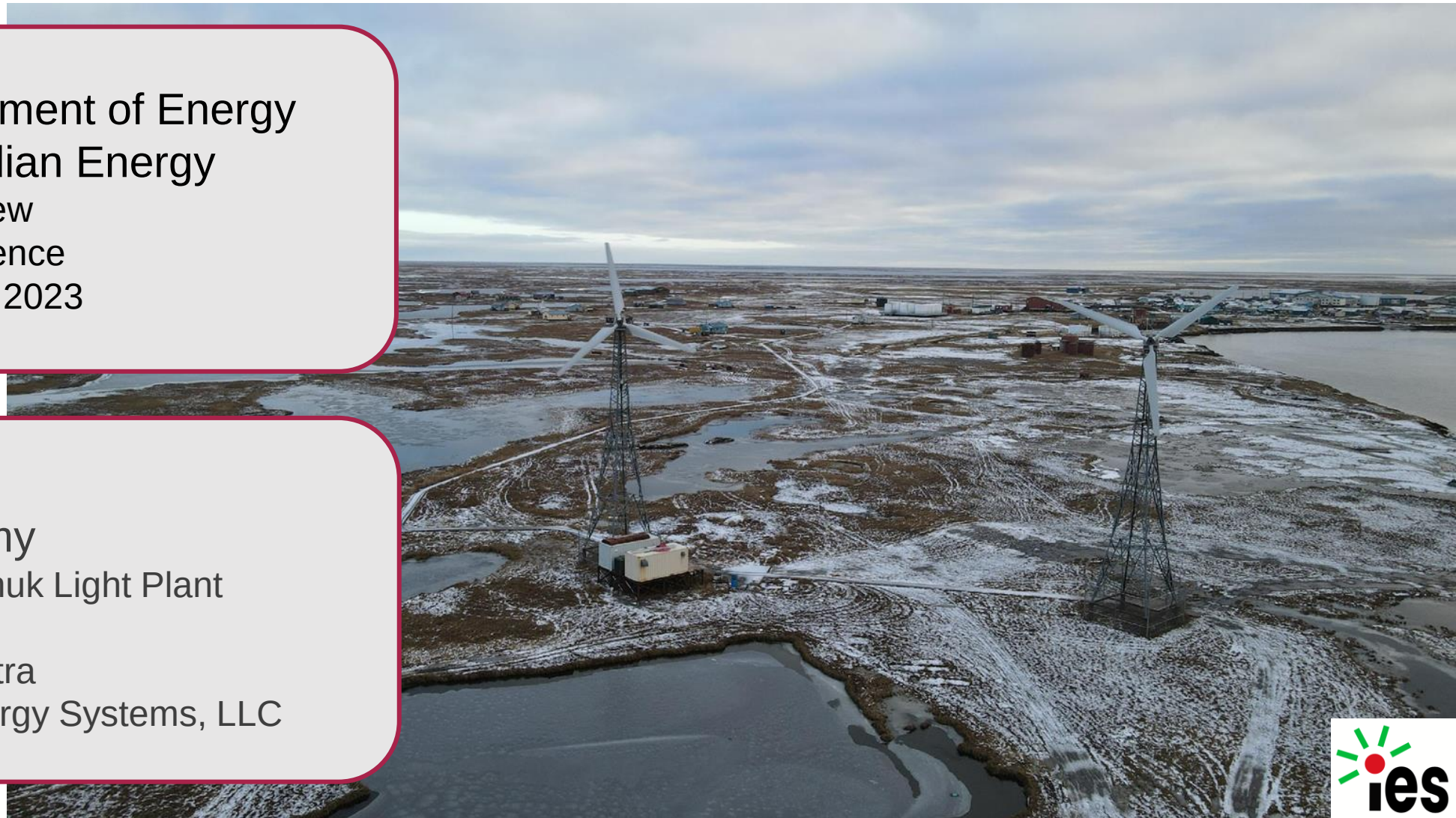
Kipnuk Light Plant

A tribally owned utility

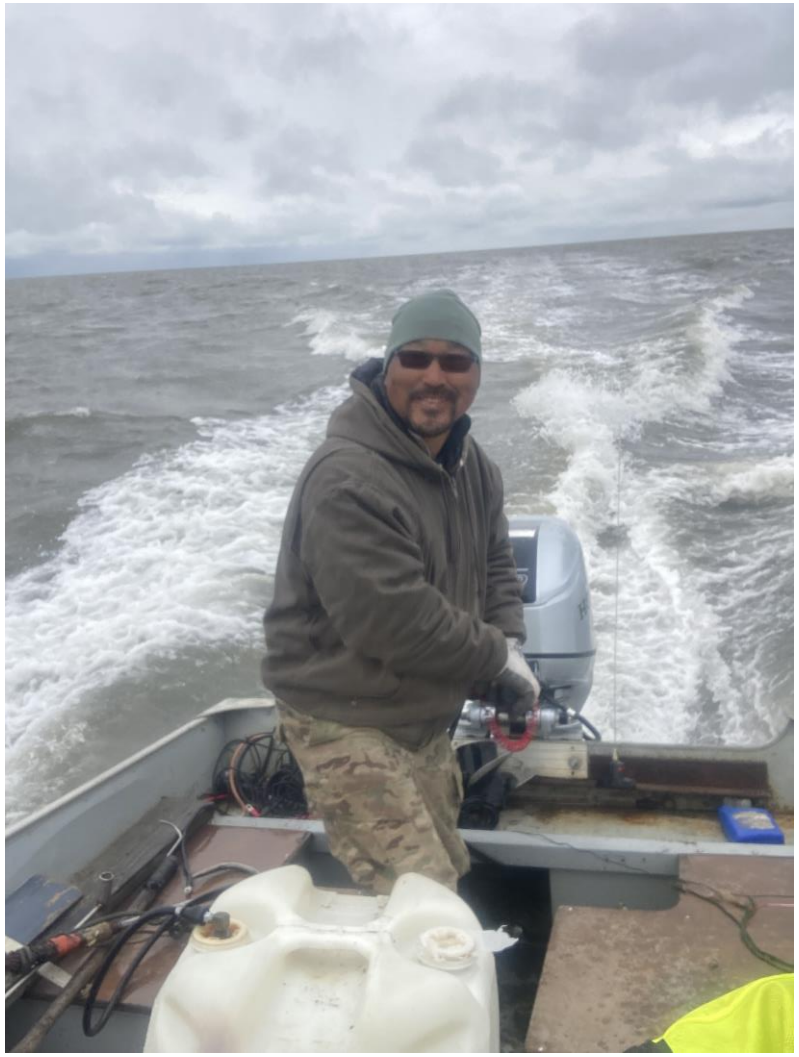


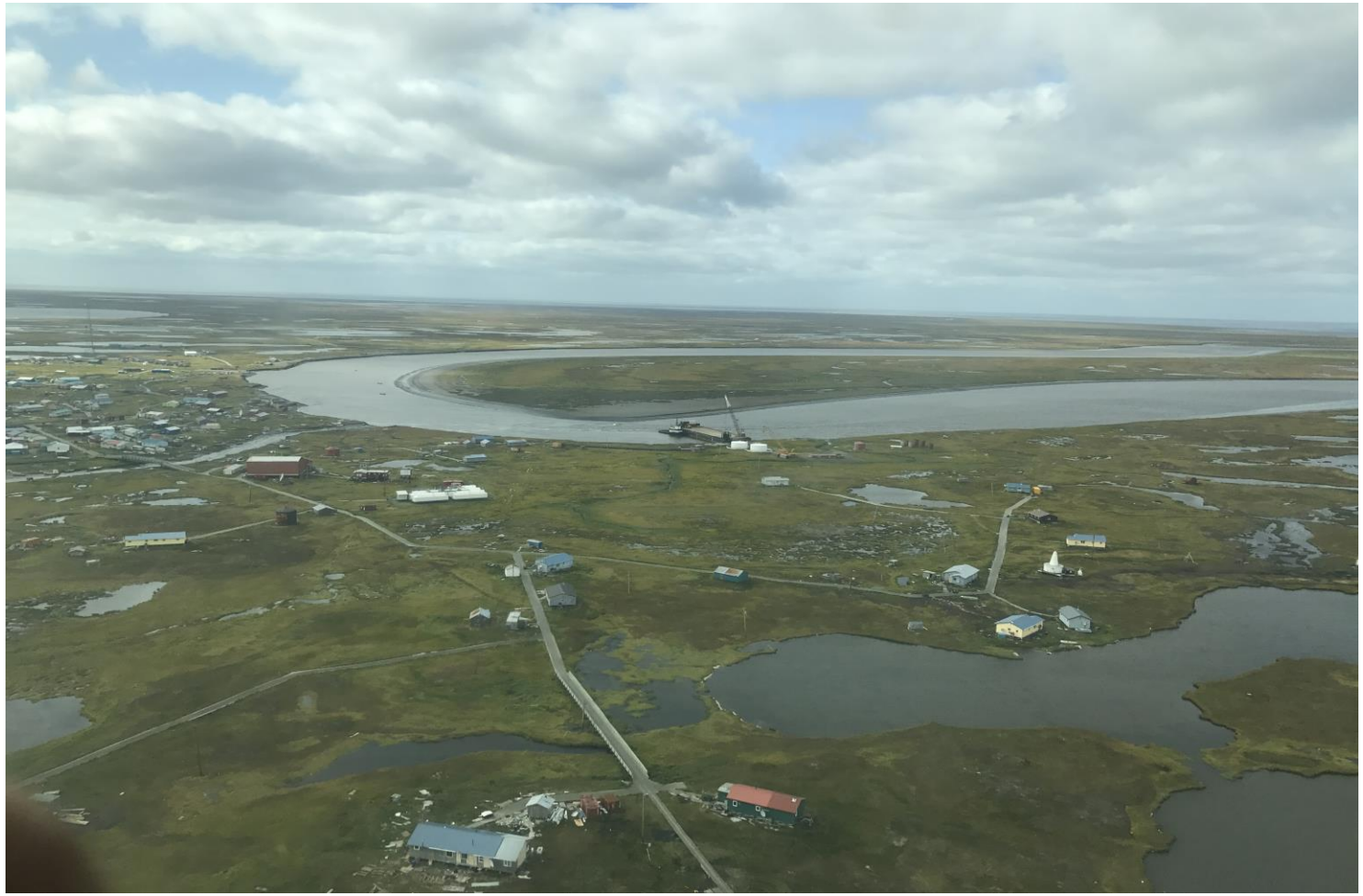
U.S. Department of Energy
Office of Indian Energy
Program Review
Virtual Conference
November 15, 2023

Presented by:
Daniel Jimmy
Manager, Kipnuk Light Plant

Patrick Boonstra
Intelligent Energy Systems, LLC

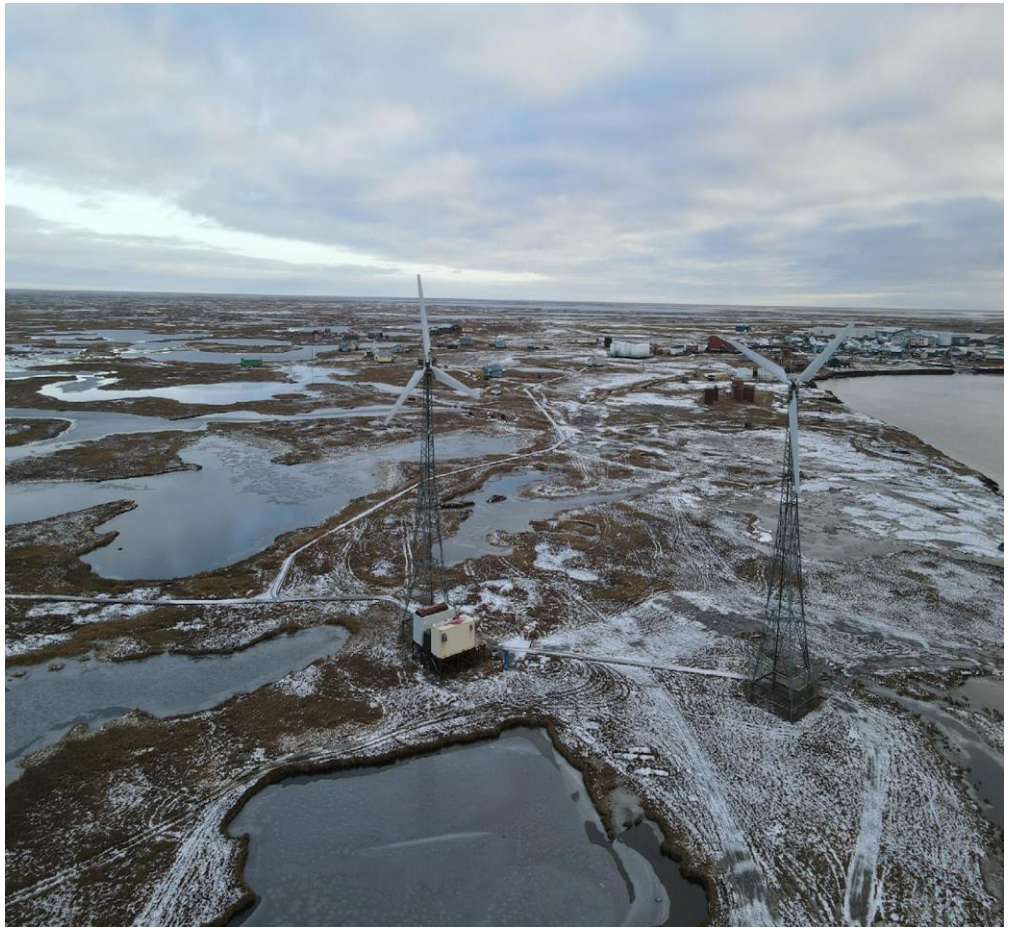
Kipnuk Community





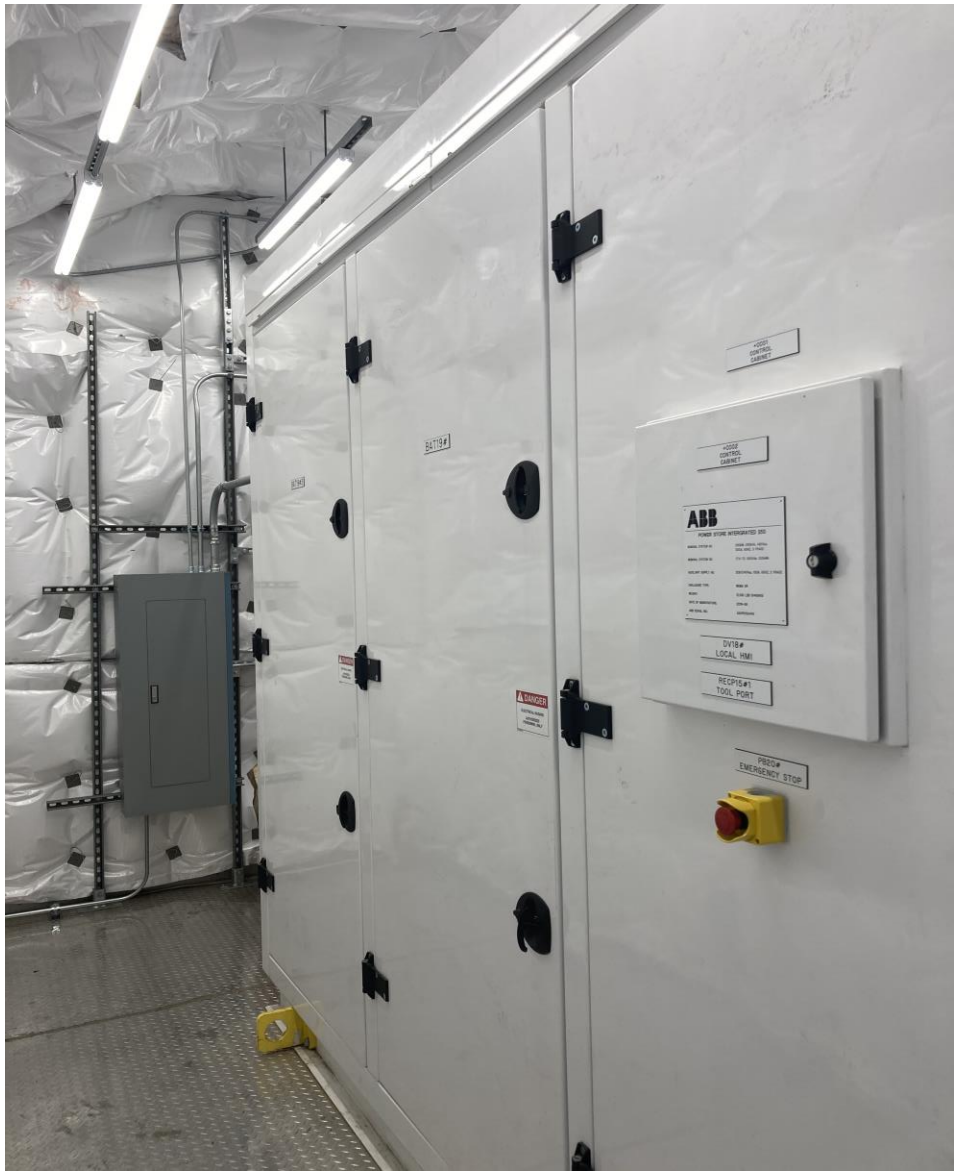
Kipnuk Light Plant Energy System

- Kipnuk's stand-alone Wind-Heat System
- (1) Powerplant With Bulk Fuel farm
- (6) 95 kW Wind turbines
- (1) Load regulating boiler
- (1) heat recovery loop heating the Qanganak Tribal Council building
- (40) ETS Electric thermal stoves in homes
- (1) Hybrid microgrid controller and SCADA
- Wind power is used for both lights and heating -



Kipnuk Light Plant BESS Project

Department of Energy
Office of Indian Energy
Energy Infrastructure
Deployment on Tribal Lands



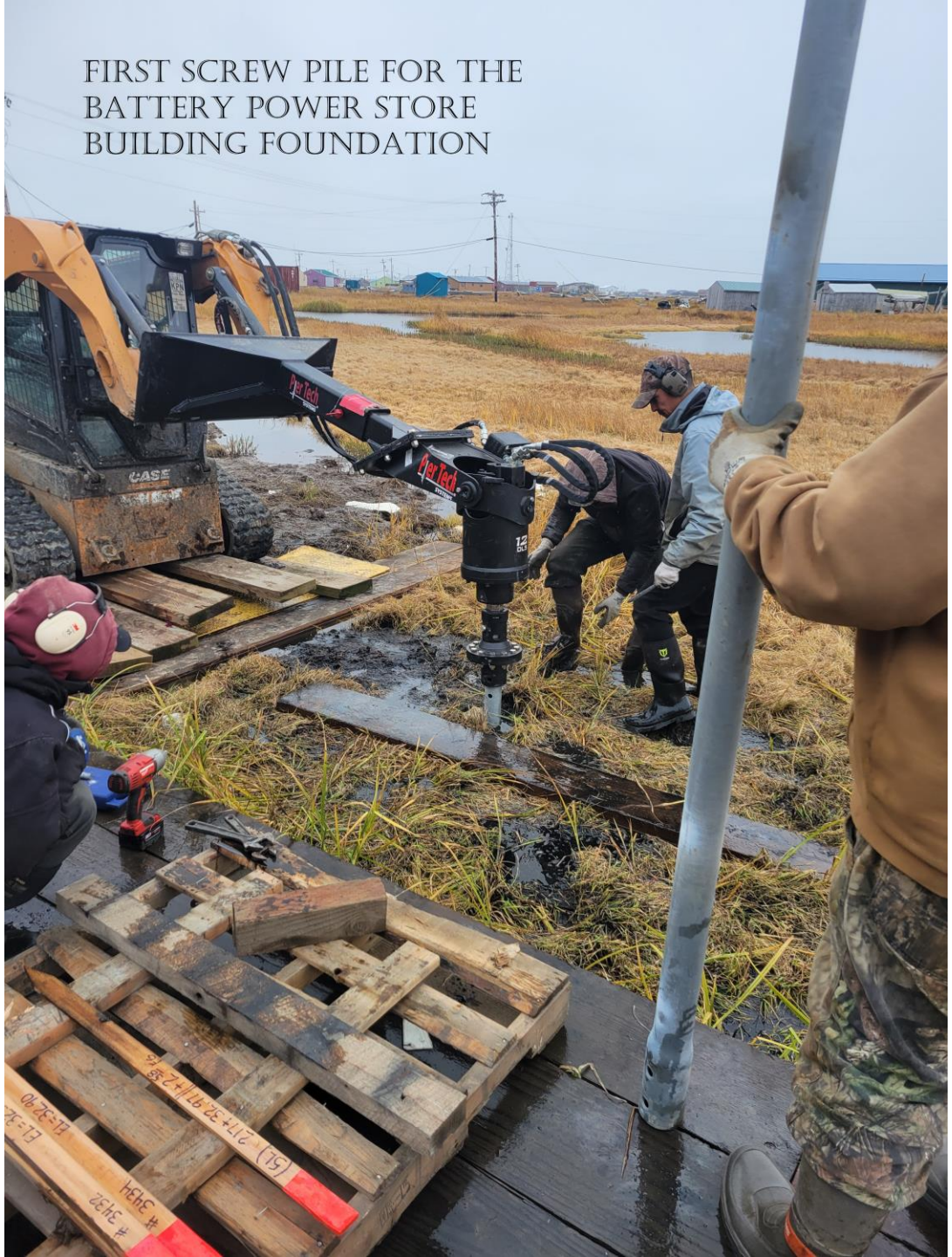
Project Overview

Install/Integrate *ABB Hitachi 500/670 kWh PowerStore* battery energy storage system (BESS) into the community wind-diesel grid. This BESS to be located by the power plant in a battery shelter for protection against the elements

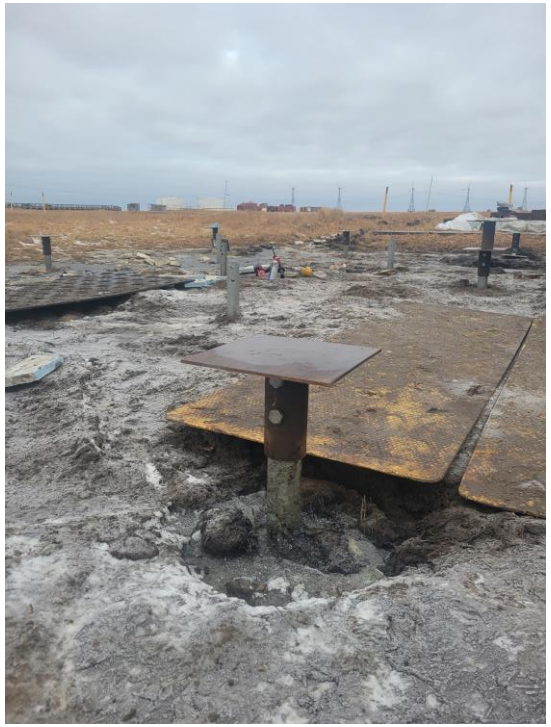
Improve Kipnuk's energy resilience and security by increasing local, renewable energy
- Increase to 4,000 hours wind battery generation (diesel off).
- Displace a total of 58,000 gallons of diesel.
- The BESS will allow for higher wind penetration and help to stabilize the grid.

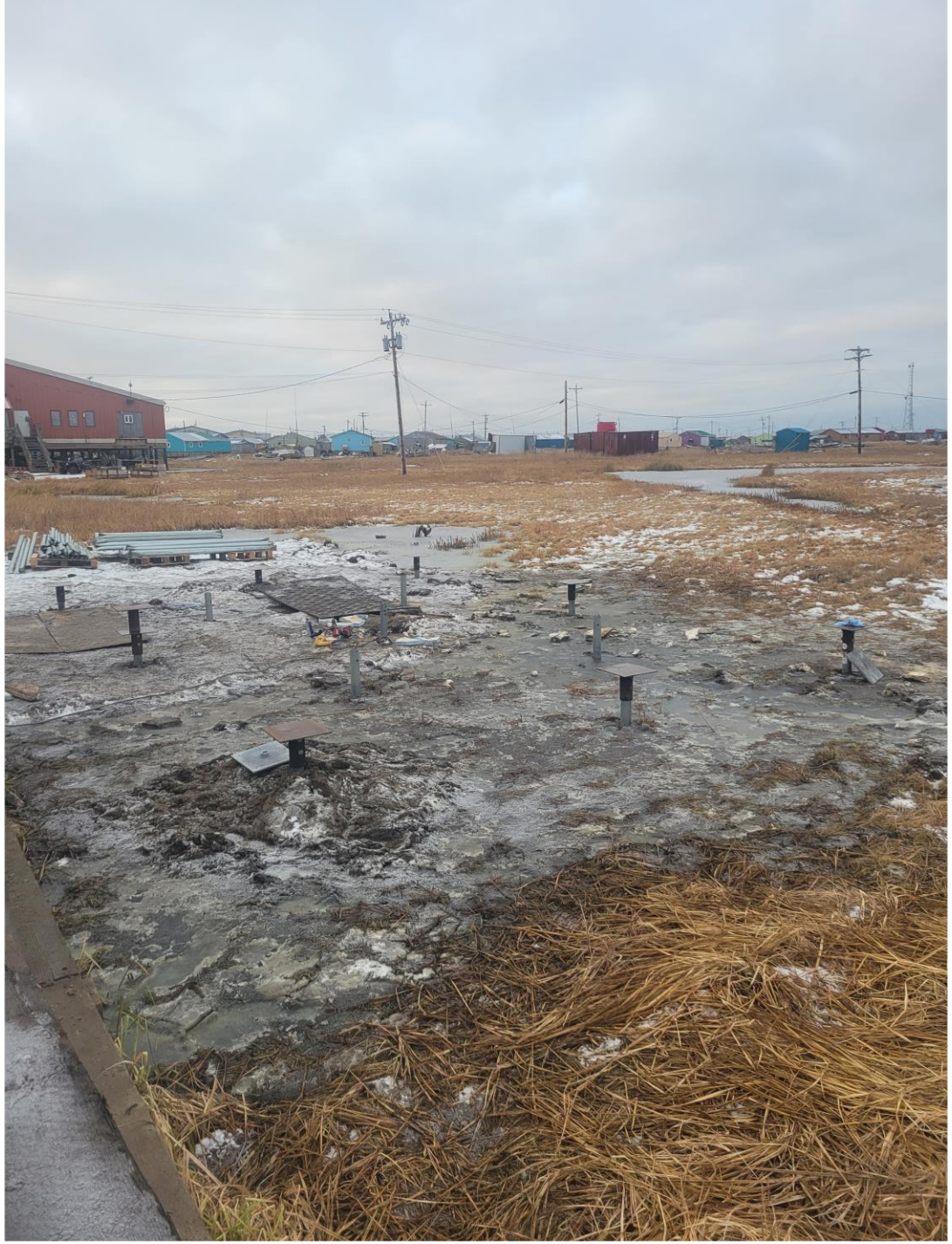
BESS PowerStore

Installing the first screw pile for the BESS Power Store Building Foundation

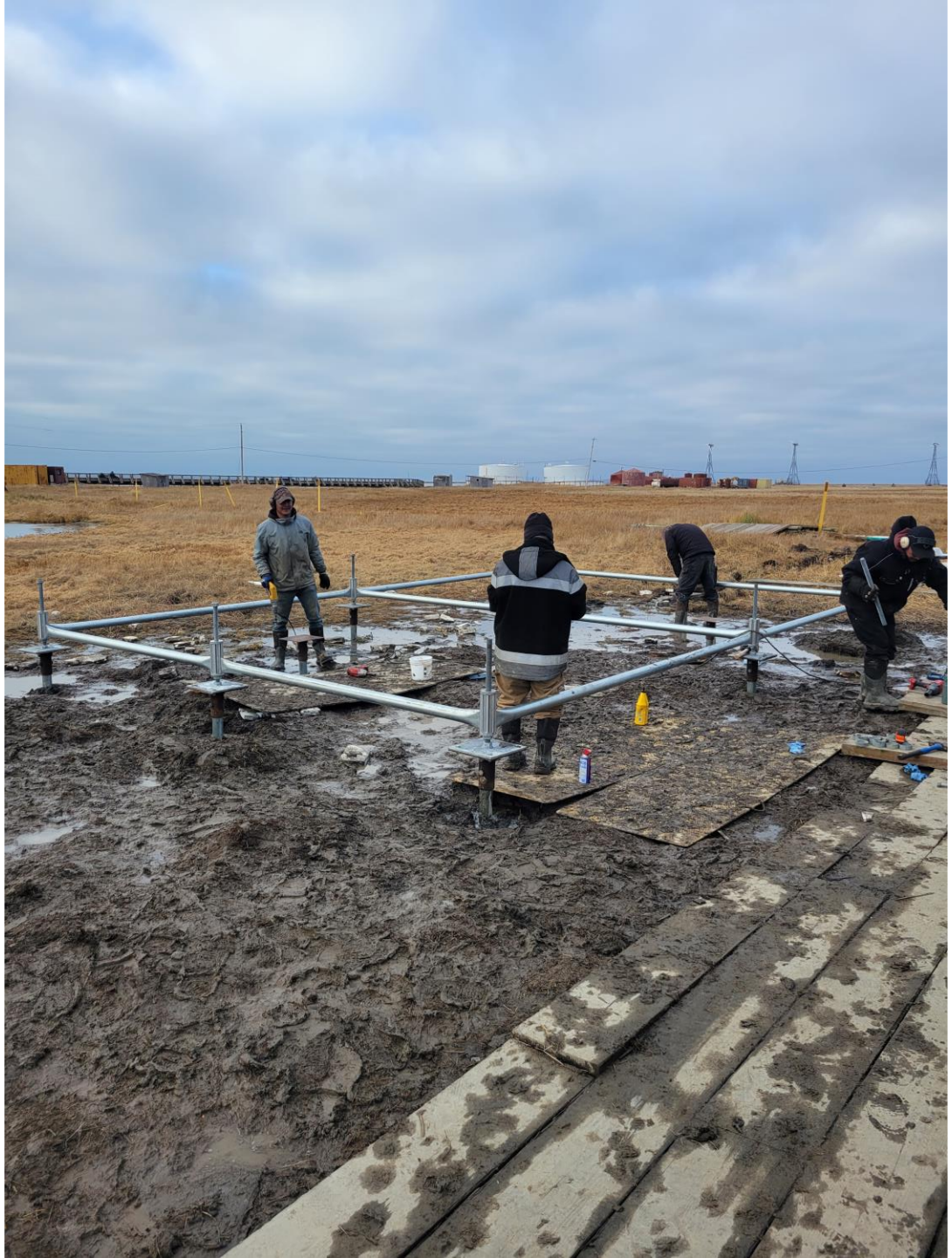


Screw piles foundation installed

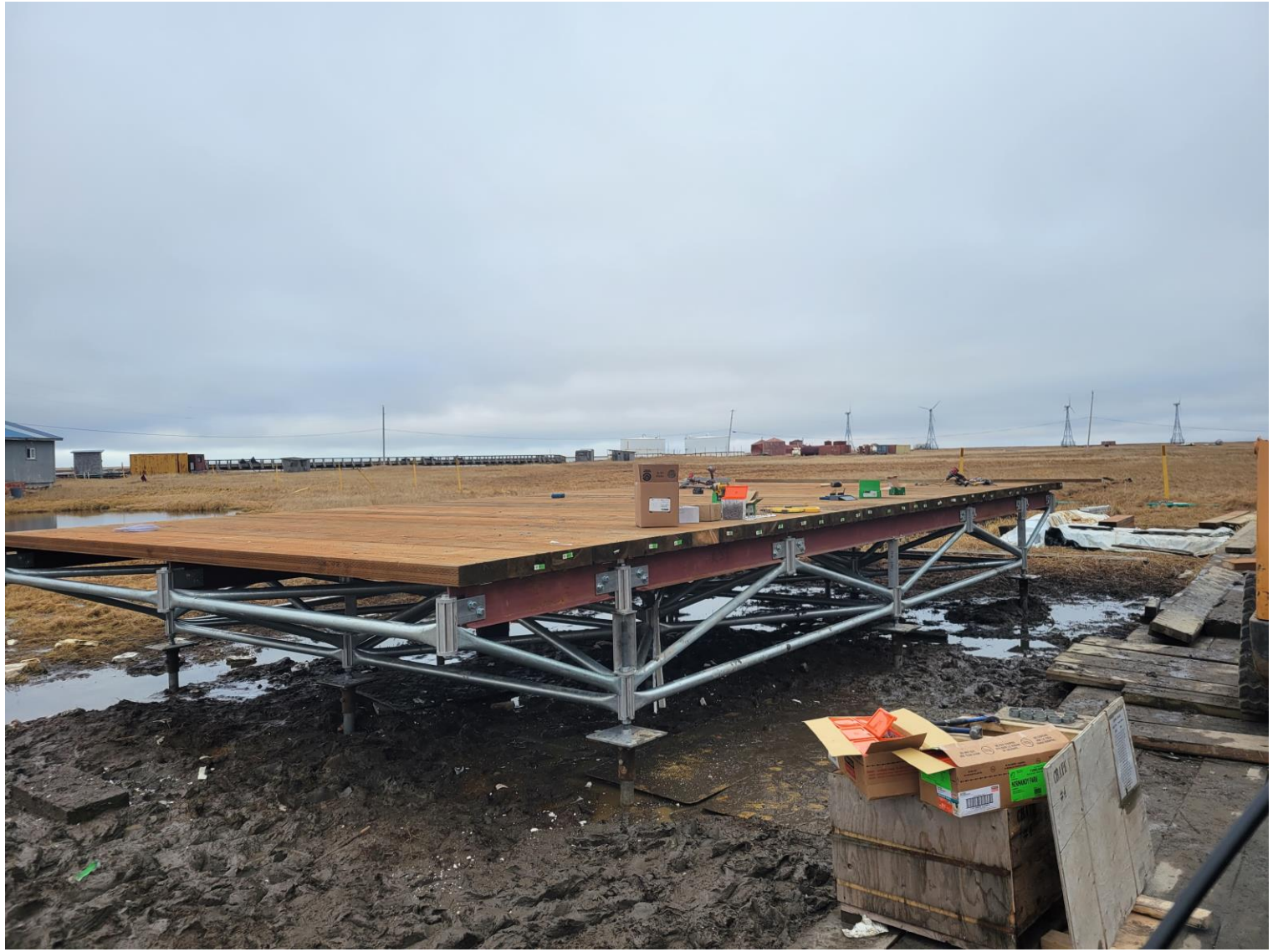




Triodetic Foundation started



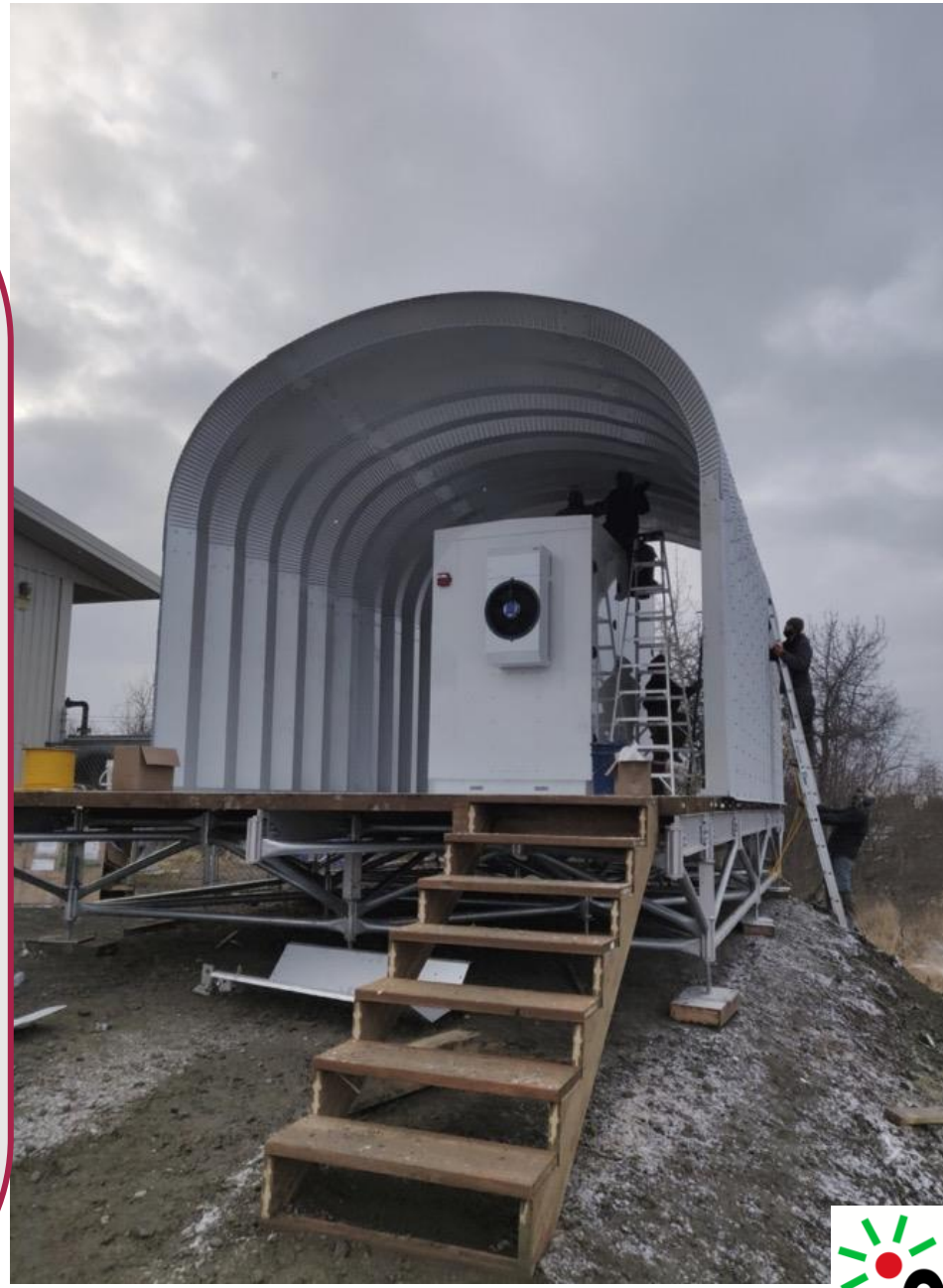
Triodetic foundation and decking



Decking and stairs

BESS Project Objectives

- Provide renewable, rechargeable non-fossil fuel emergency power backup for community facilities.
- Emergency Power, when an outage occurs for:
  - Clinic (1200 sq ft)
  - Washeteria (2,500 s\q ft)
  - Kipnuk Light Plant (2,500 sq ft) to complete necessary repairs
  - Tribal Offices/Community Center (2,000 sq ft)
- Minimal power to homes primarily to prevent subsistence food from thawing.
- BESS will provide power for an estimated 3 hours for essential services, or 1 hour at the average load.
- All Local labor force
- Training for utility staff capacity building



Project Challenges

- Logistics/Timing:

- BESS is a long-lead time item 6+months
- 2 possible barge deliveries a year in June and September. If we miss the schedule, we miss a year + of construction/installation and reduced diesel use expense. Air freight is available fro a combined cargo weight of 4,500 lbs at triple the cost of barging
- Reimbursable Funding Agreements:

Long-lead time equipment purchases are the first expense. Coming up with $400,000 or more for a down payment is a hardship for our small, subsistence-based Village.

Quyana Thank you

DoE Office of Indian Energy
USDA HEC
Alaska Energy Authority REF
Kipnuk Tribal Council
Kipnuk Tribal members
Intelligent Energy Systems
Frontier Power Systems