

St. Paul



1. **Community Information**
 - a. Average Load 70 kW
 - b. Wind Turbines Not Connected to Community Grid
2. **Wind Turbines - Installed Capacity: 675 kW**
 - a. 3 Vestas V-27 Rated at 225 kW
 - i. 1 Online: June 1999
3. **Diesel Gen-Sets**
 - a. Diesel Efficiency 13.83 kWh/gallon
4. **Plant Efficiency**
 - a. 28.81 kWh/gallon

Saint Paul is a remote community on the largest of the Pribilof Islands, in the middle of the Bering Sea about 750 air miles west of Anchorage. The Saint Paul Municipal Electric Utility currently operates a diesel power plant with a total installed capacity rating of 2,125 kW and an average load of 600 kW. In 1999, the high cost of diesel-generated power from the municipal utility motivated Tanadgusix Corporation (TDX), the Alaska Native village corporation on Saint Paul, to install and operate a stand-alone power system at an airport and industrial complex the corporation owns.

Future Plans:

Currently only one of the three turbines is being operated. As of November 2010, negotiations were ongoing between TDX and the city of St. Paul to tie the turbines into the grid.



Kokhanok



1. Existing Diesel Generation

- a. 490 kW Generation Plant
- b. 482,809 kWh annual production
- c. Diesel Efficiency 12.1 kWh/gallon generated

2. Additions to Diesel System

- a. Installed Wind Capacity: 180 kW
- b. 2 reconditioned Vestas V-17 Rated at 90 kW (85' lattice tower with 56' rotors)
- c. Synchronous Condenser
- d. One grid forming inverter
- e. 200 kVA Battery Storage
- f. Thermal electric heat recovery system and secondary load control
- g. Substantial Power Plant Controls Upgrade
- h. Remote operations monitoring and control
- i. Wind system operator training
- j. Project Cost: \$1.94 million
- k. 5-year O&M agreement with Marsh Creek Energy Systems

Kokhanok: High Penetration Wind-Diesel System with Energy Storage and Electric Thermal Recovery

Kokhanok is a remote community in Southwest Alaska, directly across Lake Iliamna from the community of Iliamna. The Kokhanok Electric Utility currently operates a diesel power plant with a total installed capacity rating of 490 kW and a peak load of 106 kW. Logistics for getting diesel fuel to Kokhanok are difficult and expensive, forcing the utility to charge \$.90/kWh for power (2009 statistic). In July 2009, Marsh Creek LLC answered an RFP from the Lake and Peninsula Borough and was awarded a contract to team with the tribally owned electric utility for a high penetration wind-diesel system with coincident thermal energy generation. Construction began in May of 2010 following a wind resource assessment and geotechnical evaluation. The wind turbines were commissioned October 18, 2010, and the system is expected to be fully operational by the end of December this year. The project was completed on schedule with no change orders and no cost overruns.

Future Plans

Marsh Creek, LLC expects to complete testing and have the system fully operational by the end of December 2010. The thermal heat recovery system will use excess electricity to provide additional heat to the existing jacket water heat recovery system for the school.

Unalakleet



1. **Community Information**
 - a. Average Load 430 kW
 - b. Peak Load 870 kW
2. **Wind Turbines - Installed Capacity 600 kW**
 - a. 6 Northwind 100kW turbines(Online: November 2009)
3. **Diesel Gen-Sets**
 - a. Diesel Efficiency 13.5 kWh/gallon
4. **Performance Data**
 - a. 697,929 kWh (Nov. 2009 – Nov. 8, 2010)

Unalakleet's six-turbine wind farm began to supply wind generated electricity to the community in November 2009. The project is owned and operated by Unalakleet Vally Electric Cooperative and was completed through the financial support of the Alaska Energy Authority, Norton Sound Economic Development Corporation, and the Unalakleet Native Corporation.

By producing energy with no fuel costs, the project (constructed by STG Incorporated during the summer of 2009) will save the community thousands of dollars annually in avoided diesel fuel expenditures, reducing and stabilizing the cost of energy in Unalakleet. As of November 2010, the system has produced 697,929 kWh of electricity, which is equivalent to \$139,585 (based on \$.20/kWh) or 53,686 gallons of diesel fuel.

Future Plans:

STG is currently working on integration controls and, pending progress of the plant remodel, should have all of the secondary load equipment operational by the end of the 2010. The current status of this wind site can be seen at: <http://northernpower.kiosk-view.com/unalakleet>



Kodiak



1. **Community Information**
 - a. Average Community Load: 16 MW
 - b. Maximum Community Load: 26 MW
2. **Wind Turbines - Installed Capacity 4.5 MW**
 - a. 3-GE 1.5 MW (GE 1.5 SLE)
 - i. Date Online: July 2009
3. **Diesel Gen-Sets**
 - a. Diesel Efficiency 15 kWh/gallon
4. **July 2009-June 2010 Performance Data**
 - a. Average Capacity Factor: 33%
 - b. Average Net Wind Penetration: 8.8%

Kodiak Electric Association installed three 1.5 MW GE turbines during the summer of 2009, marking this as the first MW-scale turbines installed in Alaska. The wind turbines, in their first year, offset diesel fuel use by 930,000 gallons. KEA provides electric service to approximately 5,800 meters in a service area surrounding the City of Kodiak, US Coast Guard Integrated Support Command Kodiak, Bells Flats and Russian Creek area, and villages of Chiniak, Pasagshak and Port Lions. KEA's loads range from 11 to 26 MW with peak loads driven primarily by seafood processing.

Future Plans:



Photo courtesy of Dake Schmidt

Kodiak is looking at installing another three 1.5-MW wind turbines, but to do so a more complex integration system will be required. At present, Kodiak is undergoing high-resolution modeling to determine the best solution for meeting its future development objectives.

KEA's vision is to produce 95% of its energy sales with cost effective renewable power solutions by the year 2020. The additional 4.5 MW has the potential to push KEA's isolated grid to a 75% wind penetration rate, and KEA is currently investigating grid stabilizing solutions that would provide both wind energy storage and grid frequency support so the additional wind power can be

safely integrated onto the island's system. The first of these endeavors is to expand Terror Lake's base load capacity with an additional hydro turbine generator.

KEA trained its own employees to be able to perform routine maintenance required on the wind turbines by sending them to an extensive GE Wind Turbine School. KEA's homegrown wind-smith technicians are trained at the same level of GE Commission Technicians. This on-island expertise provides KEA a great benefit in reducing the operation and maintenance costs of the wind generation while providing the Kodiak community exciting new employment opportunities in this emerging industry. KEA is exploring the potential of providing "green tags" to the US Coast Guard station in Kodiak to assist them in achieving their Presidential Initiative on renewable energy, and to the local seafood processors to enhance the marketability of Kodiak's wild seafood products. These "green" marketing projects provide a secondary value to the wind resource that KEA is proud to share with its members.

Nome – Banner Wind



1. **Community Information**
 - a. Average Load 4,000 kW
2. **Wind Turbines - Total installed capacity of 1.17MW**
 - a. 18 Entegritiy EW50s (AOC 15/50s)–Rated at 66 kW
 - i. Online December 2008
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output 2.9 MW
4. **2009 Performance Data (PCE)**
 - a. 487,000 kWh
 - b. Net Capacity Factor 7%
5. **2010 Performance Data (as of 10.4.10)**
 - a. 767,000 kWh
 - b. Net Capacity Factor 12%

Western Community Energy (WCE), a company from Bend, Oregon, is the developer and manager of the Banner Wind Project in Nome. The Banner Wind Project is a joint venture between Bering Straits Native Corporation and Sitnasuak Native Corporation. The project consists of 18 Entegritiy EW-50 turbines.

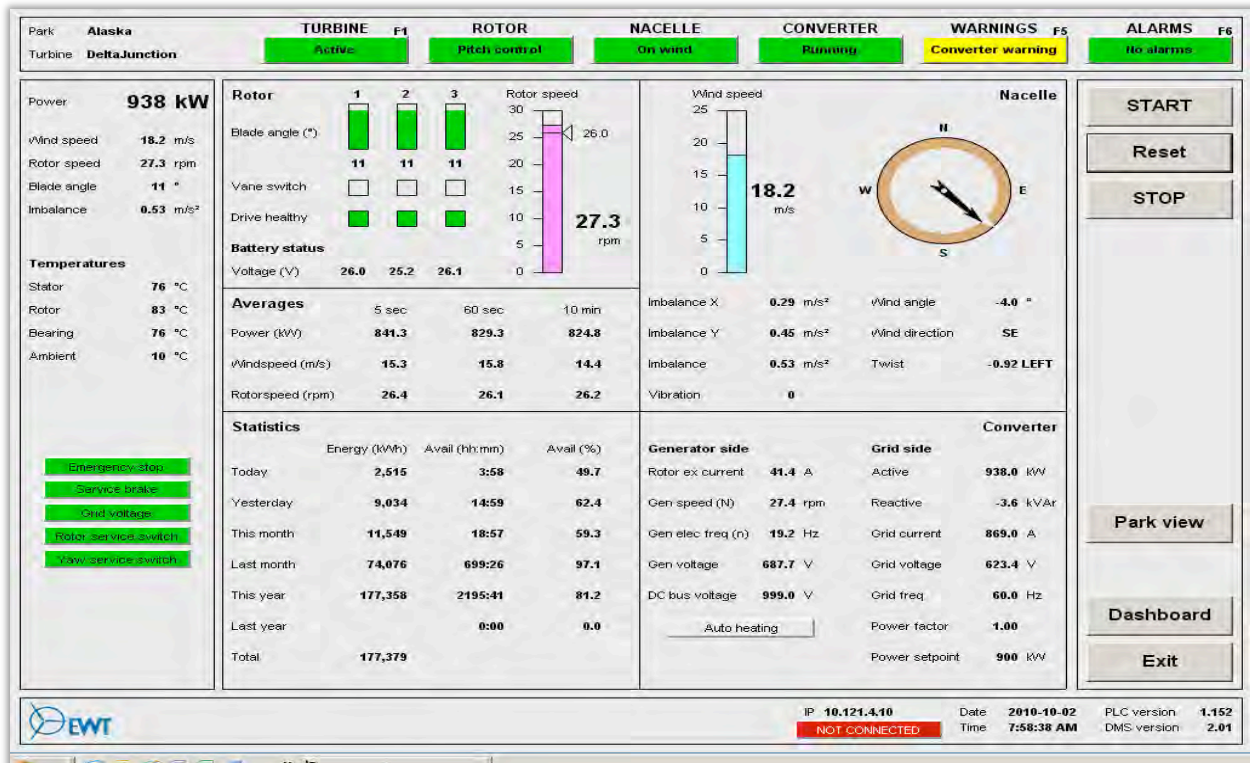
Delta Junction



1. **Community Information**
 - a. Wind Turbines Connected to GVEA grid
2. **Wind Turbines - Installed Capacity: 1 MW**
 - a. 1 Northwind 100 (online 2009)
 - b. 1 EWT 900 (online 2010)
 - c. 6 Skystream 3.7
 - d. 1 Skystream 4.7
3. **2010 Performance Data**
 - a. 560,000 kWh
 - b. Net Capacity Factor (expected)
 - i. EWT 32%
 - ii. Northwind 26%

Future Plans:

AEP is pushing 1MW currently from the EWT900KW and the Northern Power 100KW and 2 Sky stream 3.7s , and is engaged in a integration study for 25.6MW expansion due early November 2010. We will be building in spring 2011, We have all permits and have put 6 additional foundation sites in to date. We are also testing the new Southwest wind power Sky stream 4.7 turbine at Healy.



Wales



1. Wind Turbines - Total installed capacity of 130 kW

- a. 2 Entegriety EW50s (AOC 15/50s)–Rated at 66 kW
(Online Summer 2000)

2. Diesel Gen-Sets

- a. 75 kW
- b. 142 kW
- c. 148 kW

In 1995, AEA, KEA, AVEC, and NREL began collaborating on a technically ambitious project—installing a high-penetration wind-diesel system in Wales. When operating, this community-wide system allows diesel gen-sets to shut off when sufficient wind energy is available. Renovations were underway mid-2010.

Future Plans:

In early 2010, Wales received an Emerging Technology Grant from the Denali Commission, through KEA, that will allow for the necessary modifications to be made. In general, the scope of work will include repair of the Entegriety wind turbines, installation of satellite communications, and operator training.

Kotzebue



1. Community Information

- a. Average Load 2,800 kW
- b. Maximum Load 3,700kW

2. Wind Turbines - Total installed capacity of 1.14 MW

- a. 15 Entegriy EW50s (AOC 15/50s)–Rated at 66 kW
- b. 1-Northwind 100 – Rated at 100 kW
- c. 1 Vestas V-17 Rated at 65 kW

3. 2009 Performance Data (PCE)

- a. Wind Output: 1,054,480 kWh
- b. Net Capacity Factor: 10.6%
- c. Net Wind Penetration: 3.3%

Future:

Kotzebue Electric Association will be expanding the installed capacity of its wind farm during the summer of 2011, with the installation of two 900 kW EWT turbines. Since this expansion will significantly increase the amount of wind penetration on the grid, KEA will simultaneously be installing a Zinc Bromide Flow Battery to stabilize the power quality of the grid. This will arrive in July 2011. In addition to wind-farm improvements, the utility is also in the midst of renovating the waste-heat recovery system to include capture of stack heat. The additional heat will be used to generate power with an ammonia power cycle power plant designed by Energy Concepts.

(Note: Kotzebue was the first utility-scale wind farm in Alaska. The first three Atlantic Orient Corporation (AOC) turbines were installed in 1997.)



Selawik



1. **Community Information**
 - a. Population served: 850 residents
 - b. Average Load: 336 kW
2. **Wind Turbines**
 - a. Installed Capacity: 260 kW
 - b. 4- Entegrity (65 kW)
 - i. Date Online: June 2003
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output: 333 kW
4. **2009 Performance Data**
 - a. Net Wind Production: 63,876 kWh
 - b. Capacity Factor: 3.4 %
 - c. Net Wind Penetration: 1.7 %

Selawik, located in the Northwest Arctic Borough, is AVEC's first wind system installation. It consists of four Entegrity 65 kW (AOC 15/50) turbines. The turbines have had tip brake problems that reduced production.

Toksook Bay/ Tununak/ Nightmute



1. **Community Information**
 - a. Population Served: 1200 residents
 - b. Average Load: 377 kW
2. **Wind Turbines – Total Installed Capacity 400 kW**
 - a. 4 - NW 100s
 - i. Date Online: 3 online July 2006, 1 online October 2010
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output: 309 kW
4. **Other Pertinent Info**
 - a. Tununak Intertie (6 miles)
 - b. Nightmute Intertie (17 miles)
5. **2009 Performance Data**
 - a. Net Wind Production: 564,257 kWh
 - b. Capacity Factor: 22.6 %
 - c. Net Wind Penetration: 17.6 %

The wind project at Toksook Bay also serves the communities of Nightmute and Tununak via 23 miles of electrical interties. Toksook Bay is a community of about 600 on Nelson Island, northwest of Bethel. Wind contributes 22% of Toksook Bay's electric load.

As in Kasigluk, AVEC initially installed three NW100 wind turbines in 2006, and is installing one additional NW100 in October 2010, for a total installed capacity of 400 kW. To maximize operation in the region, an intertie was developed from Toksook Bay to Tununak and Nightmute—the other two communities on Nelson Island—and the power plants in those communities were shut down and replaced with standby plants that only operate during outages.

Savoonga



1. Community Information

- a. Population Served: 730 residents
- b. Average Load: 266 kW

2. Wind Turbines

- a. Installed Capacity: 200 kW
- b. 2 - NW 100s
 - i. Date Online: November 2008

3. Diesel Gen-Sets

- a. Average Diesel Plant Output: 226 kW

4. 2009 Performance Data

- a. Net Wind Production: 345,743 kWh
- b. Capacity Factor: 13.6 %
- c. Net Wind Penetration: 14.6 %

AVEC also installed two NW100s in Savoonga, on St. Lawrence Island, in the fall of 2008. At times, Savoonga has seen instantaneous wind penetrations of greater than 60% without any energy storage or secondary load. A secondary load was added in 2010, which has reduced the stop and start cycles of the wind turbines.

Hooper Bay



1. Community Information

- a. Population Served: 1160 residents
- b. Average Load: 334 kW

2. Wind Turbines

- a. Installed Capacity: 300 kW
- b. 3 - NW 100s
 - i. Date Online: November 2008

3. Diesel Gen-Sets

- a. Average Diesel Plant Output: 308 kW

4. 2009 Performance Data

- a. Net Wind Production: 310,289 kWh
- b. Capacity Factor: 11.9 %
- c. Net Wind Penetration: 11.0 %

A wind system in Hooper Bay, a community of about 1,200 in the Yukon-Kuskokwim Delta, is another AVEC project that includes three NW100s, installed in 2008. The wind turbines were integrated in 2009 after the control module commissioning. Secondary load was installed in 2010.

Gambell



1. **Community Information**
 - a. Population Served: 675 residents
 - b. Average Load: 252 kW
2. **Wind Turbines**
 - a. Installed Capacity: 300 kW
 - b. 3 - NW 100s
 - i. Date Online: October 2009
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output: 207 kW
4. **2009 Performance Data - (Partial Year)**
 - a. Net Wind Production: 60,262 kWh
 - b. Capacity Factor: 15.1 % (Average for the months it was operational)
 - c. Net Wind Penetration: 16.9 % (Average for the months it was operational)

Gambell is a village located on the northwest cape of St. Lawrence Island, Alaska or about 200 southwest of Nome, AK. Gambell has approximately 675 residents. The wind project in Gambell, includes three NW100. A secondary load was added in 2010.

Chevak



1. **Community Information**
 - a. Population Served: 925 residents
 - b. Average Load: 272 kW
2. **Wind Turbines**
 - a. Installed Capacity: 400 kW
 - b. 4 - NW 100s
 - i. Date Online: December 2009
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output 272 kW
4. **2009 Performance Data - (Operational in December only)**
 - a. Net Wind Production: 1,304 kWh

Chevak is a southwestern Alaska village with approximately 925 residents. The wind project includes four NW100 turbines.

Kasigluk/Nunapitchuk



1. **Community Information**
 - a. Population Served: 1118 residents
 - b. Average Load: 316 kW
2. **Wind Turbines**
 - a. Installed Capacity: 300 kW
 - b. 3 - NW 100s
 - i. Date Online: July 2006
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output: 242 kW
4. **Other Pertinent Info**
 - a. Nunapitchuk Intertie
5. **2009 Performance Data**
 - a. Net Wind Production: 621,706 kWh
 - b. Capacity Factor: 23.6 %
 - c. Net Wind Penetration: 22.8 %

The wind project in Kasigluk also serves the community of Nunapitchuk via an electrical interties. Kasigluk is a southwestern Alaska village in the Kuskokwim River Delta, 26 miles northwest of the regional hub of Bethel. Kasigluk has approximately 500 residents. The wind project in Kasigluk, includes three NW100 turbines and displaces an average of 23% of the diesel fuel previously used for power generation. It also supplies wind power to Nunapitchuk through an intertie. A secondary load is integrated into the local recovered heat system.

Mekoryuk



1. **Community Information**
 - a. Population Served: 200 residents
 - b. Average Load: 101 kW
2. **Wind Turbines**
 - a. Installed Capacity: 200 kW
 - b. 2 - NW 100s
 - i. Date Online: Not online yet. Estimated 2011.
3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output: 101 kW
4. **2009 Performance Data - No data yet**
 - a. Net Wind Production:
 - b. Capacity Factor:
 - c. Net Wind Penetration:

Mekoryuk is a southwestern Alaska village located at the mouth of Shoal Bay on the north shore of Nunivak Island in the Bering Sea. Mekoryuk has approximately 200 residents. The wind project in Mekoryuk, includes two NW100 turbines and average displacement was estimated at 33,000 gallons per year. Wind turbines are not online yet, control module and secondary load are currently being installed.

Quinhagak



5. Community Information

- a. Population Served: 660 residents
- b. Average Load: 220 kW

6. Wind Turbines

- a. Installed Capacity: 300 kW
- b. 3 - NW 100s
 - i. Date Online: November 2010

7. Diesel Gen-Sets

- a. Average Diesel Plant Output 220 kW

8. 2009 Performance Data – No data yet

- a. Net Wind Production:
- b. Capacity Factor:
- c. Net Wind Penetration:

Quinhagak is a southwestern Alaskan village situated on the Kanektok River approximately a mile from the Kuskokwim Bay. The village load has taken a drastic decline in 2010 with the closure of the fish processing plant. Some freezing continues. The wind project in Quinhagak includes three NW100 turbines, and is projected to displace 53,000 gallons of fuel a year.

Shaktoolik

1. **Community Information**
 - a. Population Served: 225 residents
 - b. Average Load: 99 kW

2. **Wind Turbines**
 - a. Installed Capacity: 200 kW
 - b. 2 - NW 100s
 - i. Projected Construction Date: June 1, 2011

3. **Diesel Gen-Sets**
 - a. Average Diesel Plant Output 99 kW

4. **2009 Performance Data – No data yet**

The wind project in Shaktoolik includes two NW100 turbines to be installed in 2011. Construction was delayed for redesign to include a new dispatch controller and switchgear, with upgrades to the 3-phase distribution system. Current estimates show that the wind project in Shaktoolik will displace about 27,000 gallons of fuel each year.

2009 Statistics

	Kasigluk/ Nunapitchuk	Selawik	Toksook Bay/ Tununak/Nightmute	Savoonga
Community Information -				
Population served:	1118	846	1186	722
Average Load:	316 kW	336 kW	377 kW	266 kW
Wind Turbines Installed -				
Installed Capacity:	300 kW	260 kW	400 kW	200 kW
Type:	3- NW100	4-Entegrity65	4-NW100	2-NW100
Date Online:	Jul-06	Jun-03	(3)Nov-06, Oct-10	Nov-08
Diesel Gen-Sets -				
Average Diesel Plant Output:	242 kW	333 kW	309 kW	226 kW
2009 Performance Data -			* 3 turbines only	
Net Wind Production:	621,706 kWh	63,876 kWh	564,257 kWh	345,743 kWh
Capacity Factor:	23.6%	3.4%	22.6%	13.6%
Net Wind Penetration:	22.8%	1.7%	17.6%	14.6%
Total fuel saved in 2006	n/a	6,468	n/a	n/a
Total fuel saved in 2007	29,457	10,684	43,916	n/a
Total fuel saved in 2008	43,700	7,223	49,990	n/a
Total fuel saved in 2009	45,966	4,835	39,329	23,900
Total fuel saved thru July 2010	22,543	6,360	23,036	6,423
Total fuel saved	141,666	35,570	156,271	30,323
Total money saved	\$455,427	\$120,596	\$446,596	\$108,588

	Gambell *	Hooper Bay *	Chevak	Mekoryuk	Quinhagak
Community Information -					
Population served:	673	1160	922	195	661
Average Load:	252 kW	344 kW			
Wind Turbines Installed -					
Installed Capacity:	300 kW	300 kW	400 kW	200 kW	300 kW
Type:	3- NW100	3-NW100	4- NW100	2- NW100	3- NW100
Date Online:	Oct-09	Nov-08	Dec-09		Nov-10
Diesel Gen-Sets -					
Average Diesel Plant Output:	207 kW	308 kW			
2009 Performance Data -	* not operational the entire year			* not yet fully operational	
Net Wind Production:	60,262 kWh	310,289 kWh			
Capacity Factor:	15.1%	11.9%			
Net Wind Penetration:	16.9%	11.0%			
Total fuel saved in 2009	4633	22301	n/a		
Total fuel saved thru July 2010	8797	17660	17965		
Total fuel saved	13430	39961	17965		
Total money saved	\$48,512	\$142,446	\$58,386		

	Kasigluk/ Nunapitchuk	Rate per Gallon	Total Savings	Selawik	Rate per Gallon	Total Savings
Total fuel saved in 2006	n/a	1.87		6,468	2.44	\$15,782
Total fuel saved in 2007	29,457	2.11	\$62,154	10,684	2.79	\$29,808
Total fuel saved in 2008	43,700	3.07	\$134,159	7,223	3.97	\$28,675
Total fuel saved in 2009	45,966	3.95	\$181,566	4,835	4.61	\$22,289
Total fuel saved thru July 2010	22,543	3.44	\$77,548	6,360	3.78	\$24,041
Total fuel saved	141,666		\$455,427	35,570		\$120,596

	Toksook Bay/ Tununak/ Nightmute	Rate per Gallon	Total Savings	Savoonga	Rate per Gallon	Total Savings
Total fuel saved in 2006	n/a	1.87		n/a	1.86	
Total fuel saved in 2007	43,916	2.08	\$91,345	n/a	2.20	
Total fuel saved in 2008	49,990	3.11	\$155,469	n/a	3.05	
Total fuel saved in 2009	39,329	3.10	\$121,920	23,900	3.67	\$87,713
Total fuel saved thru July 2010	23,036	3.38	\$77,862	6,423	3.25	\$20,875
Total fuel saved	156,271		\$446,596	30,323		\$108,588

	Gambell	Rate per Gallon	Total Savings	Hooper Bay	Rate per Gallon	Total Savings
Total fuel saved in 2009	4633	4.30	\$19,922	22301	3.79	\$84,521
Total fuel saved thru July 2010	8797	3.25	\$28,590	17660	3.28	\$57,925
Total fuel saved	13430		\$48,512	39961		\$142,446

	Chevak	Rate per Gallon	Total Savings
Total fuel saved in 2009	n/a	3.50	
Total fuel saved thru July 2010	17965	3.25	\$58,386
Total fuel saved	17965		\$58,386

TOTAL GALLONS SAVED	TOTAL MONEY SAVED
435,186	\$1,380,551

* Rate per Gallon is based on the average fuel delivery price per village, per year.

Upcoming Railbelt Projects



Eva Creek 24 MW – Golden Valley Electric Association

GVEA took its Board of directors on a tour of the proposed Eva Creek wind site in September. Wind flow modeling and energy yield analysis of the site was completed and based on this information GVEA has solicited bids from four turbine suppliers, GE, Siemens, Vestas and RePower. Siemens has elected to not bid on the project. GVEA will begin evaluating turbine bids in November and after selecting a manufacturer will go out to bid for an Engineer, Procure and Construct (EPC) contractor to construct the project. GVEA's goal is to have a

turbine manufacturer selected in December and EPC and Turbine contracts finalized by the end of March 2011 to take to the Board for final approval.



Fire Island 53.8 MW - CIRI

The project is estimated to power up to 17,000 homes, and would use 33 GE XLE 1.6 MW turbines. Power Purchase Agreement negotiations are ongoing between developer CIRI and the Railbelt utilities.



Delta Junction 25 MW – Alaska Environmental Power

Plans call for expanding this project from 1 MW to 25.6 MW. (See the one page update for more details.)

Upcoming: Deering, Buckland, Noorvik

Northwest Arctic Borough Wind-Diesel Program

The NWAB wind-diesel program, an AEA Renewable Energy Fund project, will develop the wind energy resources in the communities of Deering, Buckland and Noorvik in Northwest Alaska. \$10.3M in funding has been awarded to the NWAB for the project. WHPacific is providing project management and technical services on the project.

Deering Status

Final feasibility analysis of low, medium and high penetration wind-diesel systems is in progress. A suitable wind power site, identified during the wind resource analysis phase, is located 1 mile west of Deering. A road and powerline extension will be needed to reach the site.

The Deering power plant, built in 2000, is co-located with the Deering waterplant and washeteria. All three services are owned and operated by the City of Deering. The powerplant is plumbed to provide secondary heat off the engines to the waterplant and washeteria. Co-location of the two utilities provides an opportunity to greatly reduce the cost of both electric and water/sewer costs for Deering through wind energy displacement of diesel fuel for both power generation and water heating.

Buckland Status

Final feasibility analysis of low, medium and high penetration wind-diesel systems is in progress. A second wind resource location several miles closer to town will be evaluated through software modeling, to determine if the wind resource would be more cost effective with reduced powerline costs.

The Buckland powerplant, built in 2006, is located near the soon-to-be constructed water treatment plant. The powerplant is now providing secondary heat to the washeteria. The project has been in communication with Village Safe Water regarding utilization of surplus wind power for water heating.

Noorvik Status

Additional wind data collection is in progress. A potentially strong wind resource exists several miles to the east of Noorvik, however, the cost of a powerline extension is significant. Also, the location of the airport, roughly 1 mile east of Noorvik, is causing met tower and turbine siting challenges for a near-village installation. Notice from the FAA on the near village site should be received in early November 2010. Installation of a met tower is planned for the near-village site once FAA siting issues are resolved.

The Noorvik powerplant is comprised of generator modules and switchgear module. Preliminary discussions with AVEC are leading to a replacement of the switchgear module with a wind-diesel switchgear/control packaged module. The Noorvik powerplant is not located near a large thermal load thus remote controlled secondary loads will be evaluated for the system.



NOME INT'L AIRPORT RENEWABLE ENERGY PROJECT- ALASKA AIRLINES

Corporate Environmental Initiatives – Facilities in AK

- ▶ Energy Efficiency Projects
 - Nome (2006) – Terminal addition and existing building renovation
 - Prudhoe Bay (2007) – Terminal restroom water-saving fixtures
 - Kodiak (2008) – New TPO Membrane Roof
 - Cordova (2009) – Terminal renovation (Siding, windows, lighting, and new TPO roof)
- ▶ Renewable Energy Projects
 - Evaluated various terminal sites in Alaska
 - Nome was the front runner – 1) High energy costs to offset, 2) favorable wind/solar resources, 3) receptive utility, 4) Nome has local knowledge in RE applications, 5) available property at terminal to install RE system

Energy System

- ▶ Proven 11 Wind Turbine – 6kW (Cold climate package with 29 foot tower)
- ▶ Six (6) BP175B Solar Panels from BP – 1.05kW system

Estimated Production/Savings

- ▶ System produces ~15,000kWh annually (~6% of the building load)
- ▶ Saving ~\$5000 annually on electricity
- ▶ Eight (8) year payback period
- ▶ Save 375 gallons of diesel per year
- ▶ Reduces 7600 lbs of carbon emissions per year
- ▶ Eligible for US Treasury Renewable Energy grant
- ▶ Test site for expanded RE applications at Alaska Airlines terminal in AK

Project Schedule

- ▶ Permits secured – November 2010
- ▶ Procurement – December 2010
- ▶ Construction
 - Solar Panels – March 2011
 - Wind turbine foundation – May 2011
 - Turbine Erected/Commissioned – June 2011



Photoshopped Image - Nome Airport with Wind Turbine

PROJECT CONTACT: Heritage Renewables www.heritagerenewables.com

Project Manager: Kyle Smith (Anchorage) -- Phone: 206.769.5627 -- Email: kyle@heritagerenewables.com

Wind Training Update - AVTEC



AVTEC – Alaska’s Institute of Technology (Seward)

Construction: Northwind 100

By the end of this year, Seward’s skyline will feature a fully operational Northwind 100 wind turbine adjacent to AVTEC’s Applied Technology building. The nacelle and the blades for the turbine are on site, soil testing has been completed, the foundation has been excavated and formed, and the concrete has been poured. AVTEC now just has to wait for the cure time to pass, and for arrival of the tower. AEA, STG, Northern Power and AVTEC are developing the electrical plan for integration into AVTEC’s power plant, and a thermal storage device will allow use of excess power produced. AVTEC Director Fred Esposito

addressed the Seward City Council on October 11th and received approval and for the project, alleviating concerns about new city ordinance standards.

Curriculum: Wind Turbine/Power Plant Operator & Wind Technician

AVTEC plans to hire a new instructor for the program, and now that the application period has closed, administrators will review each applicant’s qualifications and schedule interviews. An apparent lack of qualified applicants from inside Alaska necessitated a nationwide applicant search. In the meantime, current AVTEC staff members who have the necessary background and experience have started the curriculum development process.

The curriculum for the program’s initial class has been fleshed out and a daily syllabus is in rough draft form. Two versions are in the works: one is a three-week operator’s class for those who have attended AVTEC’s power plant and advanced power plant courses, and who work in areas that have (or plan to install) wind turbines to augment their community power. This is the planned first course offering for spring 2011.

Another course in development will be nine weeks long, with both power plant and wind turbine training. This is intended for an operator who is new to the field and will be starting work in a combined-system power plant. Both of these classes will train technicians for the day-to-day operation and maintenance of the community power system.

One of the major challenges has been the need to safely climb the tower to service the turbine and nacelle of the unit. AVTEC has been in contact with several companies who perform this training, and will identify one who can train AVTEC staff to then train the students. An instructor will attend the “Train the Trainer” course at the earliest opening that can be coordinated.

In addition, staff members are working on a third course option for a “Wind Technician” program. In a recent Advisory Board meeting, members identified the need (though still limited) for a person who can go far beyond the day-to-day operation and normal maintenance and be more of a diagnostician. The qualifications fit very directly with those taught in AVTEC’s Industrial Electricity course, with just a few additions. As AVTEC explores a program restructuring, instructors will develop a career track within the Industrial Electricity program that includes an emphasis on wind technology and those competencies. The program will run approximately 41 weeks, and program development will occur over the next year with an anticipated offering in August 2011.

The Sustainable Energy Initiative at UAF Bristol Bay



The Sustainable Energy Initiative at the UAF Bristol Bay Campus in Dillingham is currently engaged in many projects directly related to energy efficiency and renewable energy. This includes teaching classes as well community outreach and research projects. The following is a summary of our efforts.

- We have offered numerous classes in sustainable energy: Home Energy Basics, Intro to Sustainable Energy, Energy and Society, Residential Wind Power, Residential Solar Power, Residential Weatherization in AK, Residential Energy Auditing in AK, Electric Vehicle Conversion, Intro to Bristol Bay Energy, plus a series of classes on energy efficient construction.
- We are currently in the initial stages of developing an **Occupational Endorsement in Sustainable Energy**. This one-year program will focus on energy efficiency and renewable energy basics and will provide students with both the tools to seek entry-level employment in the sustainable energy field as well as a foundation for further education.
- We recently adopted the **Construction Trades Technology Certification** program and began teaching classes in the summer of 2010. Classes are taught with a heavy emphasis on energy efficient construction and basic, cold-climate building science.
- We are finishing construction of our "**Passive Office**", a small, super energy-efficient structure designed to serve as an educational tool and model for cold-climate construction in the region. The building is largely based on the Passive House Standard and its annual heating requirements are provided primarily by passive solar energy, body heat and waste heat from electrical appliances and lighting. Most of the labor was provided by students of our Construction Trades Technology Certification program. The building should be completed soon and energy-performance data will be collected.
- In the fall of 2009, we installed a **4 kW solar photovoltaic** system on the main campus building to serve as an educational model and to decrease our consumption of diesel powered electricity. We are currently collecting data on the system's energy production.
- We are helping to facilitate the *Wind for Schools* Program in the Bristol Bay Region.
- We are involved in promoting local, sustainable agriculture and have assisted with local gardening and composting efforts and also helped organize the 2010 Southwest Alaska Gardening Symposium in Dillingham
- We administered the USDA Rural Business Energy Grant (RBEG) which provided small local businesses with free commercial energy audits. Staff and faculty are providing technical support for energy efficient upgrades as well assisting business owners with securing grant funding to pay for the upgrades.
- In October, we hosted the Dillingham Solar Tour as part of the Alaska Solar Tour and the National Solar Tour. The campus' solar photovoltaic system and Passive Office were featured in the tour.

These are many but not all of the efforts of the Sustainable Energy Initiative at the UAF Bristol Bay Campus in Dillingham. We are currently seeking input from potential employers in the sustainable energy field regarding the development of our Occupational Endorsement. For questions or additional info, contact Chet Chambers at **(907) 842-5109, toll free at 1-800-478-5109** or via email at cochambers@alaska.edu

Wind Training Update - NACTEC



Northwestern Alaska Career and Technical Center (NOME):

NACTEC is beginning the development of a Renewable Energy program for students of the 16 communities of the Bering Strait School District and Nome Public Schools. Students will complete instruction in a two-week intensive session at NACTEC. Students will receive a minimum of 32 hours of direct instruction in Wind Energy during the inaugural course that will be taught February 21- March 4 in Nome.

Students will receive an introduction to Renewable Energy with a focus on wind as a renewable resource. Curriculum resources from the Alaska *Wind for Schools* network will prove valuable as the program in Nome gets started. In addition to classroom and authentic learning experiences in a laboratory environment, students will also tour the Banner Wind Farm in Nome.

NACTEC hopes to expand the Renewable Energy program to include summer intensive sessions. The intent is to build a program that will expose students to Renewable Energy careers and transition students to post-secondary education programs such as Power Generation at UAF-Community and Technical College and the program being developed at AVTEC. Using a successful partnership infrastructure already in place in Nome, UAF-Northwest Campus would collaborate with NACTEC to offer dual credit courses as the means to transition students into post-secondary education and training opportunities.

Training grant – Alaska Labor Department

For more information: Roger Foisy, Division of Business Partnerships
907-269-4647, Roger.Foisy@Alaska.Gov

Labor Accepting Applications for Energy Sector Training

JUNEAU, Alaska—The Alaska Department of Labor and Workforce Development is accepting applications for employment training programs under the Alaska State Energy Sector Partnership, which received \$3.6 million to train 700 workers in the skills required for careers in emerging energy-efficient and renewable energy industries from the U.S. Department of Labor’s Employment Training Administration.

“Alaska's energy goal is to achieve 50 percent of energy from renewable sources by 2025,” Labor Commissioner Click Bishop said. “These training and education programs will provide workers to help reach that goal. Training programs will focus on serving veterans, people with disabilities, unemployed and under-employed workers, low-income individuals, dislocated workers and out-of-school youth.”

The Alaska Workforce Investment Board, AVTEC-Alaska’s Institute of Technology, Alaska Energy Authority, Alaska Housing Finance Corporation, Alaska AFL-CIO, Denali Commission, University of Alaska, U.S. Office of Apprenticeship and Alaska Works Partnership, Inc. are working together as the Alaska State Energy Sector Partnership to increase the supply of workers with skills to support the energy-efficiency and renewable energy industries, including geothermal, hydroelectric, wind turbine and biomass industries.

The department’s Division of Business Partnerships will use its new online Electronic Grant Administration and Management System to streamline the grant application and monitoring process. Using the EGrAMS system, agencies can search for existing grant opportunities, register for notification of new grant opportunities and register to submit an application.

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Alaska Wind for Schools Program

The Alaska Wind for Schools program has been up and running for almost a year. We have had many successes in 2010 and look forward to an exciting and eventful year in 2011. More than 20 schools across the state have signed up to participate in the program so far either by installing turbines or by using an accompanying curricula for teaching students about energy and science. Two turbines are currently up and running.

Sherrod Elementary in Palmer was the first to install a WfS-affiliated turbine. The second WfS-affiliated project was installed in October in Juneau by the Coast Guard. Although not a school, the Coast Guard has been a wonderful program sponsor. They installed a Skystream turbine in downtown Juneau at the Coast Guard station with a data acquisition system that will process and post the data for schools to utilize. The Coast Guard is excited to have the students' use the local wind data and hope to be long-term partners in the program. Several local schools were on-site during the installation and several others plan to visit the turbine for future field trips.

Mt. Edgecumbe in Sitka will be the third WfS school to install a wind turbine. After working through unforeseen permitting issues, Mt Edgecumbe has scheduled the foundation installation for Nov. 18 and plans to install the turbine the first week of December. The Skystream turbine is being provided by the Coast Guard, and the tower and foundation were primarily funded by the school and local utility. Several local organizations are donating their time and equipment for the installation, Lynden Transport donated the shipping of the tower and foundation from Seattle to Sitka.

The letters of intent for 2011 projects were due in October and WfS received letters from seventeen applicants. These schools include:

Emmonak School (Emmonak)	Grace Christian (Anchorage)
Howard Valentine (Coffman Cove)	Martin L. Olson Schools (Golovin)
Kodiak High School (Kodiak)	Kake High School (Kake)
West High (Anchorage)	Dzantik'i Heeni Middle School (Juneau)
Petersburg Elementary, Middle & High School (Petersburg)	Northwestern Alaska Career and Technical Center (Nome)
Denali Montessori (Anchorage)	Juneau-Douglas High School (Juneau)
Begich Middle (Anchorage)	Sterling School (Sterling)
Winterberry Charter (Anchorage)	Napakiak School (Napakiak)
Kokhanok School (Kokhanok)	

The WfS team is working with these individual schools to determine their interest in the program to tailor the program to meet the needs of their school and classrooms. The WfS program is working with teachers to incorporate the National Energy Education Development Project (NEED) and WindWise energy curricula into their classrooms. An educational webinar was held in August to introduce teachers to the curricula and energy kits, and the program plans to host similar webinars in the future.

WfS is holding the first annual KidWind Design Challenge in February and March 2011. Students compete in teams to produce the most powerful and creative wind turbine, which is then tested in a wind tunnel. This Challenge has been held in other states. To read more about the Challenge, go to: http://www.kidwind.org/workshops_events/challenge_winners_2010.php.

Future Plans: We would like to hold regional challenges that are integrated into regional science fairs and then have the regional winners compete in a statewide challenge. We are currently in the early stages of planning and are identifying regional science fairs and interested schools and teachers. More info at www.akwidac.com

Other Projects: Existing, Under Construction, being discussed

Tin City

Nome

Tuntutuliak

Kwigilingok

Kongiganak

Sand Point

Perryville

Nikolski