Wind-Diesel Project Nikolski, Alaska

"10,000 Years of Sustainability… and Counting"

Wind Energy Application & Training Symposium

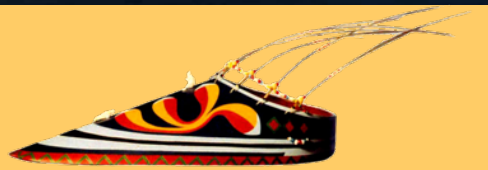
August 13, 2007

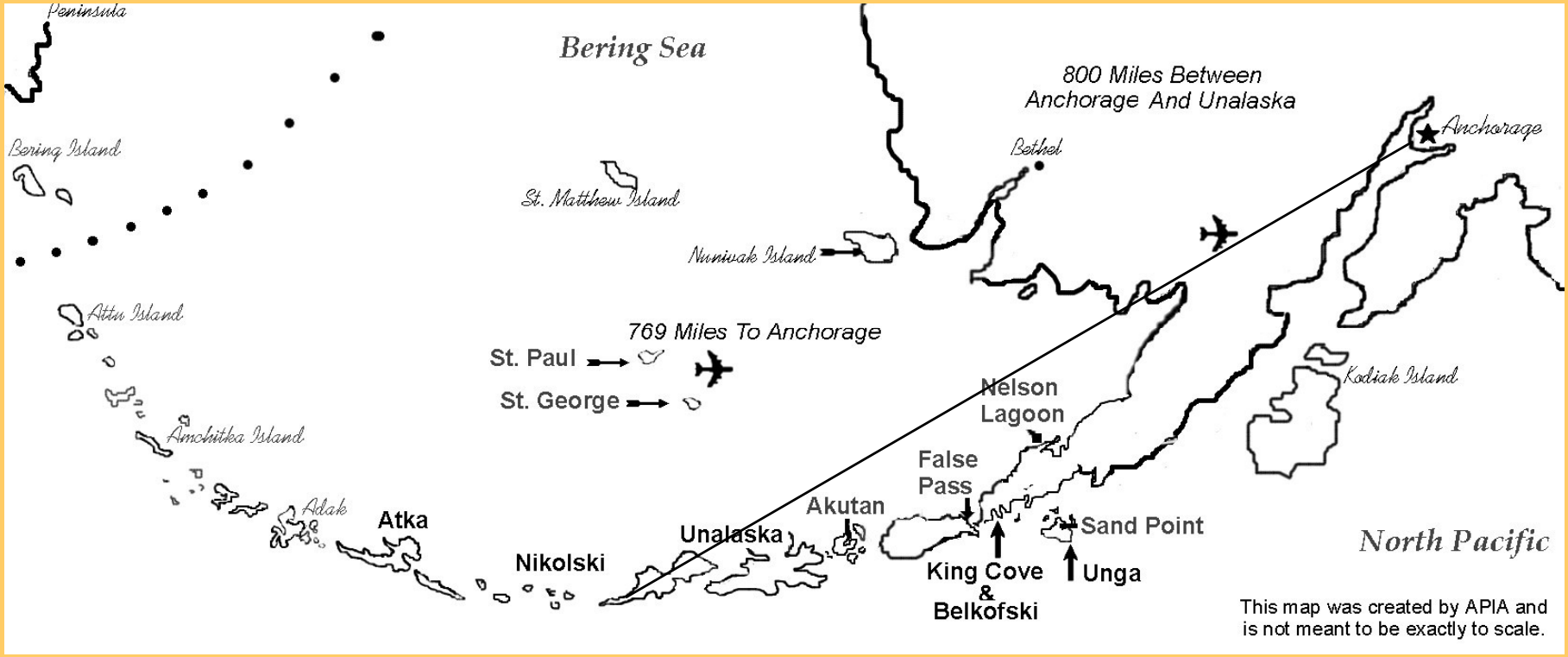
By Connie Fredenberg

Aleutian Pribilof Islands Association

1131 E. International Airport Rd.

Anchorage, AK 99518





LOGISTICS

- **Anchorage to Nikolski is 916 air miles for $1,316 rt – refundable fare.**
- **During fishing times in Dutch Harbor the price rises to $2,648 rt.**
- **Weather Rules.**

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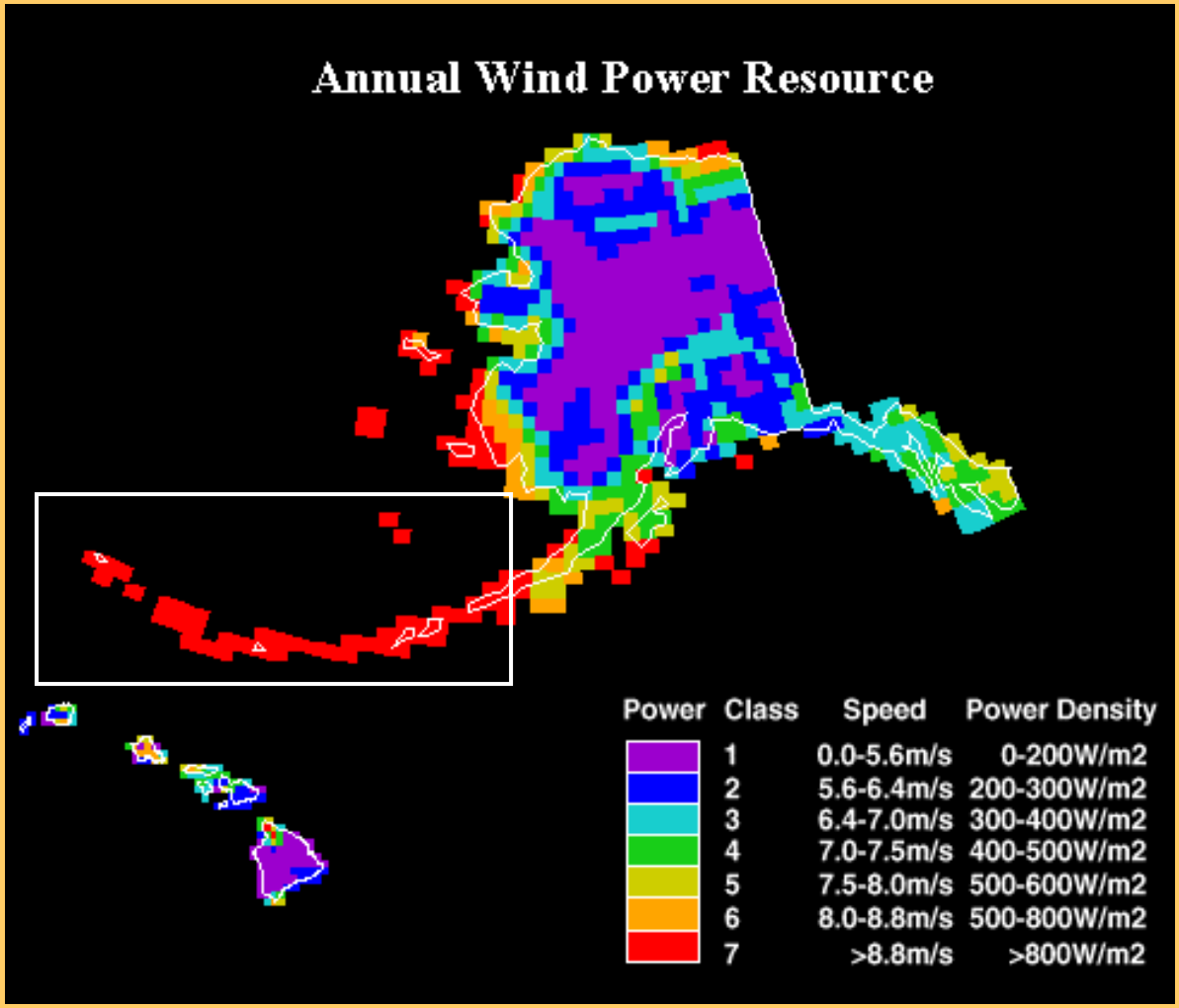
Mt. Visavidov and Mt. Rechesnoi, both active volcanoes, dominate the scene on a clear day.

The unofficial population of Nikolski is 34.

Photo by Tyler Schlung

- **Fuel deliveries get delayed by weather and more recently by fuel company policy.**
- **Diesel retails for up to $5.00/gallon.**
- **Electricity costs $.42/kWh to produce.**
- **To improve Umnak Power's sustainability Ampy Pre-Pay Electric Meters were installed in March of 2007.**

World Class Wind: A Mixed Blessing



- 150 mph gusts
- Extreme Turbulence Potential
- Corrosive Salt Spray

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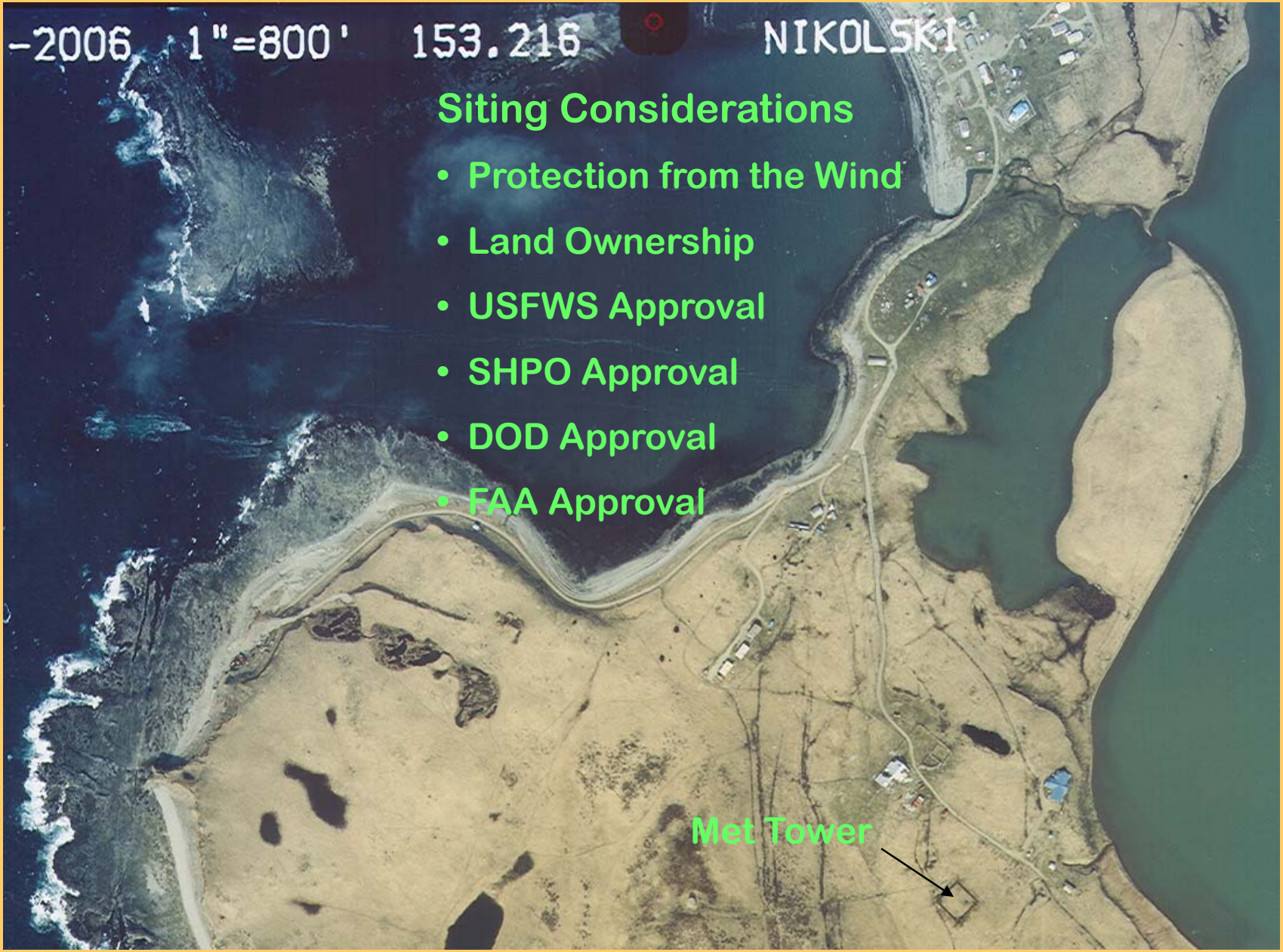
-2006 1"=800' 153.216 NIKOLSKI
Siting Considerations
• Protection from the Wind
• Land Ownership
• USFWS Approval
• SHPO Approval
• DOD Approval
• FAA Approval
Met Tower

Nikolski Wind Resource Report

Summary Information

Nikolski has superb potential for wind power development with Class 7 wind power density, moderate wind shear, bi-directional winds and low turbulence.

Meteorological Tower Data Synopsis

Wind power class (measured to date)
Class 7 – Superb
Average wind speed (30 meters) **9.01 m/s** (at 30 meters)
Maximum wind gust (2 sec average)
40.9 m/s, 1/24/07, 12 p.m.
Turbulence Intensity (30 meters) **0.108**

Data start date December 11, 2005
Most recent data date March 13, 2007

Nikolski Project Facts

- Umnak Power is owned by the Nikolski IRA.
- Average electric load is 25 kW.
- Peak load is 50 kW.
- AEA "commissioned" a new diesel plant with 2 John Deere 70 kW generators and one 37 kW generator in May of 2006.
- USDA/RUS awarded APIA $474,475 to incorporate a remanufactured Vestas V-15 (65 kW) wind turbine with the diesel plant.
- The rising prices for steel, concrete and freight has increased the budget by nearly $100,000 since grant award.
- Unfunded modifications to the controls in the diesel plant may be required. Cost yet to be determined.

- A tilt up tower was designed and built by TDX Power and Halus in San Francisco, CA.
- The tower was shipped in pieces and assembled on site.
- The tower is 80’ high and weighs 7,000 lbs.
- At $60,000 this tower design saved the project the cost of leasing and transporting a crane to the site.

The gin pole is a rectangular metal frame.

Three winches, fitted with strain gauges, are operated by a master hydraulic control unit.


The tower must come down within ¼ inch of the bolts set in concrete.

- The turbine was erected over 12 hrs. on July 28, 2007.
- Connection is pending repairs to the diesel power plant and an assessment of the existing controls.
- Penetration level is pending evaluation of new technology – Static versus Dynamic mean VAR support.

Lessons Learned

- Build a significant contingency fund into your budget.
- A power plant operator that loves the job and does it well is priceless.
- Technical problems are usually much easier to solve than people problems.

Made Possible with Funding and Assistance from:

USFWS

USDA/RUS

Bureau of Indian Affairs

US Department of Energy

State of Alaska Energy Authority

Tanadgusix Corporation / TDX Power

Aleutian Pribilof Islands Development Corporation

Thank You, Thank You Very Much

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