I. Calista Region - Southwest Alaska
I. Nuvista Electric Cooperative

Non-profit utility established ‘95:

- An Electric Utility Cooperative
- Common Goal: deliver and reduce electrical costs to residents
- Assess high cost of power, demands and find stable alternatives
- Organized as a cooperative to function as a future region-wide Generation & Transmission utility
- Includes region major stakeholders

Board Members:

- Association Village Council Presidents
- Yukon Kuskokwim Health Corporation
- AVCP Regional Housing Authority
- Alaska Village Electric Cooperative
- Chaninik Wind Group
- Middle Kuskokwim Electric Coop.
- Lower Yukon Representative
- Calista Regional Corporation
I. Y-K Region Energy Situation

Diesel
- Primary home heating ranged $6.14 to $9.50/gallon in 2010 (barged in yearly)
- Expect $7.34 to $10.70 gallon this year
- 50% of family income goes to heating, now grown to 65 to 75% income
- Families choosing food vs. heating

Electricity
- Many small village diesel generators
- Home use is less than 50% Natl Average
- Cost = $0.58 to $1.05 kilowatt hour 2010
- Escalating cost of energy
- PCE cannot keep up
II. Where We’ve Been

- Over 21 Energy Studies, Data, and Reports since ’75.
- > 41 largely independent aged diesel power generator plants
- Village generators use >20 million gallons of diesel year
- Transmission lines needed
- 65Gwh electrical energy need for Bethel +13 villages by 2020
- Coal and Hydropower listed repeatedly as feasible options
- Energy costs escalating
II. Electrical Cost Projections 2002

Actual Cost of past year is $0.60 to $1.05 per kwh (avg of $0.825 per kwh) compared to projections.

Projected Village Power Costs

- 15 MW Coal Plant at Bethel+Wind+SWGR, 5% Interest
- Continued Diesel Gen.+W.H.+ Wind
- Mine Power Costs, Bethel+Mine+Wind, 5% Interest
- Bethel+Mine Gen. +Wind at 5% Interest, SWGR System, 5% Interest
- Bethel+Mine Gen.+Wind and SWGR System, 0% Interest

Village Power Costs
II. Found Energy Needs Varied

Region Villages Vary:

- Diverse Village options
- Conservation Underway but not the complete solutions
- Some Coastal Villages proceed w/wind generation but there’s limited application in region
- Some villages have small needs
- *One size doesn’t fit all!*
- Sub-region Bethel +13 villages 65Gwh electrical energy need by year 2020
II. Transmission System Needed

Figure 2.1

Transmission Grid Build Out Sequence with Wind Turbine Generation Option
## II. Previous Alternatives Considered

<table>
<thead>
<tr>
<th>Alt. Energy Type</th>
<th>Cost to Construct</th>
<th>Cost to Operate</th>
<th>Use Cost per Kw</th>
<th>Capacity to Demand 65kw</th>
<th>Public Perception</th>
<th>Likelihood or Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>Existing</td>
<td>High</td>
<td>High</td>
<td>Same</td>
<td>-</td>
<td>Existing</td>
</tr>
<tr>
<td>Geothermal</td>
<td>High</td>
<td>Low</td>
<td>-</td>
<td>None</td>
<td>Positive</td>
<td>Small</td>
</tr>
<tr>
<td>Wind Power</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Positive</td>
<td>Limited</td>
</tr>
<tr>
<td>Hydropower</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Positive</td>
<td>High</td>
</tr>
<tr>
<td>Coal Power Plant</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Negative</td>
<td>Medium to Low</td>
</tr>
<tr>
<td>Nuclear Power</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Very Negative</td>
<td>Poor to None</td>
</tr>
</tbody>
</table>
III. Future - Remaining Candidates

- **Wind Turbines**
  Variable – region precedent, low power production capacity, augments needs, does not work for all areas of region.

- **Coal Power Plant**
  Bethel 15-60 Mw Plant - negative public perception, would provide the cheapest and greatest energy capacity.

- **Hydroelectric Power**
  Kisaralik River – 3 sites Yukon Delta National Wildlife Refuge Chikuminuk Lake - in Wood Tikchik State Wilderness park, could provide clean, mid cost, proven alternative energy.
III. Remaining Hydroelectric Sites
### III. Hydroelectric Feasibility Findings

<table>
<thead>
<tr>
<th>Potential Hydropower Site</th>
<th>Distance from Bethel (miles)</th>
<th>Head (ft)</th>
<th>Generating Capacity (MW)</th>
<th>Year Around, or Seasonal Energy Production</th>
<th>Useable Hydro Energy GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chikuminuk Lake Allen River Outfall</td>
<td>118</td>
<td>91</td>
<td>13.4</td>
<td>Y</td>
<td>65+</td>
</tr>
<tr>
<td>Kisaralik River Upper Falls</td>
<td>70</td>
<td>149</td>
<td>27.7</td>
<td>S</td>
<td>39.7</td>
</tr>
<tr>
<td>Kisaralik River Lower Falls</td>
<td>62</td>
<td>122</td>
<td>34.1</td>
<td>S</td>
<td>46.9</td>
</tr>
<tr>
<td>Kisaralik River Golden Gate</td>
<td>57</td>
<td>78</td>
<td>27.0</td>
<td>S</td>
<td>38.8</td>
</tr>
</tbody>
</table>
IV. Moving Forward & Ahead

Selection of Option(s):

- Nuvista Team & Stakeholders Reviewed latest Findings
- Public Meetings found Chikuminuk Site Positive and Preferred
- Board Unanimous Decision to move ahead with Hydropower Design Feasibility
- Chikuminuk Lake has year around capability to supply ½ region’s population, 13+ villages, and displace 10M gallons diesel

A. Bethel Area Sub-Region

Complete plan and project(s) underway to stabilize and reduce energy costs, and integrate with Region-Wide plan

B. Region-Wide Alternative Energy Plan

Beginning a comprehensive region wide alternative energy plan that integrates work done and underway to guide future development
## IV. Preferred Alternative

<table>
<thead>
<tr>
<th>Site</th>
<th>Construction Cost w Transmission in 2010 dollars</th>
<th>Design Cost</th>
<th>Total Project Cost</th>
<th>Estimated 20 year Cost/Kwh</th>
<th>Meets Bethel Sub-Region 2020+ Demand?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chikuminuk Lake Outfall</td>
<td>$391.7 M</td>
<td>$91.3 M</td>
<td>$483 M</td>
<td>$0.70-0.58</td>
<td>Yes</td>
</tr>
<tr>
<td>Kisaralik River Upper Falls</td>
<td>$386.4 M</td>
<td>$92.6 M</td>
<td>$479 M</td>
<td>$0.70-0.65</td>
<td>No</td>
</tr>
<tr>
<td>Kisaralik River Lower Falls</td>
<td>$329.5 M</td>
<td>$78.5 M</td>
<td>$408 M</td>
<td>$0.70-0.65</td>
<td>No</td>
</tr>
<tr>
<td>Kisaralik River Golden Gate</td>
<td>$305.5 M</td>
<td>$72.5 M</td>
<td>$378 M</td>
<td>$0.70-0.65</td>
<td>No</td>
</tr>
</tbody>
</table>
IV. Current and Next Tasks

- Completed Phase I- Hydro Reconnaissance & Feasibility Study - 1/2011
- Public and Nuvista Board Decision to Proceed Ahead
- Hiring Project Manager to develop scope, oversee work, lead process - 5/2011
- Initiate Federal FERC preliminary licensing and ROW Processes
- Begin standard AEA project Phase II process: Detailed Feasibility & Design
### IV. Next Steps: Capital Request

<table>
<thead>
<tr>
<th>Hydroelectric Energy Tasks</th>
<th>Lead Agency</th>
<th>Schedule</th>
<th>Funding</th>
<th>Cost (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a Detailed Feasibility, Geotech, FERC Licensing (PAD), Surveying, Engineering Plans...</td>
<td>Nuvista, FERC</td>
<td>2011-2014</td>
<td>State Private</td>
<td>$5.88M</td>
</tr>
<tr>
<td>1b Preliminary Engineering Design, Site Field Investigations, Specs</td>
<td>Nuvista, AEA</td>
<td>2011-2016</td>
<td>State</td>
<td>$11.75M</td>
</tr>
<tr>
<td>3. Final Designs, Permitting, Modifications, and Bidding</td>
<td>Nuvista AEA</td>
<td>2016-2018+</td>
<td>AIDEA, BIA Bonds</td>
<td>$35.25M</td>
</tr>
<tr>
<td>4. Hydropower and transmission system project Construction</td>
<td>TBD</td>
<td>2018-2022</td>
<td>Mix, DOE Bonds</td>
<td>$391.7M</td>
</tr>
</tbody>
</table>

**(-10 to +25%)**

**Total Project Estimated Cost:**

| TBD | 2012-2022 | Mixture | $460M to $630M |

**$483M**
IV. FY2012 Capital Request

Region: Calista/AVCP Southwest Alaska

Project: Chikuminuk Hydroelectric Alternative Energy


Cost: $17,630,000.
Chikuminuk Questions Answered

- **How much local support do you have for your project?**
  - Region wide support represents 56 villages, and numerous stakeholder letters to legislature.
- **How much local matching funds/other do you have, expect, or may be available for project?**
  - TBD with BIA, DOE, BLM, AIDEA, others. Nuvista invested >$650,000. private funds since ‘02
- **What are the total costs of your project?**
  - $483 Million is the engineering estimate, over the period of 2012 to 2022
- **What is the funding plan over next five years? See formal presentation**
- **How many years work is funded in this appropriation and how many years remain?**
  - Request is 2 years due to legislative approval timelines & seasonal work sequencing. Further fund requests in 3 parts noted in presentation (ROW acquisitions, final design, construction)
- **What phase is project in now and what phase or phases addressed by this appropriation?**
  - Phase II Feasibility and 35% Design
- **Upon completion, what are expected costs to rate payers compared with current cost?**
  - Anticipated conservative (high end) cost (without use for heat) = $0.58-$0.70 kwh;
  - Compared to current electrical costs = $0.60-$1.05 per kwh.
- **Where is your project on the priority list of the area’s regional energy plan?**
  - Highest priority or #1 for region as a whole, documented option since 1975
- **Has your project been vetted by AEA? If so, how?**
  - AEA has funded approx. $2.28 million since ’96, and been a partner on conceptual design.