

02/22/13

Overview:

Lessons

Learned in

Iceland by

Institute of

the North

<TARGET><BILL></BILL><SUBJECT>02-22-13 Overview Lessons
Learned in Iceland by Institute of the
North</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature

House Special Committee on Energy



Rep. Charisse Millett

Capitol Building, Room 403
Juneau, AK 99801
Phone (907) 465-3879
Fax (907) 465-2069
rep.charisse.millett@akleg.gov

Rep. Doug Isaacson

Capitol Building, Room 13
Juneau, AK 99801
Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.org

Agenda

Wednesday, February 22, 2013

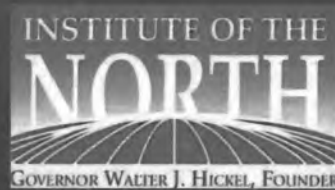
8:00 – 10:00 a.m.

Barnes Committee Room (#124)

- + Report on Lessons Learned in Iceland and around the Circumpolar North Presented by Nils Andreassen, Executive Director, and Ira Perman, Past Chair – Board of Directors, Institute of the North
- * First hearing in first committee of referral
- + Teleconferenced
- = Bill previously heard/scheduled

###

Report on Lessons Learned in Iceland and around the Circumpolar North



Nils Andreassen
Executive Director

Ira Perman
Past Chair - Board of Directors

Presentation to House Energy - February 22, 2013

Reality, Richness, Responsibility

Our values

- Value the Arctic as a *commons* with management of resources for the benefit of peoples and communities of the North
- Focus on responsible energy and infrastructure development that facilitates sustainability
- Goal of healthy, prosperous and resilient communities
- Elevate the voices of northern peoples in state, national and international arenas



Reality, Richness, Responsibility

Our work

- Convene and facilitate civic discourse in order to cultivate an engaged citizenry
- Inform public policy through outreach and education
- Sustain networks of stakeholders, policy makers and technical experts
- Synthesize research for broader awareness and accessibility



Energy & Transportation Infrastructure

- Arctic port and airport infrastructure, response capacity
 - Arctic Maritime and Aviation Transportation Infrastructure Initiative
 - An Arctic Council SDWG project
 - Inventory of ports and airports around the Arctic
- Arctic Energy
 - Arctic Energy Summit 2013
 - Akureyri, Iceland
 - Expert presentations
 - Best practices
 - Latest technology
 - Sustainable development



Strengthening Networks

- Current networks include:
 - Arctic Energy Network
 - PNWER Arctic Caucus
 - Bering Strait region
- Circumpolar Policy Tours
 - Norway 2011
 - Iceland 2012
 - Greenland 2013?
 - Provideniya?



Responding to

Fundamental challenges facing Alaska:

- Declining oil production
- Decreased state revenue
- High energy costs in Fairbanks and much of Alaska
- Significant fiscal hurdles in next decade

Search for best practices, new and innovative policies and systems that have derived maximum benefit from their resources for their people

Lessons from Iceland

Energy Policy Report to Alaskans



Institute of the North

Iceland Policy Tour - An Overview

- Policy Meetings with
 - Parliament
 - President
 - Ministry of Foreign Affairs
 - Ministry of Industries and Innovation
- Renewable Energy Industry Visits to
 - Landsvirkinn – Iceland's National Energy Company
 - Karahnjúkar Dam's Fljótisdalur power station
 - Hellisheidi Geothermal Plant
 - Reykjavik Geothermal
 - Municipality of Arborg/Selfoss District Heating
 - Mannvit Engineering
 - Verkis Consulting
- Economic Development: Energy Intensive Industries
 - ALCOA Fjarðaál aluminum smelter
 - Verne Global data center
 - Fluda Sveppir mushroom plant
- Research/Education
 - University of Iceland
 - Gekon Consulting (cluster management)



SNAPSHOT OF ICELAND (2011):

- Population: 320,000
- Area: 40,000 sq miles (The size of Kentucky)
- Latitude: 64 to 67 degrees North.
- Climate: Mild - Warmed by the Gulfstream
- Income Per Capita: \$38,000 (vs. \$65,543 AK)
- Government: "Althingi" The world's oldest parliamentary democracy. 85+% voter turnout
- Currency: Kroner (ISK); Not part of the E.U.
- Geology: Volcanic; No Hydrocarbons

PERPETUAL ENERGY: Hydroelectric and Geothermal

- Replaced Coal and Oil
- Hydro: 70% of Iceland's electricity
- Geothermal: 90% of Iceland's heating
- Hydro: Financed by long term contracts with commercial smelters. i.e.: ALCOA/Karahnjukar
- Inexpensive commercial power: 2-3cents/KWH
- Residential costs: 11 cents/KWH; Heat \$90/month
- Not exported (Off the European Grid), except through value-added products

Geothermal Playground



Pick a Resource

Resource Assessment

Identify Comparative Advantages

- Invest in People, Institutions and Infrastructure

Prioritize affordability to spur economic development

Energy independence

Iceland Energy Mix

80% of primary energy supply comes from renewable resources (hydro, geothermal)

- 99.9% of electricity production
- 99% of space heating

Remaining 20% comes from imported fossil fuels, used mainly in transportation and fisheries

Selective about its investments, measured against comparative advantage; and affordability for citizens and businesses

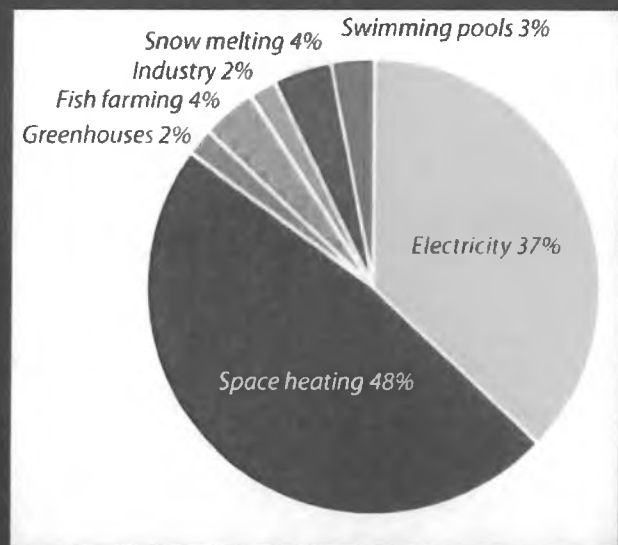
- Zero Wind Power
- Zero Solar Power
- Zero Tidal Power

Geothermal Energy in Iceland

Space Heating



Geothermal Utilization



Geothermal Electricity Generation

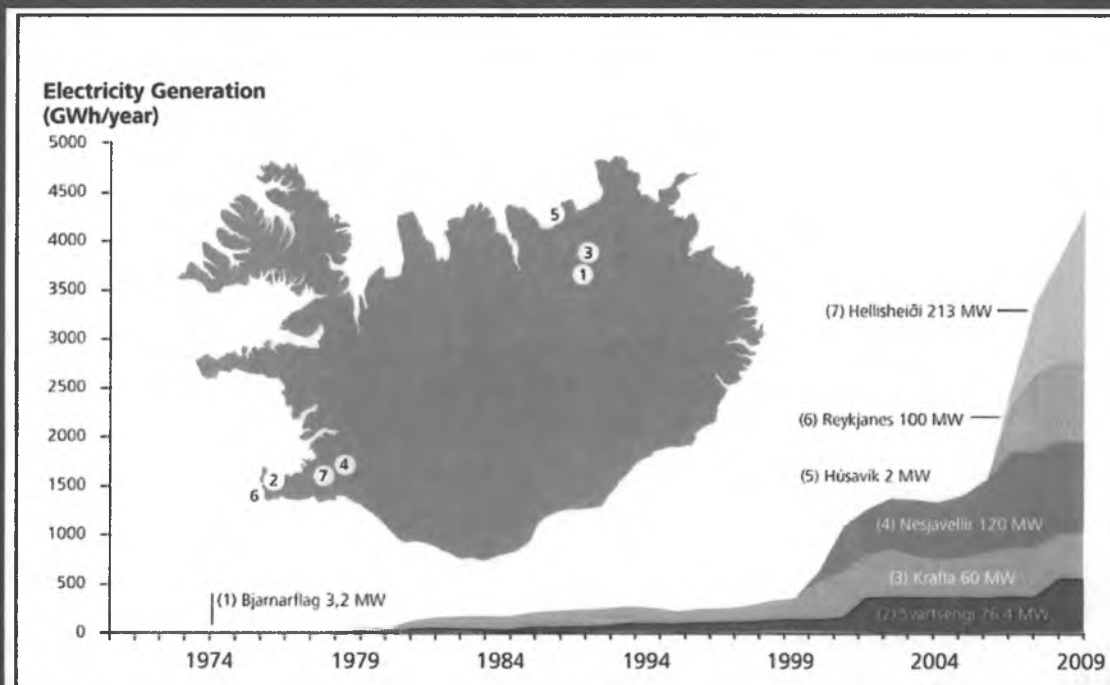
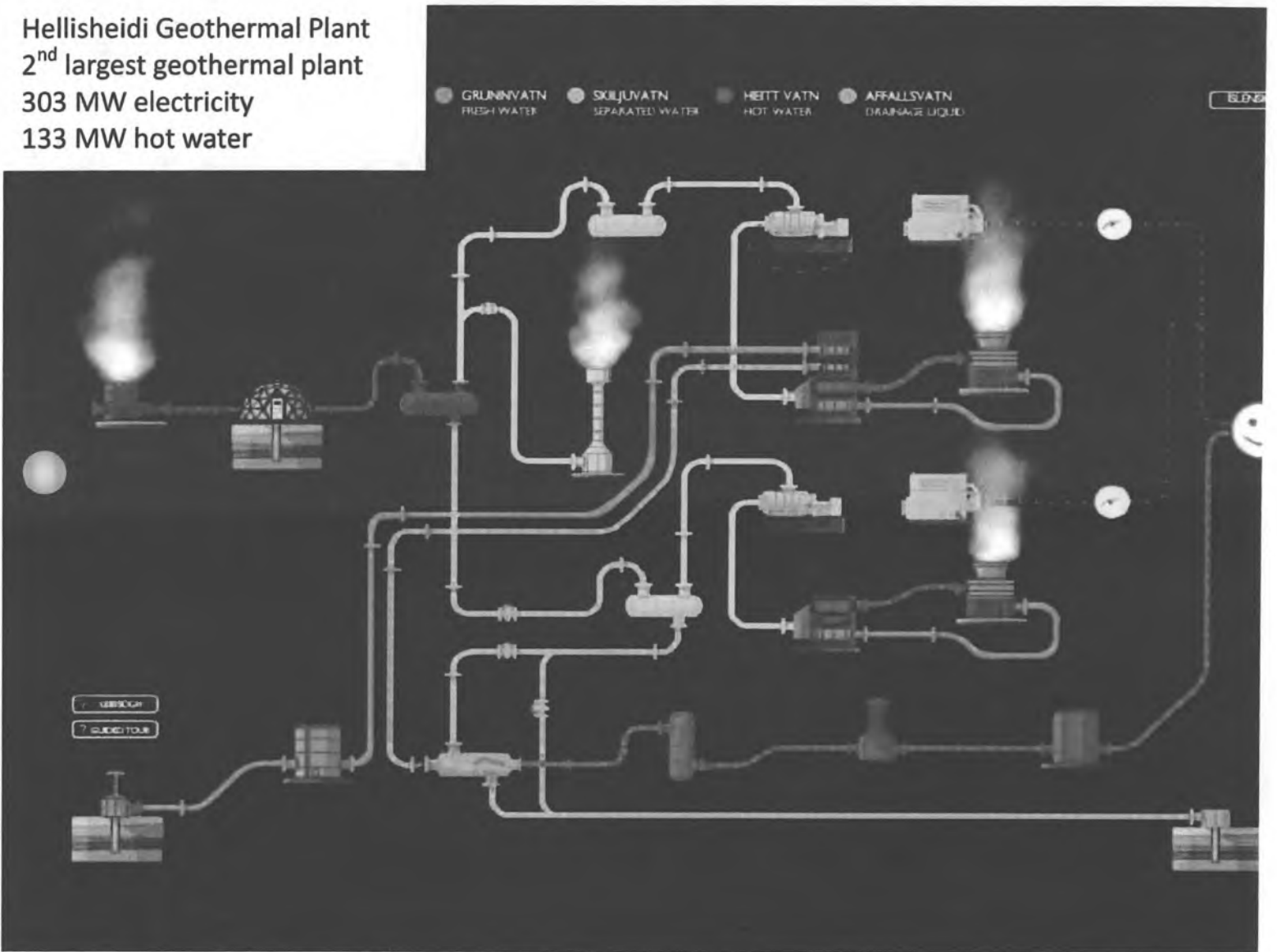
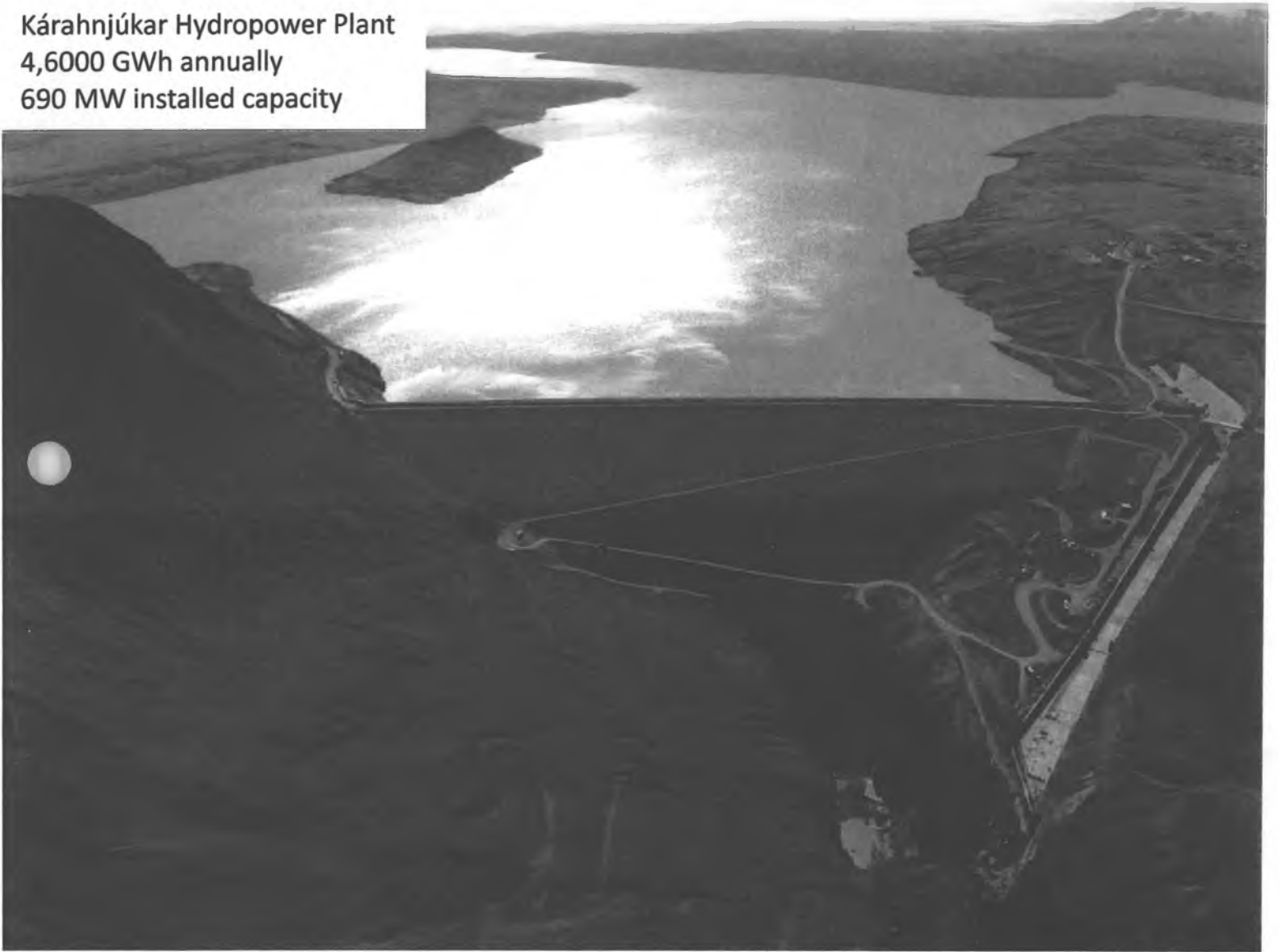


Fig. 9. Generation of electricity using geothermal energy 1969–2009.

Hellisheidi Geothermal Plant
2nd largest geothermal plant
303 MW electricity
133 MW hot water



Kárahnjúkar Hydropower Plant
4,6000 GWh annually
690 MW installed capacity



Export product

Domestic use of affordable energy

Spur economic development

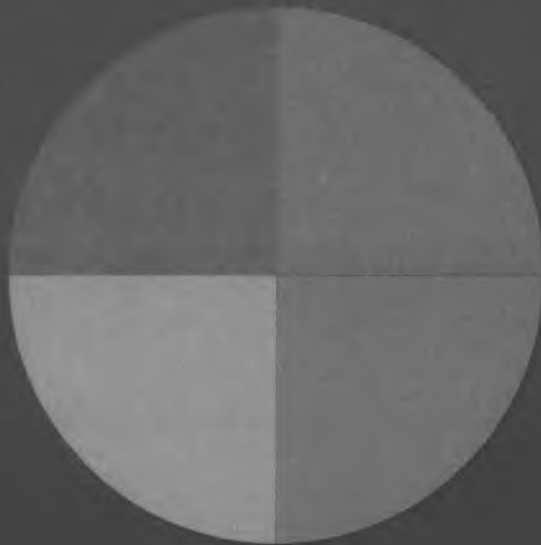
Export energy resource in form of value-added product

Develop projects by securing customers

Maximize revenue streams

Iceland Exports (2011)

Total ca \$8.5 billion

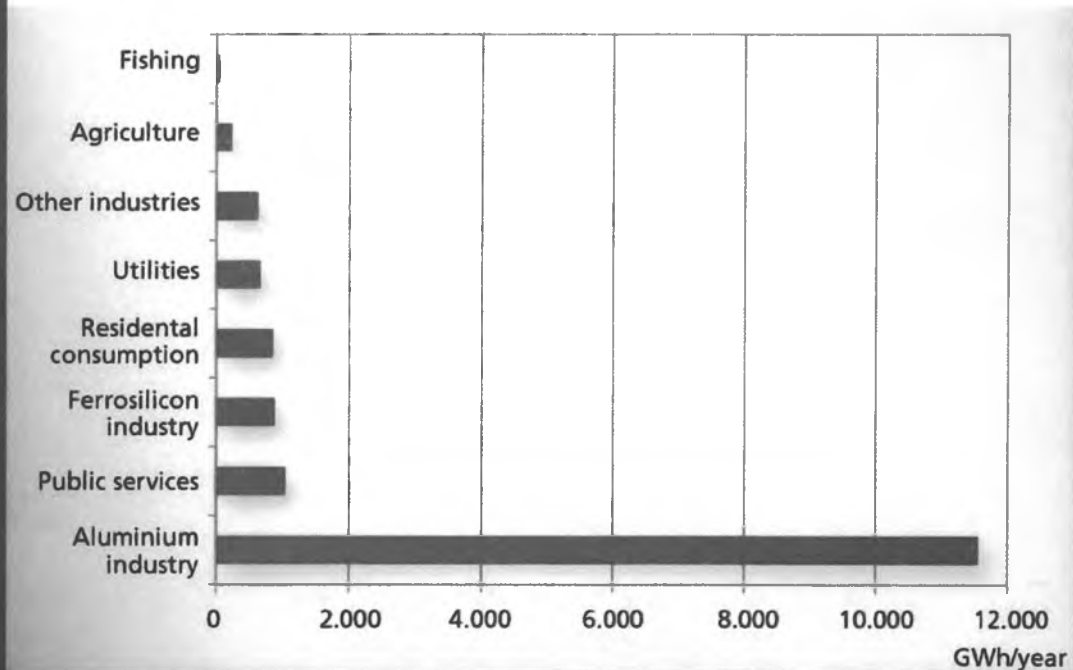


- Energy Intense Industry
- Marine Products
- Transportation
- Other

Positive Trade Balance, 14%

Use of Electricity

Electricity consumption 2008



Energy Intensive Industries

- Export: Value Added Products and Services:
 - Hothouse Agriculture
 - Advanced Pharmaceuticals
 - Internet Server Farms



Fjarðaál Aluminum Smelter
940 tons of aluminum a day
~1% of world aluminum production



Verne Global Data Centre



Copyright © 2012 Verne Global

Planning

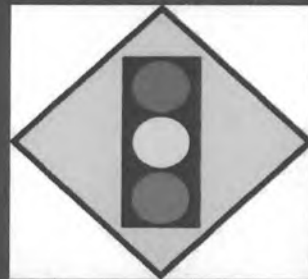
- Political Decisions – Faced with daunting energy challenges in the 1970's, Iceland made fundamental energy policy decisions.
- Investment – Iceland invested In Energy Infrastructure For Long Term Benefit
- Today – Iceland has developed a plan/system/framework for weighing its many energy options.

Iceland Energy Planning

- Comprehensive Energy Strategy for Iceland
 - Having renewable energy sources replace imported energy
 - Support diversified industry
 - Precautionary and protective approach in energy production
- Master Plan for Utilization of Renewable Energy Resources
 - 80 different possibilities for hydropower and geothermal power plants have been listed and analyzed
 - Sustainability issues, preservation of natural environments and historic sites, tourism and alternative land use, regional development and economy

Iceland's Energy Master Plan

- A “**Framework**” for selecting energy projects that balances the needs of:
 - Energy
 - Fishing
 - Tourism
 - Preservation
- Sites put in three categories:
 - Green – Proceed with utilization process (apply for licenses etc.) – 8.5 TWh
 - Yellow – Site subject to further research – 12.5 TWh
 - Red – Site shall be preserved and not utilized for energy purposes – 11.3 TWh
- 16 years of inclusive discussion



National Energy Agency (ORKUSTOFNUN)

- Under the Ministry of Industry and Innovation
- Purpose: To advise the Government of Iceland on energy issues and related topics, promote energy research and administrate development and exploitation of the energy resources.

Own the Infrastructure

Both affordability and accessibility are factors in determining maximum benefit

Government role in infrastructure investment:

- Co-investment opportunity

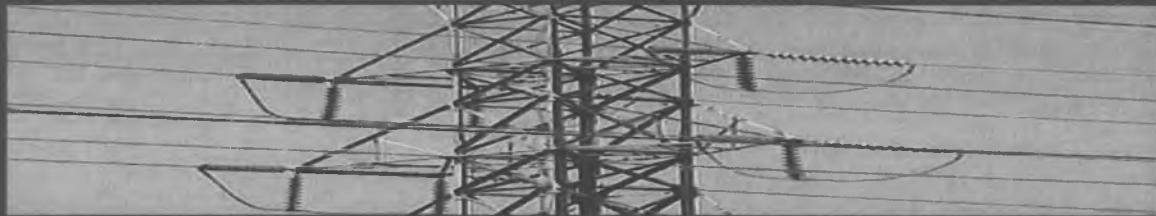
Government guarantor of open system and independent power production

- Increase competitiveness

Iceland's National Power Grid



National Power Grid



- Owned by the national government
- Connects almost all communities
- Connects to local generation and distribution
- Open access = Competition = Similar power costs across the country

Own the grid

- Circumferential electric transmission grid serves almost all communities; enables postage stamp rates
- “Power” of the grid—meet community needs and create economic opportunity
- Institutional innovation: access to transmission system creates a framework for competition



Iceland's Energy Future?

- HVDC Electricity Export?



Considering export to Europe:
800 miles by HVDC cable

Iceland's Energy Future?

OCS Oil and Gas Development via
Private Investment and Public Co-investment



Fundamental Challenge for Alaska

Invest for long-term prosperity

- Pick an energy resource
- Develop a comprehensive plan
- Own the infrastructure
- Export value added product

Next steps

Evaluate lessons from Iceland and Norway for applicability in Alaska

Research needed for implementation of lessons

Develop public awareness of challenge

Suggest fundamental shift in current system with compelling **legislation**

Thank you!

Nils Andreassen

Institute of the North

1675 C Street, Suite 106

Anchorage, AK 99501

nandreassen@institutenorth.org

Phone: (907) 786-6324 or cell: (907) 351-4982

Website: www.institutenorth.org

Twitter: @ionorth

Facebook: www.facebook.com/InstituteNorth