LIST OF FILES

HOUSE SPECIAL COMMITTEE ON ENERGY, 2013-2014 (SCOMM 175)

MEMBERS:

REPRESENTATIVE ISAACSON, CO-CHAIR
REPRESENTATIVE MILLETT, CO-CHAIR
REPRESENTATIVE FOSTER
REPRESENTATIVE HIGGINS
REPRESENTATIVE HUGHES
REPRESENTATIVE NAGEAK
REPRESENTATIVE JOSEPHSON

Established by HR 2, 2013

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01/30/13	Who's Keeping the Lights and Heat On?
02/01/13	Overview: Interior Electric Supply
02/04/13	Overview: Alaska Housing Finance Corporation Weatherization Programs Update
02/06/13	Alaska Energy Authority Overview and Renewable Energy Fund Update
02/13/13	Presentation: Emerging Energy Opportunities for Alaska
02/20/13	Alaska Energy Authority Overviews: Power Cost Equalization and Susitna-Watana Hydro
02/22/13	Overview: Lessons Learned in Iceland by Institute of the North
02/27/13	Presentations: All Alaska Energy Solution, and Alaska's Energy and Air Quality Crisis
03/20/13	Overview: Energy Wise Program
03/27/13	Presentations: Interior Rural Energy, and Alaska Energy: Problems and Solutions
04/03/13	Overview: State Energy Policy
01/27/14	Presentation: Institute of the North

01/31/14 Informal Energy Round Table Workshop: Regulatory Commission of Alaska

02/05/14 Overview: Alaska Energy Authority

02/12/14 Presentation: Alaska Energy Authority - Transmission Issues

02/26/14 Alaska Energy Authority Presentation: Renewable Energy Fund Grants and Emerging Energy Technology Fund

02/28/14 Presentation: Alaska Power Association

03/03/14 Presentation: Merged Energy Solutions - Multi-Industrial Greenhouse Facility, and Transforming Alaska

03/26/14 Presentation: Alaska Center for Energy and Power

04/09/14 Informal Energy Round Table Workshop: Addressing the Immediate Concerns of TRANSCOs and ISOs in Alaska

HB 35

HB 39

HB 340

01/23/13 Overview: Cook Inlet Gas Supply Study 2012 Update

<TARGET><BILL></BILL><SUBJECT>01-23-13 Overview Cook Inlet Gas Supply Study 2012 Update</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

Rep. Charisse Millett
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Agenda

Wednesday, January 23, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

+Cook Inlet Gas Study – 2012 Update:

1) Mayor Dan Sullivan, Municipality of Anchorage (introductory comments by phone)
2) Bill Van Dyke, Petrotechnical Resources of Alaska
3) Moira Smith, ENSTAR/Long Term Gas Supply Group, Jim Posey, ML&P, Bradley Evans, Chugach Electric Assoc.

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

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ENSTAR Natural Gas Company

CHUGACH POWERING ALASKA'S FUTURE

ML&P 80 YEARS of positiveENERGY

Cook Inlet Natural Gas Study 2012 Update

HOUSE SPECIAL COMMITTEE ON ENERGY

January 23, 2013

Prepared by
Peter J. Stokes, P. E.
Petrotechnical Resources of Alaska

Presented by
Bill Van Dyke, P.E.
Petrotechnical Resources of Alaska

PRA

Cook Inlet Natural Gas Study Update - 2012

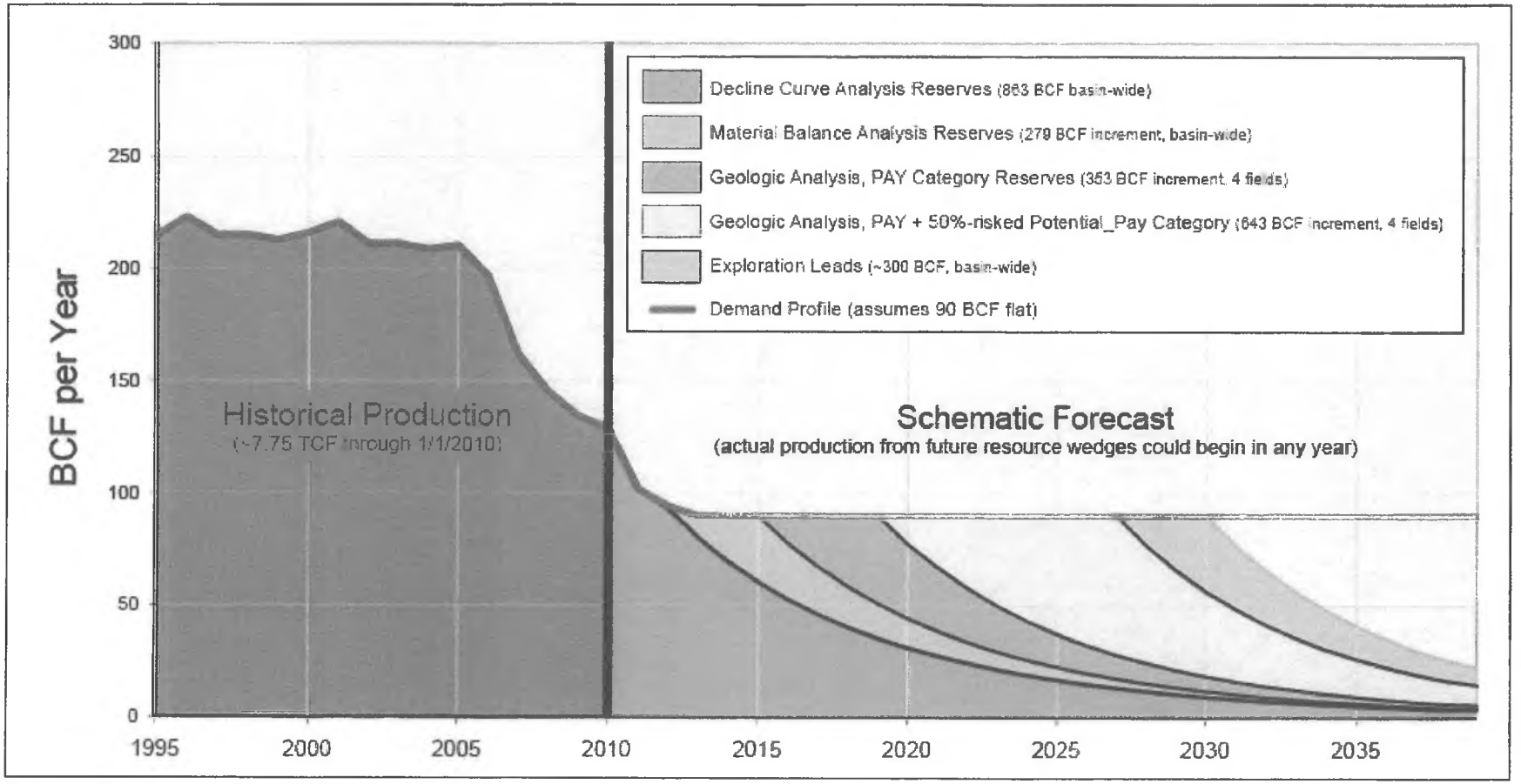
- Southcentral Alaska Gas Supply/Demand 2012-2020
- Possibilities to meet Southcentral Demand
- Impact of the CINGSA gas storage project in meeting winter peak demand

2010 PRA Cook Inlet Study

- ENSTAR, Chugach Electric and ML&P commissioned PRA to perform a study of Cook Inlet Supply from existing Fields

- 2010 Study allowed Cook Inlet Utilities to better understand their gas supply
  - Impact and drivers of drilling/development activity
  - Further understanding of DNR 2009 CI Gas Report
  - Help predict when gas would need to be imported into the Cook Inlet market

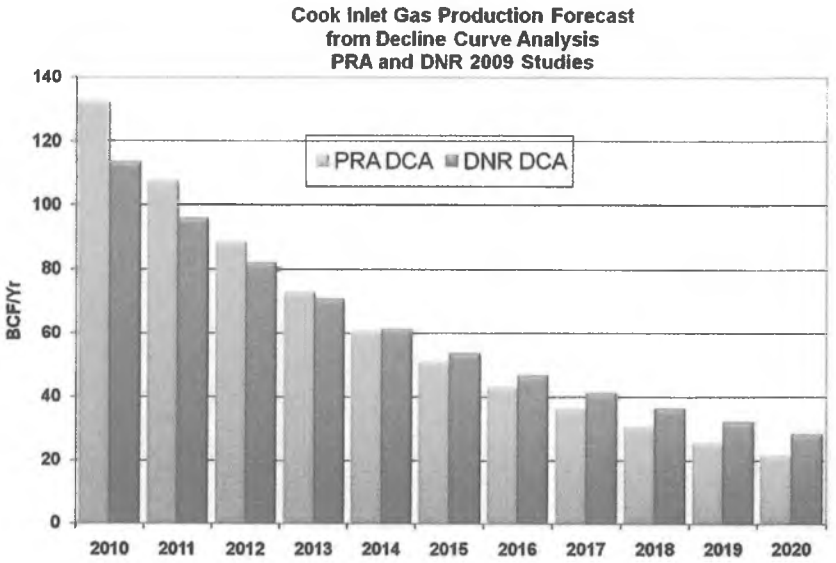
Annual Supply – DNR 2009 Report



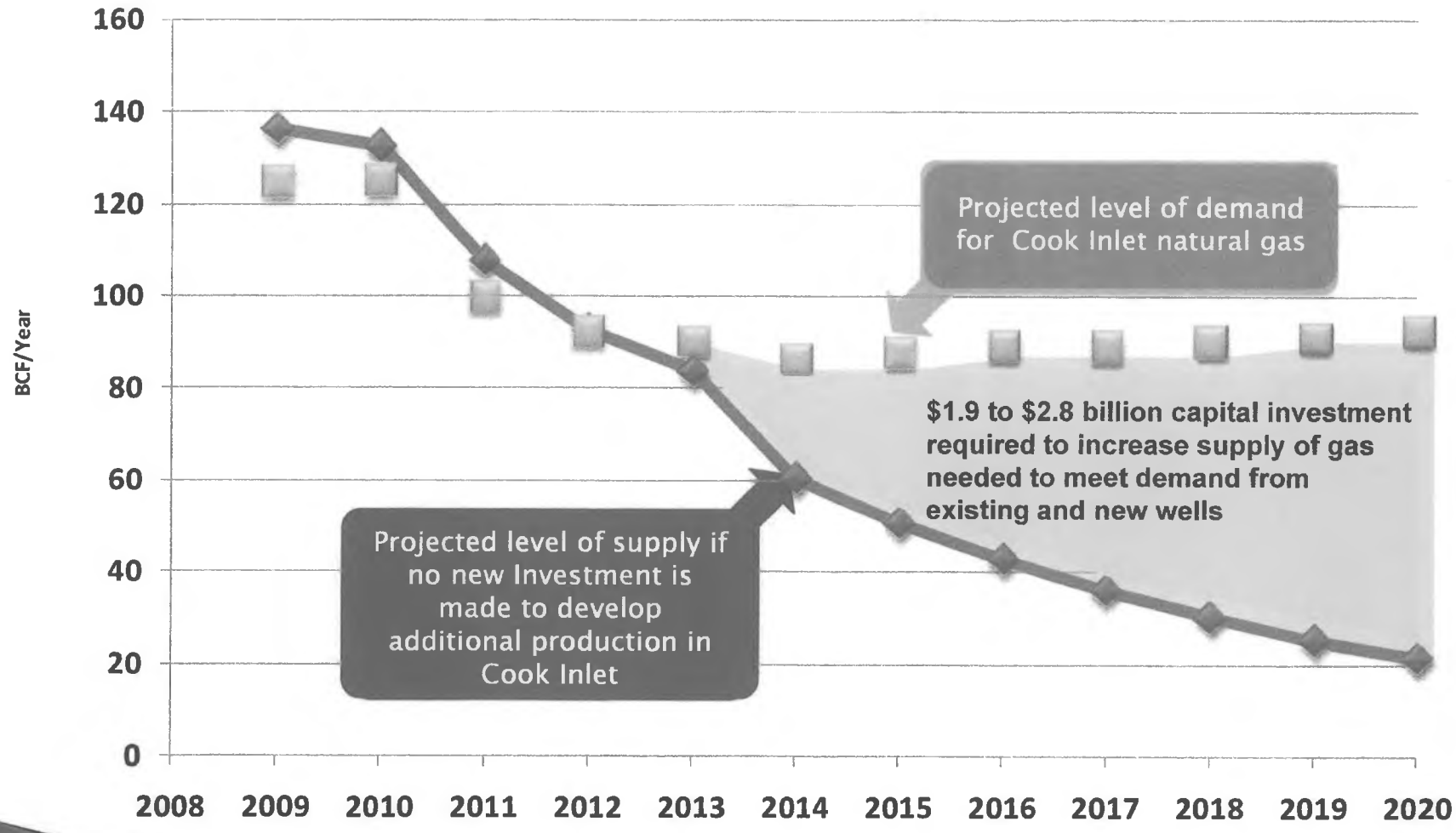
Source: AK DNR December 2009 Study

Comparison of DNR and PRA Decline Curve Analysis (DCA)

- Cook Inlet production declines in 2010 PRA Study compared favorably with DCA in DNR 2009 Study



2010 PRA Study Summary



DNR 2011 CI Gas Cost Study

DNR concluded:

- CI Basin, with investment in exploration and production, is capable of meeting needs until 2018-2020 at prices below available alternatives
- Failure to make investments in lockstep with demand will result in the need for alternative sources sooner.

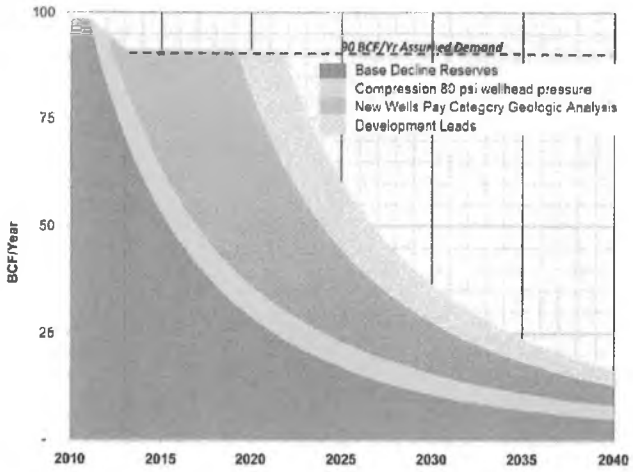


Figure 7. Hypothetical production forecasts resulting from this study for the Cook Inlet basin assuming a constant 90 BCF/Year demand after 2011. Production from future resource wedges could begin in any year. The projected "pay" volumes (green wedge) for this study are greater than that of the 2009 study (Figure 2) due to an error resulting in the understatement of McArthur River Grayling Gas Sands new well pay reserves potential. This error is corrected in this Figure.

2012 Update

- PRA was asked by the CI Utilities to update the 2010 Study to estimate the current supply from existing Cook Inlet fields for comparison with the current CI Demand Forecast.

- Due to drilling and compression additions since 2009, the predicted shortfall from existing fields has moved from 2013 to 2014.

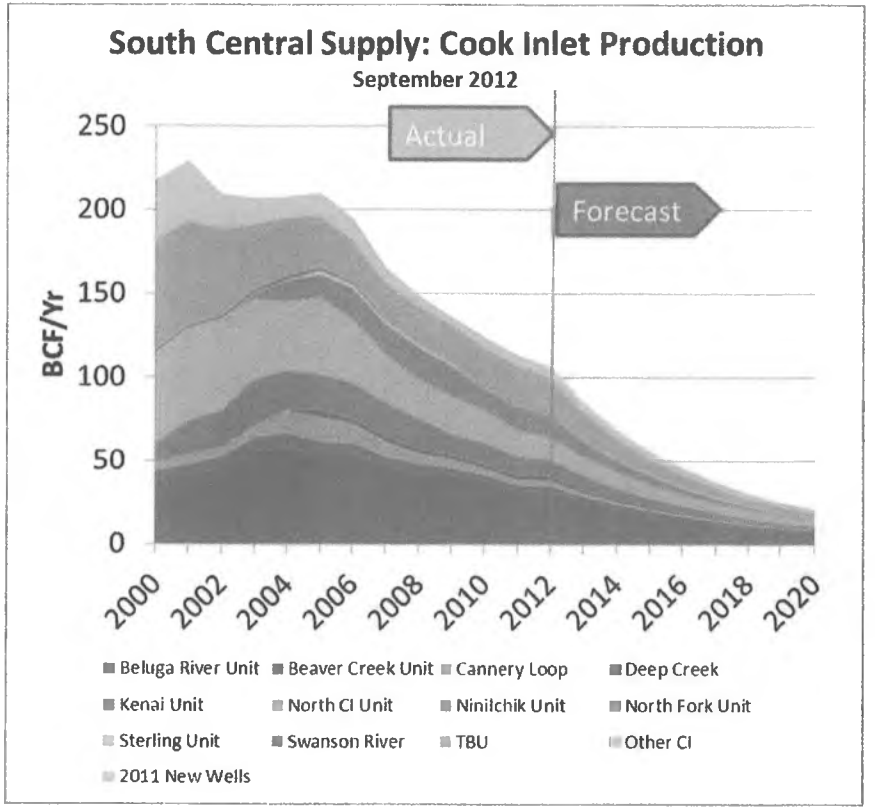
Cook Inlet Production Past and Future

2000-05: High production supported Nikiski plants

- Agrium Chemical Plant
  - Shut down in 2007
- LNG Exports continue
  - Future uncertain - License Extension ends March 2013

2014+: Production for

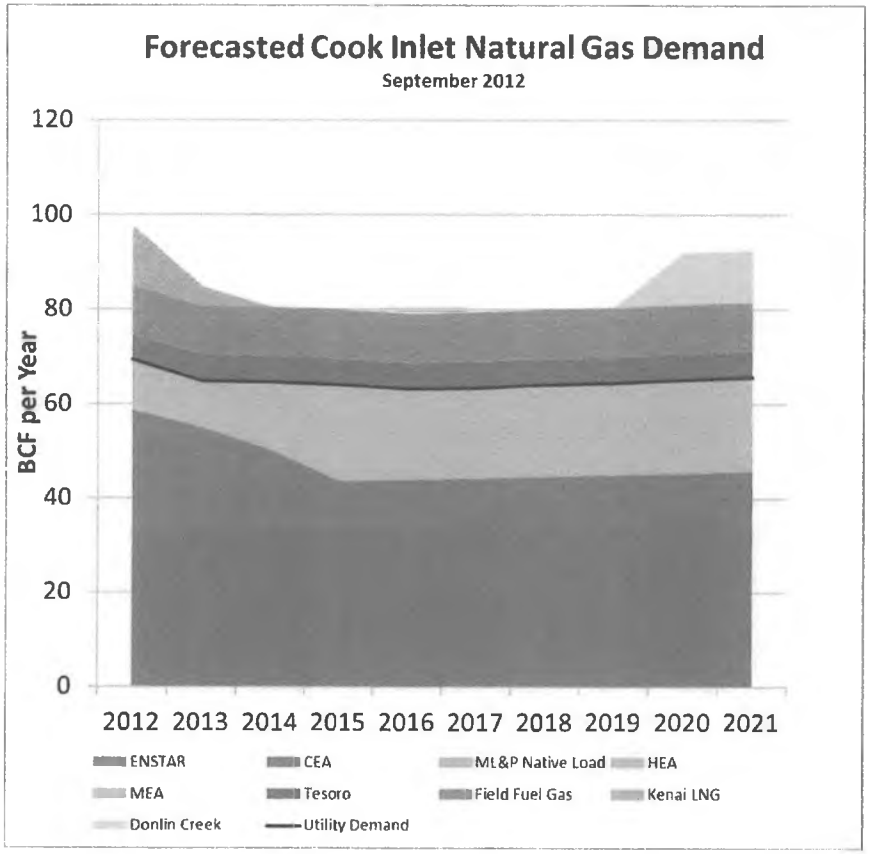
- Utilities
- Refinery
- O&G / Mining Fuel



Southcentral Future Demand

Projected Users 2014-19

- ENSTAR 44%
- Chugach Electric 13%
- O&G Fuel Gas 13%
- HEA/MEA 12%
- ML&P 11%
- Tesoro 7%

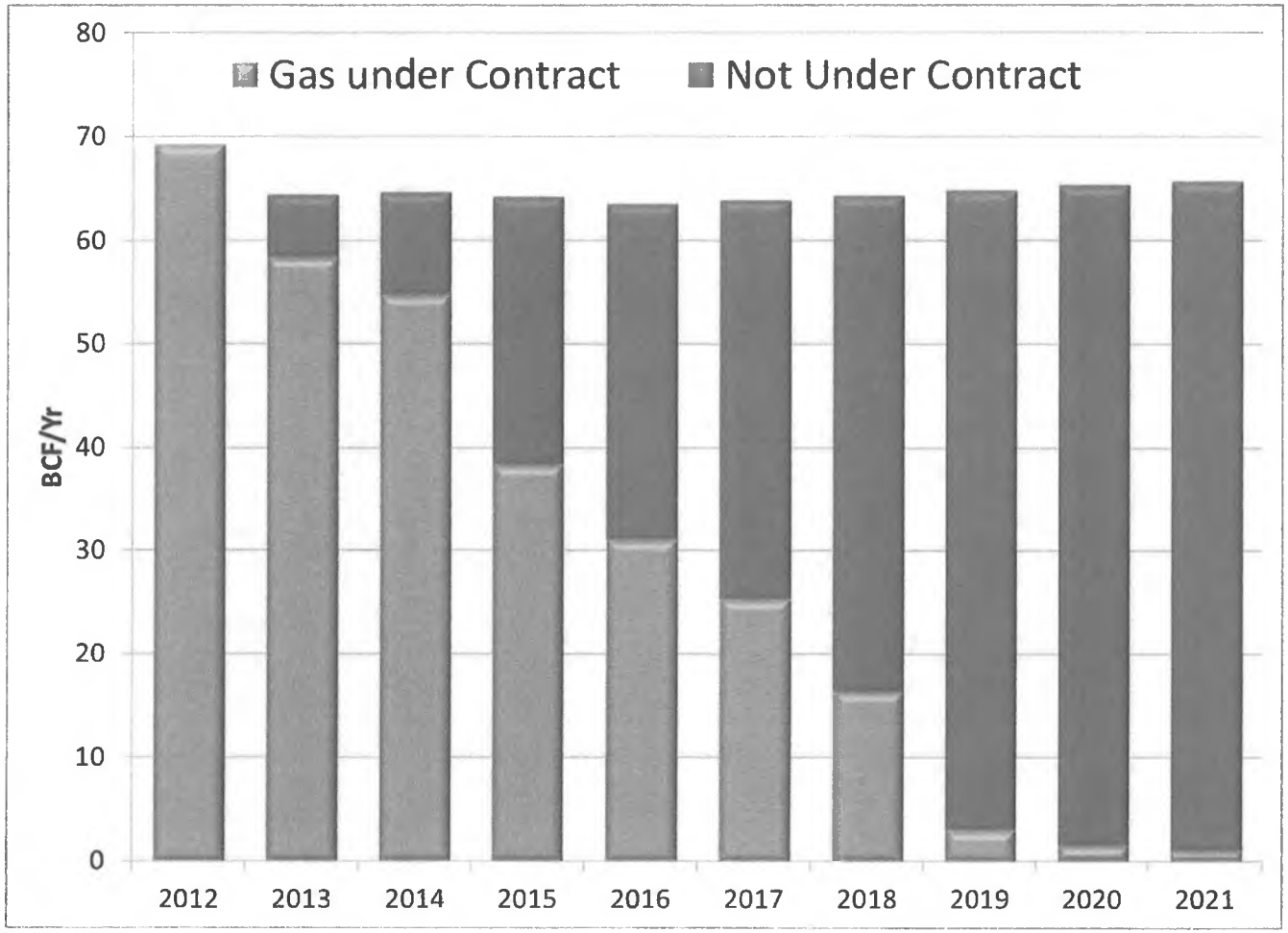


Why Do Utilities Care About Cook Inlet Gas?

- ENSTAR
  - Cook Inlet gas provides 100% of supply
- Chugach Electric
  - Cook Inlet gas used for 90% of generation
- ML&P
  - Cook Inlet gas used for 88% of generation

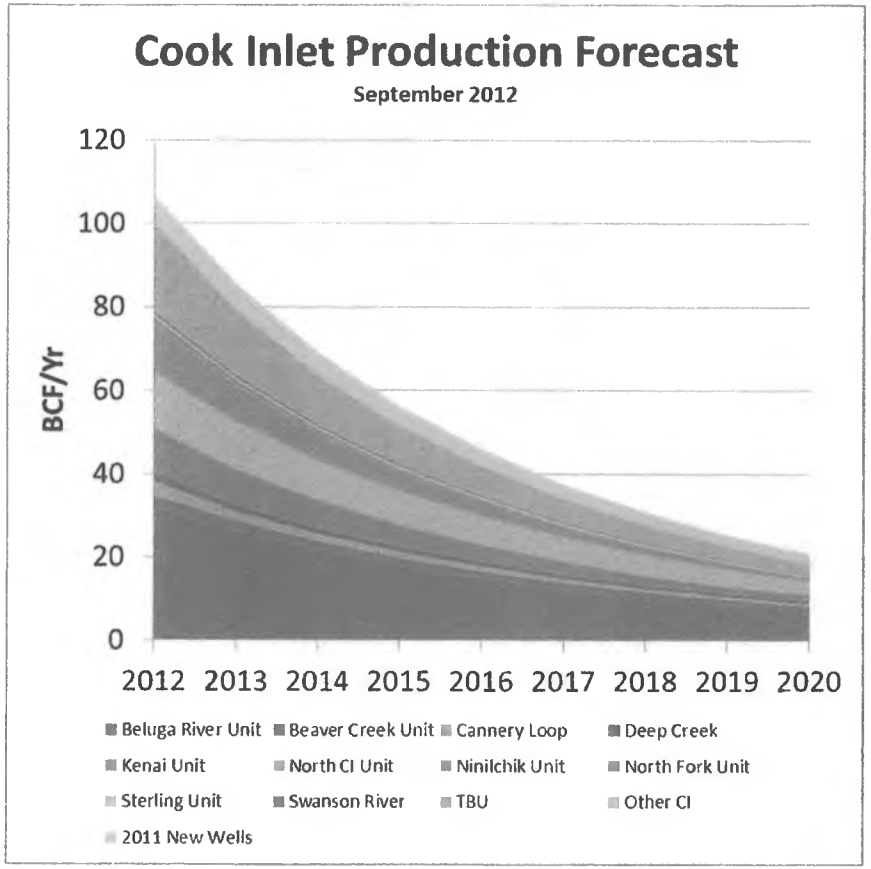
Southcentral Utility	2012 Predicted Consumption, BCF
ENSTAR	33.6
Chugach	25.0
ML&P	10.6

Total Utility Contracted and Not Contracted Gas Demand – 2012



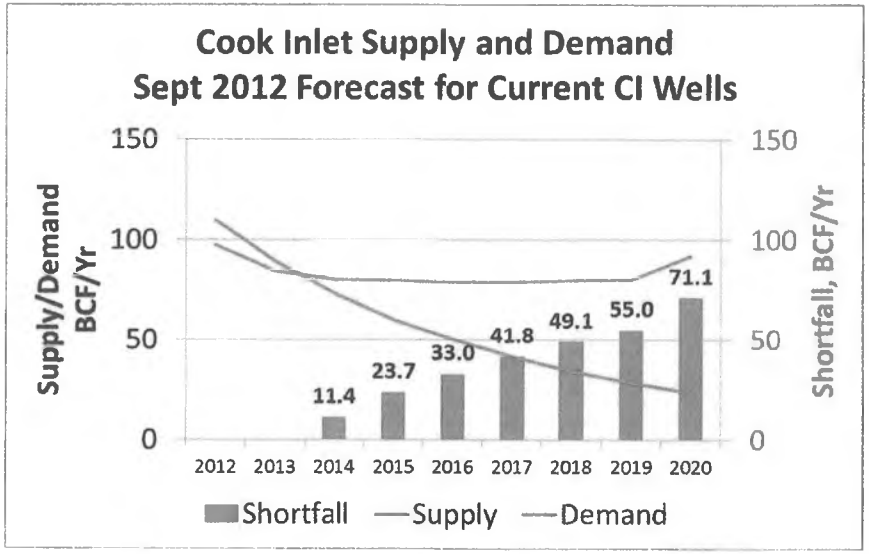
2012 Cook Inlet Supply Prediction

- PRA Decline Curve Analysis of existing fields and wells
  - 16-17% Annual Decline
- Does not include future developments or wells



2012 Supply vs. Demand Current Wells

- Based on current wells only, predicts a shortfall as early as 2014
- 2010 PRA Study forecasted need of 13-14 new gas completions per year to avoid shortfall
- Only 5-8 new wells per year were actually completed 2009-2012

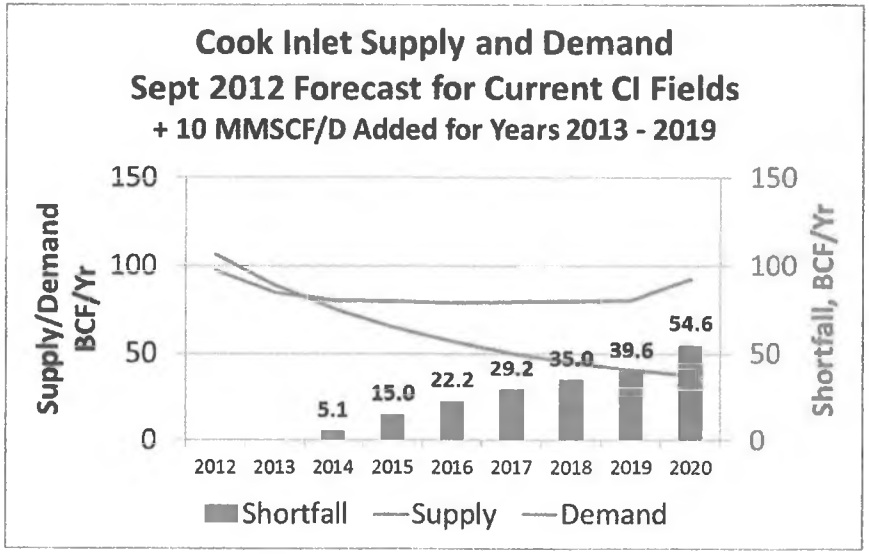


Cook Inlet Drilling Results

Period	Gas Wells Completed	Average Wells per Year	Initial Production (MMCF/day)
2001–2009	105	12.3	3.6 per well
2007–2009	34	13.6	3.1 per well
Nov–09 to Oct–10	5	5	3.7 per well
Nov–10 to Oct–11	6	6	1.7 per well
Nov–11 to Oct–12	8	8	3.6 per well

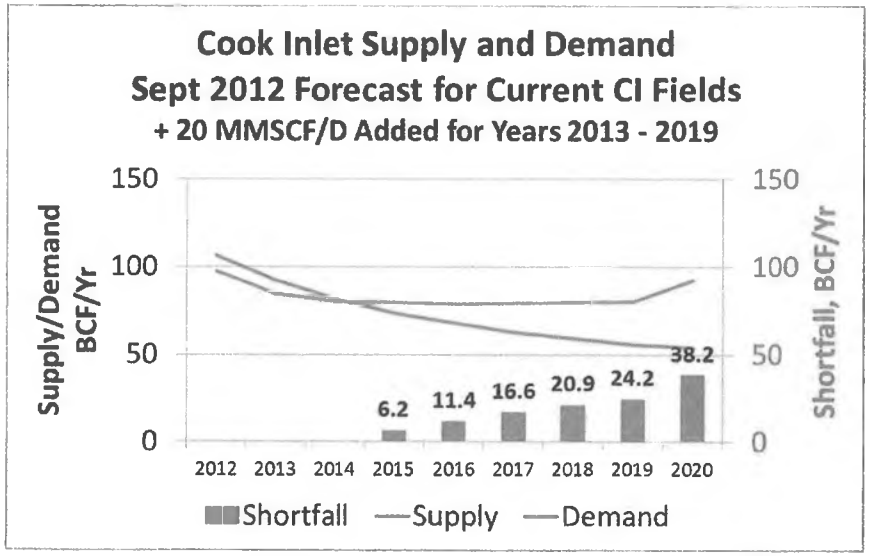
Supply vs. Demand:
Current Wells + Yearly Add of 10 MMSCF/D

- This sensitivity assumes 3-4 new gas completions added per year 2013-19.
- Shortfall still predicted in 2014.



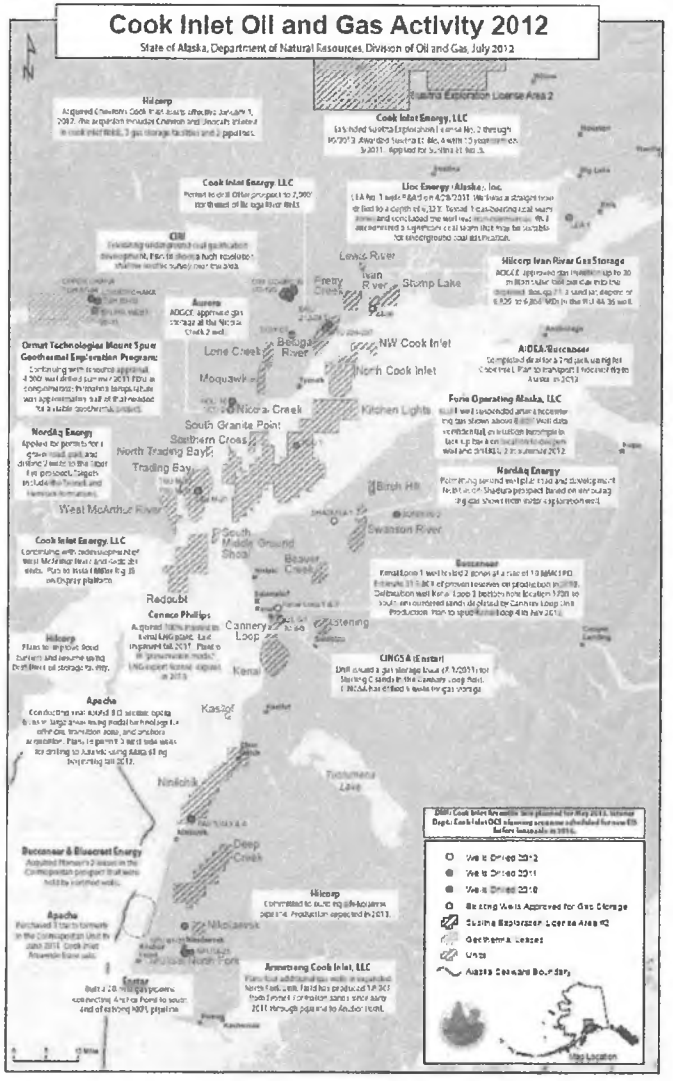
Supply vs. Demand:
Current Wells + Yearly Add of 20 MMSCF/D

- This assumes 6-8 new gas completions added per year 2013-19.
- Shortfall predicted in 2015.
- Could be changed by additional near term infield developments
  - Hilcorp
  - CPAI
  - Buccaneer
  - Armstrong
  - Others



Methods of Meeting Southcentral Demand

- Infield development
  - Hilcorp
  - CPAI
  - Armstrong, Buccaneer, CIE, Aurora and Others
- Exploration
  - Onshore: NordAq, Apache, Buccaneer and Others
  - Offshore: Furie, Apache, and Buccaneer
- Instate Gasline: ASAP
- Gas Imports



Infield Development

- Hilcorp has stated that they will spend $203 million in capital in 2012 to develop oil and gas
  - Will likely spend $150 million per year over next 2 years
  - This is a marked increase over the activity levels of Chevron and Marathon
  - Red Pad is now producing
- ConocoPhillips drilled 2 wells at Beluga River
- Buccaneer is completing Kenai Loop #4
- Armstrong has permitted 4 wells at North Fork
- Other infield development include Aurora and CI Energy

Unless more or high rate gas wells are developed, shortfall likely occurs in 2015+ timeframe.

Exploration – Onshore

- Hilcorp: 3D program at Deep Creek
- NordAq: Delineating Shadura and Exploring
  - Shadura not to be developed until 2013
  - Exploring at Tiger Eye Prospect in 2012-13
- Buccaneer exploring near Homer
- CIE exploring west Cook Inlet
- Apache shooting large 3D Seismic Program, plans to drill 4th Quarter 2012 near Tyonek

If successful exploration wells are found near current infrastructure and be quickly developed, there can be an impact on timing of shortfall.

Exploration – Offshore

- Furie is drilling exploration wells with Spartan 151 jack up rig
  - Announced discovery at Kitchen Lights #1; did not complete
  - Drilled and suspended Kitchen Lights #2 and #2A
- Buccaneer has mobilized Endeavour jack up rig to CI to drill Cook Inlet prospects
  - Plans to drill at Cosmopolitan this winter
- Apache shooting offshore 3-D Seismic

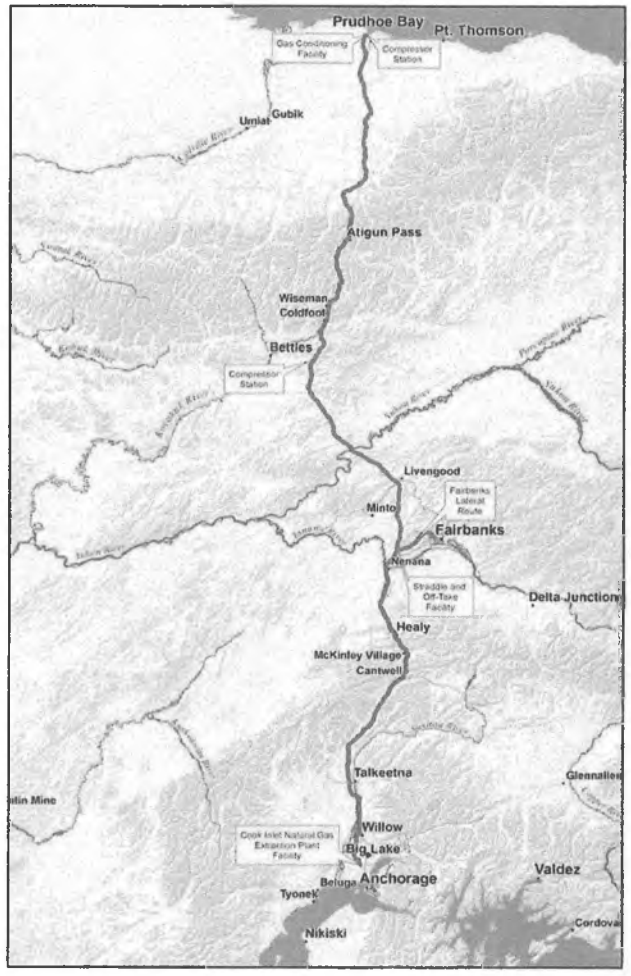
Timing for first gas production likely to be 3-5 years after discovery due to offshore permitting and construction lead times.

Alaska Stand Alone Gas Pipeline

2011 ASAP Project Plan

- Estimated to Cost $7.5 billion (2011$) +/- 30%
- Gas to South Central by 2020 at earliest.

ASAP will not solve 2015-2019 shortfalls in Cook Inlet gas supply.



Import Gas to Cook Inlet: LNG or CNG

- LNG is a commodity that can be contracted for import into Cook Inlet
  - Use of Nikiski Plant or other for regassifying
- LNG from North Slope
  - Large number of truck deliveries to meet SC shortfall
- Compressed Natural Gas (CNG) is another option for importing gas
  - Possibly a cheaper option than LNG

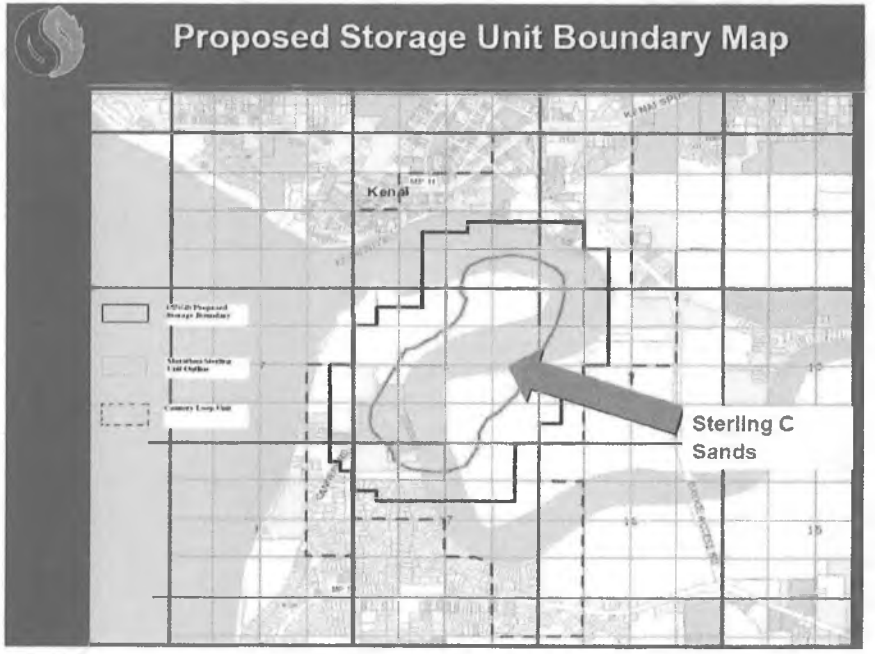
With timely engineering and permitting, LNG or CNG could be imported to fulfill short-term needs.

Summary: Possibilities to Meet 2012-2020 Demand

- Infield drilling: Recent history of activity level indicates that this will not meet demands past 2015
- Onshore Exploration: Not proven and if successful would need time for development; could impact timing of shortfall
- Offshore Exploration: Not proven and 3-5 years from discovery to production
- Instate Gas Line: Will not be operational until 2020
- Imported LNG or CNG: Could bridge demand shortfall until exploration and/or instate gas line provide for sufficient supply

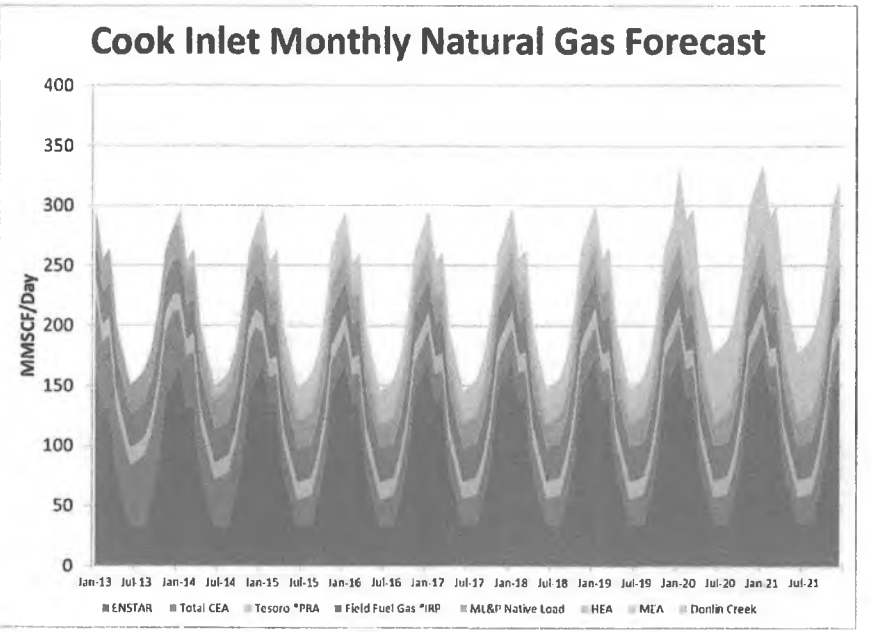
CINGSA Project

- 5 horizontal wells and compression installed
- CINGSA Storage Project allows for 11 BCF of active storage
- Winter peak capacity of 140 MMSCF available from CINGSA storage



CI Peak Gas Demands

- Large swing between Summer and Winter gas demands
  - Summer: 150 MMSCF/D
  - Winter: 300 MMSCF/D
- CINGSA gas storage allows injection of CI gas during summer to help meet winter peak demands



Impact of CINGSA

- Currently allows for storage of 11 BCF/Year.
- Will allow for meeting 45% of monthly average peak demand in the winter.
- Allows for purchase and storage of gas during summer season for use during winter peak demands.
- Available for storage of future imported LNG or CNG.
- Will help alleviate need of overproducing wells to meet peak daily utility demand.



Source: Alaska Business Monthly
Photo by Robin Barry, ENSTAR

Conclusions

- Absent major new large discoveries that can be brought online in 1-2 years, the current pace of development could mean a shortfall in Cook Inlet supply to meet demand in 2014 or 2015.
- LNG or CNG import is only "certain" method to ensure no shortfall.
- CINGSA storage is capable of storing CI produced gas or imported gas for winter peak demand.

Questions?

ENSTAR Natural Gas Company

CHUGACH POWERING ALASKA'S FUTURE

ML&P 80 YEARS of positive ENERGY

DONLIN GOLD

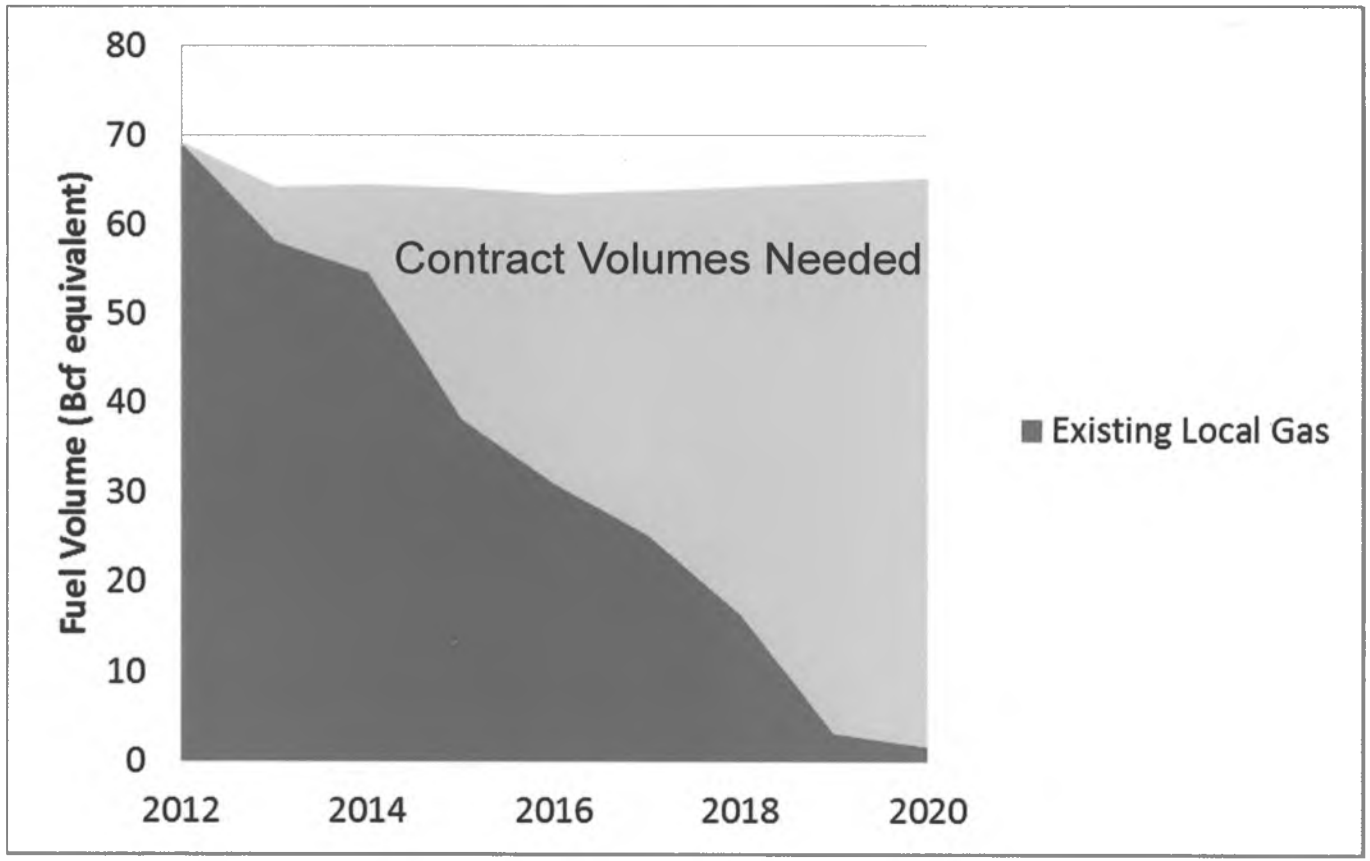
MEA MATANUSKA ELECTRIC ASSOCIATION

HEA

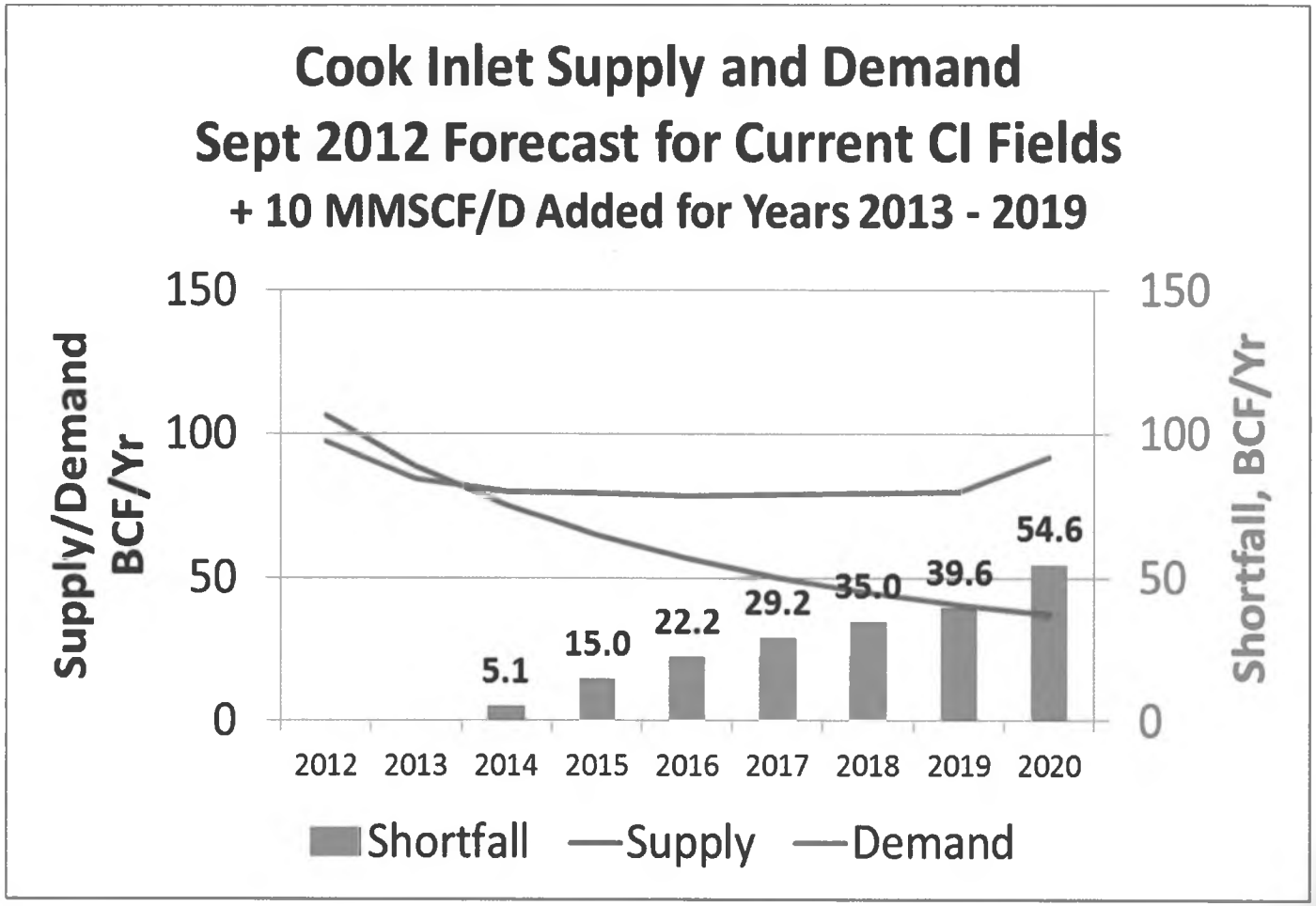
Long-term Gas Supply Work Group

January 23, 2013

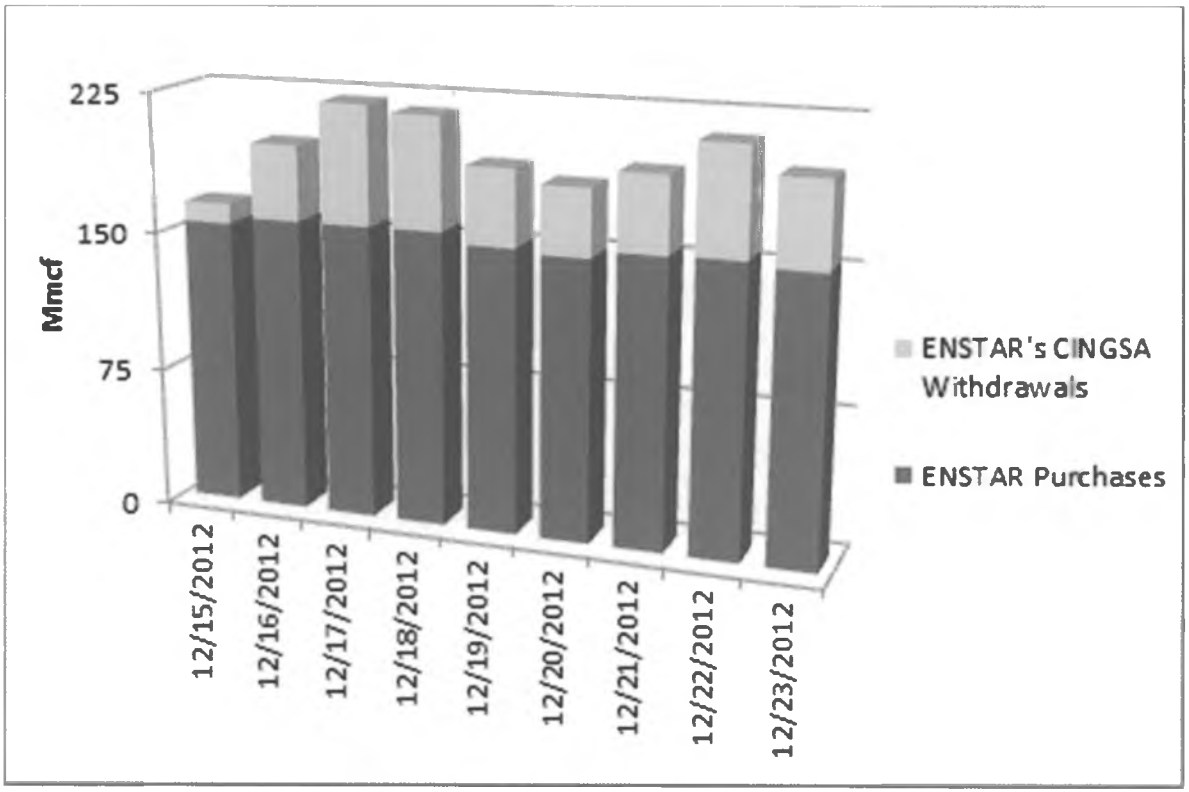
Need vs. Time


80
70
60
50
40
30
20
10
0
Fuel Volume (Bcf equivalent)
2012
2014
2016
2018
2020
Contract Volumes Needed
Existing Local Gas

PRA Update


Cook Inlet Supply and Demand
Sept 2012 Forecast for Current CI Fields
+ 10 MMSCF/D Added for Years 2013 - 2019
Supply/Demand BCF/Yr
Shortfall, BCF/Yr
150
100
50
0
5.1
15.0
22.2
29.2
35.0
39.6
54.6
2012
2013
2014
2015
2016
2017
2018
2019
2020
Shortfall
Supply
Demand

Case Study: A Cold Day in December 2012



Impacts of Incentives

Hilcorp Alaska

Apache
EXPLORING WHAT'S POSSIBLE

Aurora

LINC ENERGY



Furie Operating Alaska LLC

Anchor Point Energy



NORDAQ ENERGY

BUCCANEER ENERGY

Miller Energy

Cook Inlet Energy

Working Together - Plans Become Reality



Cook Inlet Natural Gas Storage Alaska
CINGSA on-line for Southcentral utilities
11 BCF Storage

Fire Island turbines now producing wind power for Southcentral Alaska
Offsets .4 Bcf of gas/year

SPP Spins First Turbine—Alaska Day
Oct 18, 2012
Offsets 3 Bcf of gas/year

"Bottom Line": Supplementing Cook Inlet Gas

The ideal solution would:

- Avoid discouraging new Cook Inlet production
- Be scalable to market needs
- Create price signals to producers to encourage local supply
- Be flexible to allow for portfolio of future options

"Bottom Line": Interest Expressed in Response to LTGS Request for Information

- 3 Marine CNG Providers
- 5 Marine LNG Providers
- LNG Trucking from ANS

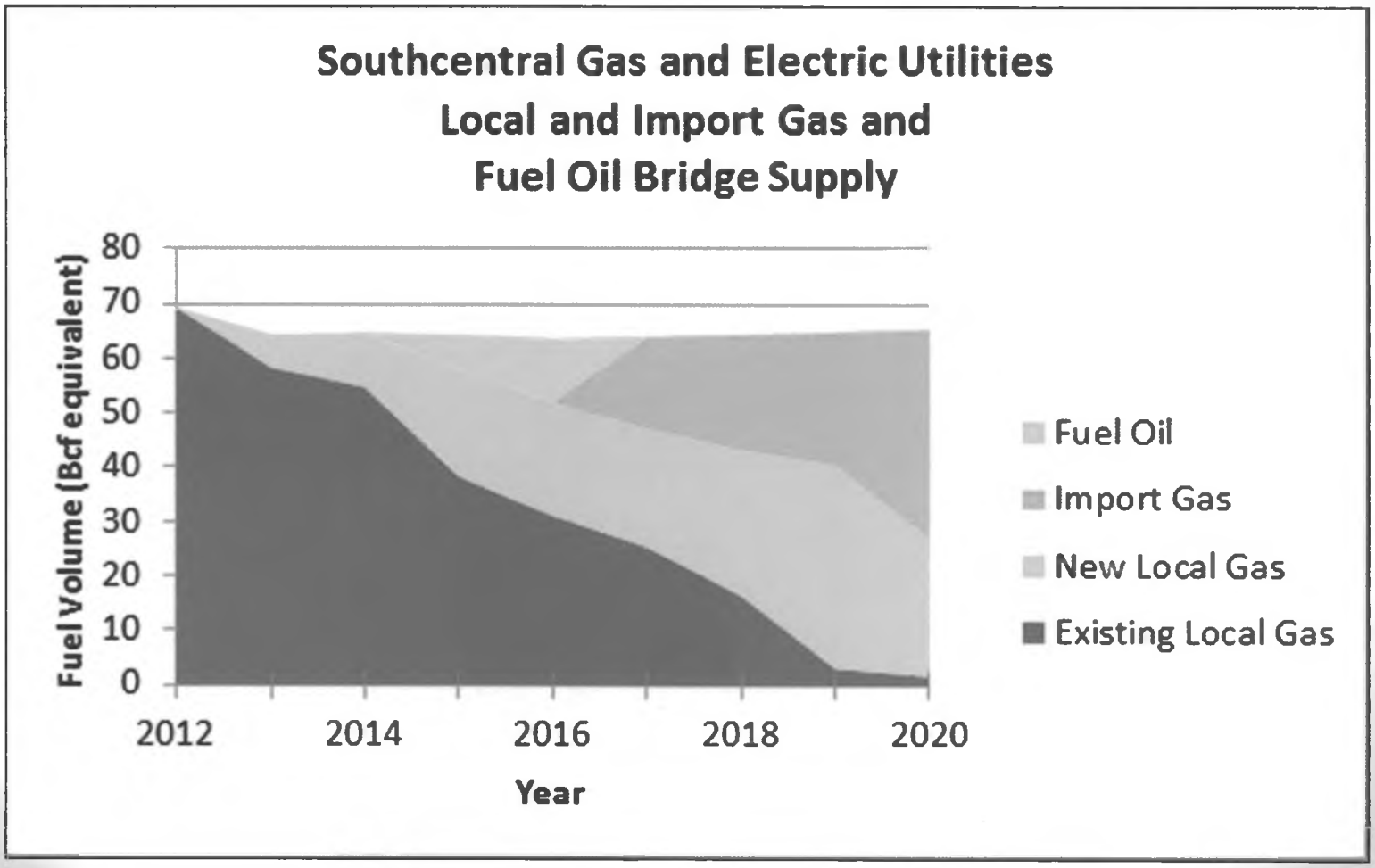
Plan Forward - Group Project Components

- Group Efforts
  - Actively engaged in years past
  - Renewed efforts
- Timeframe
  - Short term
  - Long term
- Regulatory Hurdles
- Next Steps

Timeframe

- Short Term
  - Possible Gas Supply Need - 2014
  - Weather Drives Need
  - Diesel Alternative
  - Short term/Spot LNG Imports
- Long Term
  - 10-15 years
  - CNG/LNG/Trucking
    - Australia, Canada, North Slope, U.S.

Future Supply Scenario



Next Steps

- Study Completion
- Consultants' Recommendations
- Decision on Path Forward
- Regulatory Filings
  - State
  - Federal

01/30/13 Who's Keeping the Lights and Heat On?

<TARGET><BILL></BILL><SUBJECT>01-30-13 Who's Keeping the Lights and Heat On-</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Agenda

Wednesday, January 30, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

+"Who's Keeping the Lights & Heat On?" Problems & Solutions:

1) Presented by Commissioner Dan Sullivan, AK Department of Natural Resources
Dept. Commissioner Joe Balash, AK Department of Natural Resources
Paul Decker, AK Division of Oil and Gas
PHIL BARRON - DIRECTOR, AK DIVISION OF OIL AND GAS

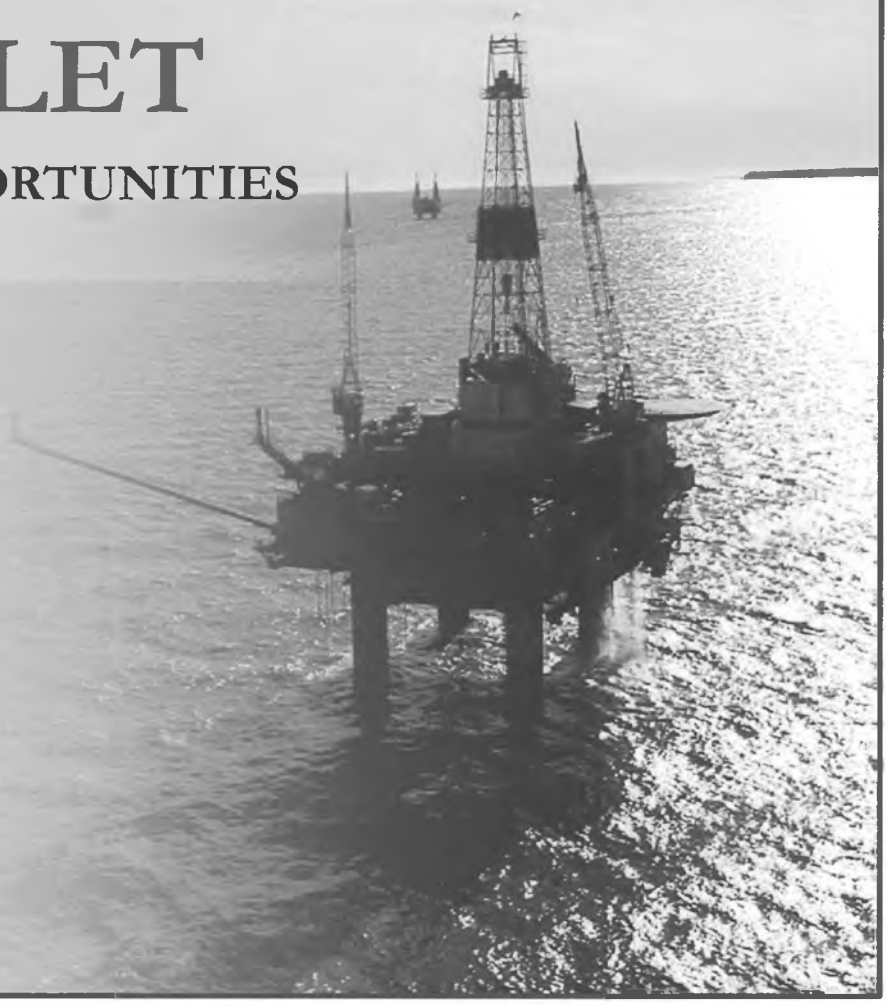
2) Mayor Dan Sullivan, Municipality of Anchorage (available for questions by teleconference)
3) Colleen Starring, ENSTAR (available for questions)

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

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COOK INLET

CHALLENGES & OPPORTUNITIES



House Energy Committee
January 30, 2013

Dan Sullivan, Commissioner
Joe Balash, Deputy Commissioner
Paul Decker, Division of Oil & Gas
Alaska Department of Natural Resources
www.dnr.alaska.gov

OUTLINE

PART I: Cook Inlet Overview & Challenges, Strategic Considerations, & Development History

PART II: Overview of Cook Inlet Resources

PART III: State's Actions Regarding Cook Inlet

PART IV: Recent Cook Inlet Activity

PART V: Moving Forward

PART I

Cook Inlet Overview & Challenges, Strategic Considerations & Development History

Cook Inlet
- Overview & Challenges -

- Cook Inlet basin supplies Anchorage and nearby communities with natural gas—the principal source of energy for heating and electric power generation
- Cook Inlet oil and gas industry has been a cornerstone of Southcentral Alaskan jobs and energy supply since statehood
- Cook Inlet is a maturing oil and gas basin. While there are legitimate concerns about possible contractual shortfalls of natural gas supplies in 2014-15, there are still large volumes of gas to be discovered and developed in small to intermediate size fields
- Cook Inlet is currently witnessing a transition from larger producers (Chevron, Marathon) to mid-size and small companies (e.g., Hilcorp, Apache, Nordaq) who specialize in reworking wells and discovering additional resources in maturing oil and gas fields
- Generally we see this as a positive trend—but transitions can slow actions and increase uncertainty
- There are several different stakeholders in the Inlet: producers, explorers, utilities, regulators, state, and feds
    - Few other places in the U.S. have so many utilities for such a small population
    - Regulated units can produce unintended consequences
    - Conflicting interests of players can result in inaction—current challenges and problems have been years in the making
    - Conflicting interests of players can affect the transparency, liquidity, and competition needed for markets to function effectively.

Cook Inlet

- Strategic Considerations/Goals -

- Most critical goal is energy security for Alaskans—keeping lights and power on
- All stakeholders working together is key to addressing challenges and taking advantage of opportunities
  - Complex problems with many variables
  - Narrow definition of interests can make solutions in the long-term public interest more difficult to achieve
- Isolated nature of power generation in Alaska requires focus on self-sufficiency and redundancy
- Must address immediate energy security concerns while focusing on long-term implications of actions taken
  - More Cook Inlet production, more jobs for Alaskans, and expediting gasline from the North Slope are all strategic goals for the State
  - Must keep in mind as near-term decisions are made so as not to undermine these
- In short: Goal is to get supply chasing demand, not demand chasing supply



Cook Inlet
- Development History -



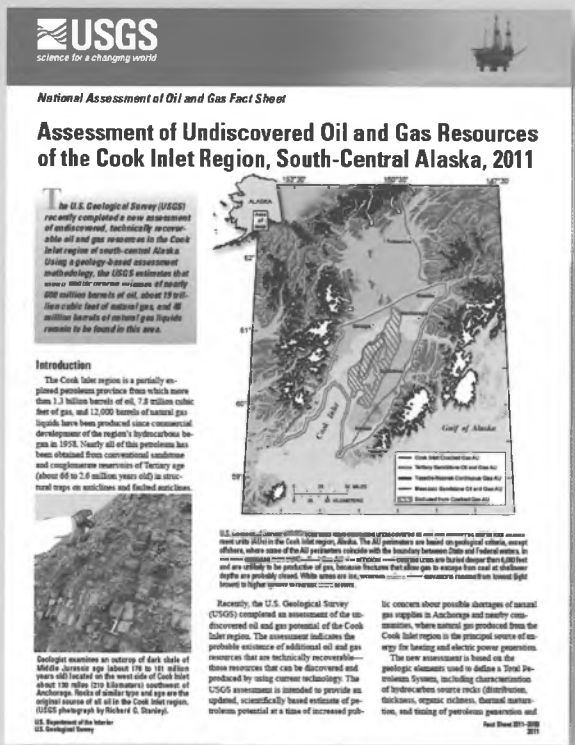
- Oil discovered at Swanson River in 1955; production began in 1958 and is still ongoing
- Gas discovered at Deep Creek and Kenai Gas field in 1958 and 1959 respectively; still in production
- So much gas that US LNG exports were pioneered here and industrial fertilizer manufacturing occurred in Kenai
- Historic production volumes of basin:
    - 1.3 billion barrels of oil
    - 7.8 trillion cubic feet of gas
    - 12,000 barrels of natural gas liquids
- 43 years of exporting LNG to Japan (approximately 2.5 trillion cubic feet); have never missed a shipment
    - Only place in the U.S. exporting LNG
    - Strategic implications of this for the big gasline are important

PART II

Overview of Cook Inlet Resources

COOK INLET
- USGS OIL & GAS ESTIMATES-

- USGS estimates (2011) that significant undiscovered volumes of hydrocarbons remain to be found in Cook Inlet
- Mean estimates of additional undiscovered resources that are technically recoverable include:
  - 19 trillion cubic feet of natural gas
  - 600 million barrels of oil
  - 46 million barrels of natural gas liquids
- These are very large volumes, even if they are not contained in large fields
- Terms can be confusing but matter in this context, e.g., "undiscovered," "reserve," "resource," "under contract"
- All assessments of undiscovered oil and gas are probabilistic to account for uncertainty
- Important issue of peak deliverability



USGS
science for a changing world

National Assessment of Oil and Gas Fact Sheet

Assessment of Undiscovered Oil and Gas Resources of the Cook Inlet Region, South-Central Alaska, 2011

The U.S. Geological Survey (USGS) recently completed a new assessment of undiscovered, technically recoverable oil and gas resources in the Cook Inlet region of south-central Alaska. Using a geology-based assessment methodology, the USGS estimates that mean undiscovered volumes of nearly 600 million barrels of oil, about 19 trillion cubic feet of natural gas, and 46 million barrels of natural gas liquids remain to be found in this area.

Introduction

The Cook Inlet region is a partially explored petroleum province from which more than 1.3 billion barrels of oil, 7.8 trillion cubic feet of gas, and 12,000 barrels of natural gas liquids have been produced since commercial development of the region's hydrocarbons began in 1958. Nearly all of this petroleum has been obtained from conventional sandstone and conglomerate reservoirs of Tertiary age (about 66 to 2.6 million years old) in structural traps on anticlines and faulted anticlines.

Geologist examines an outcrop of dark shale of Middle Jurassic age (about 176 to 161 million years old) located on the west side of Cook Inlet about 130 miles (210 kilometers) southwest of Anchorage. Rocks of similar type and age are the original source of oil oil in the Cook Inlet region. (USGS photograph by Richard G. Stanley).

U.S. Department of the Interior
U.S. Geological Survey

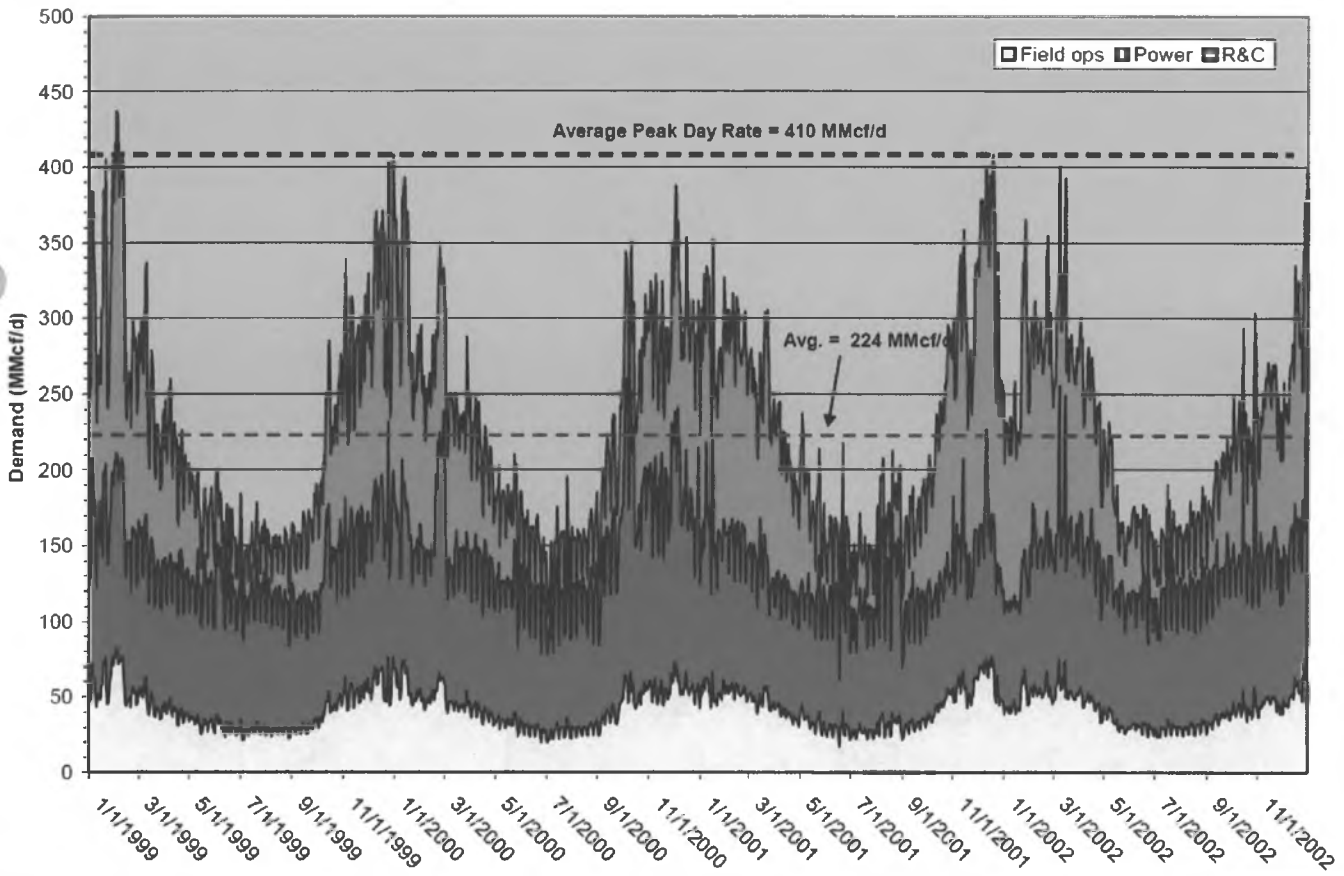
Recently, the U.S. Geological Survey (USGS) completed an assessment of the undiscovered oil and gas potential of the Cook Inlet region. The assessment indicates the probable existence of additional oil and gas resources that are technically recoverable—those resources that can be discovered and produced by using current technology. The USGS assessment is intended to provide an updated, scientifically based estimate of petroleum potential at a time of increased public concern about possible shortages of natural gas supplies in Anchorage and nearby communities, where natural gas produced from the Cook Inlet region is the principal source of energy for heating and electric power generation.

The new assessment is based on the geologic elements used to define a Total Petroleum System, including characterization of hydrocarbon source rocks (distribution, thickness, organic richness, thermal maturation, and timing of petroleum generation and

Fact Sheet 2011–3038
2011

Cook Inlet

- Seasonal Swings in South-Central Daily Demand -



Cook Inlet
- DNR, Division of Oil & Gas -

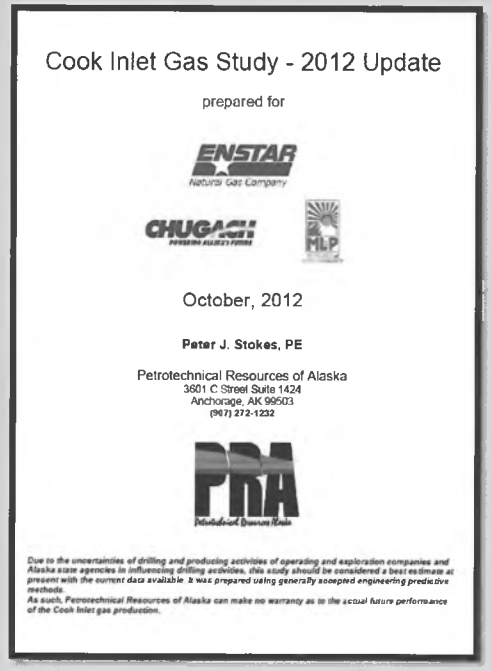
- DNR, Division of Oil and Gas (DOG), is primarily concerned with managing the gas resource in its entirety, including undiscovered resources, discovered non-producing resources, and producing reserves
- Utilities have a laser focus on the volume of gas available for contracts
- Producers are focused on delivering the contracted gas in the most efficient way possible
- DOG estimates for Cook Inlet gas incorporate decline curves, material balance, and geologic volumetric analysis
- PRA estimates focus on producing reserves from decline curve analysis alone



Cook Inlet

- Petrotechnical Resources of Alaska (PRA) Study -

- In 2009, ENSTAR, Chugach Electric and ML&P commissioned PRA to study Cook Inlet supplies from existing fields; in 2012, PRA updated the study
- Good solid product and analysis
- PRA report uses a decline curve analysis – a commonplace engineering technique that examines historical gas production rates and extrapolates forward, forecasting for how production rates will decline in years ahead
    - However, this assumes no further drilling or other redevelopment work
- Based on the PRA report, predicted gas supply decline curve drops below the anticipated demand level in 2014-15, with the supply shortfall increasing year-on-year after that
- This is and should be a concern for all



Cook Inlet Gas Study - 2012 Update

prepared for

ENSTAR Natural Gas Company

CHUGACH

MLP

October, 2012

Peter J. Stokes, PE

Petrotechnical Resources of Alaska
3601 C Street Suite 1424
Anchorage, AK 99503
(907) 272-1232

PRA

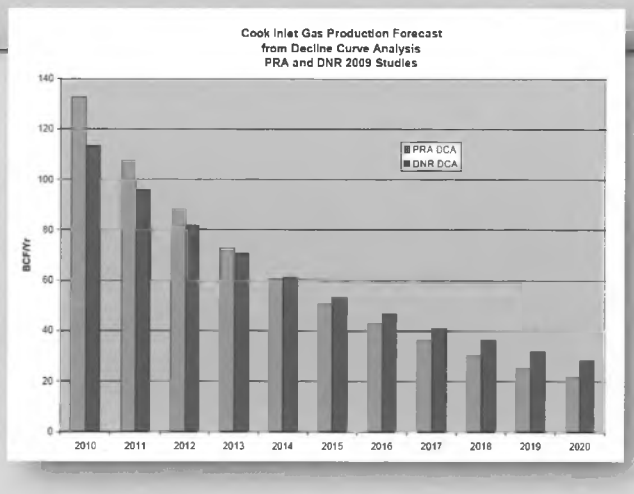
Due to the uncertainties of drilling and producing activities of operating and exploration companies and Alaska state agencies in influencing drilling activities, this study should be considered a best estimate as present with the current data available. It was prepared using generally accepted engineering predictive methods.
As such, Petrotechnical Resources of Alaska can make no warranty as to the actual future performance of the Cook Inlet gas production.

Cook Inlet

- Petrotechnical Resources of Alaska (PRA) Study -

Review of PRA Estimates

- The PRA report relies on decline curve analysis, which is complicated in a non-steady state production environment
- The DOG in 2009, 2011, and 2012 reviewed augmented decline analysis with both material balance analysis and geologic volumetric mapping of four major fields
- The basin wide material balance analysis identifies 32% more gas reserves than decline analysis alone, and the geologic volumetrics mapping identifies even more possible undeveloped gas
- Additional reserve potential exists in other currently producing fields and in recent discoveries



- In addition, the State has very limited information on any exploration activity within Native or federal lands; however, there are several publicly reported discoveries and new developments occurring on this acreage

Cook Inlet

- Petrotechnical Resources of Alaska (PRA) Study -

Material Balance Analysis Explained:

- This approach uses the change in reservoir pressure over time to estimate how much gas is contained in the parts of the field that are in pressure communication with the wells
- Basin wide, DNR's material balance analysis identified 32% more gas reserves than the decline curve analysis in the existing developed field areas
- Reserve estimates now being quoted by the utilities do not include material balance work

"Behind Pipe" Volumes:

- PRA's study only accounts for production from active completions
- As discussed in DNR's 2009, 2011 and 2012 studies, well logs indicate that existing Cook Inlet fields have nonproducing gas volumes behind pipe or in geologically isolated portions of the reservoir
- These nonproducing volumes cannot be observed by either decline curve or material balance analysis because both approaches are based on production data

Cook Inlet

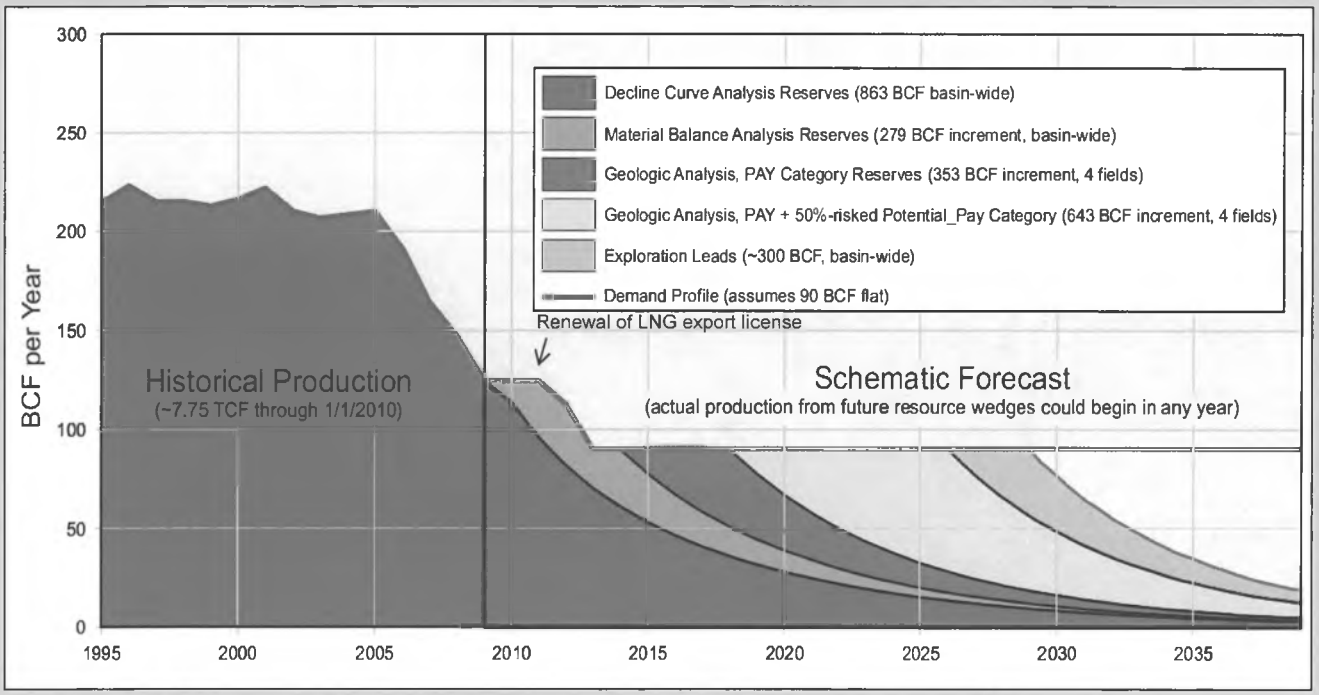
- Petrotechnical Resources of Alaska (PRA) Study -

- The fact that PRA predicts a shortfall in gas production under contract within the next few years is a cause for concern, but should not be construed to mean that gas resources in the Cook Inlet basin have been depleted
- It reflects the fact that not enough new wells are being drilled to keep pace with the declining production from existing wells
- Because the Cook Inlet basin is isolated from the gas spot market, the amount of gas available for delivery at any given moment is largely a function of sales contracts
    - Operators have no commercial reason to drill for more gas until they can contract it for sale
    - Classic chicken and egg dilemma
- Recent USGS resource assessments and other studies predict that the basin still holds large quantities of undiscovered, technically recoverable gas
- Hundreds of millions of dollars in investment by companies is further important evidence of a basin with significant hydrocarbon potential
- New gas production will need to be added from a combination of development drilling in existing fields and exploration drilling to bring new prospects online

Cook Inlet
- DNR, Division of Oil & Gas -

Cook Inlet Natural Gas Reserves and Resources: Hypothetical Production Forecast

(Assumes substantial investment in redevelopment activity in existing fields + some exploration success but does not include wild-cat drilling that is going on today)



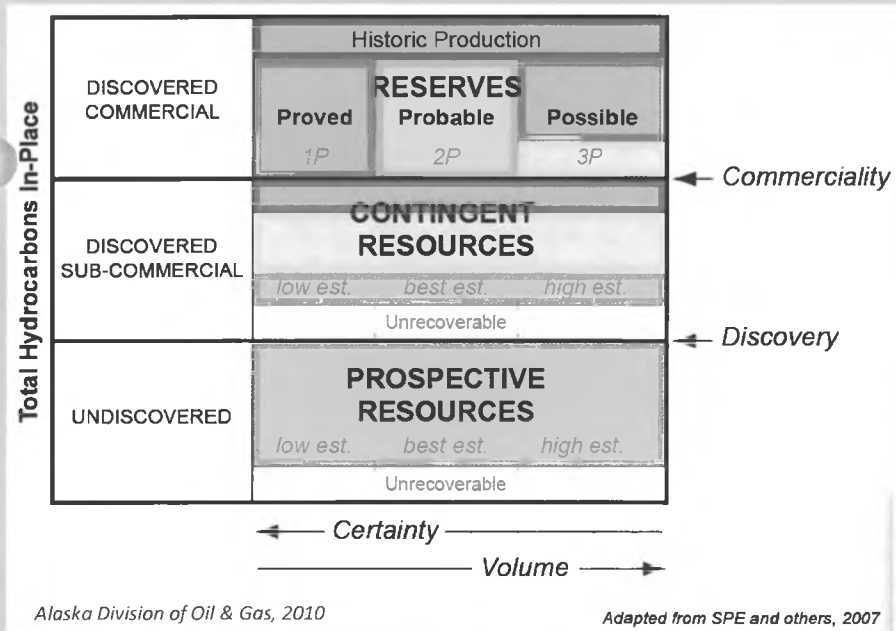
← *Past* *Present* *Future* →

Alaska Division of Oil & Gas, 2010 (modified after Hartz and others, 2009)

COOK INLET

- RESERVES AND RESOURCES NOMENCLATURE -

Categorization of Cook Inlet gas volumes identified by DNR

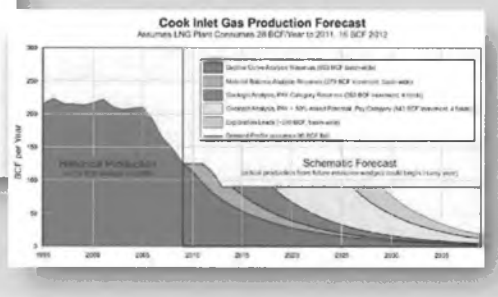


Alaska Division of Oil & Gas, 2010

Adapted from SPE and others, 2007

Important to note distinction between "resource" and "reserve" when discussing gas supplies:

- **Reserves** = oil and gas volumes that have been confirmed by drilling and are known or expected to be economically producible
- **Resources** = much broader term, and includes volumes that have not yet been proved by drilling, as well as volumes that have been discovered but whose commerciality is not yet established

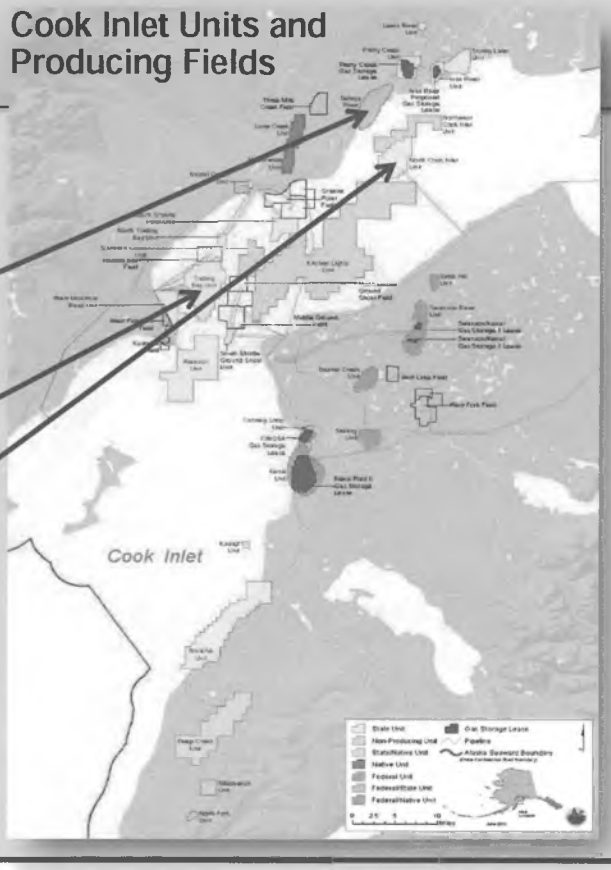


COOK INLET
- DNR, DIVISION OF OIL & GAS -

Cook Inlet Gas Estimates, DOG, December 2012

- **~ 1.1 TCF** estimated remaining producible reserves in 28 fields
- **~ 355 BCF** in undeveloped gas resources in 3 primary fields
  - Beluga River Unit (BRU) (233 BCF)
  - Trading Bay Unit (TBU) Grayling Gas Sands (72 BCF)
  - North Cook Inlet Unit (NCIU) (50 BCF)
- Recent drilling has proven new reserves in existing fields
- Current production from these wells: 1.0-7.0 MMCF/D

Cook Inlet Units and Producing Fields



PART III

State's Actions Regarding Cook Inlet

STATE *of* ALASKA
- ACTIONS REGARDING COOK INLET -

- Recognizing energy security challenges in Cook Inlet, the State has taken a number of focused actions—some are directly within DNR's authority and responsibilities, others are more tangentially related
- Aggressive use of all tools available to increase investment, exploration, and production
  - Primary focus of DNR—optimal way to address Southcentral energy challenges
  - Best way to advance the State's interests
  - Most directly inline with DNR's authority and responsibilities

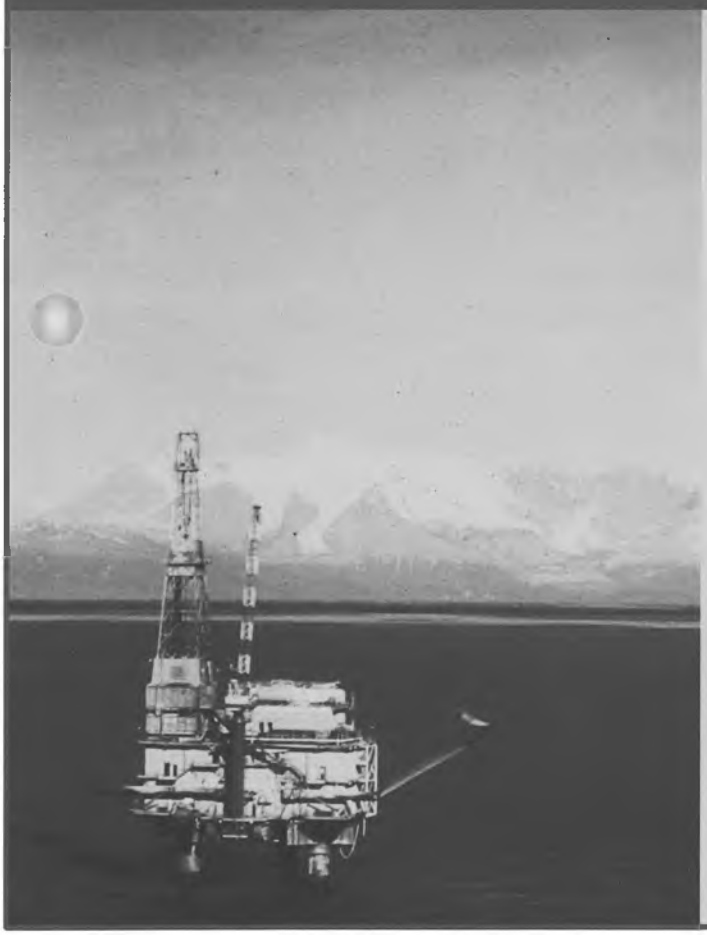


- Marketing resource potential, leases, tax and investment incentives to potential investors, explorers, and developers
  - Legislative 2010 actions very attractive and are working
  - Ex. Hilcorp, Apache meetings about investment and 2011 lease sale
  - Capital, expertise, proven track record

STATE *of* ALASKA
- ACTIONS REGARDING COOK INLET -

- Use of unit applications and lease terms as leverage to encourage new exploration and investment while maintaining vigilant regulatory oversight
- Support exploration through AIDEA—developed financing of a jack-up rig
- Ensuring stream-lined permitting that moves projects forward in a timely manner
  - Some Federal foot dragging remains a problem
  - Intervene/advocate when necessary on obstacles
  - Make RCA process less uncertain
- Gather and publish new geologic information
- Advocating for and fast-tracking additional storage capacity through CINGSA
  - Critical to additional winter energy supply
  - Provides year-round market for additional sales
  - OPMP coordination and RCA advocacy brought this project on line very quickly
- Re-orienting RAPA outlook to ensure public interest is defined as a balance between price and security of supply for Alaskans
  - Legislation has helped with RCA
- Working to expedite permitting to bring local, non-gas power generation on line
  - Present: Eva Creek
  - Future: Healy Clean Coal, UCG, Hydro

STATE *of* ALASKA
- ACTIONS REGARDING COOK INLET -



- Expediting transactions that advance the State's interests
  - Hilcorp/Chevron deal
  - FTC/Consent decree
- Convener/Problem Solving
  - Not always directly within DNR/State authorities
    - Ex. Fall 2012 storage issues, FTC advocacy
  - Frequent meetings—from Governor on down—among all stakeholders within Cook Inlet—utilities, producers, explorers, regulators
  - Encouraging cooperation, transparency, and ideas for increasing Cook Inlet investment and production
  - But convening authority only goes so far – private sector contracts between producers/utilities are critical

Part IV

Recent Cook Inlet Activity

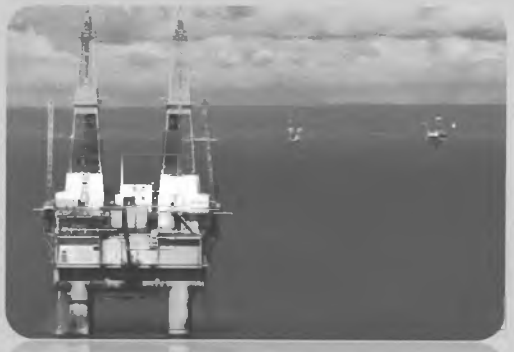
Cook Inlet
- Recent Activity -

- State efforts and incentives are having a strong, positive impact
  - Two years ago, conventional wisdom was that Cook Inlet was a dead basin
  - Now it is undergoing a significant exploration and investment renaissance
- Old and new players exploring and investing: Apache, Hilcorp, Armstrong, Linc, Buccaneer, Nordaq, Furie, Cook Inlet Energy, ConocoPhillips, CIRI
- Hundreds of millions invested in 2012

- Highly successful lease sales
  - In June 2011, the state received the highest number of Cook Inlet lease sale bids in 28 years, totaling over $11 million
    - Total tracts sold: 108
    - Total high bonus bids: $10,986,826.20
  - In May 2012, Cook Inlet lease sale bids totaled more than $6.8 million
    - Total tracts sold: 44
    - Total high bonus bids: $6,865,835



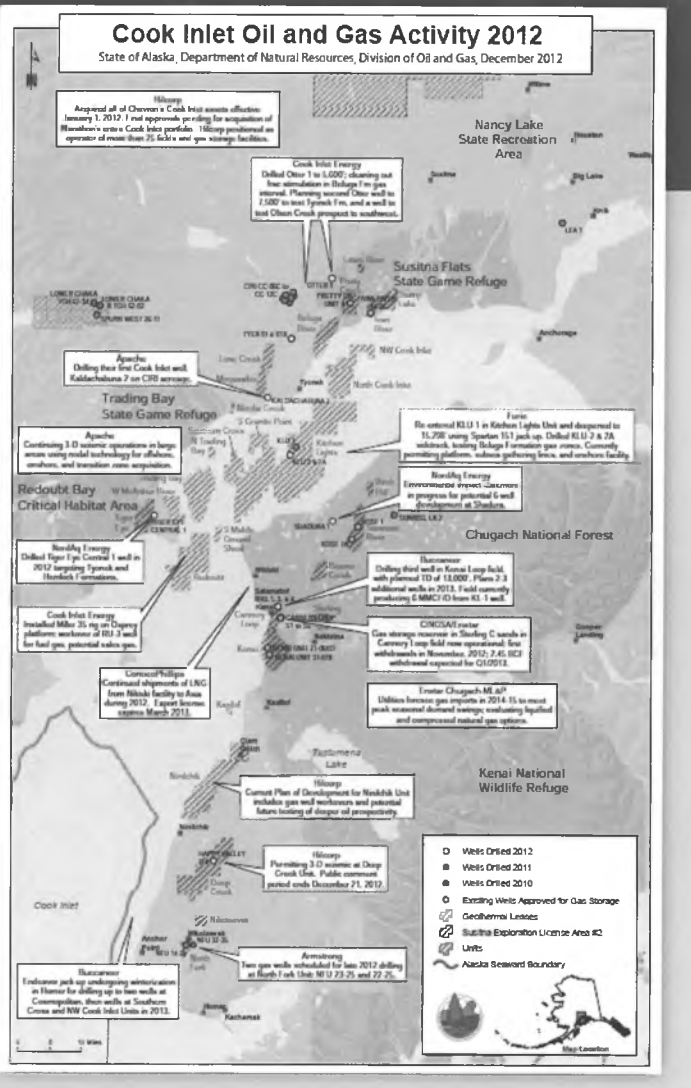
Cook Inlet
- Recent Activity -



- Dramatic increase in number of drill rigs in inlet – either idle, available or stacked
  - In November 2006, 9 rigs
  - In November 2009, 12 rigs
  - In November 2012, 17 rigs (includes 2 jack-up rigs)
- Companies shooting major 3-D seismic over large areas of the basin
  - Never previously done at this scale with this sophisticated technology
  - Presents huge opportunities for development
- New gas storage project on line; important for supply security and more steady year-round production, and peak availability
- Attractive price for gas relative to Lower 48 markets – but challenged by a relatively small market
- State continues to focus on safe, responsible development and operations

Cook Inlet
- Recent Activity -

- Diversity of players
- Oil vs. Gas – companies are indicating flexibility, but decisions will still be driven by commercial concerns
- New spending, capital investment, and well work-overs where big incumbents previously had no interest
- Jobs, jobs, jobs
- Need to move more exploration into production



Cook Inlet
- Renaissance -


EXPLORATION & PRODUCTION

Cook Inlet investment surges in 2012

After years of declining investment, several independents, small and large are taking a shot in the resource-rich basin

Petroleum News, January 13, 2013:

"Cook Inlet undoubtedly went through a renaissance in 2012.

"While dwindling supplies remain a concern, the year saw companies large and small making significant investments in the basin after years without exploration and only limited development. If the most ambitious companies were successful, the region would see increased oil and gas volumes some 55 years after production began."

U.S. NEWS | AUGUST 27, 2011

New Energy Estimate Breathes Life Into a Declining Alaskan Oil Field

By RYAN DEZEMBER

A combination of state incentives and improved estimates of the amount of natural gas held in Alaska's storied Cook Inlet are prompting energy companies to take a fresh look at the state's original oil patch.

Alaska officials want to reverse a decline in [illegible] inlet, which is home to more than half the state's populati[illegible] generate production royalties.



Time & Life Pictures/Ge[illegible]

Energy producers are returning to Alaska's C[illegible] birthplace of the state's modern oil- and gas-exploration business, after fleeing for the North Slope's vast reserves. Above, Thomas E. Kelly, former state commissioner of natural resources, at a 1969 North Slope lease auction.

WSJ, August 27, 2011:

"A combination of state incentives and improved estimates of the amount of natural gas held in Alaska's storied Cook Inlet are prompting energy companies to take a fresh look at the state's original oil patch."

reserves in [illegible] Slope, near Prudhoe Bay. The [illegible] home to the biggest oilfield in the U.S.

"It was just a flight of capital," said Joe Balash, Alaska's deputy commissioner of Natural Resources. "For a generation we've been living off Prudhoe Bay while we're sitting on what, by any other measure, is a world-class basin."

Part V

Moving Forward

Cook Inlet

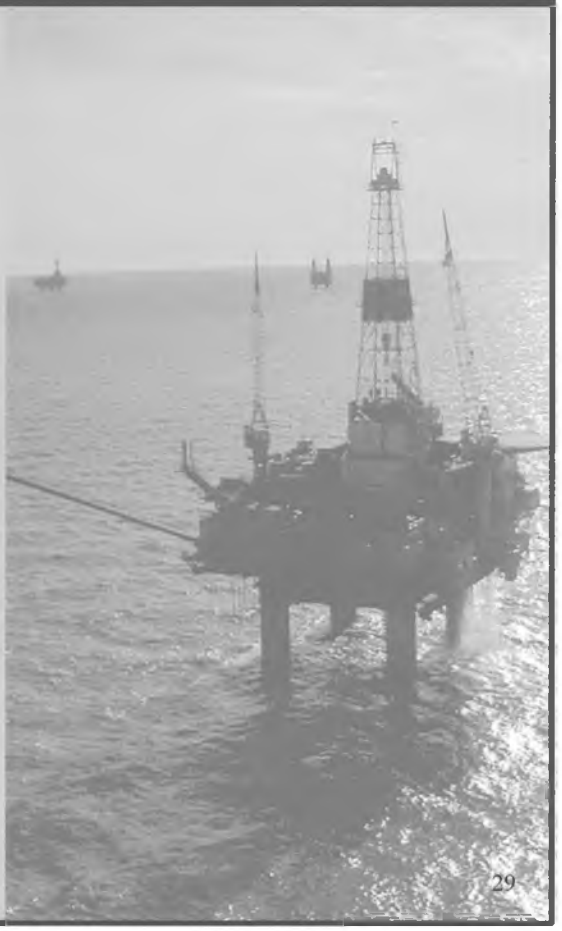
- Actions Moving Forward -

The renaissance is on, but challenges remain; the State's actions will focus on the following areas:

- Redouble efforts to continue increased investment and exploration with a particular focus on near-term increased production
  - Encourage behind the pipe production
  - Help decrease costs
  - Continue to look for ways to incentivize more Cook Inlet drilling
- Additional efforts could include:
  - Modernizing Cook Inlet information
  - Infrastructure development, particularly on west side of Cook Inlet
  - More gas storage
- Incentivize and support industrial-size markets, certainty, and opportunities to continue significant Cook Inlet investment and production
  - Complicated dynamic but critical
  - Potential industrial markets—Donlin, Agrium, LNG facility after residential and business demand is met
- Encourage utilities to work on all redundancy and "belt and suspenders" options for energy security
- Be ready to meet potential near- and intermediate-term supply shortfalls
  - More storage
  - North Slope LNG trucking initiative
  - Importing gas as a "last resort"

Cook Inlet
- Actions Moving Forward -

- Concerns regarding importing gas, particularly large volume, long-term contracts of LNG or CNG
    - Could stifle, undermine Cook Inlet renaissance
    - Could undermine Alaska jobs and employment of a local workforce
    - Importing gas from British Columbia validates and promotes one of the biggest competitors (BC gas) to an Alaskan large-diameter LNG export project
- Learn from history



Cook Inlet
- Learning from History: APL-5 -

- Contract between Marathon Oil Company and Enstar
  - Full requirements through 2016
  - Henry Hub Pricing
- RCA rejected the proposal
  - Opposed by RAPA
  - Opposed by other utilities as they feared "precedent pricing"
- Lessons learned:
  - Likely a lot of behind pipe resource in Cook Inlet
  - Without a long-term market to sell gas, companies will be reluctant to drill; this hurts Alaskans
  - Singular focus on price in short term can undermine security of supply and price in longer term
  - We all must work together

CONCLUSION

- Positive developments in 2012 with Cook Inlet Renaissance
- Concerns remain
- All agree that the best scenario is for more gas from the Cook Inlet and we need to help incentivize production there
- Must be prepared to react to numerous scenarios
    - Energy security is number one goal
    - But long-term implications of actions must be thoroughly examined
    - Long term energy security is also clearly achievable
- Most important for immediate future: All parties continue to work and cooperate on addressing these challenges together

02/01/13 Overview: Interior Electric Supply

<TARGET><BILL></BILL><SUBJECT>02-01-13 Overview Interior Electric Supply</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Rep. Doug Isaacson
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Agenda

Friday, February 1, 2013
8:00 – 10:00 A.M.
Barnes Committee Room (#124)

+ Interior Electric Supply

Presentation by Cory Borgeson, CEO, Golden Valley Electric Association

*First hearing in committee of referral
+Teleconferenced
=Bill previously heard/scheduled

GOLDEN VALLEY ELECTRIC ASSN.

INTERIOR ENERGY ISSUES



Cory Borgeson
GVEA President & CEO

February 1, 2013

GVEA
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GVEA at a Glance

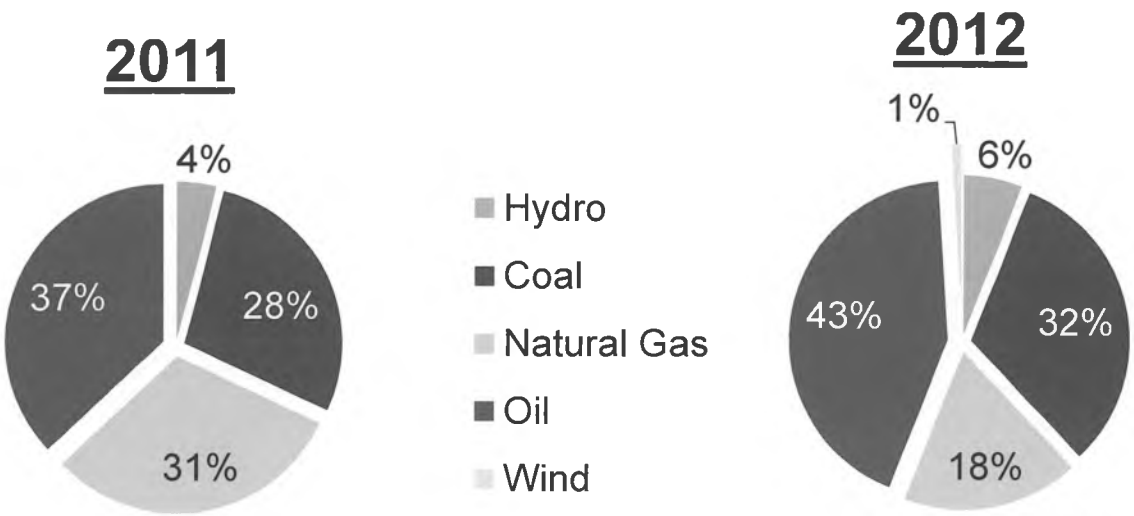
- Owned by 34,480 members
- 5,973 square mile service territory
- 99.97 percent reliability during 2012
  - Average member experienced less than 2.5 hours without power
- Generation capacity: 291(296) MW
- Anticipated wind generation: 78,840 MWh per year
- 2012 peak load 217.6 MW
- Annual sales: 1.33 billion kWh



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Where the Power Comes From

GVEA Fuel Supply



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Golden Valley Electric Association
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Alaska Residential Electric Rates*

- Fairbanks (GVEA): 20¢
- Minto (Alaska Village Electric):
  - 22¢ (with state assistance)
  - 61¢ (without assistance)
- Glennallen (Copper Valley Electric): 33¢
- Homer (Homer Electric Assn.): 16¢
- Anchorage (Chugach Electric): 13¢

*Rates are per kilowatt-hour and do not include monthly customer charges.

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Golden Valley Electric Association

Alaska Urban Space Heating Costs

Simplified Fuel Cost Comparison: Fuel Oil, Propane, Natural Gas

Location, Tariff, System	Fuel Oil, $/gallon	Propane, $/gallon	Natural Gas, $/MCF
	1.00	1.12	7.96
Anchorage June 2012	**1.38**	**1.54**	**11.00**
	2.00	2.24	15.92
	3.00	3.35	23.88
Fairbanks, June 2012	**4.00**	**4.47**	**31.84**
	5.00	5.59	39.80
	6.00	6.71	47.76
	7.00	7.83	55.72

Source: Northern Economics.

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Impacts to Our Community



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Generation Facilities



Bradley Lake (hydro) – 15 MW



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Healy Power Plant (coal) – 28 MW



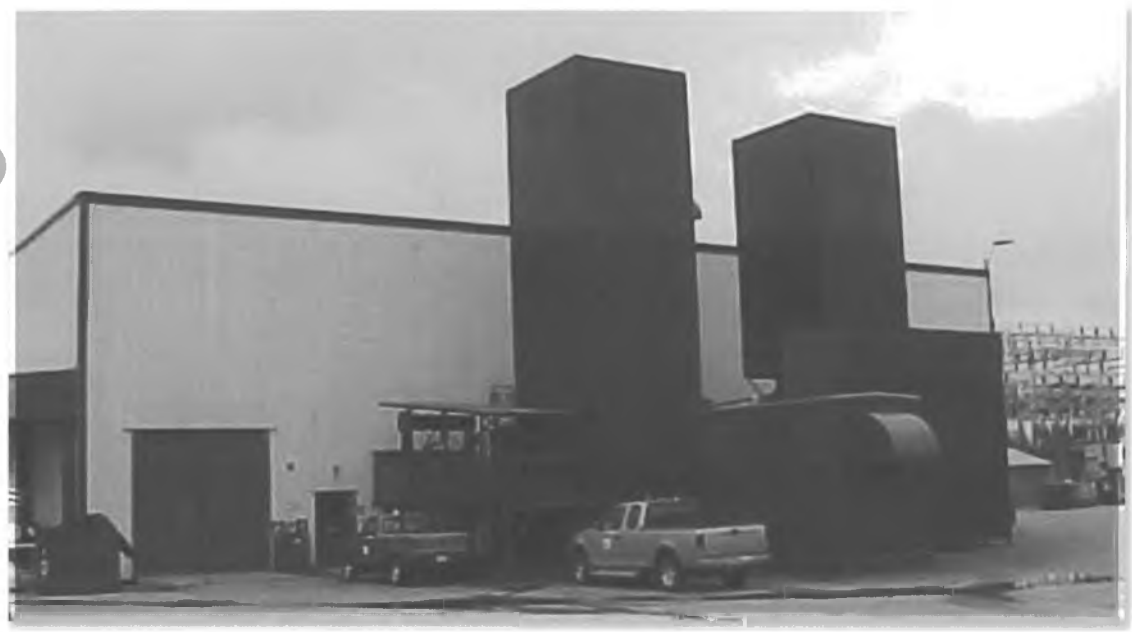
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Eva Creek Wind (25MW) – 78,840 MWh/year anticipated generation



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Zehnder Power Plant (diesel) – 41 MW



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North Pole Power Plant (diesel or HAGO) – 120 MW



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North Pole Expansion Power Plant (naphtha or natural gas) - 60 MW



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Delta Power Plant (diesel) – 27 MW



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Power Purchases



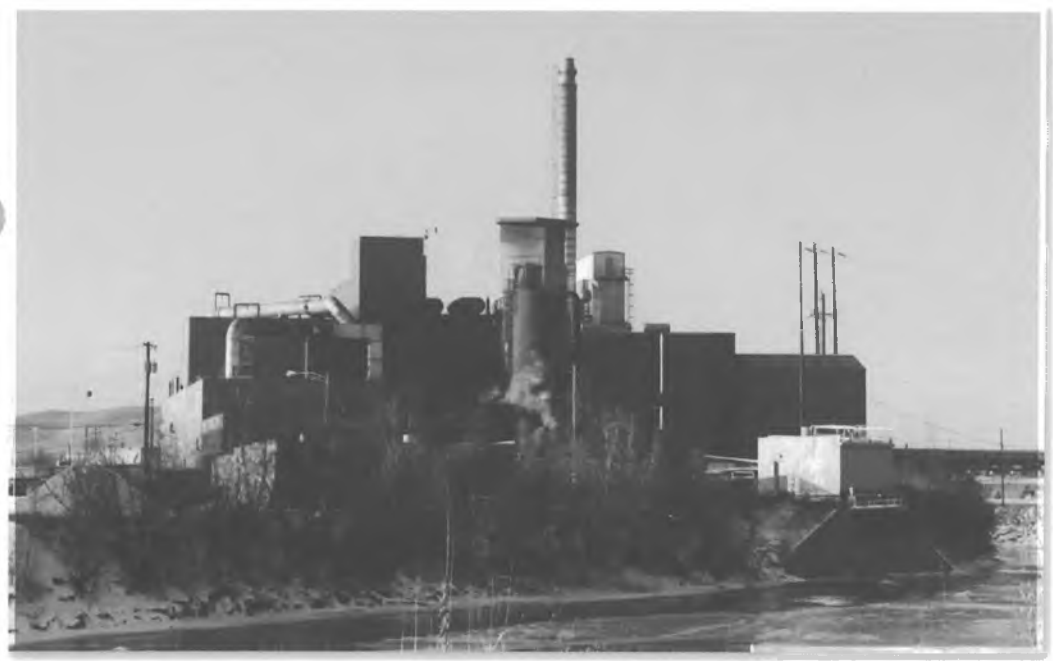
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Chugach/MEA (natural gas) – 60 MW (intertie limited to 75/80 MW)



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Aurora Energy (coal) – 25 MW



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Dispatching Power



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Electric Costs at GVEA

- Fuel & Purchased Power Charge: 10.802¢ kWh
- Utility Charge: 9.597¢ kWh
- Customer Charge: $17.50

- http://www.gvea.com/rates/rates



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Solutions

- Gas purchases via Intertie
- Healy Clean Coal Plant
- LNG Trucking
- Susitna Hydro
- HVDC Transmission
- Conservation – Power to Use Less



the power to use less

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Golden Valley Electric Association

Generation Sources

- Southeast
  - Hydro
  - Fuel Oil
- The Bush
  - Fuel Oil
  - Wind
- The Railbelt
  - Natural Gas
  - Hydro
  - Fuel Oil
  - Coal

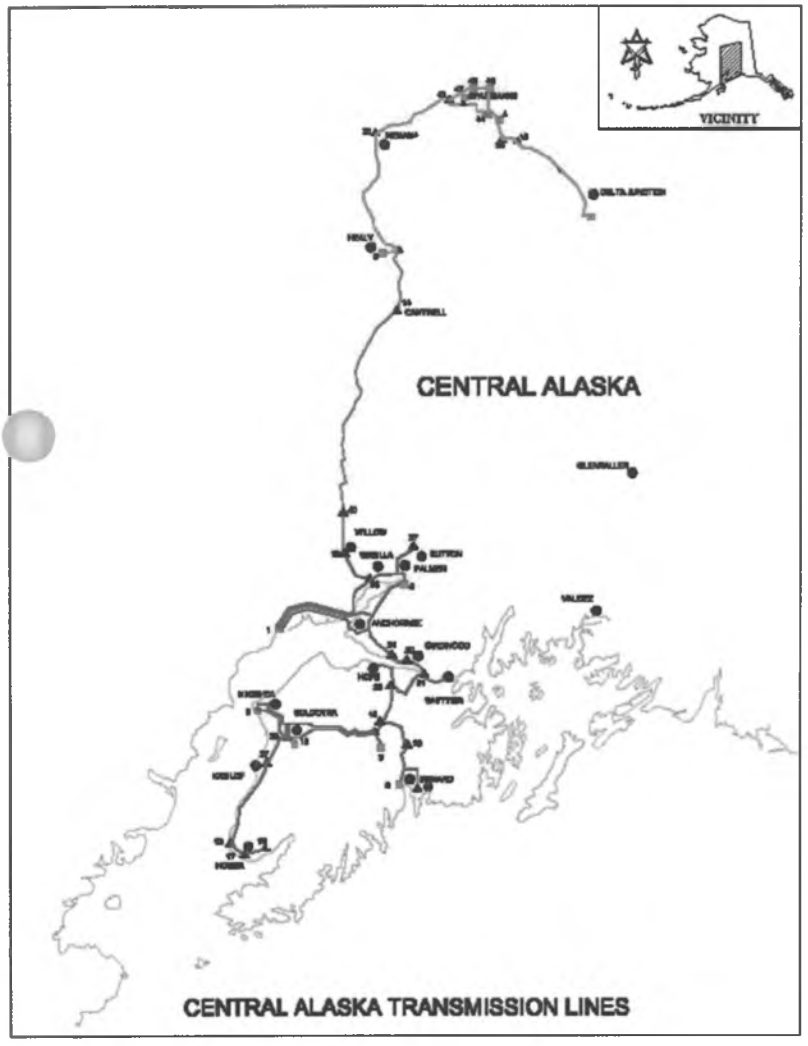


Railbelt Electric Overview

- Six distribution utilities
- Interconnection from Homer to Fairbanks
- Three primary generating utilities
- Collection of small, dispersed generating units
- Independent operation – modified Lower-48 operating rules for Alaska Intertie



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Railbelt – 1980s

- Alaska Intertie Built
- Alaska Intertie Agreement
- Soldotna Unit #1

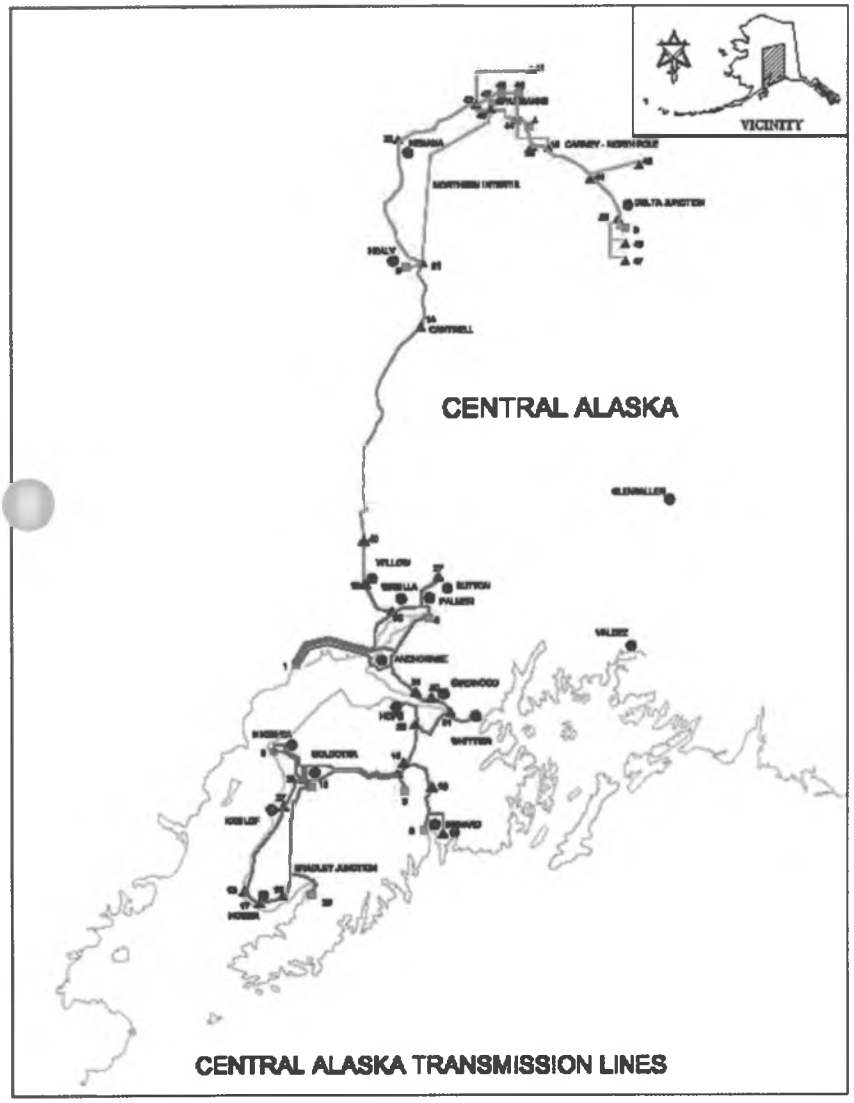
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Golden Valley Electric Association



Railbelt –1990s

- Bradley Lake Hydro
- Bradley Transmission Lines

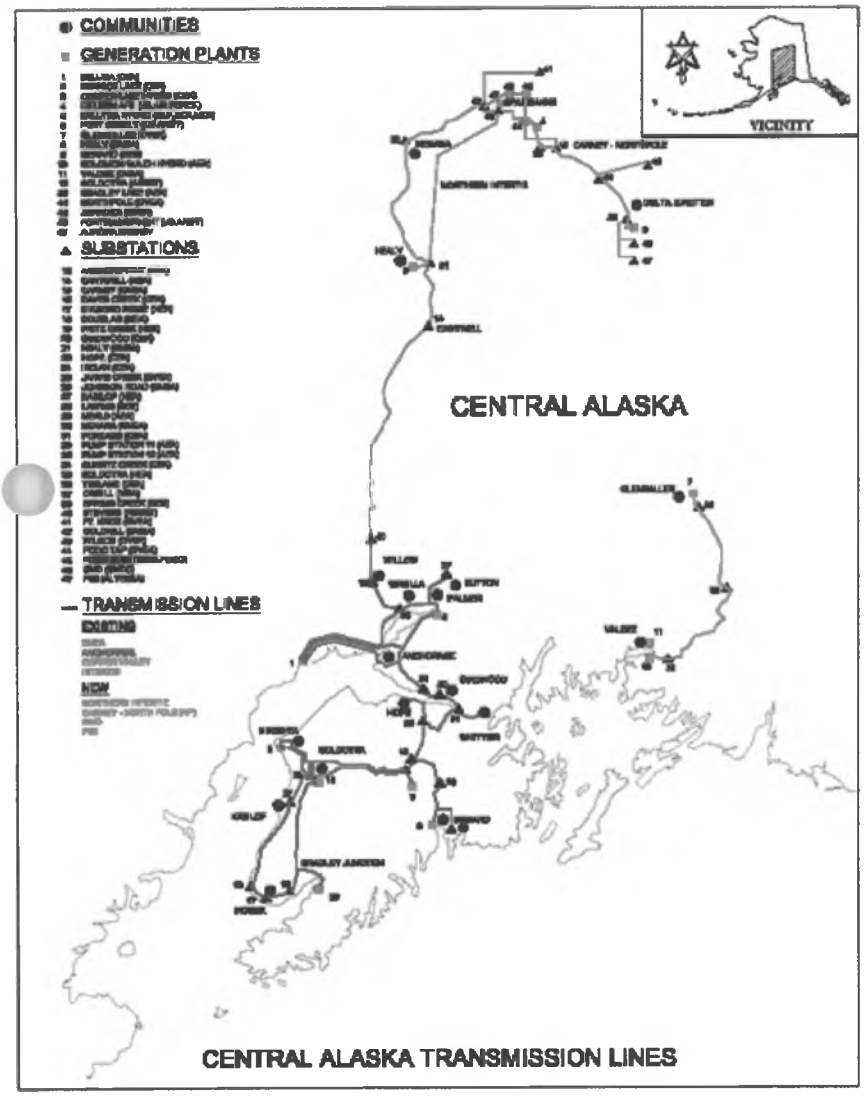
GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative



Railbelt - 2000s

- Northern Intertie
- Battery Energy Storage System

GVEA
Golden Valley Electric Association



Railbelt Today

- GVEA
- MEA
- ML&P
- Chugach
- SES
- HEA

GVEA
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Healy Clean Coal Plant Update

- 50 MW plant adjacent to Healy I
- Air permit approved in November 2012
- Expect to take possession of plant in 2013
- Estimated online in 2015



GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

Questions


GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

Power to Use Less Ads

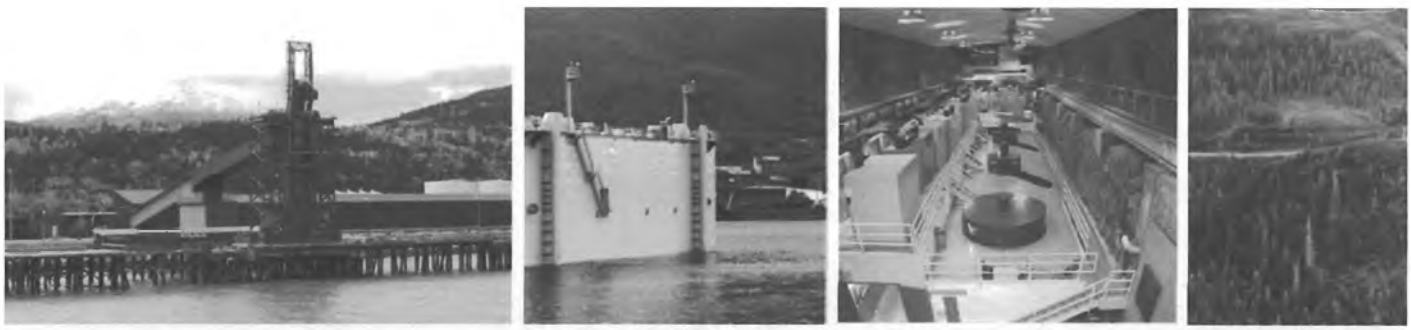


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Power to Use Less Ads



GVEA
Golden Valley Electric Association



Alaska Industrial Development and Export Authority

Energy Project Overview

Ted Leonard, Executive Director

Mark Davis, Deputy Director-Infrastructure Development

February 2013

AIDEA

AIDEA's Mission

To promote, develop, and advance economic growth and diversification in Alaska by providing various means of financing and investment.



AIDEA fulfills its mission by providing Alaska businesses, projects and infrastructure with access to long-term commercial and development financing at a reasonable cost through its strong balance sheet and credit rating (S&P = AA+)

AIDEA

AIDEA's Energy Finance Tool Box

- Own all or a part of an energy project (Development Finance Program).
- Co-Invest in a Corporation or LLC that owns an energy project (Development Finance Program).
- Purchase up to 90% of a loan from a qualified financial institution up to $20 million for a qualified energy project or transmission system (Loan Participation Program).
- Provide direct financing or guarantees on financing for 1/3 of the capital cost of a qualified energy project (SETS Development Program).
- Issue Revenue Bonds for financing of a qualified energy project (Conduit Bond Program).

AIDEA

Qualified Energy Project

Qualified energy project means a project in the state that involves:

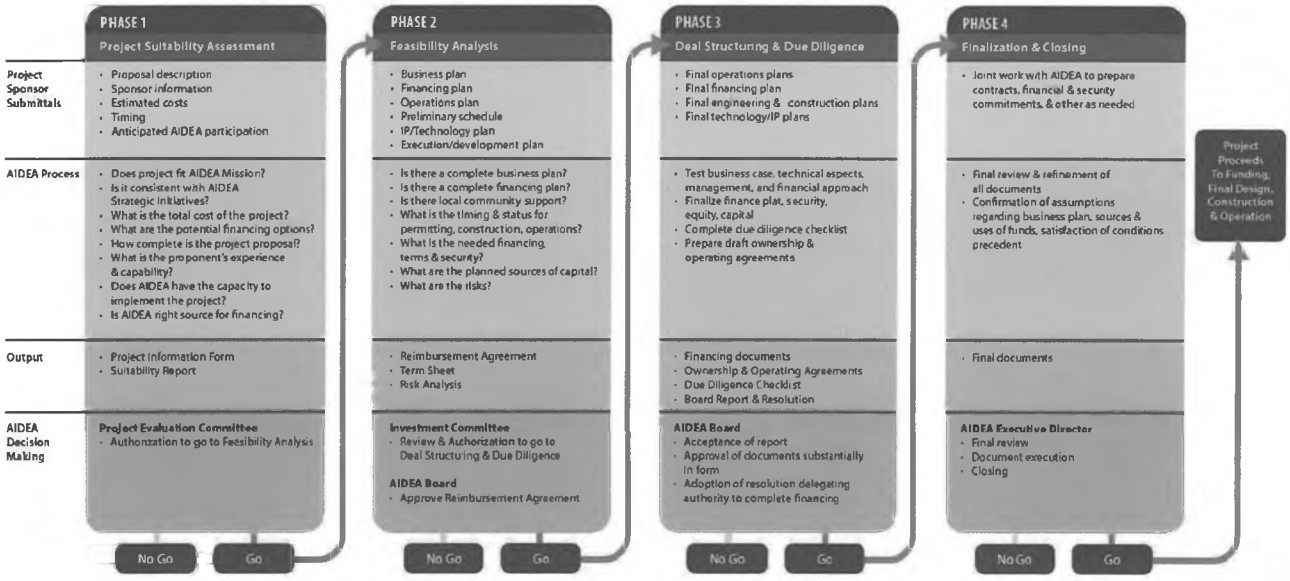
A. transmission, generation, conservation, storage of distribution of heat or electricity;

B. liquefaction, regasification, distribution, storage or uses of natural gas;

C. Distribution or storage of refined petroleum products.

Project Analysis & Decision Making

AIDEA Development Project Analysis & Decision-making Process



Endeavour – Spirit of Independence

- Strategic Investment in a oil and gas jack up rig for Cook Inlet exploration.
- AIDEA investment is $23.6 million with an ROI of 8.0% over a 5 year period through a preferred ownership interest.
- The total project cost (including refurbishment) is $120 million.
- AIDEA's investment leveraged an additional $96.4 million in private investment.
- Current Status – Refurbishment is being completed in Homer. The Endeavour is expected to mobilize to the Cosmopolitan Lease site in mid March. It is projected that three exploratory wells will be drilled in Calendar Year 2013.



AIDEA

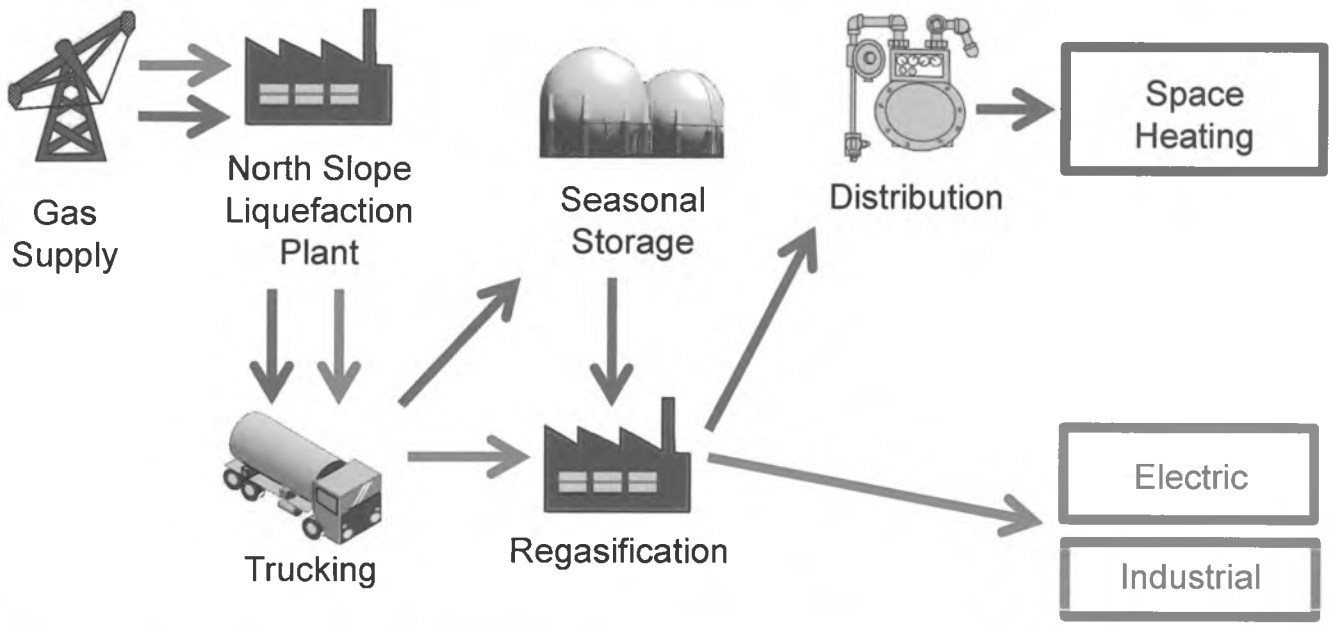
Fairbanks Gas Project

- Provide lowest cost energy to most Interior Alaska consumers as soon as possible
- Get gas first to Interior Alaska while assuring long-term access to gas from liquefaction plant for all Alaskans
- Utilize private sector mechanisms as much as possible

Project Description

- Natural gas will be liquefied on the North Slope and trucked to Interior Alaska
- Primary LNG demand anticipated to be Fairbanks and North Pole
- LNG will be temporarily stored and re-gasified in Interior Alaska
- Natural gas distribution system with storage to supply natural gas for heating

LNG Trucking Value Chain



Collaboration Structure

- AEA is leading the policy development of the project
  - Ensure that project goals are defined and consistent with the public interest
  - Engage the public, industry and elected officials
- AIDEA is developing the financing of the project
  - Examine finance options and commercial structure in collaboration with private party participants
  - Utilize available finance tools to meet project goals

Project Finance Overview

- $355 million for project in Governor's finance plan (HB 74)
- AIDEA financing can be applied to different parts of the LNG supply chain
- AIDEA will use this finance package to leverage private investment

Governor's Finance Package

- $50 million General Fund appropriation
  - Directly reduces the cost of LNG
- $150 million AIDEA bonds
  - 3% interest rate (projected rate based on current market rates)
- $125 million SETS capitalization
  - 3% interest rate
  - Flexibility to provide optimal commercial structure
- **$325 million in Financing**
- **$30 million natural gas storage credit**
  - $15 million tax credit per qualifying storage tank
  - Created through previous legislative action

AIDEA

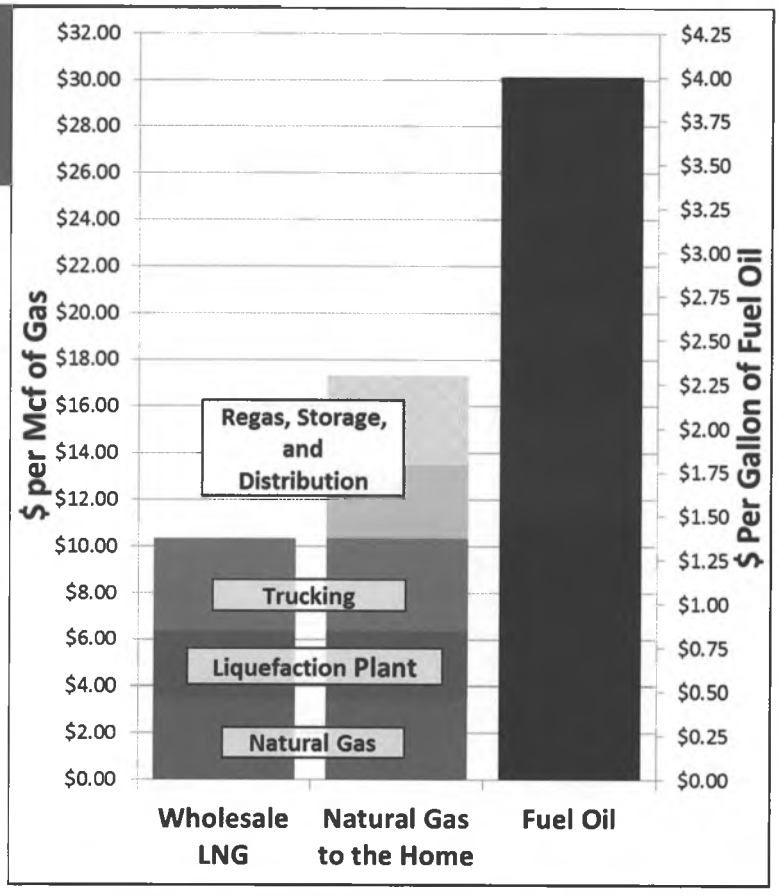
LNG Lowers Energy Costs

Key Assumptions

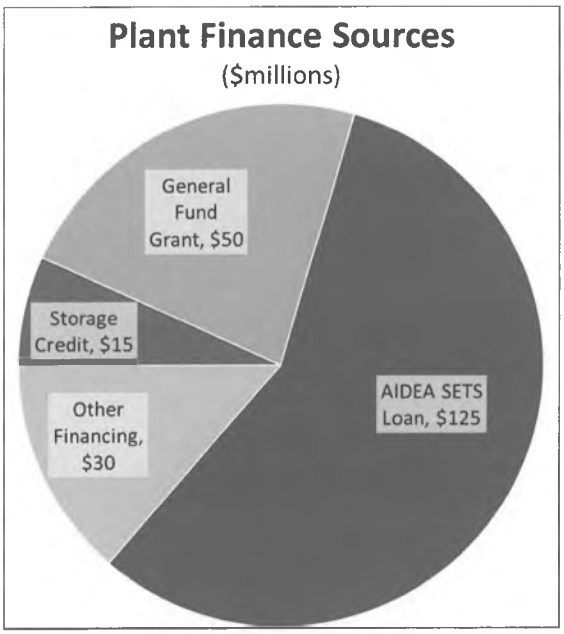
- 9 Bcf LNG Plant
- LNG plant bifurcated into two sections (industry and utility)
- $50 million capital cost reduction applied to the 4.5 Bcf utility section
- Regas, storage, & distribution costs are presented as a range

Expected Utility Price per Mcf

- Wholesale LNG: $10.33
- Natural Gas to Home: $13.49-$17.29



Financing Options for North Slope LNG Plant



- The North Slope LNG Plant may be funded from multiple sources, the example used here is just one possibility
- This analysis investigates the impact of an AIDEA SETS Loan interest rate on the final price
- The AIDEA SETS Loan is currently expected to be 3% and is compared with lower rates
- The finance payback period could be between 15 and 30 years

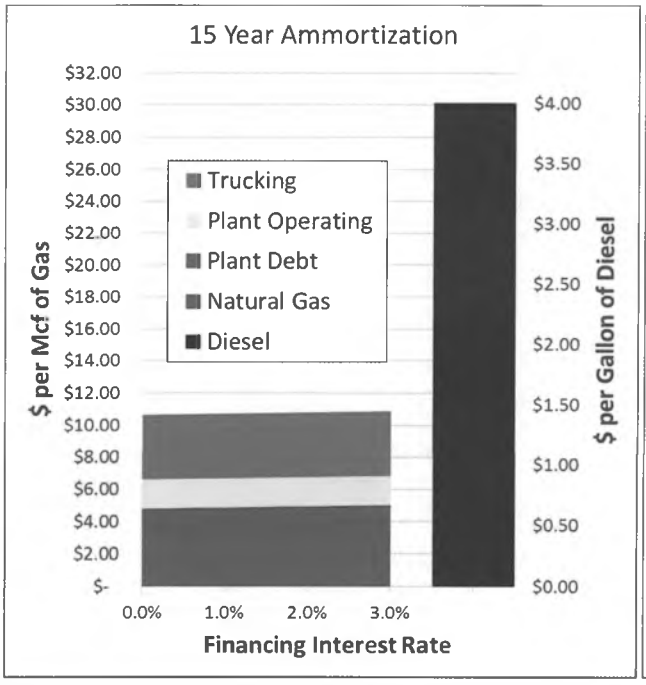
Financing Sources ($mill)

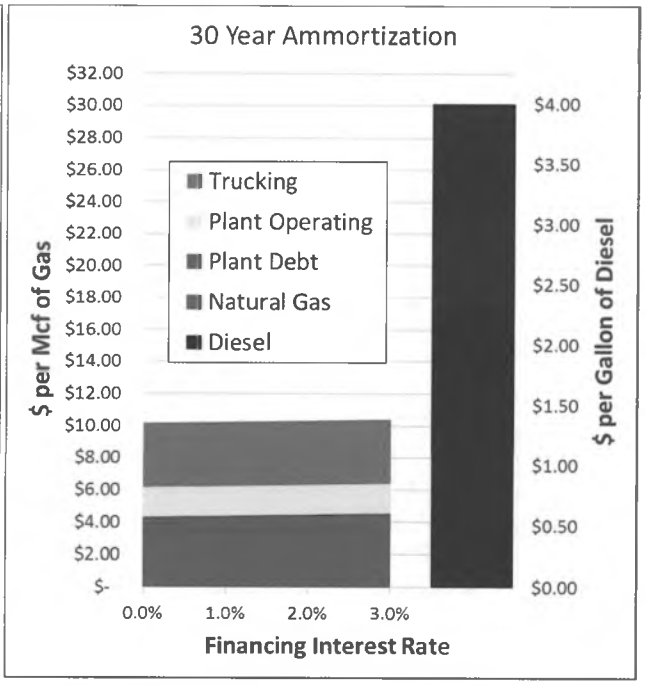
Storage Credit	$15
General Fund Grant	$50
AIDEA SETS Loan	$125
Other Financing	$30
Plant Total	$220

Finance Impact on Price

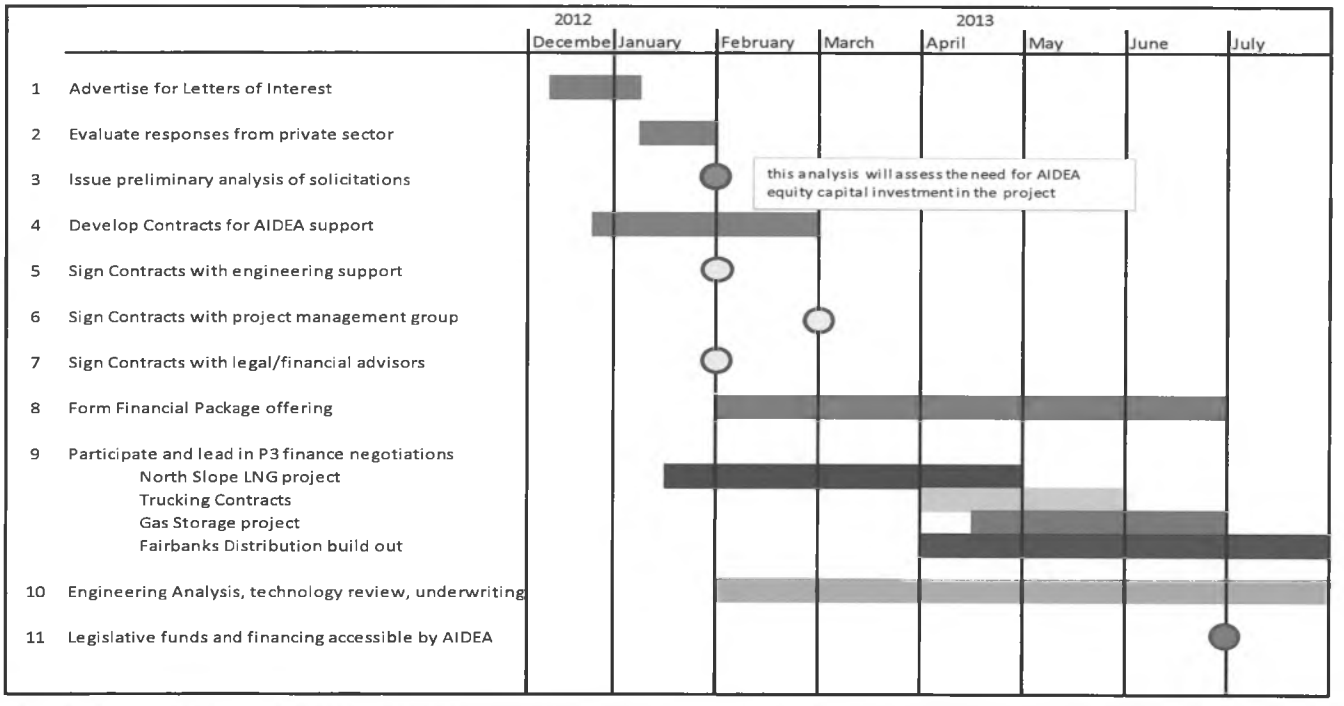
Amort-ization Period	Annual Payment ($mill)	Cost, $ per Mcf
15	$14	$1.51
30	$9	$0.95

Plant Financing





Schedules and Milestones



AIDEA

Other Potential Energy Projects

Other energy projects in feasibility analysis stage:

- Propane-air distribution system for small Alaskan Community
- LNG tank for Alaskan natural gas distribution company
- Petroleum storage facility for rural distribution
- Energy Efficiency improvement for Alaskan Educational Institution

AIDEA

AIDEA

Alaska Industrial Development and Export Authority

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Anchorage, Alaska 99503
(907) 771-3000
(888) 300-8534 (Toll Free in Alaska)

www.aidea.org

AIDEA

AIDEA

ENDEAVOUR – SPIRIT OF INDEPENDENCE

Project Information Sheet

Introduction

AIDEA's strategic investment, combined with the ACES credits for Cook Inlet as well as the SB309 mission to encourage oil and gas exploration in the Inlet, has resulted in bringing to Alaska a cold weather capable drilling rig committed to work in Alaskan waters. AIDEA's investment leveraged an additional $96.4 million in private investment.

Project Description

AIDEA invested in a limited liability company (LLC) with two partners for the purpose of owning a jack-up rig appropriate for Cook Inlet. The LLC will charter the rig to the exploration subsidiary of one of the partners, which has committed to use this rig on all of its prospective Cook Inlet developments, and to drill a minimum of four exploration wells in Cook Inlet. Additionally, as long as AIDEA remains a preferred owner, the rig will operate exclusively in Alaskan waters.

The Endeavour-Spirit of Independence (formerly "Adriatic XI") was purchased from Transocean and refurbished at Keppel FELS shipyard in Singapore and in Homer. Originally designed to operate in the cold North Sea, the rig's structural elements were built with sufficient toughness to eliminate the risk of brittle failure. The rig was also built to withstand North Sea storms. Its size allows it to operate in water depths up to 300 feet, which means the Endeavour can be used in all areas in Cook Inlet as well as in Alaskan OCS waters, such as the Chukchi and Beaufort Seas.

Economic Development Analysis

From a mission perspective, AIDEA'S ownership in the Endeavour is consistent with its mandate to encourage natural resource development. AIDEA's involvement in this project not only accelerates development of Cook Inlet oil and gas resources, it stimulates job growth and helps advance the region's economy. To date, work on refurbishing the rig in Homer has been performed by the local labor force. Additionally, the operator has been staffing the rig from regional sources and is completing the staffing of two shifts for rig operation. It is estimated that approximately 108 direct Endeavour jobs will be created, plus approximately 90 support industry jobs. Using standard multipliers, AIDEA estimates that approximately 317 jobs will be created in other Kenai Peninsula Borough businesses.



Beyond these direct and indirect jobs, there is potential for significant incremental job growth with expected oil and/or gas development(s) induced by bringing the drill rig into Cook Inlet.

Partners

Using recently granted powers to participate in an LLC for the purpose of owning a project asset, AIDEA partnered with three organizations to create Kenai Offshore Ventures, LLC (KOV). AIDEA's partners include:

Buccaneer Energy/Buccaneer Alaska/Buccaneer Resources ("Buccaneer") – an Australian company and US subsidiaries. Buccaneer has working interest ownership in a number of leases in Alaska, including Cook Inlet, and is manager of the LLC.

continued...

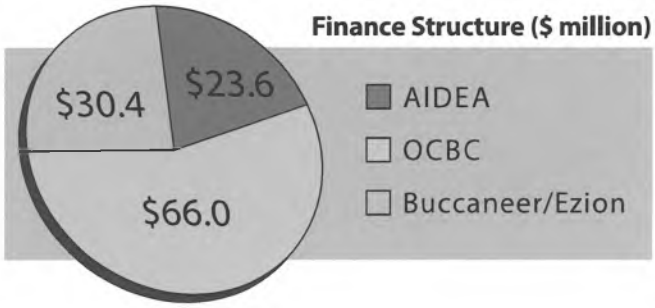
AIDEA

ENDEAVOUR – SPIRIT OF INDEPENDENCE

Partners *(continued)*

Ezion Holdings Limited – a large Singapore-based company that owns and operates a large fleet of support and drill vessels for the oil and gas business, currently with equipment and operations in Australia and the North Sea. The Endeavour is Ezion's first investment in Alaska.

Oversea-Chinese Banking Corporation Limited ("OCBC") – a Singapore bank with a long term Ezion relationship. OCBC has committed a long term loan with low cost capital rates to the project, with Ezion as a corporate guarantee.



Financing Structure and Financing Sources

AIDEA is the preferred member of KOV, contributing approximately $23.6 million towards the purchase and mobilization of the drill rig to Alaska. OCBC loaned $66 million to KOV (guaranteed by the common members) towards the purchase and refurbishment of the rig. The common members of KOV are Buccaneer and Ezion, participating with approximately $30.4 million of cash contributions and loan and payment guarantees for the refurbishment of the rig. The total project cost to date is $120 million. The most recent appraised value of the rig is $127 million.

KOV will be chartering the rig to Kenai Drilling, LLC (a Buccaneer subsidiary) via a "bareboat charter." That agreement requires a payment of approximately $27 million/year for the use of the rig. That revenue stream flows through KOV, paying the bank debt from OCBC first, and then AIDEA's payment second as a preferred owner. The common members are paid out of the remaining revenue stream.

Portfolio Analysis

AIDEA's strategic $23.6 million investment in the Endeavour is approximately 2.7% of the Authority's assets under management (not including cash and securities) as of September 30, 2012. This investment has raised AIDEA's total percentage of assets under management in the Natural Resource Development category from approximately 22% to 24.6%.

AIDEA's Preferred Ownership interest in KOV will be repurchased in six annual payments using cash flow generated by contracting the rig for drilling operations. AIDEA will also receive a fixed annual dividend of 8.0% based on the outstanding balance of AIDEA's ownership investment. Additionally, AIDEA (after OCBC) has first rights to any revenue if the Endeavour is sold. AIDEA also holds a 3.5% overriding royalty interest (ORRI) on all Buccaneer Texas and Alaskan properties, including the onshore gas wells in Kenai.

Current Status

Refurbishment work on the Endeavour was completed in Singapore in late July, and the rig was transported via heavy lift vessel to Homer for final Alaskan work, necessary to meet local codes. This work was more extensive than originally anticipated and these additional costs will be borne by the common owners per the Owner's Agreement. Currently, work is being completed to finish all winterization activity (originally planned to be completed in Alaska after the 2012 summer season), and permitting for winter operation is in process. The Endeavour is expected to mobilize to the Cosmopolitan lease site in late February or early March. In 2013, the Endeavour is scheduled to drill three exploratory wells: the first by mid-March at the Cosmopolitan lease (gas, partnered with Pioneer), the second in May at the Southern Cross prospect (oil with gas), and the third in late summer at the Northwest Cook Inlet leasehold (gas).

AIDEA
Alaska Industrial Development and Export Authority

Interior Energy Project

ALASKA ENERGY AUTHORITY

IEP Legislative Update
Week of February 10, 2014



Interior Energy Project

Bringing North Slope Natural Gas to Alaskans

AGENDA

Interior Energy Project

- IEP Goals, Financing and Project Overview
- Project Location
- Project Milestones
- Schedule & Permitting
- Gas Distribution and Demand

IEP PROJECT OVERVIEW

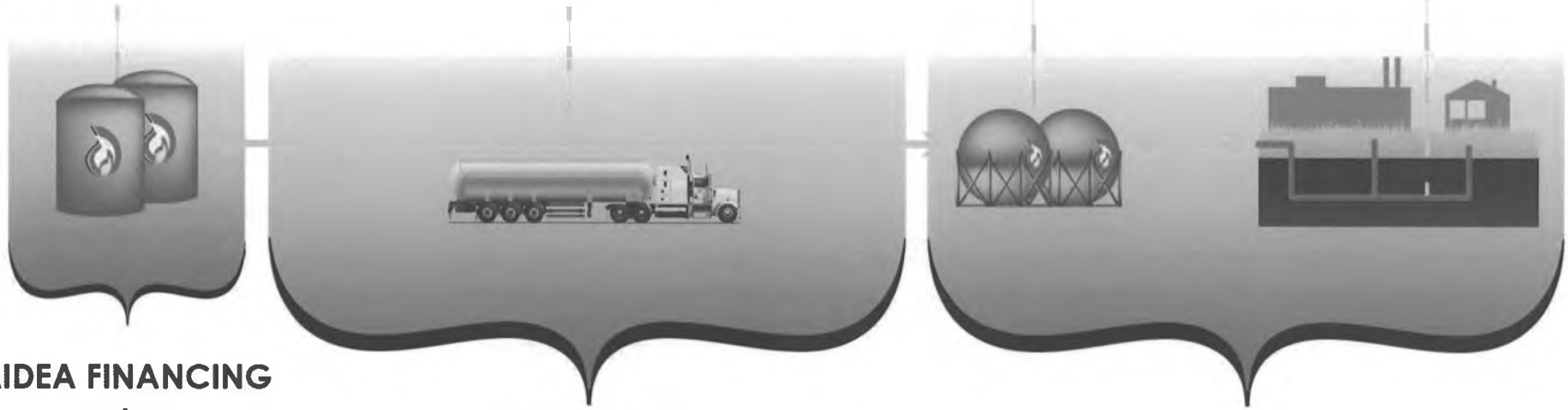
Interior Energy Project

North Slope
LNG Plant
Prudhoe Bay, AK

Dalton Highway
Haul Road
509 Miles

Storage and
Regasification
Fairbanks, AK

Distribution System
Fairbanks and
North Pole



AIDEA FINANCING
+
PRIVATE
PARTNER

PRIVATE
CONTRACT

AEA
+
LOCAL DISTRIBUTION
COMPANY

IEP GOALS

Interior Energy Project

- Supply natural gas to Interior Alaska:
  1. At the lowest cost possible
  2. As many Alaska customers as possible
  3. As soon as possible
- Provide propane from the gas stream
- IEP investments compliment alternative sources of gas supply
- Use private-sector mechanisms

SB23 FINANCE PACKAGE

Interior Energy Project

$125 Million
SETS Financing

$57.5 Million
Capital Budget Appropriation

$150 Million
AIDEA Bonds

\+ **Private Sector**

\+ **Municipal Utility**

North Slope Liquefaction Plant

\+

Gas Distribution System
Residential/Industrial

LNG AND PROPANE SALE PRIORITIES

Interior Energy Project

1. Residential and commercial space heating
2. Electric utilities
3. Industrial customers
4. Other utilities
5. Open market LNG sales





COMPLETED PROJECT MILESTONES

Interior Energy Project

North Slope Facility

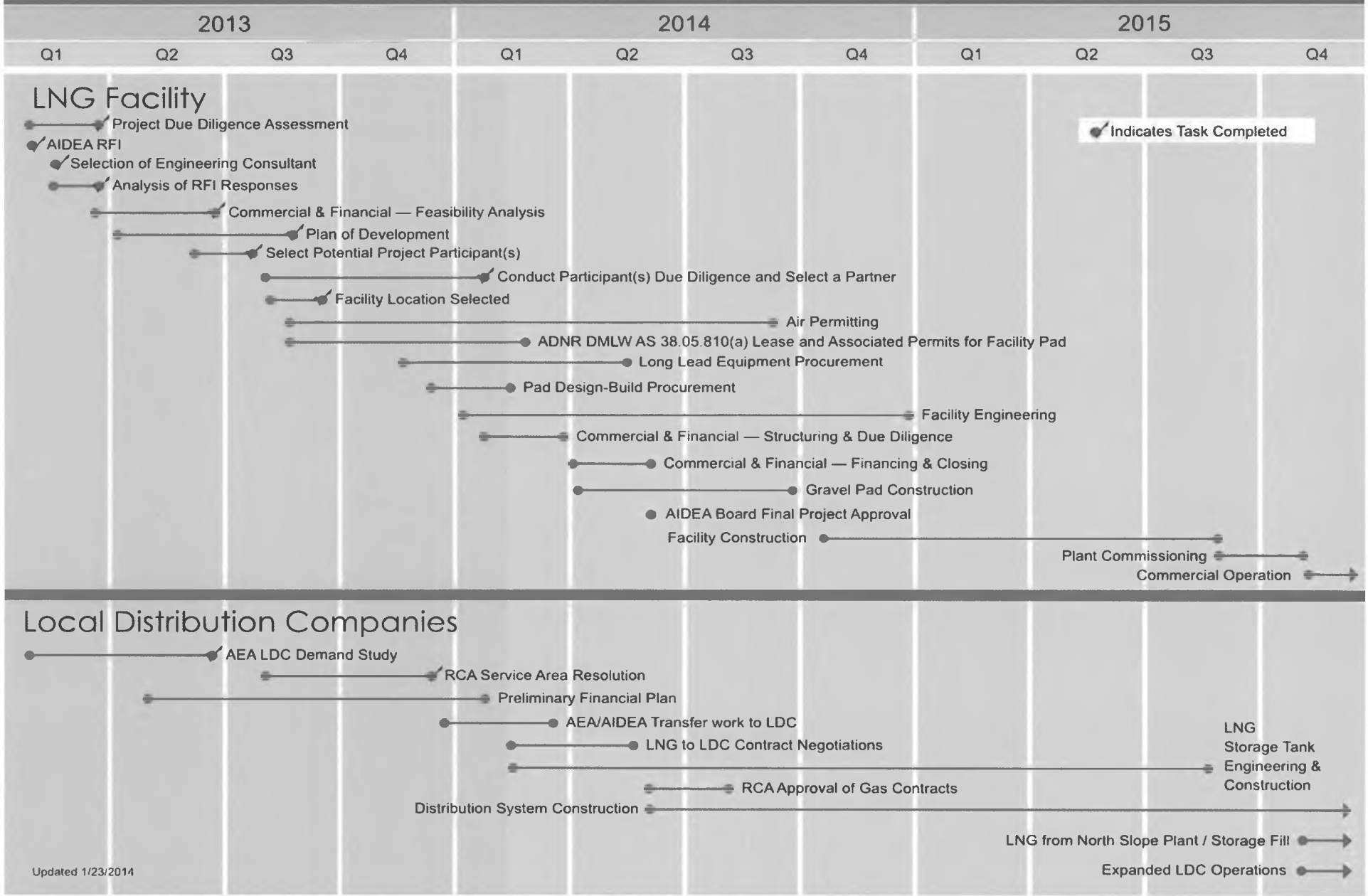
- ✓ Project Pre-Feasibility Analysis
- ✓ North Slope Plant Plan of Development
- ✓ Private Partner Due Diligence and Negotiations
- ✓ Pad Build and Design Procurement
- ✓ Long-lead Equipment Procurement

Distribution System

- ✓ Demand and Conversion Analysis
- ✓ RCA Service Area Resolution
- ✓ Distribution Cost Project Estimate
- ✓ FNG Storage Tank Financing (5.25MM gallon tank)

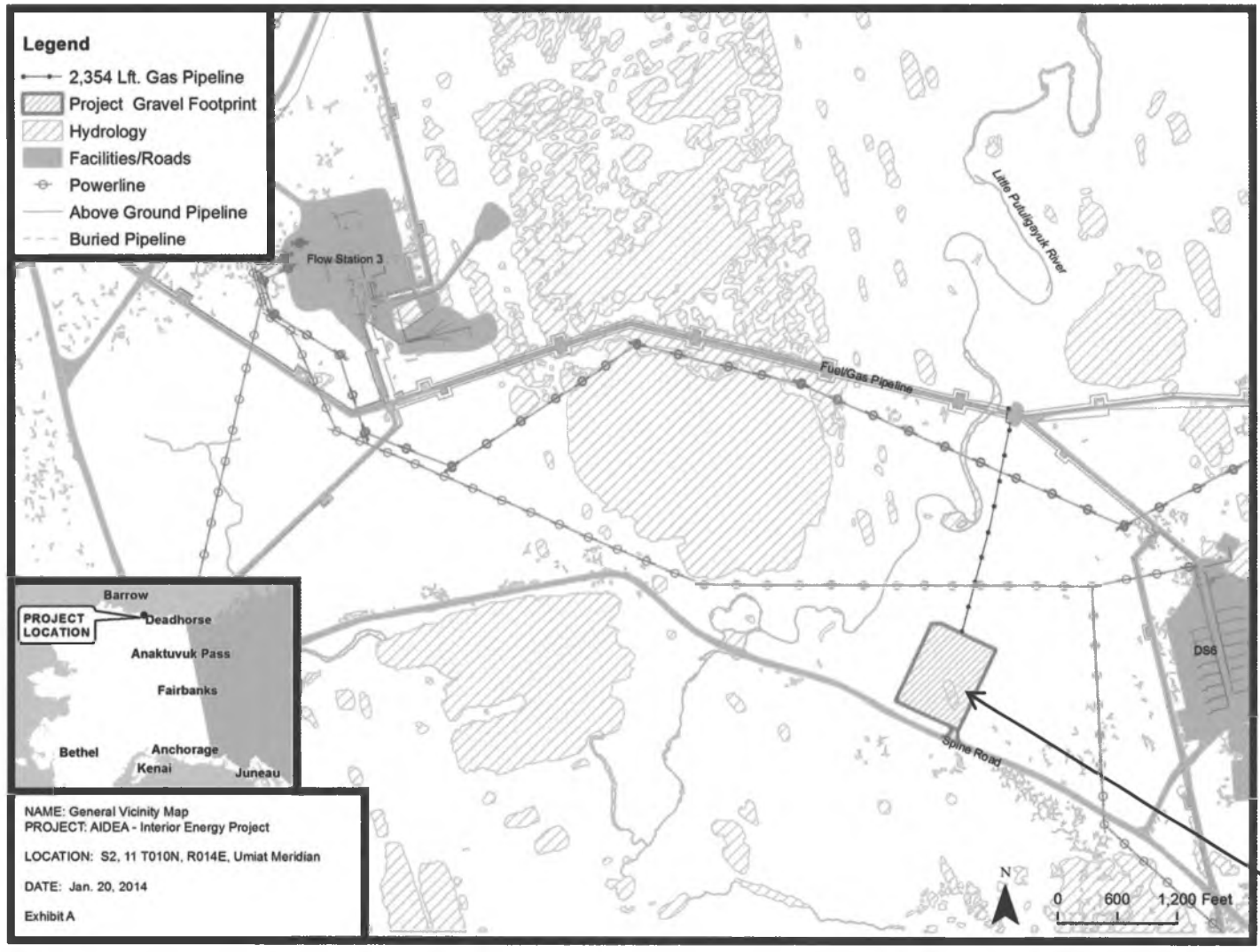
Estimated 6-year Build-Out

AIDEA Interior Energy Project - Schedule



PROPOSED PROJECT LOCATION: LNG PLANT

Interior Energy Project



Proposed Project Location

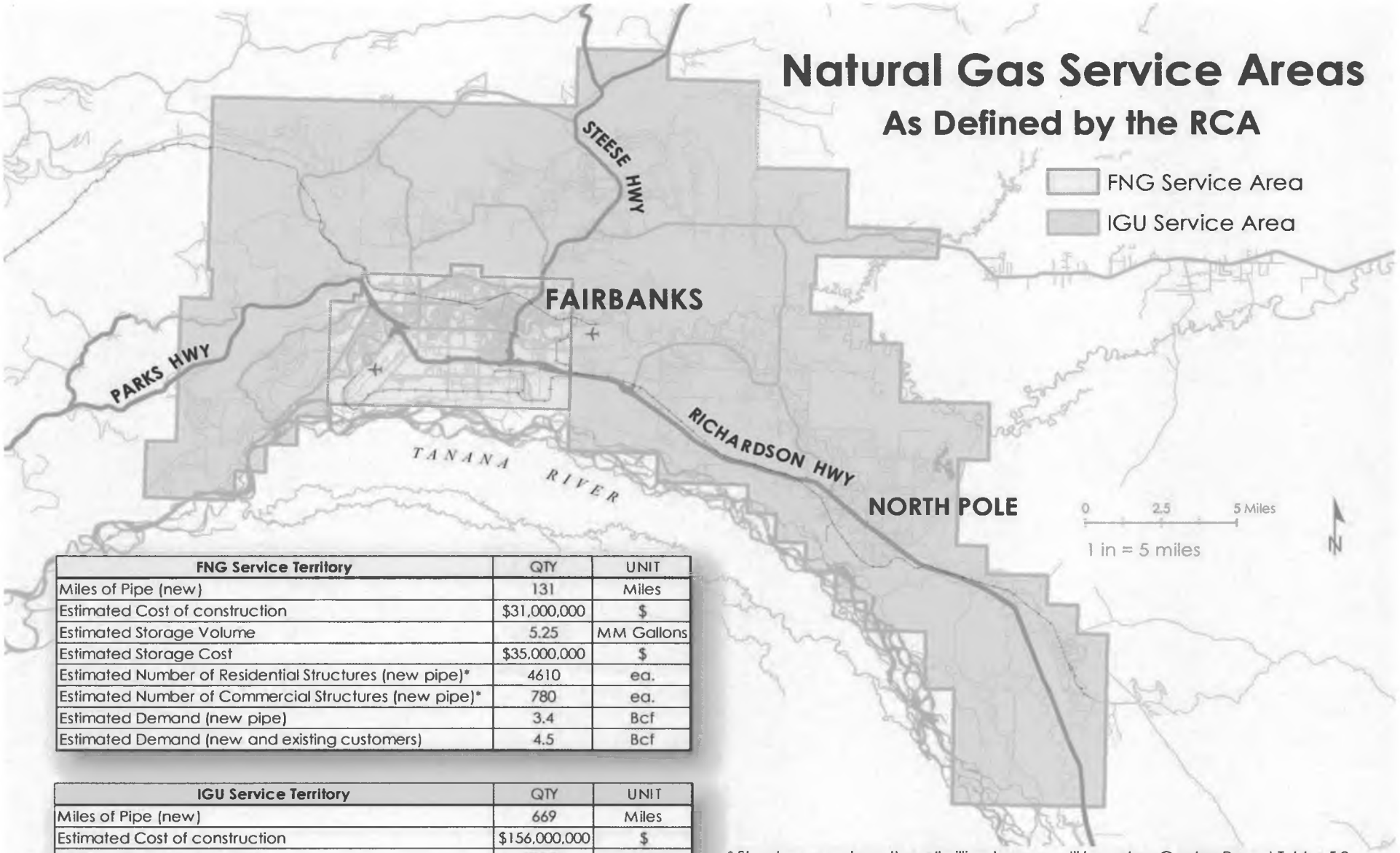
NORTH SLOPE FACILITY NEXT STEPS

Interior Energy Project

- **Letter of Intent - executed week of February 3, 2014**
  - Establishes the basic parameters of the North Slope LNG Plant financing between AIDEA and MWH
- **Project Development Agreement - March 2014**
  - Negotiate and finalize a detailed Project Development Agreement with MWH (Commercial Structure)
  - Secure LNG purchase agreements with potential customers – IGU, FNG and GVEA

Natural Gas Service Areas

As Defined by the RCA



FNG Service Territory	QTY	UNIT
Miles of Pipe (new)	131	Miles
Estimated Cost of construction	$31,000,000	$
Estimated Storage Volume	5.25	MM Gallons
Estimated Storage Cost	$35,000,000	$
Estimated Number of Residential Structures (new pipe)*	4610	ea.
Estimated Number of Commercial Structures (new pipe)*	780	ea.
Estimated Demand (new pipe)	3.4	Bcf
Estimated Demand (new and existing customers)	4.5	Bcf

IGU Service Territory	QTY	UNIT
Miles of Pipe (new)	669	Miles
Estimated Cost of construction	$156,000,000	$
Estimated Storage Volume	7.25	MM Gallons
Estimated Storage Cost**	$46,000,000	$
Estimated Number of Residential Structures (new pipe)*	11240	ea.
Estimated Number of Commercial Structures (new pipe)*	420	ea.
Estimated Demand (new pipe)	3	Bcf

* Structure count are those "willing to convert" based on Cardno Report Tables 5.9 and 5.10

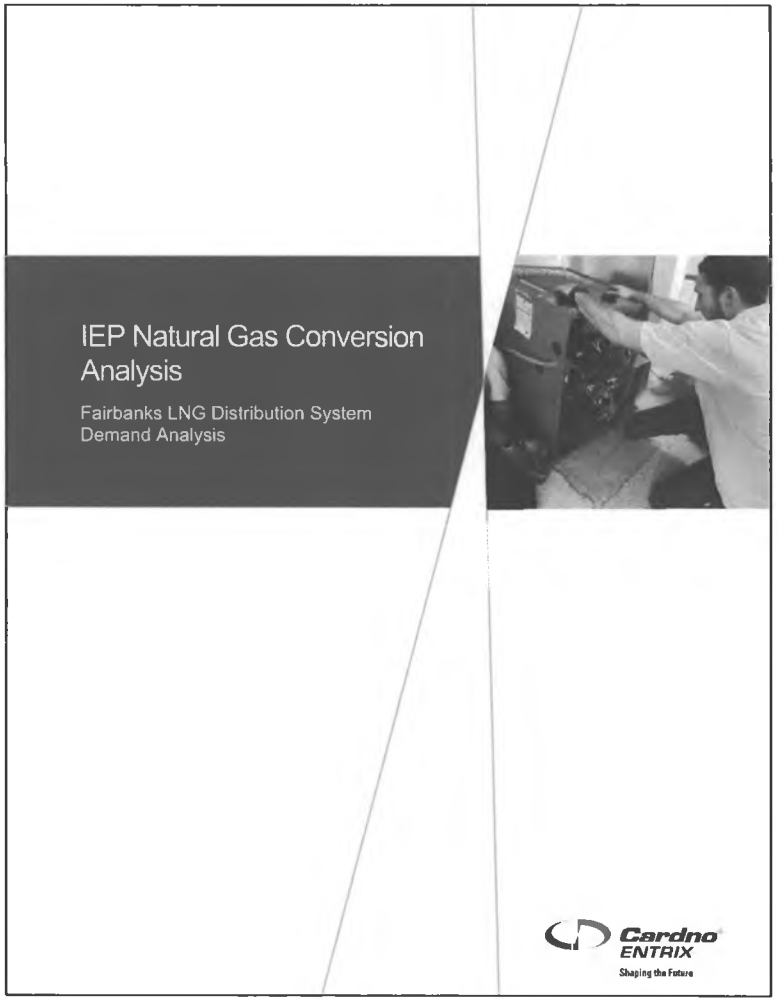
** Prorated 5.25MM gallon tank (assume $5M is associated facilities)

ASSUMPTION: Phase I (from Tables) is entirely FNG

CONVERSION ANALYSIS STUDY

Interior Energy Project

- LNG Distribution System Demand Analysis
- Report complete January 2014
- Demographics, economics, and conversion rate forecasts
- Full report posted to IEP website



NORTH SLOPE PLANT DEMAND BY YEAR
(GAS DISTRIBUTION ONLY)

Interior Energy Project

From Table 5.10, pg 5-19
Cardno Report
Natural Gas Demand by Service Territory (Bcf)

FNG Territory

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Existing Customers	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Newly Served Customers	0.5	2.3	2.8	3.3	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Total	***1.6***	***3.4***	***3.9***	***4.4***	***4.4***	***4.4***	***4.5***	***4.5***	***4.5***	***4.5***	***4.5***	***4.5***	***4.5***

IGU Territory

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0.0	0.1	0.6	1.2	1.8	2.3	2.6	2.8	2.9	2.9	2.9	3.0	3.0

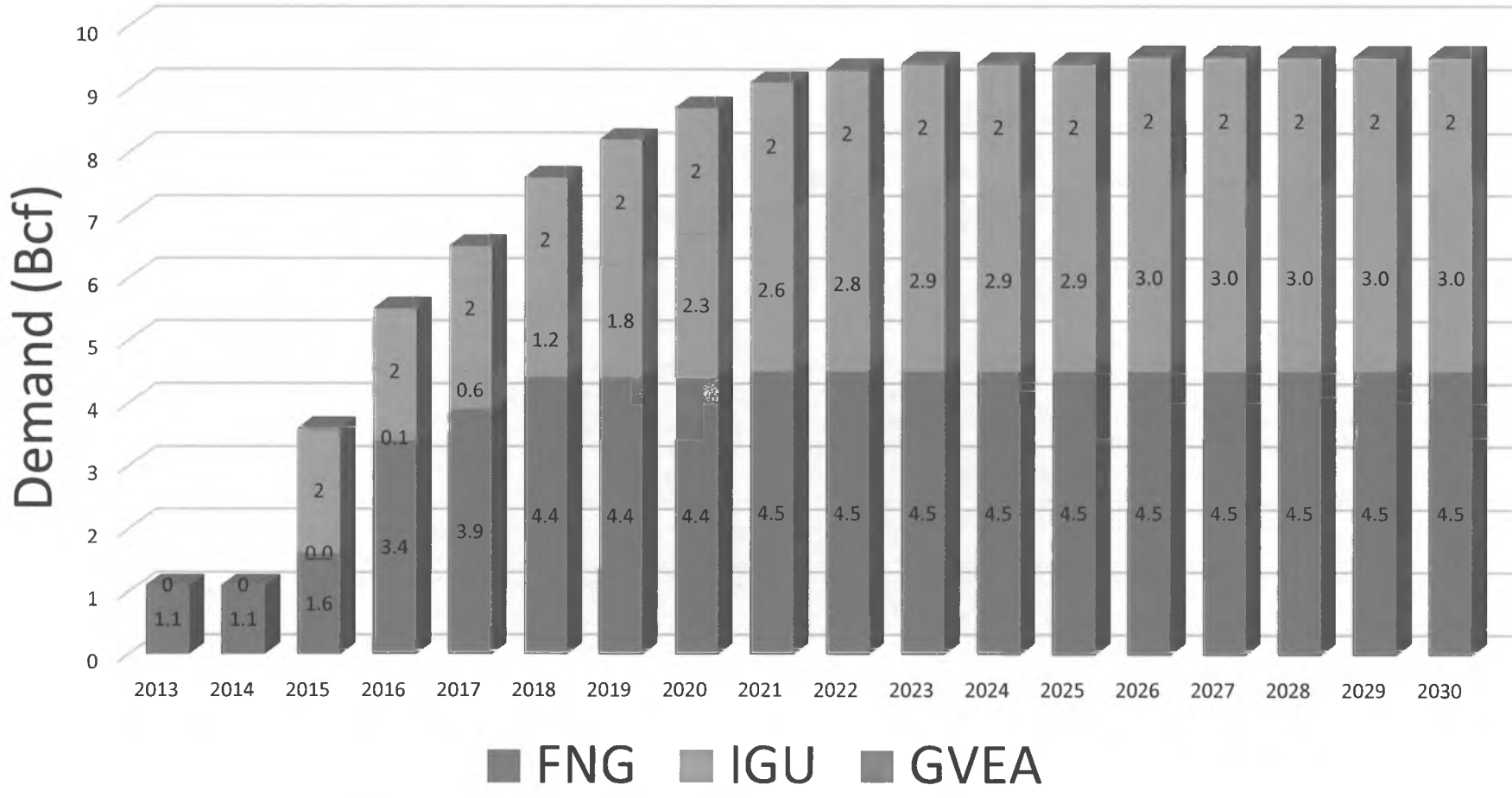
NORTH SLOPE PLANT DEMAND BY YEAR
(ADJUST FOR PEAK DAY)

Interior Energy Project

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Plant Demand by Year:	3.50	4.50	5.60	6.20	6.70	7.10	7.30	7.40	7.40	7.40	7.50	7.50
Simplified Capacity Factor of 1.5	***5.25***	***6.75***	***8.40***	***9.30***	***10.05***	***10.65***	***10.95***	***11.10***	***11.10***	***11.10***	***11.25***	***11.25***

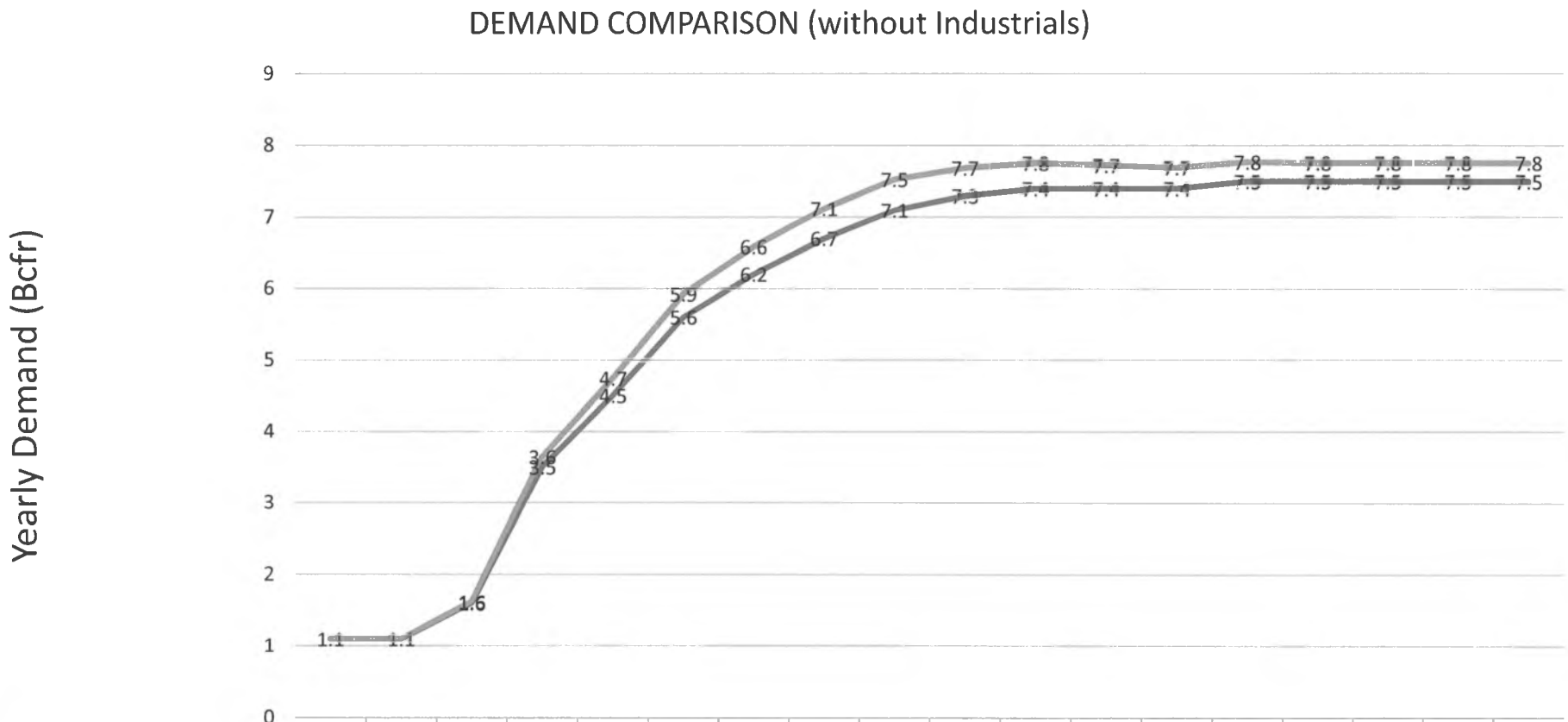
PIPELINE GAS DEMAND BY CUSTOMER

Interior Energy Project



INCENTIVE DEMAND COMPARISON

Interior Energy Project



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cardno (w/o Incentives)	1.1	1.1	1.6	3.5	4.5	5.6	6.2	6.7	7.1	7.3	7.4	7.4	7.4	7.5	7.5	7.5	7.5	7.5
Cardno (with Incentives)	1.1	1.1	1.6	3.6	4.7	5.9	6.6	7.1	7.5	7.7	7.8	7.7	7.7	7.8	7.8	7.8	7.8	7.8

DISTRIBUTION SYSTEM NEXT STEPS

Interior Energy Project

- Utility discussions on distribution financing access
- Negotiate Take or Pay Contracts
- RCA Approval of Contracts

AIDEA
Alaska Industrial Development and Export Authority

Interior Energy Project

ALASKA ENERGY AUTHORITY








Chena Hot Springs Resort

Renewable Energy and Sustainable communities

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

Bernie Karl






Chena Hot Springs Resort

Mile Post 56.5 Chena Hot Springs Road





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

Chena Hot Springs Resort



Geothermal hot springs
Lodge, restaurant, hotel, Aurora Ice Museum, administration offices, hydroponic greenhouse, flower and vegetable gardens, campground, daytime horse corals and runway

Geothermal power plant, maintenance shop, employee housing, reindeer pasture, nature trails.

Horse pastures and barns, material storage, and nature trails

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA HOT SPRINGS RESORT



Chena hot springs pool building, outdoor rock lake, hot springs ponds, high tunnel greenhouses, family suite hotel rooms and spring creek.

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

OUR VISION STATEMENT
CHENA HOT SPRINGS RESORT

We strive to become a self-sustaining, self-reliant community that can produce the energy, food, and fuel to meet our needs while being environmentally responsible.



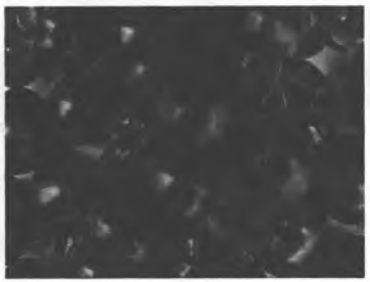




CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

A SUSTAINABLE COMMUNITY

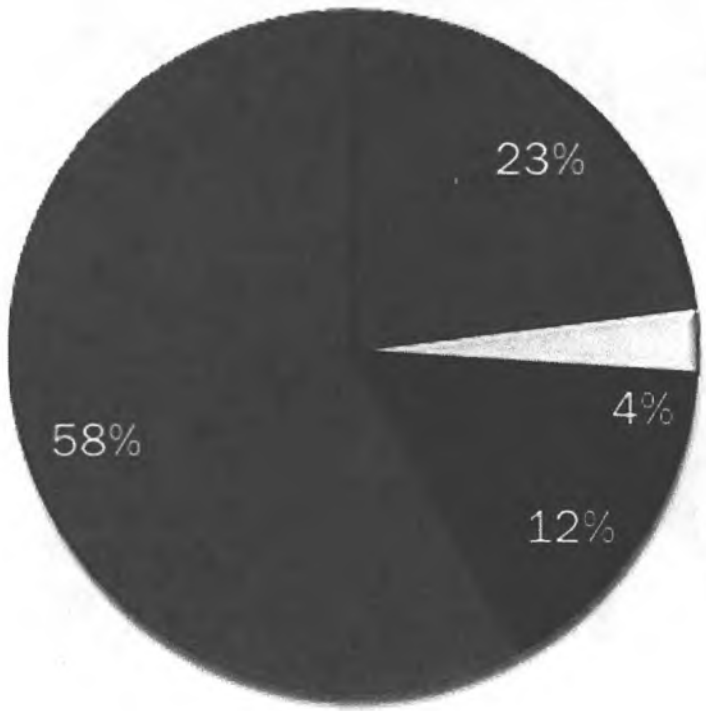
CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA




ENERGY USE AT CHENA HOT SPRINGS

(850 kW_{eq})

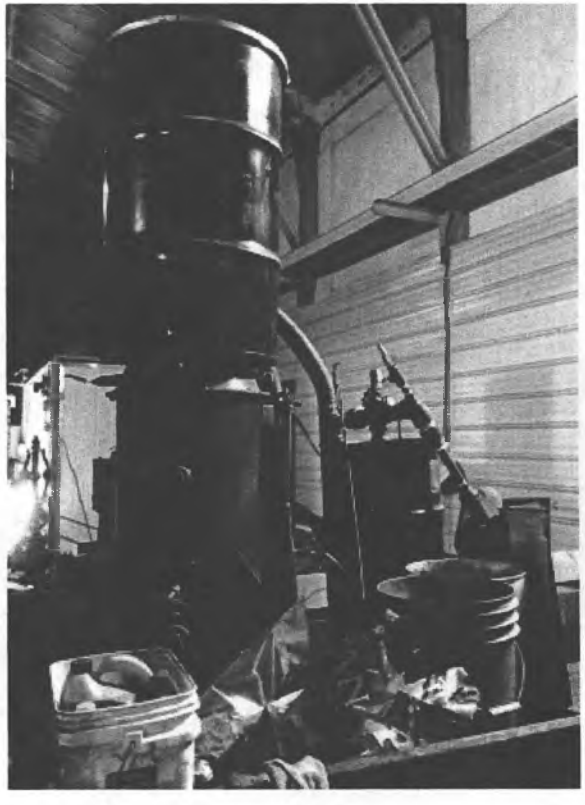


- Electricity
- Transportation
- Refrigeration
- Supplemental Heating
- Baseload Heating

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA HOT SPRINGS
GASIFICATION SYSTEMS





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

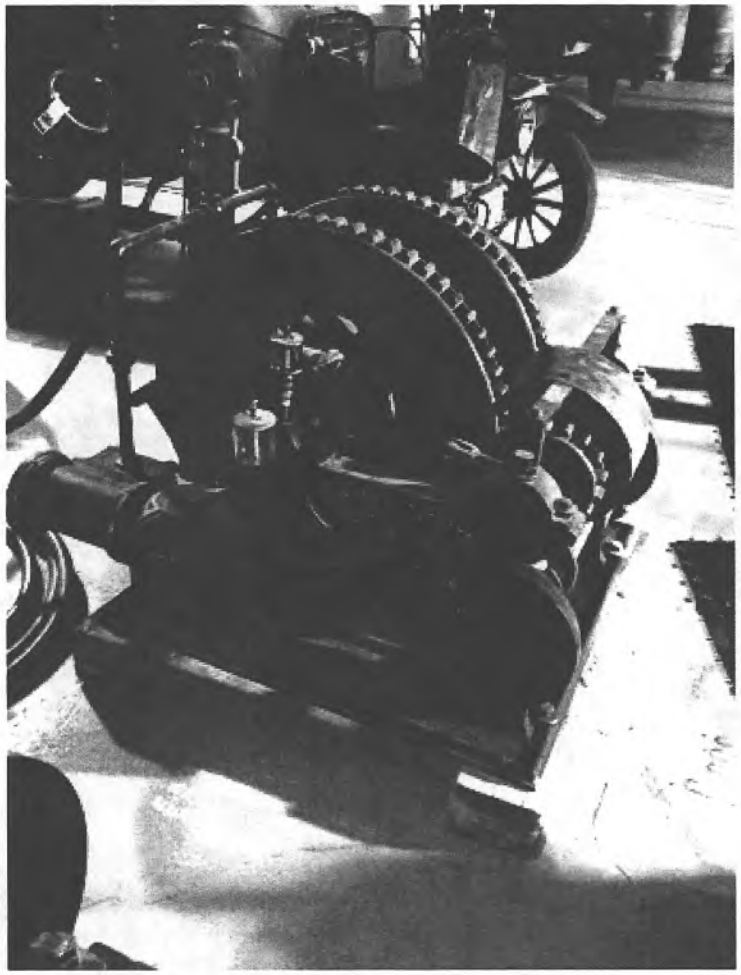
CHENA HOT SPRINGS
ANTIQUE POWER SYSTEMS





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

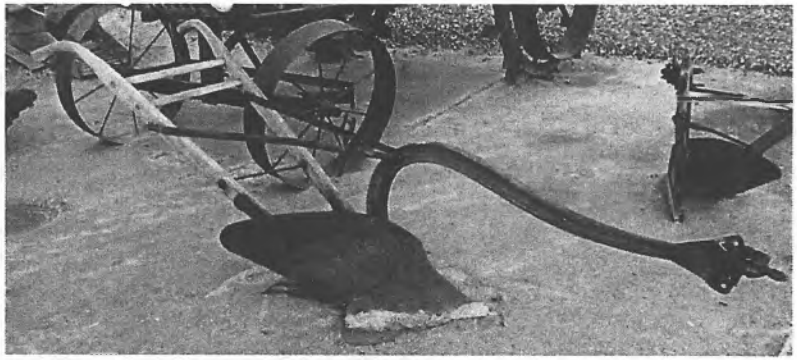
CHENA HOT SPRINGS
ANTIQUE POWER SYSTEMS





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA HOT SPRINGS
ANTIQUE POWER SYSTEMS



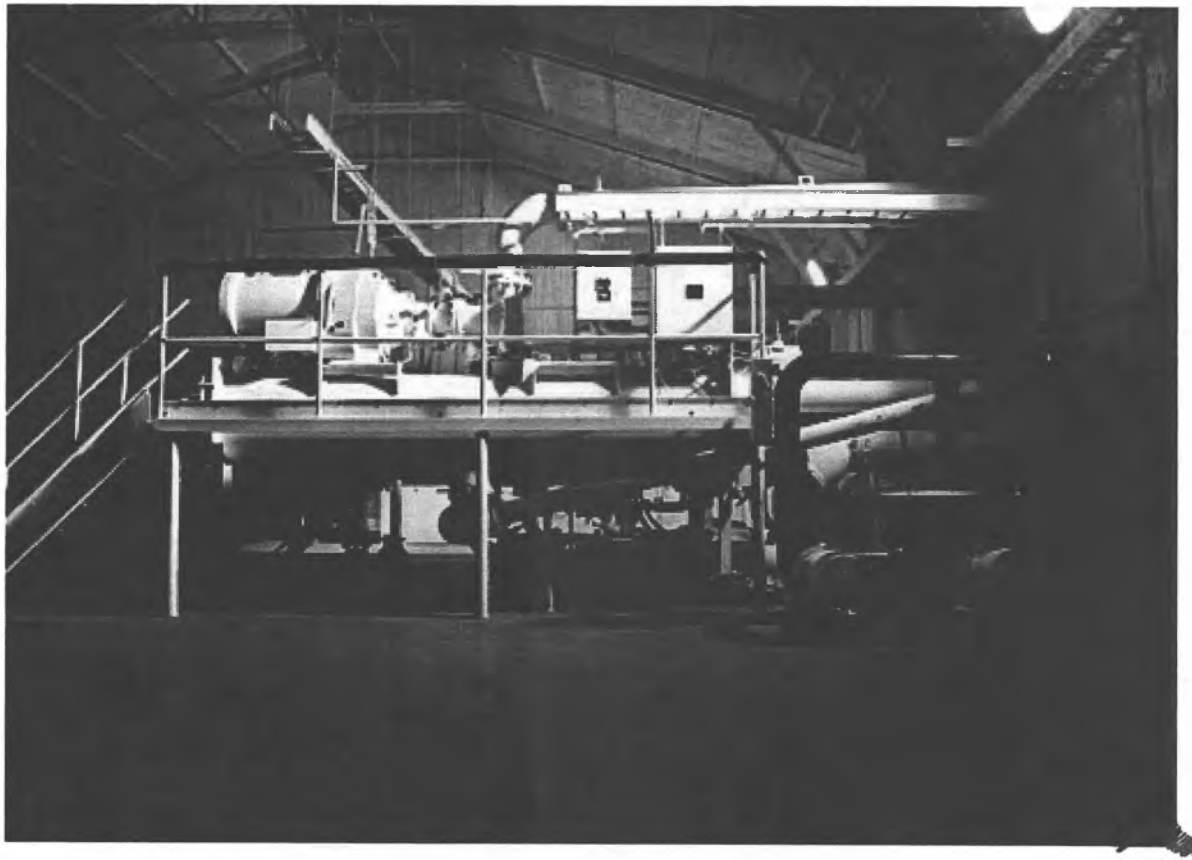


CHENA HOT SPRINGS
ANTIQUE POWER SYSTEMS



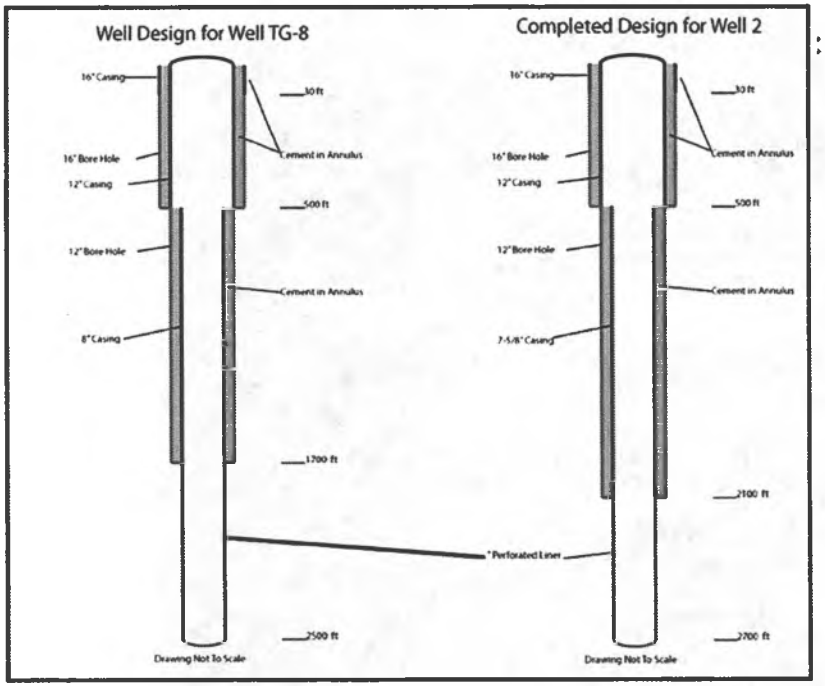


GEOTHERMAL POWER PLANT



CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

NEW GEOTHERMAL PRODUCTION WELLS



- **Deepening well TG-8 increased the geothermal capacity of the reservoir, and produces water at 179.8 °F**

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

New 2500' production well reached 179.8° F

Drilled with a JefCO 50K using a WASSARA water hammer. 2000-2500 psi cold water.

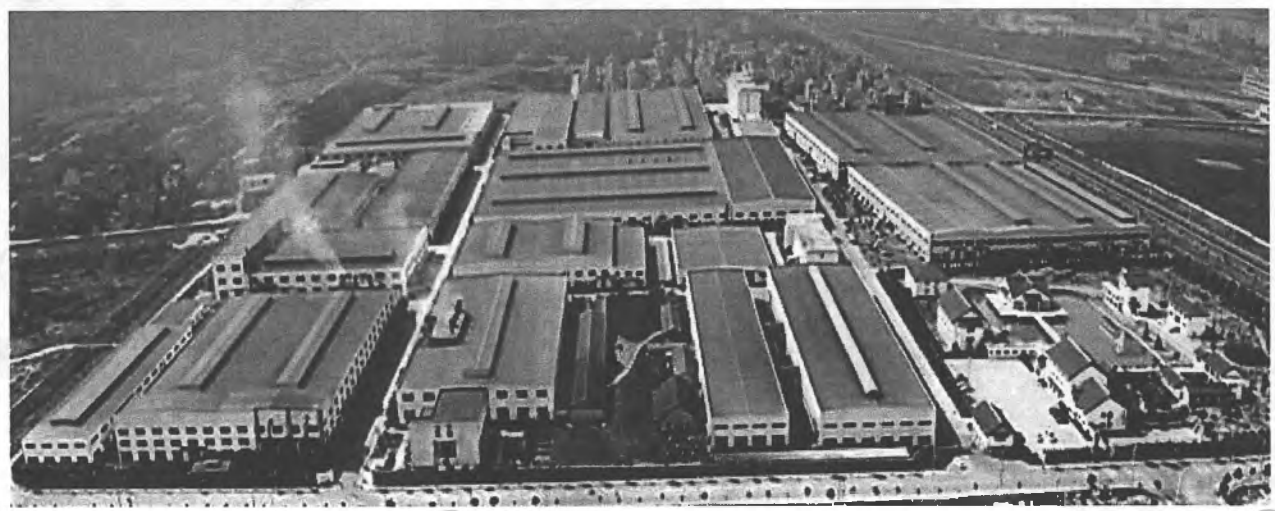




Kerry

Kaishan Compressor Co., Ltd

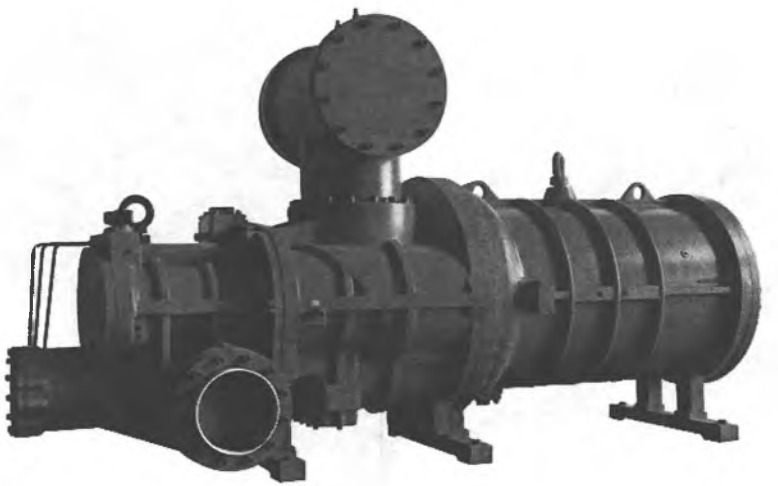
- Zhejiang Quzhou Site (Headquarter):
  - 3 Hours by Train , 4 Hours by Driving to Shanghai
  - Foundry, Pressure Vessel, Heat Exchanger and Sheet Metal Plants
  - ORC Screw Expander Power Station
  - Small Screw Compressors
  - Reciprocating Compressors
  - Screw and Reciprocating Air Compressor Units
  - Centrifugal Compressors

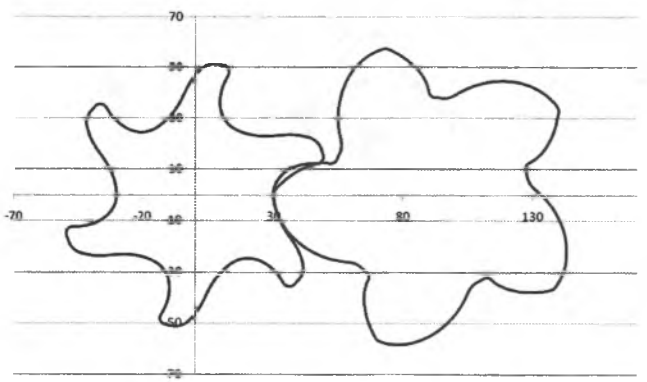


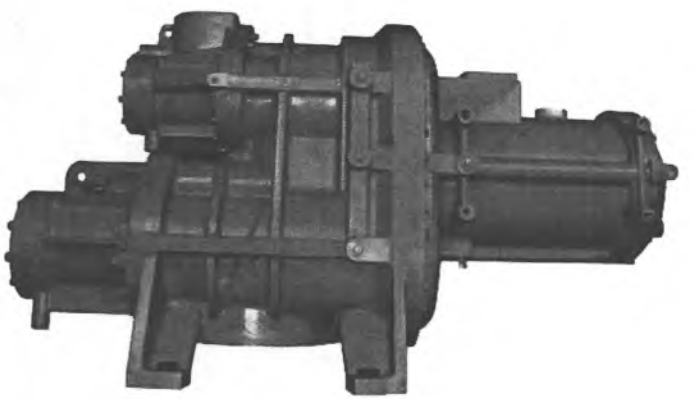
Kerry

NEW CHENA HOT SPRINGS RESORT
300 KW SCREW EXPANDER WITH A SYNCHRONOUS GENERATOR



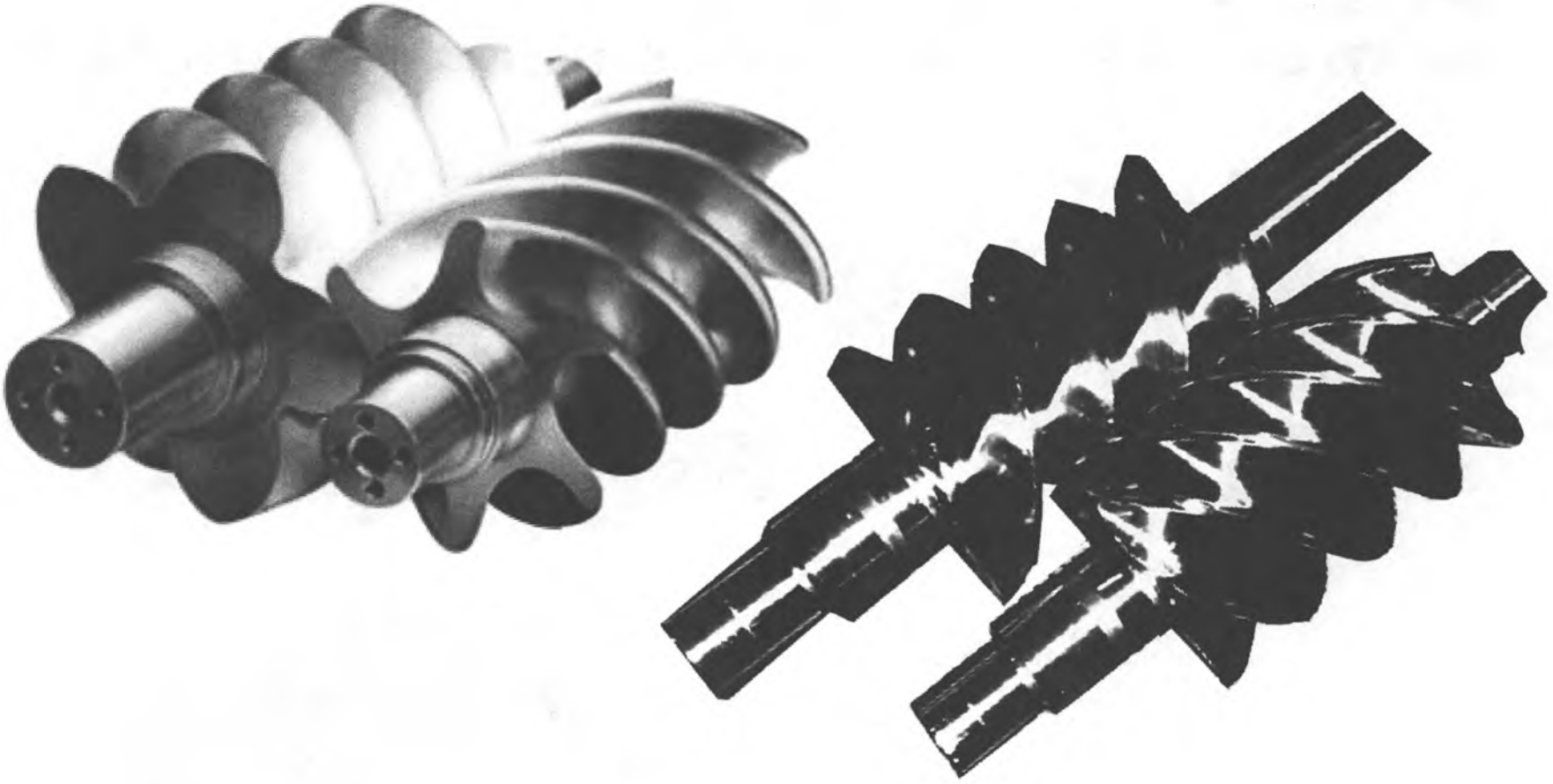






Kerry

CHENA POWER



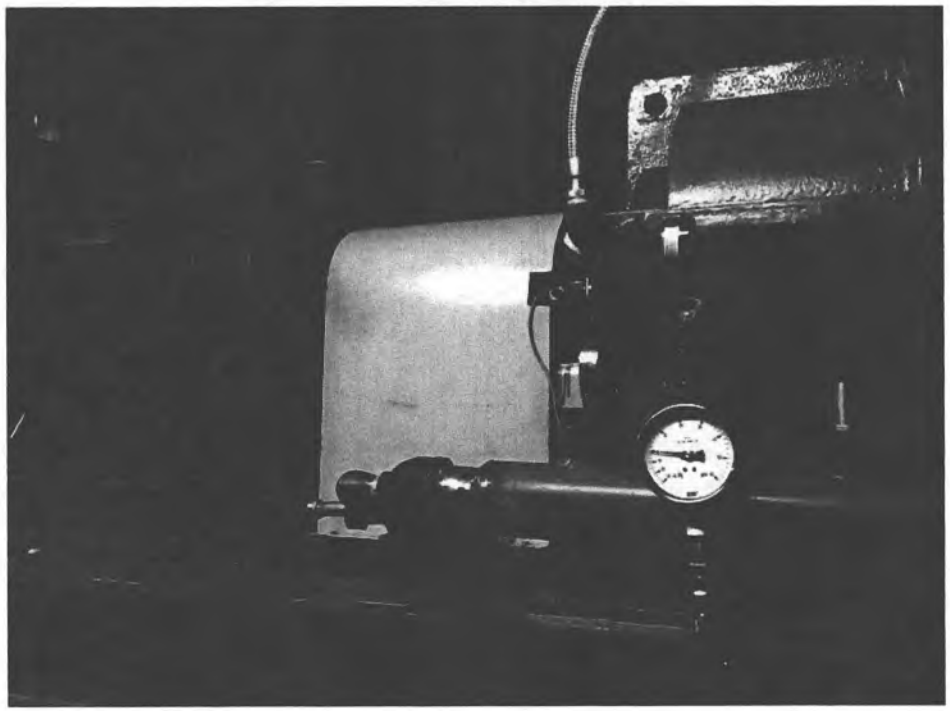
CHENA POWER

ENGINEERING THE FUTURE

Chena Power / Kaishan Compressors



NEW 300 KW SCREW EXPANDER WITH A SYNCHRONOUS GENERATOR



NEW 300 KW SCREW EXPANDER WITH A SYNCHRONOUS GENERATOR





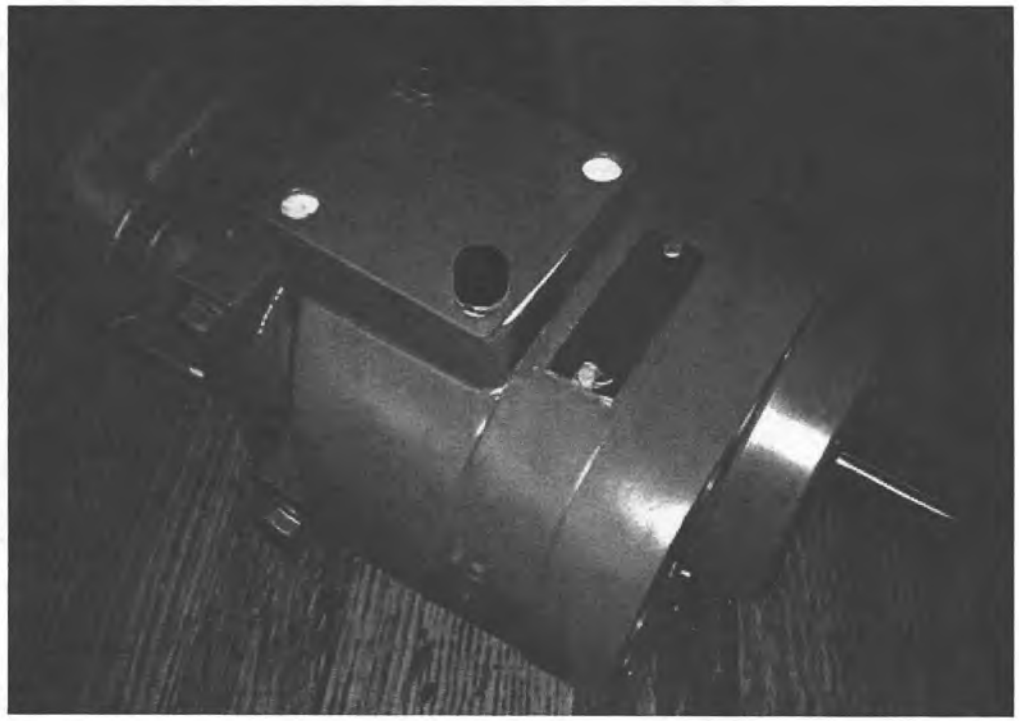
NEW 300 KW SCREW EXPANDER WITH A SYNCHRONOUS GENERATOR



CHENA POWER

ENGINEERING THE FUTURE

Chena Power / Kaishan Compressors
2.5kW screw expander for home use



CHENA POWER
MOBILE ORC

The Mobile ORC in Las Vegas, Nevada at a Geothermal Energy Conference.



CHENA POWER

MOBILE ORC
ON LOCATION IN UTAH

The Mobile ORC is currently installed and operating on a farm property at Newcastle, Utah. The onsite geothermal resource is utilized to generate electricity for sale and for district heating. The Electricity generated is sold to the .



The Mobile ORC is currently in Newcastle, Utah set to power a large scale greenhouse.

ACHENA POWER

MOBILE ORC
ON LOCATION IN UTAH

The Mobile ORC built by Chena Power is currently located in Newcastle, Utah. The Newcastle site has a proven geothermal resource and ample water for cooling. The ORC is maintained by the Christensen family that owns the farm, greenhouses, and has water rights to the geothermal well.



CHENA POWER

MOBILE ORC
ON LOCATION IN UTAH

The Mobile ORC is currently in Newcastle, Utah set to power a large scale, 2 acre, greenhouse growing cucumbers and tomatoes.



ACHENA POWER

BIOMASS FUEL
SOURCE: PELLETS

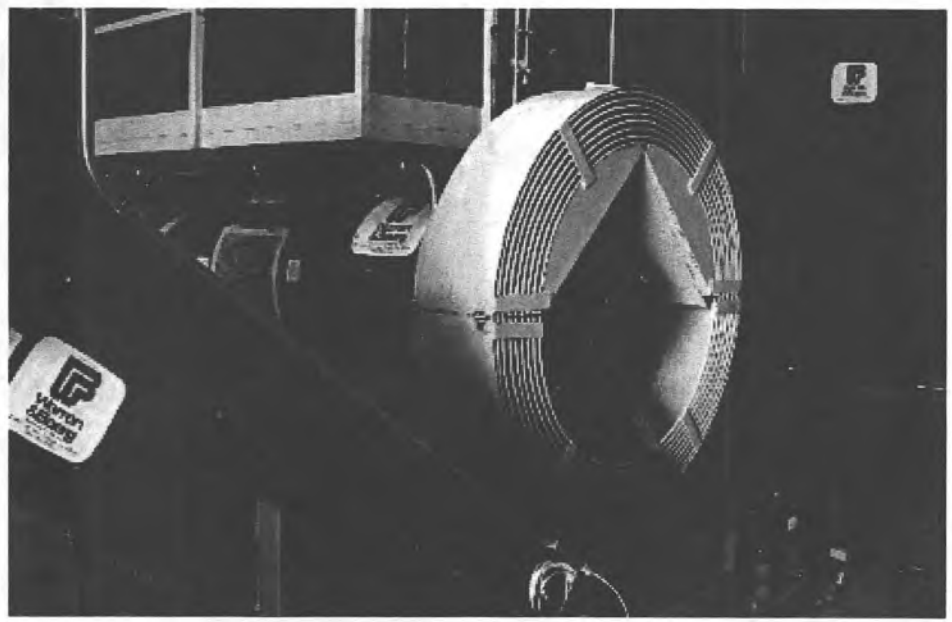
Waste paper is collected through recycling programs throughout the Fairbanks area and sorted. And prepared for different products



CHENA POWER

BIOMASS FUEL
SOURCE: PELLETS

Specialized equipment is used to (process) shred the paper as is it fed into the machines. The shredded paper is compressed into cubed paper pellets for easy handling and used as a fuel supply in biomass furnaces and boilers



CHENA POWER

BIOMASS FUEL
SOURCE: PELLETS

Fuel pellets created on site with recycled paper and cardboard through the Chena Power and K & K Recycling programs.





CHENA POWER

BIOMASS FUEL
SOURCE: PELLETS

Fuel pellets created on site with recycled paper and cardboard through Chena Power Recycling program.

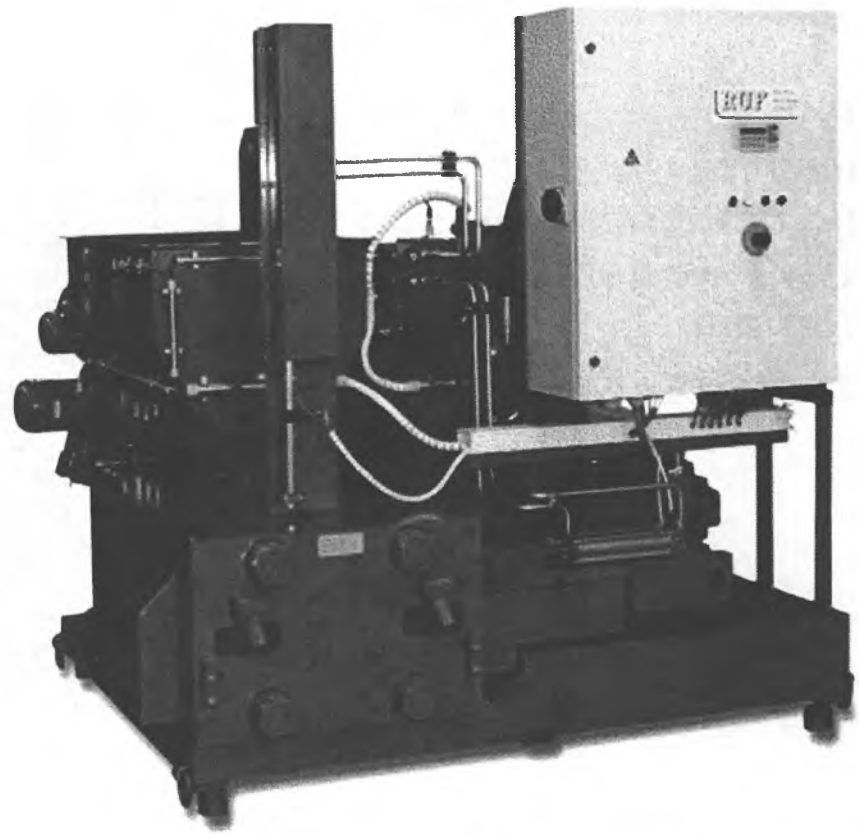


CHENA POWER

BIOMASS FUEL
SOURCE: PELLETS

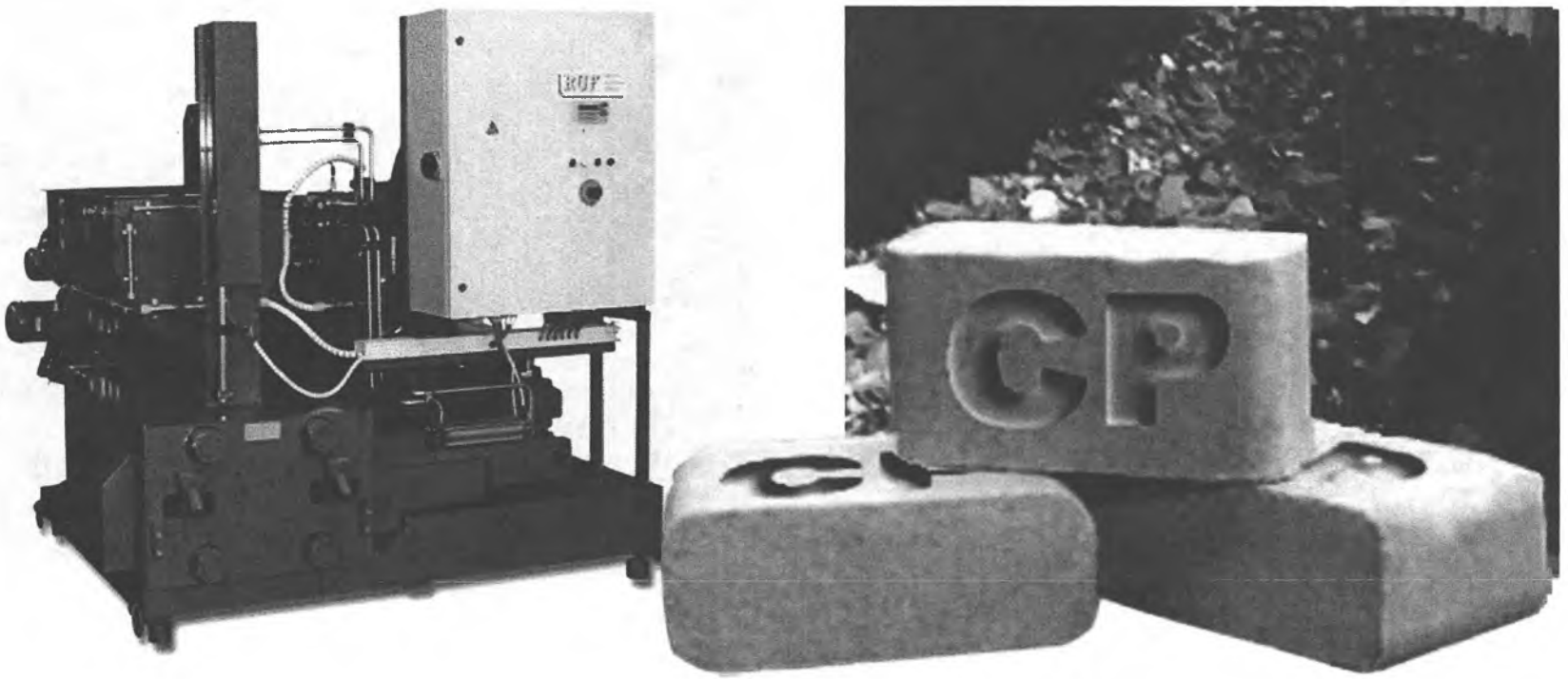
A new briquetting machine will be integrated into the recycling program. This new machine will provide an unique product utilizing the paper and cardboard collected.

We are committed, to continually seek innovative opportunities, that utilize the materials collected for recycling.



ACHENA POWER

BIOMASS FUEL
SOURCE: Briquettes



Fuel briquettes will be created on site with recycled paper and cardboard through Chena Power Recycling program.

CHENA POWER

SCRAP METAL RECYCLING

K and K Recycling collects and buys several grades of scrap aluminum and aluminum cans.

The material is baled and shipped to recycling centers in the Pacific North West



SCRAP METAL RECYCLING

All Alaska communities have ample amounts of scrap metal that in the past has littered the communities and filled the landfills. There is value in these materials that are collected throughout the year.



SCRAP METAL RECYCLING

K and K Recycling collects scrap ferrous and non-ferrous metals. Materials are then prepared to be be shipped to processors and recycling centers in the Pacific Northwest.

Aluminum, copper, brass, iron, stainless, tin and lead



RECYCLED MATERIAL COLLECTION

K & K Recycling has several vehicles to handle a variety of different sized collection containers, from simple dumpsters placed at residential and business locations, to large roll off dumpsters to handle large metal, wood, and other items discarded at large companies and construction



RECYCLING PROGRAM

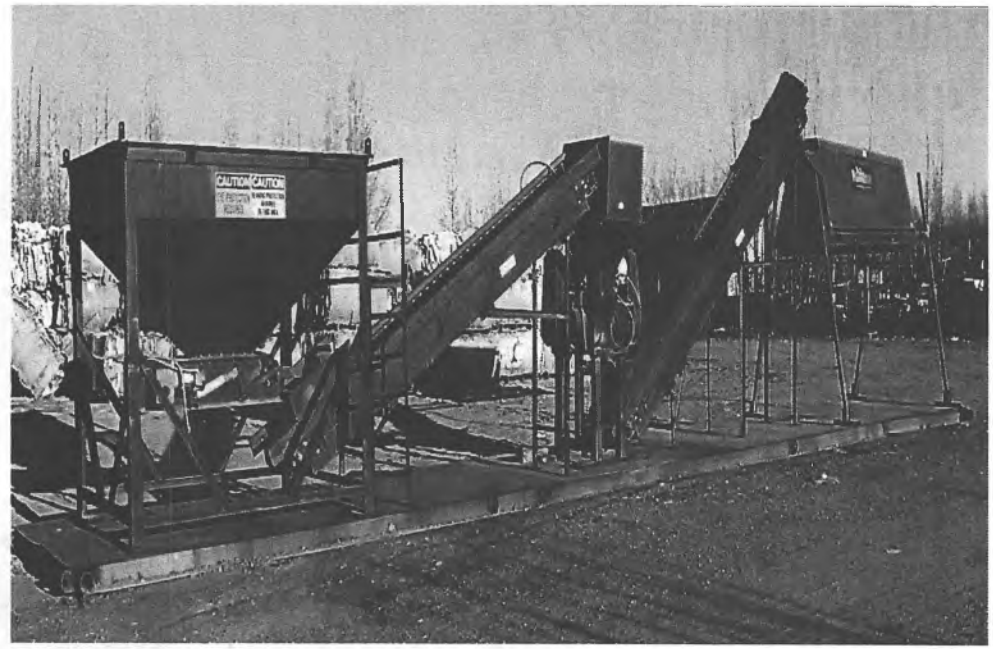
Items originally destined to be disposed in the local landfills are being collected in the Fairbanks North Star Borough and sorted for potential products, markets, and alternative uses. This program helps to reduce the material entering the landfill and provides a resource stream for biomass, metals, and glass recycling.





RECYCLED GLASS PROCESSING

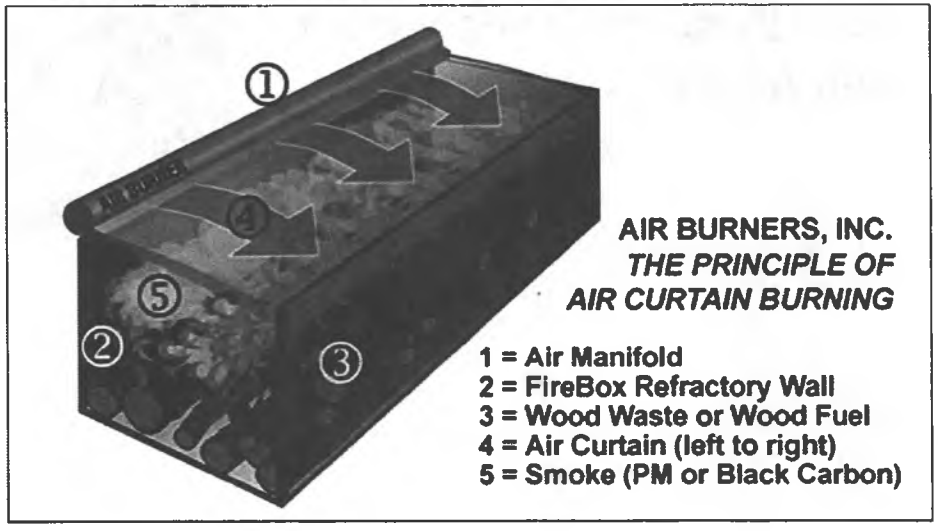
K&K Recycling has installed a glass processing system that utilizes a crusher, polisher and screening process to prepare material for further utilization in products suitable for construction, landscaping, and horticulture products.



Air Burner
Heat recovery system

Chena Power is continuing to seek opportunities for creating power and heat from local resources.
The Air Burner can be used as a heat recovery system utilizing waste heat for purposes such as power production and heating facilities this self-contained Biomass power generating system will produce electricity from the waste wood and other combustible materials

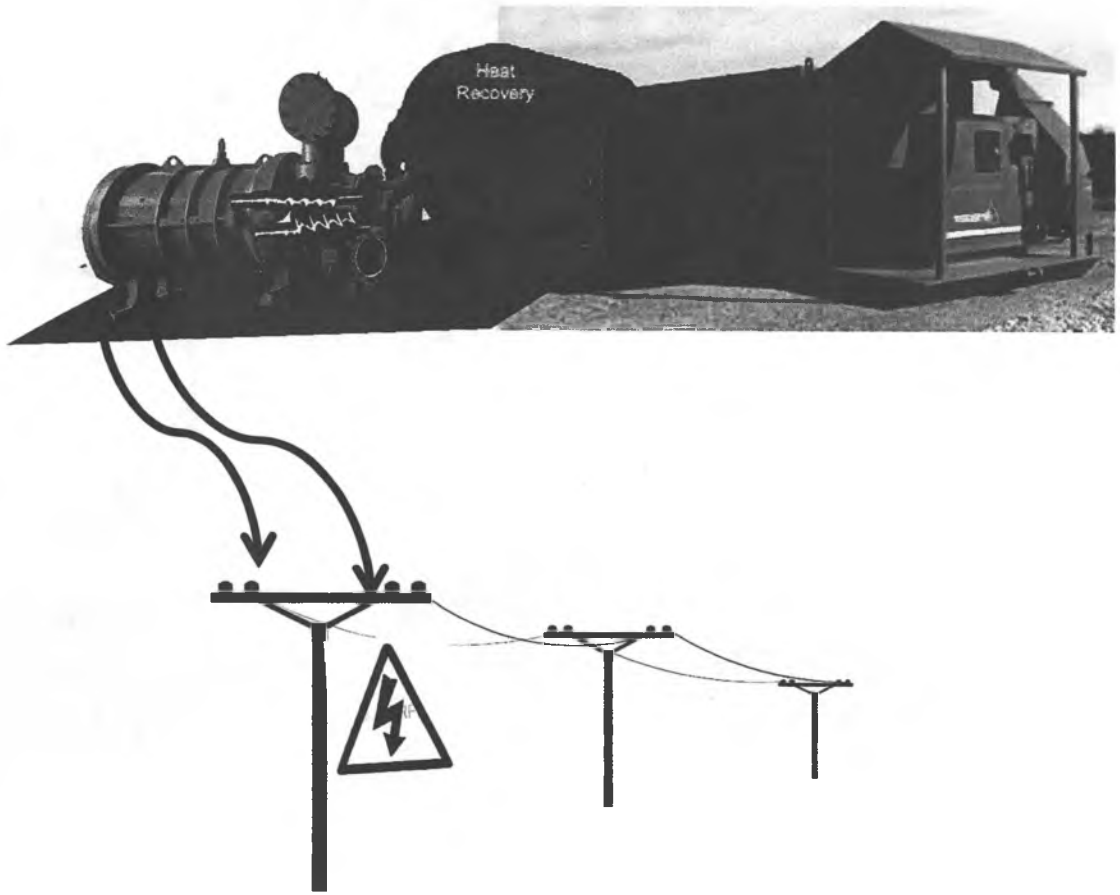




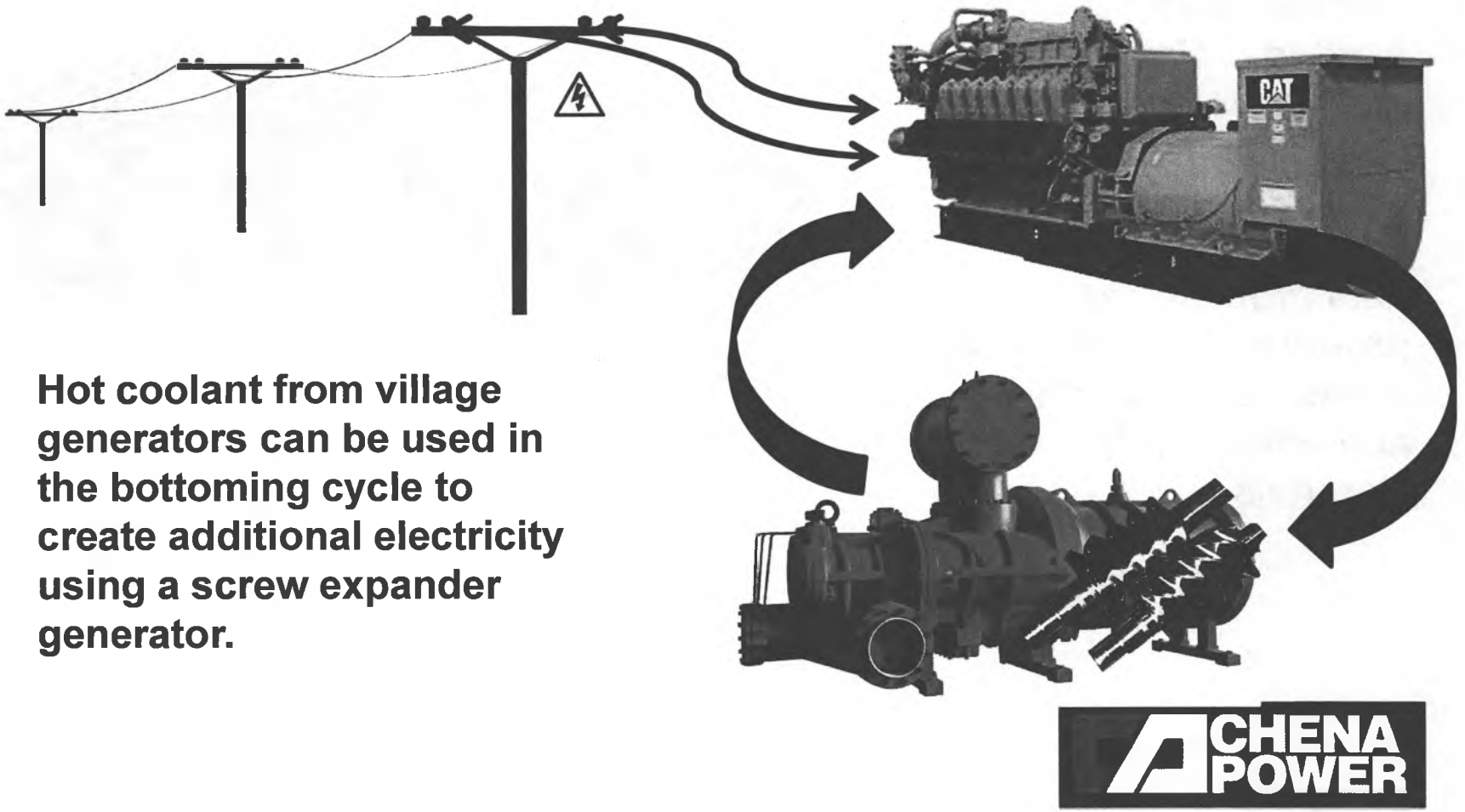
Air Burner
Heat recovery / Power generation

The Air Burner can be used to reclaim heat to generate electricity utilizing a screw expander system.

This process can produce electricity from waste wood, biomass, and other combustible materials.



Generation from bottoming cycle of diesel generation



Hot coolant from village generators can be used in the bottoming cycle to create additional electricity using a screw expander generator.

BIOMASS
HEATING SYSTEMS

Clean, efficient and affordable, heating systems provide a constant source of heat utilizing a variety of fuels available in most Alaska communities. Biomass heating systems are individually selected for the application, including location, size of heating demand, and type of fuel available. These units range in a variety of sizes from small residential units to very large systems ideal for large commercial and industrial applications.



CHENA POWER

COAL FIRED MODULAR HEATING SYSTEMS

Coal fired modular heating systems are specifically designed and manufactured for each individual customers heating needs, fuels available, and site specific requirements. Each system is manufactured in North Pole, Alaska and delivered to the customers site ready to use.



CHENA POWER

COAL AND PELLET DELIVERY

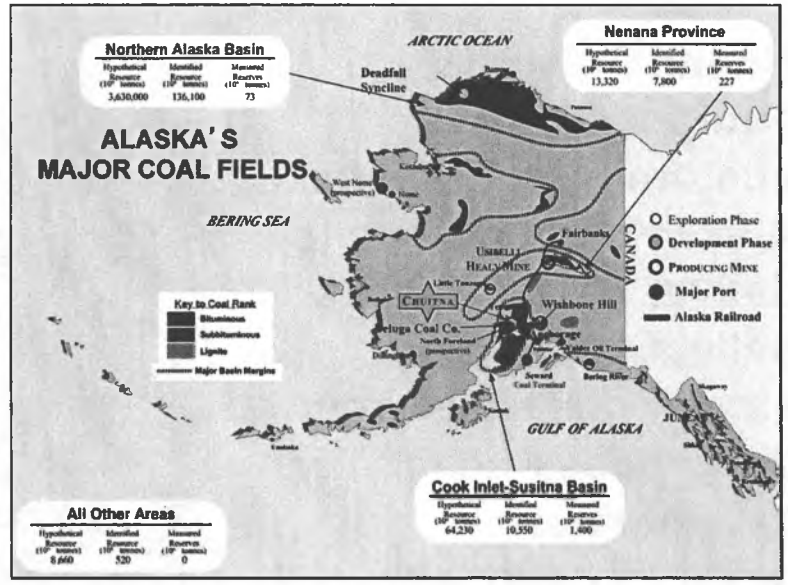
Chena Power is equipped with a custom built truck for Alaska's conditions to deliver coal, biomass pellets, and other similar materials from the processing facility to customers throughout Alaska.



CHENA POWER

COAL
Available, efficient, and clean!

- Total demand for U.S. coal reached 1.05 billion tons in 2010.
- Nearly half of U.S. electricity is generated from coal.
- 9 out of every 10 tons of coal mined each year in the U.S. is used for domestic electricity generation.
- Each person in the U.S. uses 3.4 tons of coal annually.
- Coal is the most affordable source of power fuel per million Btu, historically averaging less than one-quarter the price of petroleum and natural gas.

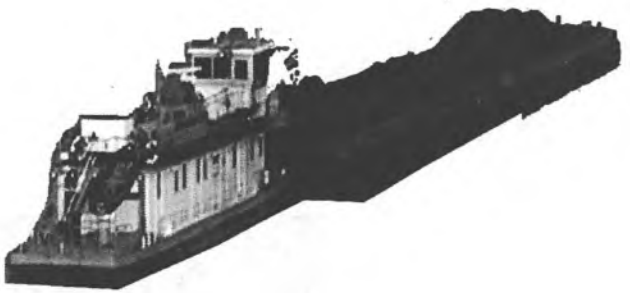


CHENA POWER

COAL
Available, efficient, and clean!



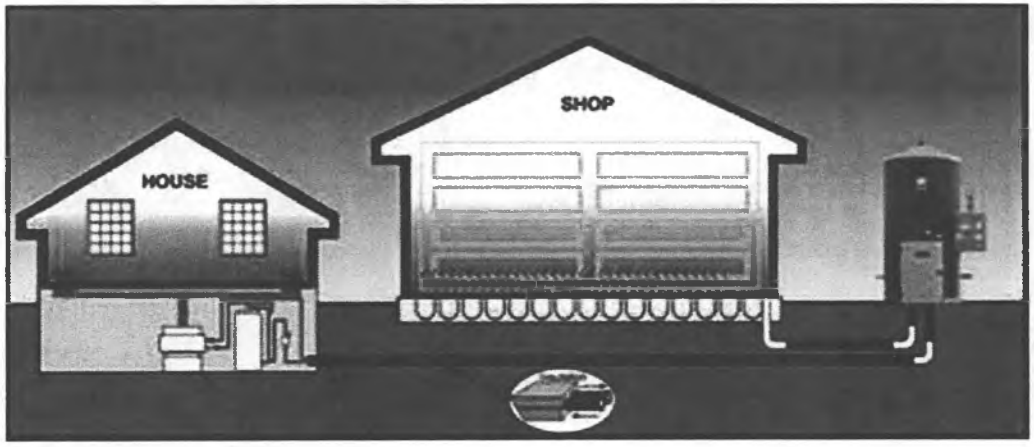
Kaltag, Alaska on the Yukon River

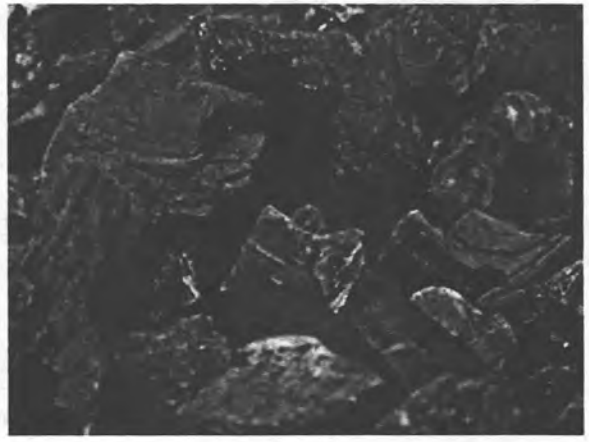




CHENA POWER

Alaska COAL
Available, efficient, clean and affordable!





CHENA POWER

GREENHOUSE AND HIGH TUNNELS





Chena Hot Springs has three greenhouses at the Resort. Tomatoes are a significant crop that is harvested throughout the year. There are four types of tomatoes grown; beefsteak, roma, grape, and cherry.

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

GREENHOUSE AND HIGH TUNNELS





The LED and hydroponic systems decrease winter energy costs and increase production. It is the largest of its kind in Alaska and the USA.

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA FRESH
GREENHOUSE AND HIGH TUNNELS







CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

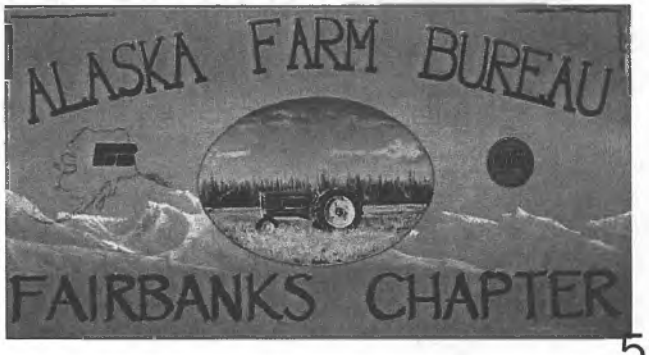
CHENA FRESH
A LOCAL FOOD PRODUCER



Alaska's Farmers Feed Alaska







C-GRO
PRODUCTION SYSTEM

The C-GRO production system was designed with the intent to provide a local supply of fresh vegetables, primarily leafy greens to Alaska communities that have shipping challenges limiting the availability of fresh and nutritious vegetables throughout the year.

As result of several years of research and implementation, C-GRO, a self-contained controlled environment production system with a hydronic heating system was built for use in Glennallen and was placed in operation in October 2013 .





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

C-GRO
PRODUCTION SYSTEM

The C-Gro unit was designed and built using a retired 40 foot refrigerated trailer van, once used to haul vegetables to Alaska. The trailer was selected for the ease of transport and final placement. This project required several special considerations in respect to the temperature extremes of Alaska's summers and winters. A hydronic heating system was installed to maintain optimum temperatures for growing even during the coldest winter when temperatures can drop to -50°F. A passive cooling and ventilation system was installed to handle the potentially hot (+85°F) summer temperatures.



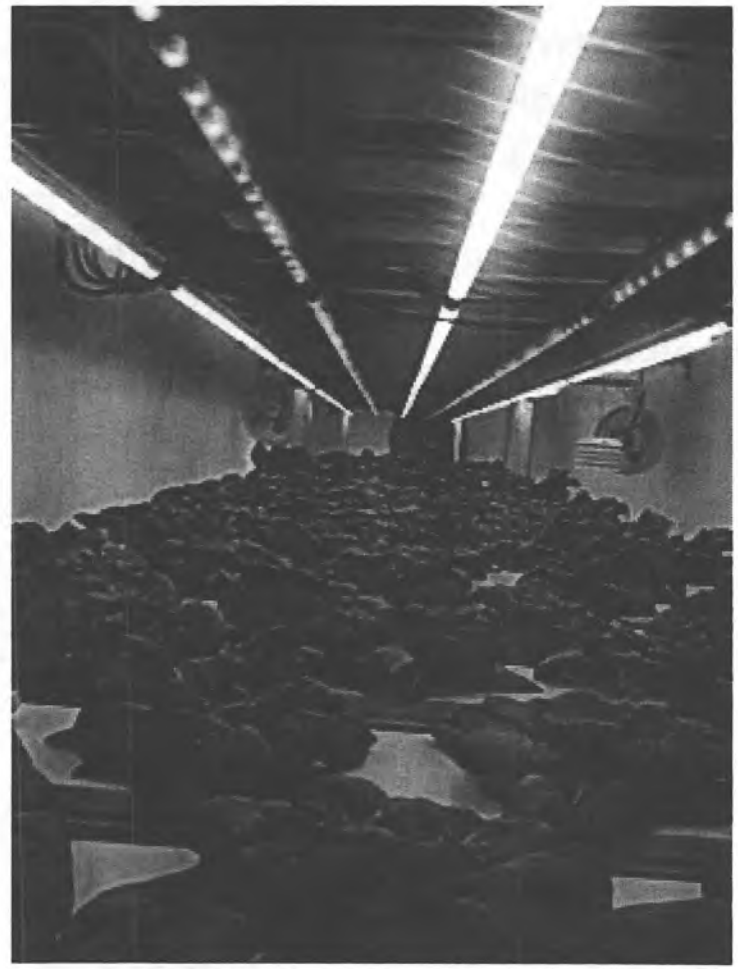


CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

C-GRO
PRODUCTION SYSTEM

The C-Gro production system has the capacity to produce up to 150 heads of lettuce a week. The productivity of the C-Gro is only the result of individuals operating the unit. For maximum production, special attention to the climatic and the nutrient needs of the plant while maintaining the proper climate and cleanliness is important. The C-Gro can successfully grow butter head lettuce, leafy-green and red lettuce types, romaine, baby greens, spinach, basil, and other plants that do not require flowering.

We look forward to work with other communities, utilizing the work that has been accomplished at Chena Hot Springs as they work toward self-sufficiency, self reliance and local food production.



C-GRO
PRODUCTION SYSTEM

The C-Gro unit utilizes proven technologies used in the Chena Hot Springs greenhouse. A significant technological concept utilized is the LED grow light system. Uniquely designed by the controlled environment specialists at Chena, this system has proven to grow lettuce, herbs and other greens. Equally important to the lighting, is the nutrient management system. The C-Gro utilizes a modified nutrient film technique watering system with a constant flow of nutrient rich water. The fertilizer and pH levels are maintained using digital controllers and peristaltic pumps that monitor and dose nutrient solutions when necessary.





CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

FRUITS AT CHENA

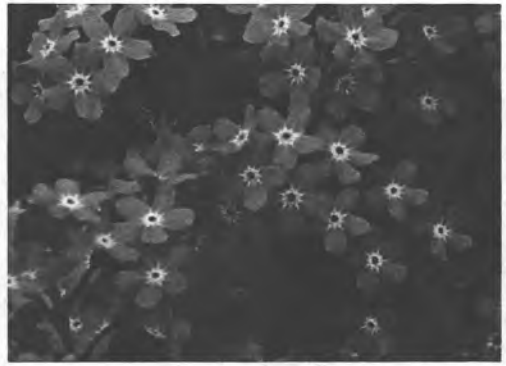






Grapes Rhubarb Bananas Strawberries Raspberries

FLOWERS AT CHENA




CHENA HOT SPRINGS
WORKING LIVESTOCK









CHENA HOT SPRINGS ALTERNATIVE LIVESTOCK

Chena Hot Springs Resort is home to a developing reindeer herd.

Alaska has several alternative livestock species that are raised for commercial meat production. Elk, Bison, Yak, and Reindeer are among those that are currently in production.

It is our desire to develop this industry onsite and produce meat for local consumption.





CHENA HOT SPRINGS
ONSITE MEAT PRODUCTION

USDA inspected and certified pork is raised using Alaska Grown feeds and other re-processed kitchen scraps to produce quality meat products used in the dining facilities.

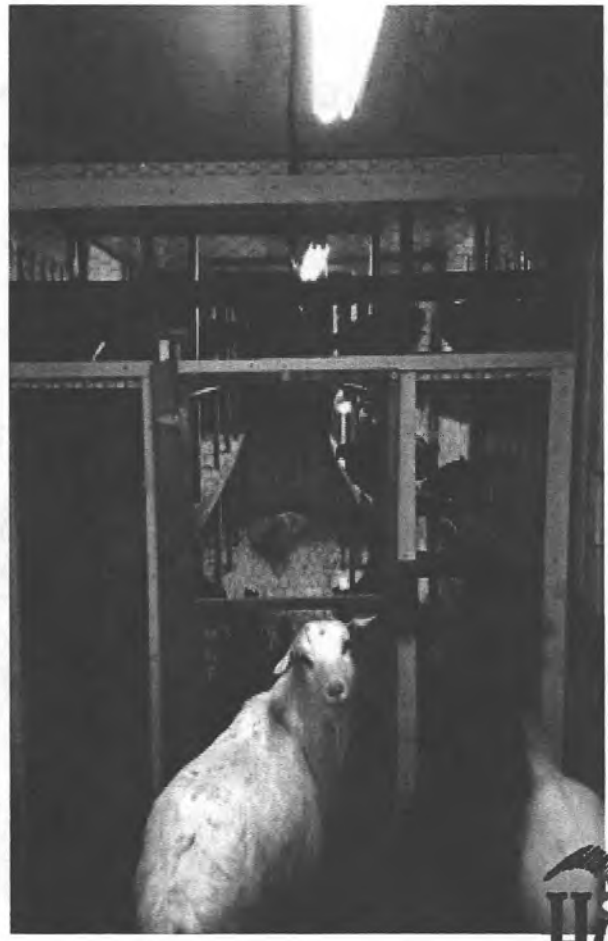




CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

SMALL LIVESTOCK
POULTRY AND GOAT FACILITY



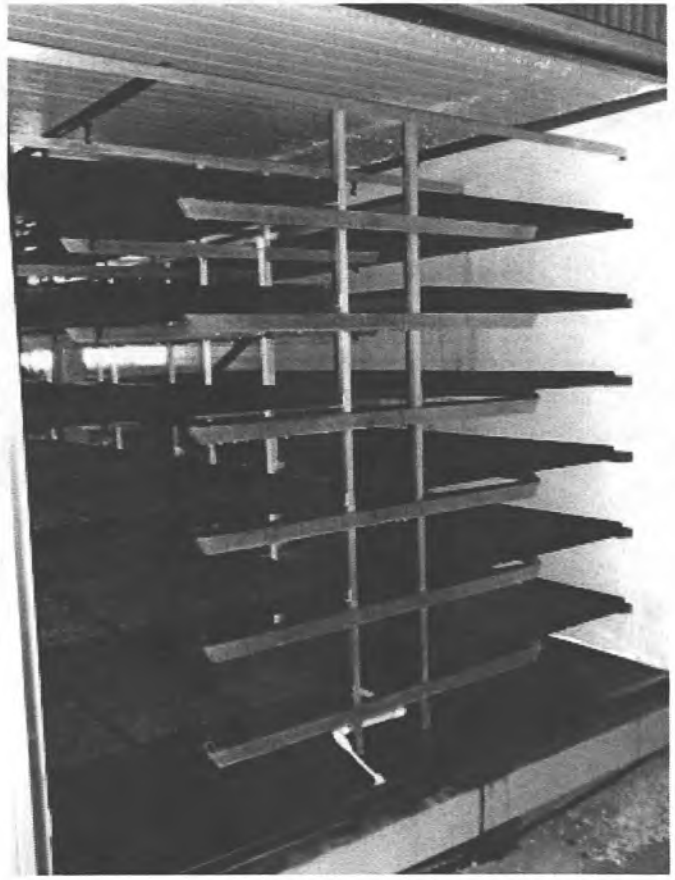


CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA



CHENA HOT SPRINGS GROWN BARLEY FODDER

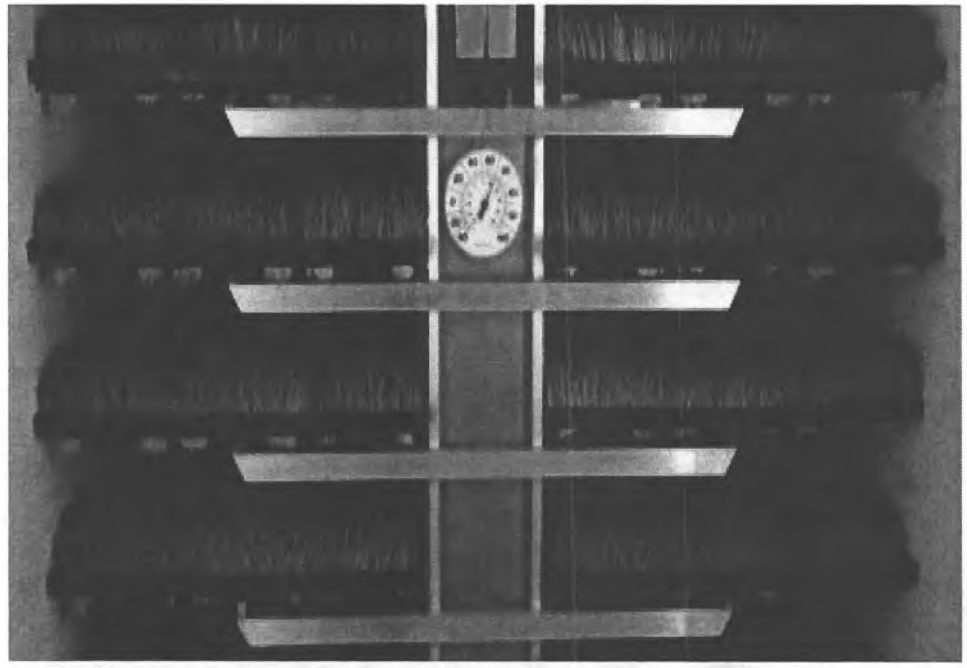
Day 1: Barley seeds are placed in system



CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA HOT SPRINGS GROWN BARLEY FODDER

Day 6: Barley seedlings are harvest and fed to livestock



CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA HOT SPRINGS GROWN BARLEY FODDER

A Nutritious livestock feed is grown onsite using Delta Junction Barley for a quality product







CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

Lettuce give you a hug from the Earth...

Key Note Speakers

Dynamic and engaging speakers are invited to speak on the immediate energy and sustainability needs of Alaska, providing insight to what is occurring locally, statewide, and nationwide. Previous years speakers include members of the US Senate, Congressmen, Presidential cabinet members, the Governor of the State of Alaska, members of the Alaska State Legislators, local area mayors, prominent industry leaders and members of the Alaska community.



Senator Lisa Murkowski, US Senate



Bernie Karl, Chena Hot Springs Resort



Olga Heiseth, Chena Hot Springs Resort



The Renewable Energy Fair is only possible with the generous support of dedicated individuals and organizations that have a passion for renewable energy and sustainable living.

Individuals, businesses and organizations are invited to participate as sponsors, vendors, and presenters. If you would like to be a part of this exciting event, please let us know how you would like to be involved in the greatest sustainable and renewable energy event in Alaska.

A new product for the biomass fuel market from CHENA POWER



Chena Power has implemented a dynamic new state of the art briquetting system for handling collected biomass and paper materials to be used in combustible fuel heating systems. A complete lineup of the new briquette products and their uses will be demonstrated at the Fair.

Chena Power, USA and Kaishan Compressor, China
An international partnership in geothermal power generation, innovation and implementation.

Entertainment

Special Entertainment is scheduled throughout the day. Performers and activities include, but not limited to live musicians, balloon artists, sketch artists, poetry reading, pony rides, a petting zoo, and much more. Free tours of the greenhouse and power plant and nature walks will also be available for all to enjoy.

Presentations

Throughout the event, invited guest speakers conduct small group lectures and presentations on topics related to this years theme. Informational, hands-on, engaging, and inspiring is the expectation for all presentations. Local and national experts have been invited to speak on renewable energy, sustainability, self reliance, power generation, conservation and geothermal activity.

Food and Beverage

Enjoy an ice cream cone, a piece of brick oven baked bread or a fresh barley flour pretzel as you learn about sustainable food production and renewable energy. The event will begin with an "Alaska Grown" barley flour pancake breakfast prepared by members of the Fairbanks Farm Bureau. Lunch will include free hot dogs and chili for all attendees. Delicious Chena Mint Iced Herbal Tea and lemonade will be served throughout the day.

Youth Activities

There are many youth activities planned to inspire and entertain Alaska's future generations. Popular events in the past included robotics and LEGO activities, natural resource and environmental engagement activities, pony rides, hydroponic garden projects, guided berry picking, and paper boat building just to name a few, all activities are provided FREE to event attendees.

Transportation

Chena Hot Springs Resort will provide bus transportation to and from Fairbanks for the Energy Fair departing in the morning and returning back in the early evening. Reservations for the bus are available online on the website. There is no charge for the bus.

Reduce
Reuse
Recycle



Greenhouse

The greenhouses and high tunnels at the Resort are filled with innovative ideas for up-to-date hydroponic production. Enjoy a fresh salad and the beautiful flowers grown on location using renewable energy.

Fodder

Explore the fodder production system and learn about the benefits of fodder production and the many opportunities for its use.

Power & Energy

Experience the latest power generation systems at Chena Hot Springs, the possibilities that may be used elsewhere throughout Alaska.

Geothermal

Witness the first in the world screw expander with a synchronous generator, generating electric from a recently drilled 178.9°F geothermal well and improved cooling system.

Hydrogen

The cleanest and easiest form of energy available known to man. Experts from around the world will demonstrate hydrogen powered equipment and generators suitable for the Alaskan sustainable lifestyle.

Draft Power

Observe draft animal farming, power production and water pumping demonstrations! Wagon rides and pony rides will be available throughout the day. Real horse and pony power!

Methane

Methane gas collected from digesters onsite will be used to demonstrate simple fuel production for a sustainable lifestyle. Cooking, heating, cooling, and electrical generation examples will be available during the fair.

9th Annual

Renewable Energy Fair

Chena Hot Springs Resort August 17th, 2014



A full day of exciting activities and presentations to educate, engage and inform participants on current topics involving renewable and sustainable energy, conservation, self-sufficiency, agriculture and the environment.

Sustainable & Renewable

- Geothermal Energy
- Screw Expander Generation
- Biomass Utilization
- Hydrogen Power Generation
- Natural Gas Issues for Alaska
- Sustainable Food Production
- Conservative Living Ideas
- Draft Horse Power and Use
- Methane Digestion and Use
- Energy Conservation

chenahotsprings.com/energyfair2014
energyfair@chenahotsprings.com
Tel (907) 488-1505

CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

PROJECT RESULTS: THE FUTURE

POWER, HEAT, FOOD



CHENA HOT SPRINGS RESORT
FAIRBANKS, ALASKA

CHENA POWER

02/04/13 Overview: Alaska Housing Finance Corporation Weatherization Programs Update

<TARGET><BILL></BILL><SUBJECT>02-04-13 Overview Alaska Housing Finance Corporation Weatherization Programs Update</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Housing
FINANCE CORPORATION

AHFC Energy Programs Update

4300 Boniface Parkway • Anchorage, Alaska 99504 • P.O. Box 101020 • Anchorage, Alaska 99510 • 907-338-6100 (Anchorage) or (Toll-Free) 1-800-478-AHFC (2432) • www.ahfc.us

Alaska Housing
FINANCE CORPORATION

Funding Since 2008

	Home Energy Rebate	Weatherization
Totals	$217.5 million	$292.5 million

Grand Total	$510 million

Alaska Housing
FINANCE CORPORATION

Rebate/Wx by the Numbers

- Home Energy Rebate Program

  17,908 Homes completed

- New Home Rebate Program

  1,751 Homes completed

- Weatherization Program

  8,513 Homes completed

More than **28,000** homes energy efficient!

Alaska Housing
FINANCE CORPORATION

Rebate/WX Program Impacts

- Alaska housing stock is safer, better quality and more affordable to heat
- More than **4,000** jobs created and retained
  - Direct jobs – 2,492
  - Indirect jobs – 1,780
  - Jobs from spent energy savings – 407

Alaska Housing
FINANCE CORPORATION

Rebate/WX Program Energy Savings

Total Energy Saved Annually – **2.3 trillion BTUs**

Equivalent to:

- **406,334** Barrels of Oil or,
- **23,567,420** CCF of Gas or,
- **17,077,840** Gallons of Fuel Oil or,
- **690,721** MegaWatt Hours of Electricity

Alaska Housing
FINANCE CORPORATION

Savings

Total Estimated Energy Cost Savings **Per Year** to Alaskan Homeowners and Renters

More than $37 million

Benefit:

Savings are spent locally, recirculating through the economy

Alaska Housing
FINANCE CORPORATION

Savings from 8,275 Anchorage Homes

Is enough energy to power **3,437** homes in the Anchorage area for 1 year

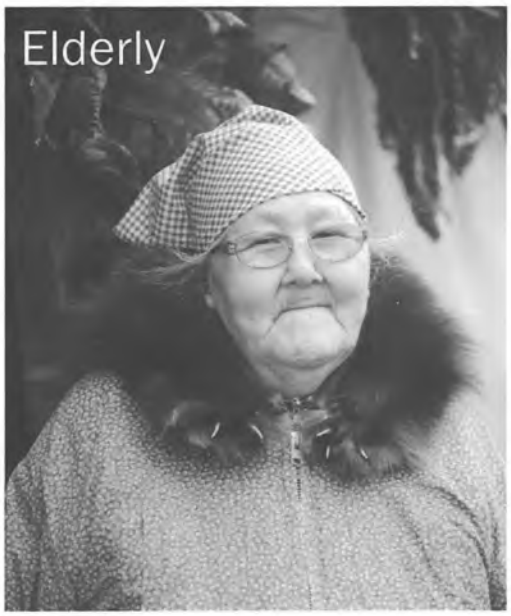
or

Power the Performing Arts Center, Egan Convention Center, Sullivan Arena, Robert Atwood Building and the Dena'ina Center for

8.7 years!

Alaska Housing
FINANCE CORPORATION

Weatherization Program



AHFC Stock Photos





Alaska Housing
FINANCE CORPORATION

Weatherization Program

- Health and Safety
- Energy Efficiency
- Homeowner Education
- Comfort
- Building Durability



Photo Credit: Jimmy Ord

Alaska Housing
FINANCE CORPORATION

Employs Local Community Members



Photo Credit: Jimmy Ord

Weatherization Program
Update

Current totals	December 31, 2012
Total expended	$199.7m
Units complete	8,513

Projected totals	March 31, 2013
Total expended	$230m
Total units complete	10,500

Projected totals	March 31, 2014
Expended	$292.5
Units complete	13,500

Alaska Housing
FINANCE CORPORATION

Weatherization Program

Savings

Average home BTU savings	60.8 million BTU/year
Average home energy savings	28%
Average home cost savings	$1,336/year

Weatherization Program

	Southeast (Outside Juneau) (n=562)	Anchorage (n=518)	Fairbanks (n=807)	NANA Region (n=106)
Average Energy Savings Per Year (Million BTUs)	54.4	54.2	56.6	62
Average reduction home energy use	31%	22%	23%	40%
Average cost savings per home ($)	$1,223	$490	$1,394	$2,335

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FINANCE CORPORATION

Home Energy Rebate Program

- Open to all Alaskans
- No income requirements
- Owner-occupied, year-round residences
- Homeowners pay upfront and are then rebated
- "As-Is & Post" energy ratings



AHFC Stock Photo

Alaska Housing
FINANCE CORPORATION

5 Star Plus New Home Rebate



Rebates	1,751 rebates
Total Expended	13.1 million

Alaska Housing
FINANCE CORPORATION

Home Energy Rebate Program

Stimulating an Economy

17,908 homeowners have spent more than **$209.1 million** on energy efficiency improvements.

Home Energy Rebate Program

Program Snapshot

Average Improvement Costs

$11,681 spent
-$6,389 rebate
-$325 As-Is
-$175 Post

= $4,792 homeowner investment

A Sample was taken of 17,233 Homeowners

Alaska Housing
FINANCE CORPORATION

Home Energy Rebate Program

Average homeowner investment	$4,792
Average home cost savings	$1,464/year

Investment pays for itself in 3.3 years!

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Home Energy Rebate Program

	Juneau (n=1,012)	Anchorage (n=9,566)	Fairbanks (n=2,361)	Bering Straits (n=13)	Ahtna (n=37)
Average cost per home	$12,089	$12,062	$11,800	$15,036	$8,783
Average cost savings per home per year	$2,219	$1,033	$2,880	$1,960	$1,954
Average rebate per home	$6,679	$7,204	$6,152	$6,114	$5,428
Average payback per home (homeowner funds) in years	2.4	4.7	2	4.5	1.7

Home Energy Rebate Program

Savings

Average home BTU savings	103 million BTU's/year
Average home energy savings	34%

Alaska Housing
FINANCE CORPORATION

Home Energy Rebate Program

Results

April 2008 – January 25, 2013

Rebates	17,908
As-Is	32,294

Waitlist

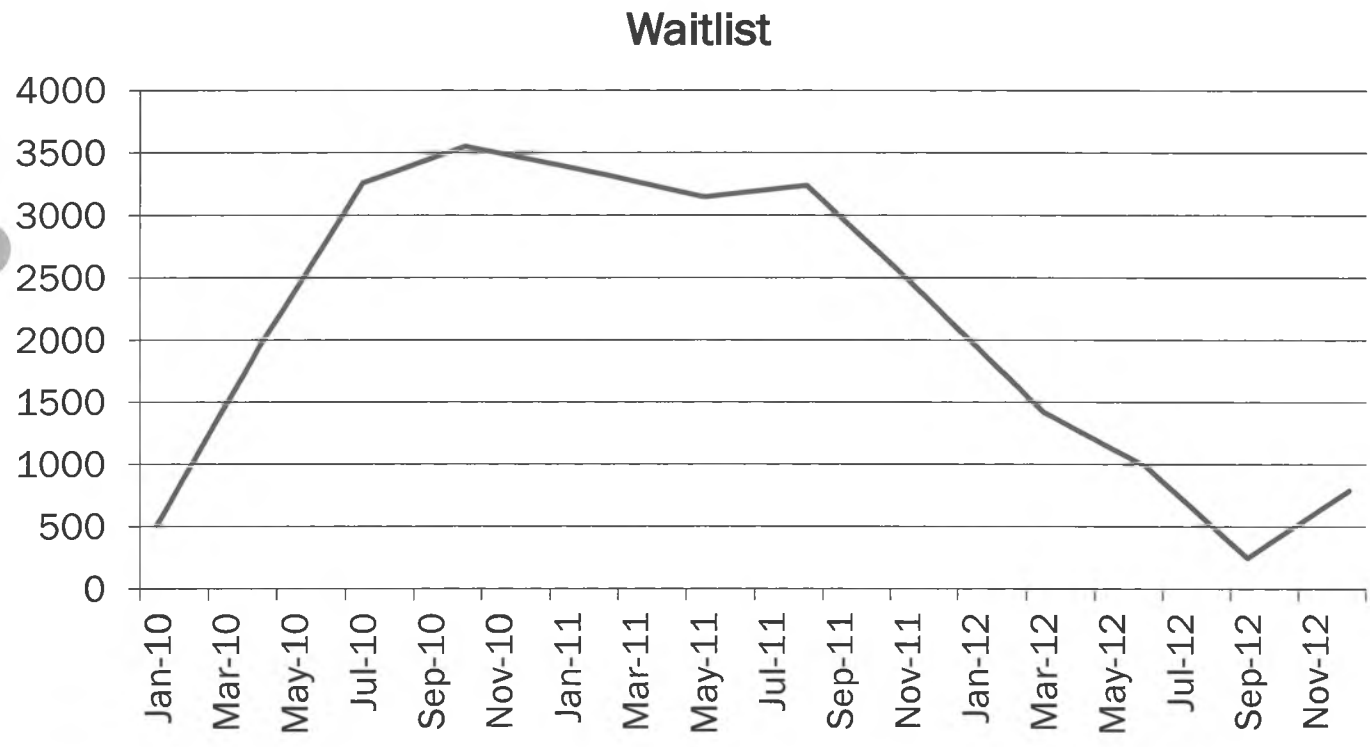
As of 1/25/13

511



Alaska Housing
FINANCE CORPORATION

Home Energy Rebate Program





Home Energy Rebate Program Marketing

Rural Marketing Effort

Radio Advertisements in South Central, Fairbanks and Juneau

Alaska Housing
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Second Mortgage for Energy Conservation

- Second mortgage up to $30,000
- 15 Year Loan at the Taxable Rate
- Active Loans: **65**
- Loans Paid Off: 82



AHFC Stock Photo

Alaska Energy Efficiency Revolving Loan Program (AEERLP)

Alaska Housing FINANCE CORPORATION

$250m available for energy efficiency improvements for:

-Schools	-State facilities
-University of Alaska	-Municipal facilities

Savings from energy efficiency improvements may be used to pay off the loan



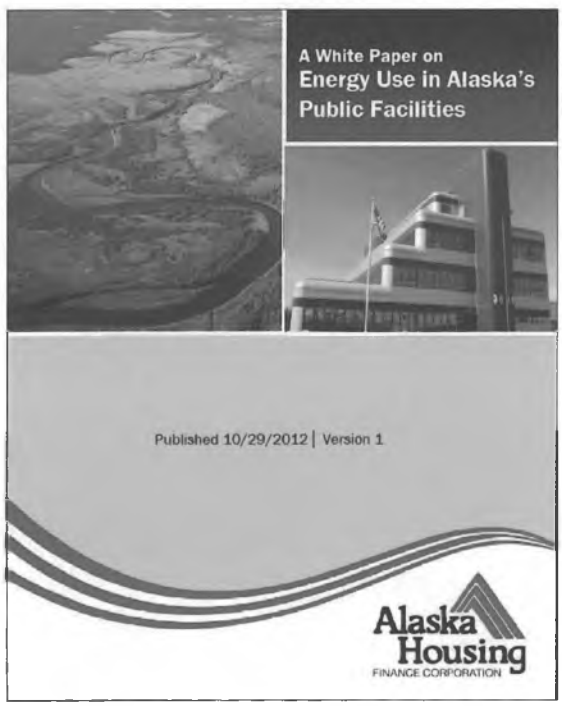
Photo Credit: CAEC

Energy Use in AK Public Facilities



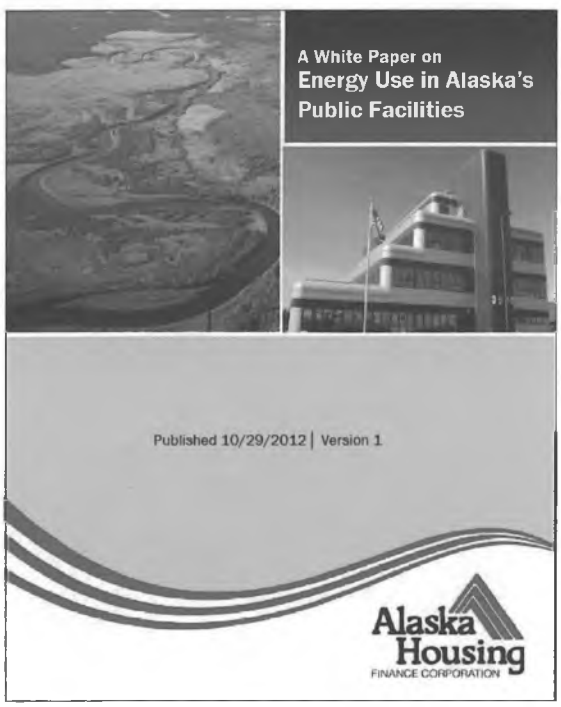
- Over 1,200 buildings benchmarked
- 327 buildings audited

Energy Use in AK Public Facilities



- ❑ Adopt and enforce energy codes
- ❑ Require all publicly owned buildings track their energy use
- ❑ Establish a level of accountability

Energy Use in AK Public Facilities



Note: Buildings were from a non-random sample

Over All Findings

- Upwards of 5,000 publicly owned buildings exist in Alaska
- Estimated energy cost equates to approximately $641,245,000 to the public each year
- At the average savings per building of $25,000 the potential statewide annual savings would equal $125,000,000

Alaska Housing
FINANCE CORPORATION

ARIS

Alaska Retrofit Information System

- AHFC's ARIS database has become the clearinghouse for information on Alaska buildings
- Used primarily by AHFC, DOT&PF, AEA, with all state agencies as users
- Over 70,000 unique records
- Available to local governments, school districts, boroughs and municipalities



Alaska Housing
FINANCE CORPORATION

ARIS

Alaska Retrofit Information System

- ❑ Home Energy Rebate Program Outcomes
- ❑ Alaska Energy End Use Study
- ❑ Energy Use in Alaska's Public Facilities
- ❑ Snapshot: The Home Energy Rebate Program
- ❑ Weatherization Assistance Program Outcomes
- ❑ Energy Efficiency of State, Municipal and Tribal Buildings in Alaska: Metrics and Analysis



Alaska Housing
FINANCE CORPORATION

Efficiency First

More than 28,000 homes more efficient

More than 4,000 jobs created and retained

2.3 Trillion BTU's saved annually





AHFC Stock Photo

Jeff Turner

From: Stacy Schubert <sschubert@ahfc.us>
Sent: Monday, February 04, 2013 1:02 PM
To: Jeff Turner; David Talerico
Cc: John Anderson; Dan Fauske; Cary Bolling
Subject: House Energy follow-up

Hi Jeff & Dave:

At the request of this morning's House Energy Committee, Alaska Housing Finance Corporation is following up with the following resources. For the sake of efficiency and a fear of burdening committee members with too much paper, we are providing links but will certainly be happy to provide hard copies to any member who requests such. I assume you will forward these to each member but I am happy to do so. Note also that a second email will follow soon that includes responses to questions posed during the committee but require a bit more time to gather (i.e., number of 4 star and greater homes, etc.)

Follow-up is organized by program highlighted by bold text.

Home Energy Rebate

General information http://www.ahfc.us/efficiency/energy-programs/home-energy-rebate/

- All Alaskan homeowners may participate in the Home Energy Rebate Program.
- There are no income requirements or limitations.
- Only owner-occupied, year-round residences are eligible.
- Only one rebate per dwelling can be given.
- Homeowners pay upfront and are then reimbursed for making the eligible improvements.
- Before work ("As-Is") and after audit ("Post-Improvement") energy ratings are required.

ISER report, including spending impact and jobs created/retained: http://www.ahfc.us/files/4613/5769/3742/2012_05_16-HERP.pdf (This report also included input from Cold Climate Housing Research Center – CCHRC – in Fairbanks).

Program Outcomes, including 2011 house district-specific information beginning on page 27: http://www.ahfc.us/files/2013/5769/3849/herp_outcomes_062612.pdf

New Home Rebate

General information: http://www.ahfc.us/efficiency/energy-programs/new-home-rebate/

- $7,500 is available for the purchase of a newly constructed 5 Star Plus Home.
- Not more than one year from time of completion
- For the original owner
- Must meet all AHFC property financing requirements and have a 5 Star Plus energy rating. (An AHFC loan is not required.)
- For purposes of funding, this incentive is provided through the Home Energy Rebate program.

Weatherization

General information http://www.ahfc.us/efficiency/energy-programs/weatherization/

- Individuals who meet income guidelines may apply for the Weatherization Program through the weatherization service provider in their area (For someone living in a home owned by a state-designated regional housing authority, contact the housing authority directly.)
- Both homeowners and renters may apply.
- The weatherization provider will provide program services at no cost to qualified applicant, averaging $11,000 per home in urban Alaska and $30,000 per home in remote-rural Alaska, allowing providers maximum flexibility to achieve greatest impact.
- Individuals may not participate in both the Weatherization Program and Home Energy Rebate Program.
- The program is subject to funding availability and preference is giving to seniors, individuals with disabilities and families with young children.

District-specific median income guideline chart as determined by U.S. Department of Energy (DOE): http://www.ahfc.us/files/1513/5551/2949/income_limits.pdf

Weatherization Service Providers http://www.ahfc.us/efficiency/energy-programs/weatherization/weatherization-service-providers/ and Housing Authorities: http://www.aahaak.org/ .

Program Outcomes, including 2011 senate district-specific information beginning on page . http://www.ahfc.us/files/6313/5769/3840/wx_assistance_prog_outcomes.pdf

Second Mortgage for Energy Conservation Loan, offering homeowners up to $30,000

General Information: http://www.ahfc.us/efficiency/energy-programs/second-mortgage-energy-conservation/

Public Facilities:

A link to the *White Paper on Energy Use in Alaska's Public Facilities* that addresses results and provides energy efficiency recommendations following benchmarking of 1,200 publically-owned buildings, and completion of 327 Investment Grade Audits (IGAs)2. http://www.ahfc.us/files/3313/5769/3854/public_facilities_whitepaper_102212.pdf. (To see results of audits performed by ANCSA region, visit this page: http://www.ahfc.us/pros/energy-programs/energy-programs/energy-efficiency-public-facilites/)

Public Facilities Access to $250 million Energy Efficiency Revolving Loan Fund:

General information: http://www.ahfc.us/pros/energy-programs/energy-efficiency-revolving-loan-fund-aeerlp/

- This loan is administered by AHFC and provides financing for permanent energy efficient improvements to buildings owned by regional educational attendance areas, by the University of Alaska, by the state, or by municipalities in the state.

- Borrowers obtain an Investment Grade Audit as the basis for making cost-effective energy improvements, selecting from the list of energy efficiency measures identified. All of the improvements must be completed within 365 days of loan closing.

- Guaranteed savings from energy efficiency improvements are used to repay the loan.

Finally, for clarity:

Energy acronyms/Definitions referenced in today's Hearing:

AkWarm--An energy software program developed by AHFC to evaluate the energy performance of homes.

ARIS-- Alaska Retrofit Information System developed by AHFC as a database to track Alaska building energy performance.

Thank you very much for the opportunity to allow AHFC to present information about these energy efficiency measures. We are happy to answer any additional questions that may arise.

Sincerely,

Stacy

Stacy Schubert, IOM, MBA
Director, Governmental Relations & Public Affairs

P.O. Box 101020 | Anchorage, Alaska 99510
Direct: 907-330-8445 | Cell: 907-301-4556 | www.ahfc.us

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Jeff Turner

From: Stacy Schubert <sschubert@ahfc.us>
Sent: Tuesday, February 12, 2013 11:21 AM
To: Jeff Turner
Cc: Dan Fauske; John Anderson
Subject: House Energy Follow-up Part II

Hi Jeff:

As you recall, a number of questions were asked at last week's House Energy committee that required some data collection from Alaska Housing Finance Corporation. The following should address all outstanding questions. If we have missed anything, please let me know. As with Part I of the reply delivered last week, thank you in advance for distributing to all members.

Sincerely,

Stacy

Question: What is the number of homes built in Alaska prior to 1990?

Answer: According to the 2009-2011 American Communities Survey for the State of Alaska, here is the information on the number of homes built prior to 1990:

	#	% of All Housing Units
Owner-Occupied	113,138	69%
Renter-Occupied	68,762	75%
Total	181,900	71%

Question: What percentage of homes in Alaska are 4 star, 5 star, etc.?

Answer: AHFC only has data on the homes that have participated in our programs. The Home Energy Rebate program shows the following:

	"First" Rating	"Post" Rating
1 Star	4.80%	0.01%
1 Star Plus	4.91%	0.34%
2 Star	13.17%	0.90%
2 Star Plus	23.17%	2.29%
3 Star	18.59%	4.57%

3 Star Plus	17.15%	11.54%
4 Star	11.81%	29.04%
4 Star Plus	5.40%	38.10%
[illegible]tar	0.91%	12.12%
5 Star Plus	0.09%	1.08%

Question: What is the total number of Weatherization program applications submitted each year?

Answer: Since applications are handled through grantees (Four service providers and 13 housing authorities), AHFC does not have a readily available listing of total applicants statewide. Rather, AHFC relies on the grantees to provide an annual plan to AHFC which estimates the number of homes each expects to complete. To respond to this question, AHFC contacted the Fairbanks grantee, Interior Weatherization, that weatherizes about 500 units per year. They estimate they have between 500-700 applicants a year.

Question: What is the Fairbanks waitlist for weatherization?

Answer: According to Interior Weatherization, the waitlist for weatherization in Fairbanks is 235.

Question: How does AHFC estimate cost and BTU savings?

Answer: Cost and BTU savings are calculated using the AkWarm Energy Rating Software, developed specifically with our state's various geographic and climatic conditions. The software references updated statewide fuel price data and models costs and savings.

Question: What is the amount of spending on life/safety measures vs. energy improvements (in the weatherization program)?

Answer: The Weatherization program does not track the investment in health/safety measures for each unit. The amount is included in project costs because both health/safety and energy improvements are closely related. The health/safety measures that are performed are all tied to the energy improvements. There are several mandatory health/safety measures performed on every home:

1. Smoke detectors
2. Carbon monoxide detectors
3. Correction of combustion testing failures
4. Whole house ventilation

5. Exterior vented range hood fan over gas range

Question: Are condo's able to take advantage of the Second Mortgage for Energy Conservation?

Answer: Yes. A condo unit owner may utilize this program for the unit. Additionally, a condo association may utilize AHFC's Homeowner Association Loan Program for common area energy improvements.

Stacy Schubert, IOM, MBA
Director, Governmental Relations & Public Affairs

P.O. Box 101020 | Anchorage, Alaska 99510
Direct: 907-330-8445 | Cell: 907-301-4556 | www.ahfc.us

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02/06/13 Alaska Energy Authority Overview and Renewable Energy Fund Update

<TARGET><BILL></BILL><SUBJECT>02-06-13 Alaska Energy Authority Overview and Renewable Energy Fund Update</SUBJECT><COMM>HENE28</COMM></TARGET>



Alaska Energy Authority Overview and Renewable Energy Fund Update

House Energy Committee
Feb. 6, 2013





Reducing the Cost of Energy

- Energy Planning and Policy
- Technical and Community Assistance
- Investing in Alaska's Energy Infrastructure
- Diversifying Alaska's Energy Portfolio

ALASKA ENERGY AUTHORITY

Electricity Generation by Region

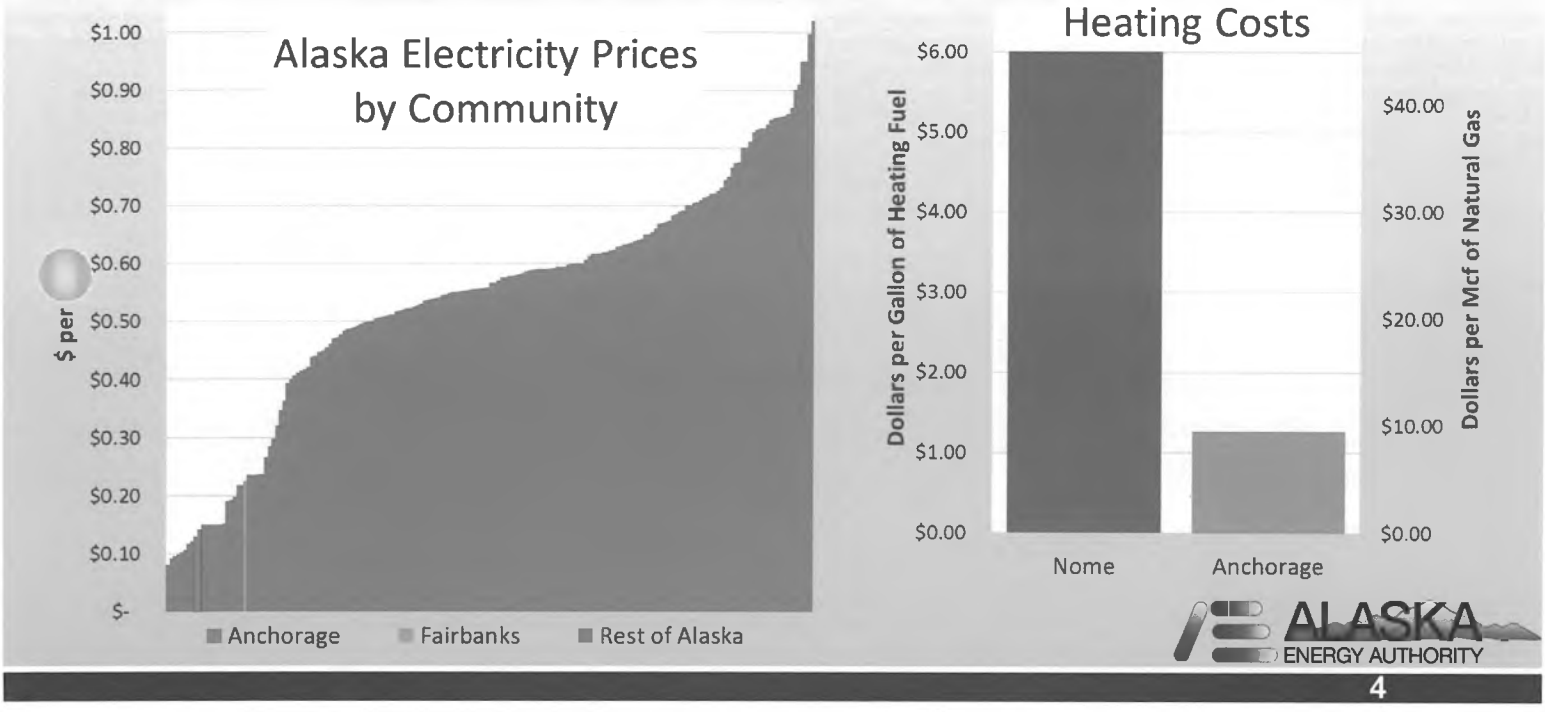
Annual Electric Generation

AEA Energy Region	MWhs per Year	Percent of Total
Aleutians	65,340	1%
Bering Straits	55,362	1%
Bristol Bay	55,145	1%
Copper River/Chugach	116,700	2%
Kodiak	150,503	2%
Lower Yukon-Kuskokwim	96,625	1%
North Slope	82,544	1%
Northwest Arctic	35,549	1%
Railbelt	5,075,507	77%
Southeast	785,190	12%
Yukon-Koyukuk/Upper Tanan	31,175	0%
Total	**6,549,640**	**100%**

2011 Alaska Energy Statistics

ALASKA ENERGY AUTHORITY

Energy Costs Vary

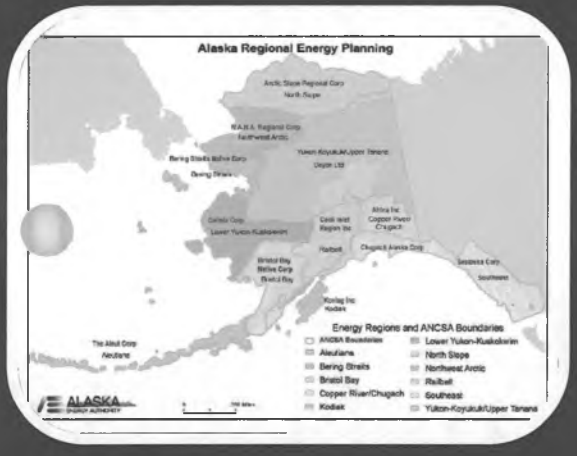


ALASKA ENERGY AUTHORITY

Energy Policy Development and Coordination

- Deputy Director for Statewide Energy Policy Development
- Serve as lead on Alaska's energy policy development
- Coordination of energy plans on statewide level
- Coordinate multi-agency efforts
- Individual project analysis and vetting
- Transmission planning
- Working with AIDEA on LNG trucking

ALASKA ENERGY AUTHORITY

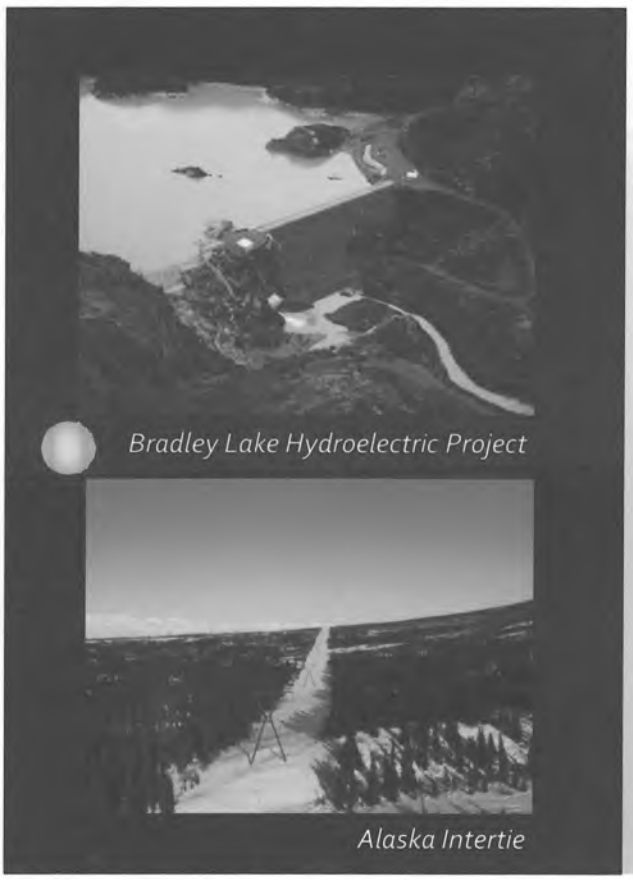


Supporting Regional Solutions

Regional Energy Planning

- Energy Pathways led to regional planning
- Address unique challenges while capitalizing on regional resources
- Locally driven and community-vetted blueprint for sustainability
- Objective to provide specific, actionable recommendations
- Includes electric, heat and transportation energy
- Previous Plans: Railbelt Integrated Resources Plan and Southeast Integrated Resources Plan
- Technical assistance to local communities to provide synergy between planning and funding sources

ALASKA ENERGY AUTHORITY



Bradley Lake Hydroelectric Project

Alaska Intertie

Infrastructure and Large Projects

Bradley Lake Hydro

- State capital contribution 50%
- Produces about 10% of Railbelt electricity
- AEA-owned asset
- Low-cost energy producer
- 120 megawatts, 4.5 cents/kWh

Alaska Intertie

- AEA-owned with no outstanding debt
- Operated by AEA and Railbelt utilities

Susitna-Watana Hydro

- Will provide about 50% Railbelt electricity
- SB 42 authorized AEA to pursue licensing
- Long-term, stable rates

ALASKA ENERGY AUTHORITY



Rural Energy

Bulk Fuel and Rural Power System Upgrades

- Help utilities improve efficiency, safety and reliability of power systems
- Completed $304 million in rural bulk fuel and rural power system upgrade projects since 2000, in partnership with Denali Commission
- Thirteen projects under construction next year
- Circuit rider technical assistance in 53 communities (FY 12)

Training and Technical Assistance

- Training for power plant operators, advance power plant, bulk fuel, electric utility manager, Power Cost Equalization
- Energy specialists assisted 40+ communities to advance to project-ready status

ALASKA ENERGY AUTHORITY

Rural Energy

Power Cost Equalization (PCE)

- Provide economic assistance in rural Alaska where electrical rates can be 3 to 4 times higher than in urban Alaska
- Available to community facilities and residential customers
- Regulatory Commission of Alaska (RCA) sets rates, calculations based on use, costs and efficiencies
- Approximately 77,341 people live in the 183 participating communities (FY 11)
- PCE payments at 100% totaling $39.5 million (FY 12)
- $788 million PCE Endowment

ALASKA ENERGY AUTHORITY



Prince of Wales: Run-of-River Hydro



Chena Hot Springs: Geothermal

AEA Programs

Power Project Fund

- Low-interest loans to upgrade or develop small-scale electric power facilities
- Includes bulk fuel storage, transmission and distribution, waste energy, energy conservation, energy efficiency and alternative energy facilities and equipment
- State assistance for a project more than $5 million requires Legislative approval
- $35 million in Power Project Fund (~half in application process)
- 34 projects funded, $31 million
- Pending applications: City of St. George, wind/diesel hybrid; Haida Energy Inc., hydroelectric project

ALASKA ENERGY AUTHORITY



ALASKA ENERGY EFFICIENCY PARTNERSHIP

AEA Programs

Efficiency and Conservation

- State Goal: improve efficiency 15% by 2020
- AEA's focus is on commercial buildings, rural public buildings, industrial facilities and electrical efficiency
- Statewide outreach and education
- Support for multi-stakeholder group, Alaska Energy Efficiency Partnership AKEnergyEfficiency.org
- Coordination between State agencies
- Alaska Commercial Energy Audit Program
- Village Energy Efficiency Program

ALASKA ENERGY AUTHORITY

Energy Efficiency and Conservation

AEA Energy Efficiency and Conservation Programs: Results

- 132 participating Alaska communities, 419 buildings
- $1,534,062 and 282,938 diesel equivalent gallons in projected savings
- Average immediate savings of implemented efficiency measures: $0.29 cents/ $1 invested, 300% ROI after 10 years
- Alaska Commercial Energy Audit Program measures produce 30% savings with 6.2 year simple payback

ALASKA ENERGY AUTHORITY



Emmonak City Hall boiler before and after efficiency improvements

Community Highlight: Emmonak

Whole-Village Retrofit for Energy Efficiency

- AEA Programs: Village Energy Efficiency Program, Energy Efficiency and Conservation Block Grant Program
- Whole-village retrofit to reduce the cost of energy
  - Audits and efficiency retrofits in 8 community buildings
- Successes:
  - $670,000 in efficiency and conservation investment projected to provide $90,000 in annual savings
  - 27% of savings from efforts to reduce electricity consumption, remainder from reducing fuel consumption
  - Used local labor
  - Increased awareness

ALASKA ENERGY AUTHORITY



Altaeros Energies Helium Balloon Wind Turbine

AEA Programs

Energy Statistics

- Summary and analysis of electricity generation and use across Alaska

Emerging Energy Technology Fund

- SB 220 (2010) created fund
- Through Denali Commission matching grant, $8.9 million available
- First round, 16 project selected for funding (2012)
- Projects must be commercially viable within 5 years
- Projects in Juneau, Fairbanks, Kodiak, Delta Junction, Nenana, Nikiski, Igiugig, Tuntutuliak, Kwigllingok and Kotzebue

ALASKA ENERGY AUTHORITY



Ruby: Hydrokinetic



Unalakleet: Wind

AEA Programs

Renewable Energy Fund

- HB 152 (2008) authorized AEA to manage program, reauthorized in 2012
- 227 projects approved totaling $202.5 million
- More than 60 projects currently under construction
- By 2016, 12.3 million gallons of diesel and natural gas equivalent will be displaced annually.
- Results: $45 million in annual savings

ALASKA ENERGY AUTHORITY

Renewable Energy Fund: Evaluation Process

- Applications solicited and received by AEA
- Technical and Economic Review
  - Stage 1 – Qualifying project
  - Stage 2 – Technical & Economic
  - Stage 3 – Scoring for Rank
  - Stage 4 – Regional Spreading
- Renewable Energy Fund Advisory Committee
- Recommendations to the Legislature

ALASKA ENERGY AUTHORITY

Renewable Energy Fund Projects

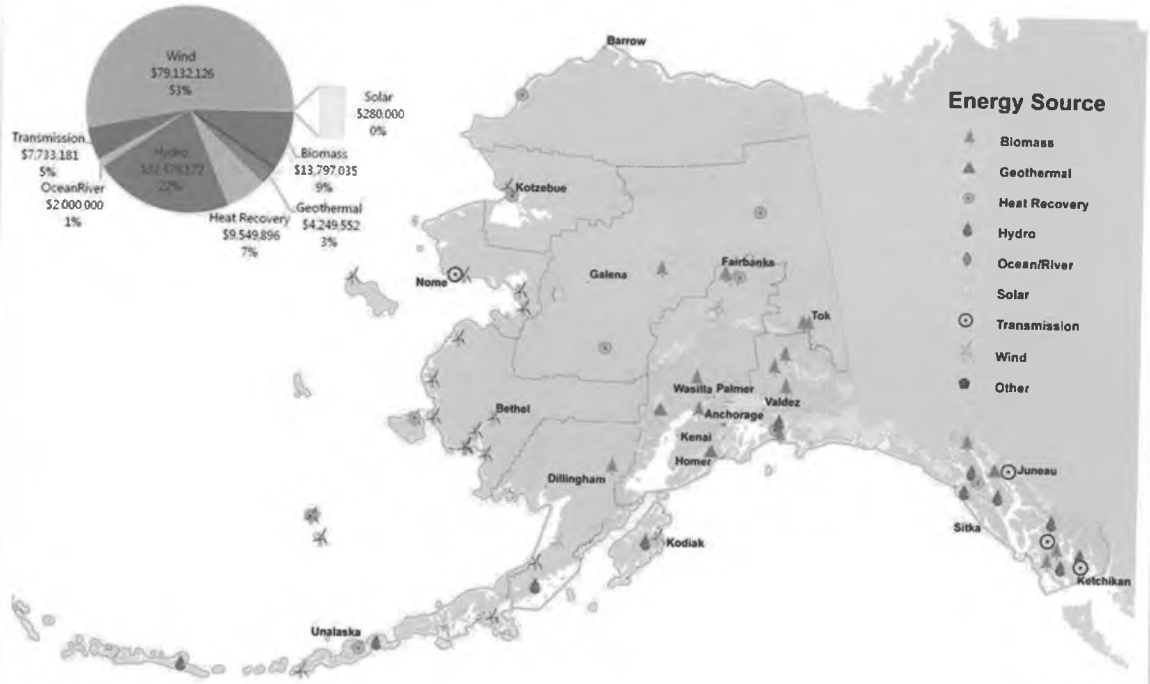
Funding by Project Phase
REF Round I - V



As of 4/17/12

ALASKA ENERGY AUTHORITY

Construction Projects (R1-5)



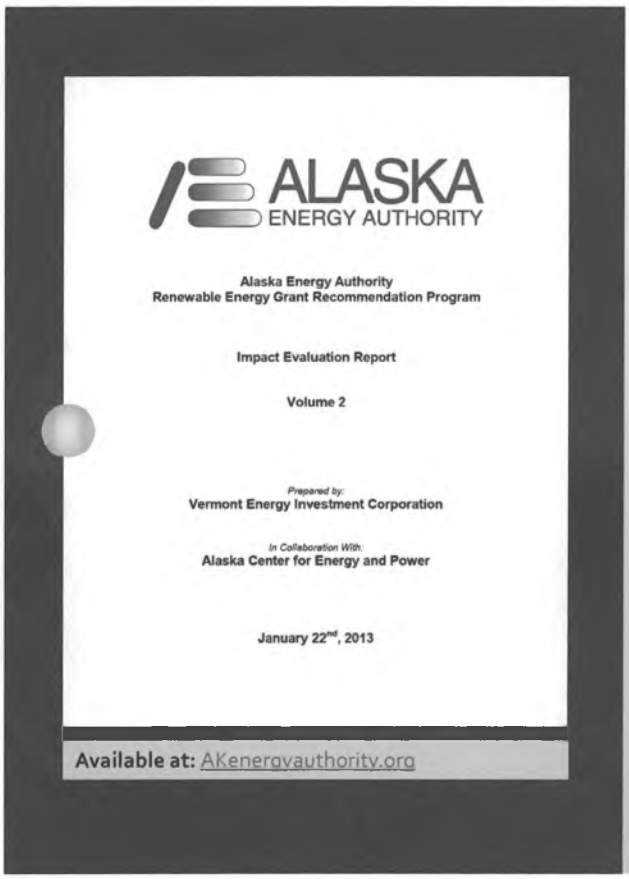
As of 4/17/12

ALASKA ENERGY AUTHORITY

Renewable Energy Fund: Benefits

- Supports Alaska's 50% Renewable Power goal
- Diversifies Alaska's energy supply
- Reduces energy costs by:
  - Providing low-cost renewable energy to displace fossil fuels
  - Reducing the cost of renewable energy
  - Keeping more dollars in local community
- Provides consistent and efficient evaluation of projects and prospective funding
- Leverages State dollars to produce energy
- Enhances regional planning efforts

ALASKA ENERGY AUTHORITY



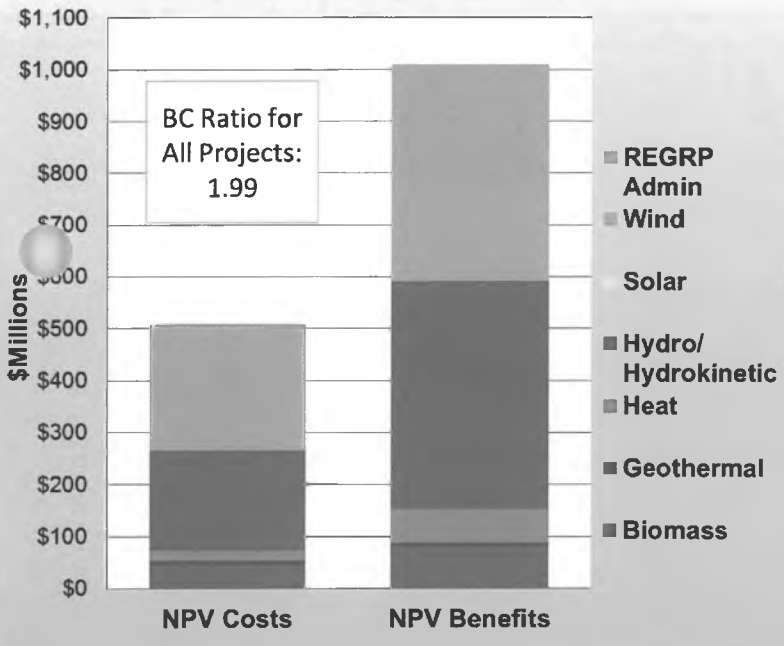
Renewable Energy Fund

Independent Program Review

- Vermont Energy Investment Corporation and the Alaska Center for Energy and Power
- Found energy savings, reduced emissions
- Renewable Energy Fund is cost effective
- Projects that have reached construction are projected to provide a positive net present value of more than $500 million
- Increased knowledge base on renewable energy development in Alaska that will improve future projects
- Includes Renewable Energy Fund Rounds 1-4

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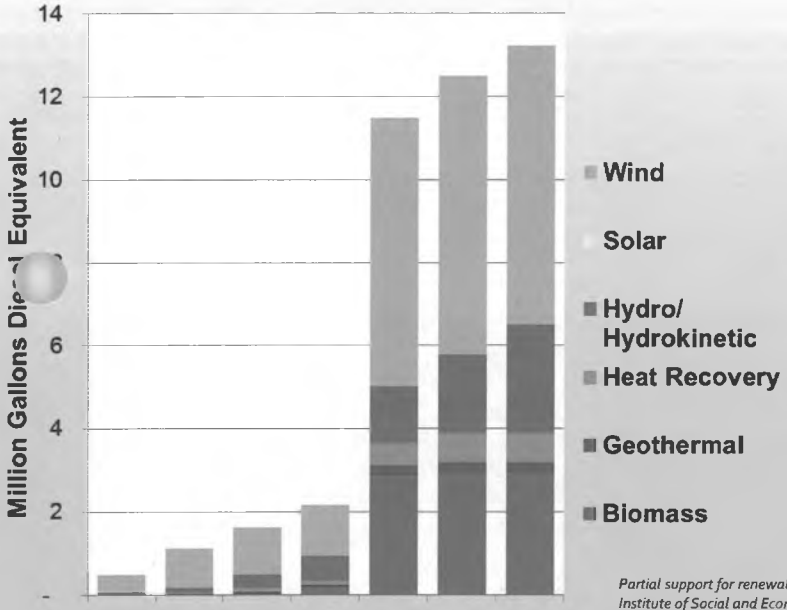
Renewable Energy Fund: Economic Benefits



- $500 million net present benefits from Renewable Energy Fund projects in construction is projected
- Integrates actual performance from completed projects
- AEA manages grants, not programs, making it difficult to precisely identify the beneficiaries of the $500 million

ALASKA ENERGY AUTHORITY

Renewable Energy Fund: Avoided Fuel

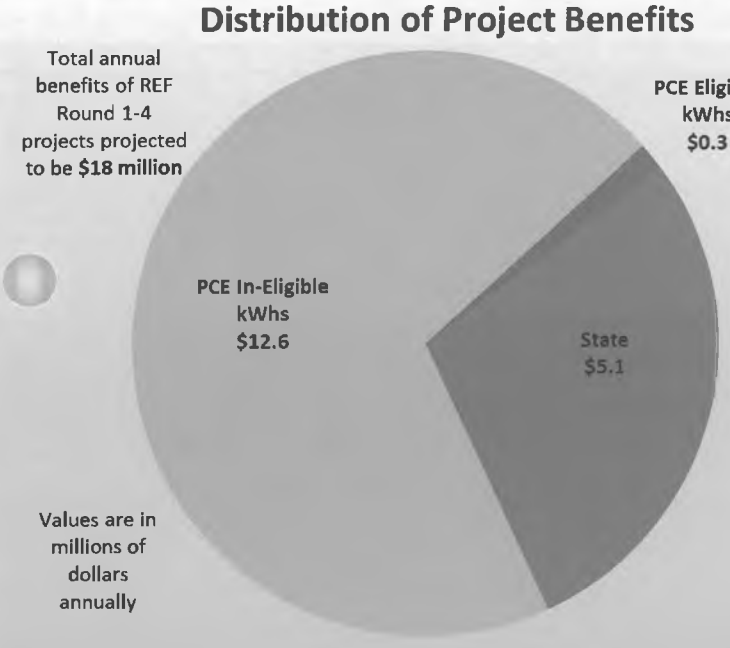


- Renewable Energy Fund projects offset a growing volume of fuel
- Large jump in 2013 is from Eva Creek Wind and ML&P Landfill Gas projects, both successful Railbelt projects
- Expect continued growth in avoided fuel as previously funded projects complete construction

Partial support for renewable energy fund project database developed by the Institute of Social and Economic Research, University of Alaska Anchorage from the U.S. Department of Energy, EPSCoR project DE-PS02-09ER09-12, Making Wind Work for Alaska: Supporting the Development of Sustainable, Resilient, Cost-Effective Wind-Diesel Systems for Isolated Communities

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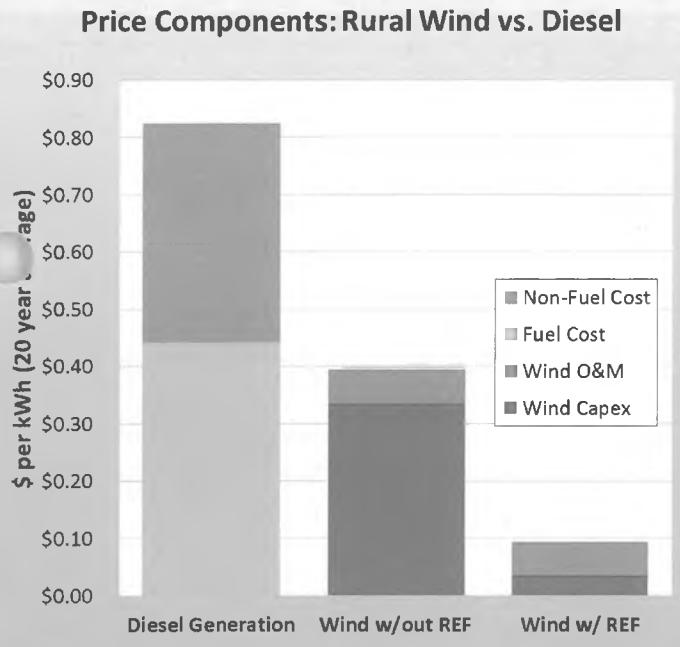
Renewable Energy Fund: PCE Communities



- $18 million annual benefits from Renewable Energy Fund projects (Rounds 1-4) projected
- Most benefit goes towards non PCE kWhs (e.g., business, households exceeding monthly limit)

ALASKA ENERGY AUTHORITY

Renewable Energy Project: Lowering the Cost of Energy



- We expect Renewable Energy Fund projects to lower power costs
  - Even without a REF grant
  - Achieving these economics are part of our scoring criteria
- Renewable Energy Fund grants help good projects get built
  - Provides needed capital
  - Decreases the payback period on good projects

ALASKA ENERGY AUTHORITY



GE Jenbacher gas engines at Doyon Utility's JBER facility

Community Highlight: JBER

Landfill-Gas-To-Energy Project

- Funding from AEA Renewable Energy Fund, Doyon Utilities and federal government
- Constructed in 2012
- Alaska's first landfill-gas-to-energy project
- Located on Joint Base Elmendorf-Richardson (JBER)
- Produce power from Anchorage Regional Landfill methane gas
- Expected results:
  - Will produce 56,000 megawatts annually, 26.2% of JBER's power use
  - Will produce more than $50 million in savings over project life

ALASKA ENERGY AUTHORITY



Heat Exchanger

Community Highlight: Delta Junction

Delta Junction School Biomass

- Completed in September 2011
- High-efficiency, low-emissions wood chip biomass heating system
- Wood chips come from Dry Creek Saw Mill waste product
- Funding $2M grant/$2.8M total
- Simple Pay Back: 13 years for Renewable Energy funds,19 years on total cost
- Successes:
  - During the first winter, saved $153,000 and 53,000 gallons in heating
  - Allowed the school to save 2 teacher positions, reopen music program and remodel the school kitchen
  - Potential to add additional facilities
  - Easy maintenance

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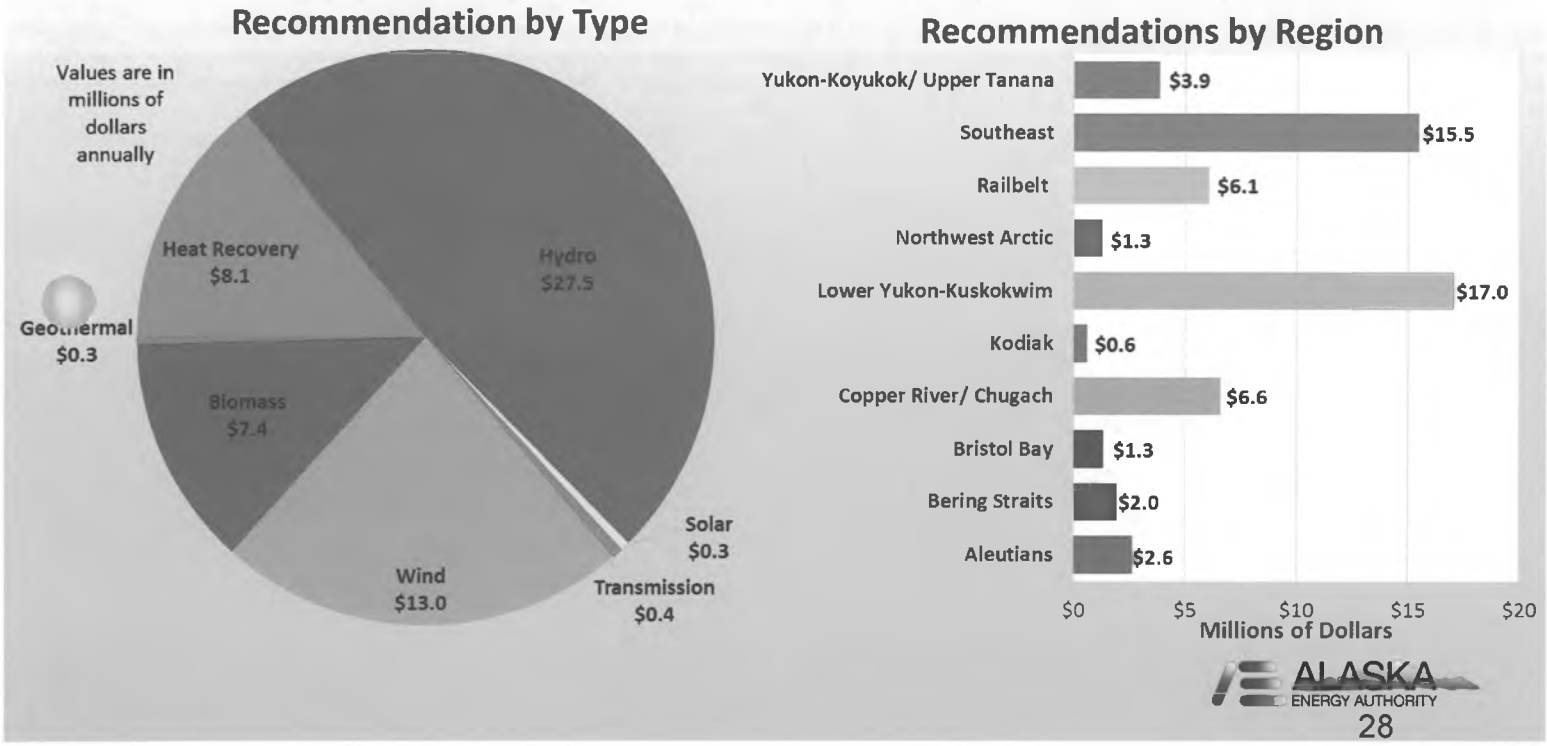
Community Highlight: Atka

Chuniisax Creek Hydroelectric Project

- Completed in 2012 (City of Atka has pursued since 1997)
- Capacity: 283 kilowatts
- Will provide nearly 100 % of Atka's power needs, including a portion of Atka Pride Seafoods' demand
- Capital Cost: $5 million
- 261,000 fuel savings
- Simple payback 21 years
- ROI 139%
- Used local labor
- Expected Results:
  - $180,000 annual savings in diesel fuel costs
  - Potential to use excess power for electric heat

ALASKA ENERGY AUTHORITY

Renewable Energy Fund : Round 6 Recommendations



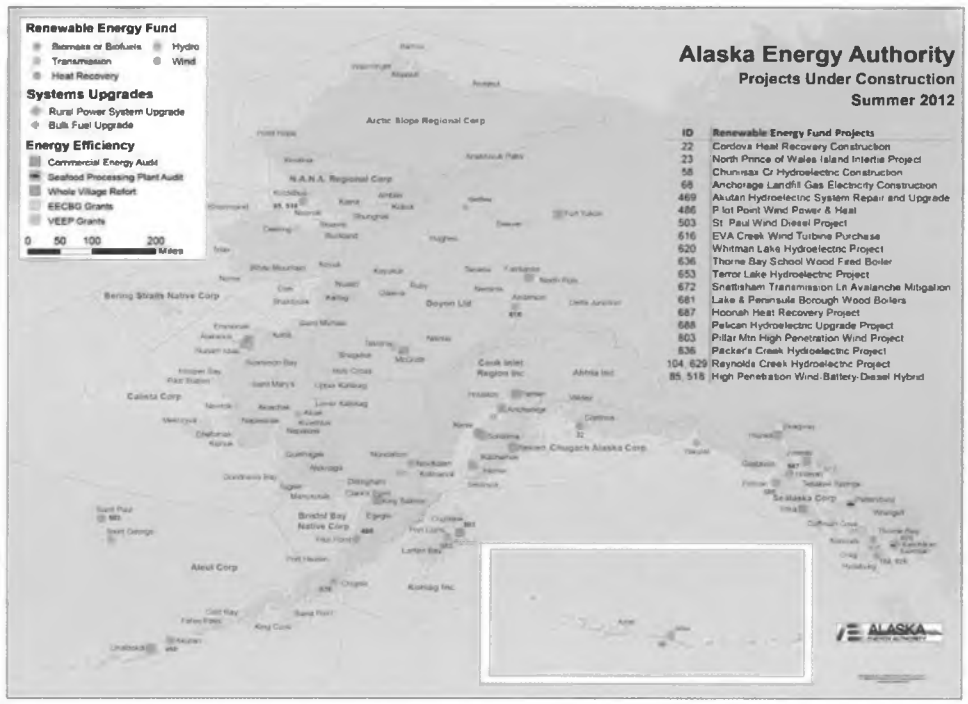
AEA: Active Energy Projects

Active Energy Projects - January 2012 thru January 2013
Prepared: January 23, 2013

Program Type	No. of Active Projects	Renewable Energy Funds	Other State Funds	Federal Funds	Total Funding
Renewable Energy Programs:					
Biomass	24	7,440,548	1,305,858	1,192,036	***9,938,442***
Heat Recovery - Other Diesel	10	4,956,664	567,727	271,543	***5,795,934***
Energy Efficiency & Conservation	20	-	5,029,132	12,053,731	***17,082,864***
Geothermal	8	9,793,213	76,908	91,184	***9,961,305***
Hydropower	40	35,382,172	25,210,755	5,128,173	***65,721,101***
Ocean & River Energy	3	718,175	634,925	8,571	***1,361,671***
Energy Generation - Transmission	25	21,662,031	70,388,208	2,402,838	***94,453,077***
Wind Energy	36	39,287,809	11,660,500	2,890,817	***53,839,127***
Solar Power	1	90,000	-	-	***90,000***
Emerging Energy Technology	*	-	-	-	-
Bulk Fuel Upgrades	11	-	8,827,551	13,828,679	***22,656,230***
Rural Power System Upgrades	27	-	25,997,441	26,345,943	***52,343,384***
Large Energy Development Projects:					
Susitna-Watana Hydro	1	-	76,000,000	-	***76,000,000***
Fire Island Wind Farm T-Lines	1	-	25,000,000	-	***25,000,000***
Totals:	**207**	**119,330,612**	**250,699,007**	**64,213,516**	**434,243,135**

* 16 projects in process of being awarded. Not active in calendar year 2012

ALASKA ENERGY AUTHORITY


Renewable Energy Fund
Biomass or Biofuels
Hydro
Transmission
Wind
Heat Recovery
Systems Upgrades
Rural Power System Upgrade
Bulk Fuel Upgrade
Energy Efficiency
Commercial Energy Audit
Seafood Processing Plant Audit
Whole Village Retort
EECBG Grants
VEEP Grants
0 50 100 200
Miles
Alaska Energy Authority
Projects Under Construction
Summer 2012
ID Renewable Energy Fund Projects
22 Cordova Heat Recovery Construction
23 North Prince of Wales Island Interties Project
58 Chuniisax Cr Hydroelectric Construction
68 Anchorage Landfill Gas Electricity Construction
469 Akutan Hydroelectric System Repair and Upgrade
486 Pilot Point Wind Power & Heat
503 St. Paul Wind Diesel Project
616 EVA Creek Wind Turbine Purchase
620 Whitman Lake Hydroelectric Project
636 Thorne Bay School Wood Fired Boiler
653 Terror Lake Hydroelectric Project
672 Snettisham Transmission Ln Avalanche Mitigation
681 Lake & Peninsula Borough Wood Boilers
687 Hoonah Heat Recovery Project
688 Pelican Hydroelectric Upgrade Project
803 Pillar Mtn High Penetration Wind Project
836 Packer's Creek Hydroelectric Project
104, 629 Reynolds Creek Hydroelectric Project
85, 518 High Penetration Wind-Battery-Diesel Hybrid
Arctic Slope Regional Corp
N.A.N.A. Regional Corp
Bering Straits Native Corp
Doyon Ltd
Cook Inlet Region Inc
Calista Corp
Bristol Bay Native Corp
Aleut Corp
Koniag Inc
Chugach Alaska Corp
ALASKA

AEA: By the Numbers

FY14 Budget Summary
Prepared: January 13, 2013

Governor's FY14 Budget (in thousands)

OPERATING:	Allocations	Appropriation	General Funds (UGF & DGF)	Other Funds	
Alaska Energy Authority		**14,362**	**5,627**	**8,735**	
AEA Owned Facilities	1,067			1,067	
AEA Rural Energy Operations	6,144		2,188	3,957	
AEA Technical Assistance	577		407	170	
Statewide Project Development, Alternative Energy & Energy Efficiency	6,574		3,032	3,541	
Language Section:					
Power Cost Equalization (estimated)		**40,351**	7,260		
			33,091	Endowment Fund AS 42.45.070(a)	

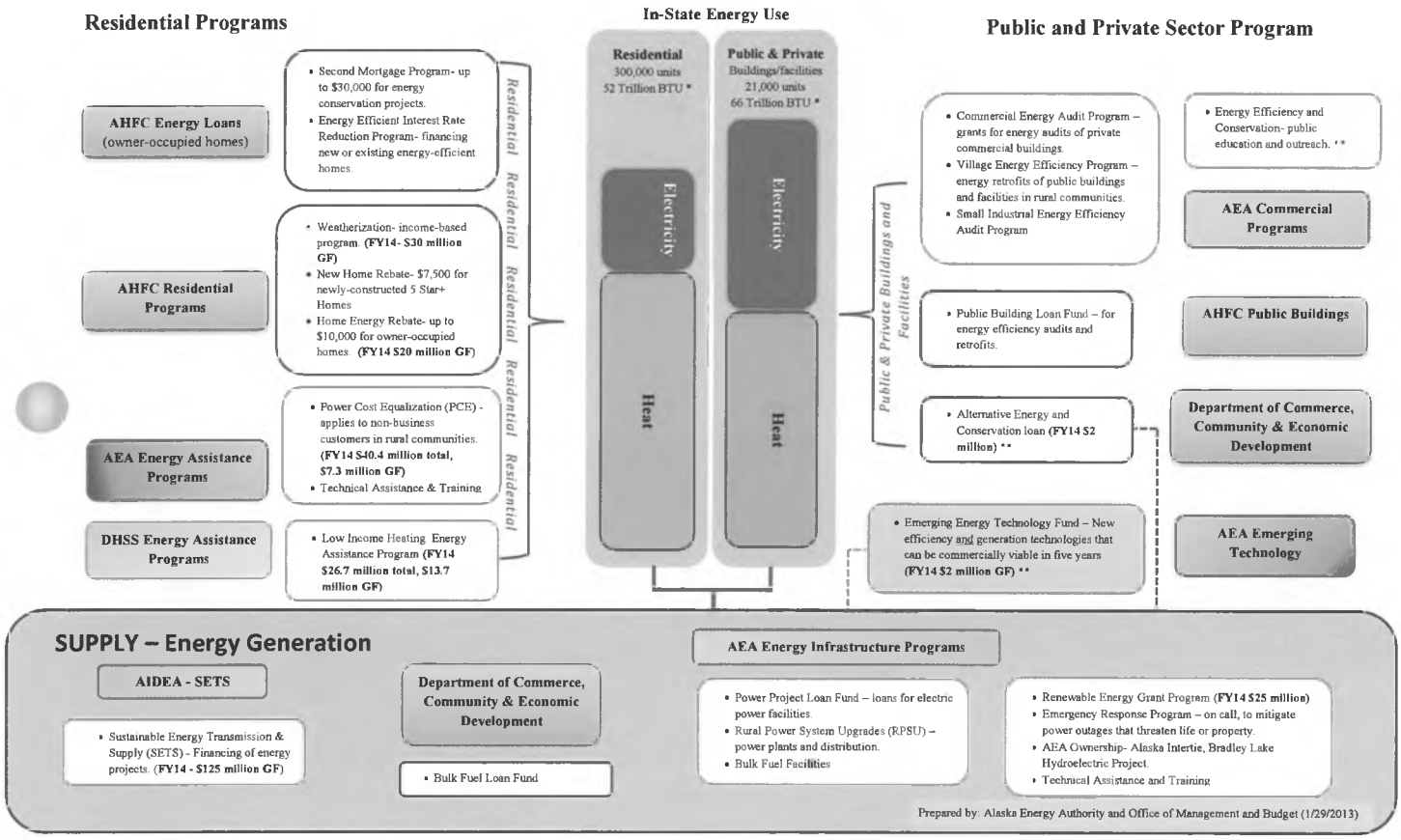
CAPITAL:	Allocations	Appropriation	General Funds	Other Funds	Federal Funds
AEA Susitna-Watana Hydro		**95,200**	95,200		
AEA Bradley Lake Transmission Upgrade		**13,700**	13,700		
AEA Rural Power Systems Upgrade		**12,600**	9,600		3,000
AEA Renewable Energy Projects Round Six		**25,000**	25,000		
AEA Bulk Fuel Upgrades		**8,500**	6,500		2,000
AEA - Alternative Energy & Energy Efficiency Programs		**2,000**	2,000		
AEA - Energy Plan Implementation		**1,000**	1,000		
AEA - Electrical Emergencies Program		**330**	330		
AIDEA - Natural Gas Treatment & Distribution		**50,000**	50,000		
Language Sections:					
Fund Capitalization - Emerging Energy Technology Fund		**2,000**	GF Appropriation to EETF AS 42.45.375		
Fund Transfers - Renewable Energy Fund		**25,000**	GF Appropriation to REGF AS 42.45.045(a)		
Reappropriation - Akiak to Atmautluak for Rural Power System Upgrades		**1,750**	Reappropriation of GF		

ALASKA ENERGY AUTHORITY

AKEnergyAuthority.org



State of Alaska Energy Programs: Serving the needs of Alaska's residential and commercial energy users



** Source: Energy Information Authority*

*** Note that some programs do not fall within specific categories - Public outreach and education serves both the commercial and residential markets and Emerging Technology and the Alternative Energy and Conservation loan serve both generation and efficiency*

02/13/13 Presentation: Emerging Energy Opportunities for Alaska

<TARGET><BILL></BILL><SUBJECT>02-13-13 Presentation Emerging Energy Opportunities for Alaska</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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

Rep. Doug Isaacson
State Capitol Building, Room 13
Juneau, AK 99801
Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.gov

MEMORANDUM

To: Chief Clerk's Office
From: Dave Talerico, Committee Aide, House Special Committee on Energy
Subject: Meeting announcement for the week of February 11, 2013
Date: February 7, 2013
CC:

The House Special Committee on Energy will hold the following meeting next week.

Wednesday, February 13, 2013

+"Emerging Energy Opportunities for Alaska" presentation by Gwen Holdmann, Executive Director, Alaska Center for Energy, UAF.

The meeting will be held in the Barnes Room (124) from 8 a.m. to 10 a.m. and will be teleconferenced.

For more information, call Dave Talerico at (907) 465-4936 or Jeff Turner at 9907) 465-6588.

*First hearing in first committee of referral

+Teleconferenced

=Bill previously heard

###



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Alaska Center for Energy and Power

Alaska House of Representatives
Special Committee on Energy

February 13th, 2013

Gwen Holdmann, Director

Alaska Center for Energy and Power

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INE

Alaska Energy Use

Assuming a constant fuel demand, we are on track to spend over $5 billion on diesel fuel in rural Alaska and ~ $60 billion on fossil fuels for Railbelt electric power generation.

Energy-related appropriations have totaled $2.3 billion since 2008 (PCE endowment, RE fund, AHFC programs, etc)

- Rep Bryce Edgmon Legislative Update Feb 8th, 2013

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Alaska's Energy Challenges

- High energy costs
- Fragmented electric grid
- Harsh climate
- End of supply lines
- Stranded resources
- Dispersed population



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Role of ACEP and the University of Alaska

- Developing Information for Decision Makers
  - Technology testing and optimization (industry)
  - Energy analysis (policy makers)
- Preparing students to work in energy-related disciplines
- Commercializing energy innovation



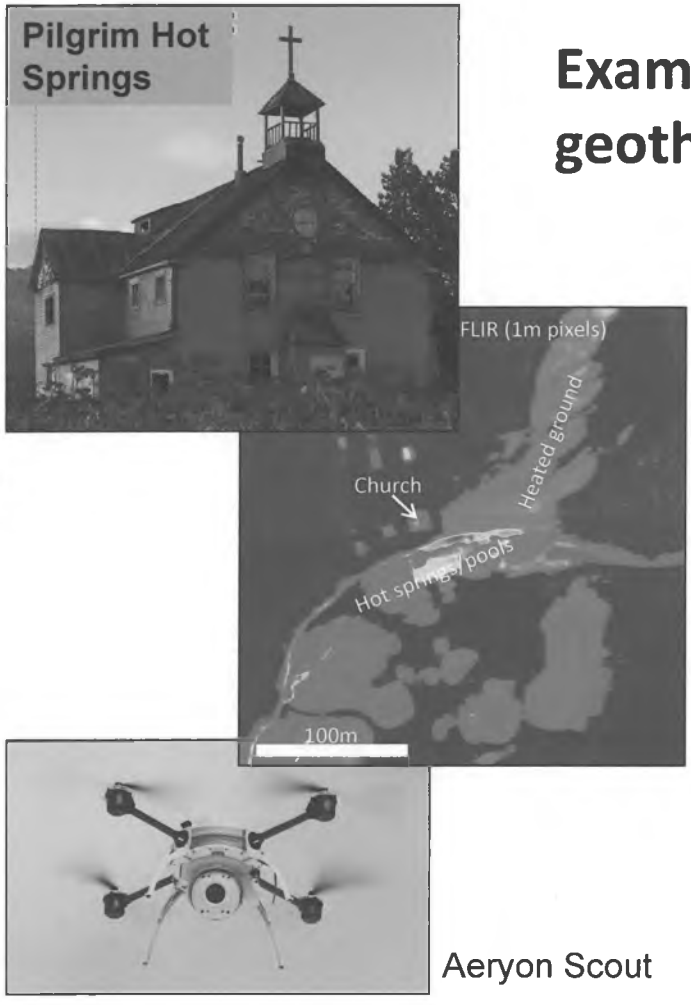


Partnerships for Energy Solutions

- Geophysical Institute
- Institute for Social and Economic Research
- Institute of Northern Engineering
- Petroleum Development Laboratory
- School of Natural Resources and Agricultural Sciences
- Institute of Arctic Biology
- UAA School of Engineering
- International Arctic Research Center
- Resilience and Adaptation Program
- Cooperation Extension Services
- Rural Campuses
- Geographic Information Network for Alaska
- Marsh Creek
- Golden Valley Electric Ass.
- Shell
- Siemens Building Technologies
- Ocean Renewable Power Company
- Kodiak Electric Ass.
- Bering Straits Native Corporation
- ABS, Alaskan
- ExxonMobile
- GraphiteOne
- WH Pacific
- BP
- Usibelli
- ABB
- Boeing



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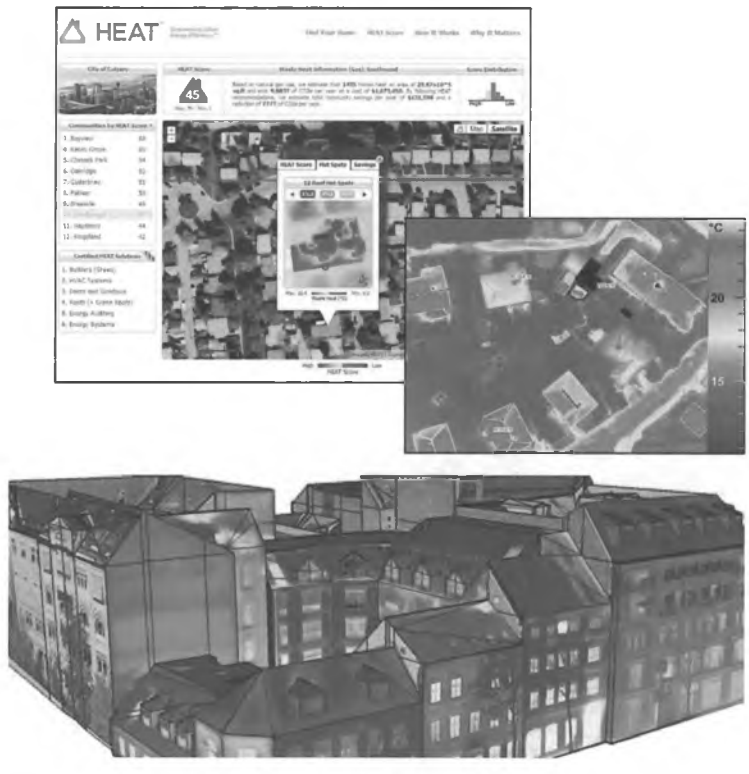
Aeryon Scout

Example: UAV for geothermal exploration

- Optical and FLIR cameras
- Potential for rapid, low-cost mapping and quantitative assessment
- Field trial at Pilgrim during 2013
- Complementary to airborne and satellite investigations

Airborne/UAV FLIR for targeting residential energy efficiency measures

- FLIR surveys to map building heat loss
- Rationale: poorly insulated homes will have hotter roofs or hot spots
- Calgary 'Heat' project
- UAV's offer potential for 3d FLIR mapping of buildings



Energy research as an engine for economic development



Community Energy Solutions



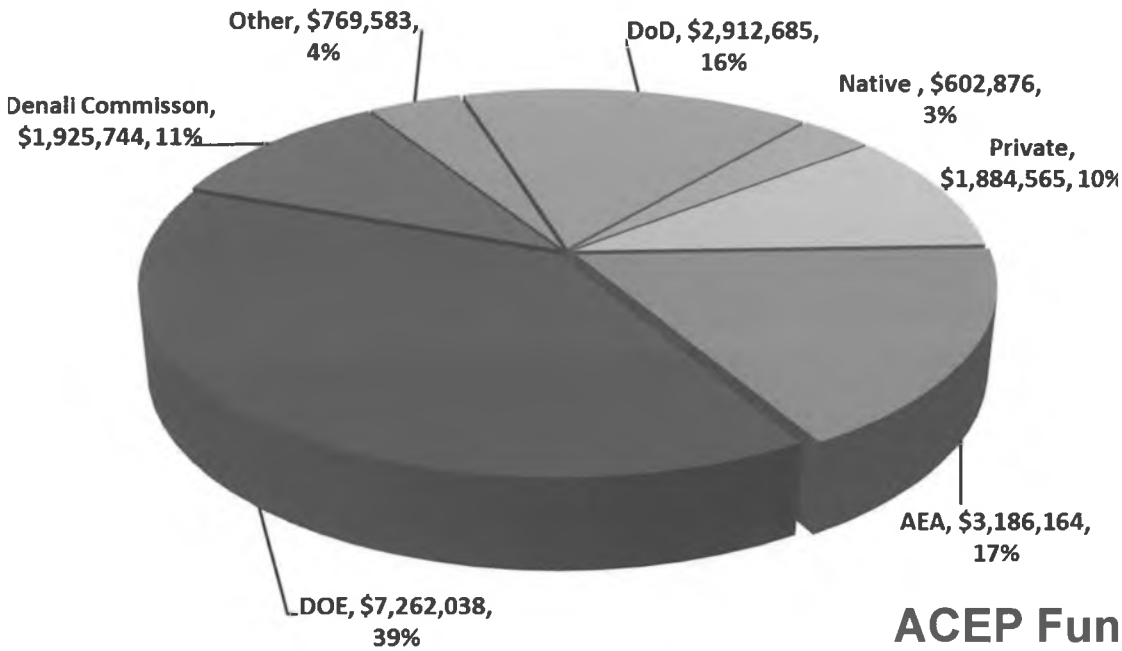
Powering the Economy



The EnergyField of the Future

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Economic benefits of Energy Research at UAF



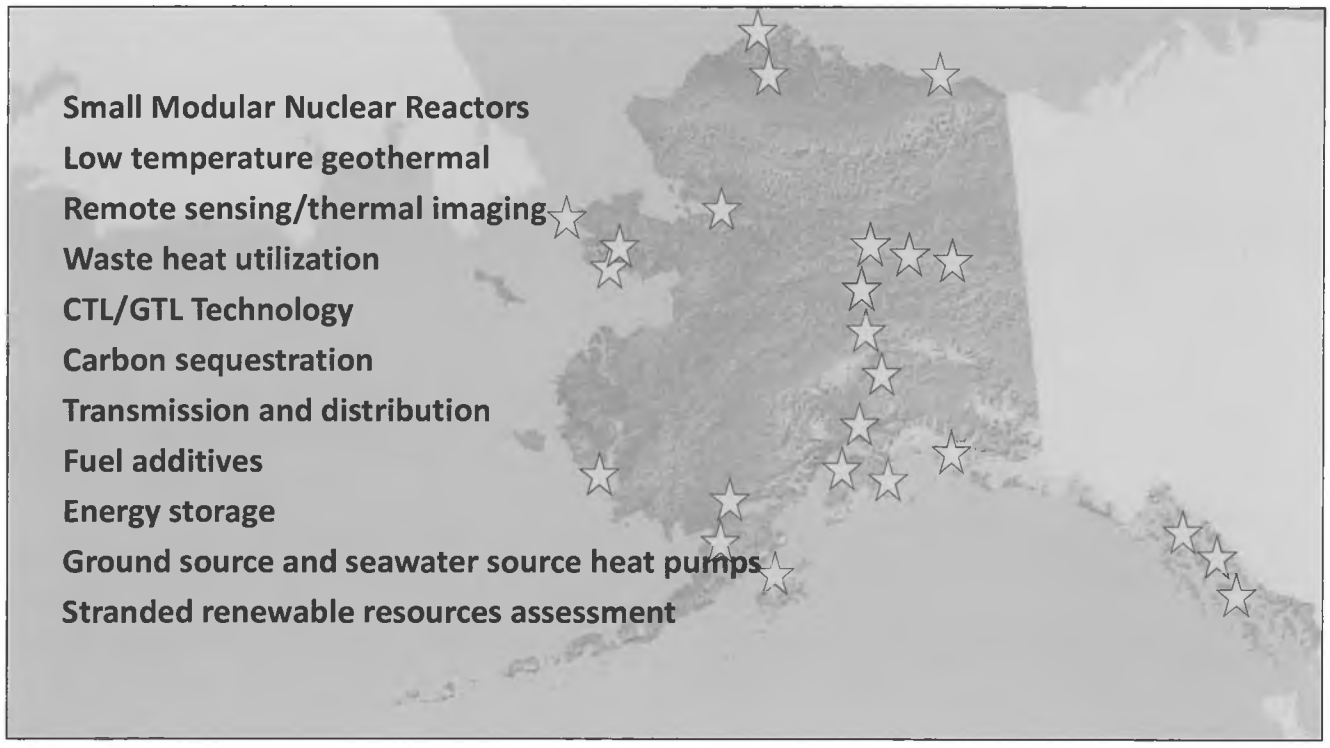
ACEP Funding

$18M in 20 active projects

$12 in external grants and contracts for every $1 in state base funding

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ACEP Projects are Statewide



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Supporting Statewide Economic Development: *Alaska's comparative advantages*

- High contribution renewables
- Niche technologies (low temp geothermal, hydrokinetics)
- Difficult to extract/transport fossil fuels
- Value added processing – exporting energy through means other than pipelines and transmission lines (example - energy intensive industries)

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Alaska is a pioneer in 'island' energy systems



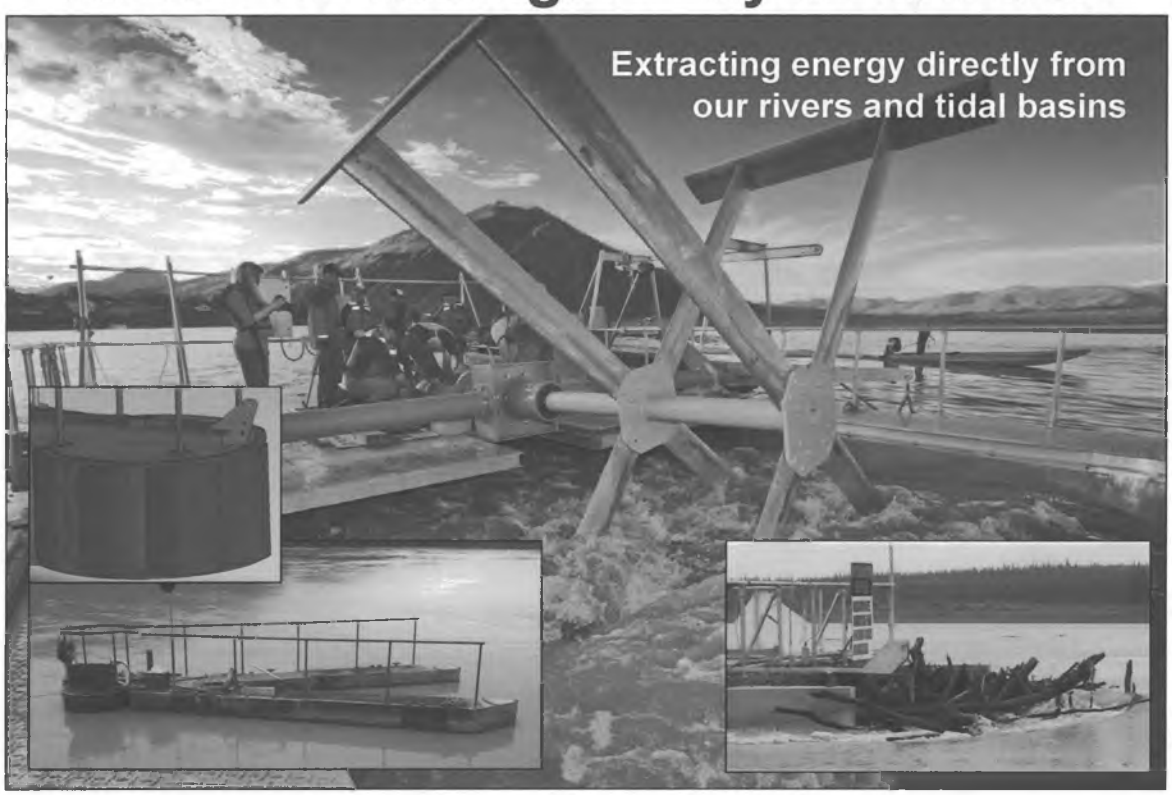
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High contribution renewables



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Niche Technologies - hydrokinetics



Niche technology: Low-temp Geothermal





Electratherm testing at UAF

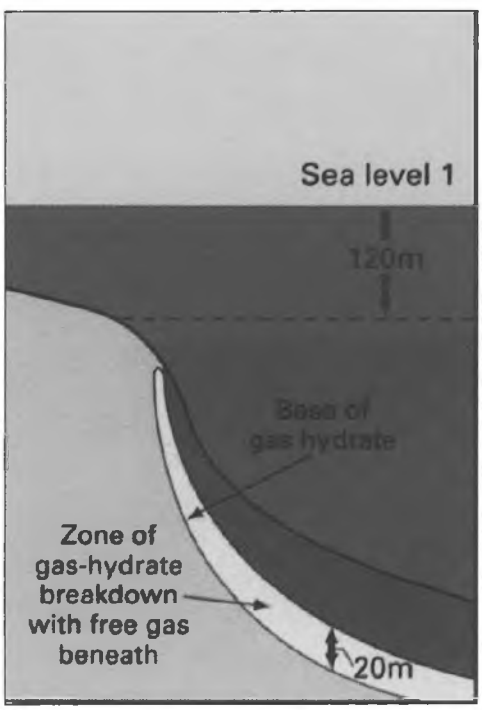


Chena Geothermal Project – lowest temperature commercial geothermal system in the world



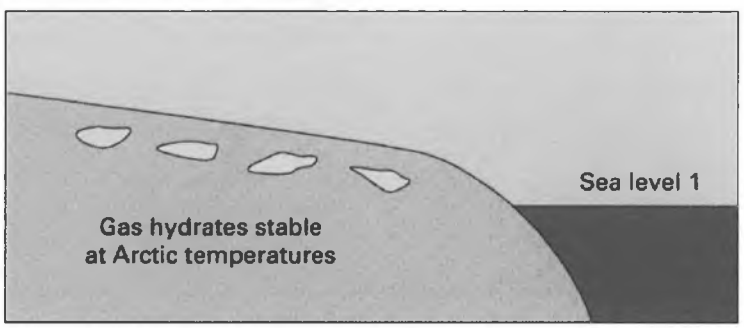
First Organic Rankine Cycle power plant using geothermal energy *in the world* operated at **Manley Hot Springs** in 1980

Difficult to extract fossil fuels: On-Shore Methane Hydrates



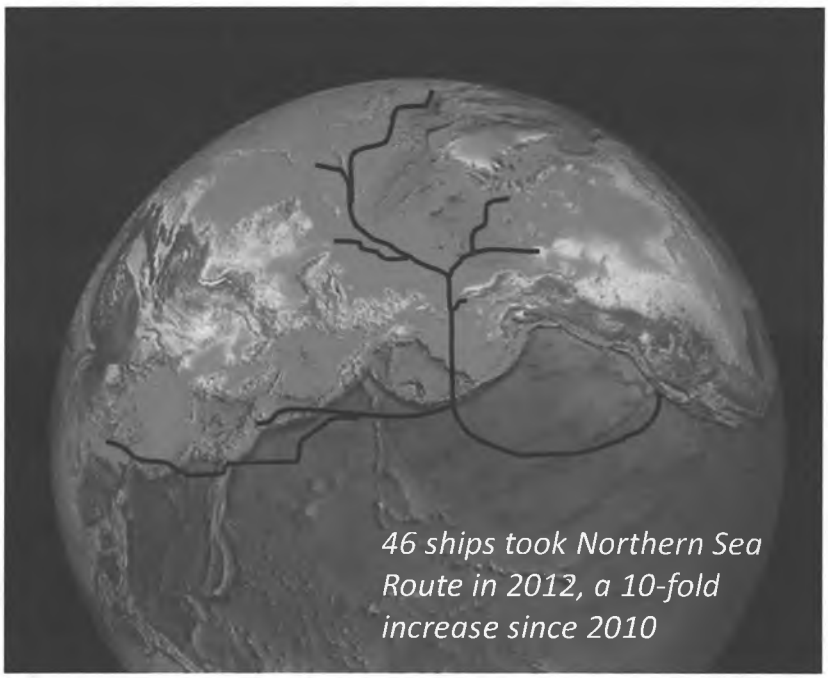


Energy content in methane hydrate resources worldwide dwarfs conventional oil and gas resources



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Energy Intensive Industries



Alaska is already situated in close proximity to Asian markets

New markets and shipping routes may open in a seasonally ice-free arctic

Many new mineral discoveries expected to be made in the Arctic

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Alaska as a leader in energy technologies

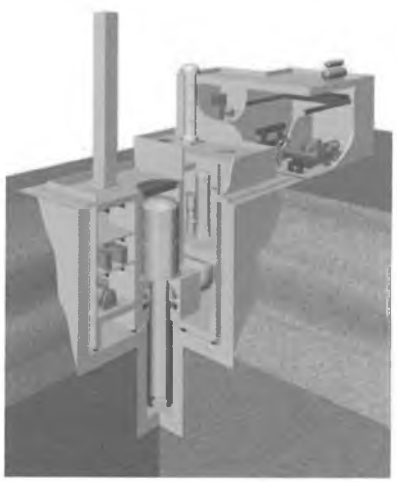
- Coil drilling technique pioneered in Alaska
- Thermosiphons for extracting heat to maintain pipeline and building foundations in permafrost-rich soil
- Largest battery system in the world in Fairbanks
- Low temperature geothermal (niche renewables)
- Leader in high contribution renewables



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How can the University support the legislative process?

- Assessing technology options
- Data collection and analysis
- Energy analysis to support policy decisions and appropriations
- Scenarios planning as a long-term planning tool



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www.uaf.edu/acep



I skate to where the puck is going to be, not where it has been

- Wayne Gretzky

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ENERGY SOLUTIONS FOR ALASKA

Capital research and development to build and sustain Alaska's economic growth

Partnership to develop statewide energy solutions: Energy technology testing and development, energy analysis and comprehensive fossil fuel research

FY14 capital budget request: $5.5 million (general fund), $3 million (non-general fund)

Total: $8.5 million

There is an energy crisis in Alaska. What are we doing to assist Alaskans to make smart decisions about their current and future energy portfolios? How can we move the state forward by meeting the demand for practical energy solutions to lower the cost of energy, maximize use of our resources, and develop economic opportunities for our residents and industries? How do we know what is practical, what is not, what has been learned and what still needs to be done?

UAF researchers work with a wide range of stakeholders, serving as neutral information brokers capable of impartially assessing a wide range of potential energy options. As pioneers in multidisciplinary energy research, UAF can provide Alaska's community leaders, industries, businesses and residents with a trusted source of analysis, research and technology development. This request significantly expands UAF's capabilities in energy technology testing and analysis, by leveraging resources throughout the University of Alaska system as well as an established national and international research network.

Critical research areas:

- Energy technology testing and development
- Energy analysis
- Integrated fossil fuels program

"ACEP plays a critical role in the state's energy industry, assessing and validating technology for Alaskans and serving as a laboratory where emerging solutions can be researched, improved, and matured for deployment."

— Ethan Schutt, senior vice president land and energy, CIRI

UAF UNIVERSITY OF ALASKA FAIRBANKS

Funding will expand capabilities for

- Energy technology testing specific to Alaska conditions.
- Addressing barriers to deployment of emerging energy technologies.
- Leveraging existing externally funded programs for fossil-based and renewable energy research, including continued exploration of nuclear generators and advanced energy storage for rural applications.
- Formation of an Energy Analysis Group, drawing on expertise across the university to address timely topics such as getting Alaska's natural gas to market, enhancing oil production, developing stranded energy resources and leveraging emerging security and economic development opportunities to reduce energy costs for Alaskans.
- Fossil fuel research to integrate capacity across the university (e.g., geology, natural resource economics, petroleum engineering, public policy and water research) to allow the university to more effectively address the pressing issues facing the state today.

Learn more

Alaska Center for Energy and Power: www.uaf.edu/acep/



"ACEP was great to work with and made every effort to include the local knowledge gleaned from our people's thousand years of dwelling in the area while providing timely and usable scientific input back to Mary's Igloo Native Corporation so we could make informed modern decisions for our community, shareholders and future generations."

— Dora Hughes, Mary's Igloo Native Corporation

"UAF has identified energy as a key research growth priority. ACEP is leading this charge, serving as a gateway to energy research throughout the system and focusing on areas that most directly meet the immediate needs of the state and its critical industries."

— UAF Chancellor Brian Rogers

Naturally Inspiring.

For more information: 907-474-5922 | www.uaf.edu/alumni/legislative/ | www.uaf.edu/omb/

The University of Alaska Fairbanks is accredited by the Northwest Commission on Colleges and Universities. UAF is an affirmative action/equal opportunity employer and educational institution

Header UAF photo by Todd Paris. Bladea photo courtesy of ACEP. | Produced by UAF Marketing & Communications 02/2013

ACEP

Alaska Center for Energy and Power

ACEP's Energy Technology Testing Facilities

provide a unique opportunity to test equipment and new software in a controlled integrated grid system to lower costs to industry and reduce risk to villages and remote locations.







Designed for maximum flexibility, this system is capable of testing a wide range of islanded microgrid and distributed generation scenarios, as well as the performance of individual components. Examples include next generation utility energy storage such as innovative battery systems and flywheel technology, diesel off operation, power electronics development and testing, and model verification.



PERMANENT COMPONENTS

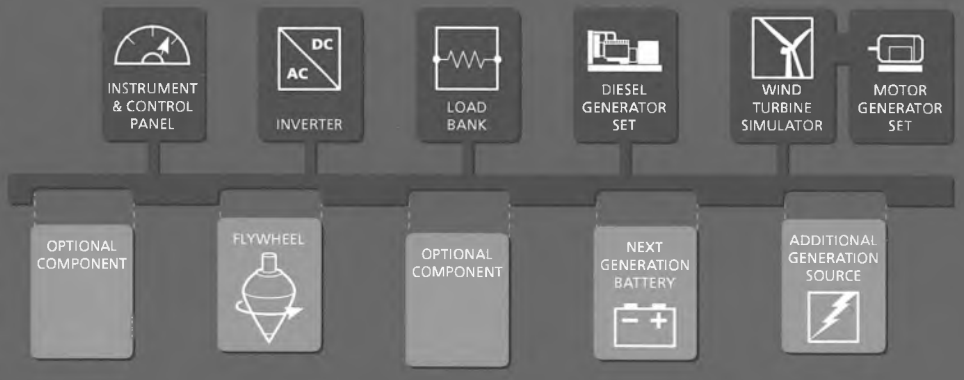
- 100kW wind turbine simulator (3-phase 480 VAC 60 Hz input motor coupled to a 3-phase 480 VAC 60 Hz output induction generator)
- Grid-forming Energy Storage Power Converter (200 kVA 480 VAC 60 Hz)
- MatLab/Simulink model of diesel generator, inverter, battery and primary loads
- Ability to connect with Diesel Engine Testbed to test various arrangements of distribution grid models and interoperability scenarios
- Programmable load bank to simulate actual village or industrial loads (250 kW)
- Lead acid battery bank (336 VDC, 1000 Ah)
- Hybrid system supervisory controller and high resolution data acquisition capabilities

PRIMARY DIESEL GENERATOR

320 kW, electronically controlled Caterpillar Diesel gen-set coupled to a 250 kW/480 VAC programmable load bank that simulates a community load.

IN-HOUSE EMISSIONS ANALYSIS

CO, O_2, NO_x, and SO_2 with planned particulate monitoring equipment.



UAF photos by Todd Paris, except top center: Patrick Endres/AlaskaPhotoGraphics.com; back, top, photo by Kala Hansen

Alaska Hydrokinetic Energy Research Center



To facilitate development of a hydrokinetic power industry in Alaska, ACEP established the Alaska Hydrokinetic Energy Research Center in Nenana, Alaska, to test hydrokinetic power-generating devices and technology under realistic Alaskan river conditions.

Researchers use the test site to define ways hydrokinetic turbines and aspects of the river interact, including fish, debris, sediment transport and icing. Information collected from these studies will be used by hydrokinetic developers to improve their designs, and by Alaska's permitting agencies to inform their decision making process.

HYDROKINETIC TEST SITE FEATURES

- Permitted location for testing hydrokinetic devices
- Equipment, instruments and experienced engineers to conduct or support testing projects and interpretation of test results.
- An anchoring point installed in the river channel for mooring devices and technology undergoing testing.
- Detailed characterization of river bathymetry, current flow (including power density and turbulence), fish population, bed-load and suspended sediment transport, and riverbed conditions.

SITE SUPPORT SERVICES

Nenana is served by major rail and highway infrastructure and offers a variety of technical services to deploy, recover, and modify or repair devices under test (e.g., welding, tugs, barges, and a dock-operated crane). Major industrial services and an international airport are available in Fairbanks, 60 miles north of Nenana.



From top: UAF photo by Todd Paris; illustration by Roger Hall

DAILY RATES

ETL Rate (per day)*	$4,714
AHERC Rate (per day)**	$5,214

* Rate applies to both pretest setup and test days.
** On-shore mobilization & de-mobilization rate is 50% of daily rate. Daily rate begins when test unit is first deployed. On days when fish researchers are not required, a 35% discount will be applied to the daily rate.

CONTACT

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02/20/13 Alaska Energy Authority Overviews: Power Cost Equalization and Susitna-Watana Hydro

<TARGET><BILL></BILL><SUBJECT>02-20-13 Alaska Energy Authority Overviews Power Cost Equalization and Susitna-Watana Hydro</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 20, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

+PCE Overview
Sara Fisher-Goad, Alaska Energy Authority

+Susitna-Watana Hydro Project
Sara Fisher-Goad, Alaska Energy Authority
Wayne Dyok, Susitna-Watana Hydro Project Manager, Nick Szymoniak, Project Economist.

Bills previously heard/scheduled

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

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Power Cost Equalization Overview

House Energy Committee

Feb. 20, 2013

ALASKA

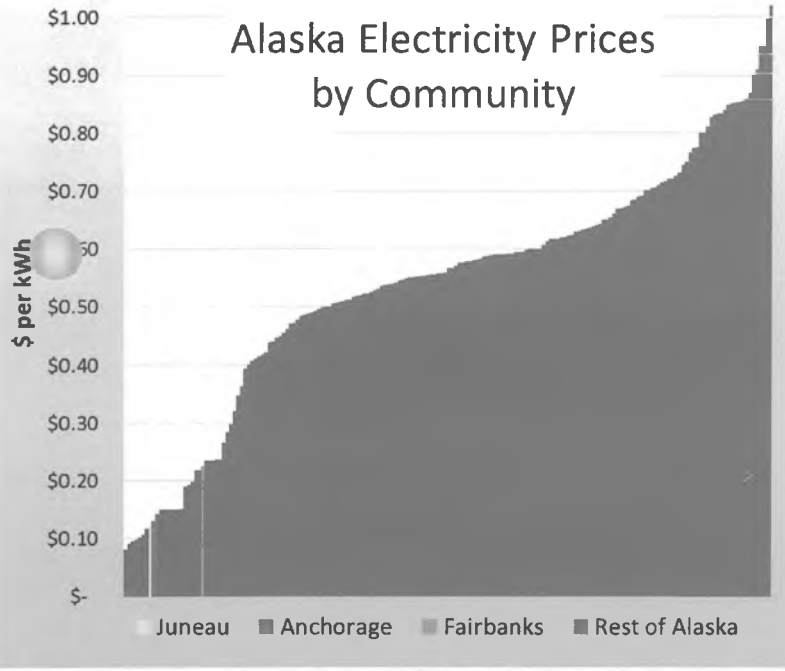
Alaska Energy Authority

Mission: Reduce the Cost of Energy in Alaska

- Accomplished by:
  - Energy Planning and Policy
  - Investing in Energy Infrastructure
  - Diversifying Alaska's Energy Portfolio
  - Technical Training and Assistance

ALASKA ENERGY AUTHORITY

Alaska's Energy Costs





ALASKA ENERGY AUTHORITY

The Need for PCE

- Rural Alaska electrical rates can be 3 to 5 times higher than in urban Alaska
- Assistance needed in rural Alaska to maintain and operate basic infrastructure and systems
- Power Cost Equalization (PCE) created at a time when State funds were used to construct major energy projects to serve urban areas
- Four Dam Pool hydroelectric facilities:
  - State-owned assets in Kodiak, Valdez, Wrangell-Petersburg and Ketchikan
  - provided low-cost and reliable power
  - Four Dam Pool facilities sold to communities they served

Power Assistance Programs

- State of Alaska had two prior power-assistance programs
  - Power Production Assistance Program ('80)
  - Power Cost Assistance Program ('81)
- AS 44.83.162.-165 replaced previous programs with the PCE program
  - effective October 1984
  - Present law AS 42.45.100-190
- PCE program equalizes the power cost per kilowatt hour (kWh) statewide at a cost close-or equal- to the mean of power costs in Anchorage, Fairbanks and Juneau (AS 42.45.100(a)(1))

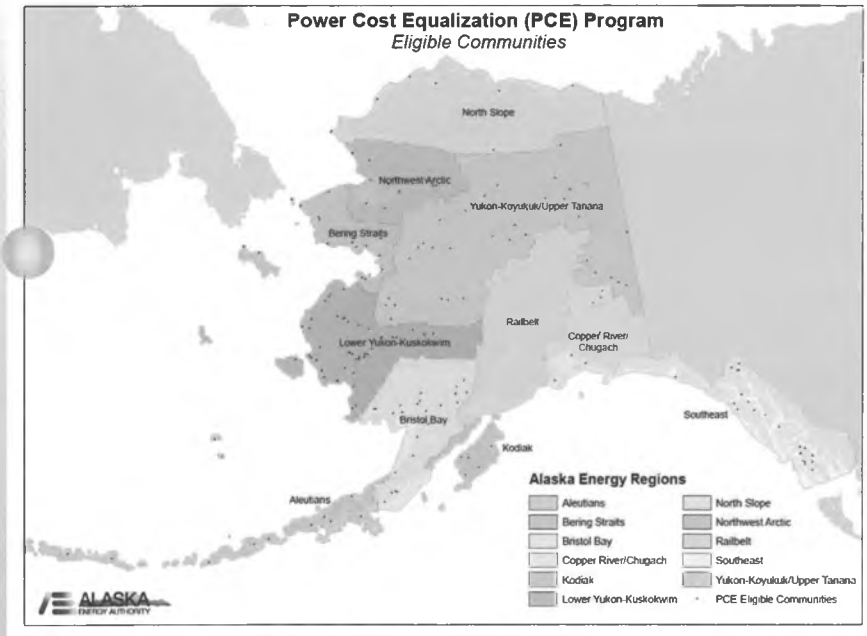
ALASKA ENERGY AUTHORITY

PCE: Eligibility

- 1983- residential sales less than 7,500/MWh and 1984- used diesel greater than 75% of consumption (AS.42.45.150)
- Eligible:
  - about 30% of all kWh sold by participating utilities
  - community facilities (e.g. water and sewer, public lighting)
  - residential customers
- Not eligible:
  - State and Federal facilities (including schools)
  - commercial customers
- Railbelt electrical utilities, Juneau and Four Dam Pool communities are not eligible

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PCE: Participating Communities



- Approximately 81,000 Alaskans live in the 188 participating communities

ALASKA ENERGY AUTHORITY

Calculating the Floor

Utility	Rates $	% PCE floor	%Utility Sales Used
Alaska Electrical Light & Power	0.1210	14.5	100.0
Chugach Electric Association	0.1418	52.3	98.5
Golden Valley Electric Association	0.2162	6.6	20.7
Matanuska Electric Association	0.1511	11.7	24.9
Municipal Light & Power	0.1302	14.9	100.0
Floor for FY 13	0.1430		

ALASKA ENERGY AUTHORITY

Calculating the PCE Level: Overview

The PCE level is:

- Calculated for each participating utility – per community
- Eligible Utility Costs determined by RCA
  - two categories of costs: fuel and non-fuel
  - non-fuel costs do not include utility profit
  - cannot exceed $0.8142kWh
- Lowered by any additional State or federal assistance
- A utility is not eligible if their average rate is below the PCE Floor

Max PCE Level equals 95% of ($1.00 - $0.1430)

ALASKA ENERGY AUTHORITY

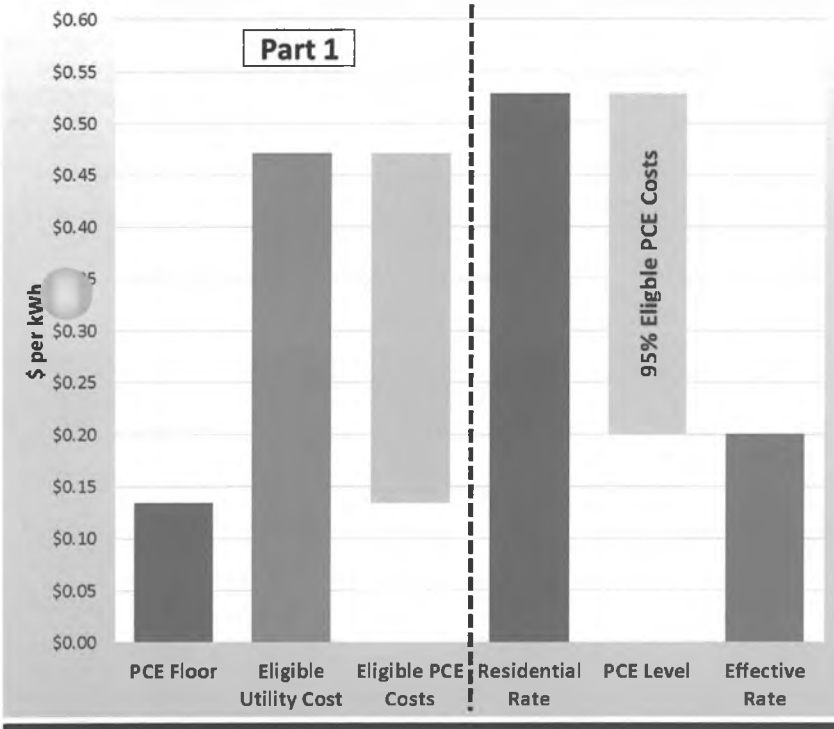
PCE: Reducing Power Bills

- Residential: credit on first 500 kWh consumed each month (per customer)
- Community facilities: credit on 70 kWh x the community population (for the entire community)
- Customer's bill= total cost - the PCE credit
- Utilities are required to notify the customer of the PCE credit and the total cost of service with every bill
- Utilities are reimbursed on the customer credit

Population numbers updated by Department of Commerce, Community and Economic Development on July 1, annually

ALASKA ENERGY AUTHORITY

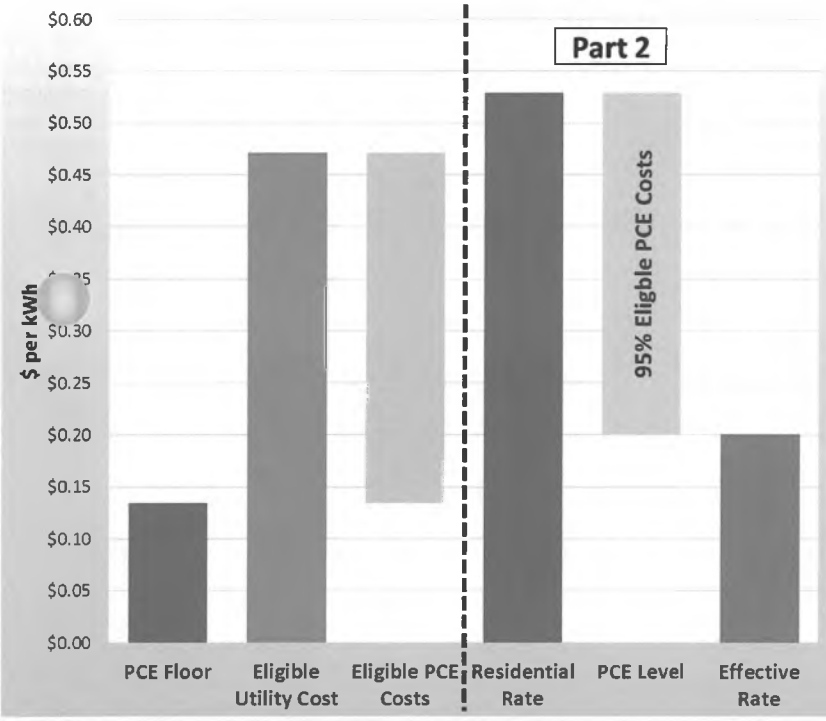
Calculating PCE Rates: Part 1



- PCE Floor
  - weighted average power cost of Anchorage, Fairbanks and Juneau
  - determined by the RCA
  - $0.1430 per kWh (FY13)
- Eligible Utility Costs (RCA verified)
  - fuel costs and non-fuel costs only
  - $0.47 per kWh (current average)
  - max cost of $1.00 per kWh
- Eligible PCE Costs
  - RCA Utility Cost minus the Floor

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Calculating PCE Rates: Part 2



- Residential Rate
  - calculated by the utility
  - $0.53 per kWh (current average)
- PCE Level
  - 95% of the Eligible PCE Costs
  - calculated for each community
- Effective Rate
  - price customers pay for PCE-eligible kWhs
  - residential Rate minus PCE Level
  - $0.22 per kWh (current average)

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PCE: Reducing Power Bills

Sample Bill

Without PCE	600 kWh (kWh used)	*	$.50/kWh (utility rate)	=	$300
PCE Credit	500 kWh (PCE eligible)	*	$.30/kWh (PCE rate)	=	$150

$300-$150= $150 (Customer Pays)

ALASKA ENERGY AUTHORITY

PCE: Administration

AEA's role:

- Authorizes payment to electric utilities
- Determines eligibility for residential and community facility customers
- Administers the PCE Fund based on
  - fiscal appropriations by the Alaska Legislature
  - monthly reports submitted by participating utilities
- Ensures compliance with Statutes and regulations

RCA's role:

- Determines eligibility of utilities
- Sets PCE rates, calculations based on use, costs and efficiencies
- Ensures compliance with Statutes and regulations

ALASKA ENERGY AUTHORITY

PCE: Funding

1. PCE Endowment Fund
2. General Fund
3. PCE Fund and Rural Electric Capitalization Fund

- PCE Payments totaling $39.5 million at 100% (FY12)

ALASKA ENERGY AUTHORITY

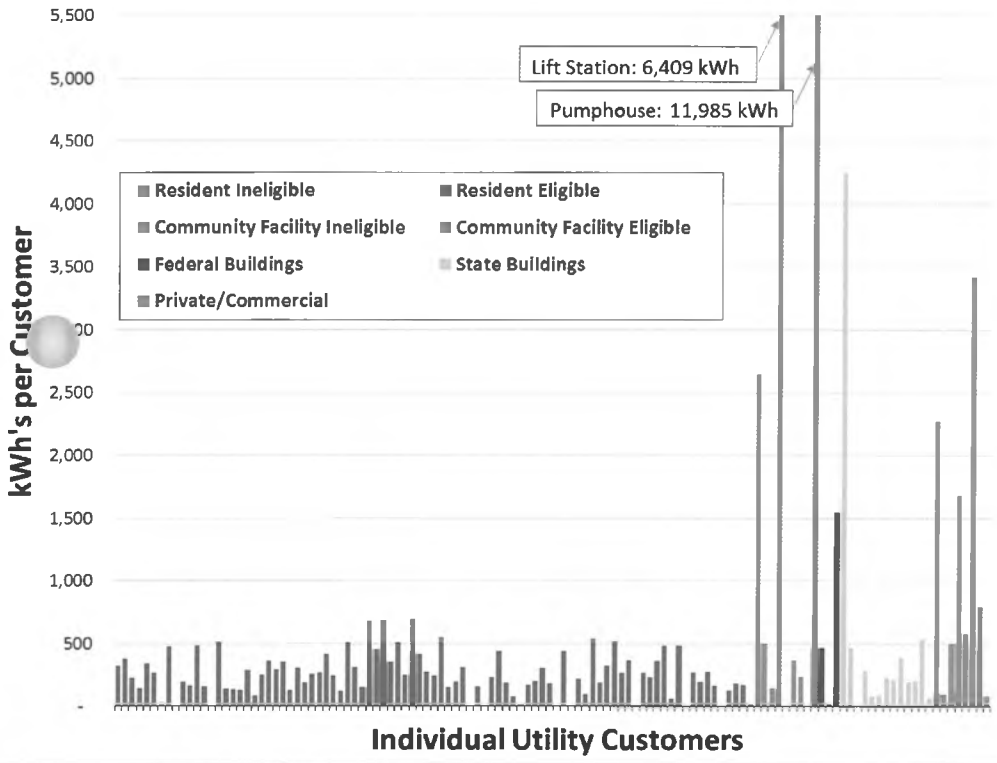
PCE: Funding

PCE Endowment Fund

- AEA fund, managed by the Department of Revenue
- Created and capitalized in FY01 with funds from the Constitutional Budget Reserve and Four Dam Pool sale proceeds
- Further capitalized with General Funds in FY07 ($182.7 million) and FY12 ($400 million)
- 7% of the endowment fund's 3-year monthly average market value may be appropriated to the PCE program (AS 42.45.085)
- Invested to earn 7% over time
- $788 million in PCE Endowment Fund (as of 12/31/12)
- Anticipated to be only funding source in FY16

ALASKA ENERGY AUTHORITY

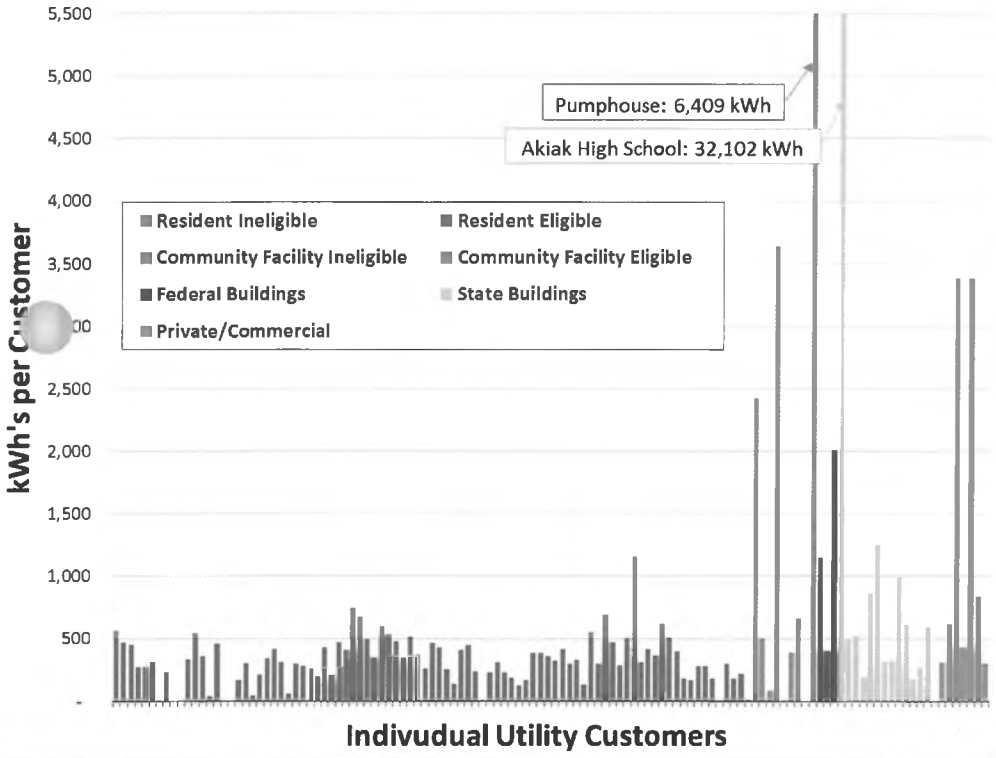
July Akiak Electric Customer Use



- July customer usage is relatively low
- Bulk of Community Facility use is associated with water and sewer

ALASKA ENERGY AUTHORITY

December Akiak Electric Customer Use



- Increase in total electric use in winter
- Akiak High School becomes the largest electric user in the community

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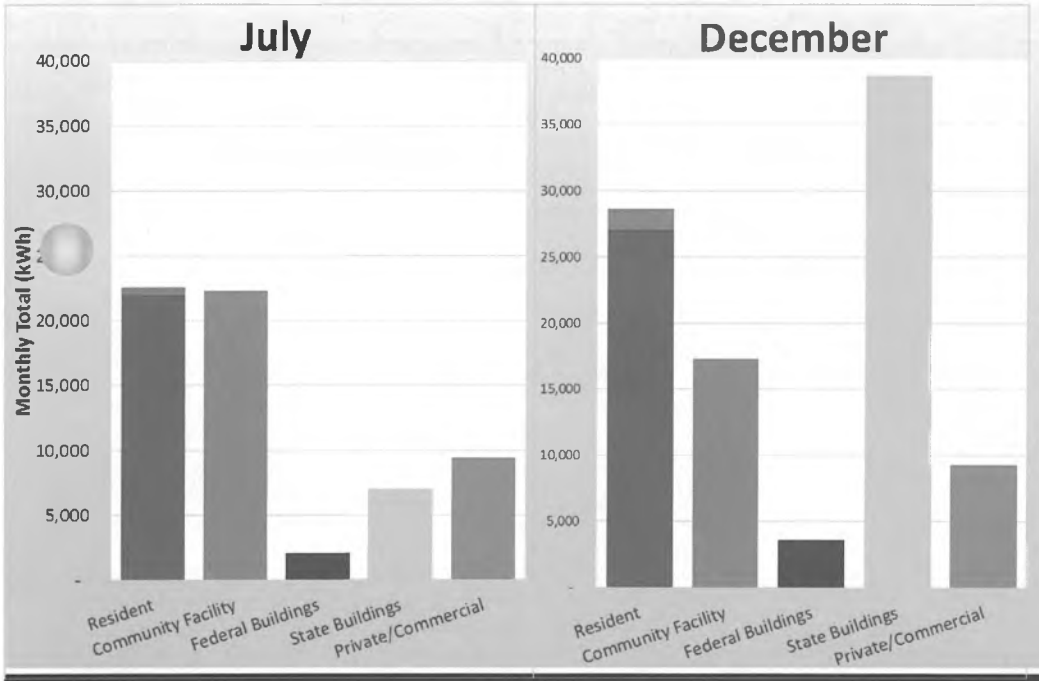


Community Example: Akiak

- Individual customer data for a summer month (July '12) and winter month (Dec. '12) in Akiak was used to demonstrate relative impact of PCE
- 121 electric customers in community
  - 89 residential
  - 9 community facilities
  - 3 Federal government
  - 13 State/local government
  - 8 commercial/private

ALASKA ENERGY AUTHORITY

Akiak Electric Use by Customer Type

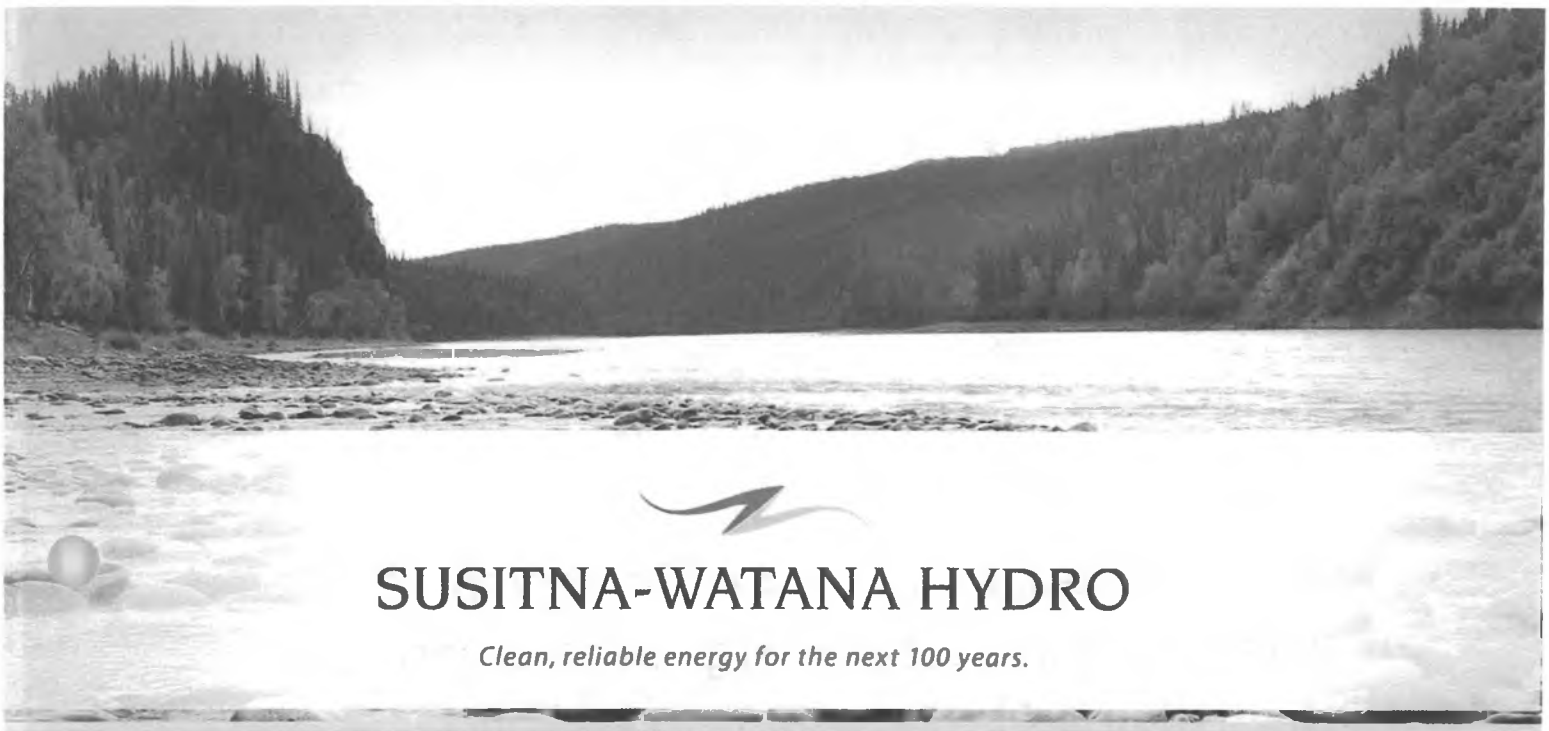


- Increases (from July – Dec.)
  - total electric: 54%
  - total residential: 27%
  - ineligible residential: 146%
  - State buildings: 451%
- PCE eligible kWh
  - July: 70%
  - December: 45%
  - high eligible percentage, compared to state average

ALASKA ENERGY AUTHORITY



AKEnergyAuthority.org



SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Susitna-WatanaHydro.org



Alaska Energy Authority

ALASKA ENERGY AUTHORITY

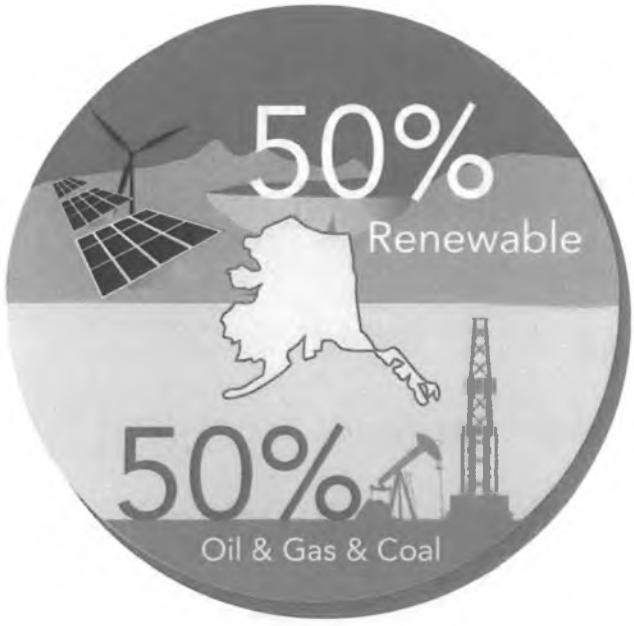
Mission: Reduce the Cost of Energy in Alaska

- Investing in Alaska's energy infrastructure
- Diversifying Alaska's energy portfolio
- Energy Planning and Policy
- Training and Technical Assistance

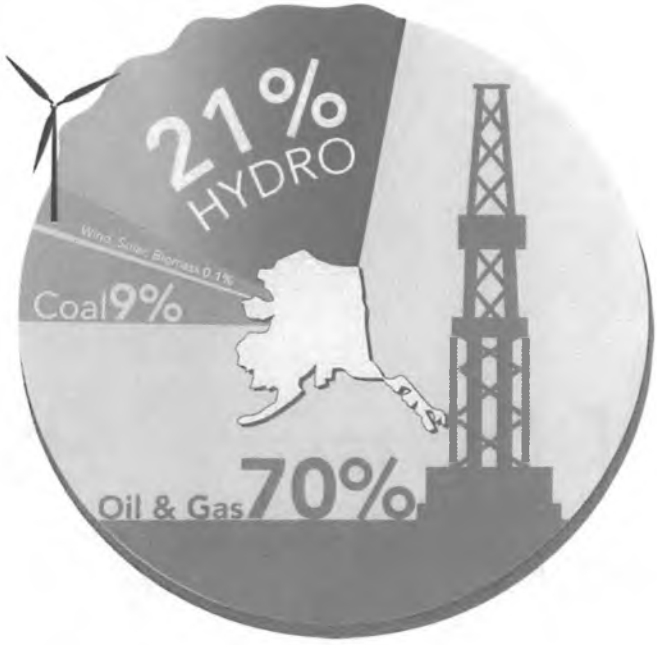
Alaska's Energy Challenges

- Varied energy costs by region
- Declining oil production / highly volatile fossil fuel costs
- Aging facilities
- Dispersed communities, no central grid
- Short and long-term solutions necessary

2025 Renewable Energy Goal



Alaska: Electricity Sources



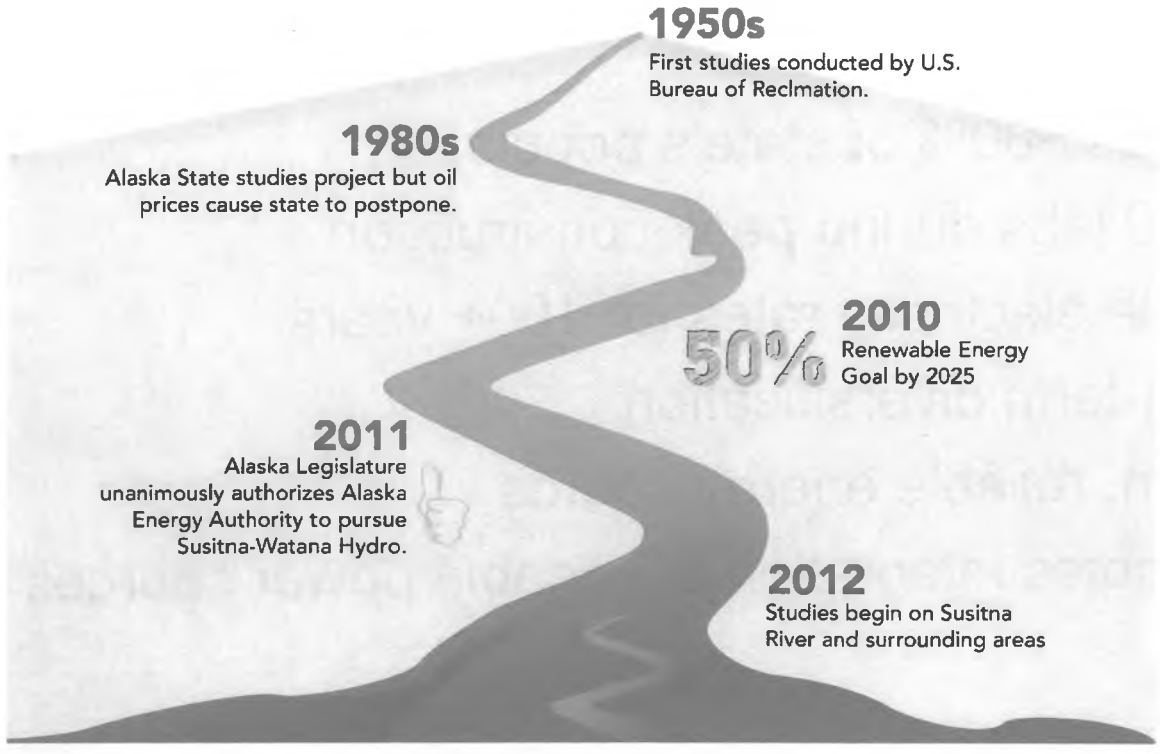
Renewable Electrical Power

Hydropower 90%

all others 10%



Susitna Hydro: History



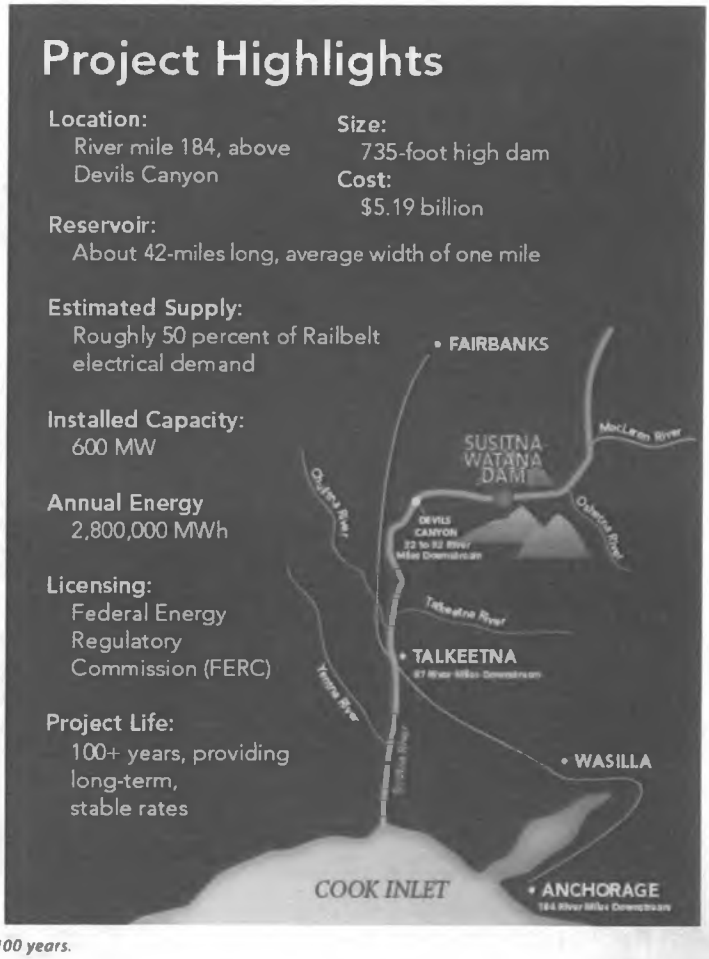
SUSITNA-WATANA HYDRO *Clean, reliable energy for the next 100 years*

Why Susitna-Watana Hydro

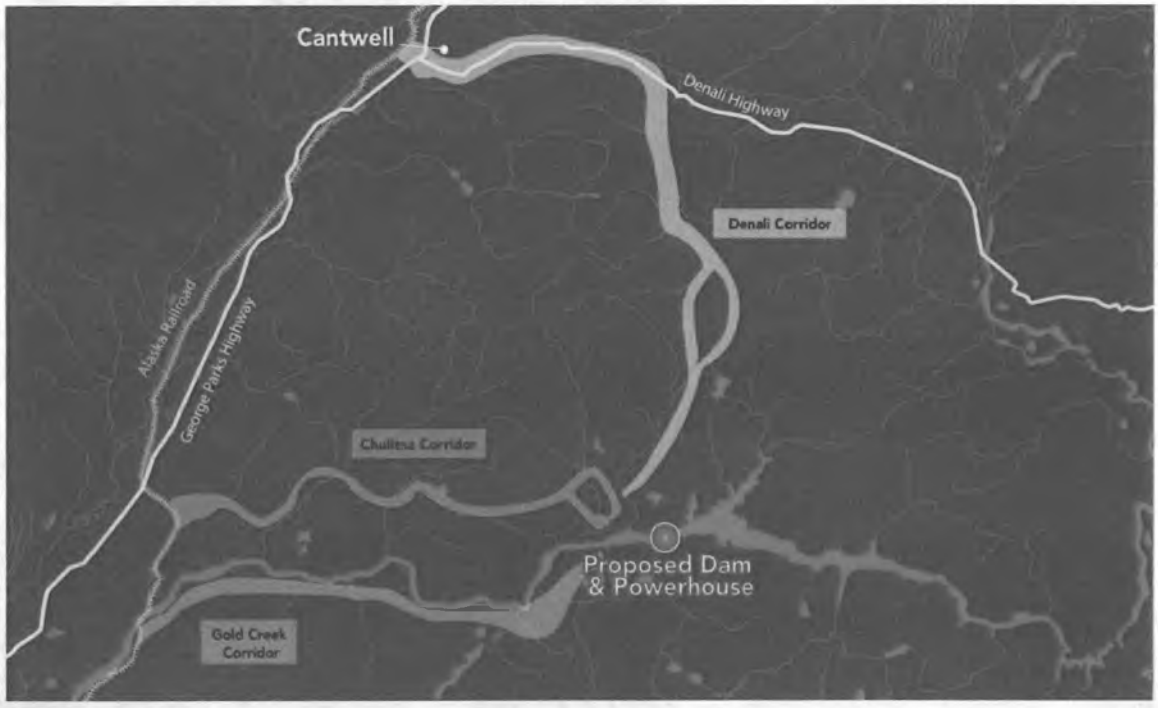
- Serves ~80% of state's population
- 1,000 jobs during peak construction
- Stable electricity rates for 100+ years
- Long-term diversification
- Clean, reliable energy source
- Promotes integration of variable power sources

Project Highlights

- Susitna-River Mile 184
- 87 River Miles from Talkeetna
- 22-32 River Miles upstream from Devils Canyon
- ~50 percent of Railbelt's Energy Demand



Access and Transmission Alternatives



Project Timeline

TIMELINE



Employment

- 385: Total individuals contracted to work on Susitna-Watana Hydro (Outside AEA)
- Majority of workers are Alaskans
- Hydropower licensing experience in the Pacific Northwest
- 180 individuals anticipated to be in the field 2013

Revised Study Plan

- Unprecedented effort
- Proactive approach
- 58 studies
- 186,000 acres



Susitna-Watana Hydro Environmental Program

- Early 2012 fieldwork, including important fish studies
- Development of a Revised Study Plan
  - significant stakeholder involvement
  - filed with FERC in 12/12
  - FERC Study Plan Determination on 44 studies 2/1/2013
  - FERC Study Plan Determination on 14 studies 4/1/2013

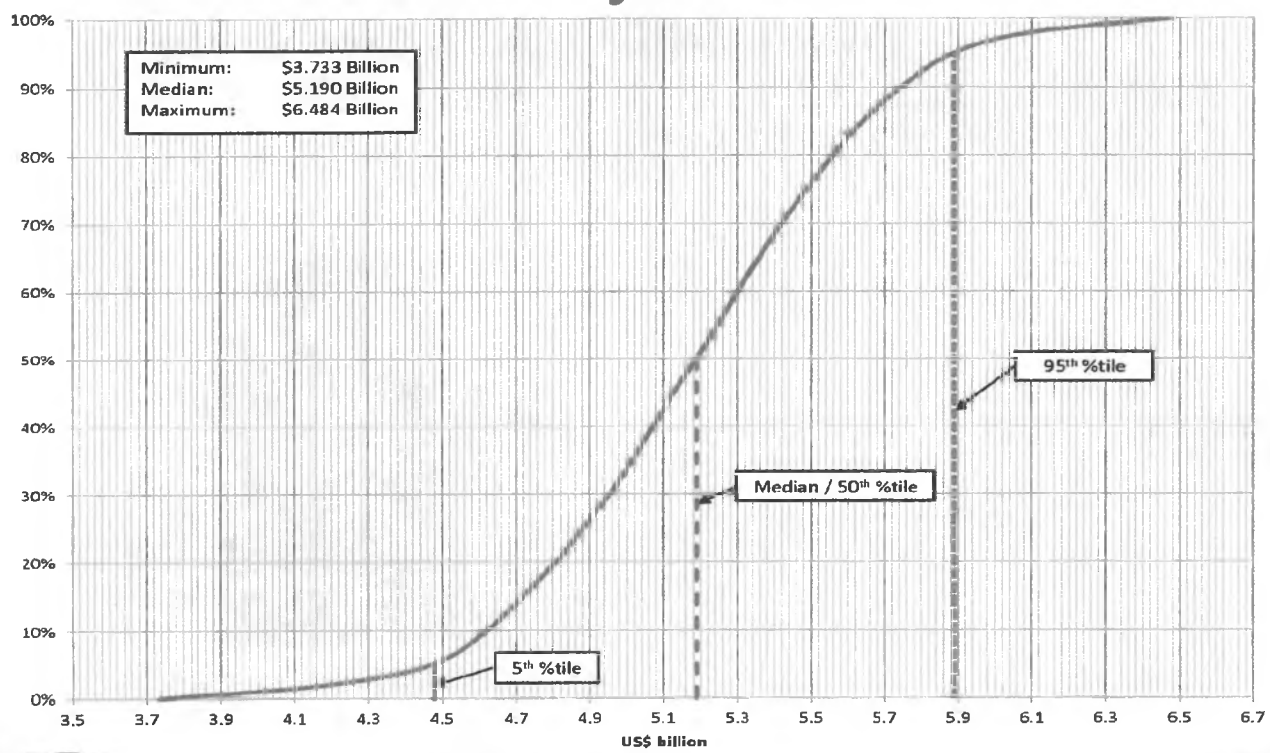
Susitna-Watana Hydro
Additional 2012 Accomplishments

- Licensing progress and meeting milestones
- Synthesized historical 1980s information
- Engineering
  - Progress refining design models
  - Identified three potential access routes
  - Brought on panel of international experts as board of consultants
  - 2012 geotechnical fieldwork and surveying
  - Development of engineering and project safety study plans
- Independent Cost Estimate

Independent Construction Cost Estimate: Results

- AECOM tasked with unit-price estimate and independent construction schedule
- AECOM confirms
  - Feasible timeline
  - Roller-Compacted Concrete (RCC) dams constructible in cold climates
- AECOM recommends
  - Year-round construction
  - Consideration of early reservoir filling for early power generation
- Comparison between original and AECOM estimates within 9%
- Accuracy of the most probable estimate: -11% to +26%

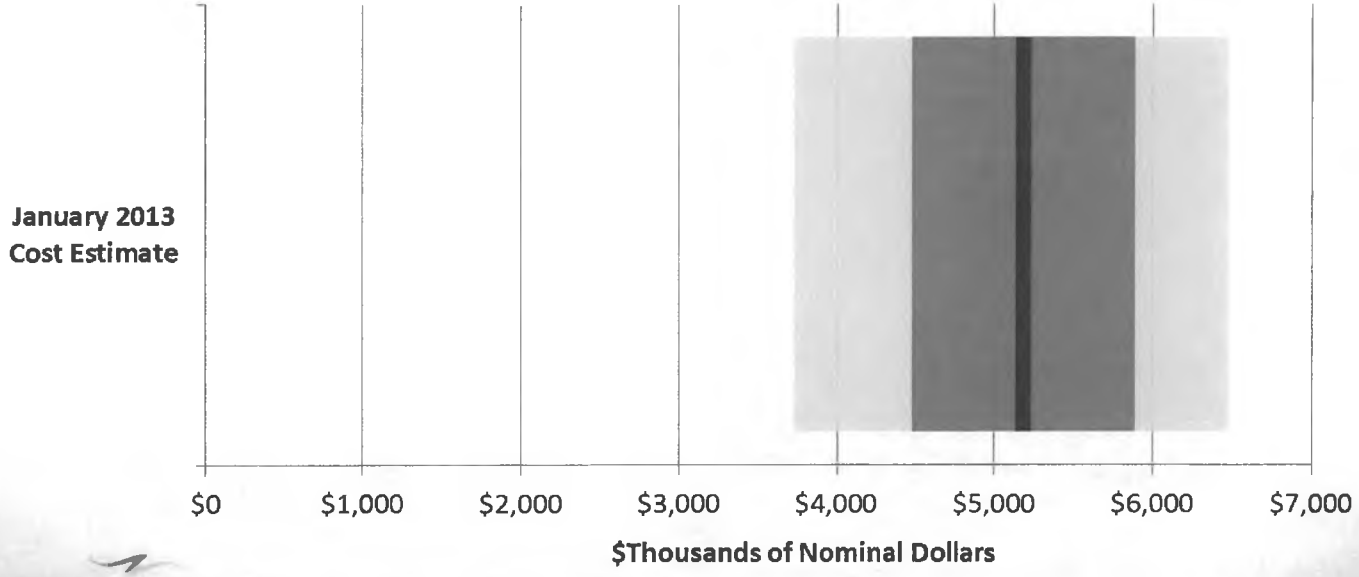
Probabilistic Range of Total Project Costs



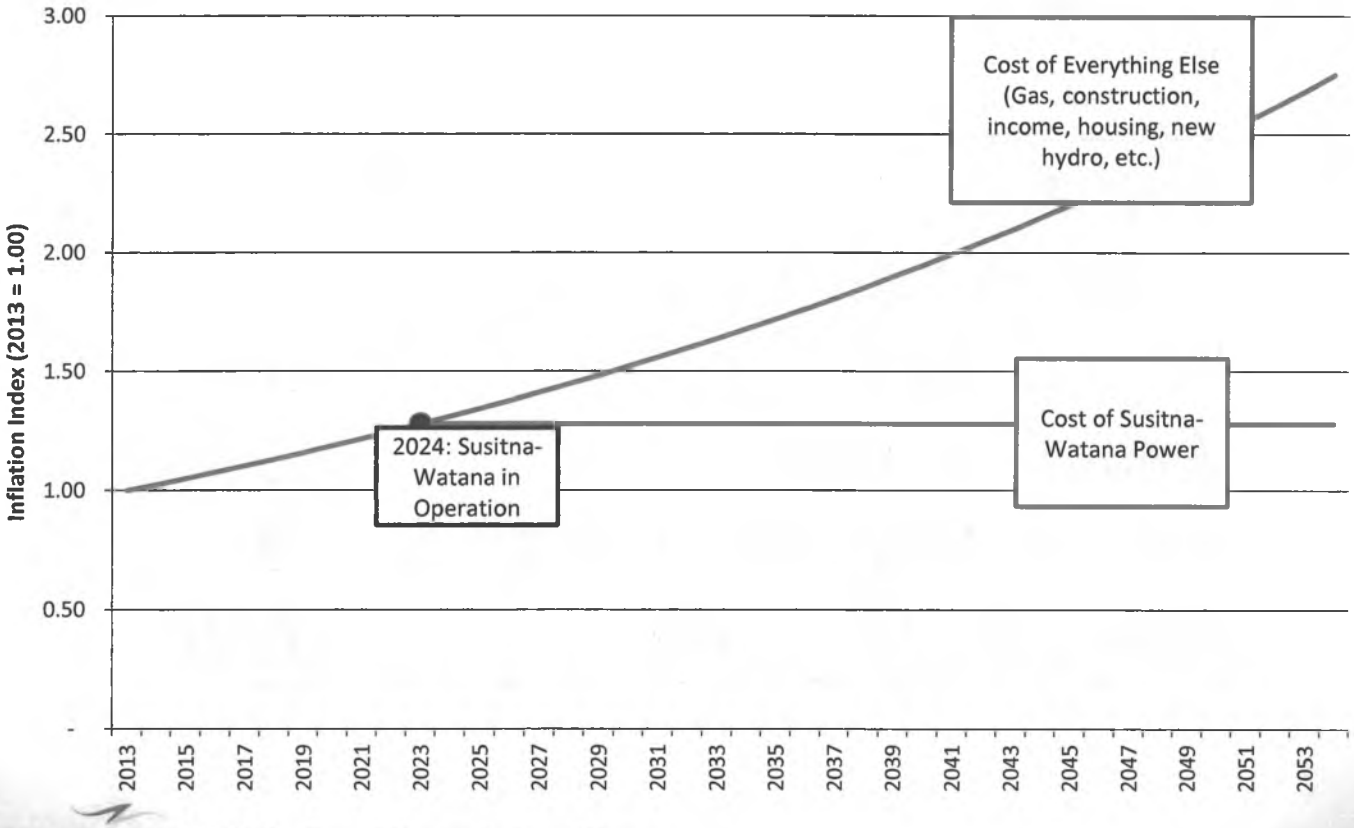
Susitna-Watana Captial Costs

	Best Estimate	Low Estimate*	High Estimate*	Minimum Cost	Maximum Cost
January 2013	$5,190	$4,480	$5,890	$3,730	$6,480

**Low and High Estimates represent a 90% probability*



Impacts of Inflation on Susitna-Watana Power Costs



SUSITNA-WATANA HYDRO *Clean, reliable energy for the next 100 years.*

Base Case Economic Assumptions

Capital Costs ($mill)	$5,190
Power Production (GWh)	2,800
Interest Rate	5.00%
Debt Term (years)	30
Annual O&M Costs ($mill)	$16
Operation Start Year	2024

Susitna-Watana Power Costs ($/kWh)

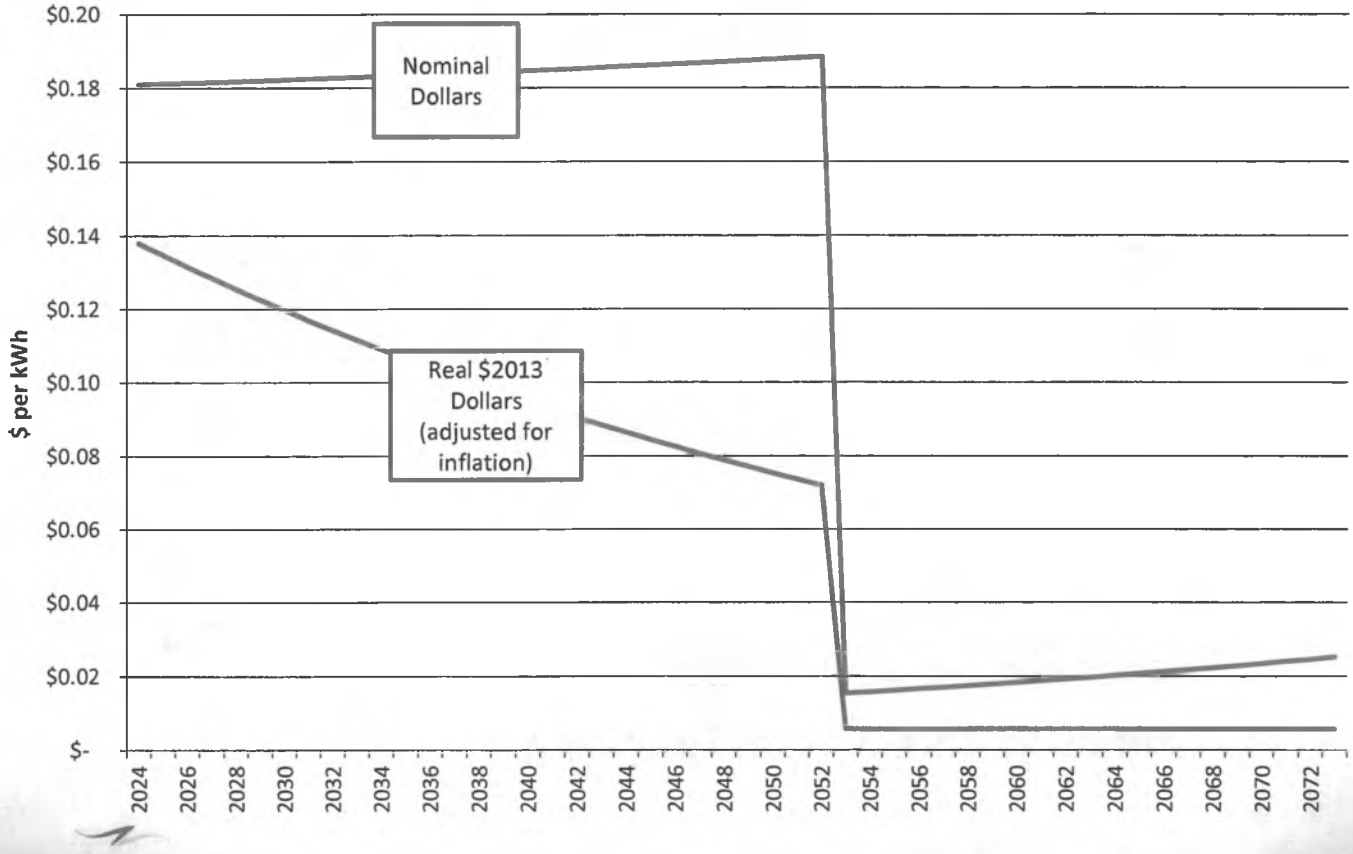
Year 1 Rate ($2024)	$0.181
Year 1 Rate ($2013 Real)	$0.138
10 Year Ave Rate ($2013 Real)	$0.124
25 Year Ave Rate ($2013 Real)	$0.106
50 Year Ave Rate ($2013 Real)	$0.061

Real= Adjusted for Inflation

Assumes no Direct State Financing

Susitna-Watana Power Costs: Real vs. Nominal

(Assumes no Direct State Financing)



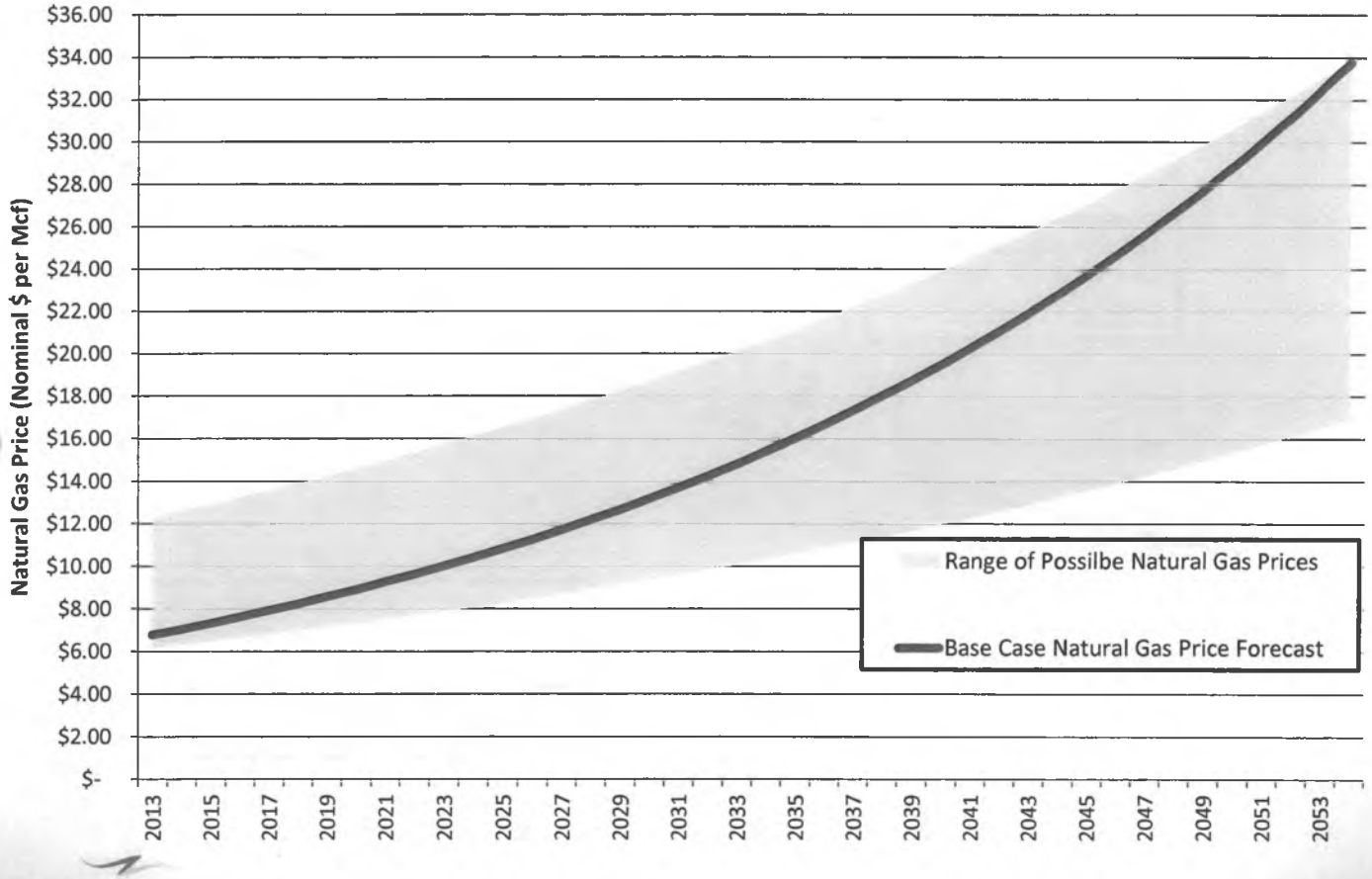
Natural Gas Generation Comparison

- Competitive with natural gas in the early years, much lower-cost over long-term
- Future natural gas prices are unknown
- Assume a constant efficiency and non-fuel cost for natural gas generation
  - Heat rate of 8,000 (Btu/kWh)
  - Non-fuel cost of $0.03 per kWh

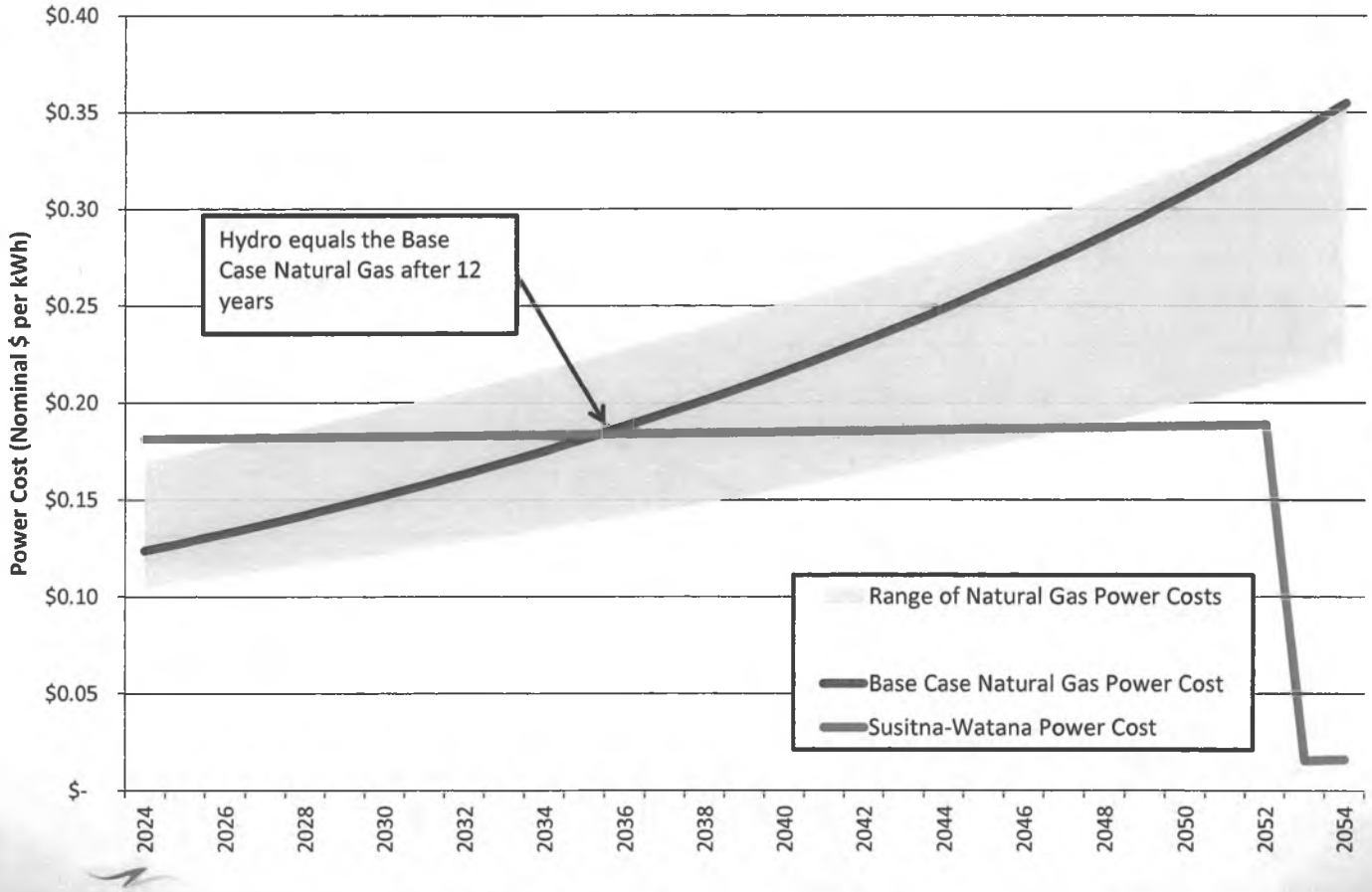
Natural Gas Price Forecast

- A single forecast was needed for a "Base Case" comparison
  - $6.50 per Mcf in 2012
  - Increases at 4% annually (1.5% greater than inflation)
- Realistically, future natural gas prices are better represented with a range
  - Prices can range $6.00 to $12.00 per Mcf in 2013
  - Range increase with inflation (2.5% annually)

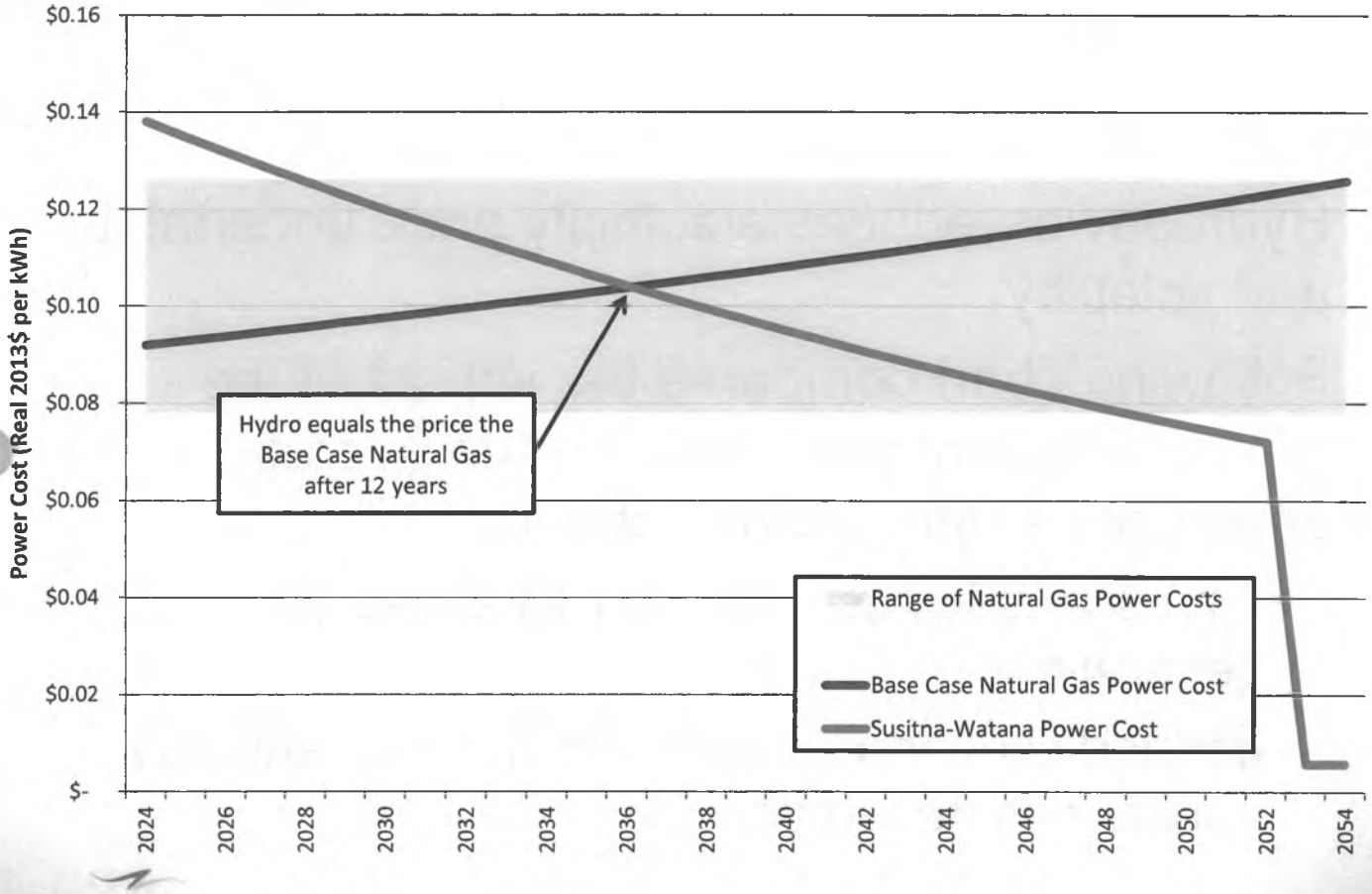
Natural Gas Price Forecast and Range



Susitna-Watana vs. Natural Gas Power Costs



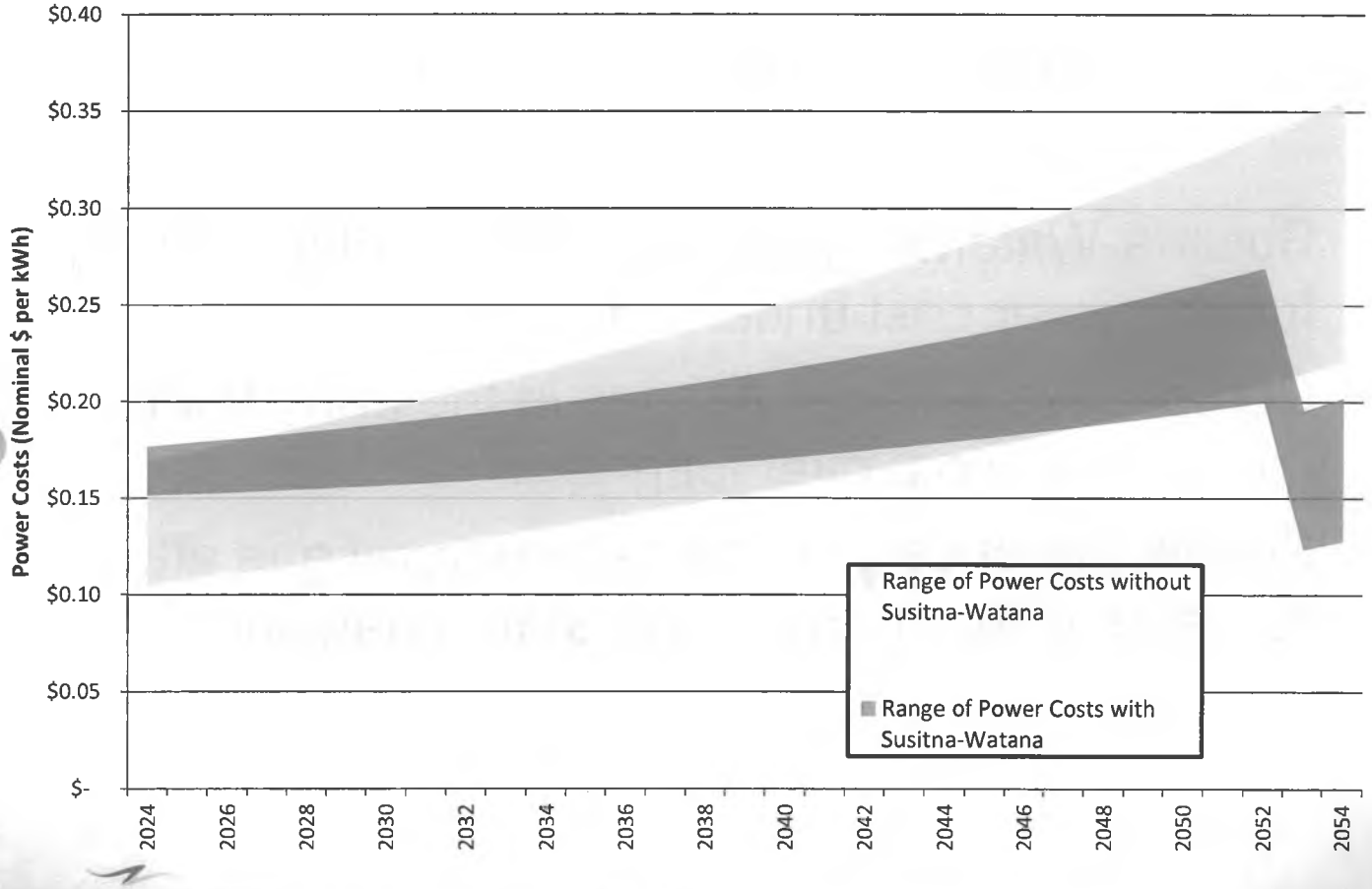
Susitna-Watana vs. Natural Gas Power Costs



Susitna-Watana Hydro Reduces Power Price Uncertainty

- Hydropower reduces electricity price uncertainty and volatility
- Following chart compares the impact of the range of natural gas prices on the average power costs under two scenarios
  - First scenario assumes 100% natural gas generation
  - Second scenario assumes 50% hydro and 50% natural gas generation

Power Costs Under Range of Natural Gas Prices



Economic Takeaways

- Susitna-Watana Hydro can significantly reduce future power cost uncertainty
- Competitive with natural gas in the early years, much lower-cost over long-term
- Equals the price of base case natural gas after 12 years without any direct State financing

2013 Goals and Milestones

- Continued stakeholder and landowner outreach
- Implement the Revised Study Plan
  - Field work agreements with Alaska Department of Fish & Game
  - Logistical support, including helicopters and field camps
  - Obtaining permits from land owners
- Resources and Procurement Plan
- Utility Precedence Agreement
- Geotechnical exploration



Susitna-WatanaHydro.org

SUSITNA-WATANA HYDRO *Clean, reliable energy for the next 100 years.*

REP. NAGOAK

But, as long as we are revising PCE legislation, we should also look at how to address the schism between the PCE formula and adding renewable energy ar energy efficiency to community utilities.

Talking Point:

When communities install renewable energy, because of the current PCE formula, it is the customers that do not receive PCE that benefit the most from the decrease in the cost to produce power.

As less fuel is used and the cost to produce power decreases, the PCE subsidy also decreases. Customers with PCE may end up paying more than before the renewable resource was developed. But non-PCE customers will benefit from the decrease in fuel costs.

"The PCE program does not address the fundamental barriers to improving energy efficiency. Because the formula currently used to calculate rates is directly tied to fuel costs, integrating alternative or renewable generation technologies could result in a lower PCE payment causing the effective electric rates to increase."

According to ISER surveys in PCE communities, energy use is roughly divided up as follows:

Electricity 27% Transportation 33% Space Heat 40%

Leading edge renewable projects are trying to address the significant heating energy needs by increasing the production renewable electrons and sending the excess to make heat for large community structures or groups of homes. This is a goo idea and stands to make significant cuts to import fuel. But the PCE formula does not reward this and may actually be a disincentive.

"Including heat kWh in the PCE formula further exacerbates the problem of dividing by all kWh sold rather than diesel generated kWh only. An alternate application of the formula, dividing solely by diesel electric kWh sold, and offsetting electric revenue requirements with heat sales revenues can more accurately compensate the utility while providing benefits to community members."

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

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Agenda

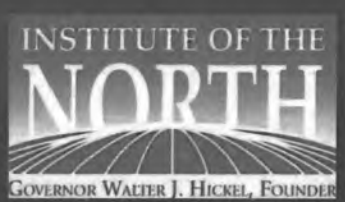
Wednesday, February 22, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

\+ 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

Strategic Locations connecting NORTH AMERICA AND EUROPE





ICELAND

Lessons that were:

- Comprehensive in scope and direction – not piecemeal
- Resulted in affordable energy for people who lived there
- Provided maximum benefit based on careful analysis



Iceland Policy Tour - An Overview

- Policy Meetings with
  - Parliament
  - President
  - Ministry of Foreign Affairs
  - Ministry of Industries and Innovation
- Renewable Energy Industry Visits to
  - Landsvirkin – Iceland's National Energy Company
  - Karahnjukar Dam's Fljótsdalur power station
  - Hellisheidi Geothermal Plant
  - Reykjavik Geothermal
  - Municipality of Arborg/Selfoss District Heating
  - Mannvit Engineering
  - Verkis Consulting
- Economic Development: Energy Intensive Industries
  - ALCOA Fjardaál 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

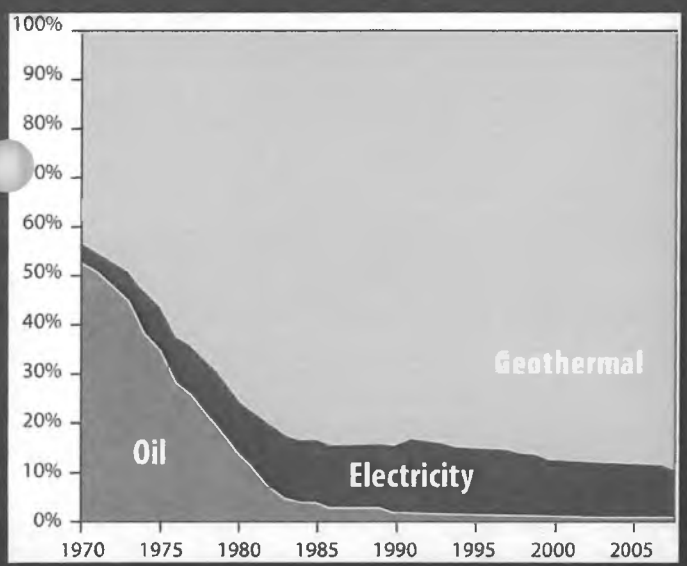
Remaining 20% comes from imported fossil fuels, used mainly in transportation and fisheries

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

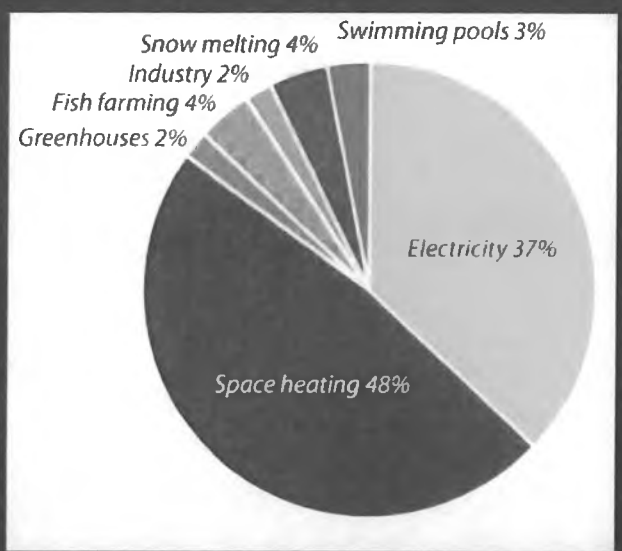
- Zero Wind Power
- Zero Solar Power
- Zero Tidal Power

Geothermal Energy in Iceland

Space Heating



Geothermal Utilization



Geothermal Electricity Generation

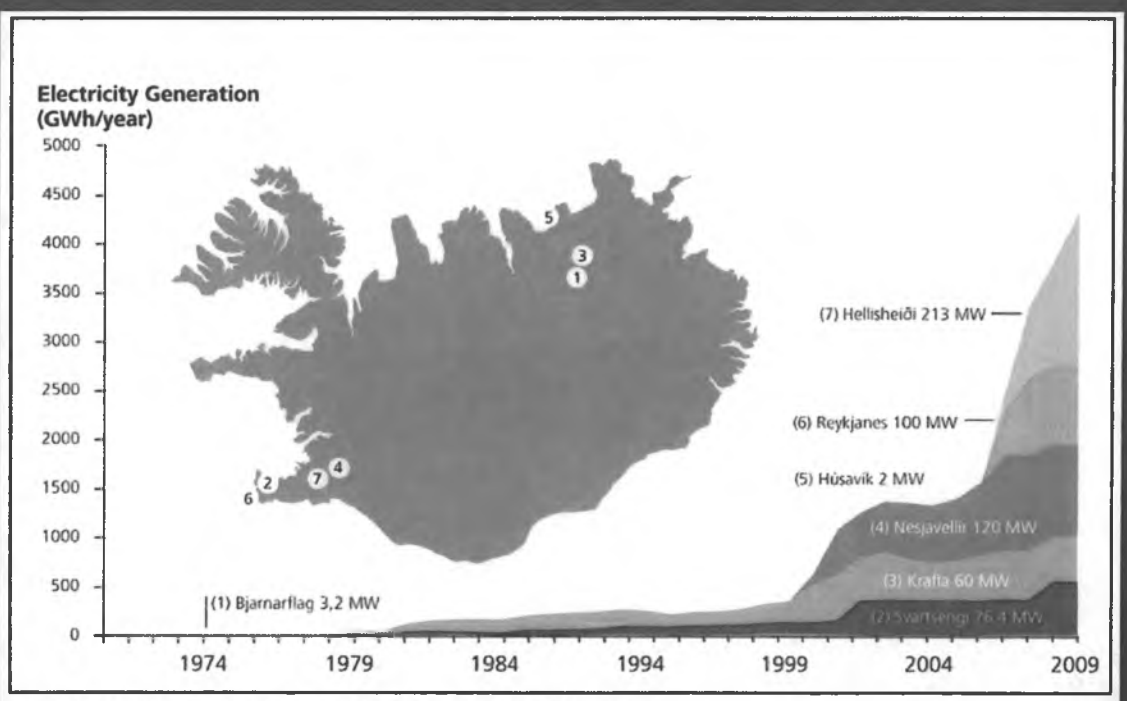
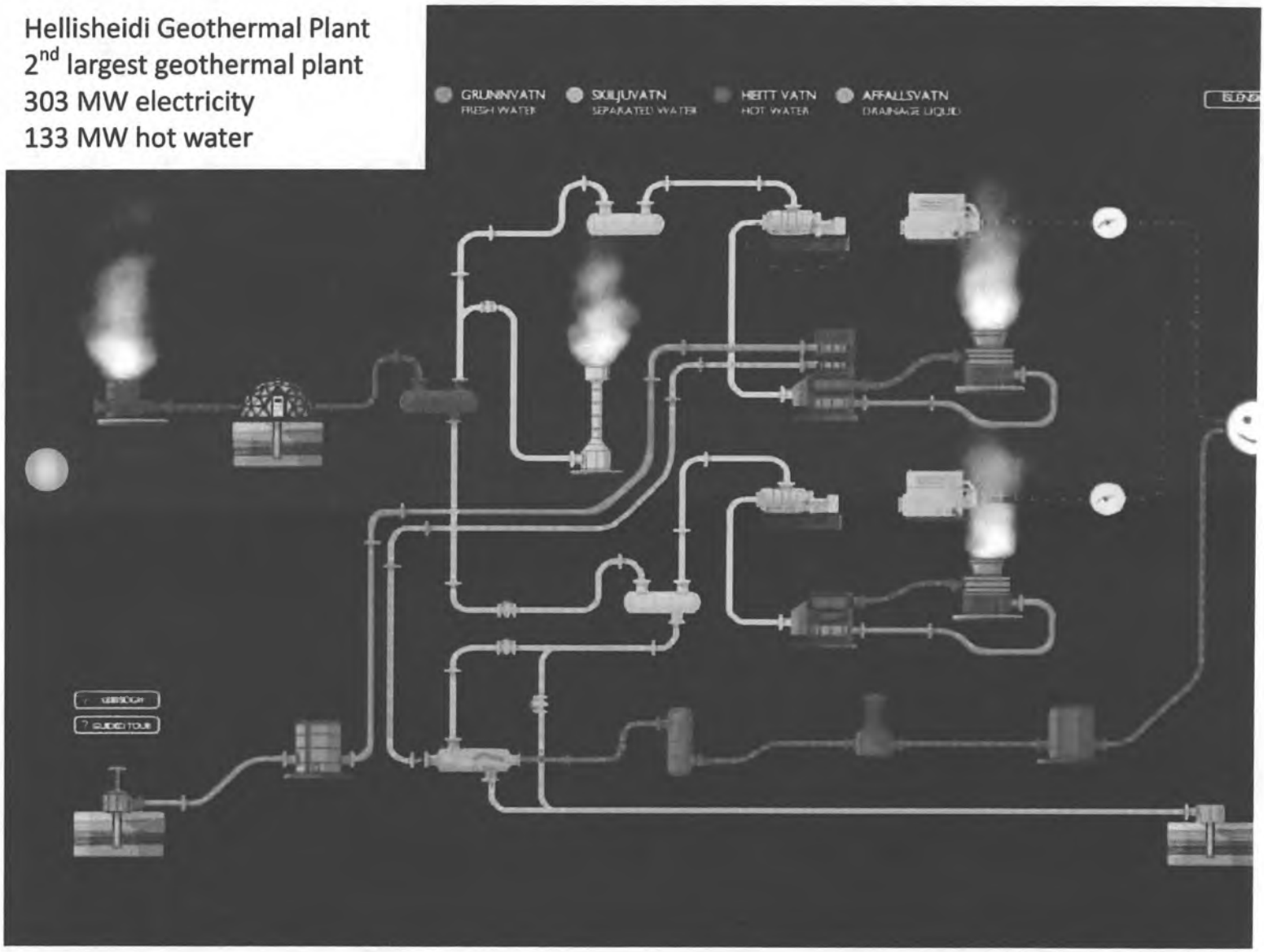
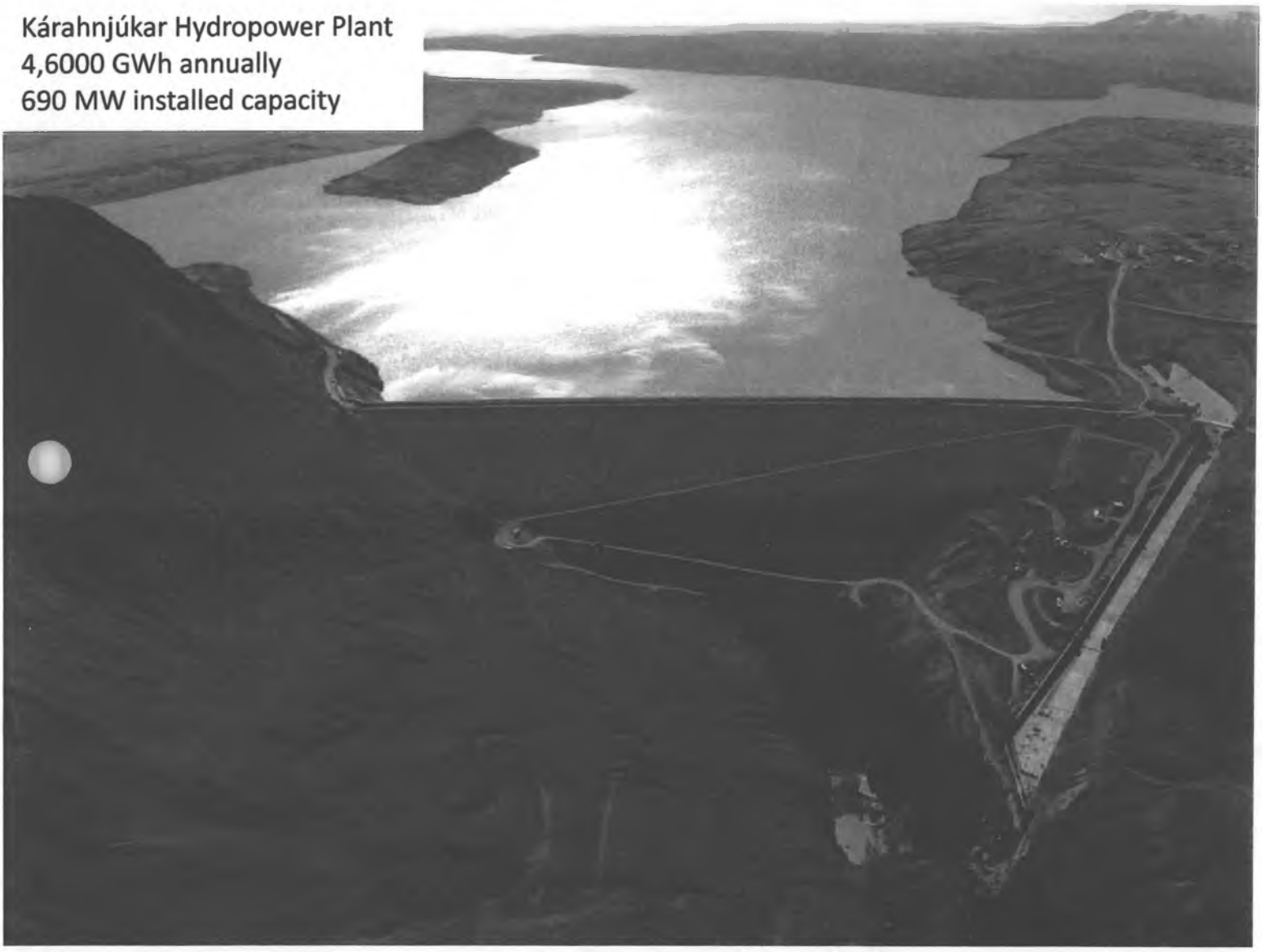


Fig. 9. Generation of electricity using geothermal energy 1969–2009.

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

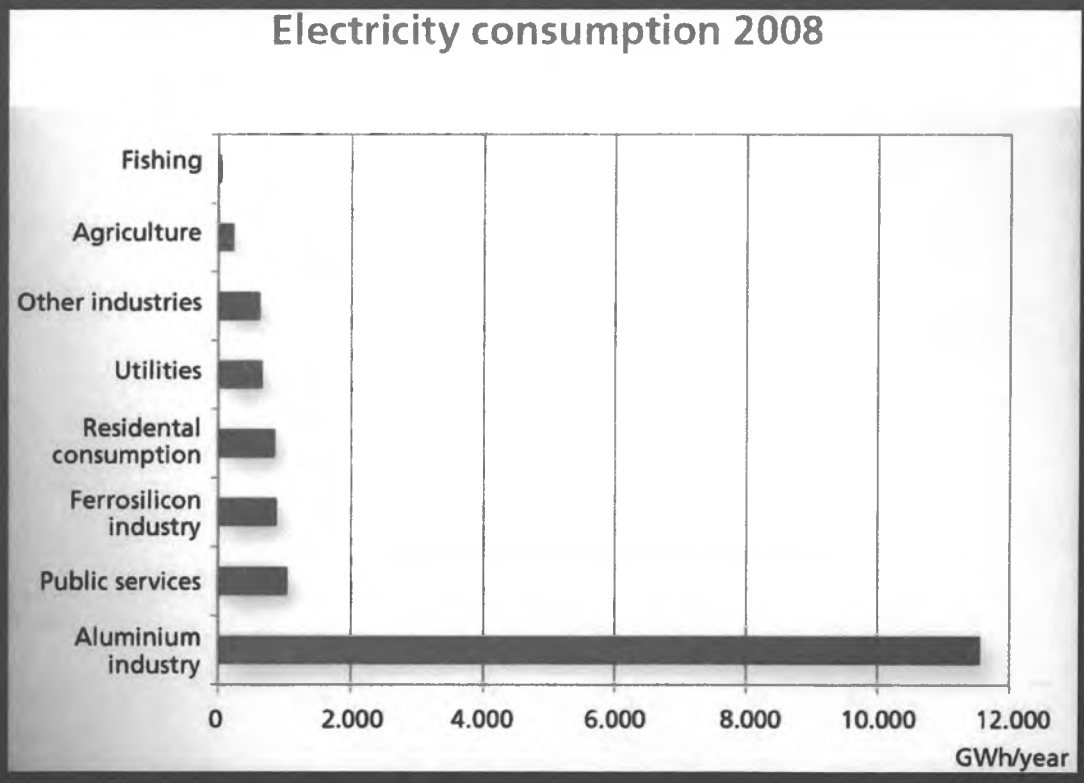
Develop projects by securing customers

Maximize revenue streams

Iceland Exports (2011)



Use of Electricity

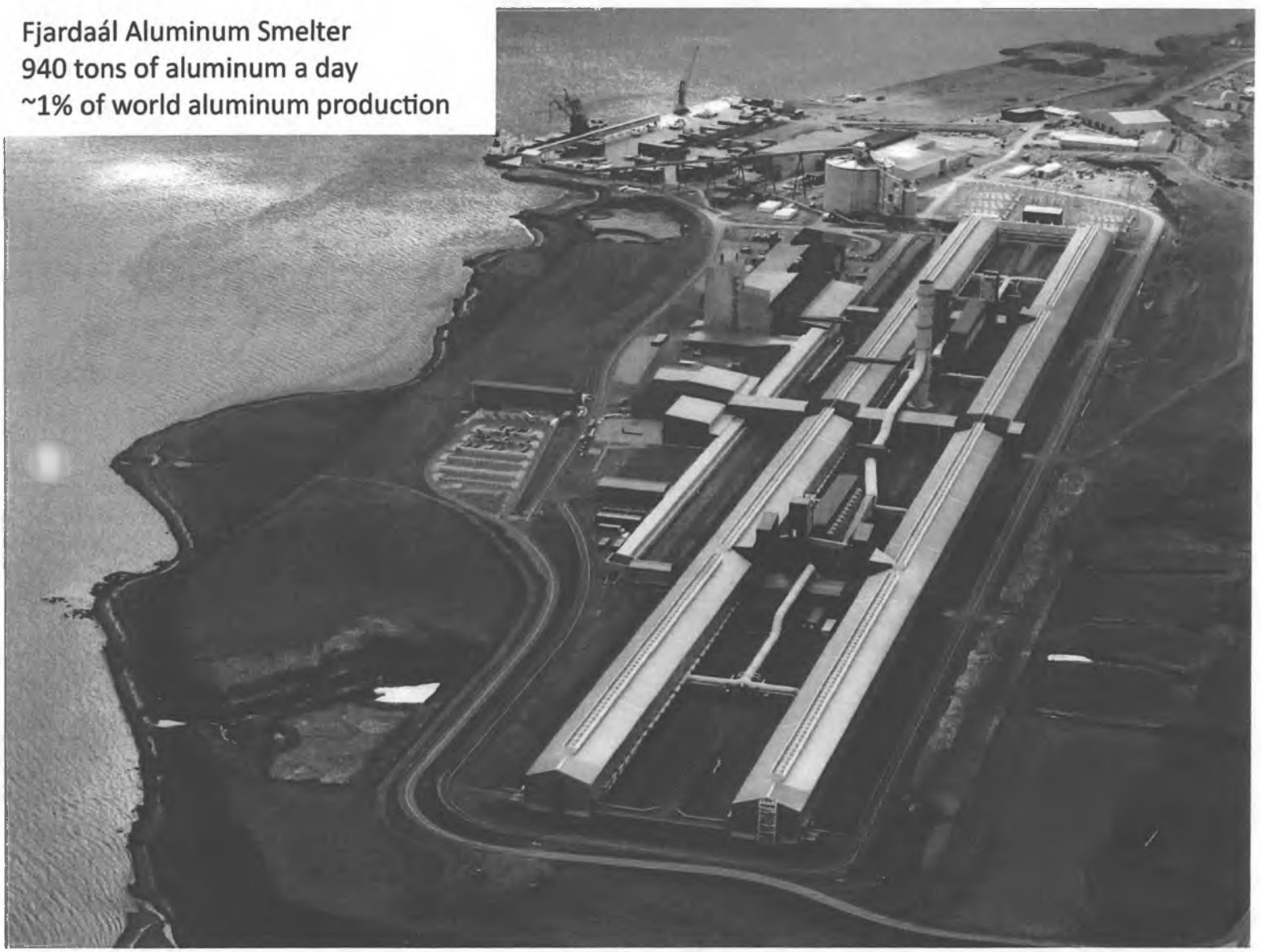


Energy Intensive Industries

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



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



Verne Global Data Centre



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

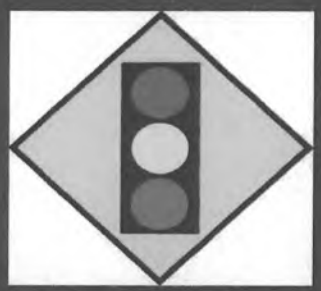
•Today – Iceland has developed a plan/system/ framework for weighing its many energy options.

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

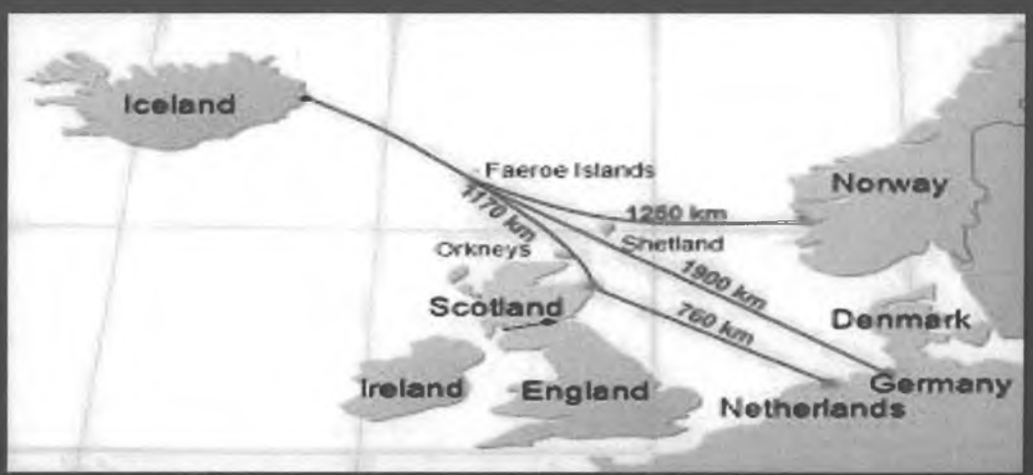
Own the grid

- 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!

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02/27/13 Presentations: All Alaska Energy Solution, and Alaska's Energy and Air Quality Crisis

<TARGET><BILL></BILL><SUBJECT>02-27-13 Presentations All Alaska Energy Solution, and Alaska's Energy and Air Quality Crisis</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Agenda

Wednesday, February 27, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

1) The All Alaska Energy Solution
Presented by Meera Kohler, CEO, Alaska Village Electric Cooperative

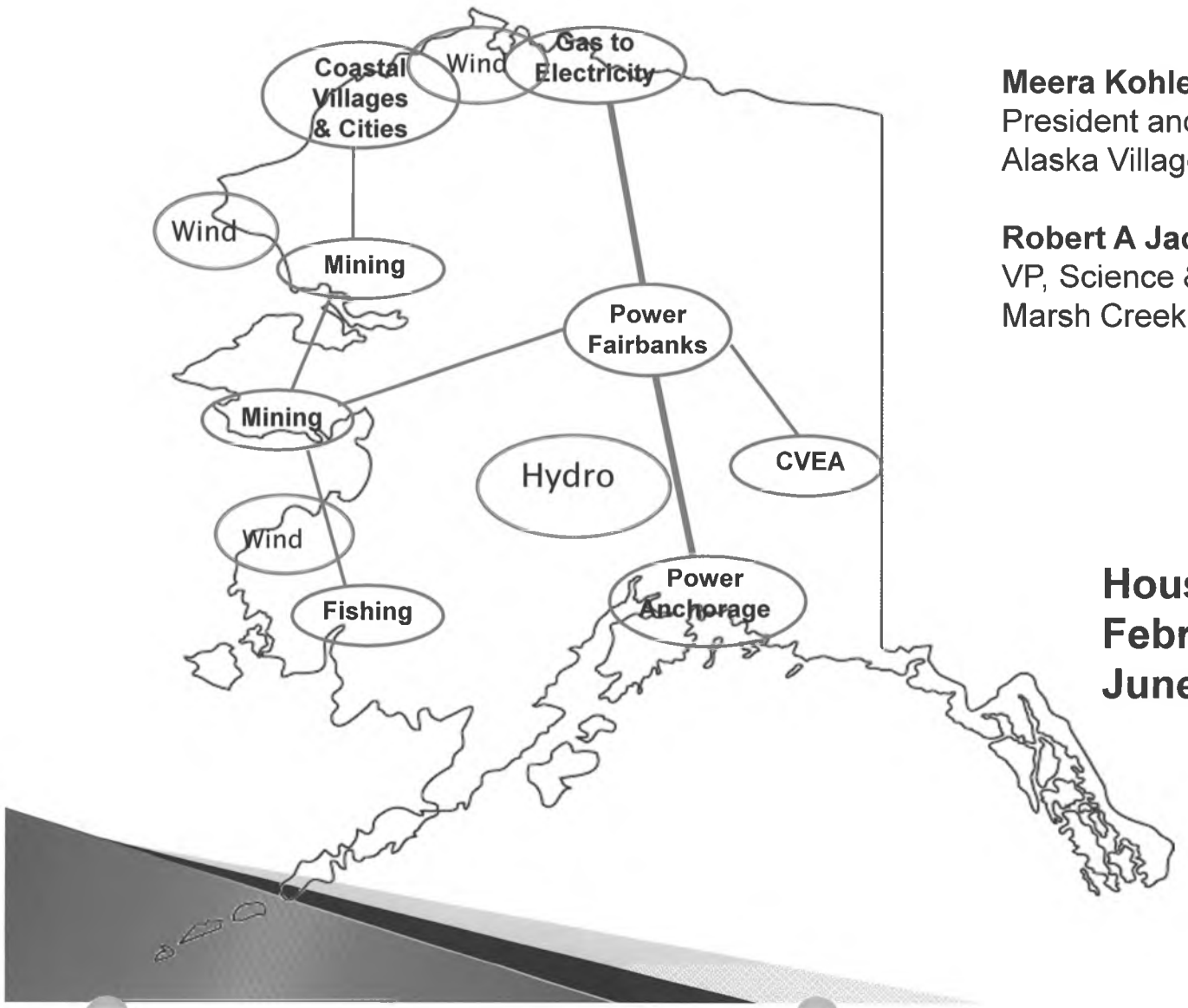
2) Alaska's Energy and Air Quality Crisis
Ward Sattler, President, Alaska Resource Agency and Dr. James Houck

Bills previously heard/scheduled

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

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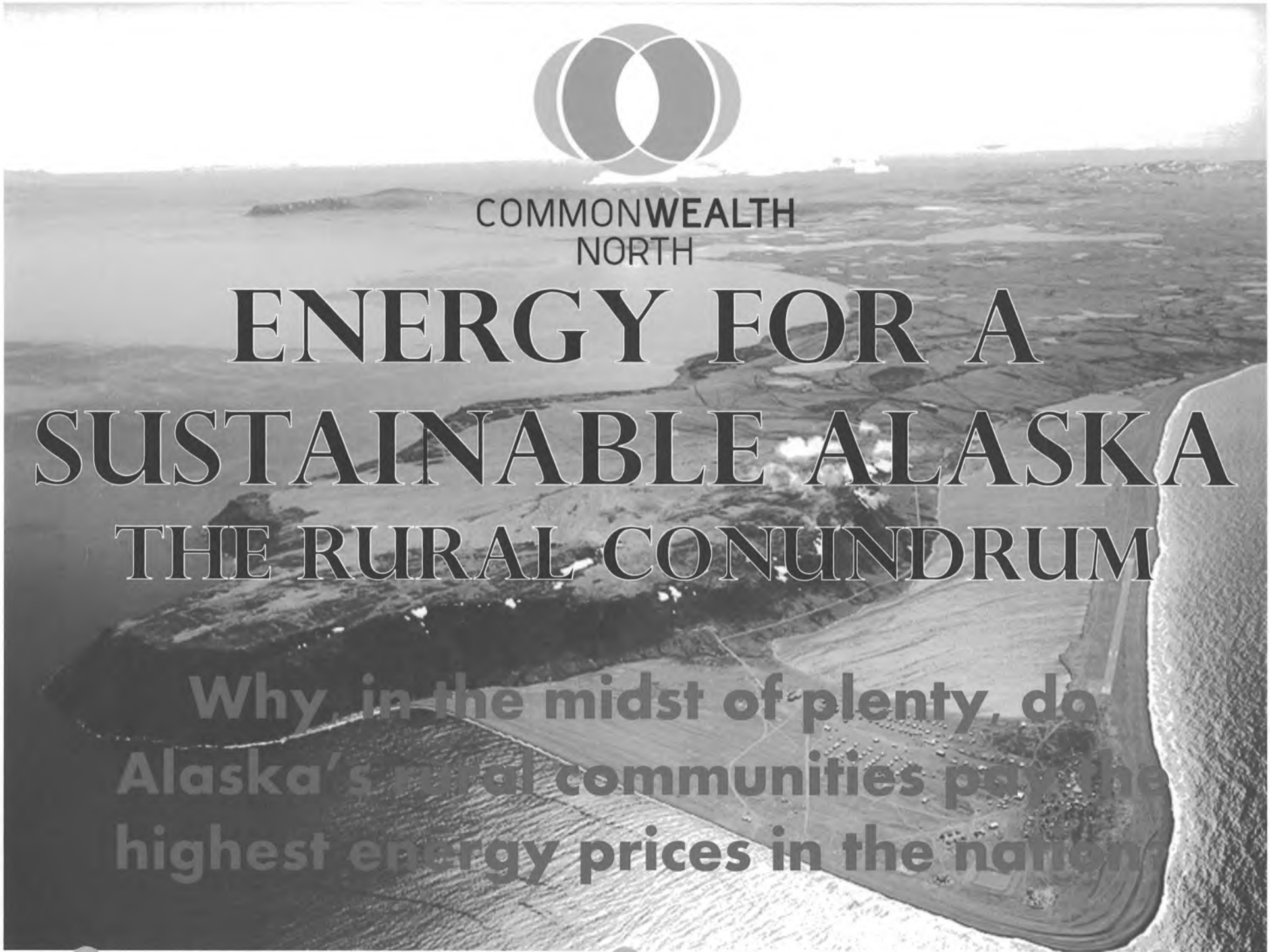
Energy Independence for Alaska - It Really is Possible!



Meera Kohler
President and CEO
Alaska Village Electric Cooperative

Robert A Jacobsen PhD
VP, Science & Technology
Marsh Creek LLC

House Energy Committee
February 27, 2013
Juneau, Alaska



COMMONWEALTH
NORTH

ENERGY FOR A SUSTAINABLE ALASKA

THE RURAL CONUNDRUM

Why, in the midst of plenty, do Alaska's rural communities pay the highest energy prices in the nation?

AVEC's Delivered Fuel Cost

• Average 2002	1.29	
• Average 2003	1.47	+.18
• Average 2004	1.98	+.51
• Average 2005	2.26	+.28
• Average 2006	2.26	
• Average 2007	2.93	+.67
• Average 2008	4.55	+1.62
• Average 2009	3.02	-1.53
• Average 2010	3.30	+.28
• Average 2011	4.27	+.97
• Average 2012	4.03	-.24
Increase 2002 - 2012	$2.74	211%

COMMONWEALTH NORTH
Study Group Finding # 1

Alaska needs a statewide energy vision, plan, and implementation strategy that incorporates a holistic view of statewide energy sustainability and which serves all Alaskans similarly



COMMONWEALTH NORTH

Study Group Finding # 2

Developing regional electrical grids yields

- Economies of scale
- Generation and technical efficiencies
- Reduced redundant infrastructure
- Viable alternative energy projects



COMMONWEALTH NORTH
Study Group Finding # 3

Dependency on diesel consumption must be reduced through increased efficiencies and utilization of economically viable alternatives



COMMONWEALTH NORTH
Study Group Finding # 4

A single statewide entity could coordinate energy generation and transmission project selection and advocate for all regions of the State in a balanced fashion



COMMONWEALTH NORTH
Study Group Finding # 5

We must ensure high-value and effective investments in energy projects, and provide a "one stop shop" to deal with permitting and federal regulators



COMMONWEALTH NORTH
Study Group Finding # 6

Alaska should strive to eliminate the need for the Power Cost Equalization Program by reducing the cost of power across the state



What We Spend on Heat and Power

From 2010 Alaska Power Statistics:	
Electricity revenue	$924 mm

Gas revenue – Southcentral	$536 mm
Diesel – Fairbanks area	250 mm gallons
Diesel – Kodiak, Copper Valley, SE	68 mm gallons
Diesel – Rest of state	63 mm gallons
TOTAL	381 mm gallons
Diesel value at $4.00/gallon	$1,524 mm
Annual cost of electricity/heat	$2,984 mm

Expenditure in 20 years $59.7 billion

Alaska's Energy Problem

Rural communities use diesel for almost all of their energy needs. No other technology is as reliable or well tested.

Fairbanks uses diesel for half their electric generation and much of their space heating needs. Home energy expenditures now rival the mortgage – especially in winter. The use of wood and coal lends to significant air quality issues.

Southcentral Alaska is running out of gas and must import LNG or CNG by 2015 to supplement Cook Inlet production.

Industry is languishing due to unavailable and unaffordable energy

Energy is scarce and expensive and is on track to become even more so

A Shortage of Affordable Energy in Alaska Really?

According to state reports, the North Slope has 235 trillion cubic feet (tcf) of technically recoverable gas.

New gas extraction techniques (fracking) have driven the price of natural gas to record lows (~ $3/mcf). As fracking becomes widespread across the world, Alaska's North Slope gas assets are virtually assured to remain stranded.

How does one use this plentiful source of cheap energy for the benefit of all Alaskans?

We Propose a Solution

- Very large scale generation on the North Slope using Alaska's stranded natural gas
- High Voltage Direct Current (HVDC) lines to move large amounts of power across Alaska
- Abundant power for
  - North Slope operations
  - Fairbanks and other Railbelt communities
  - Remote mines, military and processors
  - Heat and electricity for rural communities

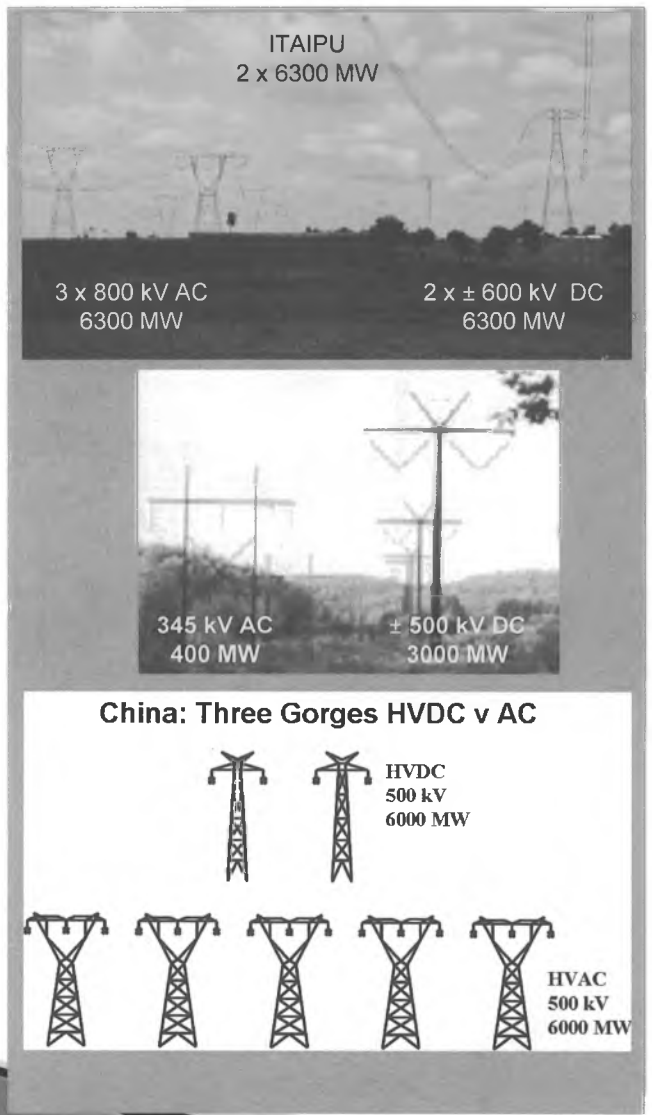
High Voltage Direct Current (HVDC) Transmission
The State of the Art

Highly efficient transport of bulk electrical power over long distances - used in the US and internationally to connect remote sources of generation (hydro, renewables, fossil fuel generation) to distant users. Line losses are similar to those of a gas pipeline.

Conventional HVDC, in use since the 1950s, utilizes a simple cheap power line offset by expensive AC/DC Converter Stations at each end; as a result it is not economic for lengths much under 300 miles.

HVDC Light, introduced in the 1990s, is now economic for much smaller power loads and distances. It can tap off conventional HVDC lines and does not experience issues that plague AC transmission, such as reactive power. It can provide black start capability within local AC grids.

Long Distance Bulk Power Transmission

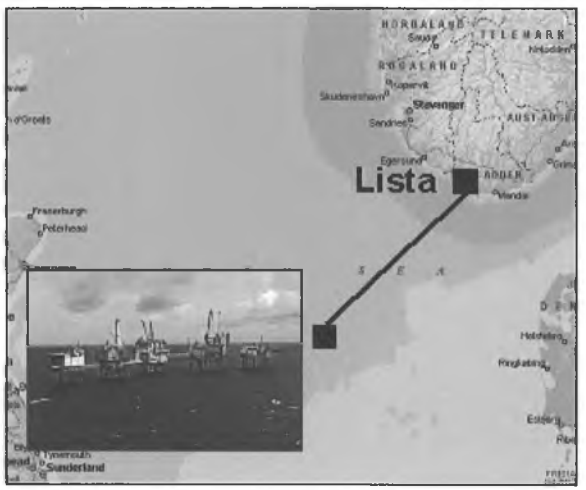


- More power on fewer lines
- Improved stability
- Lower installed cost
- Reduced losses
- Double circuit (bipolar line)
- Reduced Right of Way (ROW)

HVDC Transmission has been in use since the 1950s

	Cahora Bassa	Utah-California	Quebec-N. England	Pac. Intertie (WA to CA)	Three Gorges -Shanghai	Xiangjiaba-Shanghai
Power (MW)	1930	1920	2000	3100	3000	6400
Voltage (kV)	±533	±500	±450	±500	±500	±800
Length (Miles)	887	490	925	850	662	1294
Year Built	1979	1986	1992	1985	2007	2010

Norway Offshore HVDC Light Project

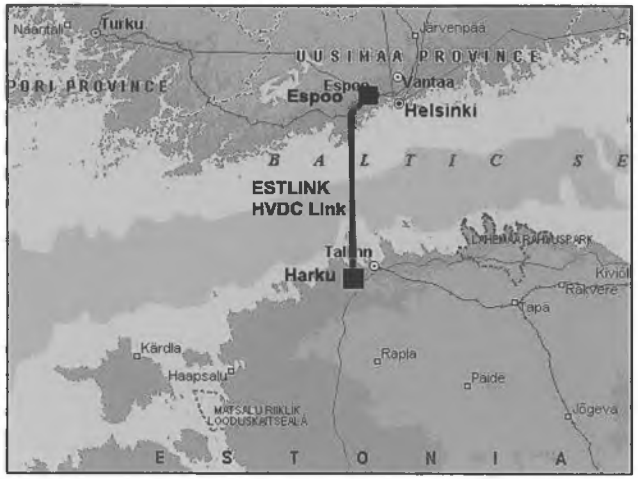


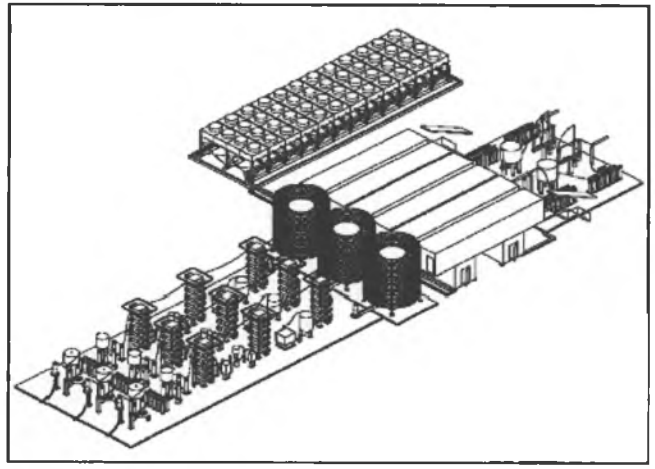
In service:	August, 2009
Power rating:	78 MW
AC Voltage:	300 kV at Lista 11 kV at Valhall
DC Voltage:	150 kV
Length of DC cable:	182 miles

Main reasons for choosing HVDC:

Environmentally benign, less maintenance and a lighter platform solution.

Estlink – HVDC Link between Estonia & Finland





Contract signed:	April 2005
In service:	November 2006
Project duration:	19 months
Capacity:	350 MW
AC voltage:	330 kV at Harku, 400 kV at Espoo
DC voltage:	±150 kV
DC cable length:	2 x 66 miles (19 miles land)
Converters:	2 level, OPWM
Special features:	Black start Estonia, no diesel
Rationale:	Electricity trade

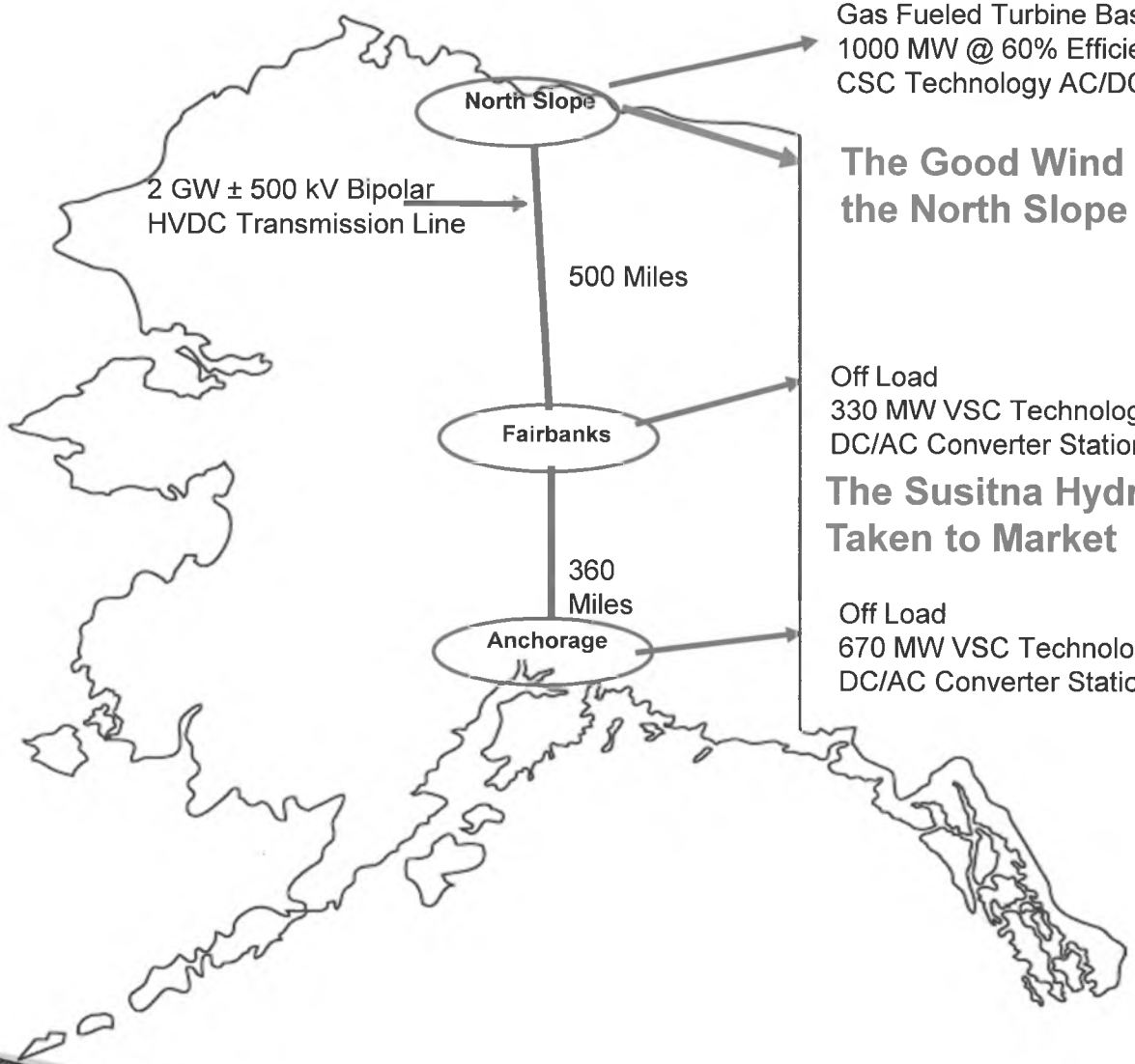
- Asynchronous Tie
- Long cable crossing
- Dynamic voltage support
- Black start

Natural Gas and HVDC for Alaska

Aggregating Alaska's loads creates enough demand to install large (300-450 MW) combined cycle gas turbines, delivering ~60% efficiency. Transmitted by HVDC, it can:

- Energize the Railbelt Grids
- Heat and power Fairbanks
- Heat and power Rural Communities
- Energize industry
- Harness distant renewables (e.g. North Slope, west coast wind, tidal power, Susitna)
- Reduce greenhouse gases from less efficient gas, coal and diesel generation
- Improve air quality by reducing particulate matter emissions

Energize the Railbelt Utility Grids



Gas Fueled Turbine Based Combined Cycle Power Plant
1000 MW @ 60% Efficiency Gas to Electricity
CSC Technology AC/DC Converter Stations

The Good Wind Power Resources of the North Slope become Available

Off Load
330 MW VSC Technology
DC/AC Converter Station

The Susitna Hydro Dam Power is Taken to Market

Off Load
670 MW VSC Technology
DC/AC Converter Station

Railbelt HVDC/Gas Turbine Power System Costs

Capital Costs (Billion $)

Power Plant (833 MW)	1.25
HVDC Power Line	1.86
Converter Stations	0.60
Total	**3.71**

Operating Costs ($/MWh)

Capital (30 years @ 7%)	48.36
Gas (0.104 bcf/day – Henry Hub $3.00/mcf)	18.36
O & M Gas Turbine Power Plant	12.50
HVDC Line System Maintenance (1.5%)	5.95
Insurance (0.5%)	3.00
Regulatory Fees	1.00
Property Taxes (0.5%)	3.00
Administrative & OH	1.00
	93.17
	9.3 ¢/kWh

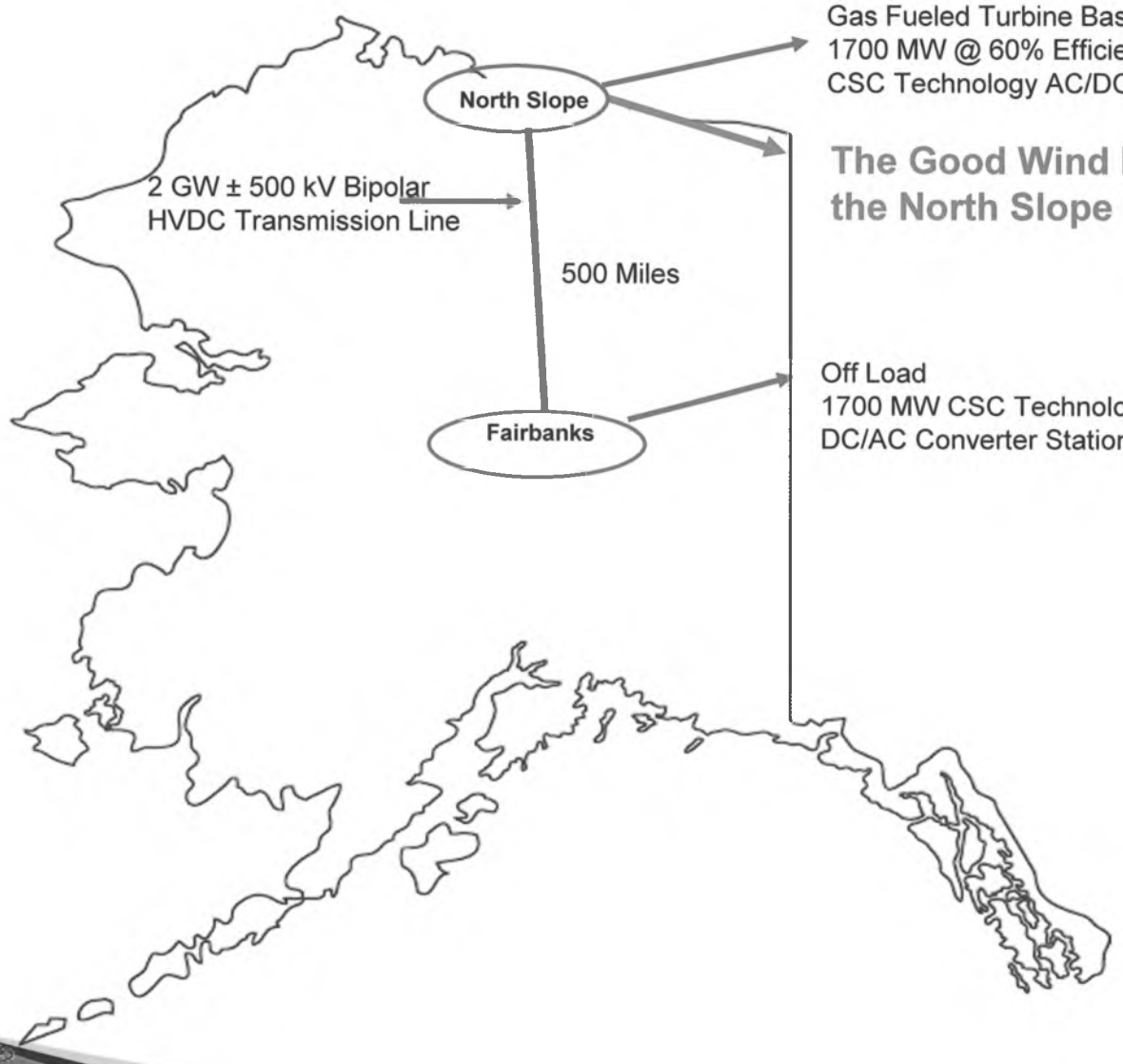
Using Electricity for Heat

At $5 per gallon, diesel used in an 80% efficient furnace costs the equivalent of 16.3 ¢/kWh.

A 2.5 GW gas fired power plant on the North Slope, together with HVDC transmission lines, could energize the entire Railbelt, power Prudhoe Bay oil field activities and provide electric heat to Fairbanks for about 6.5 ¢/kWh.

It would generate 4.5 times the retail electricity sold in 2010.

Heat and Power Fairbanks



Gas Fueled Turbine Based Combined Cycle Power Plant
1700 MW @ 60% Efficiency Gas to Electricity
CSC Technology AC/DC Converter Stations

The Good Wind Power Resources of the North Slope become Available

Off Load
1700 MW CSC Technology
DC/AC Converter Station

Heat and Power Fairbanks

Capital Costs (Billion $)

Power Plant (1700 MW)	2.44
HVDC Power Line	1.05
Converter Stations	0.60
Total	**4.09**

Operating Costs ($/MWh)

Capital (30 years @ 7%)	26.57
Gas (0.208 bcf/day – Henry Hub $3.00/mcf)	18.36
O & M Gas Turbine Power Plant	12.50
HVDC Line System Maintenance (1.5%)	2.00
Insurance (0.5%)	1.65
Regulatory Fees	1.00
Property Taxes (0.5%)	1.65
Administrative & OH	1.00
	64.73($/MWh)

6.5 ¢/kWh

Heating and Powering Remote Communities

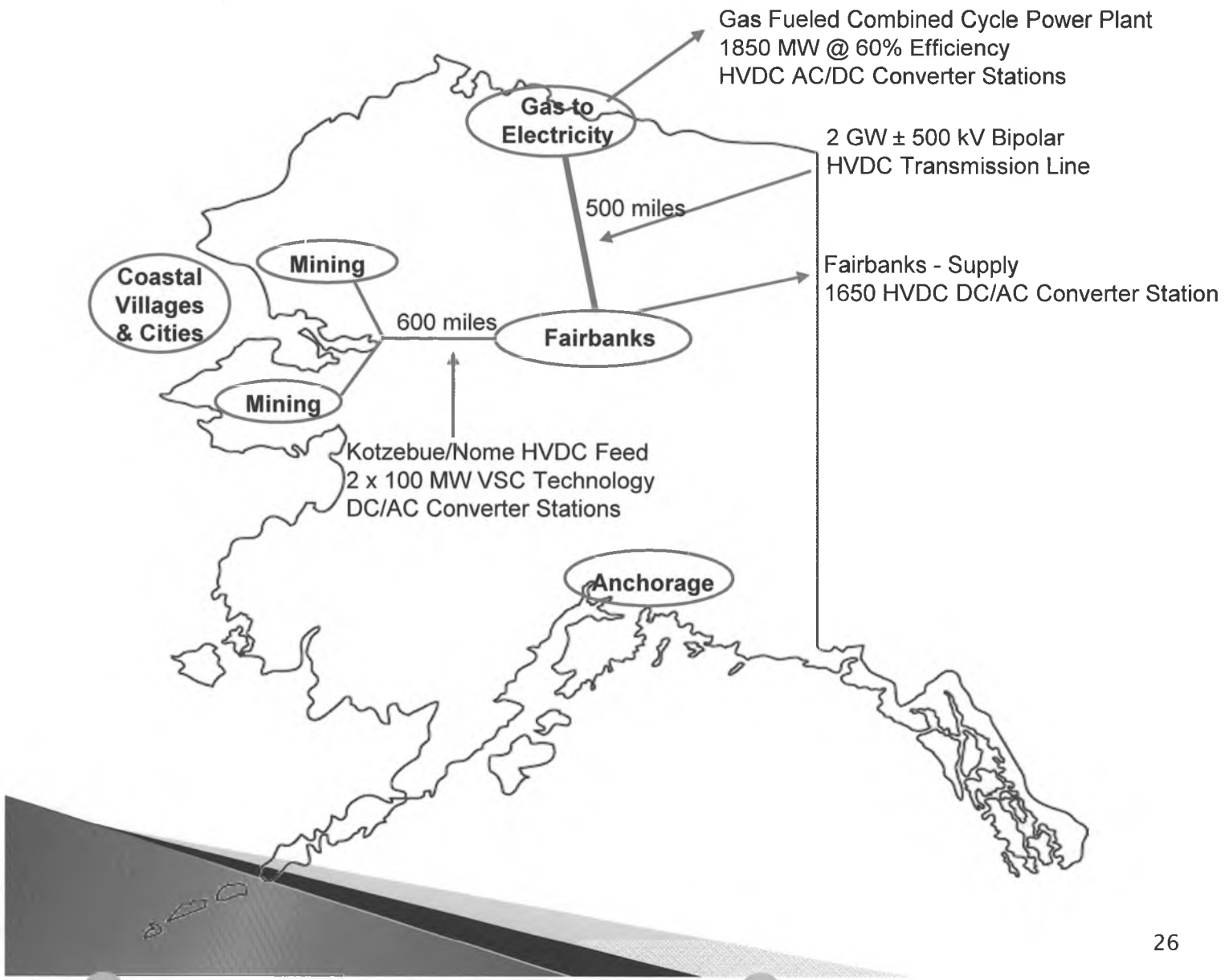
In remote communities, heat with $7 per gallon diesel costs the equivalent of 23.1 ¢/kWh. Electricity costs more than 50 ¢/kWh.

Economic development is impossible. Resource development is constrained.

Plentiful, affordable energy is

- the catalyst to transform villages from survival to viable
- the key to unlocking Alaska's remote resources
- the engine for statewide manufacturing and industrial activity

Heat and Power for NW Alaska



Heat and Power Kotzebue/Nome Area

Capital Costs (Billion $)

Power Plant (Purchase Power at Fairbanks)	0.00
HVDC Power Line (600 miles)	0.78
Converter Stations (2 x 100 MW VSC Units	0.12
Total	**0.90**

Operating Costs ($/MWh)

Capital (30 years @ 7%)	48.68
Gas (0.0 bcf/day – Henry Hub $3.00/mcf)	0.00
O & M Gas Turbine Power Plant	0.00
HVDC Line System Maintenance (1.5%)	9.06
Insurance (0.5%)	3.02
Regulatory Fees	1.00
Property Taxes (0.5%)	3.02
Administrative & OH	1.00
	65.78($/MWh)

Cost of Power at Kotzebue/Nome = (6.5 + 6.6) ¢/kWh	**13.1 ¢/kWh**

Reliability/Availability of HVDC Transmission Systems

ABB (manufacturer of 2/3 of worldwide HVDC) guarantees:

Availability due to forced outages	99.0%
Availability including scheduled outages	98.0%
Single pole forced outages	1 event / 5 years
Bipolar forced outages	1 event / 25 years

Ultimately, and as is required in any electrical system, some level of local spinning reserve and stand by power generation is needed as backup.

Green House Gas/Emission Issues

CO_2 production from diesel generation reduced by ~ 60%

Heating oil replaced by electrical heating is CO_2 neutral

CO_2 Emissions from North Slope Operations reduced by 50% (to the extent that project production is used by Producers)

HVDC transmission grid provides the means to bring remote wind and other renewable resources to market, further reducing CO_2 production

Do We Compete with a Gas Pipeline?

Known North Slope gas reserves are **235** tcf

- 833 MW project uses 38 bcf/year, **1.14** tcf - 0.5% in 30 years
- 1.7 GW project uses 76 bcf/year, **2.28** tcf – 1.0% in 30 years
- 2.5 GW project uses 113 bcf/year, **3.4** tcf – 1.5% in 30 years

In Summary

HVDC Transmission can move power long distances at greater efficiency and better stability than conventional AC transmission.

HVDC can provide power to Alaska's remote communities as well as mining operations, military installations and fish processors.

HVDC and high-efficient gas turbine technology can:

- Energize the Railbelt
- Replace diesel oil, wood and coal used to heat Fairbanks and the rural communities.
- Energize distant mining, military and processing operations.
- Revitalize rural Alaska and create thousands of jobs.

We can ship "Made in Alaska" - not pieces of Alaska



Speakers

Ward Sattler
President, Alaska Resource Agency

Dr. James Houck
Professor, Air Quality,
University of Portland

Sustainable Renewable Resource Solutions
for
Interior Alaska's
Energy & Air Quality Crisis

Several large scale energy projects are scheduled or proposed for completion over a decade away.

While these projects are good, what can the Interior do, in the meantime, to offset the high cost of energy and improve quality of life?

Alaska Resource Agency's Mission Statement

Introduce innovative, cost-effective solutions for clean heat & power.

Emphasizing utilization of
Alaska's vast Renewable Biomass Resources.

Why is this effort necessary?

Because the cost of energy is high, people use the most affordable fuels and appliances available to heat their homes and businesses.

The least expensive fuel, combined with antiquated appliances, leads to inefficient/high-cost heating and a serious air pollution problem.

Estimated 2014 Residential Heating Device Counts by Type and Area

Device Type	Entire FNSB	PM2.5 NA Area
1 - All Wood-Burning Devices	13,367	11,934
1a - Fireplace without insert	638	601
1b - Fireplace with insert	707	655
1c - Woodstove	11,490	10,205
Sub-total, Stoves/Inserts (1b+1c)	12,197	10,860
1b/c.u - Uncertified (<1988) Stove/Insert	2,658	2,409
1b/c.c - Certified (>=1988) Stove/Insert	9,539	8,451
1b/c.w - Cord Wood Stove/Insert	11,644	10,364
1b/c.p - Pellet Bags Stove/Insert	553	496
1d - Outdoor Wood Boiler	532	473
2 - Central Oil Furnace	29,392	26,695
3 - Portable Heater	1,892	1,700
4 - Direct Vent Heater	7,067	6,313
5 - Natural Gas Heating	1,336	1,248
6 - Coal Heat	580	502
7 - Municipal Heat	1,004	944
8 - Electric	1,048	920
9 - Other	2,388	2,095
All Devices	58,074	52,351

Detroit Free Press

February 18, 2013



"High pollution creates a thick haze in Beijing last month. At times, the air quality in parts of Alaska has been worse than in **Beijing**." / NG HAN GUAN/ASSOCIATED PRESS

Los Angeles Times

Fairbanks area, trying to stay warm, chokes on wood stove pollution



By Kim Murphy, Los Angeles Times *February 16, 2013, 6:17 p.m.*

"Wood-burning stoves give the Fairbanks, Alaska, area some of the worst winter air pollution in the country."

All the major State and private ventures intended to reduce energy costs and PM2.5 emissions from wood smoke are years away.

Best case scenario for Susitna Dam Project: 2024

(per the AEA report)

Best case for a Fairbanks Gas Distribution Network--expanded to the point **that all** residents switch from wood to natural gas or propane:

2021

What market conditions are favorable for converting to natural gas?

"Switching to natural gas or propane only occurs when the cost of the gas or propane and the estimated conversion cost are **equal to or less than 90 percent** of the price of fuel oil adjusted for average oil-fired appliance efficiency, **or 110 percent** of the cost of wood adjusted for average wood stove efficiency."

"...the model indicates that wood switching will not occur in the high and medium density areas for several years depending on the specific model assumptions that are used. **In most model runs the wood switching does not occur until 2021 or so**, when the volume of gas sales has increased to the point where the fixed costs can be spread across greater gas sales volumes."

"Fairbanks North Star Borough Gas Distribution System Analysis"
June 29, 2012, Executive Summary, pages 9 and 12

With these large energy projects not projecting substantial results in air quality improvement until at least 2021, there are serious economic concerns:

While the Interior waits, what happens with?

The future of Eielson and Wainwright missions;

Federal transportation funds with lack of air quality attainment;

Retailers The Housing Market Service Industry

In terms of Public Health, and Economics, the Interior cannot afford to wait for air quality improvement from a large-scale project.

A cost-effective solution for air quality improvement, and concurrent reduction in energy costs per household, is a **new infrastructure for biomass utilization.**

Alaska Resource Agency addresses the "Interim" Energy and Air Quality problem by

administering field and R&D projects

Launched the Air Quality Attainment project (AQA)

The purpose of this project is to:

- **Identify** pollution sources within designated air quality "hotzones" and near sensitive areas, such as schools, and densely populated neighborhoods;
- **Reach out to the homeowner** with information on upgrading or replacing their current appliance;
- **Upgrade equipment** where necessary;
- **Teach** homeowners best burn practices and boiler/stove maintenance procedures;
- **Replace** uncertified, damaged, or old wood stoves with the latest certified equipment.

Recent Field Accomplishments

Since September, 2012

- Inspected and maintained (45) indoor appliances;
- Installed (25) indoor appliances now emitting under 2.6 grams/hour;
- Inspected & repaired/maintained (61) outdoor wood boilers;
- Installed (42) pollution control devices;
- Replaced (5) large outdoor wood boilers with unit emissions well under EPA's pending emission standards;

Progress is being made

Between the Air Quality Attainment Project and FNSB's wood stove Change-out Program, nearly **1,000** units have been upgraded, removed, or replaced in the past two years.

And this figure does not include privately purchased upgrades.

Unique Features of the Program

- Residents, and businesses, can apply online (www.AlaskaResourceAgency.com)
- The program can upgrade, replace, and help maintain any solid fuel burning appliance;
- Equipment costs and potential renovation costs are covered; many applicants are **low income** households;
- Stoves are replaced with only the cleanest, commercially available units with comparable BTU output;
- All installations are followed-up on with personal visits to ensure proper equipment performance and address any operation concerns;
- There is a focus on the **hotzones** within the non-attainment area to address immediate air quality complaints;
- All original furnaces must be removed and rendered inoperative. ARA is the only entity that can guarantee former furnaces are removed.

3 Key R&D activities

- **Pollution Control Device** (PCD) development for
  - Outdoor Hydronic Heaters (Outdoor Wood Boilers)
  - Wood stoves

An example of a Pollution Control Device:

This is a catalyst, with an intelligent controller to regulate heat and air flow.

Visible Emissions can be reduced by **90%** with Catalytic Technology

Similar technology used to reduce vehicle emissions since the 1970s.



Emission Control Technology

- **Improving Furnace Design**
  - Testing for Efficiency and Emissions (at EPA certified laboratories)
    - Integrating Catalytic Emission Control Technology into a Hydronic Furnace. This increases efficiency by reducing the time it takes for the water jacket to reach temp. and eliminates most emissions throughout the **entire** burn cycle.

Joining me to discuss the economic and health aspects of upgrading equipment through a community-wide change-out effort is **Dr. James Houck**.

Jim Houck received his Ph.D. in Chemical Oceanography from the University of Hawaii, his M.S. in Environmental Chemistry also from the University of Hawaii, and his B.S. in Chemistry from the University of Arizona. He has been involved in the field of air quality since 1980. He currently is an independent consultant, and adjunct professor of air quality.

Wood Heater Change Outs –
A Reality Check

James E. Houck, Ph.D.

Benefits of Change Outs

- **Health** – Reduced Air Pollutants
- Contribute to the goal of attainment of federal fine particulate (PM2.5) standards (NAAQS)
- Reduced number of home fires – less creosote (fewer chimney fires)
- Safer Units – fewer burns, less indoor carbon monoxide exposure, plus hearth and chimney inspection at time of installation
- New units have higher efficiencies – less fuel consumed – lower fuel cost for home occupants

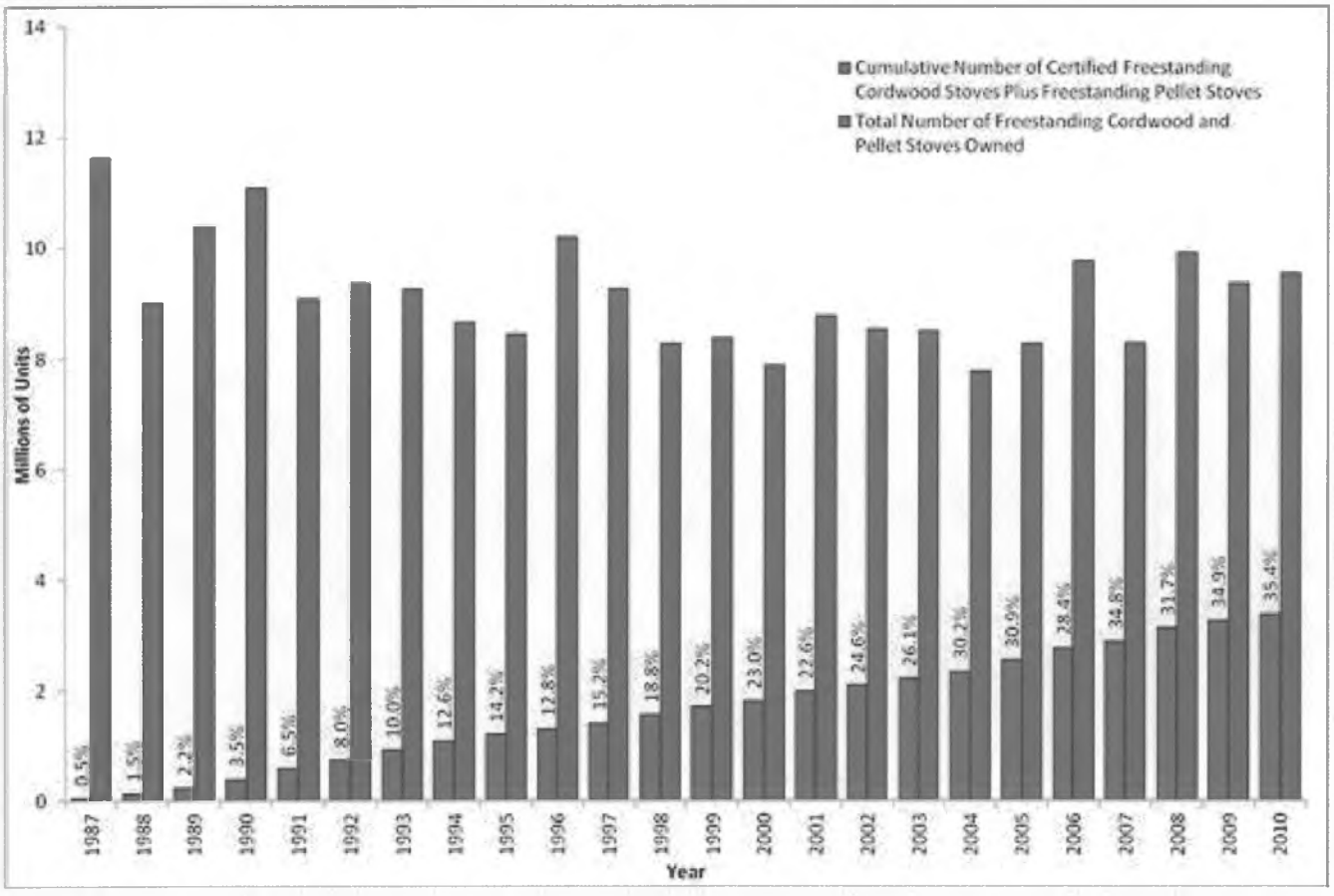
Documented Clean Wood-Burning Candidates for Installation

- Cordwood Stoves (Catalytic and Non-catalytic), new EPA certified units (40 CFR, NSPS)
- Cordwood Inserts – essentially same as stoves but designed to fit into existing fireplace cavity, EPA certified units
- Outdoor Cordwood Boilers, a.k.a. hydronic heaters, EPA qualified units (also indoor and pellet fueled) http://www.epa.gov/burnwise/owhhlist.html

Documented Clean Wood-Burning Candidates for Installation (cont.)

- Pellet Stoves, Inserts, and Furnaces – all clean burning as compared to cordwood stoves, some EPA certified, some boilers qualified
- Fireplaces – EPA qualified units
  http://www.epa.gov/burnwise/fireplacelist.html
- Masonry Heaters – all clean burning, high cost, upper end homes only
- Fireplace Retrofits – EPA qualified units
  http://www.epa.gov/burnwise/fireplacelist.html

Opportunity for Change Outs – Nationwide Most Stoves are Still Old, High- Emitting Units



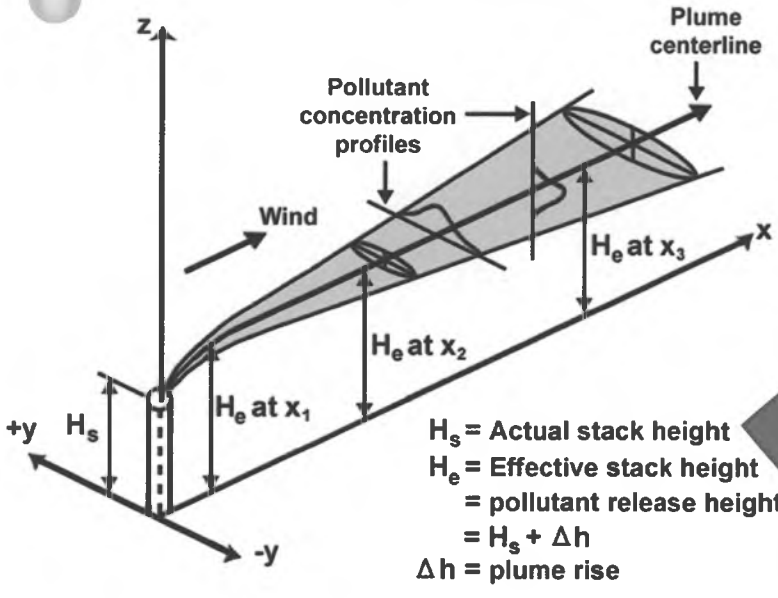
Health Concerns

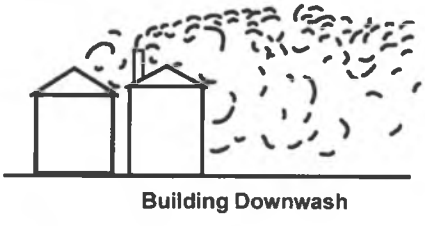
Majority of wood-burning air emissions are health injurious, incomplete combustion of organic compounds

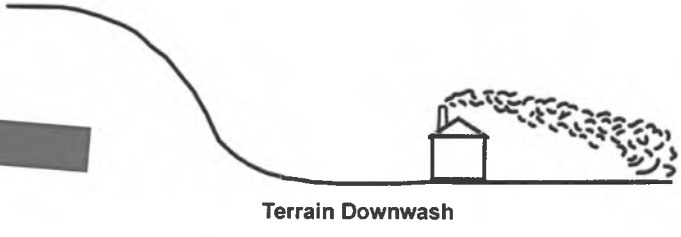
- Carbon Monoxide
- Respirable Particles, solid or liquid droplets, less than 1 micron in size from combustion sources
- Volatile Organic Compounds (VOC), vapor phase

Exposure

- Discharge at only 10 ft to 30 ft above ground level exacerbates human exposure
- 41 million single-story homes (32%)
- 43 million two-story homes (33%)
- 8.7 million manufactured and mobile homes (7%)





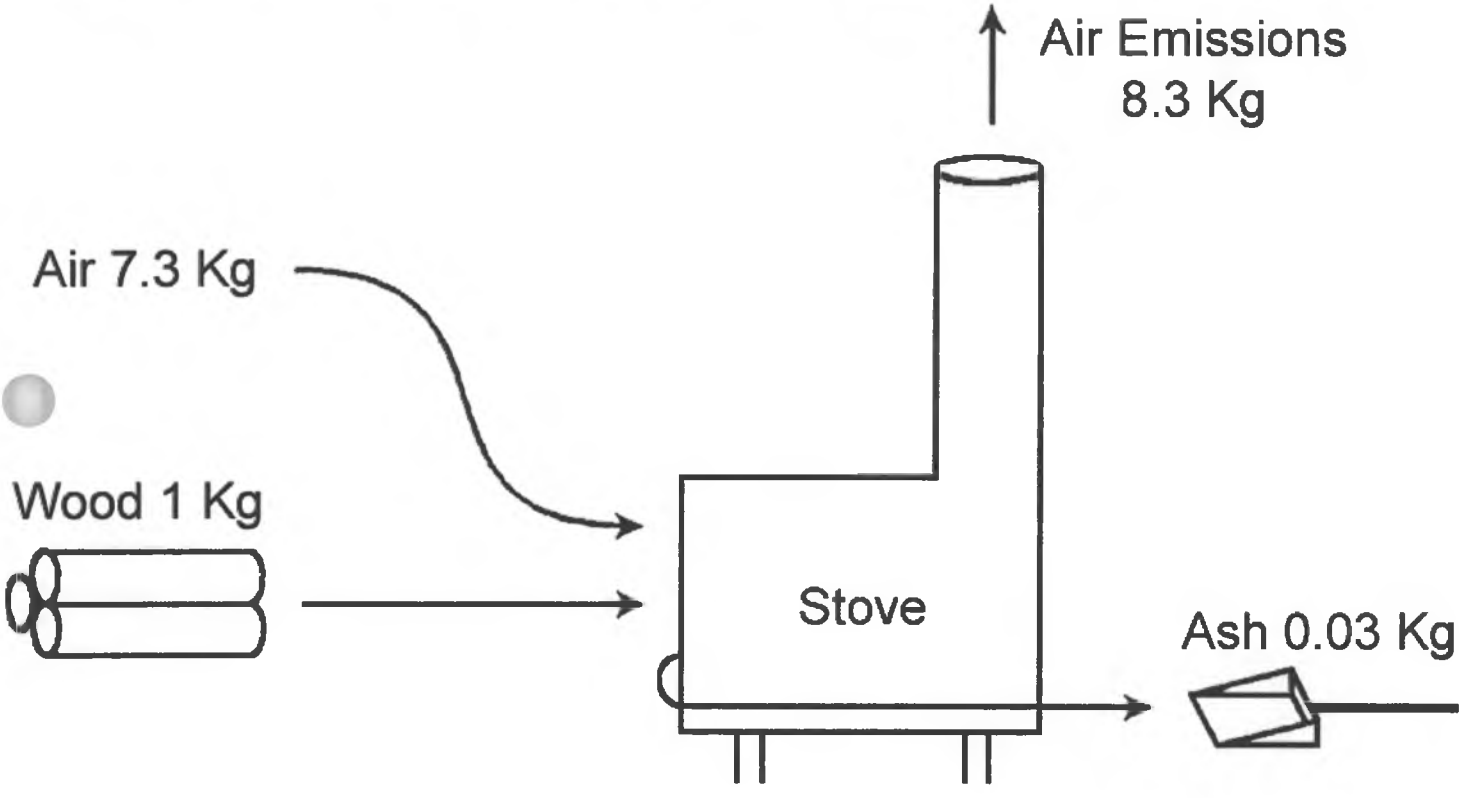


Exposure

Individuals most sensitive to air pollutants (very young, very old, infirm) spend most of their time indoors in residential settings where the home heaters are located

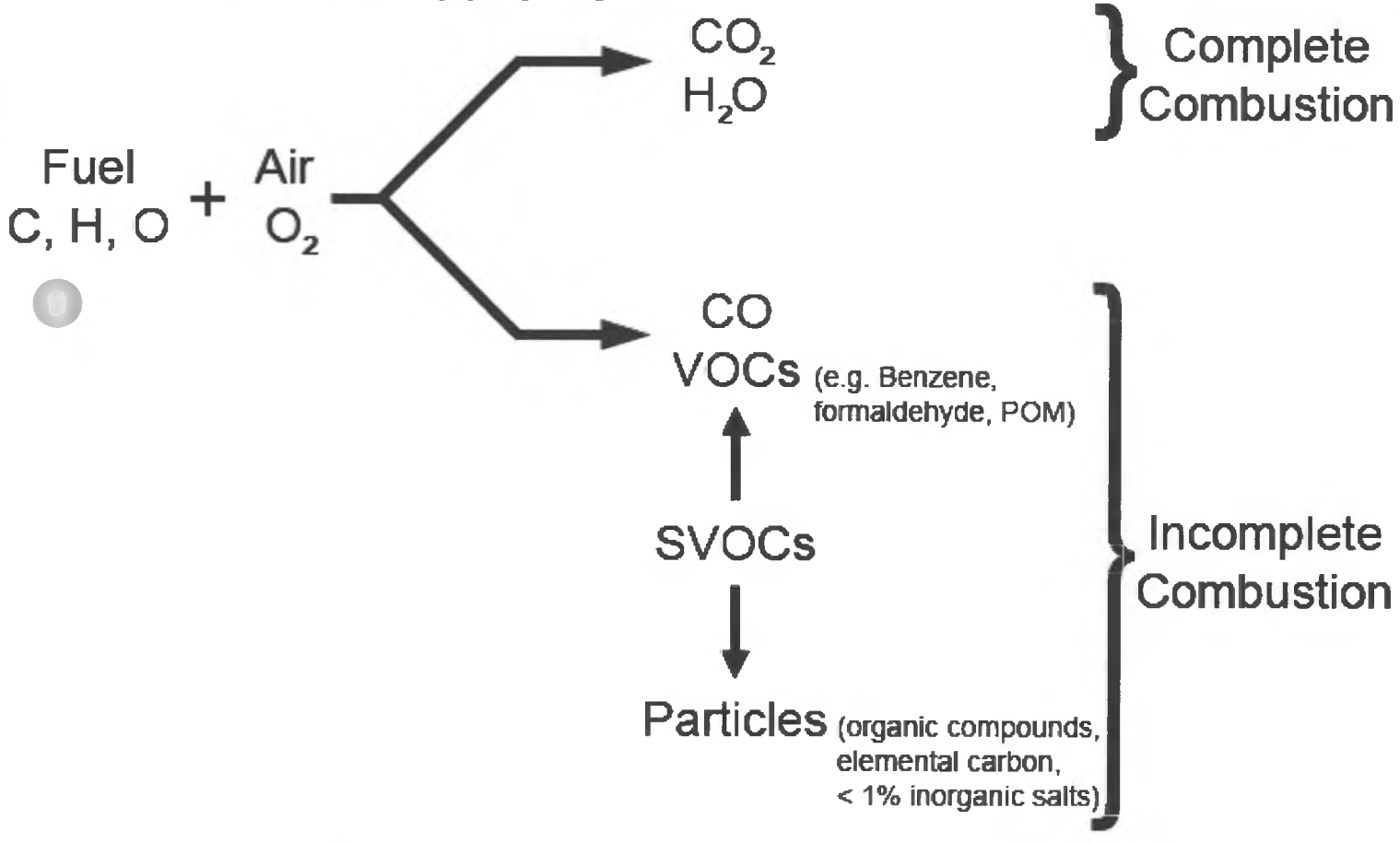
Indoor air originates from outdoor air – Occupied Single-Family Houses – 0.5 to 2.5 air exchanges per hour

Origin of Air Emissions – Mass Balance



20% Moisture Douglas Fir Fuel, Conventional Woodstove, Low Burn Rate

Characteristics of Air Emissions



Health Concerns

- Carbon Monoxide – Even though there are ambient and industrial standards, no level is good, carboxyhemoglobin
- Particles from combustion (< 1 μ) reach the deepest levels of the lungs, chemical exchange with blood, particles from wood-burning emissions are appx. 90% organic compounds, many are toxic, mutagenic, or carcinogenic
- Volatile Organic Compounds (VOC) – many are toxic, mutagenic, or carcinogenic

Conventional Uncertified Wood Heater Title III Hazardous Air Pollutants

Pollutant	Emission Factor (g/Kg)
Acetaldehyde	0.308 g/Kg
Acetophenone	0.010 g/Kg
Acrolein	0.046 g/Kg
Benzene	1.08 g/Kg
Biphenyl	2.43 mg/Kg
1,3-Butadiene	0.197 g/Kg
Catechol	0.331 g/Kg
o, m and p-Creosols	0.080 g/Kg
Dibenzofurans	1.9 mg/Kg
Ethyl benzene	ND
Formaldehyde	0.727 g/Kg
Hexachlorbenzene	13 ng/Kg
Hexane	0.012 g/Kg
Methanol	3.24 g/Kg
Naphthalene	0.091 g/Kg
Phenol	0.147 g/Kg
Polychlorinated biphenyls	0.50 pg/Kg (PCB_{TEQ})
Propionaldehyde	0.096 g/Kg
Styrene	0.117 g/Kg
2,3,7,8-Tetrachlordibenzo-p-dioxin	2.30 ng/Kg ($Dioxin_{TEQ}$)
Toluene	0.320 g/Kg
o, m and p-Xylenes	0.099 g/Kg
Polycyclic Organic Matter	0.315 g/Kg (16-PAH)

Appliance	Particulate Emissions Factor		
	Pounds/Ton	Grams/Kilogram	Reduction (%)
Conventional Stove	37	18.5	--
Non-Catalytic Stove	12	6	68
Catalytic Stove *	13	6.2	65
Pellet Stove	4	2	89
Masonry Heater	6	3	84
Conventional Stove with Densified Fuel	25	14	24

Reduction in Emissions

Conventional = Uncertified

Appliances	Efficiency (%)	Mass Particulate Emissions/Delivered Heat		
		lb/MBtu	g/MJ	Reduction (%)
Conventional	54	3.89	1.68	-
Non-cat. Stove	68	1.14	0.49	71
Catalytic Stove*	72	1.02	0.44	74
Pellet Stove	78	0.31	0.13	92
Masonry Heater	58	0.59	0.25	85
Conv. with Densified Fuel	57	2.79	1.20	27

Certified Woodstoves Continue to Improve

Comparison of Average Certified Emission Rates for Old and New Phase 2 Cordwood Stoves

Time Period	Woodstove Type	Number of Stoves	Average Emission Rate (g/hr, 5H equivalent)	Percent Reduction (%)
First 5 years of certification (1988-1992)	Non-catalytic	115	5.1	-
	Catalytic	110	2.9	-
Currently certified woodstoves (certified or renewed in the last 5 years)	Non-catalytic	137	4.1	19.6
	Catalytic	23	2.7	6.9

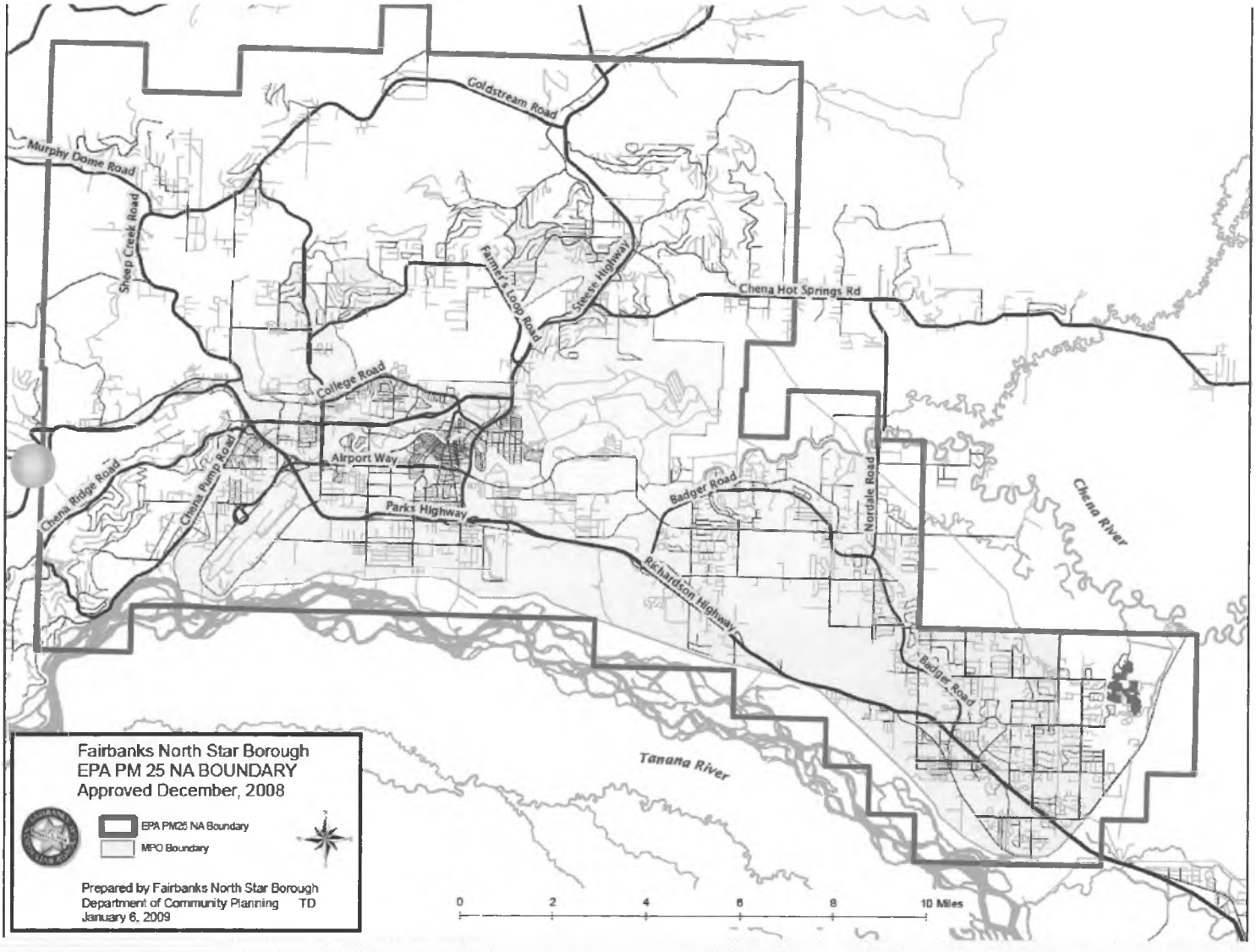
"last 5 years" was 2000 to 2005

Outdoor Wood Boilers Have Improved Dramatically

- Average of 12 models prior to 2005 — 71.6 g/h
- Average of 27 EPA qualified models (annual average values) — 4.7 g/h

Fairbanks is Federally Nonattainment for Fine Particles a.k.a. Respirable Particles or $PM_{2.5}$

- Particles produced by combustion less than 1 micron and as such less than 2.5 microns ($PM_{2.5}$)
- 24 hour standard now 35 µg/m³ (prior to Dec. 2006 was 65 µg/m³)
- Annual standard now 12 µg/m³ (prior to Dec. 2012 was 15 µg/m³)


Goldstream Road
Murphy Dome Road
Sheep Creek Road
Farmer's Loop Road
Steese Highway
Chena Hot Springs Rd
College Road
Airport Way
Chena Ridge Road
Chena Pump Road
Parks Highway
Badger Road
Nordale Road
Chena River
Richardson Highway
Badger Road
Tanana River
Fairbanks North Star Borough
EPA PM 25 NA BOUNDARY
Approved December, 2008
EPA PM25 NA Boundary
MPO Boundary
Prepared by Fairbanks North Star Borough
Department of Community Planning TD
January 6, 2009
0 2 4 6 8 10 Miles

More fuel burned (fuel oil, wood, coal, waste oil, motor vehicle fuel) in cold weather plus temperature inversions more common in cold weather

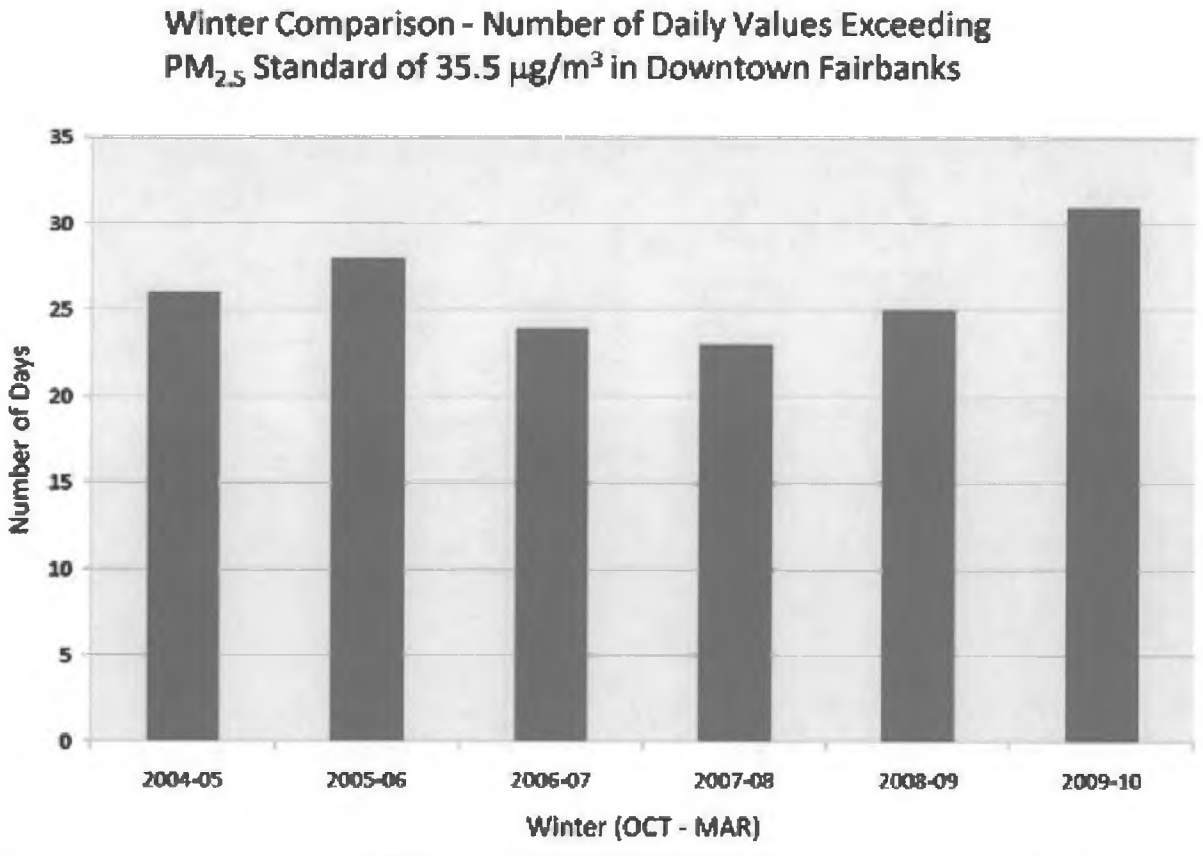


Table 6: Summary statistics for Fairbanks State Office Building site, 2004 to 2009.

	2004	2005	2006	2007	2008	2009
Max 24-hour concentration						
Days above standard						
Annual 98th percentile value	46.2	40.6	**42.2**	33.1	**46.7**	**51.0**
24-hour design value	40	40	**43**	**39**	**41**	**44**
Annual design value	10.9	10.5	11.1	11.0	11.2	11.2

Wood Heater Change Outs and Attainment

- Number of 24-hour wintertime exceedances most likely to be reduced by wood heater change outs
- With the lowering of the federal annual standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ in Dec. 2012 and continued future growth, wood heater change outs may be of value for future attainment of annual standard (see annual design values in previous slide)
- Wood heater change outs may contribute slightly to the maintenance of the urban Fairbanks CO attainment – most CO from vehicles

Safety

- Wood heating stoves and fireplace inserts responsible for **11,000 home fires** per year in the U.S. causing **228 civilian deaths** and more than **$366 million dollars** in property damage (NFPA 2003-2006)

- **190 deaths** per year due to carbon monoxide poisoning from space heaters (CPSC 1999-2002)

- Creosote buildup in chimneys and chimney connectors is responsible for another **25% of home heating fires**

Cost Savings Due to Increased Efficiency

- Assume 5 cords/yr in uncertified stove
- Assume $275/cord
- Assume 54% efficiency for uncertified stove and 68% efficiency for certified non-catalytic stove
- Cost per year uncertified stove 5 X $275 = $1375
- Cost per year for certified non-catalytic stove for same heat output 5 X (54/68) X $275 = $1092
- Cost Savings $1375-$1092 = $283 or 21%
- Analogous cost savings by replacing uncertified stove with certified catalytic stove = $344 or 25%

Libby, Montana 2005-2008
Wood Heater Change Out – A Case Study



Libby – Heating Season Attribution of $PM_{2.5}$ Sources (2003/2004)

Local and regional dust (road and wind blown)	1%
Local and regional (15% regional) ammonium nitrate	5%
Local and regional (40% regional) ammonium sulfate	3%
Local wood smoke	66%
Cooking (commercial frying and grilling only considered)	1%+
Regional (background) organic compounds and elemental carbon	6%
Vehicular exhaust	7%
Heating oil	1%
Propane	<1%
Diesel exhaust from trains	3%
	Total 93%

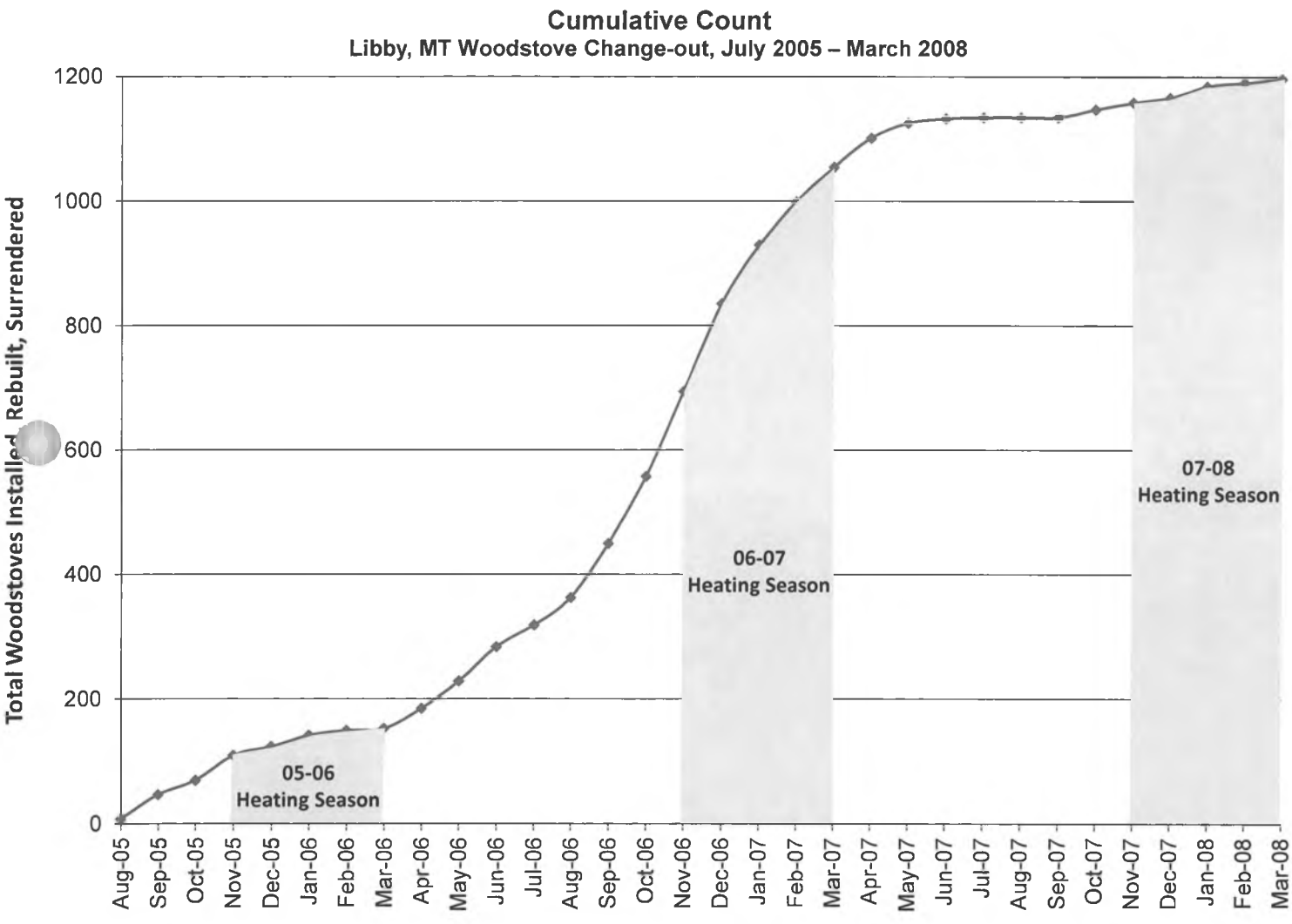
Notes: The local NH_4NO_3 and local $(NH_4)_2SO_4$ which together are about 6% of the average $PM_{2.5}$ concentration in Libby during the heating season are probably primarily from vehicular exhaust and fossil fuels emitting gaseous NO_x and SO_2, some may be from RWC. It is likely that the contribution of heating oil, vehicular exhaust, and diesel exhaust from trains is higher at the courthouse monitoring site due to its proximity to those sources and the estimate provided above for them is from an emission inventory for the airshed as a whole.

Annual and Heating Season Mean and Maximum Particulate Values

Year*	Heating Season	Means (µg/m³)		Max. 24-hr Value (µg/m³)		98th Percentile Value (µg/m³)
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	$PM_{2.5}$
2003		25	15.6	91	47	43
	2003-2004	35.9	27.3	76.0 (2/3/04)	42.5 (12/17/03)	
2004		28	14.0	81	40	38
	2004-2005	40.8	27.0	106.0 (2/3/05)	75.3 (1/19/05)	
2005		30	15.8	126	75	51
	2005-2006	32.7	26.0	74.0 (2/10/06)	51.1 (11/3/05)	
2006		28	15.3	100	44	41
	2006-2007	27.1	22.0	96.0 (2/17/07)	41.2 (11/1/06)	
2007		24	11.1	104	35	32
	2007-2008	27.9	22.5	44.0	42.3 (1/4/08)	
Standard		50 µg/m³ (Annual)	15/12 µg/m³ (Annual)	No Standard	65/35 µg/m³	

Note: 98th percentile and not the maximum 24-hour value determines compliance with 24-hour standard, i.e., surveying every three days yields 122 samples per year whereas the top two values "don't count."

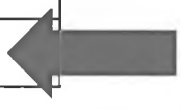
*Annual data taken from EPA Monitor Values Reports – Criteria Air Pollutants.



Note: Count is for the beginning of respective month.

Days $PM_{2.5}$ Exceeded 35 $\mu g/m^3$

Year (winter)	Days Above 35 $\mu g/m^3$
2004/2005	1/19/2005, (75.3 $\mu g/m^3$) 1/22/2005 (52.8 $\mu g/m^3$) 2/3/2005 (45.9 $\mu g/m^3$) 11/5/2004 (39.7 $\mu g/m^3$) 11/23/2004 (37.7 $\mu g/m^3$) 2/27/2005 (35.0 $\mu g/m^3$)
2005/2006	11/3/2005 (51.1 $\mu g/m^3$) 12/24/2005 (47.7 $\mu g/m^3$) 1/14/2006 (43.9 $\mu g/m^3$) 1/17/2006 (40.5 $\mu g/m^3$)
2006/2007	11/1/2006 (41.2 $\mu g/m^3$) 12/22/2006 (40.0 $\mu g/m^3$) 12/25/2006 (39.6 $\mu g/m^3$) 11/4/2006 (36.2 $\mu g/m^3$)
2007/2008	1/4/2008 (42.3 $\mu g/m^3$)



Down to one!

Summary – Air Quality Reductions from Woodstove Change-out and Potential Application to Other Nonattainment Areas

	2004-2005 Mean (Pre-Change-out)	2007-2008 Mean (Post-Change-out)	Reduction
FRM $PM_{2.5}$ ($\mu g/m^3$)	27.0	22.5	16.7%
$PM_{2.5}$ Normalized* ($\mu g/m^3$)	26.7	21.7	18.7%
PM_{10} ($\mu g/m^3$)	40.8	27.9	31.6%
PAH (ng/m^3)	351.8	104.4	70.3%
Phenolic (ng/m^3)	391.4	151.0	61.4%
Organic Carbon ($\mu g/m^3$)	17.9	12.2	31.8%
Days $PM_{2.5}$ Exceeded 35 $\mu g/m^3$	6	1	—

*Using $PM_{2.5}$ data paired with days with valid HDD data.

Note: The reduction percentages among different parameters are surprisingly different.

Consumer Reasons for Selection of Wood Heating Options

- Energy independence – Non-interruptible fuel supply

- Economic and recreational value of firewood harvesting
  - 58% Minnesota survey 2007-08
  - 66% National 1993 (DOE survey)
- Green Awareness – Climate Change Advantages
  - Carbon Dioxide GHG credit for biomass
  - Methane fugitive emissions from Natural Gas
- Fuel Economy

Economy – Realistic Scenarios

- 3 households, all same heating demand, 115MBtu energy input per heating season, all heaters 80% efficient

- Household #1, Electric Furnace, 22¢/kWh = $7415
- Household #2, Fuel Oil Furnace, $4.00/gal = $3316
- Household #3, Outdoor Wood Boiler, $275/cord = $1375

03/20/13 Overview: Energy Wise Program

<TARGET><BILL></BILL><SUBJECT>03-20-13 Overview Energy Wise Program</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, March 20, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

OVERVIEW: +Energy Wise Program
Sarah Scanlan, Deputy Director, RurAL CAP, Ellen Kazary, Development Director, RurAL CAP

Call in testimony:
Kirk Oviok Jr. - Energy Wise crew leader from Selawik
Tommy Ballot Sr. - Selawik Housing Authority

Bills previously heard/scheduled

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

###

Rural Alaska Community Action Program, Inc.
Energy Programs:
Designed to Meet the Needs of Alaskans

Rural Alaska Community Action Program, Inc.
Sarah Scanlan, Deputy Director
Ellen Kazary, Development Director
907-865-7366; ekazary@ruralcap.com

2013-2015 Strategic Directions

- Advocacy
- Education
- Health
- Housing
- Energy & Environment
- Capacity Building



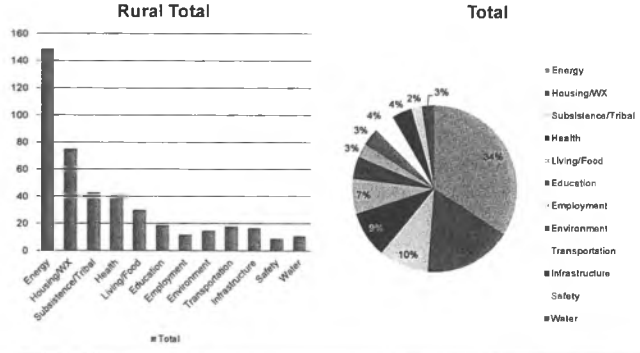
RurAL CAP

Employed 1,023 Alaskans in 81 communities last year



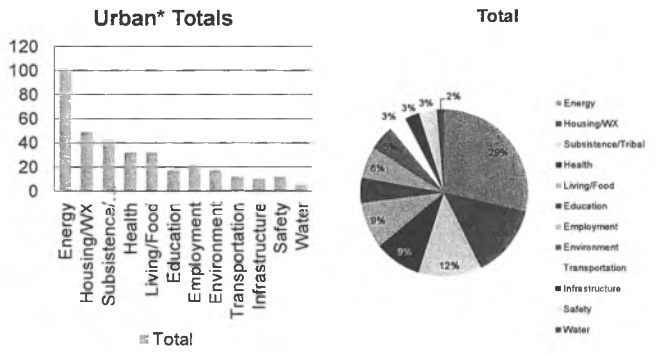
What are the top issues in your community?
2012 AFN Survey

(Rural: n=182 from 171 villages)



What are the top issues in your community? 2012 AFN Survey:

(n=143)



*Includes Anchorage, Eagle River, Wasilla, Palmer, Fairbanks, North Pole, Juneau

Rural Energy Crisis

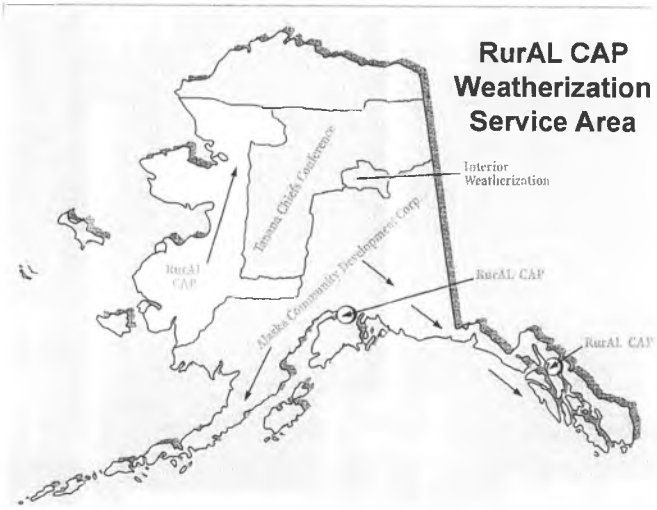
AHFC estimates of annual average household fuel and electric costs by region reported in the 2011 "Energy Savers Tips for Alaska:"

- Northern: $10,773
- Southwest: $8,361
- Interior: $8,317
- Southeast: $5,947
- Railbelt: $4,753

Rural Energy Crisis

According to the 2012 Commonwealth North report; "Energy for a Sustainable Alaska; The Rural Conundrum;"

"*Remote households with the lowest incomes face the highest cost burden, estimated in some cases to be 47% of their total income.*"

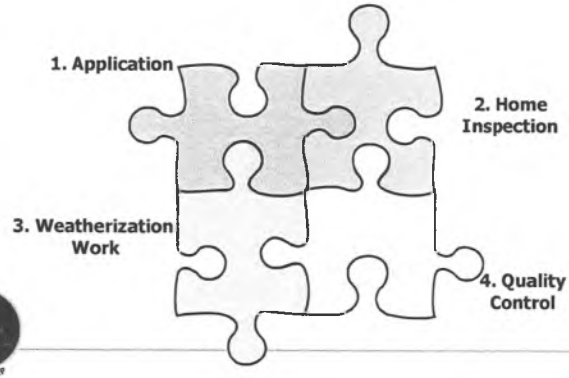


2013 RurAL CAP Weatherization Sites

# Homes	Community
500	Anchorage
100	Juneau
40	Kotzebue
13	Shaktoolik
12	Nome
40	Unalakleet
60	Chevak
8	Platinum
33	Toksook Bay
830	Total



Four Steps to a Weatherized Home



1. EZ Application process

- Already getting public assistance, LIHEAP, SSI, Sec 8 Sec 202/811 housing, LIHTC, Senior benefits, or food stamps?

☞Good news: YOU AUTOMATICALLY QUALIFY!

- Application assistance is available for everyone
- New, easier to complete application

Households with Seniors over 55 and/or children under 6 are a priority

2. Home Assessment





A complete check-up is done. Top to bottom, inside and out, each home is inspected to identify where energy is being wasted and air quality needs improvement.

Each home gets an individual "prescription."

3. Weatherization Work



Shaktoolik Wx Crew ready to go out to their job sites for the day

- Local hires, working under the supervision of highly-trained field supervisors and foremen, perform the weatherization work.



Typical Weatherization Work

Local workers receive on the job training



Ventilation for extreme climates



Sealing prior to installing a new window



Wrapping a home to increase insulation



Completed homes



Homeowners select the colors to top off the finished weatherization job.



4. Quality Control



Weatherization improvements are reviewed with homeowner both before and after the work is done.

Follow-up visit is made after completion to ensure that everything is working properly and to respond to issues or questions.

Weatherization Works

www.weatherizeme.org

907-771-7800

Rural Alaska Community Action Program, Inc.'s

Energy Wise Program

RurAL CAP

Rural Alaska Community Action Program, Inc.'s

Energy Wise Program

Energy Wise is a comprehensive residential energy efficiency and conservation education program.

- RurAL CAP works in partnership with local communities to reduce the burden of high energy costs.



Rural Alaska Community Action Program, Inc.'s

Energy Wise Program

- **Reduces** energy consumption, **saves** money (resident) and PCE subsidy (state)
  - Household assessment of energy use
  - Identification of best savings options
  - Low-cost home upgrades
- **Creates jobs** for rural Alaskans
  - Hire and train locally
  - Professional development and certification

Proven Performance and Results





Since 2010:

- 22 communities served, over 2,000 households benefited (95% participation rate)
- More than 80% report maintaining changes, lower bills, warmer homes
- 240 rural Alaskans trained and employed

Proven Performance and Results

Articles about Energy Wise:

- Information Insights identified RurAL CAP's Energy Wise program as a best practice, proven tactic and recommended action step to improve the energy crisis in their 2011 report *"Recommendations for Alaska Energy Efficiency and Conservation Public Outreach Education and Outreach"* commissioned by the Alaska Energy Authority
- Highlighted in as a successful program in:
  - Alaska Business Monthly
  - The Hunter
  - Arctic Sounder
  - National Native News - NPR
  - Petroleum News
  - KTVA Channel 11
  - APRN

Collaborative Effort with State Energy Partners

Designed and implemented in partnership with:

- Alaska Housing Finance Corporation
- Alaska Energy Authority
- Weatherization Service Providers
- Housing Authorities
- Department of Energy
- Denali Commission
- Department of Labor
- Regional and community organizations
- Utilities

Complements Weatherization

- Prioritizes communities not recently served or scheduled to be served by Weatherization
- Focuses on immediate improvements for energy savings and education
- Residents are involved in assessing energy use and making changes in their homes
- Engages the entire community, all homes eligible



Effective Program Design

- Community Partnership
- Message Delivered by Local Crews
  - 4- 10 hired per community, 6-12 weeks
  - Professional training and certification







Preparing for future employment in:

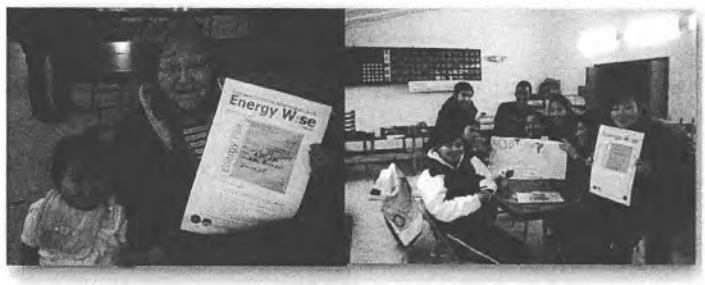
Energy Development
Weatherization
Construction Fields

Crews receive certification in:

- Weatherization Tech 1
  General building science
  Weatherization basics
  Hands-on installation experience
- Occupational Safety and Health Administration (OSHA) 10
  Construction safety standards
- First Aid

Effective Program Design

- Energy Fair
  - Engages entire community
  - Residents sign-up for home assessment



Effective Program Design

- Home Visits - Energy Assessments
  - 2 crew members, 1 full day (8 hours) per home
  - Residents participate in finding where energy is used and how to save
  - Review energy bills and identify potential savings
  - $300 of energy efficiency supplies installed



Home Visit



Crews Show Residents How to Save Energy and Money

$300 in Energy Efficiency Supplies



- Compact fluorescent lights and LEDs
- Jamb-up door kit and door sweep
- Pipe insulation
- Faucet aerators, soap-up valve and low-flow shower heads
- Power strips with surge protectors
- Hygrometers
- Refrigerator thermometer and coil cleaners
- Outlet and light switch insulators, plug protectors
- Water heater blanket
- Fire alarm, extinguisher, and carbon monoxide detector (if needed)

Energy Assessment Home Visits



Insulating outlets and switches

Installing water heater blankets and teaching maintenance



Installing door sweep and weather-stripping

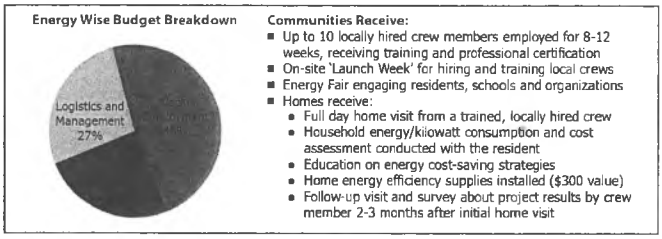


Effective Program Design

- Follow-Up Education and Survey
  - 3 to 6 months after home assessment
  - Distribute additional educational materials and supplies



Energy Wise Budget Breakdown
$2,000/home



2010 Energy Wise Results

- 120 rural Alaskans trained and employed
- 90% retention of crews
- 1,000 homes served
- 7,500 educated
- $$$ energy and money saved



2010 Outcomes – Sustained Change

Based on 700 follow-up home surveys:

- 86% reported they were still practicing energy efficiency and conservation measures
- 82% reported decreased home heating costs
- 80% reported decreased electric bills



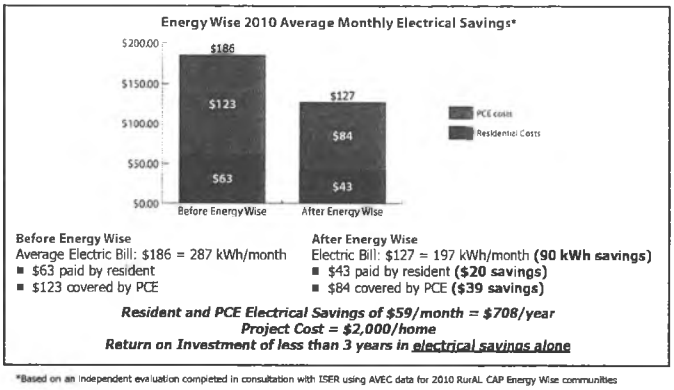
KASIGLUK CASE STUDY
2010 AVERAGE MONTHLY ELECTRICAL SAVINGS

- Before Energy Wise:
  - $186 = 287 kWh/month
  - $63 paid by resident
  - $123 covered by PCE
- After Energy Wise:
  - $127 = 197 kWh/month
  - $43 by resident = **$20 savings**
  - $84 by PCE = **$39 savings**

After Energy Wise:

- **90 kWh/month reduction**
- **$59 savings in resident and PCE electricity costs**

KASIGLUK



Before Energy Wise
Average Electric Bill: $186 = 287 kWh/month
- $63 paid by resident
- $123 covered by PCE

After Energy Wise
Electric Bill: $127 = 197 kWh/month **(90 kWh savings)**
- $43 paid by resident **($20 savings)**
- $84 covered by PCE **($39 savings)**

Resident and PCE Electrical Savings of $59/month = $708/year
Project Cost = $2,000/home
Return on Investment of less than 3 years in electrical savings alone

*Based on an independent evaluation completed in consultation with ISER using AVEC data for 2010 RurAL CAP Energy Wise communities

RETURN ON INVESTMENT
BASED ON KASIGLUK STUDY

- Residents save:
  - $20/month in electricity = $240/year
- State saves - PCE reduction:
  - $39/month = $468/year
- Project cost is $2,000/home:
  - Annual savings = $708/year
- Return on Investment = less than 3 years in electrical savings alone

NANA - ENERGY WISE
CORPORATE – NON-PROFIT PARTNERSHIP

According to the Northwest Arctic Strategic Energy Plan:

- 1 in 4 household dollars in the region goes to heating and electric ($1/20 is typical in lower 48)
- 20% poverty rate
- 20% unemployment rate
- $788/month average spent on home heating and electric
- Approximately 50% reported some knowledge of energy efficiency or conservation
- About 80% reported reducing subsistence activities because of energy costs

NANA - Energy Wise
Corporate – Non-Profit Partnership

In 2011, NANA Regional Corporation, through their Village Economic Development Council, decided to contract with RurAL CAP to bring the Energy Wise program to every household in their region.

NANA - Energy Wise
2011-13 Partners

- NANA Regional Corporation
- Alaska Energy Authority
- Community Partners
- Northwest Arctic Borough
- Northwest Inupiat Housing Authority
- Denali Commission/Department of Labor
- U.S. Department of Energy, NREL
- Alaska Works Partnership

NANA - Energy Wise
2011-13 Outcomes

- 11 communities served: Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue (180 homes), Noatak, Noorvik, Selawik, and Shungnak
- 60+ crew members received professional certification
- 120 crew members trained in energy efficiency and conservation techniques and community education
- 1,022 homes visited; 95% participation rate
- Over 4,000 people received energy efficiency and conservation education and resources
- Energy bill savings

2011-12 Outcomes – Sustained Change

Results in NANA communities based on January 2012 survey:

- Average electric bill the month before Energy Wise was $312
- Average savings on electrical bill after the Energy Wise visit was $35
- 82% reported that their homes felt warmer – despite record breaking cold temperatures



Reducing the Energy Burden

CAPSIS request submitted for $1.6M to conduct Energy Wise in 12 communities in rural Alaska.

- Energy Wise is a tested and proven initiative with immediate and long-term results
- Energy Wise can provide immediate relief to communities outside the Railbelt with few other options
- RurAL CAP is committed to reducing the energy burden for Alaskans while creating healthy economies and sustainable communities
- Regional and local requests for expansion

Additional Funding

$2M total project budget for FY13

- $1.6M requested from State of Alaska
- $100,000 secured through the Denali Commission – for Venetie and Arctic Village
- $300,000 requested through the Rasmuson Foundation
  - The Rasmuson Foundation has met with RurAL CAP and agreed that they would be interested in funding project supplies, should state funding be secured

Operational Plan CAPSIS Request

- 12 communities will be served
- 1,000 households will benefit
- 70 rural Alaskans will be employed
- Competitive selection process will evaluate:
  - Energy burden and resources
  - Economic stress
  - Efficiency considerations: population size and geographic dispersion
  - Community and regional organization buy-in, commitment of available resources, and support

Rural Alaska Community Action Program, Inc.'s

Energy Wise Program

Healthy People, Sustainable Communities, Vibrant Cultures

For more information, contact:

Ellen Kazary
Development Director
(907) 865-7366
ekazary@ruralcap.com



Rural Alaska Community Action Program, Inc.'s

Energy Wise Program

RurAL CAP

Energy Wise helps rural Alaskans reduce their energy consumption, lower their electric bills, and save money. Energy Wise also creates up to 10 local jobs and training opportunities per community. Residents and the State save approximately $708/year in home electric bills, in addition to reducing heating costs. The program costs $2,000 per home.



Martin Woods shares ways a resident can reduce her energy consumption, lower her energy bills and save money.
Photo by Darla Brown

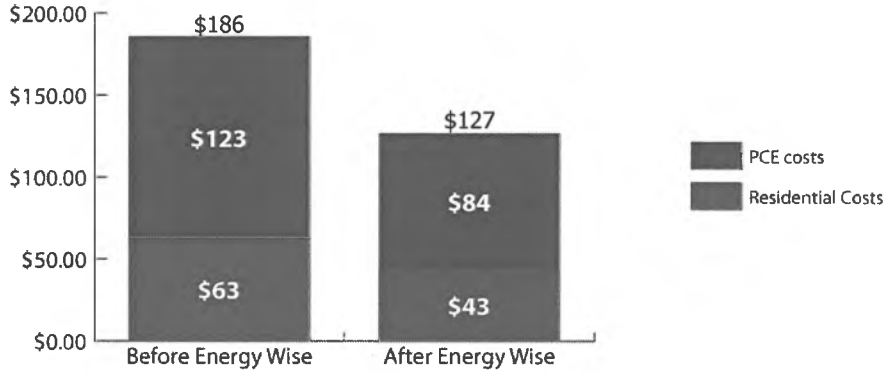
How It Works

Locally hired crews are trained to educate community residents and conduct basic energy efficiency upgrades through full-day home visits. Energy Wise crews work with residents to review their actual home energy consumption and teach them how to reduce costs. Energy Wise complements Weatherization by providing community-wide efficiency education and minor energy improvements that help people understand how their actions impact their energy bills.

Benefits of Energy Wise

- Immediate savings in household energy costs
- Meaningful employment and training in rural communities
- Consumer education resulting in sustained energy cost savings
- Serves residents not eligible or able to quickly access the State's Weatherization or Energy Rebate programs

Energy Wise 2010 Average Monthly Electrical Savings*



Before Energy Wise
Average Electric Bill: $186 = 287 kWh/month
- $63 paid by resident
- $123 covered by PCE

After Energy Wise
Electric Bill: $127 = 197 kWh/month **(90 kWh savings)**
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Resident and PCE Electrical Savings of $59/month = $708/year
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*Based on an independent evaluation completed in consultation with ISER using AVEC data for 2010 RurAL CAP Energy Wise communities



An Energy Wise crew member cleans refrigerator coils to increase efficiency

Collaboration With Energy Partners
RurAL CAP's partners include NANA Regional Corporation, Alaska Department of Labor, Alaska Energy Authority, U.S. Department of Energy, and the Denali Commission.

Energy Wise Highlights to date:
- 22 communities served
- Over 2,000 homes served
- 200 rural Alaskans employed

Energy Wise Budget Breakdown



Communities Receive:
- Up to 10 locally hired crew members employed for 8-12 weeks, receiving training and professional certification
- On-site 'Launch Week' for hiring and training local crews
- Energy Fair engaging residents, schools and organizations
- Homes receive:
  - Full day home visit from a trained, locally hired crew
  - Household energy/kilowatt consumption and cost assessment conducted with the resident
  - Education on energy cost-saving strategies
  - Home energy efficiency supplies installed ($300 value)
  - Follow-up visit and survey about project results by crew member 2-3 months after initial home visit



Up to 10 locally-hired crew members are employed for 8-12 weeks. Pictured is Shungnak's Energy Wise Crew.

Energy Wise Communities to Date

Akiak	Kotzebue
Ambler	New Stuyahok
Buckland	Noatak
Chefornak	Noorvik
Deering	Nunapitchuk
Gambell	Quinhagak
Huslia	Ruby
Kasigluk	Savoonga
Kiana	Selawik
Kivalina	Shungnak
Kobuk	Tuluksak

"It is warmer and keeps cold air out more than it used to. I am so grateful for this program. It helped me a lot on heat and lights."
- Freida Kinegak, Tuluksak resident

Rural Alaska Community Action Program, Inc. I David Hardenbergh, Executive Director
731 E. 8th Ave. I Anchorage, AK 99501 I Phone (907) 279-2511 I www.ruralcap.com

February 25, 2013

To: The Alaska Legislature

Re: Support for RurAL CAP's Energy Wise Program

Alaska Village Electric Cooperative (AVEC) has collaborated with RurAL CAP for many years, most recently on their Energy Wise Program.

This program, which is directed at making modest energy efficiency improvements in rural homes while educating homeowners about the complex subject of the efficient use of scarce and expensive energy, dovetails well with the project that AVEC has implemented in the last few years on installing real-time electric consumption monitors in rural homes.

Rural Alaskans consume modest amounts of electricity and heat sources per capita, yet their out-of-pocket expense for energy is staggering – even more so when weighed against their very low household income. RurAL CAP's efforts to create local employment, while helping homeowners reduce those energy expenditures, is timely, comprehensive and greatly needed.

AVEC strongly supports continuation and expansion of RurAL CAP's efforts and we urge the Alaska Legislature to continue to support this vital program.

Sincerely,

Meera Kohler
President and CEO

4831 EAGLE STREET * ANCHORAGE, ALASKA * PHONE (907) 561-1818 * FAX (907) 562-4086



March 1, 2013

Jolene John, Community Development Manager
Energy and Environmental Projects
Rural Alaska Community Action Program (RurAL CAP)
731 East 8th Avenue
Anchorage, AK 99501

Regarding: Letter of Support for RurAL CAP Energy Wise Program:

Dear Ms. John:

On behalf of Nuvista Light & Electric Cooperative, Inc, thank you for the work the Rural Alaska Community Action Program (RurAL CAP) is doing in western Alaska. Nuvista writes in support of the funding requests RurAL CAP has submitted to the Alaska State Legislature.

Nuvista fully supports RurAL CAP's requests for the villages within our region. We respectfully request Alaska State Legislature fully fund these important energy conservation projects.

Sincerely,

Elaine Brown

Elaine Brown, CEO

Cc:

Senators:	Representatives:
Lyman Hoffman	Bob Herron
Donald Olson	Bryce Edgmon
Gary Stevens	Neal Foster
	Alan Austerman

301 Calista Court, STE A, Anchorage, AK 99518
(907) 279-5516 ~ (907) 272-5060 Fax ~ NuvistaCoop.org

NANA Partners with RurAL CAP

Energy Wise Program cultivates energy efficiency



Photo: Kent Banks, RurAL CAP

RurAL CAP's Energy Wise program helps Alaskans reduce their energy consumption, lower their home heating and electric bills, and save money. Noorvik Energy Wise crew members include (L-R): back row: Lawrence Wells, George Smith, and Jason Smith; middle row: William Field, Tommy Snyder, Luke Snyder, Marty Smoke and Murphy Patterson; front row: Elmer Melton (crew leader) and Clayton Ballot.

By Louise Freeman

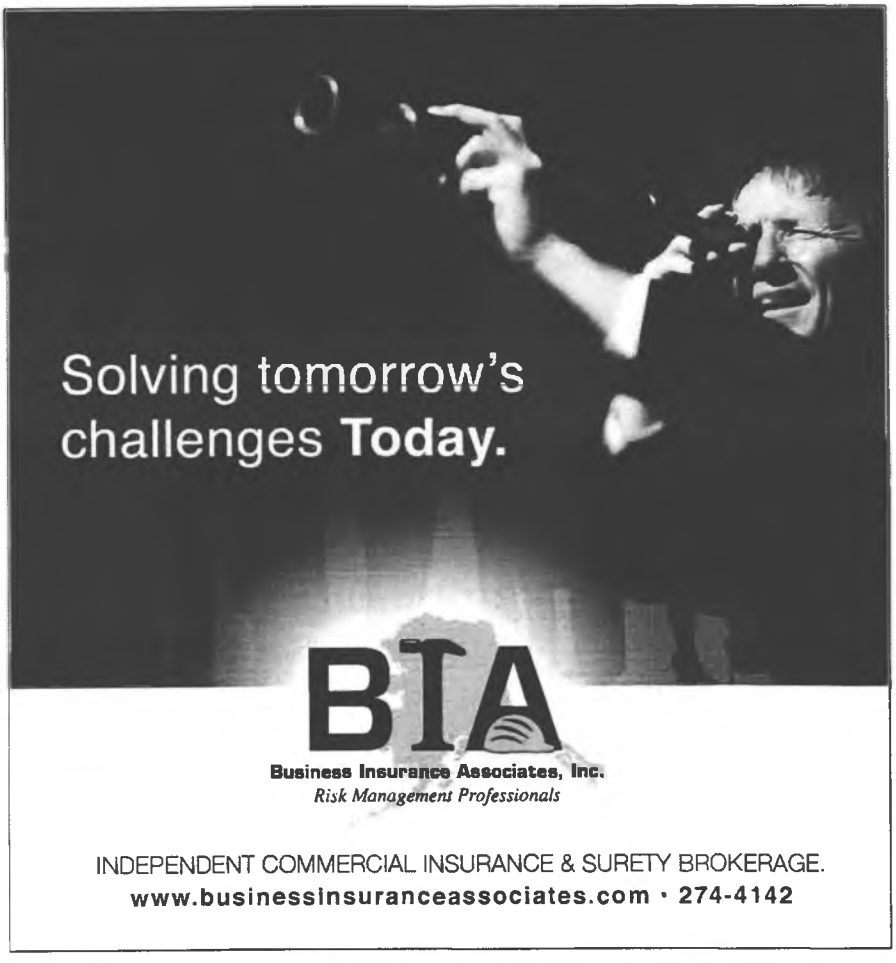
With high energy costs causing financial hardship for rural residents throughout the state, Alaska Native corporations, NGOs and state and federal agencies have been scrambling to find ways to address the problem. Weatherization programs are one answer, but however effective these programs are, they are expensive to fund–up to $35,000 per home–complex to plan, and often take years to implement. There has been a need for simple and cost-effective solutions that can be put in place immediately.

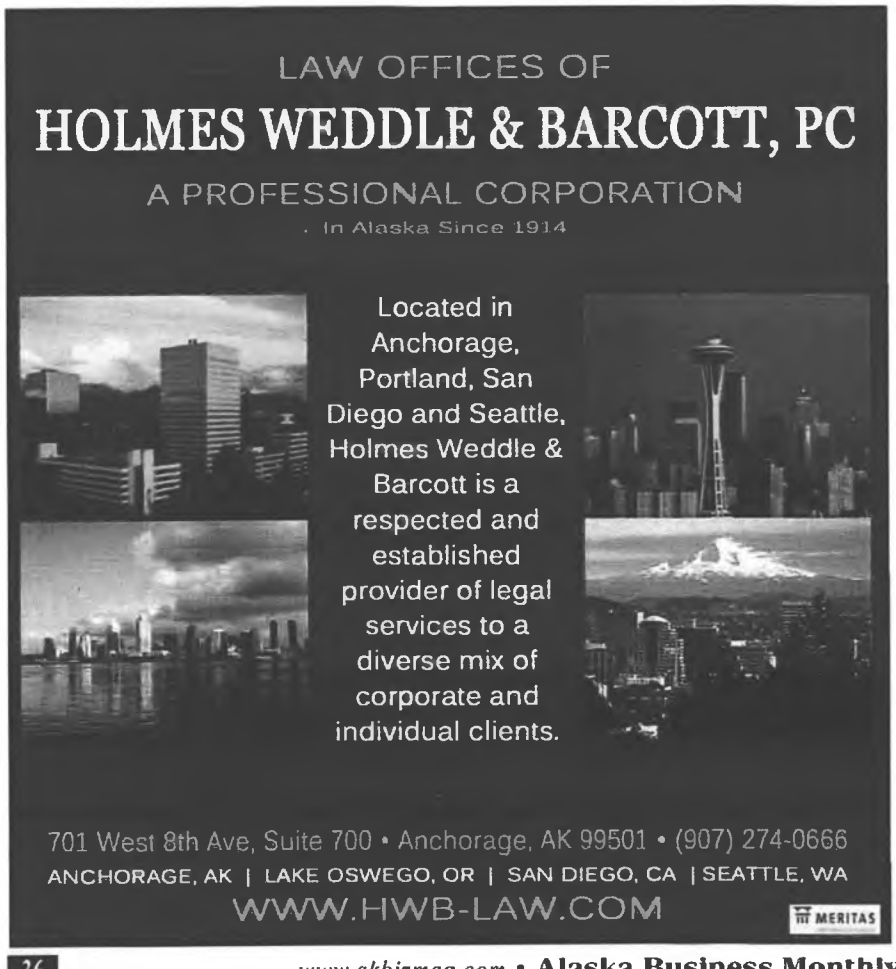
The cost of energy in rural Alaska "is an issue we are working in partnership with other regional organizations to address, but it is the single largest barrier to regional economic development," said Marie Greene, president and CEO of NANA Regional Corp. Inc. (NANA). In 2010, Rural Alaska Community Action Program (RurAL CAP), a statewide, private, nonprofit organization, used approximately $2.5 million in federal 2009 Recovery and Reinvestment Act funds to launch a pilot program to address one aspect of rural energy use that has often been ignored: education. "We can't overlook the importance of the human factor of what goes into using energy. We help people understand where their energy money is going. And based on that, they can make their own decision on how to use that energy," said Cathie Clements, community development director at RurAL CAP.

Community Education

Energy Wise focuses on communities with especially high fuel costs and that are low on the wait list for weatherization. These high-need villages are provided with a local crew of trained employees who help educate their neighbors by organizing a community conservation fair and making home visits. Interested residents are visited in their homes by a trained Energy Wise crew. The crew leader works one-on-one with them to assess household energy/kilowatt consumption.

In addition to demystifying the often confusing heating and electric bills, the crew leader helps residents to make the connection between how they use energy and what that looks like on their bills. Crew members then install





$300 of efficiency upgrade equipment, including compact fluorescent lights, weather-stripping and water heater blankets. (Energy Wise is designed to complement, or piggy-back on weatherization programs, which make larger-scale upgrades such as adding insulation and new windows.) The crew leader follows up with a visit three to six months later to answer any questions.

In the first year of the Energy Wise program, 7,500 residents in 32 high-need villages from Savoonga to Huslia received energy conservation education, 2,000 homes were given low-cost, efficiency upgrades, and 160 area residents were provided with seasonal employment. The village of Selawik, a community of about 800 residents in the NANA region, was one of the villages in the pilot program. NANA liked the results they saw in Selawik–an effective, low-cost program that used local hire, involved the whole community, and saved the residents an average of 20 percent on their energy bills.

"NANA shareholders in Selawik felt they benefited from the program," said Greene. "We evaluated the program and our board felt that it would be beneficial to our shareholders to roll out regionally. Board members felt that the Energy Wise program fit with NANA's mission to improve the lives of our shareholders. More than half of our (12,900) shareholders live within the borders of our region and the high cost of fuel impacts their lives daily."

With sky-high heating and electrical bills, rural residents have less money to buy groceries and other necessities. In rural Alaska, an average of 47 percent of household income goes to pay energy costs.

Diversified Funding

NANA will be expanding the Energy Wise program to include all eleven communities in the NANA region. The three-phase program started in the fall of 2011 and will be completed in 2013. The NANA board approved an $860,000 expenditure, which provided the majority of funding for Phase I, covering the villages most in need: Ambler, Buckland, Kivalina, Noatak, Noorvik and Shungnak. A contractual agreement was entered into with RurAL CAP to implement the program.

Phase I, now in progress and to be completed in the spring of 2012, is providing efficiency upgrades to more than 500 homes, education to more than 2,000 people, and employment to approximately 50 local residents. "NANA was really interested in doing something right away with the energy burden," said Ellen Kazary, Community Development manager at RurAL CAP.

NANA is the first private organization to fund the program, and once NANA stepped forward with private dollars, other public partners came on board. The Denali Commission/State Department of Labor ($297,239 to train crews in 2011-12 and 2012-13); U.S. Department of Energy National Renewable Energy Laboratory ($50,319 for planning and evaluation planning); Alaska Works Partnership (in-kind training support); Northwest Inupiat Housing Authority (in-kind support); and Northwest Arctic Borough (tech support and "smart meters" that track energy use). Local partners include tribal and city councils, churches, youth groups, and parks and recreation programs, which provide in-kind support. The result of all these organizations working together is the type of effective public-private partnership the stimulus funds were supposed to generate.

Local Hire

Not content with simply dispersing information and calling it "education," RurAL CAP designed Energy Wise using behavior change theory to positively affect how people use energy in their homes. "It takes not just one but several encounters with the message on a variety of levels, Kazary said. "(With Energy Wise) they hear the crew leaders talking about it, they see their neighbors implementing it, and they themselves have one-on-one discussions with the crew, not just once but several times. That really helps to sustain behavior change."

To convey this information in a friendly, culturally acceptable way, it was important to hire local people. "Local hire is a huge part of why it is a success. It makes it so much more comfortable and easy for crew members to be training friends and relatives," Kazary said. "They take a leadership role that is endorsing change in a socially acceptable and positive way. You

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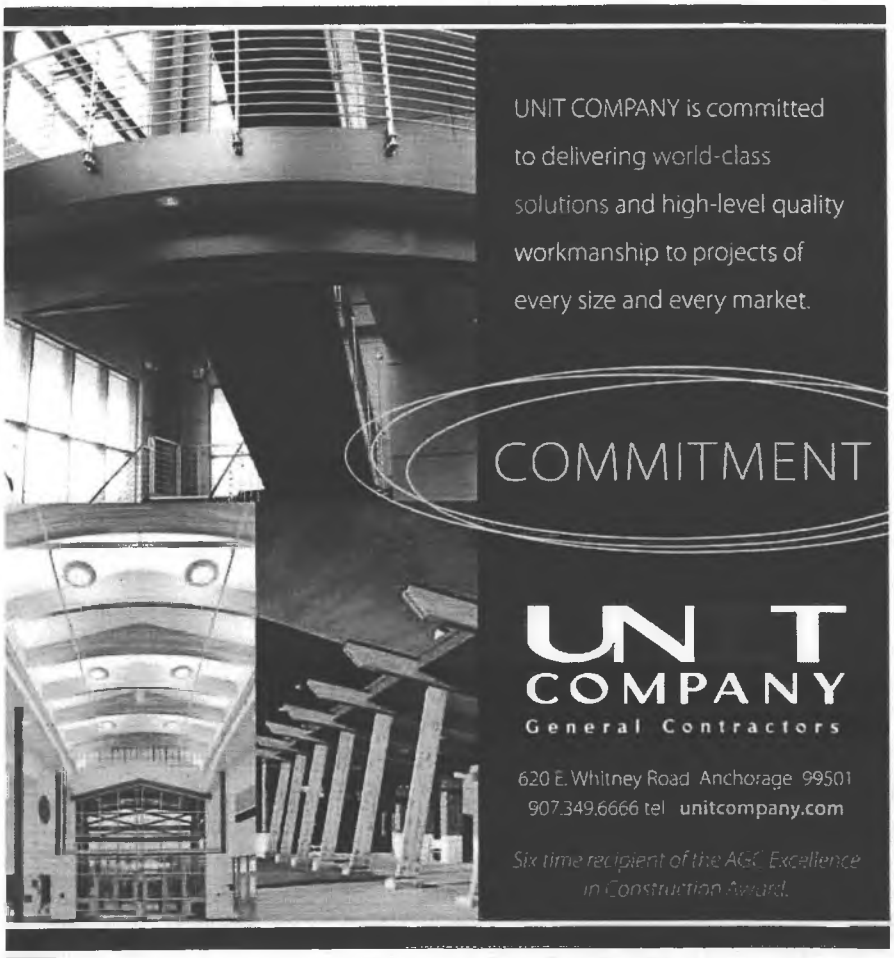
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can't just come in and lecture people as an outsider. Also, crew members live in the villages so they can continue to answer questions. It leaves that knowledge base there."

The local hire component was one of RurAL CAP's goals in designing Energy Wise and was one of the elements of the program that attracted NANA's interest. "The program also addresses some of our Village Economic Development needs by creating local jobs and offering training opportunities," Greene said. The four to 10 crew members and one crew leader hired in each participating community receive training leading to Weatherization Tech I, OSHA and First Aid certification. "Certification will be a big bonus for the crews," said Clements, preparing them for future employment on weatherization crews, or working for the housing authority, or in the construction industry. Training and implementation of the program take place September through January, offering eight to 12 weeks of full-time employment in the off-season when construction and other summer work is not available.

Cultivating Energy Conservation

Shungnak is a community of 270 people located 150 air miles east of Kotzebue on a scenic bluff above the Kobuk River. Local resident and Energy Wise crew leader Harry Commack said Shungnak is the kind of place where "you can walk out of the store with one plastic grocery bag and it's $100." The village has one of the highest energy costs in northwest Alaska. Residents pay $0.38/kilowatt hour, compared to Chugach Electric customers in Anchorage, who pay less than $0.14/kilowatt hour. Fuel is normally barged in from Kotzebue, but with area rivers running low in recent years, there are times when the barge cannot make it to upriver villages such as Kobuk and Shungnak. Fuel must then be flown in from Fairbanks. Shungnak suffers from the additional problem of inadequate fuel storage capacity. Even with the tanks topped off in the summer, the village often runs out of fuel by April, requiring fuel be flown in from Fairbanks. Stove oil, which costs an already high $4 per gallon in Fairbanks, sells for more than $9 per gallon in Shungnak



Shungnak Energy Wise crew members include (L-R): Harry Commack (crew leader), Brandon Woods, Jarraine Collini, William Sheldon IV and Jamey Gilila.

In late November, Commack led a crew on their first day of training installing energy efficiency equipment in retiree Susie Sun's house. Dressed in blue sweatshirts with the Energy Wise logo on back and the NANA logo on front, crew members William Sheldon IV, 20, and Jarraine Collini, 24, applied window insulation film. Standing back to admire her work, Collini crowed, "I did it again!" Collini said what she likes about the job is "helping people, making sure they stay warm and helping them save a little bit of money."

Sun stood over a pot of caribou soup bubbling on the stove and spoke with approval about the Energy Wise program. "I've learned something new this morning–how to use a power strip. It will save energy. Instead of plugging (an appliance) into the wall, the power strip has an on off switch you can just turn it off."

Power strips are used to eliminate what is called "phantom power" use, which is the slow drain of electricity that appliances used when they are plugged in, even if they are not turned on. Sun continued, "It has made me much more aware of what to do to save energy. Everybody in town should really look into this. They're doing a really good job."

Kazary echoed Sun's enthusiasm: "That's what I love about this program. It's contagious–you watch the whole community get involved."

The Energy Wise goal is to include 100 percent of households in each village, rather than restrict services to low-income households. Kazary explained why "low-income" is an almost meaningless designation in Alaska's rural communities. "What is considered a middle-income family elsewhere isn't really if they are spending half their





Jarraine Collini, along with other Energy Wise crew members, conducts inventory on the supplies in preparation for installing energy saving measures in each home in Shungnak.

income on energy bills," Kazary said. "A lot of those that had the highest savings have been among middle-income households that hadn't previously been eligible for weatherization resources before. It's been a huge eye-opening experience on how much they could save."

Preliminary results indicate households participating in the Energy Wise program in 2010 saved an average of 90 kWh/month, resulting in savings of $20 to the resident. An additional $39 in savings goes to the state's Power Cost Equalization program, which partially subsidizes the cost of electricity for residents of rural Alaska. When the cost of heating is included, residents' savings go up to $50. Each household upgrade costs less than $2,000. With an average combined yearly savings of $1,068 to the resident and the state, the project payback in savings is less than two years. In a follow-up survey of 700 households that participated in Energy Wise in 2010, 86 percent reported they were still practicing energy efficiency and conservation measures; 80 percent reported decreased electric bills and 82 percent reported decreased home heating costs.

RurAL CAP would like to expand Energy Wise to cover other communities throughout the state struggling with high energy costs. Tanana Chiefs Conference and other tribal organizations have expressed interest in the program. ❑

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The Hunter

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MARIE'S MESSAGE



Marie Greene with her daughter, Zoe Ivanoff.

Many things in life take time, such as the development of meaningful relationships and the growth of wisdom. Similarly, NANA was not built in a day – it takes years to build a company, to build relationships, and to build a strong foundation for our shareholders. It has taken four decades and the hard work and dedication of many, many people to bring NANA to where it is today, and I take my work with NANA very seriously.

Sometimes though, everything changes in a second, as it did recently for my family. At those times, people pull together, and I've been so honored by the love people have shown. After the passing of my daughter, Zoe Louisa on June 12, I took leave to support my son-in-law, Steve and grandchildren Kelsi, Keoni and Gage in Unalakleet. There we received calls, flowers and visitors. People were incredibly generous with their kindness. Don, Luke, Roland and Helvi's immediate presence supporting me and my family carried us as we struggled with Zoe's passing.

I am so grateful to be Inupiaq. I am so grateful to be part of a corporation, both as a shareholder and as the CEO, which is truly a family. When any of our people are in need, we find a way to be there. We hold each other up and help out. What we have here at NANA and in our region is very special – and at one of the worst moments for my family – your love, support and prayers gave us strength. I am both humbled and so filled with love and gratitude for our shareholders and employees. On behalf of my family, quyaanna and God bless you.

Marie N. Greene, NANA President / CEO



Marie N. Greene with granddaughters (L to R) Clara Dawn and Kelsi and daughter Zara at the Alaska Run for Women

NANA Board of Directors

Village funding requests approved at July meeting

NANA Regional Corporation's board of directors met on July 19, 2012 in Vancouver, British Columbia, Canada. NANA's Vancouver-based development partners – Teck Resources, Limited, and NovaCopper Resources – both presented at the meeting.

As part of NANA's ongoing commitment to village economic development in NANA region communities, the board approved several funding requests including: additional funding for Kiana's heavy equipment purchase and funding for the purchases of a Caterpillar D4 dozer for the Native Villages of Kobuk and Selawik.

The board also discussed the upcoming August 28, 2012, elections and expressed concerns regarding Ballot Measure 2. If passed, the ballot measure would establish a new Alaska Coastal Management Program (ACMP) in the Department of Commerce, Community, and Economic Development. The program would develop new state and local standards to review projects in coastal areas of the State. The prior ACMP sunset (or ended) on July 1, 2011. The measure is on the ballot as the result of a citizen's initiative.

NANA supports the re-establishment of a coastal zone management plan that allows for local involvement, however, NANA's board of directors has expressed concerns regarding Ballot Measure 2. Because of the ballot measure's language, its impacts to NANA lands, resources and shareholders are unclear.

NANA recognizes and honors that voting is an important right and an individual choice. However, NANA's board of directors felt it necessary to express NANA's concern with Ballot Measure 2 to shareholders. The board encourages all Alaska-based NANA shareholders to learn more about Ballot Measure 2 and to exercise their right to vote on August 28th.

Energy Wise Update

Gearing Up for Phase II

By Ellen Kazary, RurAL CAP

For a second year, NANA Regional Corporation has committed $900,000 in funding and contracted with the Rural Alaska Community Action Program, Inc. (RurAL CAP) to deliver the Energy Wise Program. In 2012-13, Energy Wise will be delivered to 525 homes in the communities of Deering, Kiana, Kobuk, Selawik, and a portion of Kotzebue.

Energy Wise helps Alaskans reduce their energy consumption, lower their home heating and electric bills, and save money. Through this program, locally hired crews are trained to educate community residents and conduct basic energy efficiency upgrades through full-day home visits.

Each community will be recruiting for one Crew Leader at the end of August. The Crew Leaders will start work at the end of September with supervisory and energy training in Kotzebue. Depending on community size, between four and ten Crew Members will also be hired in October and November, trained in Weatherization Tech 1, OSHA 10, and energy efficiency and conservation fundamentals.

From November to mid-February, crews will conduct home visits in all households interested in participating in this project.

Households who participate in Energy Wise will receive a day-long home visit from two Energy Wise Crew Members. Crew Members will conduct a household energy assessment with the resident, provide education on energy cost-saving strategies, and install approximately $300 in energy efficiency supplies.

Several partners have committed resources to increase the impact of this program starting in 2011. The Denali Commission Training Fund through the Department of Labor is providing funding to train and certify 65 2012-13 Energy Wise crew members to be community energy educators with certification in Weatherization Tech I and OSHA 10 (construction safety training). Alaska Works Partnership (AWP) is providing in-kind trainers to conduct the Weatherization Tech 1 and OSHA 10 training at each site.



Shown in spring 2011, Shungnak Energy Wise Crew Members include (L-R): Crew leader Harry Commack, Brandon Woods and Jarraine Tickett-Collini. Energy Wise crew members are hired and trained locally and receive certification for Weatherization Tech 1, Occupational Safety and Health Administration (OSHA) 10 and first aid.

The Department of Energy's National Renewable Energy Lab (NREL) has contracted with RurAL CAP to develop and implement a program evaluation method that will track the impact of Energy Wise on residential energy consumption and evaluate the effect of training and employment on Energy Wise crew members.

New this year is a project funded by the Alaska Energy Authority to create and pilot community energy efficiency outreach and education kits. Energy Wise crews will use these kits to provide community energy fairs, household energy education, and engage youth in energy savings.

In August, RurAL CAP's Energy Wise Program Coordinators will travel to all five villages to meet with local representatives, NANA Resource Technicians, and community leaders about the Energy Wise Program, discuss the project, answer questions, develop a timeline for launching the program in the village, and to visit houses for a better understanding of supplies that would be needed. Throughout the project, communities will be kept up to date on progress purchasing supplies, plans for shipping, and will participate in recruiting and



Locally hired crew members receive orientation training in Buckland during Energy Wise launch week in November 2011.



Tommy Adams, Sr. of Kivalina speaks with 2011 Kivalina Energy Wise crew leader, Andrew Koenig about the materials being used to help make Adams' home more energy efficient.

Hydro Power

Using Water To Create Energy

By Jacqualine Qatalina Schaeffer, Sustainability Specialist/Designer

Water sustains life. It is the one component necessary for survival of not only mankind, but the planet we live on. This vital natural resource covers more than 70 percent of our planet and is needed for all plants, animals and people to continue to survive.

In the NANA region, studies are being conducted to see if this essential resource can also be used to help offset the high cost of energy. Diesel is the current source of fuel used for electricity in many Northwest Alaska communities and current regional prices range from $7 to $10 per gallon.

Current studies in the Kobuk area, being conducted collaboratively by the Alaska Village Electric Cooperative (AVEC), NANA, WHPacific, Geo-Watersheds Scientific and Brailey Hydrologic show great energy generation potential. The areas of study include the Upper Cosmos Creek, Upper Wesley Creek, Upper Dahl Creek and the Upper Kogoluktuk River. Hydrology stations in place show potential to tap hydroelectric energy. Hydroelectricity is created by water moving from one location to another over a large drop in elevation and passing through a generator. Gravity causes the water to fall and a turbine propeller is turned by the moving water, generating electricity. This renewable energy source is a very clean, producing no direct waste and very little greenhouse carbon-dioxide.

The type of hydroelectric energy being studied in the Upper Kobuk is called "run-of-river". Run-of-river hydroelectric plants do not require a large dam, and rely on the natural flow volume of the stream or river. Such facilities tend to have far fewer environmental impacts compared to conventional dam-storage hydroelectric plants because of the lack of a large artificial reservoir like a man-made lake. With proper siting, construction techniques, and operation and maintenance, run-of-river hydropower in the region could have minimal impacts on fisheries and other subsistence resources. These hydrologic studies will help determine the water available for hydroelectric generation. Additional studies will be conducted to determine project features, estimated project costs, operating conditions, energy production costs and overall project feasibility.

To learn more about hydroelectric power and how Cosmos Hills Project visit cosmoshydro.org



Kobuk students, Angeline Custer on the left and her brother Murphy Custer Jr. on the right, helped scientists collect data for the Cosmos Hydrology Network – learning and contributing to a collaborative effort at the same time.

Exciting project-based learning opportunities for Kobuk students are coordinated with the Cosmos Hills hydrology projects.

The Kobuk students' greenhouse is outfitted with a weather station put together in cooperation with the Cosmos Hydrology Network. The weather station reports air temperatures and information about the solar-powered station itself. Building and operating the greenhouse helps the students and teachers at Kobuk school learn and teach about climate, weather, biology and other topics. Current conditions at the greenhouse are detected with the station and reported year-round on the Cosmos Hills Hydrologic Network website. The Kobuk Kids Weather Facebook group is another outlet for discussion and sharing information and photos.

Students have also assisted the scientific teams with data collection. In spring 2012, teachers and students traveled along the Cosmos Hydrology Project winter trail with Tommy Jones, one of the Cosmos Hydrology GW Scientific Hydrology Interns. The students were shown how to do snow surveys and record various measurements of snow and ice on Lake Kollioksok. This data will be used by the hydrology network and shared with the National Weather Service.

Cooperation between NANA Regional Corporation, Alaska Village Electric Cooperative, WHPacific and others is making these opportunities possible.

03/27/13 Presentations: Interior Rural Energy, and Alaska Energy: Problems and Solutions

<TARGET><BILL></BILL><SUBJECT>03-27-13 Presentations Interior Rural Energy, and Alaska Energy Problems and Solutions</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
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Agenda

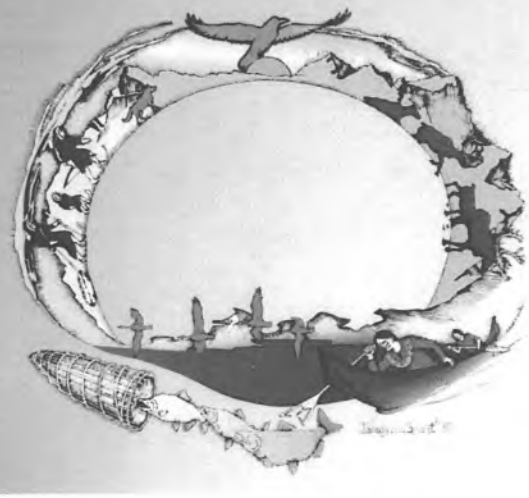
March 27, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

\+ Presentation: Interior Rural Energy: Opportunities to Move Forward
Julie Roberts-Hyslop, Vice President, Tanana Chiefs Conference
David Pelunis-Messier, Rural Energy Coordinator, Tanana Chiefs Conference

\+ Presentation: Alaska Energy: Problems & Solutions
Bernie Karl, President, Chena Power

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

###



TANANA CHIEFS CONFERENCE

INTERIOR RURAL ENERGY: OPPORTUNITIES TO MOVE FORWARD

Prepared for
House Energy Committee
March 27, 2013

The Organization

Tanana Chiefs Conference is a Tribal Consortium with 42 Members, representing 39 villages and 37 federally recognized tribes.

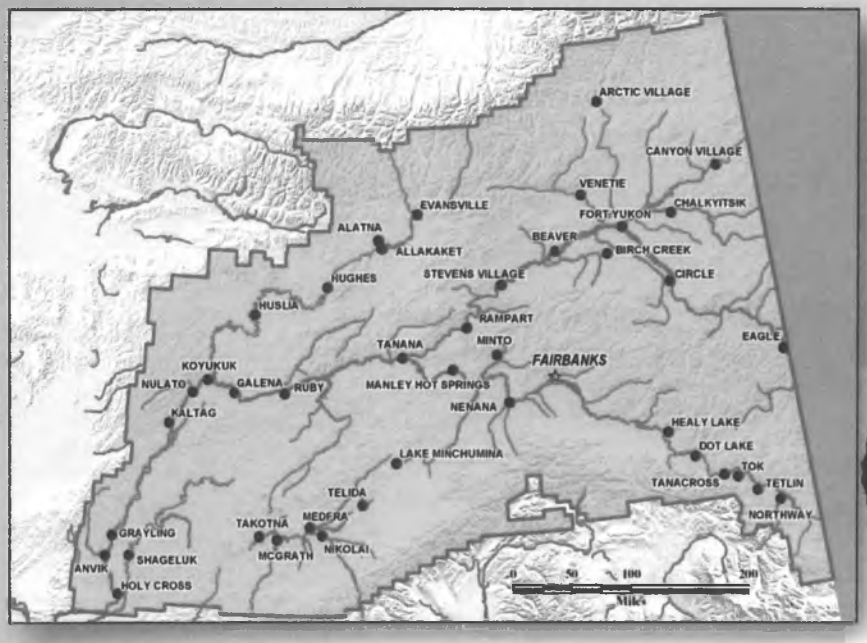
MISSION: "Tanana Chiefs Conference provides a unified voice in advancing sovereign tribal governments through the promotion of physical and mental wellness, education, socioeconomic development, and culture of the Interior Alaska Native people."







The Region



- 235,000 Square Miles
- 37% of the State

- Extreme Subarctic
- Majority off road system



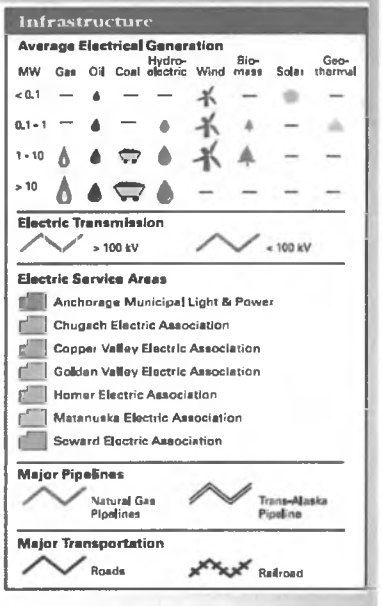
Interior Rural Energy

Some of the Highest Energy Costs in the Nation

<u>Takotna:</u>
$1.02/kWh, Or 10x the rate for Anchorage large commercial

<u>Arctic Village:</u>
$10/gal, that's roughly $60/Mmbtu, almost 6x the cost in Anchorage



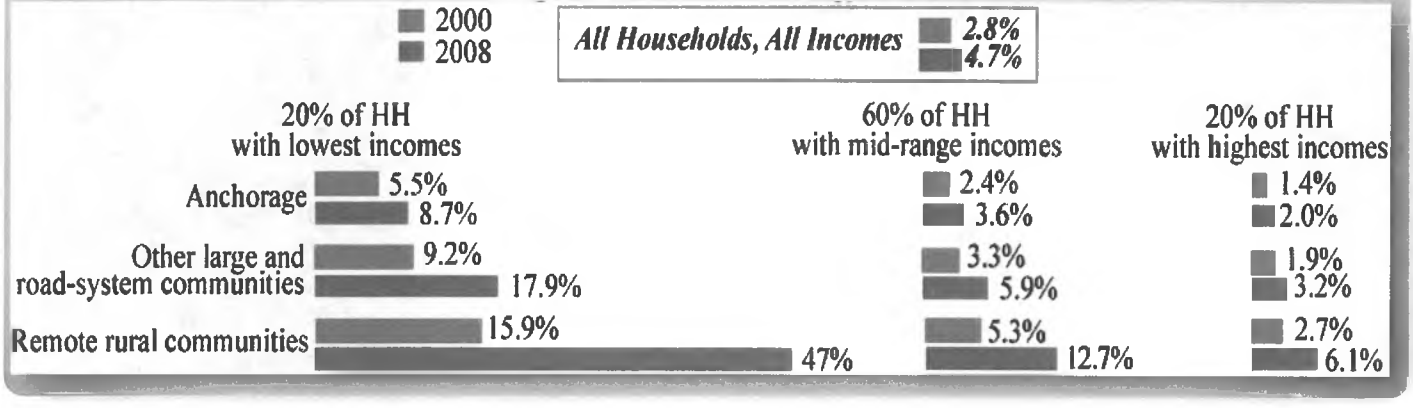


ENERGY CHALLENGES

Electrical Use:

PCE report- In 2011 over 2.5 Million Gallons of diesel used for electrical generation in the TCC Region

Estimated Median Share of Income Alaska Households Spend for Home Energy Use (ISER)



Energy Challenges

Transportation:

- **Effects on Subsistence Activities**
- **Increase cost of travel to/from villages**
- **Increases Cost of Goods in the Village**

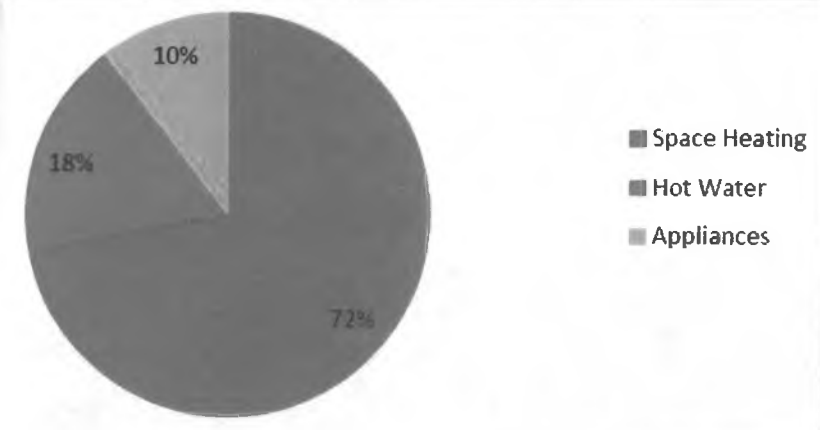


Energy Challenges

Space Heating:

- Nearly $.75 of every Energy Dollar goes to Heat a home
- Schools are unsustainable to run and maintain
- Economic Development is being stifled

Average Rural Residential Home Energy



Energy Opportunities

Electrical Conservation/Solar:

- AEA – Village End Use Efficiency Program (VEEP)
- AEA- Rural Power Systems Upgrade Program (RPSU)
- Inefficient fan motors, pumps, lighting
- Renewable Energy – Solar, Biomass
- Affordable Propane → Increased Efficiency



Solar Install Nenana Teen Rec Center

Energy Opportunities

Space Heating Conservation:

- Tanana Chiefs Conference Resolution 2013-11 established the highest energy efficiency standards for new construction in the State of Alaska
- TCC, Interior Regional Housing Authority (IRHA) Weatherization
  - Average Home Saved $1958/yr

TCC RESOLUTION: "Buildings Financed with Public Money Shall Seek To Achieve the Following Efficiency Standards..."

- Roof: R-100
- Walls: R-70
- Floor/Slab: R-50

BUILDING LIFE CYCLE



BIOMASS

Locally Produced Energy = Economic Sustainability

- **Tanana's Biomass Project:**
  - **2006: Imported 30k gal/yr @ $5/gal = $150k to Barge/Oil Companies**
  - **2013: Imported 12k gal/yr @ $5/gal = $60k to Barge/Oil Companies**
  - **2013: Purchased 150 cords @$300/cord= $45k/yr to local woodcutters**

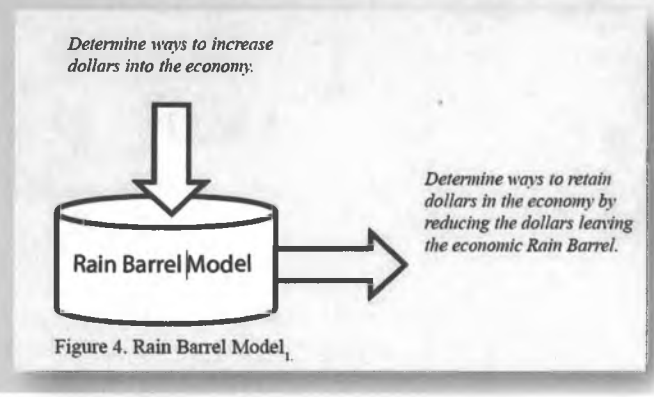


Figure 4. Rain Barrel Model[1].

Biomass



18,100,000 btus/cord (White spruce) according to *www.alaskawoodheating.com*



130 gallons of fuel oil ($552 at $4.27/gal)

Biomass

Cord Wood/Oil Have been the main heat sources in Rural Alaska since Villages were established

KISS Principle – "Keep It Simple Stupid"





PROPANE

TCC Resolution 2013-12 Support for HB-74/SB23

- Affordable Energy Is KEY to a Sustainable Economy
- Gas Trucking Plan could decrease the cost of Propane in Fairbanks by up to 50%
  - As cooking/water heating/dryers convert could lower microgrid baseload

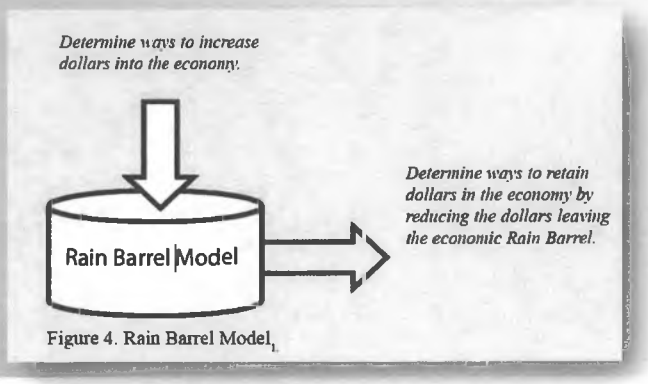


Figure 4. Rain Barrel Model[1]

Project Overview

Hydrokinetics = Power Generation from flowing water
3 yrs, $350k spent, less than 500kWhs generated
$700/kWh

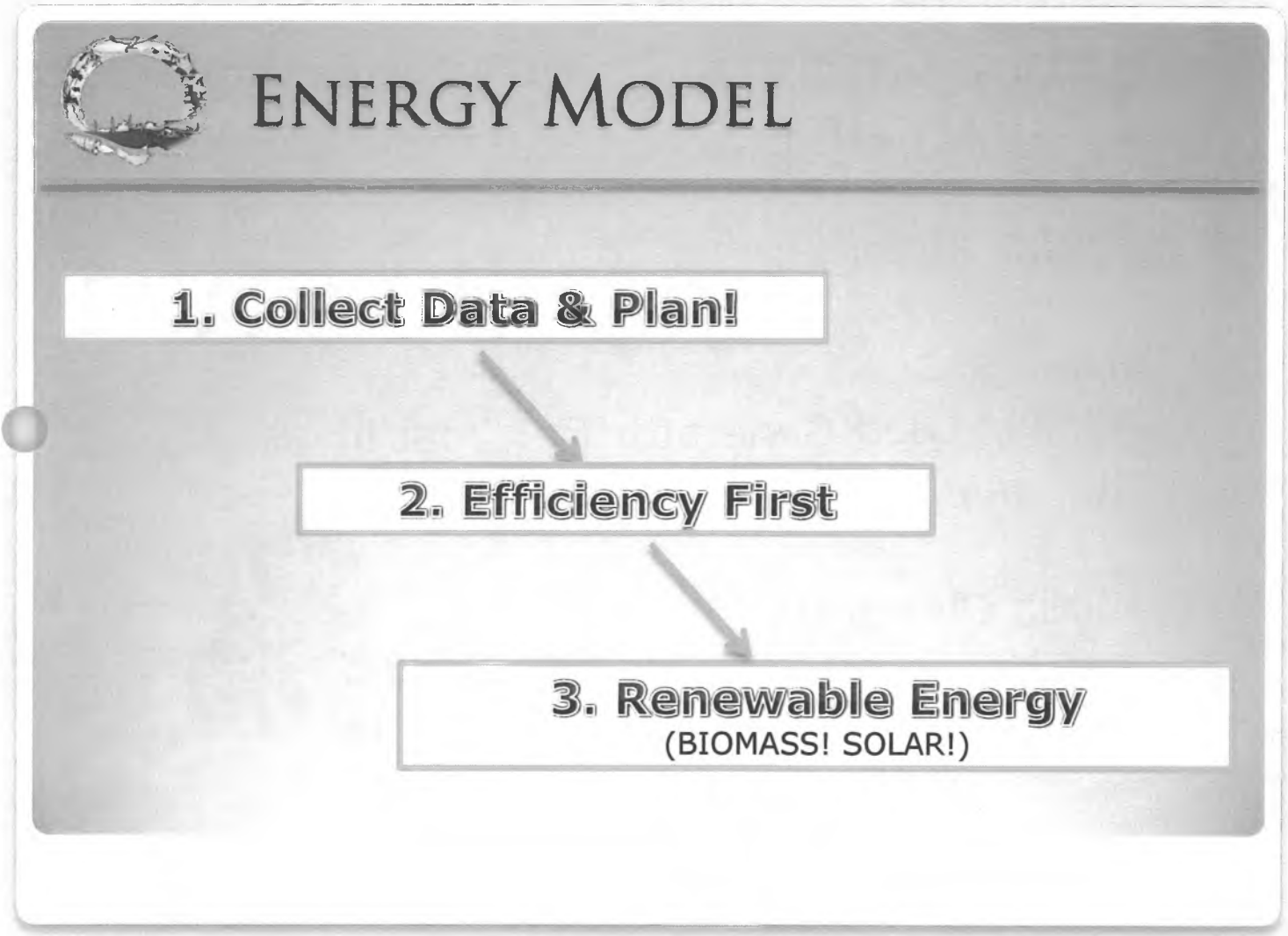
Lets be on the cutting of technology NOT the Bleeding edge…



Nenana Rec Center

Technology	5 yr $ Savings	Cost of Materials/Install	5 yr Energy Savings
Electricity	$4,400	$20,000	22,000 kWh
Hot Water	N/A	$7,000	N/A
Zone Valves, Programmable Thermostats	$19,150	$2,000	5,000 Gallons of Diesel
TOTAL	$25,270	$29,000	




ENERGY MODEL
1. Collect Data & Plan!
2. Efficiency First
3. Renewable Energy
(BIOMASS! SOLAR!)

Lets Put that Model into Practice

Manley Hot Springs Tribal Council

- 4 Buildings
- 35kW Max Load Generator @ ~2gal/hr
- 17,000 gal/yr

$70,000 in Diesel/yr



1. Collect Data and Plan

- Main Electric Loads:
  1. 6kW Electric Heat
  2. 9kW Electric Dryer
  3. 4kW Lighting
  4. Double Coil 3kW Electric water heater
  5. Freezers/computers
  6. Well Pump





2. Efficiency!

Main Electric Loads:

- 6kW Electric Heat → 92% Efficient Toyo Stove!
- 9kW Electric Dryer → 80% efficient propane dryer
- 4kW Lighting → LED lighting
- Electric water heater → on Demand Propane
- Freezers/computers
- Well Pump
- Air Compressor

New Max Load: 35kW – 19kW = 16kW

3. Renewable Energy

THE GOAL: Add Solar PV to the System!

- Store Energy During the Day In Batteries → TURN GENERATOR OFF AT NIGHT
- Potential Diesel Savings: $40k+/yr





Main Take-Aways

"We cannot solve our problems with the same thinking that we used when we created them"
-A. Einstein-

1. **Local/Cheaper Energy → Sustainable Communities**

2. **Energy is Expensive, Cheaper to Conserve than to Produce**
   - **Weatherization**
   - **Rural Power Systems Upgrade**
   - **Village Energy Efficiency Program**

3. **Renewables are only a part of the solution**

1. Collect Data and Plan → **2. Efficiency First** → **3. Renewable/Local Energy**

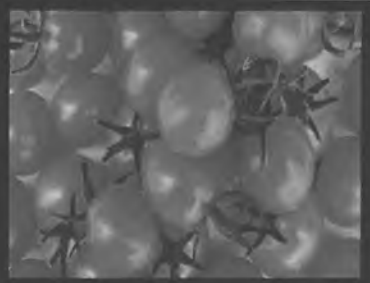






Bernie Karl Presents

ALASKA ENERGY/ECONOMY: PROBLEMS AND SOLUTIONS







OUR VISION

Become a self-sustaining state...

one household,

one business,

one community at a time in terms of:

- Fuel sources,
- Energy delivery, and
- Food security.

RESULTS: CHEAP ENERGY/VIBRANT ALASKAN ECONOMY

PROBLEMS

FUEL SOURCE

OIL, OUR MAJOR FUEL SOURCE IS A WORLD MARKET COMMODITY (WE HAVE NO CONTROL OVER THE COST OF OUR FUEL), IT IS SO EXPENSIVE THAT IT IS DESTORYING ALASKA'S ECONOMY

ENERGY DELIVERY

OTHER THAN OIL, NO STATEWIDE ENERGY DELIVERY INFRASTRUCTURE EXISTS, AND TO BUILD NEW DISTRIBUTION INFRASTRUCTURE IS SO EXPENSIVE THAT IT IS BEYOND OUR PRACTICAL REACH

FOOD SECURITY

WELL OVER 90% OF THE FOOD CONSUMED IN THE STATE IS IMPORTED AND SO EXPENSIVE THAT MANY ALASKANS FIND IT UNAFFORDABLE

BIGGER PROBLEM

OTHER THAN SAVINGS, THE STATE OF ALASKA IS OUT OF MONEY

AND THE LEGISLATURE HAS NO CHOICE BUT TO CUT THE BUDGET

???????NO MONEY/NO SOLUTIONS ??????

NOT TRUE

SIMPLY PUT: THE REALITY OF LESS MONEY REQUIRES THE NEED FOR MORE INNOVATION AND PRACTICAL APPLICATION OF INTELLEGENCE

HOW MUCH INNOVATION DO WE HAVE?

HOW MUCH INTELLEGENCE DO WE HAVE?

HOW MUCH MONEY DO WE HAVE?

ENOUGH!

WHAT DO INNOVATIVE AND PRACTICALLY INTELLEGENT SOLUTIONS LOOK LIKE?



As simple as pumping water without electricity

- initial cost $800,
- zero operating cost

OR

Applying a simple concept to a complicated system.
Geothermal heat is energy, now make electricity.



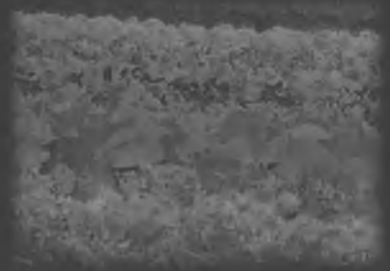
• Research and Development cost	$2,000,000
• Capital Cost	$400,000
• Operating Result	$0.06/kWh

OR



Geothermal heat is energy, now grow vegetables year-round in Alaska.

• Research and Development cost	$1,500,000
• Capital Cost	$500,000
• Operating result:	$ 0.75/head of fresh lettuce
	$ 1.50/lb fresh tomatoes



OR

Recycle cardboard and paper to produce a fuel source which can:

- heat cleanly
- and/or produce electricity cleanly

Research and development Cost:	$4,000,000
Capital Cost:	$4,000,000
Operating result:	BTU's at ≈ $1.50/gallon heating fuel
	Electricity ≈ $0.10/kWh







OR

Improve the design, reduce the cost, and improve operation capacity of the **Chena Power Energy System**. This third generation system is modular, requires no foundation, produces 300 net kWh. It is synchronous and therefore requires no grid.





Research and Development Cost		n/a
Capital cost		< $500,000
Operating result	electricity	≈ $0.10/kWh
(depending on fuel source)		

OR

Use the ash from coal, and/or recycled energy pellets, combined with recycled crushed glass to make locally produced Geopolymer Cement.

- Research and Development Cost: $250,000
- Capital Cost: $250,000
- Operating Result: per cubic yard cost of concrete 30% cheaper than imported Portland Cement





- 80% less CO2 emissions*
- 2 to 4 times stronger*
- More durable*
- More stable*
- Less permeable*
- Self-adherent
- Fire resistant to >1800 °F
- Acid, base & salt resistant
- Blast & earthquake resistant

* Than ordinary Portland cement

OR

Without prohibitively priced infrastructure

Utilize high temperature combustion wood gasifying, clean burning heating devices where wood is available.



- Research and Development Cost $0
- Capital Cost < $10,000 for single family home in rural Alaska
  < $30,000 for community buildings in rural Alaska
- Operating Result: ≈ $ 1.40/gallon in rural Alaska

OR

Utilize clean-coal technology to provide cheap energy to community heating systems in rural Alaska.



- Research and Development Cost: $0
- Capital Cost: $250,000 installed in rural Alaska
- Operating Result: ≈ $ 1.75/gallon in rural Alaska

OR

Add a combined heat/power component to community heating systems throughout Alaska



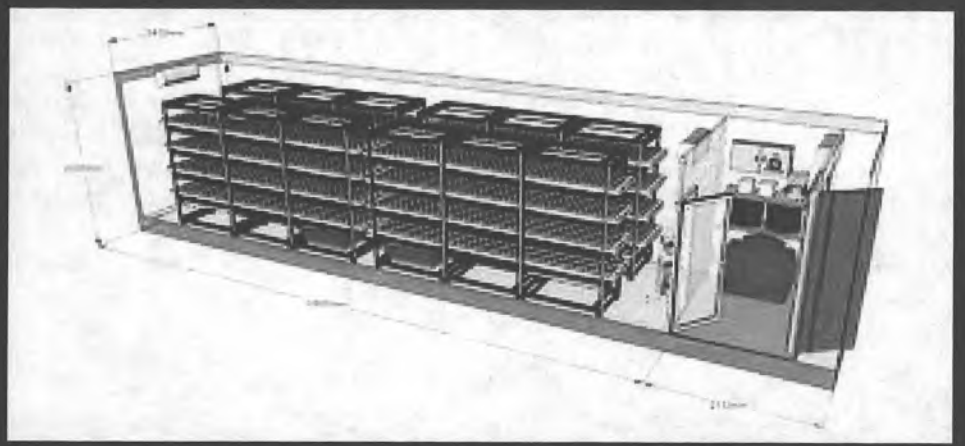
- Research and Development Cost $ 2,000,000
- Capital Cost $ 25,000 for community buildings in rural Alaska
- Operating Result: ≈ $ 0.10/kWh

OR



Add modular year-round controlled-environment grow systems to provide fresh vegetables through-out rural Alaska

- Research and Development Cost: $ 0
- Capital Cost: $ 50,000/module
- Operating Result: $ 1.25/head of fresh lettuce in rural Alaska



OR

Add modular year-round controlled-environment grow systems to provide animal fodder throughout Alaska

- Research and Development Cost: $ 0
- Capital Cost: $ 50,000/ module
- Operating Result: ≈ cost of feed less than the cost of a bale of hay





OR



Utilize Air Curtain Burners to eliminate Class II or Class III municipal solid waste landfills throughout rural Alaska*

- Research and Development Cost: $ 0
- Capital Cost: $ 48,900 - $250,000 for communities in rural Alaska
- Operating Result: environmentally compliant community waste disposal at a fraction of current cost

OR

Add a 1,000,000 BTU FireBox Heat Capture component to the Air Curtain Burner and heat greenhouses, community centers, schools, swimming pools and other public facilities.

- Research and Development Cost: $ 0
- Capital Cost: $ 90,000- $500,000 for communities in rural Alaska
- Operating Result: cheap energy and environmental compliance

* 40 CFR 1 (C) 60 EEE 60.2887(g) "air curtain incinerators in isolated areas of Alaska. Incineration units are excluded if it is used at a solid waste disposal site in Alaska that is classified as a Class II or Class III municipal solid waste landfill, as defined in § 60.2977

SO.....WE DO HAVE ENOUGH!!!!

INNOVATION

AND

INTELLIGENCE

AND

MONEY

TO PROVIDE ALASKA WITH CHEAP ENERGY AND A VIBRANT ECONOMY

WE KNOW THIS BECAUSE.....

All of the innovative ideas and products you have just seen are being utilized or sold at:

Chena Hot Springs Resort

K and K Recycling or

Chena Power.

We are just one of several organizations that are innovating and applying our collective intellect to:

- Dramatically lower the cost of energy in Alaska
- Create a vibrant and growing economy in Alaska and
- Solve Alaska's problems

We look forward to working with state agencies, regional corporations, local communities and individuals as we all move Alaska forward.



Bernie and Connie Karl

04/03/13 Overview: State Energy Policy

<TARGET><BILL></BILL><SUBJECT>04-03-13 Overview State Energy Policy</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

Rep. Charisse Millett
Capitol Building, Room 403
Juneau, AK 99801
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rep.charisse.millett@akleg.gov

Rep. Doug Isaacson
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rep.doug.isaacson@akleg.org

Agenda

Wednesday, April 3, 2013
8:00 – 10:00 a.m.
Barnes Committee Room (#124)

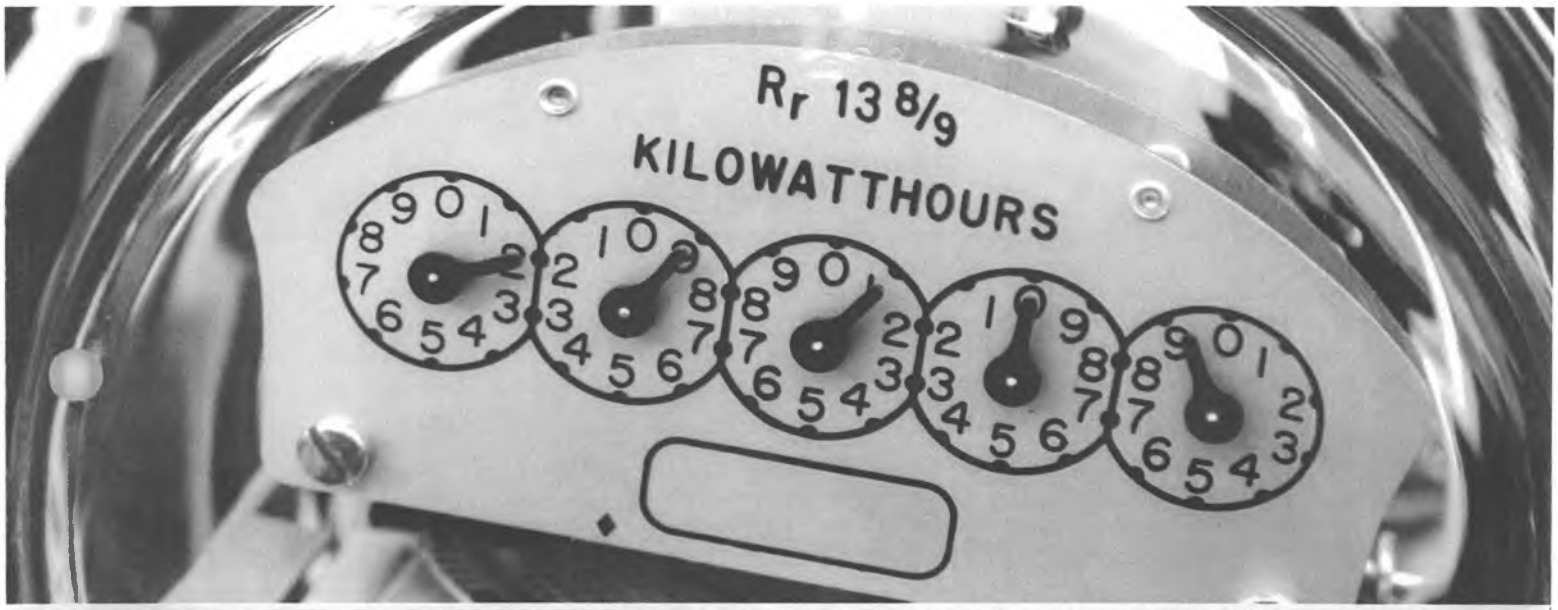
OVERVIEW: +State Energy Policy
Sarah Fisher-Goad, Executive Director, AK Energy Authority
Gene Therriault, Deputy Director, Statewide Energy Policy Development, AK Energy Authority

Available in audience for questions:
Stacy Schubert, Director of Governmental Affairs, AK Housing Finance Corporation
Bob Brean, Director of Research and Rural Development, AK Housing Finance Corporation

Bills previously heard/scheduled

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

###



Alaska Energy Authority Policy Overview

House Energy April 3, 2013





Reducing the Cost of Energy

- Investing in Alaska's Energy Infrastructure
- Diversifying Alaska's Energy Portfolio
- Energy Planning and Policy
- Technical and Community Assistance

ALASKA ENERGY AUTHORITY

Pathway from Policy to Projects



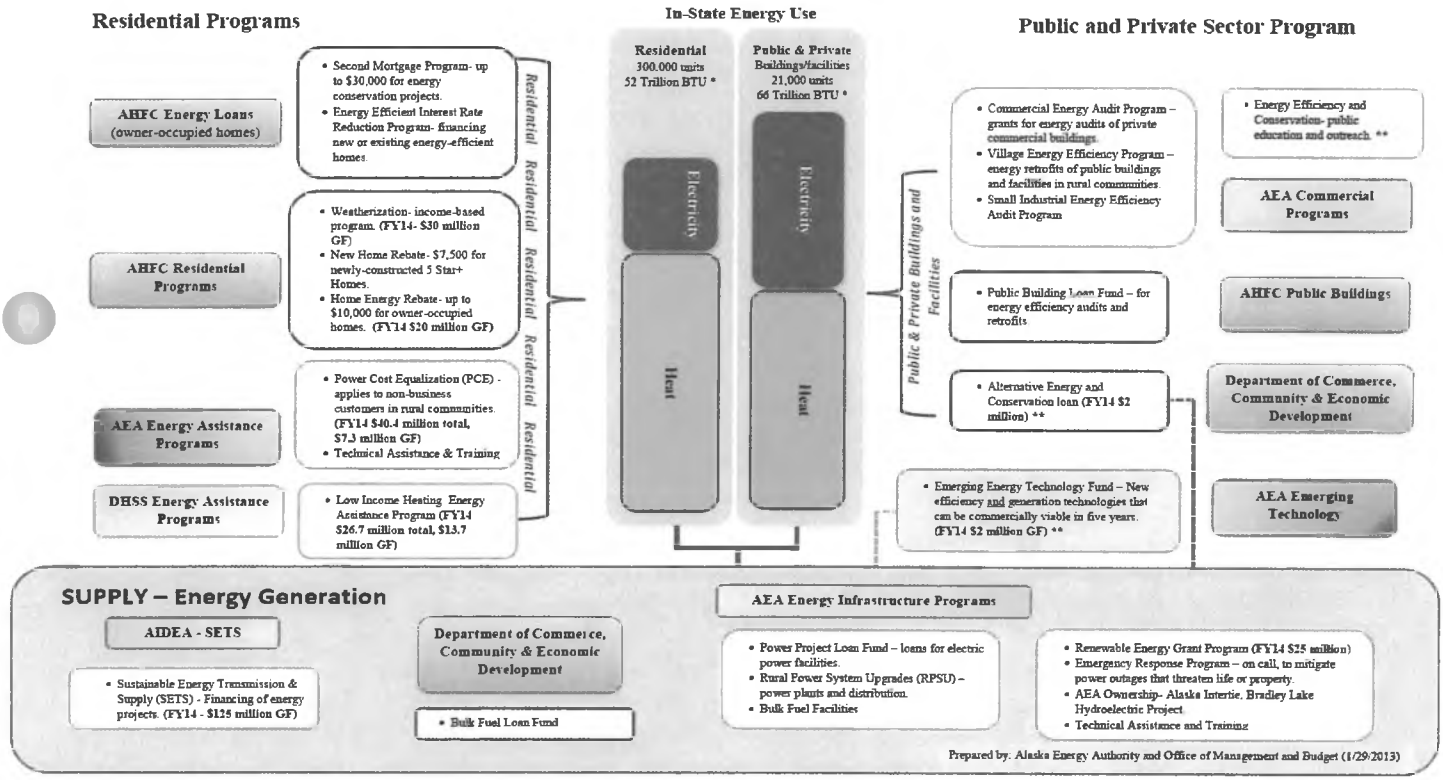
- Administration
- Alaska Legislature
- AEA Policy Development

- Board of Directors
- Regional Planning
- In-House Project Evaluation

- Loans and Direct Grants
- Project Management
- Partnerships (Private, AIDEA)

ALASKA ENERGY AUTHORITY

State of Alaska Energy Programs: Serving the needs of Alaska's residential and commercial energy users



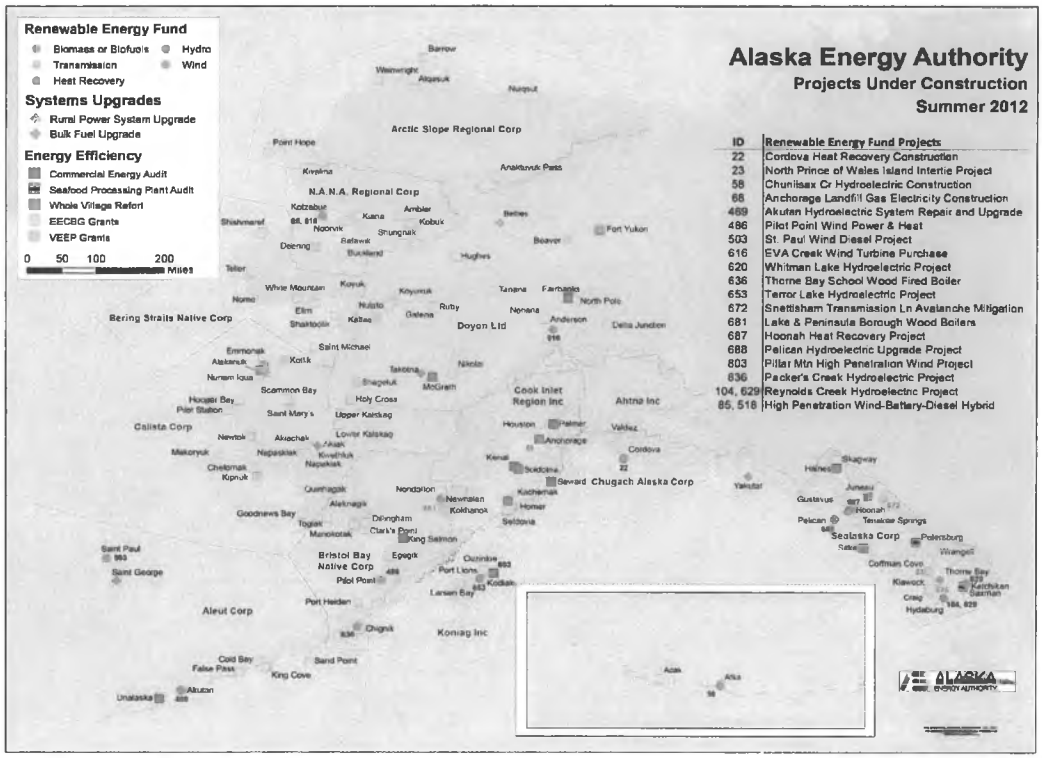
* Source: Energy Information Authority

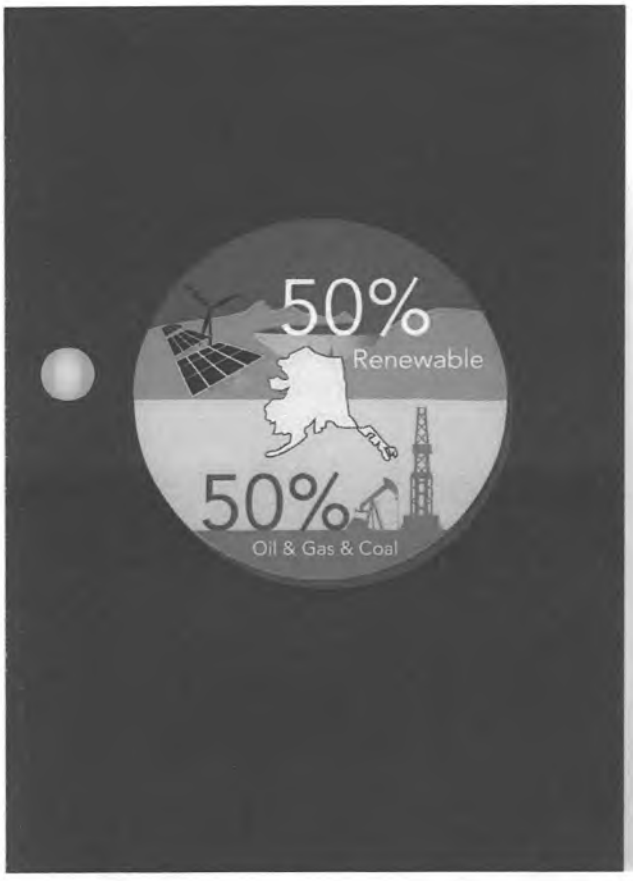
** Note that some programs do not fall within specific categories - Public outreach and education serves both the commercial and residential markets and Emerging Technology and the Alternative Energy and Conservation loan serve both generation and efficiency

Energy Policy Development and Coordination

- Serve as lead on Alaska's energy policy development
- Monitor State energy goals
- Coordinate multi-agency efforts
- Deputy Director for Statewide Energy Policy Development
- In-House Evaluation Team
  - Sara Fisher-Goad- management team lead
  - Gene Therriault- policy
  - Nick Szymoniak- economics
  - Kirk Warren- engineering

ALASKA ENERGY AUTHORITY


Renewable Energy Fund
Biomass or Biofuels
Hydro
Transmission
Wind
Heat Recovery
Systems Upgrades
Rural Power System Upgrade
Bulk Fuel Upgrade
Energy Efficiency
Commercial Energy Audit
Seafood Processing Plant Audit
Whole Village Reform
EECBG Grants
VEEP Grants
0 50 100 200
Miles
Alaska Energy Authority
Projects Under Construction
Summer 2012
ID | Renewable Energy Fund Projects
22 | Cordova Heat Recovery Construction
23 | North Prince of Wales Island Intertie Project
58 | Chunilsax Cr Hydroelectric Construction
68 | Anchorage Landfill Gas Electricity Construction
469 | Akutan Hydroelectric System Repair and Upgrade
486 | Pilot Point Wind Power & Heat
503 | St. Paul Wind Diesel Project
616 | EVA Creek Wind Turbine Purchase
620 | Whitman Lake Hydroelectric Project
636 | Thorne Bay School Wood Fired Boiler
653 | Terror Lake Hydroelectric Project
672 | Snettisham Transmission Ln Avalanche Mitigation
681 | Lake & Peninsula Borough Wood Boilers
687 | Hoonah Heat Recovery Project
688 | Pelican Hydroelectric Upgrade Project
803 | Pillar Mtn High Penetration Wind Project
836 | Packer's Creek Hydroelectric Project
104, 629 | Reynolds Creek Hydroelectric Project
85, 518 | High Penetration Wind-Battery-Diesel Hybrid
Barrow
Wainwright
Atqasuk
Nuiqsut
Arctic Slope Regional Corp
Point Hope
Kivalina
Anaktuvuk Pass
N.A.N.A. Regional Corp
Kotzebue
Ambler
Kiana
Kobuk
Noorvik
Shungnak
Selawik
Buckland
Deering
Shishmaref
Bethel
Fort Yukon
Beaver
Hughes
Teller
White Mountain
Koyuk
Koyuruk
Tanana
Fairbanks
North Pole
Nome
Nulato
Ruby
Galena
Nenana
Elim
Shaktoolik
Koyuk
Doyon Ltd
Anderson
Delta Junction
Bering Straits Native Corp
Saint Michael
Emmonak
Alakanuk
Kotlik
Nikolai
Nunam Iqua
Scammon Bay
Shageluk
McGrath
Cook Inlet Region Inc
Ahtna Inc
Hooper Bay
Pilot Station
Saint Mary's
Upper Kalskag
Holy Cross
Calista Corp
Lower Kalskag
Akiachak
Newtok
Houston
Palmer
Valdez
Anchorage
Cordova
Mekoryuk
Napaskiak
Kwethluk
Napakiak
Chefornak
Kipnuk
Kenai
Soldotna
Seward
Chugach Alaska Corp
Quinhagak
Nondalton
Kachemak
Alekhagik
Newhalen
Kokhanok
Homer
Goodnews Bay
Togiak
Dillingham
Clark's Point
Manokotak
King Salmon
Seldovia
Saint Paul
Saint George
Bristol Bay Native Corp
Egegik
Ouzinkie
Port Lions
Kodiak
Pilot Point
Larsen Bay
Port Heiden
Aleut Corp
Chignik
Koniag Inc
Cold Bay
False Pass
Sand Point
King Cove
Unalaska
Akutan
Haines
Skagway
Yakutat
Juneau
Gustavus
Hoonah
Pelican
Tenakee Springs
Sealaska Corp
Petersburg
Wrangell
Coffman Cove
Thorne Bay
Klawock
Craig
Hydaburg
Ketchikan
Saxman
Adak
Attu
ALASKA ENERGY AUTHORITY



Renewable and Emerging Energy

Renewable Energy Fund

- State Goal: 50% renewable electricity by 2025
- HB 152 (2008) authorized AEA to manage program, reauthorized in 2012
- Provides consistent vetting mechanism for individual capital projects
- By 2016, 12.3 million gallons of diesel and natural gas equivalent will be displaced annually. Results: $45 million in annual savings

Emerging Energy Technology Fund

- SB 220 (2010) created fund
- Leveraged Federal funds
- Can provide consistent vetting mechanism for emerging energy technologies (renewable, fossil fuels, efficiencies)
- Not a research fund, projects must be commercially viable within 5 years

ALASKA ENERGY AUTHORITY

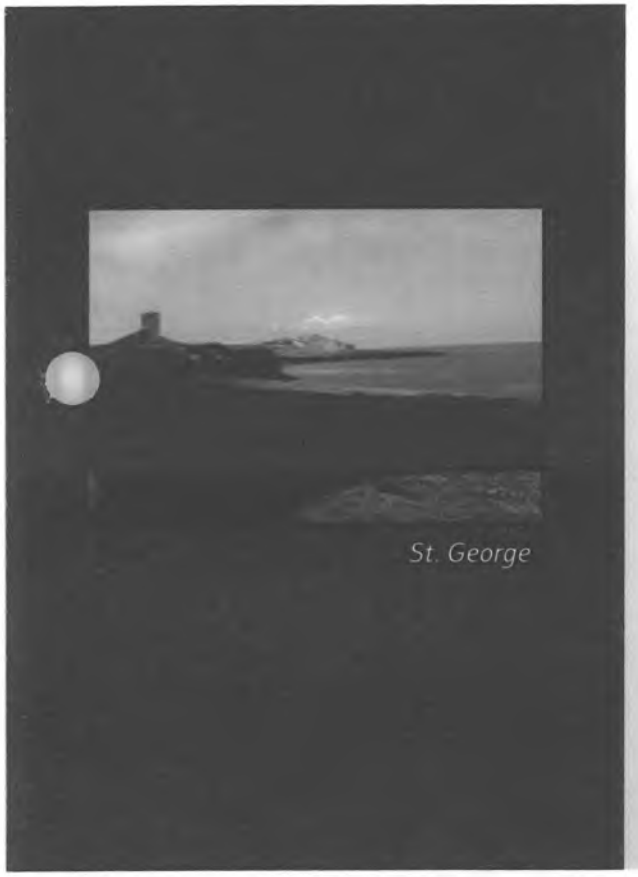
Improve Energy Efficiency 15 % by 2020



Energy Efficiency and Conservation

- State Goal: improve efficiency 15% by 2020
- AEA's focus is on commercial buildings, rural public buildings, industrial facilities and electrical efficiency
- Statewide outreach and education
- Support for multi-stakeholder group, Alaska Energy Efficiency Partnership AKEnergyEfficiency.org
- Coordination between State agencies
- $1,534,062 and 282,938 diesel equivalent gallons in projected savings
- Average immediate savings of implemented efficiency measures: $0.29 cents/ $1 invested, 300% ROI after 10 years

ALASKA ENERGY AUTHORITY

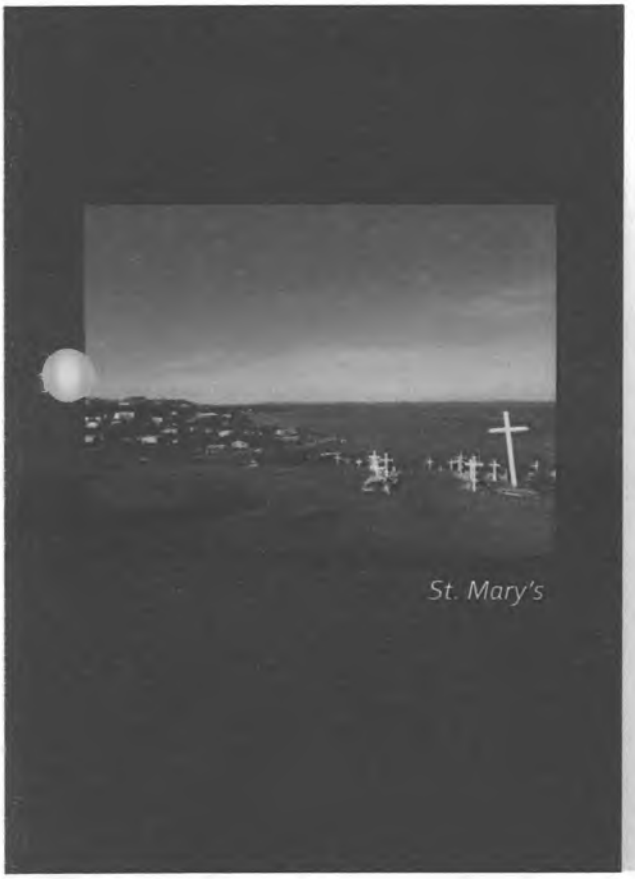


Rural Energy Infrastructure

Assessing Community Needs

- Assessment of Community Power System
- Fuel Delivery System
- Are lower-cost energy sources available?
  - Renewable energy
  - Fossil fuels (coal, natural gas, etc.?)
  - Transmission
- Community capacity to maintain the infrastructure
- Is there potential for economic development?

ALASKA ENERGY AUTHORITY

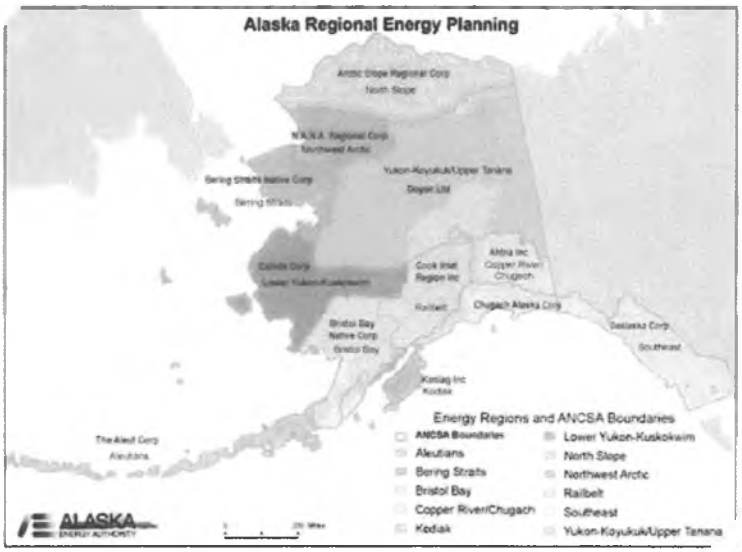


Supporting Regional Solutions

Regional Energy Planning

- No one energy plan for Alaska
- Energy Pathways led to regional planning
- Strategy to address unique challenges while capitalizing on regional resources
- Locally driven and community-vetted blueprint for sustainability
- Objective to provide specific, actionable recommendations
- Includes electric, heat and transportation energy
- Previous Plans: Railbelt Integrated Resources Plan and Southeast Integrated Resources Plan

ALASKA ENERGY AUTHORITY


Alaska Regional Energy Planning
Energy Regions and ANCSA Boundaries
ANCSA Boundaries
Aleutians
Bering Straits
Bristol Bay
Copper River/Chugach
Kodiak
Lower Yukon-Kuskokwim
North Slope
Northwest Arctic
Railbelt
Southeast
Yukon-Koyukuk/Upper Tanana
ALASKA
ENERGY AUTHORITY

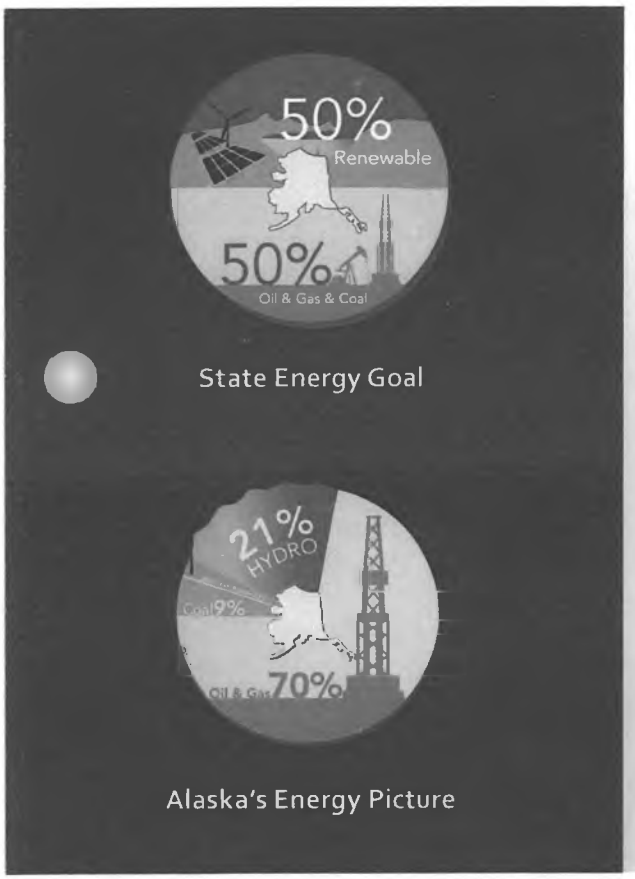


Regional Planning Group

Current Regional Plan Contracts

- **Ahtna Region** (Copper Valley Development Association)
- **Aleut Region** (Southwest Alaska Municipal Conference (SWAMC))
- **Bering Straits Region** (Bering Straits Development Council)
- **Bristol Bay Region** (SWAMC)
- **Calista Region** (Nuvista Light and Electric Cooperative)
- **NANA Region** (Northwest Arctic Borough Economic Development Commission)
- **Doyon Region** (Direct grant to Tanana Chiefs Conference from the Denali Commission)
- Working with Chugach, Kodiak and Arctic Slope Regions

ALASKA ENERGY AUTHORITY



Why Susitna-Watana Hydro

- Serves ~80% of state's population
- 1,000 jobs during peak construction
- Stable electricity rates for 100+ years
- Long-term diversification
- Clean, reliable energy source
- Promotes integration of variable power sources

ALASKA ENERGY AUTHORITY

Interior Energy Plan

- Opportunity to provide Alaskans with low-cost North Slope natural gas and propane
- Governor's finance package acts as a catalyst, bringing together LNG and propane customers with the private entities that will construct and operate the system
- AIDEA is investigating project feasibility and will only utilize their authorized finance tools if the project makes economic sense
- AIDEA will take an equity stake in project but will not outright build or operate the LNG plant or distribution system
- Governor's finance package is targeted at funding the initial capacity with future expansion funded by private/community investment

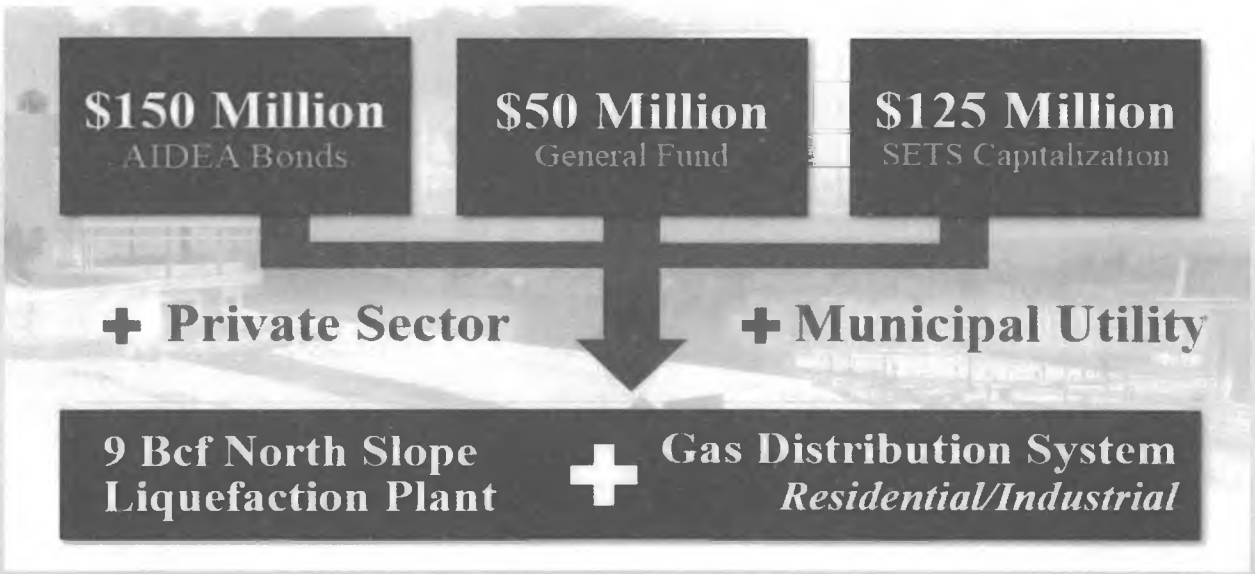
ALASKA ENERGY AUTHORITY

Interior Energy Plan: Project Goals

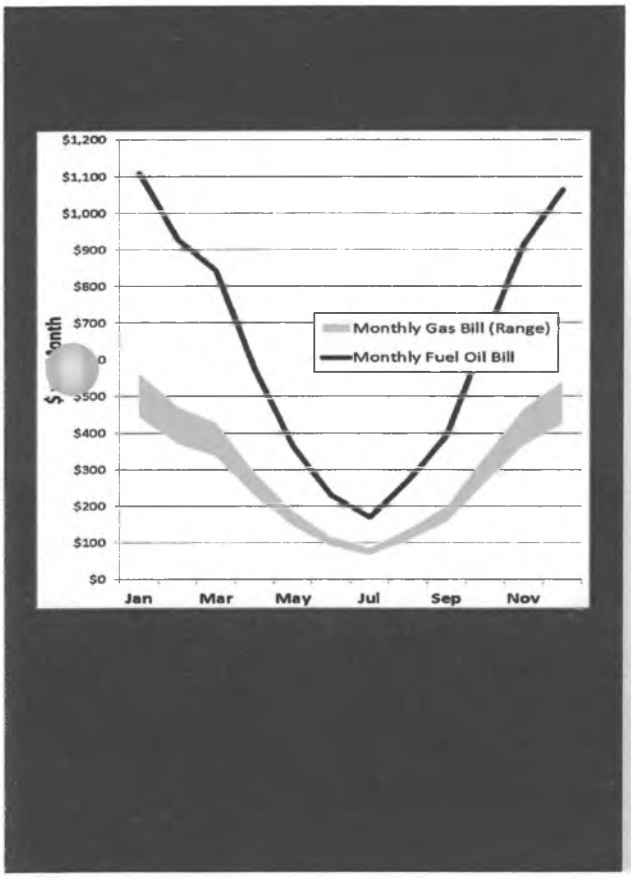
- Provide lowest-cost energy to Interior Alaska consumers as soon as possible
- Get gas first to the Interior while assuring long-term access to gas and propane from liquefaction plant for all Alaskans
- Utilize private sector mechanisms as much as possible

ALASKA ENERGY AUTHORITY

Governor's Finance Package



ALASKA ENERGY AUTHORITY



Household Heating Savings

Typical Home Heating Savings

- $2,900 - $3,750 annually
- 43% - 55% reduction in cost

Key Assumptions

- Typical Interior Alaska household will use 225 Mcf of gas per year (equivalent to 1,700 gallons of fuel oil)
- Does not account for expected improvement in heating efficiency with natural gas

ALASKA ENERGY AUTHORITY

Energy Policy Issues

- Developing State Resources on State Lands
- Can the State facilitate access to resources?
- Southeast Alaska Power Agency Call for Power
  - Looking for new sources of power
  - Allows all potential providers to participate in the discussion
  - AEA letter of support
- Open Access to Alaska Intertie
  - Alaska Intertie Agreement amended and restated Nov. 18, 2011
  - All potential users shall be provided access under common terms and conditions
  - Railbelt utilities to provide open access methodology July 1, 2013
- Unified Railbelt Transmission System

ALASKA ENERGY AUTHORITY


AKEnergyAuthority.org
ALASKA

Alaska Legislature
House Special Committee on Energy

Rep. Charisse Millett
Capitol Building, Room 403
Juneau, AK 99801
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rep.charisse.millett@akleg.gov

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Fax (907) 465-2197
rep.doug.isaacson@akleg.org

April 2, 2013

Sara Fisher-Goad, Executive Director
Alaska Energy Authority and AIDEA
813 W Northern Lights Blvd
Anchorage, AK 99503

[RE: Susitna Watana Hydro Project]

Dear Ms. Fisher-Goad,

On February 20, 2013, you addressed the House Special Committee on Energy regarding the status and plan for the 600 megawatt (MW) Susitna-Watana Hydro Project. We appreciated all the detailed information and look forward to seeing this project move forward.

During the presentation, you explained that the original, 1600 MW capacity dam had been downsized, but reassured the committee the project was moving forward such that the dam could be expanded to 1000 MW if that decision were made. The 600 MW dam would accommodate approximately 50% of today's Railbelt usage.

Representatives Higgins and Hughes inquired about the downsizing of the dam in relation to growing need in the future for electrical power. Representative Hughes asked how much power is drawn by a typical mining operation. You stated that power usage of over 300 MW is not unusual for a mine. Given that the 600 MW dam would serve the current capacity of 50% of the Railbelt, anticipating no additional electrical growth from now until 2025, if a mining operation were to come on line, it might use half of the Susitna-Watana capacity. This seems to indicate that the "ultimate build out" to 1000 MW may very well be necessary to accommodate the needs of a mine and anticipated growth of the Railbelt needs.

We ask that you assure the committee in writing that expansion of the smaller capacity dam would not require repeating the entire permit process and a complete reconstruction of the smaller dam to accommodate the

expansion. We also ask that you please provide in writing the dam capacity that is currently being permitted compared to the expansion capacity and describe that additional effort needed to complete the "build-out" to 1000 MW, or greater if deemed economical.

The committee seeks to ensure that we would not be doubling effort and extending the permitting timeline unnecessarily – at added cost – if the decision is made for the Susitna-Watana Hydro Project to be expanded.

Sincerely,

Co-chair Doug Isaacson

Co-chair Charisse Millett

01/27/14 Presentation: Institute of the North

<TARGET><BILL></BILL><SUBJECT>01-27-14 Presentation Institute of the North</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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rep.doug.isaacson@akleg.gov

AGENDA

Monday, January 27, 2014 8:00 a.m. – 10:00 a.m.
Barnes 124

Institute of the North
Presenter – *Nils Andreassen, Executive Director*

2013 Arctic Energy Summit, Akureyri, Iceland
2013 Arctic Energy Summit, Seward, Alaska

If you or your staff has any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov) or Jeff Turner at (907) 465-6588 (jeff.turner@akleg.gov).

###

Representative Doug Isaacson
Alaska State Legislature

Rep.doug.isaacson@akleg.gov • phone: 907-465-4527 • fax: 907-465-2197

MEMORANDUM January 27, 2014

SUBJECT: Committee Focus

TO: Members, House Special Committee on Energy

FROM: Rep. Doug Isaacson, Co-Chair

The House Special Committee on Energy is focused on resolving the issues that impede the ability of Alaskans from attaining affordable consumer energy. Every region of Alaska is entitled to secure the lowest affordable delivered cost for their energy needs. "Affordable" means that the cost is low enough to attract private investment, bring new jobs, and stabilize communities.

We all know that the consumer energy sector provides a lot of "interesting opportunities," so we can't tackle everything at once and be effective. There are six or more functions in providing consumer energy, listed in "TABLE A" (reverse side); a lengthy number of issues; hundreds of service providers, organizations, and independent entities within the consumer energy arena; and at least 13 State entities involved to varying degrees with consumer energy related functions, listed in "TABLE B".

To best facilitate committee action, I encourage a prioritization of issues according to the committee focus, and that each issue is identified with a function, and invite the participation of the appropriate organization and / or state agency in a committee format that best serves the understanding and resolution of the issue. Examples of Formats are: a) Bill Hearing; b) Presentation, usually from one organization or agency; c) Round-Table discussion, allowing for more than one interest to interact with the committee; or d) Informal informational workshops, such as will be held this Friday, January 31, 2014, with the Regulatory Commission of Alaska (RCA).

Each member has received previous correspondence from my office outlining possible committee topics. Our Committee schedule is still being developed and I invite your suggestions.

State Capitol, Room 13 • Juneau, Alaska 99811-1182

TABLES:

A. Consumer Energy consists of at least six separate and overlapping functions:

1. Generation
2. Operations
3. Distribution / Transmission
4. Regulation / Oversight
5. Projects / Funding
6. Fuel Sources
7. Miscellaneous

B. State Agencies with consumer energy related functions include:

1. Department of Commerce, Community, and Economic Development
    a. Alaska Energy Authority (AEA)
    b. Alaska Industrial Development and Export Authority (AIDEA)
    c. Regulatory Commission of Alaska (RCA)
    d. Division of Community and Regional Affairs (DCRA)
2. Department of Revenue
    a. Alaska Housing Finance Corporation (AHFC)
    b. Tax Division
3. Department of Natural Resources
    a. Royalty Oil and Gas Development Advisory Board
    b. Division of Forestry
    c. Division of Mining, Land & Water
4. Department of Environmental Conservation
    a. Division of Air Quality
5. Department of Law
    a. Regulatory Affairs & Public Advocacy (RAPA)
6. Department of Transportation & Public Facilities (DOT&PF)
7. Department of Administration

INSTITUTE OF THE NORTH

ALASKA'S ARCTIC THINK-AND-DO TANK

Review of 2013 Energy Projects

Nils Andreassen
Executive Director
Institute of the North

MISSION

To inform public policy and cultivate an engaged citizenry, consistent with our focus on the North and belief that commonly-owned resources should be managed and developed for community and individual prosperity.

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

LEVELS OF GOVERNANCE

National

Indigenous

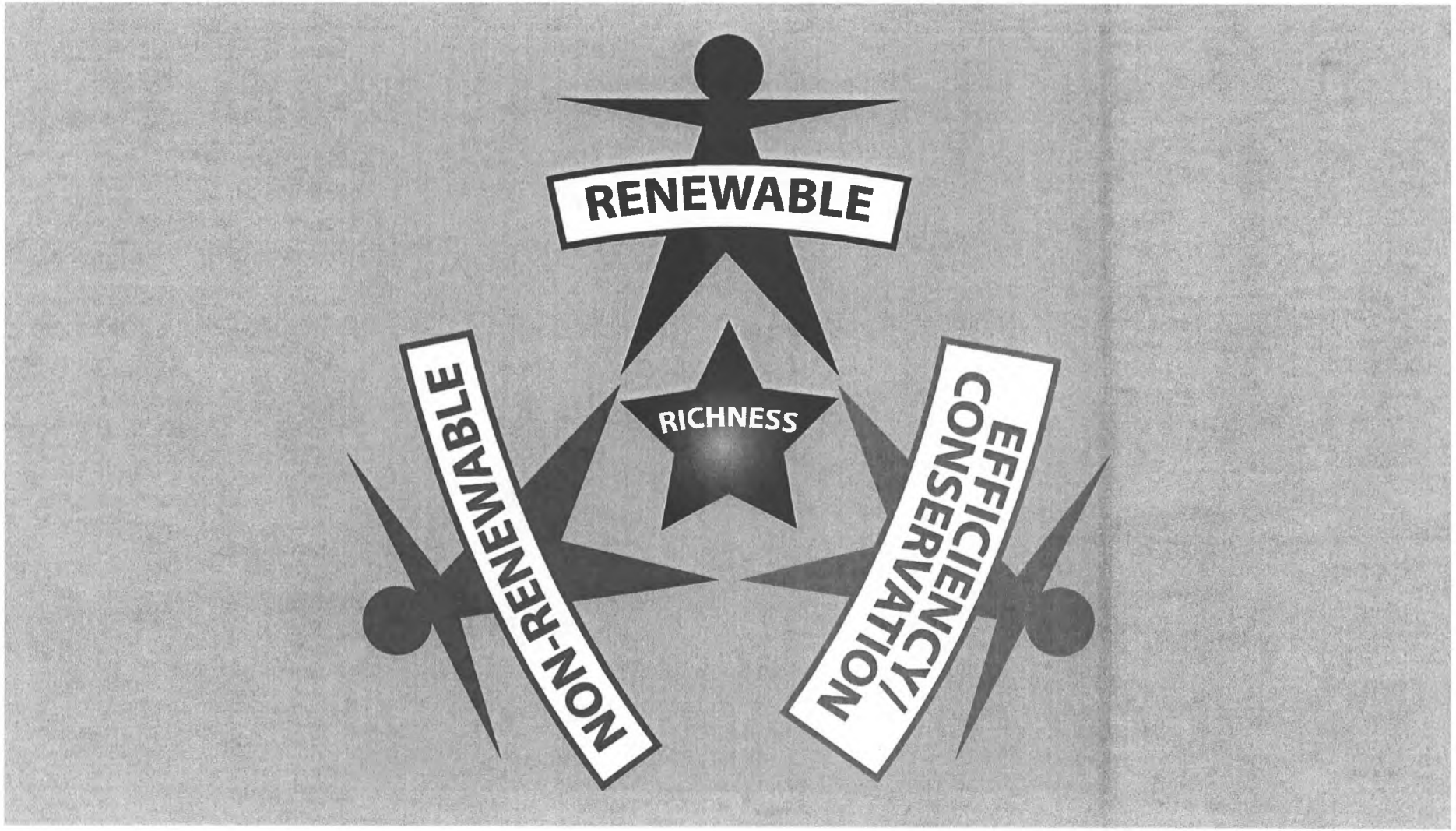
Sub-national

From Stakeholders to Rightsholders

RESPONSIBILITY

- Not risk free, but commitment to risk mitigation
- Necessary response ability
- Community, culture, and environment
  - Development of indicators

RICHNESS


RENEWABLE
RICHNESS
NON-RENEWABLE
EFFICIENCY/
CONSERVATION

RESILIENCE

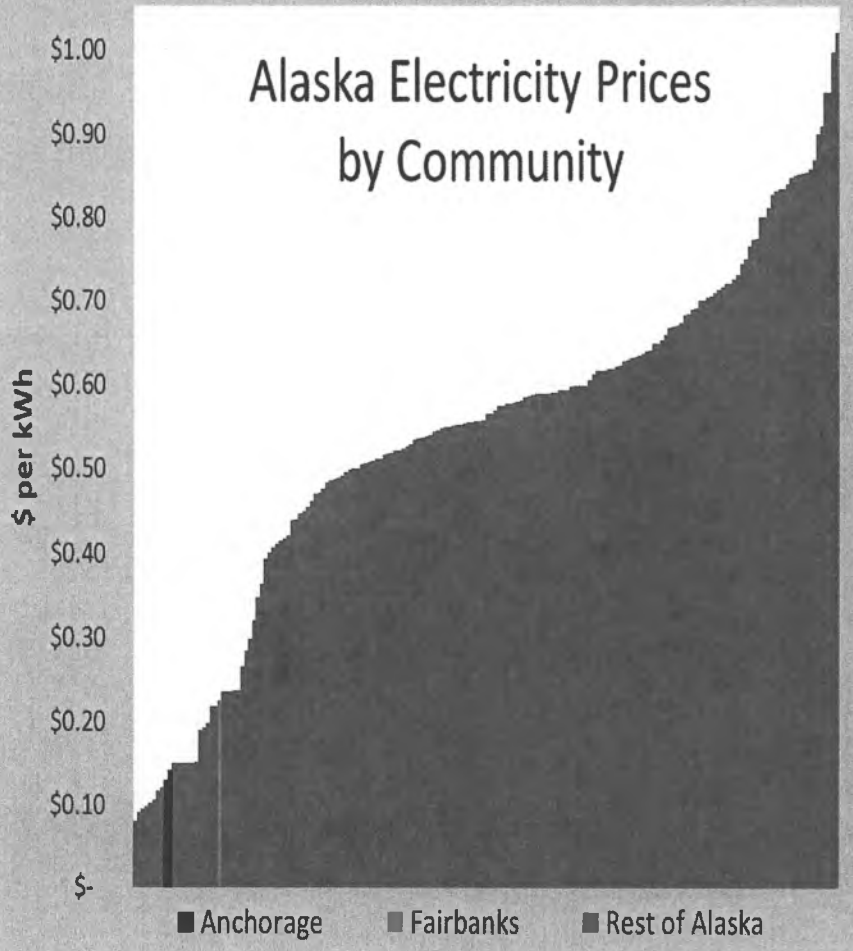
- Ability to respond and adapt to change – system capacity to bounce back
- Asset dependent, plus scale and rate of change
- Time sensitive – implement responsibility now
- Resilient communities depend on resilient energy systems

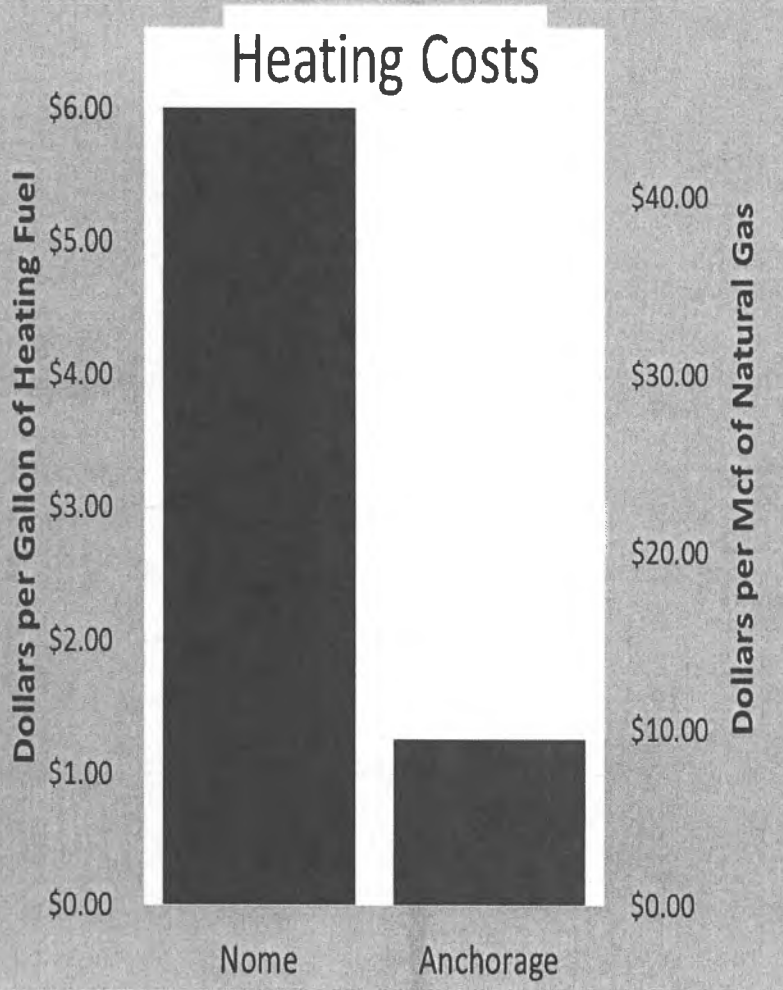
RESPONDING TO

- Fundamental challenges facing Alaska:
  - Declining oil production
  - Decreased state revenue
  - High energy costs in 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

ENERGY COSTS VARY





HIGH ENERGY COSTS

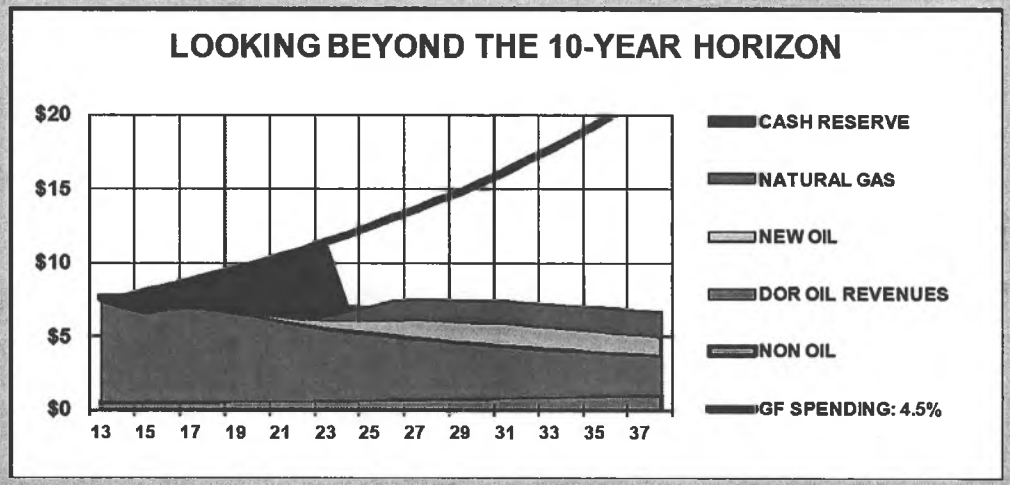
Electricity	Alaska Average Cents per killowatt hour kWh	U.S. Average Cents per kilowatt hour kWh	% Difference Alaska Higher than US	Period
Residential	17.78	12.03	48%	October 2012
Commercial	15.38	10.11	52%	October 2012

Source EIA

IMPACT- High Energy Costs are financially crippling Alaska households, costing Alaskans jobs and discouraging new industrial and resource development

THE POWER OF Alaska
ALASKA INDEPENDENT POWER PRODUCERS ASSOCIATION

FISCAL CONSTRAINT



"Reasonable assumptions about potential new revenue sources suggest we do not have enough cash in reserves to avoid a severe fiscal crunch soon after 2023, and with that fiscal crisis will come an economic crash."

ISER, *Maximum Sustainable Yield, FY2014 Update* (January 2013)

CHALLENGES

- Production
- Generation
- Distribution/Transmission
- Utilization

PRODUCTION

1. Access - Roads, Permitting willing landowners and leaseholder
2. Investment - regulatory certainty, stable market, infrastructure, access to private capital
3. Ownership of data - incentives business climate technical feasibility
4. Permitting - Clear & Consistent Standards, Avoid Duplication, Public Acceptance, timelines, capacity to process permit applications
5. Market Conditions - incentives create demand, attract and support private investment, market access for independent producers, compliance with federal regulations
6. Infrastructure - regulatory certainty, potential state involvement
7. Railbelt - Operation/Governance, balkanized, upgrades needed
8. Rural - Standalone, redundancy, no regional grid, lack of economic development, balkanized
9. Federal land ownership, and restrictive federal land use policy. (Ex: Tongass National Forest, Roadless Rule, etc.)
10. Natural Resource Development - need affordable power, value-added development

<u>Solutions:</u>

- Railbelt: Integrated operation/management, $900 million ($100-$200 annual savings) partnering, financing/ debt surcharge (from cost savings)
- Rural: Micro-grids, renewables, open access to transmission
- Extractive Industries: Partnering for rural energy renewables

GENERATION

- Security of supply
- Cost (fuel & capital/demand) → innovation, improve rates
- Logistics → regional plan, locally sourced
- Economies of scale
- Environmental impacts → fee's incentives and rules
- Dispatch and integration → technology, training, and transmission
- Firm v. Variable → battery storage curtailment
- Additional problems...
  - Storage
  - Technology
  - Aging Infrastructure
  - O & M
  - System Operations & Human Capital
  - Permitting
  - Financing and Access to Capital

DISTRIBUTION/TRANSMISSION

Anchor Tenants (potential users)

- Solution: Private investment for public benefit and create economies of scale (natural resource development, value-added industries)

High Contribution of renewables on grids, unbalanced load

- Solution: Centralized operation of stand-alone utilities (keep old tech for backup)

Regulatory uncertainty & lack of coordination

- Solution: Streamline permitting process to bring mines on-line faster (single agency POC)

Lack of infrastructure & lack of connection (distance, geo)

- Solution: Partner with other western states (PNWER, legis, admins), Connect to the North American grid where economically feasible (Yukon), Transition between utility grids within Alaska

Land access restrictions

- Solutions: Assert RS2477 & ANILCA, et al ROWs

No renewable land use designation

- Solution: virtual connections, evaluate on STWD basis, No renewable Land Use Designation (LUD) within the Tongass National Forest, or Tongass Land Management Plan (TLMP)

Competing Projects

- Solution: create big picture strategy that includes villages

UTILIZATION

NO ONE has used the AHFC public building loan fund.

- Solution: administrative leadership → make the department heads figure this out (district admn. People). As well as educating decision makers (school boards) about the benefits of applying for loans

Need low interest rates on loan programs for commercial buildings to become more energy efficient

- Solution: AHFC add this to their efforts

New methods for funding energy efficiency needs

- Solution: Implement PACE, which 29 other states are currently doing.

<u>Expand Opportunities:</u>

- Recruit and Support Energy Intensive Industries (e.g., mining, data centers)
  - Or small-scale e.g. local food processing in a village; opportunity to interconnect

- Better Management
  - Need strong infrastructure grid, equal access, RCA regulatory environment ensuring equal access to transmission

2010 PLAN

1. Establish an Energy Policy
2. Develop Strategic Goals
3. Adopt a plan to achieve the goals
4. Implement programs and projects consistent with the goals

- Steps 2-4 are the current problem statement
  - To what extent is Alaska achieving affordability, ensuring project efficacy and stable funding for projects in the long-term, while practicing fiscal constraint?

DECLARATION OF STATE ENERGY POLICY AS 44.99.115

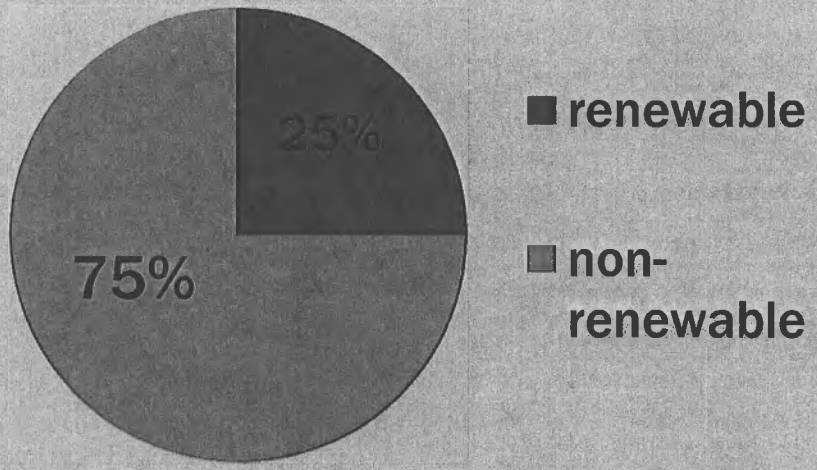
- The State of Alaska recognizes that the state's economic prosperity is dependent on available, reliable, and affordable residential, commercial, and industrial energy to supply the state's electric, heating, and transportation needs.

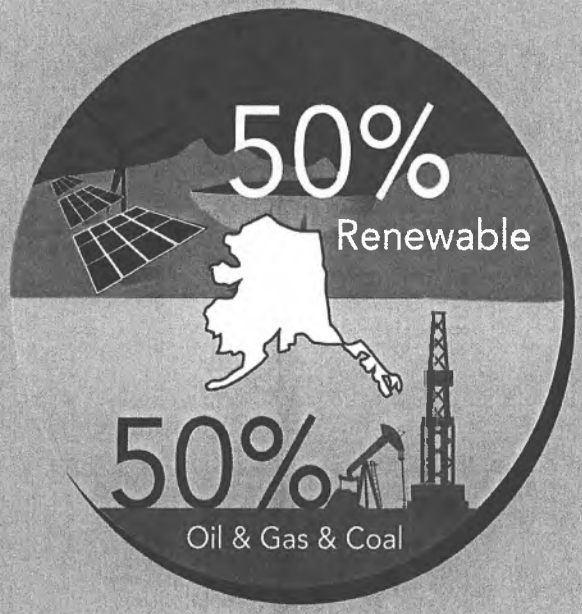
- The state also recognizes that worldwide supply and demand for fossil fuels and concerns about global climate change will affect the price of fossil fuels consumed by Alaskans and exported from the state to other markets.

- In establishing a state energy policy, the state further recognizes the immense diversity of the state's geography, cultures, and resource availability.

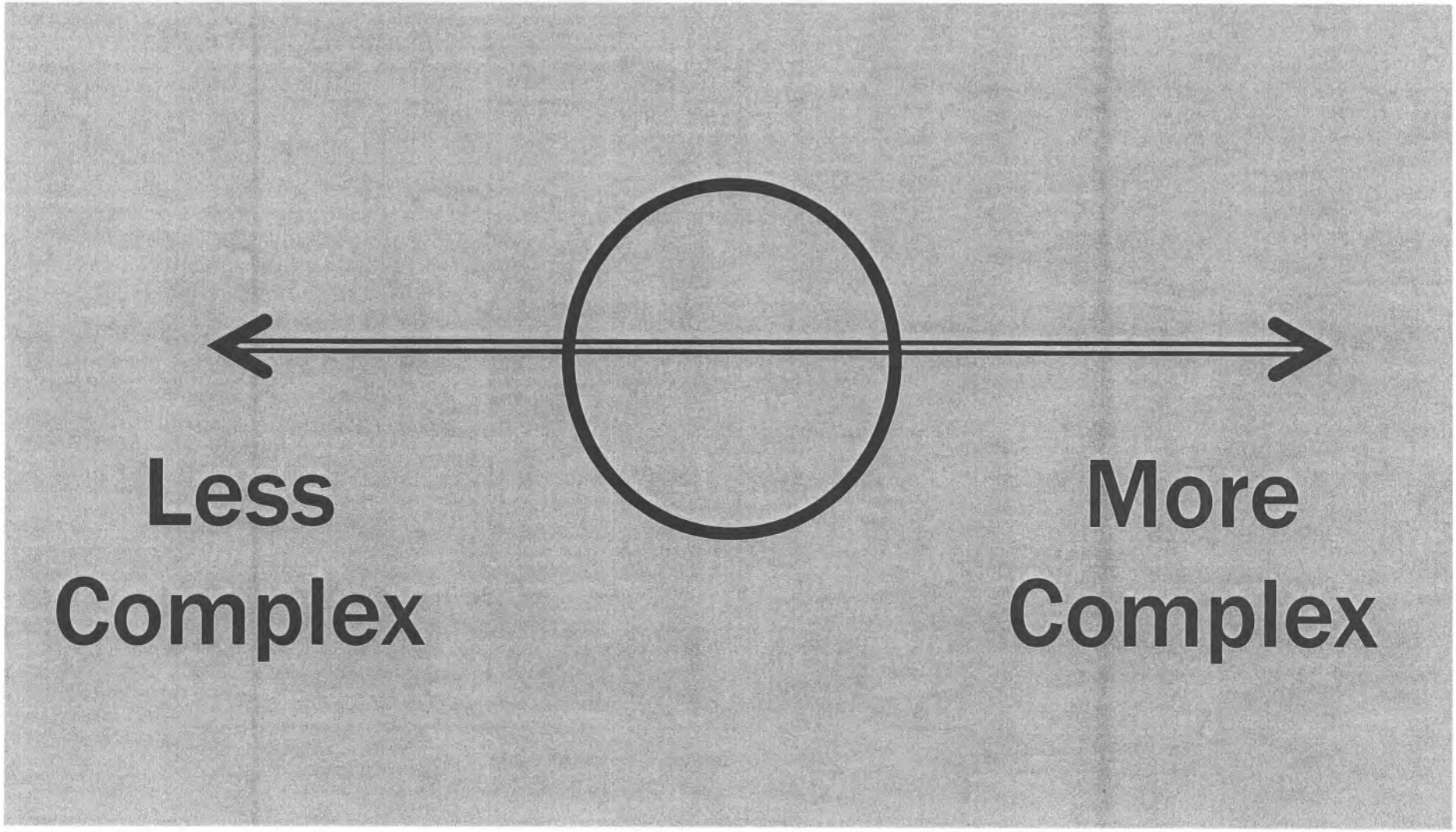
DIVERSIFYING ALASKA'S ENERGY PORTFOLIO

Alaska Net Electricty Generation
May, 2013





THE POLICY SWEET SPOT



CASE STUDY ANALYSIS - POLICY

- Certainty
  - Longevity
  - Regulatory and fiscal environment
- Empower the market (and individuals)
  - Open access—let market forces work
- Vision/Mission statement
  - Clearly articulated vision leading to broad support
  - Energy independence equals low-cost power
  - Goal of consumer benefit
  - Ancillary benefits - Energy security and Jobs
- Other
  - Broad statewide support because it is a common problem
  - Equalize costs between urban and rural
  - Leadership
  - Federal, state, and private investment
  - Legislative champion
  - Local entity adaptive (no restrictive policy)
  - Goal-oriented and Reality-based

CASE STUDY ANALYSIS - IMPLEMENTATION

- Get 'er done! (Infrastructure)
  - Build for industry first...and the rest will follow
  - Grid infrastructure
  - Could have incentivized utilities to invest, and create efficiencies
  - Emphasis on construction (not studies)
- Consensus
  - Spreading money around the state
  - Agreement among players
  - Positive change in land ownership (private)
  - Pro-active management of public lands for renewable energy development
- Other
  - Lock-in through clear contracts
  - Policy adaptation
  - Well-defined objectives, transparent process
  - Immediacy of need
  - Use what's abundant and affordable
  - Contracts
  - Outsourced to private sector
  - Existing organizations

CASE STUDY ANALYSIS – PROGRAMS/PROJECTS

- Universal, broad base, diverse and inclusive
  - Public and private financial participation
  - Popular, high demand
  - Available statewide
- Technical credibility facts! Info!
  - Good data
  - Well-prepared project plans
- Projects were catalysts and foundations
  - Created framework to enable, not dictate projects
  - Industrial-size projects to drive the completion of increased transmission interconnectivity with open access
  - Innovation, reinforcing feedback, lowering costs
  - More innovation and technology, lower costs
  - Stable prices and conservation
  - Reduction in consumption

ALASKA DIALOGUE - QUALITIES OF POLICY

An Energy Policy for the State of Alaska should:

1. Be driven by Vision and Strategy
2. Create and Supports Regulatory Clarity
3. Have Broad Stakeholder Buy-in
4. Be able to be evaluated against measurable indicators
5. Adapt and evolve based on results of evaluation
6. Establish a Loading Order (prioritization method)
7. Should include clear strategy or work plan for implementation

ALASKA DIALOGUE – WHAT POLICY ACHIEVES

An Alaska Energy Policy should achieve:

1. Economic Development/ Growth/ Sustainability
2. Stability & Predictability
3. Equity/Fairness
4. Innovation/ Entrepreneurism
5. Affordability
6. Stewardship
7. Transparency and Accountability
8. Consumer/User Responsibility
9. Support for private investment
10. Modern regulatory framework to attract, support, and protect new investment capital

INDICATORS

To what extent have we established, addressed, been affected by, incorporated...

Security of Supply
Environment and Pollution
Strategy for State
Politics and Pet Projects
Budgets
Risk Appetite
Resource Wealth
Technology Development
Social Considerations
Subsidies for People
Subsidies for Industry
Economic Development
Resource Development
Ratio of private investment to public investment

Price

ENERGY PRICE FOR POLICY SWEET SPOT

$$\text{Fuel} + \frac{\text{Capital \& Operation Costs}}{\text{Demand}}$$

KEY TAKEAWAYS

- **Does the current state energy policy meet the criteria?**

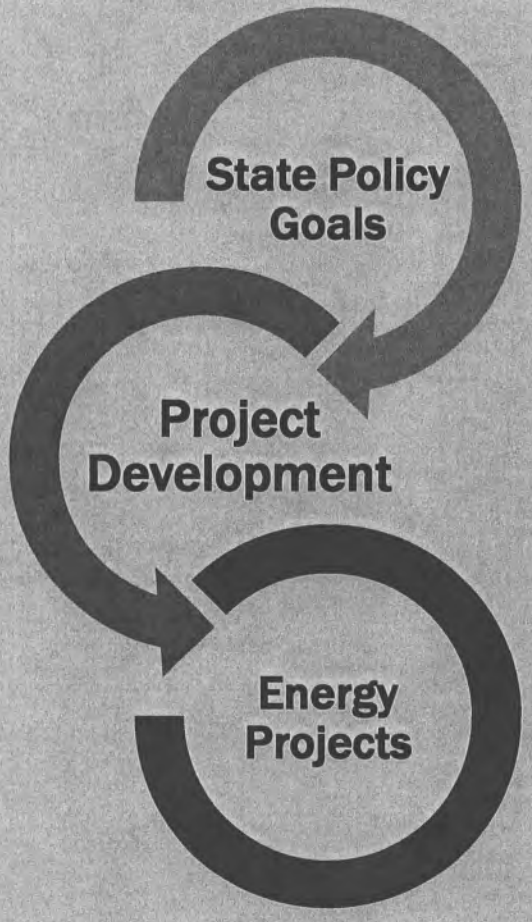
- ✓ Driven by Vision and Strategy
- • Creates/Supports Regulatory Clarity
- ✓ Has Stakeholder Buy-in
- • Can be evaluated against measurable indicators
- • Results of evaluation guides adaptation and policy evolution
- • Establishes a Loading Order (prioritization method)
- ✓ Economic Development/ Growth/ Sustainability
- ✓ Stability & Predictability
- ✓ Equity/Fairness
- • Innovation/ Entrepreneurism
- • Affordability
- • Stewardship
- • Transparent, Accountable Process
- • Consumer/User Responsibility

How are we evaluating the outcomes?

REMAINING QUESTION

- Is the current state energy policy aspirational or directional? And for whom?

AEA -
PATHWAY FROM POLICY TO PROJECTS

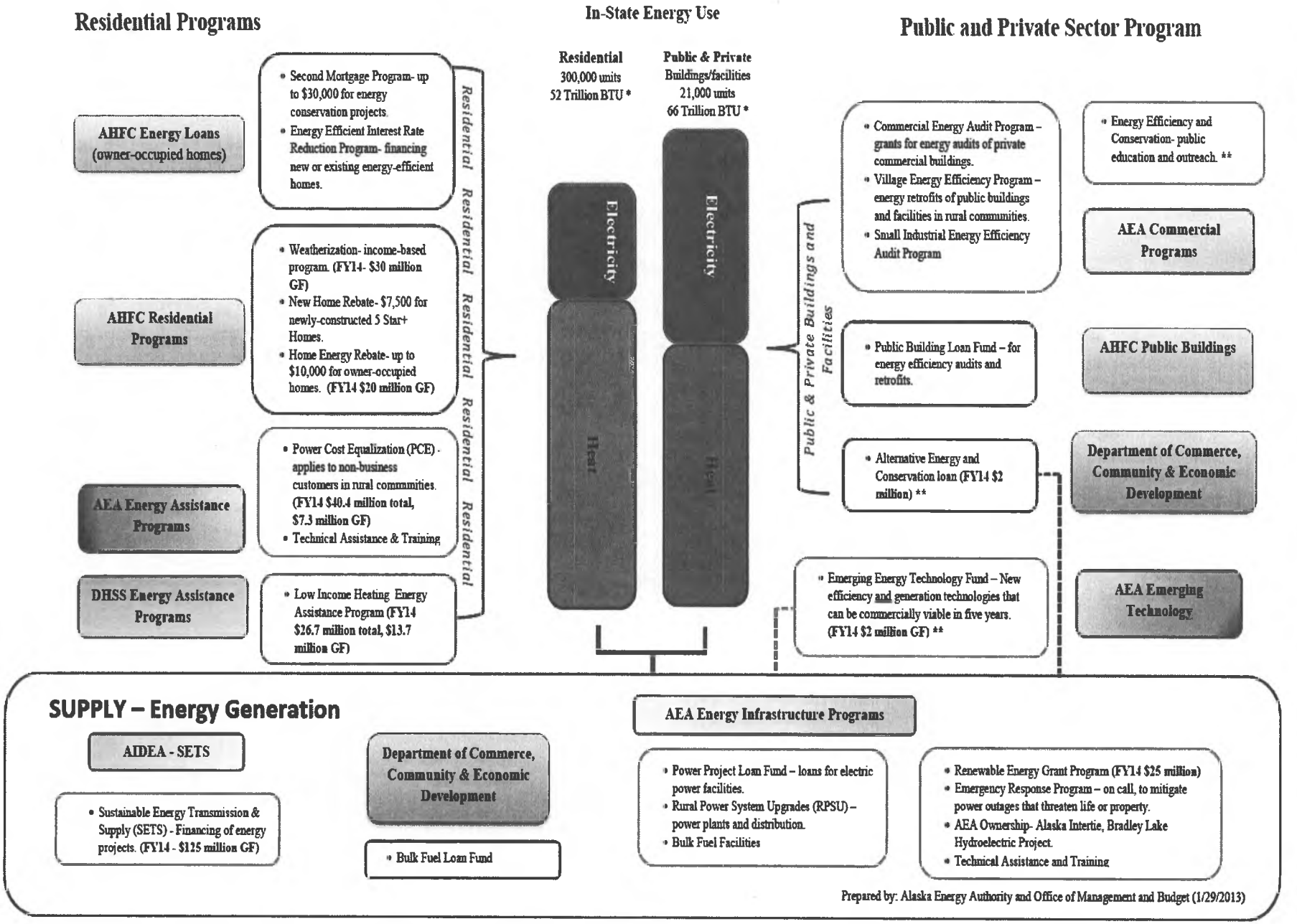


- Administration
- Alaska Legislature
- AEA Policy Development

- Board of Directors
- Regional Planning
- In-House Project Evaluation

- Loans and Direct Grants
- Project Management
- Partnerships (Private, AIDEA)

State of Alaska Energy Programs: Serving the needs of Alaska's residential and commercial energy users



** Source: Energy Information Authority*

*** Note that some programs do not fall within specific categories - Public outreach and education serves both the commercial and residential markets and Emerging Technology and the Alternative Energy and Conservation loan serve both generation and efficiency*

ROADMAP

- Criteria - A principle or standard by which something may be judged or decided
- Strategy - prioritize or rank how we spend limited money in a way that produces results
- System – tracks projects/expenditures to make sure that we are accomplishing the goals set out by the policy

POTENTIAL RECOMMENDATIONS

Draft Recommendations

- Make standing committees of House Energy and Senate In-State Energy – consolidate oversight
- Think in terms of a balance sheet – assets and liabilities
- Evaluate energy projects with accurate information, and options vetted and weighed against one another
- Encourage better outreach and communication from state agencies – benchmarks of success
- Encourage and support private investment
- Implement energy policy as a key element of fiscal policy – fenceposts for policy makers and agencies

POTENTIAL RESEARCH

1. Impact of grid connectivity to social and economic development? Regional or microgrids?
2. Inventory of measures of government support to both extractive industry and renewable energy projects
3. Study examining the benefit sharing arrangements to local communities from private sector development
4. Lessons learned from policies promoting renewable energy
5. Dedicated financial vehicle (i.e.; Arctic Development Bank or Arctic Resilience Fund) to support renewable energy, local development, and resilience

POTENTIAL PROJECTS

- Development of an Arctic Risk Map that shows potential origin, probability, and consequence
- Assess and map renewable energy sources, which can be overlaid on existing oil and gas mapping
  - Development of an energy development and distribution roadmap
- Review regulatory and fiscal regimes for impact on the human dimension and social, economic and cultural development
- Review stake/rightsholder engagement and effective consultation practices
- Drafting of a master plan for community survivability
- Develop best practices guide to northern energy efficiency, through engineering, architecture and design

NEXT STEPS

- Build on qualitative work at Dialogue by considering indicators for criteria
- Develop quantitative evaluation measures for decision-making
- Consider both as part of a strategic plan



CHALLENGE

Arctic as a model of clean energy development

Arctic as a model for delivering affordable energy to its peoples and communities

"With great energy wealth comes great energy responsibility, on behalf of our people."

01/31/14 Informal Energy Round Table Workshop: Regulatory Commission of Alaska

<TARGET><BILL></BILL><SUBJECT>01-31-14 Informal Energy Round Table Workshop Regulatory Commission of Alaska</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Juneau, AK 99801
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MEMORANDUM

To: Chief Clerk, Suzi Lowell, and
Legislative Affairs Network/Programming Supervisor, Shay Wilson

From: Co-Chairs Doug Isaacson and Charisse Millett

Subject: Informal Energy Workshops

Date: April 10, 2014

To fulfill the duty and responsibility of maintaining files for historical research, please authorize and include the two Informal Energy Roundtable Workshops listed below onto the House Special Committee BASIS site:

1. Addressing the Immediate Concerns of TRANSCOs and ISOs in Alaska, April 9, 2014; and

2. Regulatory Commission of Alaska, January 31, 2014.

As we begin the process of concluding the legislative session and archiving the work of the state legislature we thank you for your assistance.

Representative Doug Isaacson

AGENDA

Informal Energy Round Table Workshop

Regulatory Commission of Alaska

January 31, 2014

8:00 a.m. - Call the meeting to order

1. Regulatory Commission of Alaska (RCA) Workshop
   Presentation - *TW Patch, Commissioner*

2. Questions and discussion

10:00 a.m. - Adjourn

If you or your staff have any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov).

Session (Jan-April) Alaska State Capitol •Juneau, AK 99801• (907) 465.4527 • (907) 465.2197-Fax
Interim 301 Santa Claus Lane •North Pole, AK 99705•(907) 451-2818•(907) 451-2332-fax
Rep.Doug.Isaacson@akleg.gov

Basic Ratemaking

Key Concepts

Introduction

Topics to discuss:

- Why we regulate
- Basic ratemaking components
- Steps in calculating rates
- The rate approval process

Why We Regulate

- In most cases providing utility service functions better as a monopoly (more efficient provision of service)
- But by definition monopolies have no competition
- No competition means there is little incentive to keep rates down
- Rate regulation is intended to act as a substitution for competition, while still maintaining the efficiency of the monopoly
- Regulation is by no means perfect and some regulatory lag is inherently present because of due process

Ratemaking is an Art, not A Science

- Ratemaking is very subjective
  - Key concepts provide the foundation but there is much room for interpretation and personal preference
  - Basic ratemaking concepts have been shaped and molded over the last 100 years, primarily through experimentation and case law

Some Ratemaking Parameters

- Rates must be just and reasonable
  - What does this mean? *Rates must adequately compensate the utility without overcharging the ratepayer*
  - This does not necessarily mean rates will be cheap!
  - Generally this means the utility is entitled to compensation for:

1. Prudently incurred expenses used to provide safe and reliable service; and
2. Provide a fair return on the utility's investment

Some Ratemaking Parameters (contd.)

- Rates must be "cost based" and cannot be confiscatory to the utility
- Rates are implemented on a prospective basis ONLY
  - Utilities cannot retroactively collect in current rates for a specific past cost
  - Rates are intended to be representative of costs likely incurred while the rates are in effect
- Costs included in rates must be prudent
  - Plant cannot be "gold plated"
  - Costs deemed to be extravagant, unnecessary, or excessive can be disallowed

Some Ratemaking Parameters (contd.)

- Costs in rates must be "used and useful"
  - Costs must actually be in use
  - Costs must provide some benefit to the ratepayer
- Some expenses are almost always disallowed such as:
  - Charitable contributions
  - Lobbying expenses
  - Marketing expenses

Regulation is a Balancing Act

- Interests of both sides must be considered. Equity and fairness are key



- Consequences of a misbalance can be severely detrimental

Consequences of Misbalanced Rates

If rates are excessively high

- Ratepayers may be paying for excess costs the utility is not actually incurring
- Utility collects more than its allowed return
- This is unfair to ratepayers and could be considered to be price gouging

Consequences of Misbalanced Rates

If rates are excessively low

- Utility is deprived from collecting reasonably incurred costs and rates are confiscatory
- Utility may not be able to keep up with maintenance of plant, raising the risk of accidents and service failure
- Utility may not have sufficient equity to invest in needed upgrades and may not be able to attract much needed capital
- Utility could default on its debt, placing the utility in a higher credit risk. Utility may have to pay higher interest rates, which are passed on to customers
- It is in nobody's best interest to have their utility go bankrupt!

Components Used in Calculating Rates

The Revenue Requirement

- Sometimes also referred to as the "cost of service"
- The *annual* amount of revenue a utility needs to collect in order to recover prudent expenses and earn a fair return on its investment
- A study is performed using a "test year" to determine if rates should be revised. This is called a Rate Case or a Revenue Requirement Study
- Much controversy can occur in establishing a just and reasonable revenue requirement

Revenue Requirement

Basic components:

Operations and maintenance
+ General and Administrative
+ Depreciation
+ Fuel and/or Purchased Power
+ Taxes other than income
+ Allowance for Income Taxes
+ Return

= REVENUE REQUIREMENT

O&M Expenses

- Ongoing costs to physically run the utility
  - Maintenance of equipment and power lines, street lights, generators, etc.
  - Pole rentals
  - Meter expenses
  - Line operations
  - Plant operations

G&A Expenses

- Expenses incurred that are not physically associated with production of the utility's service but still necessary to operate
  - Overhead
  - Wages and benefits/pensions, etc.
  - Transportation
  - Office space rents
  - Office expenses and postage
  - Outside professional services
  - Rate case expense

Depreciation

- The allocation of cost to an asset with a useful life greater that one year
- Depreciation is how a utility gets recovery *of* its investment
- This is a key factor in a rate case because the goal is to match the recovery of cost over the period in which the asset will be in service
- Most common approach is "straight line" method, but other methods have also been used

Fuel and/or Purchased Power

- If fuel expense is volatile, either because consumption is volatile or price per gallon is volatile, etc. Commission allows for this to be passed through a separate surcharge, called a Cost of Power Adjustment (COPA)
- Allows for faster response to fluctuating fuel costs
- In a rate case, the base cost of fuel is reset and future fluctuations either increase or decrease the COPA as they occur
- In some rate cases the base cost of fuel is zeroed out and the entire cost of fuel is recovered through the COPA

Taxes Other Than Income

- Example: Ad valorem taxes
- Not usually controversial
- Typically easily verifiable,
- Usually recognized in full in rates (unless non-recurring) because they are beyond the control of the utility
- If tax rates have been rising, an adjustment may be allowed if it is known and measurable

Income Tax Allowance

- An allowance for income taxes is typically calculated to be representative of what the tax expense will be with new rates in effect
- The calculation is impacted by the *Return on Equity* because it establishes what anticipated taxable income will be
- Applicable state and federal tax rates are applied to derive the Tax Allowance

The Return Component

- Several different methods for deriving depending on the utility
- Rate Base Rate of Return method is most common for investor-owned utilities
  - In its simplest terms:

  Return= Rate Base x Rate of Return
- Rate Base is the net value of *property* (assets) used in providing service, on which a public utility is permitted to earn a specified rate of return, as determined by the commission
- Weighted average cost of capital is the rate of return

Rate Base

- Methods for calculating RB differ but the most preferred is the "Original Cost" method.
- Utility Plant makes up about 90% of Rate Base
- Based on average monthly account balances
- Contributed Capital is not allowed in rates!

Other Items Increasing Rate Base

- Materials and Supplies such as fuel stock, inventory, materials held for maintenance
- Prepayments- allowed to earn a return if not recognized elsewhere
- Utility earns a return on these items because they are assets necessary for safe and reliable service and are part of the overall utility investment
- Based on average monthly balances

Rate Base (Contd.)

Gross Plant in service (net of contributed capital)

- Accumulated Depreciation (net of CC)

= Net Plant in Service (for rate purposes)

+ Materials and Supplies

+ Prepayments

- Customer Deposits and Advances

- Deferred Income Taxes

+ Cash Working Capital Component

= RATE BASE

Rate Base (Contd.)
Net Plant

- Net Plant= gross plant less accumulated depreciation
- Represents the amount of plant that is not used up and is in service
- Cannot include contributed capital, such as from grants. Contributed capital is not included in rates because ratepayers should not be required to pay a return on money that investors did not supply

Rate Base (Contd.)- Other Items That Increase Rate Base

- Cash Working Capital Allowance
  - General concept is that if a utility bills in arrears (which is the norm), that utility was required to fund cash up-front to cover costs between the time service was provided and when payment was received
  - Average lag period is about 45 days
  - Utility is entitled to earn a return on these funds
  - Generally computed by taking 12.5% (=45/360 days) of allowed operating expenses and including it in rate base

Items That Decrease Rate Base

- Contributed capital
- Customer deposits and advances
  - General concept is that investors are not be permitted to earn a return on money they did not provide
- Deferred income taxes
  - Liability created as a result of temporary timing differences when accelerated depreciation is used for tax purposes. Treated as a "cost free" source of capital

Rate of Return

- Utilities are allowed the opportunity to recover a fair return but it is not guaranteed
- Is typically very controversial because it is highly subjective
- Often the most expensive portion of a rate case proceeding
- Usually requires hiring expert consultants

Rate if Return (Contd.)

- Must be a "fair" rate of return
  - Should provide adequate earnings
  - Should allow utility to meet its cost of debt
  - Should allow the utility to attract capital for plant replacement and expansion

Rate of Return Components

- Capital Structure- % composition of debt and equity
  - May be the utility's actual capital structure, but usually a hypothetical capital structure is used (either the utility's parent company or a well diversified proxy group)
  - Capital structure used should result in the utility being able to generate capital at reasonable costs
  - Commission usually uses a hypothetical capital structure and tends to prefer a cap structure in the range of 50%/50% debt-equity +/- 10% in either direction

Return Components

- Cost of debt
  - Rarely raises dispute and can be easily verified because of contractual debt obligations
- Return on equity
  - Where disputes often arise- very subjective
  - Fluctuates with changing market conditions
  - Cannot be definitively measured but techniques exist to compare past, present, and anticipated prices of company stock or earnings with those of comparable companies

Return Components

- Return on Equity (Contd.)
  - Must be commensurate to the returns on other investments having commensurate risks
  - Consultants are hired because it requires the exercise of informed expert judgment to attempt to estimate investors' (collectively) required rate of return
  - Many different methods and financial models used involving risk profiles, various growth methods, and the time value of money

Rate of Return Example

	Capital Structure		Cost		Weighted Cost
Debt	60%	X	6.00%	=	3.60%
Equity	40%	X	10.50%	=	4.20%
Total	100%				7.80%

Actual or hypothetical

Comes from the financial statements

ROE- highly litigated

Weighted avg cost of capital

- 7.80% in this example, is what is multiplied by Rate Base to derive the return component in rates

Steps in a Rate Case

- Select a 12 month test year (usually the most recent fiscal year or calendar year)
- Derive historical costs (and revenues) for the selected test year
- Adjust the utility's expenses and revenues for all factors which might distort them prospectively
- Determine whether any of the numbers are either excessive of deficient and make appropriate adjustments for reasonableness
- Adjustments must be known and measurable

Steps in a Rate Case (Contd.)

- Determine rate base
- Determine Weighted Avg. Cost of Capital and calculate return
- Calculate the cost of service
- Compare pro forma cost of service to revenues at existing rates to determine the revenue deficiency
- If rates are being revised on an across-the- board basis, the rate increase is the amount of the % shortfall
- If rates are not being increased across-the-board, then a cost-of-service study is prepared, which reallocates the revenue requirement over the various classes of customers and reconfigures how rates will be collected from each class

The Rate Approval Process

The Rate Approval Process

- Utility prepares its revenue requirement study and files a rate increase as a tariff filing to the commission
  - Commission has 45 days to review and take some form of action. If commission misses this deadline, the rate revision takes effect by force of law
- Rate cases (like all tariff filings) cannot be rejected unless they fail to meet form and filing requirements
- Commission may approve the rate but most rate cases are suspended for investigation because of the large amount of data contained in them
- Suspension starts another clock
  - Usually 15 months from initial filing. However, the Commission is examining how to shorten that time period

The Rate Approval Process

- Interim rate relief may be approved, subject to refund, (with interest) if the utility can demonstrate it needs immediate relief
- Other economically impacted parties are invited to intervene in the case.
- RAPA may participate to represent rate payers
- A procedural schedule is established that allows parties to perform discovery and prepare rebuttal cases
- A hearing date is set to put on evidence for the commissioners to consider and make a ruling on new rates

The Rate Approval Process

- Many rate cases do not reach the hearing stage because they are settled with a stipulation among the parties. This reduces expensive litigation
- The Commission accepts stipulations when in the public interest to do so
- If no stipulation is reached, evidence is taken at a hearing and the commission rules on the issues before the end of the statutory deadline
- New rates take effect and any refunds due are paid (with interest)

Questions?

02/05/14 Overview: Alaska Energy Authority

<TARGET><BILL></BILL><SUBJECT>02-05-14 Overview Alaska Energy Authority</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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

Rep. Doug Isaacson
State Capitol Building, Room 13
Juneau, AK 99801
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rep.doug.isaacson@akleg.gov

AGENDA

February 5, 2014

State Capitol Building, Room 124
Juneau, Alaska

8:00 AM - Call the meeting to order

1. Alaska Energy Authority (AEA),
   Presenter - *Sara Fisher-Goad, Executive Director*

   a. AEA Overview
   b. AEA Recommendations

2. Discussion

10:00 AM - Adjourn

If you or your staff has any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov) or Jeff Turner at (907) 465-6588 (jeff.turner@akleg.gov).

###



Alaska Energy Authority Overview

Sara Fisher-Goad, executive director

House Energy Committee

Feb. 05, 2014

Electricity Generation by Region

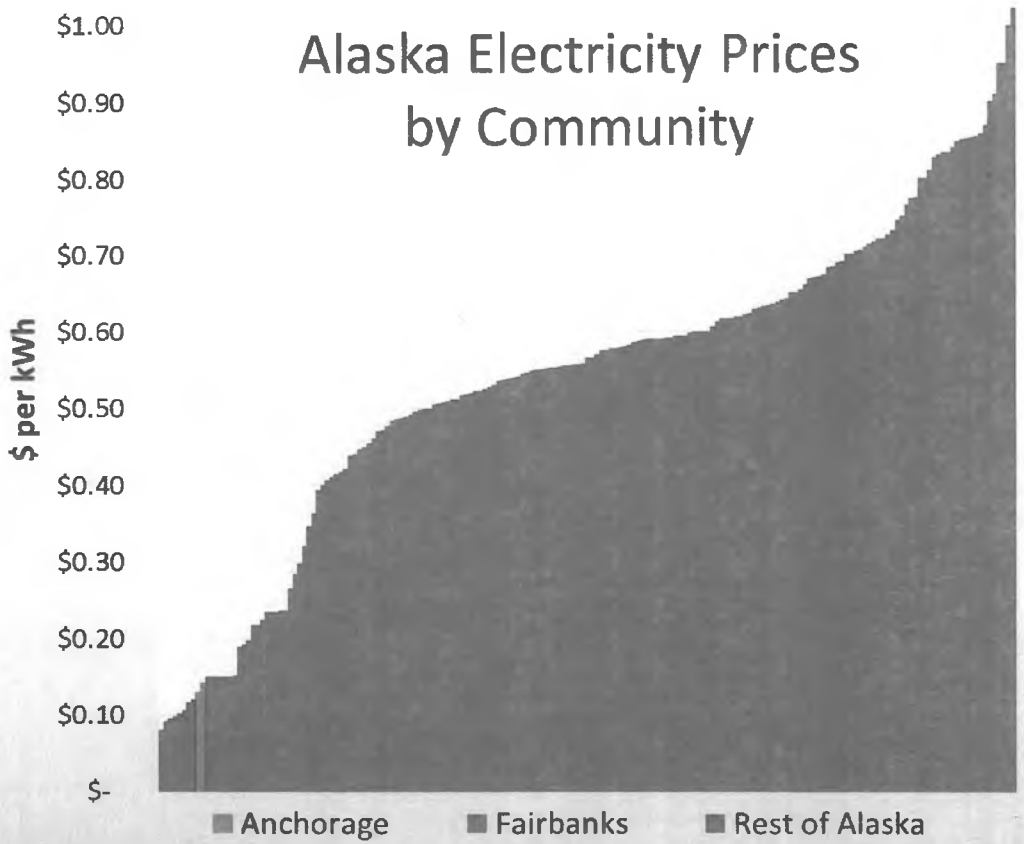
Annual Electric Generation

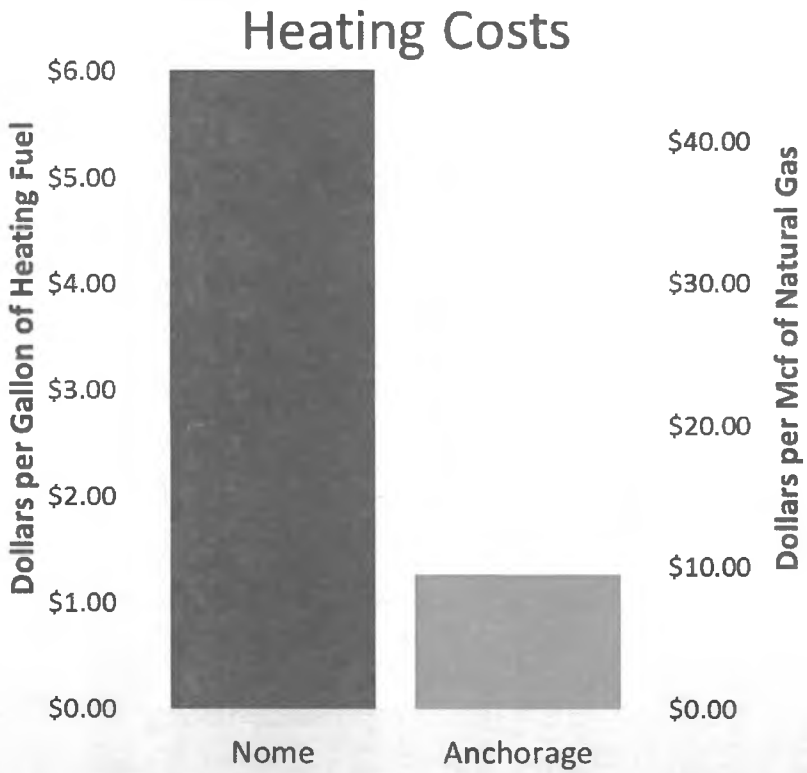
AEA Energy Region	MWhs per Year	Percent of Total
Aleutians	65,340	1%
Bering Straits	55,362	1%
Bristol Bay	55,145	1%
Copper River/Chugach	116,700	2%
Kodiak	150,503	2%
Lower Yukon-Kuskokwim	96,625	1%
North Slope	82,544	1%
Northwest Arctic	35,549	1%
Railbelt	5,075,507	77%
Southeast	785,190	12%
Yukon-Koyukuk/Upper Tanan	31,175	0%
Total	**6,549,640**	**100%**

2011 Alaska Energy Statistics

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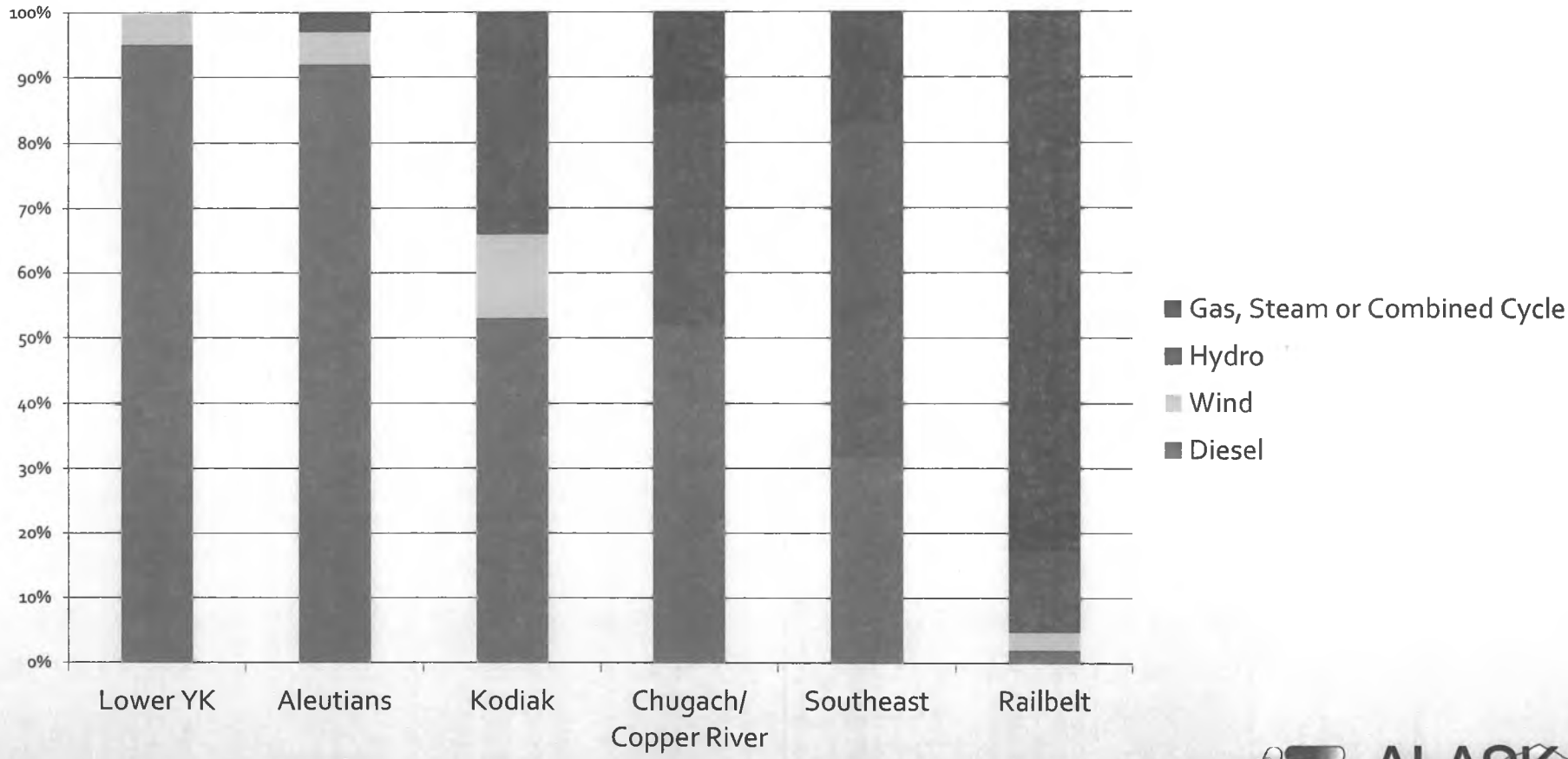
Energy Costs Vary





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Energy Sources Vary



Preliminary Alaska Energy Statistics Report Data

ALASKA ENERGY AUTHORITY





Reducing the Cost of Energy

- Energy Planning and Policy
- Investing in Alaska's Energy Infrastructure
- Diversifying Alaska's Energy Portfolio
- Technical and Community Assistance

ALASKA ENERGY AUTHORITY

Energy Planning and Policy

Alaska's Energy Office

- Serve as lead on Alaska's energy policy development
- Coordination of energy plans on statewide level
- Monitor State energy goals
- Coordinate multi-agency efforts
- Individual project analysis and vetting
- Transmission planning

Statutory Authorities

- 44.99.115 4(B)

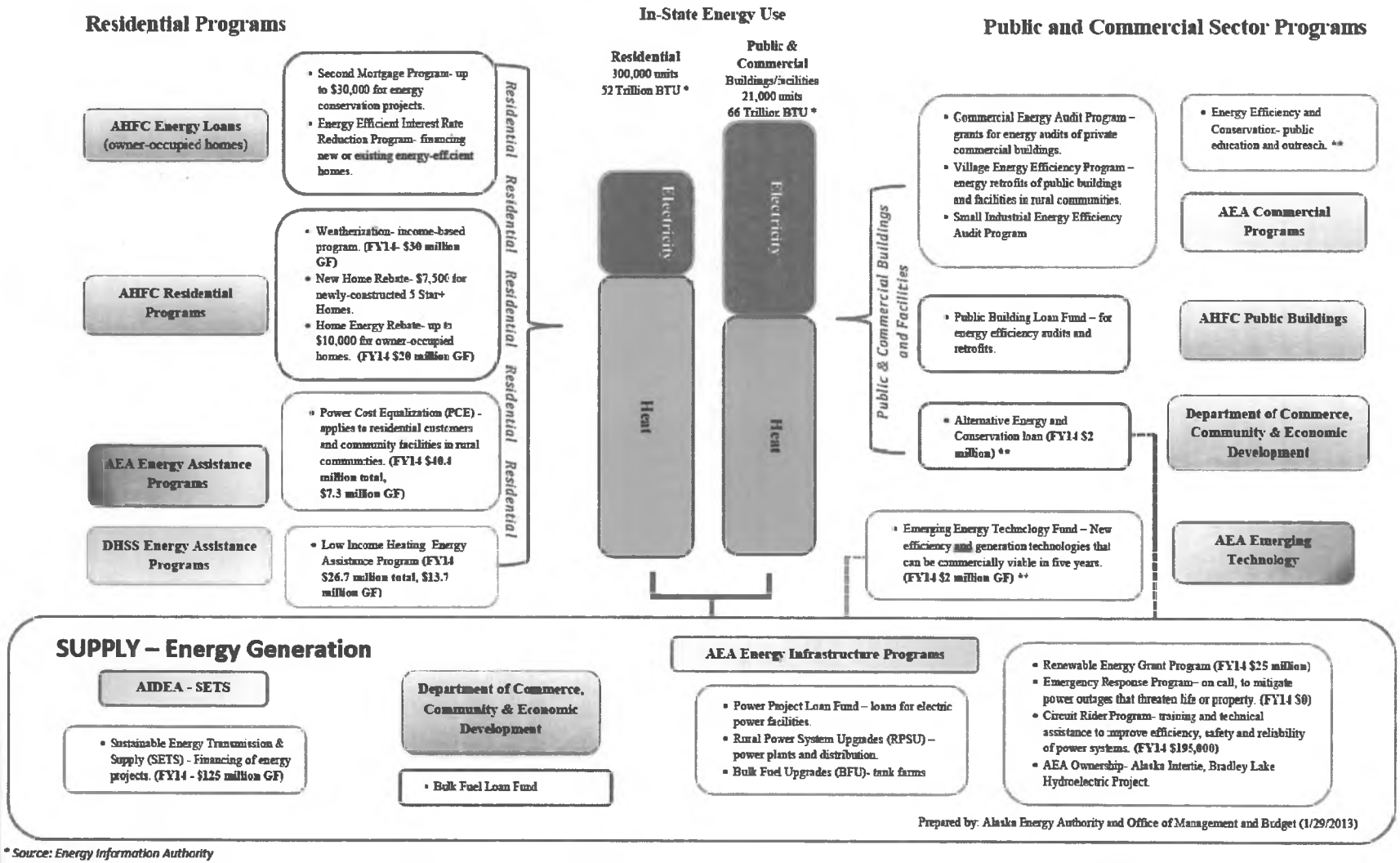
"by using one office or agency, as may be specified by law, to serve as a clearinghouse in managing the state's energy related functions to avoid fragmentation and duplication and to increase effectiveness"

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Energy Program Coordination

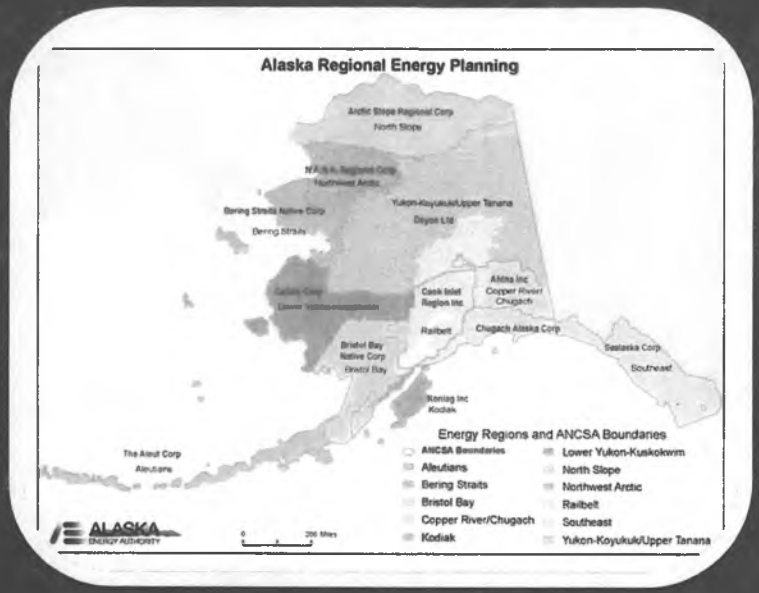


State of Alaska Energy Programs: Serving the needs of Alaska's residential and commercial energy users



** Source: Energy Information Authority*

*** Note that some programs do not fall within specific categories - Public outreach and education serves both the commercial and residential markets and Emerging Technology and the Alternative Energy and Conservation loan serve both generation and efficiency*



Energy Planning and Policy

Supporting Regional Solutions

- Energy Pathways led to regional planning
- Address unique challenges while capitalizing on regional resources
- Locally driven and community-vetted blueprint for sustainability
- Objective to provide specific, actionable recommendations
- Includes electric, heat and transportation energy
- Previous Plans: Railbelt Integrated Resources Plan and Southeast Integrated Resources Plan

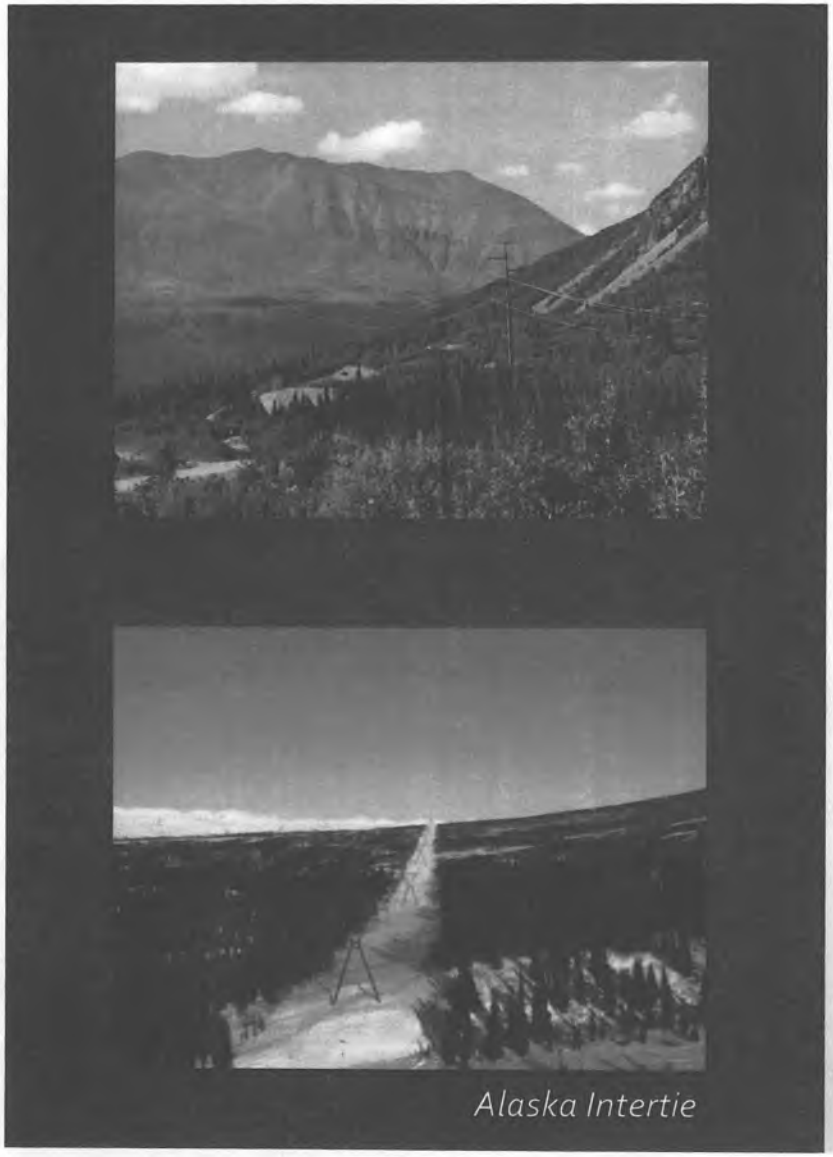
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Technical and Community Assistance

- AEA technical staff have assisted 64 communities this year
- Energy Planning
  - Technical assistance to local communities to provide synergy between planning and funding sources
  - Assist communities to move to project-ready status
  - Village Energy Efficiency Program (VEEP), Renewable Energy Grant Fund , Emerging Energy Technology Fund
- Training
  - Partnership with AVTEC in Seward
  - Circuit Rider and emergency services; Bulk Fuel Operator; Power Plant Operator; Advanced Power Plant Operator Training
- Emergency community assistance provided to about 20 communities since Sept. 2012
- Circuit rider program assisted about 50 communities in 2013

Power Cost Equalization

- Provide economic assistance in rural Alaska where electrical rates can be 3 to 4 times higher than in urban Alaska
- Available to community facilities and residential customers
- Regulatory Commission of Alaska (RCA) sets rates, calculations based on use, costs and efficiencies
- Approximately 80,000 people live in the 188 participating communities (FY 12)
- PCE program costs approximately $41 million
- $867 million PCE Endowment (July 1, 2013)



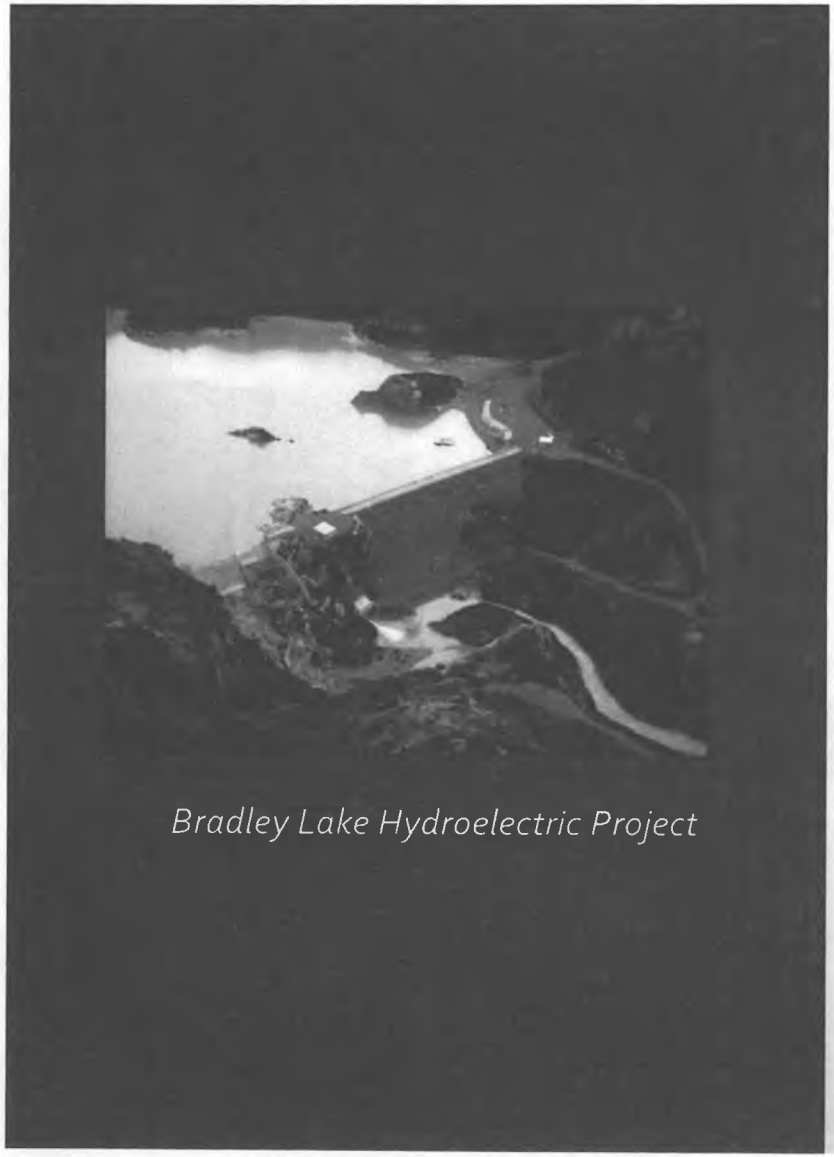
Alaska Intertie

Investing in Energy Infrastructure

Alaska Intertie: Improving Railbelt Transmission

- AEA owns Alaska Intertie, no outstanding debt
  - 170 miles between Willow and Healy
  - 345 kv transmission line
- Operated by AEA and Railbelt utilities through Intertie Management Committee
- Recently adopted open access and reliability language
- AEA-commissioned study identified $900 million in priority transmission system projects
  - Un-constraining Bradley Lake Power: $402.2 million
  - Southcentral Substations: $20.5 million
  - Northern Intertie projects: $480.7 million
- Annual projected savings $146-241 million

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Bradley Lake Hydroelectric Project

Investing in Energy Infrastructure

Large Projects

Bradley Lake Hydro

- Produces about 10% of Railbelt electricity
- AEA-owned asset
- Low-cost energy producer
- 120 megawatts, 4.5 cents/kWh

Battle Creek Diversion

- Produce more energy by diverting Battle Creek
- FERC-license amendment process
- Estimated ~$61 million
- 28,496 MW/hours annually
- Investigating financing models

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Investing in Energy Infrastructure

Rural Energy

Bulk Fuel and Rural Power System Upgrades

- Help utilities improve efficiency, safety and reliability of power systems
  - Promote local hire and training
- Completed $304 million in rural bulk fuel and rural power system upgrade projects since 2000, in partnership with Denali Commission
- Common to see 30 to 40% increase in fuel savings after a Rural Power Systems Upgrade is completed

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Prince of Wales: Run-of-River Hydro



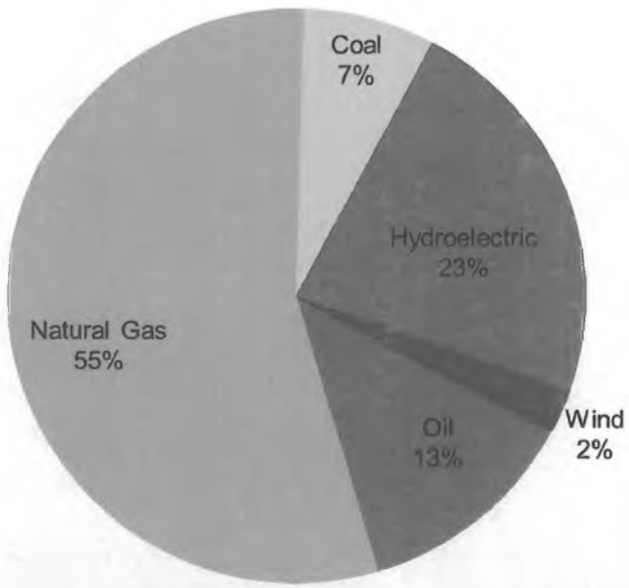
Chena Hot Springs: Geothermal

Investing in Energy Infrastructure

Power Project Fund

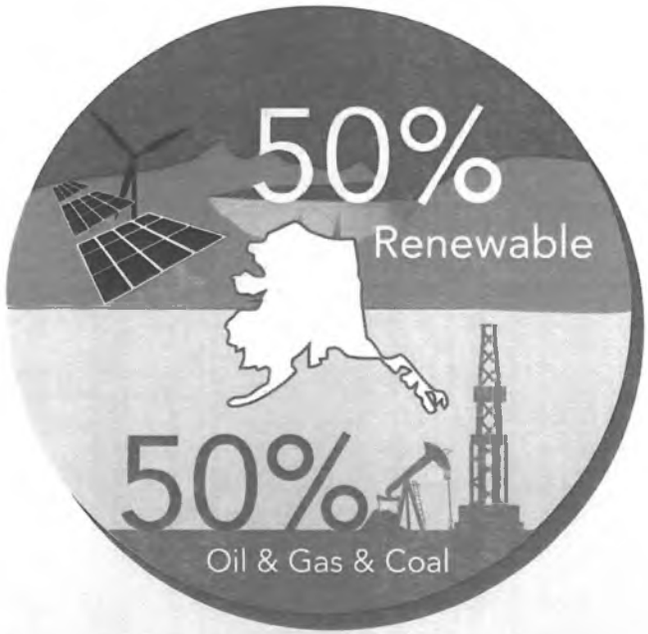
- Low-interest loans to upgrade or develop small-scale electric power facilities
- Includes bulk fuel storage, transmission and distribution, waste energy, energy conservation, energy efficiency and alternative energy facilities and equipment
- State assistance for a project more than $5 million requires Legislative approval
- $35 million in Power Project Fund (~half in application process)

Diversifying Alaska's Energy Portfolio



Alaska's Electrical Generation

Preliminary Alaska Energy Statistics Report Data



ALASKA ENERGY AUTHORITY



Altaeros Energies Helium Balloon Wind Turbine

Diversifying Alaska's Energy Portfolio

Emerging Energy Technology Fund

- Provides funds for projects that can demonstrate commercial viability within 5 years
- Includes renewable and alternative energy
- First successful year 2012-2013
  - Sixteen projects selected for funding
- Round 2 process underway
  - Twenty-seven applications received
- Projects in Juneau, Fairbanks, Kodiak, Delta Junction, Nenana, Nikiski, Igiugig, Tuntutuliak, Kwigllingok and Kotzebue

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Ruby: Hydrokinetic



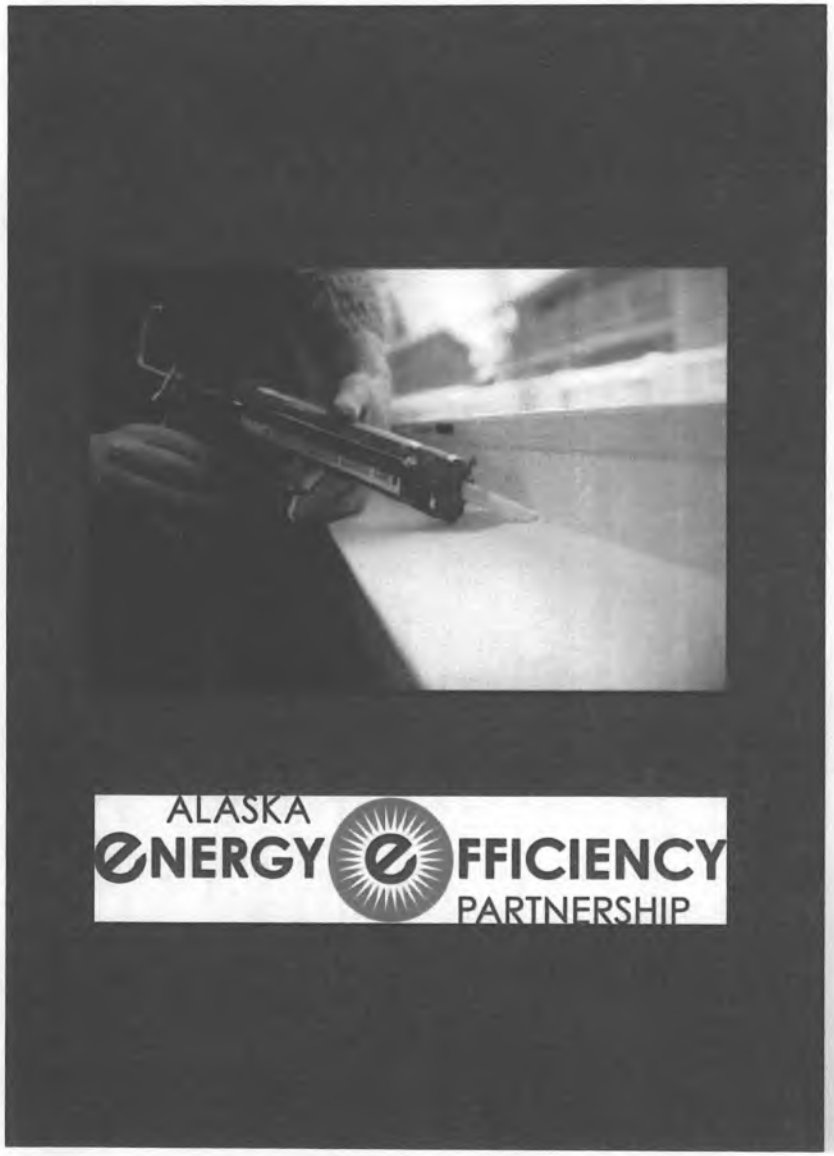
Unalakleet: Wind

Diversifying Alaska's Energy Portfolio

Renewable Energy Grant Fund

- Includes heat recovery, hydro, wind, geothermal, biomass, solar, wind and transmission
- 251 projects approved totaling $277.5 million
- More than 60 projects currently under construction
- In 2013 more than 11 million gallons of diesel and natural gas equivalent will be displaced
- Results: $45 million in annual savings

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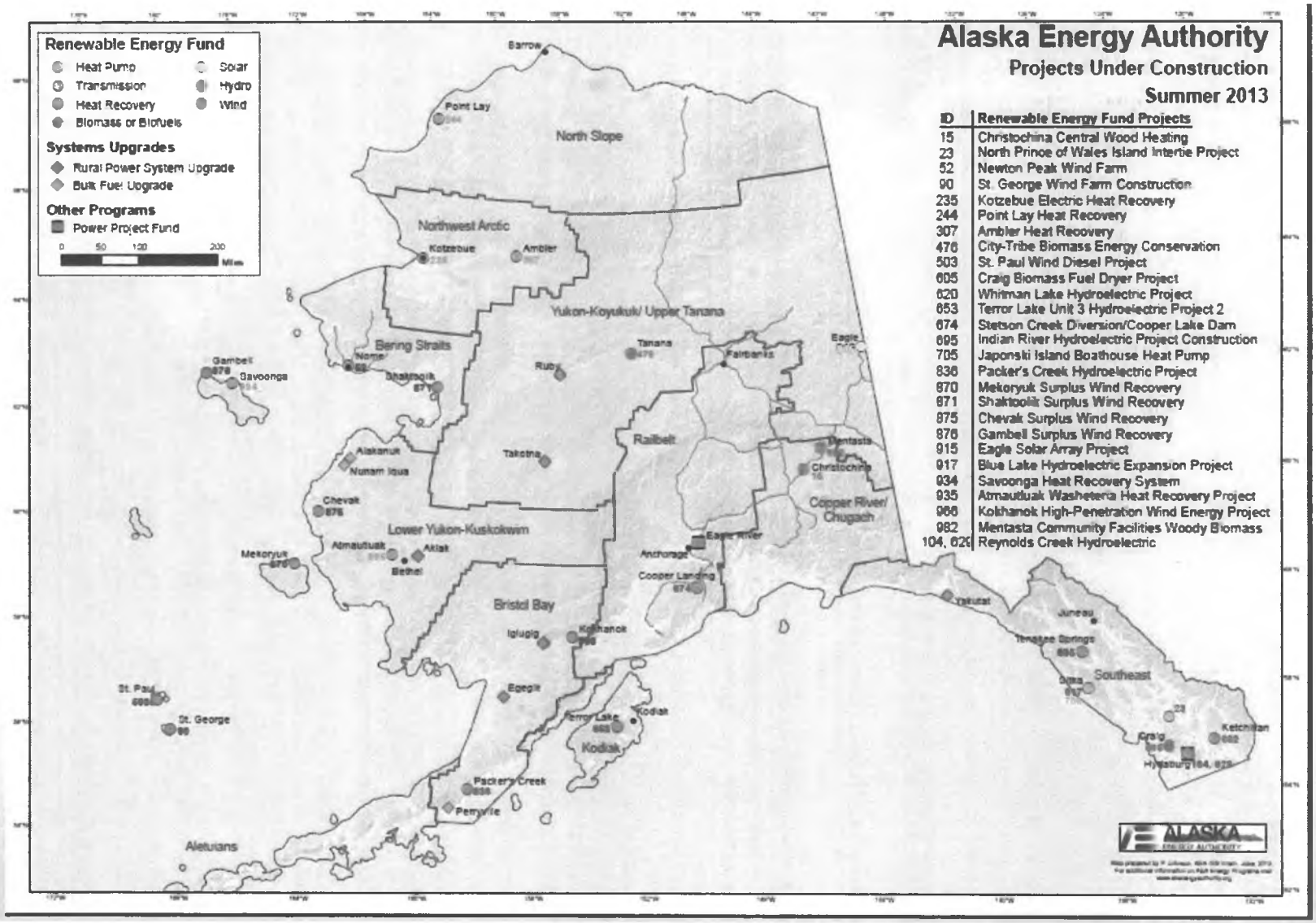
Energy Efficiency and Conservation

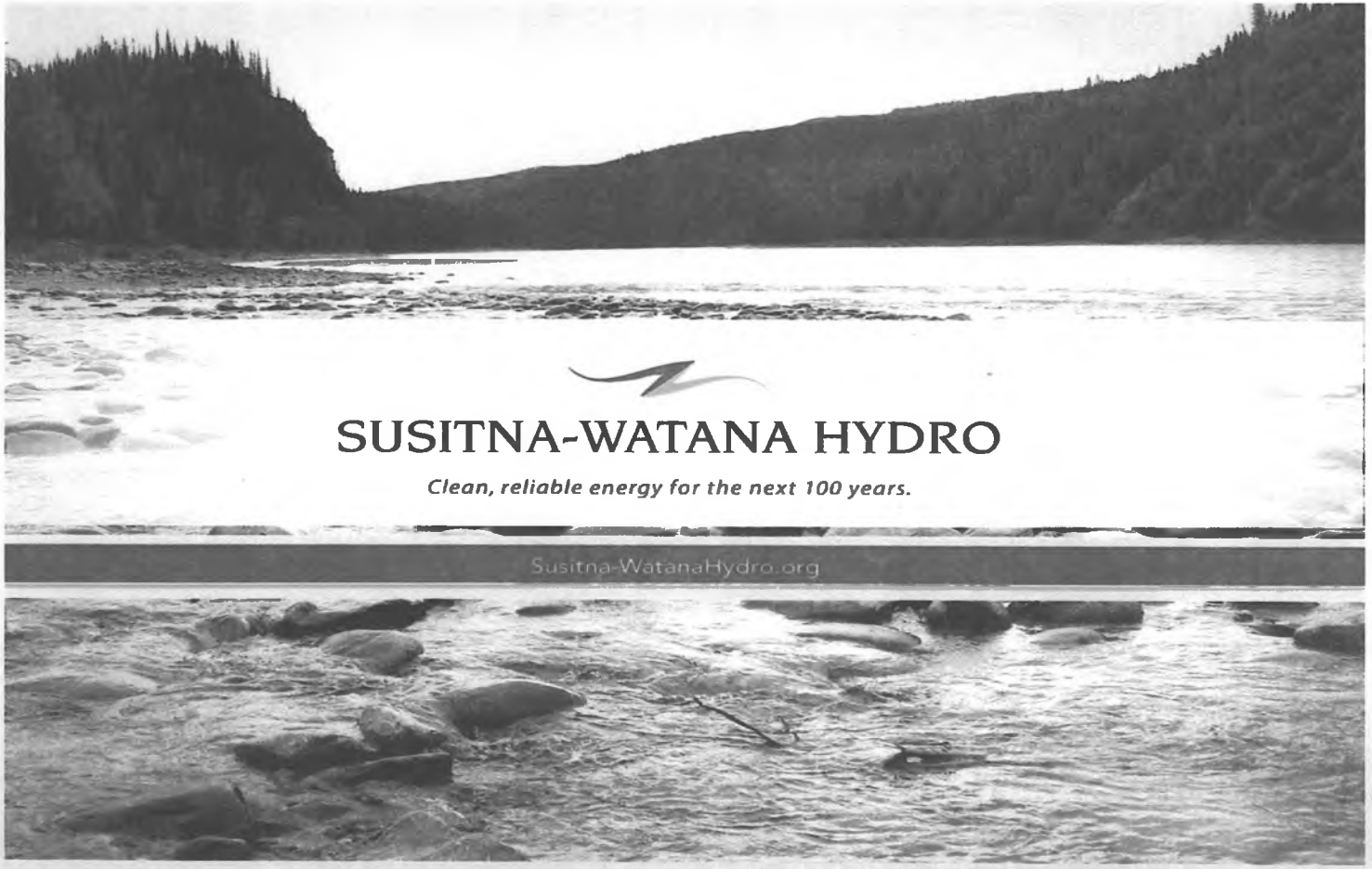
- AEA's focus: commercial buildings, rural public buildings, industrial facilities and electrical efficiency
- Statewide outreach and education AKEnergyEfficiency.org
- Coordination between State agencies

Results:

- $1,534,062 and 282,938 diesel equivalent gallons in projected savings
- Average immediate savings of implemented efficiency measures: $0.29 cents/ $1 invested, 300% ROI after 10 years
- Alaska Commercial Energy Audit Program measures produce 30% savings with 6.2 year simple payback

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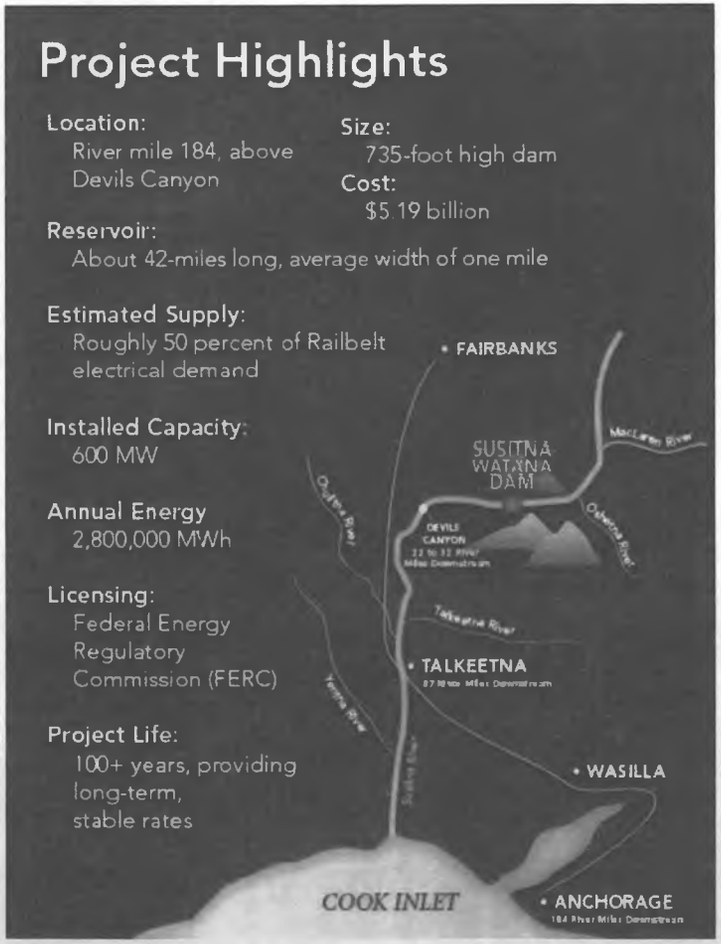

Renewable Energy Fund
Heat Pump
Transmission
Heat Recovery
Biomass or Biofuels
Solar
Hydro
Wind
Systems Upgrades
Rural Power System Upgrade
Bulk Fuel Upgrade
Other Programs
Power Project Fund
0 50 100 200
Miles
Alaska Energy Authority
Projects Under Construction
Summer 2013
ID | Renewable Energy Fund Projects
15 Christochina Central Wood Heating
23 North Prince of Wales Island Intertie Project
52 Newton Peak Wind Farm
90 St. George Wind Farm Construction
235 Kotzebue Electric Heat Recovery
244 Point Lay Heat Recovery
307 Ambler Heat Recovery
476 City-Tribe Biomass Energy Conservation
503 St. Paul Wind Diesel Project
605 Craig Biomass Fuel Dryer Project
620 Whitman Lake Hydroelectric Project
653 Terror Lake Unit 3 Hydroelectric Project 2
674 Stetson Creek Diversion/Cooper Lake Dam
695 Indian River Hydroelectric Project Construction
705 Japonski Island Boathouse Heat Pump
836 Packer's Creek Hydroelectric Project
870 Mekoryuk Surplus Wind Recovery
871 Shaktoolik Surplus Wind Recovery
875 Chevak Surplus Wind Recovery
876 Gambell Surplus Wind Recovery
915 Eagle Solar Array Project
917 Blue Lake Hydroelectric Expansion Project
934 Savoonga Heat Recovery System
935 Atmautluak Washeteria Heat Recovery Project
966 Kokhanok High-Penetration Wind Energy Project
982 Mentasta Community Facilities Woody Biomass
104, 626 Reynolds Creek Hydroelectric
Barrow
Point Lay
North Slope
Northwest Arctic
Kotzebue
Ambler
Yukon-Koyukuk/ Upper Tanana
Bering Straits
Nome
Shaktoolik
Gambell
Savoonga
Ruby
Tanana
Fairbanks
Eagle
Railbelt
Takotna
Alakanuk
Nunam Iqua
Mentasta
Christochina
Chevak
Copper River/ Chugach
Lower Yukon-Kuskokwim
Atmautluak
Akiak
Bethel
Mekoryuk
Eagle River
Anchorage
Cooper Landing
Bristol Bay
Iliamna
Kokhanok
Igiugig
Yakutat
Juneau
Southeast
Ketchikan
Craig
Hydaburg
St. Paul
St. George
Egegik
Terror Lake
Kodiak
Kodiak
Packers Creek
Perryville
Aleutians
ALASKA ENERGY AUTHORITY


SUSITNA-WATANA HYDRO
Clean, reliable energy for the next 100 years.
Susitna-WatanaHydro.org

Why Susitna-Watana Hydro

- Serves ~80% of state's population
- 1,000 jobs during peak construction
- Stable electricity rates for 100+ years
- Long-term diversification
- Clean, reliable energy source
- Maximizes the value of Alaska's fossil fuels
- Promotes integration of variable power sources

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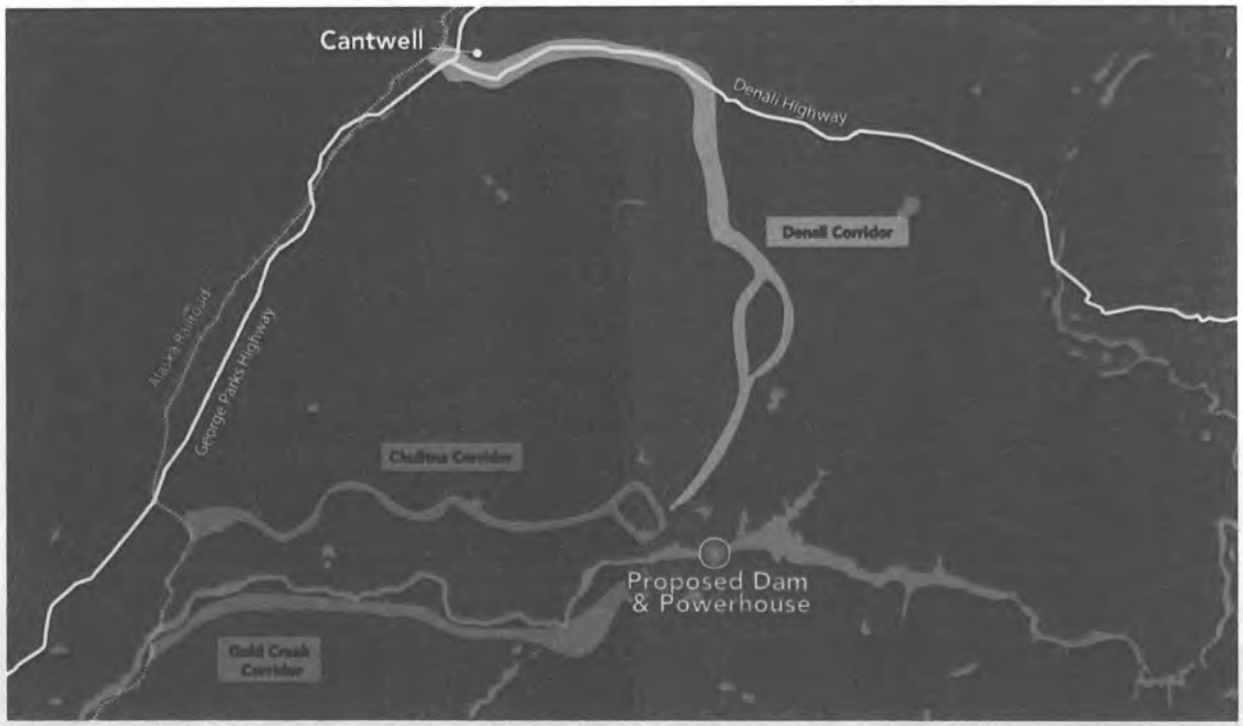


Project Highlights

- Susitna-River Mile 184
- 87 River Miles from Talkeetna
- 22-32 River Miles upstream from Devils Canyon
- ~50 percent of Railbelt's Energy Demand

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Access and Transmission Alternatives



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Susitna-Watana Hydro Artists Rendering



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Boots on the Ground in 2013

2013 was a highly-successful field season

- 385: total individuals contracted to work on Susitna-Watana Hydro (not AEA employees)
- 300: estimated number of individuals in the field summer 2013
- Majority of workers are Alaskans
- Elements of all 58 studies conducted this year

Winter Studies







- Ice Processes
- Hydrology studies
- Bed sampling
- Fish sampling

- Aerial surveys for moose, caribou, furbearers



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Fish Studies







- Extensive fish sampling and tagging throughout accessible portions of Upper, Middle and Lower Basin



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Chinook and Devils Canyon

Only one salmon species has been documented within 35 miles of the project site.



Of the Chinook tagged at Curry 94 percent headed up the tributaries. 6 percent stayed in the Mainstem.

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Wildlife Studies

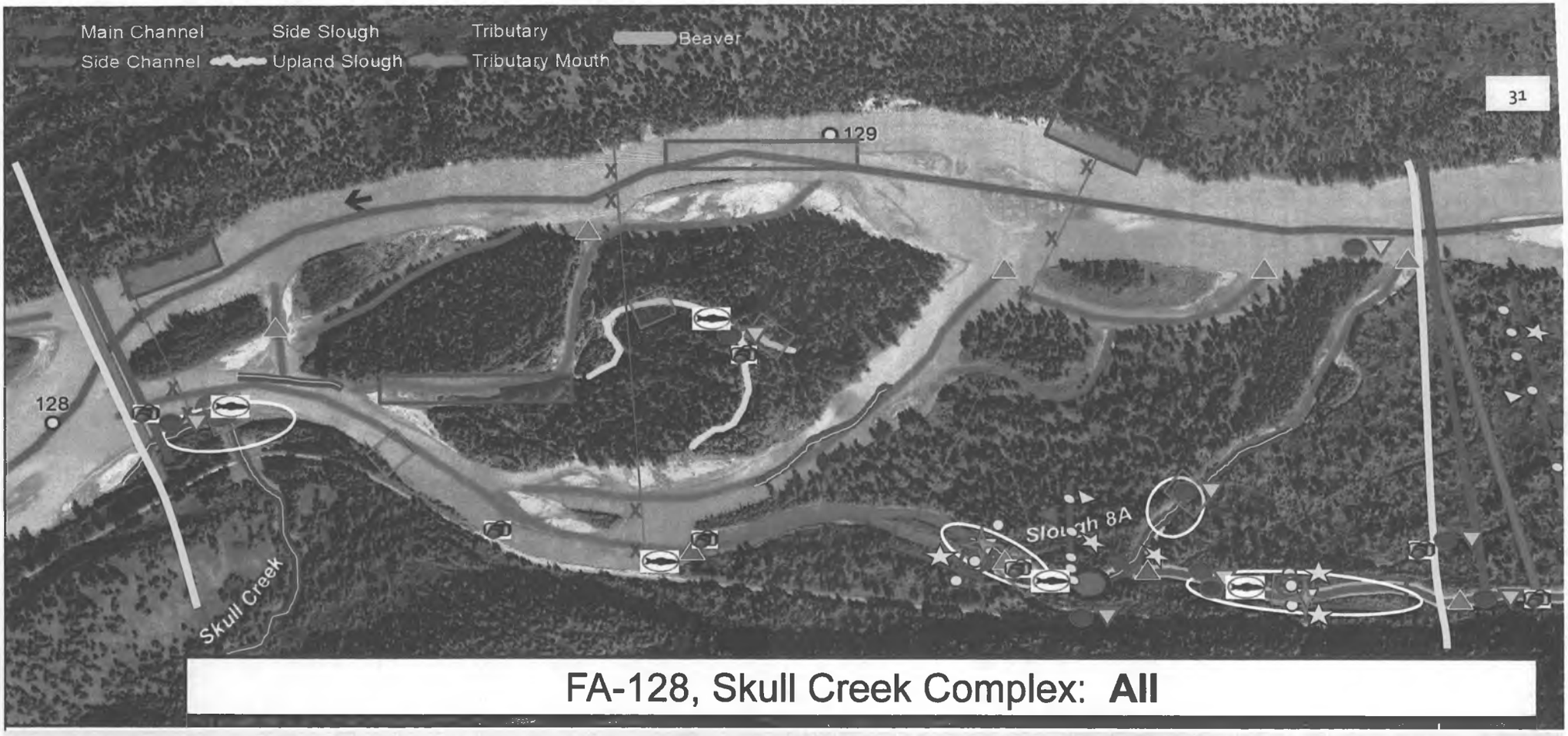




- Collaring moose, caribou
- Raptors
- Little Brown Bat
- Wood Frog
- Waterbirds, landbirds and shorebirds
- Dall's sheep



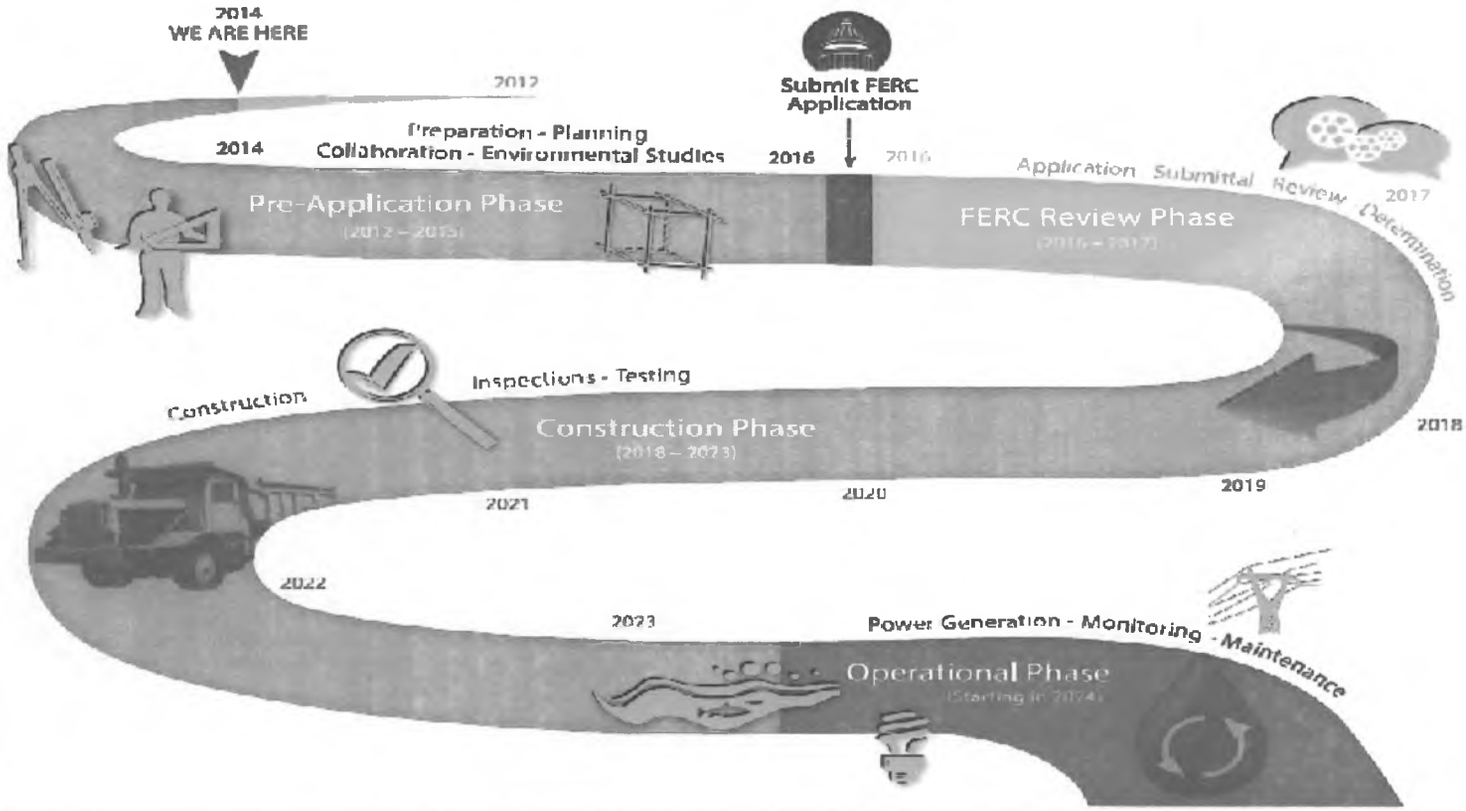
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Example of Intensive Interdisciplinary Study Site (Focus Area)

Equipment and instrumentation has been installed at the 7 accessible sites

Project Phases



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Financing and Cost/Kilowatt Hour

- Hired financial advisor firm who has confirmed:
  - Susitna-Watana Hydro is economic and financeable
  - original economic assumptions are valid
- Will develop potential financial models

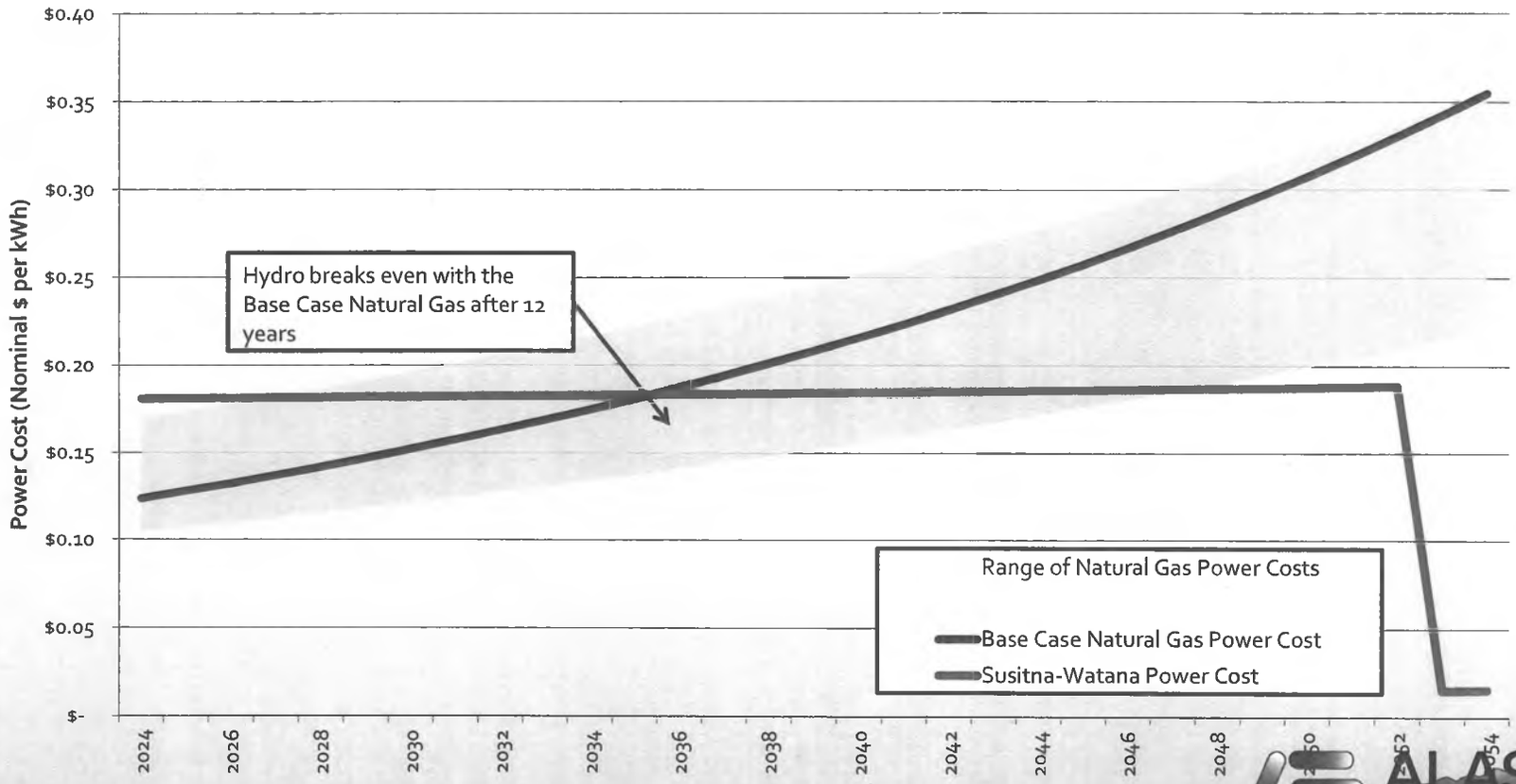
Year 1 Rate ($2024)	$0.181
Year 1 Rate ($2013 Real)	$0.138
10- Year Average Rate ($2013 Real)	$0.124
25-Year Average Rate ($2013 Real)	$0.106
50-Year Average Rate ($2013 Real)	$0.069

Real= Adjusted for Inflation

Assumes No Direct State Financing

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Susitna-Watana Hydro Compared to Natural Gas Power Costs



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Susitna-Watana Hydro: Next Steps

- Licensing and Engineering Milestones
  - Filed draft Initial Study Report on Feb. 3
  - Resource Management and Procurement Plan
  - Owner's Engineer RFP
  - Feasibility Report
- Continued Work on Financing Plan and Economics
- Utility Coordination
- Stakeholder Engagement

ALASKA ENERGY AUTHORITY

AKEnergyAuthority.org



02/12/14 Presentation: Alaska Energy Authority - Transmission Issues

<TARGET><BILL></BILL><SUBJECT>02-12-14 Presentation Alaska Energy Authority - Transmission Issues</SUBJECT><COMM>HENE28</COMM></TARGET>



Alaska Transmission Issues

Gene Therriault, Alaska Energy Authority

House Energy Committee

Feb. 12, 2014

Railbelt Distances, Cost and Governance

- Distance
  - Homer to Fairbanks – 580 miles
- Governance
  - Reliability Standards
  - Open Access Provisions
- Needed Upgrades
  - Evaluate Cost/Benefit Ratio



ALASKA ENERGY AUTHORITY

Unconstraining Bradley Projects

Project	Description	Cost ($mill)
New HVDC Line: Bernice Lake to Beluga	100 MW HVDC intertie	$185.0
Anchorage Area Battery	25 MW/14MWh BESS	$30.2
New Line: Bradley to Soldonta	115 kV line and substation	$72.4
Reconstruct Line: University to Dave's Creek	Reconstruct line to 230 kV	$70.5
Upgrade Substations: University & Dave's Creek	Convert line to to 230 kV	$31.1
Upgrade Line: Dave's Creek to Quartz Creek	Upgrade line to rail conductor	$13.0
Total		**$402.2**

Benefits

- Physically move Bradley energy off of the Kenai Peninsula
- Reduce transmission losses and provide voltage control
- Increase reliability to N-1

ALASKA ENERGY AUTHORITY

Southcentral Projects

Project	Description	Cost ($mill)
Fossil Creek Substation	New 115 kV substation	$10.7
Eklutna Hydro Substation	New 115 kV substation	$9.8
Total		**$20.5**

Benefits

- Allow for energization of Anchorage to Eklutna "express" circuit
- Allow for future transmission additions and upgrades

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Northern Projects

Project	Description	Cost ($mill)
New Stations: Lorraine & Douglas	230 kV station	$73.4
New Line: Lorraine to Douglas	230 kV dbl circuit line	$55.9
New Stations: Gold Creek & Healy	230 kV station	$35.8
New Line: Douglas to Healy	230 kV line opearted at 138 kV	$188.1
Communication	Communication for control	$15.0
Healy Additions	2 new transformers	$5.7
Ugrade Stations: Wilson & Gold Hill	230 kV upgrade	$10.3
Ugrade Stations: Nenana, Ester, Eva & Clearly	Station updgrades	$10.8
Upgrade Line: Healy to Gold Hill	Convert line to 230 kV	$85.7
Total		**$480.7**

Benefits

- More firm/low cost power from Anchorage to Fairbanks
- System stabilization and voltage control
- Increase reliability to N-1

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Transmission Projects: Potential Railbelt Consumer Impact

- This presentation is for discussion purposes and not an AEA position.
- Demonstration of impact to consumers if cost of projects recovered in electric rates

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Transmission Upgrade: Potential Impact

	CAPEX ($mill)
Unconstraining Bradley	$402.2
Southcentral Projects	$20.5
Northern Projects	$480.7
Total Cost	**$903.4**

- Transmission system upgrades benefits entire Railbelt system
- Project separated into two phases
  - The State has not provided funding for first stage of project
- Costs from May 9, 2013 EPS Presentations
- **Analysis of impact on rates of transmission upgrades**

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Transmission Upgrade: Costs

Base assumptions

- Full capital cost recovered through rates
- Annual operating costs are 2% of capital costs
- Entirely funded with commercial rates
- Costs shared proportionally by all utilities

CAPEX ($millions)	$903
OPEX (2% OPEX)	$18.1
Interest Rate	5.00%
Bond Term (Years)	30
Output (GWhs)	4,817
Inflation	2.50%

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Transmission Upgrades: Benefits

Base assumptions

- The annual cost savings from transmission upgrades will lower rates
- Range of annual savings has been estimated by Electric Power Systems, Inc. (EPS) (May 9, 2013)
  - Low savings: $146 million
  - High savings: $241 million
  - Estimates are being refined by AEA/EPS
- Savings shared proportionally by all utilities

	Annual Savings ($millions)
Low Savings	$146
High Savings	$241

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Impact on Railbelt Rates: Net Effect

- Annual costs and savings are spread across all Railbelt kWh's
- Majority of upgrade costs are fixed while savings increase with inflation
  - Larger savings over time
- $146 million savings
  - Immediate positive impact on rates
- $241 million savings
  - Immediate and significant positive impact on rates

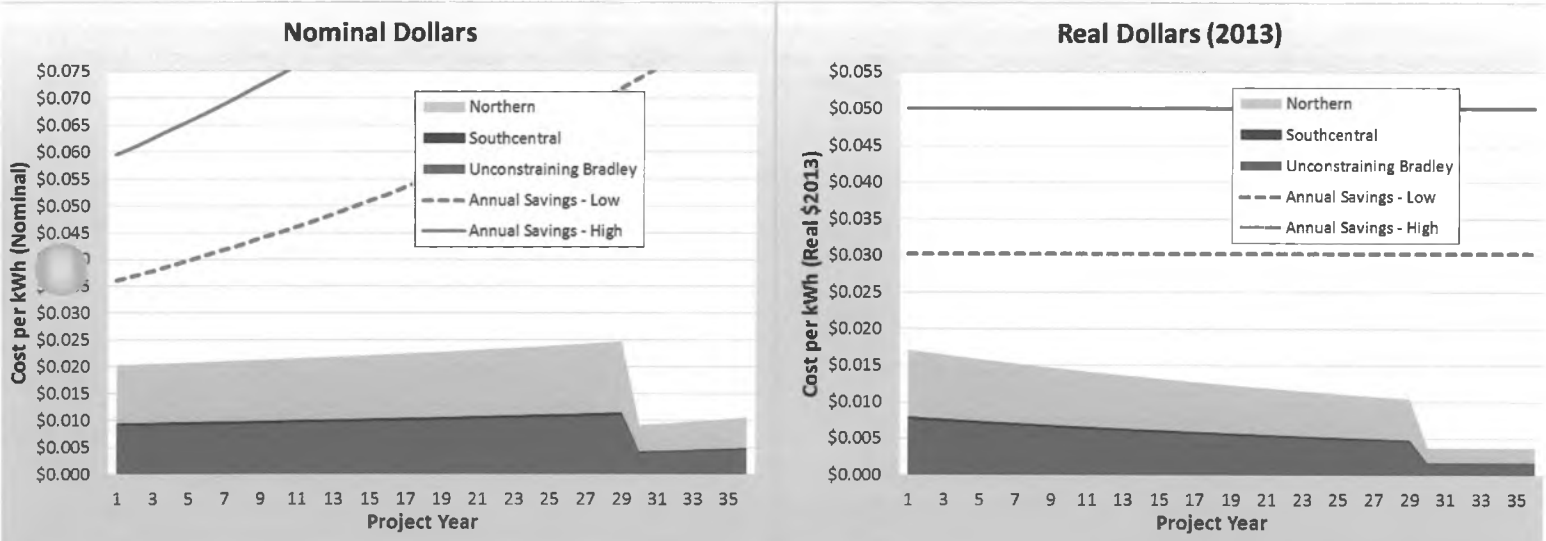
Net Rate Savings (Costs) ($/kWh)

	$146 MM Savings	$241 MM Savings
Year 1 (Nominal)	$0.016	$0.039
Year 1 ($2013)	$0.013	$0.033
10 Yr Ave ($2013)	$0.015	$0.034
25 Yr Ave ($2013)	$0.016	$0.036
50 Yr Ave ($2013)	$0.021	$0.041

**($2013) means adjusted for inflation to today's dollars*

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Impact on Rates: Nominal vs. Real



- When annual savings exceed costs – positive impact on rates
- $146 million annual savings – immediate positive impact on rates
- $241 million annual savings - immediate and significant positive impact on rates

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02/26/14 Alaska Energy Authority Presentation: Renewable Energy Fund Grants and Emerging Energy Technology Fund

<TARGET><BILL></BILL><SUBJECT>02-26-14 Alaska Energy Authority Presentation Renewable Energy Fund Grants and Emerging Energy Technology Fund</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Agenda

Wednesday, February 26, 2014
8:00 – 10:00 a.m.
Barnes Committee Room (124)

Presentation by Sara Fisher-Goad, Executive Director, Alaska Energy Authority

- Renewable & Alternative Energy Resources
- Emerging Technologies
- Recommendations

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

###



Renewable Energy Grant Fund and Emerging Energy Technology Fund

House Energy Committee

Feb. 26, 2014

ALASKA ENERGY AUTHORITY

Renewable Energy Grant Fund

- Diversifies Alaska's energy portfolio and supports State renewable goals
- Displaces volatile-priced fossil fuels
- Provides a vetting mechanism for energy projects
- Capitalizes on local energy resources
- Expands Alaska's renewable energy knowledge base
- Provides local employment
- Benefits businesses not eligible for PCE



Coffman Cove School Garn boiler.

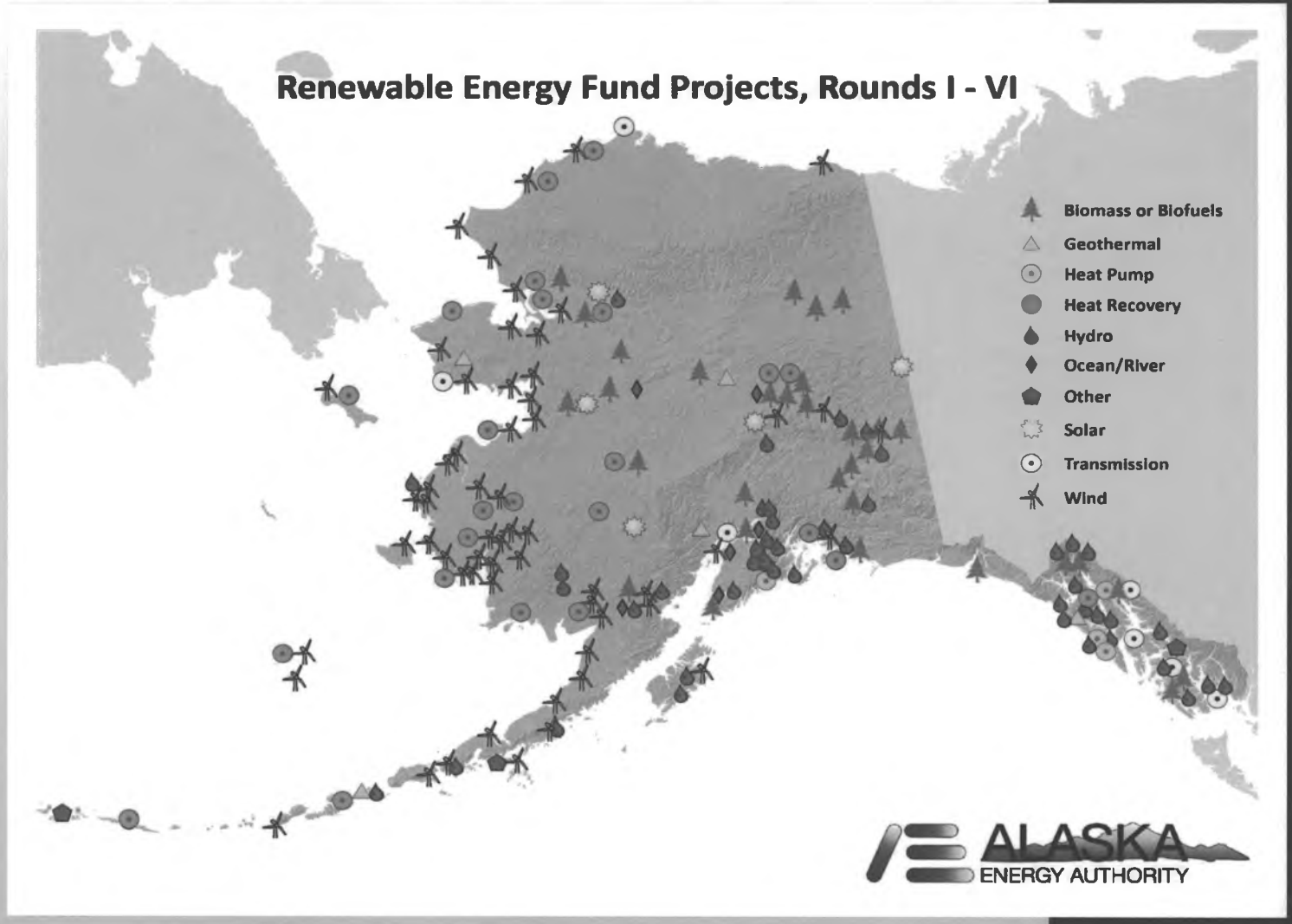
Photo courtesy of Karen Petersen

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Renewable Energy Fund Grant and Funding Summary

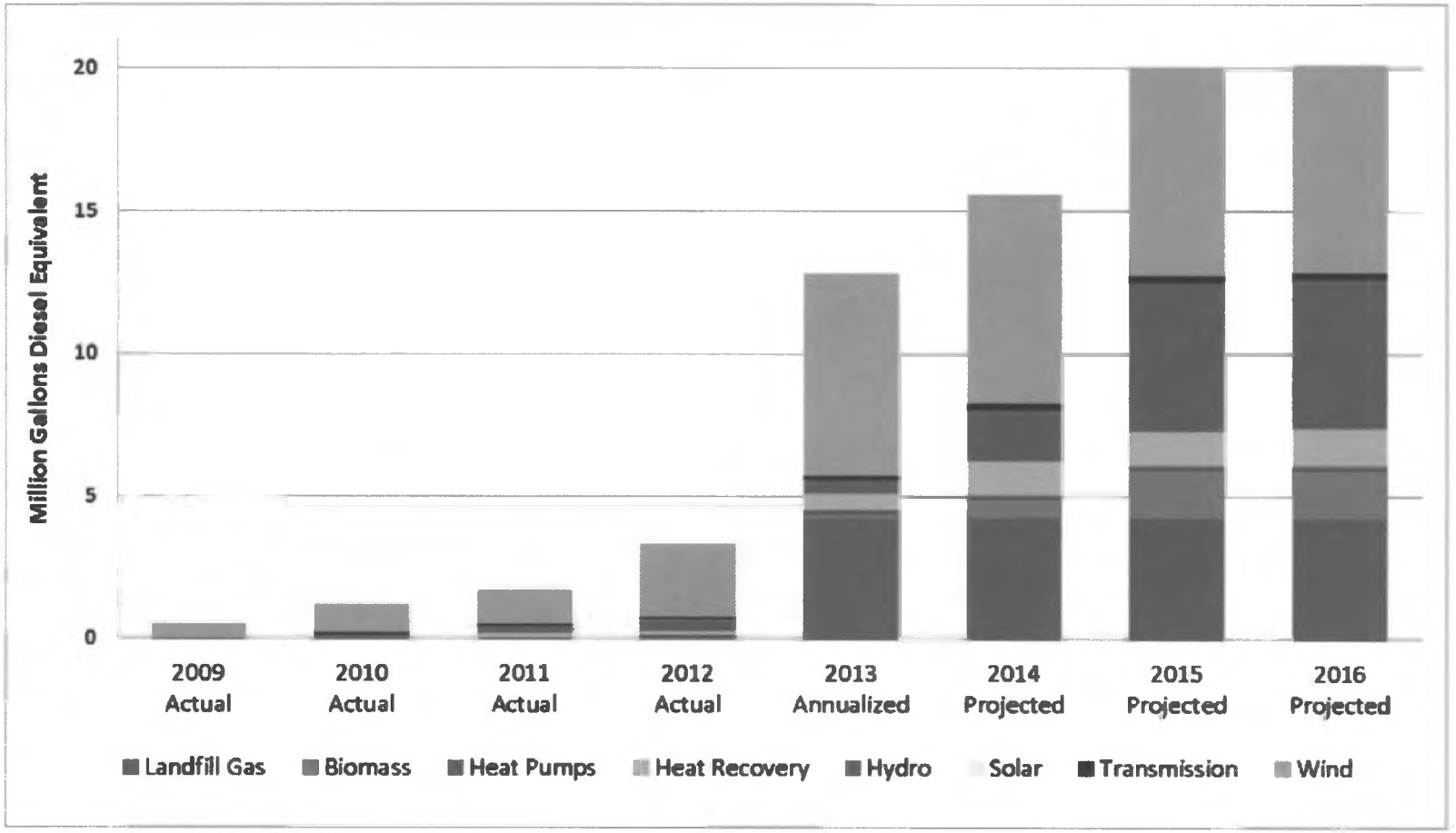
	Round I	Round II	Round III	Round IV	Round V	Round VI	Totals
Applications Received	115	118	123	108	97	85	646
Applications Funded	80[1]	30	25	74	19	23	251
Grants Currently in Place	26	10	13	51	17	16	133
Grants Completed and Closed	49	18	7	12	1	0	87
Grants Cancelled or Combined	5	2	4	1	0	0	12
Grants Unissued to Date[2]	0	0	1	10	1	7	19
Amount Requested[3] ($M)	$ 453.8	$ 293.4	$ 223.5	$ 123.1	$ 132.9	$ 122.6	$ 1,349.3
AEA Recommended ($M)	$ 100.0	$ 36.8	$ 65.8	$ 36.6	$ 43.2	$ 56.8	$ 339.2
Appropriated ($M)	$ 100.0	$ 25.0	$ 25.0	$ 26.6[6]	$ 25.9	$ 25.0	$ 227.5
Cash Disbursed ($M)	$ 72.3	$ 19.2	$ 14.0	$ 18.3	$ 8.2	$ .3	$ 132.3
Match Provided ($M) [4]	$ 20.7	$ 22.6	$ 10.5	$ 34.6	$ 8.2	$ 6.0	$ 102.6
Other Known Funding ($M) [4, 5]	$ 9.2	$ 1.6	$ 0.8	$ 14.5	$ 0	$ 0	$ 26.1

1. Includes seven projects from an earlier solicitation issued by AEA. The amount of funding budgeted for these seven project from sources other than the Renewable Energy Fund totals $ 338,992.
2. Grants unissued are due mostly to grantee conditions that require earlier phases of work to be completed first or awaiting grantee action on the grant document.
3. Total grant amount requested by all applicants.
4. These totals are for awarded grants only.
5. $26.6 Million was appropriated for Round IV, and additional $10.0 million was re-appropriated from rounds I, II and III for use in Round IV.



Statewide Impacts

Renewable Energy Fund: Annual Fuel Savings



Renewable Energy Fund: Project Performance

Performance of Renewable Energy Fund Projects in Operation

Technology Type	Grantee	Project Name	Operation Start Date	2011 Energy Production Electrical (MWh)	2011 Energy Production Thermal (MMBtu)	2011 Fuel Displaced Diesel (Gal x1000)	2011 Fuel Displaced Value ($ x 1000)	2012 Energy Production Electrical (MWh)	2012 Energy Production Thermal (MMBtu)	2012 Fuel Displaced Diesel (Gal x1000)	2012 Fuel Displaced Value ($ x 1000)	Jan - Sep 2013 Energy Production Electrical (MWh)	Jan - Sep 2013 Energy Production Thermal (MMBtu)	Jan - Sep 2013 Fuel Displaced Diesel (Gal x1000)	Jan - Sep 2013 Fuel Displaced Value ($ x 1000)	Cumulative Total (2009-Sep 2013) Energy Production Electrical (MWh)	Cumulative Total (2009-Sep 2013) Energy Production Thermal (MMBtu)	Cumulative Total (2009-Sep 2013) Fuel Displaced Diesel (Gal x1000)	Cumulative Total (2009-Sep 2013) Fuel Displaced Value ($ x 1000)
LANDFILL GAS	Municipality of Anchorage	Anchorage Landfill Gas Electricity	2012 Aug	-	-	-	$ -	-	-	-	$ -								
HYDRO	City of Alka	Chuninax Creek Hydroelectric	2012 Dec	-	-	-	$ -	-	-	-	$ -								
HYDRO	Cordova Electric Cooperative	Humpback Creek Hydroelectric Project Rehabilitation	2011 Jul	1,563	-	114.9	$ 410.3	3,510	-	270.0	$ 1,060.6								
HYDRO	Gustavus Electric Company	Falls Creek Hydroelectric Construction	2009 Jul	1,933	-	138.1	$ 483.3	1,956	-	150.4	$ 645.3								
SOLAR	Alaska Village Electric Cooperative	Kalskag Solar Construction	2012 Oct	-	-	-	$ -	-	-	-	$ -								
TRANSMISSION	Alaska Power and Telephone	North Prince of Wales Island Intertie Project	2011 Sep	311	-	16.4	$ 67.0	589	-	44.3	$ 161.7								
TRANSMISSION	Nome Joint Utility System	Nome Banner Peak Wind Farm Transmission	2010 Oct	955	-	53.9	$ 151.6	995	-	61.2	$ 193.3								
WIND	Alaska Environmental Power	Delta Area Wind Turbines	2010 Sep	1,641	-	95.9	$ 256.1	989	-	63.9	$ 132.9								
WIND	Alaska Village Electric Cooperative	Toksook Wind Farm	2009 Aug	560	-	37.7	$ 129.1	131	-	9.6	$ 38.6								
WIND	Alaska Village Electric Cooperative	Mekoryuk Wind Farm	2010 Nov	239	-	13.7	$ 49.5	147	-	10.4	$ 41.1								
WIND	Alaska Village Electric Cooperative	Kwigillingok Wind Farm	2010 Nov	409	-	28.9	$ 105.6	500	-	38.1	$ 161.4								
WIND	Alaska Village Electric Cooperative	Emmonak/Alakanuk Wind	2011 Sep	63	-	4.5	$ 17.7	505	-	35.8	$ 142.0								
WIND	Alaska Village Electric Cooperative	Shaktoolik Wind Construction	2012 Apr	-	-	-	$ -	116	-	8.9	$ 35.7								
WIND	Golden Valley Electric Association	GVEA Eva Creek Wind Turbine Purchase	2012 Oct	-	-	-	$ -	13,091	-	921.9	$ 1,972.9								
WIND	Kodiak Electric Association, Inc	Pillar Mountain Wind Project	2010 Sep	12,448	-	870.7	$ 2,873.3	16,201	-	1,140.9	$ 4,211.8								
WIND	Kotzebue Electric Association	Kotzebue High Penetration Wind-Battery-Diesel Hybrid	2012 May	-	-	-	$ -	2,177	-	148.1	$ 549.9								
WIND	Nome Joint Utility System	Banner Peak Wind Farm Expansion	2013 Jul	-	-	-	$ -	-	-	-	$ -								
SubTotal Electric Only				20,122		1,375	$ 4,543.5	10,908		2,904	$ 9,337.1	1							
WIND	Aleutian Wind Energy	Sand Point Wind	2011 Aug	196	-	14.3	$ 64.9	792	-	58.1	$ 266.2								
WIND	Kwigillingok Power Company	Kwigillingok High Penetration Wind-Diesel Smart Grid	2012 Feb	-	-	-	$ -	-	-	-	$ -								
WIND	Puvurnaq Power Company	Kongiganak High Penetration Wind-Diesel Smart Grid	2010 Dec	88	-	6.6	$ 30.1	185	-	14.0	$ 63.4								
WIND	Tuntutuliak Comm Svcs Assoc	Tuntutuliak High Penetration Wind-Diesel Smart Grid	2013 Jan	-	-	-	$ -	-	-	-	$ -								
WIND	Unalakleet Valley Electric Co	Unalakleet Wind Farm	2009 Dec	958	-	58.2	$ 211.2	938	-	67.8	$ 247.6								
SubTotal Electric and Heat				1,242	-	79	$ 306.2	1,914		140	$ 577.2								
BIOMASS	Alaska Gateway School District	Tok Wood Heating	2010 Oct	-	3,217	24.4	$ 92.0	-	4,595	44.0	$ 147.0								
BIOMASS	Chilkoot Indian Association	Haines (Chilkoot) Central Wood Heating System Construction	2011 Oct	-	-	-	$ -	-	212	1.7	$ 6.8								
BIOMASS	Delta/Greely School District	Delta Junction Wood Chip Heating	2011 Sep	-	-	-	$ -	-	3,977	38.2	$ 133.5								
BIOMASS	Gulkana Village Council	Gulkana Central Wood Heating	2010 Oct	-	780	5.9	$ 23.5	-	780	7.0	$ 28.9								
BIOMASS	Native Village of Eyak	Cordova Wood Processing Plant	2011 Dec	-	1,500	11.4	$ 42.0	-	600	5.4	$ 25.2								
HEAT PUMPS	City and Borough of Juneau	Juneau Airport Ground Source Heat Pump	2011 May	-	5,117	37.1	$ 130.5	-	5,400	45.0	$ 169.0								
HEAT PUMPS	City and Borough of Juneau	Juneau Aquatic Ctr. Ground Source Heat Pump	2011 Apr	-	-	-	$ -	-	1,740	16.7	$ 61.4	-	2,069	29.5	$ 124.9	-	4,809	46.2	$ 186.2
HEAT PUMPS	City of Seward	Alaska Sealife Center Phase II Seawater Heat Pump Project	2011 Nov	-	-	-	$ -	-	-	-	$ -	-	2,836	27.8	$ 106.2	-	2,836	27.8	$ 106.2
HEAT RECOVERY	Golden Valley Electric Association	North Pole Heat Recovery	2009 Nov	-	5,240	61.5	$ 171.5	-	3,349	32.8	$ 90.6	-	-	-	$ -	-	9,595	106.0	$ 285.2
HEAT RECOVERY	Inside Passage Electric Cooperative	Hoonah Heat Recovery Project	2012 Aug	-	-	-	$ -	-	-	-	$ -	-	4,119	36.7	$ 178.7	-	4,119	36.7	$ 178.7
HEAT RECOVERY	McGrath Light & Power Company	McGrath Heat Recovery	2010 May	-	2,896	23.0	$ 156.7	-	2,617	25.2	$ 97.1	-	1,681	16.2	$ 120.1	-	8,356	76.6	$ 419.5
HEAT RECOVERY	City and Borough of Wrangell	Wrangell Hydro Based Electric Boilers	2011 Feb	-	6,889	66.0	$ 230.3	-	7,711	79.4	$ 134.5	-	4,998	61.5	$ 82.6	-	19,697	196.9	$ 447.4
SOLAR	Golden Valley Electric Association	McGrath Village Solar Thermal	2010 Jun	-	134	1.8	$ 7.1	-	130	1.9	$ 7.6	-	108	0.8	$ 6.8	-	433	5.0	$ 23.0
SubTotal Heat Only					25,782	731	$ 883.8		31,111	297	$ 891.7		33,896	312	$ 1,171.8		94,636	899	$ 3,077.5
TOTAL				21,364	25,782	1,884.9	$ 5,733.3	42,821	31,111	3,341.0	$ 10,806.1	114,384	71,126	9,571.1	$ 21,646.6	202,605	95,596	15,972.7	$ 41,601.1
									2013 Estimated Annualized Total			152,512	94,835	12,761.5	$ 28,862.1				

Note: 9 months only for 2013

Jan - Sep 2013

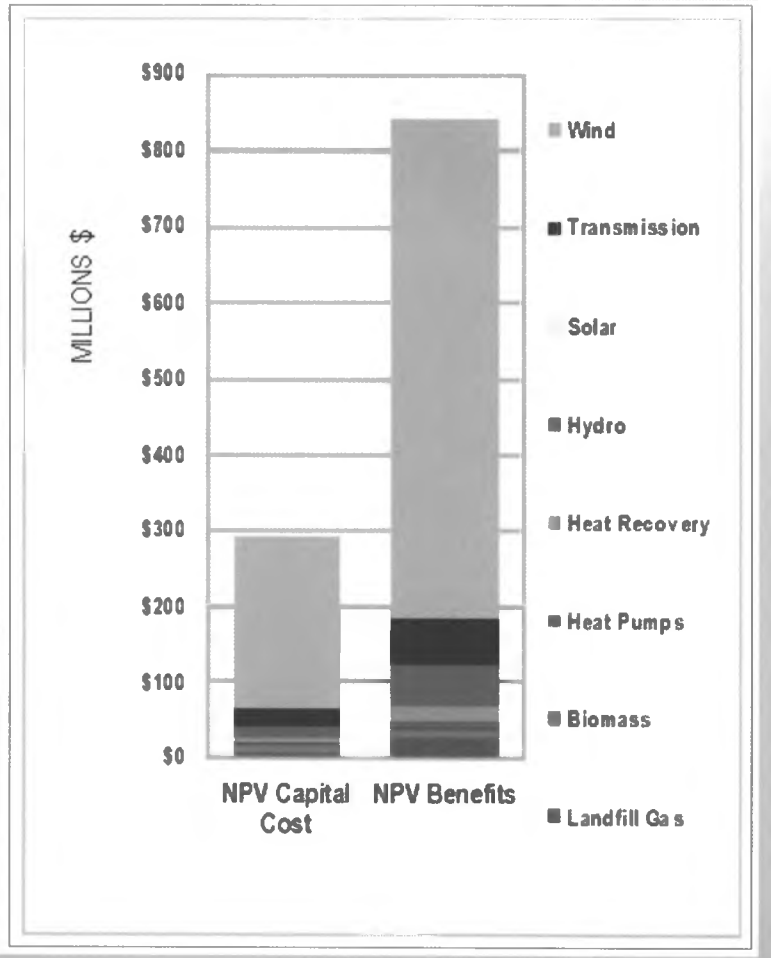
Energy Production Electrical (MWh)	Energy Production Thermal (MMBtu)	Fuel Displaced Diesel (Gal x1000)	Fuel Displaced Value ($ x 1000)
33,834	-	3,224.0	$ 1,602.0
285	-	21.9	$ 118.4
2,933	-	225.6	$ 809.6
1,490	-	114.6	$ 481.1
9	-	0.6	$ 2.3
644	-	48.4	$ 175.0
700	-	43.1	$ 138.2
210	-	13.6	$ 36.4
96	-	7.0	$ 26.1
123	-	8.7	$ 32.5
391	-	29.8	$ 116.7

Renewable Energy Fund: Value Generated

- For first 36 projects in operation
- Fund Investment of $82 million
- Total NPV cost of $290 million
- NPV Benefits: $840 million

NPV Benefits/ NPV Costs

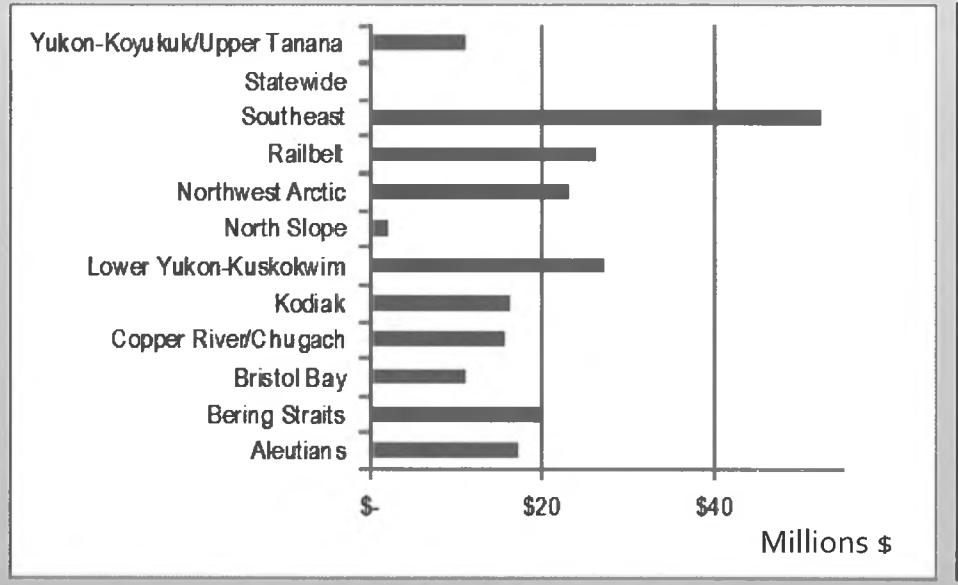
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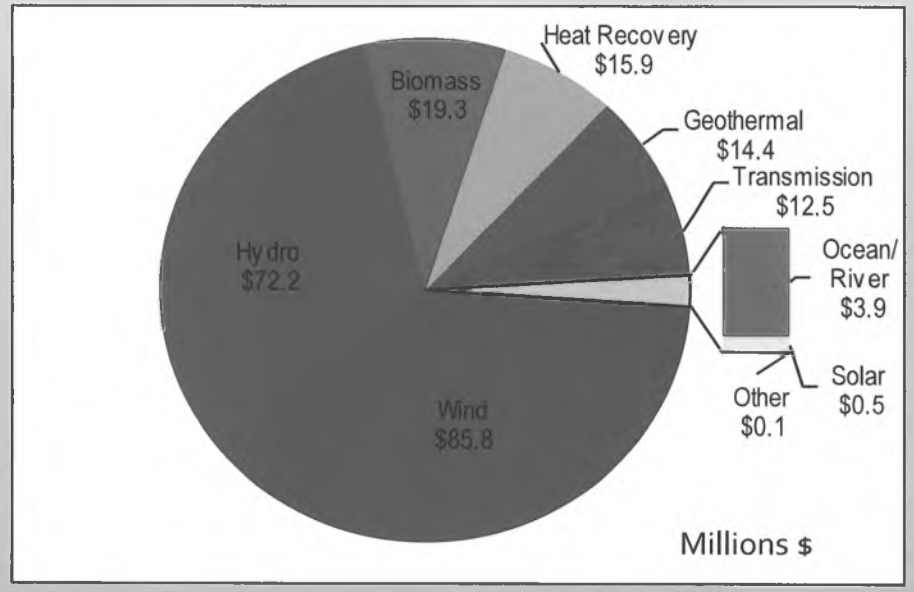
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Appropriated Renewable Energy Fund Grants Rounds I-VI

By Energy Region

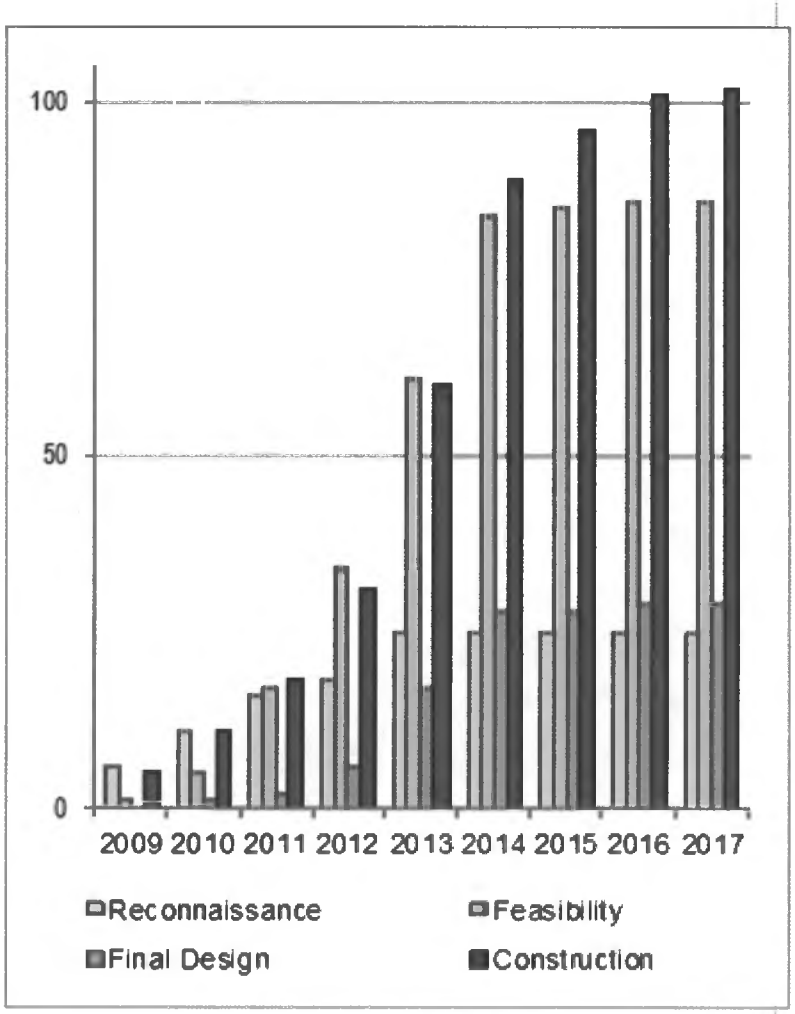


By Resource Type



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Scheduled Grant Completion

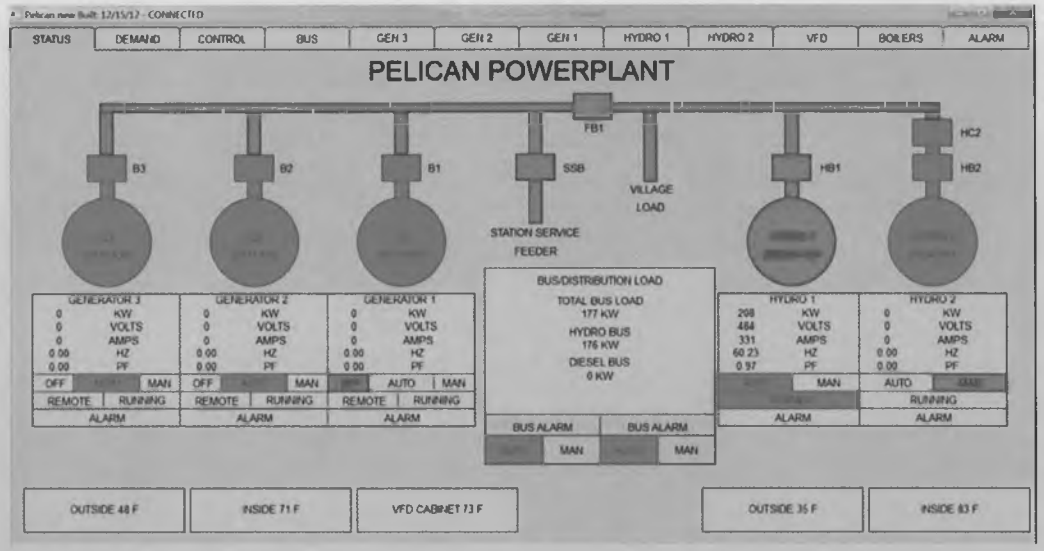


Grant Completion Schedule

- Grants issued in phases to ensure quality projects
- This year, completed construction grants will exceed completed feasibility grants
- Large increases in completed construction

Project Highlight: Pelican Hydro

- REF Funding: $1.95 million
- Total Cost: $5.8 million
- kWh/year: 948,522
- Gallons of diesel saved: 70,000
- First year savings: $312,000



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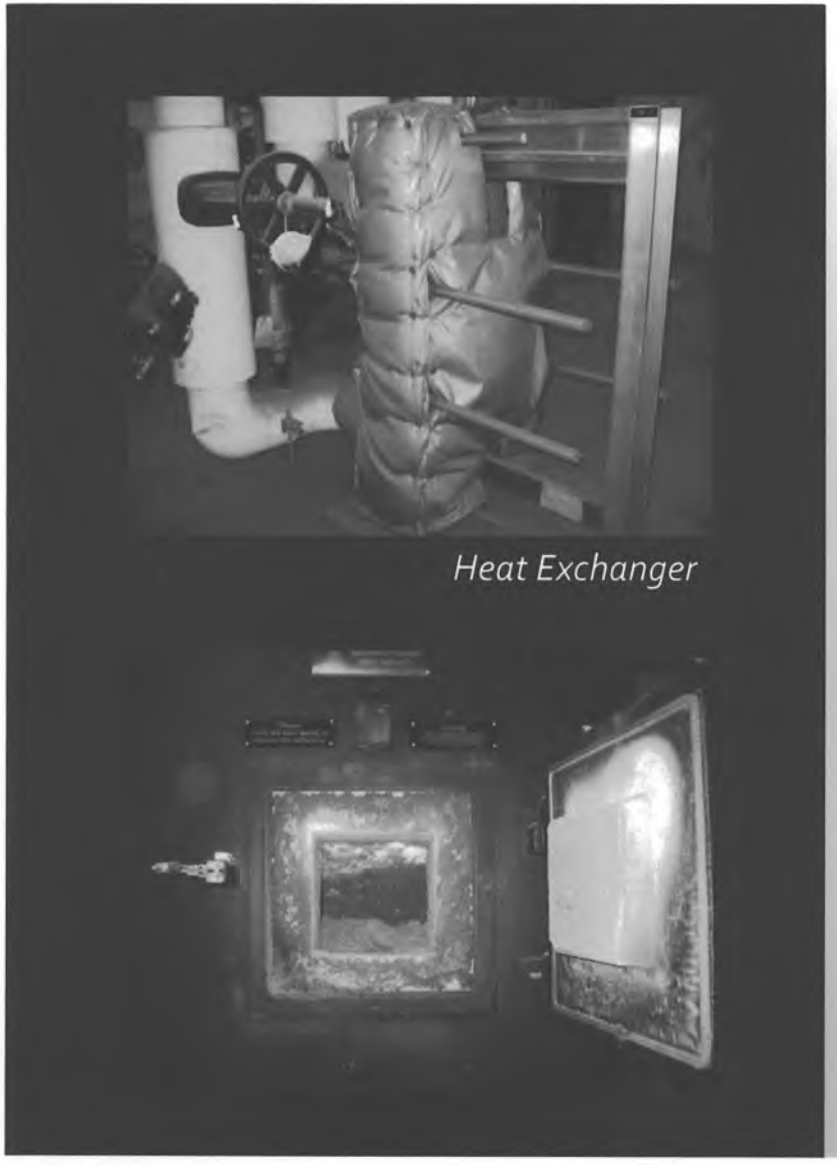
Pelican Hydro, Before, During and After





- Wood stave and blue tarp penstock before
- Aerial view of site during construction
- AEA project manager with new surge tank





Heat Exchanger

Project Highlight: Delta Junction School Biomass

- Completed in September 2011
- High-efficiency, low-emissions wood chip biomass heating system
- Wood chips come from Dry Creek Saw Mill waste product
- Funding $2 million grant/$2.8 million total
- Simple Pay Back: 13 years for Renewable Energy funds,19 years on total cost
- Successes:
  - During the first winter, saved $153,000 and 53,000 gallons in heating
  - Allowed the school to save 2 teacher positions, reopen music program and remodel the school kitchen
  - Potential to add additional facilities
  - Easy maintenance

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Project Highlight: Kodiak Renewables

- More than 95 percent of electricity from renewables
  - Hydro, wind, battery
- Less than 5 percent of electricity from diesel
- Pillar Mountain wind saved 1.8 million gallons of diesel in 2013 ($6.1 million savings)
  - Renewable Energy Fund Grants for wind and battery: $11.9 million
- Renewable energy grant to upgrade Terror Lake Hydro underway
  - Renewable Energy Fund Grant for Terror Lake: $4.5 million

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Renewable Energy Fund: Round VII Recommendations

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Renewable Energy Fund: Round VII

- Technical and economic analysis
  - Priority given to regions with high energy costs
- Capital Budget request includes $20 million
  - Can fund 26 projects: 17 heating and 9 electric or other projects
- Advisory committee recommended partial funding for two large hydro projects to fund five additional heating projects and one regional priority
- Requested fully fund hydro if additional funds available

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Round VII Heat Applications

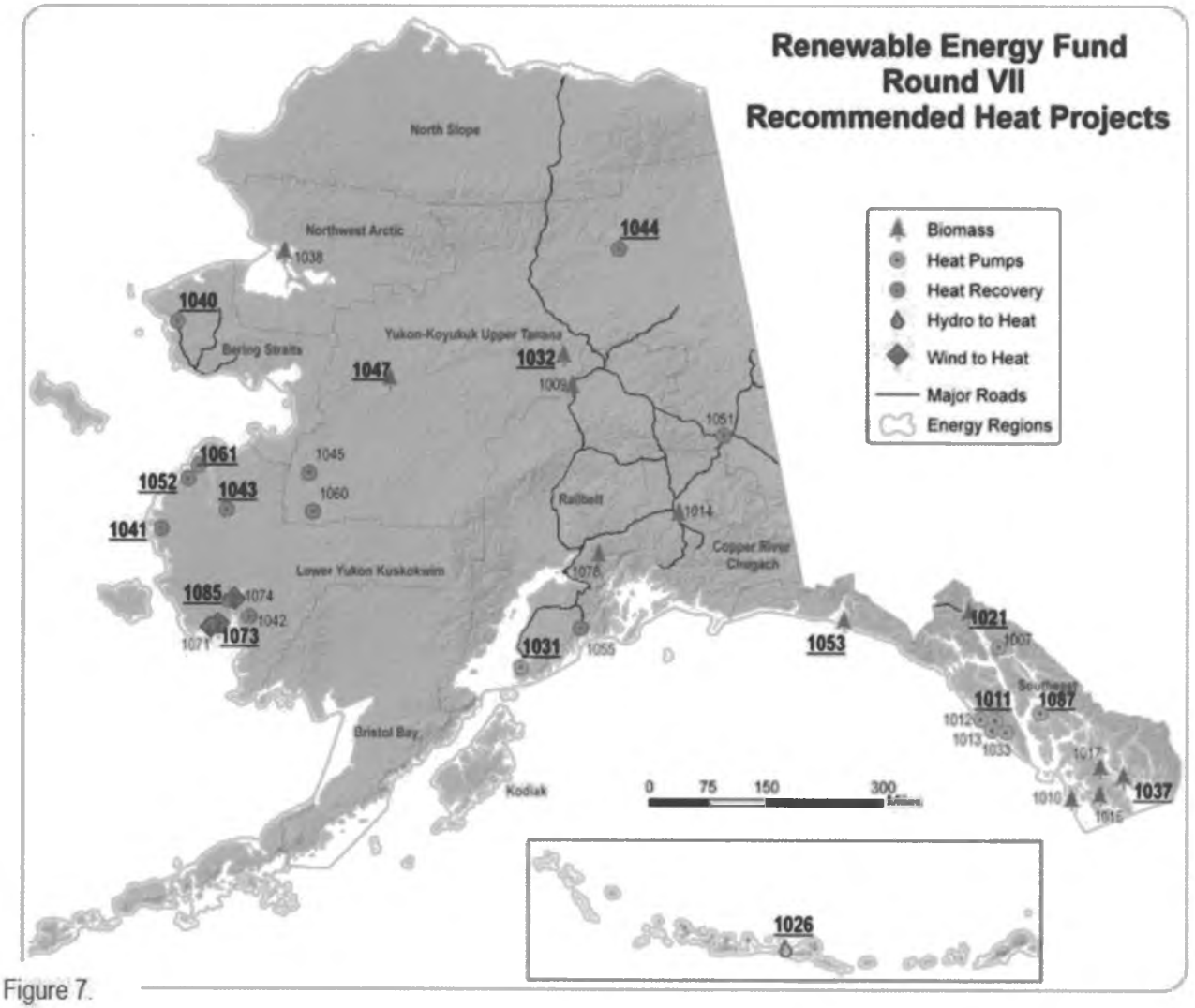


Figure 7.

Round VII Standard Applications

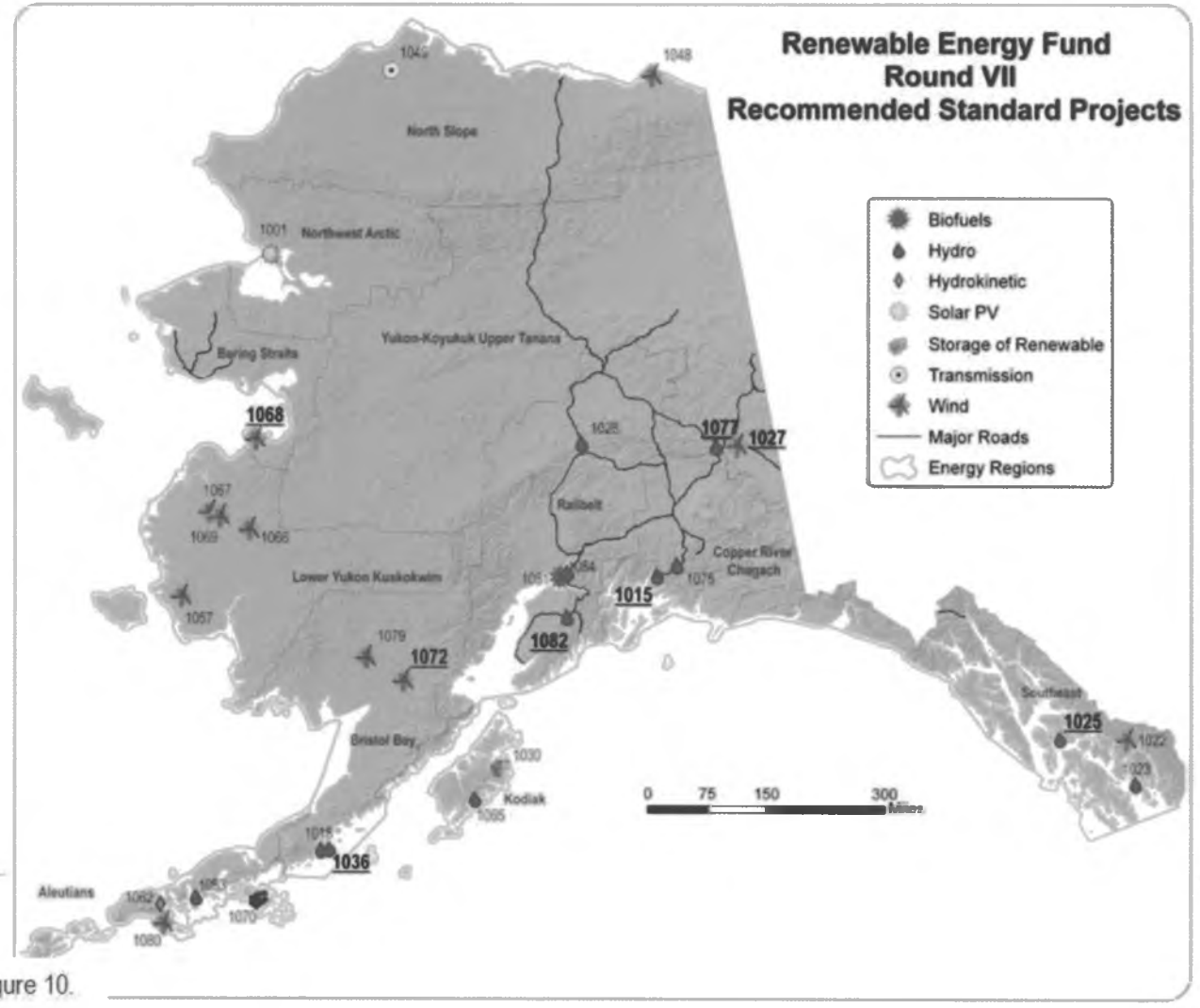


Figure 10.

Renewable Energy Fund Round VII: Recommended Heat Applications

Recommended funding by type

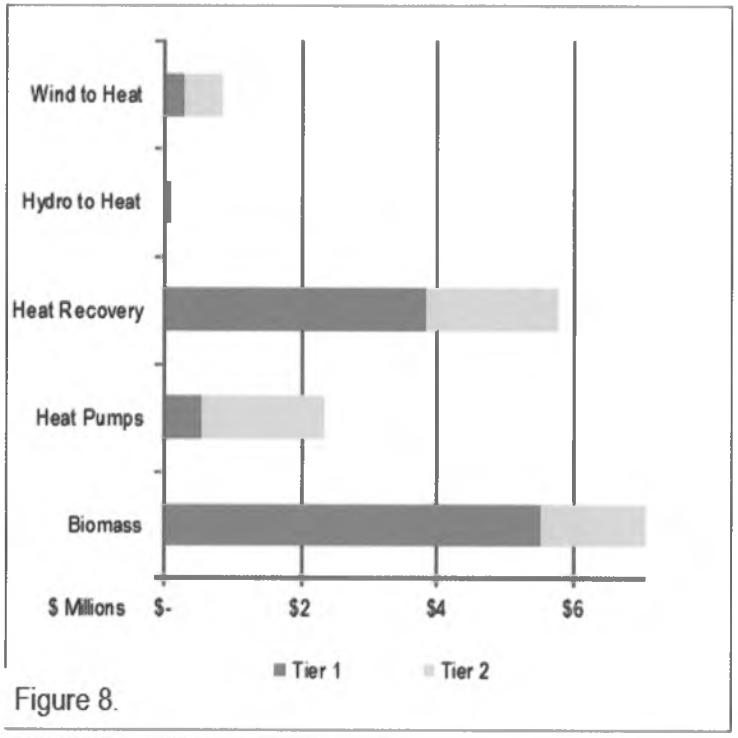


Figure 8.

Recommended funding by region

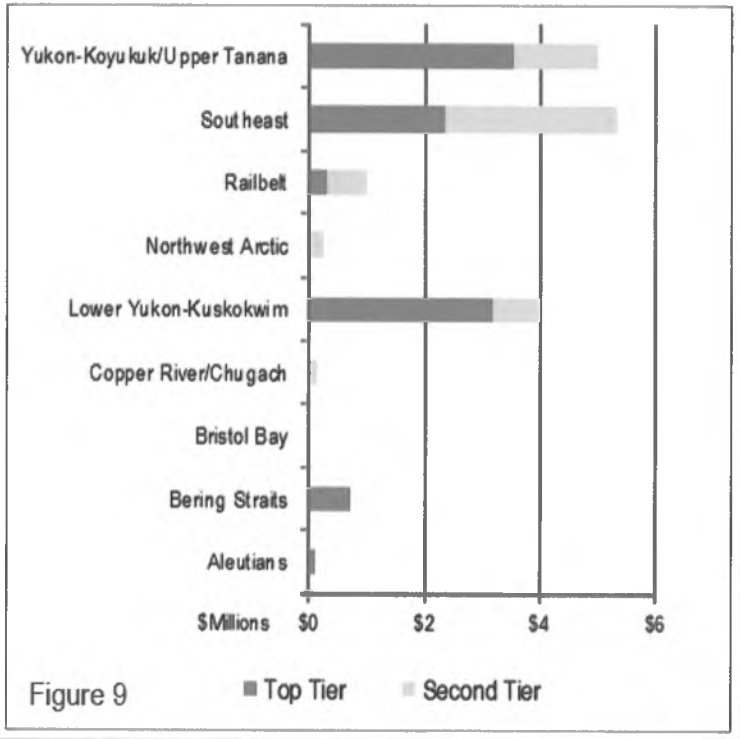


Figure 9

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Renewable Energy Fund Round VII: Electrical Applications Recommended

Recommended funding by type

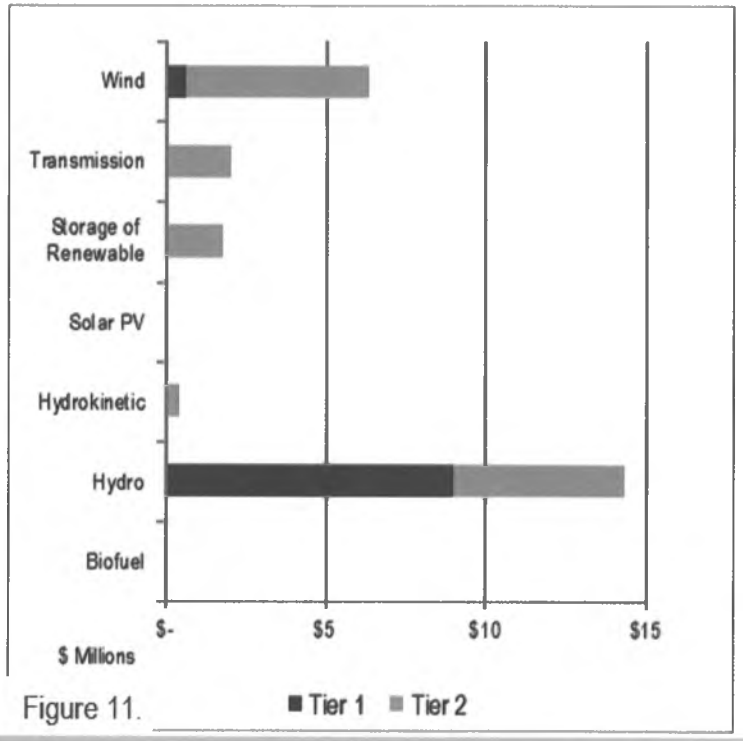


Figure 11.

Recommended funding by region

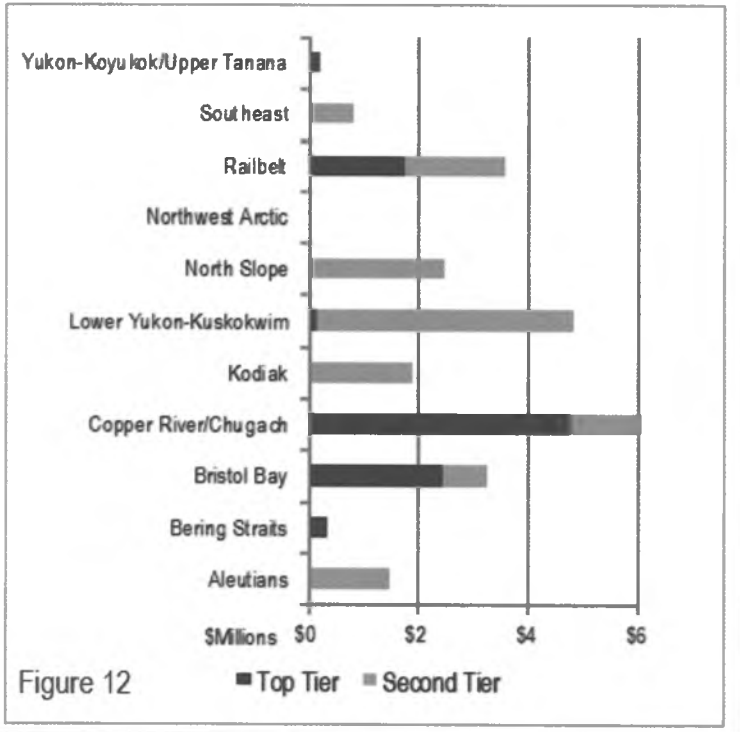


Figure 12

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Emerging Energy Technology Fund

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Testing Safe and Efficient Exhaust Thimble



Emerging Energy Technology Fund

"...make grants to eligible applicants for demonstration projects of technologies that have a reasonable expectation to be commercially viable within five years that are designed to:

- test emerging energy technologies or methods of conserving energy;
- improve an existing energy technology; or
- deploy an existing technology that has not previously been demonstrated in Alaska. "

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Arctic Field Testing of Eocycle Wind Turbine



Wind-Diesel Battery Hybrid for Kwigillingok

Emerging Energy Technology Fund

Energy Technology includes renewables, energy conservation and efficiency, hydrocarbons, enabling technologies and integrated systems.

- (2010) Program Legislation: AS 42.45.375
- Program Regulations: 3 AAC 107.700-799

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EETF: Process

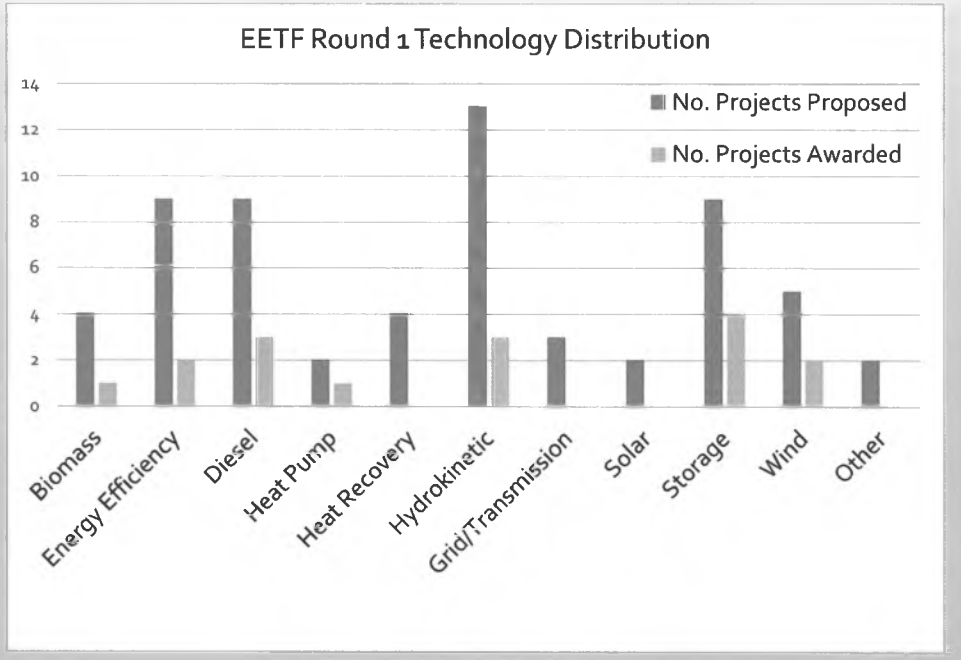
- Two-step review process
  - Project abstracts and full applications
- Project abstracts reviewed by AEA staff and a seven-member advisory committee
  - Evaluated on technical merit
- Priority given to:
  - Alaska entities
  - Projects demonstrating post-secondary partnerships
  - Matching funds or in-kind commitments
  - Demonstration of potential for widespread deployment
- Top-ranking projects invited to submit detailed project applications and deliver presentations to AEA staff and the advisory committee

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EETF: Project Awards

2012: First round of projects selected and funded

- Funds available: $8.9 million (through Denali Commission matching grant)
- Projects selected: 16 (15 awarded funding)
- Juneau, Fairbanks, Kodiak, Delta Junction, Nenana, Nikiski, Igiugig, Tuntutuliak, Kwigllingok and Kotzebue



2014: Second round of projects selected

- Funds available $2.3 million
- Projects recommended: six, pending funding
- Expecting award announcement within the month

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Modified '97 Eagle Talon EV Test bed



Modified 15 kW Genset

EETF: Project Highlight

Ultra-Efficient Generators and Diesel Electric Propulsion (Kodiak)

- Technology aims to provide more efficient diesel power generation
- Can be used in marine propulsion and stationary powerhouses
- Power dense motor and inverter/controller invented by operators of a machining and fabricating shop in Kodiak
- Commercial availability anticipated at project's end

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Installation of Slinky Loop



Installed 3-ton Heat Pump

EETF: Project Highlight

Cold Climate Heat Pump Demonstration (Fairbanks)

- Cold Climate Housing Research Center demonstrating the potential for ground source heat pumps as an efficient and economic heat source in colder climates
- Different ground surface treatments are applied to compare effects on the loop field
- Next phase is data collection

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March 12, 2014

The Honorable Doug Isaacson
House Energy Co-Chair
State Capitol, Room 13
Juneau, Alaska 99801

The Honorable Charisse Millett
House Energy Co-Chair
State Capitol, Room 403
Juneau, Alaska 99801

Dear Representatives Isaacson and Millet:

The Alaska Energy Authority (AEA) presented an update of the Renewable Energy Fund (RE Fund) and Emerging Energy Technology Fund (EETF) programs to the House Energy Committee on Feb. 26, 2014. This letter is to follow-up and answer questions that were asked during the committee hearing.

Project Management
During the discussion, Co-Chair Isaacson asked for a description of our project management.

AEA works to serve the community first and foremost. Our project managers, regional energy planning staff and technical assistance teams work with the communities to identify their unique needs and help them advance successful projects to construction. This may include identifying additional funding sources, connecting multiple governmental agencies to apply a holistic approach, and assisting to identify permitting needs and paths forward.

RE Fund project managers' work closely with grantees to move through stages and achieve milestones before releasing additional funds. Our goal is to issue grants with clear scopes of work and milestones to ensure successful project outcomes. As the grantee moves through project development and reaches milestone completion, they submit to AEA for reimbursement of allowable costs. There is flexibility in the process to provide funding for upfront project costs, like mobilization before a field season or large construction like hydroelectric projects.

Rural energy infrastructure projects are managed by AEA and the agency manages and constructs the project on behalf of the grantee. The RE Fund is a pass-through grant program. If the grantee or applicant requests, AEA has the capacity to manage the RE Fund project similar to our rural energy infrastructure projects.

I offer an example of St. George as the community-based approach to AEA project management. This complex project includes the coordination of AEA-managed and pass-through grants to the benefit and savings of the community.

813 West Northern Lights Boulevard Anchorage, Alaska 99503 T 907.771.3000 Toll Free (Alaska Only) 888.300.8534 F 907.771.3044

St. George: A Whole-System Approach

St. George is located in the Bering Sea on the northeast shore of St. George Island, the southernmost of the two Pribilof Islands. The island lies 47 miles south of St. Paul Island and 750 air miles west of Anchorage. Access to the island can be difficult as lingering fog or winds often make landing impossible. The wind driven salt spray and sand rapidly corrodes equipment.

The community's powerhouse and electrical distribution system were at the end of their design life. Power outages were frequent and the electrical distribution system had large line losses. The heat recovery system was inoperable.

The St. George project model enabled a "whole-system" design and construction plan as opposed to treating the individual projects separately, even though there are different funding sources and grants involved. The community was able to receive stable and efficient power from the powerhouse and incorporate renewable energy. The project included the design and construction of a new modular powerhouse, waste heat recovery system (to include the school), upgrades to the electrical distribution, a wind turbine system and integrated controls with remote monitoring.

Before the rural power system upgrade (RPSU) was feasible the existing infrastructure needed to be stabilized. AEA secured funding for the stabilization project via a pass-through grant to the St. George Municipal Electric Utility. The City of St. George contracted with Marsh Creek, LLC for the purchase and installation of the required equipment.

A RE Fund pass-through grant provided wind turbine system funding. The City of St. George made procurements under authority of the grant and AEA provided technical assistance and recommendations. Coordination between the community and AEA takes advantage of AEA's RPSU experience to ensure that the wind turbine correctly interfaces with the entire power system and maintains a commonality of parts and systems making the system easier to troubleshoot or repair.

The City of St. George has procured the wind turbine, tower, variable frequency controller and associated materials. In coordination with the RPSU construction, the community procured installation services for tower assembly, turbine placement and electrical distribution. Under the RE Fund, the grantee submits reimbursement requests to the AEA project manager and after appropriate documentation is verified the funds are deposited into the project account. AEA works to provide accountability and prompt payment to vendors that are working on the project for the community.

An AEA-managed grant has funded the modular power generation building, waste heat recovery, upgrades to the distribution system and integrated controls. In accordance with the RPSU grant, AEA procured materials (in compliance with the State's procurement code) on behalf of the community and coordinated the construction of the powerhouse module by the City of St. George personnel.

The remote location of St. George required AEA to plan a unique approach to training the local operators and testing the combined power system. St. George received in-depth training and system

familiarization by participating in the actual construction of the powerhouse module and testing of the integration of the wind system.

The whole-system approach saved more than one million dollars in project costs and shortened the schedule by eight months. This close coordination also identified and resolved many technical issues before construction, thus avoiding costly field fixes.

With the new heat recovery system the utility receives new income from heat sales to the school and the school benefits by reduced heating fuel consumption resulting in lower costs. The integrated diesel / wind design is expected to provide a 10 percent increase in diesel generated power efficiency and an estimated annual fuel savings of $140,000 from wind generation. AEA is taking an innovative approach to this project by coordinating work on the powerhouse, distribution, heat recovery, and wind components in order to lower costs and ensure that all aspects of the final system work together effectively.

Project Timelines

Renewable Energy Grant Fund Projects

RE Fund projects are funded by phase and often the reconnaissance and feasibility studies dictate the viability of a project. This may not be achieved in a calendar year. Permitting typically takes place concurrently with feasibility through design steps.

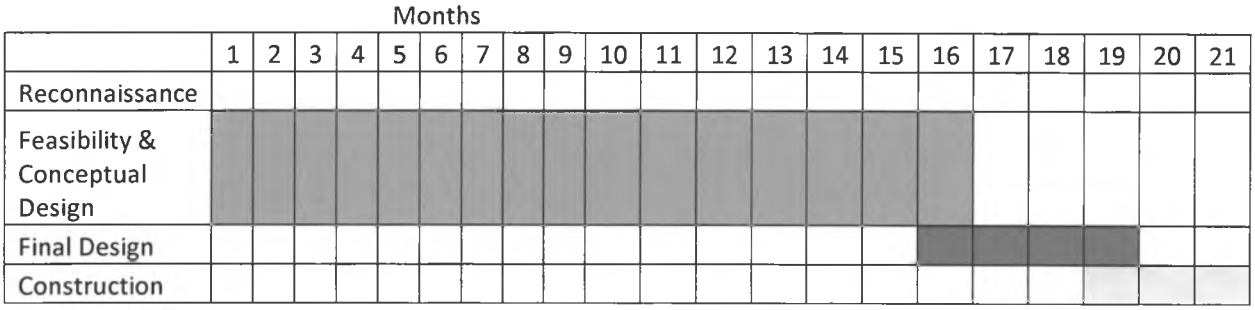
Below is a simplified timeline based on time required to complete each phase, organized by resource, assuming available funds:

Hydroelectric

	Years									
	1	2	3	4	5	6	7	8	9	10
Reconnaissance										
Feasibility & Conceptual Design										
Final Design										
Construction										

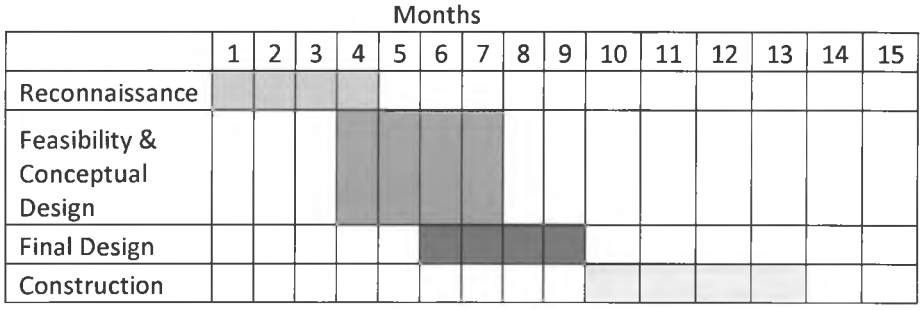
Hydroelectric projects as part of the Renewable Energy Grant Fund often qualify as small hydro projects and have a shorter licensing and construction timeline than a large hydro project like Susitna-Watana Hydro. Permitting can add time to the hydro final design phase.

Wind



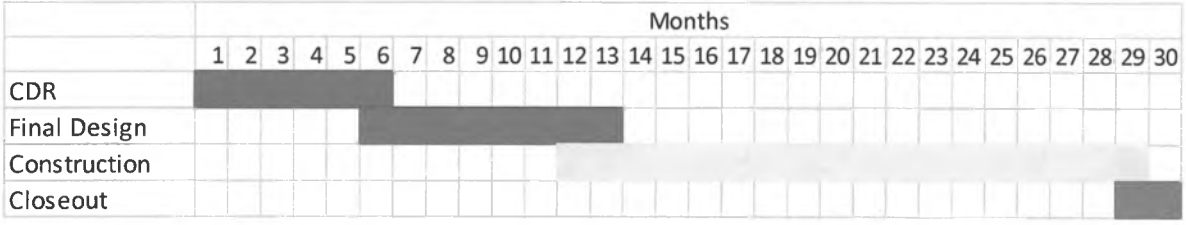
Wind reconnaissance is not included above because approximate wind availability is attainable through other existing sources. A detailed location-specific wind study is performed as part of the feasibility stage.

Biomass



Rural Energy Projects

Rural energy projects, like powerhouse upgrades, are AEA-managed grants. Assuming all funding is obtained, the typical AEA-managed project timeline is below:



Standards for Biomass Boilers

Co- Chair Isaacson asked about the process of selecting technologies for biomass systems and if only Garn systems are approved. Through the RE Fund, applicants procure the actual equipment and AEA's expectation is that the procured systems are high efficiency and result in low emissions. AEA does not require a specific brand of equipment, rather that the equipment meet these standards. ASTM International has been found to be the best standard and provides the best testing protocol to date. This organization publishes International standards on building codes, materials and products. As a result, we have included this set of standards in the RE Fund Request for Applications. Although Garn Boilers do meet this standard, we do not require Garn Boilers for RE Fund projects. We are currently funding a Portage and Main Enviro-Chip Burner boiler system in Mentasta that has achieved ASTM certification.

Fire Island Wind

Rep. Josephson asked about Fire Island Wind. Wind continues to play an important role in Alaska's renewable energy mix and other utility-scale wind projects came online in the Railbelt in 2013. Fire Island Wind, LLC is a subsidiary of Cook Inlet Region, Inc. (CIRI), and owns and operates the 11-tower, 17.6 megawatt wind turbine project. In Round 5, AEA reviewed a RE Fund application requesting funding for the Fire Island transmission line. The project was recommended for funding by AEA, but it was not funded because it ranked lower than that year's available Capital Budget funding amount.

Cost of Energy

Rep. Hughes had questions about the cost of energy and requested a list of communities with the highest and lowest electrical rates.

Included in this letter is additional information about electrical costs, but you may also be interested in an online tool that tracks energy sources and costs by community. The Alaska Energy Data Gateway posts helpful energy information for the public at https://akenergygateway.alaska.edu/.

Electrical Costs

Following is a list of Alaska communities that pay 12 cents and less per kilowatt hour (KWh). Six of the eight lowest-electrical cost communities are in the Southeast and have access to mature hydropower resources. Nuiqsut and Barrow are North Slope communities that benefit from North Slope natural gas.

Low-cost Electrical Communities:

Community Name	Population (2013)	Energy Region	Residential Rate ($/kWh)
Nuiqsut	452	North Slope	.08
Metlakatla	1,471	Southeast	.09
Sitka	9,039	Southeast	.09
Ketchikan	8,313	Southeast	.10
Petersburg	2,957	Southeast	.10
Wrangell	2,456	Southeast	.11
Juneau	33,064	Southeast	.12
Barrow	4,514	North Slope	.12

Data sources: DCRA community database and Alaska Energy Statistics 2011.

There are thirteen communities who currently pay more than one dollar per KWh (pre-Power Cost Equalization (PCE)). As you can see by the chart on the following page, these communities have very small populations- some declining in population- and are in remote regions of the state.

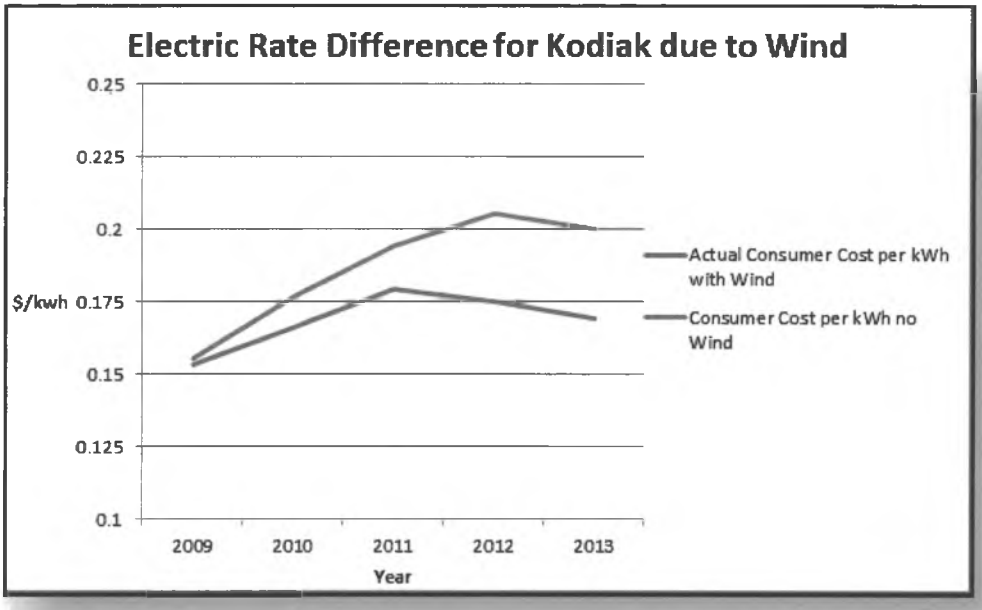
High-cost Electrical Communities:

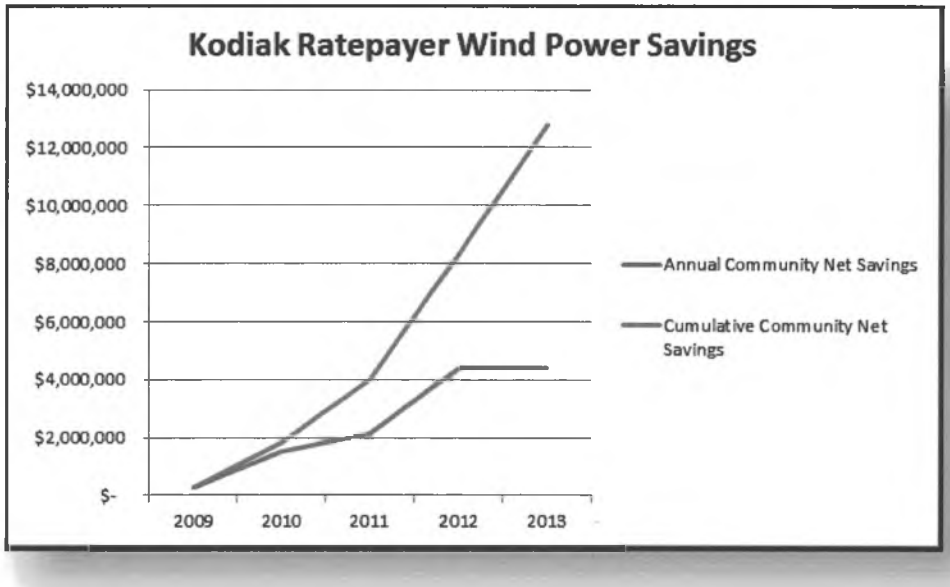
Community Name	Population (2013)	Energy Region	Residential Rate ($/kWh)	PCE Level ($/kWh)	Effective Rate ($/kWh)
Healy Lake	13	Yukon-Koyukuk/Upper Tanana	3.2789	0.8164	2.4625
Lime Village	25	Lower Yukon-Kuskokwim	1.7748	0.8164	0.9584
Adak	283	Aleutians	1.4556	0.8164	0.6392
Chuathbaluk	127	Lower Yukon-Kuskokwim	1.0814	0.8164	0.2650
Crooked Creek	93	Lower Yukon-Kuskokwim	1.0754	0.8164	0.2590
Red Devil	18	Lower Yukon-Kuskokwim	1.0754	0.8164	0.2590
Sleetmute	103	Lower Yukon-Kuskokwim	1.0754	0.8164	0.2590
Stony River	40	Lower Yukon-Kuskokwim	1.0754	0.8164	0.2590
Stevens Village	65	Yukon-Koyukuk/Upper Tanana	1.0700	0.4636	0.6064
Takotna	56	Yukon-Koyukuk/Upper Tanana	1.0220	0.5893	0.4327
Twin Hills	82	Bristol Bay	1.0040	0.4639	0.5401
St. George	97	Aleutians	1.0000	0.6465	0.3535

Data sources: DCRA community database and AEA PCE Database. Rates are from the most recent monthly PCE report as of March 2014, which for most communities is December 2013 or January 2014. Stevens Village has not participated in the PCE program since 2009 and its rates shown are as of then.

Kodiak Renewables

Kodiak was highlighted as a successful example of the integration of renewable energy resulting in lower power costs for Alaskans. Kodiak receives nearly all of its power from a combination of hydropower from Terror Lake and the Pillar Mountain Wind project. Below are two charts that identify the ratepayer savings as a result of the wind power and offset of diesel generation. According to the Kodiak Electric Association, annual savings are $4.5 million and residential rates are now 15.5 cents per KWh.



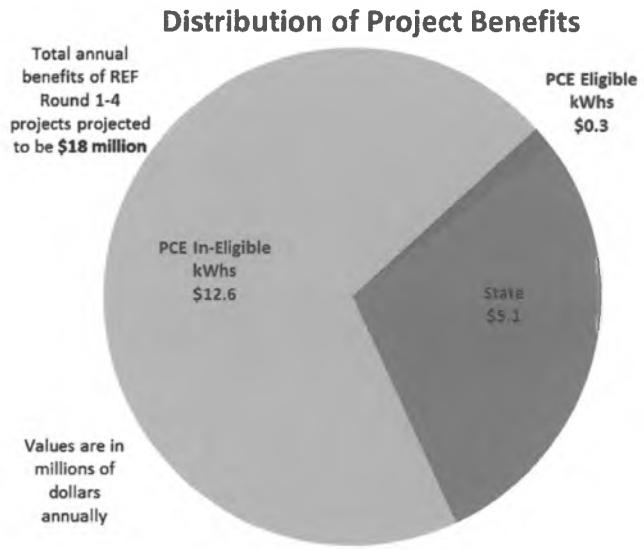


Information provided by Kodiak Electric Association

Renewable Energy and PCE

PCE provides assistance in rural Alaska to maintain and operate basic infrastructure and systems. As outlined in the power costs section of this letter, electrical rates in rural Alaska can be three to five times higher than in urban Alaska. Roughly 30 percent of all Kwhs sold by participating utilities are eligible for PCE, this includes residential customers and community facilities. State and federal facilities and commercial customers are not eligible.

Renewable energy projects benefit the non-PCE eligible customers the greatest; this includes rural Alaska's business community. Rounds 1-4 of the RE Fund result in $18 million in annual benefits to communities.



In smaller communities where a relatively substantial amount of intermittent electrical generation, such as wind, is incorporated into the electrical system the energy cannot always be absorbed into the load. These communities then must shift to a secondary load, often heat. There is concern that if excess renewable energy is incorporated as part of the PCE calculation it would artificially lower the PCE rate for the community members not receiving the secondary load benefit. AEA is currently exploring ways to segregate the secondary load from the primary electrical load for PCE calculations.

Emerging Energy Technology Fund Questions

The Emerging Energy Technology Fund (EETF) was established to promote the expansion of energy sources available to Alaskans by making grants for demonstration projects of technologies that have a reasonable expectation to be commercially viable within five years. There was committee discussion about AEA's ability to gain partial ownership of intellectual property rights of technology that was developed during the course of EETF projects, or if any other profit-sharing mechanism existed.

Per program statute, EETF projects can be designed to:

(1) Test emerging energy technologies or methods of conserving energy;
(2) Improve an existing energy technology; or
(3) Deploy an existing technology that has not previously been demonstrated in the state.

It is important to clarify that EETF is not a research and development (R&D) fund. While inventors of technologies in very early stages of development may be more interested in an arrangement that involves sharing intellectual property rights as a condition of R&D funding, such technologies are likely outside EETF program statute. Typically, projects that are either testing emerging technologies or improving existing technologies are already patented or have patents pending.

Projects that are deploying an existing technology that has not been previously demonstrated in Alaska include technologies that are generally currently commercially available and EETF applicants are not necessarily affiliated with the manufacturers or patent holders. A successful demonstration of an existing technology that is new to Alaska would ideally result in broader deployment and multiple commercial entities potentially marketing the technology. It is unclear how a profit-sharing mechanism could be implemented in this case without disadvantaging the awardee relative to other potential technology marketers. Of the 15 Round 1 EETF projects underway, seven awards were for amounts less than $300,000. A mandate for profit-sharing could possibly discourage such projects of smaller size from applying to the fund.

Thank you for the committee's attention to these energy issues. If you have any further questions, please contact me.

Sincerely,

Sara Fisher-Goad for
Executive Director

02/28/14 Presentation: Alaska Power Association

<TARGET><BILL></BILL><SUBJECT>02-28-14 Presentation Alaska Power Association</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Agenda

Friday, February 28, 2014
8:00 – 10:00 a.m.
Barnes Committee Room (124)

1. APA, Crystal Enkvist, Director of Member & Public Relations
   APA background

2. Review of APA Resolutions, focusing on rural energy issues, Clay Koplin, CEO, Cordova Electric Cooperative
   Renewable Energy Grant Fund
   Emerging Energy Technology Fund
   Power Cost Equalization
   Denali Commission Funding of Energy Infrastructure

3. Review of APA Resolutions focusing on Railbelt energy issues, Joe Griffith, General Manager, Matanuska Electric Association

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

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Alaska Power Association
2014 Legislative Priorities



Presented to the House Special Committee
on Energy by:

Clay Koplin, Cordova Electric Cooperative,
Joe Griffith, Matanuska Electric Association,
and Crystal Enkvist, Alaska Power Association

What Will Be Covered



- Alaska Power Association background
- Development of APA's legislative priorities
- Legislative Priorities
- Questions

Alaska Power Association

- Trade association for electric utility industry
- Electric cooperatives, municipals, joint action agencies and investor-owned utilities
- Statewide membership







APA members provide power to a majority of Alaskans



Development of Legislative Priorities



- Diverse electric utility membership comes together to speak with one voice
- Positions reflect the challenges and opportunities of providing safe, reliable and affordable electric power
- Statewide issues as well as rural- and Railbelt-focused issues





ALASKA POWER ASSOCIATION

Resolutions Process

- Issues brought forward by APA members
- Resolutions and Government Affairs Steering Committee
  - Chair: Rick Schikora, Golden Valley Electric Association
- APA Managers' Forum
  - Co-Chairs: Clay Koplin, Cordova Electric, and Brad Evans, Chugach Electric
- Review by APA Board of Directors
  - President: Ben Frantz, Barrow Utilities & Electric

APA State Legislative Resolutions

- A Resolution Urging the Creation of an Urgent Implementation Plan for Alaska Energy Policy
- A Resolution Urging Capital Funding in Support of Alaska Energy Policy
- A Resolution Supporting Full Funding for Power Cost Equalization
- A Resolution Addressing Unaffordable Energy in Rural Alaska
- A Resolution Urging Continued Funding of the Emerging Energy Technology Fund
- A Resolution Urging the State of Alaska to Provide a Match to Denali Commission Funding of Energy Infrastructure
- A Resolution Supporting Construction of an Alaska Natural Gas Pipeline
- A Resolution Supporting Funding for Projects Recommended by the Alaska Energy Authority for the Renewable Energy Grant Fund
- A Resolution Urging the Legislature to Support Utility Efforts to Create a Unified Transmission System for the Railbelt
- A Resolution Urging the Legislature to Use the Bradley Lake Model for Financing Additional State-owned Hydroelectric Projects
- A Resolution Urging the Legislature to Support Legislation to Address Metals Theft

APA State Legislative Resolutions



Presented by

Clay Koplin, Cordova Electric Cooperative
Joe Griffith, Matanuska Electric Association

Renewable Energy Grant Fund

A Resolution Supporting Funding for Projects Recommended by the Alaska Energy Authority for the Renewable Energy Grant Fund

- Provide appropriation sufficient to cover the projects and funding levels recommended by AEA
- Renewable energy projects benefit Alaskans in many ways
- Projects recommended for funding help advance Alaska's goal of producing 50 percent of the state's power with renewable energy by 2025

Emerging Energy Technology Fund

A Resolution Urging Continued Funding of the Emerging Energy Technology Fund

- Continue funding the EETF
- Alternative Energy Source
  - Research
  - Development
  - Application



Full Funding for PCE

A Resolution Supporting Full Funding for Power Cost Equalization

- Residential rates in rural Alaska range from .018/kWh to $1.30/kWh
- High energy costs are crippling rural Alaska
- Fully fund Power Cost Equalization in the Administration's FY15 operating budget.



State Funding Match for Denali Commission

A Resolution Urging the State of Alaska to Provide a Match to Denali Commission Funding of Energy Infrastructure

- Established in 1998 to establish code-compliant energy facilities in rural Alaska
- Intended to be joint State-Federal partnership
- Provide 200 percent matching State funds
- Safe, code-compliant electric generation and bulk fuel tank farm facilities for rural Alaska



Implementation Plan for Alaska Energy Policy

A Resolution Urging the Creation of an Urgent Implementation Plan for Alaska Energy Policy

- Create an energy policy implementation plan
- Provide support and funding sources to short-, mid-, and long-term generation and transmission facilities
- Fund fuel development and storage infrastructure projects

Capital Funding for Energy Projects

A Resolution Urging Capital Funding in Support of Alaska Energy Policy

- Direct appropriations toward major energy projects
- Capitalize the Power Project Loan Fund
- Implement the State-funded and administered revolving loan fund (AIDEA Sustainable Energy Program) for financing infrastructure



Construction of Natural Gas Pipeline

A Resolution Supporting Construction of an Alaska Natural Gas Pipeline

- Natural gas accounts for just over one-half of Alaska's electricity generation
- Facilitate the prudent development of an Alaska Natural Gas pipeline that will bring North Slope natural gas to market immediately
- Encourage the use of Alaska royalty natural gas in communities along the pipeline route

Unified Transmission System for the Railbelt

A Resolution Urging the Legislature to Support Utility Efforts to Create a Unified Transmission System for the Railbelt

- Support efforts by the Railbelt electric utilities to unify the regional transmission system
- Alaska's Raibelt "grid" not robust. Utilities studying successful Lower 48 models.
- Working together to develop, operate and maintain a rational regional transmission system



Bradley Lake Financing Model

A Resolution Urging the Legislature to Use the Bradley Lake Model for Financing Additional State-owned Hydroelectric Projects

- **Bradley Lake Hydro financing**



  - 50 percent equity contribution from the State
  - 50 percent debt through State-issued bonds
- Proven itself fair and equitable for the State of Alaska and the ratepayers of the region
- Use this model for financing additional State-owned hydro electric projects



Metals Theft Legislation

A Resolution Urging the Legislature to Support Legislation to Address Metals Theft

- Several APA members have experienced metals theft
- Results: power outages, lost productivity and needless expenses to electric customers
- APA part of stakeholder group led by Associated General Contractors
- Legislation being drafted with assistance from AG's office

ALASKA POWER ASSOCIATION

Questions?



APA State Legislative Resolutions

- A Resolution Urging the Creation of an Urgent Implementation Plan for Alaska Energy Policy
- A Resolution Urging Capital Funding in Support of Alaska Energy Policy
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Alaska Power Association
Government Relations Team

Marilyn Leland, Executive Director

Crystal Enkvist, Director of Member & Public Relations

Larry Markley, Lobbyist

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LEGISLATIVE RESOLUTIONS 2014

State Resolutions

A Resolution Urging the Creation of an Urgent Implementation Plan for Alaska Energy Policy (14-1) 1
A Resolution Urging Capital Funding in Support of Alaska Energy Policy (14-2) 2
A Resolution Supporting Full Funding for Power Cost Equalization (14-3) 3
A Resolution Addressing Unaffordable Energy in Rural Alaska (14-4) 4
A Resolution Urging Continued Funding of the Emerging Energy Technology Fund (14-5) 5
A Resolution Urging the State of Alaska to Provide a Match to Denali Commission Funding of Energy Infrastructure (14-6) 6
A Resolution Supporting Construction of an Alaska Natural Gas Pipeline (14-7) 7
A Resolution Supporting Funding for Projects Recommended by the Alaska Energy Authority for the Renewable Energy Grant Fund (14-8) 8
A Resolution Urging the Legislature to Support Utility Efforts to Create a Unified Transmission System for the Railbelt (14-9) 9
A Resolution Urging the Legislature to Use the Bradley Lake Model for Financing Additional State-owned Hydroelectric Projects (14-10) 10
A Resolution Urging the Legislature to Support Legislation to Address Metals Theft (14-11) 11

Federal Resolutions

A Resolution Objecting to the "One Size Fits All" Approach of Federal Regulations (14-12) 12
A Resolution Urging Congress to Formally Recognize Hydropower as a Renewable Source of Energy (14-13) 13
A Resolution Encouraging EPA to Consider Alaska's Unique Circumstances in Newly Proposed Environmental Regulations (14-14) 14
A Resolution Recommending the Elimination of Impediments to the Development of Hydroelectric Power Projects within National Forests (14-15) 15
A Resolution Urging Continued Federal Support of the Denali Commission (14-16) 16
A Resolution Urging Support for the USDA RUS High Energy Cost Grant Program (14-17) 17

ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging the Creation of an Urgent Implementation Plan for Alaska Energy Policy (14-1)

Alaska is in the midst of an energy crisis. Communities statewide are faced with aging generation and transmission facilities. The unstable price and supply of fuel is increasingly impacting Alaskans everywhere.

The Alaska Power Association membership urges the creation of an implementation plan that provides support and funding sources to short-, mid-, and long-term generation and transmission facilities, and facilitates fuel development and storage infrastructure projects with financial commitments from the State.

Alaska Power Association urges the 28th Alaska Legislature and the Parnell Administration to make the implementation plan of energy policy the highest priority for the 2014 legislative session.

APA further urges the State to develop and maintain current Alaska power statistics that demonstrate quantifiable progress towards the goals established in the plan.

(Adopted Dec. 2009; updated Dec. 2011; updated Dec. 2012; updated Dec. 2013)

Association Members

Alaska Electric and Energy Co-op
Alaska Electric Light & Power
Alaska Power & Telephone
Alaska Village Electric Cooperative
Anchorage Municipal Light & Power
Aurora Energy
Barrow Utilities & Electric Co-op
Chugach Electric Association
Copper Valley Electric Association
Copper Valley Telephone Co-op
Cordova Electric Cooperative
Doyon Utilities
Golden Valley Electric Association
Homer Electric Association
INN Electric Cooperative
Inside Passage Electric Co-op
Kodiak Electric Association
Kotzebue Electric Association
Kwaan Electric Transmission Intertie Cooperative
Matanuska Electric Association
McGrath Light and Power
Metlakatla Power & Light
Middle Kuskokwim Electric Co-op
Naknek Electric Association
Nome Joint Utility System
North Slope Borough
Nushagak Cooperative
OTZ Telephone Cooperative
Southeast Alaska Power Agency
Tanalian Electric Cooperative
Tanana Power Company
TDX Power
Unalakleet Valley Electric Co-op
Yakutat Power

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging Capital Funding in Support of Alaska Energy Policy
(14-2)

In light of the ambitious and aggressive goals set forth in the Alaska Sustainable Energy Act and State Energy Policy, the Alaska electric utility sector needs sources of capital for infrastructure and transmission.

Alaska Power Association urges the Alaska Legislature to fully support the following funding mechanisms:

- Direct appropriations toward major energy projects;
- Properly capitalize the Power Project Loan Fund, enabling meaningful funding for infrastructure projects; and
- Implement the State of Alaska-funded and administered revolving loan fund (AIDEA Sustainable Energy Program) for the financing of infrastructure projects.

(Adopted Dec. 2010; updated Dec. 2011; updated Dec. 2012; updated Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Supporting Full Funding for Power Cost Equalization (14-3)

Alaska Power Association strongly supports full funding for Power Cost Equalization. APA appreciates the Alaska State Legislature's full funding of the PCE benefit at 100 percent for FY14. We urge the legislature to fully fund PCE in the Administration's FY15 operating budget.

(Adopted Dec. 2005; updated Dec. 2008; updated Dec. 2009; updated Dec. 2010; updated Dec. 2011; updated Dec. 2012; updated Dec . 2013)

Association Members

Alaska Electric and Energy Co-op
Alaska Electric Light & Power
Alaska Power & Telephone
Alaska Village Electric Cooperative
Anchorage Municipal Light & Power
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Barrow Utilities & Electric Co-op
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Kodiak Electric Association
Kotzebue Electric Association
Kwaan Electric Transmission
Intertie Cooperative
Matanuska Electric Association
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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Addressing Unaffordable Energy in Rural Alaska (14-4)

Alaska's citizens are subject to the most extreme disparity in the cost of energy for homes and businesses of any state in the union. Electricity to a homeowner can cost as little as 10 cents a kilowatt-hour (kWh) and as much as $1.20 per kWh. Heating fuel can cost as little as $9 per million BTU (natural gas in Anchorage) and as much as $75 or more in rural Alaska.

The cost of energy in rural Alaska has resulted in a tremendous financial burden on virtually every resident and business in these remote communities. New businesses are stymied due to the crippling cost of energy. Existing businesses are crippled and frequently forced into closure due to the high cost of energy. Schools must apply ever increasing percentages of their operating revenues towards energy costs, diverting funds from essential educational needs. Industry is unable to compete with low energy costs in the Pacific Northwest or the rest of the world, resulting in high-paying processing and value-added jobs being exported along with Alaska raw materials and products.

The survival of rural Alaska depends upon immediate and real relief from the cost of energy needed for electricity, heat and transportation. Rural Alaskans, despite their geographic location, should nonetheless expect reasonably priced energy equivalent to what it costs in urban Alaska.

The State of Alaska is strongly urged to take immediate, meaningful steps to ensure that every Alaskan has access to affordable, reliable energy for their electricity, heating and transportation needs.

(Adopted Dec. 2009; updated Dec, 2012; updated Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging Continued Funding of the Emerging Energy Technology Fund (14-5)

Alaska Power Association members are facing the challenge of providing reliable and cost-effective electric power service while paying rapidly escalating costs for fuel with no substantial financial relief in sight.

This unfortunate reality, coupled with advances in the application of alternative energy technology in cold weather climates, is moving the consideration of distributed generation and renewable energy sources to the forefront of many electric utilities' long-term strategic plans. The Alaska Power Association Board of Directors recognizes that established renewable energy projects such as wind farms and alternative energy sources such as nuclear may play an important role in Alaska's future energy supply.

Without a funding mechanism to assist Alaska's electric utilities with researching and developing renewable energy generation, whether it be in the form of alternative energy project grants, low interest loans or production tax credits, the utilities are forced to decide between either not pursuing such opportunities due to their extraordinarily high capital costs or raising electric rates to help offset the cost of adding new generation into the energy portfolio. Alaska's electric utilities will pursue renewable energy projects as long as they make economic sense on behalf of the consumers.

Alaska Power Association urges the Legislature to continue funding the Emerging Energy Technology Fund to assist with the research, development and eventual application of alternative energy sources into the Alaska electric utility generation portfolio.

(Adopted March 2006; updated Oct. 2007; updated Nov. 2009; updated Dec. 2011)

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ALASKA POWER ASSOCIATION
R E S O L U T I O N

A Resolution Urging the State of Alaska to Provide a Match to Denali Commission Funding of Energy Infrastructure (14-6)

The Denali Commission was established by Congress in 1998 with the objective of establishing code-compliant energy facilities in rural Alaska. The commission was intended to be a joint State-Federal partnership in this endeavor.

Since inception, the Denali Commission has provided more than $500 million in federal energy grants to upgrade rural fuel storage and energy production facilities. As Alaska's congressional influence evolves, it is critical that the State of Alaska recognize the importance of this program to the sustainability of rural Alaska. In doing so, the State provides much needed funding while illustrating to Congress the priority of this program to Alaska.

Alaska Power Association urges the State of Alaska to provide 200 percent matching State funds to assist the Denali Commission in achieving the mission of providing safe, code-compliant electric generation and bulk fuel tank farm facilities to serve the rural citizens of Alaska.

(Adopted Dec. 2009; updated Dec. 2010; updated Dec. 2011; updated Dec. 2012; updated Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Supporting Construction of an Alaska Natural Gas Pipeline (14-7)

Alaska Power Association strongly encourages our Governor, Congressional Delegation, and Legislature to take all reasonable actions to facilitate, and, if it is in the State's best interests, actively participate in the prudent development of an Alaska Natural Gas pipeline that will bring North Slope natural gas to market immediately. Alaska Power Association further encourages the use of Alaska royalty natural gas in communities along the pipeline route.

(Adopted Dec. 2004; updated 2006; updated Nov. 2009; updated Dec. 2010; updated Dec. 2011)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Supporting Funding for Projects Recommended by the Alaska Energy Authority for the Renewable Energy Grant Fund (14-8)

Regarding the capital appropriation for the Renewable Energy Grant Fund, Alaska Power Association supports funding for the list of projects recommended by the Alaska Energy Authority through its review process. AEA has developed and applied a professional process to screen projects in determining its recommended list.

Renewable energy projects benefit Alaskans in many ways, including reducing dependence upon fossil fuels. The projects recommended for funding through the REGF help advance Alaska's goal of producing 50 percent of the state's power with renewable energy by 2025.

Accordingly, APA urges the 28th Legislature to provide an appropriation sufficient to cover the projects and funding levels recommended by AEA.

(Adopted Feb. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging the Legislature to Support Utility Efforts to Create a Unified Transmission System for the Railbelt (14-9)

The Railbelt electric transmission system is comprised of hundreds of miles of lines owned by a number of entities, including utilities and the State of Alaska. The system is not nearly as robust as grids in the Lower 48. Limitations affect both the reliability and the cost of electric energy in the region.

A 2012 study by the Alaska Energy Authority determined that there are Railbelt transmission restrictions that result in significantly higher energy costs in the region. The AEA study determined that more than $900 million of transmission projects are needed to resolve existing problems. Although it is clear that the region would benefit from these necessary improvements, it is unlikely to be financed by utility ratepayers under the current operating model.

Absent a clear path to implement AEA study results, the Railbelt needs to consider a different approach to grid management.

In the Lower 48, a series of geographic Regional Transmission Organizations or Independent System Operators have been developed to address similar problems. Railbelt electric utilities have begun working together to study successful Lower 48 models and consider how best to develop, operate and maintain a rational regional transmission system.

Alaska Power Association urges the Alaska State Legislature to support efforts by the Railbelt electric utilities to unify the regional transmission system.

(Adopted Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging the Legislature to Use the Bradley Lake Model for Financing Additional State-owned Hydroelectric Projects (14-10)

The Alaska Energy Authority has been advancing the concept of a new, major hydropower resource in the Railbelt. Also under consideration is a diversion project that will increase production from the existing Bradley Lake Hydroelectric Project. The financing of major energy projects such as these will be critical to the eventual price of power paid by consumers. Alaskans and their economy will reap long-term benefits from following a financing model that results in stable, affordable electric energy.

The Bradley Lake Hydroelectric Project was financed by a combination of 50 percent equity contribution from the State of Alaska and 50 percent debt through state-issues bonds. In exchange for power from the project, the electric utilities of the Railbelt pay the annual debt service on the bonds. These payments will continue to be made to the State after the bonds are retired, in recognition of its initial equity contribution.

The Bradley Lake financing model has proven itself fair and equitable for both the State of Alaska and the ratepayers of the region. Today, low-priced energy from Bradley Lake flows to Alaskans throughout the Railbelt on a non-discriminatory basis, providing an economic benefit that will be in place for decades to come.

The Alaska Power Association urges the Alaska State Legislature to use the Bradley Lake model for financing additional State-owned hydroelectric projects.

(Adopted Dec. 2013)

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R E S O L U T I O N

A Resolution Urging the Legislature to Support Legislation to Address Metals Theft (14-11)

The theft of metals and subsequent sale as scrap is a growing problem across the nation and for Alaska utilities and contractors. These metal thefts result in power outages, lost productivity and needless expenses to all electrical customers. Further, the theft of ground wires creates dangerous conditions for workers and the public.

Many states have enacted laws to allow legal scrap metal recycling while minimizing metal theft by requiring identification of all customers, trackable payments, and between two and seven years of recordkeeping of all businesses purchasing scrap metal.

Alaska Power Association urges the Alaska State Legislature to support legislation to address metals theft.

(Adopted Dec. 2013)

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R E S O L U T I O N

A Resolution Objecting to the "One Size Fits All" Approach of Federal Regulations (14-12)

Alaska is a state of spatial, geographic and climatic extremes, comprising 20 percent of the US landmass, 50 percent of its coastline, 100 percent of its arctic lands and 0.2 percent of its population. These characteristics render the federal government's "One Size Fits All" regulatory approach incompatible and impractical in Alaska. Complex regulations developed to address concerns in the contiguous United States have tremendous unintended consequences when applied indiscriminately to Alaska.

APA urges the federal government to tailor regulations regarding Ultra Low Sulfur Diesel, Air Quality Permitting, Endangered Species Act, Federal Energy Regulatory Commission, Roadless Rule, etc. to recognize the severe impacts such actions have on Alaskans.

The costs to Alaskans from impacts of federal regulations pose significant economic hardships, far in excess of purported benefits of such regulations. The absence of an electric grid necessitates hundreds of generation plants across the state, with most serving less than 500 customers. Even the largest utilities serve only thousands of customers, not millions as in the contiguous US. All Alaska utilities should be classified as "small" as none of them exceed the Small Business Administration threshold of electricity sales of four million megawatt hours.

The following effects should be assessed before extending regulations to Alaska:

- Impact on availability and affordability of electricity
- Impact on availability and affordability of all sources of energy
- Impact on Alaska communities' economic viability and wellbeing
- Impact on small, stand-alone public utilities

APA further urges that federal permitting processes such as those implemented by FERC be required to provide immediate feedback to applicants during the permitting process, to ensure that very short construction windows can be optimized. Project delays caused by lengthy permitting processes cost millions of dollars and result in the loss of years of benefits.

APA further urges that human populations be afforded priority over endangered and/or threatened flora and fauna species and that historical rights-of-way to deliver electricity to communities be restored and maintained.

(Adopted Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging Congress to Adopt Energy, Economic and Regulatory Improvement Policies for Hydropower (14-13)

Hydroelectric power is a proven source of reliable, renewable electricity in Alaska and across the nation. Hydropower currently accounts for 25 percent of Alaska's electricity generation. However, the need for additional hydropower generation continues to grow as fossil fuels decrease in availability, increase in price, and are the focus of ever increasing environmental regulation.

The continued dependence of the United States on foreign supplies of oil (still the generation fuel for many of Alaska's rural communities) remains both a national energy security issue and an economic concern for Alaska families and businesses. In recent years, diesel oil has drastically increased in price, resulting in electric rates higher than $1 per kilowatt-hour for some rural communities in Alaska.

The State of Alaska and many Alaska Power Association members are striving to develop viable forms of renewable and alternative energy such as hydropower, wind, and geothermal.
However, the development of Alaska hydropower, in particular, is severely impeded when hydropower is not recognized as a renewable or alternative energy source in some federal laws and programs.

Alaska Power Association supports policies that provide incentives and regulatory policy support that improve the market for hydropower project development. APA calls on Congress to:

1. Broaden the inclusion of hydropower as a renewable and clean energy resource in federal energy policies. This includes, but is not limited to, a federal RES or CES, and all federal procurement requirements for renewable or clean energy resources.
2. Improve the federal licensing process to expedite project deployment timelines, allowing hydropower projects to compete with other energy resources, such as wind and natural gas.
3. Adopt and extend for the long term tax and other economic incentives for hydropower projects.
4. Increase R&D funding for advancements in hydropower technology and operations, as well as project demonstrations in Alaska.

(Adopted Dec. 2010; updated Dec. 2011; updated Dec. 2012)

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ALASKA POWER ASSOCIATION
R E S O L U T I O N

A Resolution Encouraging EPA to Consider Alaska's Unique Circumstances in Proposed Environmental Regulations (14-14)

Alaska's unique circumstances are not conducive to a one-size-fits-all national environmental policy approach. Basic infrastructure assumed to be available throughout the United States, such as roads, interconnected utilities, or waste disposal facilities, is limited or nonexistent in most of Alaska. Access to renewable power and natural gas is regionally-specific, and non-existent or cost prohibitive in many parts of the state. These factors, as well as Alaska's extreme weather, limited construction season, and the extremely high cost of goods and transportation, result in Alaskans paying some of the highest electric bills in the nation.

When the Environmental Protection Agency does not consider Alaska's unique circumstances, the resulting regulations can make the cost of producing electricity too expensive for a local economy to sustain. Alaska utilities are distinctly different than those in the rest of the nation, and these significant differences must be considered when proposing new environmental regulations. For example, it is not reasonable to require Alaska facilities to ship coal ash to the Lower 48 for disposal in hazardous waste landfills, nor is it reasonable to put rural communities at risk with ammonia storage for negligible NOx emission reduction.

All Alaskans deserve to live in a healthy and productive community, yet the approach to improving environmental conditions must be practical, achievable, and cost-effective.

Alaska Power Association (APA) commends EPA for recognizing Alaska's unique limitations when they redefined Generally Available Control Technology for engines subject to the new RICE NESHAP Subpart ZZZZ requirements. In keeping with this theme, APA encourages EPA to continue its acknowledgment of Alaska's unique obstacles when drafting environmental regulation, and to continue providing conditional exemptions or Alaska-specific standards.

(Adopted Dec. 2010; updated Dec. 2012; updated Dec. 2013)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Recommending the Elimination of Impediments to the Development of Hydroelectric Power Projects and Other Sources of Renewable Energy Within National Forests (14-15)

Government at all levels, including the federal Administration, electric utilities, and our consumers are embracing development of renewable energy sources for the production of electricity. Renewable energy sources have environmental, economic and social benefits that are well documented. Hydroelectric and geothermal energy are among the cleanest of all renewable resources and the most cost effective during the long, low-maintenance lives of the projects.

Alaska is blessed with an abundance of hydro resources from its lakes and streams that can be built with minimal environmental impact. Most new hydro development in Alaska replaces costly, finite and less environmentally benign fossil generation fuels, specifically diesel, coal and natural gas. Geothermal resources are also abundant in Alaska and replace fossil fuels at low cost.

Special use permits necessary for federal approval of hydro projects withdrawn by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act of 1920 that are within Inventoried Roadless Areas (IRAs) of national forests must be individually signed by the Secretary of the United States Department of Agriculture (USDA). Roads needed to move equipment from tidewater to areas withdrawn for hydro projects by the FERC that pass through IRAs are prohibited by the 2001 Roadless Rule. 36 C.F.R. § 294.12 (a). Transmission lines through IRAs and roads needed to maintain them are likewise prohibited, adding cost to hydro projects that are authorized.

Projects which must be permitted under the Mineral Leasing Act, including geothermal resources, that were not in existence on January 12, 2001, are prohibited by the 2001 Roadless Rule. 36 C.F.R. § 294.12 (b). (See also 66 Fed. Reg. 3244, at 3256 January 12, 2001).

Prior rights-of-way, easements and other authorizations issued or managed by the United States Forest Service may need to be modified to not impede the development of otherwise acceptable projects that pass through IRAs. The 2001 Roadless Rule will either prohibit or add time to the hydro project approval process at the Federal Energy Regulatory Commission (FERC), seriously jeopardizing the three-year timeframe within which applicants are bound to perfect their FERC permits. The 2001 Roadless Rule also creates impediments to the accessibility and expansion of existing hydropower project facilities.

Alaska Power Association urges Alaska's Congressional delegation and their fellow members of Congress, the Governor's Office, the federal Administration and federal agencies such as USDA and FERC to work collaboratively and expeditiously to eliminate the burdensome and, in some cases, fatal impediments to hydro and geothermal development caused by the 2001 Roadless Rule and the need for the Secretary for Agriculture's personal signature on Roadless Rule designation special use permits and mandatory forest plan amendments, where national forest lands are involved.

APA further urges the highest level of support from the above-mentioned lawmakers and agencies for ensuring that the US Forest Service works cooperatively with project proponents and others to eliminate unnecessary impediments to project development and continued maintenance and expansion of existing hydropower created by prior use authorizations.

Association Members
Alaska Electric and Energy Co-op
Alaska Electric Light & Power
Alaska Power & Telephone
Alaska Village Electric Cooperative
Anchorage Municipal Light & Power
Aurora Energy
Barrow Utilities & Electric Co-op
Chugach Electric Association
Copper Valley Electric Association
Copper Valley Telephone Co-op
Cordova Electric Cooperative
Doyon Utilities
Golden Valley Electric Association
Homer Electric Association
INN Electric Cooperative
Inside Passage Electric Co-op
Kodiak Electric Association
Kotzebue Electric Association
Kwaan Electric Transmission Intertie Cooperative
Matanuska Electric Association
McGrath Light and Power
Metlakatla Power & Light
Middle Kuskokwim Electric Co-op
Naknek Electric Association
Nome Joint Utility System
North Slope Borough
Nushagak Cooperative
OTZ Telephone Cooperative
Southeast Alaska Power Agency
Tanalian Electric Cooperative
Tanana Power Company
TDX Power
Unalakleet Valley Electric Co-op
Yakutat Power

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Juneau office
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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging Continued Federal Support of the Denali Commission
(14-16)

The Denali Commission was established by Congress in 1998 with the express mission of building essential safe, code-compliant infrastructure in rural Alaska.

Since inception, the commission has been the primary investor in critical infrastructure such as health clinics, power generation facilities and bulk fuel tank farms in numerous rural Alaskan communities, but tens of thousands of Alaskans are still without rudimentary health services or code-compliant energy facilities.

The work of the Denali Commission is far from complete, yet the federal administration and Congress have reduced funding for the commission by more than three quarters in recent years.

As citizens of the United States of America, rural Alaskans must be assured a reliable and affordable provision of electric service and heating fuel.

Alaska Power Association urges the federal administration and Congress to restore funding to the Denali Commission so that they can continue their life-saving mission of providing essential safe, code-compliant infrastructure to the rural residents of Alaska.

(Adopted Dec. 2009; updated Dec. 2010; updated Dec. 2012)

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ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging Support for the USDA Rural Utilities Service High Energy Cost Grant Program (14-17)

The USDA Rural Utilities Service High Energy Cost Grant Program provides grants for rural communities with extremely high energy costs (where the average residential expenditure for home energy is at least 275 percent of the national average) to acquire, construct, extend, upgrade, and otherwise improve energy generation, transmission, or distribution facilities.

The High Energy Cost Grant Program was authorized by Congress in the 2000 Rural Electrification Act because it covered a gap in programs that desperately needed to be filled. The funds are dispersed via a national competitive process.

The program was funded at $30 million in FY 2003. Since then, annual funding has decreased dramatically and funding for the next fiscal year is in jeopardy. Reducing the program will not only constrain economic activity in rural areas but also worsen the nation's overall economy and unemployment, and contribute to unaffordable energy costs in rural areas where the per capita income is already the lowest in the country. Furthermore, an enormous amount of work remains to be done in Alaska to bring rural power plants up to acceptable national standards.

Alaska Power Association urges Congress and the federal Administration to restore funding for the USDA High Energy Cost Grant Program to $30 million.

(Adopted Dec. 2009; updated Dec. 2010; updated Dec. 2011; updated Dec. 2012)

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LAWS OF ALASKA

2012

Source
SCS CSHB 250(FIN)

Chapter No.
_____

AN ACT

Relating to the renewable energy grant fund and recommendation program; and providing for an effective date.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

THE ACT FOLLOWS ON PAGE 1

AN ACT

Relating to the renewable energy grant fund and recommendation program; and providing for an effective date.

---

* **Section 1.** The uncodified law of the State of Alaska is amended by adding a new section to read:

LEGISLATIVE INTENT. It is the intent of the legislature that, each fiscal year for the next 10 fiscal years, $50,000,000 be appropriated to the renewable energy grant fund for projects recommended by the Alaska Energy Authority under AS 42.45.045.

* **Sec. 2.** AS 42.45.045(i) is amended to read:

(i) An advisory committee is established and consists of **nine** [SEVEN] members, appointed as follows:

(1) five members shall be appointed by the governor to staggered three-year terms, with one representative to be appointed from each of the following groups:

(A) small Alaska rural electric utilities;

(B) large Alaska urban electric utilities;

(C) Alaska Native organizations;

(D) businesses or organizations engaged in the renewable energy sector; and

(E) the Denali Commission established under P.L. 105-277, 42 U.S.C. 3121 note;

(2) **two members** [ONE MEMBER] of the house of representatives shall be appointed by the speaker of the house of representatives; and

(3) **two members** [ONE MEMBER] of the senate shall be appointed by the president of the senate.

* **Sec. 3.** Section 5, ch. 31, SLA 2008, is amended to read:

Sec. 5. AS 42.45.045 is repealed June 30, **2023** [2013].

* **Sec. 4.** This Act takes effect immediately under AS 01.10.070(c).

Emerging Energy Technology Fund
Round 1 Project Status Updates

The Alaska State Legislature created the Emerging Energy Technology Fund (EETF) in 2010 to promote the expansion of energy sources available to Alaskans. EETF grants are for demonstration projects of technologies that have a reasonable expectation of becoming commercially viable within five years. Projects can either:

- Test emerging energy technologies or methods of conserving energy
- Improve an existing technology
- Deploy an existing technology that has not previously been demonstrated in the state

For the EETF, energy technology is defined as technology that promotes, enhances, or expands the diversity of available energy supply sources or means of transmission, increases energy efficiency, or reduces negative energy-related environmental effects. Energy technology can include technologies related to renewable sources of energy, conservation of energy, enabling technologies, efficient and effective use of hydrocarbons and integrated systems.

The following fifteen projects have begun work on EETF demonstration projects. A sixteenth project selected for funding was cancelled before a grant was issued.

Project	EETF Award	Committed Match
Biomass Reforestation for Boreal Forests	$ 45,000	$ 45,000
Arctic Thermal Shutters & Doors	$ 136,000	$ 34,000
Ultra-Efficient Generators and Diesel-Electric Propulsion	$ 247,036	$ 302,317
Cold Climate Heat Pump Demonstration	$ 119,467	$ 24,311
Enhanced Condensation for Organic Rankine Cycle	$ 166,044	$ 30,168
Safe and Efficient Exhaust Thimble	$ 87,889	$ 5,793
High Capacity Airborne Wind Turbine	$ 740,115	$ 620,010
Oceana In-Stream Hydrokinetic Device Evaluation	$ 1,230,945	$ 620,000
RivGen Power System Commercialization Project	$ 1,491,750	$ 379,889
Application of Composite Flywheels	$ 672,500	$ 517,000
Small Community Self-Regulating Grid	$ 465,634	$ 20,000
Wind-Diesel Battery Hybrid for Kwigillingok	$ 1,025,750	$ 30,000
BRI Cyclo-Turbine Energy Production	$ 728,630	$ 141,360
High Efficiency Diesel Electric Generator Set	$ 677,508	$ 75,278
Arctic Field Testing of the Eocycle 25/12 Wind Turbine	$ 293,300	$ 55,000

Arctic Field Testing of the Eocycle EO-25/12 Wind Turbine

Project Lead: Northwest Arctic Borough **Award Amount: $293,300**

Location: Kotzebue **Match Committed: $55,000**

The Northwest Arctic Borough is demonstrating the cold weather capabilities of a 25 kW wind turbine at the Kotzebue wind farm. The turbine is mounted on a tilt-up monopole tower that uses a winch to raise and lower the unit during installation and for maintenance, eliminating the need for a crane.

Year 1 Progress

The turbine and tilt-up tower arrived at Kotzebue on the last barge of the year. The project team was able to take advantage of an existing unused tower foundation; the tower and turbine are now fully assembled and mounted. The turbine is currently in the final stages of commissioning.



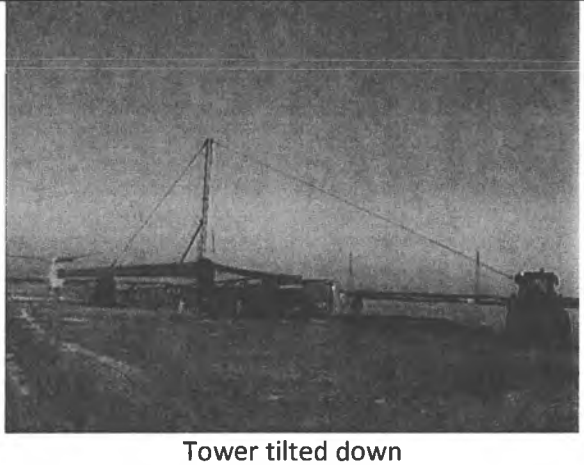
Assembling the tower



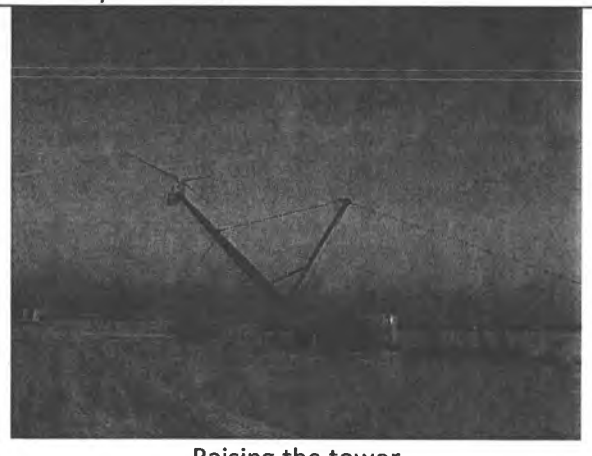
Installing turbine blades

What's Next

After the turbine has been fully commissioned, performance data will be collected for one year. A fully instrumented meteorological tower will be installed within five rotor-lengths of the tower to collect baseline wind data as the turbine generates electricity.



Tower tilted down



Raising the tower

Photos from Northwest Arctic Borough and Kotzebue Electric Association.

Ultra-Efficient Generators & Diesel Electric Propulsion

Project Lead: Genesis Machining & Fabrication **Award Amount: $247,036**

Location: Kodiak **Match Committed: $302,317**

Genesis Machining and Fabrication is demonstrating its two core technologies, the Power Dense Motor and Universal Modular Inverter Controller, for use in both stationary power generation and propulsion applications. The technologies are being concurrently developed and demonstrated in stages using prototypes of increasing in size and capacity that will be used to power electric vehicles and gensets of varying sizes.

Year 1 Progress

In the first year, the team demonstrated the functionality of the inverter in an electric vehicle testbed which has logged over 1,000 Kodiak road miles. A proof-of-concept 15 kW load matching genset which delivers power via the inverter was also built and demonstrated. Now that functionality has been confirmed, next efforts will focus on documenting the efficiency of the systems.



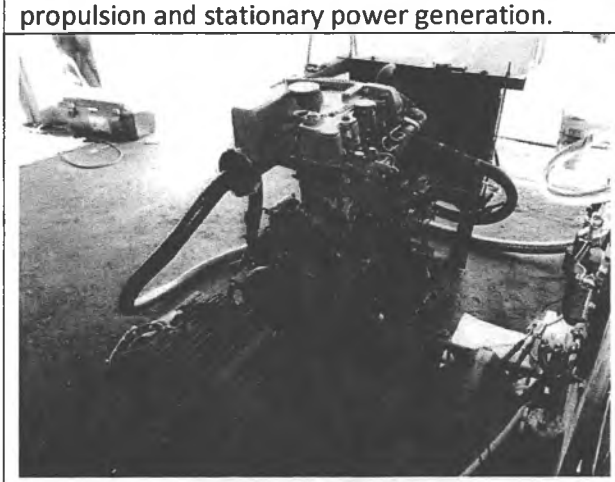
Converted '97 Eagle Talon EV testbed



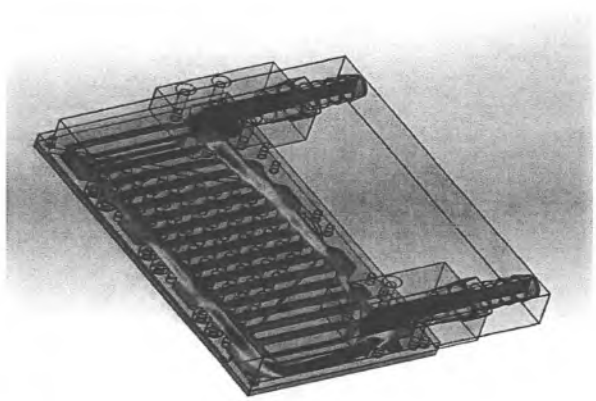
Monitoring performance in the EV testbed

What's Next

In the second year of the project, the team will focus on efficiency testing and demonstrate the next prototype iteration in a Diesel-Electric bus testbed. The testbed will house a 150 kW genset and employ both the Power Dense Motor and Universal Modular Inverter Controller technologies for propulsion and stationary power generation.



Modified 15 kW genset



Designing the controller heat sink

Photos from Genesis Machining and Fabrication.

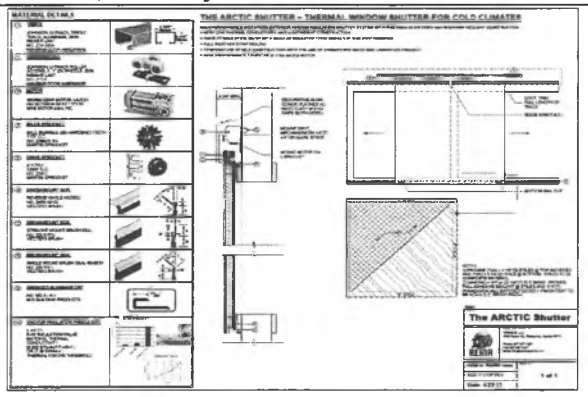
Arctic Thermal Shutters & Doors

Project Lead: Arctic Sun, LLC **Award Amount: $136,000**
Location: Fairbanks **Match Committed: $34,000**

Arctic Sun, LLC is demonstrating energy efficiency improvements of homes in colder climates using arctic doors, arctic shutters and blown-in insulation shutters. Maintaining climate control in arctic high-efficiency housing has been challenging because of high condensation on doors and windows. The technological improvements proposed by Arctic Sun include improving R-values in the arctic doors; creating exterior arctic shutters that are controlled by an electric drive and use air-tight weather stripping; and shutters for retrofitted fixed-pane windows that can be automatically filled and emptied with insulating beads.

Year 1 Progress

In the first year, the project team completed design, component selection, and prototype construction of the arctic door and two shutter types. A fully instrumented dedicated testing structure was also designed and constructed into which the technology components will be installed and monitored. Collection of baseline data for the test box has begun in advance of installation of the shutters and doors. For the blown-in shutter cavity, solid extruded polystyrene (EPS) beads were selected as the fill material, and subjected to ultra-violet resistance testing over the course of the summer.



Arctic shutter design



Testing box under construction

What's Next

The second year of the project will be devoted to installation of the technology types in the test box and into actual residences and collection of performance data. The units will be installed and tested individually in the testing box.



UV stability test of the EPS beads



Testing the blown-in shutter

Photos from Arctic Sun, LLC.

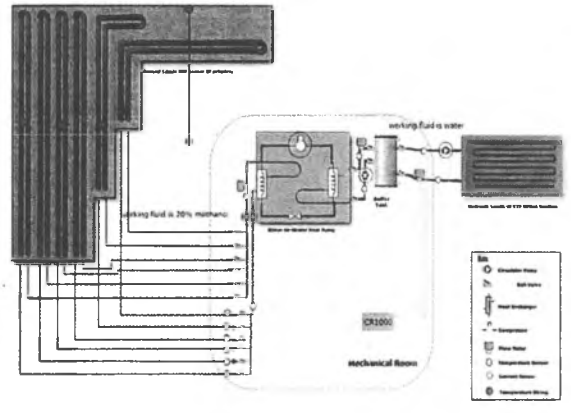
Cold Climate Heat Pump Demonstration

Project Lead: Cold Climate Housing Research Center **Award Amount: $119,467**
Location: Fairbanks **Match Committed: $24,311**

The Cold Climate Housing Research Center (CCHRC) is demonstrating the potential for ground source heat pumps (GSHPs) as an efficient and economic heat source in colder climates. This project will install a GSHP at the Cold Climate Housing Research Center's research and testing facility in Fairbanks in a narrow band of thawed ground. Several different surface treatments will be modeled and tested to maximize surface heat capture during summer months and to prevent winter heat loss.

Year 1 Progress

The horizontal loop field was installed and buried along with a network of thermcouples at varying depths. The heat pump unit was then installed and fully comissioned. Different surface treatments have been installed above selected areas of the ground loop including several gravel types and grass; a fence has been installed around the area to minimize snow compaction and maximize wintertime insulation.



System layout



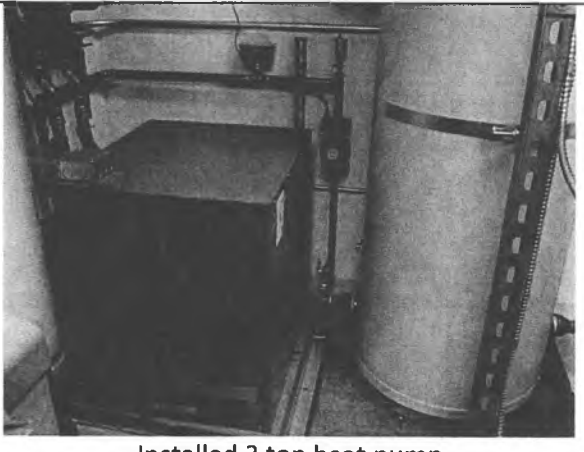
Digging the trench for the coil

What's Next

With installation complete, the remainder of the project will consist of data collection of the system's performance, monitoring the loop field for thermal degradation, and comparison of the effect of the different surface treatments on the thermal health of the loop field.



Installation of the slinky loop



Installed 3 ton heat pump

Photos from Cold Climate Housing Research Center.

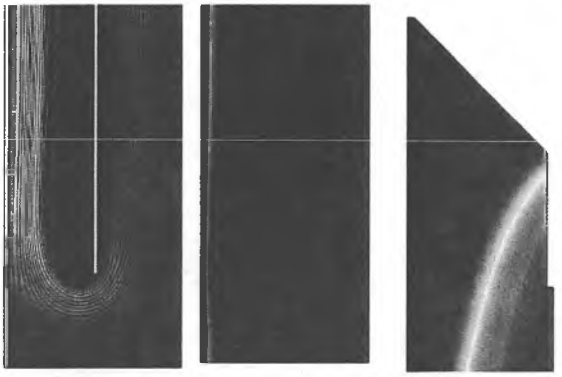
Safe and Efficient Exhaust Thimble

Project Lead: UAF - Institute of Northern Engineering **Award Amount: $87,889**
Location: Fairbanks **Match Committed: $5,793**

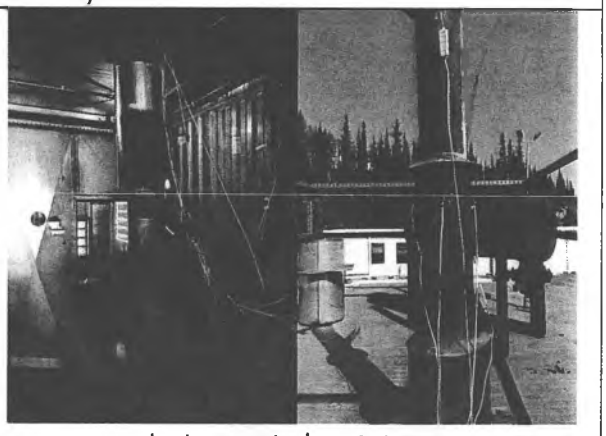
The Institute of Northern Engineering is demonstrating a new design of ventilated exhaust thimbles for wood stoves, oil-fired furnaces, diesel generators and other high-temperature exhaust-generating sources. Stove thimbles prevent wood framing from igniting from the hot exhaust as it passes through the chimney. In this project, the traditional thimble will be replaced with one that relies on thermal siphoning for passive cooling. The new design eliminates heat loss that accompanies traditional thimbles by maintaining integrity of the building's envelop.

Year 1 Progress

The project team has completed final design and computational fluid dynamics modeling of the exhaust thimble, modified a conex container for testing, and constructed prototypes of varying sizes. Testing of the smallest, 2-inch diameter thimble is underway.



Modelled airflow and temperature distribution



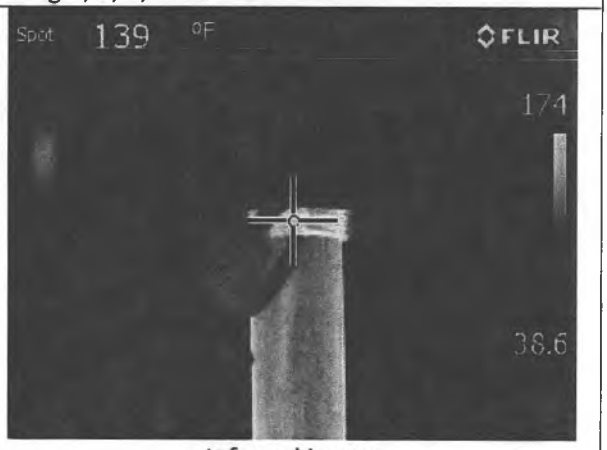
Instrumented prototype

What's Next

The project team will continue testing with the remaining 4, 6, 8, and 10 inch thimble sizes.



Thimble in operation



Infrared image

Images from UAF. Photo credit Stephen Gemmel.

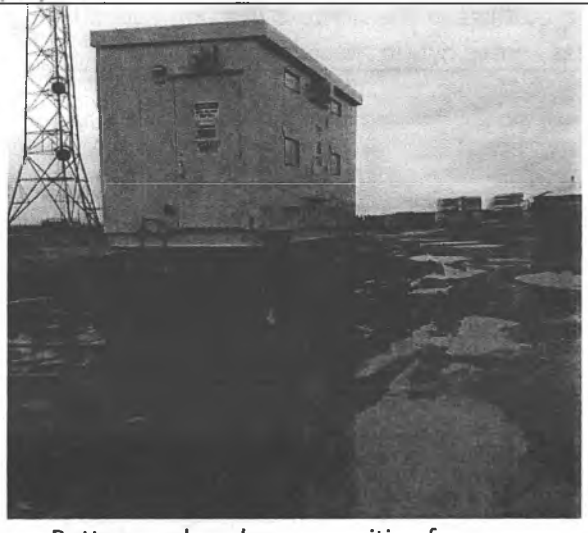
Wind-Diesel Battery Hybrid for Kwigillingok

Project Lead: Intelligent Energy Systems **Award Amount: $1,025,750**
Location: Kwigillingok **Match Committed: $30,000**

Intelligent Energy Systems is demonstrating the use of high-performance lithium ion batteries, similar to those found in some electric vehicles, to provide short-term energy storage in Kwigillingok's wind-diesel electrical system.

Year 1 Progress

After a comparison of batteries from several well-known manufacturers, a lithium ion battery was selected and procured from LG Chem and delivered to Anchorage. After acceptance testing, the battery was barged to Kwigillingok. The unit was successfully unloaded from the barge, but an abnormally warm winter delayed freeze-up, and transport to the installation site was impossible across the muddy terrain. Severe storms also contributed to the poor conditions, bringing other projects in the area to a stop.



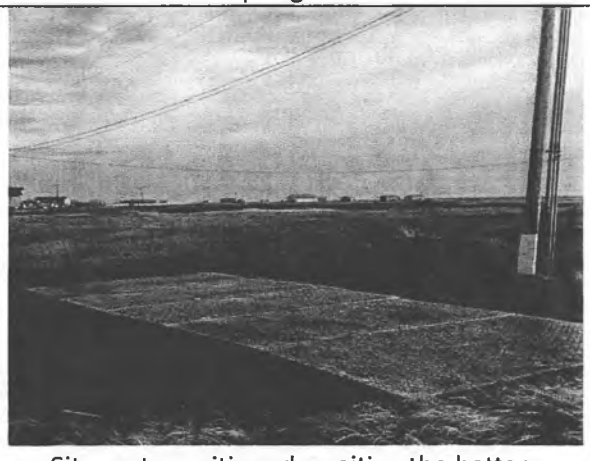
Battery and enclosure awaiting freeze up



Early winter storm aftermath

What's Next

While commissioning was delayed due to site conditions, LG Chem approached the project team with an offer to replace the battery at no cost with a newer model capable of faster charging and able to deliver a higher number of both short and deep cycles. The new battery will be flown in and commissioned this spring.



Site mats positioned awaiting the battery



Counterpoise installation

Photos from Intelligent Energy Systems.

Biomass Reforestation of Boreal Forests

Project Lead: Alaska Division of Forestry **Award Amount: $45,000**
Location: Palmer and Delta **Match Committed: $45,000**

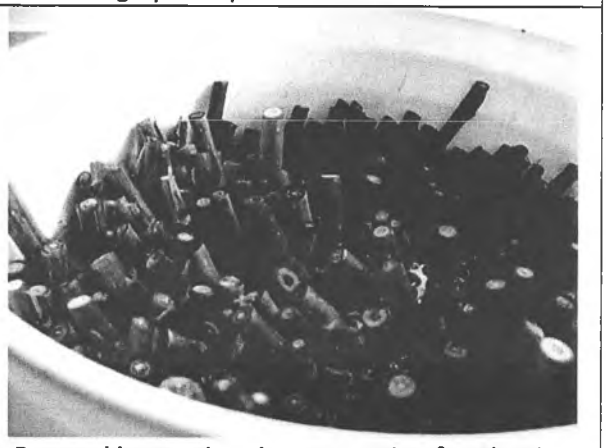
The Alaska Division of Forestry is demonstrating a low cost planting technique intended for forest regeneration after a biomass harvest that uses un-rooted poplar tree stem-cuttings. Although less energy-dense than other biomass fuel stocks, poplars have much faster growth rates. The technique involves the wintertime collection of branch cuttings that are stored and then planted as stems after snowmelt. Stooling beds will also be planted to facilitate future stem harvests of species that are found to thrive over the course of the project.

Year 1 Progress

The project team harvested cuttings during the winter of 2013 which then underwent a pre-soak treatment in advance of planting in the late spring at sites in the Matanuska-Susitna Valley and near Delta. Unfortunately, abnormally hot and dry conditions during the summer of 2013 resulted in a very high mortality rate of the planted cuttings. However, cuttings at the wettest site fared significantly better, and the project team noted higher survival rates among hybrid species.



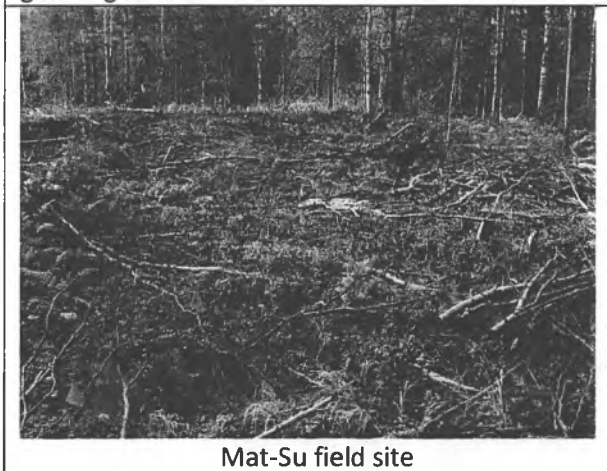
Winter poplar cuttings



Pre-soaking cuttings in preparation for planting

What's Next

In the second year of the project, the team will focus on more drought resistant varieties for a second round of planting, both at the Delta and Palmer sites and also at a rural village site that currently harvests for biomass. All plantations will be evaluated for growth at the end of the 2014 and 2015 growing seasons.



Mat-Su field site



First year poplar growth

Photos from AK Division of Forestry.

BRI Cyclo-Turbine Energy Production

Project Lead: Boschma Research, Inc. **Award Amount: $728,630**
Location: Igiugig **Match Committed: $141,360**

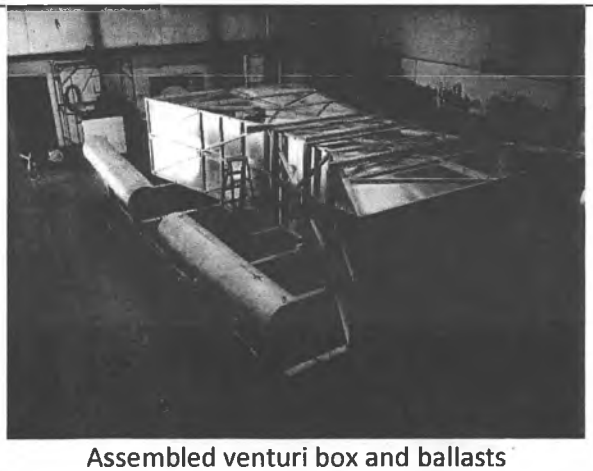
Boschma Research, Inc. (BRI) plans to demonstrate a 5 kW River In-Stream Energy Conversion (RISEC) device in the Kvichak River at Igiugig. The cycloidal turbine is housed within an open-ended venturi enclosure with a fish/debris guard at the entrance. Intended to be mounted on the river bottom in shallow water, the device's frame uses buoyancy chambers for river transport which are filled with water to submerge the device to its final position.

Year 1 Progress

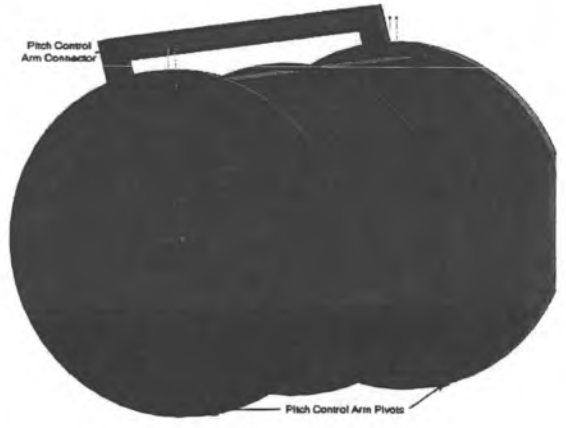
BRI has fabricated and assembled components that make up the venturi support box and mechanical components of the turbine assembly, and conducted an initial deployment and retrieval test in shallow water.

What's Next

Prior to shipping the device to Igiugig, the project team will demonstrate complete deployment, operation, and retrieval of the device in the Tennessee River. Deployment in the Kvichak River is scheduled for the summer of 2014.



Assembled venturi box and ballasts



Turbine assembly sketch

Photos from Boschma Research, Inc.

Application of Composite Flywheels

Project Lead: Hatch
Location: Fairbanks

Hatch is demonstrating a high-efficiency and lightweight flywheel which could be used to provide grid stability in wind-diesel systems.

Year 1 Progress

One month's worth of high resolution baseline data has been collected at Nome's wind-diesel system which will be used to assist in modelling and controller programming. The project team is identifying and procuring components that will be used to lab-test the flywheel.

What's Next

The unit will be extensively tested at UAF's Power Systems lab prior to deployment in a village.

RivGen Power System Commercialization Project	
Project Lead: ORPC Alaska, LLC	**Award Amount: $1,491,750**
Location: Nikiski, Igiugig	**Match Committed: $379,889**

ORPC proposes to demonstrate the RivGen hydrokinetic device, a river bottom-mounted River In-Stream Energy Conversion (RISEC) device. The device will be mounted on a redesigned pontoon support structure, which consists of a mounting frame which rests on buoyancy chambers which can be filled and emptied of air for controlled submerging during deployment and floatation during retrieval.

Year 1 Progress

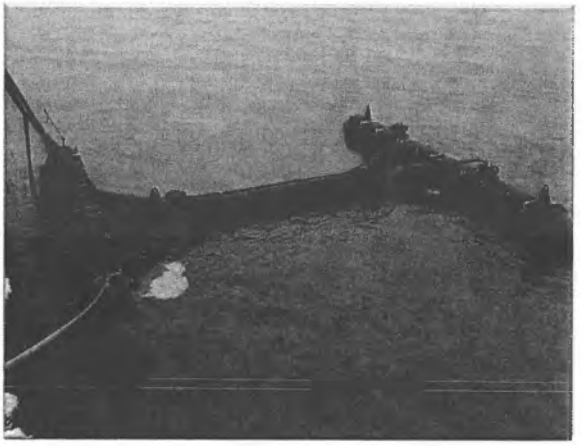
ORPC has refursbished and dry-tested its first generation RivGen prototype and completed modeling and redesign of the support structure (shown below prioir to redesign) that will be used to deploy and retrieve the turbine.

What's Next

The project team will complete construction of the Pontoon Support Structure; deployment and retrieval of the structure will be tested in Cook Inlet in the spring of 2014 where incoming tides will provide a river like environment with the benefit of a slack tide for troubleshooting. When deployment and retrieval has been successfully demonstrated, the entire unit will be shipped for deployment and operation in the Kvichak River.



RivGen unit being refurbished



Early testing of the 1st gen support structure

Photos from ORPC.

High Efficiency Diesel Electric Generator Set	
Project Lead: Marsh Creek, LLC	**Award Amount: $677,508**
Location: Anchorage, Fairbanks	**Match Committed: $75,278**

Marsh Creek is demonstrating the use of a permanent magnet "soft clutch" coupling in a diesel genset to facilitate engine operation at speeds of both 1200 and 1800 rpm. Operating at a lower rotational speed when power demand is low could significantly increase fuel efficiency.

Year 1 Progress

The project team has modelled performance, designed the test system, and established plans for testing at different speeds and loads.

What's Next

After baseline testing, the team will conduct a battery of tests in their Anchorage facility to characterize the modified system. The unit will then be sent for performance validation test at the UAF's Power Systems Integration lab.

Enhanced Condensation for Organic Rankine Cycle

Project Lead: UAF - Institute of Northern Engineering **Award Amount: $166,044**
Location: Fairbanks **Match Committed: $30,168**

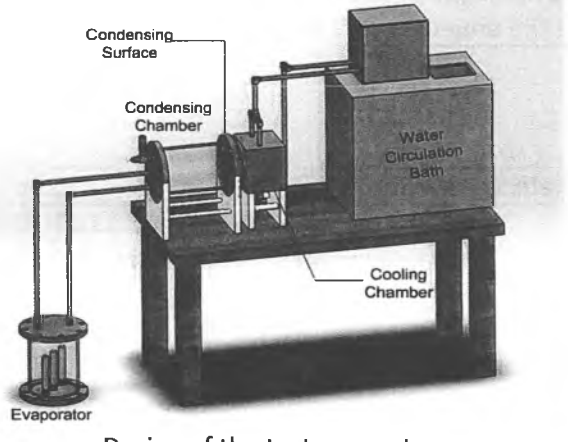
The Institute of Northern Engineering seeks to demonstrate a technology that could improve the efficiency of Organic Rankine Cycle (ORC) systems by increasing the heat transfer rate of the condenser. A hydrophobic coating will be patterned onto the condenser to create a heterogeneous surface, reducing film formation on the condensing surface.

Year 1 Progress

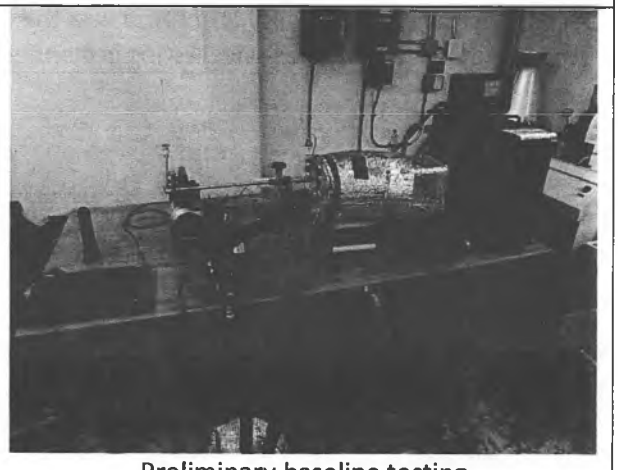
The project team has completed design and construction of a testing apparatus that will be used to measure the efficacy of the hydrophobic coating that will be applied to give the condenser a heterogeneous surface. Instrumentation calibration and preliminary baseline testing of the apparatus has begun.

What's Next

When instrumentation has been calibrated and baseline data collection completed, the effect of different hydrophobic coatings on heat transfer coefficient will be demonstrated.



Design of the test apparatus



Preliminary baseline testing

Photos from the Institute of Northern Engineering.

Small Community Self-Regulating Grid

Project Lead: Intelligent Energy Systems **Award Amount: $465,634**
Location: Tuntutuliak **Match Committed: $20,000**

Intelligent Energy Systems (IES) is demonstrating a method of electrical grid stabilization using an advanced control system with ceramic electrical heating units. A distributed network of Steffes heaters in the community will be equipped with modified controllers that respond individually to grid frequency, providing grid stability during times of high wind penetration rates.

Year 1 Progress

A modified controller has been independently tested and the team is preparing for field installations.

What's Next

Approximately 30 units will be retrofitted with the new controller and tested during 2014.

High Capacity Airborne Wind Turbine
Project Lead: Altaeros Energies, Inc. **Award Amount: $740,115** **Location: Fairbanks** **Match Committed: $620,010** Altaeros Energies, Inc. proposes to demonstrate a 30 kilowatt (kW) wind turbine suspended 1,000 feet above ground in a helium-filled shell. The project seeks to take advantage of higher and more consistent wind speeds and to demonstrate an improved capacity factor relative to tower-mounted wind turbines. By tethering to a portable trailer, a substantial decrease in installed capital costs is expected. Altaeros plans to commercialize both 30 and 100 kW models.
Year 1 Progress Altaeros has identified candidate sites throughout Alaska, visited a selection of sites, and tentatively selected the Eva Creek wind farm as the deployment site. In Maine, construction and testing of a half-scale prototype has progressed in advance of full-scale construction.
What's Next Permitting from FAA is the critical next step for the project. The agency has been drafting policy regarding airborne wind energy system deployment, and extended testing of any system cannot be permitted until the new policy is entered into the Federal Register. Meanwhile, deployment, retrieval, and limited operational testing is planned at the project team's Maine facility.

Oceana In-Stream Hydrokinetic Device Evaluation
Project Lead: Oceana Energy Company **Award Amount: $1,230,945** **Location: Nenana** **Match Committed: $620,000** The Oceana Energy Company is demonstrating a barge-mounted River In-Stream Energy Conversion (RISEC) device in the Tanana River. Originally intended for tidal power applications, the demonstration will verify performance under harsh the conditions typical of Alaska rivers. The turbine uses an open ring design, with blades located on both the inside and outside of the structural ring.
Year 1 Progress After a delayed start, the project team is finishing a redesign of the first generation protoype (built and tested prior to this project) and has begun procurement and assembly of some components.
What's Next Assembly of the redesigned unit will occur in the remaining winter and spring months, with testing scheduled in May and June using a tow carriage in the Carderock David Taylor Model Basin in Maryland. After initial testing, the device will be shipped to Nenana for testing at UAF's hydrokinetic test bed in the Tanana River.

Prepared by Alaska Energy Authority on 2/24/2014

Emerging Energy Technology Fund Grants

As of December 31, 2013

Award No.	Project No.	Grantee Name	Grant Title	Grant Budget	Grant Expenditures	Grant Encumbrances	Remaining Balance
7310003	413002	Alaska Division of Forestry	Biomass Reforestation for Boreal Forests	$45,000.00	$18,251.99	$26,748.01	$0.00
7310006	413003	Arctic Sun, LLC	Arctic Thermal Shutters and Doors	$136,000.00	$45,000.00	$91,000.00	$0.00
7310009	413004	Genesis Machining and Fabrication	Ultra-Efficient Generator and Diesel-Electric Propulsion	$247,036.00	$57,406.65	$189,629.35	$0.00
7310026	413005	Cold Climate Housing Research Center	Cold Climate Heat Pump Demonstration	$119,467.00	$66,395.25	$53,071.75	$0.00
7310028	413006	UAF- Institute of the Northern Engineering	Enhanced Condensation for Organic Rankine Cycle	$166,044.00	$48,564.55	$117,479.45	$0.00
7310029	413007	UAF Institute of Northern Engineering	Safe and Efficient Exhaust Thimble	$87,889.00	$5,771.40	$82,117.60	$0.00
7310035	413008	Altaeros Energies, Inc.	High Capacity Airborne Wind Turbine	$740,115.00	$149,685.00	$590,430.00	$0.00
7310037	413009	Oceana Energy Company	Oceana In-Stream Hydrokinetic Device Evaluation	$1,230,945.00	$0.00	$1,230,945.00	$0.00
7310043	413010	ORPC Alaska, LLC	RivGen Power System Commercialization Project	$1,491,750.00	$379,676.25	$1,112,073.75	$0.00
7310045	413016	Hatch	Application of Composite Flywheels	$672,500.00	$126,252.00	$546,248.00	$0.00
7310049	413011	Intelligent Energy Systems	Small Community Self-Regulating Grid	$465,634.00	$155,783.17	$309,850.83	$0.00
7310051	413012	Intelligent Energy Systems	Wind-Diesel Battery Hybrid for Kwigillingok	$1,025,750.00	$475,500.00	$550,250.00	$0.00
7310058	413013	Boschma Research, Inc	BRI Cylo-Turbine Energy Production	$728,630.00	$387,281.00	$341,349.00	$0.00
7310061	413014	Marsh Creek, LLC	High Efficiency Diesel Electric Generator Set	$677,508.00	$116,292.50	$561,215.50	$0.00
7310071	413015	Northwest Arctic Borough	Arctic Field Testing of the Eocycle EO-25/12 Wind Turbine	$293,300.00	$171,061.50	$122,238.50	$0.00
				$8,127,568.00	**$2,202,921.26**	**$5,924,646.74**	**$0.00**

RECAP:	
Fund Capitalization-Round 1	$8,900,000.00
Grant Budgets	-$8,127,568.00
Remaining Balance	$772,432.00
Less DC Award for Data Collection - Round 2	-$345,000.00
Fund Capitalization-Round 2	$2,000,000.00
Total Available for Grants	**$2,427,432.00** *

* DC funds in the amount of $10,839 remain uncommitted for Round 1. State funds of $2,416,593 are available for Round 2 grants.

03/03/14 Presentation: Merged Energy Solutions – Multi-Industrial Greenhouse Facility, and Transforming Alaska

<TARGET><BILL></BILL><SUBJECT>03-03-14 Presentation Merged Energy Solutions - Multi- Industrial Greenhouse Facility, and Transforming Alaska</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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

Rep. Doug Isaacson
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Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.gov

AGENDA

State Capitol Building, Room 124
Juneau, Alaska

Monday, March 3, 2014, 8:00 a.m. – 10:00 a.m.

Joint hearing with the House Special Committee on Economic Development, Trade and Tourism.

\+ Michael Smith, *CEO, Merged Energy Solutions (teleconference)*
Kurtis Zell, *Development Coordinator (teleconference)*
"Multi-Industrial Greenhouse Facility" and "Transforming Alaska"

If you or your staff has any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov) or Jeff Turner at (907) 465-6588 (jeff.turner@akleg.gov).

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Merged Energy Solutions
Multi-Industrial Greenhouse Facility

Vision and Mission

MES Vision

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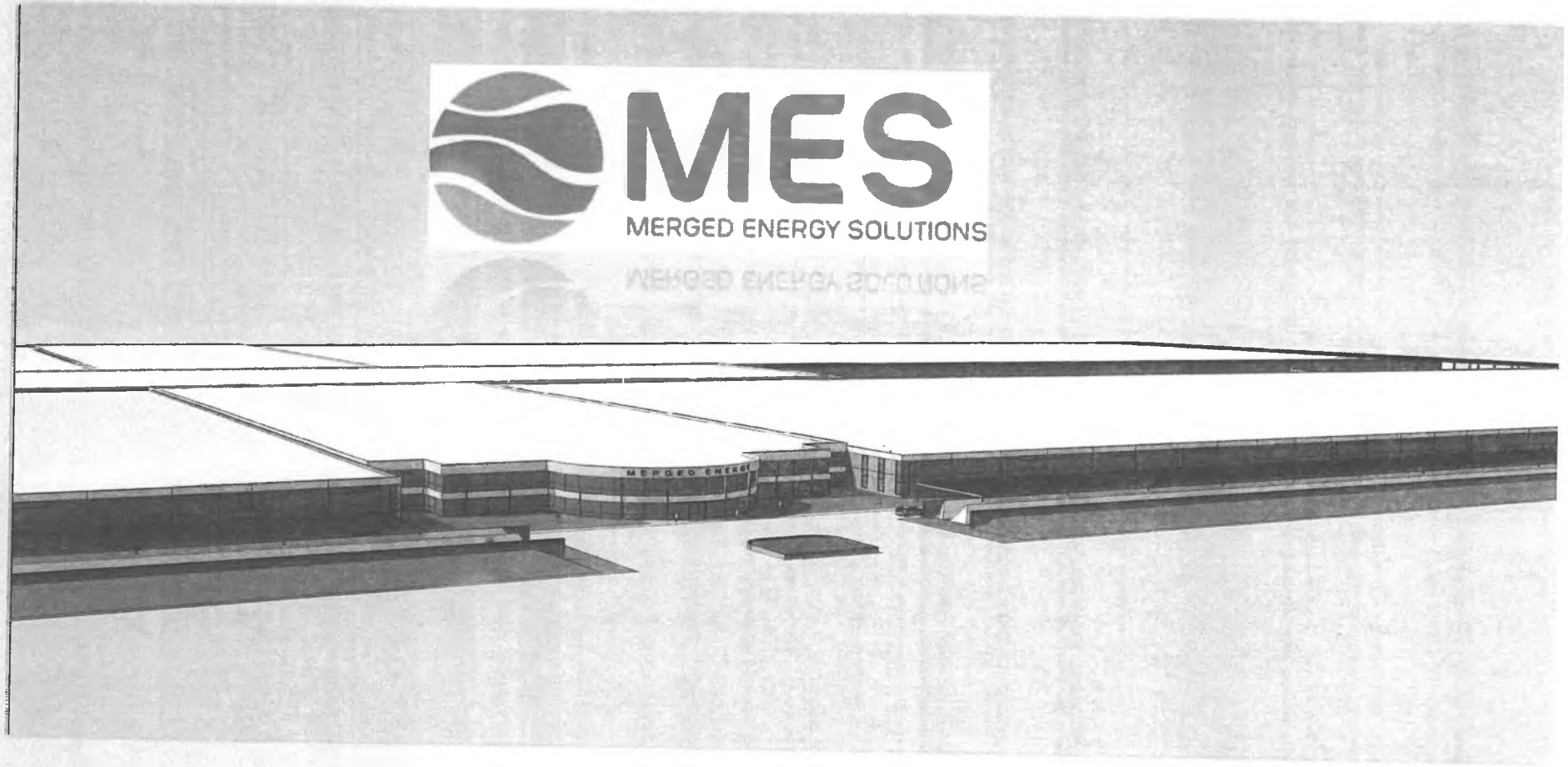
Generating tomorrows growth today

Mission Statement



Our mission is to **renew** and **build** a **sustainable** Earth by **empowering** and **educating** people throughout the world. We **collaborate** with **nature**, **technology**, and people to create sustainable **energy** and **food**. We realize our vision by committing **cutting-edge** technology, building **state-of-the-art** clean energy and agriculture projects, and **investing** in the **education**, **health**, and **well being** of **people** throughout the **world**.

Multi Industrial Greenhouse (MIG)

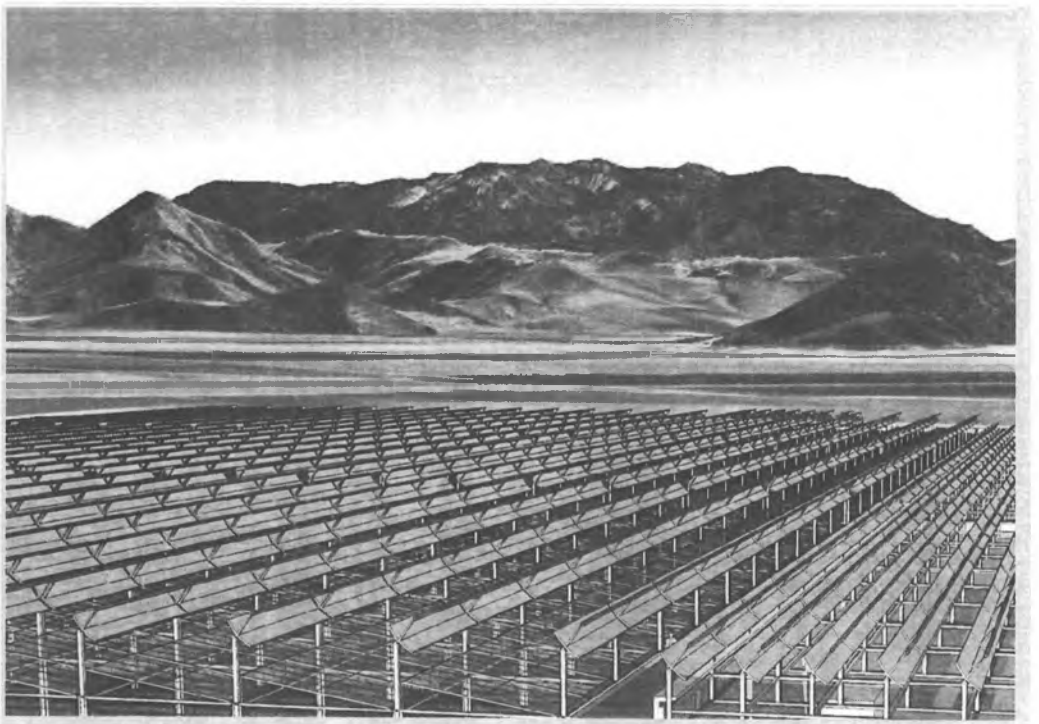


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Multi Industrial Greenhouse (MIG)

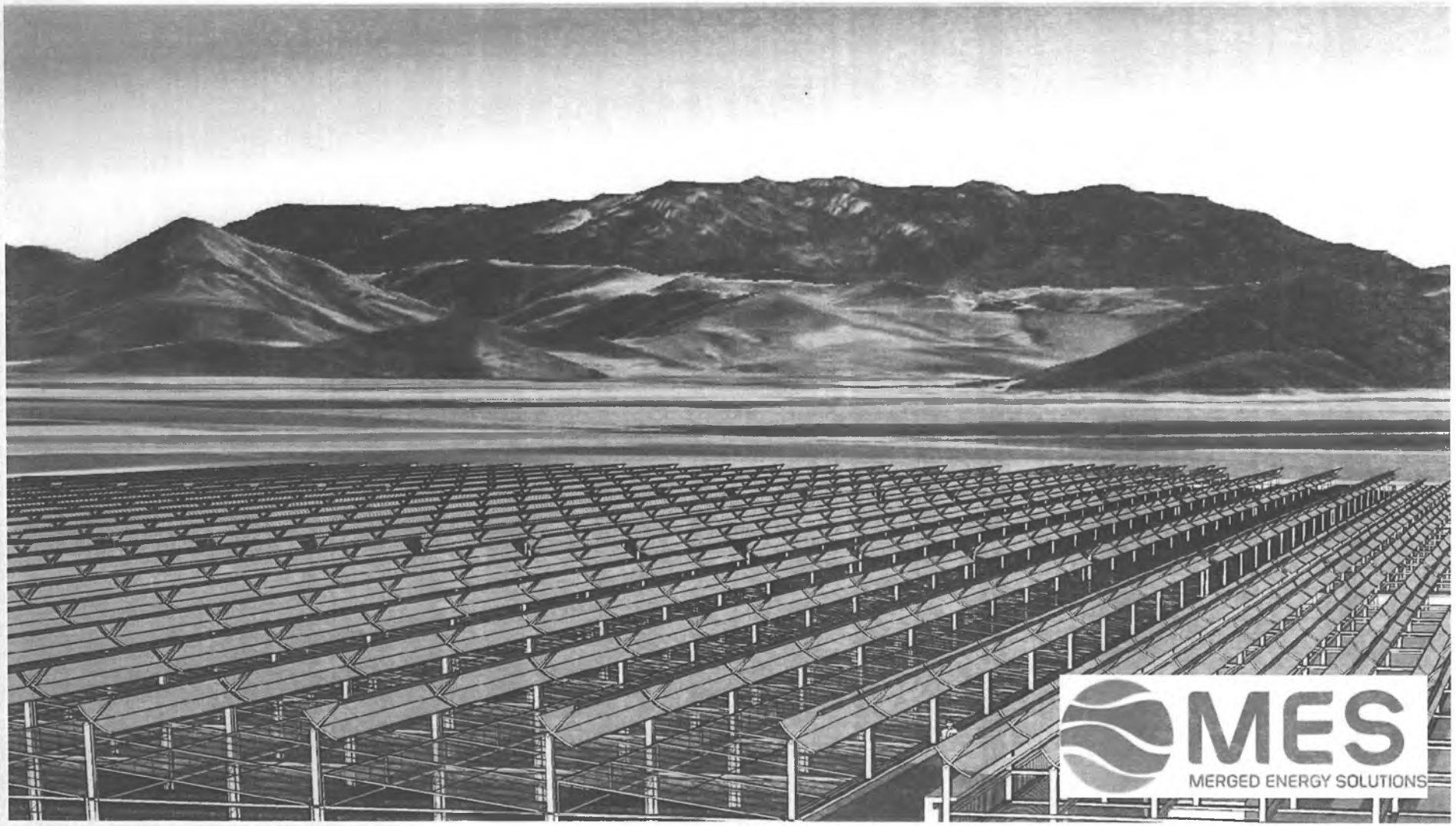
Components

- Concentrating Solar Thermal
- Advanced Biomass Gasification (ABG)
- Geo Thermal
- High-Density Vertical Farm
- Aquaculture
- Water Desalination & Purification
- Academy of Advanced Technical Science



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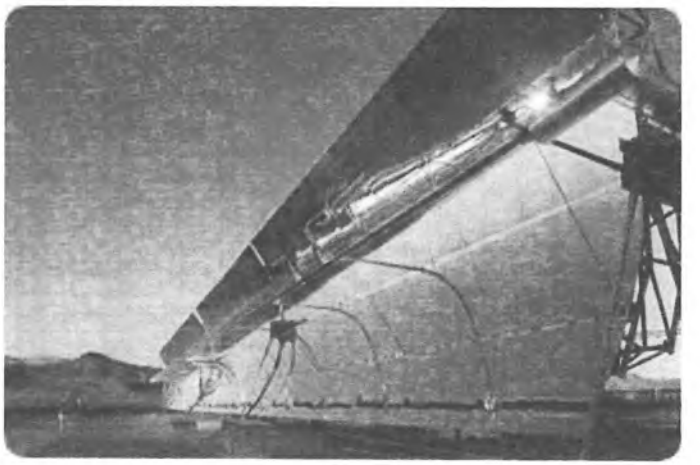
Concentrating Solar Thermal



Why Concentrating Solar Thermal?

The Process

A Concentrating Solar Thermal Roof **(CSTR)** produces electric power by converting the sun's energy into high-temperature heat, which is then channeled through a conventional generator.



Efficiency

The CSTR is one of the most efficient and dependable producers of solar energy available today. The CSTR is rated at **34-38% efficiency** in terms of translating the direct solar energy to electricity and has a useful life of 50 years.

Heating & Cooling

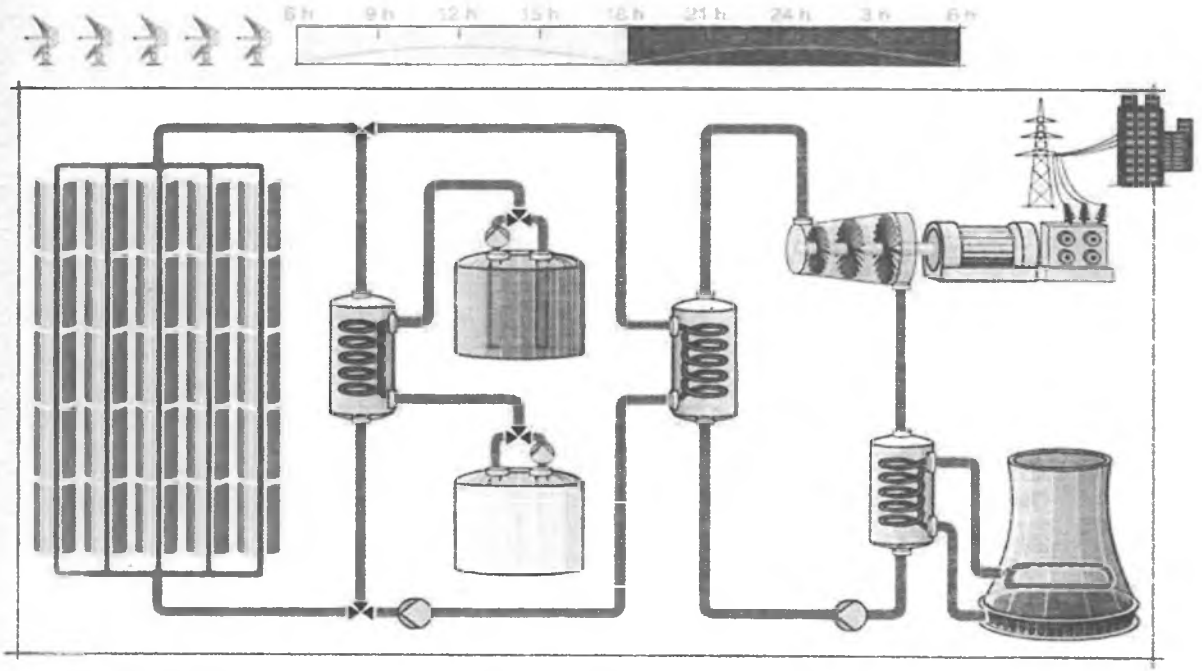
The thermal energy can also be used directly for heating and cooling purposes; running it to absorption chillers for cooling and a heat exchanger for heating.

Energy Storage Capability

Trough designs can incorporate thermal storage—setting aside the heat transfer fluid in its hot phase—allowing for electricity generation several hours into the evening.

Concentrating Solar Thermal

How it Works…



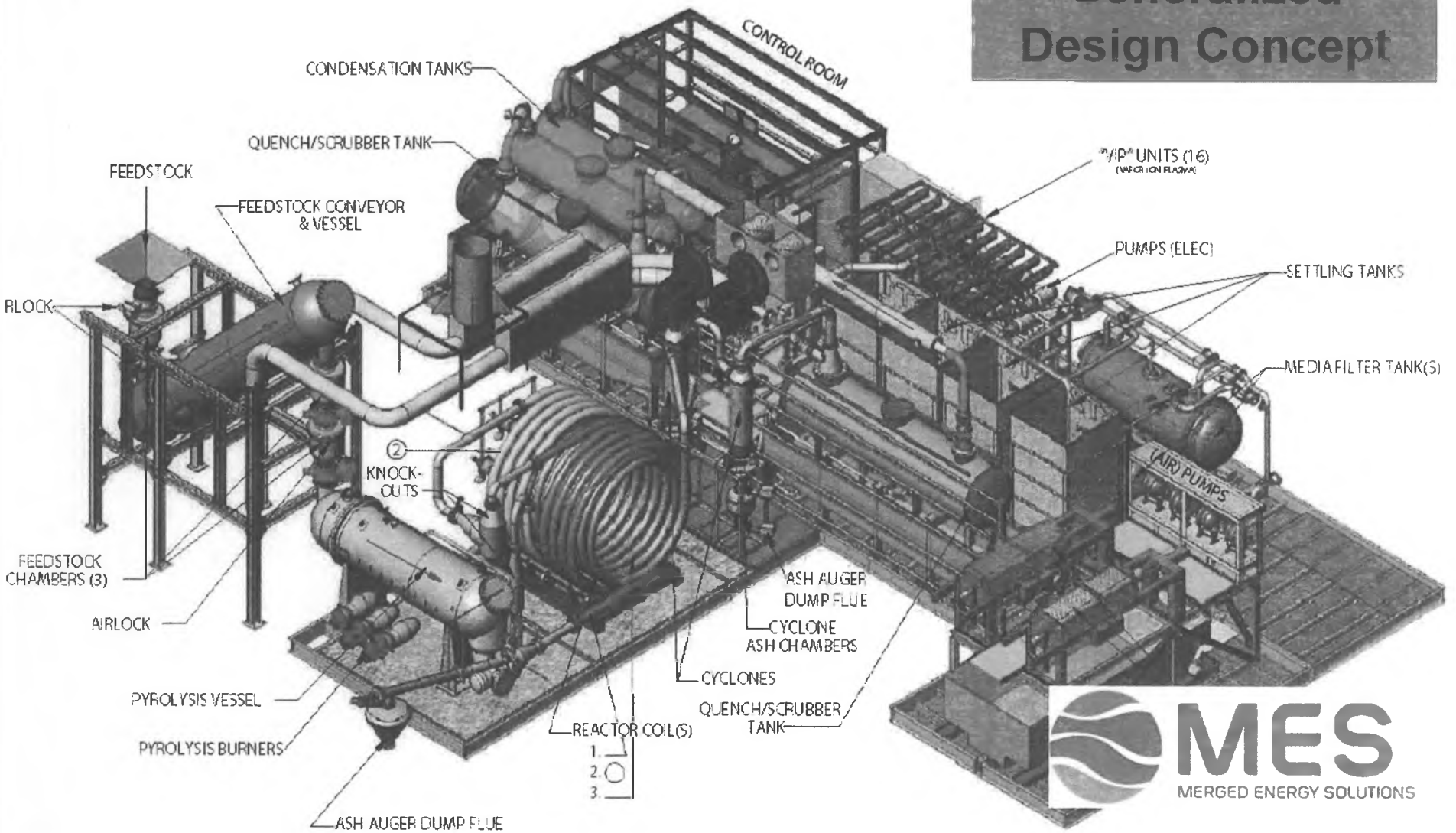
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Advanced Biomass Gasification (ABG)



Advanced Biomass Gasification (ABG)

Generalized Design Concept



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Advanced Biomass Gasification (ABG)

Products

Syngas

- Electricity
- Synthetic Diesel

Ash

- Soil Conditioner

Purified Water



Feedstock

- Agricultural or Municipal Waste

- Low Feedstock Cost
- Plant Adaptable to Any Location

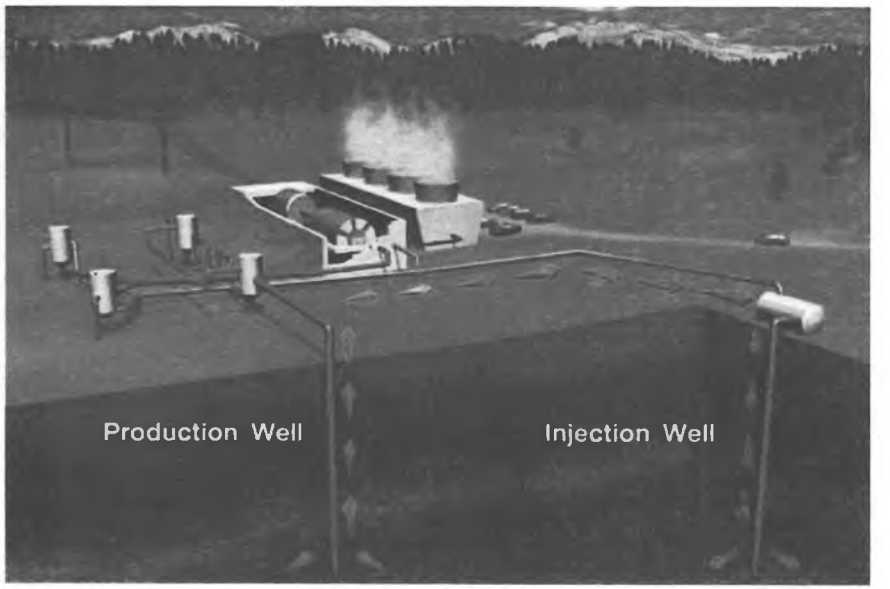
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Geo-Thermal

Hydrothermal Power Systems

There are three geothermal power plant technologies being used to convert hydrothermal fluids to electricity - **Dry Steam**, **Flash**, and **Binary Cycle**. The type of conversion used depends on the state of the fluid (whether steam or water) and its temperature.

Flash steam plants are the most common type of geothermal power generation plants in operation today. They use water at temperatures greater than 360°F (182°C) that is pumped under high pressure to the generation equipment at the surface. Binary cycle geothermal power generation plants differ from Dry Steam and Flash Steam systems in that the water or steam from the geothermal reservoir never comes in contact with the turbine/generator units.



Dry steam power plants systems were the first type of geothermal power generation plants built. They use the steam from the geothermal reservoir as it comes from wells, and route it directly through turbine/generator units to produce electricity.

Power Generation - Summary

Between the **Concentrating Solar Thermal**, **Bio-Mass**, and **Geo-Thermal** outputs, a 150 acre MIG facility can generate ***20 to 40 megawatts*** of power. The MIG would consume approximately 3 to 4 megawatts.

One (1) megawatt will provide **power for approximately 2,400 average-sized homes**. This means an average of ***28,000 to 85,000 homes*** can be serviced by one facility, and can be taken off the power grid.

This is important when it comes to security because by being **independent from the grid**, earthquakes, tsunamis and other natural or man-made disasters will not impede the MIG from producing energy, water, fresh produce and fish .

Advanced High-Density Vertical Farming

The Advanced High-Density Vertical Farming (AHDVF) or hydroponic growing system does not use soil. The crops are either suspended in water or a water mist is periodically sprayed on the plant root structures of the crops. The water is infused with nutrients like those naturally found in the soil.



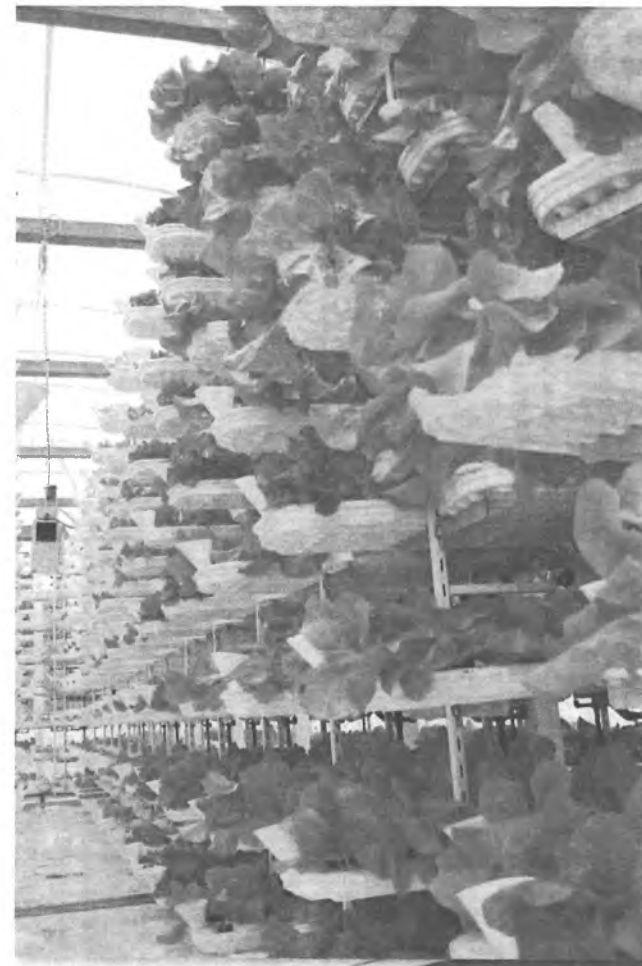
This system uses no pesticides or fertilizers in this growing environment. Additionally, for example, bees will be introduced into the system to provide a natural pollination cycle. Unlike any genetically modified organisms (GMOs), the seeds are free of any genetic alterations and use only a natural nutrient solution that will allow for organic certification of all the produce.

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Advanced High-Density Vertical Farming

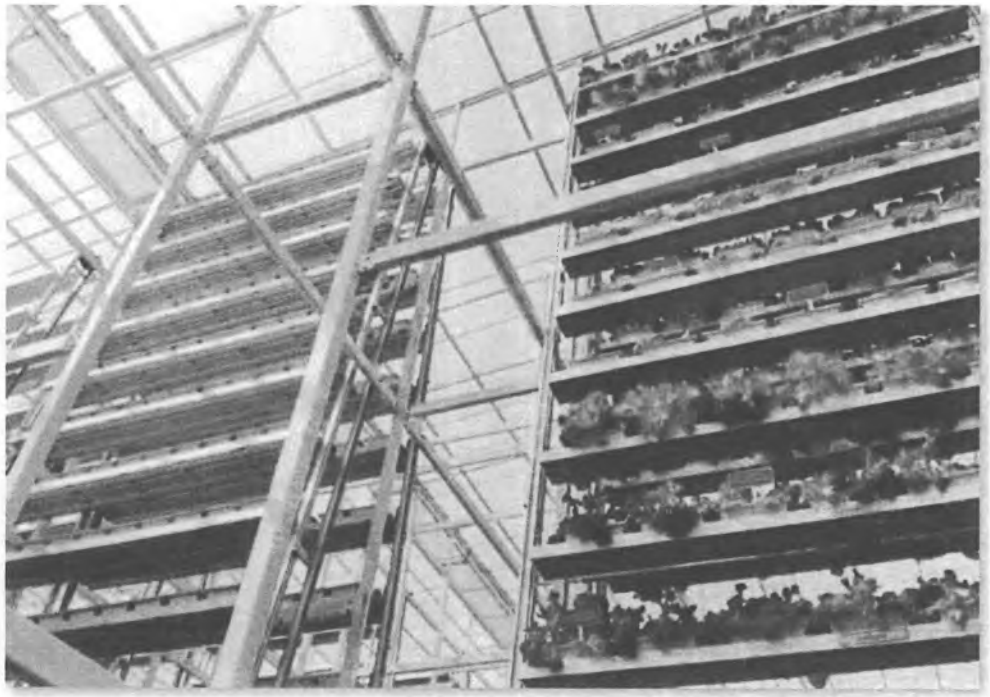
The current generation of hydroponic greenhouse technology in North America produces fresh tomatoes, bell peppers & cucumbers in sufficient quantities to market all over the country. The **MIG System** offers immense variety over and above that current level and type of production, including lettuce, herbs and some fruits, such as strawberries.

Quadrants of each greenhouse may be organized to maintain a specific growing environment, which will support the crops suited to that environment. The diversification of production will allow for a more balanced and complete produce offering to suit each market served.



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Advanced High-Density Vertical Farming



The annual production level of the ADHVF described here is projected, at normal operation, to be approximately **90 million pounds** - enough produce to feed an average **population of 300,000** people **or 60,000 families.**

Water Desalination

MES recognizes that, today, **water** is a **precious commodity** and with water shortages around the world, it is essential that we are aware of how we can best utilize our resources.



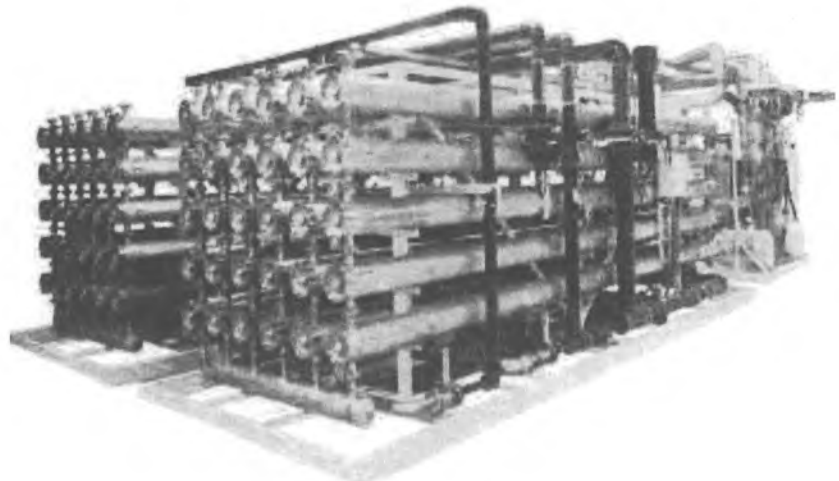
With this in mind, we have created a water treatment system known as Alpha Water that will desalinate, reclaim, purify and produce over **one and a Half million gallons** per day for use by the MIG and for neighboring city use.

By incorporating this **critical element**, we are reducing the amount of water that we use in our facility (or take from other users) and that we are producing the **highest quality** drinking water possible.

Water Purification

Applying the Technology

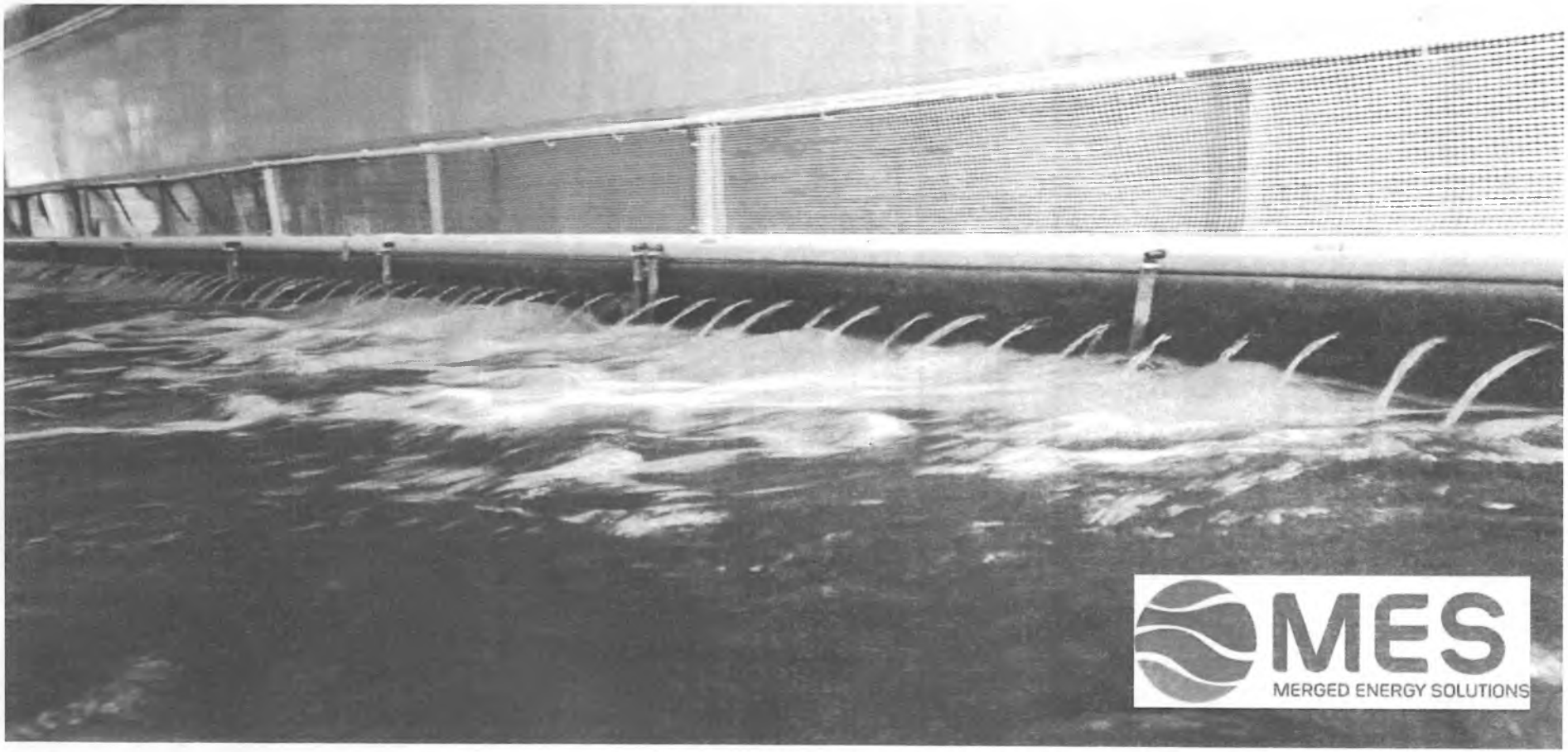
Until now, no one desalting process has **proven itself as** "the best." A variety of factors have come into play in choosing the appropriate process for a particular situation.



These factors include the quality of the source water, the desired quantity and **quality of the water produced**, pre-treatment, energy and chemical requirements, and methods of concentrate disposal. MES, however, has developed the most **advanced and unique** system, ***regardless of the water source***, by applying additional multiple-step **procedures**, including the use of quantum mechanics and a plasma bioreactor system. Due to the proprietary nature of this process, it is not detailed in this presentation.

Aquaculture: Opposing Flow Technology

The unique and patented "Opposing Flow" technology depicted below also creates a continual current in the culture tank. After the biofilter, the purified water is evenly distributed back into the culture tank, entering from both sides of the tank **causing the fish to align themselves** in the current, constantly swimming " upstream" facing either side of the 40' long tank. With this constant swimming motion, **the fish can metabolize the high protein feed into flesh which produces a higher yield**, compared to fish grown in circular aquaculture tanks.



Why Produce and Fish?

Prior to the early twentieth century, virtually all produce grown was what we now consider organic. No pesticides were used and the only fertilizer available was natural and nutrient rich manure and biodegraded foliage. The soil was also rich from years of continued farming. At that time, the variety of produce varied greatly – for example, there were some 4,000 varieties of potatoes and approximately 7,000 varieties of apples in the 1800s. Today, we are lucky to have maybe four different varieties of potatoes and apples commonly available.

After World War I, agriculture started using nitrogen fertilizer in mass quantities - a development derived from the nitrogen explosive used in bombs – to increase crop production. If that wasn't enough, we developed DDT from poison nerve gas to use as an insecticide.

By the mid 20th century, we moved into the period called the "Green Revolution" which was an attempt to **systematize the growing industry and increase food production**. However, this led to the dramatic **reduction in variety, often to a single crop type, causing further** vulnerability to insects and disease. **With more insects and disease,** the industry was forced to use more pesticides. This ultimately led to the Genetically Engineered seed that would be resistant to the pesticides.

All this engineering of nature's bounty is clearly not a positive development. One prime example of the negative effects of this process is the tomatoes today. These vegetables may be big and red, but they lack the taste and nutrients of naturally-produced tomatoes.

Why Produce and Fish?

Continued...

The same companies who developed the most common pesticides were also the first companies to patent the first genetically engineered or genetically modified organisms (GMOs), seeds that were immune to the pesticide.

Our obesity problem today is not necessarily based primarily on inherited genes and/or our poor eating habits. Rather, the prevalence of GMO products being grown under specific control have lost most of their nutritional value; in order for the human body to obtain its required nutrients, a person must eat more. In turn, by eating more we are taking in excessive calories, which turn to fat and, hence the contribute to the proliferation of obesity.

It is time we get back to basics... The **Advanced High Density Vertical Farming System** that is an integral part of the MIG System, is designed to grow these vegetables **the way nature meant them to be grown**, with all the nutrients and great taste and without any type of GMO or pesticide use. This is especially **important for the health and well-being** of the younger generation and for the generations to come.

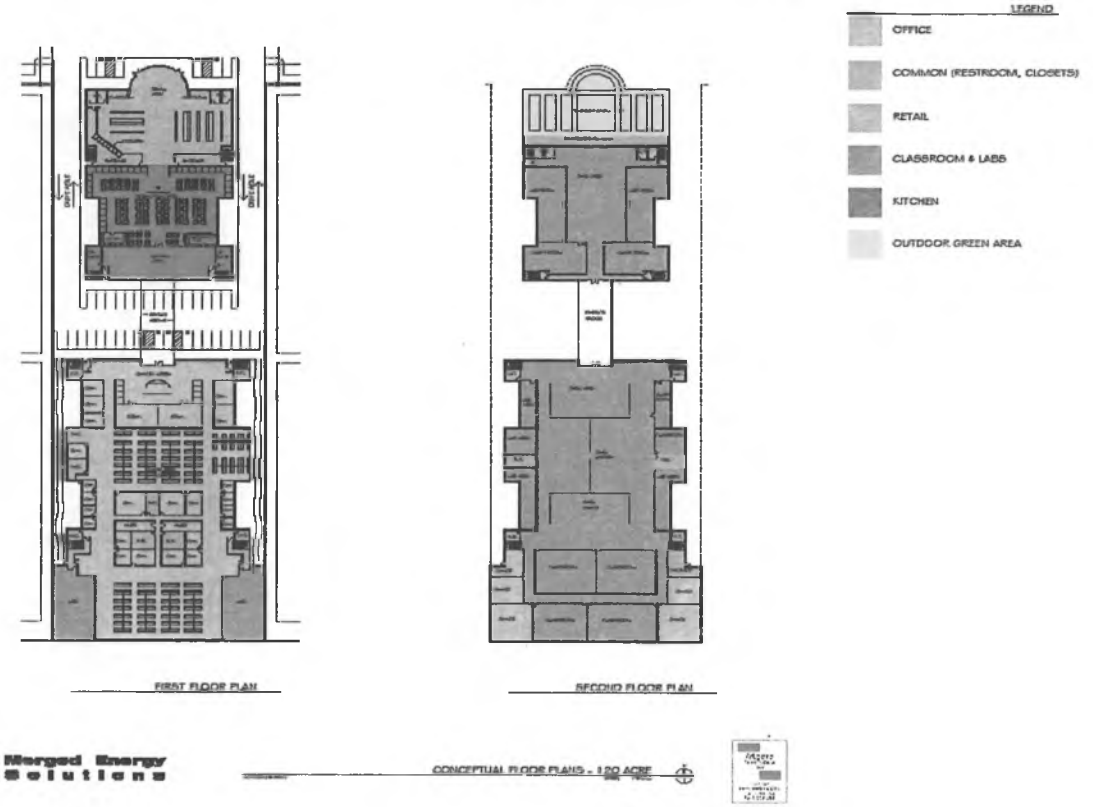
Why the Combination?

Reduced Land Area – Commercial-scale greenhouses produce as much as **30 times the yield** of conventional agriculture. That means a 100-acre greenhouse is equal 3,000-acres of horizontal farming production.

Reduced Water Consumption - Produce grown in a Multi Industrial Greenhouse (MIG) requires **10% of the amount of water** that conventional agriculture consumes. This is primarily due to the technology and management systems employed in the system.

The Synergies of Combining Solar, Geo-Thermal and Bio-Mass Energy Systems – Combining these creates particularly high levels of heat, which is required to make steam. This steam drives a turbine that generates electricity. The high-heat generation of the combined system significantly reduces the initial capital costs of the system. Also, while the solar or geo-thermal system is operational during daylight hours, the system requires less bio-mass to fuel the system.

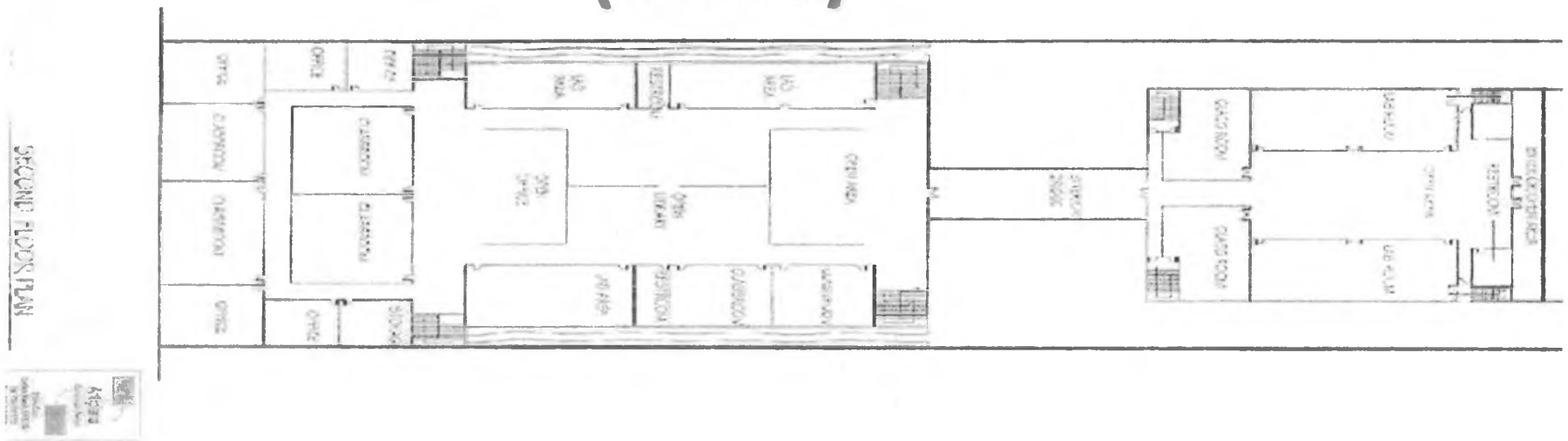
Academy of Advanced Technical Science (TAATS)



Academy of Advanced Technical Science

MERGED ENERGY SOLUTIONS

Academy of Advanced Technical Science (TAATS)



The Academy of Advanced Technical Science **(TAATS)** will be a **120,000 square-foot institute** located on the second floor of the main MIG facility.

TAATS will be devoted to **teaching students** of all walks of life the importance of combining the latest technology with a variety of applications such as agriculture, farming, water treatment, alternative energy, and sustainability, to name just a few.

It is our belief that in order for the younger generation to thrive they must become proactive in **creating new strategies to enhance mankind's general advancement**. We will provide that training and **encourage creative thinking to bring new technologies to life.**

MERGED ENERGY SOLUTIONS

MIG Production – 120 acre

Annual Production

- **9 million** gallons Synthetic Fuel
- **40 MW** Electricity
- **90 million** pounds Organic Produce
- **5 million** pounds Fish
- **1.5 million** gallons Potable Water per day











MERGED ENERGY SOLUTIONS

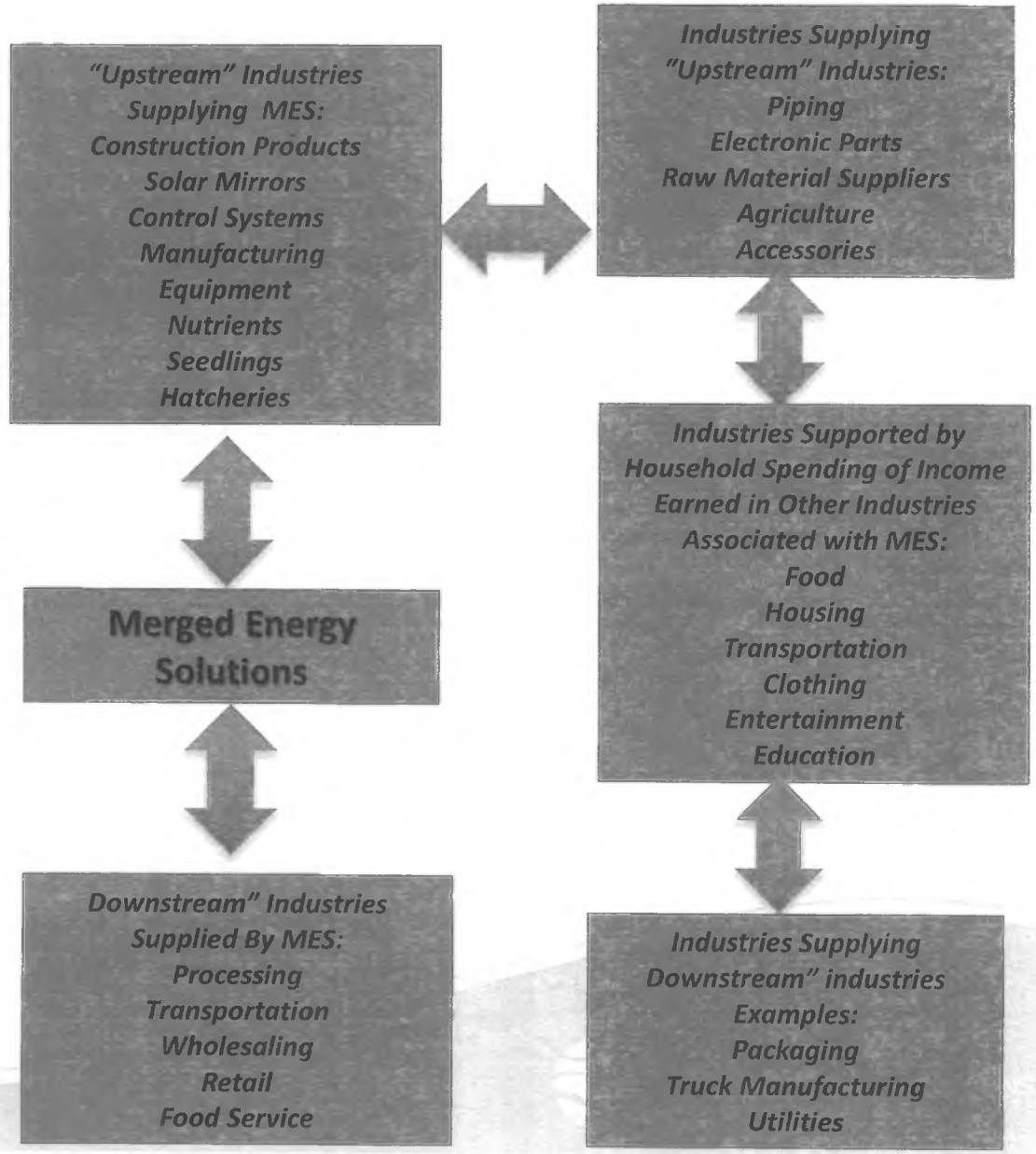
MIG Employment

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Number of Employees

Water :	20
Bio-Mass:	25
Solar:	25
Greenhouse	300
Packing	80
Sales & Mktg	20
Trucking	20
Aquaculture	50
Total	**540**

Employment is based on the averages for the type of industry and the size of the facility. These figures are also based on the facility operating 24 hrs a day, 7 days a week and 50 weeks out of the year. This does not take into account the branch jobs created up stream. The anticipated wages for this facility are estimated at $12 to $20 per hour, excluding upper management and technical positions.



Contact Us

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MERGED ENERGY SOLUTIONS

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email: michael@mergedenergy.com

TRANSFORMING ALASKA

THROUGH INOVATIVE TECHNOLOGIES IN: AVIATION, RE ENERGY, SUSTAINABLE FOOD, CLEAN WATER, BIO FUELS AND HARDENED DATA CENTERS

SKY LIFT
AERONAUTICS

MES
MERGED ENERGY SOLUTIONS

BENNEFITS TO ALASKA

* **ECONOMIC GROWTH**
* **LOWER OPERATING COSTS Vs FIXED WING**
* **MORE PRODUCTIVITY**
* **NEW JOBS**
* **SAFER TRANSPORTATION**
* **EXPANDED COMMERCE DOMESTIC & INTERNATIONAL**
* **CLEANER ENVIRONMENT**

SKY LIFT AERONAUTICS

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ECONOMICS

* **MINING**
* **ALTERNATIVE SHIPPING**
* **OIL AND GAS**
* **ALTERNATE TRANSPORTATION**
* **SURVEILLANCE AND MAPPING**
* **ON THE SPOT MEDICAL RESPONSE**

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ECONOMICS

* **TOURISM INDUSTRY**
* **DISASTER RELIEF**
* **SEARCH AND RESCUE**
* **FISHING**
* **FIRE FIGHTING CAPABILITIES**
* **TIMBER / LOGGING INDUSTRY**

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MINING



Infrastructure Costs

- Roads
- Rails
- Power
- Equipment
- Trucks
- Earth movers

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SHIPPING - TRANSPORT



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ICE ROAD TRUCKING

Ice roads are a common feature across Alaska & Canada, and are typically the only way to access the most remote communities via ground transport.



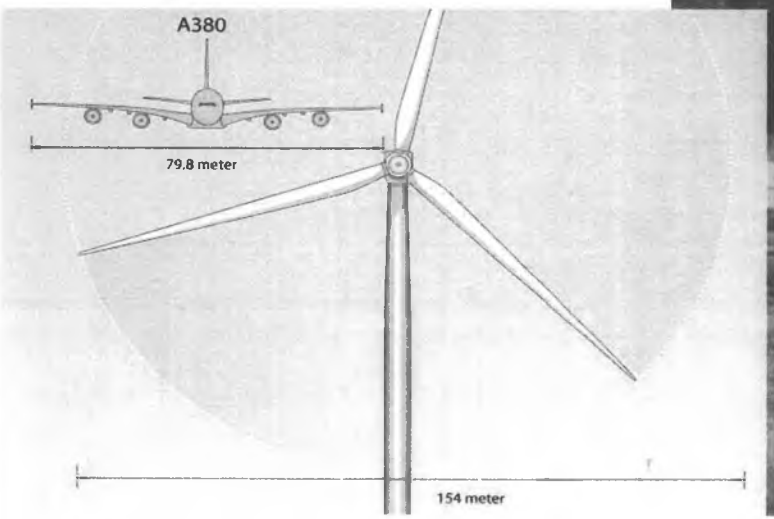


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SPECIALTY TRANSPORT

B75 Quantum Blades are solid one-piece and 187 ft. long!





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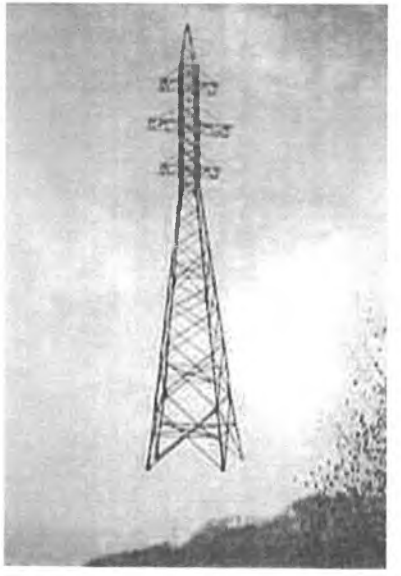
IT'S ABOUT THE PAYLOAD, AS WELL AS THE PLATFORM



Transportation



Power Grid/Cell Towers



Oil and Gas E&P (and remote areas)



Mining



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Alaskan North Slope Oil & Gas Potential Production & Today's Market Value

ALASKA FACTS

- **First Major Oil Discovery:** 1957.
- **Industry Investment:** $50B+ to date.[1]
- **State Production:** 16+ billion barrels of oil (bbo).[1]
- **North Slope Oil Fields:** 4 of 10 largest in US; 12+ currently producing.[1]
- **North Slope Estimates:** ultimate recoverable oil reserves of 22.2 bbo; up to 124 trillion cubic feet (tcf) of natural gas.[1]
- **Prudhoe Bay Field:** 1,000+ wells; largest oil field in North America & largest producing US oil field; site of large natural gas processing plant.[2]
- **Prudhoe Bay Estimate:** 2.5 billion barrels of recoverable oil & 426 million barrels in reserves.[1]
- **Pipeline Infrastructure:** 800-mile Trans-Alaska Pipeline System (TAPS); 1.5+ million barrels per day of spare capacity; supplying American energy to Americans without environmental risks or 'dirty oil' associated with Keystone Pipeline.
- **Ongoing Development:** major operators such as Exxon Mobil (NYSE:XOM | Market Cap: $410.84B), BP (NYSE:BP | $139.96B) and ConocoPhillips (NYSE:COP | $71.86B) investing heavily in oil and gas-related projects.

1. Resource Development Council for Alaska (website), Oct. 18, 2012.
2. ConocoPhillips (website), Oct. 18, 2012.

Today's Estimated North Slope Oil Reserves of up to 22.2 billion barrels of oil are valuated at $2.3 trillion at today's prices

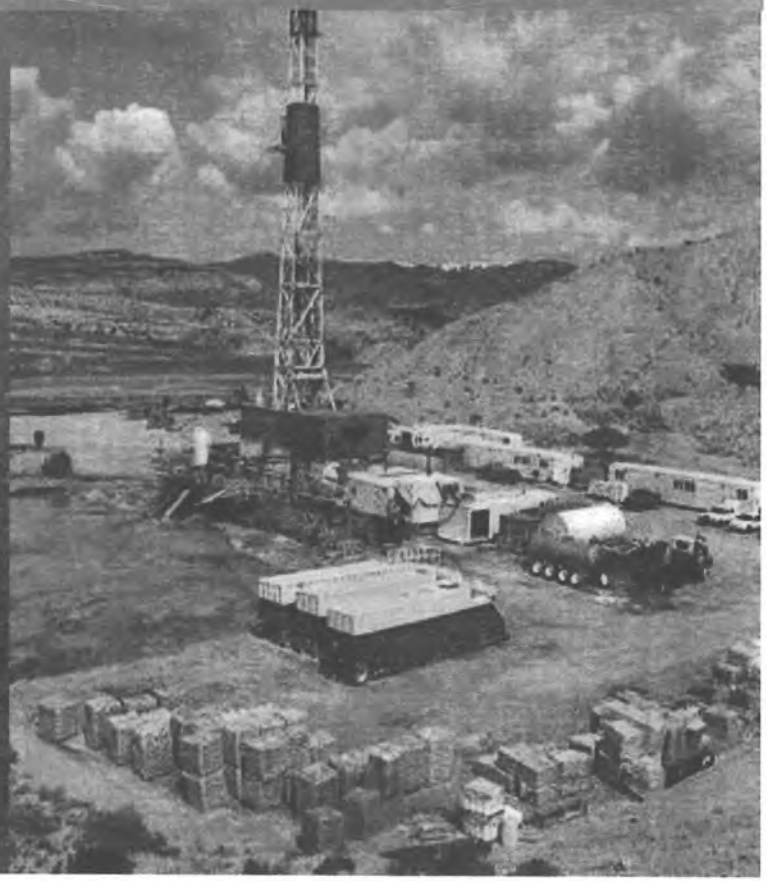
Today's Estimated North Slope Natural Gas Reserves of 123 Trillion Cubic Feet (TCF) are valuated at $459 billion at today's prices

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OIL AND GAS - 1





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OIL AND GAS - 2

MACONDO INCIDENT

It is critical to get a craft onsite as quickly as possible for command & control, well control, SAR, firefighting/suppression, oil spill containment & collection

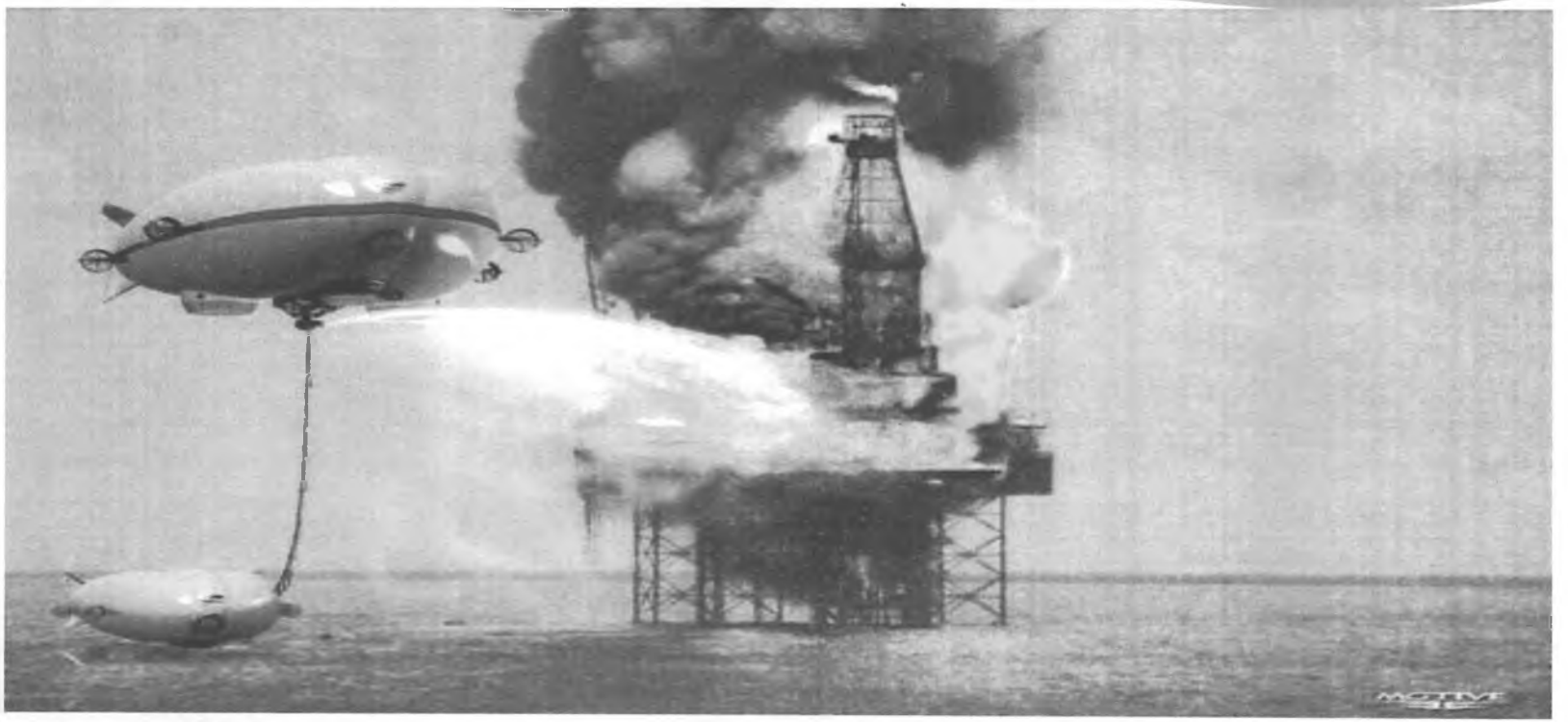


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APPLICATIONS OIL & GAS RAPID EMERGENCY RESPONSE

Emergency Response, Firefighting, Containment, Collection, Search & Rescue (Could have be on scene at Macondo Incident in 1l/2 hours)

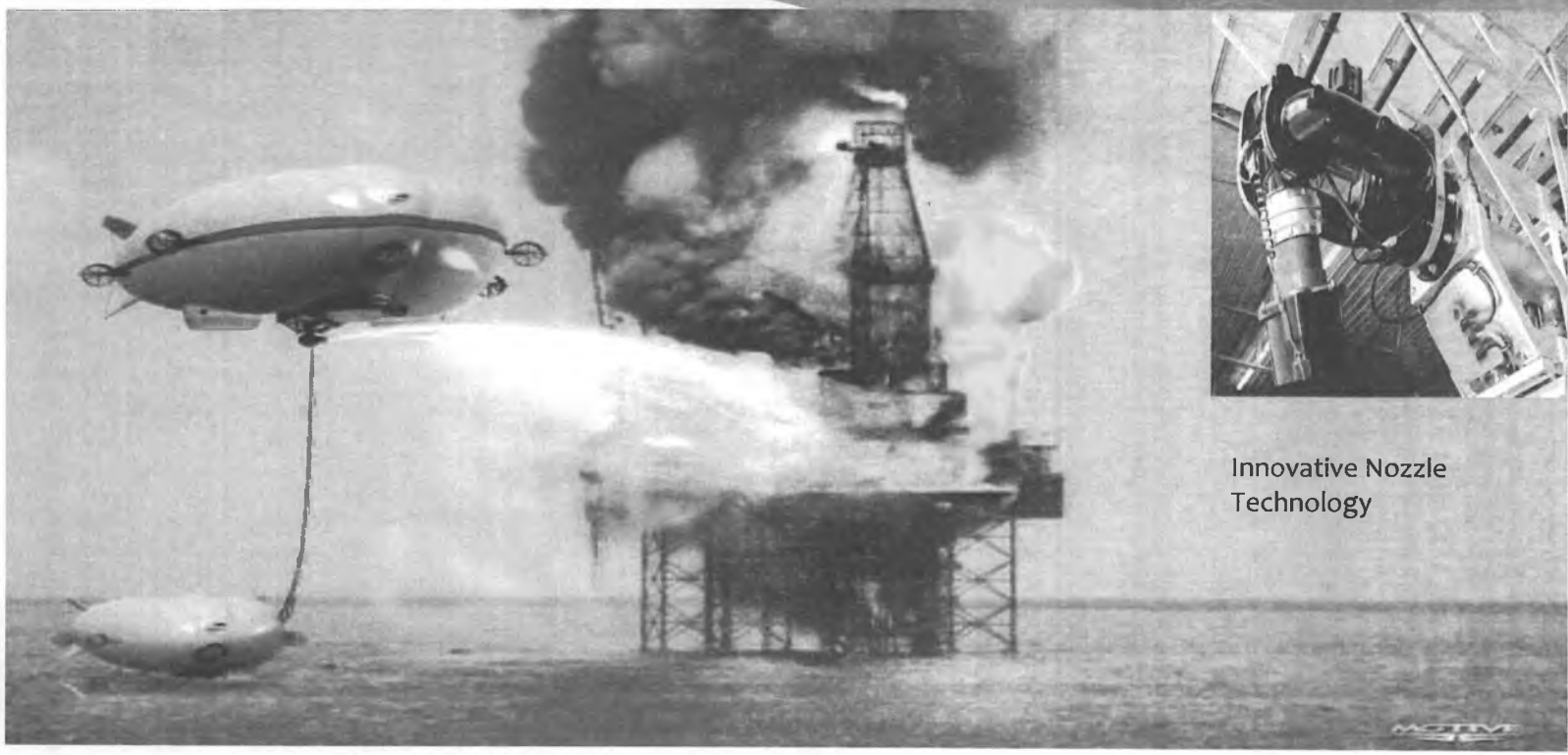


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APPLICATIONS OIL & GAS RAPID EMERGENCY RESponse

Emergency Response, Firefighting, Containment,



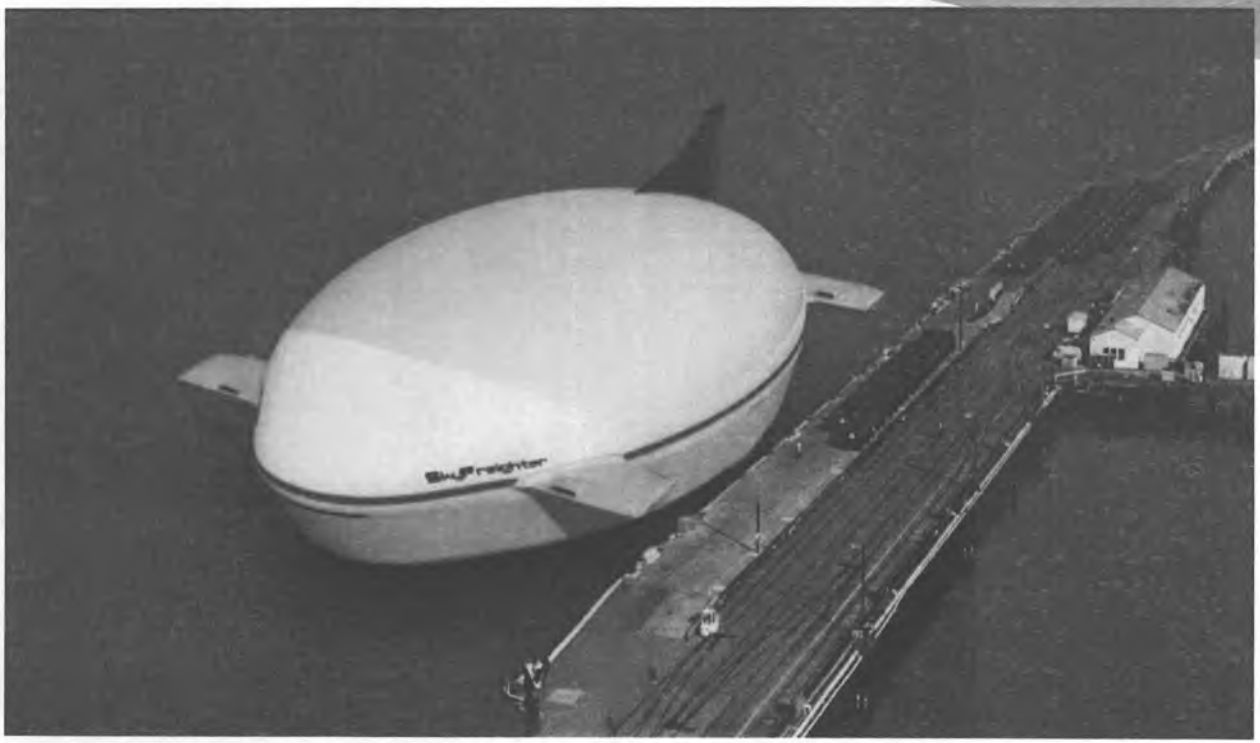
Innovative Nozzle Technology

New technology to lift & apply modified seawater

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LNG TRANSPORT



LNG GAS IS QUICKLY BECOMING A HIGHLY NEEDED COMMODITY BUT BEING ABLE TO DELIVER IT QUICKLY AND BE COST EFFECTIVE HAS BEEN AN ISSUE. ITS NOW POSSIBLE WITH THE SKYLIFT TANKER TO LOAD FROM ANY LOCATION AND DELIVER EASILY TO ALMOST ANYWHERE, MAKING THE USE OF LNG MORE PRACTICLE AND ECONOMICAL.

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ALTERNATE TRANSPORT

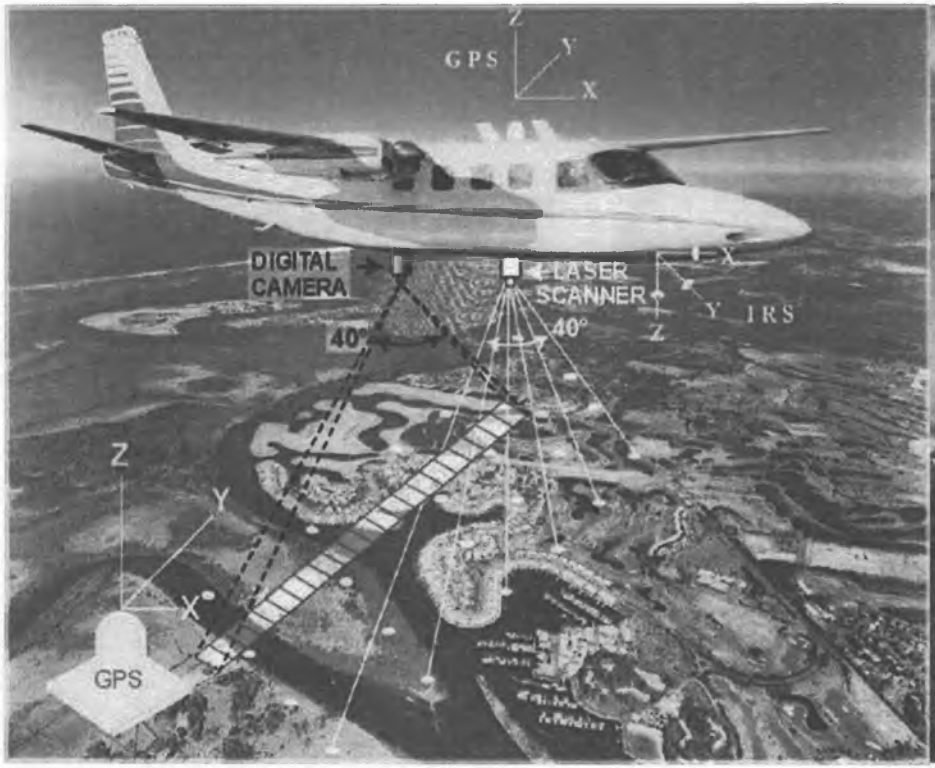


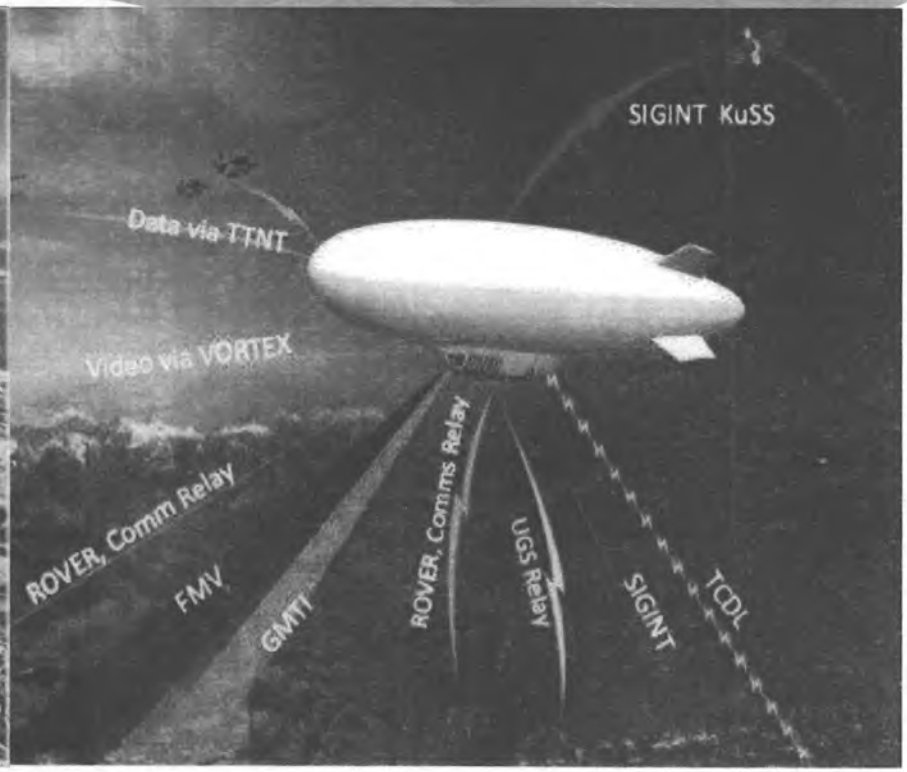


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SURVEILANCE AND MAPPING





courtesy: U.S. Air Force

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ON THE SPOT MEDICAL RESPONSE

100 TON VARIANT

WHEN TIME IS NOT AN OPTION



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TOURISM







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DISASTER RELIEF



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DISASTER RELIEF

Hurricane Katrina



- 1,836 people died in the hurricane and
- An estimated $90 billion worth of damage.

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DISASTER RELIEF

Hurricane Katrina – A few people at a time by helicopter



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SEARCH AND RESCUE

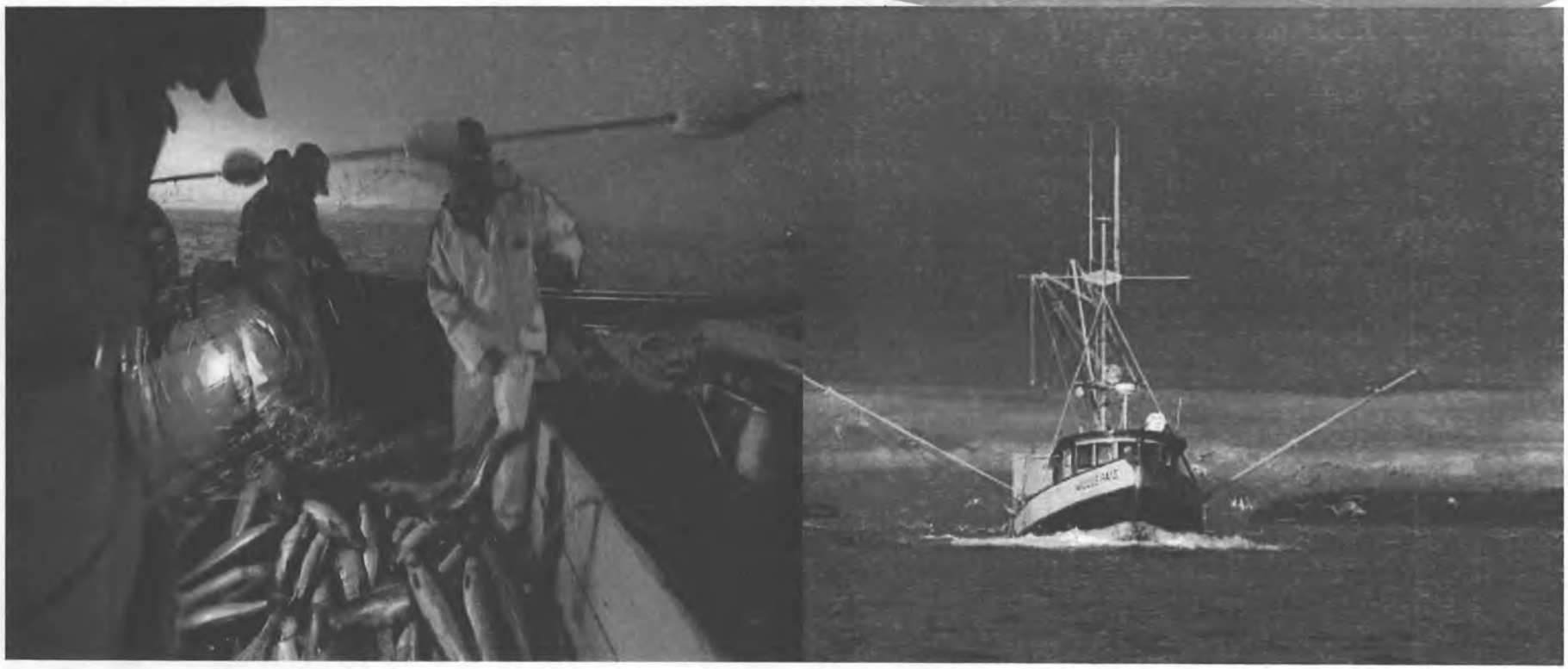




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AERO NAUTICS

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FISHING ENHANCEMENT



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FIRE FIGHTING

Wildfire Air Tanker Concept

An average of 50 Tankers are needed, but only 7 are operating*
Wildfire fighting experts agree 50 additional planes are needed to complement ground crews overwhelmed by the number and intensity of wildfires during the fire season.
The Cost of putting out wildfires is over $1.65 billion/year.

*July 3, 2012 Disaster Relief & Reuters, 2012

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HYBRID AIRCRAFT WILDFIRE AIR TANKER CONCEPT



NOT JUST A TANKER! A New Disruptive Firefighting System

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FOREST MANAGEMENT

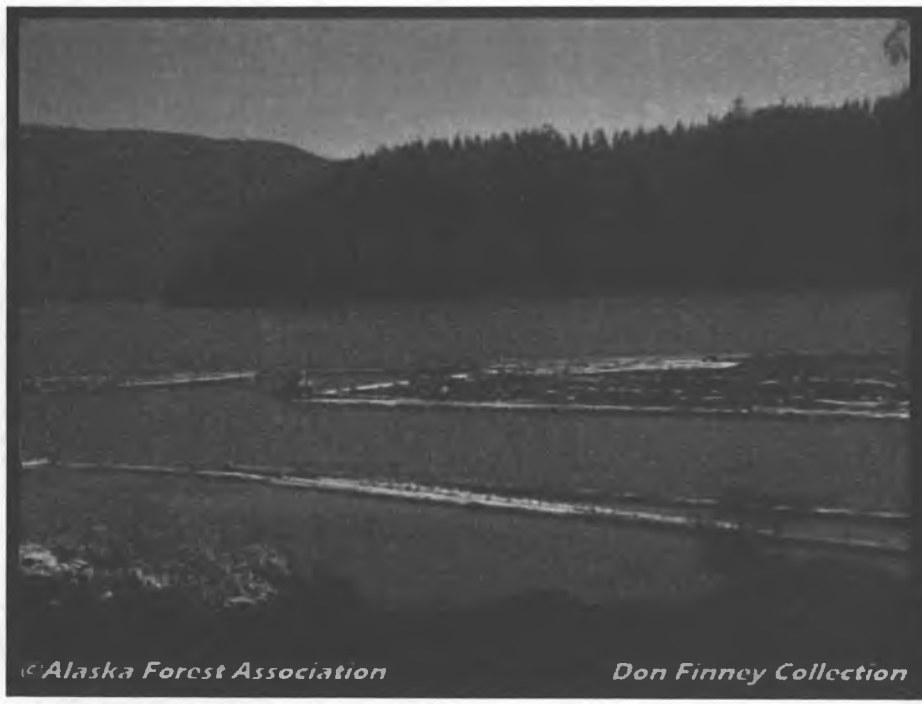




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TIMBER AND LOGGING



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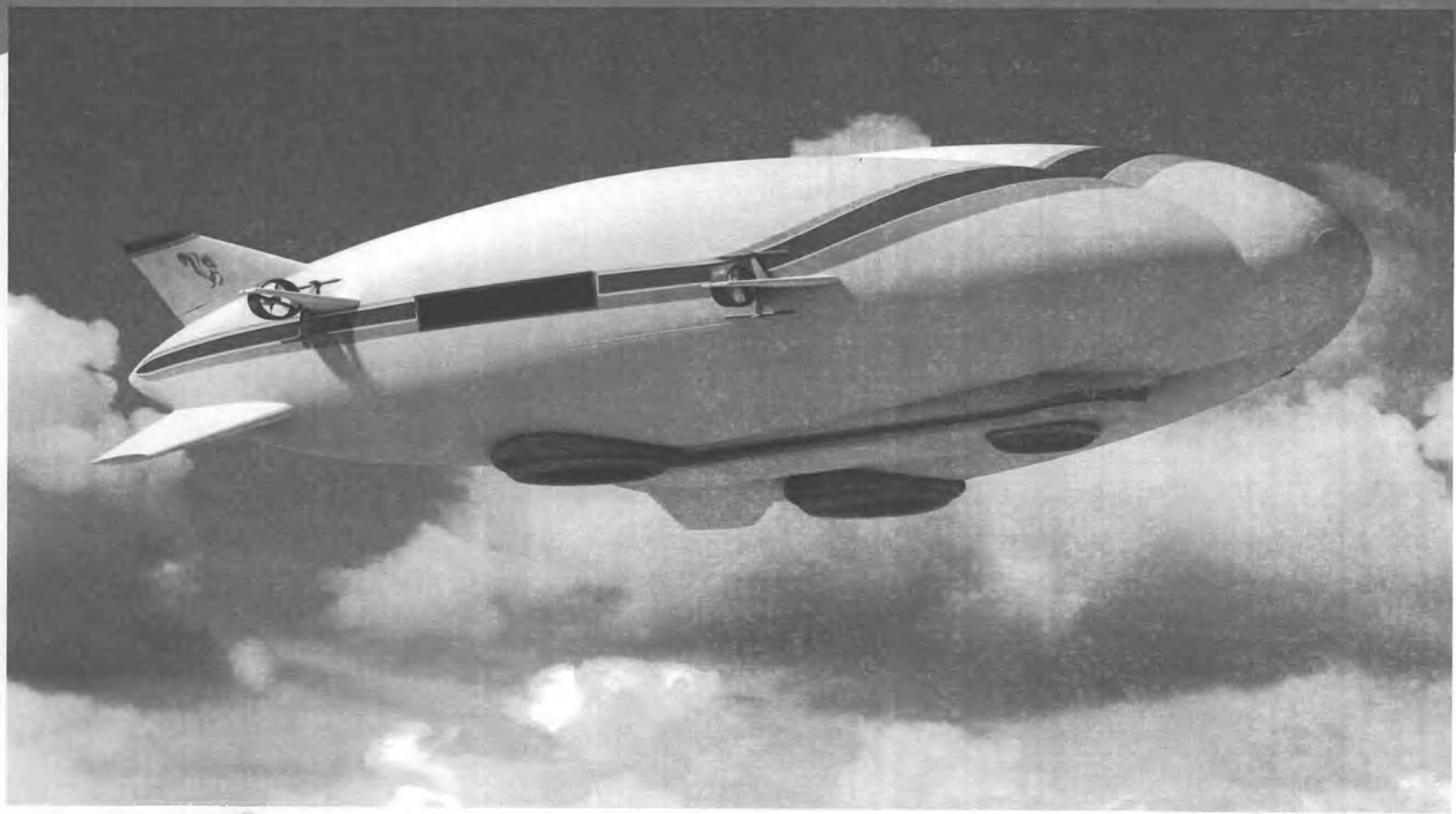


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AEROSERVICES

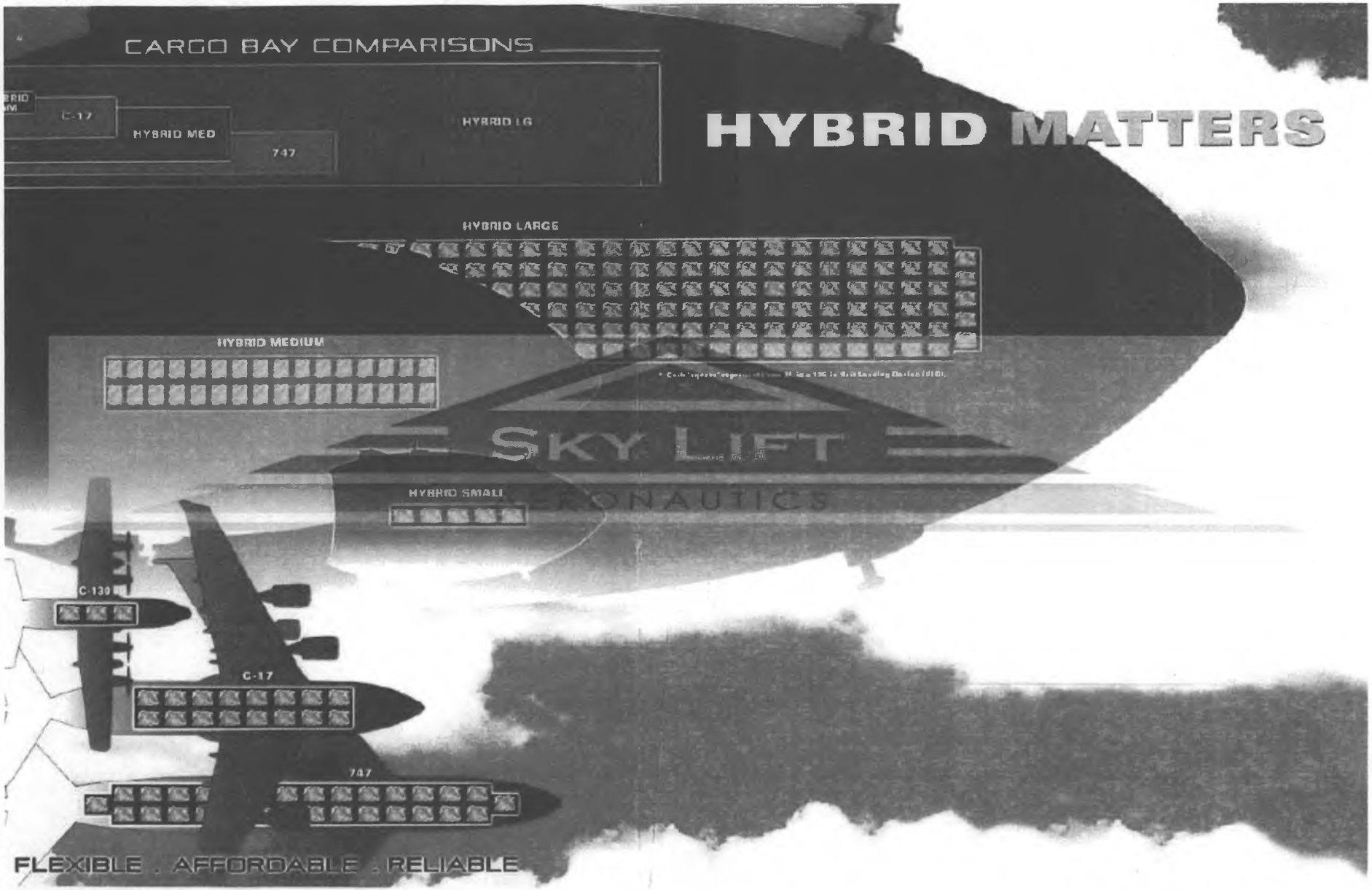
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SKYLIFT HYBRID AIRCRAFT



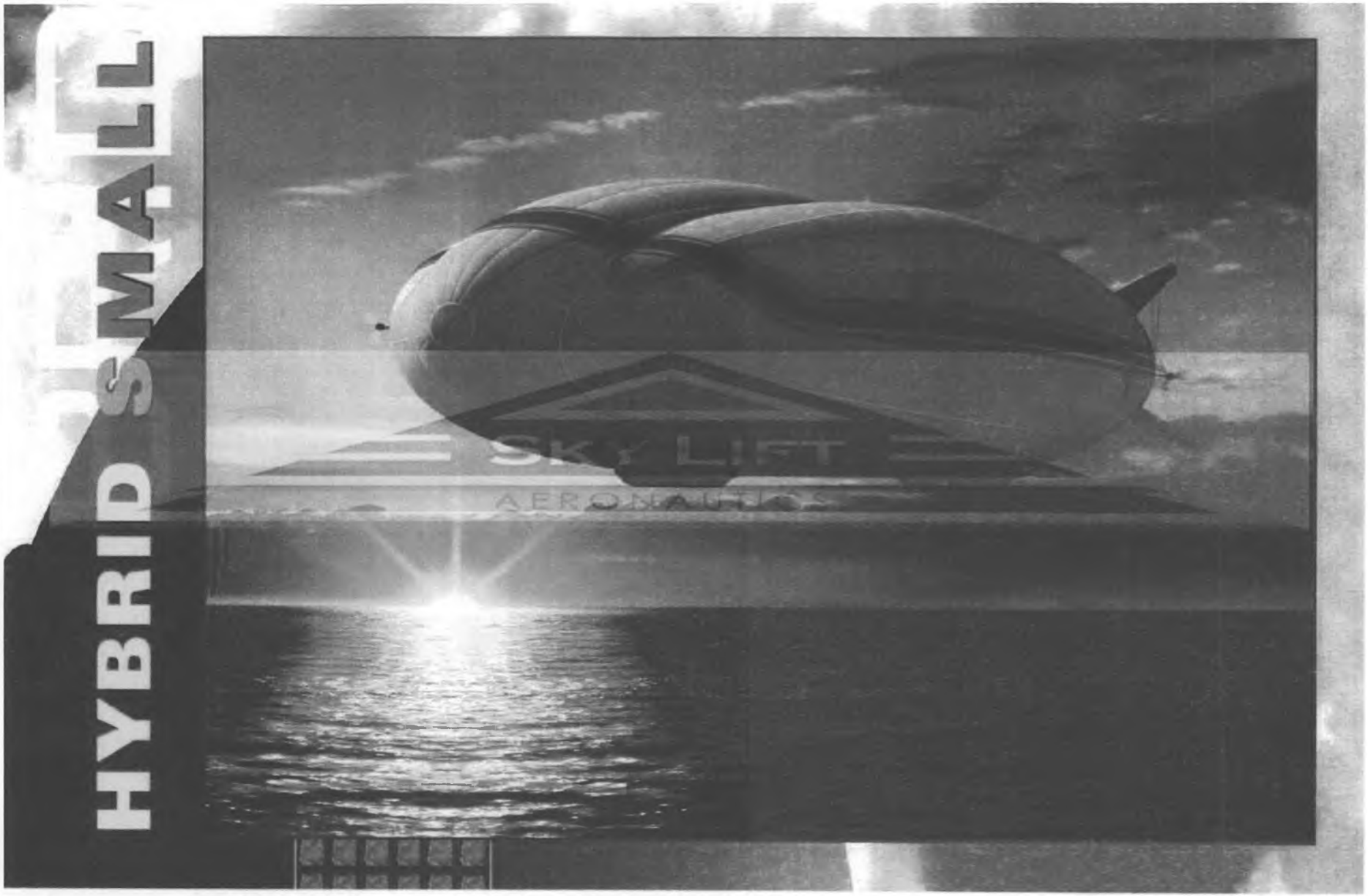
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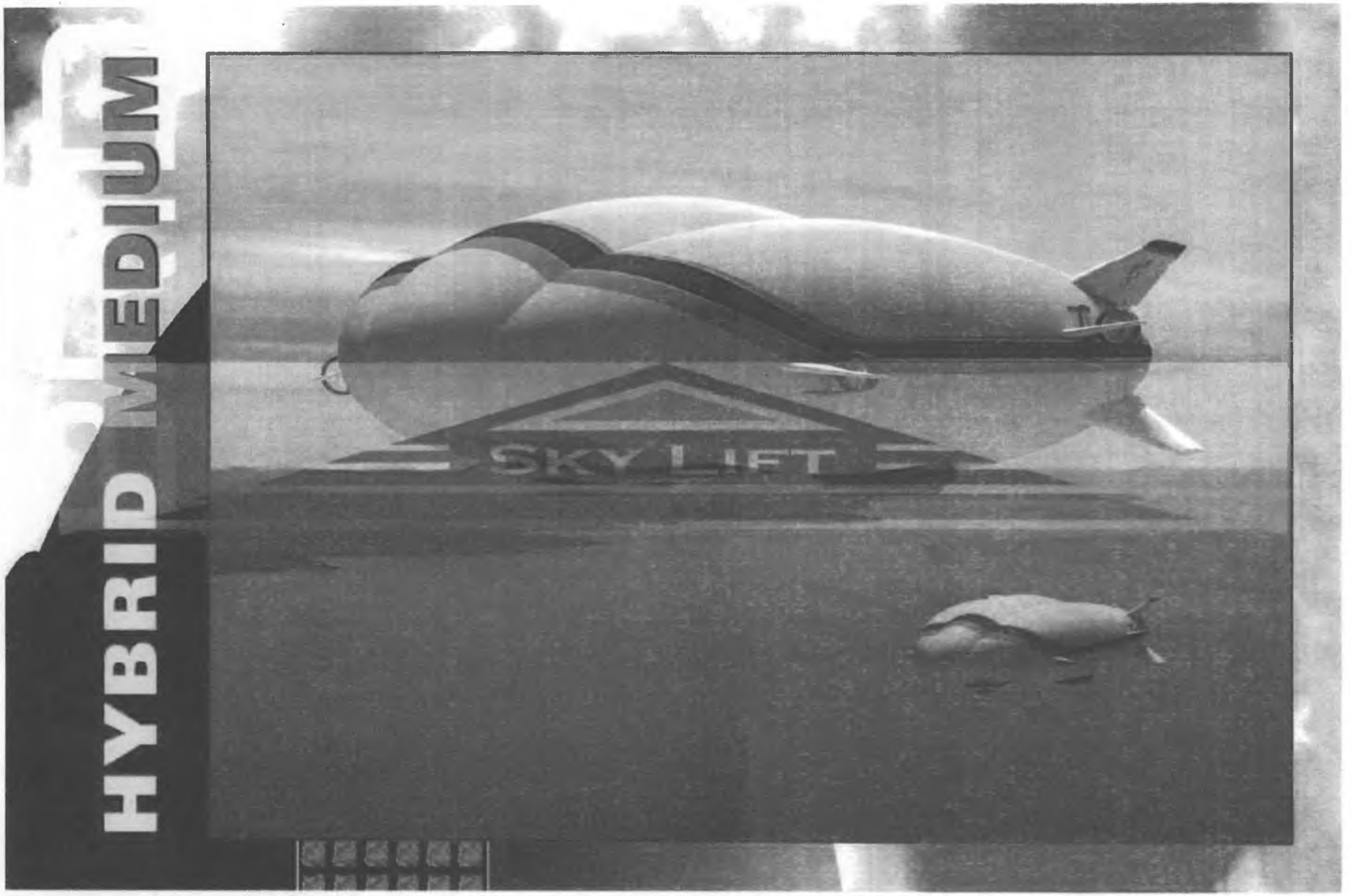
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SKY LIFT

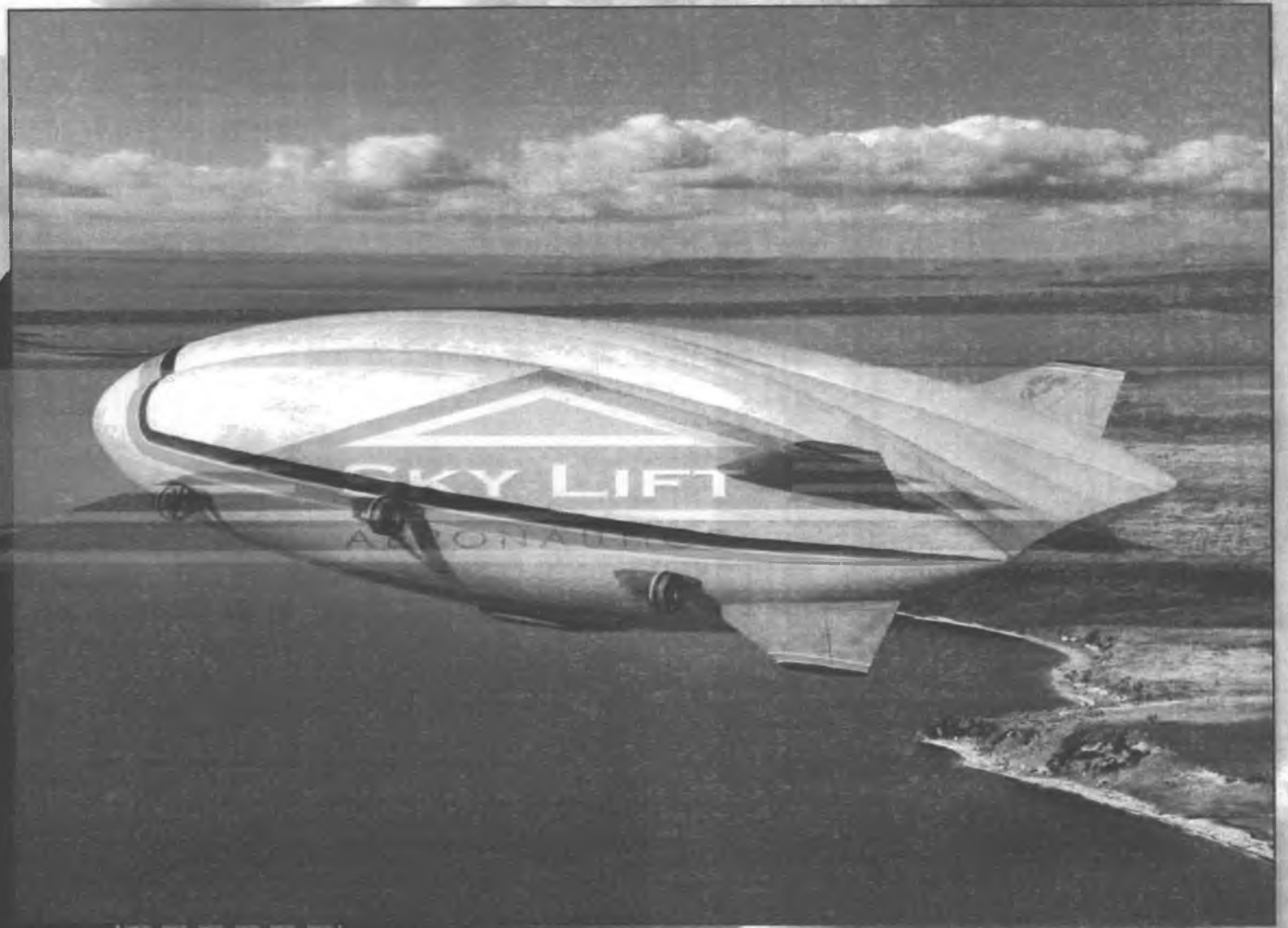
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HYBRID LARGE



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4 Proven Technologies Merged Into 1 Transformational Technology



Vertical Airlift

Helicopter

Deltoid Shape Aerodynamic Lift



Cargo Airplane

Hybrid Aircraft



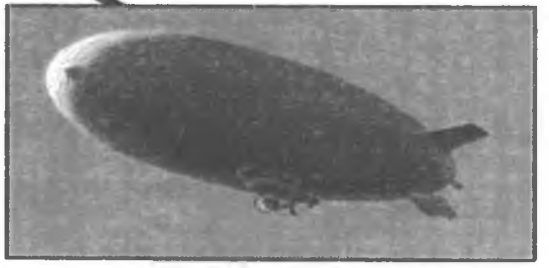
Vectored Thrust



Hover Craft

Air Cushion Landing System (ACLS)

Helium Filled Envelope Up to 80% Vertical lift



Airship (Blimp)

SKY LIFT

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FOR MORE INFORMATION

ON HOW TO ORDER THE AIRCRAFT AND OR SPECIFICATIONS

HYBRID VARIANTS

20 TON CAPACITY
100 TON CAPACITY
500 TON CAPACITY

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03/26/14 Presenta-tion: Alaska Center for Energy and Power

<TARGET><BILL></BILL><SUBJECT>03-26-14 Presentation Alaska Center for Energy and Power</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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

Rep. Doug Isaacson
State Capitol Building, Room 13
Juneau, AK 99801
Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.gov

AGENDA

State Capitol Building, Room 124
Juneau, Alaska

Wednesday, March 26, 2014, 8:00 a.m. – 10:00 a.m.

\+ **Alaska Center for Energy and Power (ACEP)**
Presenters – Gwen Holdmann, Director and Antony Scott, Energy Economist

ACEP program and projects overview
ACEP working relationships state and industry
Funding energy projects

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

If you or your staff has any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov) or Jeff Turner at (907) 465-6588 (jeff.turner@akleg.gov).

###

ACEP

Alaska Center for Energy and Power

ACEP Mission: Develop and disseminate practical, cost-effective, and innovative solutions for Alaska and beyond

Results-Driven Research for Alaska

March 26th, 2014

Gwen Holdmann, Director

Alaska Center for Energy and Power

UNIVERSITY OF ALASKA FAIRBANKS

INE

Presentation Agenda

- **ACEP program and projects examples and overview**
  - Diesel fuel price benchmarking
  - Assessment of Southeast-BC Intertie
  - LNG – screening assessment for rural AK communities
  - Private investment models for renewable energy in Alaska
  - Small modular nuclear reactors – update
  - A role for Independent Power Producers – an example from Nome
  - others
- **Working Relationships (how we do business)**
  - State Agencies
  - Industry
- **Funding energy projects**
  - Attracting private funding, and thoughts on the Renewable Energy Fund and proposed Rural Capital Energy Fund
  - Emerging Energy Technology Fund – positioning Alaska in a global energy economy

ACEP
Alaska Center for Energy and Power

Alaska Center for Energy and Power

ACEP Mission: Develop and disseminate practical, cost-effective, and innovative solutions for Alaska and beyond

Who we are:

- Organized 6 years ago under the Institute of Northern Engineering as 'Gateway' to Energy Research for UA
- Based at UAF with a satellite office in Anchorage
- 20 dedicated staff (mostly engineers)
- 35 affiliated faculty and 50 students

ACEP
Alaska Center for Energy and Power

Alaska Center for Energy and Power

ACEP is a revenue center, not a cost center

- ACEP has received a total of $3.1M through UA operating budget (over 6 years)
- ACEP has received a total of $26M in grants and contracts during this period
- Where has this funding gone?
  - ~40% to fund 100+ small Alaska-based businesses to support research enterprise
  - ~40% to fund researchers throughout UA system (not just within ACEP)
  - ~20% to fund base University operating costs ($6M)

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Role of ACEP and the University of Alaska

- **Developing information for decision makers**
  - Technology testing and optimization (industry)
  - Energy analysis (policy makers, communities)
  - Data management
- **Preparing students to work in energy-related disciplines**
- **Commercializing energy innovation**







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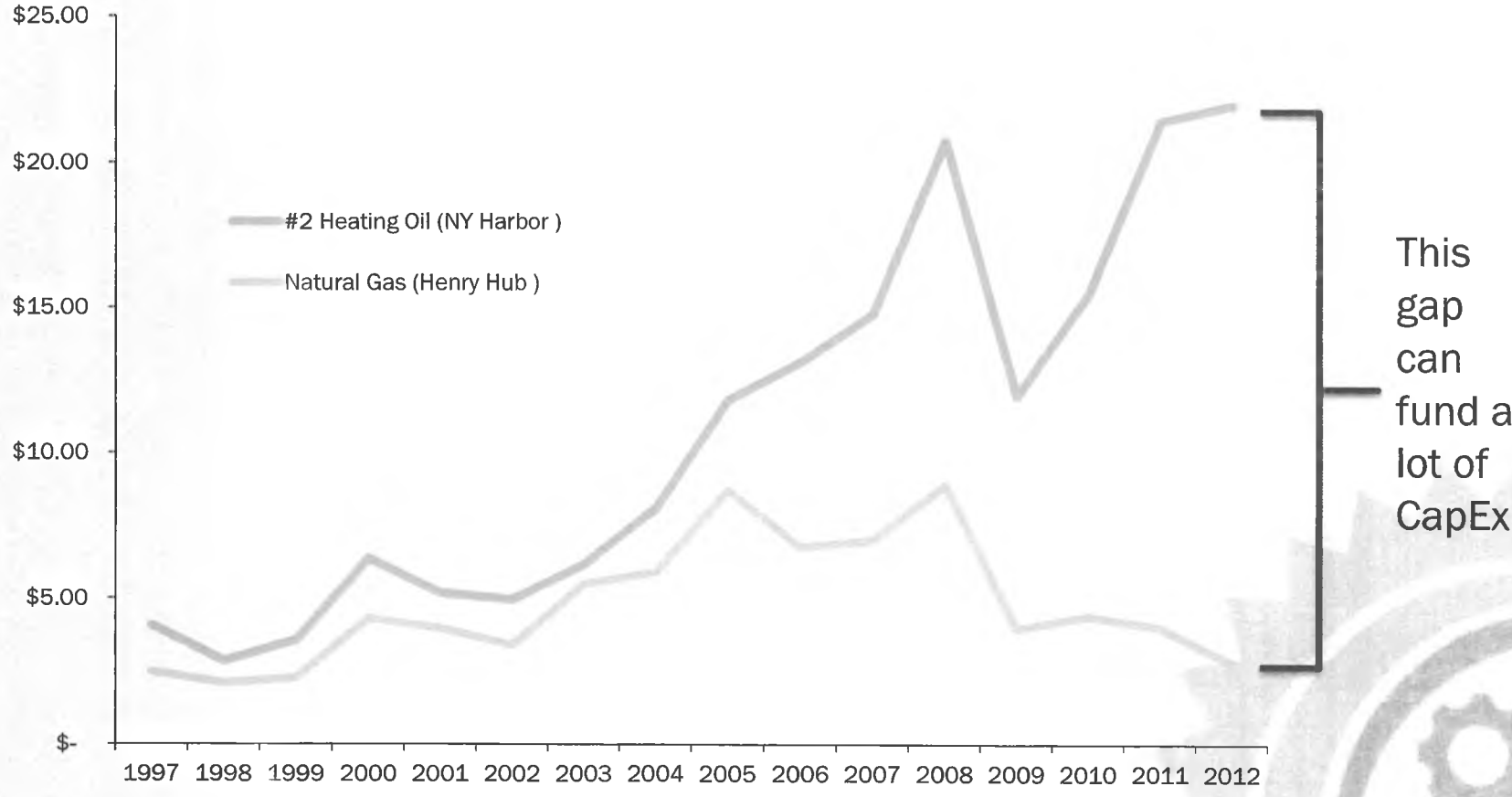
Energy Analysis Group: Examples of Ongoing Projects

- Diesel fuel price benchmarking
  (Helps with comparative economic analysis)
- Assessment of Southeast-BC Intertie
  (Report from AEA is forthcoming)
- Private investment models for renewable energy in Alaska
  (Private money can sometimes offer better rates)
- LNG screening assessment for coastal Alaska communities

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Why small scale LNG now?

Comparative Commodity Costs, $/MMBtu



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Screening-Level Evaluation of LNG for Coastal PCE Communities

- Assessment framework – keeping it simple(er)
  - Electric utility loads only (commercially simpler)
  - Coastal communities (logistically simpler)
  - ISO containers ("plug & play")
- Can LNG work in this framework (worst case!)?
  - Can we get to 10,000 MMBtu/day in load (supports favorable shipping economics)?

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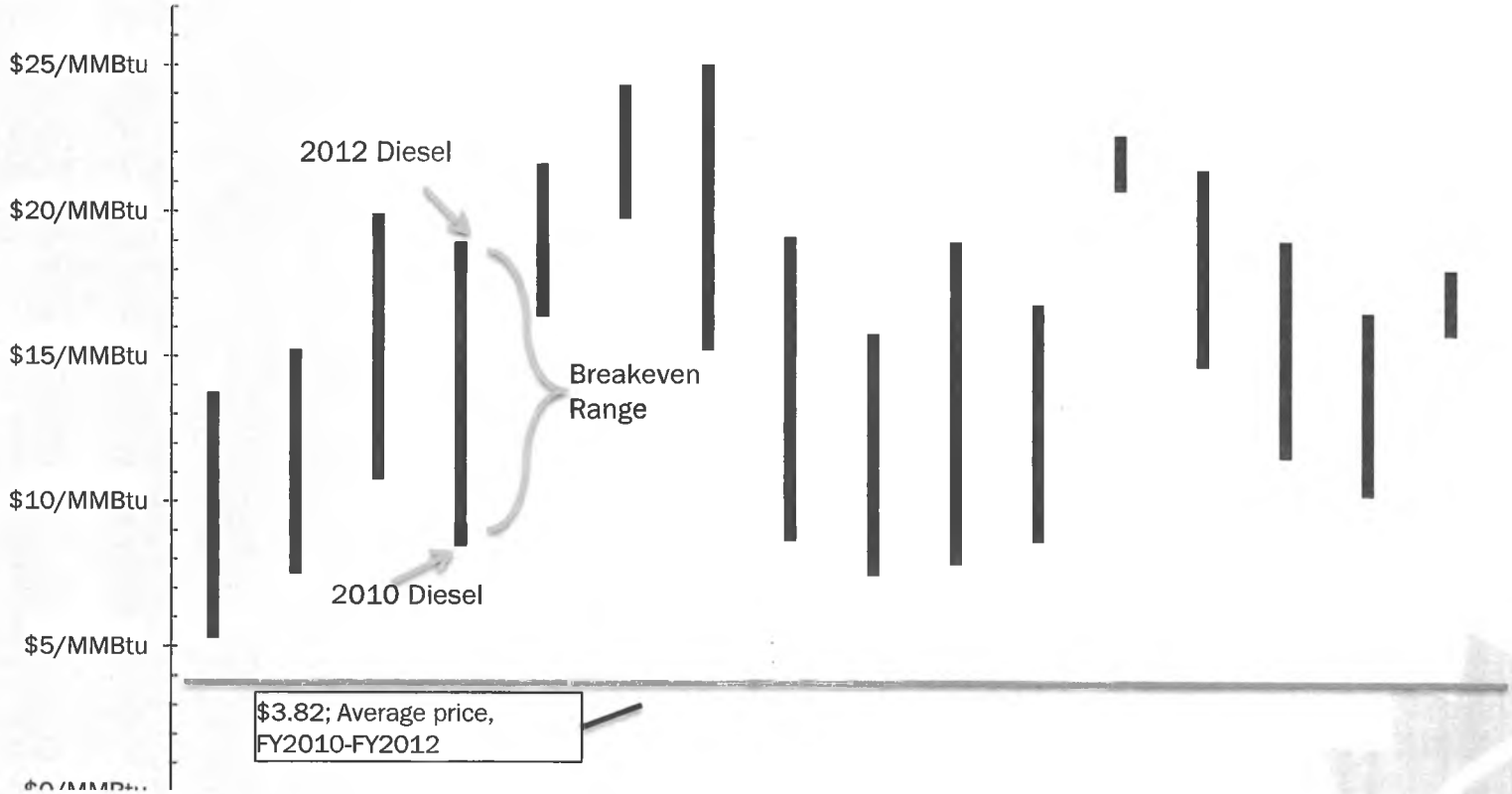
How big is SE & SW AK utility demand?

- Small!
  - Insufficient to get to 10,000 MMBtu/day
- Total annualized demand ≈4,000 MMBtu/day
  - 50% of this met by 3
  - 65% of this met by 6
  - 75% of this met by 10
  - 95% of this met by 30 (cutoff for smallest communities)

	MMBtu/day	Cumulative %
Unalaska/Dutch Harbor	1,005	24.98%
Naknek, South Naknek, King Salmon	512	37.71%
Dillingham	480	49.65%
Cordova	511	57.37%
Yakutat	160	61.34%
Hoonah	119	64.31%
St. Paul	117	67.22%
Sand Point	95	69.59%
Adak	94	71.94%
Togiak	82	73.97%
Cold Bay	81	75.99%
Kake	78	77.93%
Craig	73	79.75%
Hooper Bay	71	81.50%
King Cove	69	83.23%
Toksook Bay	67	84.89%
Angoon	50	86.14%
Scammon Bay	44	87.23%
Quinhagak	42	88.28%
Kwigillingok	32	89.09%
Kongiganak	28	89.77%
Nunam Iqua	27	90.45%
Chignik (Bay)	27	91.11%
Port Heiden	23	91.69%
Mekoryuk	22	92.23%
Pelican	21	92.75%
Goodnews Bay	20	93.26%
Egegik	20	93.76%
Old Harbor	20	94.26%
False Pass	20	94.76%
St. George	19	95.23%
Akutan	17	95.65%
Tatitlek	16	96.05%
Ouzinkie	15	96.43%
Pilot Point	15	96.80%
Nelson Lagoon	15	97.16%
Chignik Lake	14	97.52%
Twin Hills	14	97.87%
Chignik Lagoon	14	98.21%
Naukati	13	98.54%
Tenakee Springs	12	98.84%
Atka	11	99.11%
Perryville	10	99.36%
Chenega (Bay)	9	99.59%
Elfin Cove	9	99.81%
Pedro Bay	7	100.00%
Total	4,022	

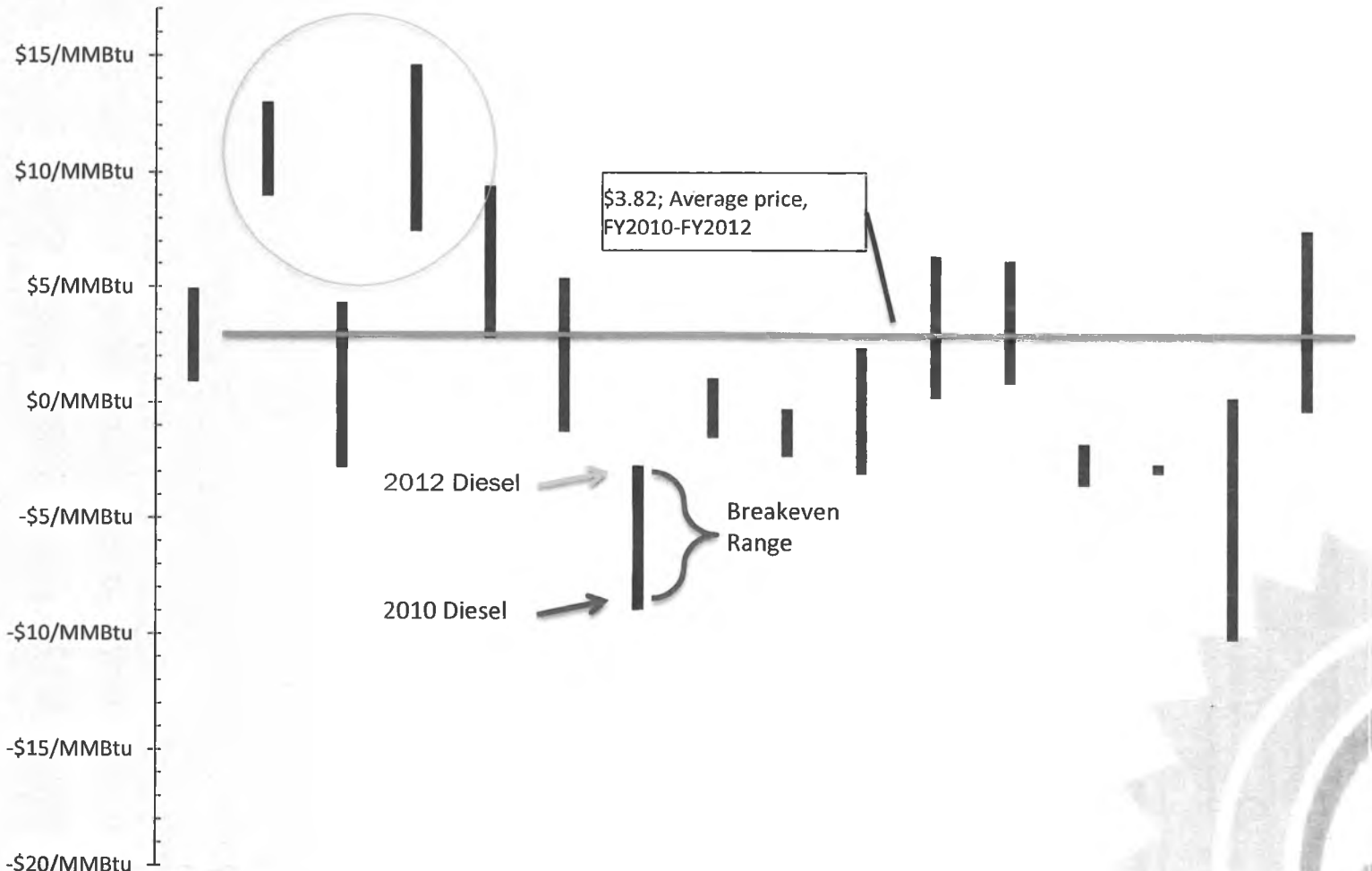
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Break-even Natural Gas Prices for Select Ice-free Communities Given FY2010 & 2012 Diesel Costs



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Break-even Natural Gas Prices for Select Ice-bound Communities Given FY2010 & 2012 Diesel Costs



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Some takeaways

- Economies of scope and scale matter
  - Project must aggregate larger (and industrial) loads to start
  - Economics for smaller loads in ice-free communities may work, but larger-project must first be commercially assembled
- Efficiency of use matters; scale can sometimes overcome
  - Economics for ice-bound communities are challenged
  - Ice-bound communities with larger demand (e.g. Dillingham) may get enough economies of scale from bulk (non-ISO) storage
- Reasonable to expect:
  - Unalaska/Dutch – Dillingham – Naknek bulk (non-ISO) project
    - ISOs for proximal communities may follow
  - SE ISO project with PCE utility needs met by ISOs will need:
    - SE industrial anchor tenant(s), or
    - Backhaul from Unalaska

ACEP Focus Areas

ACEP is an honest broker (and developer) of information to help clarify choices and assist with decision making related to energy technologies and options



Community Energy Solutions



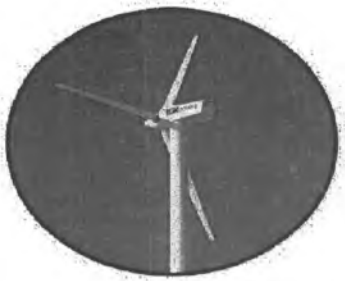
Powering the Economy



The EnergyField of the Future

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ACEP Focus Areas

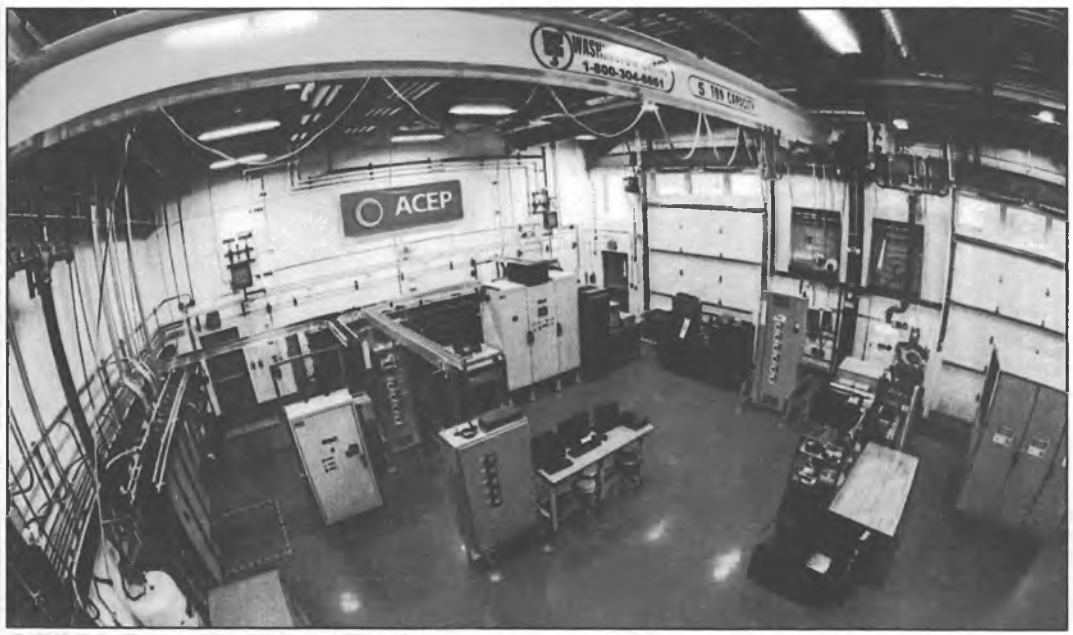
	 Community Energy Solutions	 Powering the Economy	 The EnergyField of the Future
Testing & optimization	✓	✓	
IP Development	✓		
Analysis and Planning	✓	✓	✓
Student involvement	✓	✓	✓

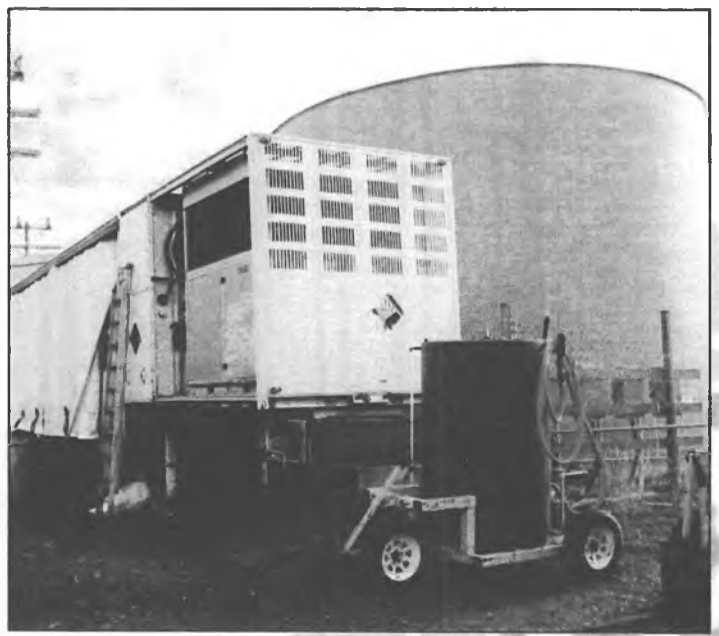
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Testing and System Optimization

- **Both in the laboratory and in the field**

  Recent lab-based examples include: Electratherm, Sustainable Automation grid-forming inverter, Prudent Energy flow battery, Williams flywheel (next up)





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ACEP Energy Technology Lab (L) and Premium Power Installation in Kotzebue (R)

Example: Geothermal → Industrial Process Energy

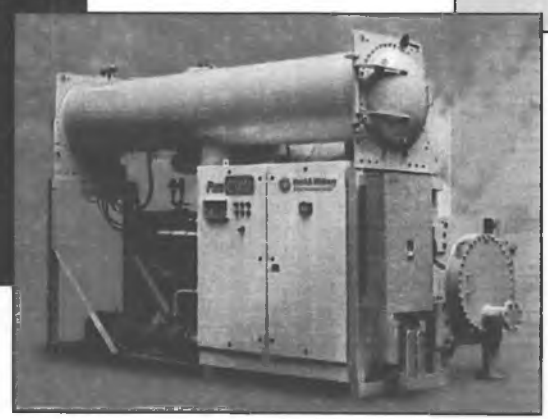
Using Organic Rankine Cycle technology for waste heat recovery



Electratherm testing at UAF



Electratherm 50kW ORC System



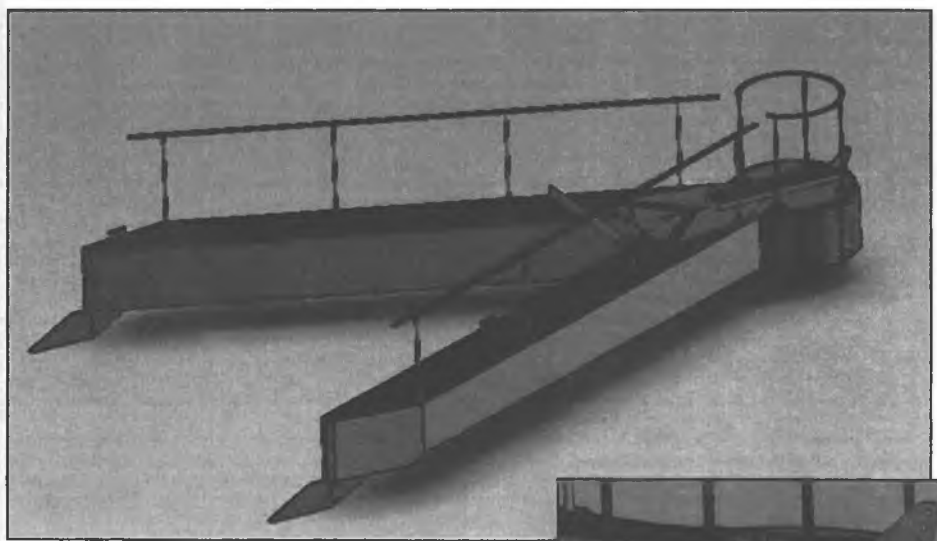
Pratt & Whitney 280 kW ORC System

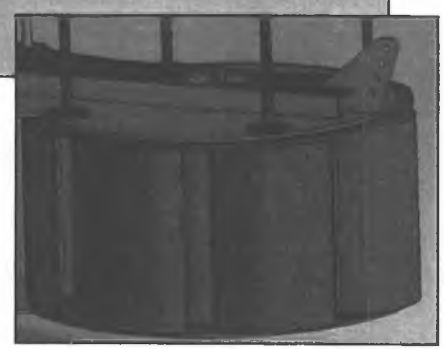
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Development of IP with Alaska applications

ACEP has developed a device to divert surface debris from a surface deployed hydrokinetic device



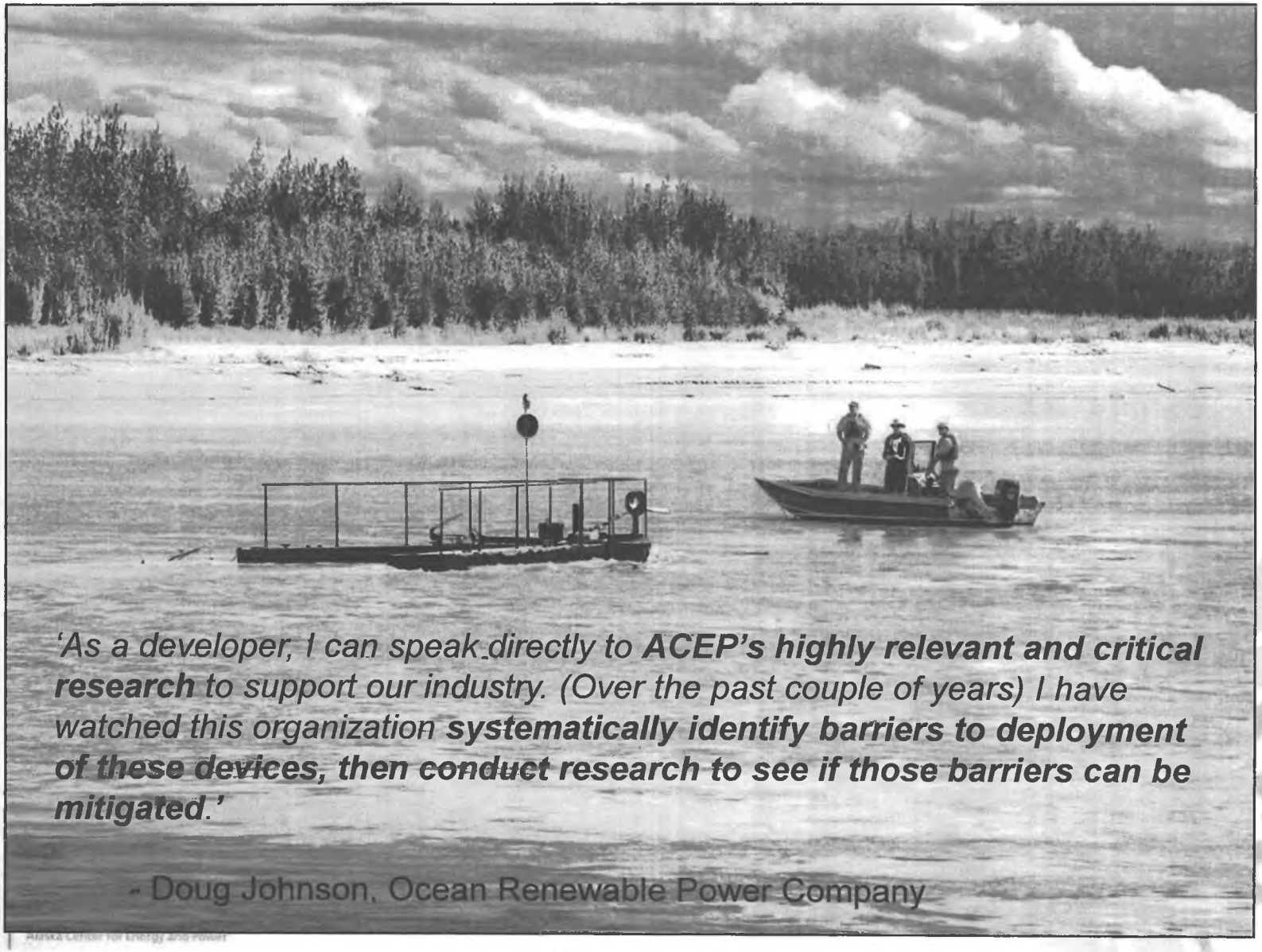






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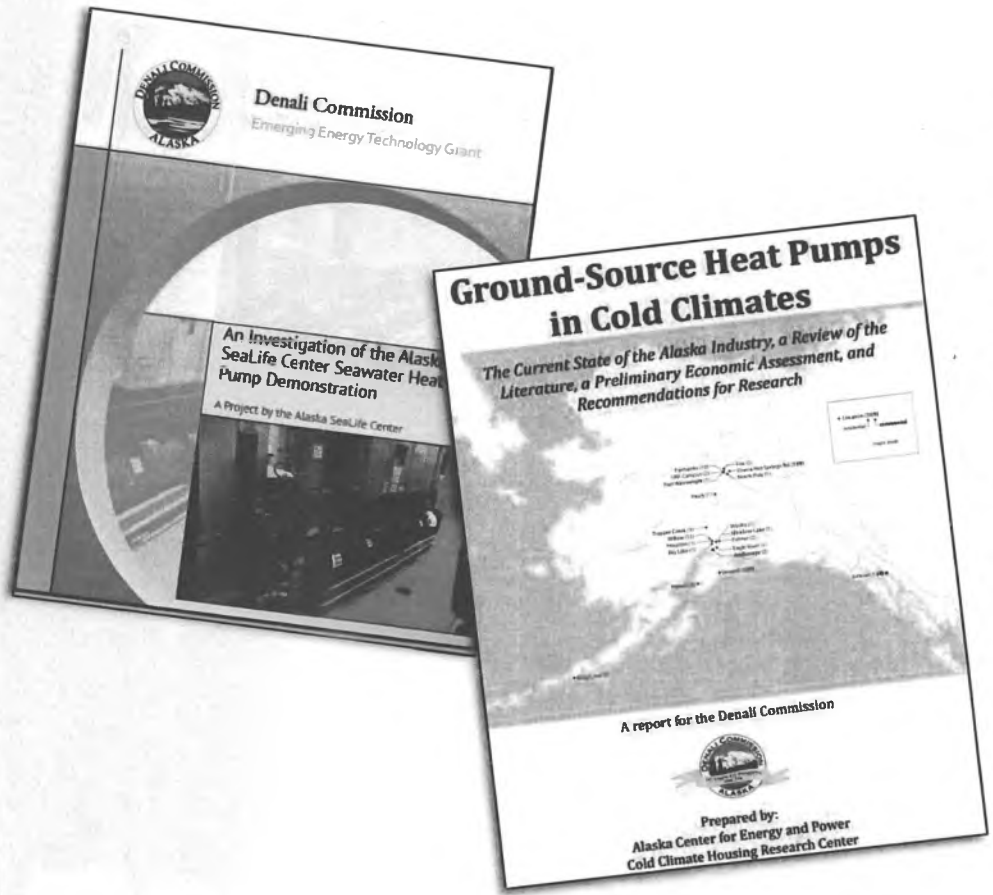
Development of IP with Alaska applications

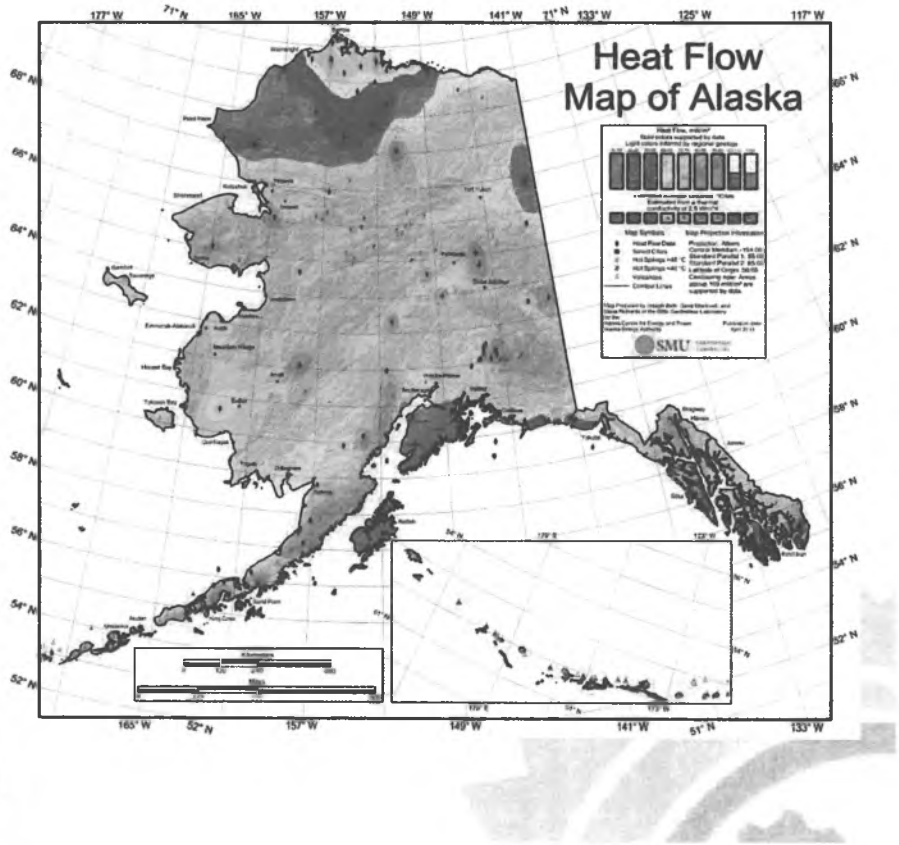


*'As a developer, I can speak directly to **ACEP's highly relevant and critical research** to support our industry. (Over the past couple of years) I have watched this organization **systematically identify barriers to deployment of these devices, then conduct research to see if those barriers can be mitigated**.'*

- Doug Johnson, Ocean Renewable Power Company

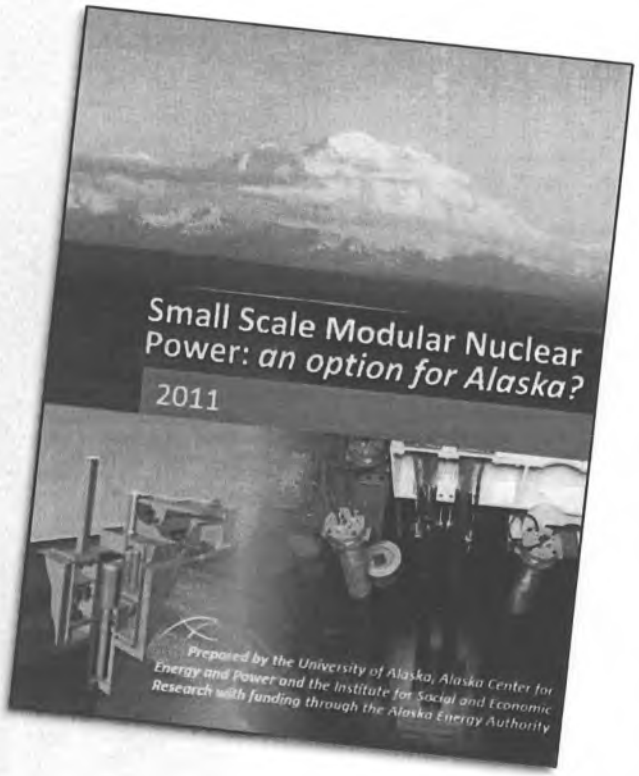
Technology Analysis: Ground and Seawater Source Heat Pumps

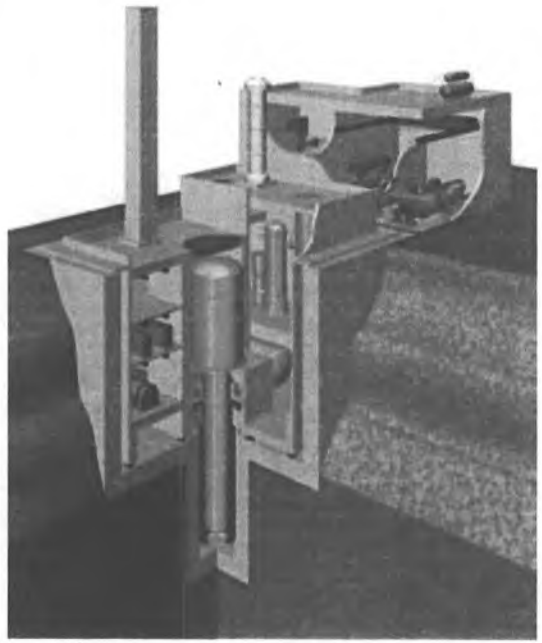




ACEP has compiled data and completed technical evaluations of operating systems statewide – these reports have been downloaded and used extensively. ACEP has also collected data statewide to update our understanding of heat flow. *In collaboration with: AEA, the Denali Commission, CCHRC, the Seward Sealife Center, and Southern Methodist University.*

Technology Analysis: Small Modular Nuclear Reactors

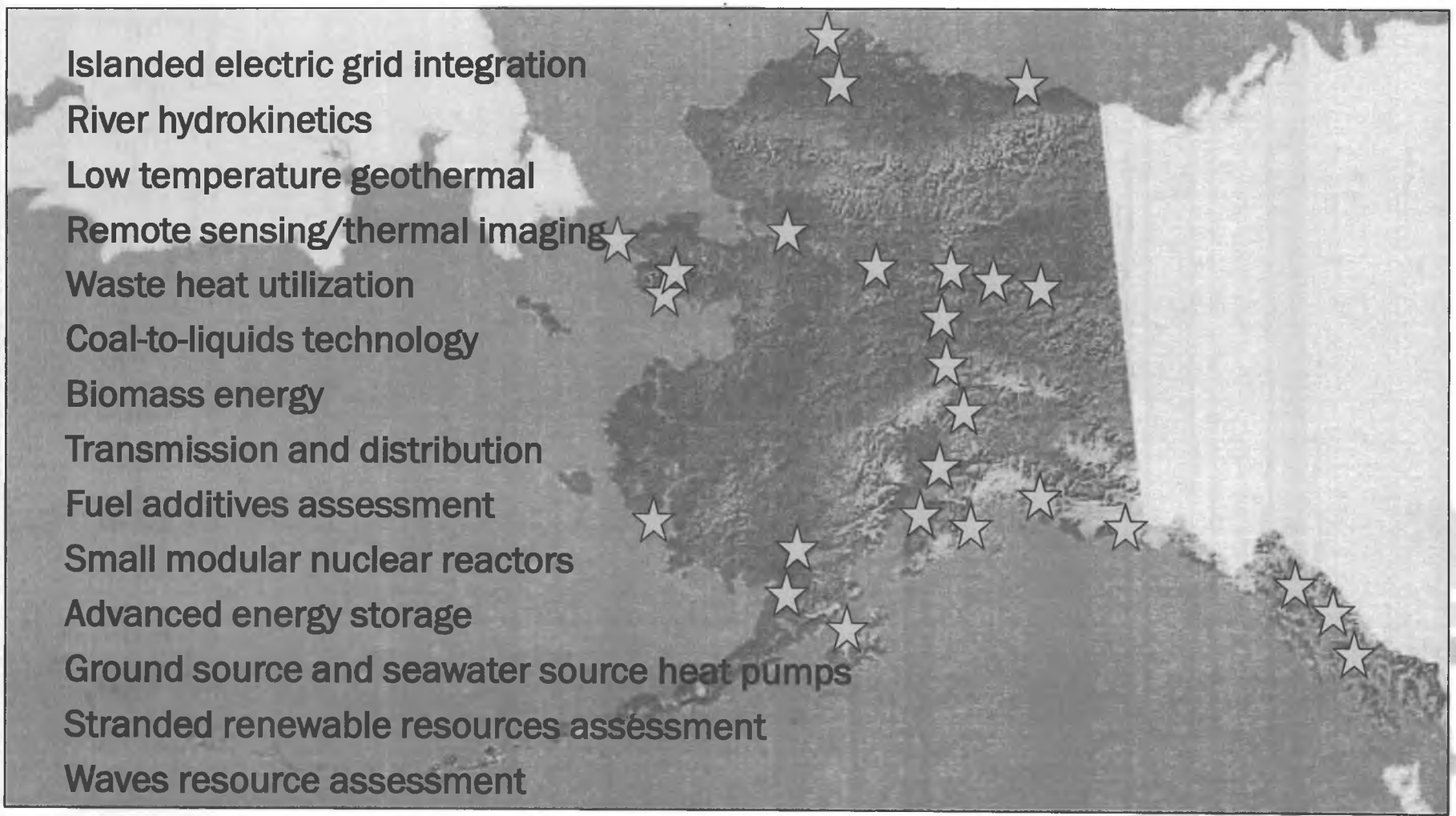




Proposed Toshiba 4S reactor (10MW, proposed for Galena)

In 2011, ACEP completed a comprehensive report on the potential for using small modular reactor technology for Alaska. We continue to track this technology, and are sending 3 UAF graduate students to Idaho National Lab to participate in the design of a 1MW system for space applications. *In collaboration with ISER (UAA).*

ACEP Projects are Statewide



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Example: Geothermal Energy for Nome









Clockwise from left: ACEP shallow drilling program; confirmation drilling program in 2013, community meeting in Teller; thermal mapping of region.

ACEP been involved in multiple aspects of assessing geothermal energy as an option for Nome, including an extensive resource assessment, economic analysis, fuel pricing, and integration with existing generation sources. *In collaboration with: AEA, US DOE, Unaatuq, BSNC, NSEDC, the City of Nome and NJUS, SNC, WMNC, TNC, MINC, USGS*

Project Financing- A Role for Independent Power Producers – Lessons from Nome

POTELCO INC
A Quanta Services Company

QUANTA SERVICES





Above: Binary power plant at Chena Hot Springs. Right: Two turbines from BSNC wind farm at Banner Peak in Nome. Note turbine repairs to tip breaks taking place in winter conditions.

Nome has been purchasing power from BSNC via a power purchase agreement for several years and is in the process of entering into a second PPA with a subsidiary of Potelco, Inc for the possible development of a geothermal project. If developed, as much as $40M in private financing could be invested in energy infrastructure to serve Nome, and to provide a substantial portion of the utilities' base load needs.

Thoughts on Proposed Rural Energy Capital Energy Fund (HB 277/SB 138)

Initial Analysis by AEA would entail:

1) Develop a plan for developing infrastructure to deliver more affordable energy to areas of the state that are not expected to have direct access to a North Slope natural gas pipeline.
2) Recommend a plan for funding the design, development, and construction of the required infrastructure, and may identify a source of rent, royalty, income, or tax received by the state that may be appropriated by the legislature to implement the plan.
3) Provide the plan and suggested legislation for the design, development, construction, and financing of the required infrastructure to the legislature before January 1, 2017.

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VISION: Alaska leading the way in innovative production, distribution, and management of energy



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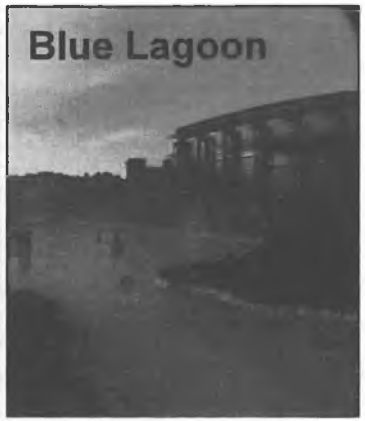
VISION: Alaska leading the way in innovative production, distribution, and management of energy

What does this mean?

- We are maximizing production of our oil and gas resources
- We are developing local resources wherever practical
- We are using innovative financing mechanisms to incentivize private sector investment in Alaskan project
- Diesel-off is common place in our rural communities
- Experience gained by solving Alaska's energy challenges is exported (knowledge-based economy)

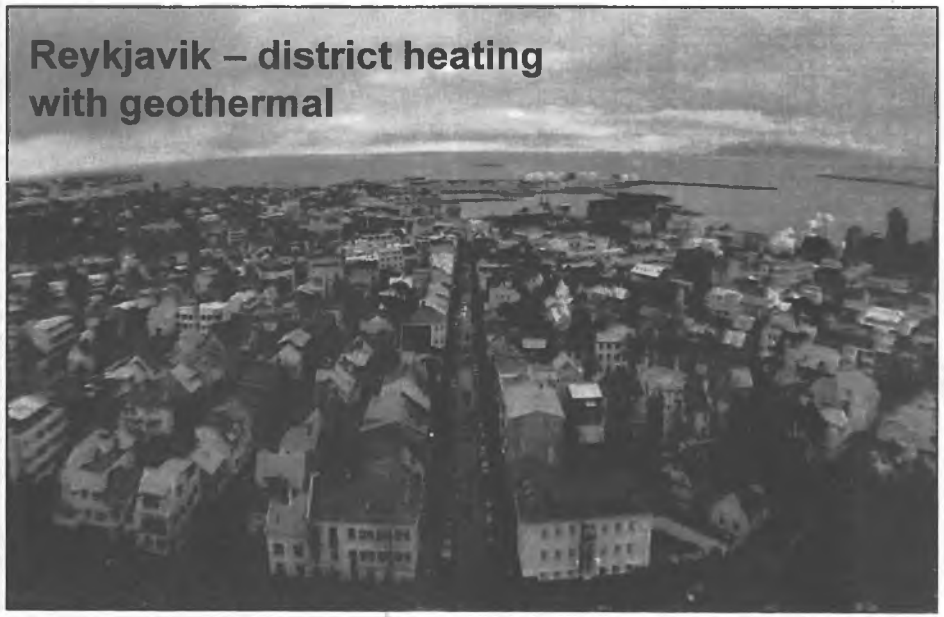
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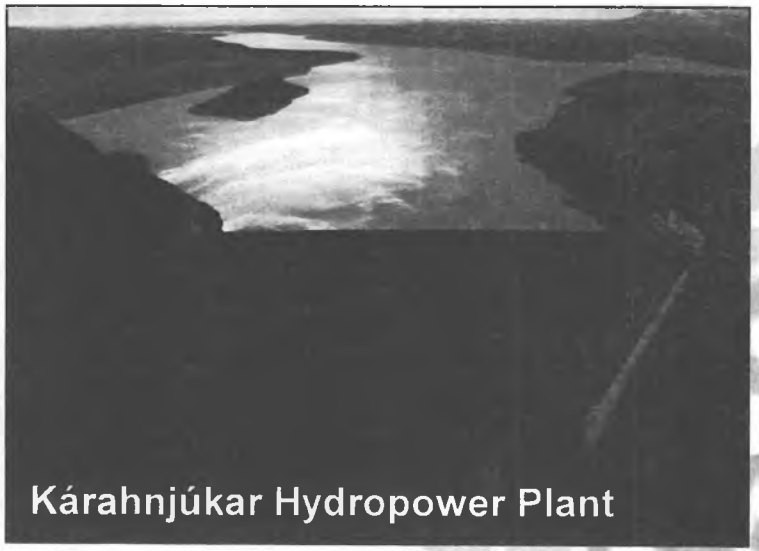
Iceland – World leader in geothermal energy











Creating opportunities at home & abroad

- Over 80 companies involved in geothermal industry (exploration, development)
- Provides free education to students from countries with undeveloped geothermal potential
- Pipeline for business opportunities for Icelandic businesses in emerging markets
- High quality jobs, energy sector significant contributor to GDP

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Supporting Statewide Economic Development: *Alaska's comparative advantages*

- High contribution renewables
- Difficult to extract/transport fossil fuels
- Value added processing
- Niche technologies (low temp geothermal, hydrokinetics)

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Funding Energy Research is a Critical Component to a Healthy Business Ecosystem

- Emerging Energy Technology Grant Fund – funding pilot and demonstration projects
- University-based research in energy (including support for extractive industries) – creating value
- Example from Texas – sustainably funded research through STARR program

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www.uaf.edu/acep

For more information contact:

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Director, Alaska Center for Energy & Power
University of Alaska
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04/09/14 Informal Energy Round Table Workshop: Addressing the Immediate Concerns of TRANSCOs and ISOs in Alaska

<TARGET><BILL></BILL><SUBJECT>04-09-14 Informal Energy Round Table Workshop Addressing the Immediate Concerns of TRANSCOs and ISOs in Alaskas</SUBJECT><COMM>HENE28</COMM></TARGET>

Representative Doug Isaacson

Addressing the Immediate Concerns of TRANSCOs and ISOs in Alaska

An Informal Energy Roundtable Workshop

AGENDA

State Capitol - Barnes Room 124

Juneau, Alaska

April 9, 2014

8:00 a.m. - Call the meeting to order

+Presentations:

Commissioner TW Patch, *Chairman, Regulatory Commission of Alaska (Telephonic)*

Eric Myers, *Manager of Business Development, American Transmission Co.*

Brad Evans, *CEO, Chugach Electric Association*

Comments/Discussion:

Evan "Joe" Griffith, *President, ARCTEC & Matanuska Electric Association*

Bradley Janorschke, *General Manager, Homer Electric Association*

Cory Borgeson, *President & CEO, Golden Valley Electric Association (Invited)*

Ethan Schutt, *President, CIRI Energy*

Duff Mitchell, *Business Manager, Juneau Hydropower*

10:00 a.m. - Adjourn

+ Teleconferenced

If you or your staff have any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov).

Session (Jan-April) Alaska State Capitol •Juneau, AK 99801• (907) 465.4527 • (907) 465.2197-Fax
Interim 301 Santa Claus Lane •North Pole, AK 99705•(907) 451-2818•(907) 451-2332-fax
Rep.Doug.Isaacson@akleg.gov



Helping to keep the lights on,
businesses running
and communities strong®

Integrating the Grid for Reliability, Efficiency and Growth

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Paul Jett
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Eric Lundberg
Manager Financial Services
Business Development
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262-506-6853

American Transmission Company

First Multi-State Stand-Alone Transmission Utility in the U.S.

- Formed in 2001
- Privately-Held
- 28 Owners
- Investor-Owned, Municipal and Cooperative Utilities
- 500M in Assets in 2001

Growth Since Formation

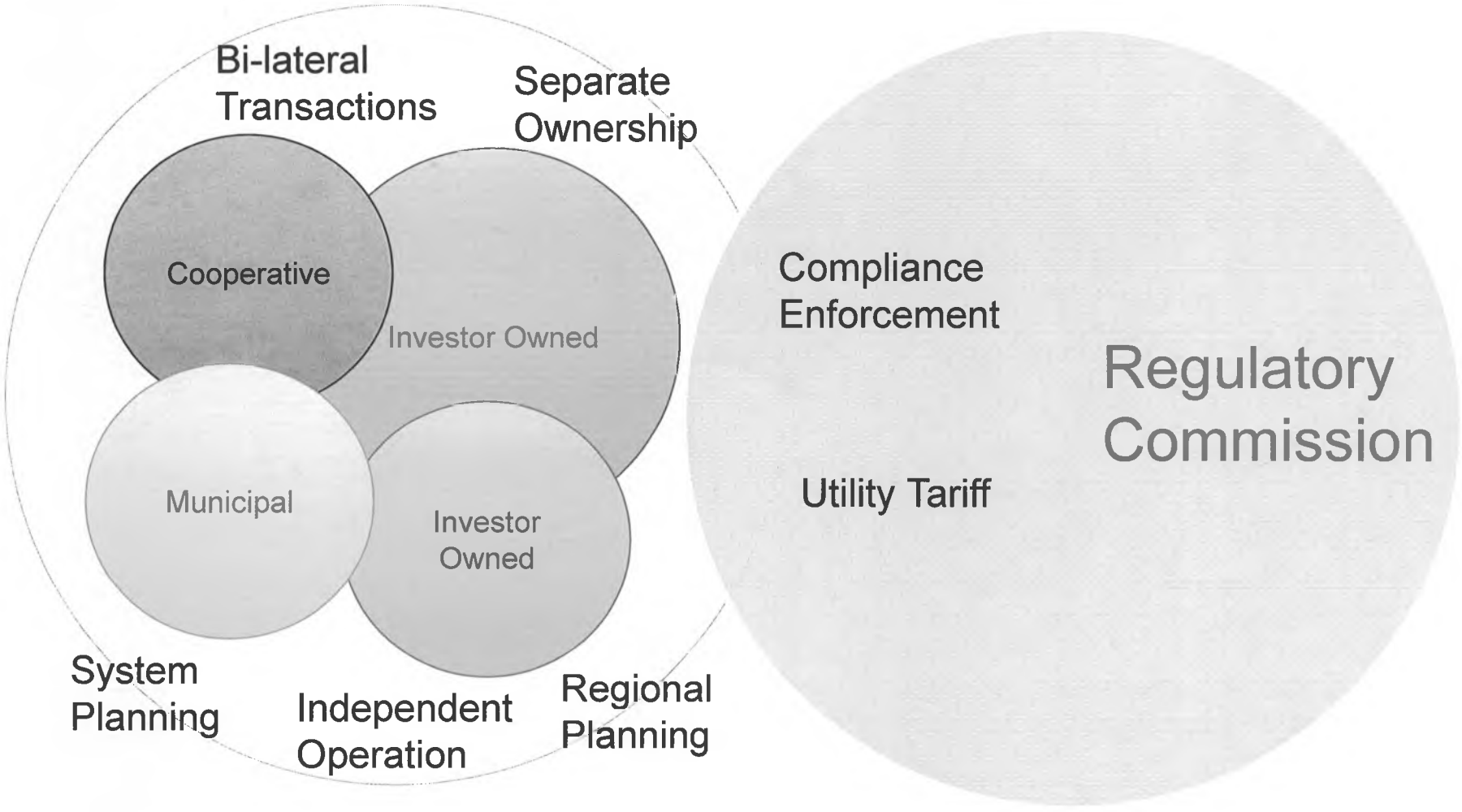
- $Over $3.3B in Assets today
- Own and Operate 9,480 Miles of Transmission
- 529 Substations



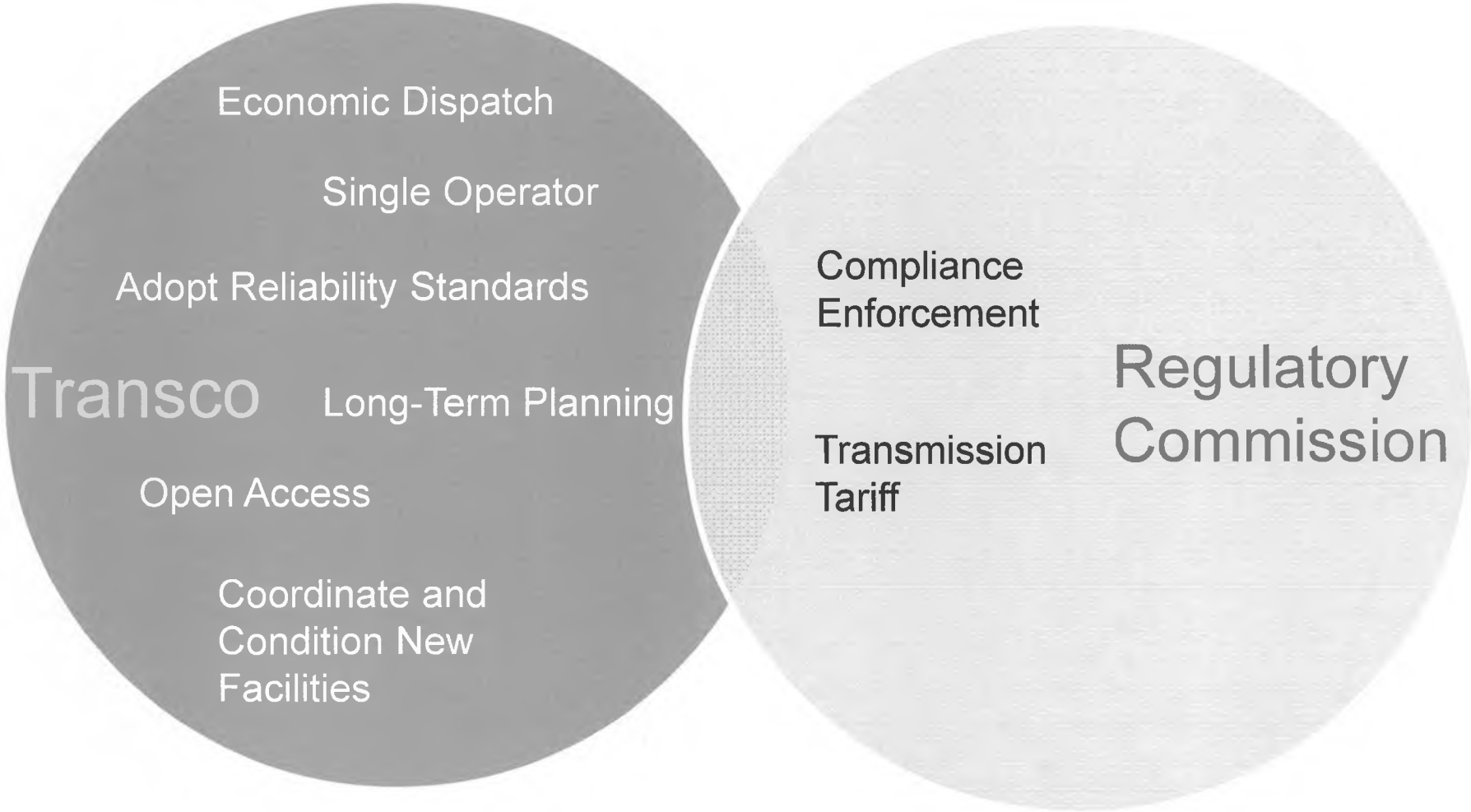
AMERICAN TRANSMISSION COMPANY®

What does ATC do?

- Authority over transmission operation and construction
- Non-discriminatory open access
- Adopt, maintain & enforce reliability standards
- Plan, coordinate and condition new facilities
- Single operator – economic dispatch
- Administer universal transmission tariff


Bi-lateral Transactions
Separate Ownership
Cooperative
Investor Owned
Municipal
Investor Owned
System Planning
Independent Operation
Regional Planning
Compliance Enforcement
Regulatory Commission
Utility Tariff

Pre-Transco


Economic Dispatch
Single Operator
Adopt Reliability Standards
Transco
Long-Term Planning
Open Access
Coordinate and Condition New Facilities
Compliance Enforcement
Transmission Tariff
Regulatory Commission

In our experience, it works.

Our singular focus on transmission allows ATC to:

- Plan Effectively
- Obtain and Deploy Capital,
- Build the Network,
- Operate Efficiently,
- Respond to Changing Conditions and
- **Serve our Customers**.

Railbelt

Independent System Operator (ISO) and its relationship to a Transco

Legislative Roundtable
April 9th, 2014

Reliability, Efficiency, and Open Access Transmission

CHUGACH
POWERING ALASKA'S FUTURE

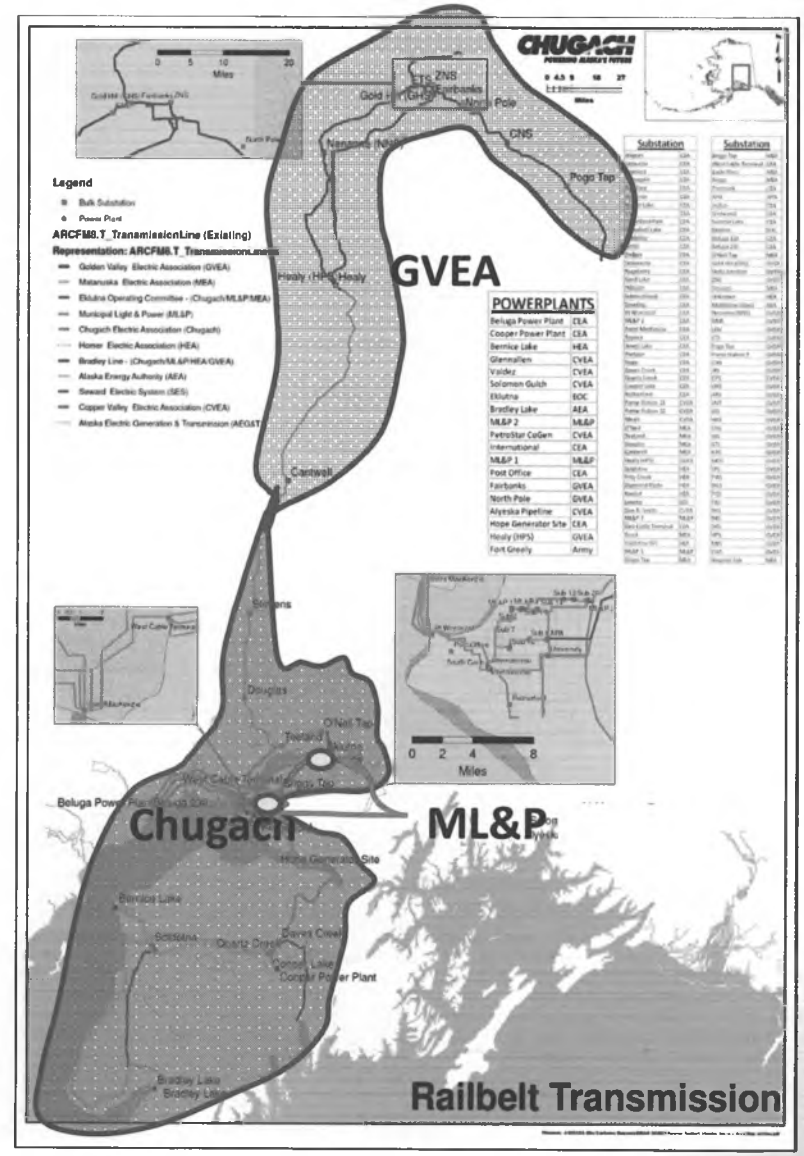
The Railbelt is changing

- **Historically three generation and transmission (G&T) utilities with regional responsibility, and voluntary compliance**
- **We now have five G&T utilities and regional challenges that cannot easily be resolved within the current structure**
- **For a successful future we will require:**
  - **An independent authority and accountability**
  - **Consistent and mandatory rules**
  - **A regional approach to reliable power delivery**
  - **And efficient least-cost economic generation dispatch**

Railbelt 1985-2013

1985 - 2013

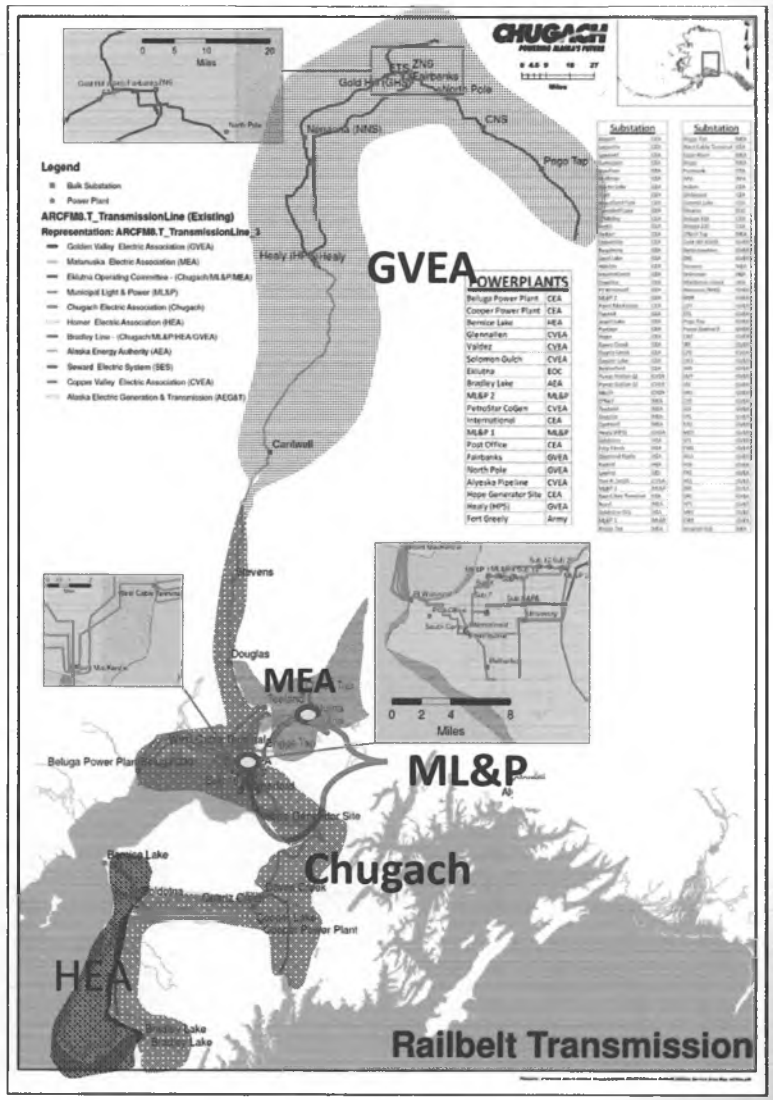
- 3 vertically integrated utilities
- Reliability rules unanimously adopted with voluntary compliance
- Alaska Intertie Agreement "utility users only"
- Bradley Lake Agreements with transmission access
- Minimal changes to Generation & Transmission (G&T) system
- Utility owned & operated generation
- Chugach economically dispatched HEA, MEA, SES & Chugach retail plus GVEA economy



Railbelt 2014-2015

2014 - 2015

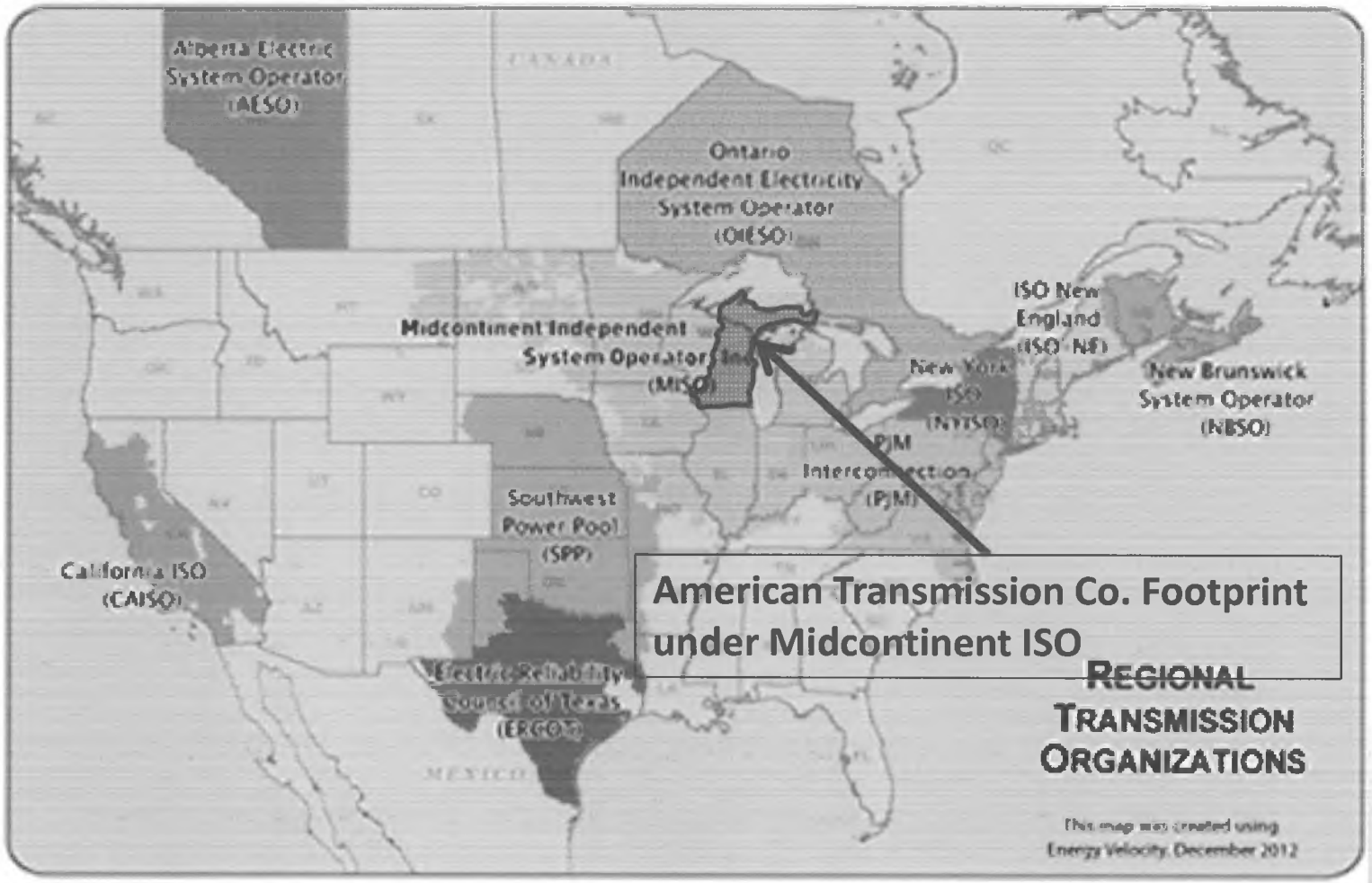
- **Addition of 2 new vertically integrated utilities**
- **Reliability rules not unanimous –interconnection standards not uniformly implemented**
- **Alaska Intertie Agreement "possible new users" through open access terms**
- **Bradley Lake transmission congestion and access issues**
- **Significant new generation- erosion of stability margins**
- **Addition of Independent Power Producers (IPP'S)**
- **Unbundle transmission costs- reserve sharing without transmission rights?**



Costs of system Balkanization business case

- Increased Cost of Regulatory Oversight
- No business case for regional expansion of transmission
- Lost regional economic opportunities i.e. mines, pump stations, etc.
- Increased barriers to IPP project integration
- Inequitable distribution of system reserve and other costs
- Decreased reliability -"more outages to customers"
- Generation dispatch is run inefficiently
- Uneconomic dispatch wastes fuel
- Transmission congestion wastes fuel
- Increased losses waste fuel
- Inefficient use of hydroelectric resources
- Increased difficulty in regulating non-dispatchable resources

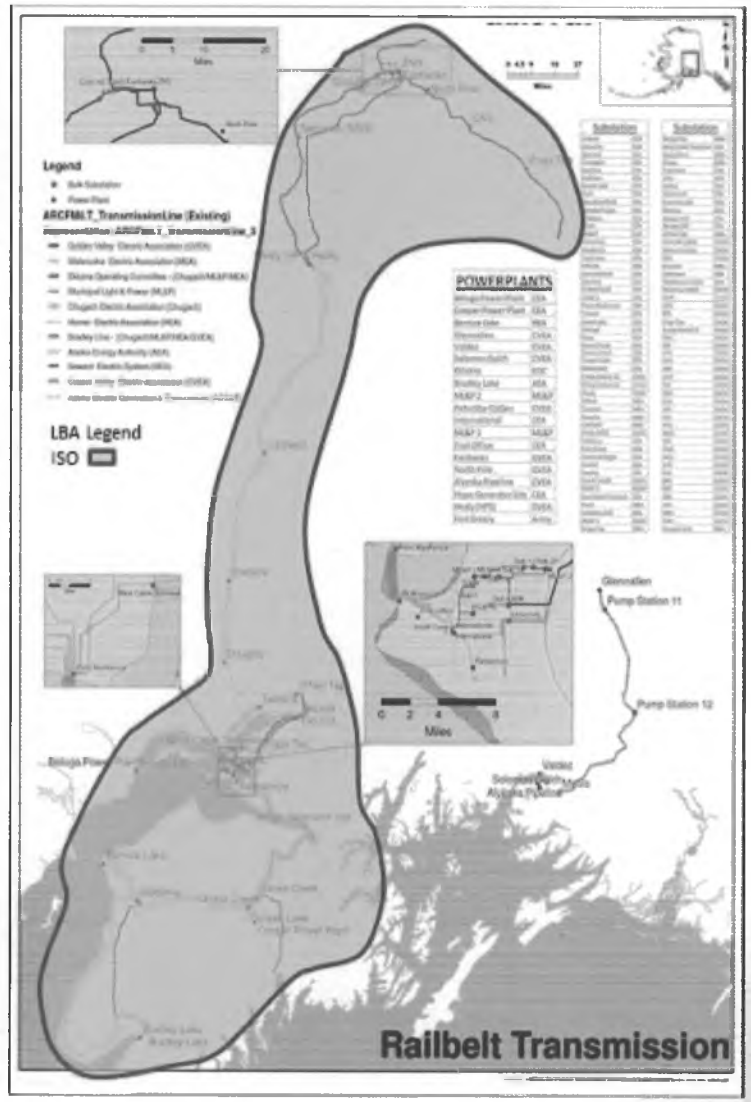
Independent System Operators and Transcos are common in the Lower-48 and Canada



Railbelt needs drive change

ISO

- **Universal reliability standards**
- **Independent authority to enforce rules**
- **Long-term planning to maximize efficiency, improve reliability, and diversify energy options**
- **Regional operations for economic dispatch, undertake regional system improvements, and resolve Bradley Lake energy delivery congestion**
- **Facilitates access for IPPS, Industrials, the military, and other non-utility generators**



Railbelt ISO





- Stakeholder governance
- Under RCA jurisdiction
- Adopts reliability & interconnection standards
- Plans and condition projects
- Enforces standards
- Ensures non-discriminatory transmission access
- Develops tariff for single system-wide transmission rate
- Responsible for reliability
- Responsible for system economic dispatch

• Possesses regulatory compact

Regulatory compact

RCA assigns authority to the ISO to:

- **Ensure reliability compliance**
- **Implement non-discriminatory open access**
- **Develop a universal tariff**
- **Develop reliability standards**
- **Oversee system-wide economic dispatch**

RCA recognizes ISO's stakeholder developed planning protocols

Responsible for long-term transmission planning

Assures project cost recovery for ISO-approved transmission projects

Ensures stakeholder representation on ISO board

Railbelt Transco



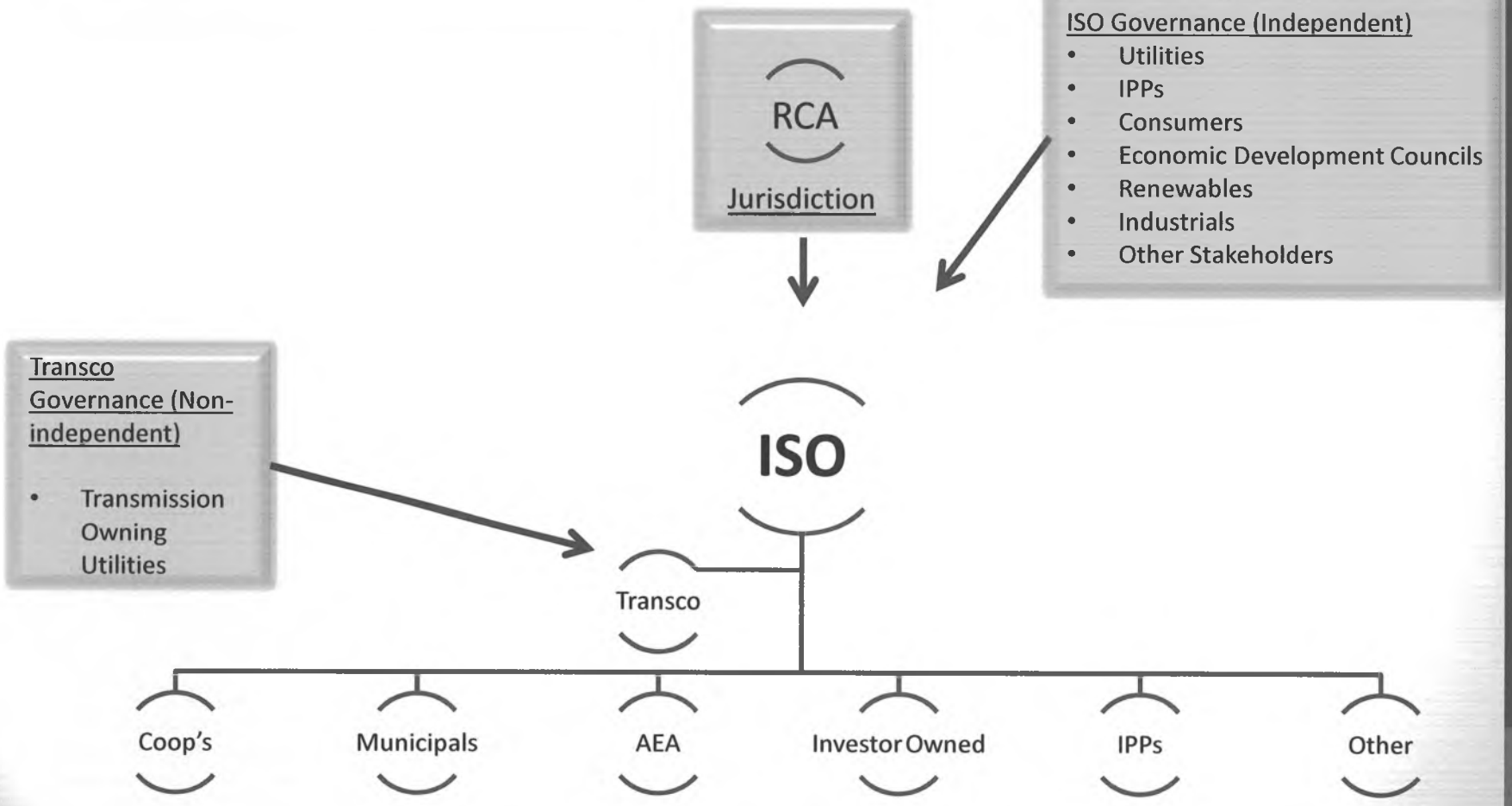
Under ISO-RCA jurisdiction

- Participation voluntary
- Its owners are its customers, a "cooperative-like" model
- Could encompass all or part of the Railbelt transmission system
- Finances, permits, engineers and constructs ISO proposed transmission assets
- Maintains transmission system assets in its region
- Provides non-discriminatory open access to its transmission system
- Pools costs and submits to ISO for rate recovery
- Possesses regulatory rate recovery assurance through ISO regulatory compact

ISO-Transco Relationship

	ISO	Transco
Performs economic dispatch	Yes	No
Plans projects	Yes	No
Conditions projects	Yes	No
Drafts reliability standards, assures compliance	Yes	No
Independent board represents stakeholders	Yes	No
Responsible for ensuring non-discriminatory open access	Yes	No
Responsible for short term reliability	Yes	No
Regulatory Compact	Yes	Through ISO
Owns assets	No	Yes
Builds transmission	No	Yes
Finances transmission	No	Yes
Maintains transmission	No	Yes

ISO Structure with Transco



Benefits of system integration business case

- Simplified regulatory environment
- Business structure for regional transmission project development
- Reduced barriers to IPP project integration
- Enhanced regional economic development
- Increased reliability- "the value of unserved Energy"
- Increased equity in the distribution of "system costs"
- Efficient least-cost economic dispatch
- Regional planning relieves transmission congestion
- Additional transmission construction reduces losses
- Hydro reservoir optimization
- Enhanced non-dispatchable resource integration

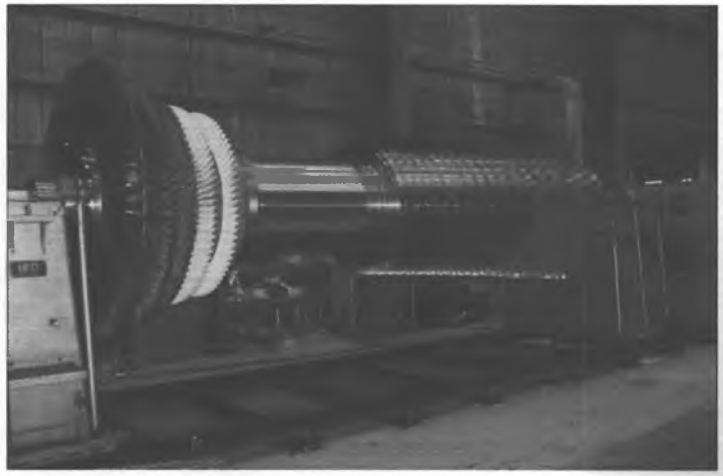
Questions?











HB

39

<TARGET><BILL>HB 39</BILL><SUBJECT>HB
39</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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Capitol Building, Room 13
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Fax (907) 465-2197
rep.doug.isaacson@akleg.org

Agenda

Wednesday, February 6, 2013
8:00 – 10:00 A.M.
Barnes Committee Room (#124)

*+ HB 39 "An act relating to the Power Cost Equalization program"

\+ Renewable Energy Projects Overview, Presentation by Sara Fisher-Goad, Executive Director, Alaska Energy Authority

*First hearing in committee of referral
+Teleconferenced
=Bill previously heard/scheduled

HOUSE BILL NO. 39

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-EIGHTH LEGISLATURE - FIRST SESSION

BY REPRESENTATIVE EDGMON

Introduced: 1/7/13
Referred: Prefiled

A BILL

FOR AN ACT ENTITLED

"An Act relating to the power cost equalization program."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*** Section 1.** AS 42.45.110(b) is amended to read:

(b) An eligible electric utility is entitled to receive power cost equalization

(1) for sales of power to local community facilities, calculated in the aggregate for each community served by the electric utility, for actual consumption of not more than 70 kilowatt-hours a month for each resident of the community; the number of community residents shall be determined annually by the latest figures of the United States Bureau of the Census or other population data that the Department of Commerce, Community, and Economic Development determines is reliable; and

(2) for actual consumption of not more than **600** [500] kilowatt-hours a month sold to each [RESIDENTIAL] customer **in all classes served by the electric utility except**

(A) customers of the utility covered under (1) of this subsection;

(B) customers that are state or federal offices or state or federal facilities; and

(C) nonresidential customers of the utility that consume more than 2,400 kilowatt-hours a month.

* **Sec. 2.** AS 42.45.110(d) is amended to read:

(d) An electric utility whose customers receive power cost equalization under AS 42.45.100 - 42.45.150 shall set out in its tariff the rates without the power cost equalization and the amount of power cost equalization **for each** [PER] kilowatt-hour sold. The rate charged to the customer shall be the difference between the two amounts. Power cost equalization paid under AS 42.45.100 - 42.45.150 shall be used to reduce the cost of all power sold to local community facilities, in the aggregate, to the extent of 70 kilowatt-hours **a** [PER] month **for each** [PER] resident of the community, and to reduce the cost of the first **600** [500] kilowatt-hours **for each** [PER RESIDENTIAL] customer **a month for all other classes served by the electric utility except state and federal offices and state and federal facilities and nonresidential customers of the utility that consume more than 2,400 kilowatt-hours a** [PER] month.

Sponsor Statement

HB 39
Power Cost Equalization

HB 39 proposes to restore certain components of the Power Cost Equalization (PCE) program that existed prior to 1999. It would raise the consumption cap on residential power covered by the program from 500 kWh to 600 kWh per month, and it would include small-business rate payers in the pool of entities eligible for PCE, also at a cap of 600 kWh per month. These small commercial customers are clearly defined as only those who presently consume no more than 2,400 kWh per month. Presently, such businesses—which are important contributors to bush economies—are not eligible to receive PCE benefits.

HB 39 addresses the near-term survival of our rural communities. In recent years, the state of Alaska has created and supported energy programs that in time will significantly improve the long-term sustainability of our remote towns and villages. The legislation you have before you is an important interim measure to stabilize those same communities while permanent solutions are established.

Throughout the year, rural residents strive to conserve power and remain below the present 500 kWh ceiling. In fact, on average PCE-eligible customers consume less than 400 kWh per month—more than 40 percent less electricity than the average urban Alaskan consumer. Researchers have described rural electricity consumption as survival-level—scarcely sufficient to power what in urban areas would be regarded as the most basic household functions. In winter, it is particularly difficult to maintain such extraordinary levels of conservation.

HB 39 seeks to extend a lifeline to rural Alaskans during the harsh winter months. At the same time, it will support small business owners, strengthening their viability as local job creators and enabling them to make goods and services more affordable in remote communities.

I would be grateful for your support for this bill.

Prepared by the Office of Rep. Edgmon

LEGISLATIVE RESEARCH REPORT

DECEMBER 16, 1999

REPORT NUMBER 00.022

POWER COST EQUALIZATION, 1981-1999

PREPARED BY KEVIN O'SULLIVAN, LEGISLATIVE ANALYST

You requested an update of Legislative Research Report 95.159, a legislative history of the Power Cost Equalization Program (PCE). As enacted in 1981, the program was designed to reduce the electric rates paid by rural consumers to levels comparable to those paid by consumers in Anchorage, Fairbanks, and Juneau. The program also makes grants to eligible utilities to improve the performance of the utility. Operating under four different names over the past twenty years, the program has evolved in various ways. Because 95.159 provided a detailed history for the years 1981-1995, we focus in this report on developments from 1995 to the present.[1]

Significant Changes Since 1995

An amendment to AS.42.45.110 effective July, 1999, increased the entry rate from 9.5 cents/kwh to 12 cents/kwh and decreased the consumption cap for residential customers from 700 kwh/month to 500 kwh/month. As a result, the subsides paid to rural utilities will decline. A second significant change removed commercial customers and public schools from the energy subsidy program.[2] Especially affected by this change are rural school districts who must now absorb the cost of lost PCE credits out of their operating budgets, while still meeting the requirements of AS 14.17.520 to spend at least 70 percent of their operating budget on instructional functions.[3]

During the past five years, the Legislature appropriated approximately $17 million annually to the Power Cost Equalization and Rural Electric Capitalization (PCE-REC).[4] This is in keeping with the Legislature's intent to flat-fund the power cost equalization program at a minimum of $17 million

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[1] For a detailed history of these four programs between 1981-1995, see Legislative Research Report 95.159.

[2] Sec. 5-8 ch 93 SLA 1999.

[3] For more information, see Legislative Research Report 99.086, "Use of the PCE Program by School Districts."

[4] *Statistical Report of the Power Cost Equalization Program*, Division of Energy for fiscal years 1996-1999.

annually through the year 2013.[5] Bert Tarrant, PCE program coordinator for the Division of Energy, reports that PCE program costs without commercial customers and schools are approximately $15.7 million. If appropriations are insufficient for payment in full to program participants, statutes direct the Department of Community and Economic Development (DCED) to divide these appropriations on a pro rata basis among the utilities.[6]

The following tables summarizes the main differences in the programs over the years.

Changes in PCE Program Requirements

	FY 81 Power Production Cost Assistance Program	FY 82-FY85 Power Cost Assistance Program	FY 85-FY94 Power Cost Equalization Program	FY 94-FY 98 Power Cost Equalization and Rural Electric Capitalization Fund	FY 99-Present Power Cost Equalization and Rural Electric Capitalization Fund
Entry Rate [1]	7.65 cents/kwh	12 cents/kwh	8.5 cents/kwh	9.5 cents/kwh	12 cents/kwh
Ceiling Rate [2]	40.0 cents/kwh	45.0 cents/kwh	52.5 cents/kwh	52.5 cents/kwh	52.5 cents/kwh
Percentage of Eligible Costs Reimbursed	85 percent	95 percent	95 percent	95 percent	95 percent
Eligible Costs in Excess of the Ceiling Rate Paid	Yes	No	No	No	No
Consumption Cap for Residential and Commercial Customers[3]	None	600 kwh/month	750 kwh/month	700 kwh/month	500 kwh/month
Consumption Cap for Community Facilities	None	55 kwh/month per resident	70 kwh/month per resident	70 kwh/month per resident	70 kwh/month per resident

NOTES:
1. Entry Rate: A rural utility is reimbursed a percentage of its costs when those costs exceed the minimum amount per kilowatt hour.
2. Ceiling Rate: A rural utility is reimbursed a percentage of its costs when those costs are below this maximum but above the entry rate.
3. Customer eligibility is defined in statute and based on actual power use. State and federal offices and facilities are excluded from PCE. Recent changes to AS 42.45.110 made commercial customers and public schools ineligible for PCE credits. Residential customers are now eligible for PCE credit up to 500 kwh/month, while community facilities, as a group, continue to receive PCE credit for up to 70 kwh/month multiplied by the number of residents in the community.

SOURCES: Department of Community and Economic Development, Division of Energy (Bert Tarrant), personal communications, December 1999; Sec. 5-8 ch 93 SLA 1999; Legislative Research Report 95.159.

I hope you find this information useful. Please do not hesitate to contact us if you have questions or need additional information.

[5] Chapter 18, SLA 1993.

[6] Chapter 58, SLA 1999 transferred responsibility for administering the PCE-REC program to the Department of Community and Economic Development, Division of Energy, following the dissolution of the Department of Community and Regional Affairs. PCE pro rata reduction is required by AS 42.45.110 (l).

LEGISLATIVE RESEARCH REPORT

SEPTEMBER 19, 2005

REPORT NUMBER 06.016

POWER COST EQUALIZATION PROGRAM

BY KATHLEEN L. WAKEFIELD, LEGISLATIVE ANALYST

You asked that we update Legislative Research Report 00.022, *Power Cost Equalization, 1981-1999*, which was itself an update of an even earlier report (95.159, *Legislative History of the Power Cost Equalization Program*).

As you know, legislators established a rural electrical rate subsidy program in 1980 called the Power Production Cost Assistance (PPCA) program (now known as PCE, or the Power Cost Equalization program). The program was created to provide subsidies to utilities to reduce the electrical rates paid by rural residents to levels comparable to rates in Anchorage, Fairbanks, and Juneau. The Regulatory Commission of Alaska (RCA) determines the equalization rate for each utility, using fuel expenses (including transportation) and non-fuel expenses such as salaries, insurance, taxes, and other "reasonable costs."[1] Eligible utilities then submit monthly reports to the Alaska Energy Authority (AEA), documenting the amount of power sold.[2] AEA then calculates the amount of equalization assistance due and reimburses each utility for the subsidy the company has already provided to its customers. AEA also determines the eligibility of customers and community facilities.[3]

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[1] "Highlights of the Power Cost Equalization Program," *Statistical Report of the Power Cost Equalization Program, Fiscal Year 2004*, December 2004, p. 3.

[2] AS 42.45.115 excludes any electrical utility "whose primary source of power for sale to customers is one or more of the power projects that were part of the former initial project" from the PCE program. The "former initial project" refers to the Four Dam Pool hydroelectric facilities (Tyee Lake, Swan Lake, Solomon Gulch, and Terror Lake).

[3] For example, 3 AAC 107.270 defines "customers" as including "an eligible electric utility's residential customer of energy for a single-family or multi-family dwelling, or residential housing unit." In addition, 3 AAC 107.260 requires that customers make "timely payments" to the electrical utility. "Community facilities" include water and sewer facilities, public outdoor lighting, and other community buildings open to the public. AS 42.45.150(1).

Over the years, legislators have made a number of modifications to the program, while maintaining the initial intent of reducing rural electrical costs. The following information shows the evolution of the program:

- **FY81**: Legislators established the *Power Production Cost Assistance Program* under the Alaska Power Authority.[4] The program reimbursed utilities for a percentage of eligible power costs that exceeded the "entry rate"—85 percent of eligible costs in excess of 7.65 cents per kWh. The "ceiling rate," or maximum rate, was 40 cents per kWh—PPCA reimbursed utilities for 100 percent of costs that exceeded the maximum rate. Eligible costs included only production and transmission costs.

- **FY82**: The program's name was changed to the *Power Cost Assistance Program.* The entry rate was increased to 12 cents per kWh, and the ceiling rate was increased to 45 cents. Eligible costs were expanded to include administrative and distribution costs. Utilities received reimbursement for 95 percent of eligible costs, but no reimbursement for costs in excess of the ceiling rate. In addition, legislators imposed "consumption caps" of 600 kwh per month for residential and commercial consumers, and 55 kWh per month per resident for community facilities.

- **FY85**: The program's name was changed again, to the *Power Cost Equalization Program* (PCE). The entry rate was reduced to 8.5 cents per kWh, and the ceiling rate increased to 52.5 cents. Utilities received reimbursement for 95 percent of eligible costs, but no reimbursement for costs in excess of the ceiling rate. Consumption caps were increased to 750 kWh per month for commercial and residential users, and to 70 kWh per month per resident for community facilities.

- **FY94**: Legislators established the *Power Cost Equalization and Rural Electric Capitalization Fund* (PEC-RECF).[5] They capitalized the fund through an appropriation from the Railbelt Energy Fund. In addition, legislators stated their intent to continue to support rural electrical subsidies by maintaining the fund at a minimum of $17 million dollars each year through 2013.[6]

  The legislation also transferred responsibility for all rural energy programs from AEA to the newly created Division of Energy in the Department of Community and Regional Affairs. AEA retained responsibility for the state's hydroelectric and intertie projects, under the auspices of the Alaska Industrial

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[4] In FY91, the Alaska Power Authority became the Alaska Energy Authority.

[5] The fund allows AEA to award grants to eligible utilities for up to 75 percent of costs for small power projects designed to reduce the cost of providing electrical power. According to AS 42.45.180(b), total grants may not exceed three percent of the available fund balance in any one year. In addition to the initial $67 million appropriation from the Railbelt Energy Fund, further deposits to the fund include annual appropriations for electrical subsidies and grants, appropriations from the National Petroleum Reserve-Alaska special reserve fund, appropriations from the Power Cost Equalization Endowment Fund, interest, and "any gifts, bequests, contributions from other sources, and federal money." AS 42.45.100(b).

[6] Section 1(b), Ch. 18, SLA 1993.

Development and Export Authority (AIDEA). The PCE entry rate was increased to 9.5 cents per kWh, but the ceiling rate remained the same, as did the percentage of reimbursement. Consumption caps were reduced to 700 kWh per month for residential and commercial users, and remained at 70 kWh per month per resident for community facilities. The legislature, however, eliminated the subsidies for federal and state government facilities.

- **FY98**: Governor Knowles established the PCE Blue Ribbon Committee to "consider and recommend an overall policy on the future of PCE."[7] The committee was composed of legislators, industry representatives, and one public member. Among the committee's recommendations were the following items:

    - The legislature should extend PCE or an alternative rate support program into the future;

    - Rate support should be available only for residential consumers and for community facilities that are directly related to public health and safety; and

    - The legislature should establish a stable source of funding for the program.[8]

- **FY99**: The entry rate for PCE was increased to 12 cents per kWh, and the consumption caps were reduced to 500 kWh per month for residential users. The consumption cap for community facilities remained at 70 kWh per month per resident. Legislators abolished subsidies for commercial users and schools. The legislature approved HB 40, which reorganized several state departments, abolished the Department of Community and Regional Affairs, and transferred the agency's responsibilities to other departments.[9] Rural energy programs, including PCE, were transferred to AEA, with AIDEA oversight. Former Division of Energy staff became AIDEA employees.

- **FY01**: Legislators established the *Power Cost Equalization Endowment Fund* (PCE-RECF) to support the PCE and Rural Electric Capitalization Fund.[10] The endowment fund consists of legislative appropriations and any interest earned by the fund. Lawmakers appropriated $100 million from the Constitutional Budget Reserve Fund as the initial capitalization for the fund. The proceeds from the sale of the Four Dam Pool and the balance of the Four Dam Pool Insurance Fund were deposited into the fund in 2002, bringing the total deposits into the fund to approximately $192 million.

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[7] "Introduction," *Power Cost Equalization: Report and Recommendations of the Governor's Blue Ribbon Committee*, February 1, 1999, p. 1.

[8] "Summary of Recommendations," p. 3.

[9] Ch. 58, SLA 1999.

[10] AS 42.45.070 and 42.45.085.

The legislature has continued to appropriate funds to the PCE-RECF for the operation of the PCE program. The FY06 appropriation is $18.7 million.

Table 1 shows the changes in program provisions over the past 25 years.

Table 1: Changes in PCE Program Requirements, FY81-FY05

Program Requirements	FY81 Power Production Cost Assistance Program	FY82-FY85 Power Cost Assistance Program	FY85-FY94 Power Cost Equalization Program	FY94-FY98 Power Cost Equalization Program	FY99-Present Power Cost Equalization Program
Entry Rate [1]	7.65 cents/kWh	12 cents/kWh	8.5 cents/kWh	9.5 cents/kWh	12 cents/kWh
Ceiling Rate [2]	40.0 cents/kWh	45.0 cents/kWh	52.5 cents/kWh	52.5 cents/kWh	52.5 cents/kWh
Percentage of Eligible Costs Reimbursed	85 percent	95 percent	95 percent	95 percent	95 percent
Eligible Costs in Excess of the Ceiling Rate Paid	Yes	No	No	No	No
Consumption Cap for Residential and Commercial Customers [3]	None	600 kWh/month	750 kWh/month	700 kWh/month	500 kWh/month
Consumption Cap for Community Facilities	None	55 kWh/month per resident	70 kWh/month per resident	70 kWh/month per resident	70 kWh/month per resident

NOTES:
1. *Entry Rate*: A rural utility is reimbursed a percentage of its costs when those costs exceed the minimum amount per kilowatt hour.
2. *Ceiling Rate*: This is the maximum amount for eligible costs--under the current program, a rural utility receives no reimbursement for costs in excess of this figure.
3. In FY94, the legislature elimiated subsidies for federal and state government facilities. In FY99, the legislature eliminated subsidies for schools and commercial users.

SOURCES: AS 42.45.100-190; Alaska Energy Authority; Legislative Research Reports 95.159 and 00.022.

Over the life of the program, the state has spent $378 million for power cost equalization (this figure does not include the FY06 appropriation of $18.7 million, nor does it include power project grants from the PEC-REC fund). Table 2 shows the amount spent or appropriated for PCE by fiscal year.

Table 2: Power Cost Equalization Program Expenditures, FY1981-2006

Fiscal Year	Amount[1]	Fiscal Year	Amount
1981	$2,658.6	1994	$17,679.9
1982	$9,300.0	1995	$18,620.5
1983	$8,300.0	1996	$19,329.7
1984	$8,298.2	1997	$17,967.9
1985*	$14,128.2	1998	$18,664.2
1986	$17,532.0	1999	$18,050.0
1987	$13,787.5	2000	$14,562.2
1988	$15,000.0	2001	$16,091.6
1989	$16,823.6	2002	$15,619.7
1990	$19,715.5	2003	$15,700.0
1991	$16,747.1	2004	$15,700.0
1992	$15,029.6	2005	$15,700.0
1993	$17,533.0	*2006*	*$18,700.0*
	Total PCE 1981-2006		***$397,239.0***

Notes: 1. Amounts for FY1981-2005 are actual expenditures. Amounts for FY1981-1984 include administrative costs. FY2006 is the authorized budget amount.
* The large increase in program expenditures in FY85 was due to a reduction in the entry rate and increases in the consumption caps for residential and commercial consumers, and community facilities.

Sources: Legislative Finance Division, Historical Budgets online and Operating Budget Books ("shortforms").

I hope you find this information to be useful. Please do not hesitate to contact us if you have questions or need additional information.

Article 02. POWER COST EQUALIZATION ENDOWMENT FUND

Sec. 42.45.070. Power cost equalization endowment fund established.

(a) The power cost equalization endowment fund is established as a separate fund of the authority. The fund consists of

(1) legislative appropriations to the fund that are not designated for annual expenditure for the purpose of power cost equalization;

(2) accumulated earnings of the fund;

(3) gifts, bequests, contributions of money and other assets, and federal money given to the fund that are not designated for annual expenditure for power cost equalization; and

(4) [Repealed, Sec. 13 ch 60 SLA 2000].

(b) Nothing in this section creates a dedicated fund.

(c) [Repealed, Sec. 13 ch 60 SLA 2000].

Sec. 42.45.080. Powers and duties of the commissioner of revenue.

(a) The commissioner of revenue is the fiduciary of the fund. In managing the fund, the commissioner shall

(1) have the same powers and duties as are provided in AS 37.10.071; and

(2) invest the fund in a manner likely to achieve at least a seven percent nominal return over time.

(b) In managing the fund, the commissioner shall

(1) consider the status of the fund's capital and the income generated on both current and probable future bases;

(2) determine the appropriate investment objectives;

(3) establish investment policies to achieve the objectives; and

(4) act only in regard to the best financial interests of the fund.

(c) On July 1 of each year, the commissioner shall determine the monthly average market value of the fund for the previous three fiscal years.

Sec. 42.45.085. Use of the power cost equalization endowment fund.

(a) Seven percent of the amount determined by the commissioner of revenue on July 1 of each year under AS 42.45.080(c) may be appropriated for the fiscal year beginning the following July 1 for the following purposes:

(1) funding the power cost equalization and rural electric capitalization fund (AS 42.45.100);

(2) reimbursement to the Department of Revenue for the costs of establishing and managing the fund; and

(3) reimbursement of other costs of administration of the fund.

(b) Nothing in this section creates a dedicated fund.

Sec. 42.45.099. Definition.

In AS 42.45.070 - 42.45.099, "fund" means the power cost equalization endowment fund established in AS 42.45.070.

PCE Endowment Fund
Real and Projected Balances and Appropriations

Actual 3-Year Average Monthly Values for PCE Endowment Fund, Calculated on July 1st Each Year

FY08 through FY10	**FY09 through FY11**	**FY10 through FY12**
$357,354,639.15	**$340,796,667.84**	**$472,728,791.28**
7% of the Value—Used for Statutorily Allowed Appropriation for FY12	7% of the Value—Used for Statutorily Allowed Appropriation for FY13	7% of the Value—Used for Statutorily Allowed Appropriation for FY14
$25,014,825	**$23,855,767**	**$33,091,015**
The level of appropriation if only 5% of value were used.	The level of appropriation if only 5% of value were used.	The level of appropriation if only 5% of value were used.
$17,867,732	**$17,039,833**	**$23,636,440**

Estimated 3-Year Average Monthly Values for PCE Endowment Fund, Calculated on July 1st Each Year

FY11 through FY13	**FY12 through FY14**	**FY13 through FY15**	**FY14 through FY16**
$624,734,072.98	**$774,204,232.45**	**$796,876,704.12**	**$802,863,170.32**
7% of the Value—Used for Statutorily Allowed Appropriation for FY15	7% of the Value—Used for Statutorily Allowed Appropriation for FY16	7% of the Value—Used for Statutorily Allowed Appropriation for FY17	7% of the Value—Used for Statutorily Allowed Appropriation for FY18
$43,731,385	**$54,194,296**	**$55,781,369**	**$56,200,422**
The level of appropriation if only 5% of value were used.	The level of appropriation if only 5% of value were used.	The level of appropriation if only 5% of value were used.	The level of appropriation if only 5% of value were used.
$31,260,018	**$38,932,248**	**$40,519,416**	**$41,543,815**

Source: Alaska Department of Revenue.

POWER COST EQUALIZATION

Report and Recommendations

Of the

Governor's Blue Ribbon Committee

February 1, 1999

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INTRODUCTION

The Power Cost Equalization program has paid a portion of the electrical bills of rural consumers since 1985. During this period, the PCE budget has averaged about $17.5 million per year. In 1993, the State legislature established a Power Cost Equalization and Rural Electric Capitalization Fund (the "PCE Fund") with an appropriation of $66.9 million, and also enacted the following policy statement:

> Ch. 18, SLA 1993, Sec. 1. "FINDINGS AND INTENT. (a) The legislature finds that adequate, reliable, electric service at affordable rates is a necessary ingredient of a modern society and a prosperous developing economy. The legislature further finds at the current stage of social and economic development in the state, direct participation by the state is necessary to assist in the development of a regional electric transmission infrastructure and to assist in holding rates in high cost service areas to affordable levels.
>
> (b) The legislature recognizes the high cost of electric power in rural Alaska and intends that funding for power cost equalization from the general fund and from the power cost equalization and rural electric capitalization fund remain at a minimum of $17,000,000 annually through the year 2013. The legislature further intends that this long-term commitment to the power cost equalization program will permit and encourage the electric utility industry and its lenders to develop the plans, make the investments, and take other actions that are necessary or prudent to meet the utility needs of residents in rural Alaska."

Over the last several years, PCE outlays have been drawn exclusively from the PCE Fund, which will be nearly exhausted by the end of FY99. For PCE to continue beyond FY99, a renewed commitment will be needed by the 1999 legislature and by the Governor.

In anticipation of this pivotal legislative session, the Governor convened a Blue Ribbon Committee to consider and recommend an overall policy on the future of PCE as well as specific proposals to implement that policy. The Committee membership was designed to reflect a variety of institutional perspectives by including members from the legislature, the public utilities commission, the Anchorage chamber of commerce, rural consumers, rural utilities, and the State's industrial development agency. The Committee membership (in alphabetical order) is as follows:

Blue Ribbon Committee Membership

The Honorable Al Adams
Alaska State Senator

Mr. Robert Beans, Chairman
Alaska Village Electric Cooperative, Inc.

Mr. Sam Cotten, Chairman
Alaska Public Utilities Commission

Mr. Joe Griffith, Chairman
Anchorage Chamber of Commerce

Ms. Nancy James
Consumer representative from Ft. Yukon

Mr. Robert Martin Jr., (former) General Manager
Tlingit & Haida Regional Electrical Authority

The Honorable Drue Pearce
Alaska State Senator

Mr. Walter Sapp, representative
Four Dam Pool Project Management Committee

Mr. Randy Simmons, Executive Director
Alaska Industrial Development and Export Authority

Mr. Dewey Skan, President
Rural Alaska Community Action Program, Inc.

Mr. Eric Yould, Executive Director
Alaska Rural Electric Cooperative Association, Inc.

Beginning in January 1998, the Committee reviewed the history, structure, and impact of PCE, the organizational and cost structure of rural electric utilities, and proposals that have been made to reduce rural power costs. The Committee then returned to the task of developing policy and program recommendations with respect to the PCE program.

SUMMARY OF RECOMMENDATIONS

The Committee has adopted the following recommendations:

1. PCE or an alternative rate support program for high cost service areas should be extended into the future.

2. Such rate support should be available only for:

   A. A "lifeline" supply of electric power for residential consumers. A lifeline supply is defined as one-half of the statewide average consumption per household each month. While this amount varies over the course of a year, the average monthly lifeline supply would be approximately 350 kWh.

   B. Electric power for community facilities that are directly related to public health and safety.

3. A stable source of funding for PCE or an alternative rate support program should be established with the following major components:

   A. 60% of the annual debt service paid to the State by the Four Dam Pool – this would include the 40% now allocated to PCE plus the 20% now allocated to the Power Project Fund loan program.

   B. $20 million appropriated by the 1993 legislature as a loan for the Swan/Tyee intertie, based on a proposal from Ketchikan Public Utilities to forego the loan in exchange for State bonding of Swan/Tyee intertie costs.

   C. Proceeds of a universal service fund to be created from a surcharge on all electricity sold statewide by public utilities.

4. A statewide organization or agency should be designated to establish standards for rural electric utilities with respect to financial management, physical plant, and system operations. No rural electric utility should continue to receive rate support or capital project grants from the State unless it is in compliance with these standards, is making clear and continuing progress in attaining compliance, or has entered into an agreement with an existing utility or utility organization whose operation is consistent with the standards.

All Committee members recognize the challenge in gaining a consensus on future program funding as well as the amount of future benefits. For this reason, several options are presented in this report for consideration by the Governor and the legislature:

OPTION 1: Universal service fund.

1A. A lifeline supply of power is made available at 150% of the statewide average residential rate. (The 150% level is estimated at 17.0 cents per kWh.)

1B. Same as 1A except the lifeline rate is set at 100% of the statewide average residential rate. (The 100% level is estimated at 11.3 cents per kWh.)

OPTION 2: General Fund endowment / extend modified PCE through 2013.

OPTION 3: Declining general fund appropriations / extend modified PCE through 2010.

OPTION 4: Further explore the potential for federal funding of PCE or an alternative rate support program.

The potential funding options were debated at length by the Committee and ultimately put to a vote. Included in Attachment 1 are the questions included on the Committee ballot and the ballot results. Key results are as follows:

- A majority of Committee members recommend the creation of a universal service fund to provide limited rate relief in high cost service areas.
- Of the 7 members favoring a universal service fund, a majority would set the lifeline rate at 150% of the statewide average residential rate.
- Each of the options listed above is believed by a majority of the Committee members to be worthy of further consideration by the Governor and legislature.

DISCUSSION OF RECOMMENDATIONS

Recommendation #1 – PCE or an alternative rate support program for high cost service areas should be extended into the future.

A. Economic growth and development in rural Alaska.

For many years and in many different ways, both the State and federal government have consistently carried out a policy of helping to build up and improve the basic infrastructure of Alaska's rural villages. Examples of this commitment include continuing investments in local schools, water and sanitation facilities, housing, airports, harbors, roads, health care, bulk fuel storage, communications, and a host of other public facilities. These financial commitments make sense only on the belief that rural communities will be economically viable and self-sustaining in the future. This has been the basis of State and federal policy with respect to rural Alaska for many years. To abandon PCE at this stage of development in rural Alaska would be contrary to the long-standing State and federal policy of helping rural Alaska during its difficult transition to a modern, self-sustaining economy.

B. Affordable power is a necessity.

The Committee believes that electric power is a necessity which should be available and reasonably affordable to everyone living in an established community. For example, new housing units financed by the federal Department of Housing and Urban Development (HUD), which are increasingly common throughout rural Alaska, are essentially uninhabitable without electric power to keep pipes from freezing, to run fans and pumps for space heat, and to operate other housing essentials such as refrigerators, freezers, and lights. In addition, new public infrastructure projects financed by State and federal governments are equally dependent on electric power – pumps for water and sewer facilities, pumps for fuel transfers and dispensing, or heating and lighting systems for local schools. Very little of this makes sense if electric power is not available and affordable throughout the expected life of these facilities.

But in most of rural Alaska, electricity is not reasonably affordable because the cost of service is high while average cash incomes are low. There are three approaches the State can take to help make rural power more affordable:

1. Increase personal income through economic development or increased transfer payments. The Committee assumes, however, that a major advance in economic development on a broad scale is not something that the State can quickly bring about and that significant increases in transfer payments are not likely to occur.

2. Reduce rates directly through PCE or an alternative rate support program.

3. Reduce the actual cost of generating and distributing power. Among the possible cost reduction strategies are the following:

   a. Utility mergers to create economies of scale.

   b. Consolidated fuel purchasing to reduce fuel costs.

   c. Increase the efficiency of diesel generators.

   d. Upgrade distribution systems to reduce line losses.

   e. Replace diesel with alternative energy where warranted.

   f. End use conservation.

   A working paper prepared for the Panel entitled "Options for Reducing Rural Power Costs" is included as Attachment 2. A number of these options continue to hold promise for long-term reduction in power costs, and the Committee believes that aggressive efforts to pursue them should accompany any extension of a rate support program.

   The Committee is also aware, however, that none of these cost reduction strategies are new and that all have practical limitations. For example:

   - Utility mergers. The data suggest that electricity rates for a single-village utility are likely to go up initially rather than down if it merges with a multi-village system, despite the benefit of administrative economies of scale. This is because the multi-village utility is more likely to budget for such fundamentals as plant depreciation, preventive maintenance, and insurance. In addition, the multi-village utility is more likely to finance needed investments in physical plant, and to recover the associated debt service in its rates, while the single-village utility is more likely to obtain

government grants when equipment replacement can no longer be postponed.

- Consolidated fuel purchasing. If this were to reduce delivered fuel costs for a given utility by 25 cents per gallon – a generous assumption on fuel cost savings – and if the diesel generating efficiency for the utility were 12 kWh per gallon – roughly the average for all PCE utilities – then the reduction in the cost of power would be about 2 cents per kWh. While certainly valuable, savings of this magnitude would have a relatively small impact on the power cost differential between urban and rural Alaska.

- Alternative energy. While established alternatives such as small hydro should be pursued where favorable prospects exist, and while developing technologies such as wind and fuel cells should be further tested and improved, there is little evidence that these alternatives will reduce power costs in the near future on an unsubsidized basis. In those limited cases where alternative energy projects can result in lower rates, the reason can most often be traced to the use of government grants or other favorable project financing.

The Committee concludes that there is no utility cost reduction program that can begin to provide the near-term impact that PCE has on utility rates. For power to be widely affordable in rural Alaska within the foreseeable future, there is no practical alternative to direct rate reduction through PCE or an alternative rate support program.

C. Eliminating PCE would create financial hardship.

There is an additional reason for the Committee's basic recommendation eliminating PCE would create financial hardship for many rural families. If further budget reductions are needed to match sustainable revenues, the State should avoid targeting the population that, overall, is least able to afford it. At the present time, the average PCE benefit per residential customer is about $550 per year.

The Committee retained Prof. Scott Goldsmith of ISER to examine the likely impact on rural consumers, rural utilities, and village economies if PCE were eliminated and no other program were established to take its place. The Executive Summary of his report, "The Economic Significance of the Power Cost Equalization Program," is included in Attachment 3, and the full report is available under separate cover. Key findings from the report are as follows:

- All but 8 of the 190 communities that receive PCE have populations below 1,000. The median population size is 264.

- For the median (or "typical") community, average household income is $35,203 compared with $65,054 for non-PCE communities.

- The cost of electricity in the typical PCE community is $.42 per kWh compared with about $.10 per kWh in Anchorage. After accounting for PCE assistance, residential customers in PCE communities still pay about $.20 per kWh – roughly twice the Anchorage cost.

- Average residential consumption in the typical PCE community is 3,921 kWh per year, or 51% of the Anchorage average.

- Eliminating PCE would immediately result in higher electricity prices. Higher prices would cause a reduction in electricity usage. Lower usage would lead, in turn, to additional rate hikes as utilities try to cover fixed costs with a smaller sales base.

- For a representative village like Elim – population 281 – eliminating PCE would be expected to have the following impacts:

  i. The residential price of electricity would increase 190 percent – from $.19 to $.55.

  ii. Average residential consumption would fall by 38 percent – from 4,202 kWh per year to 2,608 kWh per year.

  iii. The average monthly residential bill would increase by 80% – from $66 to $119.

- The financial viability of rural electric utilities without PCE depends on how sensitive electricity sales are to price increases:

  i. If doubling the price led to a 20% decrease in consumption, most rural utilities are projected to survive although with much higher prices and lower sales.

  ii. If doubling the price led to a 30% decrease in consumption, utilities in half the communities now served by PCE are projected to become financially insolvent.

Recommendation #2 – Limit rate support to "lifeline" residential usage equal to one-half of the statewide average consumption per household each month, and to community facilities that are directly related to public health and safety.

The Committee recommends that future rate support be limited only to the most essential uses of electric power. The reasons for this are both philosophical and practical:

- Although electric power is a necessity that should be affordable in every established community, a key principle of economic efficiency and of utility regulation is that prices should vary in proportion to actual costs. Excessive rate support sends the wrong price signals to consumers and reinforces dependence on continuing subsidy.

  Limiting rate support to essential usage cuts a middle path between these two objectives: power is available at a lower price for necessities but is otherwise priced at its full cost. Because consumers will more often be faced with full cost power at the margin of use, incentives will be strengthened both for end-use conservation by consumers and for cost reduction by utility management.

- In view of the expected decline in oil revenues, it will be increasingly difficult to obtain rate support funding for discretionary electrical usage. It is the Committee's judgment that continued funding for PCE or an alternative rate support program will require that all such assistance be focused on the most basic power requirements in high cost service areas.

Implementing this recommendation would require the following changes to the existing PCE program:

	Estimated Annual Reduction In PCE Requirement
• Remove commercial customers from program eligibility.	$2.6 million
• Reduce the monthly cap for eligible usage from 700 kWh to one-half of the statewide average consumption per household each month.	$3.7 million
• Limit the definition of community facilities to those that are directly related to public health and safety.	$1.0 million
Total Estimated Reduction	$7.3 million

A. Remove commercial customers

PCE benefits are currently paid for residential customers, commercial customers, and community facilities that are owned and operated by local government. The Committee believes that residential customers and community facilities should have priority:

i. Residential customers are the core of the program, representing about 70% of all electrical consumption that is presently eligible for PCE assistance. Affordable power for lights, heating systems, and refrigeration in residential housing is the most basic need that the program addresses.

ii. When costs such as the electrical bill go up, most commercial customers can try to increase revenue by raising prices. However, residential customers in rural villages do not have a comparable method to raise household income. Local governments with no taxing authority have some options to raise revenue by adjusting prices and fees for local services, but still fall short of the revenue-raising capability of commercial entities.

iii. Because schools are typically not owned and operated by the local government, they are considered "commercial facilities" for purposes of the PCE program and account for about 10% of the PCE-eligible electrical consumption in the commercial category. Like all such institutions, rural schools are always facing budget limitations. But relative to other institutions in rural Alaska, schools operate with relatively large budgets and have greater capability than most to absorb an increase in electricity prices. Schools are not heavily dependent on continuation of PCE benefits since PCE now provides assistance for only the first 700 kWh per month, which is much less than schools typically consume. On average, school districts are presently entitled to approximately $100 per month in PCE benefits per community.

iv. For other commercial customers, FY97 statistics indicate an average PCE benefit of about $34 per month (or about $400 per year). The Committee does not minimize the significance of this benefit to many rural businesses but concludes that, overall, commercial customers can tolerate a cut-off of PCE benefits with less difficulty than either residential customers or local governments.

B. Reduce the monthly cap for residential customers from 700 kWh to one-half of the statewide average consumption per household each month. While this amount would vary each month, the average monthly limit over the course of a year would be approximately 350 kWh.

Program statistics indicate that residential customers received PCE assistance for an average of 340 kWh per month in FY96. This is about half of the average monthly residential consumption in the southern Railbelt region. The Committee believes that a major reduction in the monthly cap for PCE eligibility is a key measure to ensure that PCE benefits are paid only for a very basic level of usage.

Although it is difficult to define where "necessary" power consumption leaves off and "discretionary" begins, adopting this recommendation would clearly address any concern that PCE is subsidizing discretionary usage. The program would no longer purport to equalize power costs for residential consumers in urban and rural Alaska – it would focus on providing affordable power for a much lower level of consumption than is typical in Anchorage, Fairbanks, and Juneau.

Included in Attachment 4 is recent monthly data on residential electricity usage in southcentral Alaska. Based primarily on this data, the following estimates are provided on the monthly kWh limits that would initially define a lifeline supply of power under the Committee's proposal:

January	461 kWh
February	419
March	376
April	343
May	312
June	284
July	301
August	277
September	290
October	318
November	358
December	394

These limits average 344 kWh per month over the course of an entire year. The Committee's concept is intended to ensure that households have access to a "lifeline" supply of affordable power – i.e. enough to run essential lights, heating pumps, refrigeration, and other basic elements of household maintenance. Attachment 5 shows how 326 kWh could be used in a typical village home in an average month.

C. Limit community facilities to public health and safety.

Only those community facilities that are directly related to health and safety are proposed to remain eligible for rate subsidy, including water and sewer projects, health clinics, public safety office, street lights, and washeteria. Other community facilities such as community halls or recreation halls would no longer be eligible. This measure is expected to reduce rate support for community facilities by roughly 25% overall.

Recommendation #3 – Program funding from 60% of Four Dam Pool debt service, $20 million Swan-Tyee intertie loan, and enactment of universal service fund.

Rural electric utilities need financial stability before long-term planning and investment can succeed on a broad scale. Financial stability will depend, in turn, on a stable source of funding for an effective rate support program.

The Committee believes that continued reliance on State general fund appropriations is inconsistent with this need for long-term financial stability. As a result, the Committee's recommended option is based on alternative sources of revenue:

A. 60% of Annual Four Dam Pool Debt Service

The starting point is the revenue stream that has already been established for the PCE program. The 1993 legislature enacted a revenue allocation plan whereby the annual debt service paid to the State by the Four Dam Pool is used as follows:

- 40% for PCE.
- 40% for the "Southeast Energy Fund," the initial purpose of which is to help fund the Tyee-Swan intertie.
- 20% for the "Power Project Fund," a loan fund administered by the Division of Energy to help finance small power projects, bulk fuel storage facilities, and potable water supply.

In a typical year and for the remaining term of the existing power sales agreement, annual Four Dam Pool debt service is estimated at $11.0 - $11.5 million. Of this amount, the existing 40% allocation would supply roughly $4.4 million per year for PCE. Four Dam Pool debt service is scheduled to be paid to the State annually through the year 2030.

The Committee is aware of the vulnerability of these funds to the "self-help" provision of the Four Dam Pool power sales agreement. That provision allows the utilities to withhold debt service that would otherwise be due the State if the funds are needed to repair certain project deficiencies. It is presently expected that $1.6 million will be withheld by the utilities in FY2000 under this provision, and unknown additional amounts could be withheld after that.

Despite the uncertainty in any given year created by the "self-help" provision of the power sales agreement, Four Dam Pool debt service still provides an important long-term source of recurring energy revenues. The Committee proposes to re-allocate to PCE, or to an alternative rate support program, the 20% share of these revenues that now goes to the Power Project Fund loan program. This would add approximately $2.2 million per year to the revenue stream allocated to rate support, bringing the total annual contribution from Four Dam Pool debt service to about $6.6 million.

The Power Project Fund was converted to a revolving loan fund in 1993 legislation, with principal and interest payments from prior loans now coming back to the Fund where they augment the balance available for new loans. At present, these repayments are sufficient to meet the demand for new loans. While loan demand may increase in the future, the Committee believes that continuing rate support for essential needs serves a more critical purpose.

B. $20 Million Swan-Tyee Intertie Loan

The 40% allocation of Four Dam Pool debt service to the Southeast Energy Fund was enacted by the legislature in 1993 as part of an overall, statewide "package" on energy projects, policies, and funding, and must be understood in that context. The Committee does not recommend altering this percentage – however, the Committee does recommend that $20.0 million appropriated by the 1993 legislature as a 3% loan for the Swan/Tyee intertie be re-appropriated to the PCE Fund. The City of Ketchikan, which is the primary intertie proponent, has suggested that it is willing to forgo the $20.0 million loan in exchange for State bonding of Swan/Tyee intertie costs. Depending on the final project cost, most or all of the debt service associated with such bonds would be paid from the 40% share of Four Dam Pool debt service allocated to the Southeast Energy Fund.

C. Universal Service Fund

The Committee recommends that the legislature enact a universal service fund for electric utility service, similar to the universal service fund already authorized for telephone service. Funding would be provided by a monthly surcharge on all electric utility bills statewide. The proceeds of the fund would be used solely to ensure that a lifeline supply of power will be available in all established communities at a designated "lifeline rate." The Committee considered setting the lifeline rate at either 100% or 150% of the statewide average residential rate. At 100%, a lifeline supply of power would be made available at approximately 11.3 cents per kWh. At 150%, a lifeline supply would be made available at approximately 17.0 cents per kWh.

The financial implications of these alternatives are as follows:

- At 150%, the estimated cost of the lifeline program is $14.7 million per year. With 60% of Four Dam Pool debt service providing $6.6 million in program revenue during a typical year, the annual amount needed from the universal service fund is estimated at $8.1 million. Based on estimated electric utility sales of 5.0 billion kWh per year statewide, the required surcharge would be about 0.16 cents per kWh. This would cost an average residential customer in the Railbelt about $14 per year.

  The $14.7 million estimated program cost is comparable to the estimated cost of PCE given the program changes recommended above. The estimated PCE cost net of recommended changes is as follows:

$23,000.0	Preliminary estimate – full funding of PCE in FY 2000.
- 2,600.0	Remove commercial customers from eligibility.
- 3,700.0	Cut eligible kWh (residential) from 700 per month to one-half the monthly statewide average.
- 1,000.0	Limit community facilities to public health and safety.
$15,700.0	FY 2000 PCE cost following proposed amendments.

  Spreadsheets included in Attachment 6 show the estimated annual payments to utilities under three scenarios:

i. The "lifeline rate" program benchmarked at 17.0 cents per kWh (i.e. 150% of the statewide average residential rate).

ii. The "lifeline rate" program benchmarked at 11.3 cents per kWh (i.e. 100% of the statewide average residential rate).

iii. The existing PCE program.

At the 17.0 cent per kWh benchmark, the lifeline rate program would cost an estimated $14.7 million per year. A summary spreadsheet of Option 1A (the "150% option") is included in Attachment 7.

Only one additional community would be added to the program that is not currently eligible for PCE – Glennallen. A lower benchmark rate would add more communities.

If the lifeline rate were set at 100% of the statewide average (11.3 cents rather than 17.0 cents), the initial year program cost would be approximatley $22.9 million, $16.3 million of which would come from the universal service fund. This would require a surcharge of about 0.32 cents per kWh on all electric utility bills statewide, and would cost an average residential consumer in the Railbelt about $27 per year.

The "100% option" would add several communities to the list of those receiving benefits under the rate support program – communities which are not presently eligible for PCE but whose residential rates exceed 11.3 cents. One or more of these communities could be relatively large and might therefore be entitled to a relatively large payment for community facilities. (Presently, the maximum kWhs each month that can be claimed for community facilities is equal to the community population times 70.) If the 100% option were adopted, the Committee would recommend limiting the community population to 1,000 for purposes of this calculation based on the premise that the local tax base of larger communities can better support the operating costs of public facilities.

The concept of the 100% option more closely approximates the original concept of the PCE program, which was to "equalize" rural power costs with average rates in Anchorage, Fairbanks, and Juneau. In actual practice, however, PCE has not equalized rates – average rural rates for PCE-eligible usage are still about twice as

high as urban rates. A summary spreadsheet of Option 1B (the "100% option") is included in Attachment 8.

The Committee is aware of the natural resistance that will develop to any proposal that will increase rates. However, there are many precedents for cost pooling in which the benefits of lower cost enjoyed by some consumers are shared to a limited extent with those whose cost of service is higher. It occurs within any service territory that has standard rates and occurs on a larger scale within such structures as the Four Dam Pool. The Committee believes that the proposed level of surcharge, particularly at the 150% level, is an acceptable amount to ensure that a lifeline supply of power is available to all households and essential public facilities at a reasonably affordable price.

Recommendation #4 – A statewide organization or agency should be designated to establish rural utility operating standards. State support should be withheld from rural utilities unless the standards are met or are in the process of being met.

The Committee resolved that, in exchange for continuing public support of rural electricity lifeline rates, effective measures must be taken to ensure that small, single-village utilities are properly managed and that they become, as much as possible, self-reliant. This will require a combination of operating standards, assistance in meeting these standards, and enforcement of sanctions if utility management does not make satisfactory progress. An enforceable commitment to improved utility management must be part of any recommendation to continue providing public financial support.

DISCUSSION OF ALTERNATIVE OPTIONS

As noted at the outset, the Committee believes that other options to fund PCE or an alternative rate support program should also be brought to the attention of the Governor and legislature. These options are as follows:

OPTION 2

Option 2 would extend the modified PCE program through 2013, consistent with legislative intent enacted in 1993 to fund PCE for 20 years. In addition to the funding sources that all of the options have in common – the 60% share of Four Dam Pool debt service and the re-appropriation of the $20 million Swan/Tyee intertie loan – Option 2 requires a $75 million State general fund endowment in FY 2000 to carry the program the rest of the way. A summary spreadsheet showing Option 2 is included in Attachment 9.

To keep the size of the endowment from escalating higher, Option 2 also incorporates a $17 million annual cap on PCE expenditures:

- Since its inception, the cost of the PCE program has averaged about $17 million per year. Continuing the program at this level is therefore consistent with the State's historical level of program support.

- Although the statement of "Findings and Intent" enacted by the legislature in 1993 established $17 million per year as the minimum level of PCE funding, the Committee believes that a maximum level is what is needed as the basis for a general fund commitment. The population of rural Alaska continues to grow as does the full funding requirement for the PCE program as presently structured. The Committee believes that an open-ended funding commitment for PCE is unrealistic and unlikely to be obtained. The $17 million benchmark has already been accepted by the legislature as a reasonable level of program funding.

OPTION 3

Option 3 seeks to extend the same modified PCE program for a significant length of time without recourse to a large general fund endowment or enactment of a universal service fund. Its main features are as follows:

A. Annual PCE outlays are capped at $15 million per year.

B. General fund appropriations are required beginning with $15 million for FY 2000. These appropriations can then be reduced by $2.5 million per year, reaching zero in FY 2006. These appropriations are in addition to:

   - 60% of Four Dam Pool debt service, and

   - Re-appropriation of the $20 million Swan/Tyee intertie loan

C. Given these funding sources and expenditure caps, PCE can be extended through the year 2010.

A summary spreadsheet showing Option 3 is included in Attachment 10.

OPTION 4

The Committee investigated the possibility of obtaining federal funds to support PCE or a similar program. Although the indications to date have not been promising, the Committee suggests that discussions continue in the event that some measure of federal contribution can be obtained.

Option 1A – Transitional Funding

The spreadsheet provided in Attachment 7 shows how the Committee would envision implementation of Option 1A (Universal Service Fund / 150% benchmark). Provision for transitional funding and other explanatory notes are as follows:

A. The Committee anticipates that more than one year will be required for approval and implementation of the recommended program. As a result, the spreadsheet projections allow for a two-year transitional period (FY 2000 and 2001) during which a modified PCE program would remain in place. The recommended lifeline program would begin in FY 2002.

B. The PCE modifications recommended earlier in this report would reduce the cost of PCE to $15.7 million in FY 2000, and to $16.0 million in FY 2001 assuming 2% annual growth.

C. The modified PCE program is funded during the two-year transition period by a combination of the following three revenue sources:

   i. The PCE Fund is presently expected to have a $3.2 million balance to carry forward into FY 2000.

   ii. 60% of Four Dam Pool debt service revenues are allocated to PCE starting in FY 2000.

   iii. The $20 million Swan-Tyee loan could be re-appropriated to PCE if other elements of Swan-Tyee intertie financing are resolved.

ATTACHMENT 1

COMMITTEE BALLOT AND BALLOT RESULTS

POWER COST EQUALIZATION
BLUE RIBBON COMMITTEE
BALLOT RESULTS

		Include in Committee Report							Designate As Best Option					
		Universal Service Fund				GF	Declining GF	Further Explore	Universal Service Fund			GF	Declining GF	Further Explore
		YES	150 & 100	150 only	100 only	Endowment	Approp.	Fed Funds	YES	150	100	Endowment	Approp.	Fed Funds
(see note 1)	Senator Adams	X	X			X		X	X		X			
(see note 2)	Robert Beans	X	X			X		X						
	Sam Cotten	X	X				X		X	X				
	Joe Griffith	X	X			X	X	X	X		X			
	Nancy James	X	X			X	X	X	X	X				
	Robert Martin	X	X			X	X	X	X	X				
(see note 3)	Senator Pearce	X		X				X						
	Walter Sapp					X	X	X				X		
	Randy Simmons	X		X			X	X	X	X				
	Dewey Skan	X			X	X		X	X		X			
	Eric Yould					X	X	X					X	
	TOTALS	9	6	2	1	8	7	10	7	4	3	1	1	

NOTES -- The following messages were added by Committee members to their ballots:

1. Senator Adams notes that, in his view, community centers and city offices should not be excluded from the definition of "community facilities" under a revised PCE program.

2. Robert Beans does not designate a single "best option," but suggests that a combination of options may turn out to be best.

3. Senator Pearce indicates that the Universal Service Fund benchmarked at 150% of the statewide average residential rate is an option worth considering but only for residential service, not for community facilities.

POWER COST EQUALIZATION
BLUE RIBBON COMMITTEE

c/o Division of Energy
Phone: 269-4630
Fax: 269-4645

January 21, 1999

The Honorable Al Adams
Alaska State Senator
State Capitol Building, Room 417
Juneau, AK 99801-1182

DELIVERY BY FAX ONLY

Subject: Ballot on Options and Recommendations
Blue Ribbon Committee on Power Cost Equalization

Dear Senator Adams:

The PCE Blue Ribbon Committee met on January 15 to consider and vote on the final set of options and recommendations to be presented to the Governor. A number of these recommendations were unanimously approved by the members in attendance, specifically:

1. PCE or an alternative rate support program for high cost service areas should be extended into the future.

2. Such rate support should be available only for:

   A. A "lifeline" supply of electric power for residential consumers – a lifeline supply is defined as one-half of the statewide average consumption per household each month; and

   B. Electric power for community facilities that are directly related to public health and safety.

3. A stable source of funding for the program should include among its components:

   A. 60% of the annual debt service paid to the State by the Four Dam Pool – this would include the 40% now allocated to PCE plus the 20% now allocated to the Power Project Fund loan program.

   B. $20 million appropriated by the 1993 legislature as a loan for the Swan/Tyee intertie, based on a proposal from Ketchikan Public Utilities to forego the loan in exchange for State bonding of Swan/Tyee intertie costs.

4. A statewide organization or agency should be designated to establish standards for rural electric utilities with respect to financial management, physical plant, and system operations. No rural electric utility should continue to receive rate support or capital project grants from the State unless it is in compliance with these standards, is making clear and continuing progress in attaining compliance, or has entered into an agreement with an existing utility or utility organization whose operation is consistent with the standards.

Since four of the eleven Committee members were absent from the meeting, the voting was inconclusive with regard to broader PCE options on which there is significant disagreement. For this reason, the Committee decided to solicit the votes of all members by means of the enclosed ballot. There are two separate issues that remain to be decided:

1. Of the options listed on the ballot, which do you believe should be included in the Committee's report as worthy of consideration by the Governor and legislature? You may vote for all of the options if you wish, or any number of them.

   Any option receiving 6 or more votes in response to Question 1 will be included in the Committee's report.

2. If you believe that one of these options should be recommended by the Committee as the single best option to pursue, which one do you support?

   A single option receiving 6 or more votes in response to Question 2 will be designated as the Committee's recommended option.

All of the options on the ballot are summarized in the attachment to this letter and are further discussed in the 12/31/98 draft report circulated to Committee members earlier this month. Please call me at 276-6222 if you would like further explanation of any of these options before casting your vote.

Since we are up against the start of the legislative session, please complete and sign your ballot as soon as possible. Your completed ballot should be faxed to Irene Tomory at the Department of Community and Regional Affairs – fax # 269-4645. The Department will ensure that the ballots are properly counted and filed and will notify all members of the results.

Sincerely,

Sam Cotten

Sam Cotten, Chairman
Blue Ribbon Committee on PCE

BLUE RIBBON COMMITTEE
POWER COST EQUALIZATION
JANUARY 21, 1999

BALLOT

Option	QUESTION 1 Include in Committee Report As Worthy of Consideration? (check up to 4)	QUESTION 2 Designate Best Option? (check no more than 1)
1. Universal service fund.	_____	_____
A. If a universal service fund should be included in the Committee report as worthy of consideration, please check only one of the following:		
☐ Both options should be included – lifeline power benchmarked at 150% and at 100% of statewide average residential rate.		
☐ Only the 150% option should be included.		
☐ Only the 100% option should be included.		
B. If a universal service fund should be designated as the best option, please check only one of the following:		
☐ The 150% benchmark is recommended.		
☐ The 100% benchmark is recommended.		
2. General Fund endowment / extend modified PCE through 2013.	_____	_____
3. Declining General Fund appropriations / extend modified PCE through 2010.	_____	_____
4. Further explore the potential for federal funding of PCE or an alternative rate support program.	_____	_____

Senator Al Adams
Committee Member

_____
Signature

Please fax completed ballot to Irene Tomory (DCRA): fax # 269-4645

January 21, 1999

SUMMARY OF OPTIONS

The following summary is based on the subcommittee report dated December 24, 1998, that was included in the January 15, 1999 Blue Ribbon Committee packet:

OPTION 1 would create the equivalent of an electric utility "universal service fund" with the following characteristics:

A. Similar to the universal service fund authorized for telephone service, it would be funded by a surcharge assessed on all electric utility bills statewide.

B. In combination with 60% of Four Dam Pool debt service, the universal service fund would provide enough annual revenue to support an "Electric Lifeline" program statewide without tapping the State General Fund.

C. The purpose of the Electric Lifeline program would be to provide affordable power for residential consumers and community facilities within the following limits of eligibility:

- For each residential customer in a high cost service area, rate support would be provided for up to one-half of the statewide average consumption per household each month.
- For community facilities in high cost service areas, rate support would be limited to those facilities directly related to public health and safety.

D. Creation of a universal service fund is anticipated to require a transitional period of two years during which a modified PCE program would continue to be administered:

- Gaining legislative approval of a universal service fund concept would probably require more than one session.
- For FY 2000 and 2001, the 60% share of Four Dam Pool debt service combined with re-appropriation of the $20 million Swan/Tyee intertie loan would be enough to fund PCE without additional draws from the General Fund.

For eligible electrical usage, rate support would lower the price of power to a selected "benchmark" level. Two alternatives are presented for the benchmark price:

A. 100% of the statewide average residential rate, which in 1985 was 11.3 cents per kWh. In other words, this alternative would make a lifeline supply of power available at approximately 11.3 cents per kWh.

The initial year program cost under this alternative is estimated at $22.9 million, $16.3 million of which would come from the universal

service fund. This would require a surcharge of about 0.32 cents/kWh on all electric utility bills statewide, and would cost an average residential customer in the Railbelt about $27 per year.

B. 150% of the statewide average residential rate, or about 17.0 cents per kWh. In other words, this alternative would make a lifeline supply of power available at approximately 17.0 cents per kWh.

The initial year program cost under this alternative is estimated at $14.7 million, $8.1 million of which would come from the universal service fund. This would require a surcharge of about 0.16 cents/kWh on all electric utility bills statewide, and would cost an average residential customer in the Railbelt about $14 per year.

OPTION 2 would extend the PCE program through 2013, consistent with legislative intent enacted in 1993 to fund PCE for 20 years. In addition to the funding sources that all of the options have in common – the 60% share of Four Dam Pool debt service and the re-appropriation of the $20 million Swan/Tyee intertie loan – Option 2 requires an estimated $75 million General Fund endowment in FY 2000 to carry the program the rest of the way.

To keep the size of the endowment from escalating higher, Option 2 also incorporates a $17 million annual cap on PCE expenditures. This is approximately equal to the average annual outlay for PCE since its inception in 1985.

OPTION 3 seeks to extend the same modified PCE program for a significant length of time without recourse to a large General Fund endowment or enactment of a universal service fund. Its main features are as follows:

A. Annual PCE outlays are capped at $15 million per year.

B. General Fund appropriations are required beginning with $15 million for FY 2000. These appropriations can then be reduced by $2.5 million per year, reaching zero in FY 2006. These appropriations are in addition to:

- 60% of Four Dam Pool debt service, and
- Re-appropriation of the $20 million Swan/Tyee intertie loan.

C. Given these funding sources and expenditure caps, PCE can be extended through the year 2010.

OPTION 4 is a recommendation to further explore the potential for federal funding of PCE or an alternative rate support program, and was added to the list at the Committee's January 15, 1999 meeting.

ATTACHMENT 2

OPTIONS FOR REDUCING RURAL POWER COSTS
WORKING PAPER – PCE BLUE RIBBON COMMITTEE
FEBRUARY 1998

OPTIONS FOR REDUCING RURAL POWER COSTS
WORKING PAPER – PCE BLUE RIBBON COMMITTEE
FEBRUARY 1998

The primary options can be organized into three categories:

1. Reduce non-fuel operating costs.

2. Reduce fuel costs.

3. Replace diesel generation with alternative energy.

Reduce non-fuel operating costs

Significant measures to reduce non-fuel operating costs per kWh involve either switching to a different mode of power generation such as hydro, or enhancing economies of scale. Alternative energy strategies are discussed in a later section of this paper. Economies of scale may be sought in either of the following ways:

1. Increase power sales. The problem is that this is not a realistic option in most rural villages.

2. Utility mergers. For example, a single-village utility could join a multi-village utility. Savings could be realized in administration, billing, and volume purchasing of parts, equipment, and fuel. Scale economies also allow for the employment of technical staff whose cost and expertise can be shared throughout the multi-village utility, and whose contribution can result in improved maintenance, longer equipment life, and fewer costly emergencies.

As noted during our initial meeting, the multi-village utilities generally do not have a record of lower rates. For example, AVEC residential rates throughout their 50-village system exceed 40 cents/kWh. Residential rates in the 6 villages served by Tlingit-Haida Regional Electrical Authority exceed 30 cents/kWh although all 6 are located in the relatively low cost region of southeast Alaska.

It may be that the main effect of joining a multi-village system is not to reduce consumer rates but rather to improve reliability, safety, and environmental protection. Further, it may be that operating cost economies are realized but that the savings are then used to "purchase" a safer and more reliable system. Overall:

1. Joining a multi-village utility to enhance economies of scale is not likely to produce significant rate reductions for the consumer.

2. Joining a multi-village utility could lead to development of a power system that is more reliable, better built, and better maintained. It is a difficult strategy to implement, however, since single-village utilities typically exist where the desire for local control is relatively high.

3. Joining a multi-village utility could lead to lower overall costs of operation and greater self-reliance even if such cost reduction is not reflected in consumer rates. Single-village utilities are more likely to seek and obtain government grants for plant replacement and emergency repairs, while multi-village utilities are more likely to finance their plant requirements and recover the associated debt service through consumer rates and PCE.

Reduce fuel costs

As discussed in the Committee's initial packet of materials, fuel costs are one reason for high rates in rural villages although the impact of fuel costs is less important than often assumed:

1. The average price of diesel fuel in 1995 for utilities in the Power Cost Equalization program was $1.01 per gallon, and the average efficiency of diesel generators for these same utilities was 12.9 kWh per gallon. The average fuel cost per kWh was therefore 7.8 cents.

2. Because the price of Cook Inlet natural gas is very favorable, the fuel cost per kWh for Anchorage area utilities is approximately 2.0 cents.

3. Therefore, the cost of fuel accounts for roughly 5.8 cents per kWh of the difference in power costs between Anchorage and the average rural Alaska community. When trying to explain power cost differentials of 20 to 30 cents or more per kWh, the fuel cost issue is important but is not a dominant factor.

Options for reducing the fuel cost component can be grouped in the following categories: increase the efficiency of power generation, increase the efficiency of power distribution, and look for ways to reduce the delivered price of fuel.

1. Increasing the fuel efficiency of power generation is typically accomplished by purchasing new diesel units that are more efficient than the old ones, by carefully matching the size of the new units with the

village demand for power, and by operating the units so that each one operates as close to maximum load as possible.

a. Like the gradual substitution of more fuel efficient cars in the nation's vehicle fleet, the widespread installation of fuel efficient diesel generators in rural Alaska has most likely been aided by government regulation but is also pushed by market forces as old equipment is periodically replaced by new.

In the case of motor vehicles, the "corporate average fuel efficiency" standards imposed by the federal government appears to have hastened the move to more fuel efficient cars. Fuel efficiency standards have also been adopted in PCE regulations. If the actual efficiency of a PCE utility is less than the standard, then the PCE subsidy rate is calculated as though the efficiency standard were met.

These standards, which have been in effect since 1993, range from 8 kWh sold per gallon for the smallest utilities to 12 kWh sold per gallon for the largest. By tying the efficiency standard to kWh sold (rather than kWh generated), the regulation encompasses both generation and distribution efficiency. Somewhat different standards pertain to those few PCE utilities that do not rely entirely on diesel generation.

A question that the Committee may wish to consider is whether any change is now warranted in the PCE efficiency standard.

b. When the opportunity arises to replace a diesel generator, it is already the policy of most utilities and of the State to select a generator size that is best matched to the power requirements of the community. This makes sense because diesel generators are most efficient when operated at or near the top of their output range.

An emerging development is the production of diesel generators designed to maintain a high level of fuel efficiency throughout a wide range of output levels. AVEC is one utility known to the Division that has been working with a manufacturer on these units and is continuing to purchase them To the extent they are successful, the importance of carefully matching generator size with community load and the importance of operating units as close as possible to maximum load, will both decline.

2. Increasing the efficiency of power distribution means upgrading distribution systems to reduce line losses, i.e. energy lost in transit between the power plant and the consumer. Because the useful life of a distribution system can often be extended for many years with periodic repairs and piecemeal replacements, upgrades resulting in higher efficiency are not as "automatic" as they tend to be with generator equipment. There are still substantial opportunities in rural Alaska to improve fuel efficiency by upgrading distribution systems, upgrades that might not occur for many more years in the absence of government funding.

3. While the base price of fuel is largely unaffected by the actions of individual consumers, there are purchasing strategies that electric utilities can adopt to help keep the delivered price as low as possible. The key principle that operates in favor of the consumer is competition among fuel suppliers which can be encouraged as follows:

   a. By pooling together the fuel requirements of multiple consumers, the purchase order volume is increased. Higher purchase volumes generate greater competitive interest among fuel suppliers.

   b. Bids are widely and aggressively solicited for the combined purchase order.

   However, as noted by the AVEC representative at the initial Committee meeting, consolidated purchasing must not be taken so far as to eliminate suppliers from the market and end up reducing competition rather than enhancing it. AVEC's approach is to package enough of its villages in combined fuel orders to gain advantage from higher volumes without driving fuel supply competitors out of the market.

   Fuel purchasing cooperatives can be formed among electric utilities and other fuel purchasers who presently arrange for their fuel supplies independently:

   a. The "Western Alaska Fuel Group" is an informal alliance of the following electric utilities:

      Kotzebue Electric Association
      Nome Joint Utilities
      Naknek Electric Cooperative
      Nushagak Electric Cooperative (Dillingham)

Iliamna-Newhalen-Nondalton (INN) Electric Cooperative

Attached is a chart showing:

1. Average fuel prices paid by each member over the last 7 years, and

2. Average fuel prices paid by a selection of other, roughly comparable rural utilities over the same period.

Within each group, coastal communities and interior communities are shown separately to provide a somewhat better comparison. Because a number of factors determine the fuel price paid by any single utility, the average price difference between the Western Alaska Fuel Group and the selected utilities in the comparison group cannot be taken as proof that cooperative buying works. Probably the best evidence in its favor is that all of the utilities in the Western Alaska Fuel Group have chosen to remain a part of it for over 10 years.

In FY95 the combined fuel usage of the members of the Western Alaska Fuel Group was just over 6.0 million gallons. Assuming for illustration a savings from coordinated purchasing of $0.05 per gallon, the total savings are about $300,000 per year.

b. Although Nunat Uquutiit Cooperative, Inc. (NUCI) presently owns only two operational tank farms, it has 42 members located in 26 villages. In 1996 NUCI bundled together the volume requirements of about half its members and purchased fuel on their behalf at $1.27 per gallon.

Although the level of savings from the 1996 purchase is difficult to judge, the consolidated purchase was apparently viewed as a success by NUCI members since, in 1997, 39 of the 42 members chose to participate in the joint purchase. The average price obtained by NUCI in 1997 was $1.20 per gallon.

<u>Replace diesel generation with alternative energy</u>

Most alternative energy concepts are unproven in rural Alaska in terms of durability, reliability, and cost. For example:

1. Wind energy. There were many experiments with wind generators in rural Alaska 10-15 years ago, none of which were successful on a utility scale or over a significant period of time. We are experimenting now with the latest generation of wind technology in Kotzebue and Wales, but it will be several years of testing and evaluation before the Division of Energy could recommend wind energy for rural utilities on a broad scale.

2. Small-scale natural gas development. Economic and geophysical assessments carried out by the State on natural gas or coal bed methane development in rural Alaska have not been promising. Our information suggests that suitable deposits are not likely to be found in close proximity to rural communities, and that the cost of development for gas that is found is not likely to be competitive. While exceptions may yet be found, there is no basis to predict that natural gas will emerge as a competitive fuel source for a significant number of rural villages.

3. The Division has evaluated power plants fueled with biomass in various forms but we have yet to identify a rural community in which this option appears to be competitive.

4. The two main alternative energy technologies with a proven track record in rural Alaska are small hydro and electric energy conservation:

    a. Hydro prospects are limited in number and unevenly distributed: most are found near the arc that extends from southeast Alaska to the Aleutians. Still, undeveloped prospects remain that could serve rural Alaska communities. The Division is presently involved in the following:

        i. Pyramid Creek in Unalaska and Old Harbor on Kodiak Island. Federal grant funds have already been appropriated to help finance the Old Harbor project.

        ii. Power Creek near Cordova. The Division is financing preconstruction costs of licensing and design. Federal grant funds have also been provided to help finance Power Creek

    It is unusual to find a rural hydro project that can support market financing and still result in rate reductions for the affected community. Most of the financial benefit of these projects is therefore tied to the amount of grant or low interest loan financing they are able to attract from the State and federal government. As an alternative for reducing rural power costs, small hydro can often

be effective not because its actual cost is low relative to diesel energy but because it can serve as a tangible, one-time vehicle for attracting government subsidy that can then reduce consumer costs throughout the extended life of the project.

b. Electric energy conservation is a form of alternative energy that can pay for itself when the cost to conserve a unit of energy is less than the cost to produce it. The following are among the relevant issues when considering conservation in rural Alaska:

   i. Because the cost to produce a kWh of energy is relatively high, electric energy conservation should be exceptionally cost-effective in this environment.

   ii. Because the present level of electricity consumption in rural villages is already very low, the remaining opportunities for conservation may be limited.

   iii. While the cost of energy for residential consumers is often considered to be the highest priority, it is most difficult to design and implement an effective energy conservation program for this segment of consumers because there are so many of them, each consuming a relatively small amount of power.

   iv. Rural utilities are typically not supportive of energy conservation programs except for the purpose of customer relations. Because much of the utility's cost is fixed, lower power sales often means upward pressure on rates. The conserving customer may still benefit, but the utility and its other customers may be left to share higher fixed costs. From the rural utility's perspective, conservation goes in the opposite direction of the utility's effort to increase sales and thereby enhance economies of scale.

Fiscal Note

State of Alaska
2013 Legislative Session

Bill Version: HB 39 (A)
Fiscal Note Number:
() Publish Date:

Identifier: HB039-DCCED-AEA-02-01-13
Title: POWER COST EQUALIZATION
Sponsor: EDGMON
Requester: House Energy

Department: Department of Commerce, Community and Economic Development
Appropriation: Alaska Energy Authority
Allocation: Alaska Energy Authority Power Cost Equalization
OMB Component Number: 2602

Expenditures/Revenues

Note: Amounts do not include inflation unless otherwise noted below. (Thousands of Dollars)

	FY2014 Appropriation Requested	Included in Governor's FY2014 Request	Out-Year Cost Estimates				
OPERATING EXPENDITURES	**FY 2014**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**
Personal Services							
Travel		10.0					
Services	83.2	341.0	83.2	83.2	83.2	83.2	83.2
Commodities	5.0		1.0	1.0	1.0	1.0	1.0
Capital Outlay							
Grants & Benefits	20,600.0	40,000.0	20,600.0	20,600.0	20,600.0	20,600.0	20,600.0
Miscellaneous							
Total Operating	**20,688.2**	**40,351.0**	**20,684.2**	**20,684.2**	**20,684.2**	**20,684.2**	**20,684.2**
Fund Source (Operating Only)							
1004 Gen Fund	20,688.2	7,260.0	17,303.8	6,840.9	5,253.8	4,834.8	4,861.0
1169 PCE Endow		33,091.0	3,380.4	13,843.3	15,430.4	15,849.4	15,823.2
Total	**20,688.2**	**40,351.0**	**20,684.2**	**20,684.2**	**20,684.2**	**20,684.2**	**20,684.2**
Positions							
Full-time							
Part-time							
Temporary							
Change in Revenues							

Estimated SUPPLEMENTAL (FY2013) cost: 0.0

Estimated CAPITAL (FY2014) cost: 0.0

ASSOCIATED REGULATIONS

Does the bill direct, or will the bill result in, regulation changes adopted by your agency? No
If yes, by what date are the regulations to be adopted, amended or repealed?

Why this fiscal note differs from previous version:

Not applicable, initial version.

Prepared By: Sara Fisher-Goad, Executive Director — Phone: (907)771-3000
Division: Alaska Energy Authority — Date: 02/01/2013 05:30 PM
Approved By: JoEllen Hanrahan, Director — Date: 02/01/13
Administrative Services

FISCAL NOTE ANALYSIS

STATE OF ALASKA
2013 LEGISLATIVE SESSION

BILL NO. HB39

Analysis

The proposed legislation amends AS 42.45.110 (b) relating to the Power Cost Equalization (PCE) program by increasing the eligible kWh from 500 kWh to 600 kWh for each eligible customer per month. The legislation also changes the definition of eligible customer to include commercial customers who consume less than 2,400 kilowatt-hours a month.

We assumed an effective date of July 1, 2013 for fiscal note purposes.

FY 14 Appropriation Requested - 20,688.2

Costs Breakdown:
1) 6,300.0 - Estimated annual cost to increase eligible kWh from 500 to 600 kWh a month for residential customers (current eligible customers):

Estimated FY14 Residential Grant Costs	31,500.0
Percentage Increase (100kwh/500kwh)	x.20
Estimated additional cost	6,300.0

2) 14,300.0 - Estimated annual cost to include commercial customers who are sold less than 2,400 kWh a month as PCE eligible customers. Eligible commercial customers would receive up to 600 eligible kWh a month. The estimate is based on the assumption that 25% (600/2400 kWh) of kWh hours sold to commercial customers would be eligible for the credit.

The estimate was based on statistical information obtained from PCE monthly reports submitted by current participating utilities. Eligible kWh was estimated by multiplying the annualized reported kWh sold to commercial customers in FY12 by 25%. The annual cost was determined by multiplying the estimated eligible kWh by the utility's last reported PCE rate. Supplementary information regarding this estimate is available at AEA upon request.

3) 88.2 - Estimated FY 14 contractual cost to AEA for one Accounting Technician. The position is required for increased work required to verify the eligibility and related kWh of additional customers as required by statute and to provide additional technical assistance for the utilities. The estimate includes 73.2 for a Range 12 Accounting Technician position, 10.0 for statewide core services, and 5.0 for first year start-up costs. Subsequent years include 1.0 for on-going supply costs associated with the position.

Please reference the associated fiscal note for AIDEA RDU Component 1234. All employees are budgeted under the AIDEA component. AEA contracts with AIDEA for personnel. AEA's costs are budgeted as contractual services in AEA's operating components.

Funding Sources:
The annual appropriation to the PCE program from the PCE Endowment Fund is based on 7% of the average monthly market value of the fund for the previous three (3) fiscal years (AS 42.45.085). In prior years, program funding for the PCE program has required an appropriation from the general fund to fully fund PCE program costs. The PCE Endowment Fund was capitalized by a $400 million dollar GF appropriation effective June 30, 2011. The full effect of the fund capitalization on the PCE program payout is not fully realized until budget year FY2016.

For purposes of this fiscal note, AEA obtained out year estimated average balances and appropriation amounts from the Department of Revenue who manages the fund investments. The calculated payout assumes the continuation of a 7% payout from the PCE Endowment Fund to the PCE program in accordance with AS.42.45.080.

Analysis Continued

Endowment Fund Analysis (from Treasury)	FY14	FY15	FY16	FY17	FY18	FY19
Average Monthly Balance	736,593.0	784,755.5	801,264.1	804,610.4	802,716.3	800,138.9
3/yr average	472,728.8	624,734.1	774,204.2	796,876.7	802,863.6	802,488.5
DoR Actual/Estimated appropriation (a)	33,091.0	43,731.4	54,194.3	55,781.4	56,200.4	56,174.2

(a) Assumes continuation of a 7% payout in accordance with AS.42.45.080.

AEA Recap of PCE Program without HB39								
	FY14 Governor	HB39	Revised Program Cost	Out-Year Cost Estimates				
OPERATING EXPENDITURES	FY14	FY14	FY14	FY15	FY16	FY17	FY18	FY19
PCE Expenditures:								
AEA Administration	186.0		186.0	186.0	186.0	186.0	186.0	186.0
AEA Training	25.0	-	25.0	25.0	25.0	25.0	25.0	25.0
RCA Administration	140.0	-	140.0	140.0	140.0	140.0	140.0	140.0
Grants	40,000.0		40,000.0	40,000.0	40,000.0	40,000.0	40,000.0	40,000.0
	40,351.0	-	40,351.0	40,351.0	40,351.0	40,351.0	40,351.0	40,351.0
Funding Sources:								
General Fund	7,260.0		7,260.0					
PCE Endowment Fund	33,091.0	-	33,091.0	40,351.0	40,351.0	40,351.0	40,351.0	40,351.0
	40,351.0	-	40,351.0	40,351.0	40,351.0	40,351.0	40,351.0	40,351.0
Reinvestment of PCE Endowment Funds				3,380.4	13,843.3	15,430.4	15,849.4	15,823.2

AEA Recap of PCE Program with HB39								
	FY14 Governor	HB39	Revised Program Cost	Out-Year Cost Estimates				
OPERATING EXPENDITURES	FY14	FY14	FY14	FY15	FY16	FY17	FY18	FY19
PCE Expenditures:								
AEA Administration	186.0	88.2	274.2	270.2	270.2	270.2	270.2	270.2
AEA Training	25.0	-	25.0	25.0	25.0	25.0	25.0	25.0
RCA Administration	140.0	-	140.0	140.0	140.0	140.0	140.0	140.0
Grants	40,000.0	20,600.0	60,600.0	60,600.0	60,600.0	60,600.0	60,600.0	60,600.0
	40,351.0	20,688.2	61,039.2	61,035.2	61,035.2	61,035.2	61,035.2	61,035.2
Funding Sources:								
General Fund	7,260.0	20,276.4	27,948.2	17,303.8	6,840.9	5,253.8	4,834.8	4,861.0
PCE Endowment Fund	33,091.0	-	33,091.0	43,731.4	54,194.3	55,781.4	56,200.4	56,174.2
	40,351.0	20,276.4	61,039.2	61,035.2	61,035.2	61,035.2	61,035.2	61,035.2

From: Timothy Clark
Sent: Monday, February 04, 2013 3:43 PM
To: David Talerico; Jeff Turner
Subject: HB39--PCE Bill--Support from Kokhanok Resident

Hello David and Jeff,

Below is a message of support for HB 39–Power Cost Equalization.

Please add it to the record for HB 39.

Many thanks,

Tim

From: garith nielsen [mailto:chaguun@yahoo.com]
Sent: Monday, February 04, 2013 2:50 PM
To: Timothy Clark
Subject: Re: HB39--PCE Bill

To;
House Energy Committee
From;
Garith J.Nielsen-Kokhanok,AK. 99606
Concerning HB39-PCE Bill
I strongly urge the adoption of HB39.
Cost per Kilowatt hour here in Kokhanok is .90 cents per KWH. Cost per gallon of heating fuel
is $7.86 without the delivery cost added.
I own a small business that consists of a building that is roughly 866 sqft. The electrical cost
runs between $600.00-$900.00 a month depending on the time of year.The fuel costs average
about $750.00-$800.00 per month also.
All of the steps to attempt the reduction of energy have been taken that are feasable&
reasonable.
(compact flourescents, lights off,freezers in unheated area,ect.)
Any assistance for small businesses in the bush would be greatly appreciated to help save on
the cost of goods available to the customer,who, often have to make the decisions between
,food,fuel,or lights.In fact a few households have had thier water turned off ,which has a very
minimal charge, to help pay for thier electricity.
Our personal residence is 1400 sqft (small by city standards-large by bush standard). The
monthly KWH usage averages between 600-700kwh per month.With the current PCE program

this is almost managable,if the weather is warm,when the mercury dips below +10f the heat tapes
have to come on.With the tapes on and when the PCE runs out for the month, the cost of
electricity jumps to $20.00-50.00 a day,depending on wether 1 or 2 heat tapes are running and/or
if a fan or two is running like they all were last winter for 3 months.
Thank You All, for taking this bill into cosideration.

HB 340

<TARGET><BILL>HB 340</BILL><SUBJECT>HB 340</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature
House Special Committee on Energy

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

Rep. Doug Issacson
State Capitol Building, Room 13
Juneau, AK 99801
Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.gov

Agenda

Wednesday, March 19, 2014
8:00 – 10:00 a.m.
Barnes Committee Room (124)

*+HB 340

Presentations by Bradley Evans, CEO, Chugach Electric Association
Gene Therriault, Deputy Director, Alaska Energy Authority

* First hearing in first committee of referral
\+ Teleconferenced
= Bill previously heard/scheduled

###

28-LS1408\N
Nauman
3/12/14

CS FOR HOUSE BILL NO. 340( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-EIGHTH LEGISLATURE - SECOND SESSION

BY

Offered:
Referred:

Sponsor(s): REPRESENTATIVE MILLETT BY REQUEST

A BILL

FOR AN ACT ENTITLED

"An Act directing the Regulatory Commission of Alaska to recommend to the legislature an action plan relating to electrical transmission in certain areas of the state; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*** Section 1.** The uncodified law of the State of Alaska is amended by adding a new section to read:

REVIEW OF ELECTRIC UTILITY INTERCONNECTION. (a) The commission shall, not later than January 1, 2015, or as soon as practicable thereafter, recommend to the legislature a plan to establish an independent entity that meets the requirements of (b) of this section to manage the electrical transmission facilities in the Railbelt area. In developing the plan, the commission shall consider options for effective and efficient electrical transmission, including economic dispatch, reliability of electrical service, and nondiscriminatory, open access to transmission services. The commission shall also provide suggested legislation and changes to the regulations of the commission in order to implement the plan.

(b) In developing a plan under (a) of this section, the commission shall evaluate the creation of an independent entity that

(1) is organizationally independent from the commission;

(2) is directed by a board of directors of stakeholders;

(3) has operational authority over the electrical transmission facilities of the Railbelt area;

(4) has the exclusive responsibility to maintain the reliability of the electrical transmission facilities of the Railbelt area;

(5) will provide for mandatory participation by all entities using an interconnected transmission system;

(6) will maximize the use of existing electrical transmission resources and will, where possible, avoid duplication of facilities;

(7) has the power to

(A) mandate the use of a nondiscriminatory electrical transmission system;

(B) adopt, maintain, and reinforce reliability standards by adopting an equivalent national reliability standard as modified to meet the needs of the Railbelt area;

(C) plan, coordinate, and condition necessary additions and improvements to the transmission system;

(D) manage the interconnection of new generation facilities;

(E) administer a universal tariff and employ a pricing system to promote the efficient use and expansion of transmission systems and generation facilities;

(F) manage parallel path flow and transmission congestion;

(G) function as a single control area operator that facilitates regional electricity pooling and economic dispatch to maximize the efficiency of electric generation.

(c) While preparing the plan described in (a) of this section, the commission shall assume that

(1) rate recovery is ensured through the planning, permitting, and construction

phases of projects planned by the independent entity;

(2) existing agreements between generation facilities will be honored to allow cost recovery of existing investments;

(3) standard and tariff rates will be just, fair, and reasonable for all ratepayers and allow transitional rates to minimize the effect on an individual utility;

(4) existing transmission systems and ancillary services recognized by the Federal Energy Regulatory Commission used for the benefit of the Railbelt area will be allowed full cost recovery from the independent entity, including costs for depreciation, interest, margin, operations, maintenance, applicable taxes, and general and administrative expenses necessary for the operation of a transmission system.

(d) The plan required in this section may not affect current open dockets. Until the issuance of the plan, the commission shall continue with activities necessary to preserve existing operations that affect the reliability of the interconnected utilities in the Railbelt area.

(e) In this section, "commission" means the Regulatory Commission of Alaska.

* **Sec. 2.** This Act takes effect immediately under AS 01.10.070(c).

Fiscal Note

State of Alaska
2014 Legislative Session

Bill Version: HB 340
Fiscal Note Number:
() Publish Date:

Identifier: HB340-DCCED-RCA-03-14-14
Title: RCA: RAILBELT ELECTRIC UTILITY REPORT
Sponsor: MILLETT BY REQUEST
Requester: House Energy

Department: Department of Commerce, Community and Economic Development
Appropriation: Regulatory Commission of Alaska
Allocation: Regulatory Commission of Alaska
OMB Component Number: 2417

Expenditures/Revenues

Note: Amounts do not include inflation unless otherwise noted below. (Thousands of Dollars)

	FY2015 Appropriation Requested	Included in Governor's FY2015 Request	Out-Year Cost Estimates				
OPERATING EXPENDITURES	**FY 2015**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**
Personal Services							
Travel							
Services	1,000.0		500.0				
Commodities							
Capital Outlay							
Grants & Benefits							
Miscellaneous							
Total Operating	**1,000.0**	**0.0**	**500.0**	**0.0**	**0.0**	**0.0**	**0.0**
Fund Source (Operating Only)							
1004 Gen Fund	1,000.0		500.0				
Total	**1,000.0**	**0.0**	**500.0**	**0.0**	**0.0**	**0.0**	**0.0**
Positions							
Full-time							
Part-time							
Temporary							
Change in Revenues							

Estimated SUPPLEMENTAL (FY2014) cost: 0.0 *(separate supplemental appropriation required)*
(discuss reasons and fund source(s) in analysis section)

Estimated CAPITAL (FY2015) cost: 0.0 *(separate capital appropriation required)*
(discuss reasons and fund source(s) in analysis section)

ASSOCIATED REGULATIONS

Does the bill direct, or will the bill result in, regulation changes adopted by your agency? No
If yes, by what date are the regulations to be adopted, amended or repealed?

Why this fiscal note differs from previous version:

Not applicable, initial version.

Prepared By: T. W. Patch, Chairman Phone: (907)276-6222
Division: Regulatory Commission of Alaska Date: 03/14/2014 04:00 PM
Approved By: Jeanne Mungle, Director Date: 03/18/14
Agency: Administrative Services

FISCAL NOTE ANALYSIS

STATE OF ALASKA **BILL NO.** HB340
2014 LEGISLATIVE SESSION

Analysis

HB340 adds a section to the uncodified law of Alaska regarding "Review of Electric Utility Interconnection" that requires the Regulatory Commission of Alaska to study, report, and suggest legislative and regulation changes. The subject matter of the study and report is determining whether to create an independent entity to manage electrical transmission facilities in the Railbelt area.

The commission estimates $1,000.0 needed in FY2015. The estimate has been arrived at after contacting well qualified attorneys and consultants and following focused discussions with state and federal regulators who have been involved with the adoption or creation of programs where transmission owners, planners, and managers now manage independent or regional electrical transmission systems. However, in the absence of participation in any request for proposal process this fiscal note remains only a carefully arrived at estimate. Actual cost to develop the contemplated comprehensive report could exceed this fiscal note. Authority for $500.0 is requested in FY2016 to complete the requirements of HB340 as work is expected to carry over.

The day-to-day operations of the RCA are funded through a regulatory cost charge (RCC). The RCC is charged to all regulated utility and pipeline service providers in Alaska. This legislation directs the commission to provide a report to the legislature determining whether creating an independent entity that meets the requirements to manage the electrical transmission facilities in the Railbelt area is the best option to provide for effective and efficient electrical transmission, including economical distribution, reliability of electrical service, and nondiscriminatory, open access to transmission services. The cost of undertaking the research, analysis, and preparation of a thorough report should be funded through general funds, rather than shouldered by those now paying regulatory cost charges. Until such time as an independent system operator managing the Railbelt electrical transmission system is certificated or approved, and actually providing a discernible utility service to Railbelt ratepayers it is not possible to collect regulatory cost charges (AS 42.05.254). Thus, the only source of funding for the study of and development of a plan or report on the relative merits of the creation of an independent entity to manage Railbelt electrical transmission facilities and obligations is the general fund.

The commission does not currently have the in-house expertise to undertake the type of research, analysis, review and reporting this legislation requires. Therefore, the commission plans to contract for the research, review, analysis and related undertakings necessary to prepare the report sought by the legislature. It is expected that commissioner and staff time will be required to monitor the process and engage as necessary during the development of a record and to assist in development of the report and to provide the appropriate recommendations with the report at the time it is submitted to the legislature.

Alaska Legislature
Representative Charisse Millett

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District 24

Version: 28-LS1408\N

Summary of Changes – Blank CS House Bill 340

Page 1

Line 1 – Replaced "provide a report" with "recommend"

Line 2 – Inserted "an action plan" after "legislature"

Line 8 – Replaced "July, 15, 2015" with "January 1, 2015"

Line 8 – Replaced "provide a report" with "recommend"

Line 9 – Replaced "determining whether creating" with "a plan to establish"

Lines 10 and 11 – Replaced "is the best option to provide" with "In developing the plan, the commission shall consider options"

Line 14 – Replaced "the report" with order to implement the plan"

Page 2

Line 1 – Replaced "the report" with "developing a plan"

Line 17 – Replaced "standards" with "standard" and inserted "as modified to meet the needs of the Railbelt area;"

Line 27 – Replaced "economical distribution" with "economic dispatch"

Page 3

Line 6 – Inserted "and ancillary services recognized by the Federal Regulatory Commission used" after "systems"

Line 11 – Replaced "report" with "plan"

Line 12 – Replaced "report" with "plan"

Prepared on March 13, 2014

Alaska Legislature
Representative Charisse Millett

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District 24

Version: 28-LS1408\N

Sponsor Statement - House Bill 340
Representative Charisse Millett by Request

"An Act directing the Regulatory Commission of Alaska to recommend to the Legislature an actionable plan relating to electrical transmission in certain areas of the state; and providing for an effective date."

Senate Bill 196 directs the Regulatory Commission of Alaska to recommend a process to adopt an actionable plan that creates a Railbelt Independent System Operator (ISO). The Railbelt comprises the interconnected electric transmission system that runs between Fairbanks in the north to the state-owned Bradley Lake hydroelectric plant near Homer, Alaska to the South.

An ISO will allow the Railbelt Transmission system to deliver Alaska's abundant energy resources to market providing both improved reliability and economic efficiency.

- The Alaska Energy Authority quantified annual cost savings from transmission upgrades of between $146 million and $241 million upon completion of AEA's recommended upgrades and adoption of economic dispatch for all Railbelt generation. Eliminating long-standing transmission constraints for Bradley Lake Energy and providing for greater and more reliable energy transfer between Anchorage and Fairbanks provide much of these savings. Adding a redundant transmission path to Fairbanks will not only improve transfer capability but will allow electric consumers in the north with firm transmission access to avoid operating costly liquid fuel generation.

- Those savings are anticipated to reduce energy rates to Railbelt electric consumers
  The ISO is a non-profit independent corporation subject to jurisdiction of the Regulatory Commission of Alaska (RCA. The ISO would be responsible for electric power grid operations, Railbelt electric reliability, non-discriminatory open access transmission and long-term planning. The ISO would be able to maximize the use of new and existing resources to achieve economic dispatch of Railbelt generation resources for the benefit of Railbelt electric consumers through a unified tariff.

- The objective of the ISO is to promote efficiency in wholesale electricity markets and to ensure electricity consumers pay the lowest possible price for reliable electric service.

- Non-discriminatory access is necessary to encourage competitive generation resources

- Recent construction of new efficient generation with multiple owners, including Independent Power Producers (IPP's), necessitates the adoption of universal reliability standards to maximize electric system safety, reliability and efficiency.

- Disparate electric prices between regions drive the need to reduce transmission congestion and adopt economic dispatch.

- The Alaska Energy Authority (AEA) has identified significant Railbelt transmission improvements necessary for regional economic efficiency but the current individual utility structure lacks a comprehensive regional approach to finance the needed investments.

The time is now! The state's economic prosperity is dependent on available, reliable, and affordable residential, commercial, and industrial energy.

The ISO provides the opportunity for utilities and power producers to collaborate and provide to consumers the savings identified by the Alaska Energy Authority.

Railbelt

Independent System Operator (ISO)

Reliability, Efficiency, and Open Access Transmission

House Special Committee on Energy
Co-Chairs Isaacson & Millett
March 19, 2014 – 8:00 AM

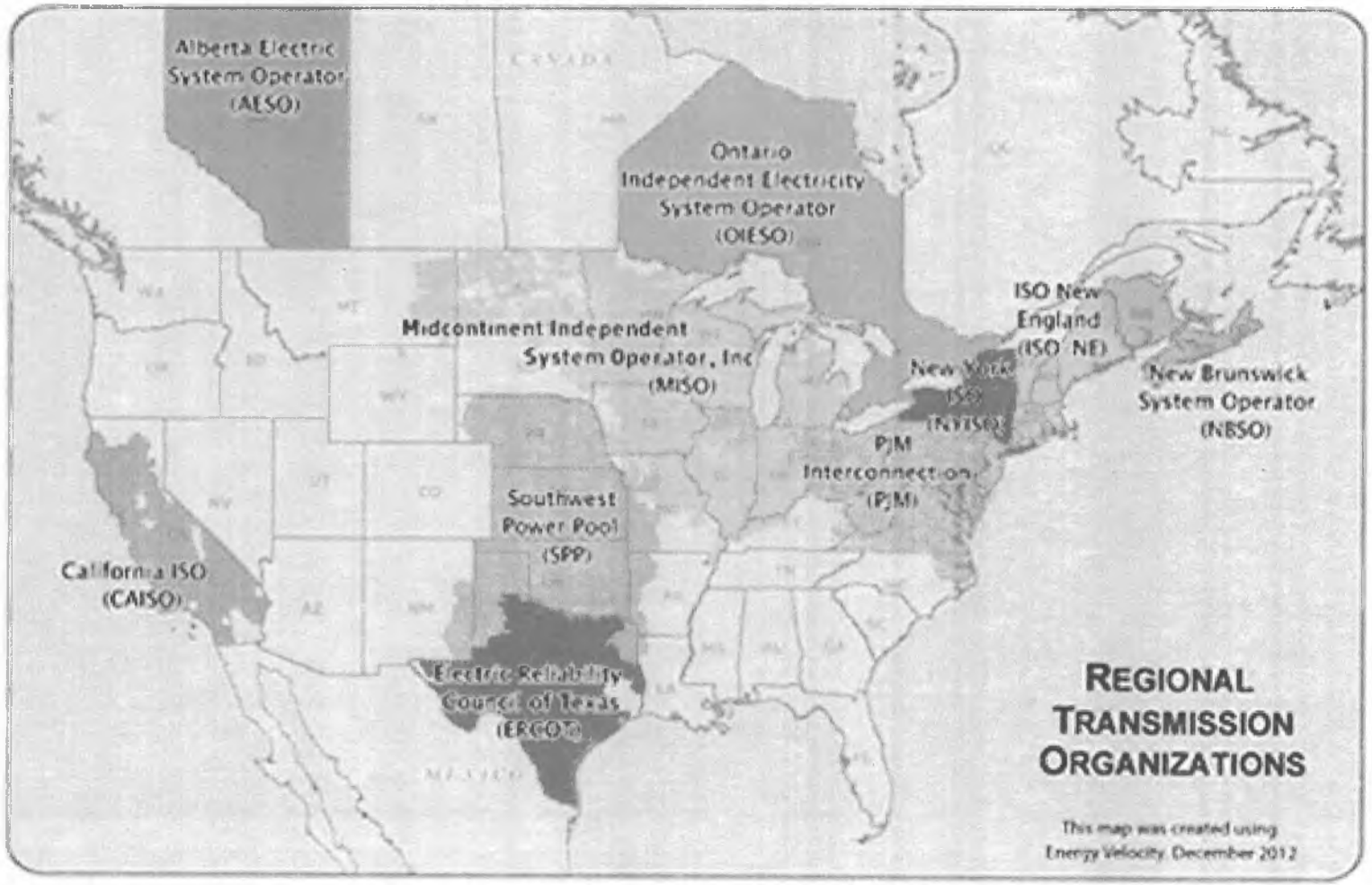
CHUGACH
POWERING ALASKA'S FUTURE

Chugach supports the plan "form an independent entity" that meets the following requirements:

- Authority over transmission
- Non-discriminatory open access
- Adopt, maintain & enforce reliability standards
- Plan, coordinate and condition new facilities
- Single operator – economic dispatch
- Universal transmission tariff

We have investigated the structure of Independent System Operators (ISOs) that are common in the Lower-48 and determined they are similar to requirements identified in HB 340.

Independent System Operators (common in the Lower-48 and Canada)



FERC ISO – An Independent System Operator



Description

- Also known as a Regional Transmission Organization (RTO)
- An ISO owns no assets
- It is neutral party responsible for planning, management and control of the electric transmission grid in a state or region



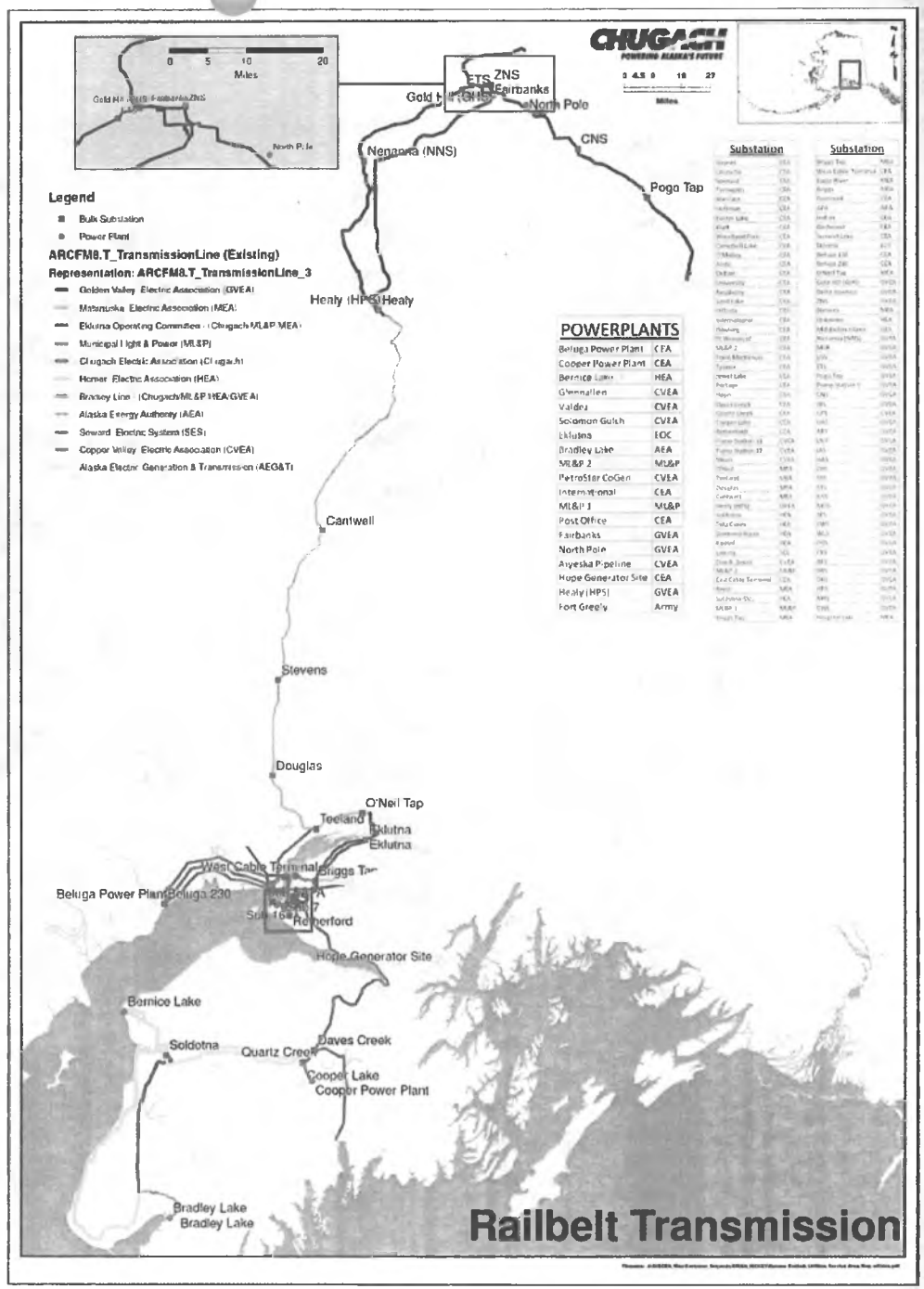
Characteristics

- Ensures non-discriminatory access
- Possession of operational authority for all transmission facilities under the ISO's control
- Exclusive authority to maintain reliability
- Regulatory compact
- Plans, conditions and approves projects

ISOs are a Proven Solution

- Mid 1990s FERC Order 888 mandated non-discriminatory open access
- 1999 FERC Order 2000 recognized and encouraged the formation of Regional Transmission Organizations (RTOs) (ISOs)
- They are common in areas without significant federal investment in transmission and generation i.e. Bonneville and Tennessee Valley Authority
- Ten exist today covering most of the US and parts of Canada with proven improvements in efficiency and reliability
- Alaska is not FERC regulated.... *However:*
- Adapted for the Railbelt's smaller size and unique circumstances they provide a proven road map - a workable rational Railbelt business structure

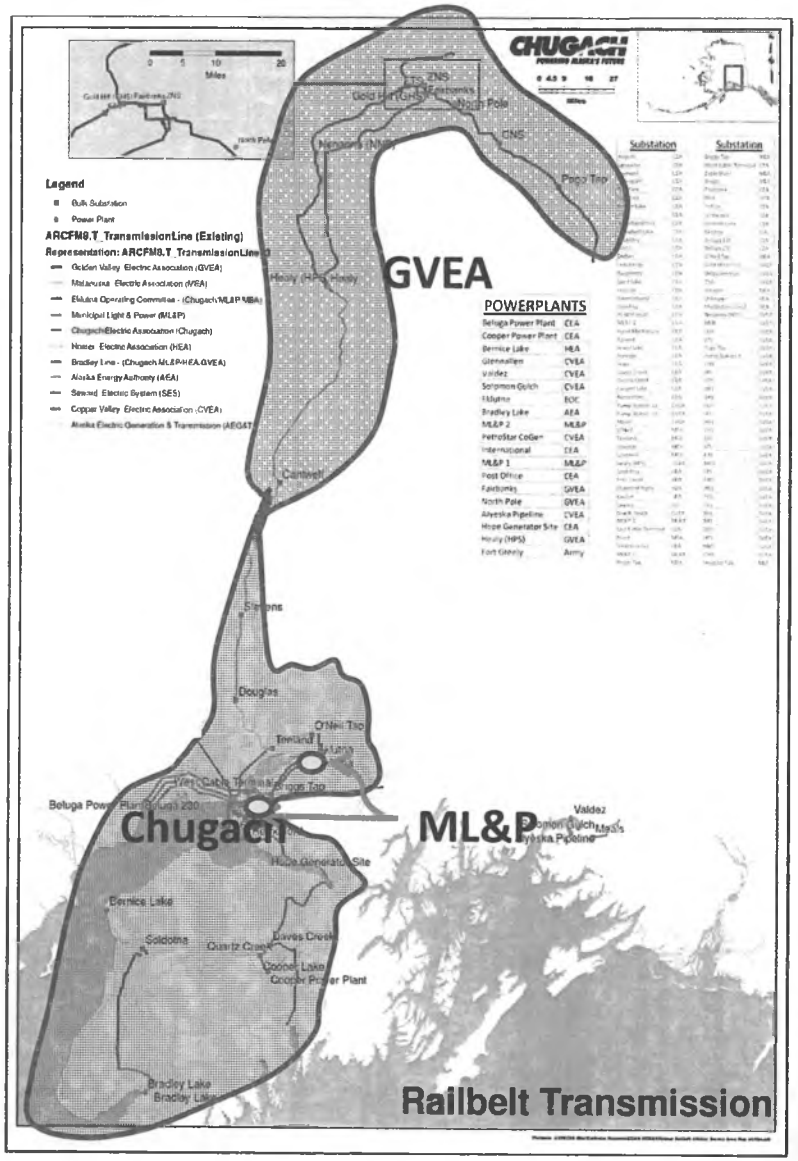
The Railbelt Grid



Railbelt is changing

1985 - 2013

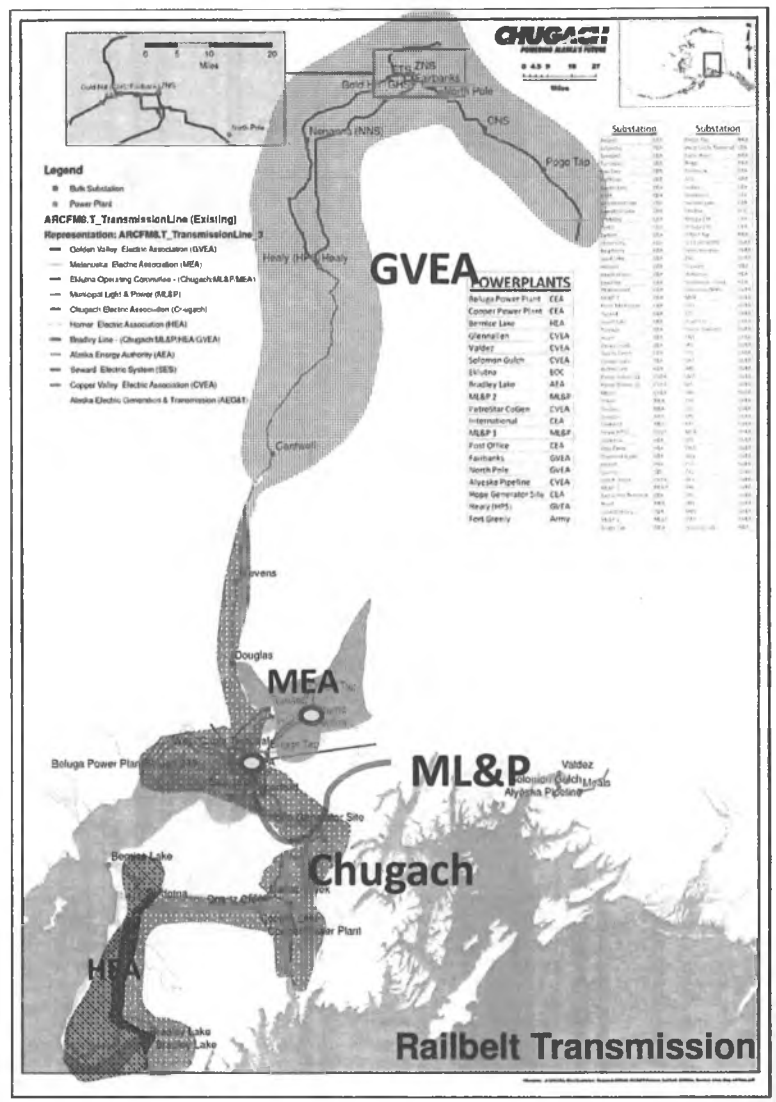
- 3 vertically integrated utilities
- Reliability rules unanimously adopted with voluntary compliance
- Alaska Intertie Agreement "utility users only"
- Bradley Lake Agreements with transmission access
- Minimal changes to Generation & Transmission (G&T) system
- Utility owned & operated generation
- Chugach economically dispatched HEA, MEA, SES & Chugach retail plus GVEA economy



Railbelt is changing

2014 -

- Addition of 2 new vertically integrated utilities
- Reliability rules not unanimous – interconnection issues not defined
- Alaska Intertie Agreement "possible new users" through open access terms
- Bradley Lake transmission access congestion
- Significant generation replacement/additions – new industrial loads
- Addition of Independent Power Producers (IPP'S)
- Separate dispatch – reserve sharing without transmission rights?



Railbelt needs drive change

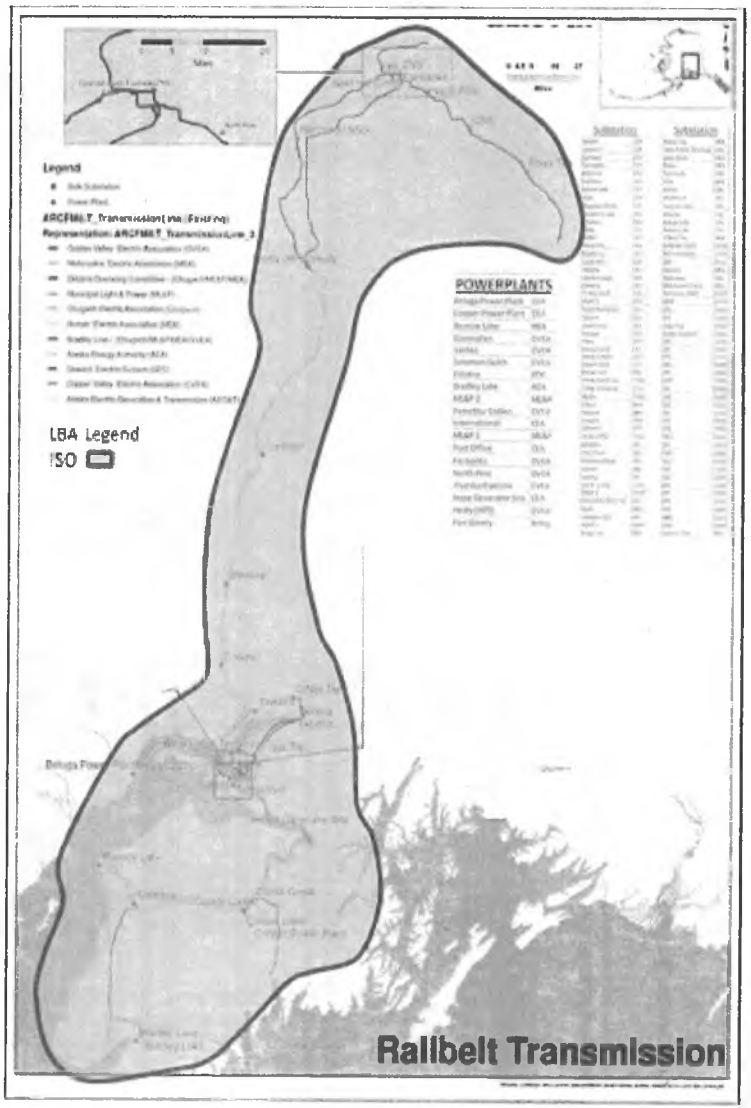
ISO

Universal reliability standards

Independent authority to enforce rules

Long-term planning to maximize efficiency, improve reliability, and diversify energy options

Regional operations for economic dispatch, undertake regional system improvements, and resolve Bradley Lake energy delivery congestion

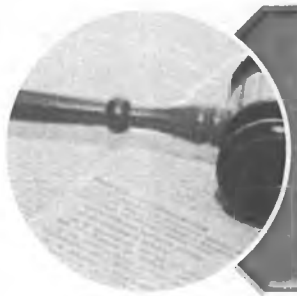


Transmission Challenges

AEA studies highlight transmission constraints that limit power transfer and economic dispatch

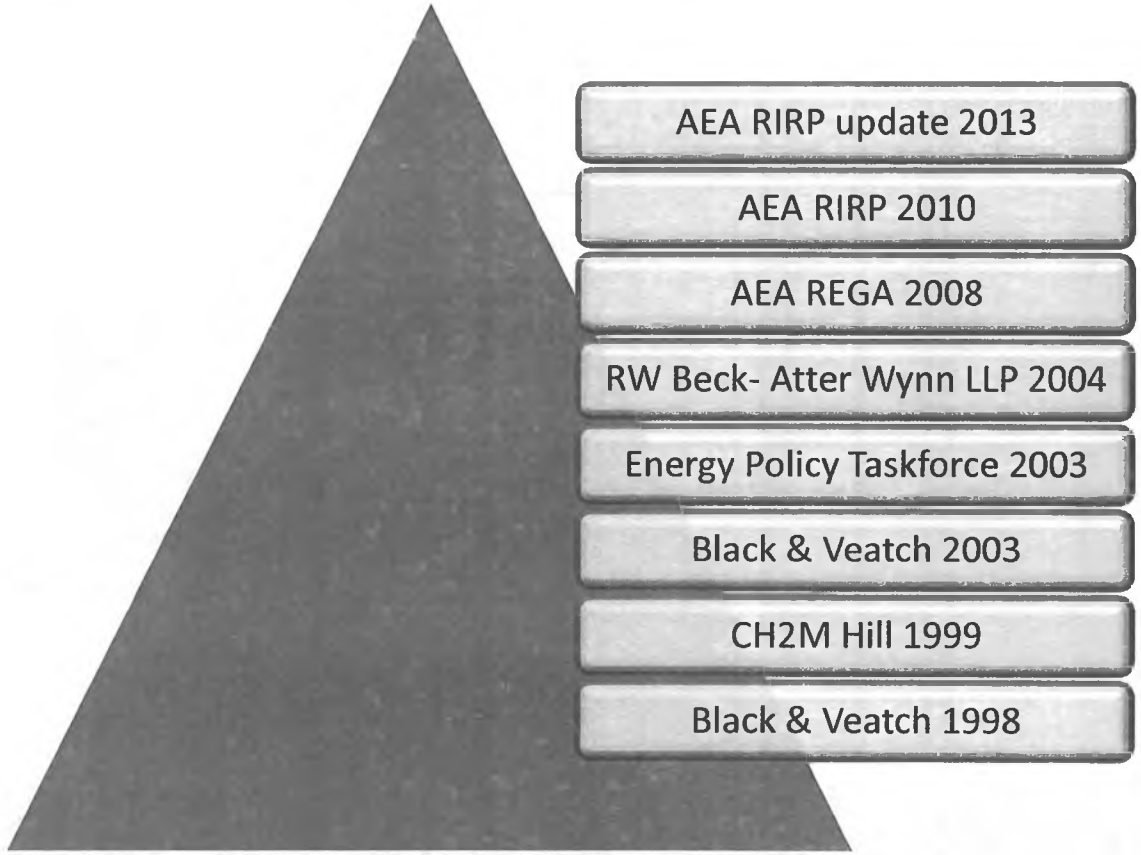


Individual utilities will not sponsor regional transmission projects or undertake economic dispatch without independent entity

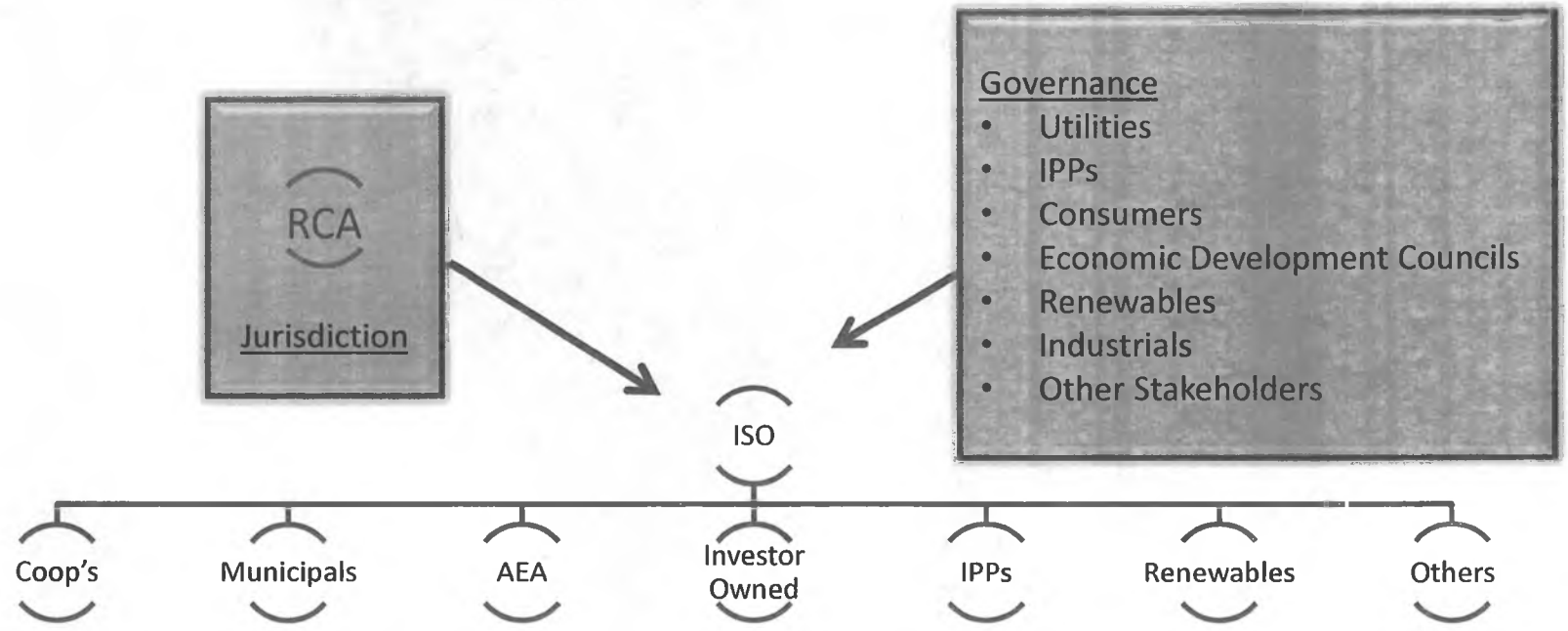


Multiple transmission tariffs and operating rules make interconnection challenging and cost recovery uncertain

Studies Recommend Integrated Planning and Economic Dispatch



ISO Structure



Railbelt ISO





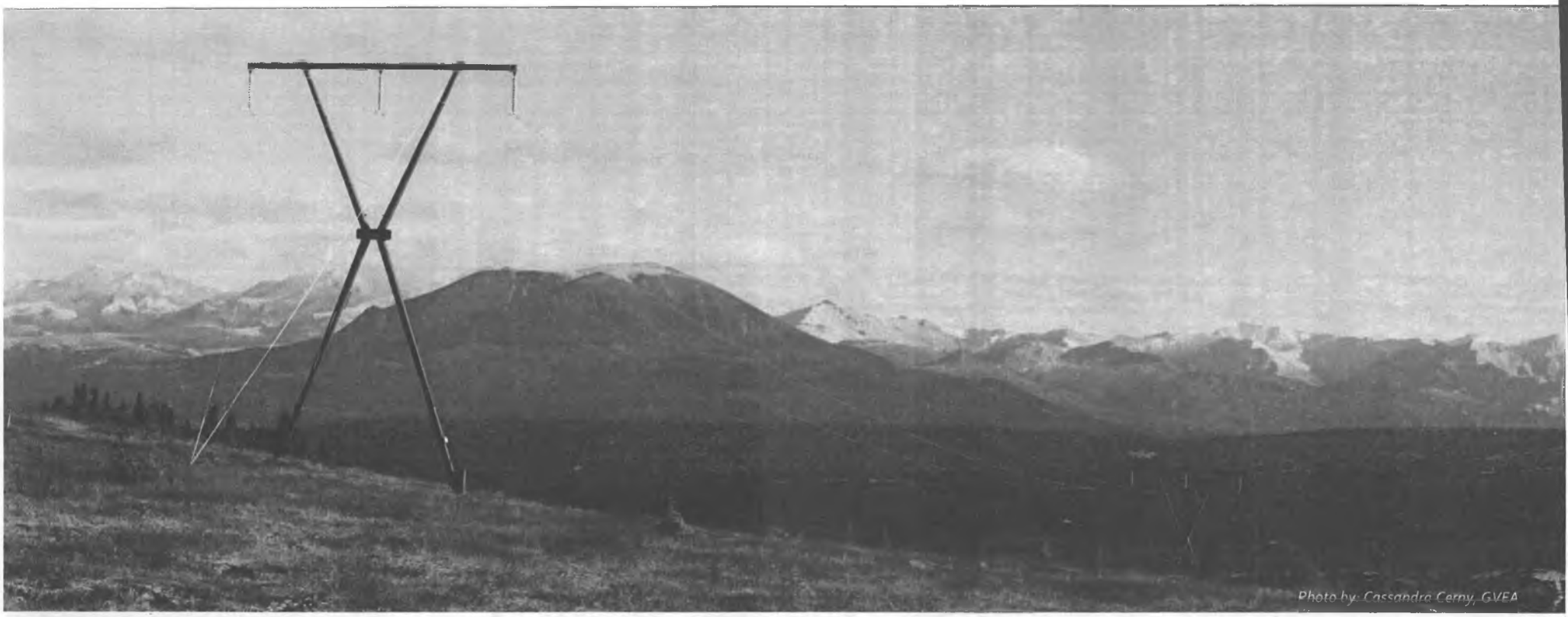
- Stakeholder governance
- Under RCA jurisdiction
- Adopts reliability & interconnection standards
- Plans and condition projects
- Enforces standards
- Possesses regulatory compact
- Ensures non-discriminatory transmission access
- Develops tariff for single system-wide transmission rate
- Responsible for reliability
- Responsible for system economic dispatch

Legislation and Path Forward (HB 340)

- Regulatory Commission of Alaska (RCA) to recommend plan to legislature by January 1, 2015
  - Establish an independent entity to satisfy transmission needs of Railbelt to:
    - Reduce electric rates through economic dispatch
    - Oversee and enforce reliability "rules of the road"
    - Assure fair non-discriminatory open-access
    - Plan, coordinate and condition necessary upgrades
    - Establish a universal transmission tariff
  - Provide suggested legislation and/or regulatory changes necessary to implement plan if needed

Take Away

- Millions of dollars of annual savings can be realized through a Railbelt wide approach to electric system planning and operations and economic dispatch
- A new business structure is required to accomplish this
- A proven business structure exists to achieve these savings
- The first step in achieving these savings is passage of *House Bill 340*
- The next step is design a plan to investigate the best option to improve Railbelt electric cost and service
- Next is to adopt statutory language if required to give the RCA statutory authority to regulate such action

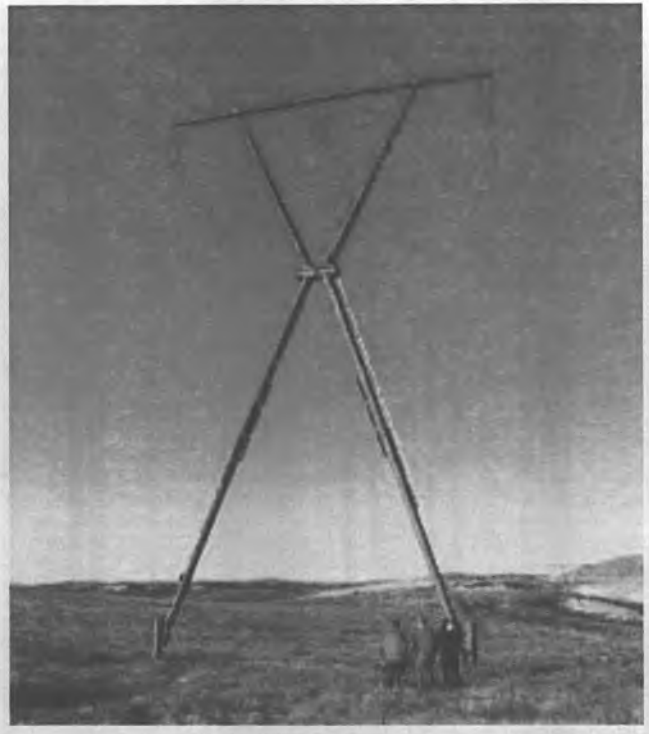


Alaska Transmission Issues

Alaska Energy Authority
House Energy Committee Hearing on HB 340
March 19, 2014

Railbelt Distances, Cost and Governance

- Distance
  - Homer to Fairbanks – 580 miles
- Governance
  - Reliability Standards
  - Open Access Provisions
- Needed Upgrades
  - Evaluate Cost/Benefit Ratio



ALASKA ENERGY AUTHORITY

Unconstraining Bradley Projects

Project	Description	Cost ($mill)
New HVDC Line: Bernice Lake to Beluga	100 MW HVDC intertie	$185.0
Anchorage Area Battery	25 MW/14MWh BESS	$30.2
New Line: Bradley to Soldonta	115 kV line and substation	$72.4
Reconstruct Line: University to Dave's Creek	Reconstruct line to 230 kV	$70.5
Upgrade Substations: University & Dave's Creek	Convert line to to 230 kV	$31.1
Upgrade Line: Dave's Creek to Quartz Creek	Upgrade line to rail conductor	$13.0
Total		**$402.2**

Benefits

- Physically move Bradley energy off of the Kenai Peninsula
- Reduce transmission losses and provide voltage control
- Increase reliability to N-1

ALASKA ENERGY AUTHORITY

Southcentral Projects

Project	Description	Cost ($mill)
Fossil Creek Substation	New 115 kV substation	$10.7
Eklutna Hydro Substation	New 115 kV substation	$9.8
Total		**$20.5**

Benefits

- Allow for energization of Anchorage to Eklutna "express" circuit
- Allow for future transmission additions and upgrades

ALASKA ENERGY AUTHORITY

Northern Projects

Project	Description	Cost ($mill)
New Stations: Lorraine & Douglas	230 kV station	$73.4
New Line: Lorraine to Douglas	230 kV dbl circuit line	$55.9
New Stations: Gold Creek & Healy	230 kV station	$35.8
New Line: Douglas to Healy	230 kV line opearted at 138 kV	$188.1
Communication	Communication for control	$15.0
Healy Additions	2 new transformers	$5.7
Ugrade Stations: Wilson & Gold Hill	230 kV upgrade	$10.3
Ugrade Stations: Nenana, Ester, Eva & Clearly	Station updgrades	$10.8
Upgrade Line: Healy to Gold Hill	Convert line to 230 kV	$85.7
Total		**$480.7**

Benefits

- More firm/low cost power from Anchorage to Fairbanks
- System stabilization and voltage control
- Increase reliability to N-1

ALASKA ENERGY AUTHORITY

Transmission Projects: Potential Railbelt Consumer Impact

- This presentation is for discussion purposes and not an AEA position.
- Demonstration of impact to consumers if cost of projects recovered in electric rates

ALASKA ENERGY AUTHORITY

Transmission Upgrade: Potential Impact

	CAPEX ($mill)
Unconstraining Bradley	$402.2
Southcentral Projects	$20.5
Northern Projects	$480.7
Total Cost	**$903.4**

- Transmission system upgrades benefits entire Railbelt system
- Project separated into two phases
  - The State has not provided funding for first stage of project
- Costs from May 9, 2013 EPS Presentations
- **Analysis of impact on rates of transmission upgrades**

ALASKA ENERGY AUTHORITY

Transmission Upgrade: Costs

Base assumptions

- Full capital cost recovered through rates
- Annual operating costs are 2% of capital costs
- Entirely funded with commercial rates
- Costs shared proportionally by all utilities

CAPEX ($millions)	$903
OPEX (2% OPEX)	$18.1
Interest Rate	5.00%
Bond Term (Years)	30
Output (GWhs)	4,817
Inflation	2.50%

ALASKA ENERGY AUTHORITY

Transmission Upgrades: Benefits

Base assumptions

- The annual cost savings from transmission upgrades will lower rates
- Range of annual savings has been estimated by Electric Power Systems, Inc. (EPS) (May 9, 2013)
  - Low savings: $146 million
  - High savings: $241 million
  - Estimates are being refined by AEA/EPS
- Savings shared proportionally by all utilities

	Annual Savings ($millions)
Low Savings	$146
High Savings	$241

ALASKA ENERGY AUTHORITY

Impact on Railbelt Rates: Net Effect

- Annual costs and savings are spread across all Railbelt kWh's
- Majority of upgrade costs are fixed while savings increase with inflation
  - Larger savings over time
- $146 million savings
  - Immediate positive impact on rates
- $241 million savings
  - Immediate and significant positive impact on rates

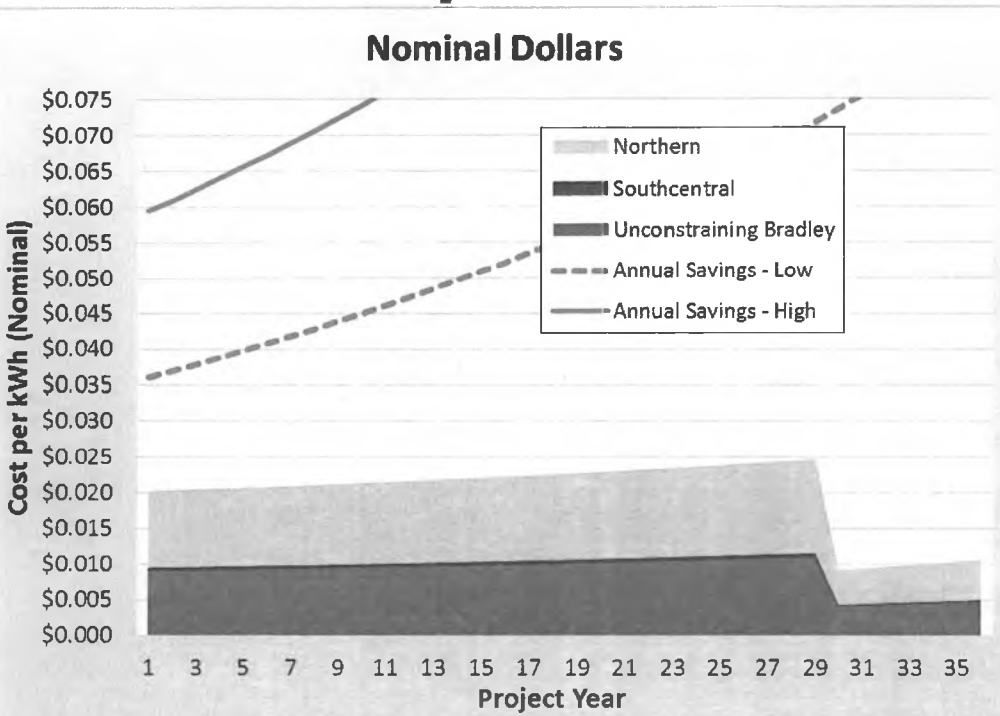
Net Rate Savings (Costs) ($/kWh)

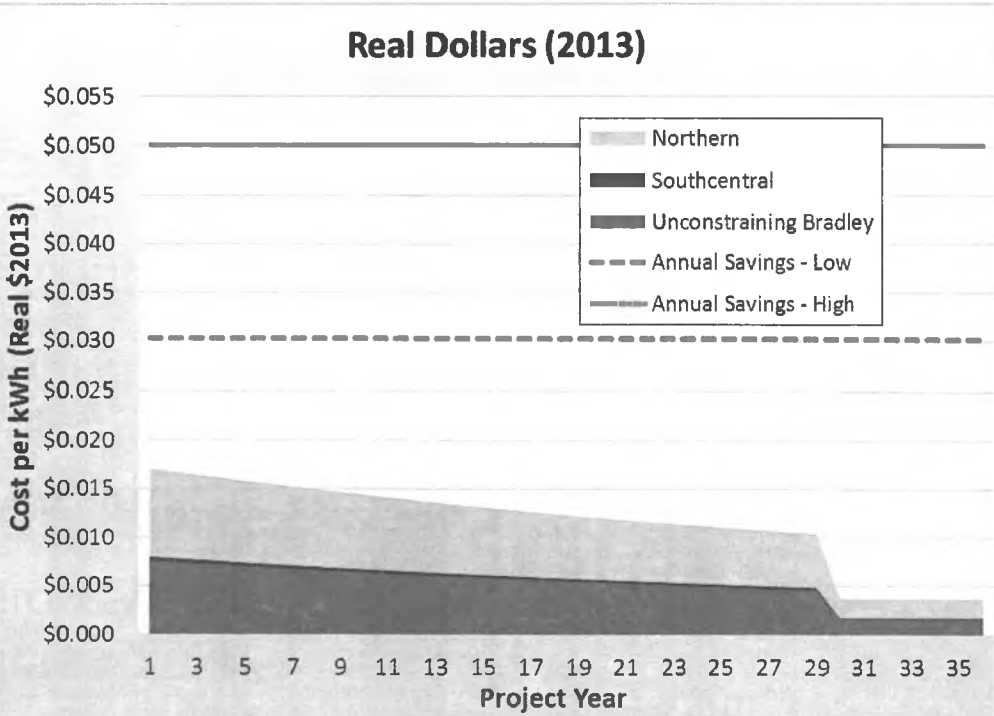
	$146 MM Savings	$241 MM Savings
Year 1 (Nominal)	$0.016	$0.039
Year 1 ($2013)	$0.013	$0.033
10 Yr Ave ($2013)	$0.015	$0.034
25 Yr Ave ($2013)	$0.016	$0.036
50 Yr Ave ($2013)	$0.021	$0.041

**($2013) means adjusted for inflation to today's dollars*

ALASKA ENERGY AUTHORITY

Impact on Rates: Nominal vs. Real





- When annual savings exceed costs – positive impact on rates
- $146 million annual savings – immediate positive impact on rates
- $241 million annual savings - immediate and significant positive impact on rates

ALASKA ENERGY AUTHORITY

Next Steps – Policy Direction

- AEA will work with all stakeholders to make recommendations for transmission system
- Formal coordination with transmission system users/stakeholders (utilities, independent power producers, potential independent system operator, military)

  -File transmission system reliability standards

  -File transmission system open access language

ALASKA ENERGY AUTHORITY

AKEnergyAuthority.org



Creation of a Railbelt Electric Independent System Operator (ISO)

What?

A non-profit independent corporation subject to jurisdiction of the Regulatory Commission of Alaska (RCA) that is responsible for electric power grid operations, Railbelt electric reliability, non-discriminatory open access transmission and long-term planning that maximizes the use of new and existing resources to achieve economic dispatch of Railbelt generation resources for the benefit of Railbelt electric consumers through a unified tariff.

Why?

The objective of the ISO is to promote efficiency in wholesale electricity markets and to ensure electricity consumers pay the lowest possible price for reliable electric service.

- Non-discriminatory access is necessary to encourage competitive generation resources
- Recent construction of new efficient generation with multiple owners, including Independent Power Producers (IPP's), necessitates the adoption of universal reliability standards to maximize electric system **safety, reliability** and **efficiency**.
- Disparate electric prices between regions drive the need to reduce transmission congestion and adopt economic dispatch.
- The Alaska Energy Authority (AEA) has identified significant Railbelt transmission improvements necessary for regional economic efficiency but the current individual utility structure lacks a comprehensive regional approach to finance the needed investments.

'hen?

The time is now! The state's economic prosperity is dependent on available, reliable, and affordable residential, commercial, and industrial energy.

Where?

Interconnected Railbelt Region Only

How?

Draft legislative language that directs the Regulatory Commission of Alaska (RCA) to identify the statutory changes necessary and once identified, proceed with introduction of appropriate legislation that allows the RCA to oversee creation of the ISO.

The initial legislation would permit the utilities to submit an implementation plan to create an ISO that meets the governance requirements, minimum characteristics, functions, and regulatory compacts of an ISO by July 1, 2015. In the absence of a submission of a plan by two or more utilities within a reasonable time, the RCA could order affected utilities to make such filing. Following submission of the plan, the RCA shall have 180 days to review the plan and approve or disapprove the structure in whole or part and direct the utilities to bring any non-conforming aspects into compliance with final approval by July 1, 2016. The characteristics and functions are based upon Federal Energy Regulatory Commission (FERC) orders and regulations and are modified to meet Railbelt electric needs.

Establish capital appropriation for ISO transitional start-up functions completed over an estimated five-year time horizon.

- ISO – initial start-up costs – $7.5 million
- RCA supplemental funds for administrative support and consultation to establish ISO - $1.0 million

Governance

The initial ISO board membership shall be comprised of electric industry professionals who have direct opertional experience in transmision or generation infrastructure and shall include relevant stakeholder segments that will expand over time as those markets mature.

Characteristics

1. Independence ensured organizationally by stakeholder appropriate Board of Directors.
2. Possession of operational authority over the Railbelt transmission system.
3. Exclusive authority to maintain Railbelt reliability.
4. Mandatory participation by all entities using interconnected transmission system.
5. Maximize use of existing resources to avoid duplication of facilities.

Functions

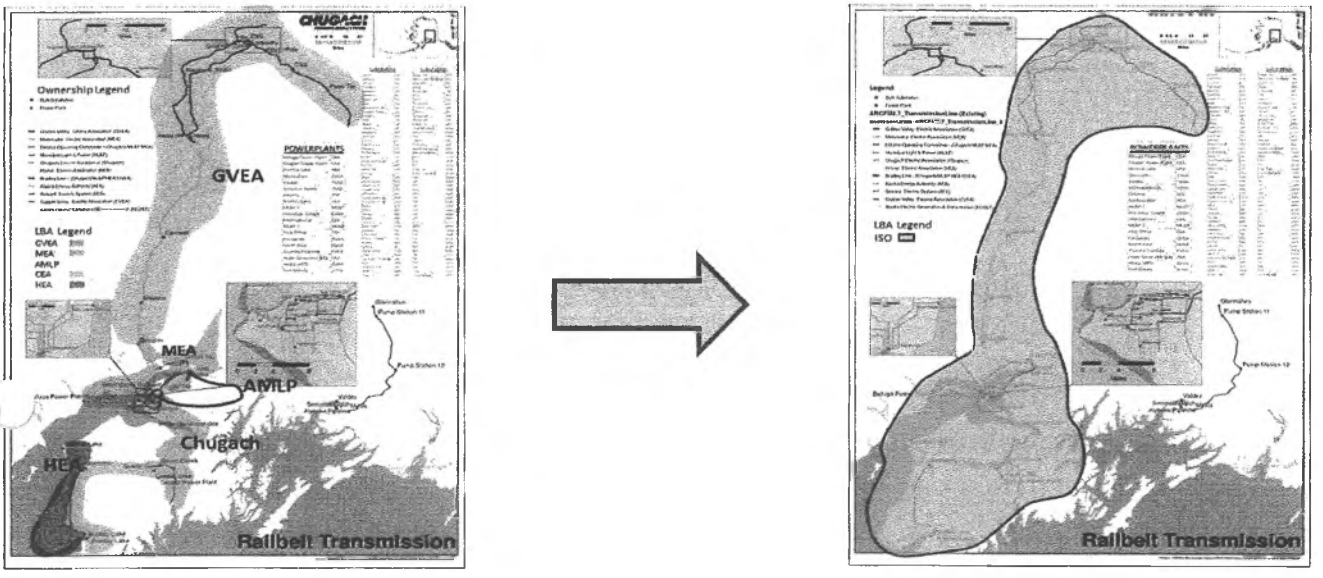
1. Mandates non-discriminatory open access transmission.
2. Adopt, maintain and enforce Railbelt reliability standards - initially adopts North American Electric Reliability Corporation (NERC) based reliability standards equivalent to those approved by the Intertie Management Committee (IMC) for the Railbelt.
3. Plan, coordinate and condition necessary transmission additions and upgrades.
4. Condition and authorize the interconnection of new generation.
5. Administer a universal tariff and employ a transmission pricing system that will promote efficient use and expansion of transmission and generation facilities.
6. Manage parallel path flow and transmission congestion.
7. Functions as a single control area operator facilitating regional power pooling or economic dispatch to maximize generation efficiency.

Regulatory Compact

1. RCA ensures rate recovery throughout the planning, permitting and construction phases of projects planned and conditioned by the ISO.
2. RCA honors existing agreements and allows cost recovery of existing investments.
3. RCA ensures that standards and tariff rates are just, fair and reasonable to all ratepayers and allows transitional ramp-in rates to minimize individual utility rate impacts.
4. Existing transmission assets used for the benefit of the Railbelt region will receive full cost recovery from the ISO including depreciation (both direct and general plant), interest, and margin, as well as operations, maintenance, applicable taxes, and general & administrative expenses necessary for the operation of the transmission system.

Stakeholders

All Alaska Railbelt Electric Utilities, Independent Power Producer's (IPP's), Alaska Energy Authority (AEA), Large Industrial Users, Consumer Advocates, Regulatory Commission of Alaska (RCA), and Renewable Energy Interests



Consideration of a Railbelt Electric Independent System Operator
By Bradley Evans
CEO, Chugach Electric Association
February 5, 2014

The interconnected Railbelt electric system is in transition. Legacy agreements are coming to an end. New generating facilities are being built. New and upgraded transmission lines are needed but are not being constructed. Commonly accepted rules of the road are needed for the transmission network, along with a means of enforcing them. Non-utility power providers want access to the grid. And above all, studies by the Alaska Energy Authority have shown that ratepayers in the Railbelt could save significant amounts of money each year if the most efficient generating units could be dispatched first – and if there were not transmission bottlenecks restricting their output.

These conditions, and the potential benefits to Railbelt electric consumers, illustrate the need to consider a new business model for the region. Years ago, similar circumstances caused regulators to create a series of Independent System Operators (ISOs) to improve grid operations across the Lower 48. It is time to consider whether a similar approach would be beneficial for the Railbelt.

Currently, six different electric utilities provide retail service to customers throughout the region. For decades, Chugach Electric Association provided centralized planning, construction and operations of generation and transmission facilities to meet the electrical requirements of much of the region. Chugach was in this role because it had wholesale contracts to meet the needs of customers of three other utilities in addition to providing for its own retail base.

Now we have reached a time when two of those contracts are ending, and the subject Southcentral utilities have and are building new power plants to serve their customers. These plants need to be connected to the grid and operated in a way that does not cause harm to other users. Additionally, through the Alaska Energy Authority, the State owns both generation and transmission assets that are part of the Railbelt system. Existing and prospective non-utility generators also want to be able to promote projects and gain grid access.

The benefits of coordinated planning and dispatch extended northward after the State constructed the Alaska Intertie between Willow and Healy. This 170-mile segment of transmission line connected the Southcentral and Interior grids. The intertie made it possible for power to flow between the two regions. For more than 20 years Interior customers have seen lower bills because power generated with Cook Inlet natural gas has moved north over the intertie. Chugach actively planned and managed the fuel supply, generation and transmission assets necessary to make these sales. After the original gas supply contract ended, Chugach secured additional supplies to continue these sales. Interconnection with the Interior provides security and reliability benefits to Southcentral utilities as well.

When it comes to grid operations, customers are best-served by a system where the most economic generation runs most of the time and power can flow efficiently from where it is made to where customers need it. In order to do this, an entity must be empowered to direct the incremental use of the most efficient generating units. Currently no single entity has this ability, leaving individual utilities to make their own decisions from a more-limited list of generating choices. Eliminating duplication of dispatch services is another area where an ISO could achieve savings.

It is also vitally important that the grid remain reliable. Some entity must set and enforce interconnection standards that ensure the reliability of the transmission system. At present that authority is not clearly recognized within the Railbelt. Absent any other alternative, the Intertie Management Committee (a committee comprised of the majority of Railbelt electric utility operators) has adopted and applied to the Railbelt interconnection and reliability standards from the North American Electric Reliability Corporation. While this was both reasonable and necessary, a long-term solution is needed. An ISO should be given the specific authority to address these issues in the future.

In fairness, organizations up and down the Railbelt have made investment decisions based upon circumstances and rules in effect at the time. In considering a transition to a new business model, it is important that utilities and others be able to recover the costs of existing and under-construction infrastructure. Existing contracts must also be honored.

It is not necessary for one organization to own all of the transmission facilities in the Railbelt in order to achieve the benefits of a unified grid. However, there do need to be operating agreements between the ISO and transmission owners so the facilities may be used for the good of the interconnected region. The transmission-owning entity must also be made whole for its costs. The best approach would be for the ISO to create a unified tariff for the transmission system. In other words, add up all the annual costs of the component parts of the Railbelt transmission system and apportion them across the region as a single transmission rate. This would allow a prospective generator or purchaser to negotiate a sales contract knowing they would have one entity to deal with for interconnection rules and a uniform transmission rate.

Creating an organization to take a regional approach is probably the only realistic means to build out a fully functional grid for the future. Currently much of the discussion of new transmission has focused on only two models: either have the State grant fund all new transmission or have it funded by utility customers. Each of these has its limitations. The State has constraints on its capital budgets and individual utilities are challenged to pass on the cost of regional activities to the customers of their defined service territories. An independent ISO however, can consider what improvements are necessary, cause them to be built, and recover the cost through a unified tariff.

The ISO would not be unconstrained however. The development of a Regulatory Compact would be critical to this business model. This would be an agreement with the

Regulatory Commission of Alaska that system improvements consistent with a regional plan would be guaranteed rate recovery. The Compact would provide guidelines for the ISO as it worked to expand and strengthen the grid.

Creating an ISO for the Railbelt will ensure a more rational approach to future planning, investment and operations. It will provide a regional approach to grid planning. That is increasingly difficult for individual utilities to undertake when they are focused within their respective service territories.

Fortunately for Alaska, we are not the first to confront this issue. Throughout the Lower 48, federal and state regulators over the past 15 years have taken actions to address similar concerns on a much larger scale. The creation and use of independent, non-asset-owning ISOs has created a way to more rationally plan, operate and finance generation and transmission systems. It is time to seriously consider whether a similar approach – modified if necessary to fit the Railbelt – would provide similar benefits for Alaska's most populous region.

Examples from the Lower 48 provide a path forward. The Legislature should pass legislation directing the Regulatory Commission of Alaska to identify statutory changes necessary to permit utilities to submit implementation plans to create an ISO that meets certain requirements. Once identified, proceed with introduction of appropriate legislation that allows the RCA to oversee creation of an ISO.

CHUGACH
POWERING ALASKA'S FUTURE

March 17, 2014

Representative Charisse Millett
State Capitol Rm 403
Juneau, AK 99801-1182

Dear Representative Millett:

Chugach Electric Association supports legislation that would lead to the creation of an Independent System Operator (ISO) for the Railbelt. This concept is currently embodied in the Committee Substitute for HB 340.

In the Lower 48, ISOs are a proven means of providing the benefits of grid unification and ensuring the economic operation of transmission systems. We need the same thing in the Railbelt. Currently six electric utilities and the Alaska Energy Authority own most of the transmission facilities in the Railbelt. An ISO can cause these assets to be operated as one unified system, administered under uniform rules for reliability and interconnection. A universal tariff would recover the cost of the transmission system, with the owners of the system components compensated for their investments. Assets do not transfer under the ISO model.

The ISO would also provide the structure to take a regional approach to planning and improvement of the transmission system. Studies by the Alaska Energy Authority have identified there would be significant benefits to ratepayers from expanding the regional transmission system. However, today's structure makes it difficult for individual utilities to make regional investments.

The Regulatory Commission of Alaska would have jurisdiction over the ISO. The involvement of the RCA is critical to the success of the concept. CS HB 340 calls for the RCA to recommend to the Legislature a plan to implement an ISO for the Railbelt in line with key principles. This is the same method the Federal Energy Regulatory Commission used years ago in establishing what became a series of regional ISOs in the Lower 48.

CS HB 340 would take the first steps to rationalize the Railbelt transmission system. Chugach supports the bill and urges its passage.

Sincerely,

Bradley W. Evans
Chief Executive Officer

Chugach Electric Association, Inc.
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www.chugachelectric.com • info@chugachelectric.com

MEA
MATANUSKA ELECTRIC ASSOCIATION

March 17, 2014

Representative Charrise Millett
716 W. 4th Avenue
Anchorage, AK 99501-2133

Dear Representative Millett:

I would like to express my full support for HB 340, "An Act directing the Regulatory Commission of Alaska to provide a report to the legislature relating to electrical transmission in certain areas of the state and providing for an effective date".

Matanuska Electric Association is the state's oldest and second largest electric cooperative with almost 50,000 members and 60,000 accounts. Our service area includes over 4200 miles of power lines and extends from Eagle River up to the South Denali town site beyond the Chulitna River and from the Little Susitna River across to Sheep Mountain.

MEA is a part of Alaska's Railbelt grid and will become a vertically integrated utility when we begin producing our own power in 2015. Our service area sits at the heart of the Railbelt and our ability to achieve our vision 'To ensure our members have safe, reliable, sustainable and economical electricity' relies on a healthy and robust Railbelt grid and the cooperation of all the involved utilities. This is why in 2011 we became an active and founding member of the Alaska Railbelt Cooperative Transmission and Electric Company (ARCTEC).

While ARCTEC provides a platform for the Railbelt utilities to work together to address common opportunities and concerns, there are opportunities to do more to optimize the Railbelt system for the benefit of all the electric cooperatives and their members.

We firmly believe one single operator to manage and economically dispatch power on the Railbelt system is in the best interest of Alaskan utilities and ratepayers. Not only should it decrease the cost of providing power to our members, but it also provides an avenue to accomplish large capital projects which benefit the entire system.

The health and vitality of our state's core electric and transmission system will drive economic growth and improve the quality of life for the Alaskans we serve. I urge you to support HB 340 to allow further exploration of this concept and determine the best model to provide Alaskans with this economic benefit for our residents, businesses and communities.

Thank you for your consideration,

Evan J. Griffith
General Manager

ALASKA POWER ASSOCIATION

R E S O L U T I O N

A Resolution Urging the Legislature to Support Utility Efforts to Create a Unified Transmission System for the Railbelt (14-9)

The Railbelt electric transmission system is comprised of hundreds of miles of lines owned by a number of entities, including utilities and the State of Alaska. The system is not nearly as robust as grids in the Lower 48. Limitations affect both the reliability and the cost of electric energy in the region.

A 2012 study by the Alaska Energy Authority determined that there are Railbelt transmission restrictions that result in significantly higher energy costs in the region. The AEA study determined that more than $900 million of transmission projects are needed to resolve existing problems. Although it is clear that the region would benefit from these necessary improvements, it is unlikely to be financed by utility ratepayers under the current operating model.

Absent a clear path to implement AEA study results, the Railbelt needs to consider a different approach to grid management.

In the Lower 48, a series of geographic Regional Transmission Organizations or Independent System Operators have been developed to address similar problems. Railbelt electric utilities have begun working together to study successful Lower 48 models and consider how best to develop, operate and maintain a rational regional transmission system.

Alaska Power Association urges the Alaska State Legislature to support efforts by the Railbelt electric utilities to unify the regional transmission system.

(Adopted Dec. 2013)

Association Members
Alaska Electric and Energy Co-op
Alaska Electric Light & Power
Alaska Power & Telephone
Alaska Village Electric Cooperative
Anchorage Municipal Light & Power
Aurora Energy
Barrow Utilities & Electric Co-op
Chugach Electric Association
Copper Valley Electric Association
Copper Valley Telephone Co-op
Cordova Electric Cooperative
Doyon Utilities
Golden Valley Electric Association
Homer Electric Association
INN Electric Cooperative
Inside Passage Electric Co-op
Kodiak Electric Association
Kotzebue Electric Association
Kwaan Electric Transmission Intertie Cooperative
Matanuska Electric Association
McGrath Light and Power
Metlakatla Power & Light
Middle Kuskokwim Electric Co-op
Naknek Electric Association
Nome Joint Utility System
North Slope Borough
Nushagak Cooperative
OTZ Telephone Cooperative
Southeast Alaska Power Agency
Tanalian Electric Cooperative
Tanana Power Company
TDX Power
Unalakleet Valley Electric Co-op
Yakutat Power

Anchorage office
703 W. Tudor Road,
Suite 200
Anchorage, Alaska
99503
907-771-5700
1-877-992-7322
Juneau office
302C Assembly
Building
211 Fourth Street
Juneau, Alaska 99801
907-463-3636

alaskapower.org

	Allocations	Appropriation Items	General Funds	Other Funds
Hydro Project (HD 5)				
Native Village of Cantwell - Jack River Hydro Project (HD 7-11)	30,000			
Wrangell - Electric Vehicle Feasibility Study (HD 2)	25,000			
Sitka - Centennial Hall and Library Renewable Energy Feasibility Study (HD 2)	30,000			
Sitka - Wastewater Treatment Plant Renewable Energy Feasibility Study (HD 2)	20,000			
Inside Passage Electric Cooperative - Tenakee Inlet Geothermal Resource Study (HD 5)	599,200			
Metlakatla Indian Community - Triangle Lake Hydroelectric Project (HD 5)	500,000			
Alaska Energy Authority -		SPP 56,000,000 ~~96,500,000~~	SPP 56,000,000 ~~96,500,000~~	
ARCTEC Energy Projects		SPP 15,000,000		
AEA - Anchorage to Quartz Creek Transmission Line Maintenance and Repair (HD 16-32)		~~25,000,000~~ SPP 5,000,000		
AEA - Battle Creek Diversion (HD 33-35)		~~15,000,000~~ SPP 1,000,000		
AEA - Cook Inlet Gas Gathering System Remodel		~~2,000,000~~		

	Allocations	Appropriation Items	General Funds	Other Funds
(HD 12-35)	SLP 500,000			
AEA - Daves Creek to	~~1,500,000~~			
Seward Transmission Line				
Completion (HD 33-35)	SLP 2,000,000			
AEA - Girdwood and Sterling	~~4,000,000~~			
Substation Improvements				
(HD 16-32)	SLP 20,000,000			
AEA - Homer Electric	~~25,000,000~~			
Association Soldotna to				
Nikiski Transmission				
Upgrade (HD 33-35)	SLP 5,000,000			
AEA - Quartz Creek to	~~10,000,000~~			
Soldotna Transmission				
Maintenance and Repair (HD				
33-35)	SLP 2,000,000			
AEA - Seward Power Plant	~~4,000,000~~			
Integration (HD 33-35)	SLP 2,000,000			
AEA - Soldotna to Quartz	~~5,000,000~~			
Creek Transmission Study,				
Design and Permitting (HD				
33-35)	SLP 2,500,000			
AEA - Teeland to Healy	~~5,000,000~~			
Substation Improvements				
and Repair (HD 7-11)				
Alaska Energy Authority -				
Energy Generation Projects				
It is the intent of the legislature that the state's capital investment into energy generation projects not exceed 50% of the total investment required to fully complete those projects.				
AEA - Akiak Community		4,000,000	4,000,000	
Electrical Generation				
System Upgrade (HD 38)				

Stuart Goering, Asst. Attorney General/HB 340

As requested, the following are concerns I have identified with HB 340. I have tried to keep my comments somewhat general, as the bill currently before the committee is ver. \U, but I am also aware that a work draft ver. \N is under discussion. I will address those two versions as a singular concept, except where necessary to address specific differences.

As I explained to the committee last Wednesday, these concerns are not advanced on behalf of the RCA. Instead, they represent my observations as an Assistant Attorney General in the exercise of the Department of Law's function, found in AS 44.23.020(b)(5), of advising the legislature on current and proposed law. However, my observations necessarily reflect the expertise and perspective I have developed advising and representing the RCA, and could fairly be assumed to be what I would advise commissioners if asked.

My concerns fall into three broad categories: timing, scope, and possible internal conflicts and conflicts with existing law. In essence, the bill would task the RCA to examine an idea and prepare a work product (characterized as a report in ver. \U or a plan in ver. \N) for delivery to the legislature. The nature of the examination is determined by the objectives to be considered, the "requirements" of the entity to be evaluated, and assumptions to be made in the evaluation process.

Timing

Both versions of the bill have fairly short timelines for completion. This appears reflect the sense that there is a crisis that must be addressed quickly.

While the RCA has significant expertise in the subject matter, and a highly qualified advisory staff, it is already using its resources to accomplish its existing statutory duties. Unique to the RCA are strict statutory timelines for completion of most of its core work, so existing matters cannot be put on hold while the work contemplated by this bill takes priority. As a consequence, it is likely that outside expertise will have to be identified and contracted for, which takes time and is governed by the state procurement process. In addition, as a commission (unlike a line department such as a DCCED) it must conduct its decision making in a matter of this type in public, and generally also includes public input in the form of written and oral comments.

Balanced against the difficulty of accelerating the assigned task is the probability that the crisis, while real, is not as pressing as it might initially appear. The RCA already has broad authority over efficiency and reliability of public utility operations (AS 42.05.291), joint use and interconnection of public utility facilities (AS 42.05.311 - .321), discrimination (AS 42.05.301 and .391) and management practices (AS 42.05.511). While there are completed and pending matters tangentially involving electric transmission, those have all arisen in the context of individual utility tariff filings. Overarching structural problems with the electric transmission system could be, but to date have not been, brought to the commission under the cited authorities. Such a proceeding would be an appropriate remedy even in the absence of this bill or additional legislation.

Scope

The scope of the evaluation portion is fairly narrow, and appears to dictate the adoption of a particular model. However, neither the bill itself, nor legislative history to date, clearly identifies the alternatives from which that particular model was selected nor the relative merits of the model. Indeed, there is as yet no legislative history to support the proposition that the selected model (apparently ERCOT) is even correctly described by the list of attributes in sub-section (b) of the bill.

The narrow scope of inquiry has two potentially negative effects. First, in the absence of a clearly articulated basis for the legislative decision in favor of the selected model, it negates the broad expertise of the agency in utility and pipeline matters which the RCA would otherwise bring to bear on their inquiry. This could have the probably-unintended effect of a work product that appears to reflect agency expertise, but which in fact only echoes a decision that was already made by the legislature. In other words, the RCA might be merely the conduit through which an idea is conveyed, not a meaningful contributor to the development of that idea.

Second, the narrow scope also creates ambiguity as to the RCA's task. On one hand, sub-section (a) directs the commission to "consider options," while at the same time sub-section (b) lists numerous details of the notional entity to be considered, and sub-section (c) mandates that the RCA make a number of foundational assumptions about the regulatory environment in which that entity will operate. A probable result of that ambiguity is a work product that does not address the range of existing solutions in electric and other regulated industries, except to the extent that a particular solution, no matter how effectively implemented in another jurisdiction or context, coincidentally matches the characteristics in sub-section (b) and the assumptions in sub-section (c).

I would suggest that the bill be modified to either: (1) identify the problem to be solved and grant the RCA latitude to apply its expertise to achieving a solution, or (2) define the concept to be implemented and pass authorizing legislation to allow the RCA to establish and regulate the appropriate entity. Essentially, existing sub-section (a), after deleting references to "the requirements of (b)," would suffice for the first option.

As an example of the latter approach, see AS 42.05.800 - .890, dealing with intrastate long distance telephone competition, and particularly the authority to create a state universal service fund (AS 42.05.840) and an exchange carriers association (AS 42.05.850). With that statutory authority, the RCA's predecessor adopted regulations and an access charge manual to govern the process of pooling of costs and access charge revenues for many of the state's local exchange carriers. One result is a single tariff developed from a pooled revenue requirement reflects the costs of operating facilities owned by multiple telecommunications carriers, and used by other telecommunications carriers, in a unitary telecommunications network.

Conflicts

One of the assumptions, funding of new facilities, contains language that appears to conflict with existing regulatory law. Specifically, the statement that "rate recovery is ensured through the planning, permitting and construction phase" suggests that cash flows from ratepayers to the new entity will begin at the planning stage. Normally, a public utility is expected to generate the cash necessary to plan, permit and construct a project, with rate recovery beginning when the facilities are placed into public utility service. The concept is that ratepayers should not have to pay for facilities until they are "used and useful," and, more importantly, that ratepayers do not pay for facilities that never enter service, or that otherwise do not benefit them. There is also an intergenerational inequity inherent in having

current ratepayers finance improvements that will benefit future ratepayers, because current and future sets of ratepayers usually have significantly different members.

Two of the assumptions appear to be internally inconsistent. Just and reasonable rates (assumption 3) are generally cost-based rates, but will not necessarily provide for "full cost recovery" (assumption 4) if costs were not prudently incurred, or were incurred for facilities that are not used and useful. The "full cost recovery" assumption therefore violates existing regulatory law, and the explicit assumption that rates will be "just and reasonable."

These apparent conflicts may be intentional. However, if the legislature intends to fundamentally modify regulatory jurisprudence, it is preferable to do so explicitly, not by implication.

One last item that does not necessarily merit a complete discussion is the amount of highly technical language in the bill (e.g., economic dispatch, ancillary services, universal tariff, single control area operator, parallel path flow and transmission congestion). Virtually none of the terms have definitions in existing Alaska law, and are susceptible of differing interpretations. For example, "open access" has a well-understood meaning in the context of transmission of electricity generated in a transparent, competitive market. It may not have a clear meaning in a different context.

Please call me if you have questions or would like to discuss this bill further.

Stuart W. Goering
Assistant Attorney General
(907) 269-5565
Stuart.goering@alaska.gov

CIRI
ENERGY LLC

CIRI Testimony to Energy Committee Hearing (SB 340 HB 196) on legislation proposing studies relating to unified grid operation and ISO in the Railbelt.

Background:
The Railbelt represents the largest population concentration in Alaska. Within the Railbelt there is also a significant industrial base. The electric energy needs of this area are met by 6 separate utilities (CEA, MEA, HEA, GVEA, AMLP, and Seward). Historically there has been limited cooperation between utilities to share generation reserves and some sales of economy energy. The utilities are interconnected by a high voltage transmission system (which is really just one line) that extends from the Kenai Peninsula to Fairbanks.

The vast majority of the High Voltage (HV) transmission system is a single path only and limited transfer capacity between regions. Therefore there is considerable reliability risk if there were to be a transmission outage and there are limited opportunities to share the most economic resources due to the limited transfer capacity between balancing areas. As a result, each utility has built generation plants (including reserve capacity) to serve its own loads. Because each utility has operated separately, there has been emphasis on planning for generation needs and less focus on the high voltage transmission system between utilities that ties the Railbelt together.

Historically CEA, the largest utility in the Railbelt has served the loads of or dispatched the generation of multiple smaller utilities (MEA, HEA, Seward) and so some economies of economic dispatch have been available. Starting in 2014 however, with expiration of certain whole-sale power agreements between the utilities, there will be no obligation for utilities to cooperate with each other regarding dispatch of generation. This means that at many times there could be economical generation sitting idle in one location, while at another point in the Railbelt a utility could be serving load with its own generation which is more expensive and less efficient than the generation that is sitting idle. This means that most of the time some customers in the Railbelt are paying more than they need to for their electricity. In addition, each utility pays for and operates its own spinning reserves, and as a result the cost of reserves for the Railbelt as a whole is greater than it should be.

In order to achieve the critically important efficiencies of economic dispatch and unified generation reserves sharing, there are two primary needs, which must be addressed: 1) Utility to utility coordination must be increased, and 2) The non-redundant (low reliability) and undersized HV transmission system must be upgraded.

Key Points:

1. **The benefits to Railbelt utility customers are significant and achievable:** CIRI agrees that the potential benefits of joint economic

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dispatch for Railbelt electric generation, coupled with HV transmission improvements is substantial. CIRI has reviewed the AEA sponsored Railbelt Transmission Plan dated November 13, 2103, and has discussed the conclusions with AEA and some Railbelt utilities. CIRI concurs that a significant annual benefit, estimated to be between $60 million and $140 million/year, is possible to achieve.

2. **The Railbelt utility operations must be modified to achieve the financial benefits**. In order for the benefits to be attained, the Railbelt grid must be re-structured. Key among the necessary components is the creation of an Independent System Operator (ISO) with authority to plan HV transmission expansions, and economically dispatch Railbelt generation for benefit of the entire Railbelt load. This legislation takes the critical first steps of completing the necessary studies, and setting the framework for RCA regulation of the ISO and its participants. CIRI supports the creation of an ISO and encourages the Legislature to begin the process of enabling formation of an ISO immediately.
3. **Cooperation between utilities will be greatly enhanced**: The formation of an ISO with mandatory membership by all utilities will encourage and cause the utilities to cooperate more fully on both transmission planning as well as generation dispatch and reserves sharing. The foregoing will all inure great financial benefit to Railbelt customers.
4. **Economic dispatch is a critical need**. The current state of industry practice in the USA is to utilize a centralized ISO or Regional Transmission Organization (RTO) to ensure that within regions, generation can reach load largely without restriction. In the Railbelt, a future where Fairbanks residents could be assured of the most efficient generation serving their load, irrespective of where in the Railbelt the generation is located or who in the Railbelt owns it, would represent major cost savings. Further, the ability of all utilities to share one set of generation reserves instead of each utility providing its own, would also create significant cost savings for Railbelt customers.
5. **Centralized planning of grid expansions is necessary.** Historically, Railbelt utilities have not always taken advantage of the ability to plan joint transmission projects for benefit of all customers. This has resulted in, among other things, the "over building" of new generation by individual utilities because there is no assurance that excess generation at "utility A" can be used to serve load at "utility B" who might need it. Having a centralized ISO-based transmission planning function will ensure that the Railbelt grid operates with the highest reliability and lowest cost to customers. **Further, the ISO's independent plans to improve or expand the grid can be implemented not only by utilities but also by interested 3rd party private investors. Bringing 3rd party investment into energy infrastructure is an important means to**
6. **gain efficiencies and to prevent utilities from becoming over-levered or from having to continually seek state funds to operate.**
7. **Reduced generation reserves cost will result from ISO formation**. Sharing of generation reserves within the ISO region (Railbelt) and for

benefit of all customers will be far less costly than current practices which apply very limited sharing of reserves.

8. **Independent status – not for profit structure ensures "open" operations**: Maintaining a 3rd party independent relationship with each ISO stakeholder will be critical. This will prevent one member from using its assets to disadvantage or otherwise increase costs of operation for other stakeholders. Structuring the ISO as a "not for profit" entity subject to RCA regulation will ensure lowest possible operating costs of the ISO organization over time.
9. **Stakeholder control.** CIRI supports the ISO model that provides for a board of stakeholders acting as its governing body. A fair balance should be struck between stakeholder interests, so that undue influence cannot be exercised by any one segment of the stakeholder group. The board of stakeholders should at the very least include electric utilities, transmission owners, generation owners including IPPs, large industrial customers, residential representatives and commercial customers.
10. **Mandatory participation is necessary**. CIRI supports the ISO legislation requiring mandatory participation/membership by all utilities and 3rd party owned generation and HV transmission owners (if any). In order to achieve the significant "economies of scale" for the savings associated with the ISO, all asset owning stakeholders must be required to participate.
11. **RCA regulation is preferred in AK**: CIRI supports the rates of the ISO and its operations being subject to regulation. In the Lower 48, it is the FERC which regulates ISO operations. FERC is non-jurisdictional in Alaska. It is critical for an overall regulatory oversight to take place to ensure lowest possible rates, non-discriminatory treatment, and the open and fair operation of electric power markets within the ISO region.
12. **Private investment in transmission infrastructure should be encouraged**: In the Railbelt, studies to date indicate that significant capital must be invested in order to complete the upgrades which will unlock the significant benefits of joint economic dispatch, reserves sharing, and liquid energy markets. The recent AEA study concludes that over $900 million will need to be invested in transmission upgrades within the next 10 years. **CIRI supports an ISO structure that encourages 3rd party non-utility investment in transmission infrastructure as a means to keep costs as low as possible, and to help eliminate pressure on the State of Alaska to fund infrastructure upgrades.**
13. **Aligns AK with utility practice in L48**: There are many examples of efficiently designed and operational ISO's in the electric power industry in the US. Forming an ISO in Alaska will move our system to be able to capture the efficiencies and cost savings which customers in many other states have enjoyed for more than a decade.
14. **Final clarifications CIRI:**
    a. Allow stakeholders to help RCA develop the scope of the required study and participate in structural discussions about the ISO. CIRI believes all stakeholders; not just utilities and the RCA, should participate in the scoping studies required by the legislation, and in the formation of the ISO.

b. Mandate opportunity for private investment in the construction and ownership of transmission assets as this will be a key factor to ensure that the needed network upgrades can be financed efficiently and timely and with minimal state participation. Competition lowers cost of power for all.
c. Governance of the ISO should consist of broad membership representing the market. Broad participation should be required including utilities, transmission owners, generation owners, industrial, commercial, and residential representation on the board of governance.
d. CIRI supports moving directly to formation of the ISO now without the pre-requisite step to study its viability first. The benefits are clear and delay increases the cost of electricity to everyone in the Railbelt.

Sincerely,

CIRI Energy, LLC



Ethan Schutt
President

A Partial Description of Relationships

distributed by Rep. Isaacson

Entity:	**RCA**	**ISO**	**TRANSCO**	**UTILITY**	**IPP**	**STATE**
Purpose:	Oversees/Regulates ISO,TRANSCO, & UTILITY	Manages load: economical dispatch	Owns Transmission	Owns Customer		
	Adjudicates Conflicts					
	Sets Tariffs	Recommend Tariff				
		Recommend Generation and Transmission		Owns Generation (retail)	Owns Generaton (wholesale)	Currently owns Generation
				Owns Transmission		Currently owns Transmission
				Owns Debt Service		
	Fee Funded	What/who Funds?	What/who Funds?	Rate Funded	Sales Funded	Provides funding