Regional Economic Wind Development in Rural Alaska

Wind Energy Applications Training Systems

Anchorage, August 14, 2007

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Alaska Energy Authority




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Alaska Energy Authority

Public Corporation with Alaska Industrial Development and Export Agency

- Infrastructure Owner
- Coordinates Statewide Planning
- Develops Renewable Energy & Energy Efficiency
- Conducts Training and Education
- Administers PCE
- Finances Projects



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AEA's Mission

Reduce the cost of Energy in Alaska

Assisting in the development of safe, reliable, and efficient energy systems throughout Alaska, which are sustainable and environmentally sound.



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What I'll talk about

- Statewide Energy Issues
- Regional Economic Development
- Wind Resource in Alaska
- Other Energy Options
- The Future



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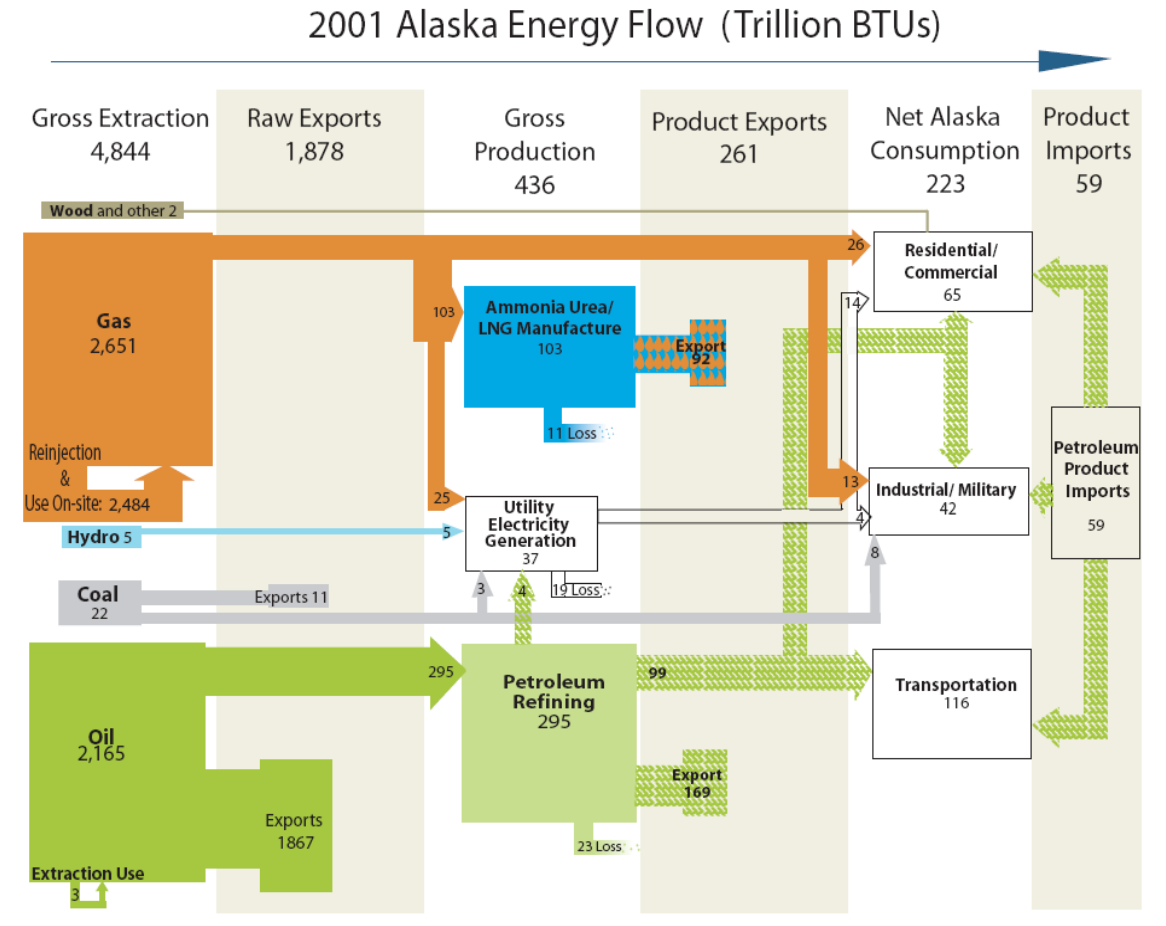
Statewide Energy Issues



- In 2001 4.8 trillion BTU of energy were produced in Alaska
- Mostly from Oil and Gas
- About 85% of the oil Alaska produces is exported
- Alaska is importing about 30% of its exported refined petroleum back

Source: UAA ISER 2003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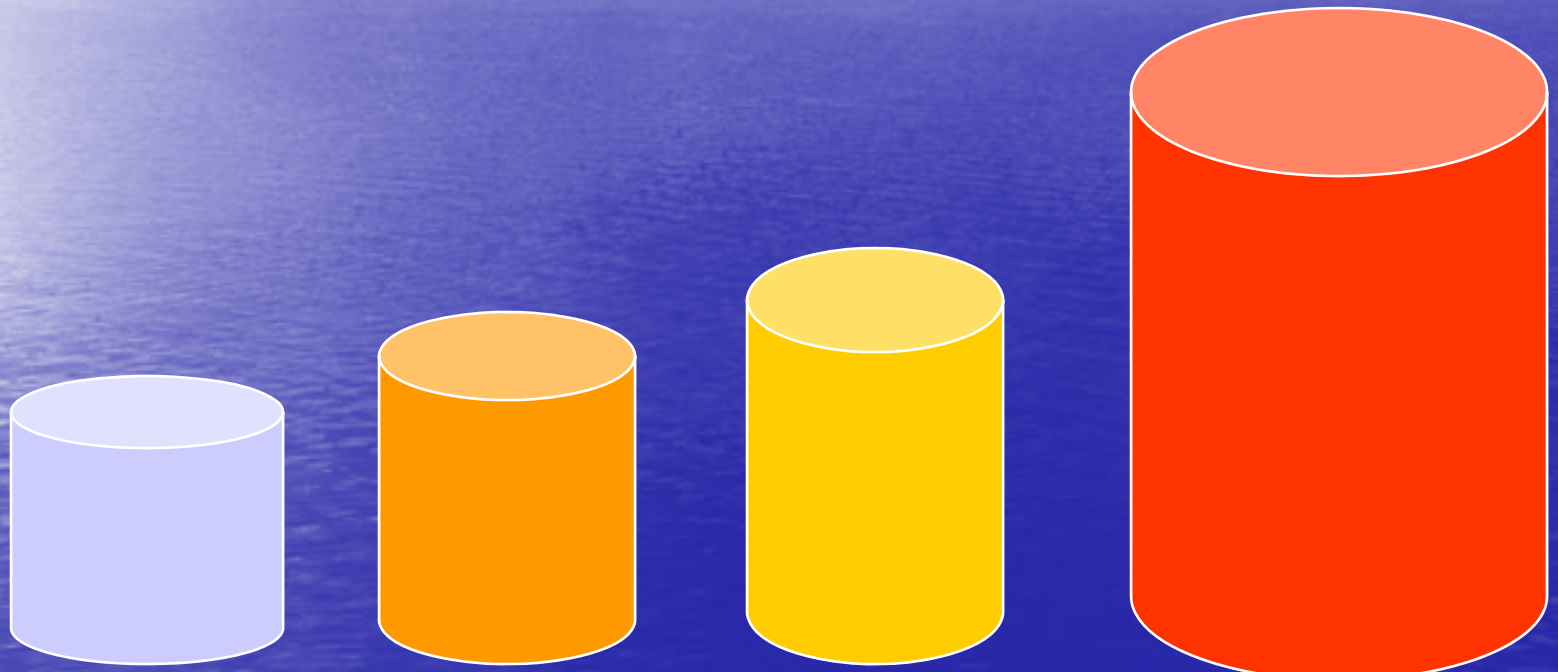
Breakdown of "Typical Village" Power Price 38 ct/kWh



Gen. and Admin

14%

Renewal and Replacement

19%

Operation and Maintenance

21%

Fuel

46%

Source: AEA 2006

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Regional Economic Wind Development


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Key Elements

- Consortium of entities that is responsible for implementing
- regional wind development
- Business Structure
- Hub-Cities acting as O&M training and supply centers
- Job creation
- Design and implementation of wind maintenance/technician training
- Local workforce training
- Wind turbine bulk purchases
- Long-term local commitment (e.g. O&M, R&R, Decommissioning plan)
- Environmental assessment
- National and international technology transfer based on Alaska experience



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Planning

- Wind resource
- Diesel fuel cost
- Wind Project Capital cost
- Diesel and Wind-Diesel system O&M costs
- Expected load and economic growth
- Utility Regulatory environment
- O&M training
- Transportation costs
- Construction cost
- Existing Power System upgrade costs
- Landownership
- Environmental issues



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Regional Database Basic Parameters

- Local Wind Resource
- Population
- Diesel Fuel Cost
- RPSU Project

Note: Under Development


Regional Database Advanced Parameters

- Load Profile (Electrical & Thermal)
- Pre-Feasibility Study (HOMER,HYBRID)
- Project Cost
- Affirmative Stakeholder Resolution
- Potential Business Structure

Note: Planned.


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Implementation Strategies

State

- Funding
- Develop Expertise
- Collect/Organize Data
- Educate Public
- Implement Policies
- Identify Regions
- Coordinate Agencies
- R & D

will result in

Sustainability
Economic Growth
Import Capital

Region

- Identify Funding Sources
- Organize Regional Players
- Provide Training
- Organize Bulk Purchase, O&M support from Hubs
- Plan Deployment

will result in

Sustainability
Economic Development
Job Creation
Wind Development

Project

- Budgeting
- Data Collection
- Feasibility Study
- Project Management
- O & M Support

will result in

Sustainability
Revenues
Local Identification

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NOTE: For discussion purposes only

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Economics

Wind Energy Cost Trends

Cost for the Lower 48. For Alaska increase of 50 % in remote locations possible

1981: 40 cents/kWh

- Increased Turbine Size
- R&D Advances
- Manufacturing Improvements

2006: 9.5 cents/kWh

- Multi-megawatt Turbines
- High reliability systems
- Infrastructure Improvements

Land-based Class 4

2006: 4 - 6 cents/kWh
2012: 3.6 cents/kWh

Offshore Class 6

2014: 5 cents/kWh

Source: NREL

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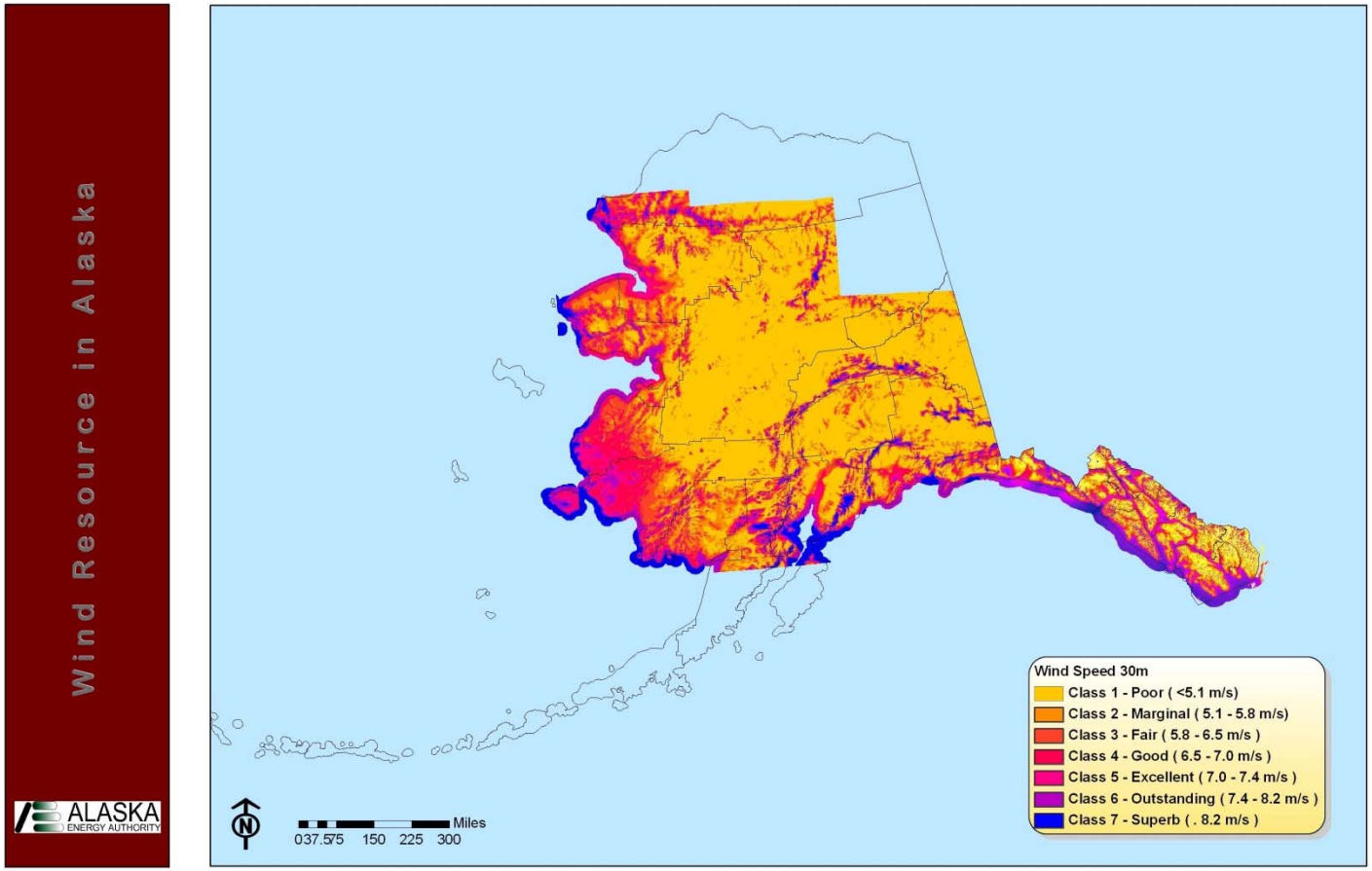
Wind Resource in Alaska



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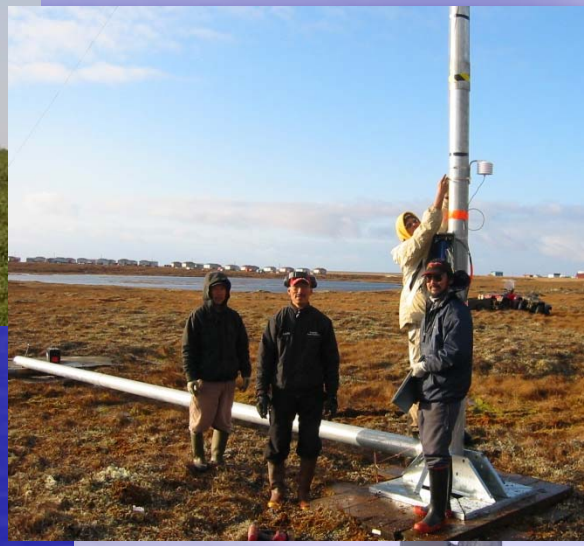
State Anemometer Loan Program

AEA provides:

- Tower kit
- Installation assistance
- Technical assistance



Community provides:

- Land use for 1 year of monitoring
- Installation assistance
- Maintenance
- Data collection

Location of Meteorological Towers

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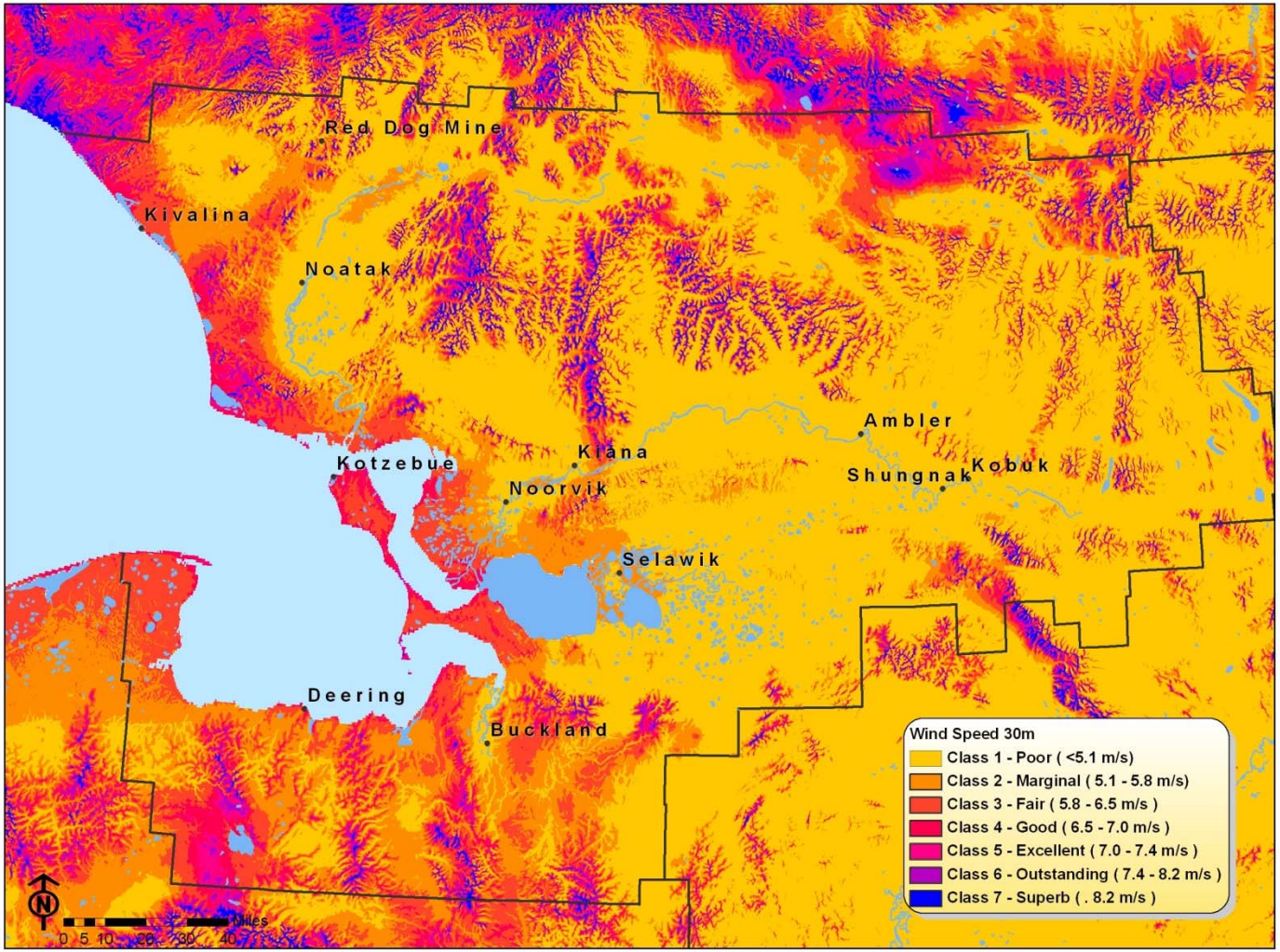
Wind Resource in NW Alaska

Wind Resource in the NWA Borough



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Community-Wind Resource

Community	Wind Class	Population
Ambler	1	277
Buckland	1	418
Deering	3-4	138
Kiana	1	401
Kivalina	4-5	391
Kobuk	1	135
Kotzebue	5-6	3,104
Noatak	1	470
Noorvik	1	636
Red Dog Mine	3-4	33
Selawik	1-2	841
Shungnak	1	260


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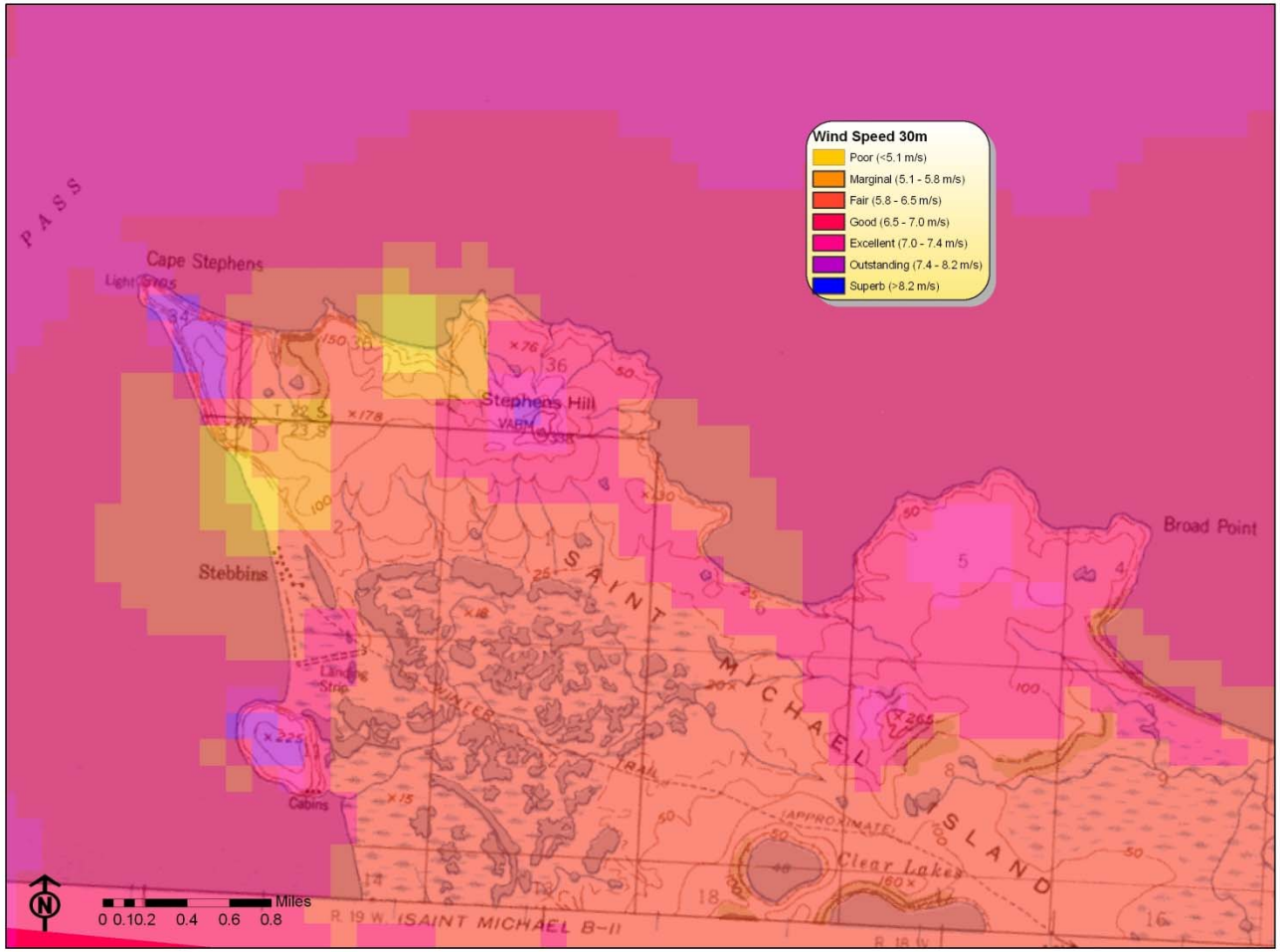
Local Wind Resource

Wind Resource in Stebbins



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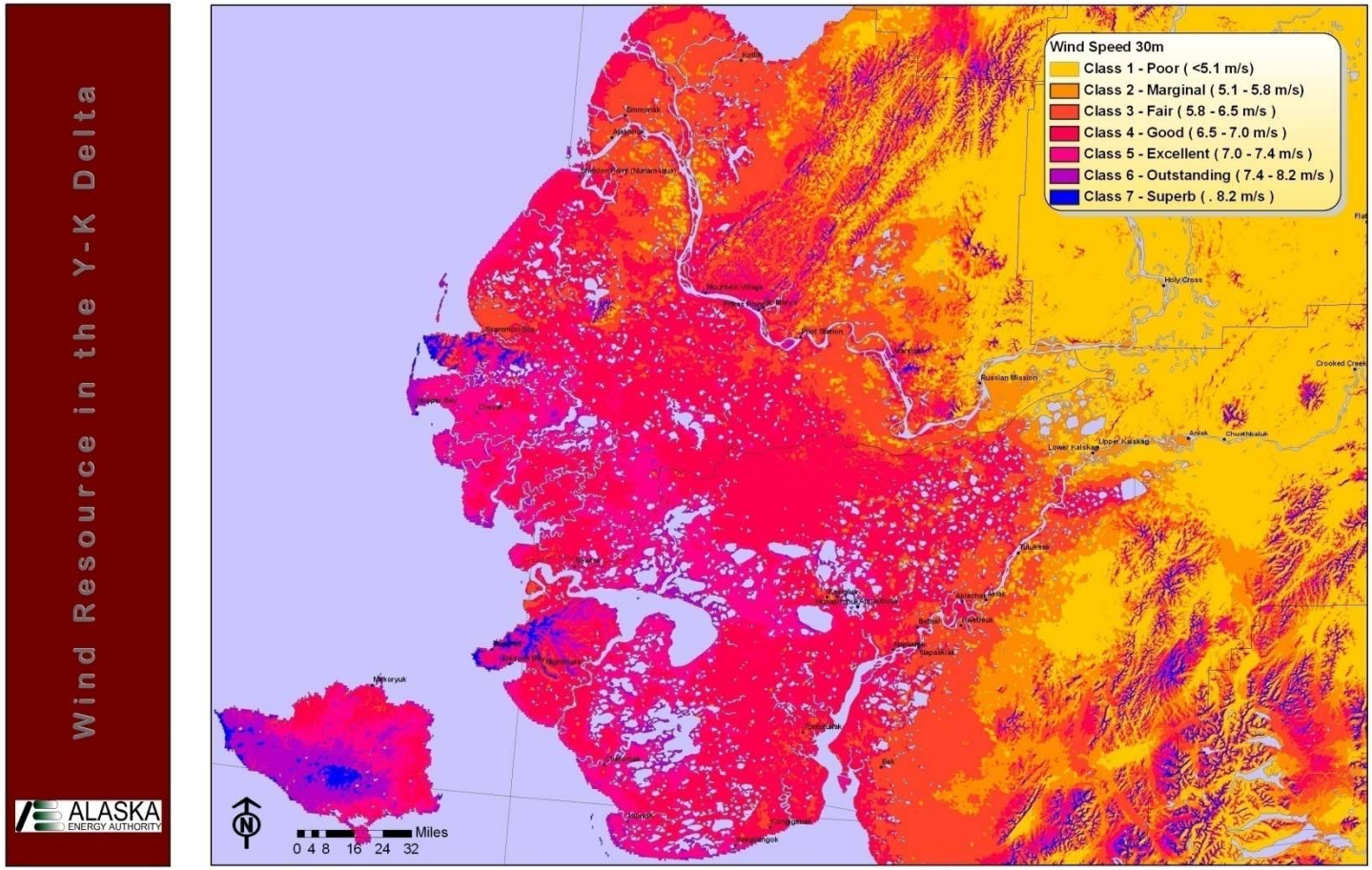
Wind Resource in the Y-K Delta





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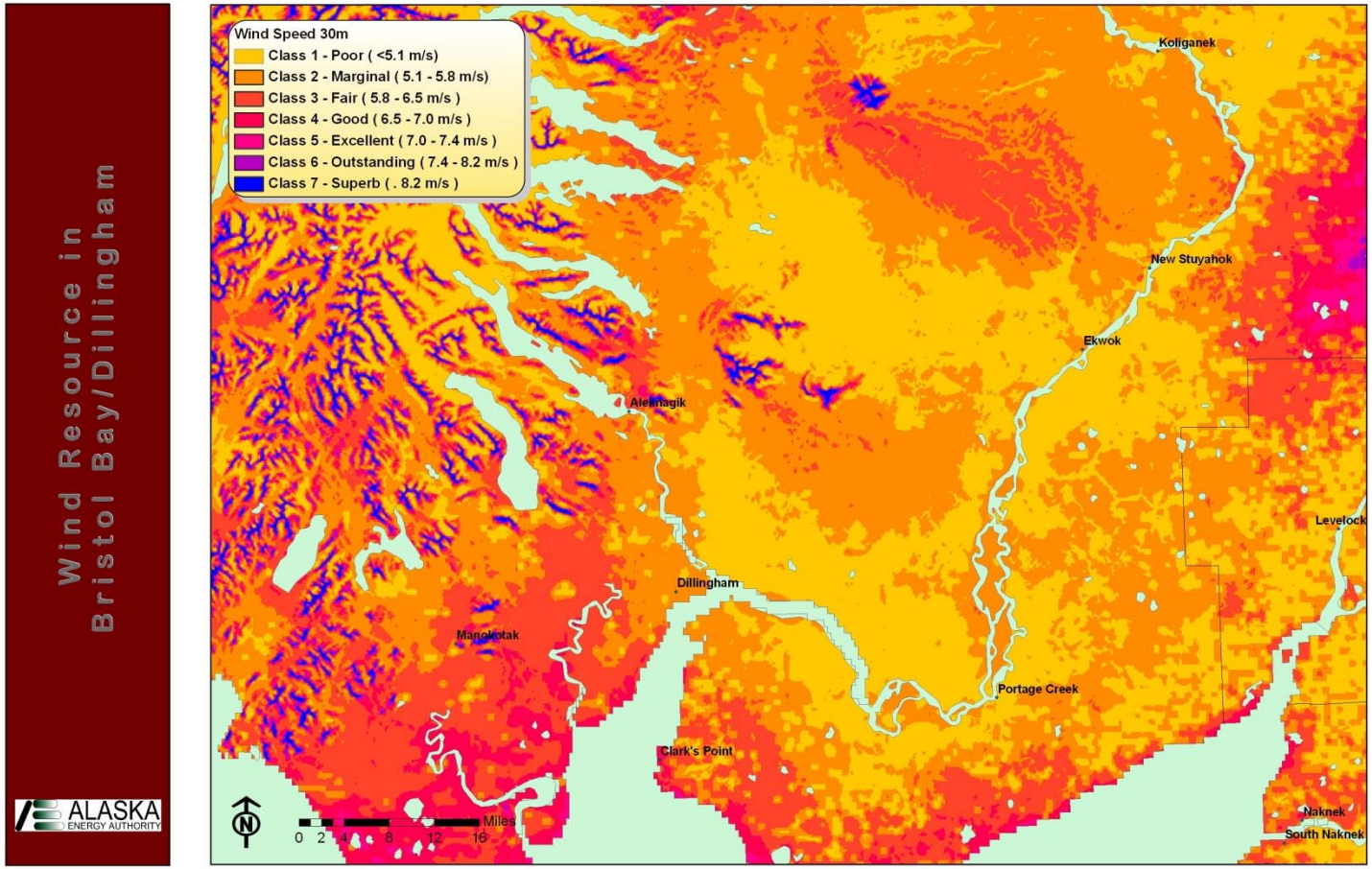
Wind Resource in Bristol Bay/Dillingham



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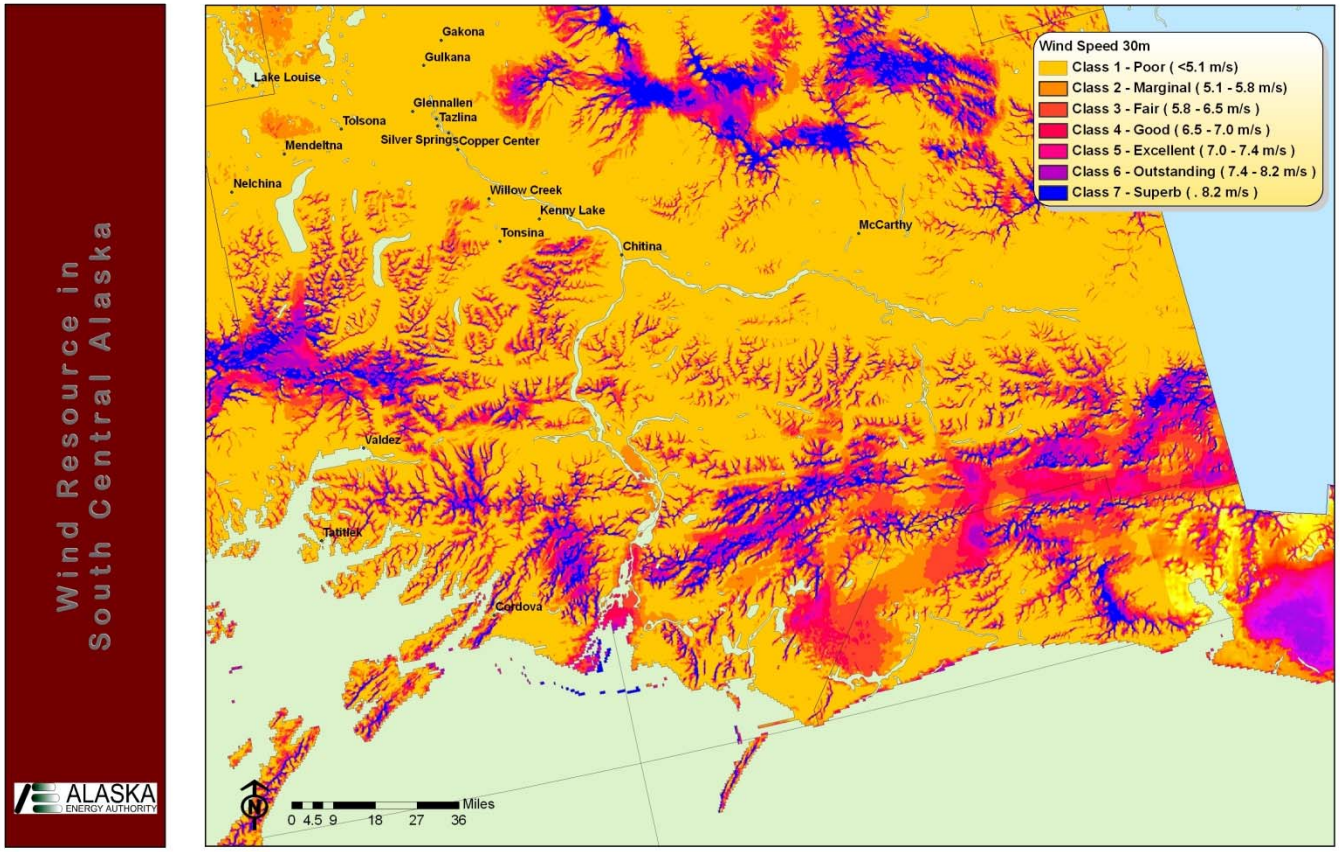
Wind Resource in South Central Alaska



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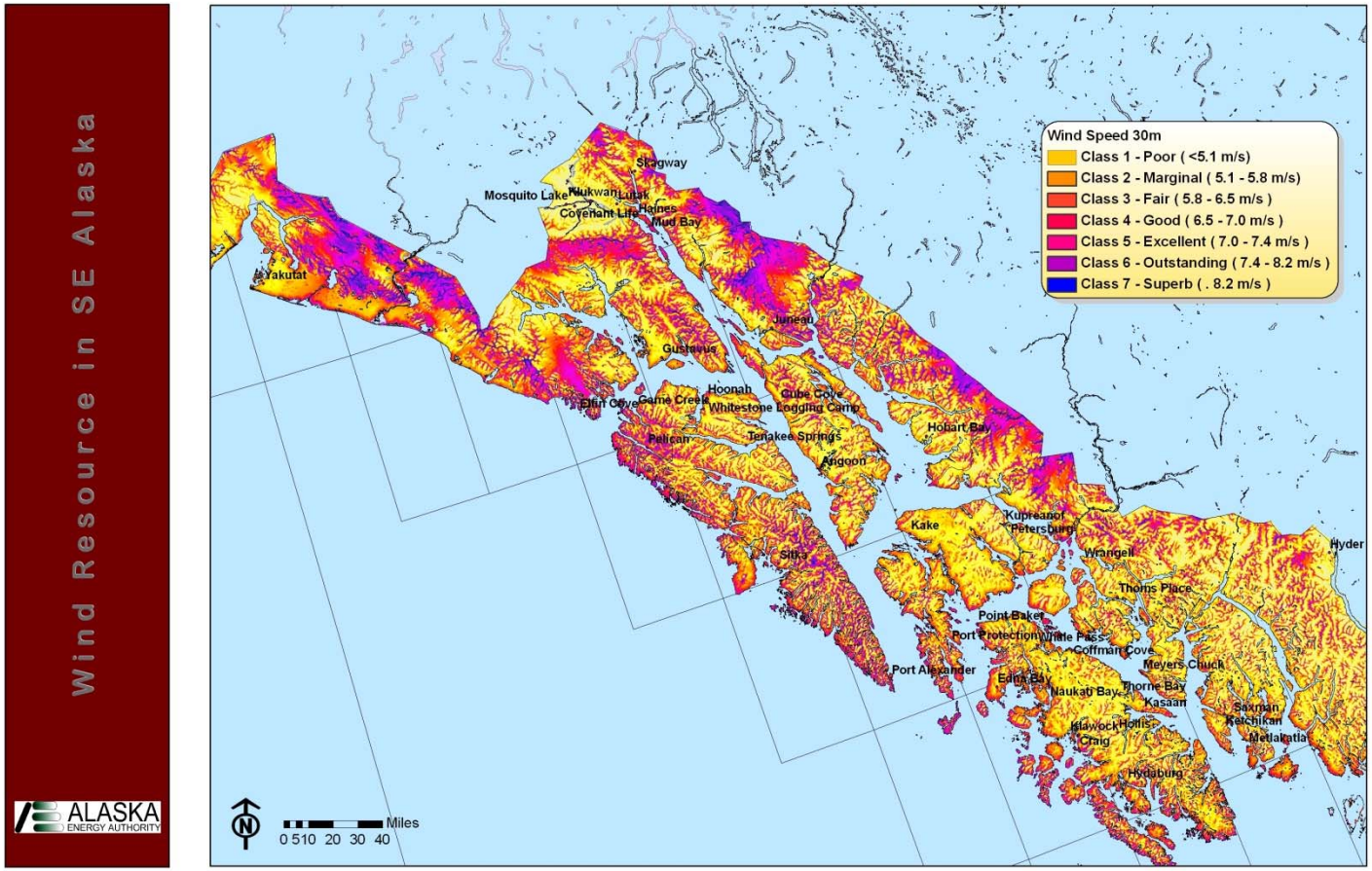
Wind Resource in SE Alaska



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Wind Farm Construction

Challenges in Alaska:

- Limited Construction Season
- High Transportation Costs
- Challenging Soil Conditions
- Size Limitation for Construction Equipment
- Remote Locations
- Severe Weather Conditions

Source: AEA

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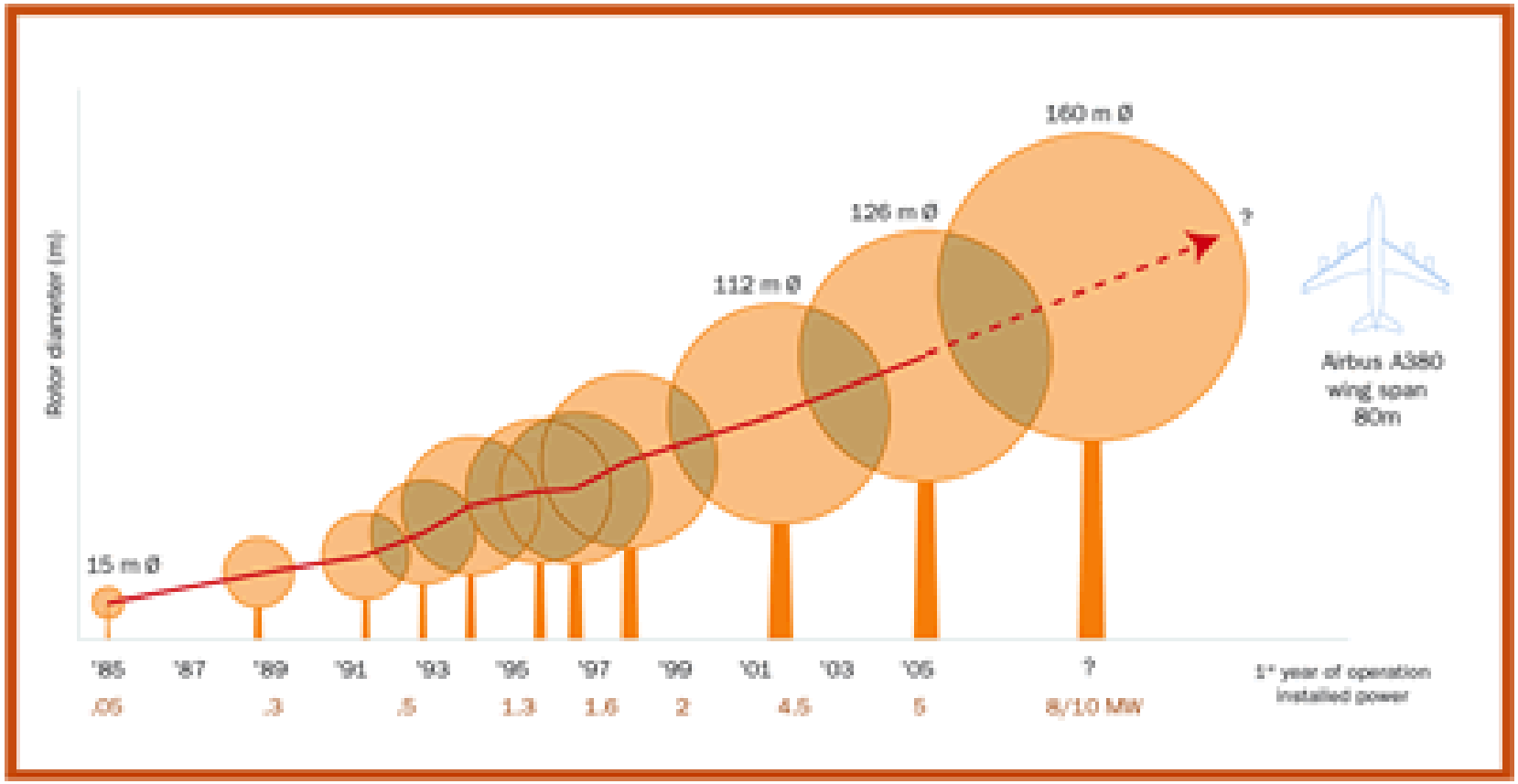
Turbine Development



Source: Jos Beurskens, ECN

Source: ECN

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Large Size Turbines

For Railbelt Applications and Offshore

Source: RE Power, NREL, Vestas

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Small Size Turbines

For Rural Applications

Source: Distributed Energy, Bergey, AEA (V15, Entegrity)

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Kotzebue Wind Farm Construction

Source: KEA

Transportation

Weather

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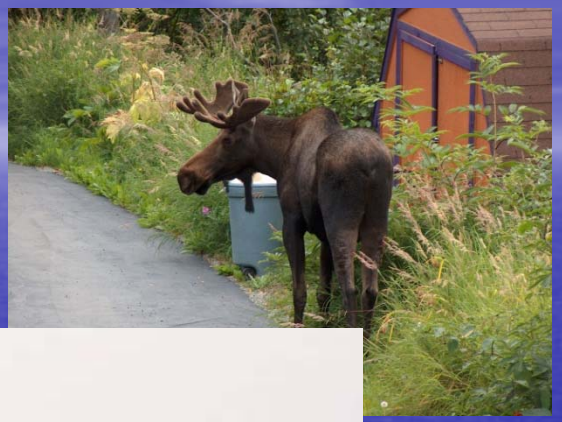
Wildlife



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Other Issues

Visual Impact

Noise Impact

Permitting

Landownership

Historical/Archeological

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Other Energy Options



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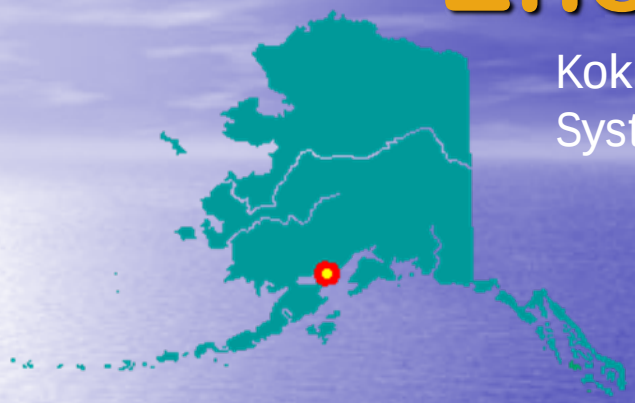
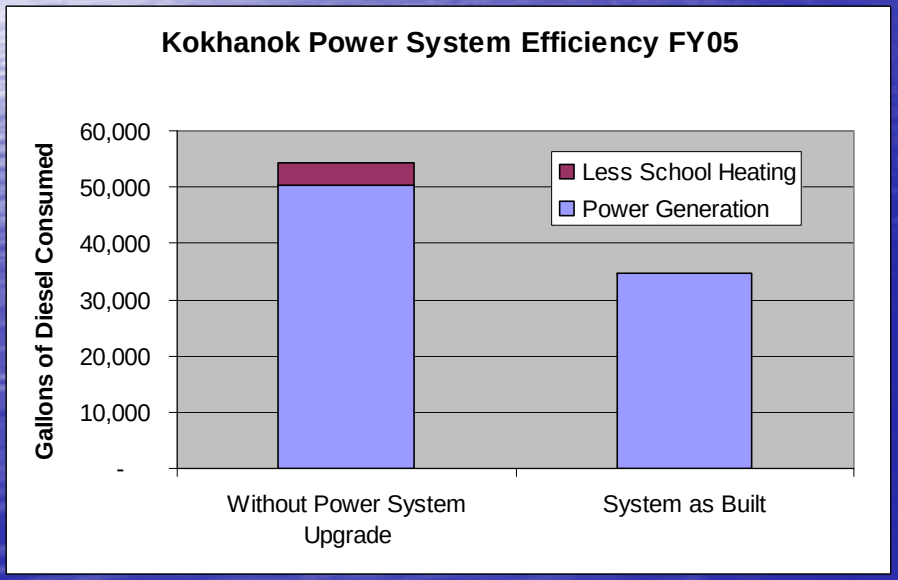
Energy Efficiency

Kokhanok: Power System Upgrade





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Energy Conservation

Facilities:

- Audits
- Upgrades

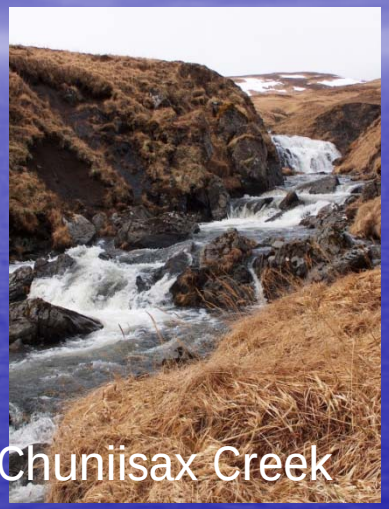
Homes:

- Weatherization
- Bulb, Appliance and Heating Upgrades

Small Hydroelectricity Projects

Atka

Old Town

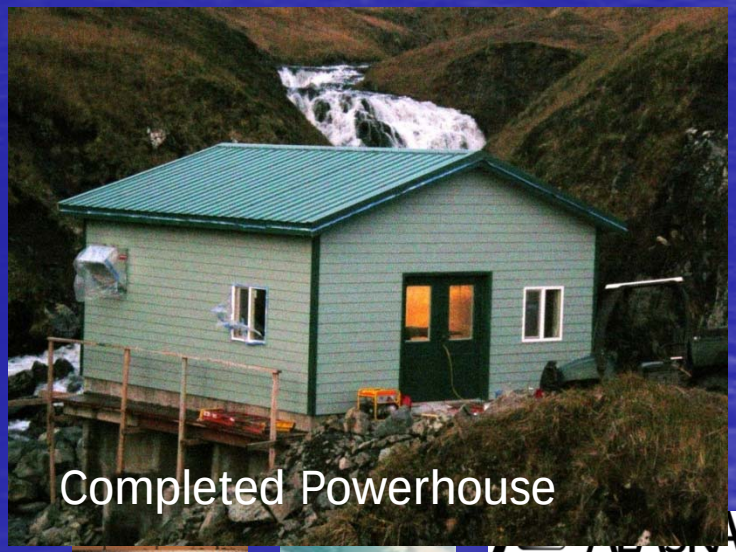


Chuniisax Creek

Site Construction

Turbine

Generator Installation



Completed Powerhouse

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Geothermal

Chena Hot Springs

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The Future

- Develop regional energy planning
- Continuous discussion of all Stakeholders in the region
- Affirmative resolutions
- Education & Training



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"We do not inherit the earth from our ancestors,

We borrow it from our children."

Native American Proverb

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