

## App #600 AVCP Housing Wind Turbine Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** AVCP Regional Housing Authority

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

### Project Description

The purpose of the AVCP Housing Wind Turbine Project is to construct two turbine towers for wind generated energy, with the purchase of land from the City of Bethel for the site, a power generation/controls building, and complete Operations and Maintenance training of permanent employees. The calculated annual projected kWh usage of the Low Income Rental units, Lulu Herron Congregate housing and the AVCP RHA Office Complex and warehouses is 581,573 kWh.

### AEA Review Comments and Recommendation

Not Recommended

AVCP Regional Housing Authority proposes to construct a 200 kW wind energy project to serve their campus in Bethel. AVCP would first purchase land from the City of Bethel for \$670,000 in late 2011, and begin equipment purchase and construction in spring 2012.

There are other significant energy planning and project development activities taking place in Bethel. The City of Bethel has been funded through the RE Fund round 1 for a 400 kW wind project. To date the City and utility have not reached an agreement for power purchase or interconnection. Additionally, Village Wind Power is funded under round 0 to assess feasibility of a large scale wind power project. Napakiak Incinraq Power Company is proposing reconnaissance through design of a wind project. TDX, who state they are assuming ownership of the Bethel utility in summer 2011, has proposed feasibility through construction of a 1+ MW wind system on the Bethel grid. Finally AVCP Regional Housing Authority is proposing study of hydro at the Kiseralik and Chikuminuk Rivers in Round 2 of the RE Fund. Therefore, there is a need for a regional integrated resource energy plan in the Bethel area to coordinate when and where energy projects should be developed. This proposal should be considered in the context of an integrated plan to assure proper sizing, timing, and integration of multiple energy projects. AEA believes that such an overall plan for the Bethel power system should be developed before proceeding with any additional wind development.

AEA has met with City of Bethel, AVCP Rural Housing Authority, Yukon Kuskokwim Health Corporation, Calista Corporation and TDX to discuss regional energy planning, including wind and hydro development. The group has agreed to pursue coordinated energy planning for the region and the Bethel grid.

AEA believes that Bethel's large load provides the opportunity for deploying megawatt scale turbines with better economics than smaller-scale wind installations. TDX, as the major power generator for the Bethel system, is the logical entity to lead feasibility assessment of wind generation in Bethel.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.54 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$3,045,000

**Matched Funds Provided:**

\$750,000

**Total Potential Grant Amount:**

\$3,795,000

**AEA Funding Recommendation:**

## App #600 AVCP Housing Wind Turbine Project

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** AVCP Regional Housing Authority

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

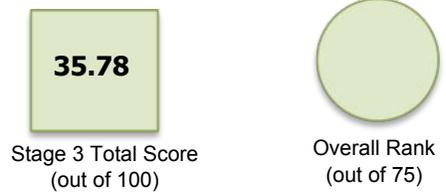
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.78
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #601 Waste Energy Powered Absorption Refrigeration Unit

**Resource:** Other

**Proposed Project Phase:** Design

**Proposer:** Valdez Fisheries Development Assn., Inc.

**AEA Program Manager:** Plentovich

**Applicant Type:** IPP

### Project Description

The project, located in Valdez, AK will capture waste heat generated at the Petro Star Refinery. Waste heat will be collected by a shell & tube glycol medium recovery system. The medium will drive 2 technologies operating in a series. Ammonia absorption technology will create cooling for 45 million pound -20 degree cold storage facility. An organic Rankin Cycle Generator will use the medium once it has exited the ammonia absorption system to create 600 kw's of power which will be used to operate the cold storage facility as well as the Solomon Gulch Hatchery. The final benefit will be to use the cold cycle of the generator to create a salmon rearing facility.

### AEA Review Comments and Recommendation

Not Recommended

Valdez Fisheries Development Association is requesting funding for permitting and final design of a system to convert recovered heat from the Petrostar Refinery to 630 kW of power to the CVEA grid, refrigeration to a cold storage and fish processing facility, and tempered water to the Solomon Gulch Hatchery. VFDA submitted a related application in RE Fund round 2 (#207) that was not recommended for funding because it was for the entire cold storage facility, not the energy system. The VFDA submitted a second application in round 3 (#434) identical to the current application, which limits the scope to the energy system design.

The project has substantial value for demonstrating a system that would aid development of fish processing and cold storage in coastal communities with access to recoverable heat.

However, AEA has the following concerns with this application:

1. VFDA has still not secured financing for the cold storage facility that justifies the absorption system.
2. During round 3 review AEA requested the feasibility analysis for the ORC (power generation) component of the system, but VFDA was unable to provide it. The current application still does not include this analysis.
3. In round 3 AEA requested a breakdown of the \$1 million design budget, but VFDA was unable to provide any detail. The current application still does not include this detail. Without this detail that justifies this cost, AEA must regard this amount as excessive.
4. Similar to the last application there remains no indication they will purchase power from the project, a requirement of the IPP status that make the grantee eligible.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Requested Grant Funds:**

\$1,021,287

**Matched Funds Provided:**

\$350,000

**Total Potential Grant Amount:**

\$1,371,287

**Energy Region:**

Copper River/Chugach

**AEA Funding Recommendation:**

## App #601 Waste Energy Powered Absorption Refrigeration Unit

**Resource:** Other

**Proposed Project Phase:** Design

**Proposer:** Valdez Fisheries Development Assn., Inc.

**AEA Program Manager:** Plentovich

**Applicant Type:** IPP

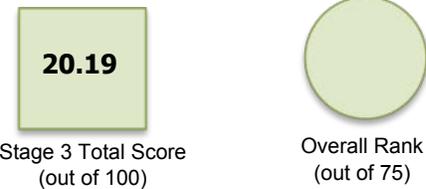
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Possible .850 permits required for the pipeline from Petro to the parcel applicant intends to purchase. DOT has encroachment permits, but those are not likely to be sufficient authorization under a grant program to demonstrate site control. Needs to address the permitting for taking water from Abercrombie Creek for cooling.

### 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 #602 Adak Renewable Diesel Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** TDX Adak Generating, LLC

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

Phase I: Reconnaissance & project feasibility was funded. It includes a site survey; wind resource monitoring installation, data gathering and reporting on first year's data; Feasibility Study and conceptual design. This activity is a preliminary engineering and financial analysis of the potential for a hybrid renewable project. The proposal is for Phase II, Preliminary Design; this proposal will advance the assessment and engineering evaluations conducted in Phase I with the preliminary design efforts necessary to advance the potential project to the stage that it's ready for final design, permitting and construction. Phase III (Final Design & Permitting) will include the final design of the winning resources. Phase IV (Construction) will cover the construction portion of this project.

### AEA Review Comments and Recommendation

Not Recommended

TDX proposes conceptual design and feasibility assessment of a hybrid renewable (wind, geothermal and/or hydro)-diesel system for Adak. TDX proposes to follow-up on an existing grant for \$85,835 matched by \$6,470 to perform a reconnaissance report, monitoring, wind resource report, feasibility study, and conceptual design.

AEA has the following concerns about this application:

1. The existing grant was put in place in May 2010. TDX has made little progress on the existing grant and has not requested reimbursement or submitted any progress reports.
2. The proposed work is for feasibility and conceptual design. This work is already included in the scope of the current grant.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.71 /kWh

**Requested Grant Funds:**

\$250,050

**Matched Funds Provided:**

\$0

**Total Potential Grant Amount:**

\$250,050

**AEA Funding Recommendation:**

**Energy Region:**  
Aleutians

## App #602 Adak Renewable Diesel Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** TDX Adak Generating, LLC

**AEA Program Manager:** Ott

**Applicant Type:** Utility

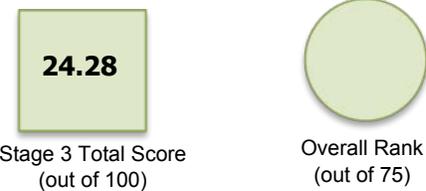
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	22.28
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Scope of Work cited as Attach C not in package for review. Reference to lake utilization affecting several possible lakes in Section 4.1. MTP maps does not show the federal withdrawals affected several of the larger lakes. Possible .850 authorizations from DMLW.

### 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 #603 Takatz Lake Hydroelectric Feasibility Analysis

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

### Project Description

Development of hydroelectric power at Takatz Lake would include construction of a 200-foot high main concrete arch dam, a small 30-foot high secondary saddle dam, power intake, unlined tunnel, power penstock, power plant, tailrace, and transmission line segments including: underground, submarine, and overhead sections. The project would produce approx. 106,900 MWh per year via two 13.8 MW turbine-generators.

### AEA Review Comments and Recommendation

Not Recommended

CB of Sitka requests additional funding for assessing feasibility of the potential 28 MW Takatz Lake hydro project. To date RE Fund round 1 has awarded partial funding of \$1,152,134 to the project for this purpose. For this application CBS is requesting an additional \$2 million.

Project is consistent with findings of the 2008 Sitka Power Supply Plan and would follow less expensive alternatives, including increasing capacity of the existing Blue Lk Hydro project, in order to avoid more costly diesel generation. There is potential for developing road and marine facilities associated with the project that would provide access to the eastern Baranof Island. FERC has issued a preliminary permit to Sitka to assess feasibility of Takatz. Given the widespread interest in linking major electric generation and loads in Southeast, development of Takatz should be coordinated with the SE Alaska Regional Energy Plan.

AEA has recently determined that additional funding is available from round 1 funds to support funding this project at the original Rd 1 application amount of \$2 million. This is also the cap amount for feasibility for this project. The existing grant will be amended to increase its funding level to \$2 million. No additional funding recommended due to the cap.

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$0

**Total Potential Grant Amount:**

\$2,000,000

**AEA Funding Recommendation:**

**Energy Region:**  
Southeast

## App #603 Takatz Lake Hydroelectric Feasibility Analysis

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

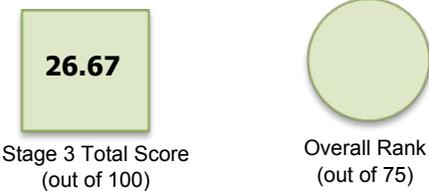
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	11.47
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	2.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project will be authorized by FERC under a federal power withdrawal. Uplands will be owned by the municipality. FERC will have jurisdiction of the dam. There may be an issue that gets bogged down in the ownership of the beds of the Lake. The lake is large enough to be considered navigable. If so, the beds are state owned. Typically the USFS disputes ownership of lakes within the boundaries of the Tongass NF. Part of the project construction would be on the beds of the lake, therefore this might get sticky around the debate of who owns the lands under the lake. A secondary concern may be if there is any road built to support the transmission line because there may be local concerns about a new road from Sitka to Baranof. Will need state tideland and water permits.

### 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 site lies between two major strike slip fault systems. Known active faults do not occur on the project property, however the site is close enough to major sources to experience strong ground shaking. Project is relying on a 1968 report that states that the conditions at the site are adequate for construction of a concrete arch dam. The City is evaluating the need for additional geotechnical studies. An updated geotechnical study should be performed to assess seismic hazards, incorporating information from probabilistic seismic hazard maps. In particular, strong ground motions from earthquakes along the Queen Charlotte-Fairweather and southern Denali fault systems should be addressed. The proposal mentions a proposed geotechnical study that will conduct a query with BLM to see if there are any mineral claims prior to building. This is not the purpose of a geotechnical report. Seismic hazards are not listed as one of the environmental issues to be addressed in the EA. See general DGGS comments.

## App #604 Bethel Renewable Energy Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** TDX Power, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

### Project Description

Phase II includes a site survey; wind resource monitoring installation, data gathering and reporting on 10 month's data in conjunction with existing wind data and will result in completion of feasibility & conceptual design within two quarters of wind data compilation. The project will include the feasibility of building new wind energy capacity and leveraging in other wind projects being planned by the City of Bethel and the Housing Authority. TDX Power is a seasoned rural energy operator with extensive wind turbine experience. TDX Power will complete a Phase III final design by the end of the second year of the project. Phase IV construction will commence in the first quarter of year 3 and will be completed by the end of year 4 with an operating 1 MW rated wind turbine producing 3,050,000 kWh and leveraging a potential additional wind farm capacity of 1 MW to provide a total of 6,100,000 kWh from the combined 2MW of renewable energy to the Bethel utility grid.

### AEA Review Comments and Recommendation

Partial Funding

TDX Power proposes feasibility, design, and construction of 1-2 MW wind energy project for Bethel.

TDX owns and/or operates three wind-diesel power systems in St. Paul, Sand Point, and Tin City. TDX states in their application that they will be assuming operation of the Bethel power utility by summer 2011. Given these circumstances, TDX is an attractive and logical entity to develop a large-scale wind project in Bethel.

However there are other significant energy planning and project development activities taking place in Bethel. The City of Bethel has been funded through the RE Fund round 1 for a 400 kW wind project. To date the City and utility have not reached an agreement for power purchase or interconnection. Additionally Village Wind Power is funded under round 0 to assess feasibility of a large scale wind power project. AVCP has submitted an application for final design and construction in round 4 for a 200 kW wind project to serve Bethel (#600). Napakiak is proposing feasibility and design of wind generation (#697) along its intertie with Bethel. Finally AVCP Regional Housing Authority is proposing study of hydro at the Kiseralik and Chikuminuk Rivers in Round 2 of the RE Fund. Therefore, there is a need for a regional integrated resource energy plan in the Bethel area to coordinate when and where energy projects should be developed. This proposal should be considered in the context of an integrated plan to assure proper sizing, timing, and integration of multiple energy projects. AEA believes that such an overall plan for the Bethel power system should be developed before proceeding with any additional wind development.

AEA has met with the City of Bethel, AVCP Rural Housing Authority, Yukon Kuskokwim Health Corporation, Calista Corporation and TDX to discuss regional energy planning, including wind and hydro development. The group has agreed to pursue coordinated energy planning for the region and the Bethel grid.

AEA believes that Bethel's large load provides the opportunity for deploying megawatt scale turbines with better economics than smaller-scale wind installations. TDX proposes a logical, stepwise approach for developing large scale wind generation in Bethel.

Recommend partial funding of \$213,690 for feasibility analysis and conceptual design with the requirement that TDX work with the City, the Housing Authority, the Health Corp, Calista, Napakiak Ircinraq Power Company, and other entities in regional and community energy planning.

### Funding & Cost

Cost of Power: \$0.54 /kWh

**Requested Grant Funds:** \$3,961,637.5

**Matched Funds Provided:** \$699,112.5

**Total Potential Grant Amount:** \$4,660,750

**AEA Funding Recommendation:** \$213,690

### Energy Region:

Lower Yukon-Kuskokwim

## App #604 Bethel Renewable Energy Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** TDX Power, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

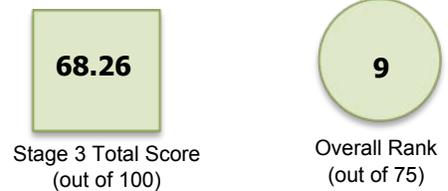
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.78
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	15.40
4) Project Readiness (Max 10)	3.67
5) Benefits (Max 15)	11.75
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Because the project location was not specific enough, can't tell whether any state lands will be involved.

### 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 #605 Biomass Fuel Dryer Project

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** City of Craig, Alaska

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The project consists of acquiring & installing equipment that will dry approx. 13,000 tons of wood waste per year produced as a byproduct of the sawmilling process. Dried wood would then be burned in publicly owned facilities to provide reduced cost, district-style heat for these facilities at a reduced cost to the public entities that operate these facilities. The project enables recipient facilities to burn renewable fuels to provide heat at lower costs over time than the cost to burn fossil fuels to produce heat.

### AEA Review Comments and Recommendation

Full Funding

Applicant proposes to purchase a chip fuel dryer and lease it to the Viking Lumber Mill which currently provides chip fuel to the city of Craig for use in the biomass boiler to heat the pool and school for the community. Fuel could also be made available to other facilities on Prince of Wales Island and other locations.

The new biomass boiler currently has a fuel dryer as part of its system. The moisture content of the fuel has consistently been higher than design parameters. The new dryer would allow for the fuel to be pre-treated before delivery to the school, and could potentially allow for the development of other chip customers for Viking Lumber.

AEA recognizes that there is significant public benefit from this project, however, it believes that there must be reasonable economic return to the public from the allocation of the grant fund, while at the same time assuring that Viking receives reasonable return.

Recommend full funding with the following special provision: Before funds are made available, AEA must approve the lease/operate/maintain business agreement between Viking and Craig.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$350,000

**Matched Funds Provided:**

\$250,000

**Total Potential Grant Amount:**

\$600,000

**AEA Funding Recommendation:**

\$350,000

## App #605 Biomass Fuel Dryer Project

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** City of Craig, Alaska

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

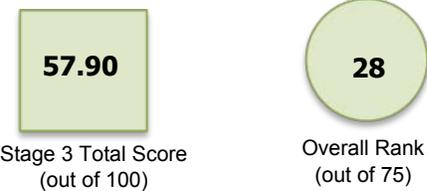
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.16
2) Matching Resources (Max 20)	18.00
3) Project Feasibility from Stage 2 (Max 20)	13.20
4) Project Readiness (Max 10)	9.00
5) Benefits (Max 15)	3.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is for a proposed wood chip fuel drier system. The biomass supply for this project is mill waste generated from the Viking Lumber Company's sawmill. Most of the round log material supply for the mill is coming from the Tongass National Forest. Uncertainty of a consistent log supply from the National Forest continues to arise however timber from State sales has also supported the Viking Mill and provides another potential source of raw material. This project is aligned with broader efforts of the state administration and the multi-agency Tongass Team to support remaining timber processing facilities in Southeast.

### 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 #606 Jack River Hydro Project**

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Native Village of Cantwell

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## 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

**Partial Funding**

The Native Village of Cantwell proposes a reconnaissance study for a 1+MW storage hydro project on the Jack River located near Cantwell. The project would connect to the Railbelt Energy Grid served by GVEA. AEA recommended funding for this project in RE fund round 3 (#402) but insufficient funds were available.

The proposal includes letters of support from Ahtna Inc, Denali Borough, Denali National Park, Golden Valley Electric, and Usibelli Coal.

DNR comments note proximity to the Denali Fault and dam safety issues.

AEA staff accompanied NVC and their potential consultant Polarconsult on a site visit in 2008 and concluded that the project may have merit. However insufficient information has been collected and provided to justify funding for full feasibility and conceptual design.

Recommend partial funding of \$30,000 for reconnaissance assessment.

## Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**

Railbelt

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

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

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

**AEA Funding Recommendation:** \$30,000

## App #606 Jack River Hydro Project

Resource: Hydro

Proposed Project Phase: Recon

Proposer: Native Village of Cantwell

AEA Program Manager: Ott

Applicant Type: Local Government

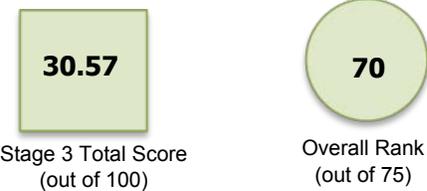
### Stage 3 Scoring Summary

Criterion (Weight)	Score
1) Cost of Energy (Max 25)	5.25
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	7.20
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	0.63
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Not sure of navigability of Jack River but there was a previous dispute of the navigability. May or may not need authorizations from DNR beyond that for dam construction if it went beyond feasibility study. There is mention of a dam being constructed near the Denali Fault. Feasibility of getting a dam construction approved would be an issue our dam safety engineer would have to evaluate. This project must include stream gaging. A gage in this area operated by USGS could cost as much as \$50,000 per year. It will take 5+ years of data to determine if the project is feasible from a water stand point, not including any other studies that may be required.

### 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 proposal does not mention the Denali fault which passes a few miles north of the project site and was the source of the 2002 m=7.9 earthquake. Strong ground motions due to another event on the Denali fault should be considered in the cost estimates of engineering a proper structure to withstand such strong ground motions. See general DGGS comment.

## App #607 Lime Village Photovoltaic System Retrofit

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Lime Village Traditional Council

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

### Project Description

Between 1995 and 2001, Lime Village became the first community in Alaska to develop a hybrid solar and diesel fuel generation electrical system. Hybrid systems use more than one power source to meet its community energy needs. This proposal is to upgrade and retrofit the existing solar system, develop remote monitoring system and provide for ongoing maintenance of the system. The system consists of an array of solar panels that can produce 12KW of electricity. The electricity generated by the solar panels is stored in a battery system. The community's electrical energy needs are then supplied by the batteries and supplemented by a diesel generator. The existing cost of diesel fuel in Lime Village is approximately \$8.00 per gallon. This generates an average electrical cost of \$1.00 to \$1.50 per kilowatt. The community uses approximately 7,000 KW per month and has 30 units using electricity. The proposed retrofit is predicted to result in a significant reduction in the cost of electrical energy.

### AEA Review Comments and Recommendation

Partial Funding

AVCP proposes refurbishing the existing 12 kW photovoltaic-diesel hybrid system in Lime Village. The system was installed in 1999-2001 with donations by British Petroleum and Siemens for the PV panels. Although the panels are reportedly operable, the charger-inverter and control system does not work. The status of the ~100 kWh lead acid battery system is unknown. AEA notes that the efficiency of the Lime Village power system is very low (7.88 kWh/gal).

Given the remoteness and very high cost of fuel in Lime Village, it makes sense to determine if and how the system can be reactivated before allocating funds for the task. \$25,000 is a reasonable estimate for system evaluation.

Recommend partial funding for system evaluation.

### Funding & Cost

Cost of Power: \$1.17 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:** \$69,000

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

**Total Potential Grant Amount:** \$72,000

**AEA Funding Recommendation:** \$25,000

## App #607 Lime Village Photovoltaic System Retrofit

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Lime Village Traditional Council

**AEA Program Manager:** Stromberg

**Applicant Type:** Government Entity

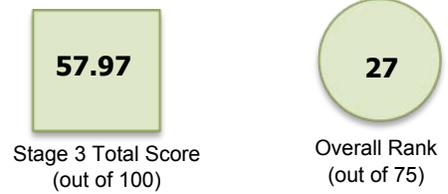
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	25.00
2) Matching Resources (Max 20)	7.00
3) Project Feasibility from Stage 2 (Max 20)	9.27
4) Project Readiness (Max 10)	8.00
5) Benefits (Max 15)	1.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #608 Renewable Energy Feasibility Study**

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Louden Tribal Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

This feasibility study will be used to elect the best technology and to develop a preliminary design for a renewable biomass based CHP (combined heat and power) system to replace diesel fuel for --

1. The Galena electrical power supply and
2. To provide district heating for the utilidor system that serves the Galena Interior Learning Academy (GILA).

The proposed system will provide about 1000 kilowatts of electrical generation capacity and will provide recovered heat for the utilidor. The CHP project is expected to replace about a million gallons of diesel fuel per year by using locally harvested biomass in the form of wood chips.

The technology options appear to be either a steam powered generator and heating system or a biomass gasification system. A reconnaissance study is already in progress to provide the baseline information for this feasibility study. The reconnaissance survey by WH Pacific is scheduled for completion by December 31, 2010.

## AEA Review Comments and Recommendation

**Full Funding**

Louden Tribal Council proposes assessing feasibility of a combined wood-fired heat and power system in Galena. The project under consideration involves formation of a partnership with the biomass owner (Gana-a-Yoo Native Corporation), purchasing and installation of the harvesting equipment, appropriate generation and heat recovery systems, and providing heat for the existing utilidor and buildings occupied by the Galena City School District.

Louden is seeking funding from USDA for assessment and management planning for the local biomass resources. These funds, although important to the effort, are not assured.

Louden has contracted with WH Pacific for a reconnaissance study scheduled for completion in December 2010.

Recommend full funding with requirement that AEA accept the reconnaissance study before any funds are disbursed.

## Funding & Cost

Cost of Power: \$0.56 /kWh

### Energy Region:

Yukon-Koyukuk/Upper Tanana

<b>Requested Grant Funds:</b>	\$100,000
<b>Matched Funds Provided:</b>	\$49,300
<b>Total Potential Grant Amount:</b>	\$149,300
<b>AEA Funding Recommendation:</b>	<b>\$100,000</b>

## App #608 Renewable Energy Feasibility Study

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Louden Tribal Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

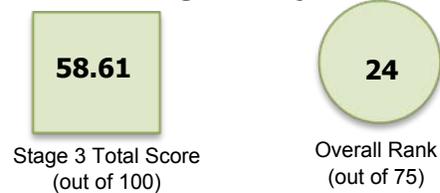
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	17.59
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	14.93
4) Project Readiness (Max 10)	4.33
5) Benefits (Max 15)	14.25
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It is estimated that between 17,000 and 23,000 green tons of biomass would be required for the fuel oil offset. Utilizing conversion estimates from the Tanana Valley State Forest Inventory Update 2010 of 34 pounds per cubic foot and 90 cubic feet of solid wood per cord, this biomass demand is equivalent to over 11,000 cords per year. In perspective, Fairbanks Area State Forestry which currently has the largest timber sales program in the Interior sold 8,724 cords of wood for fiscal year 2010. Conversion of this amount of Galena's fuel oil use would entail a significant timber harvest program. The Tanana Chiefs Conference forestry program has conducted a forest inventory consisting of timber type mapping of Galena village corporation lands. This inventory will be invaluable in determining a sustainable and operable wood supply. TCC has conducted a rough estimate of biomass availability in a ten mile radius of the village and has calculated a volume of over 840,000 tons. The proposal states that a separate grant application will fund a more detailed inventory to refine the volume estimate. TCC has the expertise available to define operable and sustainable biomass resources to help develop an appropriately scaled facility for the village.

### 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 #609 Atqasuk Transmission Line**

**Resource:** Other

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

This phase of the Barrow to Atqasuk Power Transmission Project will initiate the engineering phase of the project concept that was proven to be the most viable in the feasibility study. The intent of the feasibility study was to first determine if there is an economical solution for providing electric power to Atqasuk from a low cost energy source. That source, of course, is the natural gas that is available in the Barrow area. The next goal of the study determines which power transmission concept is the most economical and compatible with the prevailing technical, environmental and social constraints. In short, the most attractive power transmission concept will be the result of the feasibility study.

The winning concept then enters the preliminary engineering phase. The purpose of the preliminary design is to adequately define the project so that all stakeholders can understand it. These stakeholders include the owners, end-users, financiers and the concerned regulatory bodies. It is the basis for gaining approval and agreement to go forth with the project. It should be noted that this preliminary phase of engineering constitutes about 30% of the entire engineering effort. The 70% balance is for final design engineering and is required solely for constructing the project. The final design consists of detailed drawings, specifications and other materials relevant to the construction phase.

Tasks involved during this preliminary engineering phase include the following:

- Establishing the transmission line route
- Determine physical constraints such as rivers, lakes, roads, infrastructure
- Analyze ice and wind loading
- Determine optimum structure types
- Plan structure height, spacing and conductor sag curves
- Determine wire sizes
- Determine grounding requirements
- Identify insulation and hardware requirements
- \* Assess environmental permit requirements
- \* Schedule critical procurement and contracting
- \* Produce cost estimates

## AEA Review Comments and Recommendation

**Full Funding**

The North Slope Borough proposes following up earlier feasibility work funded under the RE Fund round 2(#245) on developing a 70-mile transmission line connecting Atqasuk to the natural gas-fired power plant in Barrow. AEA recognizes that renewable energy resource development is not viable, thus the project is potentially eligible for RE fund support.

NSB's feasibility report is due this winter. Work to date has identified concerns with steller and spectacled eider habitat, raising concerns for increased costs due to possible requirements for underground construction. Additionally right-of-way issues will need to be resolved, including those associated with Native allotments. The current feasibility analysis (#245) does not include conceptual design.

Recommend full funding with provision that AEA accept the feasibility report for the work currently underway (#245) before any funds are disbursed for the proposed project.

## Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

North Slope

**Requested Grant Funds:**

\$210,000

**Matched Funds Provided:**

\$21,000

**Total Potential Grant Amount:**

\$231,000

**AEA Funding Recommendation:**

**\$210,000**

**App #609 Atqasuk Transmission Line**

**Resource:** Other

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

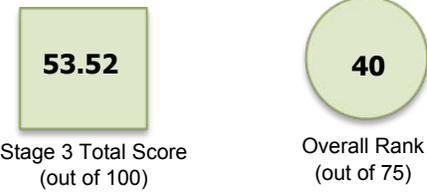
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.69
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	14.67
4) Project Readiness (Max 10)	5.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.17

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

Section 3.4 in AEA application lists DNR environmental permits under "Project Resources" but does not specify which permits

## 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 #610      Kaktovik Wind Diesel**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

## Project Description

The North Slope Borough (NSB) envisions a wind energy and area-wide energy management system, consisting of wind diesel integration, end-use energy efficiency, automated building controls, and conservation. This phase of the project is the feasibility study phase of a three phase project which will include phases for design and permitting, and construction and commissioning for three anticipated wind turbines to supplement the existing power generation and distribution system for the community of Kaktovik. Participants in the project include North Slope Borough, a contracted engineering/design firm, and Northern Power Systems of Barre, Vermont (wind turbine experts and supplier). The contractor will provide overall project management and system engineering during this phase of the project. During the construction phase, MSB will recruit an engineering and construction contractor for design and installation of all civil works, erection of the wind turbines, and installation of all ancillary electrical systems. Northern Power will provide Northwind 100B model wind turbines plus startup & commissioning services.

## AEA Review Comments and Recommendation

**Full Funding**

North Slope Borough proposes feasibility assessment of developing a wind-diesel system in Kaktovik. Currently the North Slope Borough is conducting similar feasibility analyses in Pt. Hope (#413), Pt. Lay (#421), and Wainwright (#412).

NSB has completed onsite wind resource assessment and provides the wind resource report in the application. The report documents a Class 5 wind resource.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

North Slope

**Requested Grant Funds:** \$132,000

**Matched Funds Provided:** \$13,200

**Total Potential Grant Amount:** \$145,200

**AEA Funding Recommendation:** \$132,000

**App #610      Kaktovik Wind Diesel**

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

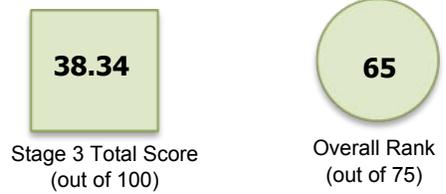
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.69
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	11.40
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	4.50

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW 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 #611 Point Hope Wind Turbine Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

### Project Description

The North Slope Borough (NSB) envisions a wind energy and area-wide energy management system, consisting of wind diesel integration, end-use energy efficiency, automated building controls, and conservation. This phase of the project involves the final design and permitting for three anticipated wind turbines to supplement the existing power generation and distribution system for the community of Point Hope. Participants in the project include North Slope Borough, a contracted engineering/design firm, and Northern Power Systems of Barre, Vermont (wind turbine experts and supplier). The contractor will provide overall project management and electrical system engineering for the project, as well as, in the final phase of the project, the design and installation of all civil works, erection of the wind turbines, and installation of all ancillary electrical systems. Northern Power will provide Northwind 100B model wind turbines plus startup & commissioning services.

### AEA Review Comments and Recommendation

Partial Funding

The North Slope Borough proposes final design and permitting for a 300 kW wind project to serve the Point Hope grid. The Borough is currently working on a round 3 grant for conceptual design (#413) and has completed onsite wind resource assessment which indicates a class 6 resource.

The proposed budget includes \$160,000 for final environmental assessment and mitigation plans. The current work includes \$102,000 for similar activities. AEA believes that it is reasonable to reduce the budget for this on the basis of the previous award.

Since conceptual design is not yet complete, construction cost estimates are very approximate; However, unless the construction cost can be reduced economics for constructing the project will not be favorable,

Recommend partial funding of \$298,000 with requirement that before final design funds are disbursed AEA accept the feasibility and conceptual design report.

### Funding & Cost

Cost of Power: \$0.15 /kWh

#### Energy Region:

North Slope

**Requested Grant Funds:** \$400,000

**Matched Funds Provided:** \$40,000

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

**AEA Funding Recommendation:** \$298,000

## App #611 Point Hope Wind Turbine Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

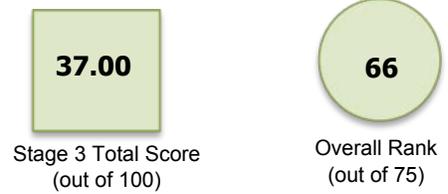
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.69
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	10.93
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #612 Point Lay Wind Generation Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

### Project Description

The North Slope Borough (NSB) envisions a wind energy and area-wide energy management system, consisting of wind diesel integration, end-use energy efficiency, automated building controls, and conservation. This phase of the project involves the final design and permitting for three anticipated wind turbines to supplement the existing power generation and distribution system for the community of Point Lay. Participants in the project include North Slope Borough, a contracted engineering/design firm, and Northern Power Systems of Barre, Vermont (wind turbine experts and supplier). The contractor will provide overall project management and electrical system engineering for the project, as well as, in the final phase of the project, the design and installation of all civil works, erection of the wind turbines, and installation of all ancillary electrical systems. Northern Power will provide Northwind 100B model wind turbines plus startup & commissioning services.

### AEA Review Comments and Recommendation

Partial Funding

The North Slope Borough proposes final design and permitting for a 300 kW wind project to serve the Point Lay grid. The Borough is currently working on a round 3 grant for conceptual design (#421) and has completed onsite wind resource assessment which indicates a class 4-5 resource.

The proposed budget includes \$160,000 for final environmental assessment and mitigation plans. The current work includes \$102,000 for similar activities. AEA believes that it is reasonable to reduce the budget for this on the basis of the previous award.

Since conceptual design is not yet complete, construction cost estimates are very approximate; However, unless the construction cost can be reduced economics for constructing the project will not be favorable,

Recommend partial funding of \$298,000 with requirement that before final design funds are disbursed AEA accept the feasibility and conceptual design report.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

North Slope

**Requested Grant Funds:**

\$400,000

**Matched Funds Provided:**

\$40,000

**Total Potential Grant Amount:**

\$440,000

**AEA Funding Recommendation:**

\$298,000

## App #612 Point Lay Wind Generation Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

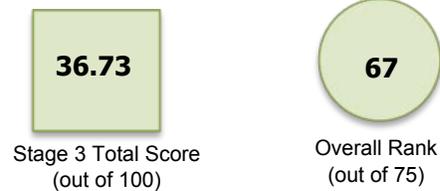
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.69
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	10.67
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #613 Wainwright Wind Turbine Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

### Project Description

The North Slope Borough (NSB) envisions a wind energy and area-wide energy management system, consisting of wind diesel integration, end-use energy efficiency, automated building controls, and conservation. This phase of the project involves the final design and permitting for three anticipated wind turbines to supplement the existing power generation and distribution system for the community of Wainwright. Participants in the project include North Slope Borough, a contracted engineering/design firm, and Northern Power Systems of Barre, Vermont (wind turbine experts and supplier). The contractor will provide overall project management and electrical system engineering for the project, as well as, in the final phase of the project, the design and installation of all civil works, erection of the wind turbines, and installation of all ancillary electrical systems. Northern Power will provide Northwind 100B model wind turbines plus startup & commissioning services.

### AEA Review Comments and Recommendation

Partial Funding

The North Slope Borough proposes final design and permitting for a 300 kW wind project to serve the Wainwright grid. The Borough is currently working on a round 3 grant for conceptual design (#412) and has completed onsite wind resource assessment which indicates a class 4-5 resource.

The proposed budget includes \$160,000 for final environmental assessment and mitigation plans. The current work includes \$102,000 for similar activities. AEA believes that it is reasonable to reduce the budget for this on the basis of the previous award.

Since conceptual design is not yet complete, construction cost estimates are very approximate; However, unless the construction cost can be reduced economics for constructing the project will not be favorable,

Recommend partial funding of \$298,000 with requirement that before final design funds are disbursed AEA accept the feasibility and conceptual design report.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

North Slope

**Requested Grant Funds:**

\$400,000

**Matched Funds Provided:**

\$40,000

**Total Potential Grant Amount:**

\$440,000

**AEA Funding Recommendation:**

\$298,000

## App #613 Wainwright Wind Turbine Design

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** North Slope Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

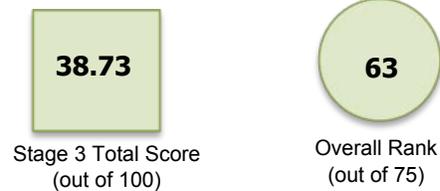
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.69
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	10.67
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #614 NWAB School Alternate Energy Solar Awareness Project

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Northwest Arctic Borough

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

### Project Description

This proposal is for a 700 watt Solar PV array, to be installed on each of the ten NWAB high schools in the Borough, co-generating with the grid. The project explores modular inverter technology for redundancy and also provides a platform for understanding Solar (PV) technology for our student base, supporting an upcoming curriculum-addendum at high school-level and a class at Chukchi College. With an ongoing program for alternate energy in our curriculum, the schools could expand the alternate energy program every spring to the extent allowable by the local utility (KEA) and AVEC and also communicate the technology & teachings to other schools in the State of AK. Over time, the schools could become more and more efficient in their use of energy as each high school finishing class would contribute a project to offset the energy usage in the school. As we incorporate alternate energy sources in Alaska's rural communities, it is important to make a way available for our coming generations to become proficient in the new implementation of the resources. After all, they will live with what we create and have to be able to understand and work with the systems. If this doesn't happen and we have to rely on outside expertise to service the new energy systems, then the cost of operation will be excessive and our effort of lowering energy cost for the region will be hampered. We need to take responsibility now for what we create for future generations. This project will be a start.

### AEA Review Comments and Recommendation

Not Recommended

The NW Arctic Borough proposes installing a total of 7 kW of photovoltaic panels in 10 communities (700 W/community). The purpose of the application is for energy cost reduction and local education. The solar panels would be installed by a Fairbanks supplier.

AEA has the following concerns about this application:

1. Given a cost of almost \$150,000 for all ten systems and total annual fuel savings of only 800 gallons per year, project economics are poor (B/C = 0.54).
2. Since the panels would be installed, not by local community members but by a contractor, education value would be limited.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.70 /kWh

**Energy Region:**

Northwest Arctic

**Requested Grant Funds:**

\$137,209

**Matched Funds Provided:**

\$12,500

**Total Potential Grant Amount:**

\$149,709

**AEA Funding Recommendation:**

**App #614 NWAB School Alternate Energy Solar Awareness Project**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Northwest Arctic Borough

**AEA Program Manager:** Stromberg

**Applicant Type:** Local Government

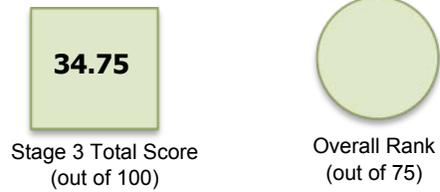
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	21.75
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW 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 #615 CEA Transmission Line to Renewable Energy Resources

**Resource:** Transmission

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Chugach Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

Chugach is proposing to bring the process of route selection and permitting for a new transmission line linking potential renewable energy projects on the west side of Cook Inlet to the existing Chugach system. 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 multi-phased exploration and development plan, with a goal to explore and build a utility scale 50-100 MW geothermal power plant to be connected to the Railbelt power grid around 2016. Ormat has built over 1,000 MW of geothermal plants during the last 3 decades all over the western United States and several locations internationally. Phase 1 of Ormat's exploration, focusing on both aerial and ground based geological and geophysical surveys was completed in August 2010. Phase 2a, focusing on drilling four 500' to 1000' core holes, to measure temperature gradients and other geological features, started early September 2010 and is expected to be completed by the end of the month. Phase 2a will move on to drilling additional, deeper, slim holes in 2011. Both phases (1 and 2a) will be partially cost shared by Oramat and AEA as part of Round III of the Renewable Energy Grant Program. Future Ormat exploration and development phases, planned for 2012-2013, will focus on additional drilling in an attempt to confirm and delineate the geothermal resource. Subsequent geothermal field development and power plant construction and commissioning are expected to take place in 2014-2016. Hydroelectric resource assessment at Lake Chakachamna is not as far along, but a project in the future is possible.

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 operation 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. The initial phase would investigate feasible routes and select a preferred route, including permitting and right of way acquisition. While Chugach would own and operate the line, all purchases (presumably all Railbelt utilities) would be able to access the renewable energy. The line would be designed to accommodate future development of a hydro resource at Lake Chakachamna.

### AEA Review Comments and Recommendation

Partial Funding

Chugach Electric Association proposes a multiphased approach toward developing electrical transmission on the west side of Cook Inlet to carry power from potential geothermal project at Mt Spurr and a potential hydropower project at Lake Chakachamna. Phase 1 (feasibility) consists of preliminary design, route selection, and assessment of permit requirements. Phase 2 (final design) would consist of permits and rights-of-way, geotechnical and survey work, and final design.

Chugach Electric would complete feasibility activities in June 2012. Following feasibility, Chugach would complete final design activities in June 2013. The proposal provides only a general description of project tasks and costs.

Ormat is test drilling on Mt. Spurr four 500-1000' depth core holes and plans to drill additional deeper slim holes in 2011 as part of round 3 grant #477. Additionally, Ormat has applied for a round 4 grant (#652) to construct a test well. Chakachamna would involve a lake tap from Lake Chakachamna, a 10 mile power tunnel leading to an underground power house in the McArthur River Basin. The two power generation projects have not been proven to be technically and economically viable and also may have environmental permitting challenges. Railbelt IRP findings are favorable for both Mt. Spurr and Chakachamna projects. Under direction from the Legislature, AEA is undertaking additional analyses to determine the feasibility of Chakachamna in relation to other large hydro projects on the Railbelt. The results of that study are not available on the date of this review.

Since the two energy generation projects remain in the feasibility determination phase, AEA believes it is reasonable to provide funding for the proposed transmission project to completion of the feasibility.

Recommend partial funding of \$600,000 with the requirements that CEA prepares a more detailed scope and budget for AEA approval.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:** \$1,700,000

**Matched Funds Provided:** \$80,000

**Total Potential Grant Amount:** \$1,780,000

**AEA Funding Recommendation:** \$600,000

## App #615 CEA Transmission Line to Renewable Energy Resources

**Resource:** Transmission

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Chugach Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

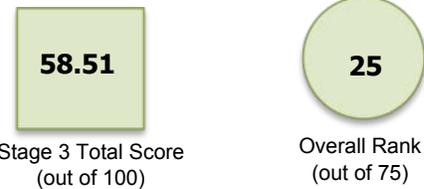
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	17.67
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	14.13
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Possible .850 permits required. Project describes usage of what is presumed to be state managed land or water based on information furnished.

### 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 #616 GVEA Eva Creek Wind Turbine Purchase

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Golden Valley Electric Association

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

GVEA plans to award the EPC contract and wind turbine purchase contract in April 2011. The wind turbine purchase contract will require a 10% down payment based on discussions with possible wind turbine suppliers. GVEA will be purchasing 12-24 wind turbines depending on the results of a wind turbine evaluation. The turbines under review are sized from 1-2.2 MW. The total planned output of the Eva Creek Project is 24 MW.

### AEA Review Comments and Recommendation

Full Funding

GVEA requests funding for ordering wind turbines for a 24 MW project in the Healy area. AEA has provided \$2 million toward feasibility and permitting in round 1 (#109). Turbines are scheduled for purchase in summer 2011 following consideration of bids from turbine suppliers and EPC contractors by the GVEA board. Site work and turbine erection would be completed in summer 2012. The project would be commissioned in summer 2012.

GVEA has received federal approval for CREB bond financing.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.17 /kWh

#### Energy Region:

Railbelt

**Requested Grant Funds:**

\$1,463,200

**Matched Funds Provided:**

\$36,329,400

**Total Potential Grant Amount:**

\$37,792,600

**AEA Funding Recommendation:**

\$1,463,200

## App #616 GVEA Eva Creek Wind Turbine Purchase

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Golden Valley Electric Association

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.25
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	15.77
4) Project Readiness (Max 10)	8.00
5) Benefits (Max 15)	8.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This is now in the process of permitting and evaluation by DNR. Access for construction is the biggest challenge to get the turbines up the mountain and across the river, but GVEA is evaluating the requirements.

### 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 #617 Tok School Biomass Heating Project

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Alaska Gateway School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

Phase I of the Tok School biomass heating project is scheduled to be complete Oct. 2010. Project was developed using AEA Round I Grant funding. Project consisted of a biomass heating facility that contained an automated biomass heating system that will heat the existing K-12 school. Phase II which is seeking AEA round IV grant funding, is an extension of the Tok School biomass heating project and will consist of the bid alternates that were developed during Phase I but not constructed. Bid alternates that would be of most benefit to the facility & will be part of the scope of work for Phase II will consist of: 1) Bid Alternate 1: Extending a hot water heating loop & related mechanical & electrical integration from the biomass heating facility to a detached multipurpose building which houses an ice hockey rink and shooting range and also to an additional detached Zamboni garage. Both buildings are located on the Tok School campus. 2) Bid Alternate 3: Adding a heat exchanger in the K-12 school building to isolate new biomass boiler system fluid from existing K-12 school heating system fluid.

### AEA Review Comments and Recommendation

Not Recommended

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 new wood heating system at the Tok School is very promising. However, given that the project would displace 9720 gallons of heating fuel per year at a cost of \$754,651, economics are not favorable.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.53 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:**

\$754,651

**Matched Funds Provided:**

\$560,000

**Total Potential Grant Amount:**

\$1,314,651

**AEA Funding Recommendation:**

## App #617 Tok School Biomass Heating Project

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Alaska Gateway School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

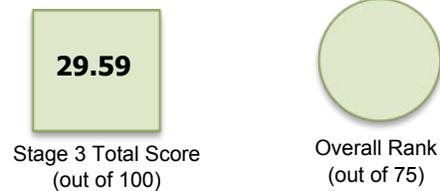
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.59
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It is also stated in the proposal that based upon current fuel oil consumption; the wood boiler is estimated to use 800 tons of wood fuel each year. Using the figure of 40 tons per acre as estimated in the above AP&T project (AEA #665), 20 acres per year would be required to heat the school. This amount appears to be available in a sustainable manner for the Tok area. Even if one uses the more conservative 27 tons per acre as calculated in the Tanana Valley State Forest Inventory Update 2010 for poletimber and sawtimber types, then approximately 30 acres per year would be required to heat the school. This material is projected to be available to the school at roughly \$60/ton in chipped form. Thus 800 tons of wood chips would cost the school \$48,000 versus about \$138,000 for fuel oil, a \$90,000 annual savings. The applicant at page 5, item 2.6, incorrectly states that the Alaska Division of Forestry will be chipping the 1,000 to 1,200 green tons of decked material resulting from fuel reduction projects. While the material is available to the project, the Alaska Gateway School District will be responsible for hiring and paying for contractors to process the decks using the Tok Umbrella Corporation's rotochopper. Because some of the forest supply would be land outside of State Forest land, there may be a need for additional DMLW permits for the fuel reduction projects in the long term.

### 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 #618 CVEA Silver Lake Feasibility**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Copper Valley Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

The primary purpose of this application for preliminary permit is to secure the right to investigate the power potential at Silver Lake and determine the best adapted use of that power potential in the geographic area, including CVEA's system. Detailed maps showing the project boundary and study area are provided in Exhibit 3-Project Maps & Photos. CVEA proposes to step down from generation voltage at the project to serve local requirements in the immediate area. The transmission segment that would connect the proposed Silver Lake project to CVEA's system in Valdez is therefore not jurisdictional as a "primary line" and would be constructed under State of AK approvals. Two alternative approaches to this line are provided in Exhibit 4.1, Alternative Transmission Line Routes.

## AEA Review Comments and Recommendation

**Full Funding**

CVEA proposes studies to address fish, wildlife, water use, geology, soils, cultural, recreational and other potential impacts of a 20-40 MW hydro project at Silver Lake. CVEA applied for reconnaissance assessment funding in round 3 (#452) and were recommended for funding, however there was insufficient funding for the project. Since then, CVEA has funded a recon study using their own resources. This recon report is to be completed in December 2010. CVEA has applied to FERC for a preliminary permit for Silver Lake, which is anticipated to be issued in the near future.

CVEA has received \$2,288,000 in round 1 funding and \$1,000,000 in legislative funds for feasibility analysis of Alison Lake hydro. Given the current load of the CVEA system it is likely that either, but not both Allison Lake and Silver Lake hydroelectric projects can be economically developed.

A significant factor in the feasibility of Silver Lake is development of a 20-mile transmission line through mountainous terrain from the proposed power house to Valdez. Silver Lake was studied in the 1980s and 90s and was not pursued further due to poor economics and fish habitat issues. The project, however, would provide substantial amounts of energy, significantly greater than the output of Alison Lake.

Recommend full funding with special provision that a CVEA -funded reconnaissance report that addresses Silver Lake's project economics and potential fatal flaws is provided to AEA, and AEA concurs with the recommendations to proceed to further study of Silver Lake. Also AEA will want to see a thorough analysis of the land ownership issues associated with this project in the feasibility stage since that will affect licensing provisions. (See DMLW comments).

## Funding & Cost

Cost of Power: \$0.33 /kWh

**Energy Region:**  
Copper River/Chugach

**Requested Grant Funds:** \$637,500

**Matched Funds Provided:** \$212,500

**Total Potential Grant Amount:** \$850,000

**AEA Funding Recommendation:** \$637,500

## App #618 CVEA Silver Lake Feasibility

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Copper Valley Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

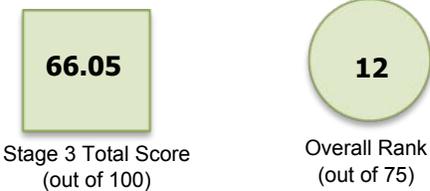
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	10.34
2) Matching Resources (Max 20)	16.00
3) Project Feasibility from Stage 2 (Max 20)	16.33
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	11.88
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Been discussed as a hydro site for 20+ years. Past feasibility studies should be evaluated. Will be a FERC project. Will need water, tideland, and fish habitat permits. From the cursory review it appears that Silver lake is actually in Chugach National Forest rather than Native Corp Lands as stated in the application. There is no federal power withdrawal so Chugach NF would have to make a specific decision to allow this use of increasing the size of the lake. Secondly the lake appears to be of sufficient size to make this a navigable lake, thus state owned lands under the lake and would require state permits. This ownership issue may get sticky when determining who owns the beds of the lake. Finally LSH 536 is a conservation easement that recognizes this potential hydro site but limits the us to 15 acres and needs approval from both Tatitlek and USFS.

### 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 site lies just within the zone that was uplifted during the 1964 Prince William Sound earthquake. This should be accounted for in design considerations. The project calls for an 18 mile submarine cable for power delivery. Submarine landslides due to strong ground shaking and earthquakes and other causes have been documented in Valdez Bay. This hazard to the transmission line should be addressed. Proposed geologic studies if conducted should incorporate the above topics. See general DGGS comment.

## App #619 Port St. Nick Fish Enhancement Hydropower

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Coffman Cove

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

### Project Description

The City of Coffman Cove and Craig partnered in a King Salmon Enhancement Program. We built a hatchery at the Craig water treatment plant with Pacific Sustainable Salmon Funds. This was the first year of return for Port St Nick's fish. Upwards of 6,000 fish returned to the area. Next year will be Coffman Cove's first year of returning fish. The Port St. Nick site was chosen due to the availability of generous quantities of high pressure water feeding the Craig water plant. An 8 inch line is currently side tapped into a 12 inch line to feed the hatchery. Inside the hatchery there are pressure reduction valves to step down the pressure from 250 lbs to an operational pressure of 10 PSI. This results in a waste of hydro energy that could be used to drive a small hydro electrical plant effectively producing power and depressurizing and providing the hatchery needs simultaneously. Electricity produced from a small hydro plant could be used to provide power to the grid, be used to supplement or provide power to the water plant and be purchased to provide funds for rearing of King Salmon smolts.

### AEA Review Comments and Recommendation

Not Recommended

The City of Coffman Cove proposes to construct 55 kW project that would capture hydro energy from the penstock that provides water supply to the City of Craig Water Treatment Plant and the Port St. Nicholas fish hatchery near Craig.

AEA has the following concerns about this project:

1. The RE Fund has already allocated funding to the 5 MW Reynolds Creek (RC) project and the Northern Prince of Wales Intertie that provides all electrical needs for the island for the foreseeable future. The RC hydro project is expected to spill water over much of the next decade.
2. The application provides little to no reconnaissance, feasibility or design information.
3. Business arrangements are not described.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$158,400

**Matched Funds Provided:**

\$39,600

**Total Potential Grant Amount:**

\$198,000

**AEA Funding Recommendation:**

## App #619 Port St. Nick Fish Enhancement Hydropower

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Coffman Cove

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

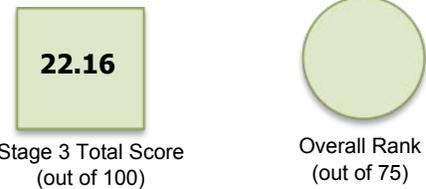
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.16
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Hatchery has existing Water rights, will likely need additional water rights or amendment to existing water rights for hydro.

### 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 #620     Whitman Lake Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

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

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

## Project Description

The proposed 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 & sportfishing industries.

## AEA Review Comments and Recommendation

**Partial Funding**

Ketchikan Public Utilities proposes to construct a 4.5 MW storage hydro project on an existing dam at Whitman Lake. KPU was funded at \$1.3 million for final design and permitting under RE fund round 2 (#37) and expects to complete this work by December 2010. KPU has reached a settlement agreement with DNR, ADFG, and the USFS on the project.

KPU plans to finance the \$14.5 million balance of the project using unspecified grants, municipal bonds, or other options.

With legislative funding, AEA is currently developing a regional integrated energy resource plan for Southeast Alaska. Whitman Lake hydro appears to be a viable energy resource that could be valuable in satisfying future energy and capacity demands for the SEAPA network at large. However, this cannot be confirmed until the Southeast IRP (SEIRP) project is complete. One specific output from this plan is a preferred generation resource plan. Currently there is not sufficient information to serve as a basis for an economic analysis. This analysis will be done as a part of the SEIRP.

Partial funding of \$700,000 (\$2 million cumulative cap for final design/construction minus \$1.3 million granted in round 2) recommended.

Special provisions are as follows: (1) Grantee to demonstrate that all preconstruction activities (including those previously funded under Round 1 RE Fund grant) have been completed in a manner acceptable to AEA, including resolution of all land and site control issues; (2) Before any funds can be paid out under this grant, grantee will submit a project financing plan acceptable to AEA which describes the source and financial cost of all committed funds required to complete the entire Whitman Lake project and allow it to produce and sell power; (3) Provide FERC notice to proceed with construction activities; and (4) Consistent with AEA policy, energy and capacity from this project must be available to all ratepayers on the SEAPA network on an equal, non-discriminatory Basis; and (5) Scope of work is consistent with findings of the Southeast Alaska IRP. .

## Funding & Cost

Cost of Power: \$0.10 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:** \$2,000,000

**Matched Funds Provided:** \$14,500,000

**Total Potential Grant Amount:** \$16,500,000

**AEA Funding Recommendation:** \$700,000

## App #620 Whitman Lake Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

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

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

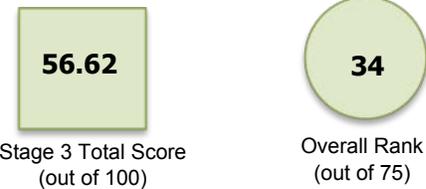
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	3.00
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	13.70
4) Project Readiness (Max 10)	7.67
5) Benefits (Max 15)	2.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Project is progressing with permitting mostly done. May need slight adjustment to move the location of the access road.

### 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 ~110 miles 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 geologic feature. See general DGGS comment.

## App #621 Akutan Geothermal Development Project

**Resource:** Geothermal

**Proposed Project Phase:** Design

**Proposer:** City of Akutan

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

This project is the continuation of the Hot Springs Bay Valley Geothermal Recon. Project, previously funded under AEA REF Grant Agreement #2195475. Surface exploration & analysis, a preliminary technical feasibility assessment and economic assessment were completed in 2009-2010. With the City's commitment of an additional \$1.2 million, exploratory drilling of two test wells was completed 8/10. Drilling program confirmed presence of a geothermal resource sufficient for final design & permitting as described in Phase III requirements listed in Section 2.5 of RFA AEA 11-005. This Round IV grant application is a request for funds to complete Phase III, Final Design & Permitting.

### AEA Review Comments and Recommendation

Full Funding

The City of Akutan proposes to complete final design and permitting of a geothermal power plan serving the City and Trident Seafoods. The City of Akutan began this project under a RE Fund Round 2 grant (#246) and continued with partial funding under a round 3 grant (#470). In the summer of 2009, the City performed surface exploration work, including field mapping, CSAMT and remote sensing, to help choose drill sites. In summer 2010 two wells were drilled with good results. The first well hit several shallow, hot aquifers (up to 359F at 585 ft). The second well was evidently less permeable and did not encounter much fluid, although an elevated geothermal gradient was recorded.

The City is proceeding with feasibility stage activities, scheduled for completion in June 2011. Pending are finalization of the resource assessment, conceptual design and project cost, financial analysis, preliminary power sales agreement, and a draft operational and business plan.

DGGS finds that "Drilling at Akutan during the summer of 2010 confirmed the presence of a high-temperature geothermal resource at Akutan. This resource is comparable to that at Makushin, and is in the tens-of-megawatts class.." The substantial geothermal resource combined with the substantial energy load of the fish processing plant and the City of Akutan indicates promise for this project.

Recommend full funding with provision that before funds are made available for final design and permitting, the City must provide to AEA and AEA must accept a feasibility assessment that justifies continued project development.

### Funding & Cost

Cost of Power: \$0.32 /kWh

#### Energy Region:

Aleutians

**Requested Grant Funds:**

\$2,695,000

**Matched Funds Provided:**

\$355,000

**Total Potential Grant Amount:**

\$3,050,000

**AEA Funding Recommendation:**

\$2,695,000

## App #621 Akutan Geothermal Development Project

**Resource:** Geothermal

**Proposed Project Phase:** Design

**Proposer:** City of Akutan

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

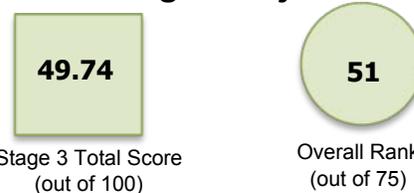
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	10.09
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	11.90
4) Project Readiness (Max 10)	5.67
5) Benefits (Max 15)	2.75
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Will require Temporary Water Use Authorization (TWUP) for drilling. The project may need water right if developed, depending on the water temperature. AOGCC would still regulate the geothermal drilling.

### DNR/DGGS Feasibility Comments

Drilling at Akutan during the summer of 2010 confirmed the presence of a high-temperature geothermal resource. This resource is comparable to that at Makushin, and is in the tens-of-megawatts class, as distinct from resources such as Chena, which is in the hundreds-of-kilowatts class. Akutan's combination of a good resource and coordinated management and investigation teams make Akutan the most promising high-temperature geothermal resource in the state. This proposal documents as fully as possible the extent of results of previous and ongoing work. The proposal itself is for Phase III, final design and permitting. This is clearly the next step, but is somewhat removed from the geologic aspects of the project on which DGGS can provide meaningful technical 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 #622 Cordova Community Biomass Feasibility Study

**Resource:** Biomass

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Native Village of Eyak

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The Native Village of Eyak proposes a feasibility study to evaluate the potential of installing a biomass heating system to heat one or more community buildings. The community would utilize wood waste from the community burn pile and cardboard from the landfill. Alder from right-of-way clearing of roads would also be considered as a fuel source. The community would develop a community energy audit protocol as part of the feasibility process.

(Project description edited for length and clarity.)

### AEA Review Comments and Recommendation

Partial Funding

Applicant Native Village of Eyak proposes assessing feasibility of heating buildings in Cordova with local wood and waste cardboard. The applicant also proposes to develop a community energy audit protocol. The applicant requested funding for this project last year (#408) and AEA recommended partial funding. However, the project was not funded due to insufficient funding.

Based on prefeasibility reports provided upon AEA request, the community may need to utilize local wood in addition to the burn pile.

The budget provided in the application does provide justification for what appears to be a very expensive feasibility analysis. Based on experience with other biomass thermal projects in Alaska, AEA recommends partial funding of \$75,000.

### Funding & Cost

Cost of Power: \$0.33 /kWh

**Energy Region:**  
Copper River/Chugach

**Requested Grant Funds:** \$245,065

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

**Total Potential Grant Amount:** \$248,065

**AEA Funding Recommendation:** \$75,000

## App #622 Cordova Community Biomass Feasibility Study

**Resource:** Biomass

**Proposed Project Phase:** Design Feasibility

**Proposer:** Native Village of Eyak

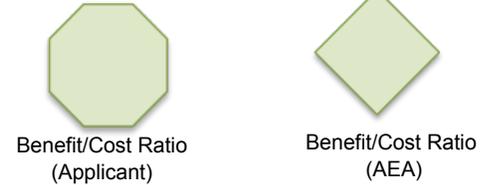
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

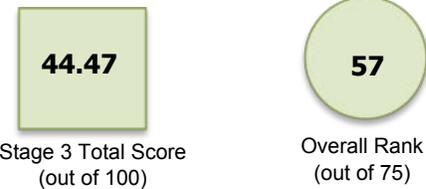
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	10.34
2) Matching Resources (Max 20)	7.00
3) Project Feasibility from Stage 2 (Max 20)	11.33
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	2.63
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is for a feasibility study for the utilization of waste wood and cardboard to heat one or a few public buildings. The study will analyze the community's energy needs. The project proposal also states that alder growing on village corporation land to the east will also be considered as a potential fuel source. The Forest Service is currently conducting a Lidar remote sensing analysis of the extent of this resource. This project appears to be a reasonable approach to analyzing the feasibility of utilizing biomass for a building heating program. Most of the feasibility research focuses on the waste wood and cardboard aspect. Analyzing the feasibility of alder use may require additional study of the economic operability and sustainability of the resource not specifically mentioned in the project proposal.

### 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 #623 Susitna Valley High School Wood Heat

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Matanuska Susitna Borough

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The proposed project is to design and build a redundant wood fired heating plant to heat the Susitna Valley High School with fuel wood which will be sustainably harvested from an appropriately-scaled, designated, land-base selected from nearby Borough timber lands. It includes the Energy Building which houses the boilers, the connection piping to the building and the controls required to monitor and control the system. The project also includes the on site storage of the split cordwood. A long-term management plan for the designated timber lands will be developed in which a Secondary Vocational-Education curriculum can be enfolded that will directly involve student and community participation in ongoing studies of forest regeneration, biodiversity, timber harvest, wood products development, trail development and managing for multiple use.

### AEA Review Comments and Recommendation

**Full Funding**

The Matanuska-Susitna Borough proposes design and construction of a cordwood-fired heating system for the Susitna Valley High School. The project would displace approximately 22,000 gallons of heating oil per year using approximately 250 cords of wood per year with a delivered cost of \$200/cord.

The proposal is based on a detailed feasibility analysis completed in 2009 with support from a grant under the Denali Commission/AEA alternative energy grant program. The analysis considered conceptual design of the wood boiler systems as well wood fuel availability and cost.

The proposal to heat the school has many attractive features, including creating jobs and enhancing educational opportunities of the local students, providing a research forest, and demonstrating biomass energy in a relatively accessible part of the state. Based on the feasibility report there is an ample, sustainable wood supply and the school would save \$20,000-50,000 per year.

AEA has received a letter expressing concern about the project impacts on the nearby forest, air emissions from the facility, and economic benefit versus cost.

AEA is concerned about the relatively high project cost and marginal economics using the standard 20-year project life assumption. The feasibility report runs sensitivity analyses and concludes that project economics are attractive using only the most optimistic assumptions for heating load, wood consumption and price, and project cost. During the final design and permitting stage, AEA strongly encourages the Borough to consider alternate combustion systems and construction methods to improve the economics of the system

Recommend full funding with the requirement that before construction funds are released for the project, the Borough prepare a final design acceptable to AEA.

### Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:** \$750,000

**Matched Funds Provided:** \$5,500

**Total Potential Grant Amount:** \$755,500

**AEA Funding Recommendation:** \$750,000

## App #623 Susitna Valley High School Wood Heat

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Matanuska Susitna Borough

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

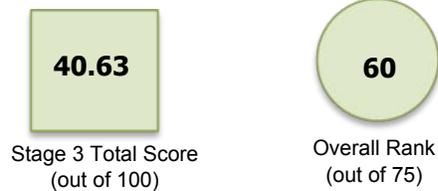
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.28
2) Matching Resources (Max 20)	7.00
3) Project Feasibility from Stage 2 (Max 20)	11.27
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	2.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is for a proposed cordwood fueled Garn boiler school heating system. It is estimated that 253 cords of fuelwood will be required annually and will offset 20,800 gallons of heating oil. Current price of the displaced fuel oil is \$58,448. A report completed for AEA's feasibility funded study of this project (Northern Economics Report 2009) estimated an annual timber harvest area of 16 acres. The study also estimated a delivered price for wood at approximately \$200 per cord or \$50,600. The project proposal states that the wood supply will come primarily from Mat-Su Borough owned forests located in relatively close proximity to the school. It states that 1,400 acres of "dedicated borough land" will provide a sustainable harvest block. The assumptions are using approximately 16 cords per acre with an 88 year rotation length. The 16 cords per acre may be somewhat generous given the fact that the harvesting may not be all by the clear cut method. A more conservative estimate of 10 cords per acre would require roughly 25 acres per year or 2,200 acres of a sustainable harvest block. The Mat-Su Borough has just recently completed a land management plan which has allowed the sale of timber to begin again after a moratorium was placed on timber sales prior to the plan's adoption and completion. The project proposal states that it is the Mat-Su Borough's intention to offer between 400 and 600 acres per year of commercial timber sales. This figure may vary depending upon public input on individual timber sales. The management plan mentioned supplying a proposed boiler facility from its management units, but did not specifically mention "dedicated borough land" for the project. The Division of Forestry is currently preparing an inventory for forest classified lands in the Mat-Su valley. This inventory will update the volume and acreage of lands available for timber harvest. Significant accessible timber areas are present in the Willer-Kash road area. State timber areas will allow additional timber supply from more than just the Mat-Su Borough land ownership. Currently the State is scheduling approximately 1,000 acres per year in the Mat-Su valley. The supply of timber from borough and state lands would appear to be more than adequate to supply this project. The location of specific sales however will still have an influence on the delivered price of the raw material.

### 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 #624 Wrangell Electric Vehicle Feasibility Study

**Resource:** Other

**Proposed Project Phase:** Construction

**Proposer:** City & Borough of Wrangell

Design

Feasibility

Recon

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

### Project Description

This project is a conceptual design/feasibility study of localized testing and evaluation of electric vehicles and related infrastructure in an Alaska community, using locally-generated renewable electricity to displace the use of gasoline and diesel vehicle fuel. The community served by this project is Wrangell, Alaska. Directly involved in this project is the City and Borough of Wrangell (City), through Wrangell Municipal Light and Power (WMLP), and the Southeast Alaska Power Agency (SEAPA). The City is requesting grant funds for a feasibility/design study/cost estimate of an electric vehicle charging station in Wrangell, presumably to be located at City-owned buildings such as the WMLP/public works, well as a feasibility/market study of the types of electric vehicles most appropriate for use in Wrangell. Different business models, including an EV rental car pool, would be explored. Cost estimates for partially converting the city's vehicle fleet to EVs could also be prepared.

### AEA Review Comments and Recommendation

Partial Funding

The City and Borough of Wrangell proposes assessing feasibility of using electric vehicles utilizing excess hydro from the southern Southeast electric grid. Specifically, as an output of the project the City proposes to purchase an electric car and develop a charging station in Wrangell.

AEA supports the concept of displacing transportation fuel using renewable energy resources where shown to be economically feasible. AEA notes the benefit/cost ratio is 0.39 assuming 5 cent per kWh power over a 15 year project life. We are concerned that power may not be available at this rate for the long-term.

Impacts of conventional power consumption, heating conversions, and electric transportation are being considered in the Southeast Alaska IRP project, expected to be complete by the end of 2011. For this reason we feel it would be useful to the IRP project for portions of this work to be done. Specifically, work that would be useful includes studies on the impacts of electric vehicles on the City distribution system, incremental impacts that electric vehicles will have on the future energy consumption and power demand for the Wrangell system, and opportunities for deploying smart grid technology.

Recommend partial funding of \$25,000 for reconnaissance study that will be useful to the Southeast IRP project with requirement that scope must be developed in coordination with the AEA-led IRP.

### Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$112,500

**Matched Funds Provided:**

\$12,500

**Total Potential Grant Amount:**

\$125,000

**AEA Funding Recommendation:**

\$25,000

## App #624 Wrangell Electric Vehicle Feasibility Study

**Resource:** Other

**Proposed Project Phase:** Construction

**Proposer:** City & Borough of Wrangell

Design

Feasibility

Recon

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.13
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	9.40
4) Project Readiness (Max 10)	0.67
5) Benefits (Max 15)	1.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



Benefit/Cost Ratio  
(Applicant)



Benefit/Cost Ratio  
(AEA)

### Scoring & Project Rank



Stage 3 Total Score  
(out of 100)



Overall Rank  
(out of 75)

### DNR/DMLW 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 #625 Excursion Inlet Hydro Project Phases I and II

**Resource:** Hydro

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** Haines Borough

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

### Project Description

AEA Renewable Energy Fund grant guidelines require a multi-phase approach to project development. The Borough is requesting funds for the first two phases in this application: Reconnaissance and Feasibility/Conceptual Design Studies. The tasks for this project are described in Section 2.4 of the grant application instructions

### AEA Review Comments and Recommendation

Partial Funding

The Haines Borough proposes reconnaissance and feasibility assessment of two hydro projects totalling 3 MW and 1.5 miles of transmission to connect to the Ocean Beauty's fish processing facility and residences in the community of Excursion Inlet.

As the proposal notes "barriers to project development will include anadromous fish concerns...." Major concerns with protection of these species include minimum flows below a diversion facility and the need for both upstream and downstream fish passage at the intake structures".

The applicant does not indicate who owns the land on the projects would be developed. The processor and most residences are seasonal.

Recon study should address fish habitat, electrical service and estimated load for the Borough subdivision, establishment of community utility, business arrangement for selling power to the fish processor Ocean Beauty, site control and land ownership, and FERC jurisdiction. Specifically, the recon work shall include consideration of fish habitat issues as it affects the cost, capacity, and energy output of the project and environmental licensing concerns.

Recommend partial funding for reconnaissance study.

### Funding & Cost

Cost of Power: \$0.21 /kWh

**Energy Region:**  
Southeast

**Requested Grant Funds:** \$317,130

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

**Total Potential Grant Amount:** \$327,130

**AEA Funding Recommendation:** \$93,593

## App #625 Excursion Inlet Hydro Project Phases I and II

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Haines Borough

Recon

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

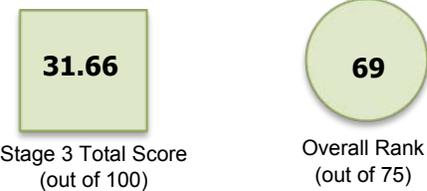
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.63
2) Matching Resources (Max 20)	7.00
3) Project Feasibility from Stage 2 (Max 20)	7.53
4) Project Readiness (Max 10)	1.67
5) Benefits (Max 15)	1.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

The state would probably request a navigability determination to understand whether the inlet creeks are state owned. The project would have to address the anadromous fish habitat in the streams. Two proposed sites and little or no discharge date. Review of past proposals and studies may provide basic information, but hydrology will require up to 5 years of flow data.

### 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 Chatham Straight segment of the Denali fault passes ~15 miles east of the project site. Strong ground motions due to future earthquakes on this structure should be considered in engineering designs. See general DGGS comment.

## App #626 Carlson Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

APC proposes to construct the 300 kW Carlson Creek Hydroelectric Project (Project), which will be located approximately 8 miles north of Slana on the Glenn Highway (Tok Cutoff). The Project would off-set diesel generation which presently supplies power to the communities of Slana, Chistochina, and Mentasta. The Project will consist of two small diversion structures, approximately 13,200 feet of penstock, a powerhouse with a single generating unit, tailrace, small substation, and a very short length of transmission line. For about half the year, the Project operation will be run-of-river, but during the colder months the Project will draw water from Carlson Lake. The potential annual generation is estimated to be approximately 1,200 MWh/yr, which is about equal to the current annual requirements of the three communities.

Therefore, the Project has the potential to almost offset 100% of the current diesel generation. The Project will provide clean, renewable electricity, as well as rate stabilization. The cost to maintain a hydro project is also significantly lower than diesel generation.

## AEA Review Comments and Recommendation

Not Recommended

APC (a wholly owned subsidiary of Alaska Power and Telephone) proposes feasibility assessment, permitting and final design for a 300 kW hydro project at Carlson Cr. that would serve Slana and Chistochina.

This is a continuation of a project reconnaissance assessment funded in round 2 (#226), now projected to be complete in spring 2013. As part of the current work APC will request a project jurisdictional determination by FERC.

APC submitted a similar proposal in round 3 (#443) that was recommended for funding. However insufficient funding was available.

Work under the current proposal would not begin until fall 2013. It is reasonable for APC to complete current work and resubmit an application for funding after determining project viability.  
Recommend no funding.

## Funding & Cost

Cost of Power: \$0.52 /kWh

**Requested Grant Funds:** \$540,000

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

**Total Potential Grant Amount:** \$600,000

**AEA Funding Recommendation:**

## App #626 Carlson Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Power Company

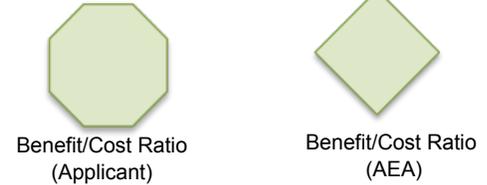
**AEA Program Manager:** Ott

**Applicant Type:** Utility

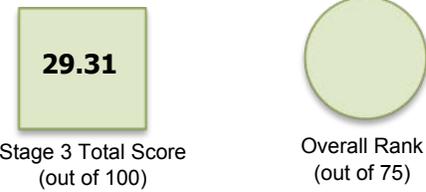
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.31
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
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 flow data or Lake data to date, gaging will not start until Fall 2011. Asking for full funding for a project that has no hydrologic data to determine feasibility. Will need a minimum of 5 years of real or derived flows. TWUP, Water rights, land use and habitat permits at a minimum. FERC project?

### 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 Denali fault passes ~10 miles to the northeast of the project site and should be discussed in the geotechnical report. Large magnitude earthquakes along this fault should be considered in engineering designs of structures. See general DGGS comment.

## App #627 Connelly Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The Connelly Lake Hydroelectric Project (Project) will be located in Southeast Alaska, approximately 14 miles northeast of the City of Haines and 10 miles southwest of the City of Skagway. Connelly Lake (formerly known as Upper Chilkoot Lake) is an 85 acre Alpine Lake, and drains into the Chilkoot River. The project will be on state and private land, including the Haines State Forest and Chilkat Bald Eagle Preserve. 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. Final dimensions and capacities of these facilities will be determined by optimization studies to be conducted during Phase II. The Project will be developed by APC to provide additional generation to its interconnected Haines and Skagway electrical systems.

### AEA Review Comments and Recommendation

Partial Funding

Applicant proposes feasibility study and final design/permitting for a 12 MW storage hydro project. An IRP is desirable for the Skagway, Haines, Klukwan area before proceeding to final design and construction for these projects. AP&T is also proposing recon and feasibility study of Schubee Lk hydro project (#441) in response to local input. AP&T submitted a similar proposal in RE fund round 3 (#437) that was recommended for partial funding, but did receive a grant due to insufficient funds.

Existing recon study proposes a substantially smaller 6 MW project which impounds less water than the current proposal. Project may require intertie and road access across the Chilkat Bald Eagle Reserve if it is not feasible to route through the Haines State Forest. Application includes March 09 letter from BLM indicating land has been transferred to State of Alaska, thus reducing likelihood of FERC jurisdiction. Power sales/benefits limited to offset of diesel costs and air pollution during summer cruise ship landings in Haines and Skagway. Seasonal power production would limit year-round availability.

Recommend \$468,000 partial funding for Phase 2 feasibility study with scope per application with provision that 1) land issues and licensing jurisdiction question be resolved with go/no-go points established 2) scope of work is consistent with findings of the Southeast Alaska IRP.

### Funding & Cost

Cost of Power: \$0.21 /kWh

**Energy Region:**  
Southeast

**Requested Grant Funds:** \$1,040,000

**Matched Funds Provided:** \$260,000

**Total Potential Grant Amount:** \$1,300,000

**AEA Funding Recommendation:** \$468,000

## App #627 Connelly Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

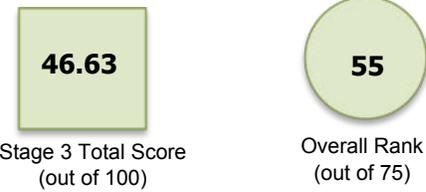
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.63
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	10.13
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	1.38
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

The applicant is aware of some of the potential oppositions because of the eagle preserve. Will be a FEREC project. Lots of past information available.

### 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 Chilkat River segment of the Denali fault extends near the project site (~6 miles to the west). Strong ground motions due to future earthquakes on this structure should be considered in engineering designs. The powerhouse was considered vulnerable to seismic activity in an earlier reconnaissance report which noted that the site was in seismic zone 3, a reference to the obsolete Uniform Building Code. This should be reevaluated in light of new probabilistic seismic hazard maps and the current International Building Code. See general DGGS comment.

## App #628 Neck Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

Design

Feasibility

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

APC proposes to construct a small run-of-river hydroelectric project at Neck Lake, a 1,000 acre lake located 1.5 miles southwest of the community of Whale Pass on Prince of Wales Island. The Project would supply power to the community of Whale Pass, and would offset diesel generation, which is currently the sole source of electricity. The relatively high and modulated flows from the lake combined with the steep drop at the lower end of the outlet stream provide a good opportunity for a small run-of-river hydroelectric development. Facilities would include an access road, intake structure, 400 feet of penstock, a containerized power plant, a tailrace channel, and upgrade of 4 miles of transmission line. The hydroelectric facilities will be designed to avoid interference with the existing salmon rearing and collection facilities operated at Neck Lake by the Southern Southeast Regional Aquaculture Association (SSRAA). APC conducted a reconnaissance study of the site in 2008, and determined that there is sufficient potential to almost always provide enough generation for Whale Pass loads (see Section 10 for a copy of the reconnaissance report). The Project will provide clean, renewable electricity, as well as rate stabilization and lower rates for APC's Whale Pass customers.

### AEA Review Comments and Recommendation

Not Recommended

AP&T proposes final design, permitting, and construction of a run-of-river 124 kW hydro project at Neck Lake. The project would result in displacing virtually all of the diesel used for power generation in Whale Pass. RE Fund round 2 (#223) provided \$108,000 for feasibility analysis, scheduled for completion in 2011-12. AEA has allocated \$90,000 in round 3 funds (App #440) for permitting and final design to be completed by Summer 2013. Construction would begin in Fall 2013.

In November 2010, FERC ruled it has jurisdiction for licensing at Neck Lake. When contacted by AEA, AP&T announced they have decided to stop any further activity to develop a hydroelectric power plant at Neck Lake.

Recommend no funding since on 12/6/2010 AP&T indicated it won't pursue this project.

### Funding & Cost

Cost of Power: \$0.44 /kWh

**Requested Grant Funds:**

\$1,844,000

**Matched Funds Provided:**

\$596,000

**Total Potential Grant Amount:**

\$2,440,000

**AEA Funding Recommendation:**

**Energy Region:**  
Southeast

## App #628 Neck Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

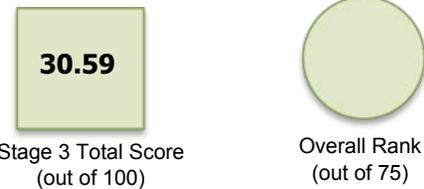
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.59
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Will need hydrology for permitting

### 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 Queen Charlotte fault passes about 85 miles to the west of the project site, thus seismic hazard is low and structures should be designed to withstand low to moderate ground shaking. See general DGGS comment.

## App #629 Reynolds Creek Hydroelectric Project Transmission Line

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**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 Hydaburg 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

Full Funding

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 \$4.1 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
- 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

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 has been funded by the Denali Commission and RE Fund round 1.

Haida Energy has recently informed AEA that the project budget may need to be increased and has agreed to direct its engineer of record to update the project cost estimate. Also, Haida Energy has informed AEA that it has redesigned the project to relocate the power house and to make other changes to improve constructability.

Recommend full funding with the following grant conditions: Before any construction grant funds are disbursed: 1) Grantee must secure an amendment to the existing project management agreement to include this grant in the agreement, and to become a signatory to the agreement, 2) all final design documents, permits, rights-of-way, and FERC license must be in place, 3) completion of a revised project cost estimate by the engineer of record that is satisfactory to AEA and a revised project finance plan that demonstrates that the applicant has raised all funds necessary to complete the project, 4) the grantee must establish a power purchase agreement acceptable to AEA, based on cost-based rate methodology that demonstrates that benefits of public funds flow to the ratepayers, 5) ownership of the transmission line must be with Haida Energy, or Grantee must provide a transmission maintenance and operations agreement giving control of the project to Haida Energy or an alternative business arrangement acceptable to AEA.

### Funding & Cost

Cost of Power: \$0.32 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$400,000

**Total Potential Grant Amount:**

\$2,400,000

**AEA Funding Recommendation:**

\$2,000,000

## App #629 Reynolds Creek Hydroelectric Project Transmission Line

**Resource:** Transmission

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

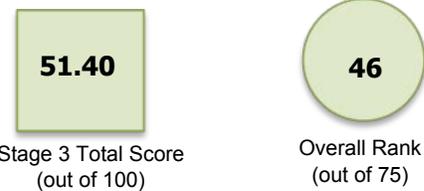
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	10.03
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	9.37
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	5.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

FERC Licensed project. Permit to Appropriate Water issued. Construction postponed. State ROW and dock applications received

### 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 site is over 60 miles from the Queen Charlotte fault zone, thus seismic hazards should be considered low. However, towers constructed for the transmission line should take low to moderate ground motions into consideration. See general DGGS comment.

## App #630 Schubee Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

APC is actively looking to add another hydroelectric storage facility to its Upper Lynn Canal (ULC) system serving Haines, Skagway, and nearby communities. To date, APC has considered Connelly Lake near Haines and Walker Lake near Klukwan, with Connelly Lake being preferred because of its much greater energy potential. However, some Haines citizens are opposed to development of Connelly Lake, and have expressed their interest in APC evaluating the Schubee Lake site as an alternative. APC has made a very preliminary evaluation of the Schubee Lake site and believe there is some potential; therefore the proposed grant is to study the Schubee Lake site to approximately the same depth as Connelly Lake so that a fair comparison can be made between the two. In our view, this means bypassing the reconnaissance phase (Phase I) and proceeding directly with conceptual design and feasibility work (Phase II).

### AEA Review Comments and Recommendation

Partial Funding

AP&T proposes funding feasibility of developing a 6 MW storage hydro project at Schubee Lake. This proposal is almost identical to a round 3 proposal for this purpose (#441) that for which AEA recommended partial funding. However, insufficient funds were available to provide a grant.

As before, AP&T has not prepared a formal reconnaissance assessment of the project that meets requirements of the RFA. AP&T is responding to a level of public opposition to developing another hydro site at Connelly Lk. AEA is recommending feasibility funding for Connelly Lk (#627).

AEA has the following concerns with Schubee Lk: 1) it is located on USFS lands and would be subject to FERC licensing, 2) it has a higher relative cost with less energy output than Connelly, 3) it would require an expensive connection to the existing submarine cable connecting Haines and Skagway.

AEA recognizes the importance for the Haines Borough citizens to make informed decisions regarding development of alternative hydro locations. However we believe that sufficient information for determining the development path can be achieved by more limited analysis.

Recommend partial funding of \$80,000 for reconnaissance assessment with the provisions that 1) AP&T must provide a revised scope of work for approval by AEA before funds are disbursed, 2) scope of work is consistent with findings of the Southeast Alaska IRP .

### Funding & Cost

Cost of Power: \$0.21 /kWh

**Energy Region:**

Southeast

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

**Matched Funds Provided:** \$40,000

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

**AEA Funding Recommendation:** \$80,000

## App #630 Schubee Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

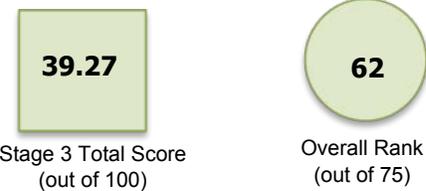
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.63
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	10.27
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Getting the approval from the USFS to allow the project in a roadless area may be a substantial hurdle with the current administration. Has no plans to collect hydrology until 2012 after they conduct feasibility. They should gage the system ASAP.

### 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 Chilkat River segment of the Denali fault extends near the project site (~10 miles to the west). Strong ground motions due to future earthquakes on this structure should be considered in engineering designs. See general DGGS comment.

## App #631 Yerrick Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

APC proposes to construct the 1.5 MW Yerrick Creek Hydroelectric Project (Project) located on Yerrick Creek, approximately 20 miles west of Tok. The Project would off-set diesel generation in the communities of Tetlin, Tanacross, Dot Lake and Tok. The Project will consist of a small diversion structure, approximately 15,000 feet of penstock, powerhouse with a single generating unit, tailrace, small substation, and transmission line. The Project operation will be run-of-river; annual generation is expected to be approximately 4,900 MWh/yr (approximately 40% of the interconnected load). The Project will provide clean, renewable electricity, as well as rate stabilization. The cost to maintain a hydro project is also significantly lower than diesel generation.

### AEA Review Comments and Recommendation

Did Not Pass Stage 1

Already has a \$4 M grant from Round III; which is to be used for construction / Therefore, not eligible for additional grant funding for construction.

### Funding & Cost

Cost of Power: \$0.53 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:**

\$4,000,000

**Matched Funds Provided:**

\$8,725,000

**Total Potential Grant Amount:**

\$12,725,000

**AEA Funding Recommendation:**

## App #631 Yerrick Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

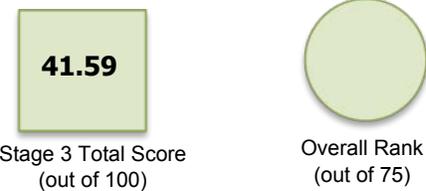
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.59
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

The applicant claims that things are progressing well with negotiations with Tanacross, but no agreement is reached. 1/2 of the project is on Tanacross land and as of Sept. 8th, 2010, Tanacross has not consented to allow development. DMLW authorizations on hold pending indication that APT and Tanacross are making progress toward land use agreements.

### 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 projects site is near the newly discovered Cathedral Creek fault zone. This fault is not shown on many geologic maps. The applicant should consult DGGS for the most recent maps of fault traces. This fault should be considered in engineering design. Additionally, DGGS has recently published surficial geologic maps in the proposed site area. These maps should supercede surficial maps presented in some of the preliminary reports. See general DGGS comment.

## App #632 Reconnaissance Study of Tenakee Inlet Geothermal Resource

**Resource:** Geothermal

**Proposed Project Phase:** Recon

**Proposer:** Inside Passage Electric Cooperative

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

### Project Description

The purpose of this project is to investigate the potential of using the known geothermal resource at Tenakee Inlet to produce power and evaluate alternative uses of the source. Springs near the head of Tenakee Inlet have the highest recorded surface temperature (176° F) of any of the numerous geothermal springs tested on Chichagof Island and listed on the Geothermal Resources of Alaska Map. Geochemistry of the spring waters indicates a maximum subsurface temperature of 243° F. The surface flow rate of the spring has been measured at 90 L/min and the convective heat discharge estimated at 0.5 MW. We request funding for a two-phase reconnaissance study of the resource with a planned timeline of approximately 18 months. Phase I will include mapping, remote sensing, aerial and ground based geophysics, and geochemical sampling. If justified by the first phase, we will commence with Phase II - exploratory well drilling. In this second phase, two wells would be drilled, although the second would have to be justified by the combined results of Phase I and the first well. 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 additional drilling necessary to confirm and develop the resource, necessary permitting, and power plant and infrastructure construction.

### AEA Review Comments and Recommendation

Partial Funding

Applicant IPEC proposes a staged assessment of geothermal resources of Tenakee Inlet Hot Springs consisting of field work in 2010 followed by exploratory drilling in the summer 2011. This application is identical to a round 3 application (#501) that was recommended, but which did not receive funding due to limited funds.

DGGS notes that the hot spring is one of the hottest in Southeast Alaska suggesting a reasonable chance of power outputs up to a few megawatts. The hot springs is located in a remote location on Tongass NF land and would require a special land use permit. The hot springs is approximately 20 miles from Hoonah with no road access. Hoonah has also submitted an application to construct a hydro project at Gartina and Water Supply creeks. The hot springs is approximately 10 miles from Pelican, which has a hydro resource that supplies all of its power.

DGGS agrees with the proposed two-phase plan outlined in this proposal—1) geological and geophysical studies followed by 2) site test drilling. However, DGGS states concerns regarding IPEC’s approach to identifying the exact location of the sub-surface resource prior to drilling. Further DGGS notes that “Additional clarification and details of the work plan, and how the information will be used to provide drilling locations and/or indication of reservoir should be provided to fully evaluate the proposal. Additionally, if chosen for funding, it would seem reasonable to provide the funds in a phased manner that coincides with the phases of the work: drilling to occur only after geological and geophysical fieldwork and economic, environmental, and permitting issues are resolved favorably.”

The project represents an option for displacing the 350,000 gpy diesel consumption for power in Hoonah. At an estimated installed cost of \$27 million not including transmission to Hoonah or other infrastructure, however, project economics do not appear to be attractive.

AEA recommends partial funding for the initial phase of field work with the requirement that prior to any funds being disbursed for the field investigation IPEC will prepare a workplan and project team satisfactory to AEA and DGGS.

### Funding & Cost

Cost of Power: \$0.38 /kWh

**Requested Grant Funds:**

\$2,579,200

**Matched Funds Provided:**

\$0

**Total Potential Grant Amount:**

\$2,579,200

**AEA Funding Recommendation:**

\$599,200

**Energy Region:**

Southeast

## App #632 Reconnaissance Study of Tenakee Inlet Geothermal Resource

**Resource:** Geothermal

**Proposed Project Phase:** Recon

**Proposer:** Inside Passage Electric Cooperative

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

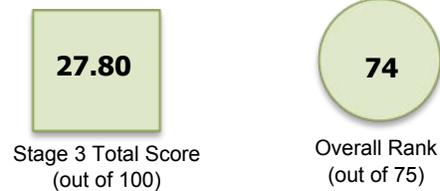
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	12.00
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	6.80
4) Project Readiness (Max 10)	1.00
5) Benefits (Max 15)	1.50
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	2.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

No Comments - recognition of permits needed.

### DNR/DGGS Feasibility Comments

Tenakee Inlet (as opposed to Tenakee Springs) has the highest surface temperature and the highest apparent reservoir temperature (based on chemical geothermometry from the '80s statewide inventory program) of any of the southeast Alaska hot-spring systems. There is a reasonable chance of encountering a moderate temperature geothermal resource that would be capable of generating hundreds of KW to a few MW. Evaluation of the resource generation potential will require direct investigation of reservoir characteristics through properly sited drilling. The two-phase plan outlined in this proposal; (a) geological and geophysical studies followed by (b) site test drilling, is a reasonable approach and necessary to firmly establish the existence, location, and characteristics of a resource. However, the proposer's ability to identify the exact location of the sub-surface resource through geological and geophysical investigation cannot be determined from the proposal because the work description lacks sufficient detail to fully evaluate. For example, in section 3.2 Phase I it is stated that "LIDAR and aerial photography will be collected as well, if deemed useful for this work". Similarly, site-specific aeromagnetic surveys are mentioned but not described - it's unclear what the target would be (imaging the reservoir?) and how the survey would be configured to achieve the goal. Additional clarification and details of the work plan, and how the information will be used to provide drilling locations and/or indication of reservoir should be provided to fully evaluate the proposal. Additionally, if chosen for funding, it would seem reasonable to provide the funds in a phased manner that coincides with the phases of the work: drilling to occur only after geological and geophysical fieldwork and economic, environmental, and permitting issues are resolved favorably.

### 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 #633 Nushagak Community Wind Power Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Nushagak Electric & Telephone Cooperative (NETC)

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

The Nushagak Community Wind Power Project proposes to erect two wind turbines (approximately 200-300 kW. e.g. Aeronautica 29-225kW) and connect them into the adjacent electric grid operated by Nushagak Electric and Telephone Cooperative (NETC) serving Dillingham and Aleknagik, Alaska. This installation will deliver annually up to 900 mega watt hours of electric power and replace more than 64 thousand gallons of diesel fuel.

The proposed Kanakanak site has enough wind to be considered a commercially viable site for a small commercial sized mid-scale turbine. Such a device would produce in excess of \$155,000/yr. Further, such wind turbines will serve as an important educational tool for NETC to gain the important skills and expertise to operate and maintain state of the art renewable technology. Such knowledge is a central component to NETC developing a sustainable energy system that will integrate renewable power sources with existing diesel technology.

### AEA Review Comments and Recommendation

Not Recommended

Nushagak Cooperative requests funding for final design and construction of a 450 kW wind project.

Currently Nushagak has received a \$100,000 grant from the Denali Commission under the Alternative Energy Grant program for wind feasibility. Nushagak has a grant to study hydro feasibility for project(s) at Lake Elva and Grant Lake north of Aleknagik.

Nushagak's proposal demonstrates impressive level of community support for developing a utility-scale wind project in Dillingham. The utility has performed a substantial amount of work in preparation for wind development, including a reconnaissance level assessment of energy alternatives prepared by the University.

AEA has the following concerns regarding this proposal:

1. The feasibility information submitted is not sufficient to provide a basis for final design and construction. Specifically, it does not include a conceptual design.
2. Alternatives assessed were limited to small turbines. There is no discussion of the risks associated with deploying a new turbine model in the state.
3. The economics of this project are marginal and may be improved by considering other sites, equipment, and project size.
4. Nushagak has not yet completed a substantial portion of or drawn any conclusions from the wind feasibility work underway.
5. The proposed scheduled begins in October 2010 with design and permitting completed in May 2011 before funding from the RE Fund would be available.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.46 /kWh

**Requested Grant Funds:**

\$3,199,400

**Matched Funds Provided:**

\$355,488

**Total Potential Grant Amount:**

\$3,554,888

**Energy Region:**

Bristol Bay

**AEA Funding Recommendation:**

## App #633 Nushagak Community Wind Power Project

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Nushagak Electric & Telephone Cooperative (NETC)

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

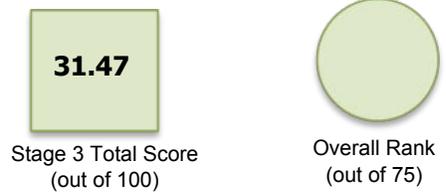
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	14.47
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #634 Nikiski Combined Cycle Conversion (NCCC)

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** Alaska Electric & Energy Cooperative

Design

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

### Project Description

The Nikiski Combined Cycle Conversion (NCCC) project will convert the existing simple cycle 42MW gas turbine into a highly efficient combined cycle plant by adding a Steam Turbine Generator (STG) and re-commissioning the existing Heat Recovery Steam Generator (HRSG). The STG will recover waste heat from the existing gas turbine and produce an additional 18MW of capacity with no additional fuel required. The plant conversion will increase the base load plant efficiency by 45% without increasing fuel consumption. AEEC is seeking grant funds for the construction phase of this waste heat recovery project.

### AEA Review Comments and Recommendation

Not Recommended

Alaska Electric Energy Cooperative (AEEC), a wholly-owned subsidiary of Homer Electric Association, proposes to convert the existing 42 MW single-cycle combustion turbine into a 60 MW combined cycle system utilizing recovered heat from the combustion turbine exhaust.

This project was considered in the Alaska Energy Authority Railbelt Integrated Resource Plan (RIRP), as a “committed unit”, that is, a power generation project an individual utility was planning, designing or constructing while the integrated resource plan was being developed.

The RIRP included an analysis of the cost impacts these committed units would impose on the Railbelt, if built outside of the regional planning process. While the RIRP analysis does not capture the full incremental cost of utilities acting independently over the 50-year planning horizon, it does give an indication of relative cost differential. Cumulatively, costs over the 50 years increase 5.6% from the least cost scenario of regional power portfolio development, if utilities pursue independent project development. (RIRP, p. 1-31)

The RIRP concludes: “...there are significant cost savings associated with the Railbelt utilities implementing a plan that has been developed to minimize total regional costs, while ensuring reliable service, as opposed to the individual utilities working separately to meet the needs of their customers.” (RIRP, p. 1-32)

While the project appears to be economic as a stand-alone project, it was not selected as a regional plan generation facility, and its construction appears to increase costs for the ratepayer. For this reason AEA cannot recommend this project.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$500,000

**Total Potential Grant Amount:**

\$2,500,000

**AEA Funding Recommendation:**

**Energy Region:**  
Railbelt

## App #634 Nikiski Combined Cycle Conversion (NCCC)

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Electric & Energy Cooperative

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

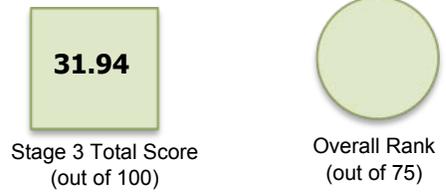
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	3.00
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	6.75
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #635 Grant Lake Hydroelectric Facility

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**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 & stepup 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

Partial Funding

Kenai Hydro LLC, a wholly-owned subsidiary of Homer Electric Association, proposes field studies/environmental assessment, preliminary engineering/project scoping, cost analysis, and FERC license application for developing a 4.5 MW hydro facility at Grant Lake. AEA has granted Kenai Hydro \$100,000 for reconnaissance assessment in the alternative energy RFP and \$816,000 in RE Fund round 1 (#34). Kenai Hydro proposes to provide a 20% match.

AEA has the following concerns about this project:

1. There is significant public opposition to the project.
2. We think it's going to 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.
3. 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.

However, recognizing that this project would provide a significant amount of renewable energy, AEA recommends funding for continued feasibility to assist the applicant in developing a low-impact project configuration that is economic, able to be licensed by FERC, and is acceptable to project stakeholders.

Recommend partial funding of \$1,184,000 (\$2 million cap minus the existing grant of \$816,000).

### Funding & Cost

Cost of Power: \$0.18 /kWh

#### Energy Region:

Railbelt

**Requested Grant Funds:** \$1,500,000

**Matched Funds Provided:** \$375,000

**Total Potential Grant Amount:** \$1,875,000

**AEA Funding Recommendation:** \$1,184,000

## App #635 Grant Lake Hydroelectric Facility

Resource: Hydro

Proposed Project Phase: Feasibility

Proposer: Kenai Hydro LLC

AEA Program Manager: Ott

Applicant Type: IPP

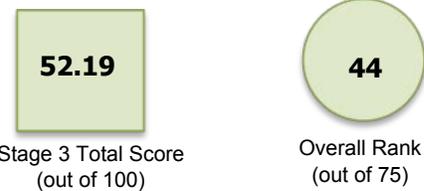
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.50
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	12.57
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	7.13
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Pre-Application meeting already occurred with applicant. Unsure of whether there will be any conflicts with the historic Iditarod Trail. Well into hydrology and fishery studies. Water right applied for already. Will require State land for transmission line. FERC Project.

### 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.

**App #636      Thorne Bay School Wood Fired Boiler Project**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Southeast Island School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

## Project Description

This project consists of the construction of biomass heating system, using high efficiency, low emissions wood fired boilers to heat the school and the athletic complex. It includes construction of wood-fired boiler heat building and a cordwood storage building, at the Thorne Bay School. An alternative plan could be to use the new self contained wood boilers housed in a connex unit used at Stebbins if the unit becomes approved and proves efficient to use.

## AEA Review Comments and Recommendation

**Full Funding**

The SE Island School District proposes to construct a cordwood -fired heating plant that will supply the Thorne Bay K-12 school and school district office. SEISD submitted a RE fund Round 1 proposal for \$178,179 with a \$42,000 match . The project team concluded that this was insufficient funding for the project and , have spent the last year pursuing additional financing. Under an existing grant from AEA SEISD is currently in the final design stage for the the project.

The school district is installing a similar system in Coffman Cove expected to be in operation in 2011.

School enrollment has been variable, but has managed to stay above the minimum level. USFS facilities are located near the campus and represent potential additional heating loads. Management capability is very good.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.59 /kWh

### Energy Region:

Southeast

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

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

**Total Potential Grant Amount:** \$360,000

**AEA Funding Recommendation:** \$300,000

## App #636 Thorne Bay School Wood Fired Boiler Project

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Southeast Island School District

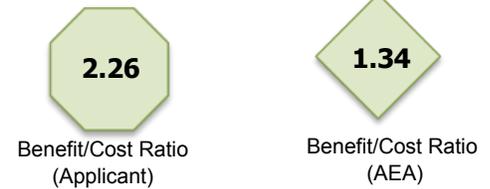
**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

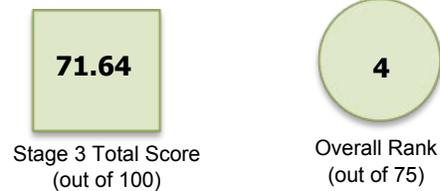
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	18.56
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	15.20
4) Project Readiness (Max 10)	8.00
5) Benefits (Max 15)	9.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is for a proposed cordwood fueled Garn boiler school heating system. It is estimated that 160 cords of fuelwood will be required annually and will offset 18,699 gallons of heating oil. Current price of the displaced fuel oil is \$67,500. The contract for wood delivery is estimated at \$25,800 or about \$161 per cord. The wood supply for the project seems more than adequate given the fact that large sources of Forest Service timber would be available on Prince of Wales Island. The annual resource supply of 270 million board feet may be in fact the sustained annual harvest level but the sale of timber off of Forest Service lands has been substantially less than this in recent years. It appears that prospective wood delivery contractors have been contacted for this project.

### 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 #637 Feasibility Assessments for Wood Heating in Interior AK Communities

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Interior Regional Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

The eight communities named in this proposal—Hughes, Ruby, Koyukuk, Nulato, Kaltag, Nikolai, Anvik, and Holy Cross—have all identified wood heating in public buildings as a priority energy opportunity that can displace fuel oil, save the communities money, utilize locally available renewable resources, and create local employment opportunities. These communities are interested in installing high-efficiency, low emission biomass boilers similar to the Garn boiler system currently in use in the Tanana washeteria and other Alaska communities. The first step in this process is the preparation of a feasibility assessment that identifies potential buildings for wood heating, the size and type of boilers that would be required, estimated fuel displacement and cost savings, capital cost and payback period, forest inventory and wood harvest plan, and so on. The applicant proposes to subcontract with Dan Parrent, wood utilization specialist of the Juneau Economic Development Council, to conduct 1- to 2-day site visits in each community and prepare feasibility assessments for each. Parrent has extensive experience in this area and has prepared numerous such reports for other Alaska communities. The forest inventory and wood harvest planning work will be conducted by Will Putman, head forester for Tanana Chiefs Conference (TCC). Following the completion of these reports, project staff Kim Carlo of Interior Regional Housing Authority (IRHA) and Ross Coen of TCC and the Alaska Center for Energy and Power at the University of Alaska Fairbanks (UAF) 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. The applicant anticipates submitting final design and construction proposal(s) to the RE Fund (Round 5) for those communities named in this proposal that wish to proceed.

### AEA Review Comments and Recommendation

Full Funding

IRHA proposes to team with Tanana Chiefs Conference and UAF to perform reconnaissance assessment and fuelwood inventory for community cordwood systems for Nulato, Ruby, Holy Cross, Koyukuk, Anvik, Nikolai, Hughes and Kaltag. Communities were chosen based on 1) biomass energy development was indicated as an objective in the Alaska Energy Pathway and 2) community councils passed resolutions of interest.

The application includes a strong project team and indicates substantial community buy-in.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.69 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:**

\$154,477

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$154,477

**AEA Funding Recommendation:**

\$154,477

## App #637 Feasibility Assessments for Wood Heating in Interior AK Communities

**Resource:** Biomass

**Proposed Project Phase:** Feasibility

**Proposer:** Interior Regional Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

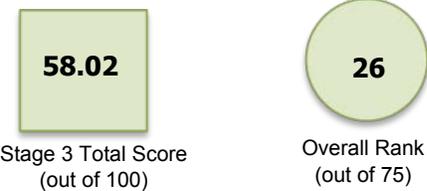
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	21.66
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	16.20
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	7.50
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This seems to be more of a planning exercise than a feasibility study of a project. If funded this project will be a good starting point to determine an operable sustainable biomass resource supply for 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

## App #638 Yukon River Debris Mitigation Project

**Resource:** Other

**Proposed Project Phase:** Construction  
Recon

**Proposer:** Alaska Power & Telephone Company

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

### Project Description

The project will be a study of the phenomena of river debris with an emphasis on developing technologies and protocols to mitigate the impact of the debris on the operation of hydrokinetic turbines, in general, and specifically the hydrokinetic turbine operating in the Yukon River at Eagle, AK. The Yukon River Hydrokinetic Project [YRHP] is a multiyear pilot study being performed by AP&T to determine the viability of hydrokinetic technology in a remote isolated Alaskan community. The YRHP originally funded by the Denali Commission is currently operating from funds granted by the Alaskan Center for Energy and Power [ACEP]. The YRHP will be operated for two more years through the operating seasons of 2011 and 2012. Recognizing that debris mitigation is a critical issue to the success of the hydrokinetic concept AP&T will contract the University of Alaska-Fairbanks [UAF] to perform debris studies during the 2011 and 2012 operating seasons and analyzing and evaluating mitigating techniques from the data collected in the studies.

Please refer to the UAF Statement of Work [SOW] attached for more details. During the 2010 operating season a debris boom was deployed upstream of the hydrokinetic device. This first generation debris mitigation system [DMS] failed to perform but lessons were learned and AP&T along with its contractors will manufacture a second generation DMS-2 through the winter of 2010 that will be deployed with the hydrokinetic device at the beginning of the 2011 operating season. This new debris system will be designed primarily to deflect the surface debris. Subsurface debris moving through the water column also needs to be deflected and the results of the UAF study will be used to upgrade the DMS-2 over the winter of 2011. The upgraded third generation system DMS-3 will be deployed in 2012 and UAF will complete its studies with the collection of data through the 2012 operating season and its evaluation. If feasible the hydrokinetic unit will be deployed in the years subsequent to the pilot study period. If this is the case the results of the UAF study will be utilized to determine if new improvements should be made to the debris mitigation system.

### AEA Review Comments and Recommendation

Not Recommended

Alaska Power & Telephone proposes to study and develop mitigation measures for river debris that impacts hydrokinetic devices, specifically the 25 kW New Energy Corporation's Encurrent device at Eagle.

The impact of debris is an important issue for developing river hydrokinetic devices in Alaska. Debris has caused serious disruptions and lower availability of power production in demonstration projects in Eagle and Ruby. Debris monitoring and/or mitigation is addressed in the scopes of work of at least two other projects in Alaska—1) AEA's grant to UAF for work at ORPC's Tanana River site and 2) the Denali Commission grant to ORPC Inc which includes a component for debris monitoring and mitigation. Denali Commission is providing substantial support (~\$3 million) to support demonstration of hydrokinetic technology in Eagle.

Given the amount of work that is already funded to address debris mitigation, AEA believes that a statewide approach is a more effective means of accomplishing the objectives of this proposal. AEA will coordinate with the UAF Alaska Hydrokinetic Energy Research Center to do this.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.64 /kWh

**Requested Grant Funds:** \$1,190,876

**Matched Funds Provided:**

**Energy Region:**

Yukon-Koyukuk/Upper Tanana

**Total Potential Grant Amount:** \$1,190,876

**AEA Funding Recommendation:**

## App #638 Yukon River Debris Mitigation Project

**Resource:** Other

**Proposed Project Phase:** Construction  
Recon

**Proposer:** Alaska Power & Telephone Company

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

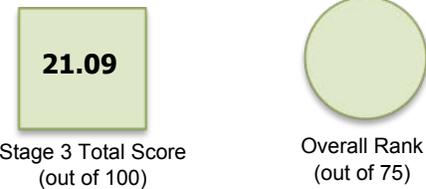
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	20.09
2) Matching Resources (Max 20)	1.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Debris management is a serious concern for all types of hydrokinetics in river and tidal applications. Without solving this issue, there will be challenges to insuring long term application of hydrokinetic devices in AK. If this project were funded, the information and data should be made public to all to benefit. May need DMLW authorization.

### 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 #639      Eek Wind Feasibility**

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**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 Eek. The work will involve obtaining a letter of non-objection from the landowner for the placement of the met tower and geotechnical fieldwork, permitting, transporting and installing a met tower at this location, 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 would be created based on the outcome of the met tower recordings and geotechnical investigation. Permits and site control would be obtained for the conceptual design of this project.

## AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes assessing feasibility of a wind-diesel system in Eek. Wind resource is estimated from the state’s high resolution map as a class 3. The applicant estimates wind resource as a class 4 based on nearby Quinhagak’s measured resource. The community operates a single phase power system. The Northwind 100 turbines operates in three phase. AVEC has prepared a recon- level wind power report for Eek based on regional wind data.

This application is one of 7 wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in 3 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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

## Funding & Cost

Cost of Power: \$0.70 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$142,500

**Matched Funds Provided:**

\$7,500

**Total Potential Grant Amount:**

\$150,000

**AEA Funding Recommendation:**

**\$142,500**

## App #639 Eek Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

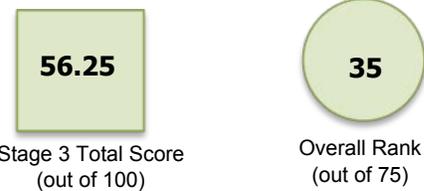
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	21.94
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	11.40
4) Project Readiness (Max 10)	5.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Project map is in close proximity to known RST trail in the area. Unclear whether this is a DOT managed airstrip so unsure whether state authorizations are needed.

### 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 # 640 Elim Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**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 Elim. The work would involve obtaining a letter of non-objection from the landowner for the placement of the met tower and geotechnical fieldwork, permitting, transporting and installing a met tower at this location, 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 would be created based on the outcome of the met tower recordings and geotechnical investigation. Permits and site control would be obtained for the conceptual design of this project.

## AEA Review Comments and Recommendation

Full Funding

AVEC proposes assessing feasibility of a wind-diesel system in Elim. Wind resource is estimated from the state's high resolution map as a class 3-4. AVEC notes that wind towers would provide a landmark for navigation in Norton Sound.

This application is one of 7 wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in 3 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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

## Funding & Cost

Cost of Power: \$0.60 /kWh

**Energy Region:**

Bering Straits

**Requested Grant Funds:** \$142,500

**Matched Funds Provided:** \$7,500

**Total Potential Grant Amount:** \$150,000

**AEA Funding Recommendation:** \$142,500

## App # 640 Elim Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

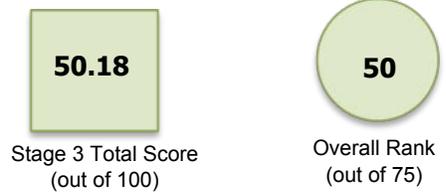
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	18.69
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	11.87
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	1.13
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #641 Kaltag 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 kW solar array in Kaltag. 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. As a pilot study, installation of this small array in Kaltag would help AVEC evaluate the benefits of solar arrays installed at power generating facilities

### AEA Review Comments and Recommendation

Full Funding

AVEC proposes installation of a 10 kW low penetration photovoltaic-diesel system to supply station service power to the Kaltag system. Panels would be located on the Kaltag power house. Project economics are marginal ( $B/C=0.67$ ) given the minimal amount of fuel that the system will displace. However AVEC states that the main value of the project is to demonstrate performance of a solar-diesel system in a utility environment.

Full funding recommended.

### Funding & Cost

Cost of Power: \$0.63 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:**

\$90,000

**Matched Funds Provided:**

\$10,000

**Total Potential Grant Amount:**

\$100,000

**AEA Funding Recommendation:**

\$90,000

**App #641      Kaltag Solar Construction**

**Resource:** Solar

**Proposed Project Phase:** Construction

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Stromberg

**Applicant Type:** Utility

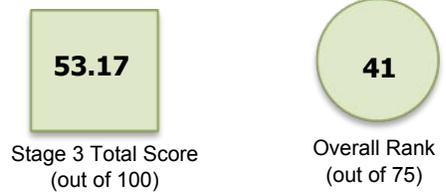
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.69
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	12.07
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.67

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW 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 #642 Koyuk Wind Phase II Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**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 Koyuk. The work would involve obtaining a letter of non-objection from the landowner for the placement of the wind tower(s) and geotechnical fieldwork, permitting, transporting and installing a met tower at this location, 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 would be created based on the outcome of the met tower recordings and geotechnical investigation. Permits and site control would be obtained for the placement of the met towers and wind turbines.

## AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes assessing feasibility of a wind-diesel system in Koyuk. Wind resource is estimated from the state's high resolution map as a class 3. AVEC notes that the wind turbines would provide a landmark for navigation in the area.

This application is one of seven wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in three 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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

## Funding & Cost

Cost of Power: \$0.63 /kWh

**Energy Region:**

Bering Straits

**Requested Grant Funds:**

\$142,500

**Matched Funds Provided:**

\$7,500

**Total Potential Grant Amount:**

\$150,000

**AEA Funding Recommendation:**

**\$142,500**

## App #642 Koyuk Wind Phase II Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.72
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	11.47
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	1.13
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #643 Marshall Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

## Project Description

To better determine the feasibility of wind power in Marshall, AVEC proposes to build on the results of the already-completed wind resource study by commissioning a geotechnical study for the site and performing a conceptual design study to determine the most optimal equipment configuration and layout. The geotechnical work would involve obtaining permanent site control from the landowner with the intent of supporting follow-on turbine construction in a future project.

## AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes assessing feasibility of a wind-diesel system in Marshall. Wind resource is measured as a class 4 based on ten months of met tower data. AVEC notes that the wind turbines will provide a local landmark for navigation.

This application is one of seven wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in three 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. AVEC eliminates the cost of wind resource assessment in this application, due to the presence of a met tower.

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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

## Funding & Cost

Cost of Power: \$0.63 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:** \$111,150

**Matched Funds Provided:** \$5,850

**Total Potential Grant Amount:** \$117,000

**AEA Funding Recommendation:** \$111,150

## App #643 Marshall Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

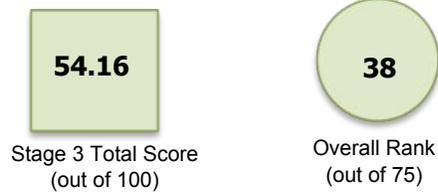
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.53
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	12.00
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	1.13
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #644    Old Harbor Hydroelectric**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

The Alaska Village Electric Cooperative (AVEC), the electrical utility provider in Old Harbor, Alaska, is proposing to complete final design and permitting of hydroelectric project in Old Harbor, Alaska. The proposed project is a 300 kW run of the river hydroelectric plant with a diversion structure, pipeline, powerhouse, and electric line. The project involves collecting up to 7 cfs of water year round from Mountain Creek tributary of Barling Bay Creek and transporting it to a tributary of Lagoon Creek. The project would meet the existing electricity demand of the community.

## AEA Review Comments and Recommendation

**Full Funding**

AVEC proposes final design and permitting of a 300 kW run-of-river hydro project on the east fork of Mountain Creek near Old Harbor. AVEC is currently working on project feasibility under an RE Fund round 1 grant (#73) which is expected to be complete by next summer. AVEC studied a project nearby in the late 90s but put the project on hold due to adverse economics and fish habitat study requirements.

Current work indicates a promising project. The proposal is supported by local city government and Native corporation.

AVEC does not identify the project engineer. Portions of the project are on USFWS refuge and on an Exxon Valdez conservation easement.

Recommend full funding with requirement that before funding is disbursed AVEC must submit a feasibility report acceptable to AEA.

## Funding & Cost

Cost of Power: \$0.62 /kWh

**Energy Region:**

Kodiak

**Requested Grant Funds:**

\$237,500

**Matched Funds Provided:**

\$12,500

**Total Potential Grant Amount:**

\$250,000

**AEA Funding Recommendation:**

**\$237,500**

## App #644 Old Harbor Hydroelectric

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

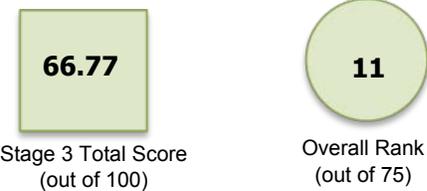
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.50
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	15.93
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	10.50
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Possible .850 permits required. Project describes usage of what is presumed to be state managed land or water based on information furnished. Applicant states that significant improvements would affect an EVOS easement. Lots of work already completed including on going gaging.

### 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. Upper plate sources (i.e. Narrow Cape fault zone) should be considered in design. This is a small system and thus, there is not a major hazard risk. However, emphasis should be in securing project foundation elements to withstand shaking. See general DGGS comment.

## App #645 St. Mary's/Pitka's Point Wind Construction

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Village Electric Cooperative

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

AVEC proposes to complete final design, permitting, construction, erection, startup, and commissioning of two wind turbines to supplement the existing power generation system for currently intertied communities of St. Mary's and Pitka's Point.

### AEA Review Comments and Recommendation

Partial Funding

AVEC proposes final design, permitting and construction of a 400 kW wind project to serve the St. Marys-Pitkas Point grid. 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.

In 2009 to 2010 AVEC has continued with onsite wind resource monitoring. Met towers between Pitkas and St Marys indicate a class 6 wind resource but also a potential problem with icing. AVEC proposes to complete final design and permitting in February 2012 and complete construction in summer 2012.

AVEC has not completed a conceptual design for this project.

Recommend partial funding of \$275,554 for completing feasibility, final design, and permitting with the requirement that before final design funds are disbursed AEA accept the feasibility and conceptual design report.

### Funding & Cost

Cost of Power: \$0.59 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$4,000,000

**Matched Funds Provided:**

\$500,000

**Total Potential Grant Amount:**

\$4,500,000

**AEA Funding Recommendation:**

\$275,554

## App #645 St. Mary's/Pitka's Point Wind Construction

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Village Electric Cooperative

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

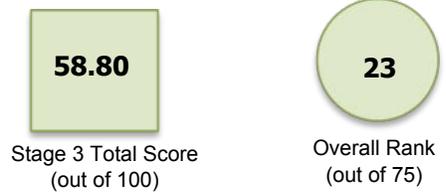
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	18.56
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	12.90
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	2.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #646 Scammon Bay Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**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 Scammon Bay. The work will involve obtaining a letter of non-objection from the landowner for the placement of the met tower and geotechnical fieldwork, permitting, transporting and installing a met tower at this location, 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 would be created based on the outcome of the met tower recordings and geotechnical investigation. Permits would be obtained for the conceptual design of this project.

### AEA Review Comments and Recommendation

Full Funding

AVEC proposes assessing feasibility of a wind-diesel system in Scammon Bay. This is a resubmittal of a round 3 application (#514) that AEA recommended for funding, but which did not receive funding due to insufficient funds. Wind resource is estimated as a class 5 based on the state's high-resolution wind map. AVEC notes that the wind turbines will provide a local landmark for navigation.

This application is one of seven wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in three 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. AVEC eliminates the cost of wind resource assessment in this application, due to the presence of a met tower.

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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

### Funding & Cost

Cost of Power: \$0.62 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$142,500

**Matched Funds Provided:**

\$7,500

**Total Potential Grant Amount:**

\$150,000

**AEA Funding Recommendation:**

\$142,500

## App #646 Scammon Bay Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

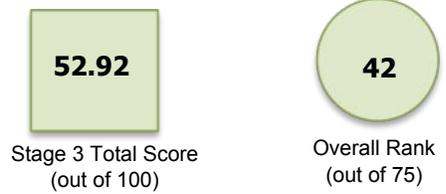
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.41
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	12.77
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	2.25
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #647 Selawik Hybrid Wind Diesel System Turbine Upgrade

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

To determine the viability of upgrading the Selawik wind turbines from the existing AOC machines to Northern Power NW100s, AVEC proposes to conduct a feasibility study and conceptual design. AVEC will analyze and report findings to partners and community members. By reusing the existing site, we anticipate to drive down the total installed cost significantly. This total project concept, with wind generation, could be segmented into the following phases:

- Phase 1. Feasibility study & conceptual design.
- Phase 2. Financing and negotiation of any power purchase agreement.
- Phase 3. Design and engineering.
- Phase 4. Installation of transmission and wind energy.
- Phase 5. Operations and maintenance.

This proposal only covers phase 1.

### AEA Review Comments and Recommendation

Full Funding

AVEC proposes assessing feasibility of replacing the existing four 65 kW AOC turbines in Selawik with 100 kW Northwind turbines, or equivalent. Since the wind farm was constructed in 2002, AVEC has had problems with turbine downtime due to tip break failures. Additionally, it appears that the wind resource is mediocre, based on low energy production when operating. Despite the presence of turbines in Selawik, AVEC does not provide any empirical wind resource data.

This application is one of 7 wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in 3 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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

### Funding & Cost

Cost of Power: \$0.66 /kWh

**Energy Region:**  
Northwest Arctic

**Requested Grant Funds:** \$85,000

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

**Total Potential Grant Amount:** \$93,500

**AEA Funding Recommendation:** \$85,000

## App #647 Selawik Hybrid Wind Diesel System Turbine Upgrade

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

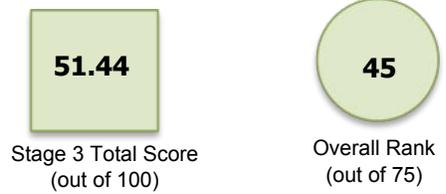
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	20.47
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	9.80
4) Project Readiness (Max 10)	3.33
5) Benefits (Max 15)	0.50
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	4.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #648 Stebbins Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

To determine the feasibility of installing wind towers in Stebbins, AVEC proposes to continue to monitor the existing wind meteorological (met) tower that was erected this year using funding from the Denali Commission. AVEC would also perform geotechnical work to support an engineering effort. The work would involve obtaining a letter of non-objection from the landowner for geotechnical fieldwork, 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 would be created based on the outcome of the met tower recordings and geotechnical investigation. Permits and site control would be obtained for the conceptual design of this project.

### AEA Review Comments and Recommendation

Full Funding

AVEC proposes assessing feasibility of a wind-diesel system in Scammon Bay. This is a resubmittal of a round 3 application (#511) that AEA recommended for funding, but which did not receive funding due to insufficient funds. Wind resource is estimated as a class 4-5 based on the state's high-resolution wind map. AVEC has some data available from a met tower that is collecting onsite wind resource data. AVEC plans a 10-mile intertie connecting Stebbins and St. Michael and has prepared a conceptual design for a bulk fuel storage facility that provides a cost estimate for adding wind to the system. Following the connection, the St. Michael power plant will be put on standby status. AVEC notes that the wind turbines will provide a local landmark for navigation.

This application is one of seven wind feasibility projects that AVEC is proposing in round 4. AVEC has received funding in rounds 2 and 3 for feasibility assessment in three 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. AVEC eliminates the cost of wind resource assessment in this application, due to the presence of a met tower.

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, AVEC will prepare budgets for all round 4 wind feasibility projects with the goal of identifying opportunities to reduce costs.

### Funding & Cost

Cost of Power: \$0.61 /kWh

**Energy Region:**

Bering Straits

**Requested Grant Funds:** \$137,750

**Matched Funds Provided:** \$7,250

**Total Potential Grant Amount:** \$145,000

**AEA Funding Recommendation:** \$137,750

## App #648 Stebbins Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Village Electric Cooperative, Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

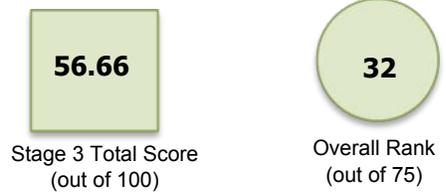
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.03
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	12.83
4) Project Readiness (Max 10)	4.67
5) Benefits (Max 15)	2.63
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #649      Kenny Lake School Wood Fired Boiler**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Copper River School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

The Copper River School District (CRSD) proposes to install a 1.8MBTU wood pellet fueled boiler at the Kenny Lake School. This boiler will displace 18,625 gallons of fuel oil every year. The current boilers will be used for backup, low load and peak heat periods. This project will involve school district personnel, local contractors, design engineers and the Alaska Energy Authority (AEA). This project will employ local residents in construction, keep energy money within the State of Alaska and utilize regional biomass resources from the Fairbanks area. This project will introduce bulk delivery of pellets from the Superior Pellet Plant, located in North Pole, AK, to the Copper River Valley. Local residents may be able to expand use of pellets for home heating use.

## AEA Review Comments and Recommendation

**Full Funding**

Copper River School District proposes to construct a 1.8 MMBtu/hr wood pellet-fired heating plant to supply the Kenny Lake School. RE Fund round 1 (#46) provided funding for final design. Upon request of the grantee AEA is managing the project.

Pellets would be purchased from the new Superior Pellets fuel facility in Fairbanks. Other potential supply is from Canada. Project is scheduled for completion in December 2011. The project would represent the first institutional-scale pellet heating plant in Interior.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**  
Copper River/Chugach

**Requested Grant Funds:**

\$565,485

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$565,485

**AEA Funding Recommendation:**

\$565,485

## App #649 Kenny Lake School Wood Fired Boiler

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Copper River School District

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

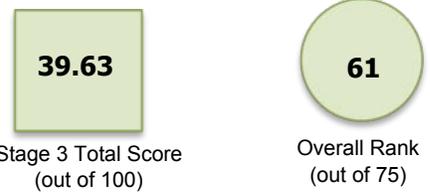
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	2.00
3) Project Feasibility from Stage 2 (Max 20)	13.90
4) Project Readiness (Max 10)	10.00
5) Benefits (Max 15)	3.38
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

The Superior Pellets facility is new and in the startup phase of development. The delivered cost estimate used for pellets from the facility may be questionable over the long term based on the operating experience once this new manufacturing facility is in full production and has some operating history. Given this uncertainty, it may be prudent to get cost estimates of pellet delivery from other outside vendors such as Atlas Pellets to have a backup source of pellets and another delivered cost estimate.

### 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 #650 Chefnak Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Chefnak

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

### Project Description

The Chefnak Wind Turbine Feasibility, Design and Permitting project involves all preconstruction activities to support the installation of three (3) 100 kW wind turbines on the eastern edge of the City of Chefnak. This proposal requests funding to complete Phase II and Phase III project activities. Funding received through this application will be utilized to accomplish the following scope of work:

1. Procure and install a MET tower at the proposed wind turbine installation location
2. Collect one year of resource data and process recordings through appropriate modeling software
3. Perform geotechnical analysis at the project site
4. Develop final project designs and cost estimates
5. Apply for and obtain relevant project permits

This scope of work proposed in this application will support the eventual installation of a 300 kW wind power installation that will be owned by the City of Chefnak and operated by the Naterkaq Light Plant (NLP). The NLP is wholly owned by the City of Chefnak and the electricity produced by the installed turbines will be distributed to the utility without charge. The wind turbines will be connected into NLP's electrical distribution system through a new three-phase distribution line running from the project site to the existing power plant. The project will offer benefits to the community of Chefnak and its electric customers through a system-wide reduction and stabilization of energy prices. The City of Chefnak has assembled a project team headed by STG Incorporated that is prepared to immediately begin work on an accelerated schedule. Among others, the project team includes members from Powercorp Wind Diesel North America, DNV Global Energy Concepts Inc, Erricos Engineering, Alaska Line Builders, Duane Miller Associates, Hattenburg Dilley & Linnell, BBFM Engineers and Aurora Consulting. All aspects of the feasibility, design, and permitting project, detailed in the following pages of this application, can be completed within one year from the receipt of funding.

### AEA Review Comments and Recommendation

Partial Funding

City of Chefnak proposes feasibility, final design and permitting of a community wind-diesel system. The system would include three Northwind 100 kW turbines, a Powerstore flywheel, and an electric boiler at the school as a dumpload. This proposal is similar to a round 3 proposal for final design and construction (#424) that was recommended for partial funding for feasibility but did not receive funding due to insufficient funds.

AEA and the City completed a powerhouse upgrade in 2004. The City has an AEA met tower stored in Chefnak. The City has not completed a full feasibility assessment including: detailed energy resource analysis; assessment of design alternatives; geotechnical analysis and a final report with recommendations.

Given that the City has not completed conceptual design, AEA questions the basis of the proposed configuration. The feasibility tasks identified in the application do not address assessment of design alternatives as stated in the RFA (sec 2.4). Given that the met tower is already onsite, the \$49,750 budget for installing the met tower is too high. AEA thinks that \$25,000 is a more reasonable figure for installing and collecting data for wind resource assessment.

Given the relatively high cost of the project under the proposed configuration, project economics appear poor, with a benefit to cost ratio that is significantly less than 1.

Recommend partial funding of \$136,750 to complete feasibility.

### Funding & Cost

Cost of Power: \$0.65 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:** \$250,000

**Matched Funds Provided:** \$15,000

**Total Potential Grant Amount:** \$265,000

**AEA Funding Recommendation:** \$136,750

## App #650 Chefnak Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design Feasibility

**Proposer:** City of Chefnak

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

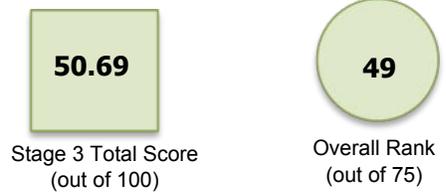
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	20.31
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	10.00
4) Project Readiness (Max 10)	2.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #651 Southwest Alaska Regional Geothermal Energy Project

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** Naknek Electric Association, Inc.

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

### Project Description

Phase IV: Construction, Testing, and Assessment – Naknek-G #3. The Southwest Alaska Regional Geothermal Energy Project has drilled Naknek-G#1 to depth and is ready to begin assessing its geothermal fluid production characteristics. Drilling Naknek-G #2 is scheduled to begin in October 2010 and completed before the end of the year. After Naknek-G #2 has been drilled and the capacity for geothermal fluid production for electric and heat energy generation is thoroughly understood NEA will contract for design, permitting, and construction of a modular generation facility. In addition to traditional geologic and geophysical logging in the Naknek wells includes a logical and well-considered set of activities undertaken during and after drilling that will serve to characterize the reservoir and communication between the first two wells in the production field. Naknek-G #3 drilling tasks are scheduled to begin September 2011, and the costs of achieving its drilling (construction), testing and evaluation objectives are the substance of NEA's request for REFGP Round IV funding. Preliminary results support temperatures and flow adequate for the production of electricity. Well field construction including production and injection wells will continue until required MW capacity is met.

### AEA Review Comments and Recommendation

Not Recommended

Naknek Electric Association requests funding for a 12,000 foot well as part of planned 25 MW geothermal project that would provide power to SW Alaska communities.

DGGS has the following comments on the project:

“The current information provided in this proposal, as well as that provided in previous proposals, fails to establish the existence of a robust geothermal resource capable of generating the amount of electricity described. In fact, the current data outlined in the press suggests the temperature and flow rates in the initial well are insufficient to maintain the level of electrical production stated as the goal of the project. In order to correctly evaluate the current proposal, the state will need additional information. This information should include:

- Sustained down hole temperature profile from well G1
- Sustained and long term effective flow rates from Well G1
- Any down-hole geophysical information to substantiate water flow, porosity, permeability, and cement bond to casing (to determine level of fluid influx into wellbore and from what horizon).
- Any additional observational or deterministic information that could be used to quantitatively evaluate the potential operational capacity of the geothermal system identified.

We will be unable to evaluate the proposal further until this information is provided.”

AEA requested this information from Naknek Electric on Oct 7 requesting a response by Oct 21. Later, AEA contacted the utility again and verified that Naknek had received the request. Naknek Electric did not provide the requested information.

AEA has no record that a viable geothermal resource exists.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.42 /kWh

**Requested Grant Funds:**

\$4,000,000

**Matched Funds Provided:**

\$5,624,000

**Total Potential Grant Amount:**

\$9,624,000

**AEA Funding Recommendation:**

**Energy Region:**

Bristol Bay

## App #651 Southwest Alaska Regional Geothermal Energy Project

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** Naknek Electric Association, Inc.

**AEA Program Manager:** McMahon

**Applicant Type:** Utility

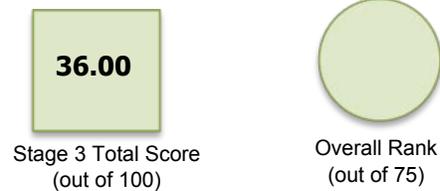
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.00
2) Matching Resources (Max 20)	18.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

At the minimum they will need to get AOGCC approval for their wells. Of bigger concern is that the Naknek Electric Association filed for bankruptcy on Sept 29th.

### DNR/DGGS Feasibility Comments

The current information provided in this proposal, as well as that provided in previous proposals, fails to establish the existence of a robust geothermal resource capable of generating the amount of electricity described. In fact, the current data outlined in the press suggests the temperature and flow rates in the initial well are insufficient to maintain the level of electrical production stated as the goal of the project. In order to correctly evaluate the current proposal, the state will need additional information. This information should include:

- Sustained down hole temperature profile from well G1
- Sustained and long term affective flow rates from Well G1
- Any down-hole geophysical information to substantiate water flow, porosity, permeability, and cement bond to casing. (to determine level of fluid influx into wellbore and from what horizon)
- Any additional observational or deterministic information that could be used to quantitatively evaluate the potential operational capacity of the geothermal system identified.

We will be unable to evaluate the proposal further until this information is provided.

### 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 #652 Mount Spurr Geothermal Project

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** Ormat Nevada, Inc.

**AEA Program Manager:** McMahon

**Applicant Type:** IPP

### Project Description

Mount Spurr represents what currently appears to be the best opportunity in Alaska to develop a Utility-scale base-load geothermal energy power plant. Located 80 miles west of Anchorage on state lands leased by Ormat Nevada Inc. in October of 2008, a successful power project at Mt. Spurr would serve communities along the Railbelt through power purchased by one or more of the Railbelt electric utilities. Ormat is leading a rigorous exploration campaign, to be partially cost shared by AEA using a grant to be awarded in the framework of round III of the Renewable Energy Fund. Exploration to date includes desktop studies based on exploration work done by the Alaska Volcano Observatory and others during the mid 1980's; a field reconnaissance trip and geochemical analysis done by Ormat in August 2009; intense geological and geophysical exploration (including mainly a heli-magnetic survey, satellite imagery, LiDAR survey, ground-based Magneto-Telluric survey and ground-based gravity survey) performed during July and August 2010 and initial results of core drilling that started early September 2010 and is currently ongoing. Analysis of all data collected during the above mentioned exploration work is very encouraging as to the potential existence of a commercial size geothermal resource. However, further exploration – planned for this fall and for summer of 2011, before funds described in this application are requested - is required in order to confirm it. This grant request is for the next phase of project development – to be sometimes referenced in this application as “phase III” - which is to start construction of the geothermal well field and later on (beyond the scope of this grant application), the power plant itself. The first step in construction of a commercial geothermal well-field is to drill a full-size deep geothermal production well, in order to tap into the geothermal reservoir and flow test the geothermal fluid in order to measure its temperature, pressure, chemical composition and other attributes. The location of this well will be based on a synthesis of 2010 and 2011 exploration work mentioned before. Follow-up steps (beyond the scope of this grant application) will include drilling additional production wells; drilling one or more injection wells; performing a long-term multi-well flow test to measure the size of the geothermal reservoir; drilling additional production and injection wells and building a power plant, including a geothermal gathering system, utility interconnection facilities etc.

### AEA Review Comments and Recommendation

**Full Funding**

Ormat proposes to drill the first full-sized geothermal production well at Mt. Spurr. Prior to the award of this grant Ormat will have completed its exploration program funded in round 3 (#477) which has or will include 1) geophysical exploration, 2) surface mapping, 3) four temperature gradient wells, and 4) two slim holes. Ormat proposes to begin the construction phase of the project in the summer of 2012 based on a go/no-go decision if the current work indicates a high likelihood of the presence of a high quality geothermal resource. This decision would be made in August 2011.

Ormat's preliminary estimate for the net capacity of the project between 50 and 100 MW at a cost of \$5,000-6,000/kW.

Although the proposed drilling work would not take place until summer 2012, Ormat needs to select contractors for the work in fall 2011. Ormat would mobilize the drill rig in spring 2012 at their own expense. Ormat will match state dollars on a 2 to 1 basis for the proposed work.

Recommend funding with the requirement that AEA, in consultation with DGGS, must concur with Ormat's decision to proceed with the proposed work before any funds are disbursed.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$1,999,972

**Matched Funds Provided:**

\$3,882,298

**Total Potential Grant Amount:**

\$5,882,270

**AEA Funding Recommendation:**

\$1,999,972

## App #652 Mount Spurr Geothermal Project

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** Ormat Nevada, Inc.

**AEA Program Manager:** McMahon

**Applicant Type:** IPP

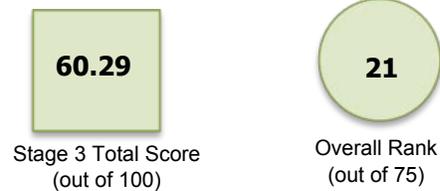
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	19.00
3) Project Feasibility from Stage 2 (Max 20)	15.03
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	6.38
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

May need temporary water permits not identified.

### DNR/DGGS Feasibility Comments

The proposal states that a geothermal resource has not (yet) been positively identified at Spurr, however, enough encouraging signs are present to proceed with exploration. This is very encouraging news, yet more information from the current efforts is necessary to provide an independent review of the results and evaluate the proposal for funding. The proposal for "Phase III" of Spurr geothermal development, which is drilling a full size production well as part of well-field development is scheduled for the summer of 2012, but only after a go/no-go decision is made at the end of August, 2011, which in turn will be based on Phase II results. Funding should logically proceed stepwise, like exploration, with support for the next level of effort contingent upon favorable results from the preceding phase.

### 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 #653 Terror Lake Unit 3 Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Kodiak Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The Terror Lake Unit 3 Hydroelectric Project proposes to install a third hydro turbine capable of producing an additional 11.25 megawatts (MW) in the existing Terror Lake plant. The original engineers of the Terror Lake facility had the foresight to design the facility for the expansion to three turbines. The original design assumed the day would arrive when additional capacity would be required. That day has arrived. Kodiak's growing electrical demand has surpassed the current capacity of Terror Lake. Expanding the capacity at Terror Lake by 11.25 MW with a third turbine generator will enhance the stability of KEA's isolated grid system allowing additional forms of renewable energy to be integrated and Kodiak's dependence on diesel fuel to be minimized. The third turbine at Terror Lake is the cornerstone necessary for KEA to achieve its' Vision Statement: Endeavor to produce 95% of energy sales with cost effective renewable power solutions by the year 2020.

### AEA Review Comments and Recommendation

Partial Funding

Kodiak Electric proposes construction funding for an additional 11.25 MW hydro turbine for the existing Terror Lk project. There have been two prior RE Fund grants, a round 2 grant of \$500,000 (#215) for feasibility and a round 3 grant (#401) of \$248,160 for final design and bid documents.

During feasibility analysis, KEA has concluded that there will be no adverse impacts to stream flow by adding an additional turbine. This will likely facilitate acceptance by the resource agencies during the required FERC license amendment process.

In November 2010 AEA received a draft FERC capacity amendment application that indicates energy production drops from 12.4 GWh/yr to 2.9 GWh/yr and project cost drops from \$15.9 million to \$10.6 million. Although the project economics are somewhat poorer given these new estimates, they remain highly attractive.

The current schedule indicates equipment procurement would begin in January 2012, while site work would begin a year later. The project is scheduled for completion in July 2013.

Recommend partial funding of \$3,751,840 (\$4,000,000 cap minus \$248,160) with provision that KEA provides AEA, and AEA accepts, final design, final construction cost estimate and bid documents.

### Funding & Cost

Cost of Power: \$0.15 /kWh

#### Energy Region:

Kodiak

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

**Matched Funds Provided:** \$7,459,790

**Total Potential Grant Amount:** \$14,459,790

**AEA Funding Recommendation:** \$3,751,840

## App #653 Terror Lake Unit 3 Hydroelectric Project

Resource: Hydro

Proposed Project Phase: Construction

Proposer: Kodiak Electric Association, Inc.

AEA Program Manager: Ott

Applicant Type: Utility

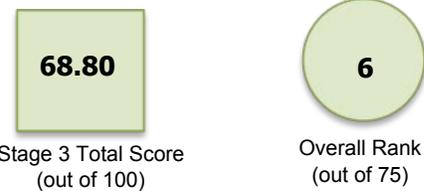
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.78
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	17.27
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	12.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Currently operational with valid permits. May require additional water rights or amendments to existing permits to appropriate water. Will be a FERC project.

### 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. Upper plate sources (i.e. Narrow Cape fault zone) should be considered in design. See general DGGS comment.

## App #654 Pilgrim Hot Springs Geothermal Resource Assessment

**Resource:** Geothermal

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** University of Alaska Fairbanks INE/ACEP

**AEA Program Manager:** McMahon

**Applicant Type:** Government Entity

### Project Description

The Pilgrim Hot Springs geothermal system was extensively studied in the late 1970s and early 1980s using a variety of geological, geochemical, and geophysical techniques. Unfortunately the execution of these surveys and interpretation of the data did not result in a thorough understanding of the area, and the most important conclusions for potential future development – such as locating the upflow zone of the geothermal fluid – was not determined.

In 2010, the University of Alaska Fairbanks began Phase I of an intensive new exploration program of the Pilgrim Hot Springs resource, funded mainly through a Department of Energy grant with cost share provided through a \$613,174 award under Round III of the Renewable Energy Grant Fund. This first Phase, which is currently underway, involves the use of an innovative geophysical remote sensing techniques (including forward looking infrared radiometry, or FLIR) intended to map the spatial extent and total heat flow to the surface and make a preliminary estimation of the developable extent of the reservoir. These remote sensing techniques are being coupled with more traditional ground-based exploration techniques to pinpoint the location of the upflow zone, map the spatial extent and total heat flow to the surface, and estimate the temperature and depth of the reservoir.

This proposal addresses Phase II and III of this project. Phase II involves drilling and testing two 500 ft temperature gradient holes and two 2500 ft confirmation holes into the resource to confirm the results from Phase I. The third Phase will involve developing a more complete understanding of the reservoir through flow testing and water sampling of the holes, and development of a numerical reservoir model. The end result of this project will be an economic and geothermal resource model of the Pilgrim Hot Springs site and surrounding area to determine if it can be economically developed, and to what extent.

### AEA Review Comments and Recommendation

**Full Funding**

UAF proposes to assess geothermal resources at Pilgrim Hot Springs through refurbishing existing shallow wells and drilling deep wells. This is a resubmittal of a RE Fund round 2 proposal (#258) and a partial resubmittal of a round 3 proposal (#466) that was recommended for funding, but which received only partial funding of \$613,174 due to limited RE Fund appropriation. USDOE funding will fund up to \$4,274,792 (~69% of the project cost).

Land above the resource is now owned by Unaatuq LLC, a consortium of seven Native organizations.

The Nome Energy Study identified development of the Pilgrim Hot Springs geothermal resource as the least-cost option for long-term power supply. The applications includes letters of support from Nome Joint Utilities and Mary's Igloo Native Council (the owner of the adjacent land). DGGs indicates support for the project (see above).

Recommend full funding with the provision that prior to the disbursement of funds, UAF confirm legal access to the resource with the new landowner.

### Funding & Cost

Cost of Power: \$0.37 /kWh

**Energy Region:**

Bering Straits

**Requested Grant Funds:**

\$1,330,467

**Matched Funds Provided:**

\$2,000,000

**Total Potential Grant Amount:**

\$3,330,467

**AEA Funding Recommendation:**

\$1,330,467

## App #654 Pilgrim Hot Springs Geothermal Resource Assessment

**Resource:** Geothermal

**Proposed Project Phase:** Feasibility Recon

**Proposer:** University of Alaska Fairbanks INE/ACEP

**AEA Program Manager:** McMahon

**Applicant Type:** Government Entity

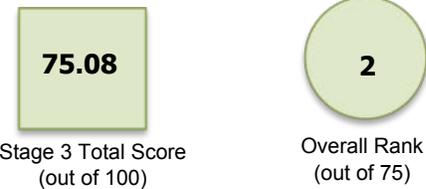
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	11.50
2) Matching Resources (Max 20)	18.00
3) Project Feasibility from Stage 2 (Max 20)	17.33
4) Project Readiness (Max 10)	5.67
5) Benefits (Max 15)	13.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Power use for proposed Rock Creek Mine and others. Rock Creek Mine is not in operation, and is looking for buyers. Project will require TWUP for drilling, and water rights depending on the temperature of the geothermal resource.

### DNR/DGGS Feasibility Comments

Pilgrim Hot Springs has been known to be a major geothermal anomaly, and suspected for decades of hosting a significant moderate-temperature geothermal resource. Earlier exploration ('70s and early '80s) failed to find the upflow zone which produces the surface springs. Location of and drilling into the upflow zone is essential for an understanding of this resource that is an adequate basis for development decisions. This project suggests a stepwise progression, with drilling following geophysical surveys, which in turn followed geological surveys. The surveys are proceeding under Phase I of this project, although results are not given. This proposal is for Phase II, drilling and results of phase I are needed to fully evaluate. The timeline given in the proposal states that this Phase II drilling will be done between about February and November of 2012.

### 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 #655 Triangle Lake Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Metlakatla Indian Community

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

### Project Description

The proposed Triangle Lake hydroelectric project will be located on the west side of Annette Island near the route of the proposed Metlakatla- Ketchikan Intertie. The project as presently envisioned will be comprised of a small embankment dam at the outlet of Triangle Lake, a 1.3 mile long penstock and a powerhouse containing a single horizontal Francis turbine generating unit with a capacity of 4.0 MW. The Triangle Lake project will provide additional hydroelectric power to Metlakatla and, with construction of the Metlakatla-Ketchikan Intertie, to the interconnected electric systems of Ketchikan, Wrangell and Petersburg. MIC will develop and own the Triangle Lake project.

### AEA Review Comments and Recommendation

Full Funding

Metlakatla Indian Community (MIC) proposes assessing feasibility of a 4 MW storage hydro project at Triangle Lk. Improved access to the proposed hydro site by recent road construction to Walden Point makes hydro development more reasonable to consider at this site. Project would be located on federal trust land. Major issue remains a market for power, which should be assessed in a regional IRP. This proposal is similar to a Round 3 proposal (#450) that was recommended for funding, but which did not receive a grant due to insufficient funds.

Because the project would connect to the SEAPA grid that has numerous existing and proposed alternatives for generation and transmission, AEA concludes that there is insufficient information provided to assign a benefit to cost ratio.

Recommend full funding with requirement that scope of work is consistent with findings of the Southeast Alaska IRP.

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Requested Grant Funds:**

\$500,000

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$500,000

**AEA Funding Recommendation:**

\$500,000

## App #655 Triangle Lake Hydroelectric Project

Resource: Hydro

Proposed Project Phase: Feasibility

Proposer: Metlakatla Indian Community

AEA Program Manager: Ott

Applicant Type: Government Entity

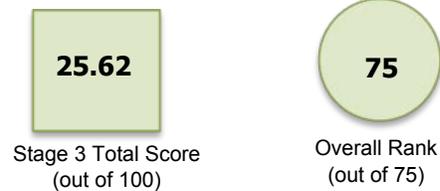
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	9.87
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

There may be no oversight by FERC because of the Indian reservation, but not sure if that holds if they are going to tie into a grid through an intertie that extends beyond the boundaries of the indian reservation.

### 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 #656 Metlakatla-Ketchikan Intertie

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Design

**Proposer:** Metlakatla Indian Community

**AEA Program Manager:** Ott

**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 Revillagigedo 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. Design of the Metlakatla- Ketchikan Intertie is nearly complete. Transmission poles have also been procured and are currently stored in Metlakatla.

### AEA Review Comments and Recommendation

Partial Funding

Metlakatla Indian Community proposes funding for constructing an 18 mile intertie that connects the Metlakatla and Ketchikan power systems. Permitting and design were funded by RE Fund round 1 (#20). MIC submitted a round 3 application (#449) that was recommended but not funded due to insufficient funding.

The project cost is now estimated at \$12.73 million, up from the previous estimate of \$7.65 million. The estimated annual surplus hydro energy has decreased from 8.5 GWh to 6.0 GWh.

The application provides no indication of a power sale agreement with Ketchikan Public Utility.

MIC is requesting over \$9.4 million for financing the balance of the project. The proposal does not recognize the maximum funding cap of \$2 million and provides no other indication of how the balance of the project would be financed.

Because the project would connect to the SEAPA grid that has numerous existing and proposed alternatives for generation and transmission, AEA concludes that there is insufficient information provided to estimate a benefit/cost ratio.

AEA recommends funding in the amount of \$1,180,000 (\$2 million cumulative cap minus the \$820,000 the project received in round 1).

AEA recommends special provisions be associated with this grant as follows: (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; (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; and (4) the scope of work is consistent with findings of the Southeast Alaska IRP.

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$9,405,200

**Matched Funds Provided:**

\$3,320,000

**Total Potential Grant Amount:**

\$12,725,200

**AEA Funding Recommendation:**

\$1,180,000

**App #656 Metlaktla-Ketchikan Intertie**

**Resource:** Transmission

**Proposed Project Phase:** Construction Design

**Proposer:** Metlaktla Indian Community

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

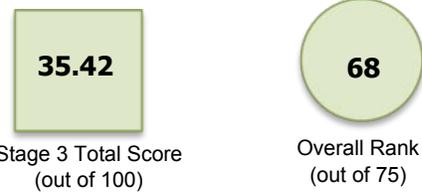
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	8.33
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	3.83

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

It appears that MIC does not recognize the need for the state to issue an easement for the submerged cable for the intertie once off of the reservation.

## 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 #657 AVTEC Hydro Training Facility

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Alaska Vocational Technical Center

Design

Recon

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

### Project Description

AVTEC, in partnership with the City of Seward, intends to renovate, refurbish, and upgrade the City of Seward's existing unused Marathon Hydro-electric plant to be used as an education and training tool in support of 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

Partial Funding

AVTEC proposes final design and construction to renovate the existing Marathon Creek 250 kW hydro project. The project was constructed in the 1980s but ceased operation in the 1990s after an electrical system failure. AVTEC intends to use the project as a hydro training facility and sell power to the City of Seward Electrical Utility.

The business arrangement and site control for this project remains to be established.

Recommend partial funding of \$67,500 for final design and permitting with the provision that the MOA between the City and AVTEC for site control be finalized before any funds are disbursed.

### Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$703,800

**Matched Funds Provided:**

\$16,588

**Total Potential Grant Amount:**

\$720,388

**AEA Funding Recommendation:**

\$67,500

## App #657 AVTEC Hydro Training Facility

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Recon

**Proposer:** Alaska Vocational Technical Center

**AEA Program Manager:** Ott

**Applicant Type:** Government Entity

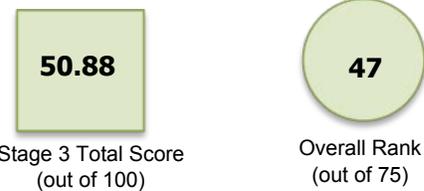
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	3.94
2) Matching Resources (Max 20)	2.00
3) Project Feasibility from Stage 2 (Max 20)	18.07
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	13.38
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	4.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Doesn't seem to offset much other energy costs. Does this type of project fit the grant criteria? Project has expired DNR Permit to Appropriate Water, but water has not been used since 1990. This permit is likely no longer valid as water has not been used for the past 5 years. City will be required to re-file for water rights.

### 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 #658 Organic Rankine Cycle Field Testing

**Resource:** Heat Recovery

**Proposed Project Phase:** Feasibility

**Proposer:** University of Alaska Fairbanks ACEP

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

This proposal represents the second phase (field testing) of “Optimizing Heat Recovery Systems for Power Generation in Rural Alaska,” a proposal funded by the Denali Commission (\$250,000) and the Alaska Energy Authority (\$54,306). The project involves laboratory testing of a 50 kW precommercial ORC unit to test the efficacy of generating power using recovered waste heat from a mid-sized rural power plant. The testing will take place at the University of Alaska Fairbanks in winter 2010-2011, with the Phase 2 field testing called for in this proposal to begin in October 2011. The Phase 2 testing includes performance data collection and analysis, evaluation of operation and maintenance requirements, economic analysis of potential power generation / cost savings, and establishing guidelines for future ORC applications throughout rural Alaska and a methodology for selecting appropriate village sites. Both phases of the overall project include data collection and comparison of a 250 kW ORC unit presently being tested in Cordova, Alaska. No funding is requested in this proposal for monitoring the Cordova project.

### AEA Review Comments and Recommendation

Full Funding

ACEP in partnership with Tanana Chiefs Conference proposes to follow up lab testing of 50 kW Electrotherm ammonia cycle engine that converts recovered heat to power. It is part of an overall program funded by EPA and AEA to develop and perform independent evaluation of organic rankine cycle and similar technology for use in rural Alaska. Following completion of lab testing in summer 2011 the unit would be moved to a suitable community power plant in the TCC region.

This project represents applied research that can provide immediate benefits to communities. Because it is not fully commercialized there is significant technical risk.

Recommend full funding contingent upon AEA accepting report from lab testing that indicates the technology is potentially viable for rural Alaska.

### Funding & Cost

Cost of Power: \$0.56 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:**

\$472,787

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$472,787

**AEA Funding Recommendation:**

\$472,787

## App #658 Organic Rankine Cycle Field Testing

**Resource:** Heat Recovery

**Proposed Project Phase:** Feasibility

**Proposer:** University of Alaska Fairbanks ACEP

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

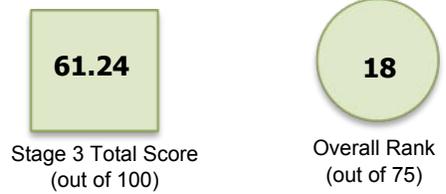
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	17.59
2) Matching Resources (Max 20)	2.00
3) Project Feasibility from Stage 2 (Max 20)	15.43
4) Project Readiness (Max 10)	5.67
5) Benefits (Max 15)	12.87
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #659 Kachemak Bay Tidal Power

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City of Homer

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

The proposed project will assess the tidal energy potential and development feasibility of four sites within Kachemak Bay. With assistance from the National Oceanic and Atmospheric Administration (NOAA), the project will utilize historical water level and current data, recent sea floor mapping data, and new ocean current measurements to construct a comprehensive ocean circulation model of the entire Kachemak Bay region. The model and tidal current data analyses will provide detailed information on tidal energy potential throughout Kachemak Bay. With this tidal power information and consideration of effective tie-in to the electric grid, four sites will be selected and power production costs, output, and availability, as well as potential environmental issues, will be assessed to determine initial feasibility of tidal energy projects. For all feasible sites, a conceptual design to optimize tidal energy production will be produced, along with a construction cost estimate for that design.

### AEA Review Comments and Recommendation

Not Recommended

The City of Homer proposes reconnaissance assessment and feasibility analysis/conceptual design of a 1.2 MW hydrokinetic device in Kachemak Bay. This is a modified resubmittal of round 3 application #500 that was recommended for funding, but that was not funded due to limited funding. Homer has assembled a strong project team that includes a number of entities with experience in assessing tidal energy feasibility and resources—NOAA’s Coast Survey Development Laboratory (CSDL), Kasitsna Bay Laboratory and Center for Operational Oceanographic Products and Services; Homer Electric Association; the ADF&G and NOAA-supported Kachemak Bay Research Reserve, Native Village of Port Graham; City of Seldovia; and the Seldovia Village Tribe. The application appropriately addresses potential wildlife impacts and includes the involvement of ADFG. NOAA commits to \$680,000 in in-kind project support.

The proposed work would take place in two stages: 1) Following initial kickoff meetings, CSDL would create a model of Cook Inlet tidal current velocity and direction based on input of bathymetry, salinity, temperature, river flow inputs, and other parameters. Work would take place between July 2011 and January 2013. Based on results the project team would decide whether or not to proceed to the next phase. 2) Conceptual design of a tidal power plant, to be completed in June 2013.

Cook Inlet is known to have the second largest tidal variation in North America. It is also adjacent to Alaska’s largest connected electrical load. The first phase of this project would provide valuable baseline data on not only tidal power density, but also information useful for oil spill response, fish and wildlife habitat, and recreational and commercial boating safety. For these reasons AEA will allocate other non-RE Fund funding to support the first phase of the project. Based on the results of the first phase the project team can decide whether or not to proceed to conceptual design.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:** \$620,811

**Matched Funds Provided:** \$706,424

**Total Potential Grant Amount:** \$1,327,235

**AEA Funding Recommendation:**

## App #659 Kachemak Bay Tidal Power

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City of Homer

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

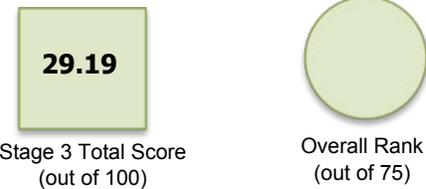
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	18.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Because this area is a critical habitat area and a research reserve, the biologic and environmental review will be in the forefront of feasibility. Would require state permits.

### 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 #660 Cook Inlet TidGen Project

**Resource:** Other

**Proposed Project Phase:** Construction

**Proposer:** ORPC Alaska, LLC

**AEA Program Manager:** McMahon

**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 tidal, river and ocean currents. ORPC requests Phase IV funding for the TidGen™ Project to complete the first stage of ORPC's larger Cook Inlet Tidal Energy Project. The TidGen™ Project involves installing a 4- device TidGen™ Power System with a total rated generating capacity of 600 kW in a 6-knot current. ORPC's TidGen™ Power System consists of one or more TidGen™ devices (which include a turbine generator unit [TGU] mounted on a bottom support frame) connected to an on-shore substation using underwater power and control cables. ORPC expects to receive the pilot project license from the Federal Energy Regulatory Commission (FERC) by December 2011. ORPC will release the initial TidGen™ Project components for manufacture by January 2012 and will ship the components of the first of four TidGen™ devices to Anchorage by May 2012. The TidGen™ Power System will be assembled at the Port of Anchorage and will be installed in phases from June 2012 to July 2013. ORPC will then monitor the system to collect essential site development and environmental data. In subsequent stages of the Cook Inlet Tidal Energy Project, which are not in the scope of this application, ORPC will deploy an OCGen™ Power System to increase the rated capacity to 0.9 MW by the end of 2013 and to 3 MW by the end of 2014. ORPC will ultimately increase the rated capacity to commercial scale – up to 100 MW – by 2020 under a FERC operating license that ORPC will obtain before the end of the pilot project license period.

### AEA Review Comments and Recommendation

Full Funding

Ocean Renewable Power Corporation proposes permitting, final design and construction of a 600 kW array of proprietary cross-flow tidal instream electric conversion units for potential scale-up to 100 MW. The units would use a gravity foundation on the bottom of Cook Inlet near Fire Island. ORPC's technology is currently being tested in Eastport, Maine. Undersea cable would bring power to shore. The project siting depends on being intertied to the Railbelt grid through transmission developed in conjunction with the planned Fire Island wind farm.

The proposer states that the most substantial challenges will be impacts on beluga, migrating fish, and sediment flow. ORPC has received \$600,000 in funding from USDOE to assess impacts on belugas and \$240,000 to assess impacts of sediment on device components. ORPC has obtained a preliminary FERC permit and would prepare a request to FERC for pilot project license in late 2011. Other permits will include ADFG fish habitat, DNR water and subsurface use, Army Corps title 10, Coastal Zone, and Coast Guard navigational assessment. ORPC has developed a team of specialists that they state will address technical and habitat issues.

ORPC will complete conceptual design and feasibility analysis by December 2011.

ORPC proposes to pay for almost all of the design and permitting. RE Fund dollars would support construction. While AEA remains concerned about the risks associated with deploying new technology, we note that the Alaska-based developers have assembled a credible project team and have invested substantially in developing the technology. Alaska has most of the nation's potential for tidal energy and it is logical for the state to support ocean energy technology development.

Recommend full funding with provision that before any funds are released 1) ORPC must demonstrate to AEA's satisfaction that, based on the Maine deployment, the technology is viable, and 2) AEA must accept the conceptual design and feasibility assessment.

### Funding & Cost

Cost of Power: \$0.15 /kWh

### Energy Region:

Railbelt

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$6,050,538

**Total Potential Grant Amount:**

\$8,050,538

**AEA Funding Recommendation:**

\$2,000,000

## App #660 Cook Inlet TidGen Project

Resource: Other

Proposed Project Phase: Construction

Proposer: ORPC Alaska, LLC

AEA Program Manager: McMahon

Applicant Type: IPP

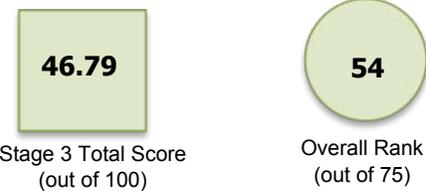
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	7.57
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	1.50
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Progressing with permitting for first phases of construction. There is still concern how the beluga whale issues will turn out since there is additional scrutiny being directed toward the protection of that species. In addition, some of the debris studies are important to determine if the turbines can be kept year round on the sea bed. Would require state permits.

### 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 #661 Turnagain Arm Tidal Electrical Generation Project

**Resource:** Other

**Proposed Project Phase:** Feasibility

**Proposer:** Turnagain Tidal Energy Corporation

**AEA Program Manager:** McMahon

**Applicant Type:** IPP

### Project Description

The Turnagain Arm Tidal Electrical Generation Project (TATEP) consists of the installation of patented and proven Rance tidal electrical generation turbines housed in a barrage located in Cook Inlet. (See Map, p. 107.) TATEP is modeled on the La Rance tidal electrical generation plant built at La Rance, Brittany, France in 1966 at a cost of \$88 million. The turbines are housed in a barrage approximately one-half mile long. (See illustration, p. 109, 110.) The tidal electrical plant has been in operation since 1966, with 240 MW of electrical capacity. The plant produces electricity at 1.2¢ / kWh to France's consumers. There have been no mechanical breakdowns in 44 years with normal maintenance. The Rance turbines work in areas with at least 80 ft. of water at high tide and 54 ft. low tide, similar to Turnagain Arm tides. TATEP turbines will be housed underwater horizontally and will turn the same direction on incoming and outgoing tides with generators located on top of the barrage. Specific sites of the turbines will be selected after further research into environmental, hydrodynamics of tides and water movement. The La Rance plant has twenty-four 10 MW generators for a total of 240 MW. TATEP's plan calls for fifty to one hundred twenty 10 MW generators which would produce 500 MW to 1200 MW net electricity. The project will be developed in stages. The first stage calls for 50 turbines which would be sufficient to provide 500 MW net electricity: 100% of the baseline demand currently in the railbelt region. Cost of the project at that point would be \$1.5 billion instead of \$2.5 billion. At that point, tidal power would be used in combination with utilities' current gas turbines, wind, coal, and hydroelectric power for the peak demand and slack period. The tidal electrical production can be expanded as needed over time by adding more turbines. Turbines will be connected by transmission lines; and submarine cable will bring the electricity produced to Chugach Electric on the Anchorage side and to Homer Electric on the Kenai side, accessing existing utility corridors as much as possible to produce inexpensive electricity to Alaska Railbelt consumer. The project is priced for all stages to be built: however, the first stage would produce enough electricity to be competitive with hydroelectric, geothermal, natural gas, and other renewables.

### AEA Review Comments and Recommendation

Not Recommended

The Turnagain Arm Tidal Energy Company's application is for a feasibility study of creating a tidal barrage energy system across Turnagain Arm. The barrage would be 1-2 miles in length, 120 feet wide at its base, and extend 15 feet above the high water line in the area between Fire Island to the Kenai Peninsula. It would include 50 to 120 La Rance-style low-head tidal generators, each with a 10 MW capacity. The proposed system would have a maximum output of 500 -1200 MW. Project to be started in 2011 and finished in 2017.

AEA has the following concerns about this application:

- 1) The application does not provide a clear description of the operation of the proposed barrage system. There is no analysis of average power output or total resource availability.
- 2) In order for the project to function similar to the La Rance project, a dam (barrage) would need to be constructed across Turnagain Arm. AEA questions the practicality of such a project given the high costs and geotechnical risks, as well as likely impacts on fish and marine mammals.
- 3) Although an investor from Singapore (Singa Mas) is reportedly willing to supply \$500 million in financing for construction, the current application includes no cash match.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

**Energy Region:**

Railbelt

**Total Potential Grant Amount:**

\$2,000,000

**AEA Funding Recommendation:**

## App #661 Turnagain Arm Tidal Electrical Generation Project

Resource: Other

Proposed Project Phase: Feasibility

Proposer: Turnagain Tidal Energy Corporation

AEA Program Manager: McMahon

Applicant Type: IPP

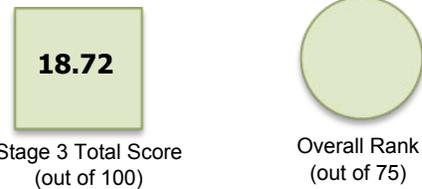
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Narrative identifies DNR permits required. As with project 660, there may be significant issues to address with the beluga whales and debris management to have a viable project.

### 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 #662 Gulkana Village Pellet Fuels Project

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Gulkana Village Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

We are constructing a facility to manufacture wood fuel pellets utilizing local wood and biomass that has no other commercial value and would normally go to waste as feedstock. Our operation will involve harvesting, chipping, and processing the material into wood fuel pellets for residential and commercial markets.

The first phase of the project is under construction. We are erecting a 30' by 40' metal building for the pellet plant. The first pellet production line will be installed in the building. We will shortly be accepting delivery of the equipment for this first line, which will produce one ton of pellets per hour. Based on the number of inquiries and orders we have already received, we anticipate this will not keep up with demand. We anticipate expanding the operation by installing additional production lines as demand warrants.

### AEA Review Comments and Recommendation

Not Recommended

Gulkana Village Council proposes funding for wood pelletizing equipment as part of a densified wood business under development by the Council. The Council is in the process of obtaining a pellet mill and a hammermill and of constructing a building to house the equipment.

AEA has provided a RE Fund round 1 grant (#2) to the Council for developing a cordwood –fired district heating system the community hall, two office buildings and four duplexes. The system is under operation.

AEA requested reconnaissance, feasibility, and design information as part of the review of this application. Specifically AEA asked to “provide copies of the business and operation plans. Your business plan should address long term raw material supply and operation, maintenance and fuel supply costs.”

In response the council provided only a brief tentative business plan that does not address long-term feedstock supply contracts, specific markets, or detailed operating and maintenance activities and costs. DNR review raises concerns about feedstock demand versus availability and costs.

The Council has demonstrated substantial initiative in developing a biofuel business for the community. AEA strongly supports the Council’s initiative but concludes that the Council has not provided sufficient information required by the RE Fund request for applications to serve as a basis for public funding.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.20 /kWh

#### Energy Region:

Copper River/Chugach

**Requested Grant Funds:**

\$955,000

**Matched Funds Provided:**

\$99,000

**Total Potential Grant Amount:**

\$1,054,000

**AEA Funding Recommendation:**

## App #662 Gulkana Village Pellet Fuels Project

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Gulkana Village Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

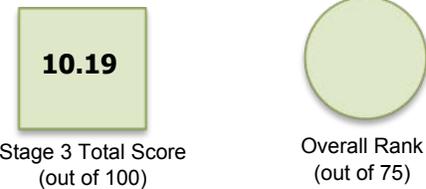
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	2.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is for the installation of 3 small sized pellet and hammer mills for the village of Gulkana. The project proposal is also requesting personnel funds for one year of equipment operation. At full production it is estimated that 9,600,000 pounds of finished pellets would be produced annually (4,800 tons). There was no estimate of annual supply needs of raw material but existing supply was noted at 300 cords of wood ready to be chipped and a hazard fuel reduction clearing of 75 acres of wood. There was also mention of a potential military clean up area of 80 acres. Based on a two to one ratio of green raw material to finished pellet product, it is estimated that 9,600 tons of raw material would be needed to sustain the project at full capacity. The project proposal states that Ahtna would consider the sale of wood volume for this project. Based on a completed forest inventory for Gulkana Village Lands conducted by Tanana Chiefs Conference, timber stands within the Gulkana village area average around 29 tons per acre. Thus approximately 330 acres per year would be required for the project. The inventory report calculates an allowable harvest level of 177 acres per year. The deficit could be made up from additional areas owned by Ahtna, Inc. or by state owned forest classified lands. These areas however would be more distant from Gulkana with the possibility of increased raw material costs.

### 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 #663 Ionia Renewable Energy Training Center

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Alaska Mental Health Trust Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

Alaska Mental Health Trust (AMHT) is applying to the Alaska Energy Authority (AEA) Renewable Energy Fund Round IV Phase IV grant program, seeking funding for equipment purchase and installation of a GARN biomass heating system for the community of Ionia. The Ionia community is building a two-story 6,000 square foot community center/barn on their property near Kasilof for the purpose of demonstrating renewable energy systems and sustainable living strategies for their neighbors of Kenai Peninsula and other rural Alaskans.

(Project description edited for length and clarity)

### AEA Review Comments and Recommendation

Not Recommended

Applicant (Alaska Mental Health Trust Authority) proposes to develop a wood fired and solar heating system for the Ionia Renewable Energy Training Center. The Trust intends to act as grantee/sponsor for this project and accepts responsibilities under RFA section 1.4 for ownership and control of the facilities. This project was recommended for funding in round 3 (#480), but did not receive funding due to insufficient funding.

Ionia has successfully developed a similar wood fired system that supplies heat and domestic hot water for the Community Long House. Ionia has a very progressive focus in producing energy and food using their own local resources.

However, the project would only result in displacing 4,200 gallons of diesel per year. Given a proposed grant of over \$240,000 and a match of \$33,000, this results in poor economic returns. AEA notes that the economic analysis in round 3 was incorrect; the current B/C corrects the error.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$241,623

**Matched Funds Provided:**

\$33,000

**Total Potential Grant Amount:**

\$274,623

**AEA Funding Recommendation:**

**App #663 Ionia Renewable Energy Training Center**

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Alaska Mental Health Trust Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

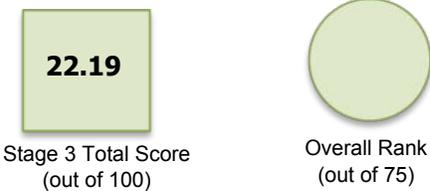
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

The wood supply for the Garn will be from Kenai Peninsula spruce forests where a volume determination has already been conducted in a Phase II resource analysis. The project proposal also states that many thousands of acres of spruce beetle killed forests still remain on the peninsula and are a wild fire hazard according to Alaska State DNR foresters. It is estimated that annual wood use would be between 40 and 50 cords at a delivered price of around \$160/cord. This wood use appears sustainable in light of the proximity of the total available resource. It is estimated that 40-50 cords of fuelwood will offset 4,200 gallons of heating oil. Current price of the displaced fuel oil is \$12,600. Ionia is currently operating two Garn boiler units in other buildings within the community.

## 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 #664 Kwethluk Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Organized Village of Kwethluk

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

## Project Description

Organized Village of Kwethluk (OVK) requests funding for an AEA Round IV Phase II Feasibility Analysis to further assess technical, economic, financial and operational viability of a wind system for Kwethluk and to narrow the focus of final design and construction of such a system.

During this project, we will install a wind meteorological (met) tower to solidify the options of installing wind towers in Kwethluk. The work will involve obtaining a letter of non-objection for placement of the wind tower, permitting, transporting and installing a met tower at this location and studying the wind resource for one year. A conceptual design for a wind farm will be created based on the outcome of the met tower recordings.

(Project description edited for length and clarity)

## AEA Review Comments and Recommendation

Full Funding

The Village of Kwethluk proposes feasibility assessment and conceptual design of a wind energy system to be located on the old runway owned by Alaska DOTPF.

AEA's high-resolution wind map indicates a class 4 resource. Despite the location on the runway, some level of geotechnical assessment will be required. Geotech is not listed in the proposal. At the same time, tasks 4-7 basically consisting of cost analysis and conceptual design are budgeted \$114,000. AEA thinks this figure is rather high.

Recommend full funding with requirement that grant scope needs to include geotechnical assessment.

## Funding & Cost

Cost of Power: \$0.52 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:** \$145,000

**Matched Funds Provided:** \$16,000

**Total Potential Grant Amount:** \$161,000

**AEA Funding Recommendation:** \$145,000

## App #664 Kwethluk Wind Feasibility

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Organized Village of Kwethluk

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

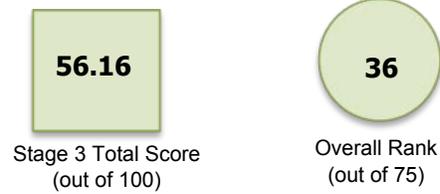
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.25
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	12.53
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	4.88
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #665 Upper Tanana Biomass CHP Project

**Resource:** Biomass

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Alaska Power & Telephone Company

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

### Project Description

Alaska Power & Telephone (AP&T) proposes to conduct a Phase II project that will complete the Feasibility Analysis, (Biomass) Resource Assessment and Conceptual Design for a 2MWe biomass gasification CHP (combined heat and power) system. AP&T, in partnership with Nexterra Systems, and with support from GE Energy, the Upper Tanana communities of Tok, Tetlin, Dot Lake and Tanacross, the State of Alaska Department of Natural Resources (DNR), Contracted Consultants, Foresters and Economists, will collaborate to assess the feasibility of a system utilizing locally sourced woody biomass as fuel. The project will thoroughly assess the long-term sustainability and projected costs of the biomass resource. The project will also develop the conceptual design, assess the project site, and identify any remaining technical and operational barriers. This will refine the Benefit/Cost Ratio projections and better define public benefits. Most of the detail in this grant application is from pre-feasibility work previously done by AP&T. All the data presented herein will be thoroughly assessed for confirmation or adjustment in the proposed analysis.

### AEA Review Comments and Recommendation

**Full Funding**

Alaska Power Company proposes feasibility assessment and conceptual design of a 2MW wood gasification power generation system to serve the Tok area power system. The system includes a 30 mmBtu/hr Nexterra gasification system and GE Jenbacher reciprocating generators. An important component of the proposed project is demonstration of an innovative gas clean up system.

APC applied unsuccessfully for a \$10 million grant from USDOE for this project in early 2010. APC proposed to use USDOE funds and its own resources to complete feasibility/concept design and permitting/final design during the first half of 2010. In round 3 APC requested construction funds from AEA (#479), but AEA recommended against funding the project. The current proposal focuses on feasibility and conceptual design.

AEA is strongly supportive of demonstrating the Nexterra/GE technology in Alaska. This proposal is particularly attractive because

1. APC has a good track record as a well-operated utility and a leader in renewable energy development in Alaska
2. Tok, located on the road system, is an excellent site for demonstration of a wood-fired biopower project
3. The upper Tanana Valley has a substantial wood resource and a number of sawmills in operation.
4. The proposed technology has strong potential for application in other parts of the state.

AEA has concerns about the viability of integrating a wood-fired heat and power system into the Tok grid since

1. There is a hydro resource available at Yerrick Creek to serve the Tok grid currently under development that is also being funded by the RE Fund is (#438)
2. The RE Fund has already supported a significant wood energy project in Tok to supply the school with heat (#49).

Recommend full funding with provision that APC coordinate its feasibility assessment with the school heating project and Yerrick Creek hydro project.

### Funding & Cost

Cost of Power: \$0.53 /kWh

#### Energy Region:

Yukon-Koyukuk/Upper Tanana

**Requested Grant Funds:** \$380,000

**Matched Funds Provided:** \$45,000

**Total Potential Grant Amount:** \$425,000

**AEA Funding Recommendation:** \$380,000

## App #665 Upper Tanana Biomass CHP Project

**Resource:** Biomass

**Proposed Project Phase:** Design Feasibility

**Proposer:** Alaska Power & Telephone Company

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

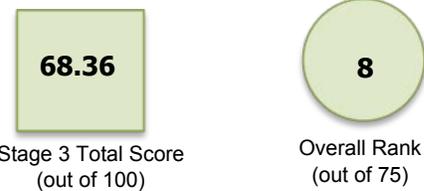
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.59
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	16.27
4) Project Readiness (Max 10)	3.67
5) Benefits (Max 15)	13.50
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project is a feasibility analysis for a proposed biomass fueled combined heat and power (CHP) project for the Tok electrical utility. Roughly \$60,000.00 of the total project cost of \$425,000 is for conducting a detailed biomass energy resource assessment. A significant amount of the raw forest inventory data will come from the Division of Forestry's inventory work in the Tok area. The forestry consultant, Clare Doig (Forest & Land Management, Inc.) will conduct a thorough review of delivered biomass costs and supply. The \$45/green ton fuel supply cost used in the cost worksheet may be optimistic given transportation, management, reforestation and other costs that will need to be imbedded in this delivered cost. This uncertainty illustrates the importance of the proposed economic analysis to determine whether a sustainable operable supply of biomass exists to provide the estimated 300 acres per year (40 tons per acre) needed for the operation of the CHP facility. The resource analysis section in the grant proposal appears to be well thought out and should provide the needed information for determining whether a sustainable operable supply of biomass is present for the near and long term horizons of the project.

### 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 #666      Kenai Winds Expansion**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Kenai Winds LLC

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

## Project Description

Kenai Winds LLC has received AEA support to develop and erect a 10 MW wind energy facility located in the Nikiski industrial area on the Kenai Peninsula. Through prior discussions with Homer Electric Association, the project size is being increased to 15MW. This proposal is submitted to secure funding needed for the expansion. The facility will consist of 5 to 10 wind turbines disbursed throughout the site, electrically interconnected to either HEA's Nikiski substation or Chugach Electric Association's Bernice Lake substation. The project will sell its electrical output to CEA. Letters of support from HEA and CEA are including in Appendix E and Appendix L. Kenai Winds LLC was included on the Round III renewable energy projects approved by the Alaska state legislature for funding. Due to budget cuts, those funds were not received. This application will help restore funding which will directly result in lower power price to the Alaska ratepayer.

## AEA Review Comments and Recommendation

Did Not Pass Stage 1

Project failed Stage 1 - capped out.

## Funding & Cost

Cost of Power: \$0.20 /kWh

### Energy Region:

Railbelt

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$8,000,000

**Total Potential Grant Amount:**

\$10,000,000

**AEA Funding Recommendation:**

**App #666 Kenai Winds Expansion**

**Resource:** Wind

**Proposed Project Phase:** Construction

**Proposer:** Kenai Winds LLC

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

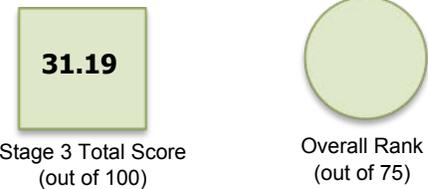
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW 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 #667 Kotzebue Paper & Wood Waste to Energy

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Kotzebue

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

The purpose of this project is to determine the feasibility of converting paper, cardboard and other wood-based waste into thermal energy for heating the municipal water system of Kotzebue, Alaska. The City of Kotzebue proposes to complete a feasibility study and conceptual design for a paper/wood waste thermal energy system. To this end, the City will study the paper/wood waste stream in Kotzebue, environmental impacts of the combustion process, and the economics of the process. This total project concept could be segmented into the following phases:

- Phase 1. Feasibility study & conceptual design.
- Phase 2. Financing and paper/wood waste collection agreements.
- Phase 3. Permitting, design and engineering.
- Phase 4. Construction.
- Phase 5. Operations and maintenance.

### AEA Review Comments and Recommendation

**Full Funding**

The City of Kotzebue proposes to study feasibility of converting paper and wood from the city waste stream into heat for the municipal water system. The City estimates 1,825 to 2,920 tons per year of paper and wood are produced in Kotzebue per year that could displace approximately 100,000 gal/yr of heating fuel.

The City submitted a round 2 application (#284) for a \$15,000 reconnaissance-level study of adapting US Dept. Defense waste-to-energy technology for use in Kotzebue which AEA recommended, but which was not funded due to insufficient funds.

For the current proposal the City is requesting funding for feasibility level assessment without submitting a reconnaissance level report that concludes that the project concept is viable.

Recommend full funding with requirement that the City will complete tasks 1-4 (permitting, resource analysis, equipment analysis, and environmental analysis) and conclude that is justified to proceed to conceptual design and further stages. AEA must agree with this conclusion before more than \$25,000 of grant funds are disbursed.

### Funding & Cost

Cost of Power: \$0.46 /kWh

**Energy Region:**  
Northwest Arctic

**Requested Grant Funds:** \$85,000

**Matched Funds Provided:** \$9,250

**Total Potential Grant Amount:** \$94,250

**AEA Funding Recommendation:** \$85,000

## App #667 Kotzebue Paper & Wood Waste to Energy

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** City of Kotzebue

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

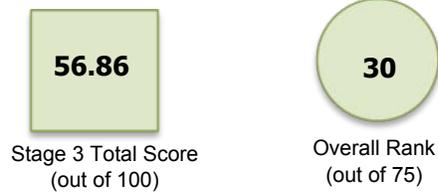
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	14.50
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	13.57
4) Project Readiness (Max 10)	0.00
5) Benefits (Max 15)	10.13
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #668 Upper Kobuk River Biomass

**Resource:** Biomass

**Proposed Project Phase:** Design

**Proposer:** Northwest Inupiat Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

### Project Description

The intent of this project is to increase the use of locally available, biomass energy for thermal heating and biomass needs. This project will be located in the upper Kobuk River Valley and will serve the villages of Ambler, Kobuk, and Shungnak. The applicant is Northwest Inupiat Housing Authority (NIHA). Other project partners include NANA Regional Corporation, Maniilaq Association, WHPacific Inc., and the Kobuk, Shungnak and Ambler Village Councils. There are four phases to this project and this application is for phase three.

### AEA Review Comments and Recommendation

Full Funding

Northwest Inupiat Housing Authority proposes to follow-up ongoing feasibility assessment for building heating in Ambler, Shungnak, and Koby funded in round 1 (#59). Based on outcome of the assessment NIHA would choose one of the communities for final design and permitting.

The grant for the round 1-funded work was executed in August 2009. AEA is concerned that the project has been progressing slowly. The project is being managed by WH Pacific, a subsidiary of NANA.

Recommend full funding with requirement that before any funds are expended, the applicant provide and AEA accept the feasibility and conceptual design report.

### Funding & Cost

Cost of Power: \$0.80 /kWh

**Energy Region:**

Northwest Arctic

**Requested Grant Funds:**

\$250,000

**Matched Funds Provided:**

\$20,000

**Total Potential Grant Amount:**

\$270,000

**AEA Funding Recommendation:**

\$250,000

## App #668 Upper Kobuk River Biomass

**Resource:** Biomass

**Proposed Project Phase:** Design

**Proposer:** Northwest Inupiat Housing Authority

**AEA Program Manager:** Plentovich

**Applicant Type:** Government Entity

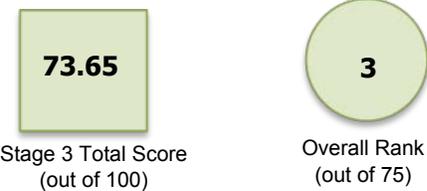
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	24.97
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	14.93
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	12.75
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Possible .850 permits required. Project describes usage of what is presumed to be state managed land or water based on information furnished. Narrative identifies DNR permits required.

### 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 #669 Akiachak Wind Feasibility & Conceptual Design

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** Akiachak Native Community/Akiachak Ltd.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Government Entity

### Project Description

To determine and document the feasibility and conceptual design of a wind diesel turbine facility in the community of Akiachak, Alaska. Akiachak Native Community (ANC) proposes to install a wind meteorological (met) tower and to complete the necessary geotechnical work to determine the economic feasibility of installing wind turbines in Akiachak, Alaska. The work will involve:

- (1) obtaining a letter of non-objection for placement of the wind tower and
- (2) geotechnical fieldwork, permitting, purchasing, transporting, and installing a met tower,
- (3) studying the wind resource for one year and documenting the results and
- (4) conducting a geotechnical investigation to determine the soil conditions and needed engineering at the site.

A conceptual design will be created based the met tower data recordings and geotechnical investigation. This will provide adequate information to determine whether there is enough wind resource to justify taking a project to design and ultimately the construction of a wind-diesel system for the community of Akiachak.

### AEA Review Comments and Recommendation

Full Funding

Akiachak Native Corporation proposes reconnaissance and feasibility of a wind-energy system in Akiachak. Akiachak was recommended in round 2 (#212) for feasibility assessment, however there was insufficient funding. Akiachak has a met tower on site, but it is not erected and operational.

The geotech portion of the budget (\$75,000) appears rather high, while conceptual design appears low.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.63 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:** \$110,000

**Matched Funds Provided:** \$15,000

**Total Potential Grant Amount:** \$125,000

**AEA Funding Recommendation:** \$110,000

## App #669 Akiachak Wind Feasibility & Conceptual Design

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** Akiachak Native Community/Akiachak Ltd.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Government Entity

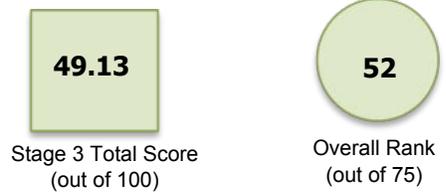
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.69
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	11.07
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #670 Thayer Lake Hydropower Development Generation

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kootznoowoo, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

### Project Description

This proposal is being evaluated as a combined proposal with #671.

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 fully in the Angoon Hydrologic Project Feasibility Evaluation Report (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 transmission line funding will be submitted in a separate companion application for Round III funds.

### AEA Review Comments and Recommendation

Partial Funding

Kootznoowoo Inc. proposes 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. AEA is lumping the two project proposals together for the purposes of evaluation. These proposals are similar to ones submitted in round 3 (#517, 523) that were recommended but not funded due to insufficient funding.

The application includes a letter of support from local utility Inlet Passage Electrical Co-op (IPEC) and others. Kootznoowoo has received a grant \$1,110,500 from USDOE for preconstruction activities.

Project appears to be a promising source of renewable energy for the community of Angoon. Special legislation (ANILCA Section 506) has granted Kootznoowoo, Inc. certain rights for development of a hydroelectric facility at Thayer Creek and has simplified the permitting for the project. The project is only six miles from Angoon and closely matches Angoon's energy requirements.

Recommend partial funding of \$1,060,500 for completion of all preconstruction activities, including final design and permitting (culminating in the issuance of the USFS Special Use Authorization for the project) with the provisions that prior to releasing any AEA grant funds: 1) Kootznoowoo and IPEC must provide a written joint report acceptable to AEA that documents the integration of project design and operation with the needs of the existing IPEC system, 2) Kootznoowoo and IPEC must finalize an MOU that defines a viable business arrangement and will include intent to sign a cost-based power sales agreement, 3) scope be must consistent with the recommendations of the Southeast Alaska IRP.

### Funding & Cost

Cost of Power: \$0.42 /kWh

**Energy Region:**  
Southeast

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

**Matched Funds Provided:** \$978,000

**Total Potential Grant Amount:** \$4,978,000

**AEA Funding Recommendation:** \$1,060,500

## App #670 Thayer Lake Hydropower Development Generation

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kootznoowoo, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

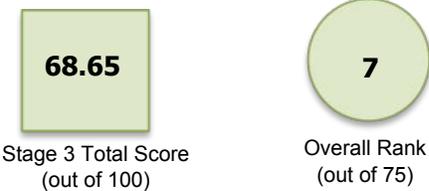
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.19
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	15.00
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	12.12
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It appears the applicant is working through the largest hurdle which was doing the project in the Admiralty National Monument. The USDA Forest Service appears to be honoring the provisions of ANILCA. DNR has required this applicant to file for a permit to appropriate water in the past and they have claimed that because it is a native project, they did not have to file for any state, or federal permits. It's been a few years since DNR last contact with Kootznoowoo Incorporated, maybe they have changed their mind, as the grant application mentions permitting as a cost.

### 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 Chatham Straight segment of the Denali fault passes ~6 miles west of the site. Strong ground shaking from earthquakes on this fault should be considered in engineering designs. See general DGGS comment.

## App #671 Thayer Lake Hydropower Development, Transmission

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kootznoowoo, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

## Project Description

See Proposal #670

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 fully in the Angoon Hydrologic Project Feasibility Evaluation Report (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 abroad forested valley then steepens for 6,800 feet through a narrow forested canyon and finally flattens again for 2000 feet before flowing in to 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 ahead of 250 feet which is approximate because of the wording of the Forest Service Record of Decision (ROD) requiring maintenance offish 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 transmission line funding will be submitted in a separate companion application for Round III funds.

## AEA Review Comments and Recommendation

See project #670

## Funding & Cost

Cost of Power: \$0.42 /kWh

**Requested Grant Funds:**

\$4,000,000

**Matched Funds Provided:**

\$978,000

**Total Potential Grant Amount:**

\$4,978,000

**AEA Funding Recommendation:**

**Energy Region:**  
Southeast

## App #671 Thayer Lake Hydropower Development, Transmission

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Kootznoowoo, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

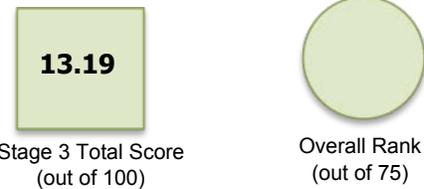
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.19
2) Matching Resources (Max 20)	
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It appears the applicant is working through the largest hurdle which was doing the project in the Admiralty National Monument. The USDA Forest Service appears to be honoring the provisions of ANILCA.

### 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 #672 Snettisham Transmission Line Avalanche Mitigation

**Resource:** Transmission

**Proposed Project Phase:** Construction  
Design

**Proposer:** Alaska Electric Light & Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

A conceptual design report has been completed for the six towers of highest avalanche risk (LaRue, 2010). The report was based on experience and engineering resources gained during the 2008 and 2009 avalanche repairs. The recommended mitigation construction cannot be completed in one year; hence the requested funds would be used over a 2011-2012 period. In 2011, we propose to construct the replacement of tower 3/4 and structural modifications to existing towers 4/1, and 4/2 for an estimated \$1,562,000. In 2012, we propose to construct a large steel diversion structure above tower 4/5 similar to one constructed in 2009 above tower 4/6. We also would construct a smaller diversion structure above tower 4/4 for an additional combined cost of \$2,457,600.

### AEA Review Comments and Recommendation

Partial Funding

Alaska Electric Light and Power proposes final design and construction of one tower replacement, two tower structural modifications, and addition of snow diversion structures to two towers on the intertie that connects the Snettisham project to Juneau.

AEL&P proposes a two-phase design and construction schedule. Phase 1 begins in late 2010 and ends in fall 2011. Phase 2 begins in late 2011 and ends in fall 2012. Round 4 funds are available only for activities that take place after July 1, 2011 (Phase 2 work).

The project is eligible for funding under the RE Fund because it will reduce the likelihood of the number of outages occurring due to avalanches that necessitate diesel generation (e.g. the major outages in the winters of 2008 and 2009) in addition to improving reliability of Snettisham hydropower.

Recommend funding of up to \$2 million for activities that take place after July 1, 2011.

### Funding & Cost

Cost of Power: \$0.11 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$3,215,680

**Matched Funds Provided:**

\$803,920

**Total Potential Grant Amount:**

\$4,019,600

**AEA Funding Recommendation:**

\$2,000,000

## App #672 Snettisham Transmission Line Avalanche Mitigation

**Resource:** Transmission

**Proposed Project Phase:** Construction Design

**Proposer:** Alaska Electric Light & Power Company

**AEA Program Manager:** Ott

**Applicant Type:** Utility

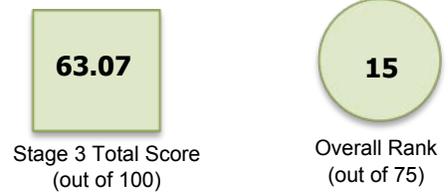
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	3.47
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	17.93
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	4.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Already permitted.

### 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 #673 Atmautluak Wind Renewable Energy

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Village of Atmautluak

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Government Entity

### Project Description

Based on the conclusions of our completed feasibility and conceptual-design efforts, the Village of Atmautluak (Village) will, with Alaska Energy Authority (AEA) assistance, complete the design process to successfully install a wind-diesel system in the community. This includes automated controls and the equipment necessary to regulate, control and deliver reliable energy to the residents of the community. The project will produce the final designs and plans and complete the necessary permitting for two projected wind turbines and the associated equipment installations to upgrade the existing power generation and distribution system to produce power from a wind turbine-diesel engine configuration. The Village of Atmautluak, will hire and contract with WH Pacific to complete this design project and provide management oversight of any subcontracted engineering/design firms. WH Pacific will also complete the RFP process: provide overall project management oversight of the necessary civil work and work closely with Northern Power to install Northwind100/21 B model wind turbines, manage the startup and commissioning.

### AEA Review Comments and Recommendation

Partial Funding

The Village of Atmautluak proposes final design and permitting for a 200 kW wind-diesel project.

The community has already completed a \$45,000 feasibility study funded by the Denali Commission. Although the feasibility study is valuable, it did not include geotechnical assessment and AEA notes the following limitations in the HOMER system modeling:

1. The model assumes the old Northwind 100a power curve instead of the new 100b model
2. The spinning reserve requirement is set too low
3. The fuel curve on one of the existing diesel gensets indicates higher fuel economy than manufacturer specs
4. Modeling did not evaluate use of excess windpower for heat
5. Analysis assumes 25 year life instead of standard 20 year life.
6. The report notes need for "more detailed design, permitting/environmental studies, and economic analysis is warranted to confirm economic feasibility before funding can be secured or a decision is made to proceed with construction"

AEA thinks that the cost of a full feasibility study and conceptual design for a wind-including geotechnical analysis ranges from roughly \$80,000-180,000.

Recommend partial funding of \$100,000 for completing feasibility and conceptual design.

### Funding & Cost

Cost of Power: \$0.77 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

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

**Matched Funds Provided:** \$25,000

**Total Potential Grant Amount:** \$250,000

**AEA Funding Recommendation:** \$100,000

## App #673 Atmautluak Wind Renewable Energy

**Resource:** Wind

**Proposed Project Phase:** Design

**Proposer:** Village of Atmautluak

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Government Entity

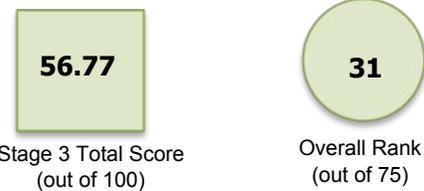
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	24.19
2) Matching Resources (Max 20)	7.00
3) Project Feasibility from Stage 2 (Max 20)	11.50
4) Project Readiness (Max 10)	5.00
5) Benefits (Max 15)	3.75
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Not sure if the 25' trail vacation necessary is a ANCSA 17(b) trail or some other type, but may or may not be an issue depending on public input.

### 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 #674 Stetson Creek Diversion/Cooper Lake Dam Facilities

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chugach Electric Association, Inc.

Design

Feasibility

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

As part of the FERC relicensing of the Cooper Lake plant in 2007, Chugach agreed to spend up to \$11.04 million (\$12.5 million in 2009 dollars) 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 purpose of the project is to enhance fish habitat. It will add water to Cooper Lake and result in additional hydroelectric energy generation.

### AEA Review Comments and Recommendation

Partial Funding

Chugach Electric requests funding for feasibility, permitting/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.

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.

Before RE Fund funding is allocated to construction, it is reasonable for CEA to complete feasibility, permitting, and final design.

Recommend partial funding for feasibility, permitting, and final design.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$2,000,000

**Matched Funds Provided:**

\$21,900,000

**Total Potential Grant Amount:**

\$23,900,000

**AEA Funding Recommendation:**

\$576,080

## App #674 Stetson Creek Diversion/Cooper Lake Dam Facilities

**Resource:** Hydro

**Proposed Project Phase:** Construction  
Design  
Feasibility

**Proposer:** Chugach Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	20.00
3) Project Feasibility from Stage 2 (Max 20)	11.43
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	1.13
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

FERC Lic. Issued, construction delayed due to cost. Project will require water rights, land permits for transmission lines. Environmental studies still underway under FERC/State/federal agreement.

### 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 #675      Battle Creek Diversion Project**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Chugach Electric Association, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

## Project Description

This is a project to divert water from the upper watershed of the middle branch of Battle Creek into Bradley Lake. Based on Battle Creek stream flow measurements from 1991 to 1993, diverting a portion of the stream flow to Bradley Lake has the potential to increase annual energy output by 27,000 to 45,000 MWh, depending on the amount of flow diverted. Environmental, geotechnical, preliminary engineering and analytical work is needed to evaluate fish habitat, the potential energy resource, and diversion dam and conveyance (i.e., tunnel, pipe, open channel) alternatives to divert the water.

## AEA Review Comments and Recommendation

**Full Funding**

Chugach Electric Association, on behalf of the Bradley Project Management Committee, proposes preliminary design of diversion of Middle Fork Battle Creek into Bradley Lake. The work would also include permitting, environmental and fish studies and preparation of an application to amend the Bradley Lake hydro project FERC license. BPMC would also provide matching funds on a 1:1 basis. AEA staff would manage the project.

Work completed to date includes reconnaissance and analysis of environmental and energy production impacts. Stream gauging is in progress.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.20 /kWh

### Energy Region:

Railbelt

**Requested Grant Funds:** \$500,000

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

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

**AEA Funding Recommendation:** \$500,000

## App #675 Battle Creek Diversion Project

Resource: Hydro

Proposed Project Phase: Feasibility

Proposer: Chugach Electric Association, Inc.

AEA Program Manager: Ott

Applicant Type: Utility

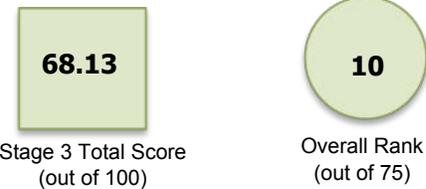
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	6.19
2) Matching Resources (Max 20)	18.00
3) Project Feasibility from Stage 2 (Max 20)	18.07
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	11.88
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

FERC project. Water rights required for the diversion of water from Battle creek to Bradley Lake/reservoir. DNR Water Section working with applicant.

### 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 #676 Eska Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Bering Pacific Engineering

**AEA Program Manager:** Ott

**Applicant Type:** IPP

### Project Description

The Eska Creek Hydroelectric Project is a potential run of river hydroelectric resource located near Sutton, AK with a capacity up to 1.5 MW.

### AEA Review Comments and Recommendation

Full Funding

Applicant proposes recon assessment of a 1.45 MW run-of-river hydropower project at Eska Creek near Sutton. The project would include a very long (13,000 ft) penstock. Environmental issues are undefined. DNR notes potential conflicts with other uses and proximity of the project to Castle Mt Fault.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$37,000

**Matched Funds Provided:**

\$7,400

**Total Potential Grant Amount:**

\$44,400

**AEA Funding Recommendation:**

\$37,000

## App #676 Eska Creek Hydroelectric Project

Resource: Hydro

Proposed Project Phase: Recon

Proposer: Bering Pacific Engineering

AEA Program Manager: Ott

Applicant Type: IPP

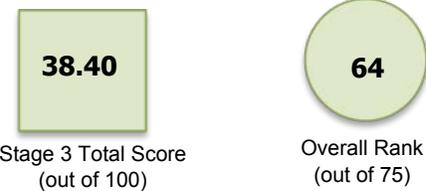
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.28
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	10.53
4) Project Readiness (Max 10)	0.00
5) Benefits (Max 15)	6.75
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	1.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Will require DNR authorizations. It is unclear where on Eska Creek this project would be envisioned. Depending on location, there may be some conflicts with other uses in this popular use 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

The Castle Mountain fault extends very close to the project site. Earthquakes on this fault should be considered in engineering design. See general DGGS comment.

## App #677 Akiak Hydro Study

**Resource:** Ocean/River

**Proposed Project Phase:** Recon

**Proposer:** City of Akiak

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

## Project Description

The Kuskokwim River meanders above and below the community of Akiak leaving it on a peninsula which at its widest point is approximately 3 miles across. The bend immediately above Akiak compresses the flow of the river resulting in increased water velocity (speed). We intend to place an intake at that point in the bend with the greatest speed, and pipe the water we collect, 1) across the peninsula, 2) to a small slough behind the village, or 3) parallel to the river to a point further down the bend depending on the results of a feasibility study. The intake will be deep enough to avoid icing issues, permitting year round operation of a run of the river hydro facility. The reconnaissance will identify annual flow and the placement of all facilities necessary for the hydro plant, pipeline, intake and transmission needs.

## AEA Review Comments and Recommendation

Not Recommended

Applicant proposes reconnaissance study of a hydrokinetic project in Akiak costing \$350,000. Due to lack of geographic relief in the vicinity of Akiak, a run-of-river hydro project is not feasible. RE Fund round 1 has performed site-specific assessment of hydrokinetic resources in nearby Kuskokwim villages. Results are not yet available. The current application provides insufficient description of the type of system that is proposed and is very expensive. AEA feels that the current statewide approach for hydrokinetic resource, technology development, and environmental analysis is a more effective use of state resources.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.63 /kWh

**Requested Grant Funds:**

\$350,000

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$350,000

**Energy Region:**

Lower Yukon-Kuskokwim

**AEA Funding Recommendation:**

## App #677 Akiak Hydro Study

**Resource:** Ocean/River

**Proposed Project Phase:** Recon

**Proposer:** City of Akiak

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

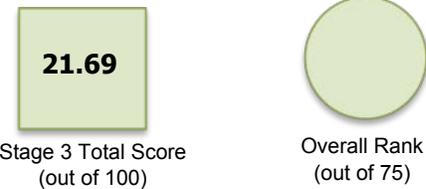
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.69
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Interesting project, feasibility will be interesting, will need hydrology, as diversion of the Kuskokwim River will need to be evaluated, once you divert a portion of a river this size, putting it back, if necessary, can be a major problem.

### 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.

**App #678 False Pass Wind Energy Project**

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of False Pass Electric Utility

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

## Project Description

False Pass currently produces all their electricity from diesel generators and heating from burning fossil fuels. Data from a met tower set up several years ago was compromised and has data gaps when bears damaged the equipment, but the data still may be useful if analyzed using appropriate assumptions and software. The wind resource may prove to be good, but we won't know until the data is analyzed and a wind resource report is completed. In addition, an avian study will determine if birds will be of concern and/or if mitigation measures are necessary.

This project seeks funding for analyzing the raw wind data and preparing a wind assessment report for False Pass. Based on wind assessment results/report a subsequent proposal may be submitted for conceptual design. In addition, an avian study will determine if migrating or nesting birds present concerns to a wind project and determine mitigation measures. The principal goals of baseline bird studies are to quantitatively describe the temporal and spatial use by birds of the study area and provide baseline information on avian species and their habitat sufficient to use in evaluating the probable impact of installation of a wind turbine. The specific goals are to provide avian monitoring protocol training to local agent(s), collect avian data to determine bird activity at the delineated areas around the turbine site, record any dead or downed (injured) birds at the site that may be the result of collisions with the meteorological tower, and prepare avian monitoring reports including back-up information and complete avian data.

## AEA Review Comments and Recommendation

**Partial Funding**

The City of False Pass proposes recon and feasibility assessment of wind energy and diesel heat recovery in False Pass. The proposal is consistent with the recommendations from a general energy assessment of Cold Bay, False Pass and Nelson Lagoon sponsored by the 2008 Denali Commission/AEA Alternative Energy grant program and AEA's Energy Pathway publication. Raw data from AEA's met tower in False pass suggests a class 4-5 wind resource.

Aleutians East Borough would manage the project.

Diesel heat recovery potential appears marginal. The system is already supplying city shop near the power plant with heat. The next closest facility is the school, 600' away.

Recommend partial funding for reconnaissance assessment.

## Funding & Cost

Cost of Power: \$0.52 /kWh

**Energy Region:**

Aleutians

**Requested Grant Funds:**

\$128,625

**Matched Funds Provided:**

\$10,000

**Total Potential Grant Amount:**

\$138,625

**AEA Funding Recommendation:**

\$69,075

## App #678 False Pass Wind Energy Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of False Pass Electric Utility

**AEA Program Manager:** Jensen

**Applicant Type:** Utility  
Local Government

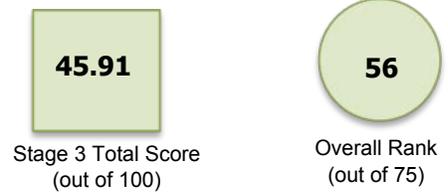
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.25
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	10.53
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.63
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	2.50

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #679 Nelson Lagoon Wind Energy Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** Nelson Lagoon Electrical Cooperative

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

Nelson Lagoon requests funding for this wind study as the first step towards supplementing the high cost of diesel generators currently in use. The wind study and avian study will satisfy Phases I, Reconnaissance and Phase II, Feasibility, and the study will result in a feasibility report on the technical, economic, financial and operational viability and guidelines of implementing the next three phases of a wind energy system.

The grant would be managed by the Aleutians East Borough and calls for the solicitation of a contractor to perform the analysis and a community meeting with the contractor for presentation, review and discussion of the results.

Participants in the project will include:

- 1) Nelson Lagoon Electrical Cooperative (owned by the Native Village of Nelson Lagoon)
- 2) Aleutians East Borough who will provide overall project management
- 3) A contracted firm who will provide civil and electrical system engineering
- 4) Contractor to perform the avian and environmental studies
- 5) A supplier for the met towers.

### AEA Review Comments and Recommendation

Partial Funding

Nelson Lagoon Electric Cooperative proposes recon and feasibility assessment of wind energy and diesel heat recovery in Nelson Lagoon. The proposal is consistent with the recommendations from a general energy assessment of Cold Bay, False Pass and Nelson Lagoon sponsored by the 2008 Denali Commission/AEA Alternative Energy grant program and AEA's Energy Pathway publication. Airport data and the Pathway indicate a class 6 wind resource.

Aleutians East Borough would manage the project.

Diesel heat recovery potential appears excellent. The power system is adjacent to a storage building and harbormaster office.

Recommend partial funding for reconnaissance assessment, including a met tower.

### Funding & Cost

Cost of Power: \$0.74 /kWh

**Energy Region:**

Aleutians

**Requested Grant Funds:**

\$158,625

**Matched Funds Provided:**

\$10,000

**Total Potential Grant Amount:**

\$168,625

**AEA Funding Recommendation:**

\$99,075

## App #679 Nelson Lagoon Wind Energy Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** Nelson Lagoon Electrical Cooperative

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

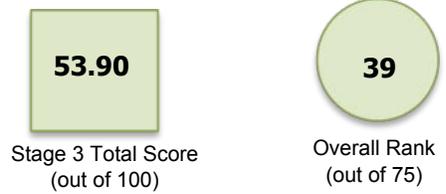
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	23.13
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	11.07
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	0.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Can not open grant application file.

[AEA assumes similar situation as nearby False Pass]

### 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 #680 Cold Bay Wind Energy Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility

**Proposer:** G&K Electric Utility

Recon

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

### Project Description

Cold Bay requests funding for this wind study as the first step towards supplementing the high cost of diesel generators currently in use. The wind study and avian study will satisfy Phase I, Reconnaissance and Phase II, Feasibility, and the study will result in a feasibility report on the technical, economic, financial and operational viability and guidelines of implementing the next three phases of a wind energy system.

The grant would be managed by the Aleutians East Borough and calls for the solicitation of a contractor to perform the analysis and a community meeting with the contractor for presentation, review and discussion of the results.

Participants in the project will include:

1. G&K Electric Utility
2. Aleutians East Borough who will provide overall project management.
3. A contracted firm who will provide civil and electrical system engineering.
4. Contractor to perform the avian and environmental studies.
5. A supplier for the met towers.

### AEA Review Comments and Recommendation

Partial Funding

G&K Electric Utility proposes recon and feasibility assessment of wind energy and diesel heat recovery in Cold Bay. The proposal is consistent with the recommendations from a general energy assessment of Cold Bay, False Pass and Nelson Lagoon sponsored by the 2008 Denali Commission/AEA Alternative Energy grant program and AEA's Energy Pathway publication. Airport data and the Pathway indicate a class 7 wind resource.

Aleutians East Borough would manage the project.

Diesel heat recovery potential appears excellent. The power system is adjacent to several public facilities and the power plant has a manifold on the diesel cooling system.

Recommend partial funding for reconnaissance assessment, including a met tower.

### Funding & Cost

Cost of Power: \$0.64 /kWh

**Energy Region:**

Aleutians

**Requested Grant Funds:**

\$158,625

**Matched Funds Provided:**

\$10,000

**Total Potential Grant Amount:**

\$168,625

**AEA Funding Recommendation:**

\$99,075

## App #680 Cold Bay Wind Energy Project

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** G&K Electric Utility

**AEA Program Manager:** Jensen

**Applicant Type:** IPP

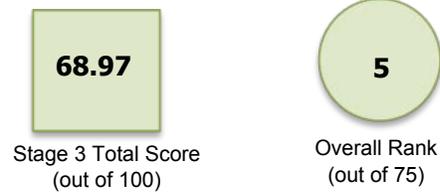
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	20.13
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	16.47
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	12.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #681 Lake & Peninsula Wood Boilers

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Lake & Peninsula Borough

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

Provide wood boilers for community facilities in Igiugig, Iliamna, Kokhanok, and Port Alsworth. Wood boilers in these villages have been the subject of a detailed feasibility/design study, which shows they are economically and technically feasible. The project would allow the borough to advertise for a design/build RFP to construct these facilities, and to have the expertise to evaluate potential designs and inspect finished construction. The competitive process would ensure the best and most appropriate design. Community organizations with a record of maintaining community facilities are supporting and have committed to use and maintain the wood boilers. Landowners where the wood will be gathered also support the project.

### AEA Review Comments and Recommendation

**Full Funding**

Lake and Pen Borough proposes construction of community wood heating systems in Igiugig, Port Alsworth, Iliamna, and Kokhanok. This proposal follows up earlier feasibility and final design work funded under RE Fund round 1 (#63).

AEA has the following concerns about this proposal:

1. Outdoor wood boilers (OWB) are proposed for deployment. Alaska experience to date indicates relatively low efficiency and substantial smoke from these units. New models have been developed that have achieved EPA emission certification. AEA has contracted with a Biomass Energy Resource Center to assess emission and efficiency for Alaska application.
2. The projects would use approximately 20-30 cords per year. Little information is provided to confirm availability of a sustained fuel supply over the 20 year life of the projects.
3. Given relatively low diesel displacement economics appear marginal.

Recommend full funding with the following requirements:

1. Before any funds are disbursed the Borough must demonstrate to AEA a sustainable long-term fuel supply in each burn location.
2. Before OWBs are specified and purchased the Borough must demonstrate to AEA that efficiency and performance are reasonable.

### Funding & Cost

Cost of Power: \$0.73 /kWh

#### Energy Region:

Bristol Bay

**Requested Grant Funds:**

\$369,900

**Matched Funds Provided:**

\$123,300

**Total Potential Grant Amount:**

\$493,200

**AEA Funding Recommendation:**

**\$369,900**

## App #681 Lake & Peninsula Wood Boilers

**Resource:** Biomass

**Proposed Project Phase:** Construction

**Proposer:** Lake & Peninsula Borough

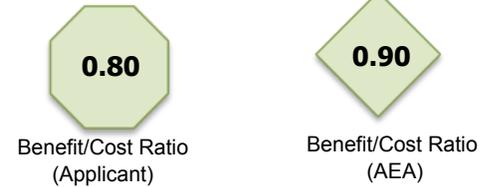
**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

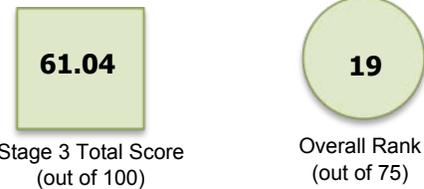
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	22.66
2) Matching Resources (Max 20)	16.00
3) Project Feasibility from Stage 2 (Max 20)	6.80
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	2.25
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	2.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It is estimated that 88 cords of wood in total would be needed per year for the project in the following ratios: 22 cords(ILI), 15 cords (KOK), 39 cords (IGG), 12 cords(PTA). The annual wood cost is estimated to be \$36,841 or about \$419 per cord. It is unclear what extent of timber resources is available in the particular villages especially for Igiugig which is located in an alder dominated vegetation type on the west side of Lake Iliamna. The Tanana Chiefs Conference has performed Native Allotment inventories in the Kokhanok area. These volumes per acre summaries could provide useful data concerning the forest resources in this area. At first glance however, the relatively small amount of wood required for this project appears to be 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

## App #682 Fivemile Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design  
Feasibility

**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 8,500 linear feet long. Its primary purpose is to pressurize the water from the creek.
- > 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.

### AEA Review Comments and Recommendation

Partial Funding

Chitina Electric proposes completing final design, permitting, and construction of a 300 kW run-of-river hydro project on Five Mile Creek. The project received a \$303,000 grant under round 2 of the RE Fund (#236). AEA is managing the project on Chitina Electric's behalf. AEA and Chitina expect to complete the conceptual design and feasibility in July 2011. AEA and Chitina completed a diesel power system upgrade for the community in 2009.

The project would be located on lands owned by the Chitina Native Corporation, who has agreed to donate lands to support the project. All indications to date suggest no significant land or environmental issues, and likely no FERC jurisdiction. There is an existing road for access to the proposed intake site. The hydro powerhouse would be located next to the diesel power plant. The project would supply most of the community electrical needs.

Since the design is not complete and a construction cost estimate is not available, AEA does not recommend construction funding at this time.

Recommend partial funding of \$277,000 (\$580,000 for total feasibility/final design/permitting minus existing grant of \$303,000) for completing permitting and final design.

### Funding & Cost

Cost of Power: \$0.53 /kWh

#### Energy Region:

Copper River/Chugach

**Requested Grant Funds:**

\$3,602,000

**Matched Funds Provided:**

\$803,000

**Total Potential Grant Amount:**

\$4,405,000

**AEA Funding Recommendation:**

\$277,000

## App #682 Fivemile Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design Feasibility

**Proposer:** Chitina Electric, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** Utility

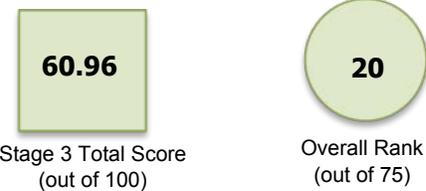
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.56
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	15.73
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	7.50
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	4.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

What happened to the Trout Lake hydro project in downtown Chitina? This project was permitted and built 10-15 years ago but seemed to have problems, from the first day of operation. Hydrology will be necessary for Fivemile Creek ASAP.

### 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 #683 Cook Inlet Tidal Hydrokinetic Power Generation

**Resource:** Other

**Proposed Project Phase:** Design

**Proposer:** Baker Hughes, Inc.

**AEA Program Manager:** McMahon

**Applicant Type:** IPP

### Project Description

The waters of Cook Inlet offer a clean and renewable power source for the communities of South Central Alaska. Our project will utilize existing infrastructure, namely the King Salmon platform, and proven submersible technologies to capture the tidal energy of the Inlet. Baker Hughes Centrilt develops electrical submersible pumps (ESP) for the oil industry and given our product's reliable history in very demanding oil well environments, their ESP system was chosen as the power generating unit. The smaller diameter of an ESP Generator allows for higher speed operation and lower impact to fish than propeller-based systems. The ESP Generator would consist of: 1) aquatic life diverters to protect the environment and minimize the environmental impact of the system, 2) rotating multistage turbine anchored in water at optimum flow velocity depth, 3) submersible electric power cable would carry the energy to shore connecting to 4) local utility substation or transformer. Buoys would be placed strategically near the system to alert boat traffic. The existing platform would act as an anchoring structure and intermediate for power distribution.

By partnering with UAF, we will utilize existing in-stream testing sites, thus allowing the deployment of prototypes aimed at providing power to rural communities. With that said, our project will also target rural communities situated on a viable year long hydro-resource. The system will be designed to produce adequate energy during low-flow conditions of the winter season. Our anchoring system will look to anchor the system throughout the year, yet enabling a break-away during significant ice/debris flow. Enabling retrieval of the system without significant damage to the internal components of our equipment, which will allow a quick turnaround once the obstruction has passed.

### AEA Review Comments and Recommendation

Not Recommended

Baker Hughes (BHI) proposes to develop new technology that would modify existing Baker Hughes Centrilt H Series pumps currently used in Cook Inlet oil and gas platforms to convert hydrokinetic flow to electrical power. This application is similar to a RE Fund round 3 submittal that was recommended but which did not receive funding due to insufficient funds. The team proposes to first develop a bench scale unit at UAF then test a 50 kW unit in the Tanana River. BHI would then use their own funding and resources to test a 500 kW unit at the King Salmon Platform in Cook Inlet.

For the purpose of round 4 technical review AEA requested the following information:

1. Design and specifications for the project including dimensions, data and calculations to determine power output at given different water velocities
2. Explain how the high speeds for the device are produced and why this will be beneficial to power production and lower impacts to marine life.
3. Will the Baker Hughes CentriLift pump be under warrantee for the modified application as a hydrokinetic turbine?
4. What effect will the "built-in aquatic life diverters" have on power output?
5. Please provide further information on the anchoring design.
6. Explain how the device will be deployed.

BHI provided technical specifications for the Centrilt pump, but did not provided any diagrams that clarify how the pump would be integrated into a power system. BHI did not respond to questions 2-6.

The application does not include a letter of support from Chevron, owner of the King Salmon platform.

AEA understands that BHI is proposing to develop hydrokinetic technology that could be a very attractive use of oil and gas platforms. Given the substantial project risk and unknowns, however, we believe that the newly established Emerging Energy Technology Fund is a more appropriate program for considering state support.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$400,000

**Matched Funds Provided:**

\$1,960,000

**Total Potential Grant Amount:**

\$2,360,000

**AEA Funding Recommendation:**

## App #683 Cook Inlet Tidal Hydrokinetic Power Generation

Resource: Other

Proposed Project Phase: Design

Proposer: Baker Hughes, Inc.

AEA Program Manager: McMahon

Applicant Type: IPP

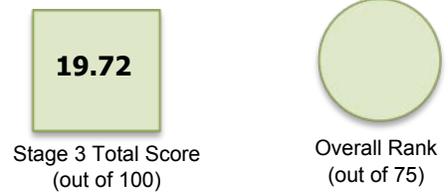
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	15.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

As this project suggests both river and ocean applicability, there will be slightly different set of permits for each application. State and federal authorizations are needed. In the proposal to attach to an oil platform, there should be consideration placed on the life expectancy of a specific platform because there are discussions of decommissioning certain platforms in Cook Inlet and this would be a secondary use that would probably not drive the decision whether to remove the platform after decommissioning.

### 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 #684      New Koliganek Wind & Heat Recovery Feasibility Study**

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** New Koliganek Village Council

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

## Project Description

The New Koliganek Village Council respectfully requests project funding for a Wind and Heat Recovery Feasibility Study. Analysis of the raw meteorological data by V3 Energy, LLC indicate a Class 4 wind regime which merits investigation. The project will result in a report of the technical, economic, financial and operational viability of installing a wind-diesel system for electric distribution and heat recovery in the village of Koliganek.

The grant will be managed by the New Koliganek Village Council. Marsh Creek Energy Systems has been selected to carry out the technical, analytical and reporting tasks of the project. The Bristol Bay Native Association (BBNA) and Marsh Creek will also be available to provide support, as needed, to the Project Manager and Koliganek Tribal Administrator in the preparation of financial reports stipulated in the grant.

## AEA Review Comments and Recommendation

**Full Funding**

The New Koliganek Village Council requests funding for feasibility assessment of wind generation and heat recovery for the community power system. Based on an AEA met tower in Koliganek, the wind resource is a class 3.

Given a high expected project cost and energy production from a fair wind resource, project economics are marginal.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.50 /kWh

**Energy Region:**  
Bristol Bay

**Requested Grant Funds:** \$105,050

**Matched Funds Provided:** \$7,000

**Total Potential Grant Amount:** \$112,050

**AEA Funding Recommendation:** \$105,050

## App #684 New Koliganek Wind & Heat Recovery Feasibility Study

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** New Koliganek Village Council

**AEA Program Manager:** Jensen

**Applicant Type:** Government Entity

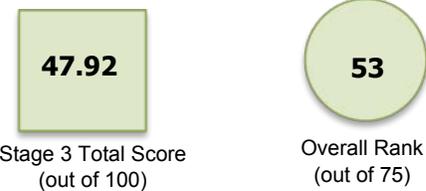
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	15.63
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	10.63
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	1.50
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Seems like a very broad scoping project with almost no detail of what the applicant wants to do. Can not give input.

### 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 #685 Napaskiak Wind, Power and Heat Recovery

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of Napaskiak Electric Utility

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

### Project Description

The City of Napaskiak requests funding for a wind study which includes an avian study and feasibility report as the first and second steps towards supplementing the high cost of diesel generators currently in use. These studies will satisfy both Phase I Reconnaissance and Phase II Feasibility components of the AEA's basic outline of the Wind Resource Development Partnering Plan Procurement. The studies will result in a feasibility report on the benefits, costs and guidelines for implementing the next three phases of a wind turbine system, both in terms of a stand-alone system operated independently by Napaskiak Electric Utility and in the context of a possible sub-regional intertie. The feasibility study will include a Heat Recovery System that utilizes jacket water from the diesel generators and excess electricity from wind generated power. This project will solicit community participation from the beginning and will promote wind-diesel O&M training opportunities to appropriate candidates.

### AEA Review Comments and Recommendation

Partial Funding

The City of Napaskiak requests funding for reconnaissance and feasibility assessment of wind generation and heat recovery for the City power system. The Energy Pathways document notes a class 5 wind resource. However the newly-revised AEA wind high resolution wind map estimates Napaskiak is a class 3 wind resource.

The recon phase budget includes \$52,250 for land use permitting and environmental analysis. AEA believes that it is not justified to spend this large amount of money before the overall wind resource is understood and the concept is validated.

Recommend partial funding of \$61,225 with a required match of \$2,800 for reconnaissance assessment.

### Funding & Cost

Cost of Power: \$0.60 /kWh

#### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$171,275

**Matched Funds Provided:**

\$9,550

**Total Potential Grant Amount:**

\$180,825

**AEA Funding Recommendation:**

\$61,225

## App #685 Napaskiak Wind, Power and Heat Recovery

**Resource:** Wind

**Proposed Project Phase:** Feasibility  
Recon

**Proposer:** City of Napaskiak Electric Utility

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

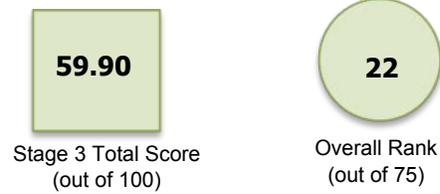
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	18.75
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	14.57
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	8.25
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	3.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Not enough information to make analysis.

### 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 #686 Port Heiden Wind Turbine Project

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Lake & Peninsula Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

### Project Description

The Lake and Peninsula Borough, along with the City of Port Heiden, proposed to install a single commercial-grade wind tower in Port Heiden to reduce the amount of fuel burned and to lower electricity rates for customers. Prompted by the success of small-scale wind towers and recommendations laid out in the 2008 Lake and Peninsula Borough Regional Energy Plan, the Borough commissioned a private firm, Knight-Piesold, to analyze Port Heiden. The results of this wind study indicated a favorable cost/benefit ratio and the Borough plans to move forward with the project. Drawing on the unique methods used by the Borough in a successful wind tower installation in the Village of Kokhanok, the Borough proposes a four-step process to reach the end goal of a successful installation of a wind tower. The first step will be the Borough selecting an owner's representative to provide engineering and technical support. The second step will be the Borough, Port Heiden, and the owner's representative to create an RFP for the actual wind tower construction and maintenance, and evaluate the bids on the RFP. The third and fourth stages are construction of the wind turbine and systems upgrade, followed by a five-year maintenance and operation contract with the winning bidder that incorporates training for local employees. This will be discussed in further detail later in the application.

### AEA Review Comments and Recommendation

Partial Funding

Lake and Pen Borough proposes final design and construction of a 330 kW wind project in Port Heiden through a design-build process.

Lake and Pen Borough has supplied a very thorough feasibility study. However the report does not include conceptual design drawings or a geotechnical study.

AEA has the following concerns about the project:

1. Economic feasibility appears to require a high penetration system. AEA believes the construction cost estimate is rather low for a high-penetration project.
2. Based on the expected 50-year extreme wind speed for the site, the feasibility report recommends an IEC class 1 turbine. The only turbine that meets this condition is the Enercon turbine. The Enercon turbine may not be available in the U.S.
3. Port Heiden has not received PCE since December 2009 because they have neglected to file an annual report with RCA. This raises questions regarding the community's ability to support a relatively complex energy project.

Given these considerations AEA believes that it is premature to allocate construction funding to this project. The design budget is configured assuming the design-build process. Assuming that design and construction are funded separately and the work includes a geotech study, AEA believes that \$250,000 is sufficient to complete design and permitting.

Recommend \$250,000 for design and permitting.

### Funding & Cost

Cost of Power: \$0.57 /kWh

**Energy Region:**

Bristol Bay

**Requested Grant Funds:**

\$1,700,000

**Matched Funds Provided:**

\$448,536

**Total Potential Grant Amount:**

\$2,148,536

**AEA Funding Recommendation:**

\$250,000

## App #686 Port Heiden Wind Turbine Project

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Lake & Peninsula Borough

**AEA Program Manager:** Jensen

**Applicant Type:** Local Government

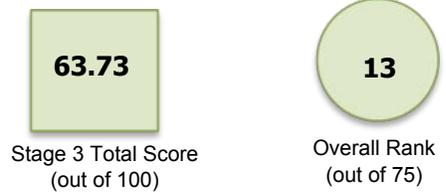
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	17.81
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	12.33
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	8.25
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #687     Hoonah Heat Recovery Project**

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** Inside Passage Electric Cooperative, Inc.

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

## Project Description

IPEC proposes to construct a heat recovery project in the community of Hoonah. The Project will recover available jacket water heat from IPEC-Hoonah diesel generation that is currently being rejected to the atmosphere via radiators and reduce annual diesel heating fuel consumption of nearby community buildings by over 55,000-gallons/year.

## AEA Review Comments and Recommendation

**Full Funding**

IPEC proposes construction of a diesel heat recovery system in Hoonah that will consist of jacket water heat recovery equipment and a piping loop that will supply heat to the school complex and community buildings. The heat recovery system is estimated to displace approximately 57,000 gallons of heating fuel per year.

AEA is managing this project on behalf of IPEC under the Denali Commission-funded rural power system upgrade program. The power system upgrade may also include hydro projects at Gartina and Water Supply creeks with average output of 340 kW. In the event that the hydro resource is developed, amount of recoverable diesel heat is expected to decrease to approximately 46,000 gallons/year.

IPEC is requesting supplementary funds above the \$530,000 available for the heat recovery project that the Denali Commission is contributing. The project is scheduled for completion in August 2012.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.42 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$475,000

**Matched Funds Provided:**

\$530,000

**Total Potential Grant Amount:**

\$1,005,000

**AEA Funding Recommendation:**

\$475,000

## App #687 Hoonah Heat Recovery Project

**Resource:** Heat Recovery

**Proposed Project Phase:** Construction

**Proposer:** Inside Passage Electric Cooperative, Inc.

**AEA Program Manager:** Plentovich

**Applicant Type:** Utility

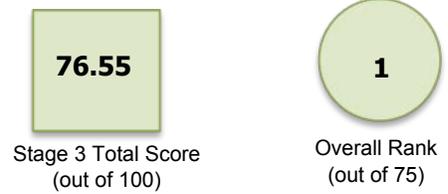
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.19
2) Matching Resources (Max 20)	17.00
3) Project Feasibility from Stage 2 (Max 20)	17.87
4) Project Readiness (Max 10)	8.00
5) Benefits (Max 15)	12.50
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #688 Pelican Hydroelectric Upgrade Project**

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Pelican

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

## Project Description

The City of Pelican proposes to complete the renovation and upgrade of the existing community hydroelectric project to replace the current failing, obsolete, inefficient and unsafe facility, and to expand the use of underutilized available hydroelectric power to meet unserved electric needs in the community

## AEA Review Comments and Recommendation

**Full Funding**

The City of Pelican proposes completing construction of a 650 kW run-of-river hydro project. Design and construction has been supported by the Denali Commission through an AEA-managed rural power system upgrade project. Other energy-related projects completed recently in Pelican by AEA include a bulk fuel plant and a new diesel powerhouse. The hydro project is a rebuild of the 1940s era hydro project that supplied the fish processing facility and the community. The project is now approximately 60% complete and is scheduled for start-up in 2012. The fish processing facility has had financial problems over the last few years.

Site control for the project is not finalized. While the Pelican Utility District (PUD), owned by Kake Tribal Corp, holds a DNR easement for the hydroelectric project from the intake to the power house, the City holds an easement on this same tract only for water and sewer improvements. The City is in discussion with the PUD to establish an operating agreement for the power system. The City will obtain site control in conjunction with this agreement.

Recommend full funding with requirements that before construction funding is disbursed the City must obtain and demonstrate to satisfaction of AEA 1) site control for the hydro project, 2) FERC approval of revised construction plans dated 10/11/10, 3) final design and specifications for all grant-funded project elements, 4) a finance plan for the entire project, and 5) an updated business plan.

## Funding & Cost

Cost of Power: \$0.43 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$1,896,836

**Matched Funds Provided:**

\$3,624,000

**Total Potential Grant Amount:**

\$5,520,836

**AEA Funding Recommendation:**

\$1,896,836

## App #688 Pelican Hydroelectric Upgrade Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** City of Pelican

**AEA Program Manager:** Ott

**Applicant Type:** Local Government

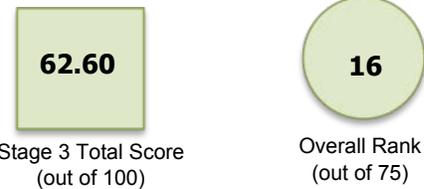
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	13.56
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	13.33
4) Project Readiness (Max 10)	8.00
5) Benefits (Max 15)	9.38
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.33

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

DMLW has issued the private non-exclusive easement for hydropower facilities to the Pelican Utility District.

### 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

This project is close to a complicated tectonic junction between the Transition and Fairweather faults. However, it is an upgrade project for an existing facility. The upgrade should use engineering designs that consider strong ground motions (i.e. strongly attached foundation elements). See DGGS general comment.

## App #689 Port Graham Biomass Waste Heat Demo Project

**Resource:** Biomass

**Proposed Project Phase:** Construction  
Design

**Proposer:** Port Graham Village Council

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

### Project Description

Port Graham Village Council and Chugachmiut are planning implementation of a 1.45 mmBtu biomass community building heat utility for Port Graham, Alaska. A feasible biomass technology option has been identified to utilize a GARN Boiler to provide hot water heat from a woody biomass fuel source that can be obtained from Port Graham Village Corporation lands on a sustained basis. An existing road system supplies access to the fuel source. The project will provide hot water to heat Port Graham community buildings (New Fire Hall (and accessory building housing a 4-wheeler foam fire trailer), the Old Fire Hall, the Port Graham Health and Dental Clinic, the Port Graham Village Council Office, the Port Graham Museum/HeadStart Center and the Port Graham Corporation Office) at a price sufficiently below the cost of current heating costs using fuel oil to justify investment. Existing community buildings fuel oil heating systems can be retro-fitted to accommodate hot water from the proposed wood-burning GARN Boiler and rely on the existing fuel oil-fired hot water heating equipment for backup. The GARN Boiler community building heating option will provide heat at less than the current fuel oil based system displacing more than an equivalent amount of diesel fuel on a Btu basis.

(Project description edited for length and clarity)

### AEA Review Comments and Recommendation

Partial Funding

The Village Council of Port Graham proposes final design and construction of a 1.45 mmBtu/hr cordwood-fired district heating system that will supply community facilities and residences.

The Council submitted an application (#488) in round 3 for construction of a wood-fired power generation system that AEA recommended against funding. As the basis for the round 3 application the Council provided an assessment of local available wood along with other combined heat and power feasibility information.

Currently the community uses approximately 53,100 gallons/year of diesel to heat community facilities, while the cannery may consume an additional 25,000 gallons/year if it resumes regular operation. Given the plentiful wood resources in the area, biomass district heating appears to be an attractive alternative.

The project budget appears excessive. Of the total budget of \$845,805 approximately 20% is for tribal and Chugachmiut project management and administration salaries. According to a email sent to AEA on 9/14 the travel budget of \$80,065 was overestimated by \$29,250. The budget includes work in support of a power purchase agreement totals over \$61,000. Since this is not a power project this item is in question. The budget for design consultants totals \$228,600, approximately 27% of the total and substantially higher than similar projects, which are usually around 15%.

Given these concerns with the budget it is premature to allocate funds for construction. Given experience with other cordwood boiler installations AEA estimates final design and permitting costs approximately \$50,000.

Recommend partial funding of \$75,000 for final design and permitting.

### Funding & Cost

Cost of Power: \$0.20 /kWh

**Energy Region:**  
Railbelt

**Requested Grant Funds:**

\$697,475

**Matched Funds Provided:**

\$148,330

**Total Potential Grant Amount:**

\$845,805

**AEA Funding Recommendation:**

\$75,000

## App #689 Port Graham Biomass Waste Heat Demo Project

**Resource:** Biomass

**Proposed Project Phase:** Construction Design

**Proposer:** Port Graham Village 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 25)	6.28
2) Matching Resources (Max 20)	14.00
3) Project Feasibility from Stage 2 (Max 20)	8.50
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	1.38
6) Local Support (Max 5)	4.00
7) Sustainability (Max 5)	3.83

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

The proposal states that the village corporation has signed a letter of intent to supply wood for this system. The Forest Service estimate for the Sitka spruce timber type is about 75 bone dry tons per acre. It is estimated that the Garn unit will use 120 bone dry tons per year or about 1.6 acres of forest land per year. On a green ton basis and using 1.53 tons per cord, the Forest Service estimate is about 64 cords per acre. This figure correlates well to a previous Tanana Chiefs Conference native allotment timber cruise in the Port Graham area. In the cruise, the allotments averaged 6,400 cubic feet per acre. On a green basis, the Garn unit would require about 100 cords per year. This amount appears sustainable given the acreage available for harvest (16,000 acres village corp., 2,877 acres allotments). Native allotments however are held in trust status with the Bureau of Indian Affairs and individual allottees as well as the BIA would have to approve of timber sales on these 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

## App #690 Hunter Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Eklutna, Inc.

**AEA Program Manager:** Ott

**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. This proposed reconnaissance study will investigate the resource to determine if a project is viable and to also perform preliminary feasibility work on the project location, size, and resource availability.

### AEA Review Comments and Recommendation

Full Funding

Eklutna Inc proposes recon assessment of a 6.5+MW hydro project on Hunter Cr. The project would include an extremely long penstock (13,000 ft cross-basin pipeline plus an 8,000 ft penstock), and 11 miles of transmission. This proposal is a resubmittal of a round 3 proposal (#475).

DNR DMLW questions that Eklutna owns the land as stated in the application. If BLM owns the land this project falls under FERC jurisdiction. DNR also notes this is popular recreation area and the project may garner public opposition. DNR DGGS notes proximity to Castle Mt Fault and potential earthquakes.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.17 /kWh

#### Energy Region:

Railbelt

**Requested Grant Funds:**

\$84,000

**Matched Funds Provided:**

\$16,000

**Total Potential Grant Amount:**

\$100,000

**AEA Funding Recommendation:**

\$84,000

## App #690 Hunter Creek Hydroelectric Project

Resource: Hydro

Proposed Project Phase: Recon

Proposer: Eklutna, Inc.

AEA Program Manager: Ott

Applicant Type: IPP

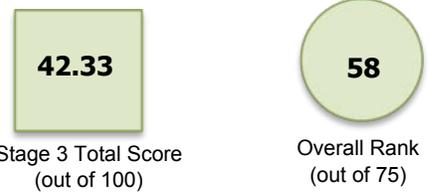
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.28
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	11.63
4) Project Readiness (Max 10)	0.00
5) Benefits (Max 15)	8.25
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	2.17

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Believe the land ownership is incorrect at this time. I believe it is still BLM land. This is a popular recreation area, although future land transfers to Eklutna will eliminate the ability to voice complaint, but will have some public opposition. No existing hydrology, gage should be installed ASAP. If they build Glacier Fork Knik River Hydro this project will not be needed.

### 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 designs should consider strong ground motions from earthquakes on the subduction zone and Castle Mountain fault. See general DGGS comment.

## App #691 Glacier Fork Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Glacier Fork Hydro, LLC

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The Glacier Fork Hydroelectric Project is an approximately 75 MW storage project proposed for the Glacier Fork of the Knik River. Electricity from the project would be delivered into the railbelt transmission grid via a new approximately 20-mile transmission line to existing transmission infrastructure in the vicinity of the Old Glenn Highway bridge over the Knik River. A map of the project is included at the end of the application in Attachment I.

### AEA Review Comments and Recommendation

Not Recommended

Glacier Fork LLC proposes reconnaissance assessment of a 75 MW hydro storage on Glacier Fork of the Knik River. This project was recommended in RE Fund round 3 (#493) but insufficient funds were available.

Since last year there have been two developments related to this project:

1. The Railbelt Energy Integrated Energy Resource Plan has been finalized by AEA. The plan identifies the Glacier Fork as a potential large hydro generation site.
2. The Alaska Legislature appropriated \$10 million in FY11 to AEA for Railbelt large-scale hydro planning, design, and permitting. These funds were for Susitna, Chakachamna, and Glacier Fork projects. AEA will be managing the funded activities for these projects.

Given that funding support is already in place to study Glacier Fork, AEA does not believe that additional RE Fund allocations are necessary.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.16 /kWh

#### Energy Region:

Railbelt

**Requested Grant Funds:**

\$210,000

**Matched Funds Provided:**

\$40,000

**Total Potential Grant Amount:**

\$250,000

**AEA Funding Recommendation:**

## App #691 Glacier Fork Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Glacier Fork Hydro, LLC

**AEA Program Manager:** Ott

**Applicant Type:** Utility

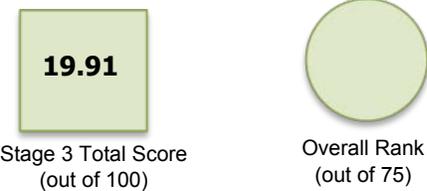
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.91
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

This project will gain much attention as it involves a legislatively designated Knik River Public Use Area which recently had a management plan adoption. Heavy recreational use. Expect substantial resistance as it changes a relatively undeveloped area that is used for recreation and tourism. Hydrology ASAP. FERC Project very likely.

### 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

Proposal states that geotechnical risks will be evaluated during the design phase. Engineering designs should consider strong ground motions from earthquakes on the subduction zone, Castle Mountain fault, and fold and thrust structures associated with the Chugach Mountains. See general DGGS comment.

## App #692 Elfin Cove Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Community of Elfin Cove Utility Commission

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

The project will include a run-of-river hydroelectric project between Crooked Creek and Jim's Lake (the upper project), and a second storage hydroelectric project between Jim's Lake and tidewater (the lower project). According to Polarconsult's June 2010 Reconnaissance Study, the upper project would have an estimated installed capacity of 50 kW, and the lower project would have an estimated installed capacity of 150 kW. These projects will meet an estimated 97% of Elfin Cove's existing electrical demand, and also provide a substantial amount of interruptible excess electricity

### AEA Review Comments and Recommendation

Full Funding

The Elfin Cove Utility proposes final design and permitting of a 50 kW run-of-river hydro project at Crooked Creek and a 150 kW storage hydro project at Jim's Lake. Feasibility study was already funded by the Denali Commission/AEA alternative energy RFP (#17). Elfin Cove submitted a similar proposal in RE Fund round 3 (#446) that was recommended but was not funded due to insufficient funds.

The proposed project is sited on USFS land, indicating FERC license will be required. AEA has constructed a power and bulk fuel system under the RUS energy program. Elfin Cove expects to deliver the feasibility report in December 2010.

Recommend full funding for final design and permitting with requirement that AEA approve the feasibility study before any funds are disbursed.

### Funding & Cost

Cost of Power: \$0.52 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:**

\$347,000

**Matched Funds Provided:**

\$48,000

**Total Potential Grant Amount:**

\$395,000

**AEA Funding Recommendation:**

\$347,000

## App #692 Elfin Cove Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** Community of Elfin Cove Utility Commission

**AEA Program Manager:** Ott

**Applicant Type:** Utility

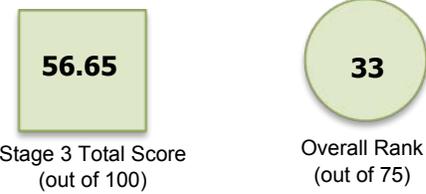
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.34
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	10.43
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	4.88
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	3.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

System of two hydro projects: It appears that some hydrology work has been conducted, but these projects will require gaging ASAP. Likely FERC project.

### 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 site is in between the Denali and Queen Charlotte-Fairweather fault systems. The Fairweather fault extends ~15 miles west of the site. Engineering designs should account for large earthquakes on these structures. See general DGGS comment.

**App #693 Fourth of July Creek Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**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 one third of Seward Electric System's annual energy requirements.

## AEA Review Comments and Recommendation

**Full Funding**

Independence Power LLC proposes conceptual design and feasibility assessment of 5.4 MW project on Fourth of July Creek near the Seward Correctional Facility. Independence Power received a grant for recon assessment from RE Fund round 1 (#86). A similar proposal was submitted and recommended for RE Fund round 3 (#494), but insufficient funding was available.

Independence Power completed a final recon report in early October 2010. Generally AEA agrees with the report's conclusions that further study is warranted. AEA is concerned about impacts of potential Fourth of July Creek torrents on proposed infrastructure.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.13 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$136,500

**Matched Funds Provided:**

\$61,500

**Total Potential Grant Amount:**

\$198,000

**AEA Funding Recommendation:**

\$136,500

## App #693 Fourth of July Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Feasibility

**Proposer:** Independence Power, LLC

**AEA Program Manager:** Ott

**Applicant Type:** IPP

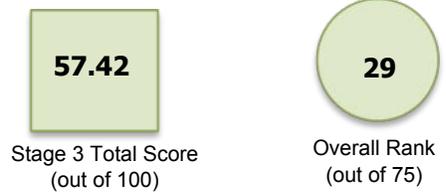
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	3.94
2) Matching Resources (Max 20)	15.00
3) Project Feasibility from Stage 2 (Max 20)	15.07
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	11.75
6) Local Support (Max 5)	3.00
7) Sustainability (Max 5)	2.67

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

Gaging ASAP. FERC?

### 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. Potential un-mapped fold and thrust faults occur nearby. See general DGGS comment.

**App #694     Southern Railbelt Small Hydro Recon. Study**

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Polarconsult Alaska, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

## Project Description

Conduct a comprehensive reconnaissance study of small hydro resources on the southern railbelt. The study would focus on alpine rivers and streams in proximity to the areas currently served by MEA, CEA, HEA, MLP, and SES. The emphasis of the study would be on low-impact run-of-river resources between 500 and 5,000 kW installed capacity. Investigated resources would include rivers and streams shown on USGS 1:63360 maps located in economic proximity to existing electrical transmission and distribution infrastructure. The study would be conducted in three screening stages. The first stage would include a desktop assessment of the resources to estimate power potential and fatal flaws (technical, environmental, economic and/or political barriers). The second stage resource screening would be a desktop technical and financial analysis of the resources that pass stage 1 to identify the most cost effective resources. The third stage resource screening would be a field visit to those resources that pass stage 2 to collect further data about the resource and provide reconnaissance-level technical and financial analyses. The budget allows for up to 30 projects to receive stage 3 review and analysis. The final deliverable for the project would be a report detailing the resources investigated and the results of all screening stages. The outcome of the study would be the most comprehensive list yet compiled of the most promising hydropower resources in the southern railbelt region, ranked by development viability. This would guide AEA, utilities, and other regional decision makers to implement more effective planning efforts for power supply in the railbelt.

## AEA Review Comments and Recommendation

Did Not Pass Stage 1

Failed Stage 1 review

## Funding & Cost

Cost of Power:        /kWh

**Requested Grant Funds:**

\$1,375,000

**Matched Funds Provided:**

\$80,000

**Total Potential Grant Amount:**

\$1,455,000

**AEA Funding Recommendation:**

**Energy Region:**  
Railbelt

**App # 694     Southern Railbelt Small Hydro Reconn. Study**

**Resource:** Hydro

**Proposed Project Phase:** Recon

**Proposer:** Polarconsult Alaska, Inc.

**AEA Program Manager:** Ott

**Applicant Type:** IPP

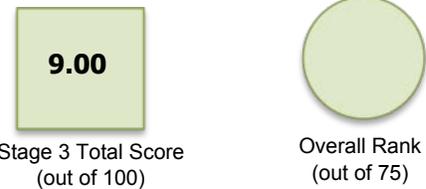
## Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	0.00
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	

## Economic Analysis



## Scoring & Project Rank



## DNR/DMLW Feasibility Comments

The proposed cost for this seems very high, there are state agencies available to conduct a majority of this type of work, including DNR, ADF&G. It might be interesting to work with DNR and ADF&G and see if they would be interested in conducting this type of study for Southcentral Alaska. If AEA continues to fund recon work for hydroelectric projects, it appears that Polarconsult, Earl and David Aussman will get to every possible SC site eventually if funded. There should be a consideration of the effects of one business servicing so many 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

**App #695 Indian River Hydroelectric Project**

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** City of Tenakee Springs Electric Department

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

## Project Description

Replace diesel generation of electricity for the community of Tenakee Springs with renewable hydroelectric power. The City of Tenakee Springs proposes to construct a hydroelectric project on Indian River. This will be a low head, run-of-river plant displacing the use of 44,400 gallons of diesel fuel annually. Design, engineering, and construction will involve the City of Tenakee Springs, multiple state and federal agencies, private contractors, and the Alaska Energy Authority.

## AEA Review Comments and Recommendation

**Full Funding**

The City of Tenakee Springs proposes final design and permitting of a 120 kW run-of-river hydro project at Indian River. The City submitted a similar application under RE Fund round 3 (#447), but there was insufficient funding available. Funded by the DC/AEA alternative energy grant program, the City has completed a feasibility assessment for this project. Over the last year the City has submitted permit applications and obtained LIDAR topo mapping of the project site using remaining feasibility funds. In general, the City has carefully managed funding for the project.

The project would be located on state and city land. The project received a non-jurisdiction finding from FERC in May 2010.

In round 1 AEA recommended against funding final design and permitting before a subregional energy plan that addressed systems in Tenakee, Hoonah, and Pelican was prepared. Hoonah is pursuing hydro development in nearby projects, while Pelican is upgrading its existing hydro project. In AEA's RE Fund round 3 review, given these circumstances and the long distances between these communities, AEA saw no reason to delay consideration of a hydro project in Tenakee further.

Recommend full funding.

## Funding & Cost

Cost of Power: \$0.30 /kWh

**Energy Region:**  
Southeast

<b>Requested Grant Funds:</b>	\$203,000
<b>Matched Funds Provided:</b>	\$26,000
<b>Total Potential Grant Amount:</b>	\$229,000
<b>AEA Funding Recommendation:</b>	<b>\$203,000</b>

## App #695 Indian River Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Design

**Proposer:** City of Tenakee Springs Electric Department

**AEA Program Manager:** Ott

**Applicant Type:** Utility  
Local Government

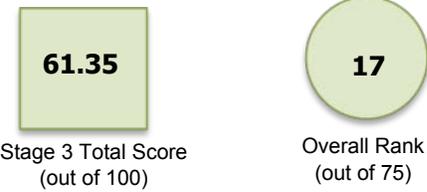
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	9.22
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	16.13
4) Project Readiness (Max 10)	6.00
5) Benefits (Max 15)	12.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It appears that the consultant has determined the by-pass flow needs for fish without having the hydrology necessary to do so. Gaging ASAP.

### 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 site lies ~12 miles west of the Chatham Strait segment of the Denali fault. Strong ground motions from earthquakes on this fault should be considered in engineering designs. See general DGGS comment.

**App #696 Merrill Field Landfill Gas Heating/Energy Project**

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Municipality of Anchorage

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

## Project Description

The project will utilize landfill gas (LFG) generated by wastes at the former Merrill Field Landfill site to fuel one or more boiler units at the adjacent Anchorage Fire Department (AFD) Fire Training Complex. The complex has four buildings which use boilers for primary heat. The project would include either installation of a central boiler system feeding into the existing boiler heat systems or modification of existing boilers at individual buildings. The project will also include expansion of existing LFG collection systems at the landfill site, as well as gas process, compression and transmission equipment, as needed. Ultimately the current gas production could support local generation of electricity (100 to 200 kw) or an expanded district heating system providing base heat load for facilities adjacent to the Fire Training Center. Because of uncertainties in gas impurities, off site facility configurations and other limitations, this grant proposal has been developed toward a district heat system for the Fire Training Facility only. The first phase of the grant project would be a feasibility study to develop other options, optimize the system and identify potential revenue streams which could flow from this project.

## AEA Review Comments and Recommendation

**Not Recommended**

Municipality of Anchorage Solid Waste Services proposes recovering remaining landfill gas from the Merrill Field collection system and piping it to the Municipality of Anchorage Fire Training Center. Landfill gas would fire a central boiler for the 4-building facility.

The concept of using landfill gas for heating is sound. However, given that project would displace only 81,000 million Btus over the 15-year lifespan of the project, the payback of the project is over 50 years.

Recommend no funding.

## Funding & Cost

Cost of Power: \$0.15 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:** \$2,000,000

**Matched Funds Provided:** \$200,000

**Total Potential Grant Amount:** \$2,200,000

**AEA Funding Recommendation:**

## App # 696 Merrill Field Landfill Gas Heating/Energy Project

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility

**Proposer:** Municipality of Anchorage

**AEA Program Manager:** Plentovich

**Applicant Type:** Local Government

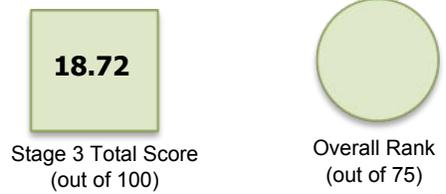
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	4.72
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #697 Napakiak Wind Design & Construction Planning

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** Napakiak Ircinraq Power Company

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

Besides photovoltaic power, the only clean emissions free renewable power source with the potential for significantly lowering energy costs in Napakiak, (pop. 370) is wind energy. The community has selected a wind site on land owned by the corporation along a newly-constructed 8.9 mile, 12470 V, 3 phase tieline over which the community receives all of its electricity from Bethel Utilities. This tieline is capable of handling up to 2 MW of power. Funding is being sought to complete final designs, construction cost estimates and integration studies needed for a construction ready project. The preliminary feasibility favors the installation of sufficient wind capacity to meet the majority of the community energy requirements and potentially sell wind energy back across the tie line into Bethel.

### AEA Review Comments and Recommendation

Not Recommended

Napakiak Ircinraq Power Company proposes reconnaissance through and design/permitting for a wind energy project for the Bethel-Napakiak grid. In summer 2010 AEA provided a met tower for onsite wind resource assessment in Napakiak. Data collection is ongoing.

There are other significant energy planning and project development activities taking place in Bethel. The City of Bethel has been funded through the RE Fund round 1 for a 400 kW wind project. To date the City and utility have not reached an agreement for power purchase or interconnection. Additionally Village Wind Power is funded under round 0 to assess feasibility of a large scale wind power project. AVCP has submitted an application for final design and construction in round 4 for a 200 kW wind project to serve Bethel (#600). TDX, who state that are assuming ownership of the Bethel utility in summer 2011, has proposed feasibility through construction of a 1+ MW wind system on the Bethel grid. Finally AVCP Regional Housing Authority is proposing study of hydro at the Kiseralik and Chikuminuk Rivers in Round 2 of the RE Fund. Therefore, there is a need for a regional integrated resource energy plan in the Bethel area to coordinate when and where energy projects should be developed. This proposal should be considered in the context of an integrated plan to assure proper sizing, timing, and integration of multiple energy projects. AEA believes that such an overall plan for the Bethel power system should be developed before proceeding with any additional wind development.

AEA has met with City of Bethel, AVCP Rural Housing Authority, Yukon Kuskokwim Health Corporation, Calista Corporation and TDX to discuss regional energy planning, including wind and hydro development. The group has agreed to pursue coordinated energy planning for the region and the Bethel grid.

AEA believes that Bethel's large load provides the opportunity for deploying megawatt scale turbines with better economics than smaller-scale wind installations. TDX, as the major power generator for the Bethel system, is the logical entity to lead feasibility assessment of wind generation in Bethel.

Recommend no funding through the RE Fund. However AEA will provide direct assistance through its wind resource assessment program to Napakiak for completing the current wind assessment work in the community.

### Funding & Cost

Cost of Power: \$1.08 /kWh

**Requested Grant Funds:** \$282,395

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

**Total Potential Grant Amount:** \$302,395

**Energy Region:**

Lower Yukon-Kuskokwim

**AEA Funding Recommendation:**

## App #697 Napakiak Wind Design & Construction Planning

**Resource:** Wind

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** Napakiak Ircinraq Power Company

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

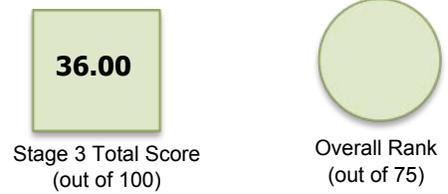
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	25.00
2) Matching Resources (Max 20)	9.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #698 Kongiganak Flywheel Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction  
Design

**Proposer:** Puvurraq Power Company

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

This project demonstrates the use of flywheel energy storage to stabilize any village power grid. Grid stability is needed to achieve increased use of wind and other renewable energy sources in diesel mini grids. The proposed project consists of installation of a Powerstore flywheel energy storage system, along with a state-of-the-art Distributed Digital Control System, to create a very high-penetration wind diesel system with residential thermal storage in Kongiganak, Alaska. The demonstration of this system will enable the effective sizing and cost reduction measures to be identified so that the system can be widely replicated throughout the state and other power systems throughout the country.

### AEA Review Comments and Recommendation

Not Recommended

Puvurraq Power Company, owned by the Native Village of Kongiganak, proposes to install a 300-kW Powerstore flywheel as a component of their 450-kW wind-diesel system under development. The function of the proposed flywheel is to maintain power quality and stability by quickly supplying power to the system when load or wind energy supply changes. This allows the system to consume less diesel capacity to supply the needed “spinning reserve”.

The wind system in Kongiganak has been under construction since spring 2009 and is funded, in part by RE fund round 1 (#110). The system is one of four projects under the auspices of the Chaninik Wind Group receiving state funding for wind construction:

1. Kongiganak (\$3.2 million of state funds allocated)
2. Kwigillingok (\$3.2 million of state funds allocated)
3. Tuntutuliak (\$3.36 million of state funds allocated)
4. Kipnuk (\$1.6 million of state funds allocated)

In addition to the total of \$11.36 million in RE fund and direct legislative appropriation, the projects are receiving \$750,000 from the USDOE for residential thermal devices.

Construction is behind schedule on these projects chiefly due to integration and control issues. The concept of using distributed residential heating loads and smart meters for frequency control has not been proven. Additionally the controllers for the Windmatic 17S turbines are under redesign and testing.

Since the wind-diesel system is currently under development and its operational characteristics are not yet fully understood, the economic evaluation of this application has a high degree of uncertainty.

Until these projects are operational as currently scoped, AEA does not support allocation of additional public funds for expanded scope.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.55 /kWh

**Requested Grant Funds:** \$1,395,231

**Matched Funds Provided:** \$166,137

**Total Potential Grant Amount:** \$1,561,368

**Energy Region:**

Lower Yukon-Kuskokwim

**AEA Funding Recommendation:**

## App #698 Kongiganak Flywheel Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction Design

**Proposer:** Puvurnaq Power Company

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

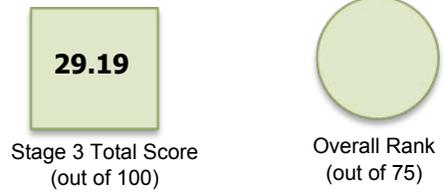
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	17.19
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	0.00
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	0.00
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #699 Akiak Integrated Renewable Energy Projects

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City of Akiak

**AEA Program Manager:**

**Applicant Type:** Local Government

### Project Description

Community Energy Information and Renewable Energy and Energy Efficiency Assessment The purpose of this project is to remove barriers to improving the energy efficiency, using renewable energy and increasing the reliability of existing energy infrastructure and is based on collecting and analyzing the information needed to make good decisions.

This project has four elements that will result in a comprehensive community-based renewable energy plan based on wood, wind and solar power. The four elements of the work plan consist of the following:

1. Community Energy Surveys
2. Community Energy and Resource Monitoring
3. Wood Energy Assessment
4. Wind and Solar Energy Assessment

### AEA Review Comments and Recommendation

Did Not Pass Stage 1

Akiak proposes

1. Community Energy surveys
2. Community Energy and resource monitoring
3. Wood Energy assessment
4. Wind and solar energy assesement

Following is text from Tanana (see #281) The work that the applicant proposes does indicate a particular type of project. While potentially valuable to Akiak, work is more effectively accomplished using standard methods on a statewide and regionwide basis that builds on the work already done in the statewide energy report that was released after this application.

Failed Stage 1 review

### Funding & Cost

Cost of Power: \$0.63 /kWh

**Energy Region:**

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$142,000

**Matched Funds Provided:**

**Total Potential Grant Amount:**

\$142,000

**AEA Funding Recommendation:**

## App # 699 Akiak Integrated Renewable Energy Projects

**Resource:** Other

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City of Akiak

**AEA Program Manager:**

**Applicant Type:** Local Government

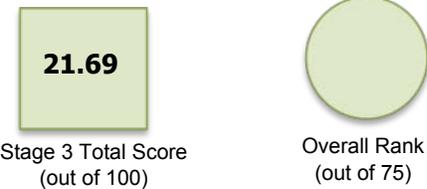
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	19.69
2) Matching Resources (Max 20)	0.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #700 High Penetration Wind Diesel Power and Heat

**Resource:** Wind

**Proposed Project Phase:** Construction  
Design

**Proposer:** Kipnuk Light Plant

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

The proposed project is a medium- to high-penetration wind system for the community of Kipnuk, Alaska. The project will be owned and operated by the Kipnuk Light Plant and the community of Kipnuk, and consists of three Northwind 100 wind turbines, a modular hybrid wind diesel power conditioning control module, a 200 kW frequency controlled heat recovery boiler, 20 residential electric thermal storage devices. This hybrid power system is designed to fit with the existing diesel power plant, and wrap into any new plant proposed for the future. The wind turbines are well proven in Alaska, the power conditioning and controls module is able to be located next to the existing or new power plant. The power control and conditioning module will contain new wind-diesel controls and switchgear, a grid regulating inverter and energy storage unit for grid stabilization. The 20 electric thermal storage devices will capture any excess available wind energy and store it as heat for residential heating. The wind turbines and hybrid controls and power conditioning module will be mounted on pile foundations on property provided by the community. This wind diesel system architecture is scalable through the addition of wind turbines, new diesel gensets, addition of more real energy storage in the form of batteries, flywheel or capacitors. The system is also capable of accommodating the addition of residential electric thermal storage devices when additional wind energy capacity becomes available.

### AEA Review Comments and Recommendation

Not Recommended

Kipnuk Light Plant proposes final design and construction of 300 kW wind-diesel system, including a 250 kW battery storage system.

Kipnuk received a direct legislative appropriation of \$1.6 million in July 2009. The system is one of four projects under the auspices of the Chaninik Wind Group receiving state funding for wind construction:

1. Kongiganak (\$3.2 million of state funds allocated)
2. Kwigillingok (\$3.2 million of state funds allocated)
3. Tuntutuliak (\$3.36 million of state funds allocated)
4. Kipnuk (\$1.6 million of state funds allocated)

In addition to the total of \$11.36 million in RE fund and direct legislative appropriation the projects are receiving \$750,000 from the USDOE for residential thermal devices.

Unlike the other Chaninik projects, Kipnuk proposes to use Northwind 100 turbines. Similar to the other Chaninik projects, Kipnuk plans to use distributed residential heating loads and smart meters for frequency control.

Kipnuk has not completed conceptual or final design. The existing legislative funding is available for these purposes.

Kongiganak, the first of the Chaninik projects, is behind schedule chiefly due to integration and control issues. The concept of using distributed residential heating loads and smart meters for frequency control has not been proven.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.65 /kWh

### Energy Region:

Lower Yukon-Kuskokwim

**Requested Grant Funds:**

\$3,424,041

**Matched Funds Provided:**

\$1,200,000

**Total Potential Grant Amount:**

\$4,624,041

**AEA Funding Recommendation:**

## App #700 High Penetration Wind Diesel Power and Heat

**Resource:** Wind

**Proposed Project Phase:** Construction Design

**Proposer:** Kipnuk Light Plant

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

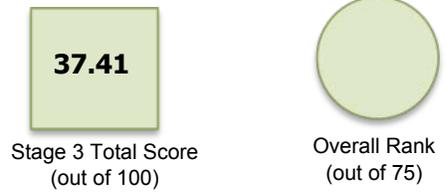
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	20.41
2) Matching Resources (Max 20)	15.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #701 Palmer Ice Arena Geothermal & Heat Recovery Improvements

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** City of Palmer

Design

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

The City of Palmer owns and operates the Palmer Ice Arena which is located at 480 E. Cope Industrial Way, Palmer Alaska. The Ice Arena was built in 2004, and opened in 2005, though the building is new, the compressors and refrigeration system are a 1950 design and were acquired from the decommissioned Bonnie Cusack Ice Arena. Wolf Architecture, Inc. performed the energy audit of the Ice Arena and identified the refrigeration system accounting for 45%, and the heating accounting for 32% of the annual costs. The energy audit recommended replacing the current equipment with new, more efficient, correctly sized equipment for the facility. With more modern compressors, the facility would easily be able to increase efficiency by 20% or more. It was recommended to use a central Geothermal Ground Source Heat Pump system for the cooling and heating demands. Additionally, waste heat recovery could be implemented with the new equipment in order to use the heat created in the required heating areas of the building. This project would be competitively bid according to the City ordinances and managed by the Public Works Department. The City Council has adopted resolution no 10-042 and 10-060 establishing a budget for the Ice Arena Expansion project.

### AEA Review Comments and Recommendation

Not Recommended

The City of Palmer proposes final design and construction of a ground source heat pump to provide heating and cooling for the City's ice arena. Construction would commence in spring 2012 and be completed fall 2012.

The current heating and refrigeration system is old, inefficient and needs to be replaced. In order to assess whether it is economically beneficial to support final design costing \$120,000 the City would need to provide basic feasibility information comparing installed cost and O&M costs of a new conventional boiler and compressor system with costs of a ground source heating pump system.

AEA requested this and other information from the City. The City provided only an electronic copy of the facility energy audit and indicated that the information was contained in the report. The energy audit does not contain the information that AEA requested and does not serve the purpose of a feasibility phase report required in the request for applications. AEA and its economic consultants are unable to assess viability of this project and whether it is reasonable to provide funding for final design.

No funding recommended.

### Funding & Cost

Cost of Power: \$0.17 /kWh

**Energy Region:**

Railbelt

**Requested Grant Funds:**

\$1,094,695

**Matched Funds Provided:**

\$250,000

**Total Potential Grant Amount:**

\$1,344,695

**AEA Funding Recommendation:**

## App #701 Palmer Ice Arena Geothermal & Heat Recovery Improvements

**Resource:** Geothermal  
**Proposer:** City of Palmer

**Proposed Project Phase:** Construction Design

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

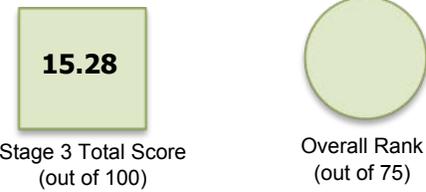
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	5.28
2) Matching Resources (Max 20)	10.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
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/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 #702 Packers Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chignik Lagoon Power Utility

**AEA Program Manager:** Ott

**Applicant Type:** Utility

### Project Description

Proposed project is a high head run-of-river hydroelectric power plant on Packers Creek in Chignik Lagoon with an installed capacity of 145 kW. Project will include a 9 foot tall timber dam, 3,220 foot long 16 inch diameter penstock and access trail; 400 square foot power house; 1,500 foot long access road with a bridge across Packers Creek to the powerhouse; and a 1,700 foot long overhead power line extension to the existing distribution system.

### AEA Review Comments and Recommendation

Not Recommended

Chignik Lagoon Power Utility was funded at \$150,000 in round 1 of the RE fund for final design and permitting (app#14). The Utility submitted a proposal for construction in RE Fund 2 (#290). AEA recommended no funding since final design and permitting were not complete.

Final design and permitting are still not complete, although the Utility has made some progress. The Utility has completed a conceptual design and has submitted applications for water rights, wetlands, and other coastal zone authorizations. The Utility has been in discussion with ADF&G for a fish habitat permit and with Chignik Lagoon Native Corp for obtaining site control. Recently the Utility obtained a non-jurisdiction finding from FERC for the project.

AEA remains concerned that permits are not in place and final design and construction cost estimate are not yet complete. For this reason we cannot support funding for construction at this time.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.50 /kWh

#### Energy Region:

Bristol Bay

**Requested Grant Funds:**

\$2,440,000

**Matched Funds Provided:**

\$60,000

**Total Potential Grant Amount:**

\$2,500,000

**AEA Funding Recommendation:**

## App #702 Packers Creek Hydroelectric Project

**Resource:** Hydro

**Proposed Project Phase:** Construction

**Proposer:** Chignik Lagoon Power Utility

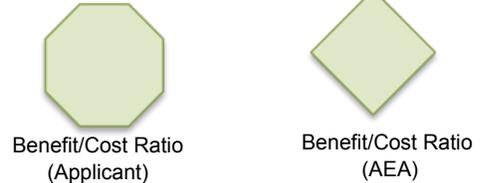
**AEA Program Manager:** Ott

**Applicant Type:** Utility

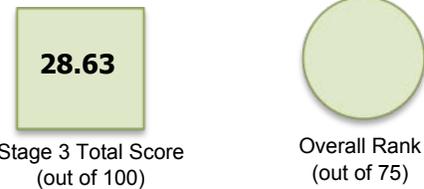
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	15.63
2) Matching Resources (Max 20)	8.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

It appears that they are requesting funds to construct this project, DNR has not seen anything on this project to date, water rights, proposed dam evaluation, hydrology, FERC exemption, habitat study or fish study.

### 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

Subduction zone earthquakes should be considered in engineering design. See general DGGS comment.

## App #703 Tuntutuliak Wind Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction  
Design

**Proposer:** Tuntutuliak Community Services Assn., Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

### Project Description

This is a proposal to add electric thermal and battery energy storage to the existing Tuntutuliak wind/diesel system in order to increase the village's use of wind energy and further displace the use and expense of diesel fuel. The project will increase power conditioning capabilities of the Tuntutuliak facility through the installation of a lithium-ion battery and power conditioning system capable of providing 250 kW of energy for 15 minutes, which is sufficient time to start a diesel generator after a long period of diesel off operation, and the installation of an additional 92 kW of Electric Thermal Storage (ETS) in community facilities. The installation of the 250kW Battery Storage System in the existing power facility will provide: 1) adequate fault ride-through; 2) voltage and frequency support; 3) excess wind energy storage and 4) sufficient energy for extended periods of 'Diesel Off' operation. When successful, this project will provide a cost-effective smart grid system which can be widely replicated throughout the state.

### AEA Review Comments and Recommendation

Not Recommended

Tuntutuliak Community Services Association proposes to install a 250-kW battery storage system as a component of their planned 450-kW wind-diesel system. The function of the proposed battery system is to maintain power quality and stability by quickly supplying power to the system when load or wind energy supply changes quickly. This allows the system to run less diesel capacity to supply the needed "spinning reserve".

The wind system in Tuntutuliak received a direct legislative appropriation of \$1.6 million in July 2009 and RE Fund round 2 design and construction funding in March 2010 (#273). The system is one of four projects under the auspices of the Chaninik Wind Group receiving state funding for wind construction:

1. Kongiganak (\$3.2 million of state funds allocated)
2. Kwigillingok (\$3.2 million of state funds allocated)
3. Tuntutuliak (\$3.36 million of state funds allocated)
4. Kipnuk (\$1.6 million of state funds allocated)

In addition to the total of \$11.36 million in RE fund and direct legislative appropriation the projects are receiving \$750,000 from the USDOE for residential thermal devices.

Construction is behind schedule on these projects chiefly due to integration and control issues. The concept of using distributed residential heating loads and smart meters for frequency control has not been proven. Additionally the controllers for the Windmatic 17S turbines are under redesign and testing.

Since the wind-diesel system is currently under development and its operational characteristics are not yet fully understood, the economic evaluation of this application has a high degree of uncertainty.

Until these projects are operational as currently scoped AEA does not support allocation of additional public funds for expanded scope.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.53 /kWh

**Requested Grant Funds:** \$708,162

**Matched Funds Provided:** \$3,200,000

**Total Potential Grant Amount:** \$3,908,162

**Energy Region:**

Lower Yukon-Kuskokwim

**AEA Funding Recommendation:**

## App #703 Tuntutuliak Wind Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction Design

**Proposer:** Tuntutuliak Community Services Assn., Inc.

**AEA Program Manager:** Jensen

**Applicant Type:** Utility

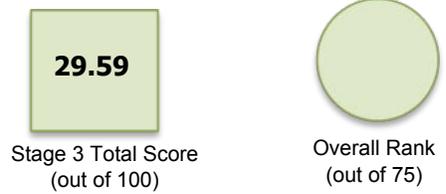
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	16.59
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #704 Kwigillingok Wind Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction  
Design

**Proposer:** Kwig Power Company

**AEA Program Manager:** Jenson

**Applicant Type:** Utility

### Project Description

This is a proposal to add electric thermal and battery energy storage to the existing Kwigillingok wind/diesel system in order to increase the village's use of wind energy and further displace the use and expense of diesel fuel. The project will increase power conditioning capabilities of the Kwigillingok facility through the installation of a lithium-ion battery and power conditioning system capable of providing 250 kWhrs of energy for 15 minutes, which is sufficient time to start a diesel generator after a long period of diesel off operation, and the installation of an additional 92 kW Electric Thermal Storage (ETS) units in community facilities. The installation of the 250kW Battery Storage System in the existing power facility will provide: 1) adequate fault ride-through; 2) voltage and frequency support; 3) excess wind energy storage and 4) sufficient energy for extended periods of 'Diesel Off' operation. When successful, this project will provide a cost effective smart grid system which can be widely replicated throughout the state.

### AEA Review Comments and Recommendation

Not Recommended

Kwig Power proposes to install a 250-kW battery storage system as a component of their planned 450-kW wind-diesel system. The function of the proposed battery system is to maintain power quality and stability by quickly supplying power to the system when load or wind energy supply changes quickly. This allows the system to run less diesel capacity to supply the needed "spinning reserve".

The wind system in Kwig received a direct legislative appropriation of \$1.6 million in July 2009 and RE Fund round 1 design and construction funding in March 2010 (#107). The system is one of four projects under the auspices of the Chaninik Wind Group receiving state funding for wind construction:

1. Kongiganak (\$3.2 million of state funds allocated)
2. Kwigillingok (\$3.2 million of state funds allocated)
3. Tuntutuliak (\$3.36 million of state funds allocated)
4. Kipnuk (\$1.6 million of state funds allocated)

In addition to the total of \$11.36 million in RE fund and direct legislative appropriation the projects are receiving \$750,000 from the USDOE for residential thermal devices.

Construction is behind schedule on these projects chiefly due to integration and control issues. The concept of using distributed residential heating loads and smart meters for frequency control has not been proven. Additionally the controllers for the Windmatic 17S turbines are under redesign and testing.

Since the wind-diesel system is currently under development and its operational characteristics are not yet fully understood, the economic evaluation of this application has a high degree of uncertainty.

Until these projects are operational as currently scoped AEA does not support allocation of additional public funds for expanded scope.

Recommend no funding.

### Funding & Cost

Cost of Power: \$0.50 /kWh

**Requested Grant Funds:** \$708,162

**Matched Funds Provided:** \$3,200,000

**Total Potential Grant Amount:** \$3,908,162

**AEA Funding Recommendation:**

**Energy Region:**

Lower Yukon-Kuskokwim

## App #704 Kwigillingok Wind Energy Storage

**Resource:** Other

**Proposed Project Phase:** Construction Design

**Proposer:** Kwig Power Company

**AEA Program Manager:** Jenson

**Applicant Type:** Utility

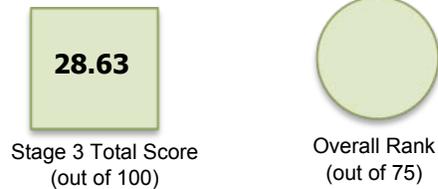
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	15.63
2) Matching Resources (Max 20)	11.00
3) Project Feasibility from Stage 2 (Max 20)	
4) Project Readiness (Max 10)	
5) Benefits (Max 15)	
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #705 Japonski Island Boathouse Heat Pump

**Resource:** Geothermal

**Proposed Project Phase:** Construction

**Proposer:** City and Borough of Sitka

Design

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

The City and Borough of Sitka is proposing the design and construction of a hybrid ground source heat pump system to serve the heating needs at the City and Borough of Sitka's Japonski Island Boathouse Historical Rehabilitation Project. The Japonski Island Boathouse Historical Rehabilitation Project is an historically accurate renovation of the small boat repair and launch facility originally constructed by the U.S. Navy in 1941. The Japonski Island Boathouse Heat Pump project hybrid system will consist of a ground source heat pump system that will meet approximately 81% of the facility's heating needs, with a supplemental electric heat system to make up the difference during periods when the facility's heat loads exceed the capacity of the ground source heat pump system. The proposed hybrid ground source heat pump system will be installed in tidelands adjacent to the Boathouse. The Renewable Energy Grant Fund request herein is for the additional design and construction costs for the hybrid ground source heat pump system.

(Project description edited for length and clarity)

### AEA Review Comments and Recommendation

Full Funding

City and Borough of Sitka (CBS) proposes design and construction of a ground source heat pump for the historic Japonski Island boathouse, a 2500 sq ft building undergoing substantial renovations. A capacity of 4-tons is expected for the GSHP system. The GSHP would be deployed horizontally within the tidal zone, with HDPE pipes buried four feet deep in 2000 sq. ft. of Sitka Sound. The expected coefficient of performance (ratio of heat delivered to electrical energy input) is 3-4.

Design would be complete in October 2011. Construction would be completed by October 2012. The project is expected to cost approximately \$90,000 more than a conventional oil-fired system.

AEA is concerned about the high project cost versus the relatively small amount of heating oil (2,700 gal/yr) that is being displaced. The applicant notes that that there may be permitting delays due to staff shortage at DNR. DNR agrees with this point.

The project would provide a demonstration of a ground source heat pump in a prominent location. Given the small project size, AEA believes it is reasonable to fund both design and construction.

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

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Requested Grant Funds:**

\$125,000

**Matched Funds Provided:**

\$40,000

**Total Potential Grant Amount:**

\$165,000

**AEA Funding Recommendation:**

\$125,000

**Energy Region:**  
Southeast

## App #705 Japonski Island Boathouse Heat Pump

**Resource:** Geothermal

**Proposed Project Phase:** Construction Design

**Proposer:** City and Borough of Sitka

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

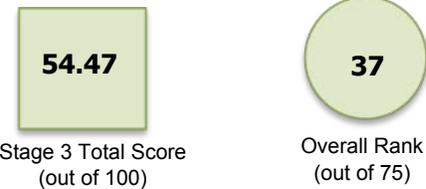
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	13.00
3) Project Feasibility from Stage 2 (Max 20)	14.60
4) Project Readiness (Max 10)	4.00
5) Benefits (Max 15)	10.00
6) Local Support (Max 5)	5.00
7) Sustainability (Max 5)	5.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

As brought up on page 15 on the application, there may be some delays in conveying tidelands if that is how they choose to pursue site control. It is possible to issue this authorization under lease or ROW also. Nonetheless, they are correct in the risk of delays because of permitting in Southeast.

### 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 #706 Sitka Renewable Energy Feasibility for Wastewater Treatment Plant

**Resource:** Geothermal

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

Application to AEA for \$20,000 grant to evaluate the technical and financial feasibility for integration and optimization of heat pump technologies to offset heating oil and grid electricity usage in the Sitka Wastewater Treatment Plant on the waterfront on Japonski Island Sitka.

### AEA Review Comments and Recommendation

Full Funding

The City and Borough of Sitka proposes a reconnaissance through conceptual design for an effluent heat pump to heat the city's wastewater treatment plant. Two 60-ton heat pumps would transfer the heat in the effluent to heat the wastewater treatment plant. The expected coefficient of performance (the ratio of the heat output relative to the electrical energy inputted) is 3-4. The project would also provide cooling by direct heat transfer. The current HVAC system has reached its useful life and needs to be replaced.

Although the preliminary economic analysis prepared for the REF review indicates marginal economics, further design work and refinement of assumptions may improve project viability.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Energy Region:**  
Southeast

**Requested Grant Funds:** \$20,000

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

**Total Potential Grant Amount:** \$26,000

**AEA Funding Recommendation:** \$20,000

## App #706 Sitka Renewable Energy Feasibility for Wastewater Treatment Plant

**Resource:** Geothermal

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

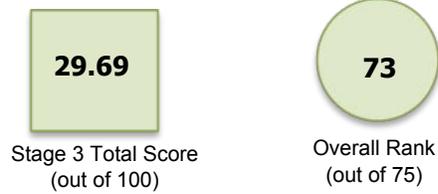
### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	10.07
4) Project Readiness (Max 10)	0.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW 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 #707 Sitka Renewable Energy Feasibility for Centennial Hall & Library

**Resource:** Geothermal

**Proposed Project Phase:** Design  
Feasibility  
Recon

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** McMahon

**Applicant Type:** Local Government

### Project Description

Application to AEA for \$30,000 grant to evaluate the technical and financial feasibility for integration and optimization of heat pump technologies to offset heating oil and grid electricity usage in Centennial Hall and the adjacent Kettleon Memorial Library on the waterfront in downtown Sitka.

### AEA Review Comments and Recommendation

Full Funding

The City and Borough of Sitka proposes a reconnaissance through conceptual design for a seawater heat pump that would provide heating and cooling for Centennial Hall and the Kettleon Memorial Library. The recon assessment would be complete in September 2011, and the feasibility assessment/conceptual design would be completed by October 2011.

Although the preliminary economic analysis prepared for the REF review indicates marginal economics, further design work and refinement of assumptions may improve project viability.

Recommend full funding.

### Funding & Cost

Cost of Power: \$0.09 /kWh

**Energy Region:**

Southeast

**Requested Grant Funds:** \$30,000

**Matched Funds Provided:** \$9,000

**Total Potential Grant Amount:** \$39,000

**AEA Funding Recommendation:** \$30,000

## App #707 Sitka Renewable Energy Feasibility for Centennial Hall & Library

**Resource:** Geothermal

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Feasibility  
Recon

**Proposer:** City & Borough of Sitka

**AEA Program Manager:** McMahon

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### Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 25)	2.88
2) Matching Resources (Max 20)	12.00
3) Project Feasibility from Stage 2 (Max 20)	10.33
4) Project Readiness (Max 10)	0.00
5) Benefits (Max 15)	0.75
6) Local Support (Max 5)	0.00
7) Sustainability (Max 5)	4.00

### Economic Analysis



### Scoring & Project Rank



### DNR/DMLW Feasibility Comments

### DNR/DGGS Feasibility Comments

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### DNR/DGGS Geohazards Comments