

Wind Resource Assessment for SEWARD, ALASKA

Date last modified: 8/24/2006
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SITE SUMMARY

Site #: 3071
Latitude (NAD27): 60° 31' 37.3" N
Longitude (NAD27): 149° 6' 46.2" W
Magnetic Declination: 12° 57' East
Tower Type: 30-meter NRG Tall Tower
Sensor Heights: 30m, 20m
Elevation: 22 meters (72 ft)
Monitor Start: 5/5/06 20:00
Monitor End: 5/31/06 9:50

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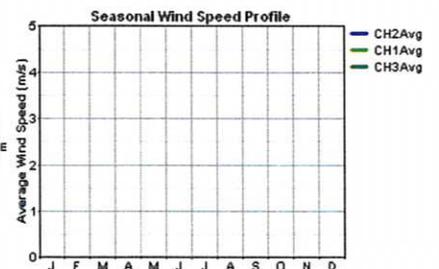
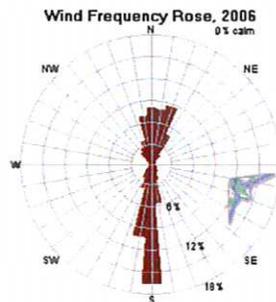
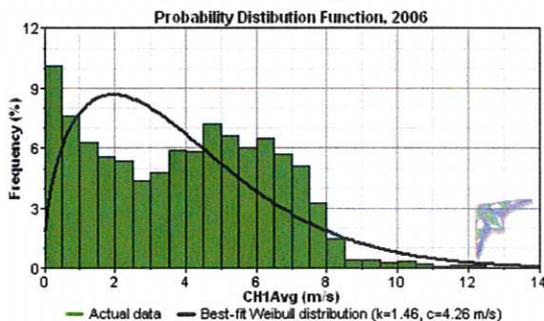
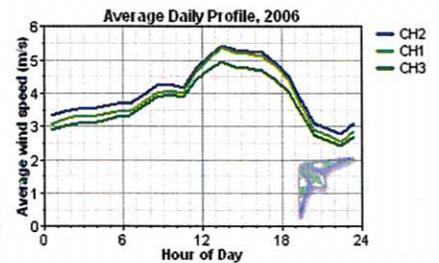


Seward is situated on Resurrection Bay on the east coast of the Kenai Peninsula, 125 highway miles south of Anchorage. It lies at the foot of Mount Marathon, and is the gateway to the Kenai Fjords National Park. Bear Creek and Lowell Point are adjacent to Seward. Seward is located in the Seward Recording District. (source: Department of Community & Economic Development)

WIND RESOURCE SUMMARY

Annual Average Wind Speed (30m height): 3.9 m/s (8.7 mph)
Average Wind Power Density (30m height): 83 W/m²
Wind Power Class (range = 1 to 7): 1
Rating (Poor, Marginal, Fair, Good, Excellent, Outstanding, Superb): Poor
Prevailing Wind Direction: South

In May 2006, a 30-meter meteorological tower was installed in Seward. The purpose of this monitoring effort is to evaluate the feasibility of utilizing utility-scale wind energy in the community. The measured wind speed and direction data at the site was compared to long-term trends in the area and estimates were calculated for the potential energy production from various types of wind turbines.



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INTRODUCTION

Seward is situated on Resurrection Bay on the east coast of the Kenai Peninsula, 125 highway miles south of Anchorage. It lies at the foot of Mount Marathon, and is the gateway to the Kenai Fjords National Park. Bear Creek and Lowell Point are adjacent to Seward.

On initial review, the community of Seward appears to be a "Poor" candidate for wind power. The wind resource map below shows that Seward is in close proximity to areas from a Class 1 wind resource. Areas of Class 4 and higher are considered suitable for utility-scale wind power development.

Wind Density Map to be added later



Source: AWS Truewind

Figure 1. Wind Resource Map of Alaska

With support from the Alaska Energy Authority, a 30-meter tall meteorological tower was installed in Seward by AVTEC and AEA. The purpose of this monitoring effort is to verify the wind resource in Seward and evaluate the feasibility of utilizing utility-scale wind energy in the community. This report summarizes the wind resource data collected and the long-term energy production potential of the site.

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SITE DESCRIPTION

The photos below document the meteorological tower equipment that was installed in Seward.

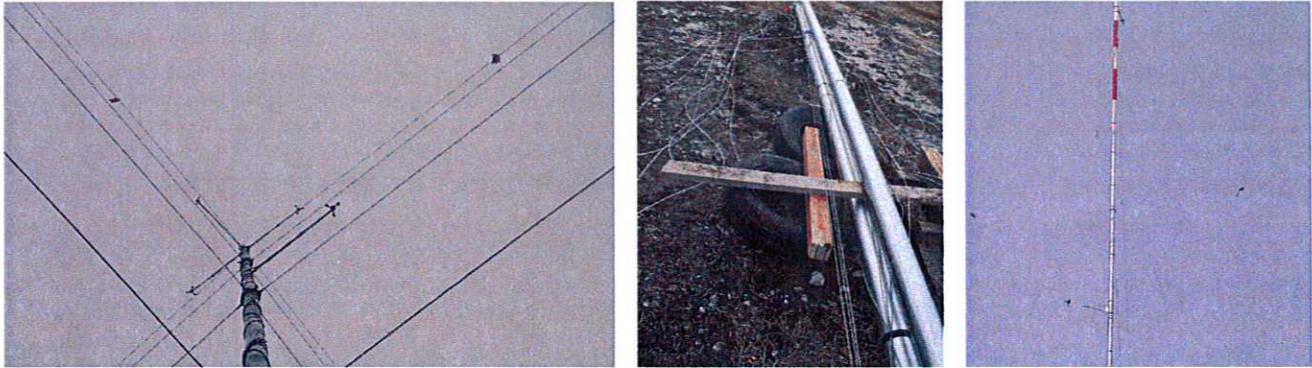


Figure 2. Photos of the Met Tower Installation in Seward, AK

The photos in Figure 3 illustrate the surrounding ground cover and any major obstructions, which could affect how the wind flows over the terrain from a particular direction. As shown, the landscape surrounding the met tower site is relatively flat with various pieces of equipment and a few trees in the area.

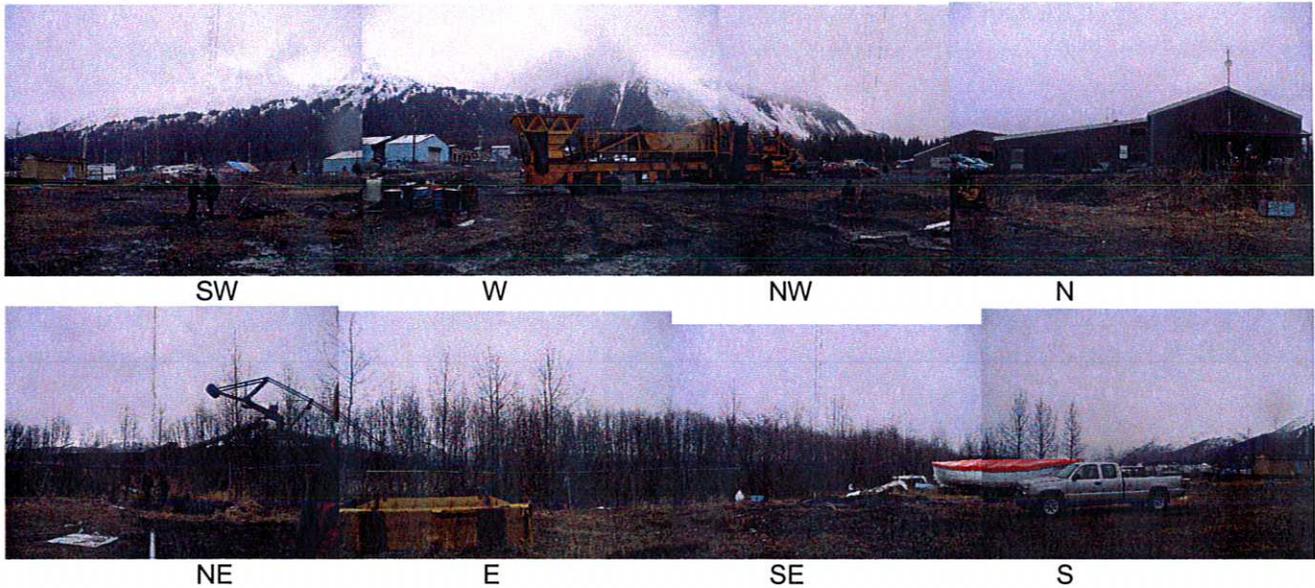
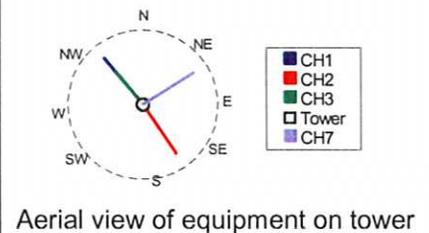


Figure 3. Views Taken from Met Tower Base

Table 1 lists the types of sensors that were used, the channel of the data logger that each sensor was wired into, and where each sensor was mounted on the tower.

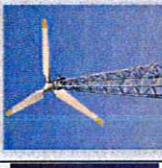
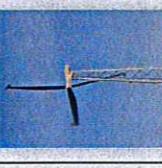
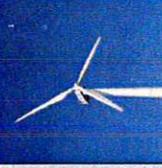
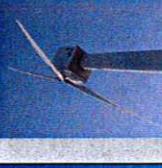
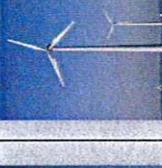
Table 1. Summary of Sensors Installed on the Met Tower

Ch #	Sensor Type	Height	Offset	Boom Orientation
1	#40 Anemometer	30 m	NRG Standard	335° True
2	#40 Anemometer	30 m	NRG Standard	155° True
3	#40 Anemometer	20 m	NRG Standard	335° True
7	#200P Wind Vane	30 m	245° True	65° True
9	#110S Temperature	3 m	NRG Standard	-



Aerial view of equipment on tower

Table 2. Power Production Analysis of Various Wind Turbine Models

Wind Turbine Options			N/A						
Manufacturer Information	Bergey 10 kW	Fuhrlander FL30 30 kW	Vestas V15* 65 kW	Entegrety 15/50 65 kW	Fuhrlander FL100 100 kW	Northern Power NW100 100 kW	Fuhrlander FL250 250 kW	Vestas V27* 225 kW	Vestas V47* 660 kW
Tower Height	30 meters	30 meters	30 meters	30 meters	50 meters	50 meters	50 meters	50 meters	50 meters
Swept Area (nacelle & rotor)	38.5 m ² N/A	133 m ² 410 kg	177 m ² N/A	177 m ² 2,420 kg	348 m ² 2,380 kg	284 m ² 7,086 kg	684 m ² 4,050 kg	573 m ² N/A	1,735 m ² N/A
Gross Energy Production (kWh/year)									
Jan									
Feb									
Mar									
Apr									
May									
Jun									
July									
Aug									
Sep									
Oct									
Nov									
Dec									
Annual									
Annual Average Capacity Factor									
Gross CF									
Net CF									

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Notes: The sizes of Vestas turbines listed are no longer available new. Remanufactured turbines are available from various suppliers. Energy estimates are based on the wind resource measured at the met tower site, adjusted for long-term trends and local air density.