Regional Economic Wind Development in Rural Alaska

Wind Energy Applications Training Systems

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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
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.
What I’ll talk about

• Statewide Energy Issues
• Regional Economic Development
• Wind Resource in Alaska
• Other Energy Options
• The Future
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
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
Regional Economic Wind Development
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
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
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.
Implementation Strategies

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

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

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

Sustainability will result in
Economic Growth
Import Capital

Sustainability will result in
Economic Development
Job Creation
Wind Development

Sustainability
Revenues
Local Identification

NOTE: For discussion purposes only
Economics

Wind Energy Cost Trends

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

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

Source: NREL
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

Chena Hot Springs
Wind Resource in NW Alaska
## Community-Wind Resource

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Local Wind Resource
Wind Resource in the Y-K Delta
Wind Resource in Bristol Bay/Dillingham
Wind Resource in South Central Alaska
Wind Resource in SE Alaska
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
Turbine Development

Source: ECN
Large Size Turbines

For Railbelt Applications and Offshore

Source: RE Power, NREL, Vestas
Small Size Turbines

For Rural Applications

Source: Distributed Energy, Bergey, AEA (V15, Entegrity)
Kotzebue Wind Farm Construction

Source: KEA
Transportation
Weather
Wildlife
Other Issues

Visual Impact
Noise Impact
Permitting
Landownership

Historical/Archeological
Other Energy Options
Energy Efficiency
Kokhanok: Power System Upgrade

Kokhanok Power System Efficiency FY05

- Gallons of Diesel Consumed
- Without Power System Upgrade
- System as Built

- Less School Heating
- Power Generation
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
Geothermal

Chena Hot Springs
The Future

- Develop regional energy planning
- Continuous discussion of all Stakeholders in the region
- Affirmative resolutions
- Education & Training
“We do not inherit the earth from our ancestors, we borrow it from our children.”

Native American Proverb
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