Renewable Energy
Seed Cluster
Southeast Cluster Initiative
Juneau Economic Development Council
Five Industry Clusters:

- Visitor Products, Ocean Products, Mining Services & Supply, Renewable Energy, Research & Development (R&D)

Engaged Volunteers:

- Public & Private sector representation

Purpose:

- Drive forward initiatives that create viable economic benefits for each respective industry in Southeast Alaska
Renewable Energy Seed Cluster

• “Seed Cluster”

• Five Current Initiatives identified and driven by industry stakeholders

• Develop a market and industry for Renewable Energy across the region
Renewable Energy Seed Cluster

• Current Action Initiatives:
  • Market-driven RE Economic Modeling & Transmission & Storage Alternatives
  • Biomass Demand Development
  • Renewable Energy Education
  • Electric Vehicle Initiative
  • Conceive and Model an Alaskan Capitol District Heating System
Renewable Energy Seed Cluster

- Past Action Initiatives:
  - Net Metering, Cogeneration, Small power production regulation
  - Renewable Energy Revolving Loan Fund for residences and small businesses
Context

• Southeast Cluster Initiative
• Community energy economy
  • Internal
  • External
• Juneau Climate Action & Implementation Plan
• Renewable Energy Seed Cluster:
  • Background
  • Purpose
  • Action Initiatives
Juneau INTERNAL energy

Juneau, Ketchikan, Sitka, Skagway, Gustavus
Juneau Annual Energy

Million Gallons Oil Equivalent

AELP 2007  AELP 2015  Internal total  External total  TOTAL total
Today’s energy economy: Juneau as-we-know-it

Million gallons per year, including electricity equivalent

“Internal”  42

“External”  106

TOTAL  148

March 17, 2014
Today’s energy economy: Juneau as-we-know-it, CO\textsubscript{2} emissions

- “Internal”: annual CO\textsubscript{2} emissions, tons
  
  TOTAL 227,000

- “External”: annual CO\textsubscript{2} emissions, tons
  
  TOTAL 1,060,000

- “Internal” + “External”
  
  TOTAL 1,287,000 tons per year
Renewable Energy Seed Cluster

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March 17, 2014
CONDUCT MARKET-DRIVEN RENEWABLE ENERGY ECONOMIC MODELING OF SOUTHEAST ALASKA, INCLUDING MULTIPLE TRANSMISSION AND ENERGY STORAGE STRATEGIES

Champion: Bill Leighty, The Leighty Foundation
Brad Ewing
Contract to JEDC

- Borough, Census area
- 2012 – 13
- Region totals
- Future research list
Initiative Goals:

• Entice private enterprises to locate in SE AK: potential, internal + export
• Inventory energy markets of SE AK communities
• Assess and inventory renewable energy resources by type, location, production potential
• Create open cash flow model for potentially productive cases
• Build on extant “seed”

Available at: jedc.org/in-the-news
Extant SE AK “Seed” Renewable Energy Cluster Industry

- Engineering: Haight, Murray, Rehfeld, PND, others
- Construction, rental
- Alaska Ship & Drydock
- Electric Utilities: IPEC, AELP, APT, KPU, Sitka, et al
- Juneau Hydropower, other
Action Initiative:

CONDUCT MARKET-DRIVEN RENEWABLE ENERGY ECONOMIC MODELING OF SOUTHEAST ALASKA, INCLUDING MULTIPLE TRANSMISSION AND ENERGY STORAGE STRATEGIES

Champion: Bill Leighty, The Leighty Foundation
Hydro
OCEAN: wave, tidal
Beyond “microgrids” --

1. Village energy independence
2. Firming large variable RE
3. Export diverse, large-scale RE as “green” NH3
• Over 100 hydro sites catalogued

• Southeast, AK-BC Interties: Cannot afford O&M costs

• Convert to wood space heat
FIGURE 1-1
Southeast Alaska
Existing Transmission Lines
Southeast Alaska Intertie Study
Input $\sim 1.5$ MW @ 11 kWe / kg NH$_3$

3 Mt / day Electrolysis + Haber-Bosch (EHB) NH$_3$ plant by Proton Ventures
Anhydrous Ammonia $\text{NH}_3$

N  Nitrogen
H  Hydrogen

Molecular weight = ~ 17

18% H by weight: “other hydrogen”

$\text{NH}_3 + \text{O}_2 = \text{N}_2 + \text{H}_2\text{O}$
Solid State Ammonia Synthesis (SSAS)
25 Feb 14, Tokyo
Japan Renewable Energy Foundation
“Revision2014 – Global Energy Turnarounds and Japan’s Path”
NEDO C-free Hydrogen import options, via tanker:
- Liquid Hydrogen, cryo
- Liquid anhydrous ammonia (NH3)
- Toluene – MCH cycle

Windpower - Hydrogen Hybrid Systems

By Dr. K. O’Hashi 20 Dec 99

Source: “Overview of the Transportation of Wind-Generated Hydrogen Using Natural Gas Pipeline Network in Northeast Asia” August, 2000
By: Asian Pipeline Research Center, Shibaura Institute of Technology
“Fukushima Forward”, deepwater offshore wind, multi-MW
"Fukushima Forward", deepwater offshore wind, multi-MW
Japan: Import Carbon-emissions-free liquid Hydrogen fuel
Japan: Import Carbon-emissions-free liquid Hydrogen fuel
Military: Land + sea fuel

- USCG, Navy ships
- Land vehicles: road, rail
- Recip engines modify: multifuel, Sturman
- Mini + microgrid app’s
Liquid Anhydrous Ammonia (NH₃) -33°C, 1 atmosphere
Action Initiative:

BIOMASS DEMAND DEVELOPMENT

Champion: Bob Deering, USFS
Initiative Goals:

• Focus on development of biomass DEMAND in Southeast Alaska
• Identify Key focus group “sectors” and hold meetings with people from those sectors to gain detailed understanding of the opportunities and challenges
• Activities:
  • Held workshop with representatives from Windhager biomass energy systems company in Juneau
  • Planning biomass webinar for schools facilities management in rural SE AK communities
Action Initiative:

RENEWABLE ENERGY EDUCATION & OUTREACH

Champion: Need New Champion, please
Initiative Goals:

• Increase awareness of Renewable Energy (RE) opportunities, costs, questions, and projects, including new and changed policy
• Coordinate with other initiatives in RE cluster to promote awareness of their goals
• Energy is complex and confusing to all

Activities:
• Created Electric Vehicle 1-page infographic
• Planning biomass webinar for school facilities managers in rural SE AK communities
Action Initiative:

EXPAND THE ADOPTION OF ELECTRIC VEHICLES IN JUNEAU

Champion: Alec Mesdag, AEL&P
Initiative Goals:

• Identify & remove barriers to electric vehicle adoption through promotion of EV infrastructure and education

• Activities:
  • Awarded grant through Funders’ Network to install 8 charging stations around Juneau
  • Working on developing support services for EV servicing in Juneau
  • After installation, Juneau will have the highest per-capita concentration of EV charging stations in the country!
Battery Electric Vehicle (BEV), Charger
Tokyo, Feb 14
Honda BEV: Single seat, Tokyo, Feb ‘14
Context:

CONCEIVE & MODEL AN ALASKAN CAPITOL DISTRICT HEATING SYSTEM

Champion: James Bibb, Northwind Architects
District Heat Initiative Goals

• Data Collection
  • Pre-Feasibility Study
    • Funding needed ~ $30,000

• Education & Outreach
  • Whitepaper available
  • Local: Willoughby District and beyond
  • Legislative
  • Industry Experts
Energy source options:
  • Wood boiler: chips
  • Seawater-source heat pump
    • AELP hydro
    • NOAA – NMFS, Lena point
    • Seward Sealife Center
  • Geothermal: new boring method?
CAPITOL DISTRICT HEATING SYSTEM
Get Involved!

• Region-wide Cluster
• Private business development in Renewable Energy
• Keep energy resource $$ in our region
• Join us!
Renewable Energy
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CAPITOL DISTRICT HEATING SYSTEM