

**Agency: Commerce, Community and Economic Development****Grant Recipient: Nuvista Light & Power****Federal Tax ID: 92-0160915****Project Title:****Project Type: Planning and Research**

# Alaska Energy Authority - Nuvista Light & Power Chikuminuk Hydroelectric and Alternative Energy Project

**State Funding Requested: \$17,630,000****House District: Southwest Region (36-38)**

Future Funding May Be Requested

**Brief Project Description:**

Detailed feasibility assessment, site field investigations, initial design, and FERC PAD permit application for the Bethel Area 14 village Chikuminuk hydroelectric project.

**Funding Plan:**

Total Project Cost:	\$483,500,000
Funding Already Secured:	(\$0)
FY2012 State Funding Request:	<u>(\$17,630,000)</u>
Project Deficit:	\$465,870,000

*Funding Details:*

*AIDEA - AEA has provided past grants to assist in region alternative energy studies for \$250,000.*

**Detailed Project Description and Justification:****Bethel and 14 Village Hydroelectric Energy**

Phase I/II of the Bethel Area Hydroelectric project is the Detailed Feasibility assessment, site reconnaissance, engineering plans, and Federal Energy Regulatory Commission (FERC) Licensing application for hydroelectric energy generation at Chikuminuk Lake (Allen River Outfall) area. The engineering cost estimate for this task of the work effort is \$5.88 million. Concurrent, to FERC permitting will be Preliminary Design, comprehensive field investigations, surveys, and design specifications developed for the site at a cost of \$11.75 million. Total of this FY'12 request is \$17.6 million for this program to occur from 2011 to 2015.

Phase III consists of land jurisdiction reviews, rights-of-ways and Dept of Interior land easement acquisitions for Electrical Transmission Lines from the generation site 118 miles to region demand centers for \$7.83 million anticipated to occur in 2013 to 2016.

Phase IV consists of Final Designs, Permits, Modifications, and Construction Oversight at an anticipated cost of \$35.25 million from 2016 to 2018 from potentially AEA energy bond sale.

Phase V will consist of Hydroelectric Construction over 3 years at a cost of \$391.7 million. This is expected to occur in the 2018 to 2021 timeframe.

Project Need: Fuel costs to heat homes in rural villages are 2X costs of fuel in urban and Anchorage area; electrical energy

is currently \$0.60 to \$1.00 per kilowatt hour and 2.5 to 3.5X the cost paid by consumers in Anchorage and Fairbanks; these same rural Alaskan citizens are utilizing only 50% (half) the National Average due to high costs, few jobs, and disproportionate percent of their annual income going to survive in rural villages. The Calista region already has some of the lowest per capita incomes for families and the high energy costs are making the situation worse after years of progress. Even with the State of Alaska Power Cost Equalization (PCE) program that helps subsidize electrical energy in rural Alaska, electrical rates are still extremely high for rural consumers. Last winter villagers in South West villages had to choose between heat and fuel to get through cold winter months. High cost of living in SW Alaska is exacerbated by a lack of transportation infrastructure which restricts fuel deliveries to once a year by barge--setting the price of fuel for an entire year. Feasible alternative energy options have been identified for the SW Region and are needed to bring down the cost of living; develop similar hydroelectric energy options realized in other areas of Alaska such as SE; increase economic development potential of the region's resource opportunities; help preserve and increase citizens remaining disposable income; and improve the survivability and overall quality of life for rural villagers.

### Project Timeline:

Phase I/II of \$17.6 million is 2012 through 2015.

Phase III of \$7.83 million is from 2013 to 2016.

Phase IV of \$35.25 million from 2016 to 2021 with majority of cost (65%) the first two years 2016 to 2018.

Phase V of \$391.7 million is Hydroelectric Construction over 3 years in the 2018 to 2021 timeframe. (All costs are in 2011 dollars).

### Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Nuvista Light & Power Cooperative

### Grant Recipient Contact Information:

Name: George Guy (Christine E. Klein)  
 Title: Nuvista, Chair (Klein - COO Calista)  
 Address: 301 Calista Court Ste A  
 Anchorage, Alaska 99518  
 Phone Number: (907)644-6309  
 Email: cklein@calistacorp.com

Has this project been through a public review process at the local level and is it a community priority?  Yes  No

# Calista Region

## Alternative Energy Update

**Nuvista Light & Electric Cooperative**

**2011**

George Paul Guy, Nuvista Cooperative Chair

Andrew Guy, Calista President/CEO

Christine Klein, COO

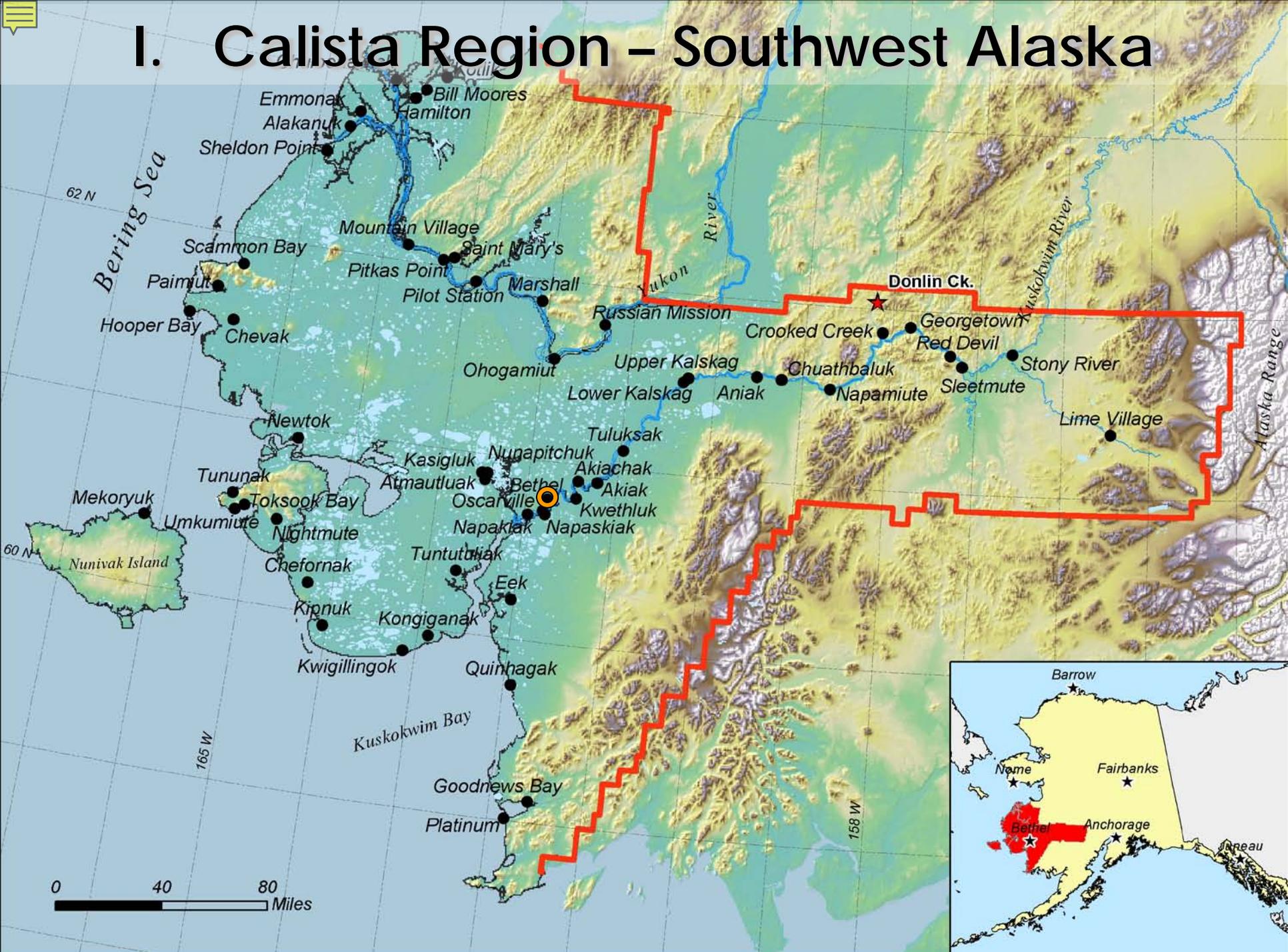


# Outline

- I. Who We are**
- II. Energy: Where We've Been & Found**
- III. Potential Alternative Energy Solutions**
- IV. Forward to the Next Steps**



# I. Calista Region – Southwest Alaska



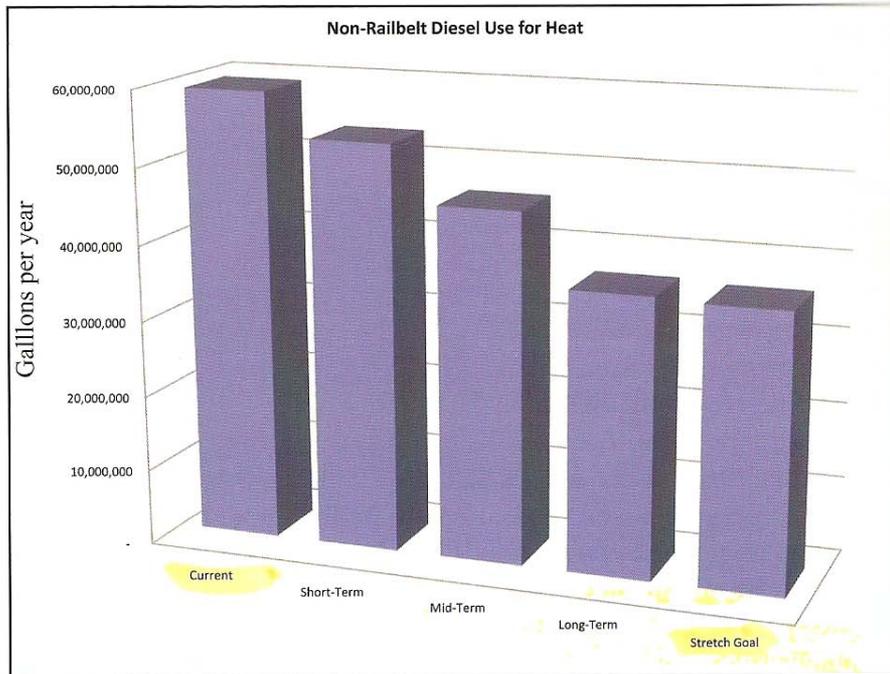
# I. Nuvista Cooperative Formation

## Non-profit established 1995:

- Utility Cooperative
- Common Goal: to reduce electrical costs to residents
- Assess high cost of power, demands and find alternatives
- Organized as a cooperative to function as a future regional Generation & Transmission utility
- Association of Village Council Presidents (AVCP)
- Yukon Kuskokwim Health Corporation (YKHC)
- AVCP Regional Housing Authority (AVCP-RHA)
- Calista Corporation
- Chaninik Wind Group
- Middle Kuskokwim Electric
- Lower Yukon Representative



# I. Region Energy Situation



## Diesel

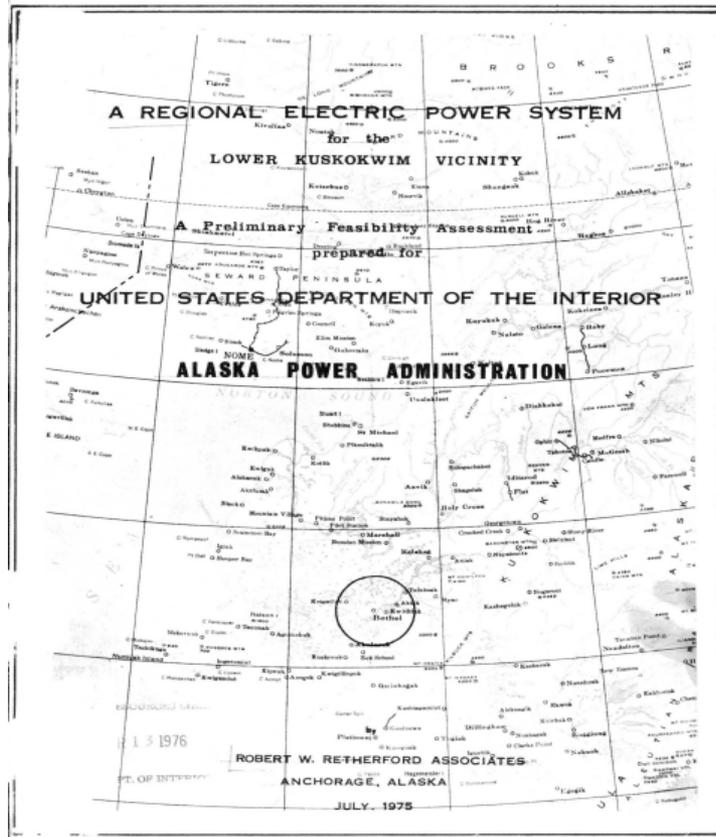
- Region primary home heating fuel, ranges \$6.14 to \$9.50/gallon
- Fuel deliveries by barged 1-2X year
- 50% of family incomes go to home heating, now grown to 75% income
- Families having to choose between food vs. heating

## Electricity

- Region small independent village diesel generators
- Household use is 50% Natl Average
- Cost \$0.52 to \$1.00 per kilowatt hour
- Escalating cost of energy
- PCE cannot keep up



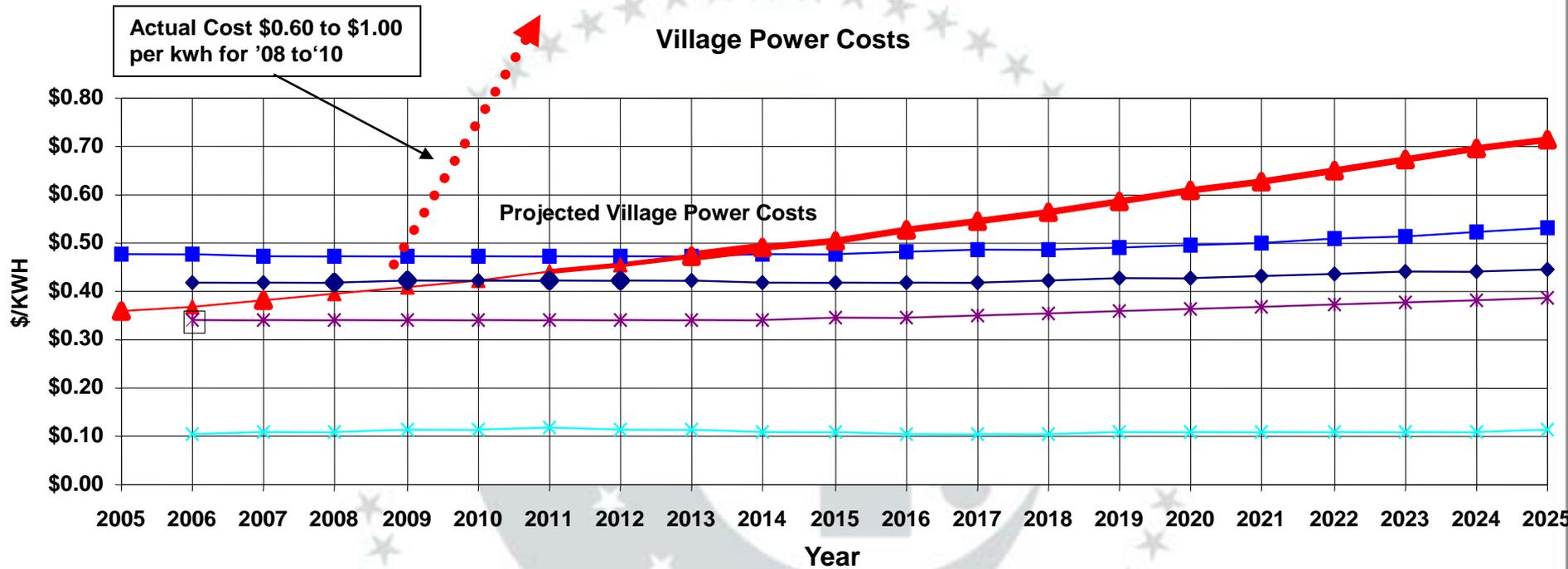
## II. Where We've Been



- 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
- 65Mw electrical demand for Bethel +14 villages by 2020
- Coal & Hydropower listed repeatedly as feasible options
- Energy costs escalating



# II. Electric Cost Projections (2002)



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



## 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  
65Mw electrical needs by 2020

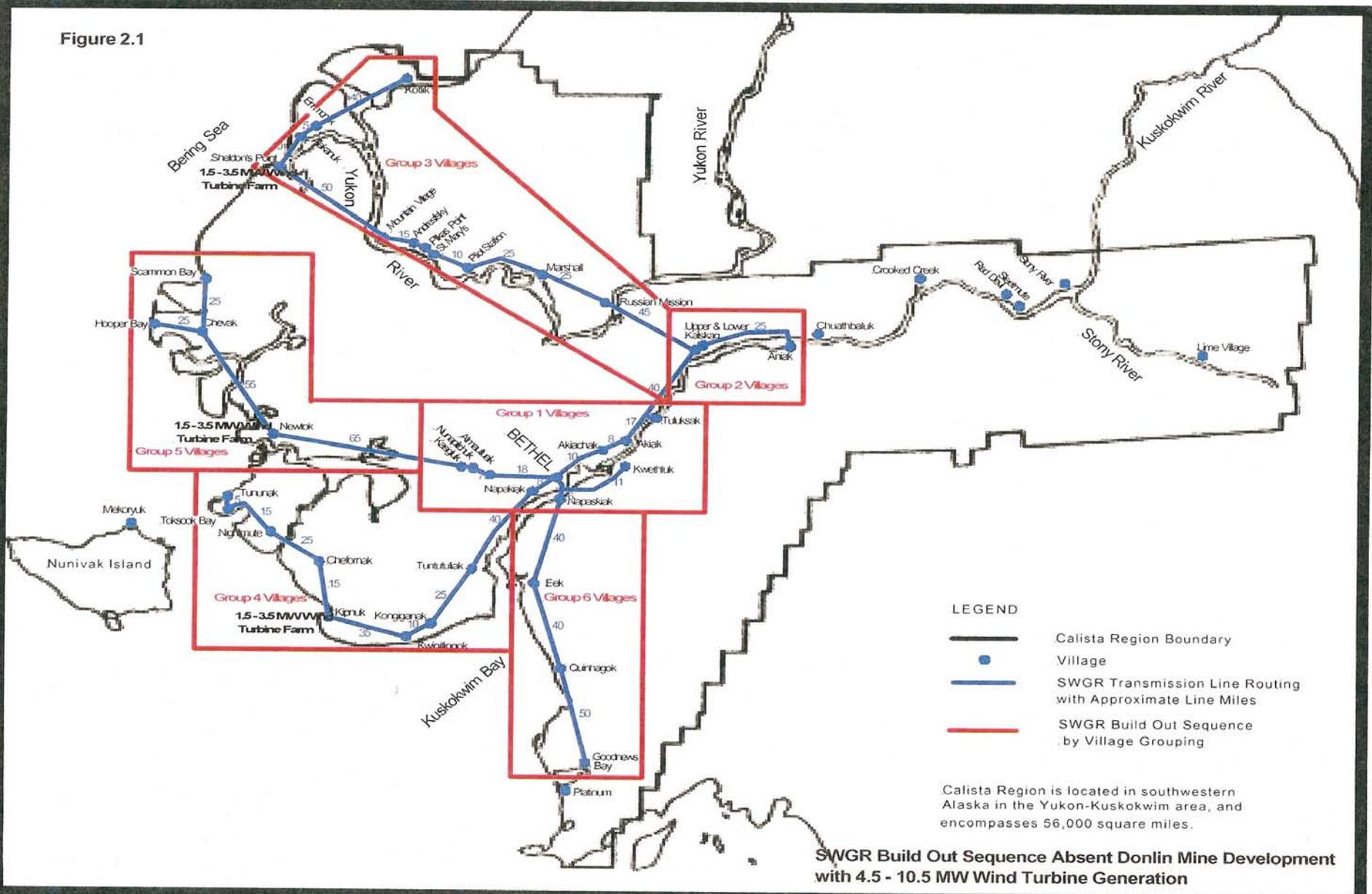


Hooper Bay



# II. Transmission System Needed

Figure 2.1



## II. Energy Alternatives Considered

<i>Alt. Energy Type</i>	<i>Cost to Construct</i>	<i>Cost to Operate</i>	<i>Use Cost per Kw</i>	<i>Capacity to Demand 65kw</i>	<i>Public Perception</i>	<i>Likelihood or Feasibility</i>
<b>Diesel (do nothing)</b>	Existing	High	High	Same	-	Existing
<b>Geothermal</b>	High	Low	-	None	Positive	Small
<b>Wind Power</b>	Medium	Low	Low	Low	<b>Positive</b>	<b>Limited</b>
<b>Hydropower</b>	High	Medium	Medium	<b>High</b>	<b>Neutral</b>	<b>High to Medium</b>
<b>Coal Power Plant</b>	High	Medium	Low	<b>High</b>	<b>Negative</b>	<b>Medium to Low</b>
<b>Nuclear Power</b>	Low	Low	Low	High	<b>Very Negative</b>	<b>Poor to None</b>



# 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.

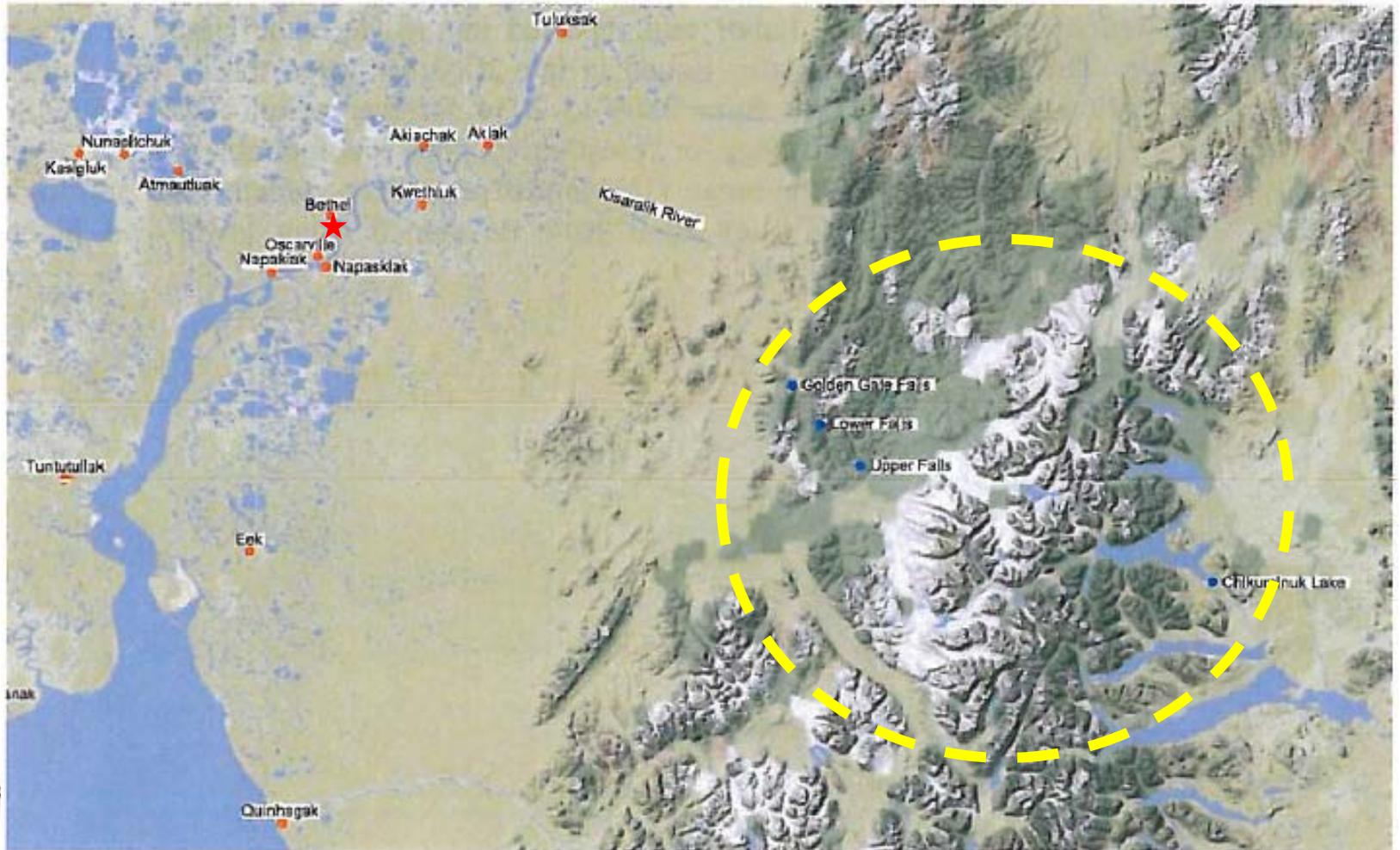
- **Hydroelectric Power**

**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

Site	Distance miles	Head ft	Generating Capacity (MW)	Year Around Seasonal	Average Annual Energy (GWh)	Projected 2022 Demand GWh	Useable Energy 2022 GWh
<b>Chikuminuk Lake - Allen River Outfall</b>	118	91	13.4	Y	<b>89.3</b>	<b>64.9</b>	<b>65+</b>
<b>Kisaralik - Upper Falls</b>	70	149	27.7	S	89.5		39.7
<b>Kisaralik - Lower Falls</b>	62	122	34.1	S	128.3		46.9
<b>Kisaralik - Golden Gate</b>	57	78	27.0	S	95.3		38.8



# IV. Moving Forward & Ahead

## Selection of Option(s):

- Nuvista Team & Stakeholders Reviewed latest Findings
- Board Unanimous Decision made to move ahead with request for Hydropower Design Feasibility for Bethel Area.
- Hydro option of Chikuminuk Lake has year around capability to supply ½ region's population, 13 villages, and displace diesel

## A. Bethel Area Sub-Region

Complete plan and project(s) underway to educe energy cost, and integrate those with the larger Region-Wide plan

## B. Region-Wide Alternative Energy Plan

Begin a comprehensive region wide alternative energy plan that integrates the work already done and underway to guide future development



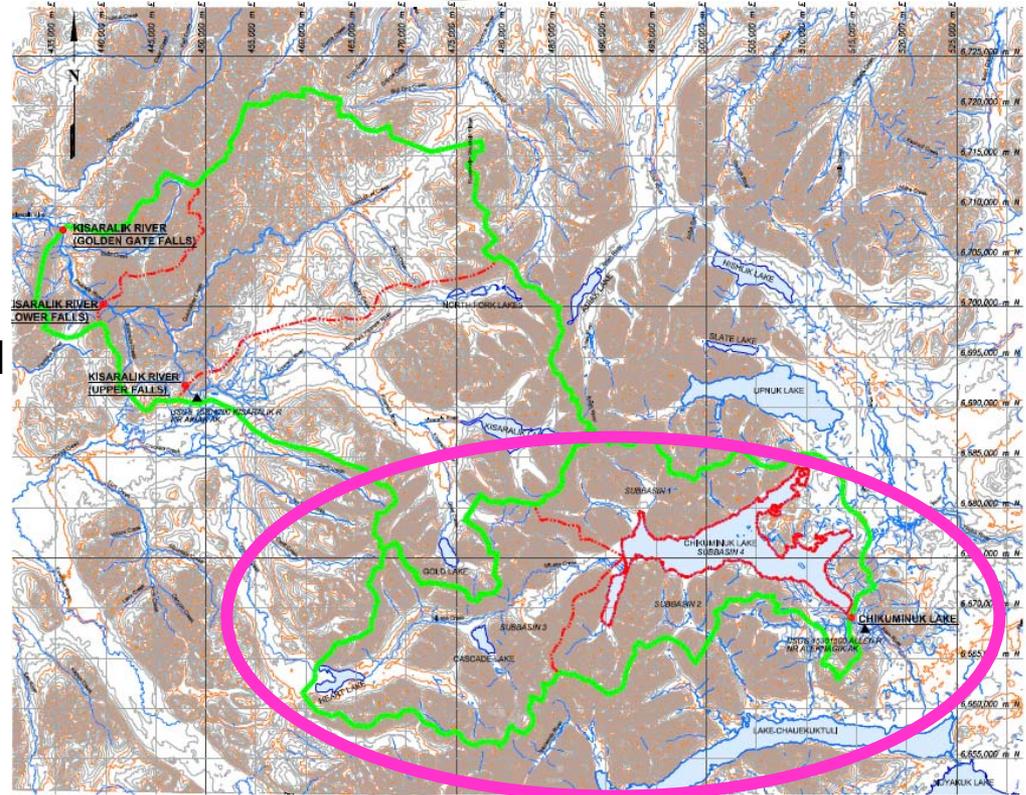
# IV. Preferred Alternative

Site	Construction Cost in 2010 dollars	Design Cost	Total Project Cost	Estimated 20 year Cost/Kwh	Meets Bethel Sub-Region 2020+ Demand?
<b>Chikuminuk Lake Outfall</b>	<b>\$391.7 M</b>	<b>\$91.3 M</b>	<b>\$483 M</b>	<b>\$0.70-0.58</b>	<b>Yes</b>
<b>Kisaralik Upper Falls</b>	\$386.4 M	\$92.6 M	\$479 M	\$0.70-0.65	No
<b>Kisaralik Lower Falls</b>	\$329.5 M	\$78.5 M	\$408 M	\$0.70-0.65	No
<b>Kisaralik Golden Gate</b>	\$305.5 M	\$72.5 M	\$378 M	\$0.70-0.65	No



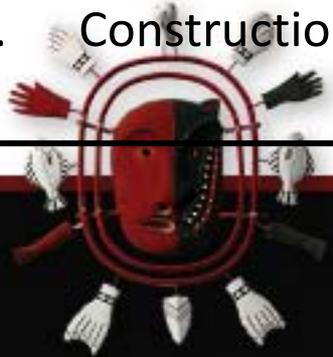
# IV. Current and Next Tasks

- Complete Hydroelectric Feasibility Study - 1/2011
- Nuvista Board Decision to Proceed Ahead - 1/2011
- Hiring Project Manager to develop scopes, lead public process, oversee work - 4/2011
- Complete Public Hearings and Preferred Alternative designs Spring – Fall 2011
- Start a Comprehensive Region wide Alternative Energy Plan
- Initiate Federal FERC and ROW Processes



# IV. Action: Energy Capital Request

Hydroelectric Energy Tasks	Lead Agency	Schedule	Funding	Cost (millions)
1a Detailed Feasibility Assessment, Permitting, Engineering Plans, Licensing	Nuvista, FERC	2011 2014	State	\$5.88M
1b Preliminary Design, Site Field Investigations, Specifications	Nuvista AEA	2011 2016	State	\$11.75M <b><u>\$17.6M</u></b>
2. Transmission rights-of-ways, and land easements	Nuvista DOI/BLM	2012- 2015	DOI	\$7.83M
3. Final Designs, Permits, Mods, and Construction Oversight	Nuvista AEA	2016 2018+	AEA Bonds	\$35.25M
4. Construction	TBD	2018 2021	AEA Bonds	\$391.7 M



# IV. FY2012 Capital Request

**Region:** Calista/AVCP Southwest Alaska

**Project:** Chikuminuk Hydroelectric Alternative Energy

**Scope:** Complete Detailed Feasibility Report, Site Field Investigations, Reconnaissance, Hydrologic Monitoring, Surveys, Permitting, Engineering Plans, FERC Licensing, and Specifications

**Cost:** \$17,630,000.

