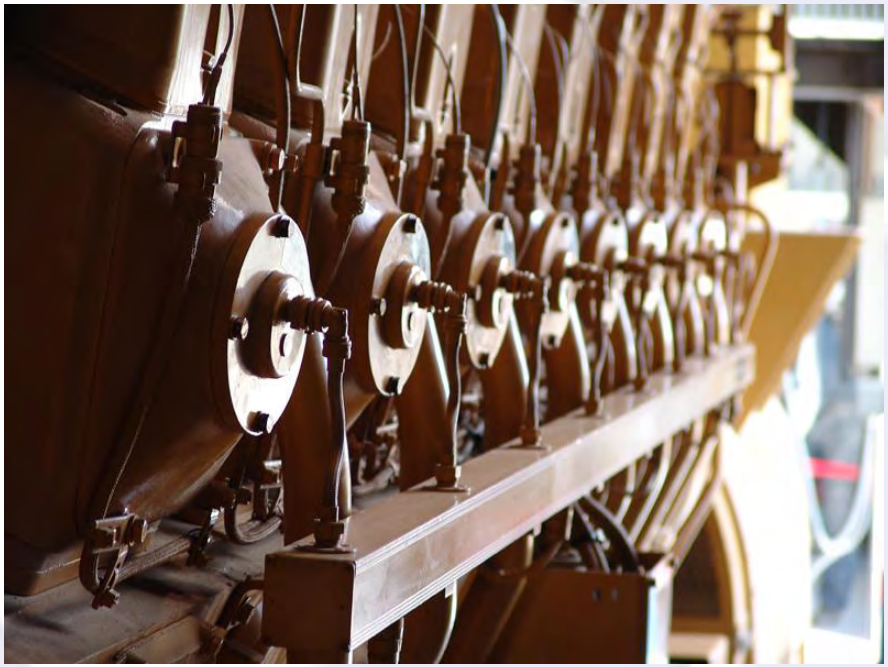
Wind Diesel in Alaska

August
2006

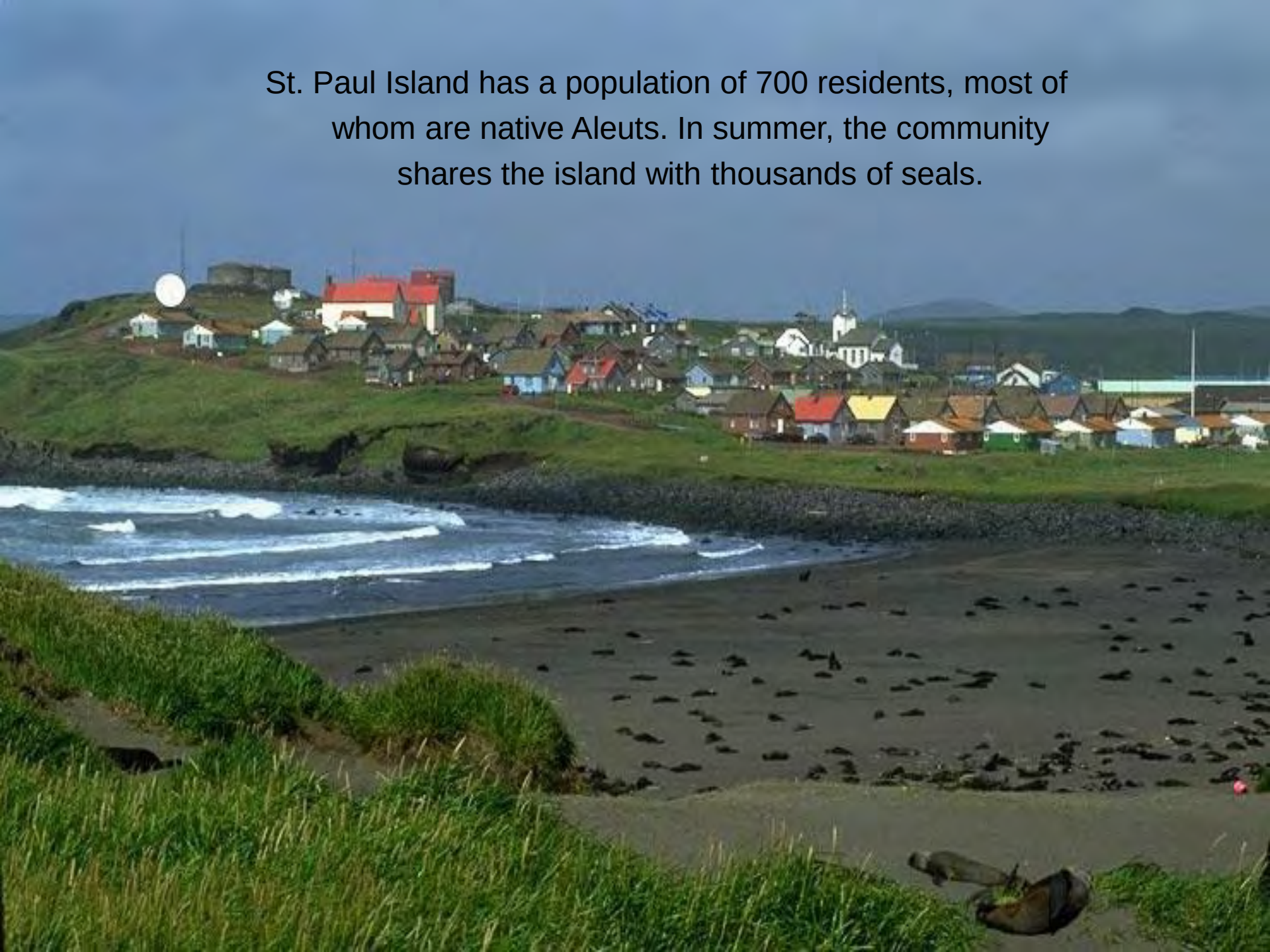
Alaska Power Association
2006 Annual Meeting
Girdwood, Alaska

TDX is a specialist power generation firm

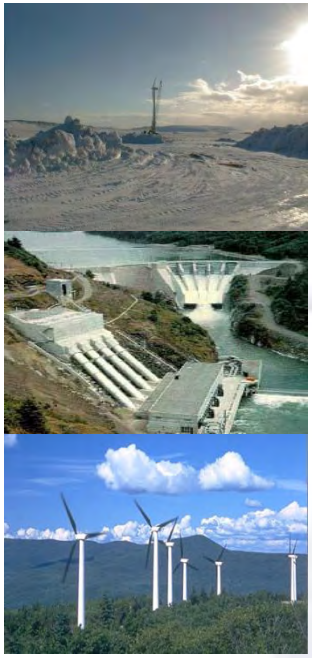


- Alaskan Native Corporation, 8a & Hub Zone Certified.
- Own, operate & maintain plants of all sizes and technologies
- Supplier of Powerhouse components and complete power generation systems

TDX power


St. Paul Island has a population of 700 residents, most of whom are native Aleuts. In summer, the community shares the island with thousands of seals.

Technology Neutral



TDX Power is technology neutral. The company has extensive experience with both fossil fuel and renewable based generation in diverse locations all over the world

Fossil Fuel Generation - TDX Power develops, owns and operates power plants of all sizes utilizing both liquid and gaseous fuels, and has experience with every major vendor of this type of generation technology.

Renewable Energy - TDX Power owns and operates the country's largest high penetration wind-diesel hybrid plant on St. Paul Island. The company also has extensive experience with geothermal, solar, biomass, landfill gas, tidal and hydro power technologies.

Hybrid Technologies - TDX Power is an industry leader in integrating renewable technologies with base load fossil fuel generation for stand alone, critical system/high-reliability requirements.

Clients & Customers

TDX Power works with the following types of customers and clients:

Electric Utilities

TDX owns and operates regulated utilities in Alaska, and works with the federal government on privatization of military utilities.

Military Branches

TDX Power provides custom engineered power generation systems to all branches of the military, including switchgear, system integration controls, and generator sets. TDX also provides field site services for a wide range of power generation facilities.

Consulting clients

TDX supplies a wide range of specialized, fee-based power industry consulting. These services include but are not limited to feasibility analysis, economic analysis, technology assessment, project development, design and construction, operations, mergers and acquisitions, project finance or refinance and troubled project work-out.

Project Developers

TDX works with companies developing industrial and commercial projects in need of reliable on site power generation.

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TDX Power in Alaska: Deadhorse

- Acquired merchant utility servicing oilfield support industry at Prudhoe Bay in January 2003
- 10 MW diesel and natural gas electric generating capacity
- Designed & installed 14-mile underground distribution system for harsh arctic, permafrost environment
- Design and engineer diesel conversion to natural gas generation
- TDX Power serves large, industrial customers such as Halliburton, VECO, Nabors and Schlumberger

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TDX Power in Alaska: Sand Point

- Community electric utility serving 520 customers
- Diesel-based generation with high penetration wind power integration under design
- 17-mile distribution system (including 12 miles aboveground and 5 miles underground)
- Infrastructure expanding to include new harbor development

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Saint Paul Island

Looking back to find the future

"Centuries of experience living in the wind have allowed us to merge our culture with this new technology for the benefit of future generations."

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TDX Power in Alaska: Saint Paul Island

- In 1999, TDX designed, constructed and commissioned the world's largest high penetration wind diesel plant.
- Funded entirely by TDX, this project provides low cost electricity and heat to a 100,000 square foot industrial complex on St. Paul island.
- Lower energy costs have supported economic development for the community at this complex.

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TDX Power in Alaska: Saint Paul Island

- System: 500 kW standalone utility: combined heat and power
- Configuration: High penetration/no storage wind-diesel
- Application: Public power supply, providing electricity and space heat to industrial/airport facility
- Avg. Power Generation: 700,000 kWh per year – 36% capacity factor
- Funding: Private commercial, lease based
- Cost of Energy: $.12/kWh (current diesel grid cost is $.49/kWh)

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Saint Paul Island: Performance Summary

- Wind turbine gearbox failures caused by design flaw
  - downtime during peak winter wind resource
  - failure resolved by manufacturer redesign resulting in dramatic increase in wind kWh production

- Overall system performance and benefits strong over five years. 100% availability on 2004 and 2005. Capacity factor over 60% in January 2006.

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Saint Paul Island Plant Expansion

- In 2004, TDX committed to expanding the plant to provide additional low cost energy on island.
- Four used V27's purchased from Denmark - remanufactured in California.
- Remanufacturing process includes complete disassembly. inspection and remanufacturing of turbine parts. Also includes generator rewinding, blade resurfacing, and new wiring and cables.

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Windpower in Sand Point

Average Power Costs in the Aleutians: (2005 PCE Stats.)

- Cold Bay 49.93 cents/kwh
- False Pass 48 cents/kwh
- King Cove 38 cents/kwh
- Nelson Lagoon 42 cents/kwh
- St. Paul 46 cents/kwh
- Sand Point 39 cents/kwh
- Unalaska 30 cents/kwh

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Windpower in Sand Point

Vestas V39 Turbine:

- 500 Kw wind turbine
- 40 meter tower
- 39 meter rotor (swept area)
- Manufactured in 1991
- Remanufactured by Halus Power Systems 2006

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Windpower in Sand Point

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Windpower in Sand Point

Proposed System Overview:

- Two (2) Vetas V-39 turbines
- One (1) Low Load, High Efficiency Diesel engine generator set - Caterpillar D-3456
- One (1) Synchronous Condenser
- Thermal or Electric Heat recovery System
- Projected Cost: $2.46 million

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Windpower in Sand Point

Proposed Structure:

- Public-Private partnership with AEA
- Project will be a Qualifying Facility (QF) under PURPA certified by FERC
- Anticipated rate will be less than 50% of existing utility avoided fuel cost

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Windpower in Sand Point

Project Benefits:

- Utility diesel fuel consumption reduced by **126,429** gallons. Current cost of fuel $3.06/gallon. Total fuel savings $386,872
- Further diesel heating fuel savings at clinic, school and community building
- Promotes economic development
- All risk of the project resides outside of the utility
- Statewide PCE program and other communities will benefit from decreased fuel use in Sand Point

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USAF Tin City Long Range Radar Site (LRRS)

Remote Wind Diesel Project In NW Alaska

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Tin City

- $2 million project – funding delayed and now rescheduled for summer of 2008.
- Major issue to address will be rime ice on Vestas V27 turbine

NIkolski

- RUS funded project to add wind power to the new diesel plant.
- TDX Power hired by APIA to install a Vestas V17 wind turbine.

Questions?

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