Wind Energy Development
In the Aleutian Pribilof Islands

“The Birthplace of the Wind”

USDOE/Tribal Energy Projects Review

October 2005

By Connie Fredenberg
Aleutian Pribilof Islands Association
201 East 3rd Avenue
Anchorage, AK 99501
• Anchorage to Adak - 1,200 air miles for $1,240
• Rich in renewable energy resources: wind, geothermal, hydro, tidal
• Home to 2,329 Unangan for over 10,000 years
• The richest marine ecosystem left in the world

Aleutian Pribilof Islands Association, Inc.
COLD HARD FACTS

• All Fossil Fuels are Imported

• Diesel up to $2.80/gallon wholesale

• Electricity primarily produced by diesel generators

• Electricity costs between $0.22/kWh to $0.58/kWh to produce

• The State of Alaska’s Power Cost Equalization (PCE) program subsidizes electric bills for residents in qualifying communities

Aleutian Pribilof Islands Association, Inc.
• North America’s largest high penetration wind-diesel hybrid power plant
• $1,000,000 cost; paid for in 5 years
• Excess electricity heats water to displace diesel heat
• Two more Vestas turbines to be installed May 2006 to help power the City

Aleutian Pribilof Islands Association, Inc.
St. Paul Island
Population 489

Aleutian Pribilof Islands Association, Inc.
It Is Not Always Winter On St. Paul

Aleutian Pribilof Islands Association, Inc.
Operator buy in and dedication is the single most important indicator of long term project success.

ST. PAUL ISLAND

Operator Paul Melovidov
Doing Winter and Summer Maintenance

Aleutian Pribilof Islands Association, Inc.
<table>
<thead>
<tr>
<th>Village Utility Owner/Operator</th>
<th>Met Tower Installed (or to be installed)</th>
<th>Data Collection Complete</th>
<th>Completed Feasibility Study (Expected)</th>
<th>Apply for RUS Funding (Expected)</th>
<th>Projected Construction Dates</th>
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<tr>
<td>King Cove City of King Cove</td>
<td>05/2005</td>
<td>05/2006</td>
<td>10/2006</td>
<td>???:</td>
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<tr>
<td>False Pass City of False Pass</td>
<td>05/2005</td>
<td>05/2006</td>
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<td>Adak City of Adak</td>
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Aleutian Pribilof Islands Association, Inc.
Site Selection Issues

- FAA approval
- USFWS approval
- Wind turbulence
- Excessive winds
- Soil conditions
- Proximity to powerhouse, power lines, houses, and animal trails

Aleutian Pribilof Islands Association, Inc.
World Class Wind: A Mixed Blessing

- 150 mph gusts
- Extreme Turbulence
- Corrosive Salt Spray

Aleutian Pribilof Islands Association, Inc.
Millions of Migratory Birds

Largest breeding colony of Red-legged Kittiwakes in the world

Endangered Eiders

APIA works with local hunters, bird watchers, students, USFWS and power plant operators to prevent and monitor avian interaction.

Aleutian Pribilof Islands Association, Inc.
Avian Deterrent Devices

Before

A tubular turbine tower will eliminate much of the concern USFWS has with guyed met towers.

After

Aleutian Pribilof Islands Association, Inc.
ST. GEORGE ISLAND  Population 89

“The Galapagos of the North

Aleutian Pribilof Islands Association, Inc.
ST. GEORGE ISLAND

Least Auklets

Red Legged Kittiwakes

Rodney Lekanof of St. George Tanaq Corporation monitors wind and avian interaction

Aleutian Pribilof Islands Association, Inc.
St. George Wind Data

Courtesy of AEA Anemometer Loan Program

Aleutian Pribilof Islands Association, Inc.
St. George Project

- Utility owned and operated by The City of St. George
- Average Electric Load is 225kW
- Peak Load is 280 kW
- Existing power plant has 2 Caterpillar 175 kW generators and a Detroit Series 60 350 kW generator
- Average Wind Speed in October 2004 was 27.7 mph

Aleutian Pribilof Islands Association, Inc.
St. George Project Timetable and Progress

• September 2004
  - Anemometer installed during Community Visioning Meeting by AEA, TDX Power, Tanaq Corporation and APIA employees

• July 2005
  - Application submitted to USDA/RUS by APIA for funds to install a high penetration wind-diesel power plant

• September 2005
  - Wind Resource Data collection completed and being analyzed by the Alaska Energy Authority

• December 2005
  - Feasibility study to be completed by TDX Power
  - NEPA documents to be prepared by APIA

Aleutian Pribilof Islands Association, Inc.
SAND POINT
Population 951

Aleutian Pribilof Islands Association, Inc.
Wind Data Collection
Completed May 2005

John Lyons, Justin Godbehere and Art Torres at Sand Point Generating, Inc.

Aleutian Pribilof Islands Association, Inc.
Sand Point Project

- Utility owned and operated by TDX Power dba Sand Point Generating, Inc.
- Average Load is 600kW
- Peak Load is 900kW
- Average Wind Speed is 20 – 25 mph
- Caterpillar Diesel Generators: 2 350 kW (rarely used), 650 kW, 800 kW, 1200 kW

Aleutian Pribilof Islands Association, Inc.
Sand Point Project Timetable

May 2004
• Anemometer on loan from USDOE/NREL Native Wind Program installed

April 2005
• Community Information Meeting sponsored by APIA with TDX Power

May 2005
• Wind Resource Data collection completed and being analyzed by TDX Power

July 2005
• Application submitted to USDA/RUS by APIA for funds to install a 1 MW wind turbine to integrate with the existing diesel powerhouse

• Community Information Meeting sponsored by APIA with AEA, TDX Power, USDOE/ WindPowering America, John Wade of Wind Consultants, LLC

October 2005
• Feasibility study to be completed by TDX Power
• NEPA documentation to be prepared by APIA

Aleutian Pribilof Islands Association, Inc.
KING COVE
Population 723
Aleutian Pribilof Islands Association, Inc.
King Cove
Kite flying high
schoolers

Mama and cubs

Aleutian Pribilof Islands Association, Inc.
Ingenuity is a requirement in rural Alaskan communities.

Aleutian Pribilof Islands Association, Inc.
King Cove Project

• Utility owned and operated by the City of King Cove

• 850 kW Hybrid hydroelectric- diesel power plant

• Average Load is 500 kW

• Peak Load is 650 kW

• Glacier now feeding hydro is melting; a new stream is being studied as well as wind potential

Aleutian Pribilof Islands Association, Inc.
King Cove Project Timetable

• May 2005
  • Anemometer on loan from AEA sited and installed by AEA, City of King Cove, and APIA employees
  • Agdaagux Tribal Office, Belkofski Tribal Office, King Cove Corporation Office and school principal informed and invited to watch installation
  • High School Science Class participated in Kite Flying Activity to demonstrate wind turbulence prior to installation

• May 2006
  • Wind Resource Data Collection will be completed and analyzed by AEA

• October 2006
  • Feasibility study to be completed by TDX Power
  • NEPA documentation to be prepared by APIA

Aleutian Pribilof Islands Association, Inc.
FALSE PASS

Population 50

Aleutian Pribilof Islands Association, Inc.
FALSE PASS

May 7, 2005   50 degrees F
No Wind, No Mosquitoes
And no bears…

Aleutian Pribilof Islands Association, Inc.
FALSE PASS

Will the Predator Proof Fence to be installed this month keep Mr. Bear out?

Aleutian Pribilof Islands Association, Inc.
False Pass Project

- Utility owned and operated by the City of False Pass
- Average Load is 36 kWh
False Pass Project Timetable and Progress

May 2005
• Anemometer on loan from AEA sited and installed by AEA, City of False Pass, APIA employee and contractor

August 2005
• New modular diesel powerhouse installed by AEA
• Grizzly chewed through anemometer wires

October 2005
• AEA to take down met tower and repair grizzly damage
• City of False Pass to install Predator Proof Fence

May 2006
• Wind data collection completed and analyzed by AEA

October 2006
• Feasibility study completed by TDX Power
• NEPA documentation to be prepared by APIA

Aleutian Pribilof Islands Association, Inc.
Nikolski, Umnak Island

Continuously inhabited for over 10,000 years
Population 39

Aleutian Pribilof Islands Association, Inc.
Wild horses, cattle, reindeer, and sheep wander the island.

Lodge for fishermen and duck hunters; weather permitting.
Nikolski Project

- Utility owned by Nikolski IRA / Primary Operator is TDX Power
- Average electric load is 25 kW
- Peak load is 50 kW
- AEA is currently installing a new diesel plant with 2 John Deere 70 kW generators and a 37 kW generator

Aleutian Pribilof Islands Association, Inc.
Nikolski Project Timetable and Progress

- **July 2005**
  - Application submitted to USDA/RUS by APIA for funds to install a 30 kW Fuhrlaender wind turbine to integrate with the newly constructed diesel powerhouse

- **November 2005**
  - New modular diesel powerhouse being installed by AEA
  - Anemometer to be installed by AEA, APIA, Nikolski IRA
    - A Predator Proof Fence will surround the met tower

- **November 2006**
  - Wind resource data collection completed and analyzed by AEA

- **December 2006**
  - Feasibility study to be completed by TDX Power
  - NEPA documentation to be prepared by APIA

Aleutian Pribilof Islands Association, Inc.
ADAK

Population 60

Aleutian Pribilof Islands Association, Inc.
Adak Project

• Utility owned by the City of Adak
• November 2005
  • Anemometer to be re-installed by AEA, City of Adak
    • Previous installation failed when anchors pulled out of the ground
• November 2006
  • Wind resource data collection completed and analyzed by AEA

Aleutian Pribilof Islands Association, Inc.
Education and Training

Power Plant Operators have attended the following conferences and workshops thanks to the Aleutian Pribilof Islands Community Development Association (APICDA), TDX Power and the Bureau of Indian Affairs:

International Wind-Diesel Conference
Girdwood, Alaska October 2004

Wind Energy Application and Training Symposium
Anchorage, Alaska July 2005

Rural Energy Conference
Valdez, Alaska September 2005

Aleutian Pribilof Islands Association, Inc.
Renewable Energy Alaska Project

REAP

REAP’s Mission: to facilitate the increased development of renewable energy in Alaska through collaboration, education, training and advocacy.

APIA joined REAP as one of 3 Native Interest Groups on the BOD in July 2005

Aleutian Pribilof Islands Association, Inc.
Made Possible with Funding and Assistance from:

**Bureau of Indian Affairs / Economic Development / Training**

**Alaska Energy Authority / Anemometer Loan Program**

**USDOE / NREL / Anemometer Loan Program**

**USDOE / Renewable Energy on Tribal Lands**

**Tanadgusix Corporation / TDX Power Staff**

**USFWS / Stewardship Grant**

Thank You Very Much

Aleutian Pribilof Islands Association, Inc.