

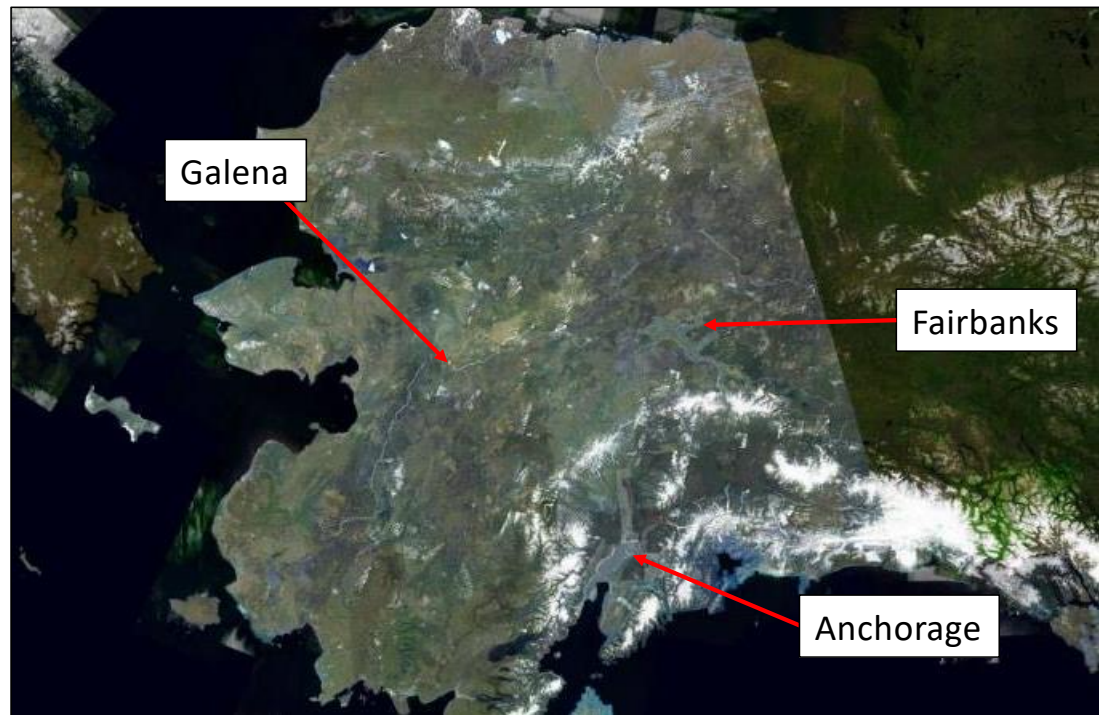
Galena Community Energy



TIM KALKE
GENERAL MANAGER

Presentation Agenda

- Biomass Project
- Residential Construction
- Solar Power Production
- Hydrokinetic Potential
- Community Energy Planning



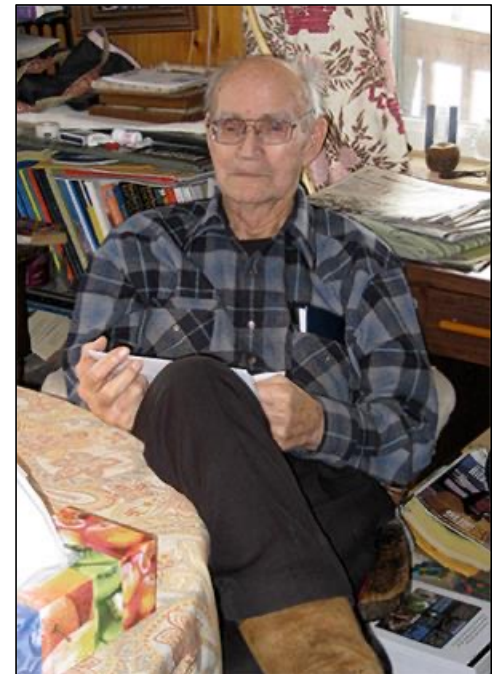
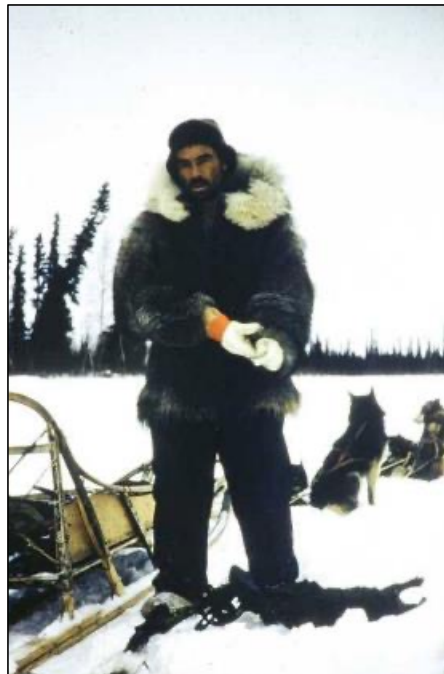
Notaalee Denh – Galena, AK

- Koyukon-Athabascan
- 400 residents – 65% Native Alaskan
- Mining Camp, U.S. Air Force, Education
- Mixed-Economy



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Community Energy Problems

- High-cost of fossil fuel for energy generation.
 - Electricity - \$0.72/kWh
 - Heating Fuel - \$8.50/g
- Long-transportation lines
- Limited capacity (e.g., physical, administrative, economic)



(photo credit Jeff Fisher – Alaska Center for Energy & Power)

Biomass Project

Former Galena Air Base

- Ownership transition to City of Galena
- Rural Energy Issues
 - Inefficient and aging infrastructure
 - Old steam distribution system consumed ~230,000 gallons annually
 - Expensive diesel fuel
- Project Funding
 - AEA Grant
 - AHFC & ADEC Loans



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Sustainable Energy for Galena Alaska, Inc.

Timber Harvest & Chip-Processing Entity

- The City of Galena, Galena City School District (GCSD) and Loudon Tribal Council (LTC) created a local non-profit organization, **Sustainable Energy for Galena, Alaska** (SEGA) tasked with providing wood fuel supply
- Successfully completed 9 timber-harvest and chip-processing seasons!



Avg. Estimated Results

Est. 16.5 billion Btu Heat Requirement

Annual averages:

- Oil used – 40,000 gallons (g)
- Wood used - 45,000 cubic feet (cf)
**Solid Wood Estimate*
- Oil displaced - 195,000 g
- Oil displaced **due to biomass** – 95,000 g

Previous Steam system used 230,000 g/year

System improvements alone provide
100,000 g savings.



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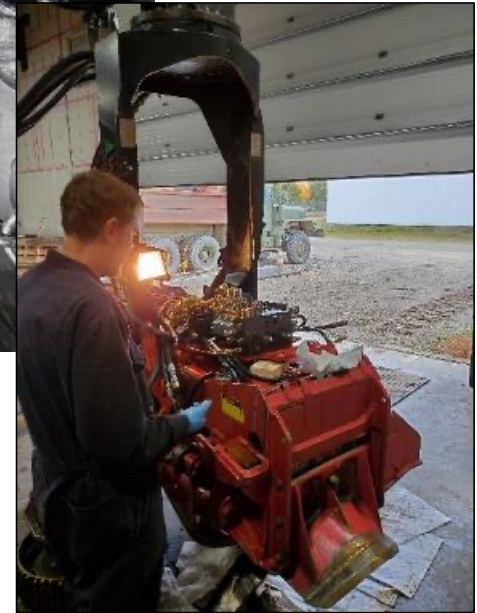
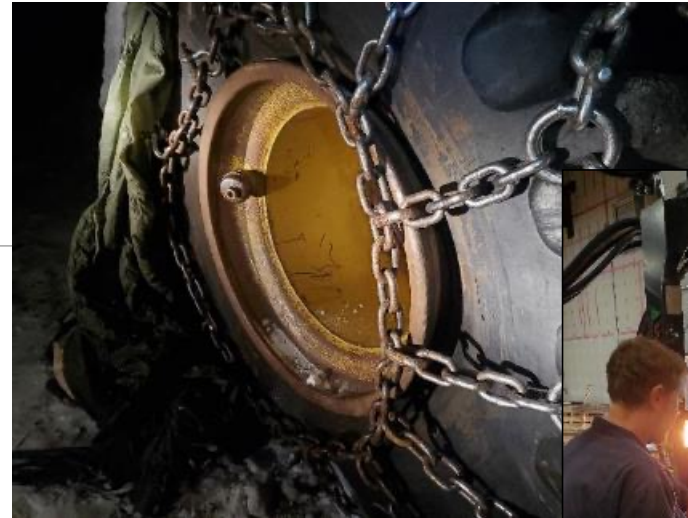
Challenges

- Maintenance - Everybody on the crew is a mechanic
- Cost – Wood vs. diesel fuel breakeven point is approximately \$5.00/g
- Access – Water crossings limit area access and reduce available time to harvest and transport
- Fuel production vs. consumption estimates; monitoring, data collection protocols



Challenges

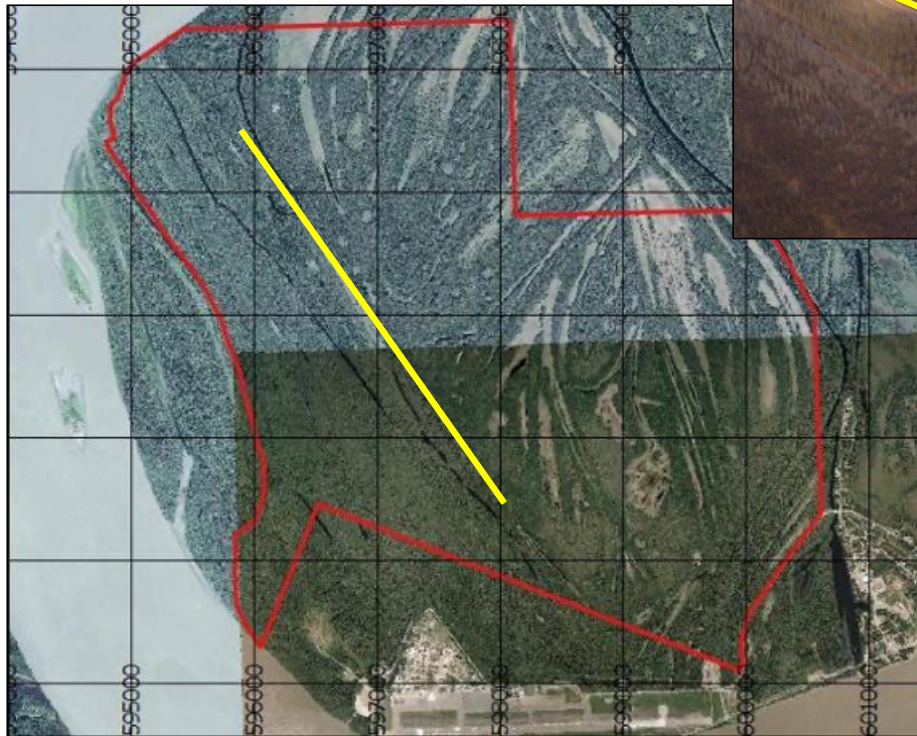
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Timber Sale Agreement Gana-A 'Yoo, Limited – Native Corporation

SEGA – Organized in Fall 2014

- 20-year contract
- 4720 acres
- Predominantly deciduous species
- Mixed conifer and hardwood
- Winter Timber Harvest & Chip Processing
 - (9 successful seasons)
 - Harvest 30 acres/year



Sustainable Energy for Galena Alaska, Inc.

Expansion of Purposes

- Provide wood fuel supply
- Facilitate sustainable energy education initiatives
- Implement other EE and RE projects in the community



Additional Equipment = Increased Capacity



2021 – Studio Cabins



2021 – Studio Cabins



2022 – 2-Bedroom Homes



2023- 3 Bedroom Homes



2023- 3 Bedroom Homes



Increased Capacity = Increased Activities



2024 & Beyond

- On-Call and Repair Maintenance for Clinic and Elder's Center
- Completed Contracts for School District, US Post Office
- Large Projects Limited / Uncertain Future





Sustainable Energy for Galena, Alaska

Solar PV Pilot Project (2023)

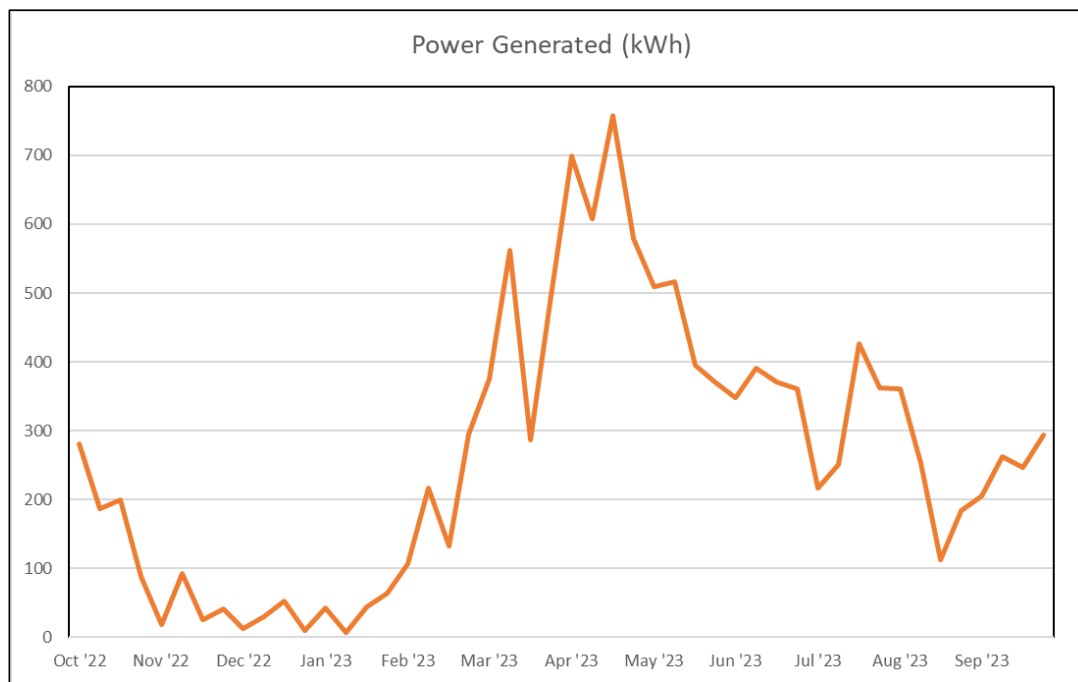


Constructed by local contractor

SEGA established as Independent Power Producer (IPP)

Contracted to manage, operate and maintain a 50kw solar array, owned by Loudon Tribe, interconnected to the City of Galena's electrical distribution system.

Example Solar PV Potential



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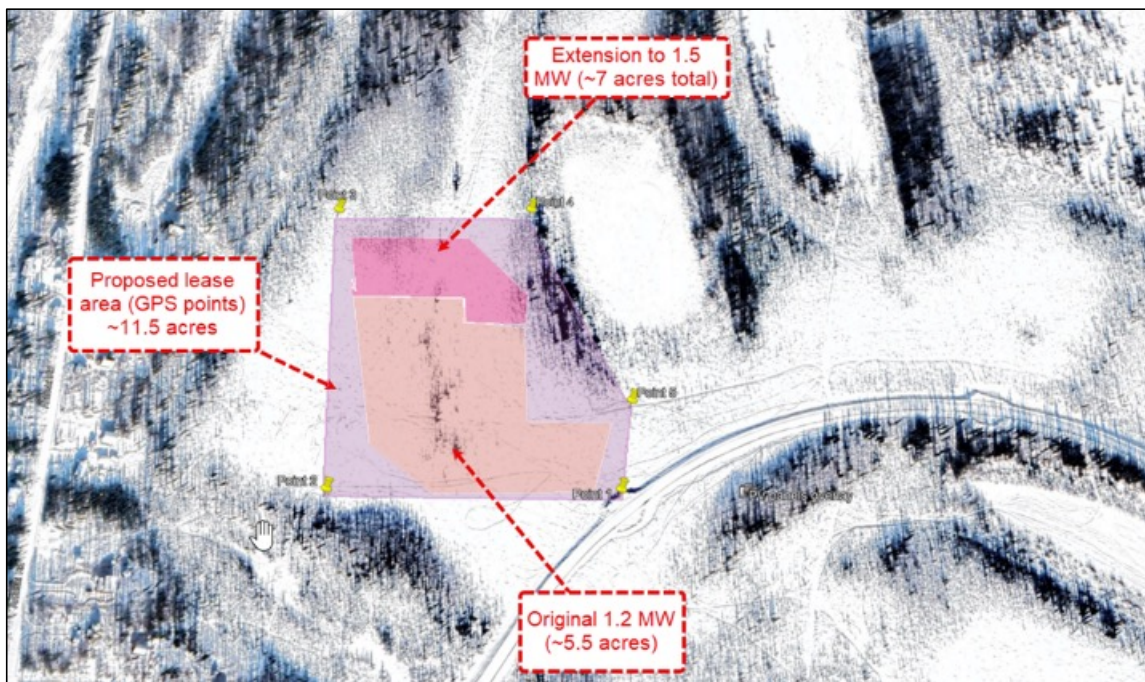
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Galena Solar Farm Project (2024-25)



- Image of **Shungnak, AK** Solar PV Farm
- System will consist of 1.5 MW Solar PV array with 1 MWh/1 MW BESS
- Designed to displace approximately 20% of utilities annual diesel fuel used for electrical generation.

Galena Solar Farm Project (2024-25)



Complex project, estimated at \$6.5 M

All grant funded through

- DOE Indian Energy – awarded to tribe
- USDA High-Energy – awarded to utility
- State of AK – awarded to utility

Administrative, technical and physical capacity strained at utility

IPP model is attractive for many reasons

Galena River Energy Project Summary

- ACEP awarded DOE
- 5 years starting April 2024
- Budget - \$9.5M

Budget Periods	Description	Key Outcomes
Year 1	<ul style="list-style-type: none">• Team Formation• Desktop R&D	<ul style="list-style-type: none">• Site and Technology requirements• Community-led Project Plan
Year 2-3	<ul style="list-style-type: none">• Field Work• Permitting• Design Finalization	<ul style="list-style-type: none">• Site Characterization• Environmental Baseline• Technology Selection• Permits Secured
Year 4-5	<ul style="list-style-type: none">• Construction• Testing	<ul style="list-style-type: none">• Technology Fabrication and Site Preparation• Technology Deployment and Demonstration

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Debris accumulation on surface turbine. Ruby, AK ~2010?

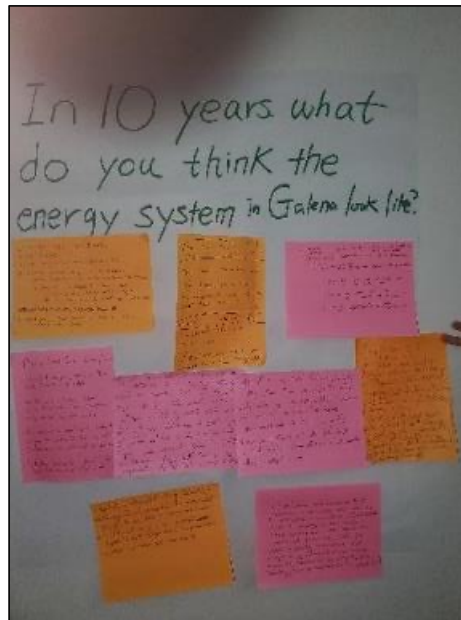
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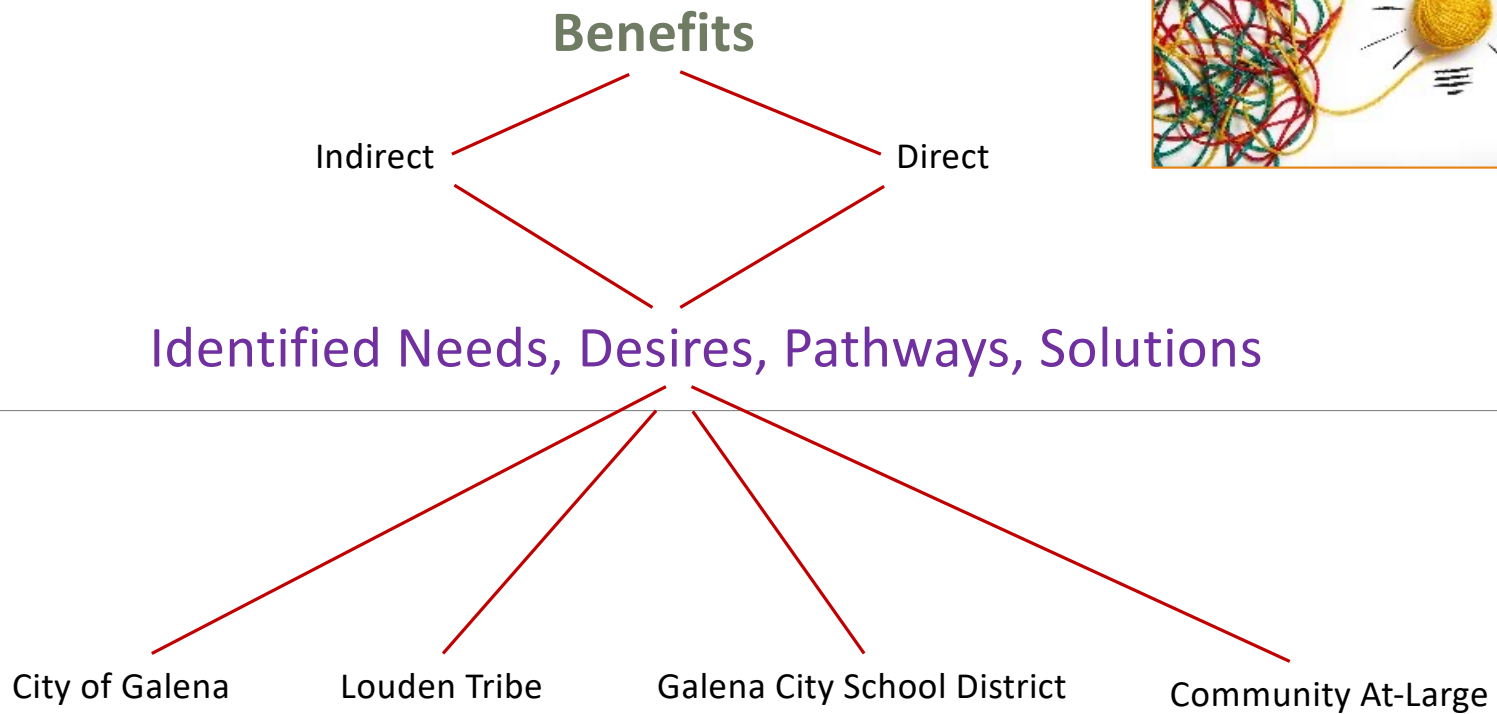
ORPC RivGen, prior to submersion. Igiugig, AK 2020

Community Energy Planning



- Purposes that align with local values
- Risks/Benefits Conversations
- Context Specific Challenges / Limitations
- Need for Specific Energy Planning

Community Energy Planning



Community Energy Planning

City of Galena

Louden Tribe

Galena City School District

Community At-Large

- Invest in existing infrastructure

- System upgrades

- Improve services

- Install additional Renewable Energy fuel sources

- Invest / Save

- Establish Funds for future cost savings

- Residential & Commercial cost-savings / rate-savings / cost-of-living-allowance

- Educational opportunities

- Economic Development

- Community Attraction / Reputation-Building



Sustainable Energy for Galena, Alaska

