Galena Community Energy

Building Energy Literacy with Community Members

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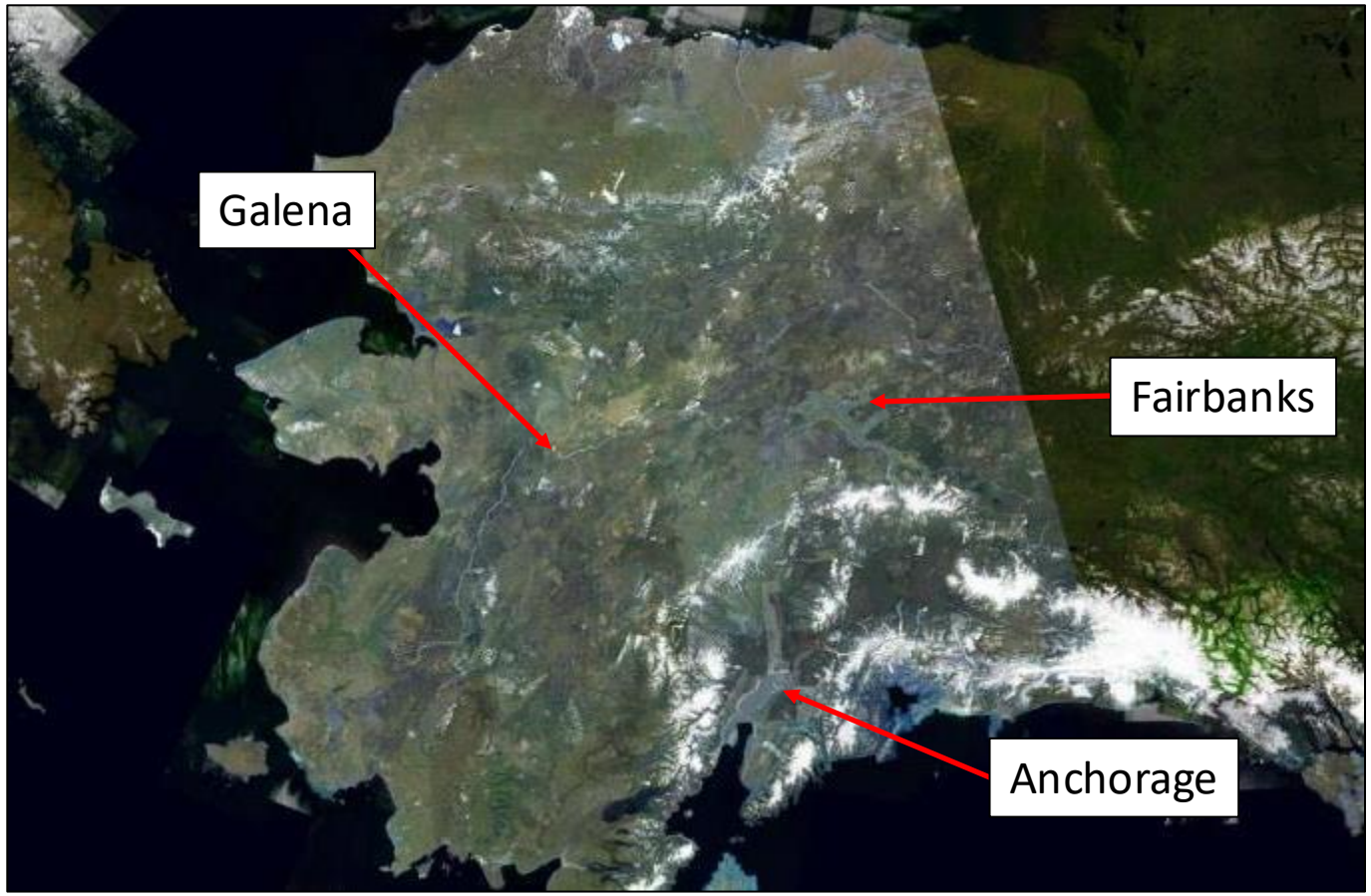
ALASKA CENTER FOR ENERGY & POWER (ACEP) ADJUNCT RESEARCH FACULTY

Presentation Agenda

- Community Energy
- Galena Context
- RE Integration Projects
- Building Energy Literacy and Future Planning Initiatives



Community Energy – What does it mean?

- Case Study – Action Research

- Framework based on the main components of **Energy Justice**:
  - Procedural (*Participatory Decision-Making Process*)
  - Recognition (*Ownership/Management Models*)
  - Distribution (*Community Benefit Plan*)

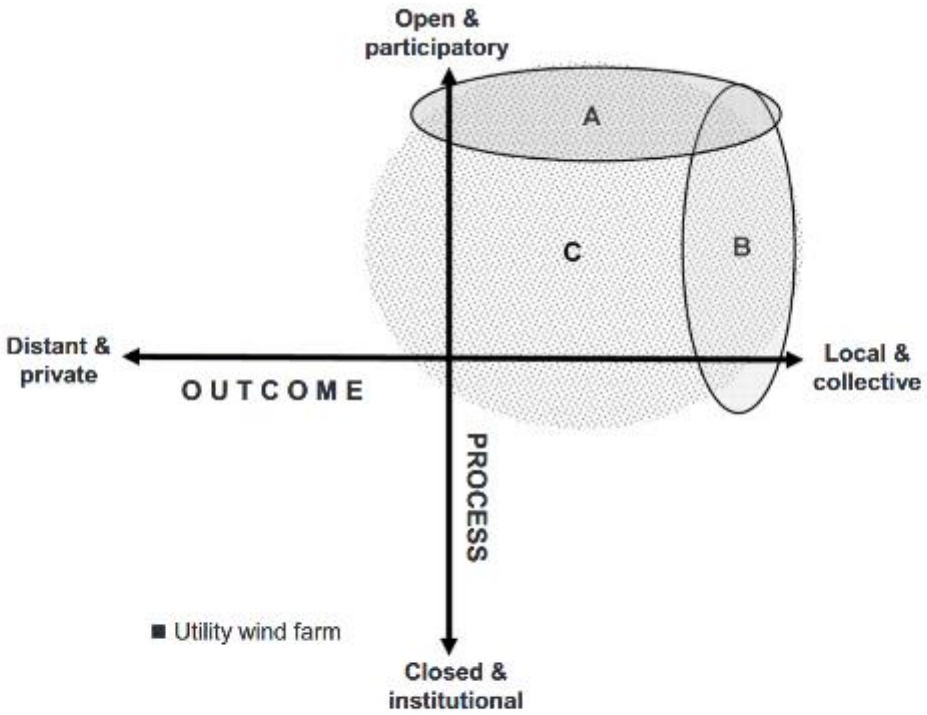


Fig. 1. Understanding of community renewable energy in relation to project process and outcome dimensions.

Walker, G., & Devine-Wright, P. (2008). Community renewable energy: What should it mean? *Energy Policy*, *36*(2), 497–500. https://doi.org/10.1016/j.enpol.2007.10.019

Notaalee Denh – Galena, AK

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

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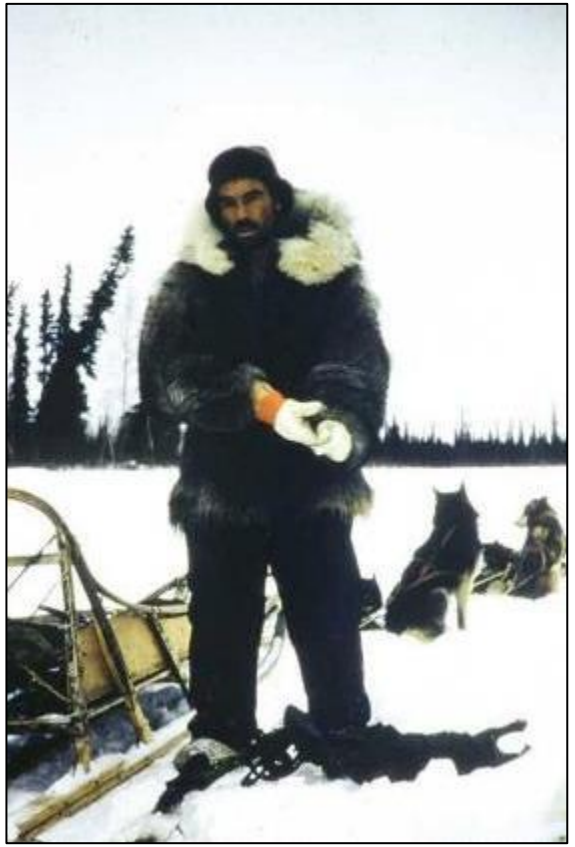
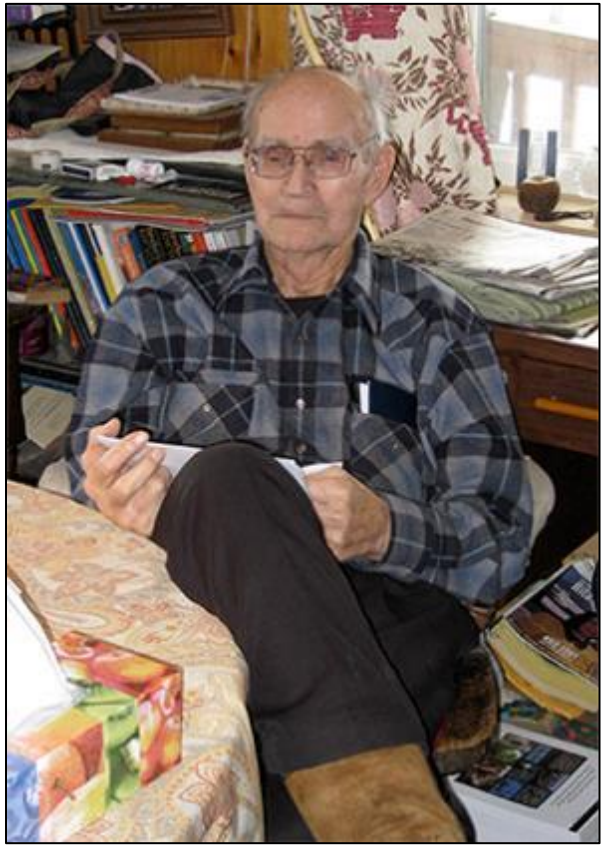




Community Energy Challenges

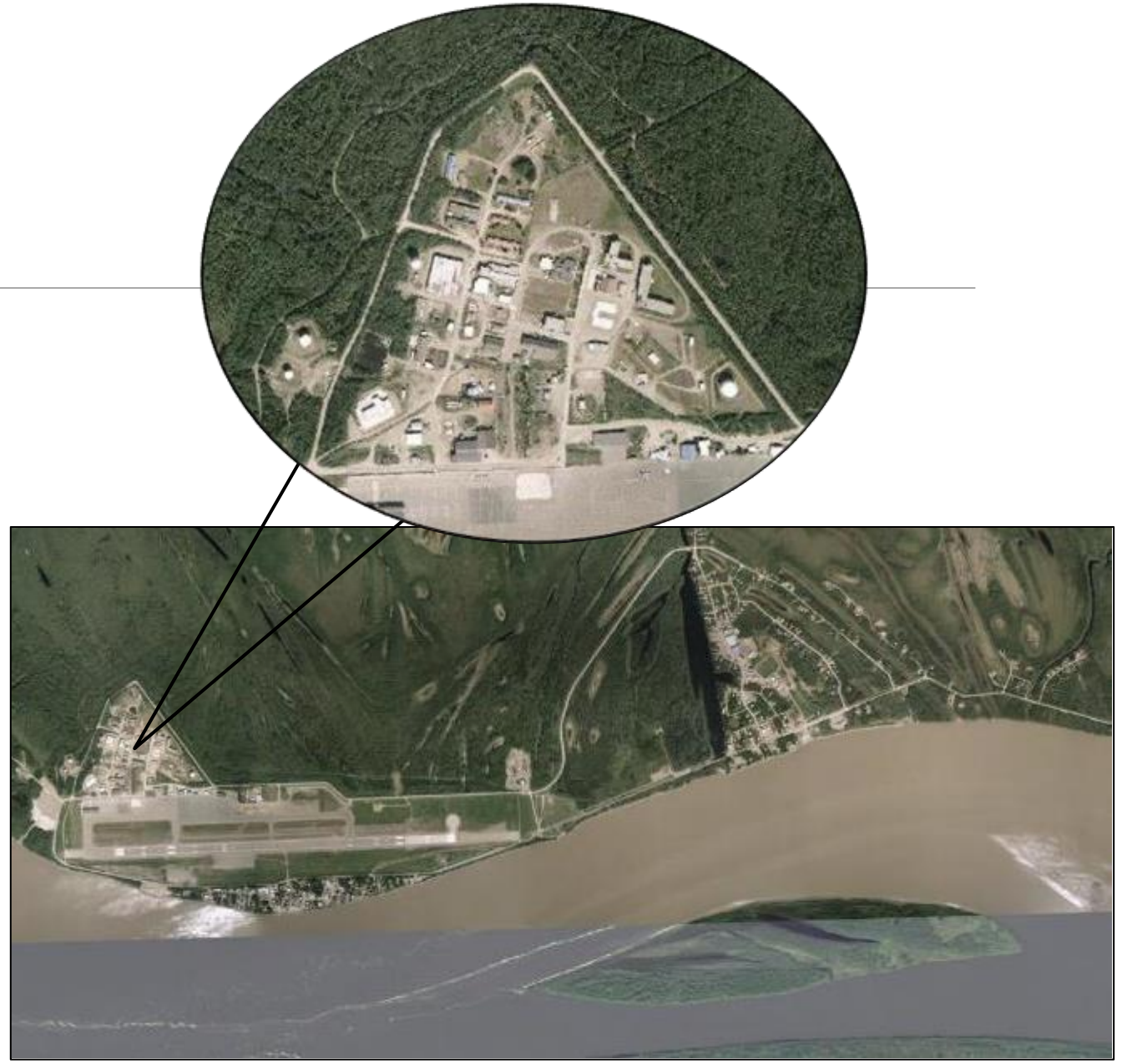
- High-cost of fossil fuel for energy generation.
  - Electricity - $0.72USD($0.99 CAD)/kWh
  - Heating Fuel - $8.50USD($11.65CAD)/g
    - $2.91CAD/Liter
- Long-transportation lines
- Limited capacity (e.g., physical, administrative, economic)

(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 (870,550 liters) 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 Louden Tribal Council (LTC) created a local non-profit organization, **Sustainable Energy for Galena, Alaska** (SEGA) tasked with providing wood fuel supply

- Successfully completed 10 timber-harvest and chip-processing seasons!

Avg. Estimated Results

Est. 16.5 billion Btu Heat Requirement

Annual averages:

- Oil used – 25,000 gallons (g) (94k liters)
- Wood used - 60,000 cubic feet (cf) / 1700 cubic meters

  **Solid Wood Estimate*
- Oil displaced - 200,000 g / (757,000 liters)
- Oil displaced **due to biomass** – 100,000 g (378,500 liters)

Sustainable Energy for Galena Alaska, Inc.

Expansion of Purposes (2018)

- 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

2022 – 2-Bedroom Homes

2023- 3 Bedroom Homes

2023- 3 Bedroom Homes

2024 - 2 Bedroom Home

2025 & Beyond

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 Louden Tribe, interconnected to the City of Galena's electrical distribution system.

Galena Solar Farm Project (2024-25)

- 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.

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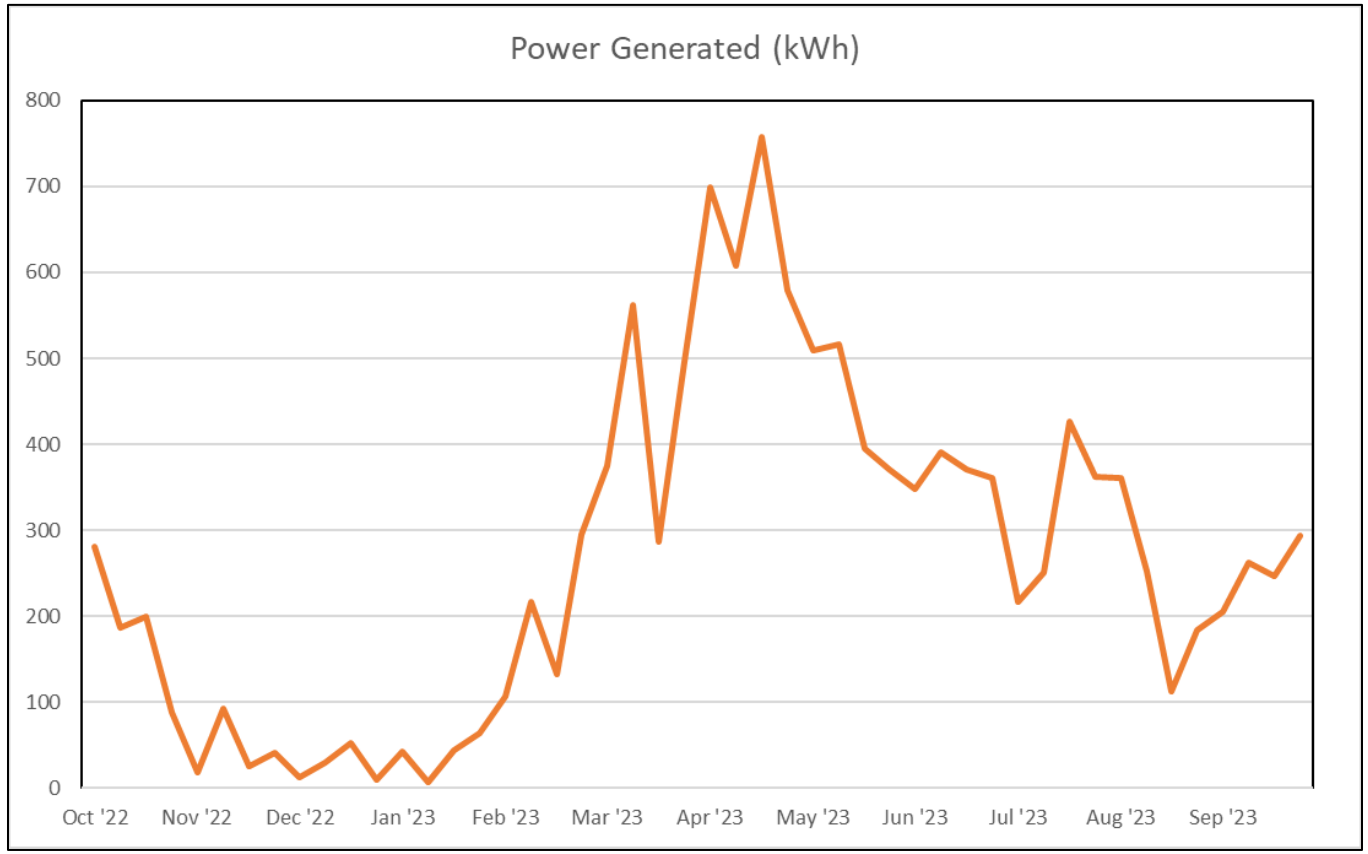
Example Solar PV Potential



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Example Solar PV Potential

- 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 River Energy Project Summary

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

Budget Periods	Description	Key Outcomes
Year 1	• Team Formation • Desktop R&D	• Site and Technology requirements • Community-led Project Plan
Year 2-3	• Field Work • Permitting • Design Finalization	• Site Characterization • Environmental Baseline • Technology Selection • Permits Secured
Year 4-5	• Construction • Testing	• 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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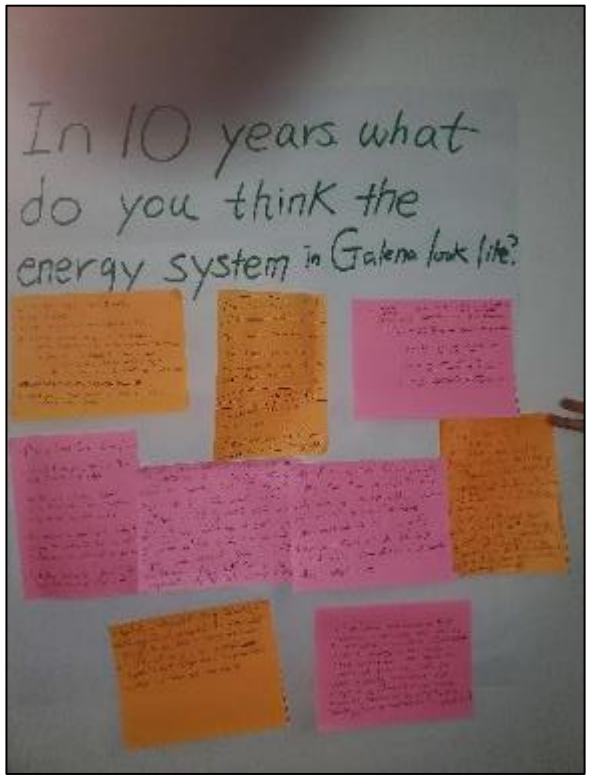
ORPC RivGen, prior to submersion. Igiugig, AK 2020

Community Energy Planning



Purposes that align with local values

Risks/Benefits Conversations

Context Specific Challenges / Limitations

Need for Specific Energy Planning

Community Energy Planning

Tashonia Martin - Community Energy Planning (CEP) Coordinator

Community Energy Planning

Priorities & S.M.A.R.T. Goals

- **Diesel Reduction**
- **Monitor Air Quality**
- **Renewable Energy Education Center**
- **Data Management Plan**
- **Distribution of Benefits Plan**
- **Reduce Power Outages**

THANK YOU!