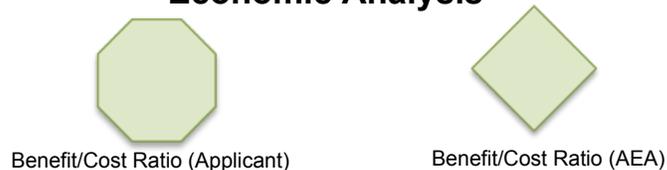
**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

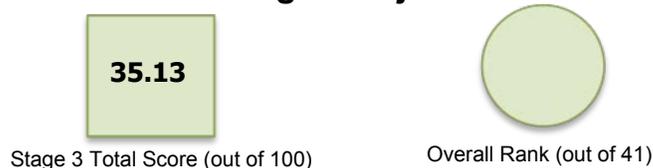
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	21.88
2) Matching Resources (Max 15)	11.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land - no DMLW land permit required for installation. Cross-country travel permit may be required for access.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 886 Fivemile Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chitina Electric, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The proposed Fivemile Creek Hydroelectric Project consists of four major components, including:

- A creek diversion structure- The diversion structure would create a small impoundment that would divert a portion of flow from Fivemile Creek into a pipeline (penstock).
- A penstock. The penstock is a pipeline that will transport water from the intake structure to the turbine powerhouse. The penstock for this project will be around 12-inches in diameter and 10,000 linear feet long. Its primary purpose is to pressurize and deliver the water from the creek to the turbine power plant.
- A hydroelectric turbine power plant – The power plant will house the turbine and electrical generating equipment and controls. Water from the penstock will spin the turbine and generators and produce electricity. The power plant will include a tailrace that will return water from the penstock to the creek bed.
- Electrical tie-in – An overhead high voltage line will connect the turbine power plant to the existing electrical distribution system near the airport.
- Diesel integration – The proposed hydro will be linked to the community’s existing, AEA type, diesel powerhouse module.

### AEA Review Comments and Recommendation

**Not Recommended**

Chitina Electric Inc. requests construction funding to build a high head, 300 kW run-of-river hydroelectric project on Fivemile Creek near Chitina. Two prior REF grants have been awarded to CEI to date including \$303,000 for feasibility study in Round II (#236) and \$277,000 for permitting and final design in Round IV (#682). The site appears to be promising as a source of hydroelectric power which can displace much of the current diesel generation of electricity. AEA constructed a new diesel powerhouse in 2008 near the proposed hydro power house site near the airport about 5 miles from Chitina. This proximity will allow hydro/diesel integration issues to be minimal. AEA’s Rural Energy Group is managing the preconstruction phase of this project and is expected to manage the future hydro project construction phase as well.

However, progress on the preconstruction phases of the project has been limited to a feasibility study. Although permitting, site control, final design and construction cost estimate were funded in round 2 and 4, they are not yet complete. Construction challenges for this project include a deeply incised stream at the proposed intake site, a highly erratic stream flow, and shallow bedrock along the proposed penstock route. Because of these challenges AEA believes that the project construction risk is high and the project cost may be underestimated. Further final design and permitting work will help identify current construction unknowns and reduce potential project risks.

Recommend no construction funding at this time.

### Funding & Cost

Cost of Power: \$0.58 /kWh

**Energy Region:**

Copper River/Chugach

**Project Cost:**

\$4,405,000

**Requested Grant Funds:**

\$3,325,000

**Matched Funds Provided:**

\$500,000

**Total Potential Grant Amount:**

\$3,825,000

**AEA Funding Recommendation:**

**App # 886 Fivemile Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chitina Electric, Inc.

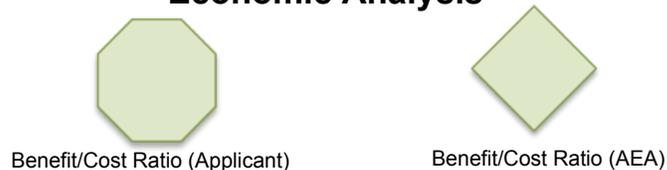
**AEA Program Manager:** Ott

**Applicant Type:** Utility

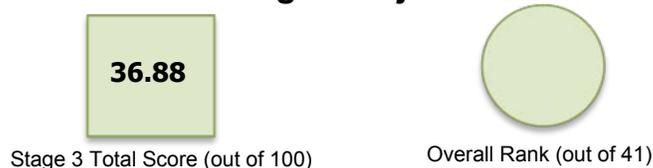
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	25.38
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	1.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land. Requires permit for water rights

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 887      Waterfall Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design

**Proposer:** City of King Cove

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Project Description

This project will be a modest, run-of-the-river hydroelectric facility using Waterfall Creek and consisting of a concrete diversion/intake structure, 4,500' HDPE penstock pipeline, 16'x40' metal powerhouse on concrete slab, Pelton Impulse Turbine and induction generator, remote-automatic control system, and 5,000' access road. This facility will be a working partner to the city's existing and highly successful Delta Creek hydroelectric project, which has been operating for the last fifteen years.

**AEA Review Comments and Recommendation** **Partial Funding**

The City applied for funding in a pre-RE Fund solicitation ("Round zero") in 2008. AEA recommended against funding this proposal due to lack of demonstrated ability to sell the excess hydro power. In the current application the City includes a MOU from Peter Pan Seafoods stating the company's interest in purchasing a minimum of 800,000 kWh per year which will generate extra revenue for the City over the life of the project. The Waterfall Creek project can reduce construction costs by expanding the existing powerhouse at Delta Creek and making use of existing transmission lines from that project.

The City completed a preliminary design for the Waterfall Creek project in 2007-9 as part of a rural power system upgrade.

The City is in negotiations with ADF&G over instream flows required to maintain Dolly Varden habitat. Flow issues may affect project economics. However the project economics are very favorable and can offset some project cost increases.

Preconstruction activities, including permitting, site control, final design plans and specs, and final construction cost estimate, are expected to be complete in February 2013. Given the significant preconstruction activities that remain, AEA believes that it premature to allocate funds for construction at this time.

Recommend partial funding of \$200,000 for final design and permitting.

## Funding & Cost

Cost of Power: \$0.26 /kWh

**Energy Region:**  
Aleutians

<b>Project Cost:</b>	\$3,800,000
<b>Requested Grant Funds:</b>	\$1,900,000
<b>Matched Funds Provided:</b>	\$1,900,000
<b>Total Potential Grant Amount:</b>	\$3,800,000
<b>AEA Funding Recommendation:</b>	<b>\$200,000</b>

**App # 887 Waterfall Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction Design

**Proposer:** City of King Cove

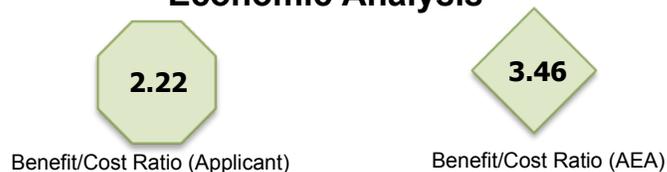
**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	11.38
2) Matching Resources (Max 15)	14.25
3) Project Feasibility from Stage 2 (Max 20)	18.40
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	13.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land. Requires permit for water rights. Cross-country travel permit may be required for site access

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Tsunami and strong ground motions from Aleutian subduction zone earthquakes are the primary seismic hazards at the site. See general DGGS comment.

**App # 888 Kodiak High School Ground Source Heat Pump**

**Resource:** Geothermal

**Proposed Project Phase:** Construction  
Design

**Proposer:** Kodiak Island Borough

**AEA Program Manager:**

**Applicant Type:** Local Government

## Project Description

The project would provide design and construction of a ground source heat pump system consisting of a water-to-water heat pump and loopfield as the primary source of heat for the new Kodiak High School. It is estimated that the heat pump will supply 85% of the heating load and the fuel oil boilers will supplement the remaining load.

**AEA Review Comments and Recommendation Not Recommended**

The Kodiak Island Borough proposes to construct a hybrid fuel oil-fired and ground-source heat pump system for the new Kodiak High School currently under construction. The hybrid system would consist of 198 wells 316' deep and a 3,000 MBH (250-ton) heat pump.

The application provides a preliminary feasibility report including a detailed breakdown of project costs.

Since Kodiak is powered by hydroelectric and wind power, the GSHP would displace a significant amount of fuel oil (77,000 gal/yr). However the proposed GSHP uses a substantial amount of electrical energy to run the system (1.9 million kWh/yr). Since savings are low compared to the high capital cost (\$6.5 million) AEA is concerned that economics are poor.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.18 /kWh

**Energy Region:**  
Kodiak

<b>Project Cost:</b>	\$6,903,000
<b>Requested Grant Funds:</b>	\$3,900,000
<b>Matched Funds Provided:</b>	\$2,600,000
<b>Total Potential Grant Amount:</b>	\$6,500,000

**AEA Funding Recommendation:**

**App # 888 Kodiak High School Ground Source Heat Pump**

**Resource:** Geothermal

**Proposed Project Phase:** Construction Design

**Proposer:** Kodiak Island Borough

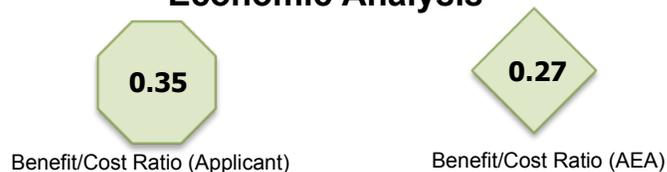
**AEA Program Manager:**

**Applicant Type:** Local Government

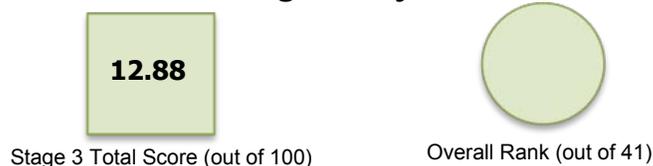
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.88
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land. Use of subsurface may require DMLW authorization

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

## App # 889 Nikolski Renewable Energy Wind Project

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Native Village of Nikolski

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

### Project Description

We propose to complete the integration of the existing 65 kW Vestas V-15 Wind Turbine Generator (WTG) with our existing diesel generation plant by adding a synchronous condenser, an additional thermal load to the Waste Heat Recovery System, and revisiting the effort to modify the supervisory controls. We intend for the WTG to be fully operational with the diesel plant and for the excess energy to maximize reduction of diesel used to provide heat to large community building.

### AEA Review Comments and Recommendation

Full Funding

The Native Village of Nikolski requests funding to complete construction and commissioning of a 65-kW wind-diesel system.

In May 2006 AEA constructed a power plant with a total capacity of 180 kW. The community purchased a refurbished Vestas V15 wind turbine generator with a grant from USDA RUS and cost share from APICDA in July 2007 (\$474,475). In 2009, Nikolski received an RE Fund round 1 grant (#89) for \$409,430 to integrate the wind turbine generator with a heat-recovery system by installing boilers and thermal nodes. Most of the work was done by the community's contractor TDX Power. Currently the wind system remains inoperable.

Given our experience with the project, AEA has the following concerns:

1. Proposed budget seems too high.
2. The wind turbine generator may need repair due to extended non-operation in a marine environment.
3. The power output from the wind turbine generator is too high for the village load and diesel power system.
4. The proposed solution has not been demonstrated to be functional in other Alaska wind systems and is thus not guaranteed to provide a working system.

Recommend full funding of \$331,240 with a special provision that AEA will be directly involved in the management of this project. AEA staff will work directly with the community and its contractors to establish a scope, design and budget for a functioning power system. The design portion of this project will not exceed \$50,000. Construction funds will be unallocated until the design, budget and schedule has been accepted by AEA. AEA notes that the round 1 grant recommendation requires a 5-year O&M agreement with an entity acceptable to AEA.

### Funding & Cost

Cost of Power: \$0.60 /kWh

**Energy Region:**

Aleutians

**Project Cost:**

\$1,348,032

**Requested Grant Funds:**

\$331,240

**Matched Funds Provided:**

\$50,080

**Total Potential Grant Amount:**

\$381,320

**AEA Funding Recommendation:**

\$331,240

**App # 889      Nikolski Renewable Energy Wind Project**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Native Village of Nikolski

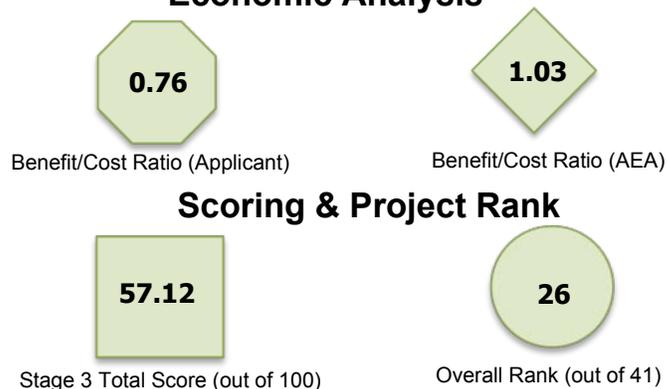
**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	26.25
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	8.00
4) Project Readiness (Max 5)	3.33
5) Benefits (Max 15)	4.13
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.17

## Economic Analysis



## DNR/DMLW Feasibility Comments

Not on DMLW land. No land permits required

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 890 Igiugig Wind, Solar, Hydrokinetic and Thermal Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Design

**Proposer:** Igiugig Village Council

**AEA Program Manager:**

**Applicant Type:** Government Entity

## Project Description

An anemometer tower to collect wind data will be installed the Fall of 2011 by the Lake and Peninsula Borough. The met tower will also be equipped with a pyranometer for monitoring the solar resource. We have an MOU in place to work with Marsh Creek, LLC to analyze the data and produce resource reports. A hydrokinetic assessment study is in progress by Alaska Energy and Engineering. Marsh Creek, LLC will report on the technical and economic feasibility of integrating renewable solar, wind, and the potential hydrokinetic resources with our diesel plant and to incorporate battery storage with the system to maximize the offset of diesel for both heat and electricity in the community.

**AEA Review Comments and Recommendation** **Did Not Pass Stage 1**

Did not pass Stage 1

## Funding & Cost

Cost of Power: /kWh

**Energy Region:**  
Bristol Bay

**Project Cost:**

**Requested Grant Funds:** \$120,000

**Matched Funds Provided:** \$5,000

**Total Potential Grant Amount:** \$125,000

**AEA Funding Recommendation:**

**App # 890 Igiugig Wind, Solar, Hydrokinetic and Thermal Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Feasibility Design

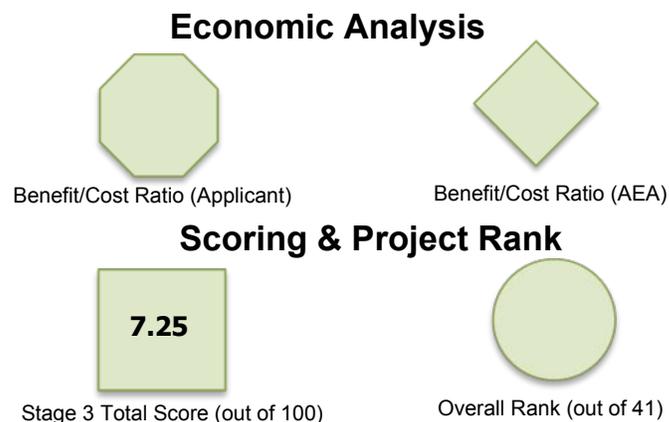
**Proposer:** Igiugig Village Council

**AEA Program Manager:**

**Applicant Type:** Government Entity

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	5.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

## App # 891 Adak Hydroelectric Feasibility Study

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** TDX Power, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The project builds on existing reconnaissance level engineering work recently completed for a hydroelectric power plant in Adak, and makes use of Adak's existing infrastructure such as dams, access roads, and possibly an existing penstock. The reconnaissance studies show that a series of alpine lakes in the immediate vicinity of the city have the potential to displace the diesel power plant as the primary energy source for Adak. Resource availability, engineering considerations, land ownership and permitting issues were all considered. The diesel power plant would still be required for backup, and would be available to parallel with the hydroelectric facility during high load conditions. TDX's engineering feasibility studies will focus on two areas;

-Quantifying the hydroelectric potential. Work will include a detailed mapping and hydrology studies, a permitting evaluation including onsite studies and agency consultations, assessment of alternatives, a detailed cost analysis for the selected project and development timeline; and,

- Interconnection requirements for integration with the utility, including analysis and selection of optimum generator and hydro-turbine size, type, and configuration; identification of requirements for paralleling switchgear and controls, and all other major power system components.

### AEA Review Comments and Recommendation

Full Funding

TDX Power requests funds to perform a feasibility study and conceptual design for hydroelectric development on Adak. This request builds on the reconnaissance study funded in Round II (#315) which found several recommended hydro options. The most favorable scheme is a storage project on Lake Bonnie Rose with a penstock discharging to a powerhouse on Mitt Lake. This option would offset much of the diesel generation for this community. A substantial consideration in this request is to review options on how to potentially integrate any new renewable energy source with the existing diesel generation equipment which was designed for 30x the present population when the Navy ran the base.

AEA is moving forward with a statewide inventory of rural power systems expected to be completed February 2012. Adak appears to be a strong candidate for upgrade under the AEA-funded Rural Power System Upgrade (RPSU) program.

The work scope proposed will need further adjustment to reflect need for stream gauging, analysis of existing dam, final report, etc. No REF funds can be spent on conventional diesel system and electrical distribution issues.

Recommend full funding with the requirements that 1) TDX will work with AEA staff to revise the scope and budget before the grant award, and 2) work needs to be coordinated with RPSU program-supported work.

### Funding & Cost

Cost of Power: \$0.82 /kWh

**Energy Region:**  
Aleutians

**Project Cost:** \$7,400,000

**Requested Grant Funds:** \$314,367

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$314,367

**AEA Funding Recommendation:** \$314,367

## App # 891 Adak Hydroelectric Feasibility Study

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** TDX Power, Inc.

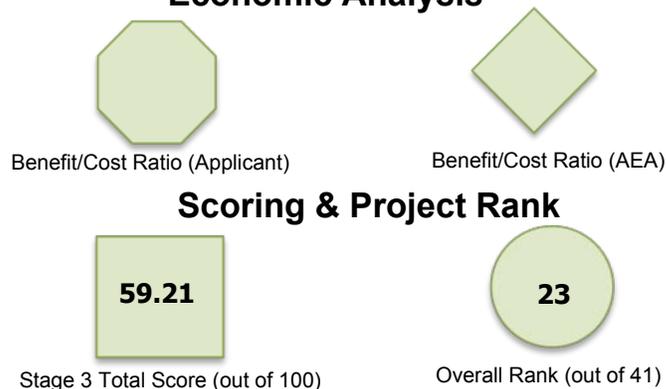
**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	35.00
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	13.33
4) Project Readiness (Max 5)	3.00
5) Benefits (Max 15)	2.37
6) Local Support (Max 5)	1.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### DNR/DMLW Feasibility Comments

Project involves meanderable water body. DNR permits are likely required.

### DNR/DOF Feasibility Comments

### DNR/DGGS Feasibility Comments

### DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

### DNR/DGGS Geohazards Comments

Tsunami and strong ground motions from Aleutian subduction zone earthquakes are the primary seismic hazards at the site. See general DGGS comment.

## App # 892 Kvichak River RISEC Project

**Resource:** Ocean/River

**Proposed Project Phase:** Construction  
Design

**Proposer:** Igiugig Village Council dba Igiugig Electric Company

**AEA Program Manager:**

**Applicant Type:** Utility

### Project Description

The continued objective of this project is to install a RISEC (River In-Stream Energy Conversion) device on the Kvichak River near the village of Igiugig. This lake outlet location provides an ideal site for the study, testing and implementation of river in-stream energy conversion (RISEC) that will also benefit other Alaska communities considering this renewable energy. A RISEC plant will convert available river kinetic energy into electric power, and feed into the existing Igiugig electric grid to reduce diesel fuel consumption at the Igiugig power plant.

### AEA Review Comments and Recommendation

**Not Recommended**

The Igiugig Village Electric Company proposes a reconnaissance final design and construction to install hydrokinetic turbines on the Kvichak River.

The application would follow up feasibility and conceptual design work supported by RE Fund Round 2 (#265) funding of \$707,250.

A reconnaissance report by EPRI in 2008, indicated that the Kvichak River near Igiugig was promising for hydrokinetic power due to suitable sites near the village and that the Kvichak River is generally ice- and debris-free.

The application proposes to test multiple hydrokinetic devices (including ORPC and Whitestone device) in mid-2012 and 2013. The project proposes to continue development through FERC's pilot project stage, leaving commercial licensing until 2018.

A field study performed by Terrasond in 2011 under the Round 2 grant, located an area of interest that had depths of 2-3-meter depth, peak velocities near 2.5 m/s, and a highest average velocity across one transect at 2.3 m/s. Terrasond also performed geotechnical studies on the areas of interest. These characteristics make it likely that the area would have a suitable resource for hydrokinetic development.

The application includes in-kind contributions from ORPC, which will test a 150 kW unit near Nikiski with support of a RE Fund grant (#660). The application also proposes to fund the completion, construction, and testing of the Whitestone Poncelet device, an undershot waterwheel under development by the Whitestone Community through assistance of a DOE grant.

AEA has the following concerns about this proposal:

1. Assuming a \$9.4 million project cost and \$100,000/yr in fuel savings, economics are poor.
2. Given that the chief goal of this project is technology development and demonstration, the site is remote from logistical and technical support.

Since the application aims to fund completion of an experimental device with no working prototype and test several other devices, it appears the Emerging Energy Technology Fund would be a more appropriate funding mechanism.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.80 /kWh

**Energy Region:**  
Bristol Bay

**Project Cost:** \$9,395,283

**Requested Grant Funds:** \$7,274,277

**Matched Funds Provided:** \$1,414,756

**Total Potential Grant Amount:** \$8,689,033

**AEA Funding Recommendation:**

**App # 892      Kvichak River RISEC Project**

**Resource:** Ocean/River

**Proposed Project Phase:** Construction Design

**Proposer:** Igiugig Village Council dba Igiugig Electric Company

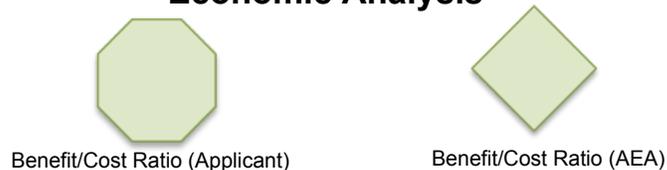
**AEA Program Manager:**

**Applicant Type:** Utility

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	35.00
2) Matching Resources (Max 15)	11.25
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Project involves state-owned land and navigable waters. DNR permits required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 893      Reconnaissance Study of Thomas Bay Public Projects**

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** City of Angoon

**AEA Program Manager:**

**Applicant Type:** Local Government

## Project Description

Reconnaissance Study of Thomas Bay Hydrological Resources.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Angoon requests funds for reconnaissance study of two potential hydro sites located near Petersburg in Thomas Bay--Scenery Lake and Ruth Lake. The application indicates that the projects would provide energy to Kake, Angoon, and Hoonah but does not address specifics of how the energy would be delivered to the communities. The City submitted separate applications for reconnaissance assessment for these projects in RE Fund round 3 (#430,485). AEA has the following concerns about this project:

1. The City of Petersburg has already prepared a reconnaissance assessment for a hydro project at Ruth Lake (#38) with funding from RE Fund round 1.
2. The RE Fund has already funded projects that would supply hydro energy to Kake, Angoon, and Hoonah that have higher likelihood of development and appear more economic.
3. At \$2.4 million the project budget requested is excessive in relation to the likelihood of the project advancing.

In response to AEA's initial recommendation for no funding, the City of Angoon submitted a letter requesting reconsideration. Angoon asks that if AEA finds the City of Petersburg reconnaissance study of Ruth Lake sufficient, then AEA should reduce the current request to a level that AEA believes is appropriate to support a reconnaissance study of Scenery Lake. AEA has reviewed the round 1 funding allocated for the completed study of Ruth Lake, and on this basis believes that partial funding of \$205,000 to support basic reconnaissance assessment of a hydro project at Scenery Lake is reasonable. As directed by the AEA executive director, staff continued Stage 2 technical review on the proposed project. The following describes rationale for the staff Stage 2 scores:

1. Project Management, Development and Operation
  - a. The proposed schedule is unrealistic in that it purports to accomplish \$2.4M worth of field work and other activities in twelve months.
  - b. The cost savings estimated include 100% electric heating conversions for all in Wrangell, Petersburg and Ketchikan when the project is brought online. Staff believes this assumption is unrealistic.
  - c. The application is silent on the team's method of communication, monitoring and reporting development progress.
2. Qualifications and Experience
  - a. The applicant and partner have little or no experience and training in hydro development, utility business, and utility operations. The contractor to perform the studies is unnamed.
  - b. The project team does not appear to have staffing, time and other resources adequate to successfully complete the scope.
  - c. The project team has little technical or environmental expertise and the project has significant technical, economic and environmental barriers to contend with.
  - d. No local labor is proposed for the project.
3. Technical Feasibility
  - a. The reviewers believe the hydro resources at Scenery Lake and Ruth Lake are sustainable, but that project licenses, permits and other authorizations will require extraordinary efforts to obtain.
  - b. The sites are not readily available, and suitability for hydro development is uncertain.
  - c. Project technical and environmental risks are high.
  - d. It is expected the two hydro sites could reliably produce energy as planned. It is doubtful the intertie system can be economically developed to serve the named communities.
  - e. This is not a demonstration project.
4. Economic Feasibility
  - a. The contracted economist estimates that the AEA benefit/cost ratio ranges from 0.87 to 1.37 and the applicant benefit/cost ranges from 8.17 to 9.09, indicating a wide disparity of economic assumptions.
  - b. Analysis performed by Black and Veatch for the Southeast Integrated Resource Plan concludes that the life cycle costs of none of the nine transmission interconnections assessed in the plan are lower than continued diesel generation in the load centers to be connected. Black and Veatch's assessment excludes the cost of new hydropower generation.
  - c. Based on these factors AEA believes that a benefit/cost ratio cannot be reasonably estimated for this proposal.

Stage 2 review resulted in a score of 28.33--less than the minimum of 35 required for the project to be scored in stage 3. Funding not recommended. AEA will work with the proposer through the AEA hydro program to address issues associated with the proposal.

## Funding & Cost

Cost of Power: \$0.55 /kWh

**Energy Region:**  
Southeast

<b>Project Cost:</b>	\$2,400,000
<b>Requested Grant Funds:</b>	\$2,400,000
<b>Matched Funds Provided:</b>	
<b>Total Potential Grant Amount:</b>	\$2,400,000

**AEA Funding Recommendation:**

**App # 893      Reconnaissance Study of Thomas Bay Public Projects**

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** City of Angoon

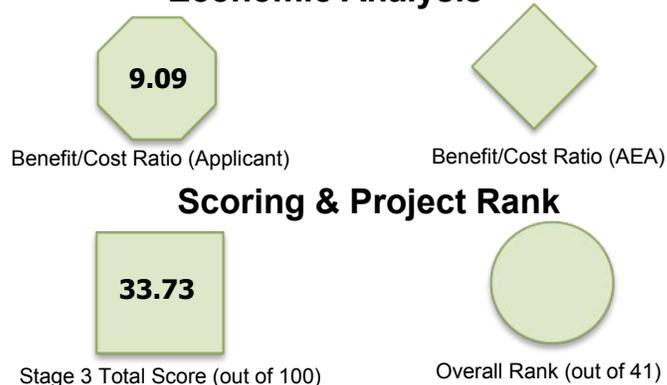
**AEA Program Manager:**

**Applicant Type:** Local Government

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	24.06
2) Matching Resources (Max 15)	0.00
3) Project Feasibility from Stage 2 (Max 20)	5.67
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	1.00
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## DNR/DMLW Feasibility Comments

High probability use of State land needed for access facilities and transmission line(s). Navigability determination needed for lakes.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

There are no known active faults in the project vicinity. See general DGGS comment.

**App # 894      Alakanuk Waste Water Treatment Facility Wind Generation**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** City of Alakanuk

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

## Project Description

The wastewater treatment facility is the single largest electrical consumer in the city of Alakanuk, averaging 16,000 kWh per month or \$5009.51 \$1 kWh based on current PCE rates. The city is provided power by AVEC, some of which is wind that is or will be generated in Emmonak. This proposal is to evaluate, design, permit and install a stand-alone wind generator to service the wastewater treatment facility sized to provide a base loading of electrical equipment as decrease the utility spend for this facility.

**AEA Review Comments and Recommendation** **Not Recommended**

The City of Alakanuk proposes the reconnaissance, feasibility study, conceptual design, design, permitting, construction and commissioning of a stand-alone wind turbine to provide electricity to the waste water treatment facility.

The City of Alakanuk is requesting funds for reconnaissance, feasibility study, conceptual design, design, permitting. The City of Alakanuk is requesting \$14,650 for reconnaissance and feasibility and \$16,700 for design and permitting for a total of \$31,350 from the RE fund. A non-monetary in-kind contribution of lodging and personnel assistance as required has been offered. The total project cost is not provided.

Alakanuk is intertied with Emmonak and AVEC provides power to both communities via an existing wind-diesel system. The proposed Alakanuk wind turbine would be offsetting electricity from AVEC's wind diesel system at a cost of \$.31/kWh to the City of Alakanuk.

AEA has the following concerns:

- 1) Alakanuk is situated between Nunam Iqua and Emmonak which have established wind regimes of low class 3 and class 2 respectively. There is no evidence that Alakanuk would have a more productive wind resource.
- 2) The project is not coordinated with AVEC's wind farm in Emmonak, or more generally the community power system.
- 3) The applicant's budget is insufficient for the proposed scope of work.

AEA recommends that the City use a comprehensive approach for identifying cost-reduction options through the regional energy plan for the Yukon-Kuskokwim region, currently underway.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.52 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Project Cost:** \$31,350

**Requested Grant Funds:** \$31,350

**Matched Funds Provided:**

**Total Potential Grant Amount:** \$31,350

**AEA Funding Recommendation:**

**App # 894 Alakanuk Waste Water Treatment Facility Wind Generation**

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** City of Alakanuk

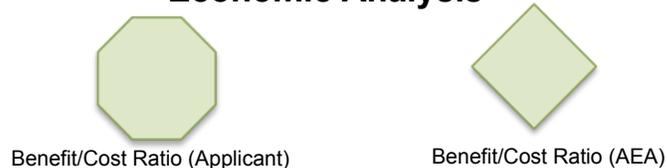
**Applicant Type:** Local Government

**AEA Program Manager:** Stromberg

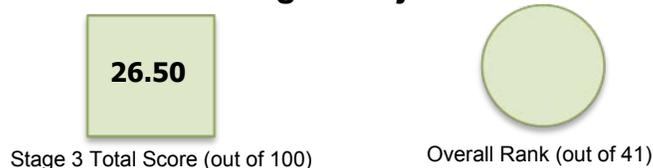
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	22.75
2) Matching Resources (Max 15)	3.75
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

It is unclear from the application if this project impacts state-owned lands or waters. DNR permits may be required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.

**App # 895      Fourth of July Creek Hydroelectric Project Design and Permitting**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Independence Power, LLC

**AEA Program Manager:** Ott

**Applicant Type:** IPP

## Project Description

The Fourth of July Creek Hydroelectric Project is a low-impact run-of-river renewable energy project proposed near Seward, Alaska. The project would be located east of the Spring Creek Correctional Facility and Fourth of July Creek Industrial Park, across Resurrection Bay from the City of Seward. The project is anticipated to have an installed capacity of 5.4 MW and provide an estimated 21,700 MWh of energy annually. The project would supply approximately 1/3rd of Seward Electric System's annual energy requirements. This proposed project phase (design and permitting) is contingent upon the favorable outcome of a feasibility study that is scheduled to start in September 2011. In the event the feasibility study determines that the project is not viable, Independence Power, LLC (IP) intends to withdraw this application from consideration.

**AEA Review Comments and Recommendation** **Not Recommended**

Independence Power LLC proposes for permitting and final design for a 5.4 MW run-of-river hydro facility on Fourth of July Creek near Seward. This request builds on previously funded grants in Round II (#86) for reconnaissance and in Round IV (#693) for feasibility. The grant award document indicates work began on the funded feasibility study in September 2011 and is expected to be completed in September 2012.

This round 5 request is contingent upon findings of a favorable outcome from this feasibility study with AEA review and approval of those results. However, those results will not be available until late 2012. There is also a significant issue regarding how the project, estimated at \$16.7-27M will be financed.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$16,700,000

**Requested Grant Funds:** \$1,521,000

**Matched Funds Provided:** \$269,000

**Total Potential Grant Amount:** \$1,790,000

**AEA Funding Recommendation:**

**App # 895 Fourth of July Creek Hydroelectric Project Design and Permitting**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Independence Power, LLC

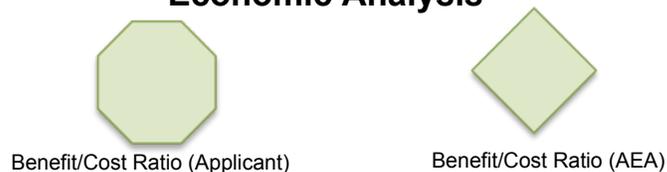
**AEA Program Manager:** Ott

**Applicant Type:** IPP

## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.44
2) Matching Resources (Max 15)	10.50
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Project involves state-owned land and navigable waters. DNR permits required.

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

Engineering considerations for strong ground shaking from subduction zone earthquakes is appropriate. There is high potential for un-mapped fold and thrust faults nearby, warranting focused seismic hazard studies in the area. See general DGGS comment.

**App # 896      MEA Power Plant Waste Heat Utilization Reconnaissance Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Recon

**Proposer:** Eklutna, Inc.

**AEA Program Manager:**

**Applicant Type:** IPP

## Project Description

Matanuska Electric Association (MEA) is building a new electric generating facility in Eklutna, Alaska that will have a generating capacity of 103 to 171 MW and an operational date of late 2014. The estimated recoverable waste heat resource associated with this power plant is 154,000 MMBtu annually. Eklutna, Inc. (EI) holds rights to the waste heat that will be generated by this plant, and owns land adjacent to the plant where waste heat uses would be sited. EI proposes to perform a reconnaissance study of potential uses of this waste heat resource. The reconnaissance study will define the potential uses of this waste heat resource, evaluate the technical and economic viability of these uses, and make recommendations for further study.

**AEA Review Comments and Recommendation** **Withdrawn**

9/21/2011 application withdrawn

## Funding & Cost

Cost of Power: /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$8,000,000

**Requested Grant Funds:** \$100,980

**Matched Funds Provided:** \$19,220

**Total Potential Grant Amount:** \$120,200

**AEA Funding Recommendation:**

**App # 896      MEA Power Plant Waste Heat Utilization Reconnaissance Study**

**Resource:** Heat Recovery

**Proposed Project Phase:** Recon

**Proposer:** Eklutna, Inc.

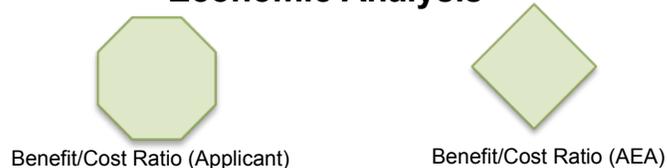
**AEA Program Manager:**

**Applicant Type:** IPP

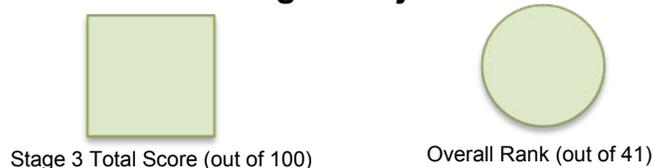
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	0.00
2) Matching Resources (Max 15)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

## DNR/DOF Feasibility Comments

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

**App # 897      Port Graham Village Biomass Waste Heat Demonstration Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Port Graham Village Council

**AEA Program Manager:**

**Applicant Type:** Government Entity

## Project Description

Native Village of Port Graham is proposing the construction of GARN Boiler hot water distribution system to provide heat to five community buildings, homes throughout the Port Graham community, and eventually be connected to a central CHP biomass fired facility. A conceptual design and feasibility review for a central combined heat and power (CHP) biomass-fired plant was completed in 2009. Detailed engineering and economic evaluations were included. The existing diesel-fired hot water heating equipment will be retained and used for backup. The proposed biomass system will displace 80-85% of the diesel to heat these community buildings.

**AEA Review Comments and Recommendation** **Not Recommended**

The Port Graham Village Council proposes construction of a wood-fired boiler to supply heat to the health and dental clinics. Currently the RE Fund is supporting final design and permitting for the project with a grant of \$75,000 matched by \$25,000 in local.

AEA supports the initiative for developing a wood boiler project in Port Graham. However, given the high cost of the project as currently configured and the relatively low fuel displacement, project economics are poor. Under the current grant-funded work, AEA believes that it is reasonable to assess options to lower the costs of the project, increase amount of fuel displaced by supplying more loads, or do both.

No funding recommended.

## Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**  
Railbelt

**Project Cost:** \$485,829

**Requested Grant Funds:** \$426,833

**Matched Funds Provided:** \$58,995

**Total Potential Grant Amount:** \$485,828

**AEA Funding Recommendation:**

**App # 897 Port Graham Village Biomass Waste Heat Demonstration Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Port Graham Village Council

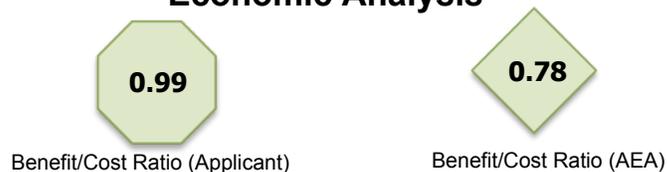
**AEA Program Manager:**

**Applicant Type:** Government Entity

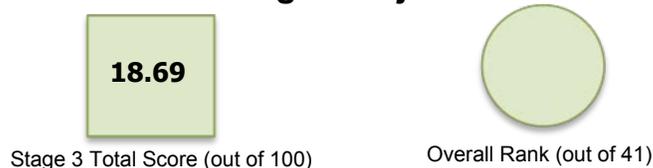
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	7.44
2) Matching Resources (Max 15)	8.25
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 5)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Not on DMLW land. May require permits from DNF-DOF for biomass source.

## DNR/DOF Feasibility Comments

This project is for the construction of two centrally located Garn boilers to heat 5 community buildings within the village. This project was reviewed last year in the Round 4 applications and it has been revised somewhat this year. Total wood use is estimated at 101 bone-dry tons per year. Chugachmiut's GIS and forest inventory data identifies 4,025 acres of Sitka spruce on accessible Native allotments near Port Graham that contain an average 98 bone-dry tons per acre. In addition 10,640 acres of Sitka spruce covered Village Corporation lands are also present. There is a developed logging road system to these lands. Using the 98 BDT per acre volume, approximately one acre of timber would be enough to supply the annual requirements of the Garn boilers. The project appears quite sustainable based on the stated quantities of the raw wood resource.

## DNR/DGGS Feasibility Comments

## DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

## DNR/DGGS Geohazards Comments

\*\*\*See general DGGS comment on hazards.