Energy Development & Training for Tribes in the NANA Region/Northwest Arctic Alaska

September 24, 2019 • National Tribal Energy Summit – Washington, DC
Sonny Adams – NANA Regional Corporation, Alternative Energy Program Director
Brian Hirsch – DeerStone Consulting, President
WHY LAND CLAIMS?

In the 1960s, the State of Alaska began making land claims as part of the Alaska Statehood Act. In 1966, 17 Native organizations met at the first Alaska Federation of Natives and adopted a resolutions requesting a “land freeze” in Alaska and asking Congress to enact legislation to enable the settlement of aboriginal title.

In 1968, the Atlantic Richfield Oil Company found oil on Alaska’s North Slope. Alaska Native peoples had claims over the lands that the federal and state government and the oil companies wanted to develop and were aware of the state’s exploration for oil.

1960

1966

1968

1971

In 1966, then Secretary of the Interior, Stewart Udall, imposed a "land freeze" to stop all transfers of land ownership until Native land rights could be confirmed.

The United States Congress took up the issue and resolved through the enactment of the Alaska Native Claims Settlement Act (ANCSA) signed into law by President Nixon on Dec. 18, 1971

DISCOVERY OF OIL CREATED NEED FOR PIPELINE, BUT LAND FOR PIPELINE WAS DISPUTED – ALASKA NATIVES HAD ALREADY CLAIMED MOST OF THE STATE. SO ANCSA TRIED TO SETTLE NATIVE LAND CLAIMS AND ALLOW OIL TO FLOW. CREATED 12 REGIONAL CORPORATIONS AND 226 VILLAGE CORPORATIONS, PROVIDED LAND AND MONEY
NANA was entitled to 2.2 million acres and $44 million in cash.
NANA REGION Introduction

Energy Projects in the NANA Region

NOT FOR NAVIGATION Date: 7/6/2016

This product is for informational purposes and does not replace the legal record of survey, land status, mining claims, case files or any other official record. Users of this information should refer to the primary sources of the information, including but not limited to Alaska Department of Natural Resources, U.S. Bureau of Land Management, and the U.S. Census Bureau. NANA makes no claims, guarantees or warranties of any kind, about the accuracy, completeness, or contents of this product and expressly disclaims liability for errors in the product and their consequences.

Service Layer Credits: Copyright© 2014 Esri

Document Path: /NRC-HC-ECO-01/Outputs/conc/NANA_GIS102_Archive_Map02_MXD/VED_3869_20160841.rmd
A Remote Region

- No roads connect communities
- 61% more expensive than Anchorage
- High cost goods and fuel
NANA’s Energy Vision

- The energy vision for the NANA Region is to be 50 percent reliant on alternative energy sources, both renewable and non-renewable.

- 10 percent decrease of imported diesel fuels by 2020
  ✔ We are on-track to meet this goal, in part thanks to DOE and significant community effort

- 25 percent decrease of imported diesel fuels by 2030

- 50 percent decrease of imported diesel fuels by 2050

DECREASING DEPENDENCE ON DIESEL FUEL = INCREASING RELIANCE ON LOCAL RESOURCES – BOTH NATURAL AND HUMAN. WE HAVE ABUNDANT WIND AND SOLAR AND TALENTED PEOPLE
NANA’s Village Energy Program History

1. 2007 DOE TRIBAL/IE Grants – NANA Strategic Energy Plan (SEP), NANA Wind Resource Assessment Plan (WRAP), NANA Geothermal Assessment Plan (GAP)

2. NANA Strategic Energy Plan (SEP) - Led to formation of the Energy Steering Committee (ESC), Regional Energy Plan, Energy Option Analysis, 2009 Energy Summit in Kotzebue, Energy Survey; Still guides our actions and strategies

3. NANA Wind Resource Assessment Plan (WRAP) – Wind data collection led to the Northwest Arctic Borough (NWAB) installing wind turbines in Deering and Buckland. Wind turbines funded by the State of Alaska (for Deering and Buckland).

4. NANA Geothermal Assessment Plan (GAP) – Report completed. Heat resource too far from the villages. (Cost of transmission line)
### WHY ARE WE DOING THIS???

**2019 ENERGY PRICES IN...**

<table>
<thead>
<tr>
<th></th>
<th>Gas/G</th>
<th>Stove Oil/G</th>
<th>Kwh (1-500) PCE</th>
<th>Kwh (&gt;501) NO PCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kotzebue</td>
<td>$5.88</td>
<td>$5.92</td>
<td>$0.18</td>
<td>$0.45</td>
</tr>
<tr>
<td>Ambler</td>
<td>$10.04</td>
<td>$10.04</td>
<td>$0.21</td>
<td>$0.61</td>
</tr>
<tr>
<td>Kobuk</td>
<td>$9.27</td>
<td>$9.27</td>
<td>$0.21</td>
<td>$0.60</td>
</tr>
<tr>
<td>Shungnak</td>
<td>$8.50</td>
<td>$8.50</td>
<td>$0.21</td>
<td>$0.60</td>
</tr>
<tr>
<td>Kiana</td>
<td>$5.15</td>
<td>$5.67</td>
<td>$0.20</td>
<td>$0.57</td>
</tr>
<tr>
<td>Noorvik</td>
<td>$6.06</td>
<td>$5.64</td>
<td>$0.20</td>
<td>$0.57</td>
</tr>
<tr>
<td>Selawik</td>
<td>$5.30</td>
<td>$6.36</td>
<td>$0.20</td>
<td>$0.52</td>
</tr>
<tr>
<td>Buckland</td>
<td>$6.15</td>
<td>$6.15</td>
<td>$0.20</td>
<td>$0.48</td>
</tr>
<tr>
<td>Deering</td>
<td>$3.35</td>
<td>$3.35</td>
<td>$0.32</td>
<td>$0.71</td>
</tr>
<tr>
<td>Kivalina</td>
<td>$5.10</td>
<td>$4.53</td>
<td>$0.20</td>
<td>$0.56</td>
</tr>
<tr>
<td>Noatak</td>
<td>$9.26</td>
<td>$9.26</td>
<td>$0.21</td>
<td>$0.75</td>
</tr>
</tbody>
</table>
Energy - What We’ve Learned So Far

NANA/NWAB Role in energy for our region

1. **Project development**, including stakeholder coordination
2. **Grant writer/fund seeker** – innovative approaches
3. Advocating for change in State and Federal policies
4. Infrastructure planner
5. Communicating NWALT (NorthWest Arctic Leadership Team) energy priorities to stakeholders
6. Update Energy plan
7. **Research arctic-appropriate technologies** (e.g., heat pumps-NWAB, batteries, solar diesels-off)
8. Regional Energy Authority/Joint Action Agency
DOE Inter-Tribal Technical Assistance Grant

- Department of Energy has awarded NANA $495,460 to create an Inter-Tribal Network in the Northwest Arctic
- 3-year effort (began in October 2016), now revised to 5 years
- Local capacity building, training, and economic development
- Regional Coordination for all 11 communities
- Other AK Regionals also received grant (with potential for cross regional collaboration), including in neighboring Bering Strait & Calista regions, attendance at ESC meetings in Kotzebue
Inter Tribal TA Project Objectives

- Two Energy Steering Committee (ESC) meetings per year (Fall & Spring); ~ 40 attendees/meeting
- A day of technical training/workforce development added to each ESC meeting. Joint Action agency, batteries, heat pumps, bulk fuel.
- Energy and business planning for individual tribes and the overall region
- Technology reviews for unique arctic applications, including inter-ties
- Promote economies of scale in energy & power projects for the NANA Region
- Conduct topical research, including the development of a Joint Action Agency. BIA TEDC grant awarded
Wind-solar-battery-diesel hybrid microgrid system with power conversion, secondary load dispatch – all needed for DIESEL OFF operation.

TRY IT AT: www.heatpump.cf
ESC Priorities ➔ JAA Action Plan

- Critical path to Village Economic Development: Roads, Interties

- Business Case for High Penetration Renewable Energy (must include heat)

- Lower/stabilize costs! (Regional cooperation, new technologies, efficiencies, business structures, financing and grants, economies of scale)

- Powerhouse Upgrades to Integrate Renewables

- Workforce Development - Utility management, Powerhouse operators/mechanics

- Renewable Energy training – wind technicians, solar technicians, energy storage battery maintenance, heat pumps; capture value with local jobs
Recent Accomplishments

• Community Meetings:
  – Shungnak
  – Selawik
  – Noatak
  – Deering
  – Buckland
  – Kotzebue
  – Ambler
  – Kiana

• Solar on Water plants in every village

• Multi-agency collaboration

• Secured funding/supported diesel powerhouse and distribution system upgrade – Deering, Shungnak

• Project development with NWArctic Borough on Joint Action Agency formation – Future Sustainability for Inter-Tribal effort, BIA TEDC funding ($95,000) secured and Phase 2 applied for

• Supported Buckland solar installation & Shungnak Solar application; Deering and Kotzebue solar installation Ongoing

• Shungnak-Kobuk solar-battery-hybrid grant awarded – $1.3 Million; create IPP

• 6 ESC meetings held, over 200 people in attendance

• Additional funding secured (~$4 million) for targeted projects

• Ambler Biomass Support – $443,476 received from USDA HECG

• Heat Pump Calculator & Study Complete – www.heatpump.cf

• Developing diesel-off technology & renewables integration in Deering, Buckland, Kotzebue, Shungnak, Kobuk

• Over 12 public presentations + Battery and Inverter/Power Conversion hardware technology (ESNA & ABB) conferences for staff capacity development
Department of Energy Solar Grant

- Department of Energy has awarded NANA $1M to install community solar arrays in Deering, Buckland, and Kotzebue; Requires $1 M cost share ($200K Deering & Buckland, $600K Kotzebue)

- **Buckland installation complete**; Deering to be installed September/Oct 2019; Kotzebue to be installed Q1-Q2 2020

- Kotzebue Electric Association has secured $600,000 from VIF to finance the required cost share for the project –

- NANA & KEA to form Joint Venture to establish ownership of solar equipment during grant period; expected completion October 2019

- Both Deering & Buckland using Village Economic Development Committee (VEDC) $ for their cost share, plus additional contribution from NANA
Targeted TA Project Support: Buckland Solar
~50 kW Solar PV
Department of Energy Solar Grant – Deering & Buckland

- BoxPower solar array installed – September/October 2018
- Deering solar construction (new diesel engine, controls)
- Solar Energy International PV 101 training held in Kotzebue in June 2018; 18-20 participants
Innovations & Lessons Learned – Buckland Solar

- Foundation Design – Box x Box + Corner Locks (Avoid Concrete if possible)
- Tilt Angle of 45 degrees = more output
- Each box > 15 kW, but could be 20 kW in low wind
- Low wind locations = less costly
- Local Crew Works!
- Trade-off between size of array and construction requirements – Still need to evaluate costs and performance
- Will be integrated with batteries, wind, grid-forming inverter, electric boilers in powerhouse and waterplant
- Installed @ ~ $4.45/Watt; incurred several one-time costs that will be “free” for future projects
- Aim to replicate: Kotzebue and Shungnak-Kobuk
USDA High Energy Cost Grant

• NANA selected for High Energy Cost Grant – $1.6M to install energy storage batteries and controls in Deering and Buckland

• USDA completed environmental review

• ABB Control system and SAFT batteries in Buckland operational, Deering construction underway

• Diesel Generator off-operation in Buckland – July 24, 2019

• Working with IES, KEA, DeerStone, NWAB for system integration
Bureau of Indian Affairs – Tribal Energy Development Capacity Grant

- NANA awarded $95,000 to advance regional energy solutions and local capacity building (July 2018)
- Baker Tilly – technical assistance provider
- Detailed energy and financial analysis for individual tribes and the overall region
- Provide business plan and strategy for more enhanced regional cooperation and cost reduction – evaluate NWAB & ANTHC partnership on water/sewer; JAA formation
- Applied for Round 2 of funding, May 2019
Energy – What we’ve learned

• Critical Path / needs

1. Interties between villages

2. Roads

3. Power Cost Equalization Reform – Current formula decreases state subsidy if diesel consumption decreases

• This current model discourages energy efficiency & renewable energy development; IPP to sell power to utility as possible solution?

4. Local training & Jobs are necessary to capture value of energy savings
Recommendations

- DOE-IE Deployment Funding Critical to Continue Infrastructure Development, but increasing Complexity of Proposal Requirements & Constraints Limits Projects’ Value to Communities
- Powerhouse Upgrades Necessary to Integrate Renewable Energy
- Workforce Development includes Utility management, Powerhouse operators/mechanics, and Renewable Energy training – wind technicians, solar technicians, energy storage battery maintenance, heat pumps
We couldn’t have done this on our own, it’s people working together that made this happen!

Taikuu!