

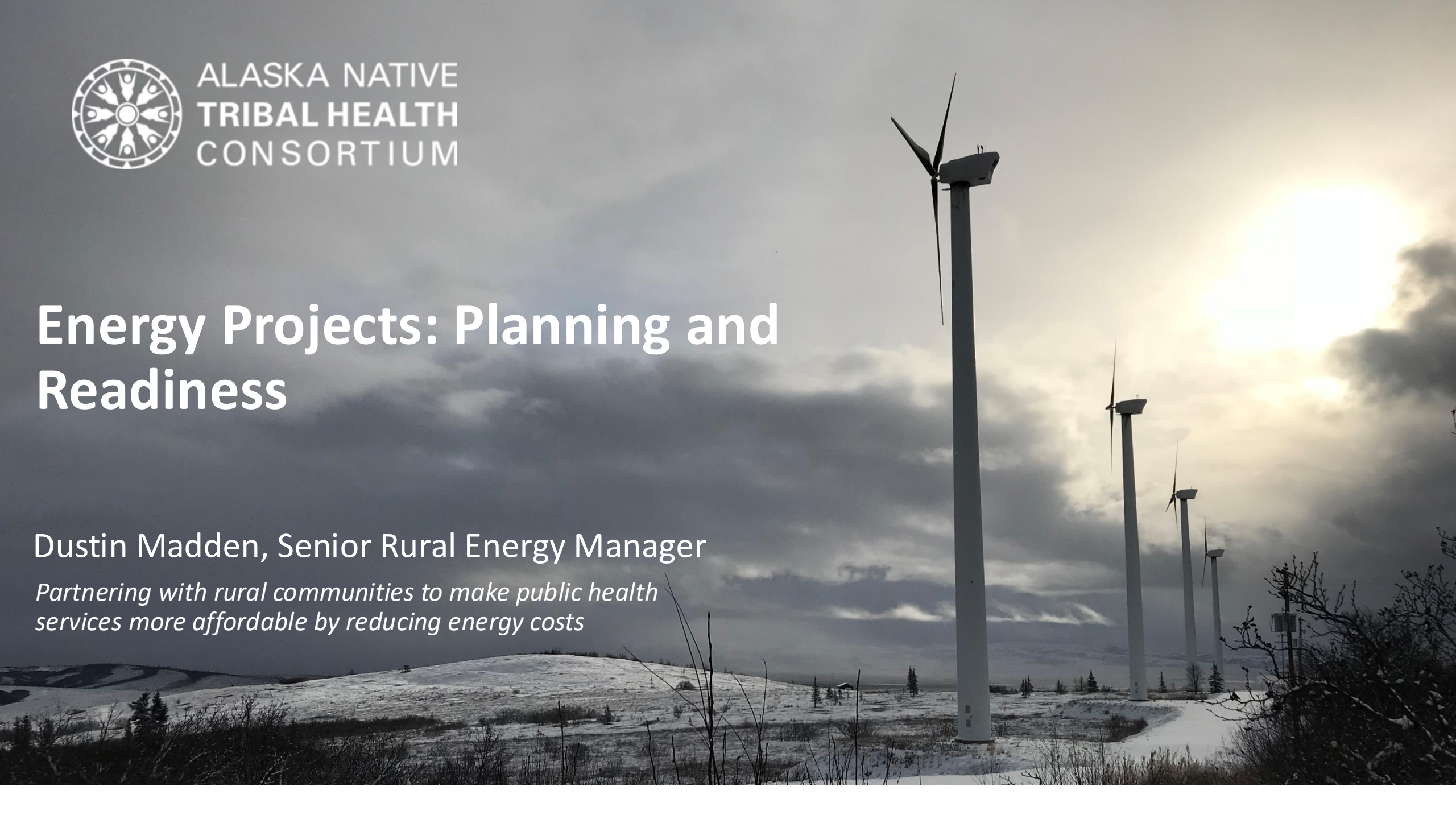


ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

Energy Projects: Planning and Readiness

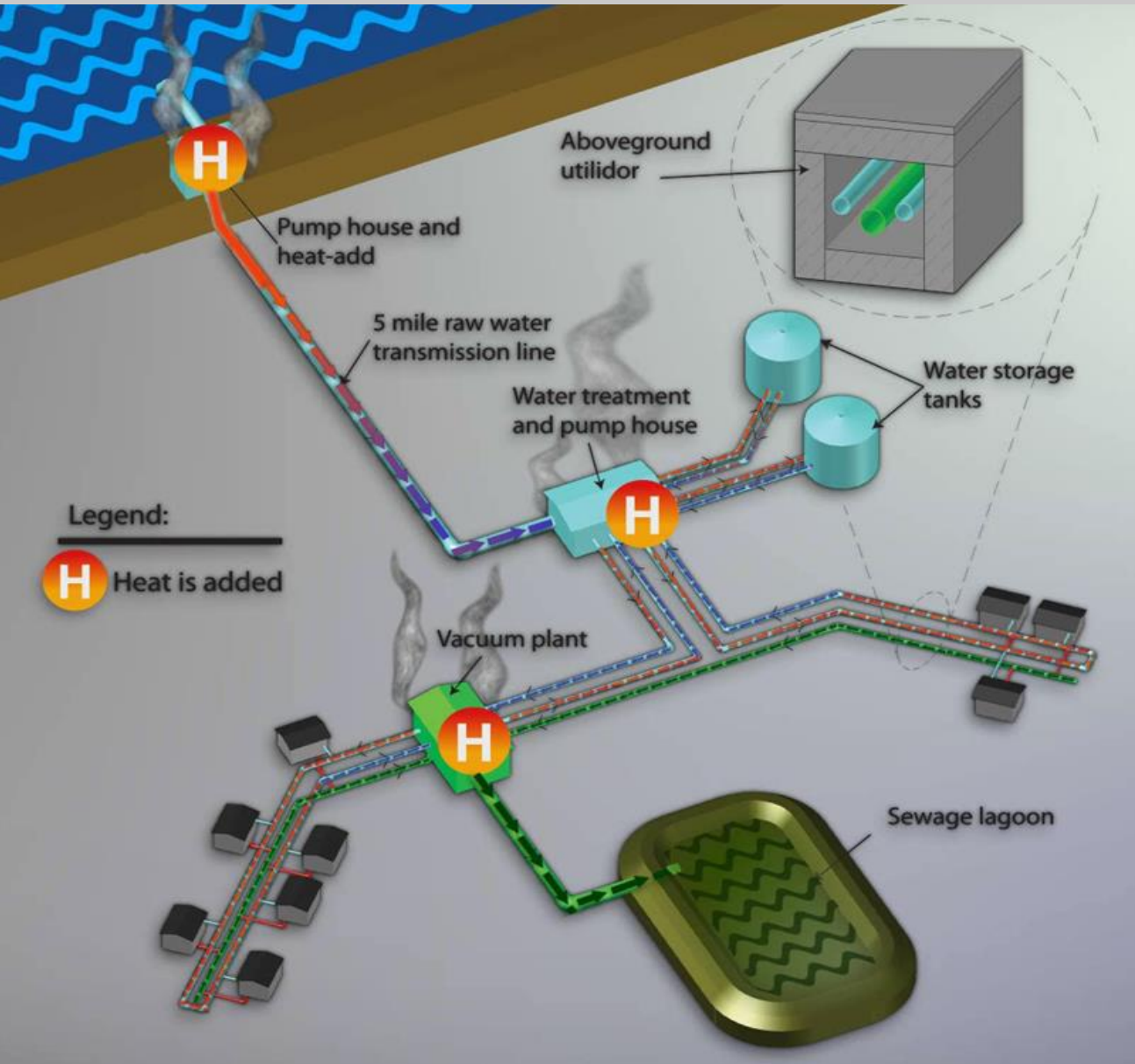
Dustin Madden, Senior Rural Energy Manager

Partnering with rural communities to make public health services more affordable by reducing energy costs



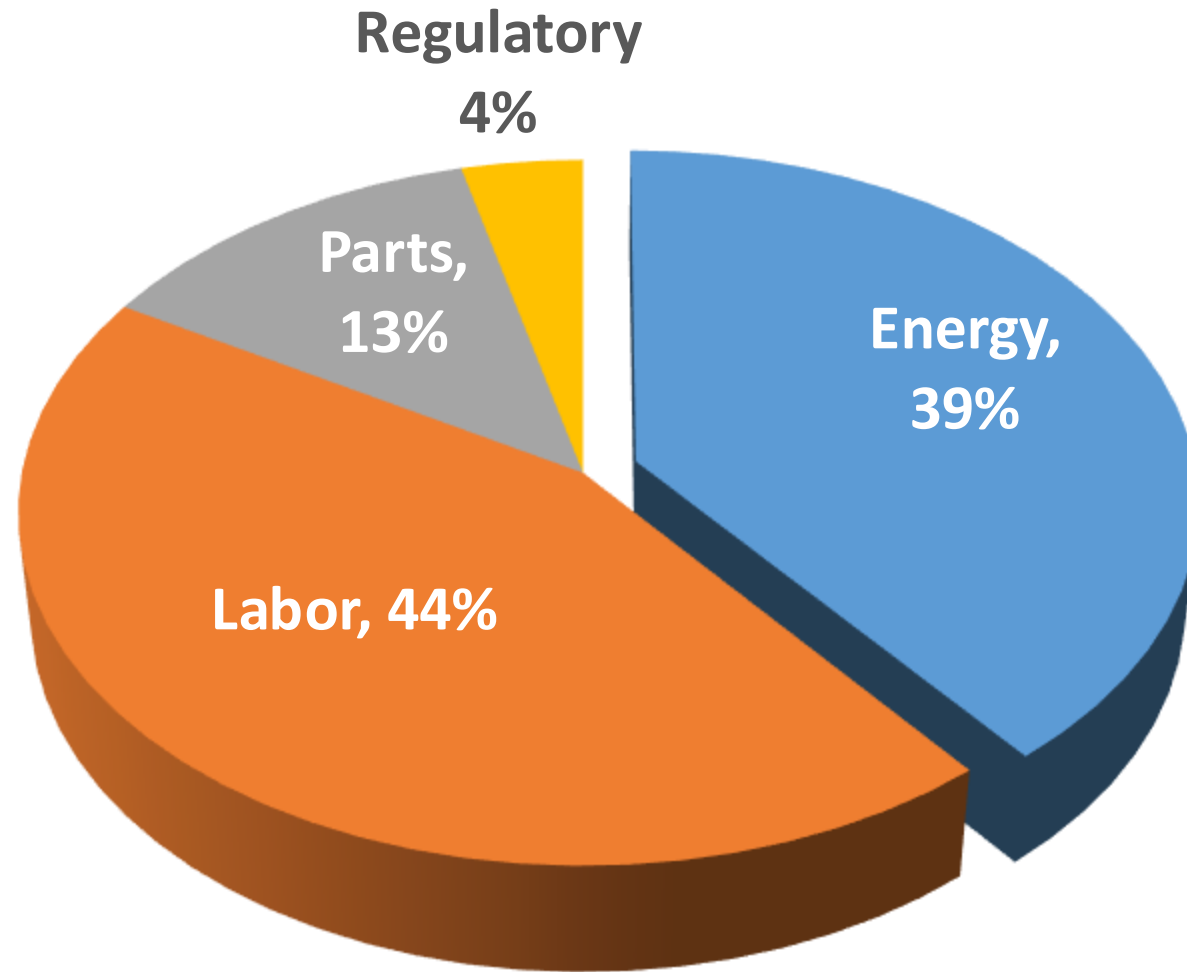
- **ANTHC's Rural Energy Program**
 - Need for services
 - Impact
 - Portfolio
- **Energy project planning:**
 - Action planning
 - Feasibility
 - Funding
- **Questions / discussion**

Why is there a Rural Energy Program?



Water and Sewer Utilidor in Saint Michael, Alaska

Energy Costs in Rural Sanitation Facilities

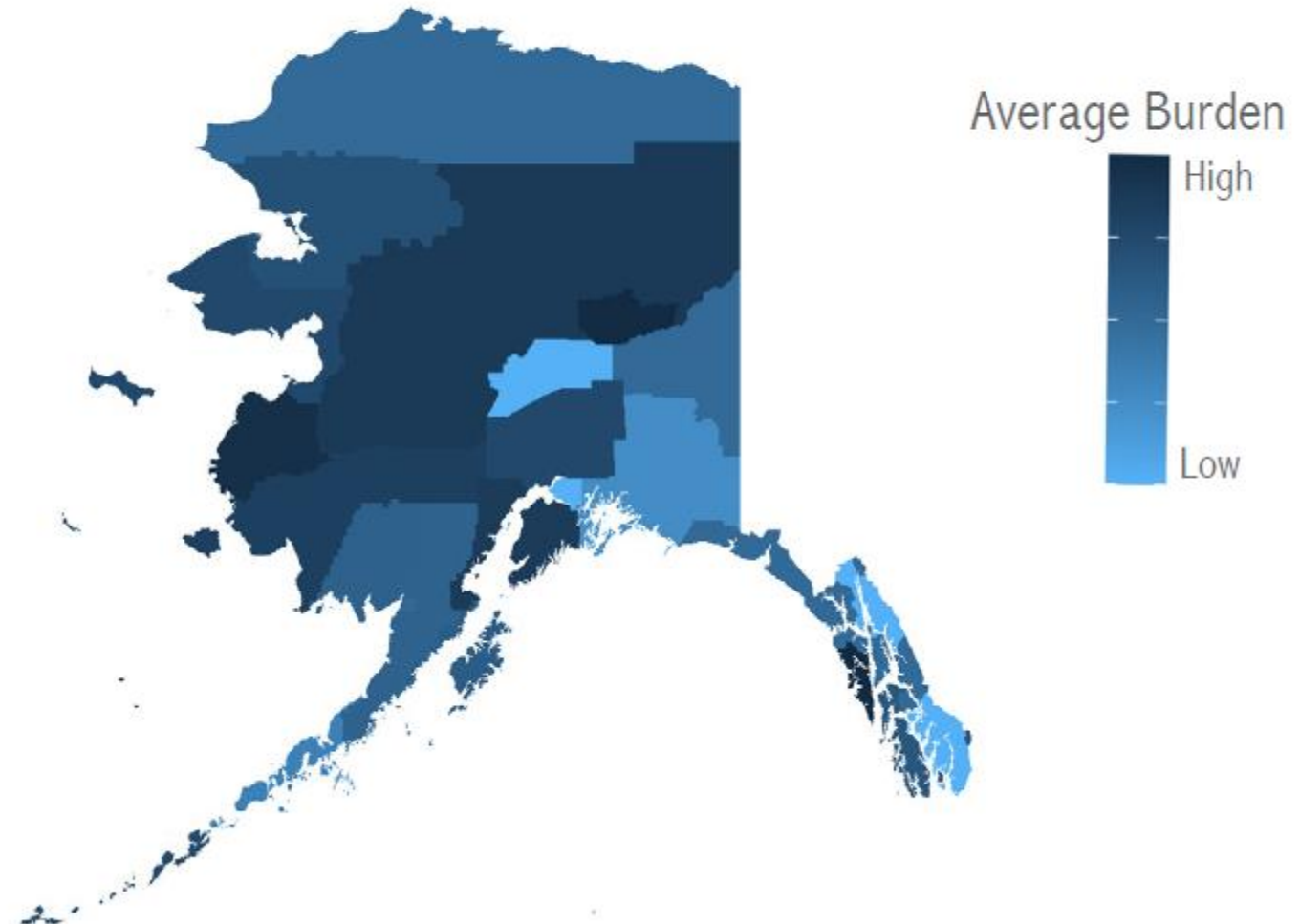


- Fuel and electricity is **39%** of the cost of water/sewer on average before Energy projects
- **Energy use x energy price x few households = 60 – 260** times higher per capita costs than national average
- Rural sanitation can account for up to **1/3 of total community energy costs**

Affordability of water and sewer

- AK DEC: “High burden” water bills in **56%** of rural communities
- Two options for water utilities:
 - Cut off service
 - Not enough funding for O&M
 - **This jeopardizes billions in infrastructure investments**

Average Burden of Residential Rates By Borough



Energy project development & implementation



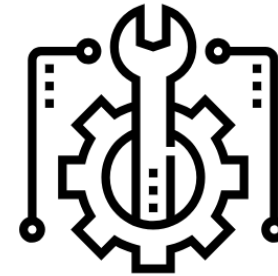
Identify



Analyze & Develop



Fund



Implement



Save

Current project portfolio

- \$180M of projects from **20** funders:
 - Federal, State, regional, philanthropic
- Active project work in **70+** communities
- **Project types:**
 - *Bulk fuel storage:* 10 communities
 - *Community-owned renewables:* Hydro, Wind, Solar/BESS
 - *Heat recovery*
 - *Biomass district heating*
 - *Energy Efficiency*
 - *Remote monitoring*



Energy project planning

1. Energy Action Plan:

- Options analysis
- Stakeholder engagement
- Prioritization

2. Engineering Feasibility Study:

- Site assessment
- Tech/economic analysis
- Cost estimate

3. Securing funding:

- Identify opportunities
- Match / leveraged funding



Technical Assistance

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Energy Action Plans

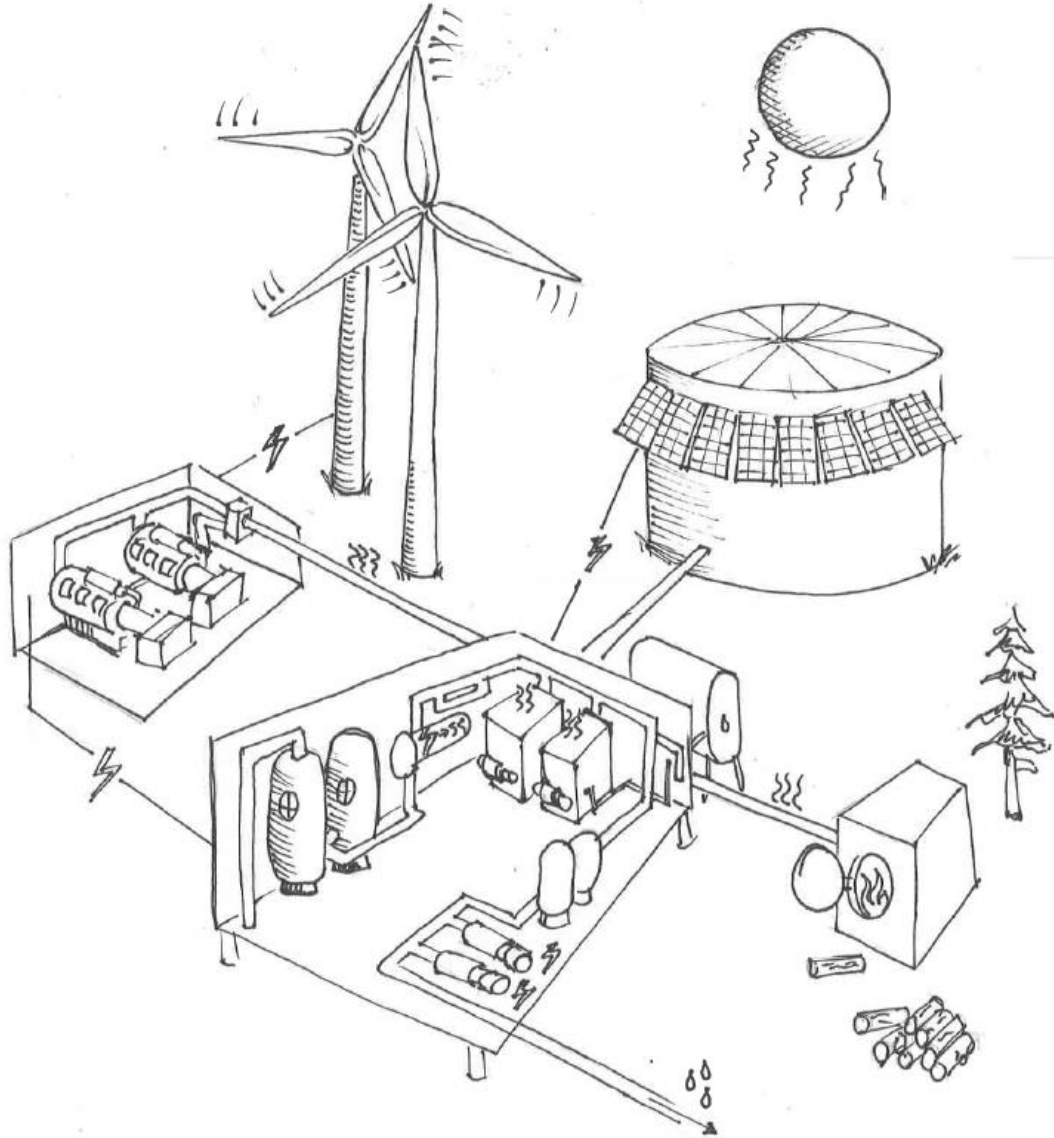
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Funding Assistance

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Action Plan: options analysis

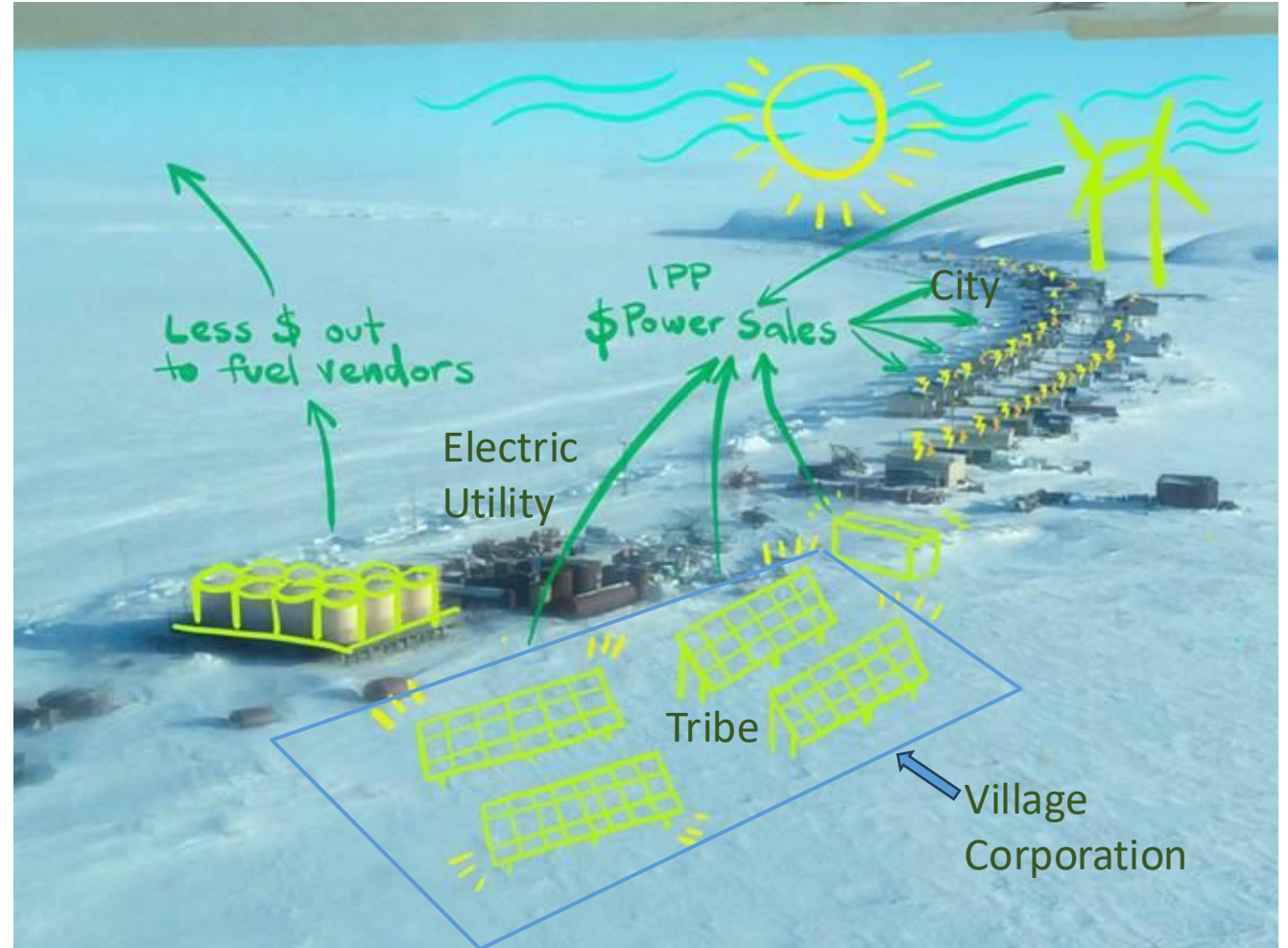


- What has already been done?
- What has already been evaluated?
- **Options:**
 - *Energy Efficiency:* cost-effective
 - *Heat Recovery:* big heating impact
 - *Biomass heating:* jobs / local
 - *Run-of-river hydro:* geography
 - *Wind:* resource / size dependent
 - *Solar PV / BESS:* fast dev, low maintenance

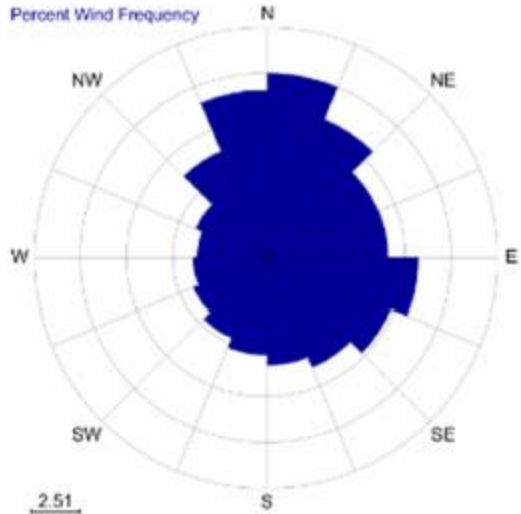
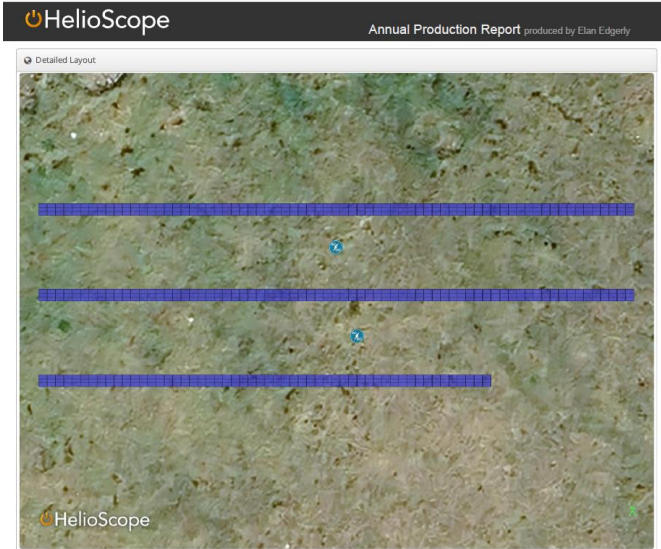
Action plan: stakeholder engagement

Stakeholders:

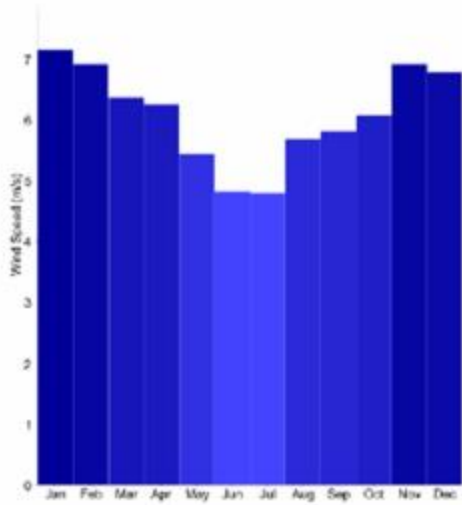
- Tribe
- Municipal Government
- Village Corporation
- Electrical Utility
- Regional Corporation
- Etc.



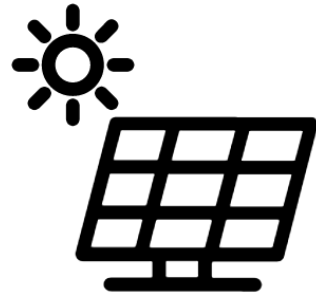
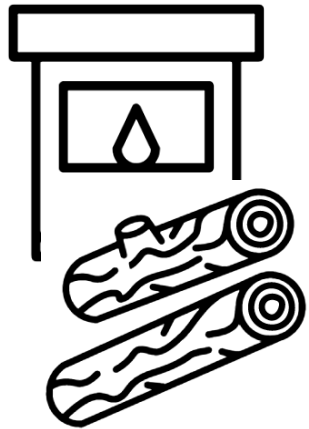
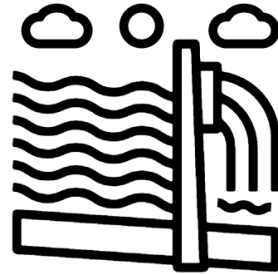
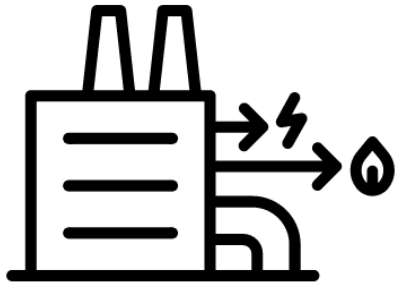
Action plan: prioritization



Wind Rose



Monthly Distribution



- **Technical Assistance via DOE Office of Indian Energy**
 - Strategic Energy Planning
 - Energy audits
 - Feasibility Studies:
 - Heat recovery
 - Solar
 - Wind
 - Biomass
 - Hydro
 - Existing system optimization



Technical Assistance

Elan Edgerly, PE:
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[Request Technical Assistance Now](#)

Site Considerations

Aspect and shading

Geotechnical – Permafrost, wetlands

Accessibility – roads?

Permitting – USACE 404, Endangered Species, Cultural Resources, SHPO, NEPA, DOT, FAA

Extreme weather conditions (wind, icing)

Site control

Logistics

REPORT SUMMARY	
Wind	
Wind Speed	150 Vmph
10-year MRI	110 Vmph
25-year MRI	120 Vmph
50-year MRI	130 Vmph
100-year MRI	135 Vmph

~4,000 Pa

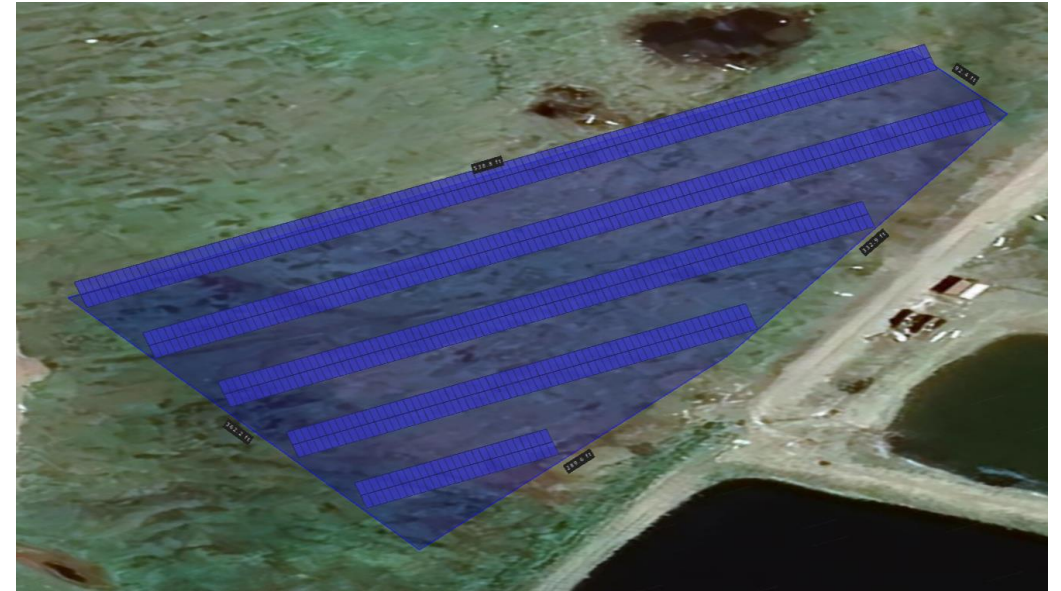
MECHANICAL PROPERTIES / COMPONENTS	METRIC
Module weight	26.2kg ± 0.2kg
Dimensions (H x L x D)	2098 mm x 1133 mm x 35 mm
Maximum surface load (wind/snow)*	2400 Pa rear load / 1400 Pa front load
Hail impact resistance	ø 25 mm at 83 km/h

Technical / Economic Analysis

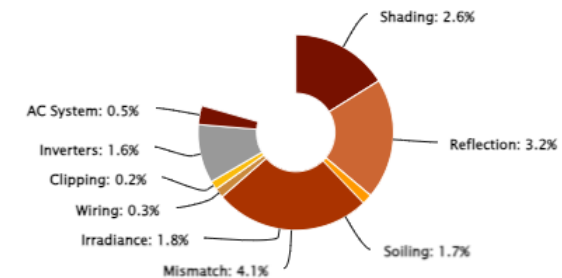
1. Is the project technically feasible?
2. What is the best system size?
3. How much energy will it produce?
4. What is the economic value of that energy?

Energy Modeling Software

- Solar Generation
 - PVWatts (simple, free, less detail)
 - Helioscope (more complex, \$, more detail)
- Wind/solar/BESS:
 - SAM (more complex, free, more detail)
 - HOMER (simple, \$, less detail for solar)
 - ReOpt
 - Windographer, WASP, etc.



Sources of System Loss



Cost estimation

- **Bottom-Up Cost Estimates**
 - Add up project components
- **Parametric Cost Estimates**
 - \$ / kW solar PV installed, \$ / linear foot + \$ / end-user for heat recovery systems, etc.
- **Estimates from internal resources**
- **Regulatory compliance costs:**
 - Build America, Buy America
 - American Iron & Steel



Securing funding

- **Grants**

- Identify relevant opportunities and evaluate
- Connect grant opportunity with project
- Secure match funding
- Learn the art of grant writing (40 apps, 87.5%)

- **Financing**

- Are project economics good enough?
- Often similar admin burden & regulatory compliance as grants

- **Investment tax credits (IRS section 48e):**

- Battery energy storage systems (BESS) and hydro until 2033 (phases out through 2036)



Funding Assistance

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Thank You!

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Ouzinkie Solar PV project



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- **Current status:** Awarded design-build
- **Partners:** Native Tribe of Ouzinkie, Ouzinkie Native Corporation, City of Ouzinkie
- **Project:** 160 kW of solar + 210 kWh battery energy storage system
- **Annual production:** 2.1 MWh
- **Economics:** Tribe will sell power to City at avoided fuel cost
 - Annual revenue: \$47,100
 - O&M costs: 30%, or \$14,130
 - Net revenue: \$32,970
 - Subsidy per household: \$660 / year



Wind in Chevak/Toksook/ Nightmute/Tununak

- **Status:** Awarding design to CRW
- **Partners:** City of Chevak, City of Toksook Bay, City of Nightmute, Native Village of Tununak, AVEC, ARUC
- **Project:** 1 MW wind turbines in Chevak and Toksook, serving Nightmute & Tununak through interties
- **Economics:**
 - Sell power to AVEC at 80% avoided fuel cost. Net revenue annually after paying for O&M (price dependent):
 - Chevak: \$300k - \$395k
 - Toksook: \$300k - \$437k
 - Toksook agreed to share revenue with Nightmute & Tununak



Old Harbor Hydro

- **Status:** 65% design
- **Partners:** Alutiiq Tribe of Old Harbor, Old Harbor Native Corporation, AVEC
- 525 kW run-of-river hydro project
- Sell power to AVEC at avoided fuel cost:
 - Annual revenue: \$237,100
 - O&M costs: \$71,100
 - Net revenue: \$166,000
 - 81 residential customers:
\$2,050 / household annually
- Project funded through DOE OCED grant

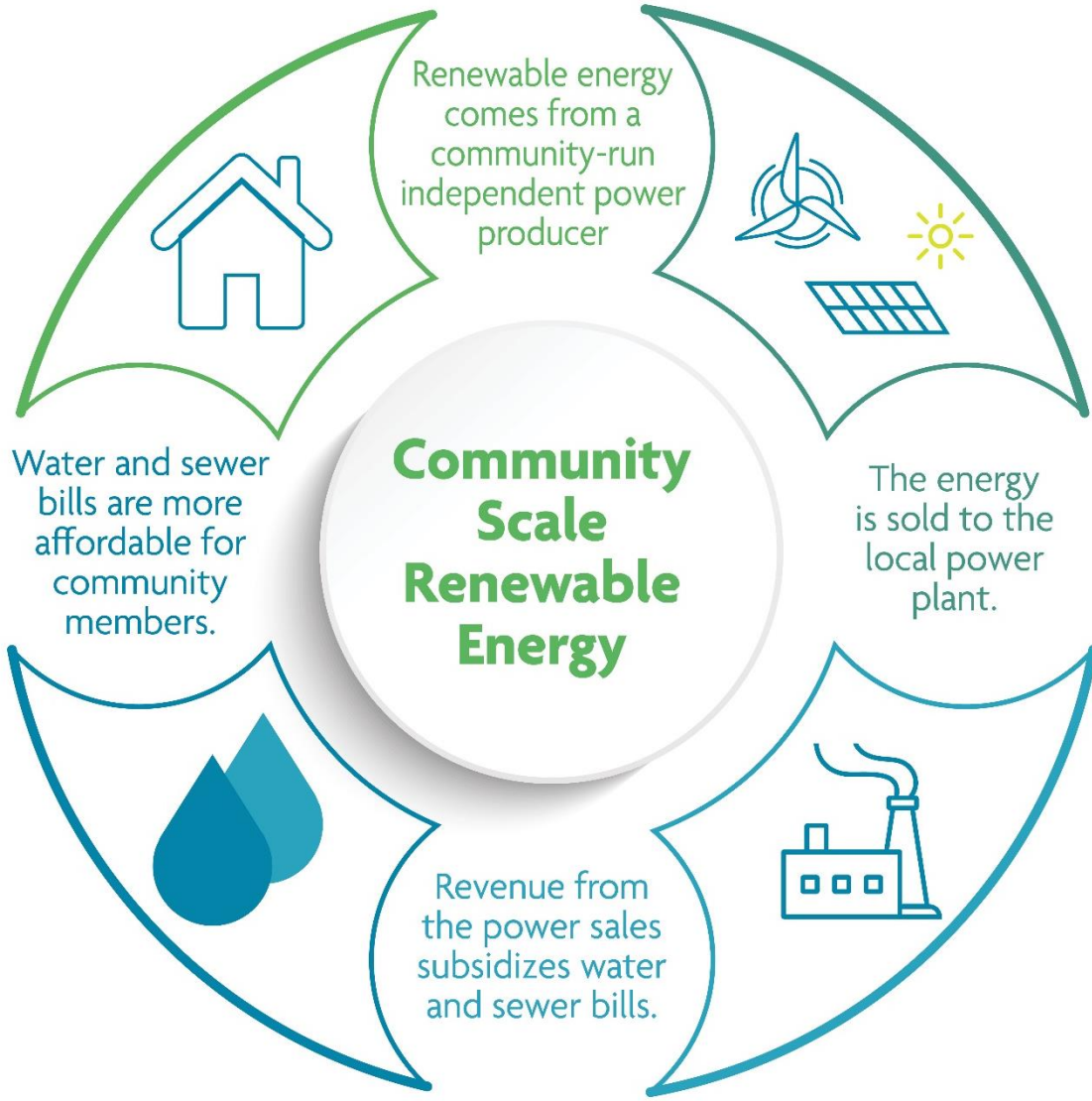


Chignik Bay Hydro

- **Current stage:** Awarding design
- **Partners:** Lake and Peninsula Borough, Chignik Bay Tribal Council, City of Chignik
- 385 kW run-of-river hydro turbine
- **Annual production:** 2.1 MWh
- **Economics:** Tribe will sell power to City at avoided fuel cost
 - Annual revenue: \$233,900
 - O&M costs: \$34,200
 - Net revenue: \$199,700
- Project funded through DOE grant



Community Scale Renewable Energy Projects



Holistic approach



Electric Utility Owned



Lowers power
plant fuel use



Lowers PCE



Lowers electric
bills



Water utility owned: behind the meter



Lowers water utility
electricity use



Lowers PCE



Increases electric
bills



Water utility owned: IPP power sales



No change in
electric bills



No change in PCE



Power sales fund
reduced water
bills