Tribal Energy Conference
Denver, Colorado
November 2019

Alaska Village Electric Cooperative, Inc./Bethel Native Corporation
Renewable Energy Joint Venture
Bethel Wind Energy Construction Project

Forest Button
Manager, Project Development & Key Accounts

[Logo of Alaska Village Electric Cooperative]
Alaska Village Electric Cooperative
Member owned, not-for-profit
Energizing Rural Alaska since 1968

• 58 Member Communities
• 11,500 Services
• Population Served: 30,194
• 94% Alaska Native
• Smallest: Shageluk 71 → Largest: Bethel 6,205
• 9.3 million gallons of diesel / $32 million ($3.46)
• 90 FT / 95 PT Employees
• 48 Power Plants & 10 Standby
• 32 Wind turbines serving 19 communities
• 2 Solar arrays serving 2 communities
• Two tug and barge sets
• Partnership between AVEC and BNC - ABRE
  • To benefit the communities of Bethel and Oscarville

**Project Partners:**
- Bethel Native Corp
- Alaska Energy Authority
- DOE Office of Indian Energy
- Denali Commission
Bethel Native Corp

- ANCSA village corporation
- Construction, Environmental, Logistics
- Alaska, Washington, California
- Serves 1,800 shareholders
- Mostly Yup’ik Eskimo
Project Overview

Upgrade power plant to accept wind energy
- Automated governors - actuators
- Voltage Regulators

Installation of one Emergya Wind Technologies (EWT) 900 kW direct drive wind turbine.
- 52 meter diameter rotor
- 50 meter high tower
2017-2018 Construction

Road, pad, and pile foundation winter 2017/2018

Turbine ship to Alaska May 2018

Concrete foundation June / July 2018

Erect turbine, install transformers connect to grid August - September 2018

Commission bring on line September 2018
Construction
# Project Objectives

<table>
<thead>
<tr>
<th>GOAL</th>
<th>ACTUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ Generate 2,100 MWh / Year</td>
<td>2,088 MWh / Year</td>
</tr>
<tr>
<td>✅ Offset 156,250 gallons fuel consumption per year</td>
<td>Offset 155,355 Gallons</td>
</tr>
<tr>
<td>✅ Save approx. $571,500 per year on fuel ($3.658)</td>
<td>$590,817 ($3.803)</td>
</tr>
<tr>
<td>✅ Eliminate 1,587 tons of CO2 / year</td>
<td>1,578 tons eliminated</td>
</tr>
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Alaska Village Electric Cooperative, Inc./Pitka’s Point Native Corporation Renewable Energy Joint Venture (APRE)

Pitka’s Point/Saint Mary’s Wind Energy Construction Project
Pitka’s Point Native Cooperation

- ANCSA village corporation
- Serves 426 shareholders
• Partnership between AVEC and PPNC
  • To benefit the communities of Pitka’s Point, Saint Mary’s, and Mountain Village

**Project Partners:**
- Native Village of Pitka’s Point
- Algaaciq Tribal Council
- Yupiit of Andreafski
- Asa’carsarmiut Tribal Council
- Azachorok, Inc.
- Nerklikmute Native Corporation
- Saint Mary’s Native Corporation
- City of Saint Mary’s
- City of Mountain Village
- Alaska Energy Authority
- DOE Office of Indian Energy
Project Overview

- Installation of one Emergya Wind Technologies (EWT) 900 kW direct drive wind turbine.
  - 52 meter diameter rotor
  - 50 meter high tower
- Upgrade electrical distribution line to three-phase between St. Mary’s and Pitka’s Point
- Upgrades at the Saint Mary’s power plant to effectively utilize wind
- Wind-to-heat component
Project Location
Progress

• Road, pad, and foundation complete in 2017

• Electrical upgrade complete 2018

• Turbine installed 2018

• Turbine Commissioned and brought on line January 2019

Next steps...

• Intertie Mt. Village with St. Mary’s – Winter 2020
Turbine Construction 2018
## Project Objectives

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<tr>
<td>Generate 2,525 MWh / Year</td>
<td>1,043 MWh / Year</td>
</tr>
<tr>
<td>Offset 202,000 gallons fuel consumption per year</td>
<td>Offset 84,104 Gallons</td>
</tr>
<tr>
<td>Save approx. $874,000 per year on fuel ($4.327 -2014)</td>
<td>$239,859 ($2.852)</td>
</tr>
<tr>
<td>Eliminate 2,100 tons of CO2 / year</td>
<td>854,216 tons eliminated</td>
</tr>
</tbody>
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Alaska Village Electric Cooperative, Inc./Stebbins Native Corporation Renewable Energy Joint Venture

(ASRE)

Stebbins / St. Michael Renewable Energy Project
• Partnership between AVEC and SNC
  • To benefit the communities of Stebbins and Saint Michaels

**Project Partners:**
• City of Stebbins
• Native Village of Stebbins
• City of St. Michael
• Native Village of Saint Michael
• Stebbins Native Corporation
• Stebbins Community Association
• St. Michael Native Corporation
• Denali Commission
• DOE Office of Indian Energy
Install EWT 900kW Turbine

- Offset 104,700 of diesel
- Savings in first year $365,403
- Life time savings $11.4 million
- Project life 25 years
- NPV benefit $6.694 million
- Provide wind to heat