

Northern Energy Futures and Economic Development: What Can We Learn from Other Countries



Arctic Development Expo

June 13, 2023



80°E 70°E 60°E 50°E 40°E 30°E 20°E 10°E 0° 10°W 20°W

40°N

40°N

Pan-arctic Circumpolar Off-grid Settlements

Off-grid Settlements
1,492 Settlements
Total Pop'n = 1,642,095

- 1 - 500
- 500 - 5,000
- > 5,000

- Regional Power Grid
- Continental Power Grid
- Arctic Boundary (ARPA 1984)

40°N

40°N

Map date: October 21, 2016

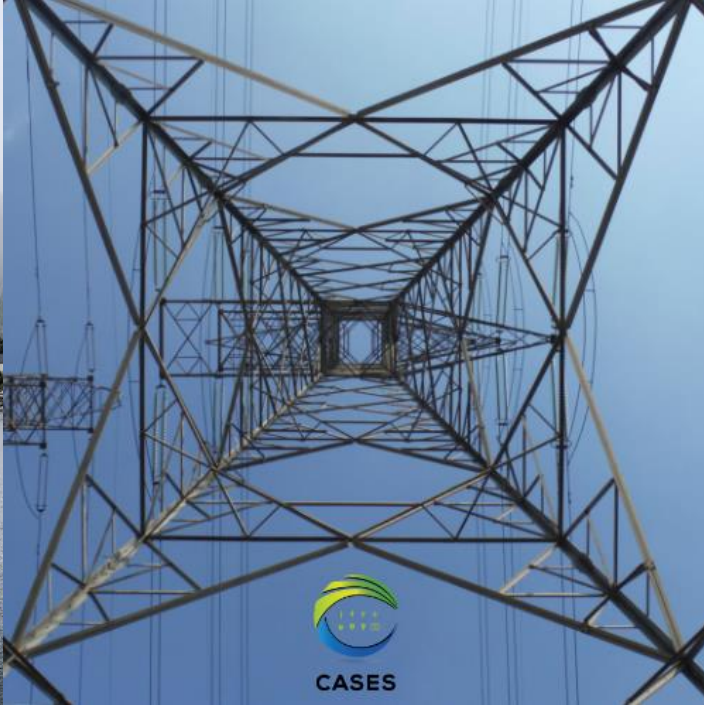
Map scale = 1:32,500,000

0 1,500 Kilometers

0 1,500 Miles

Credits: U of S, UAF-ACEP, UAF-GINA, Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors
Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other

160°E 170°E 180° 170°W 160°W 150°W 140°W 130°W 120°W 110°W



CASES

The Arctic story tells us energy is about more than infrastructure and technology....

Any number of projects can be designed to meet energy demand

...it's about communities.

Alaska's Renewable Energy Grant Fund was created by the Alaska Legislature in 2008 with the intent to appropriate \$50 million a year for five years to develop renewable energy projects across the state, particularly in areas with the highest energy costs. In 2012 the Legislature extended the program for another 10 years, until 2023.

The REF is administered by the Alaska Energy Authority (AEA) and has been a major stimulus for renewable energy projects across Alaska. Since 2008, the Legislature has appropriated \$259 million for 287 qualifying projects. Grants have been awarded for reconnaissance and feasibility studies, as well as design and construction projects covering a wide range of technologies and geographic areas – from wind turbines in Quinhagak to a hydroelectric project in Gustavus to a ground source heat pump system at the Juneau airport to a heat recovery system in North Pole.

In 2016, the Alaska Energy Authority is estimating that renewable projects constructed with funding from the Renewable Energy Grant Fund will displace 30 million gallons of diesel fuel.

The program is helping communities stabilize energy prices by reducing their dependence on costly diesel fuel for power generation and space heating. In the 2015, 54 projects displaced an estimated 22 million gallons of diesel fuel worth nearly \$61 million. These numbers are expected to increase again in 2016 as many more projects become operational. Newer projects include the construction of biomass boilers in the Lake and Peninsula Borough, the Blue

Lake hydroelectric expansion in Sitka, the Saint Paul heat recovery upgrade, and the wind-to-heat project in Gambell.

The present value of the capital expenditures used to build the first 54 generating projects is \$494 million and the present value of benefits is \$1.237 billion. Based on the present value of capital costs and future benefits, these projects have an overall benefit-cost ratio of 2.5. The Renewable Energy Grant Fund invested \$128.3 million of total project cost to these 54 projects in order to generate the \$1.237 billion of lifecycle benefits.

One completed project is Hoonah's Gartina Falls in Hoonah that displaces about one-third of the community's diesel used for electricity generations. Other projects completed are Chevak and Gambell surplus wind-to-heat water, wood boilers in Kokhanok, and Packers Creek Hydroelectric in Chignik Lagoon.

With low state revenues in recent years, AEA has been working with the Renewable Energy Fund Advisory Committee (REFAC) to adapt the program to changing times. Recent years have seen additional emphasis placed on funding early-stages of development that cannot easily be financed and providing assistance to applicants to find financing options to construct feasible projects.

To qualify for funding, project developers must submit applications to AEA, which ranks them based on economic and technical feasibility, local support, matching funding and the community's cost of energy. These rankings are submitted to the Alaska Legislature, which approves the projects and appropriates funding.



Three Lessons

- **National Investment:
Fiscal Capital Matters**
- **Pooled Resources:
Capacity Building Strategy**
- **Value Proposition:
Creating and enhancing value
in northern communities**



National Investment Matters



AVEC: Alaska Village Electric Cooperative

Incorporated 1967: Indigenous led for more than half a century

Largest—by territory—electric cooperative in the world

58 communities across rural Alaska



ALASKA VILLAGE ELECTRIC COOPERATIVE

POOLED RESOURCES

**Overcoming
Capacity Barriers**



INTER-COMMUNITY SHARING OF RESOURCES CRITICAL FACTOR

Pooling Management Resources

Pooling Service and Maintenance

Pooling Fiscal Resources

**Lessons from Inside and Outside
of Network**



BIOMASS-HEATED GREENHOUSES

Value Proposition

VALUE PROPOSITION

Getting Beyond
Price per kWh



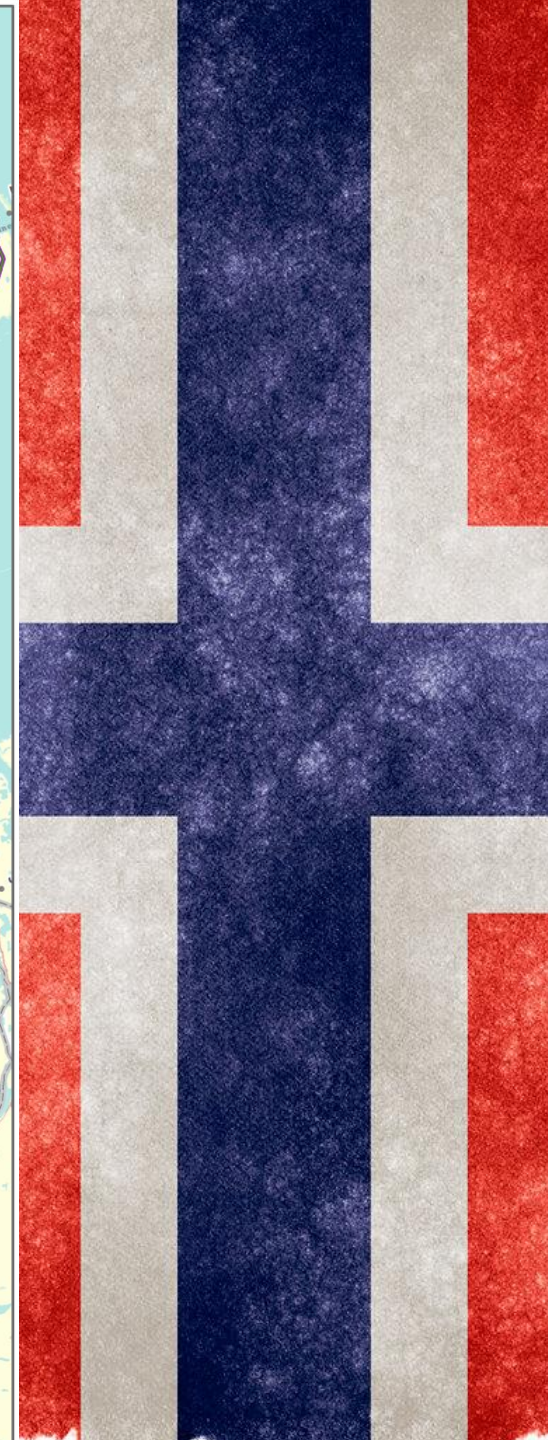
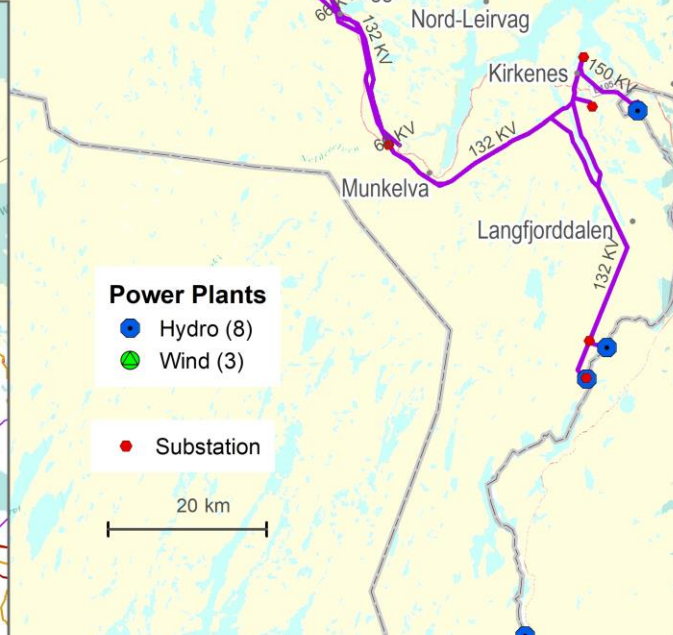
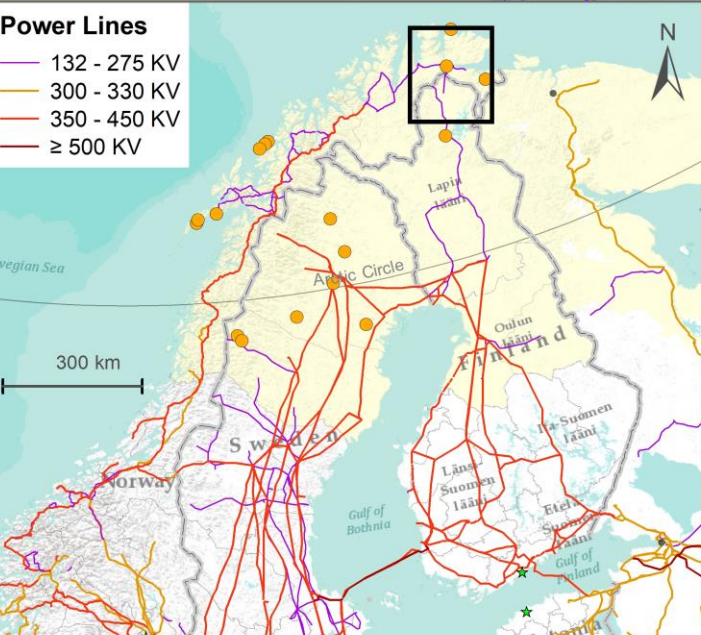
VALUE PROPOSITION

**Role of Energy Security in
Community Well-Being**

**Creating Long-Term Sustainable
Economic Opportunities**

**Strengthening Existing Economic
Activities**

**Strengthening Social Capital and
Community Pride**



Future Pathways

Which roads will the Canadian North take?

