

# Renewable Energy for Rural Alaska

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Denali Commission  
Anchorage, Alaska  
February 18, 2009

# What is Renewable Energy Alaska Project (REAP)?

- Alaska's first and only *education and advocacy* group for renewable energy
- An Alaskan coalition of small and large electric utilities and utility interests, environmental groups, consumer groups, businesses, Alaska Native organizations and energy agencies with the goal of “increasing the production of renewable energy in Alaska.”

# REAP Board of Directors

Aleutian/Pribilof Islands Association (APIA)  
Yukon River Inter-Tribal Watershed Conference  
Cook Inlet Region Incorporated (CIRI)  
Chugach Electric Association (CEA)  
Municipal Light and Power (ML & P)  
Golden Valley Electric Association (GVEA)  
Homer Electric Association (HEA)  
Kotzebue Electric Association (KEA)  
Alaska Village Electric Cooperative (AVEC)  
TDX Power  
Alaska Power Association (APA)  
Alaska Power and Telephone  
Sierra Club  
Alaska Center for the Environment  
Alaska Conservation Alliance  
Alaska Public Interest Research Group (AkPIRG)  
Rural Alaska Community Action Program (RurALCAP)  
Green Star  
Chena Hot Springs  
PowerCorp Alaska, Inc.  
ABS Alaskan

# REAP Contributing Members

Alaska Energy Authority

Denali Commission

USDA Rural Development

National Renewable Energy Lab (NREL)

Alaska Housing Finance Corporation

City of Bethel

Alaska Center for Energy & Power

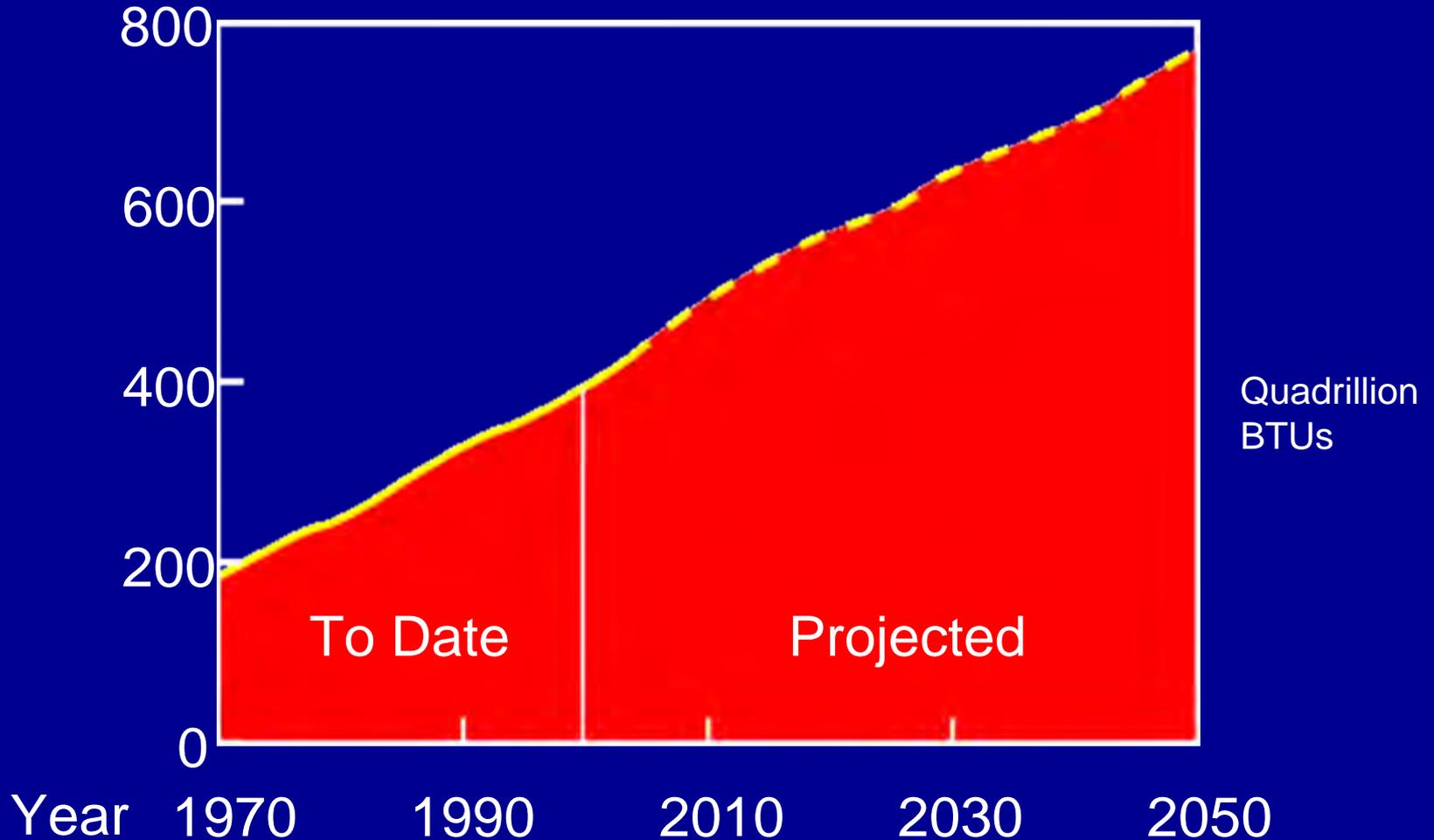
Alaska Municipal League

# Other REAP Organizational Members

- Matanuska Electric Association (MEA)
- Naknek Electric Association
- Kodiak Electric
- City of Ketchikan
- Copper Valley Electric Association (CVEA)
- Nome Joint Utilities
- City of Sitka
- Siemens Building Technologies
- enXco
- First Wind
- IBEW Local 1547
- Northern Power Systems
- STG, Inc.
- ORMAT Technologies
- Alaska Center for Acupuncture
- Alaska Green Energy, LLC
- Ameresco
  - BQ Energy
- Hydro Green Energy
- Ocean Renewable Power Company
- Premium Biofuel, LLC
- RIM Architects
- TerraSond
  - V3 Energy, LLC
- Lapp Industries
- NANA Pacific
- Polarconsult
- Northern Alaska Environmental Center (NAEC)
- Alaska Building Science Network (ABSN)
- Cold Climate Housing Research Center

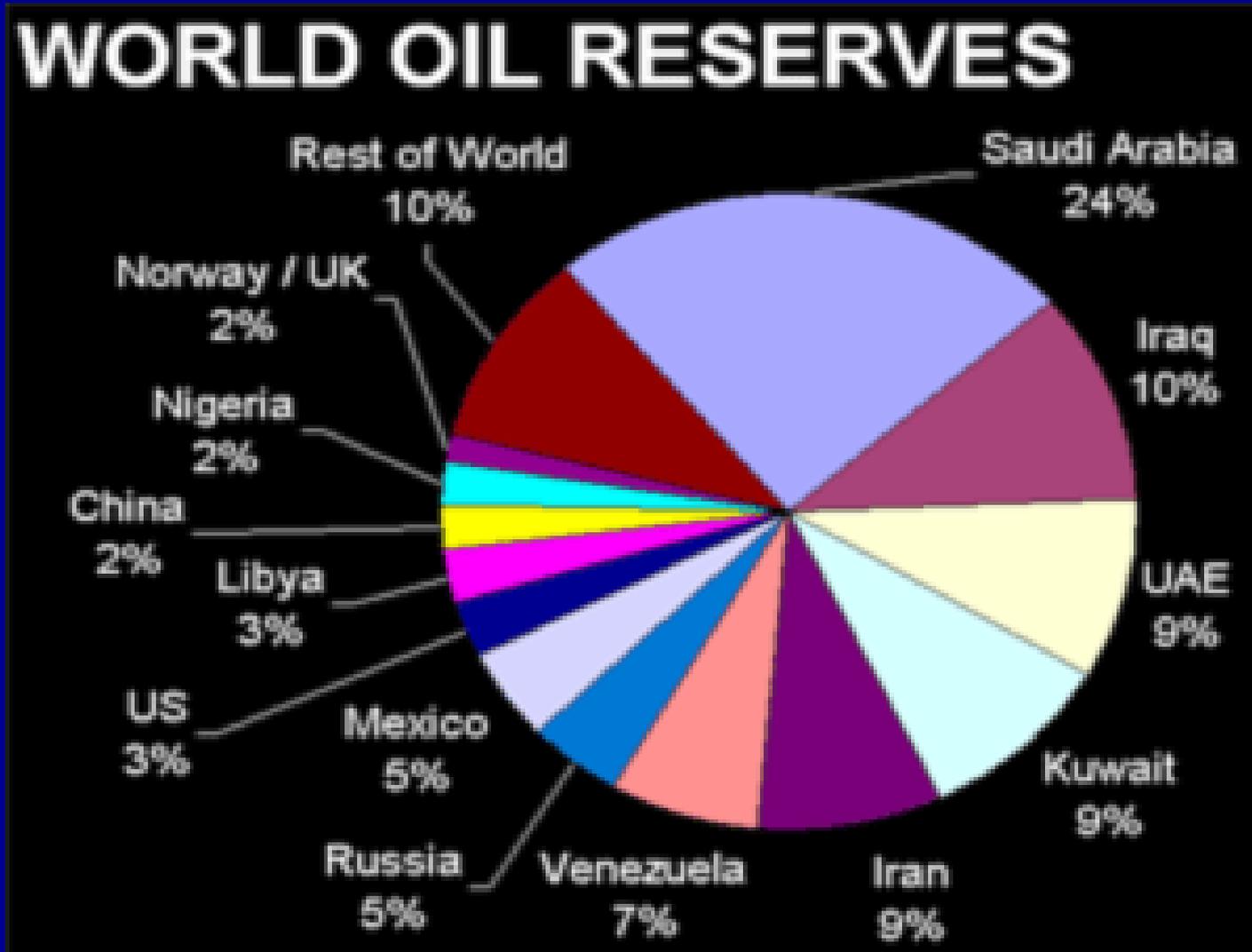
# Renewable Energy is Risk Management:

Worldwide Energy Use Expected to Double by 2050



# Renewable Energy is Risk Management

Two Thirds of the World's Proven Conventional Oil Reserves are in the Persian Gulf



# Renewable Energy is Risk Management: The World's Climate is Changing



“For Swiss Re, climate change is more than a scientific issue. It is a financial issue.”

Chris Walker, Managing Director, Greenhouse Gas Risk Solutions Unit for Swiss Re, the world's second largest re-insurer

# Renewable Energy is Risk Management:

The \$55 billion/yr Clean Energy Market is Expected to Quadruple by 2015

Sharp

Enercon

Vestas

British Petroleum

Gamesa

Toyota

Suntech



# Alaska's Renewable Energy Resources

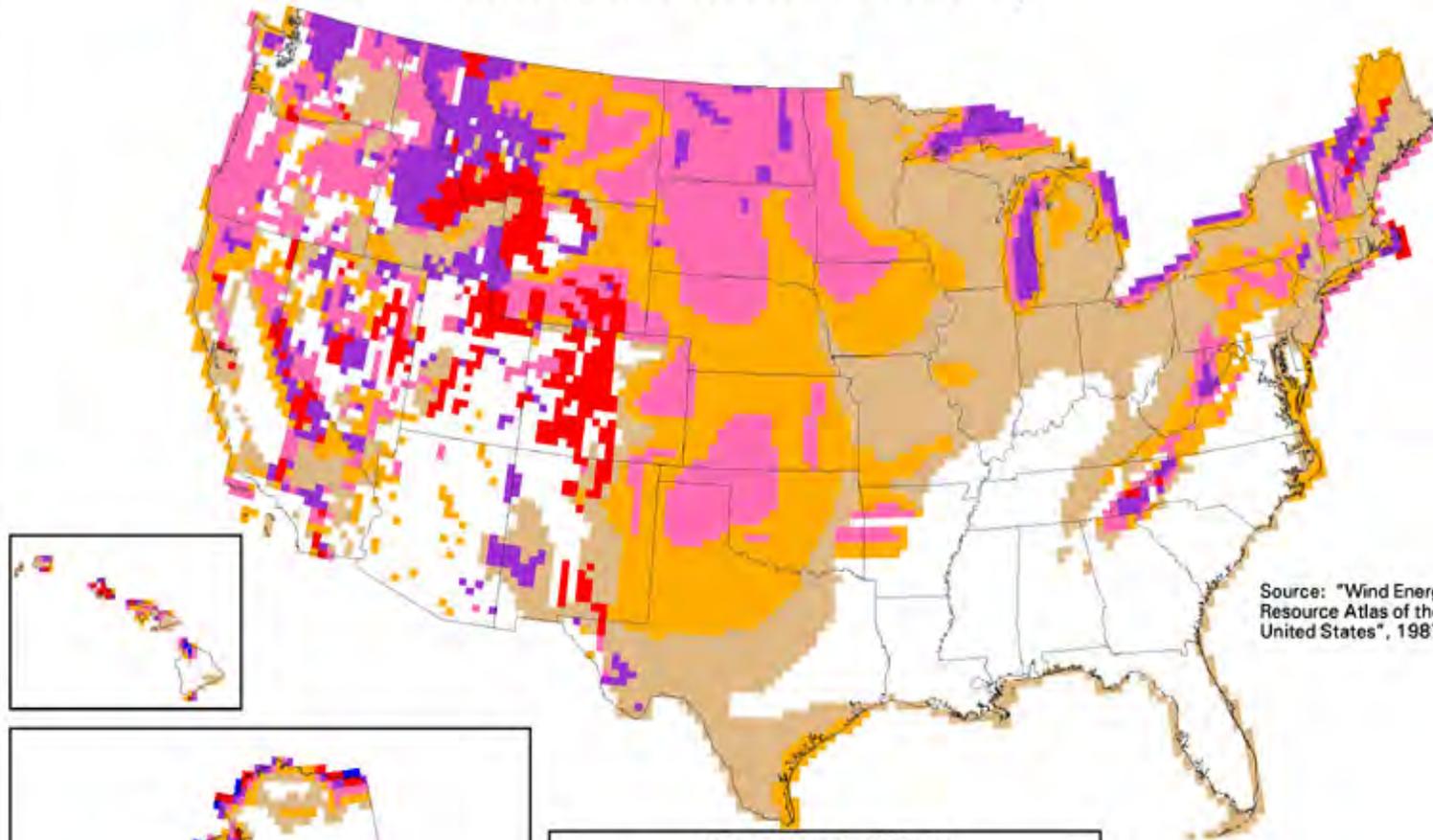


- Wind
- Geothermal
- Biomass
- Tidal/Wave
- Hydro
- Solar

# Advantages of Renewable Energy

- Stably Priced (no fuel costs)
- Clean
- Inexhaustible
- Local

# United States - Wind Resource Map



Source: "Wind Energy Resource Atlas of the United States", 1987

## Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m $W/m^2$	Wind Speed <sup>a</sup> at 50 m m/s	Wind Speed <sup>a</sup> at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

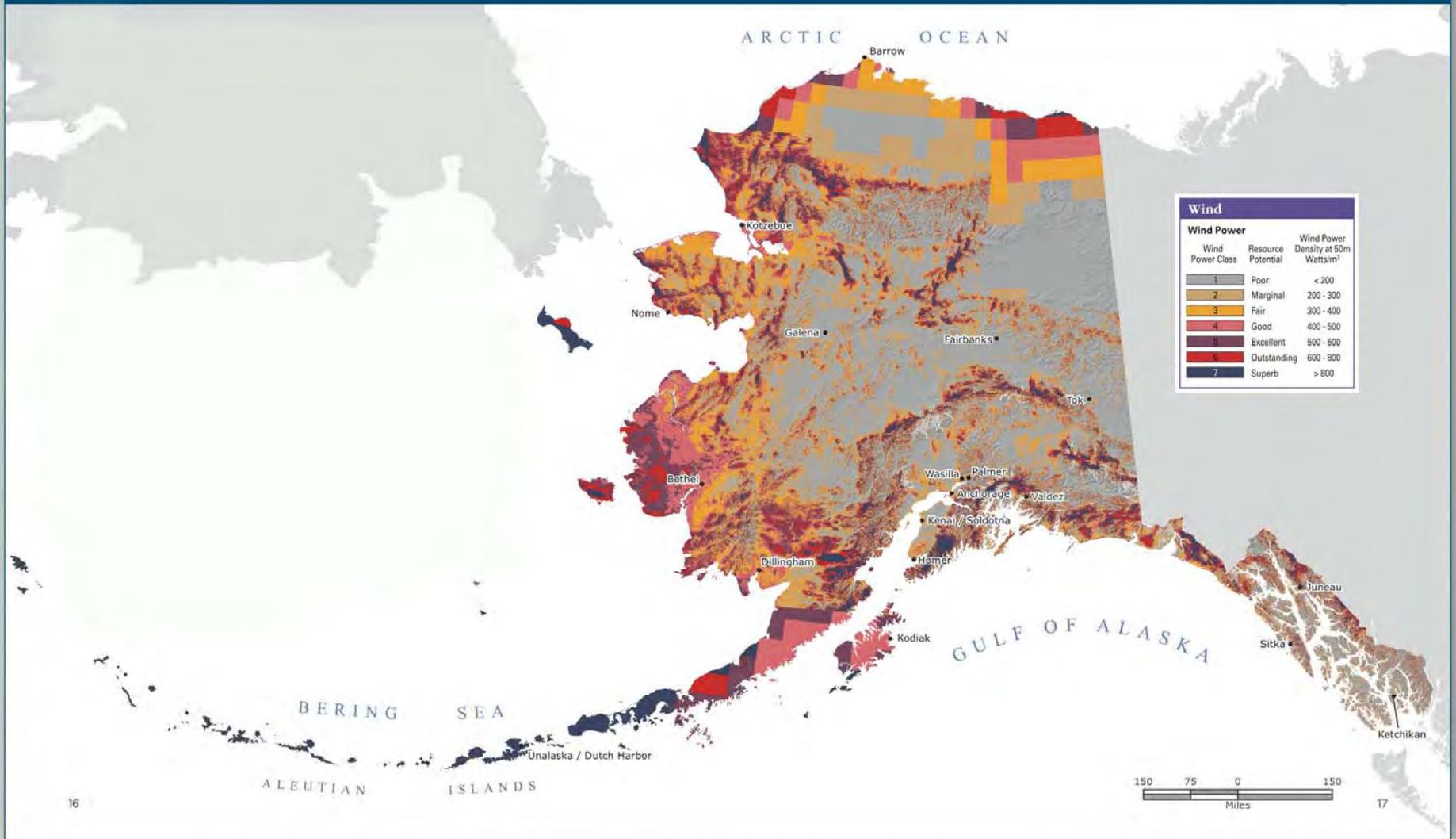
<sup>a</sup> Wind speeds are based on a Weibull k value of 2.0

U.S. Department of Energy  
National Renewable Energy Laboratory

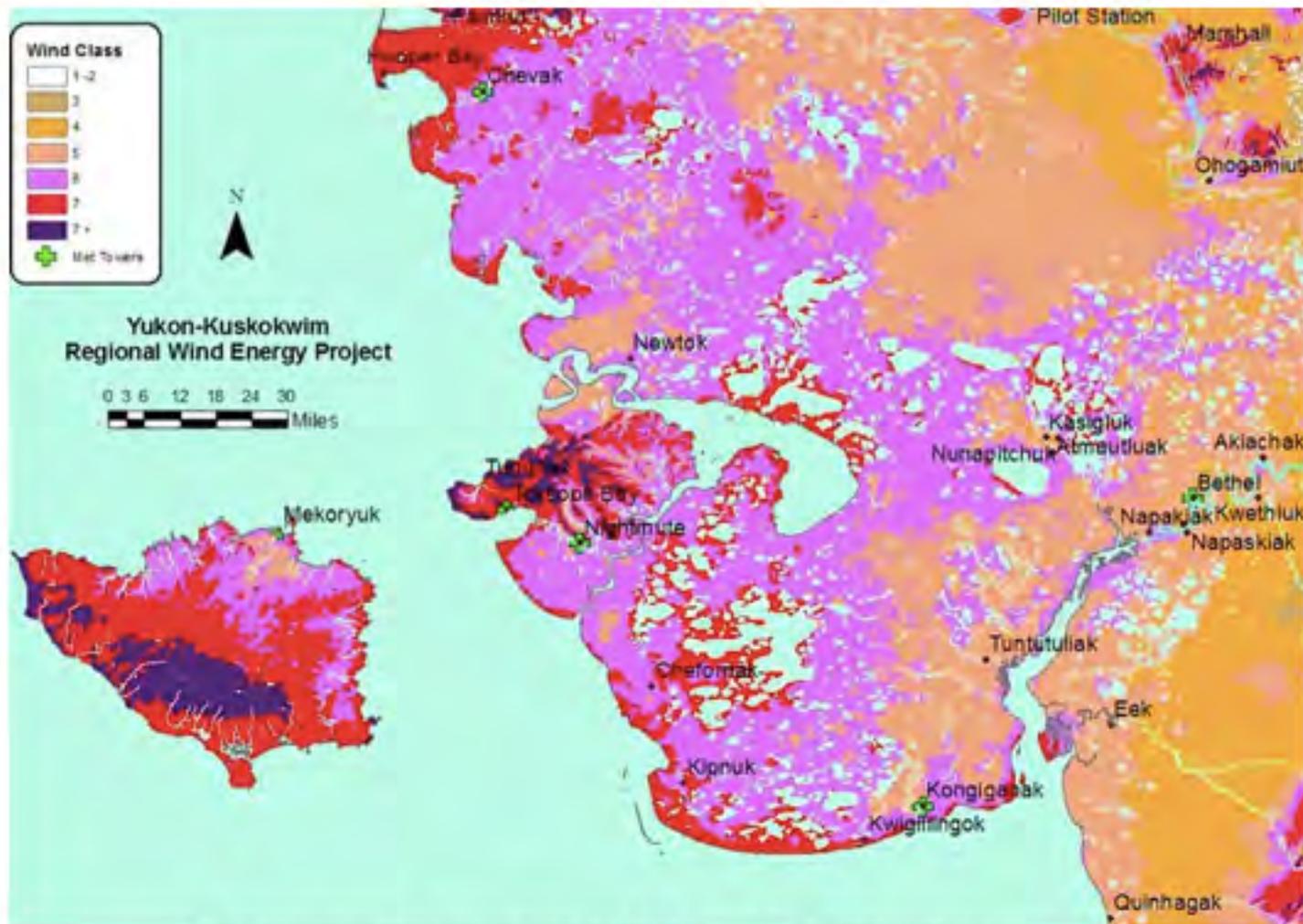


20-MAR-2000 1.1.5

# Wind



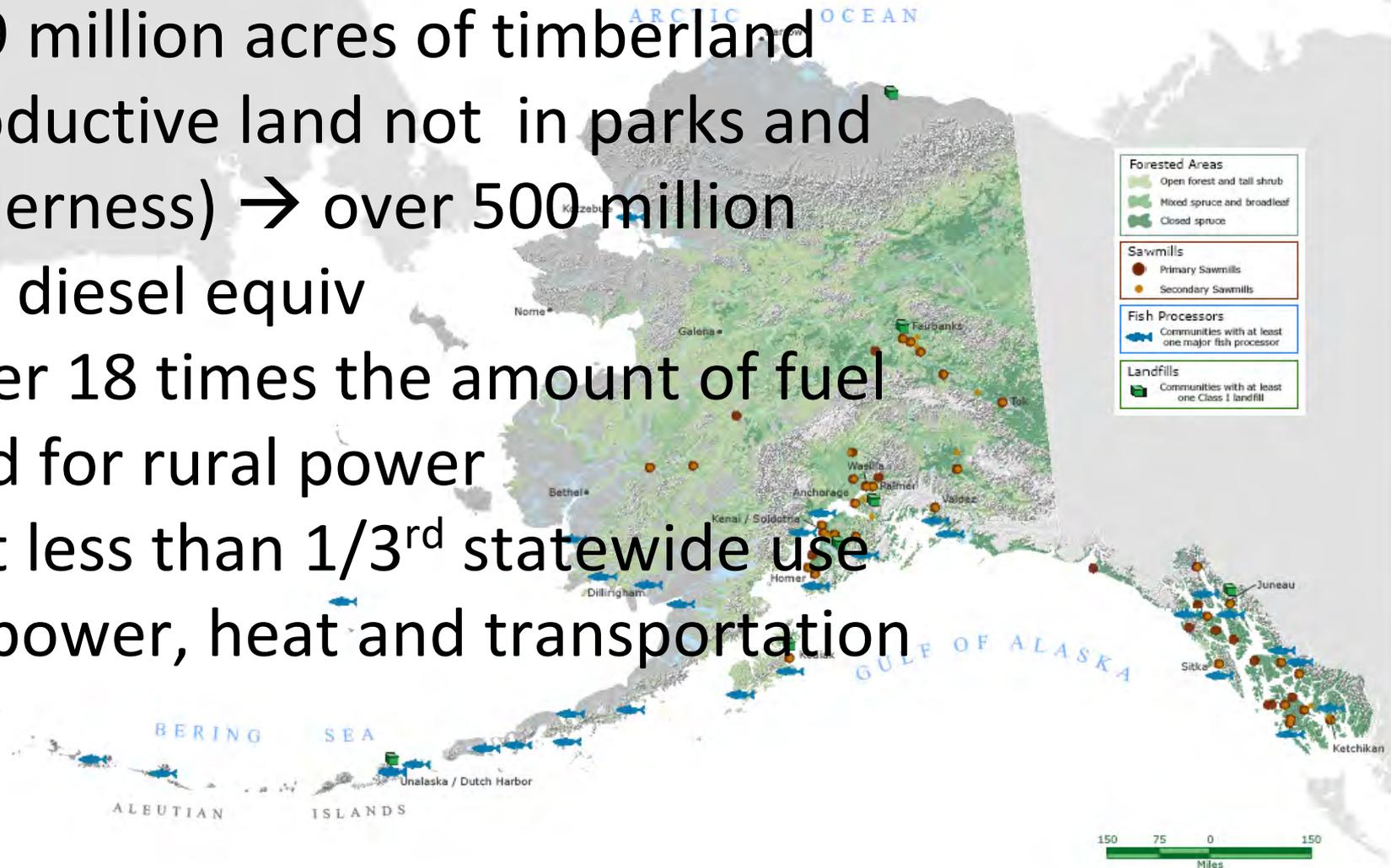
# Wind Map of Y-K Region



# Wood Energy

11.9 million acres of timberland  
(productive land not in parks and  
wilderness) → over 500 million  
GPY diesel equiv

- Over 18 times the amount of fuel  
used for rural power
- But less than 1/3<sup>rd</sup> statewide use  
for power, heat and transportation



# Wood Projects Feasible in up to 35 Communities

Atmautluak, Beaver, Coffman Cove, Galena, Homer, Huslia, Kasigluk, Kotlik, Naukati, Sitka, Stebbins, Stevens Village, St. Marys, Takotna, Thorne Bay, Juneau, Hoonah, Tanana, Kasilof, Gulkana, Haines, Craig, Tok, Tanacross, Ionia, Ft. Yukon, Coffman Cove, Nenana, Dot Lake, Mentasta Lake, Northway, Ketchikan, Klukwan, Tyonek, Pedro Bay, McGrath, Tetlin, Gulkana, Copper Center, Kenny Lake, Fairbanks, Kokhanok, Elim, Aniak, Klawock, and Venetie.

# Fish Oil



- Over 8 million gallons total utilized for power and heat generation in Dutch Harbor and Akutan
- Requires minimal processing to be made usable as fuel
- Being burned as 50/50 blend in generators and boilers
- Over 13 million gallons more is put out to sea

# Chena Hot Springs Resort

Lowest temperature geothermal plant in the world (165°F)

Displacing @150,000 gallons of diesel per year



# Alaska Ocean Energy Resources

## Tidal Electric Generation Potential

MW

- 1.3 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 220

## Wave Power Resource

kW/m

- 26 - 30
- 30 - 40
- 40 - 50
- 50 - 56

**DRAFT**



# Ocean Energy – Tidal and Wave Power



Alaska has over 50% of the nation's tidal power potential, and more than 75% of the nation's wave energy potential

Limited to a few demonstration projects so far

Twelve FERC permits granted in Alaska

Experts expect commercialization of technologies in the next 5-7 years



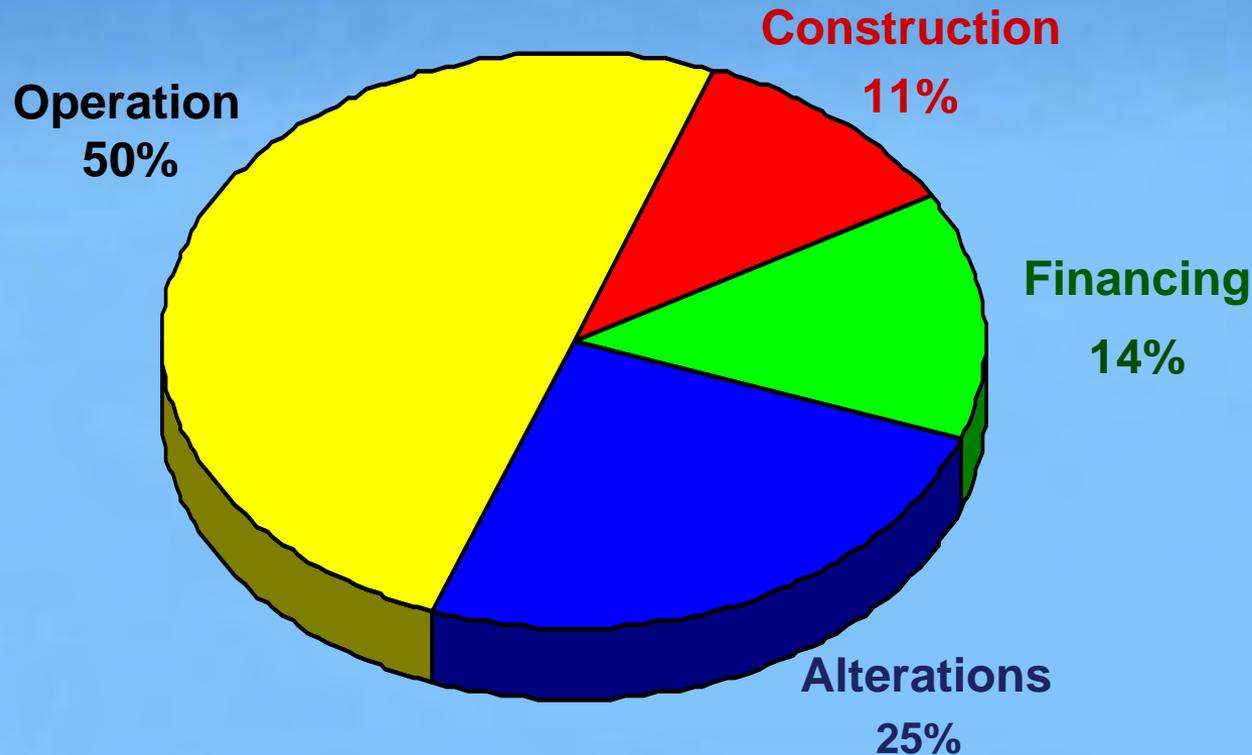
# Tidal Technology Applied to Rivers Ruby, Alaska



# Energy Efficiency



# Building Cost over 40 Years: Real World Costs\*



\*ASHRAE - American Society for Heating, Refrigeration & Air Conditioning Engineers

# State Energy Efficiency Study & Recommendations

- State Leadership
- Funding Energy Efficiency
- Public Education and Outreach
- Baseline Data
- Existing Residential Buildings
- New Residential Construction
- Existing Commercial Buildings
- New Commercial Construction
- Public Buildings.

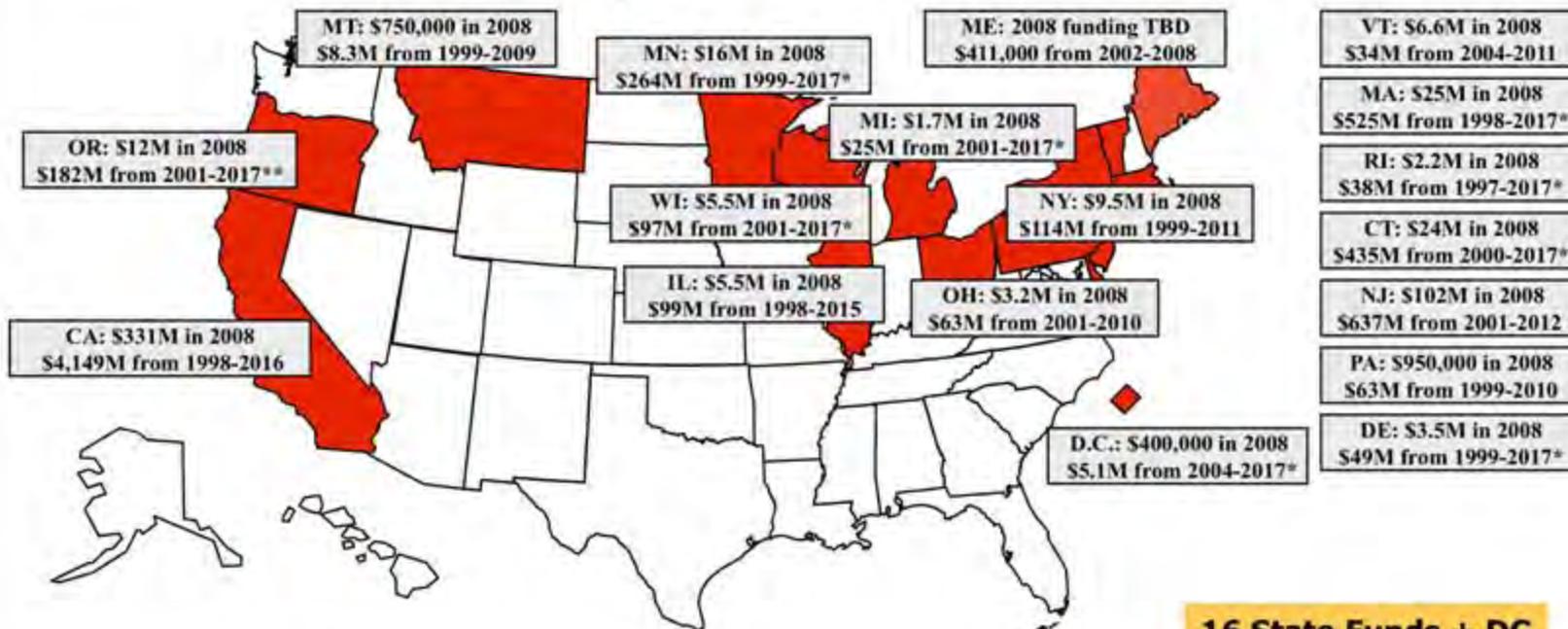
# Federal Production Tax Credit

- Primary Federal Policy
- 1.9 cent kWh tax credit
- Expires December 2009/2010

www.dsireusa.org

March 2008

## Public Benefit Funds for Renewables (Estimated Funding)



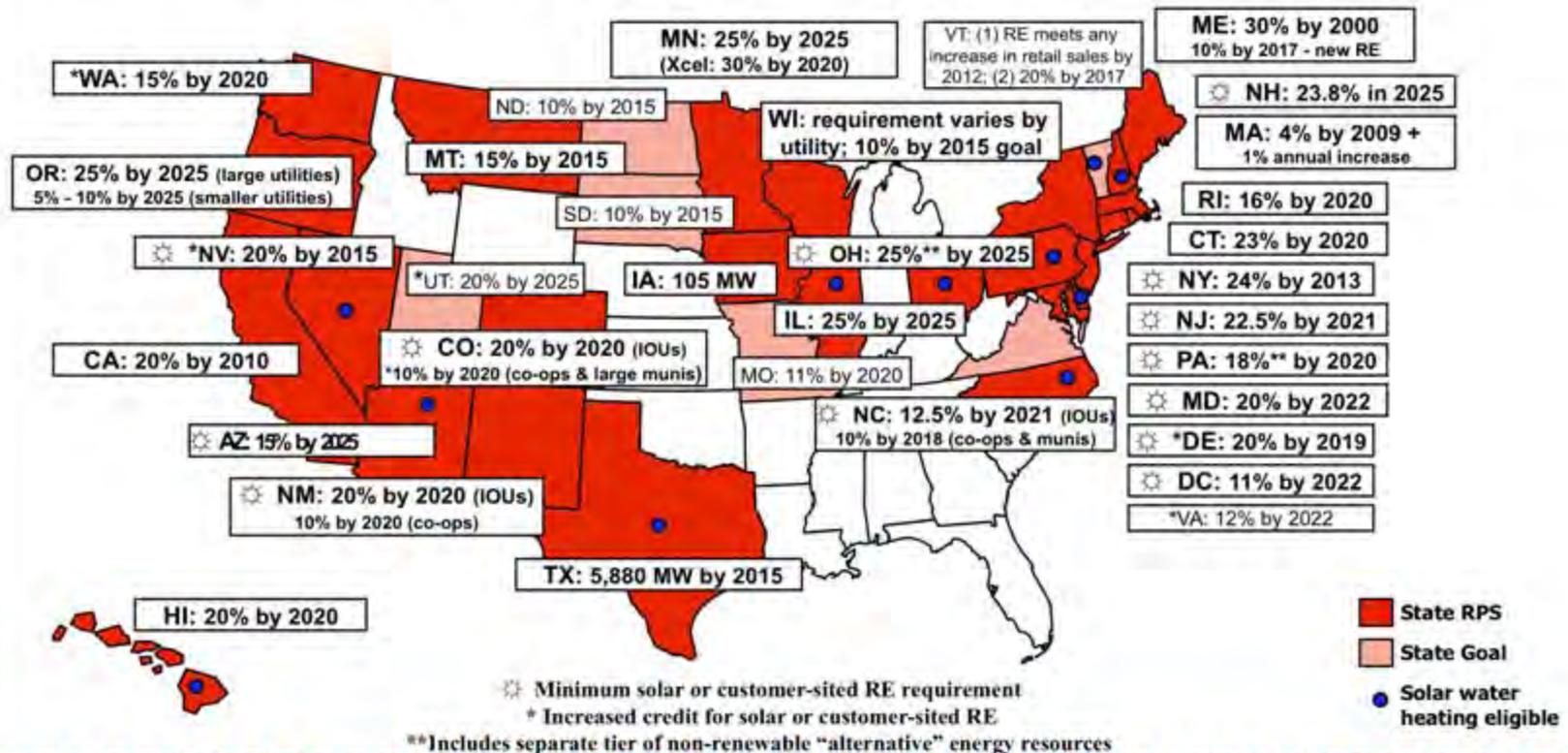
**16 State Funds + DC**  
**~\$6.8 B by 2017**

\* Fund does not have a specified expiration date.  
\*\* The Oregon Energy Trust is scheduled to expire in 2025.

(NOTE: Slides 2-9 explain the methodology for calculating funding estimates.)

■ Funded by voluntary contributions

# Renewables Portfolio Standards



# 2008 Alaska Legislative Session

HB 152 created a Renewable Energy Fund and commits \$50 million per year for five years for grants for utility scale renewable energy projects and studies (\$50 million added in special session for a total of \$100 million in Year #1)

SB 289 committed an additional \$200 to weatherization programs and \$100 million to efficiency rebate programs (\$60 million added in special session for a total of \$360 million)

# Renewable Energy Fund

77 projects have been recommended by AEA and the seven member advisory committee, out of an initial 114

The legislature approved spending the first \$100 million appropriated for those 77 projects on 2-17-09

Round II Proposals were submitted in November, resulting in @115 additional proposals

The next \$50 million for Round II is still not appropriated, though it is in the Governor's budget

# Emerging Energy Technology Development Fund

Would create an Alaska Energy Trust to administer grants and loans for R & D and demonstration projects for renewable energy and energy efficiency

Would coordinate workforce training and development

Alaska could get “first mover” advantage in several technologies including:

- Biomass gasification
- Tidal and Wave power
- Energy Storage

# Current Energy Planning Efforts

State of Alaska

Tri-Borough Commission

Railbelt Electrical Grid Authority

Balanced Energy Plan for Alaska

Anchorage Chamber of Commerce

Alaska State Chamber of Commerce

Anchorage Municipal Assembly

Tlingit Haida Central Council

Fairbanks Economic Development Council

# Next Steps

- Develop a statewide energy policy!!!
- Implement Alaska Energy Efficiency Report recommendations
- Work Force Development
- Funding for Renewable Energy R & D
- More \$\$\$ in the Renewable Energy Grant Fund

# Why Renewables Now?

All economies need affordable energy to prosper

The price of fossil fuel will likely continue to trend upward

Coal, natural gas and diesel will all likely face carbon regulation/tax

Power plants are 20-100 year decisions

Major decisions for Alaska's long term future will be made in the next 5 years

# Iceland's Vision

## vision

- Iceland's government wants it to become the world's first fully Hydrogen-driven economy by 2050
- Producing enough Hydrogen would ~~mean~~ that Iceland would no longer need to import any fossil fuels
- A recent survey showed 93 per cent of Icelanders to be behind the idea
- Ríkisstjórnin hefur lýst vilja sínum til þess að Ísland verði fyrsta vetnissamfélag heims, líklega um 2050
- Með því að framleiða nægilegt vetni á Íslandi gæti olíuinnflutningur orðið óþarfur
- Nýleg könnun gaf til kynna að um 93% þjóðarinnar styður hugmyndina

# Thanks!



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