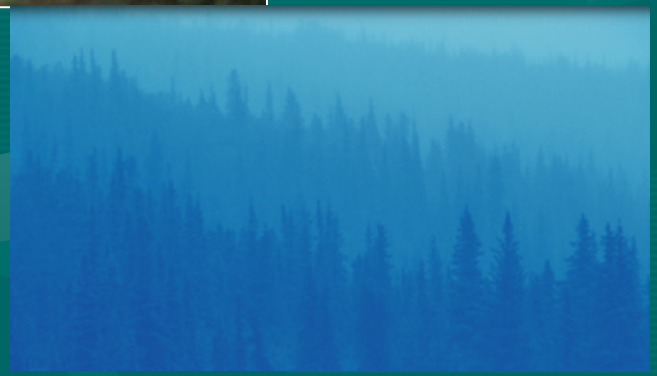
NANA



NANA Regional Corporation Overview

November 7, 2007

This is NANA | NANA Regional

- Regional Native corporation for the NW Arctic region- based in Kotzebue
- 7,200 people living in 11 communities or villages; total 11,000 shareholders
- NW Arctic Borough: governing body for the region.
- Encompasses 38,000 square miles, about the size of Indiana.
- “Tribal Members” (Inupiat Eskimos) who live the subsistence lifestyle

This is NANA | Inupiat Principles & Values

Organizational Mission

NANA improves the quality of life for our people by maximizing economic growth, protecting and enhancing our lands, and promoting healthy communities with decisions, actions, and behaviors inspired by our values and Core Principles.

Inupiaq Values

Knowledge of Language
Sharing
Respect for Others
Cooperation
Respect for Elders
Avoid Conflict
Humor
Domestic Skills
Responsibility to Tribe
Knowledge of Family Tree
Humility
Love for Children
Hard Work
Respect for Nature
Family Roles
Spirituality
Hunter Success

"The economic future of the NANA region is directly tied to restructuring current energy options and looking towards alternative & renewable sources."

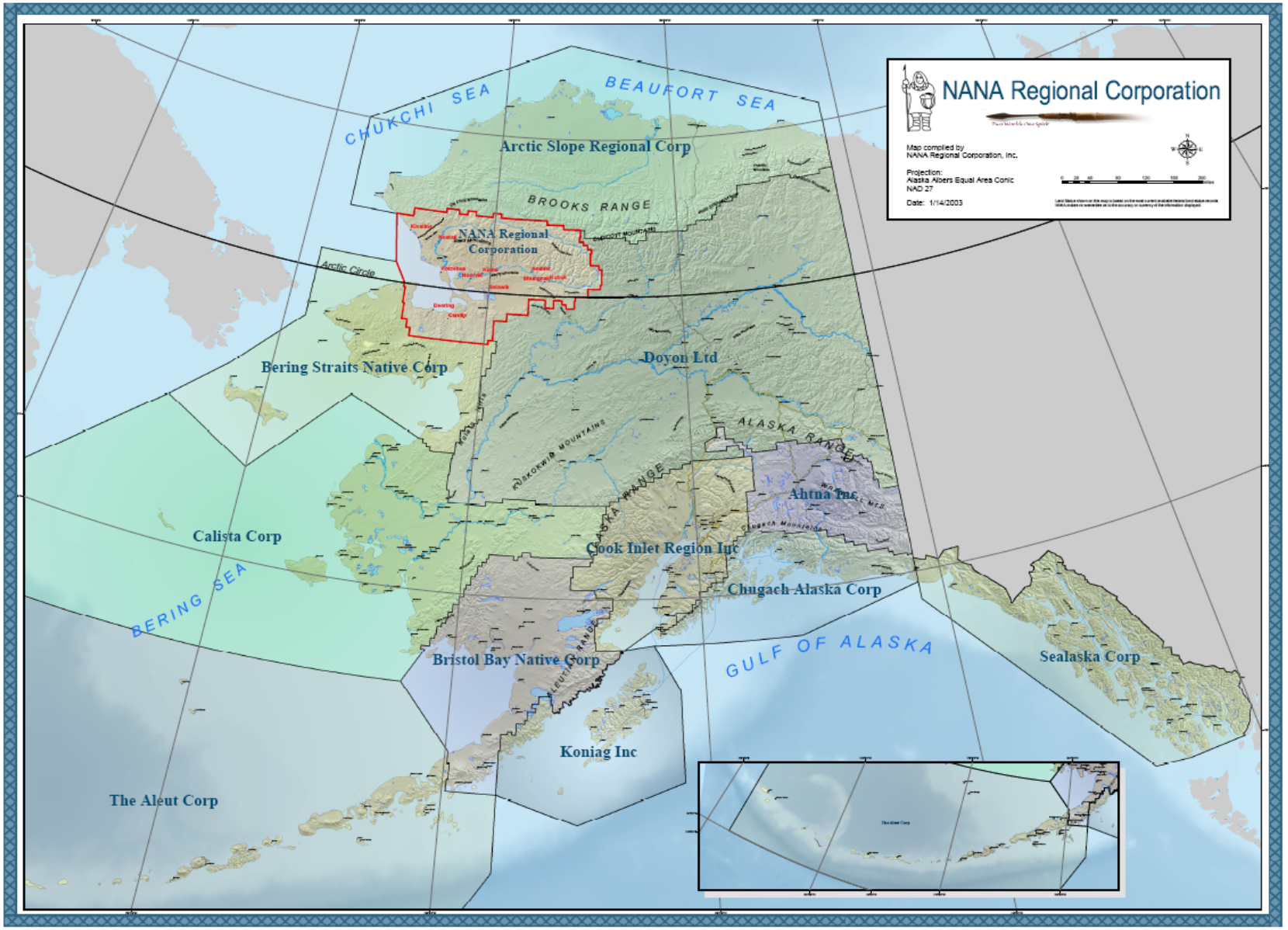
Jeff Nelson, Assistant Director of Lands

This is NANA | Shareholder Benefits

- NANA support a variety of programs to benefit shareholders, including:
  - Energy
  - Cultural programs
  - Regional Elders programs
  - Camp Sivunnigvik
  - Shareholder employee development
  - Scholarships and internships
  - Business and Career fairs
  - Village partnerships
  - Resource specialists
  - Disaster, medical and burial assistance
  - Non-profits benefiting shareholders

Alaska Native Claims Settlement Act

- Congress enacted ANCSA in 1971
- NANA is one of 12 Alaska Native-owned regional corporations
- Land transferred from federal to private ownership and to manage investment
- Alaska Native People would guide development and investment

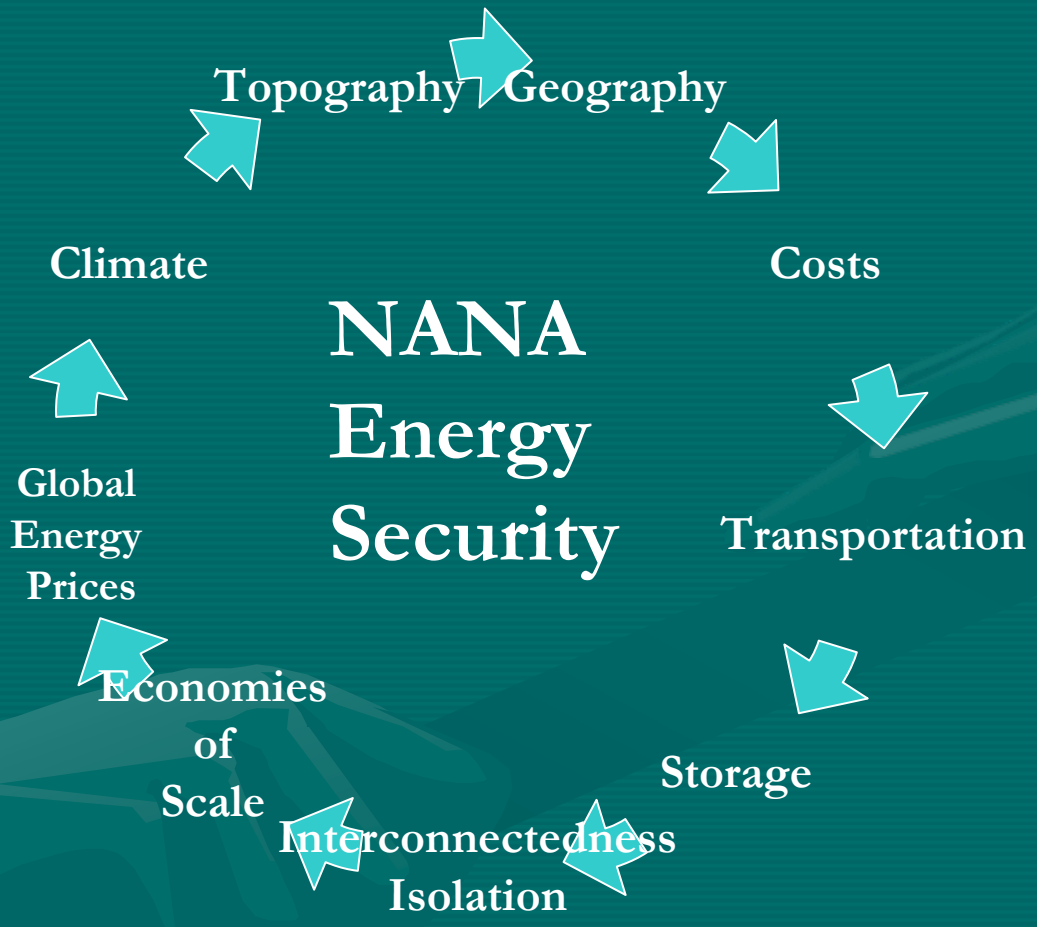

NANA Regional Corporation
Map compiled by
NANA Regional Corporation, Inc.
Projection:
Alaska Albers Equal Area Conic
NAD 27
Date: 1/14/2003
CHUKCHI SEA
BEAUFORT SEA
Arctic Slope Regional Corp
BROOKS RANGE
NANA Regional Corporation
Arctic Circle
Bering Straits Native Corp
Doyon Ltd
ALASKA RANGE
KUSKOKWIM MOUNTAINS
Ahtna Inc
Calista Corp
Cook Inlet Region Inc
Chugach Alaska Corp
BERING SEA
GULF OF ALASKA
Sealaska Corp
Bristol Bay Native Corp
Koniag Inc
The Aleut Corp

NANA Energy Security Vision: Integrated, Collaborative Efficient, Hybrid Energy Systems

Aerial view of new power plant, tank farm, cogeneration, and wind turbines at Selawik, Alaska.

NANA

Extraordinary Challenge of Providing Energy in NW Alaska



Alaska Vs. Lower Forty Eight

NANA Region Energy Challenges

- 200 miles from the nearest road
- Barge & Air Delivery of all consumables
- Forefront of Global Warming: erosion, permafrost, & transportation corridors
- Small Communities

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2005 Power Cost (actual)

Fuel	15.7
Non Fuel Power Generation	10.7
Depreciation	7.3
Administration & General	3.2
Consumer Accounts	2.0
Distribution O & M	1.9
Interest on LTD	1.7
All Taxes	.5
TOTAL	43.0 (2005)
	45.0 (2006)

An increase of 7.0 cents/kwh since 2003

Costs to Consumer

Cost of 700 Res kwh	
Anchorage	$83.64
Fairbanks	$64.40
Juneau	$71.18
Kodiak	$117.14
Kotzebue	$149.03*
AVEC Villages	$235.31*
Napakiak	$290.53*

2005 PCE Power Cost cost per kw/hr	
Chugach Electric (Anch)	$.1195
Golden Valley (Fbx)	$.092
AEL&P (Juneau)	$.1017
Kodiak Electric	$.1999*
AVEC	$.2857*
Napakiak	$.3808*

* After PCE

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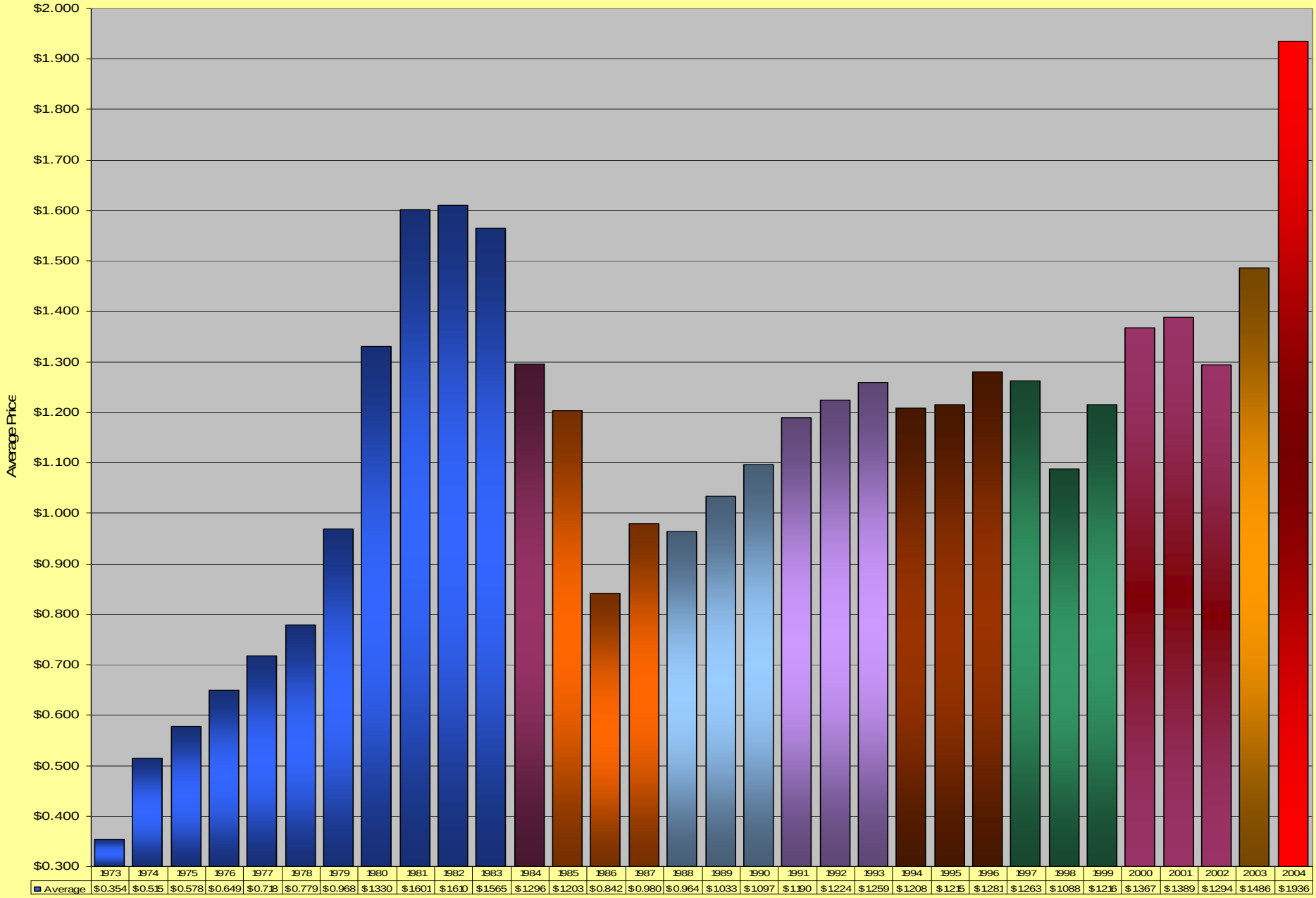
Alaska Village Electric Cooperative, Inc.
1973 - 2004 Fuel Prices



	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Average	$0.354	$0.515	$0.578	$0.649	$0.718	$0.779	$0.968	$1330	$1601	$1610	$1565	$1296	$1203	$0.842	$0.980	$0.964	$1033	$1097	$1190	$1224	$1259	$1208	$1215	$1281	$1263	$1088	$1216	$1367	$1389	$1294	$1486	$1936

Energy costs for the region are extremely high

- Bulk fuel delivered via airplane due to changing river patterns
- Gas and fuel oil must be flown in and retail prices can exceed $7.00 a gallon.

Permafrost and Weather

- Icing on equipment and extreme weather conditions
- Equipment cannot settle, tilt or be uplifted
- Foundation concerns

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Climatic and Permafrost

Poor roads, water and sewer lines, boardwalks and existing overhead power and phone lines present obstacles and challenges.

Specialty equipment creates mobilization changes

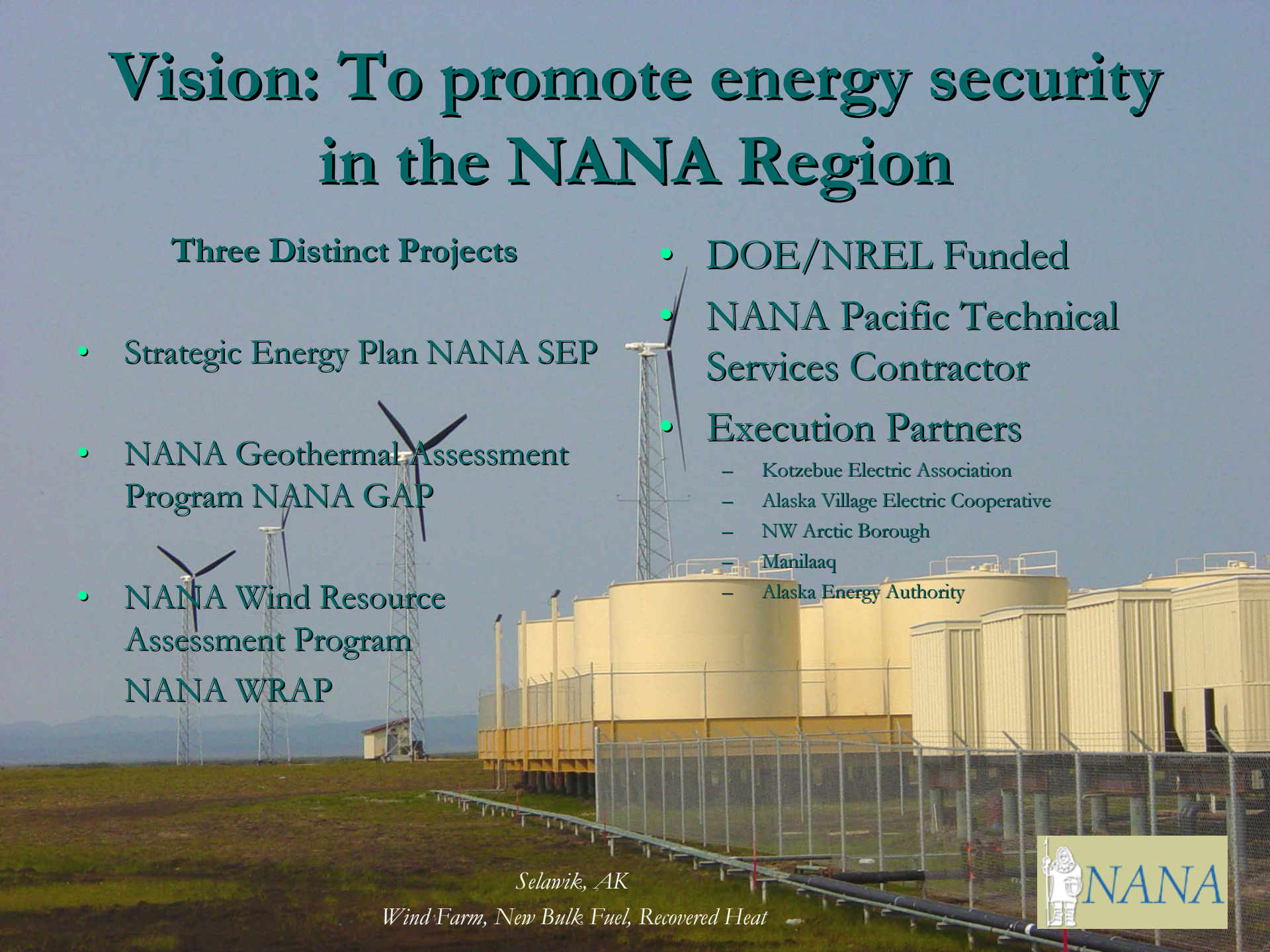
NANA

Vision: To promote energy security in the NANA Region

Three Distinct Projects

- Strategic Energy Plan NANA SEP
- NANA Geothermal Assessment Program NANA GAP
- NANA Wind Resource Assessment Program NANA WRAP

- DOE/NREL Funded
- NANA Pacific Technical Services Contractor
- Execution Partners
  - Kotzebue Electric Association
  - Alaska Village Electric Cooperative
  - NW Arctic Borough
  - Manilaaq
  - Alaska Energy Authority



Selawik, AK

Wind Farm, New Bulk Fuel, Recovered Heat

Partners & Collaborators

In-Kind

- Anemometers- AEA
- Technical Expertise
- Communication & Outreach

NANA Energy Security: Strategic Energy Plan

- *SO 1:*Increased collaboration between NANA Region stakeholders on energy policy, program, infrastructure, and increased capacity of tribal entities for the region.
- *SO 2:*Increased understanding of energy options available to NANA Region energy stakeholders for improved energy decision making.
- *SO 3:*Increased awareness and understanding of NANA Region energy needs on the part of external stakeholders.

Northern Lights, Noorvik AK

Energy Security: NANA Energy Options

Integrated Planning

Improved Efficiencies

Cogeneration Recovered Heat

Stranded Natural Gas Deposits
Red Dog Mine Area

Economies of Scale
Bulk Fuel Joint Purchasing
Transportation Co-mobilization

Diesel Hybrid & Fossil Fuels

Biomass
Shungnak/Ambler/Kobuk

Wind
Kivalina/Noatak
Kiana/Deering
Buckland
Upper Kobuk

Geothermal
Kotzebue
Deering/Buckland
Shungnak/Ambler/Kobuk

Hydro
Noatak
Shungnak/Ambler/Kobuk

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NANA SEP Activities

- Region Energy Steering Committee.
- Involve communities in energy decision making
- Strategic energy vision, vision statement, goals, and objectives.
- NANA Region Energy Summit
- Energy program metrics
- Forecast energy demand in the NANA Region.
- Identify and evaluate the costs and benefits of energy options
- Identify alternative power users
- Develop a funding and financing strategy white paper
  Participate in energy forums Disseminate results of the plan and energy options analysis

NANA SEP Technical Assistance Needs

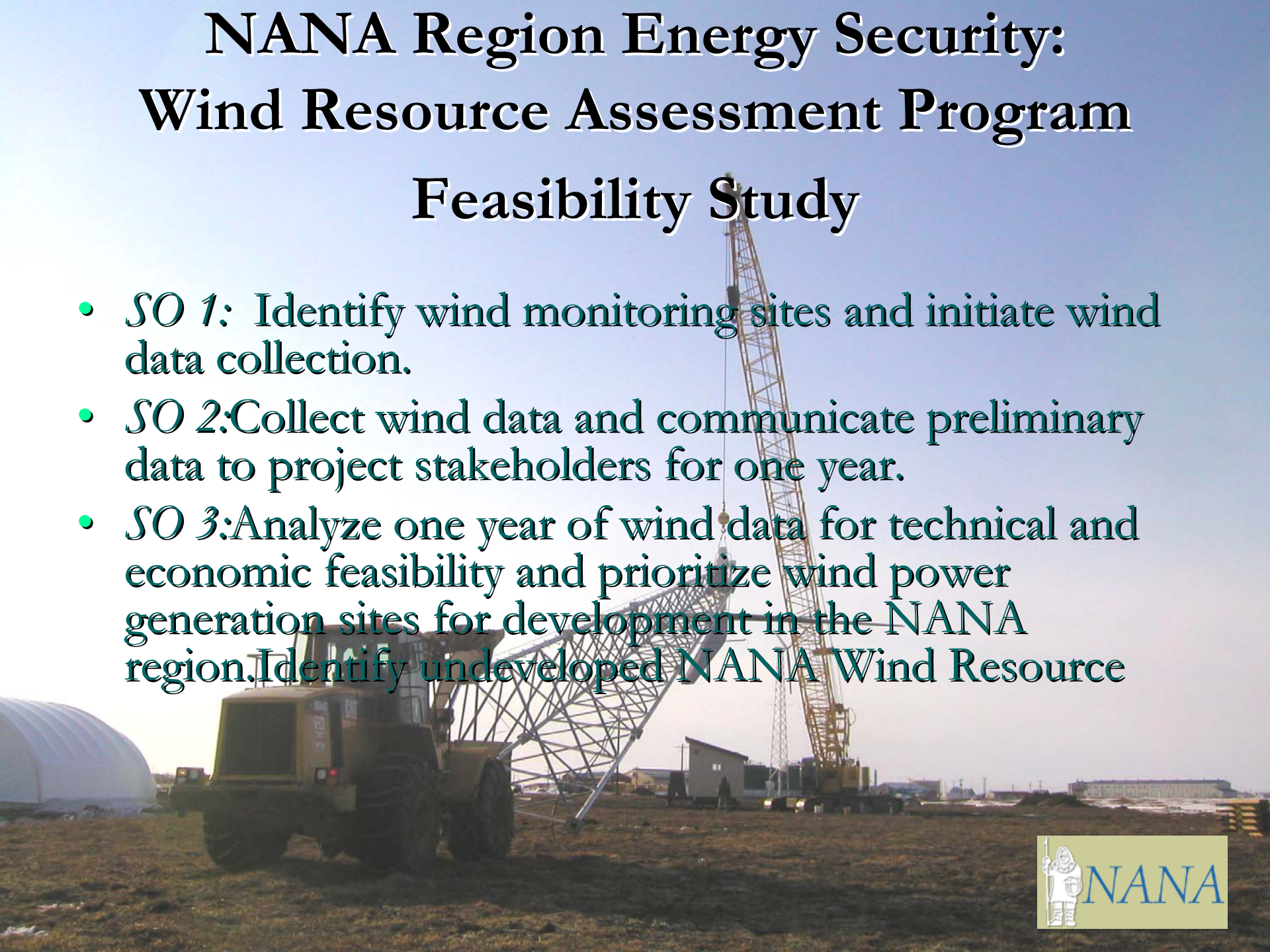
"Leverage Alaska experiences, but look to the marketplace of ideas/experiences"

- Decision making models- energy options analysis
- NANA Energy Summit technical support
- Community Energy Planning
- Economic and Financial Modelling of Energy Options.
- Public Involvement and Educational Materials.

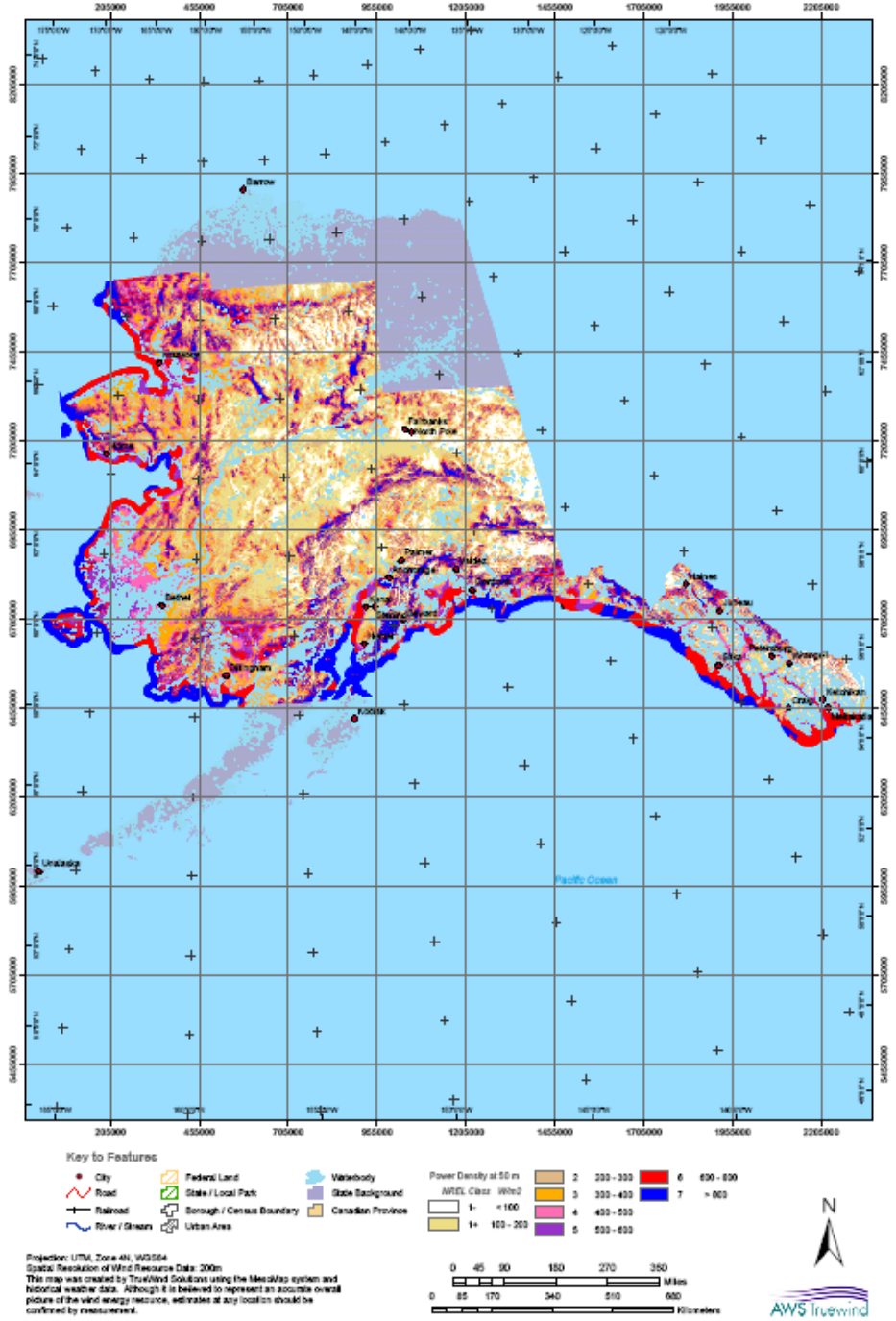
NANA Region Energy Security: Wind Resource Assessment Program

Feasibility Study

- *SO 1:* Identify wind monitoring sites and initiate wind data collection.
- *SO 2:*Collect wind data and communicate preliminary data to project stakeholders for one year.
- *SO 3:*Analyze one year of wind data for technical and economic feasibility and prioritize wind power generation sites for development in the NANA region.Identify undeveloped NANA Wind Resource



Wind Resource of Alaska



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KEA-Wind-Diesel System

- Lower electricity costs for consumers
- Minimize risk of diesel fuel spills
- Energy independence from state support
- Local economic development, including local jobs

NANA WRAP Activities

- Wind Energy Regime Qualification/Quantification
- Identify energy needs of regional interests
- Technical and Economic Viability of the Proposed Project
- Assessing a Wind/Hybrid System Impact on the NANA Region
- Environmental, Archaeological, and Historical Assessment
- Leadership and Community Involvement

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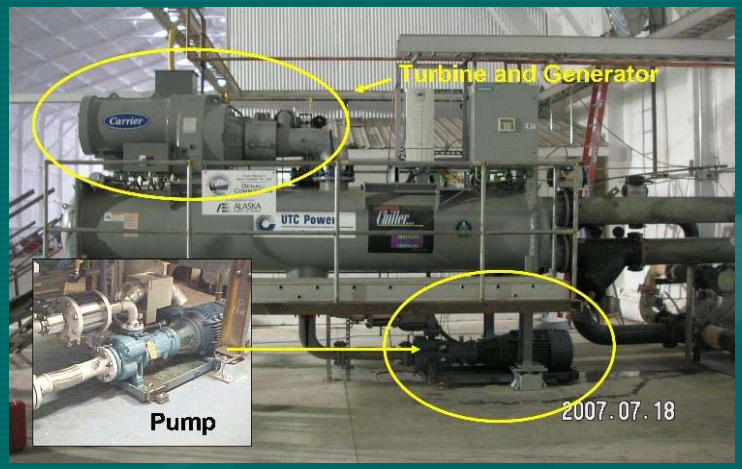
Technical Assistance-WRAP

"Leverage Alaska Experiences in Wind-Diesel Systems and feasibility analysis"

- Technical Assistance in the Analysis of Data.
- Participation at technical committee meetings.
- Economic and Financial Modelling of Energy Options.
- Anemometer Loan Program.
- Public Involvement and Educational Materials.

Geothermal Assessment Program Feasibility Study

- *SO 1:* Identify potential geothermal sites in the NANA Region.
- *SO 2:* Undertake a geological, geochemistry, and geophysical assessment of targeted sites for geothermal power generation potential.
- *SO 3:* Ascertain geothermal feasibility potential for power generation in the NANA Region.



Chena Hot Springs Geothermal Demonstration Project

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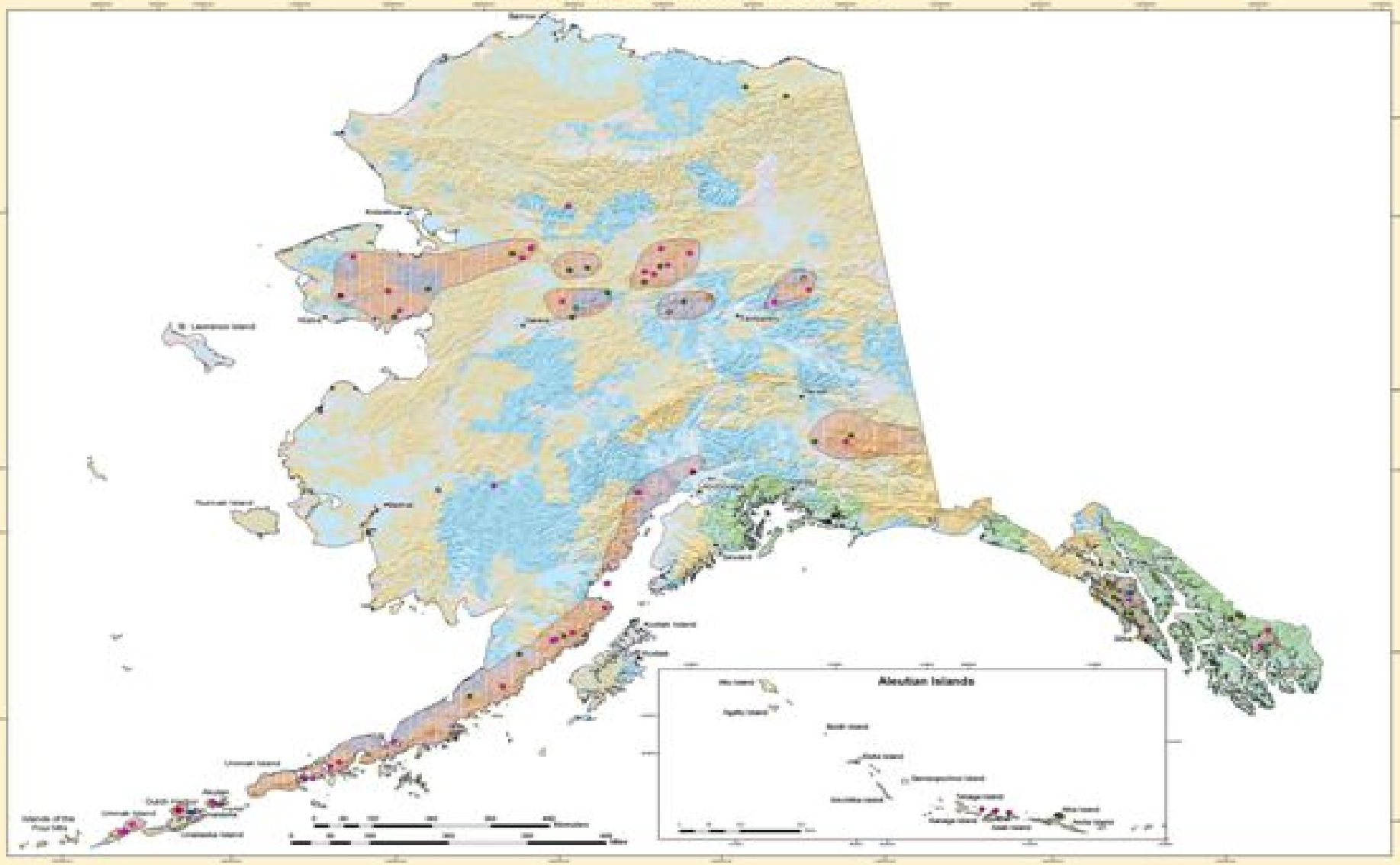
Alaska Geothermal Resources



Legend

- Cities/Towns
- Rivers/Streams
- Lakes/Reservoirs

Geothermal Categories

- Space Heating
- Spas/Resorts/Recreation Sites
- Regions of Known or Potential Geothermal Resources
- Wells < 50 Degrees C
- Springs < 50 Degrees C
- Wells ≥ 50 and ≤ 100 Degrees C
- Springs ≥ 50 and ≤ 100 Degrees C

Ownership

- Private Lands
- Bureau of Land Management and Other Federal Lands
- State Lands
- Native American Lands
- U.S. Forest Service Lands

Map prepared by Patrick Laney and John Sheaffer at the Idaho National Engineering and Environmental Laboratory

for

The U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Geothermal Technologies Program

Geothermal Data Provided by:

1. Geothermal Center, State Geothermal Database. (Compiled 2002).
2. National Geophysical Data Center, National Oceanic and Atmospheric Administration (NOAA). Geothermal Resources of Alaska. Prepared for the Geothermal Technologies Division, United States Department of Energy. Map.

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Kotzebue Geothermal Resource

• Accessibility	0 mile
• Distance from load center	Good
• Distance from power line	0 Miles
• Land status	Private
• Environmental sensitivity	Low
• Degree of development to date	None
• Exploration status	Minimal
• Surface temperature	0
• Estimated subsurface temperature	160 degrees
• Number of wells drilled	2
• Projected use	Power
	District Heating

Source: DOE/AEA Pre-Feasibility Analysis-literature review

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NANA GAP Activities

- Literature Review of the geology
- Geology/Geochemistry Site Assessment and Survey
- Geophysical Assessments
- Power Optimization Modeling.

NANA GAP Technical Assistance

"Promote Alaskan experience, but look to outside for needed technical assistance"

- Development of the scoping document.
- Identifying the technical team
- Technical Assistance in the Analysis of Data.
- Economic and Financial Modelling of Energy Options
- Public Involvement and Educational Materials.

Pathway to NANA Region Energy Security:

Obstacles	Pathways
"Turf Wars"	Consensus on Energy Security ; leverage steering committee.
Lack of appropriate technology relevant for the Arctic	Technological breakthroughs, including NW 100, UTC Power Purecycle 200, remote monitoring and control systems
Reliability & integration	Increased collaboration with providers; promotion of the steering committee
Technical expertise	Leveraging local/state experience; increased research in key areas (foundation design)
Increased cost planning, design, & construction of facilities	Amalgamated, integrated facilities
Redundant and emergency generation still needed	Leverage School District and other village facilities for redundancies
Uncertain Funding Environment	Coordinate proposal; develop alternative business models.

NANA Region Energy Security:

Regional Planning, Wind, Geothermal, and other feasibility studies

- Hedge against rural to urban migration
- Hedge against future emergency events
- Hedge against increasing fuel costs
- Hedge against increasing transportation costs
- Hedge against fuel rationing
- Hedge against increase design/build costs of energy systems


Thank you!
Questions?
NANA