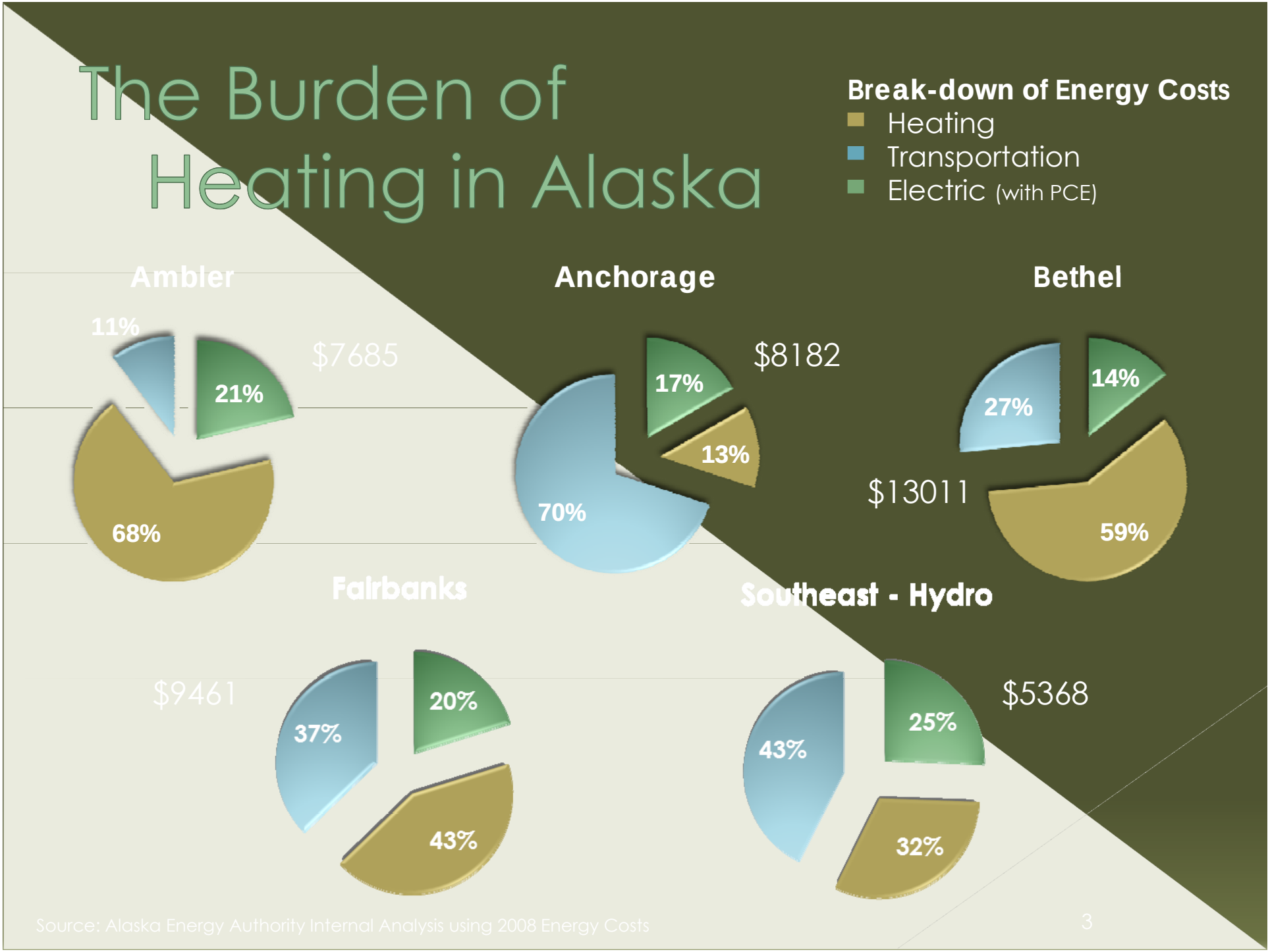
Biomass - Reducing the Cost of Heat in Alaska

Devany Plentovich
Alaska Energy Authority
March 2011

Agenda

- Heating Costs in Alaska
- Technology options
  - Biomass
    - Cordwood
    - Chips
    - Pellets
  - District Heating Infrastructure
  - Other Heating Technologies
  - Combined Heat and Power
- Economic Development Opportunities
- Regional Planning
- EPA Biomass Boiler Emissions Rules

The Burden of Heating in Alaska



Source: Alaska Energy Authority Internal Analysis using 2008 Energy Costs

Cordwood Boilers

Gulkana Community Wood-Fired Boiler

Gulkana Community Wood-Fired Boiler

RE Fund Grant	**$500,000**
Total Project Cost	**$ 500,000**
Est Fuel Displaced/yr	**14,600 gal**
2010 (Oct-Dec)	**~3,000 gal**

Chip Boilers

Tok School Wood-Fired Boiler

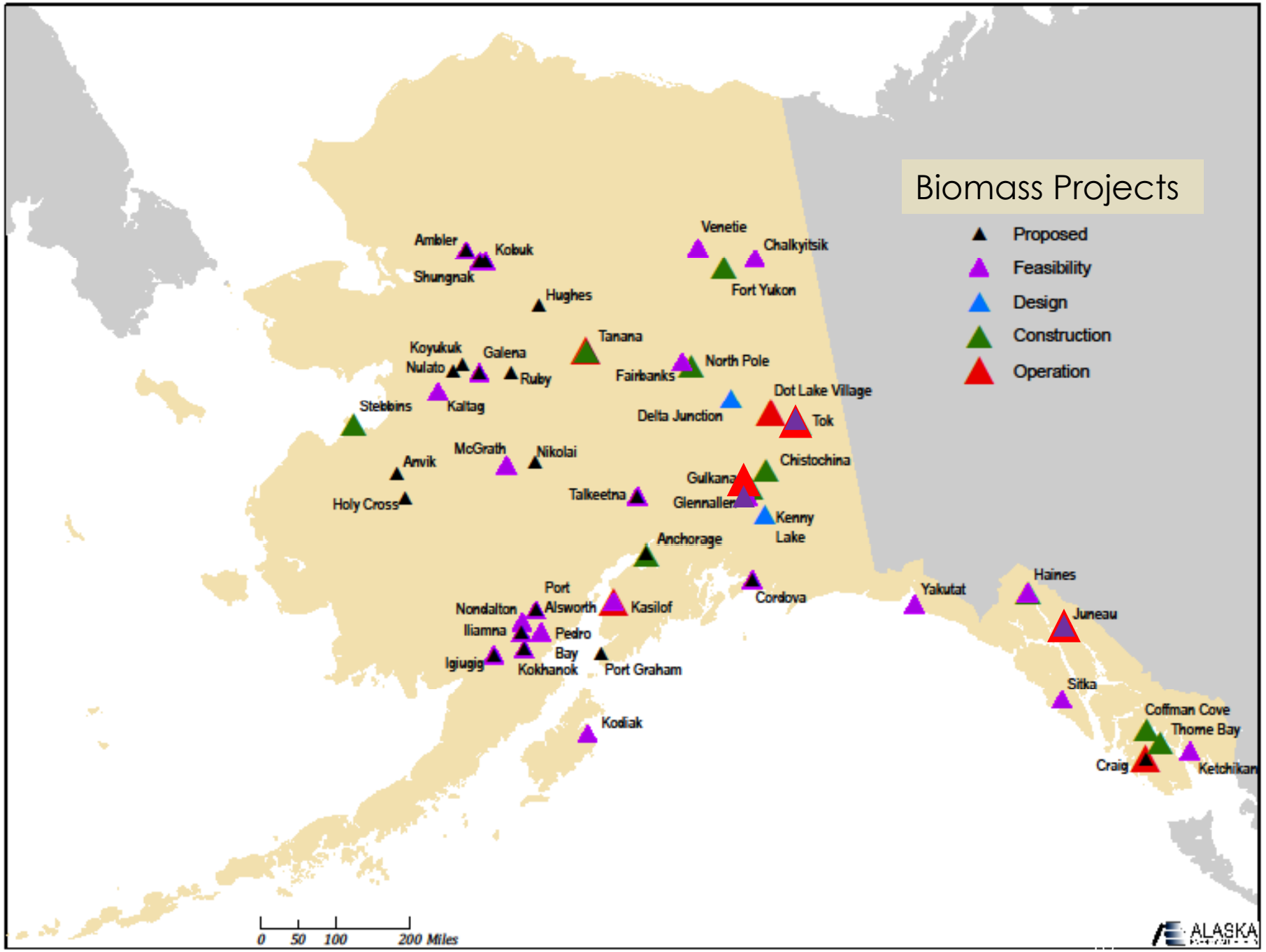
Tok School Wood-Fired Boiler

RE Fund Grant	**$ 3,245,349**
Total Project Cost	**$ 3,805,349**
Est Fuel Displaced/yr	**50,400 gal**

Pellet Boilers

Sealaska Plaza

Total Project Cost (efficiency upgrade, transportation)	**$ 1,400,000**
Est Fuel Displaced/yr	**35,000 gal**
Actual (Nov 19 – Dec 2010)	**5000 gal**


Biomass Projects
Proposed
Feasibility
Design
Construction
Operation
Ambler
Kobuk
Shungnak
Hughes
Venetie
Chalkyitsik
Fort Yukon
Koyukuk
Nulato
Galena
Ruby
Tanana
Fairbanks
North Pole
Stebbins
Kaltag
Delta Junction
Dot Lake Village
Tok
McGrath
Nikolai
Anvik
Holy Cross
Talkeetna
Gulkana
Glennallen
Chistochina
Kenny Lake
Anchorage
Cordova
Port Alsworth
Nondalton
Iliamna
Pedro Bay
Igiugig
Kokhanok
Port Graham
Kasilof
Kodiak
Yakutat
Haines
Juneau
Sitka
Coffman Cove
Thorne Bay
Craig
Ketchikan
0 50 100 200 Miles
ALASKA

District Heating Systems

- **Basic Infrastructure that provides heat to multiple buildings**
  - **Heating Source (diesel generator, biomass, etc.)**
  - **Heat Exchangers**
  - **Circulating pumps**
  - **Underground piping**
  - **Controls and Meters**
- **Flexible**
  - **Can provide heat from multiple, different sources**
  - **Power systems can be added in the future**
  - **Can be expanded to grow with a community**

Other Heating Options

- Diesel Generator Heat Recovery Systems
- Electric Boilers
  - Excess hydroelectric or wind power to heat community buildings or district heating systems
  - Aides in grid stabilization
- Ground Source Heat Pumps
- Industrial Heat Recovery
  - North Pole Refinery condenser heat is used to heat turbine building

Combined Heat and Power

- Production of electricity and useful thermal energy from a single source of energy
- Small scale biomass technology (less than 2 MW) is emerging
- Demonstration Projects
  - Renewable Energy Fund
    - Cordova (Diesel)
    - Unalaska (Diesel)
    - Kotzebue (Diesel)
    - Chena Power (Biomass)
  - Hoonah Micro-Scale
- Continuing to monitor technology development

Economic Development

- **Lowers energy costs, maintains cash flow within a community, and increases independence**
- Jobs Creation
  - Construction
  - Operation/Maintenance
  - Harvest/Thinning/Resource Management
- Business Opportunities
  - Equipment Suppliers
  - Construction/Maintenance Services
  - Heat Utilities
  - Wood Pellet Manufacture
- Forest Products Industry Support
  - Use for sawmill waste
  - Use for forest health/thinning residue

Next Steps – Regional Planning

- Continue to conduct outreach to educate communities on heating opportunities
- **Incorporate Biomass and other heating options into the SEIRP**
- Initiate additional feasibility studies for biomass and diesel heat recovery
- Pursue partnerships and funding opportunities for design/construction of viable projects

A Quick Word on EPA Boiler Emission Rules

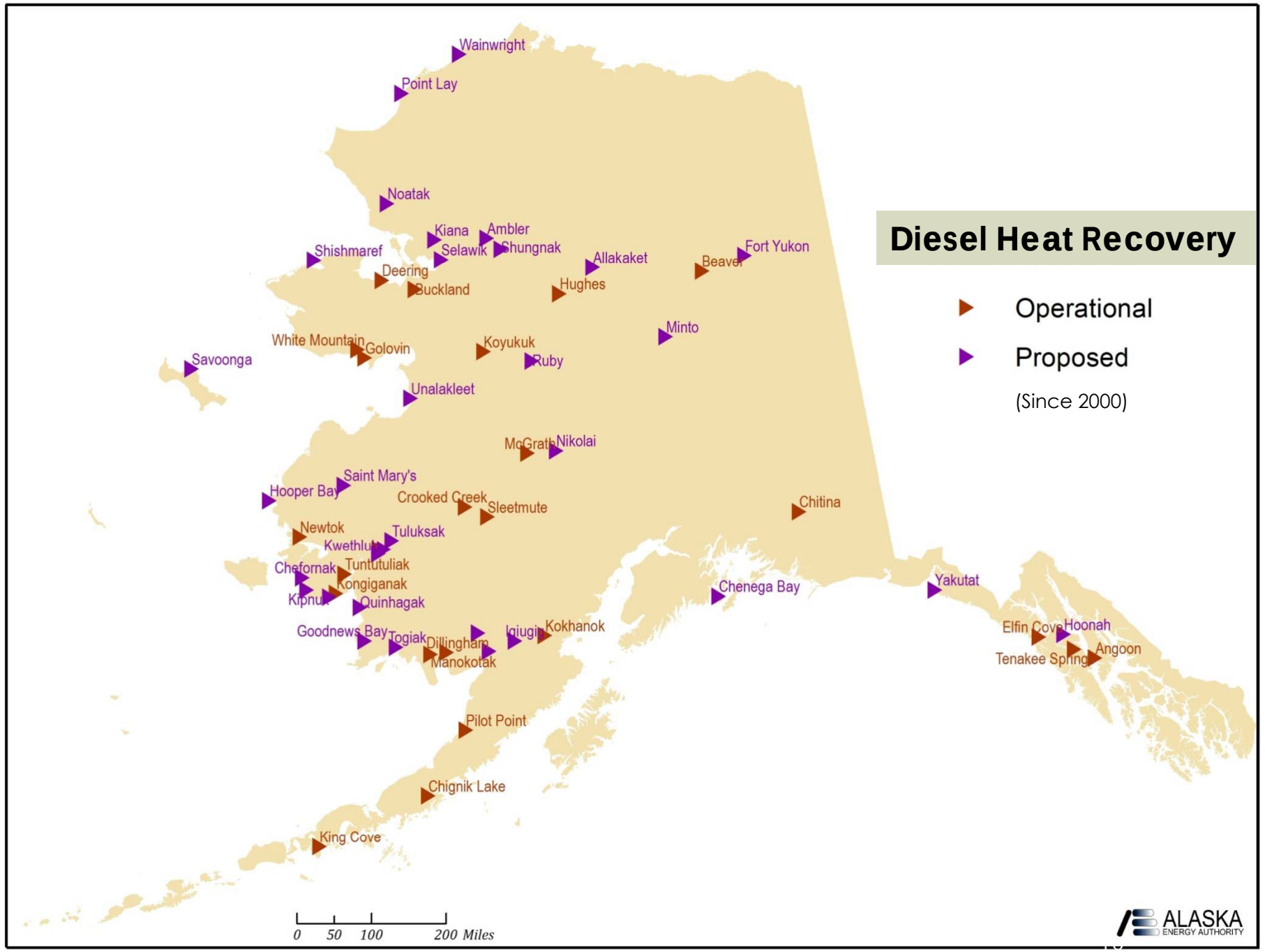
- June 2010 – EPA released biomass, coal, and oil boiler emission rules for comment
  - Annual stack testing for all boilers.
  - Emissions limits for new boilers
  - EPA received over 4000 comments
- Dec 2010 – EPA requested an additional year to rework standards based on comments
  - Courts allowed 30 days
  - Revised rules released Feb 2011
- New Rules – Impact to Biomass in Alaska
  - Small Boilers – boiler tune-up every 2 years
  - Future opportunity for more input

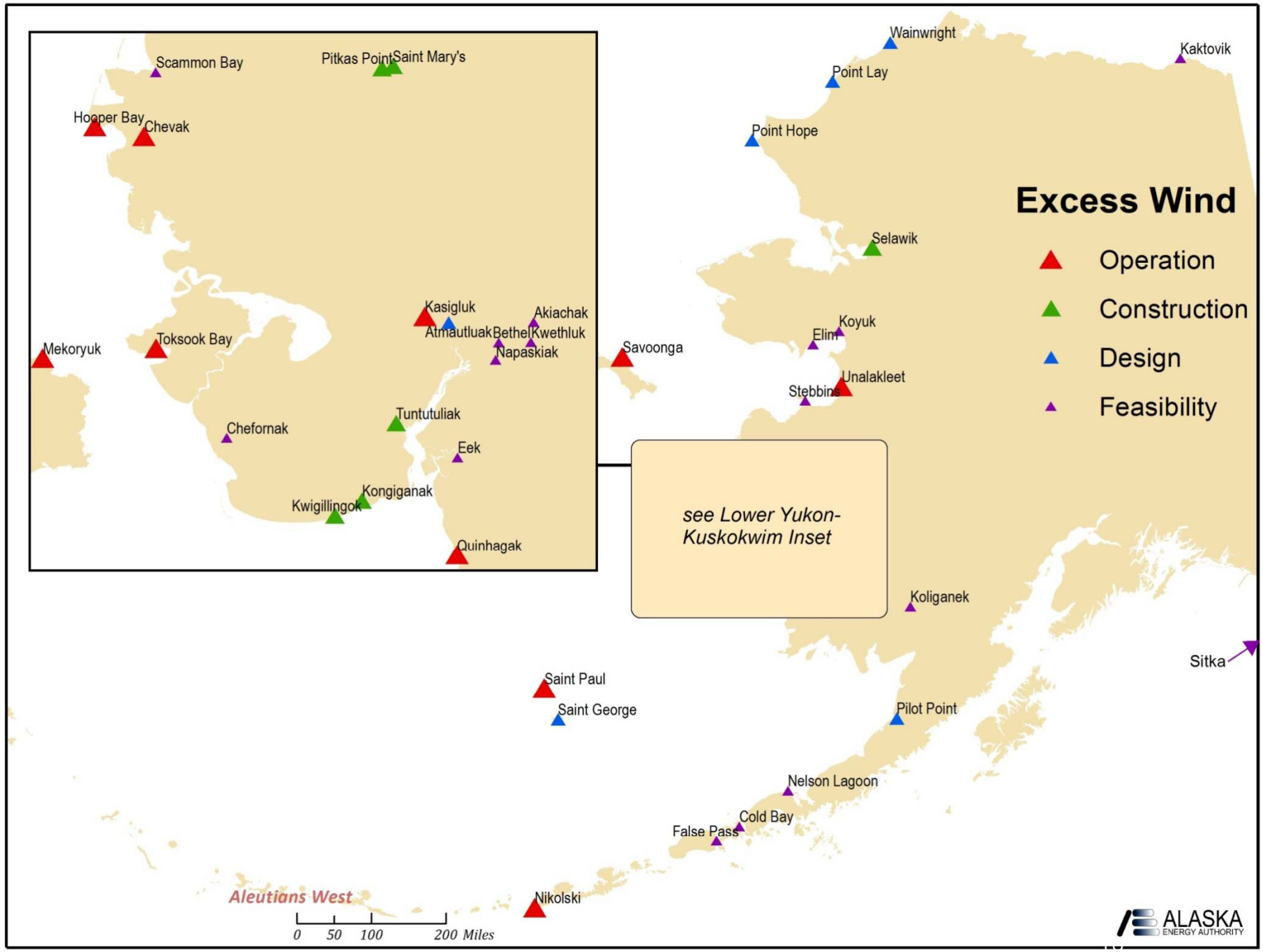
Thank you

Devany Plentovich
dplentovich@aidea.org

Alaska Energy Authority
813 West Northern Lights Boulevard
Anchorage, Alaska 99503

www.akenergyauthority.org


Diesel Heat Recovery
Operational
Proposed
(Since 2000)
Wainwright
Point Lay
Noatak
Kiana
Ambler
Shungnak
Shishmaref
Selawik
Allakaket
Fort Yukon
Beaver
Deering
Buckland
Hughes
Minto
White Mountain
Golovin
Koyukuk
Ruby
Savoonga
Unalakleet
McGrath
Nikolai
Saint Mary's
Hooper Bay
Crooked Creek
Sleetmute
Chitina
Newtok
Tuluksak
Kwethluk
Tuntutuliak
Chefornak
Kongiganak
Kipnuk
Quinhagak
Chenega Bay
Yakutat
Goodnews Bay
Togiak
Dillingham
Iqiugin
Kokhanok
Manokotak
Elfin Cove
Hoonah
Angoon
Tenakee Springs
Pilot Point
Chignik Lake
King Cove
0 50 100 200 Miles
ALASKA ENERGY AUTHORITY


Scammon Bay
Pitkas Point
Saint Mary's
Hooper Bay
Chevak
Mekoryuk
Toksook Bay
Kasigluk
Akiachak
Atmautluak
Bethel
Kwethluk
Napaskiak
Tuntutuliak
Chefornak
Eek
Kongiganak
Kwigillingok
Quinhagak
see Lower Yukon-Kuskokwim Inset
Wainwright
Kaktovik
Point Lay
Point Hope
Selawik
Koyuk
Elim
Savoonga
Unalakleet
Stebbins
Koliganek
Sitka
Saint Paul
Saint George
Pilot Point
Nelson Lagoon
Cold Bay
False Pass
Nikolski
Aleutians West
0 50 100 200 Miles
Excess Wind
Operation
Construction
Design
Feasibility
ALASKA ENERGY AUTHORITY

Biomass Strategy

- Continue education and outreach for biomass heating opportunities
- With State Forestry, prioritize and conduct resource assessments to assure sustainable harvest
- "Fill the Pipeline"
  - 3-year plan to conduct feasibility studies including technology and resource assessments
  - Collaboration with Regional, State, and Federal Agencies
  - Utilize state funding as matching for Federal Grants for design/ construction
- Support rapid deployment of heating systems in rural Alaska
  - Garn in a Box
- Support Pellet Manufacturing in Alaska