KOTZEBUE ELECTRIC ASSOCIATION

Leading the Way in Sustainable Energy

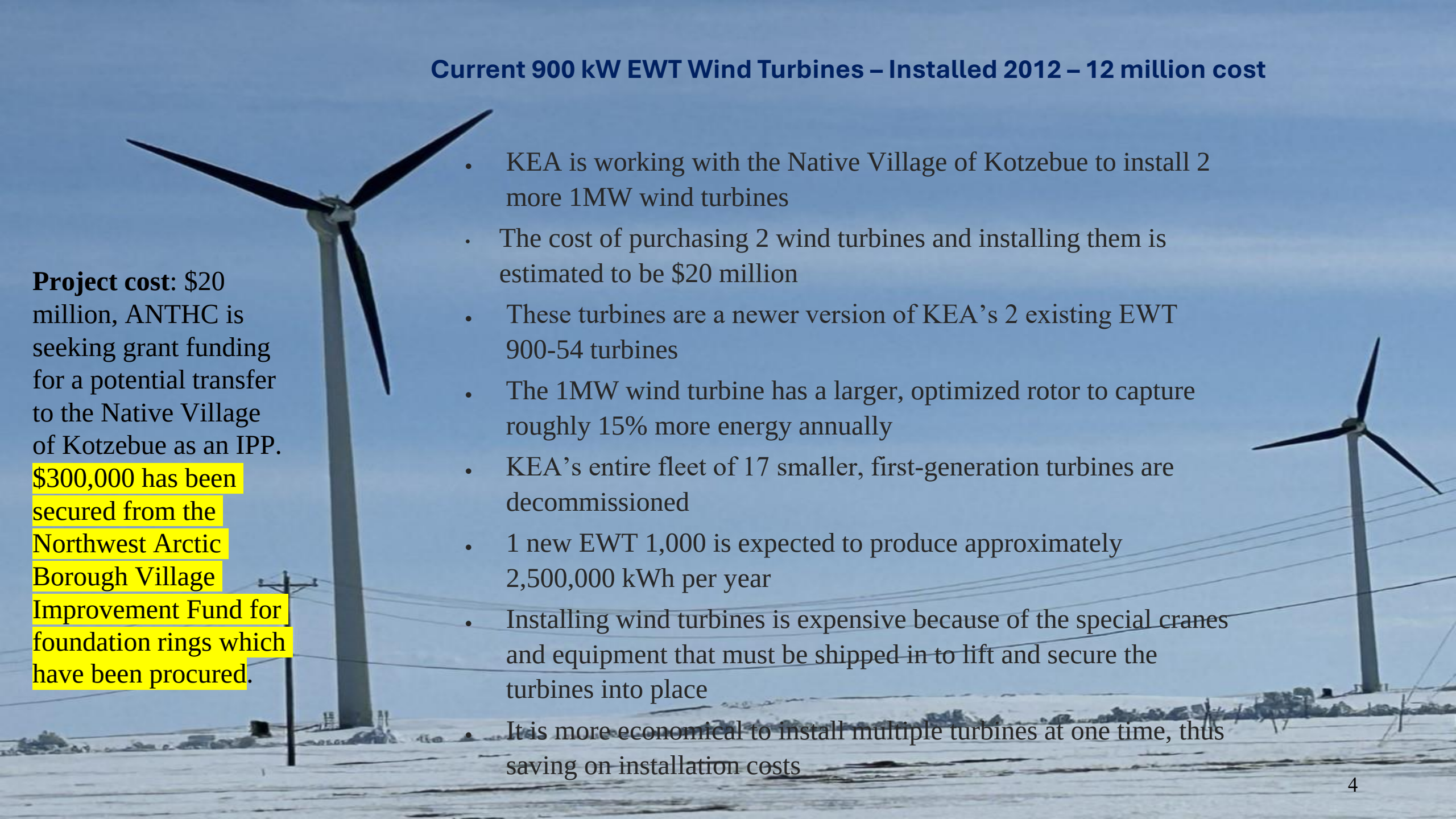
Wind **Solar** **Battery Storage**

Current Hybrid Power Plant

- **Diesel Consumption: ~1.2 Million Gallons/year #2USLD (with a 5+ month reserve) Electricity Cost:**
- **.44c/kWh for electricity, $4-5 million per year for energy**
- **Winter Load (2 - 3.5 MW) and Summer Load (1.5 – 2.5 MW)**
- **Automated ~12MW Diesel Plant: 3 x 3 MW and 3 smaller units (1.4 MW, 1.1 MW & 725 kW)**
- **Wind Turbines: 2 x 900 kW (EWT))**
- **Solar PV Array: 1072 kW (AC)**
- **Reactive Power: 1 MVAr ABB Statcom inverter**
- **Battery Storage: 950 kwh/1.225 MW SAFT Li-ion Battery (BESS)**
- **Electric Boiler: 450 kW (15 kW x 30 stages)for hot water and heat at local hospital from excess wind energy**

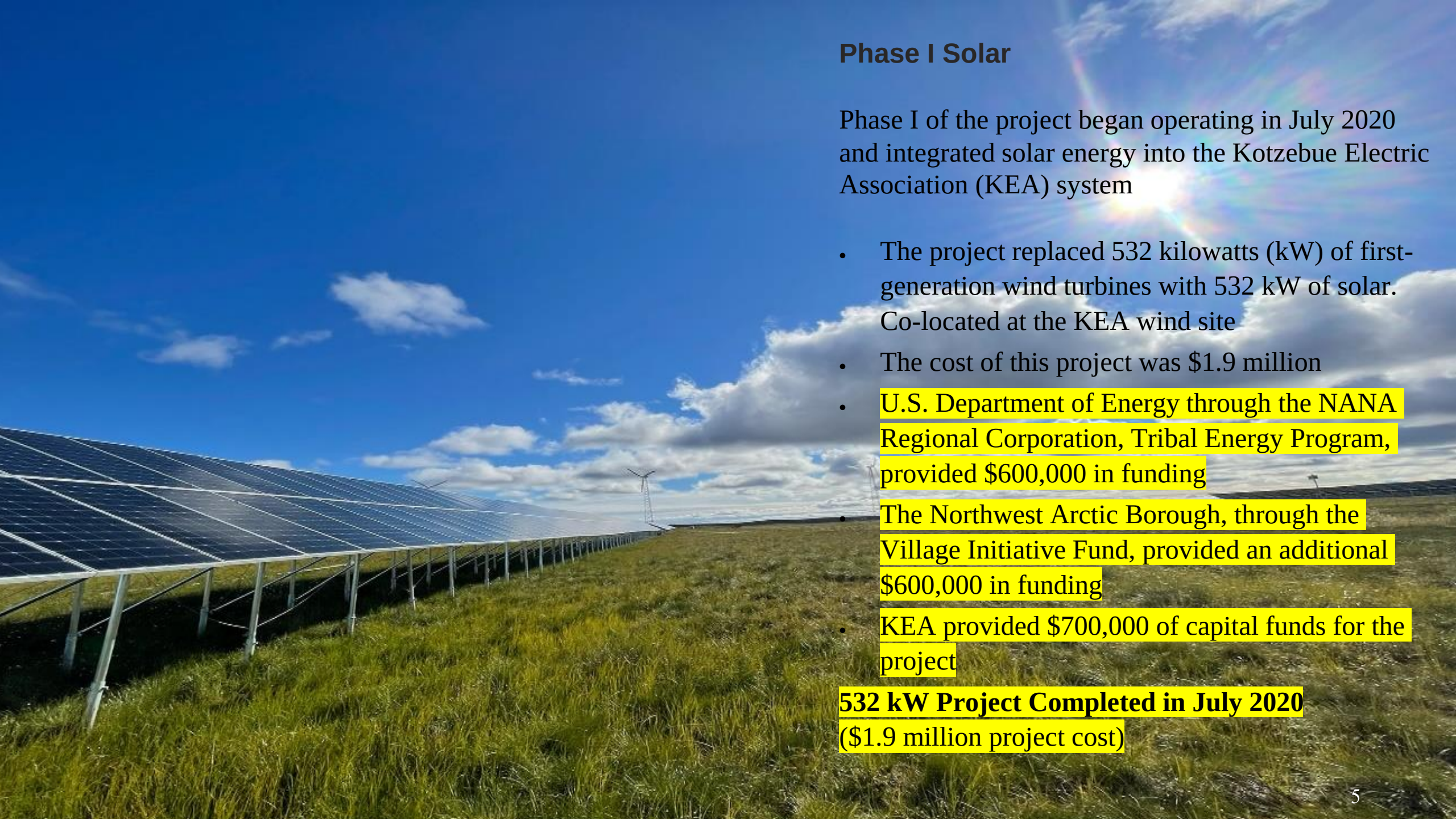
~4.5 million kWh annual wind/PV production ~20-25% capacity factor

Current 900 kW EWT Wind Turbines – Installed 2012 – 12 million cost



Project cost: $20 million, ANTHC is seeking grant funding for a potential transfer to the Native Village of Kotzebue as an IPP. $300,000 has been secured from the Northwest Arctic Borough Village Improvement Fund for foundation rings which have been procured.

- KEA is working with the Native Village of Kotzebue to install 2 more 1MW wind turbines
- The cost of purchasing 2 wind turbines and installing them is estimated to be $20 million
- These turbines are a newer version of KEA's 2 existing EWT 900-54 turbines
- The 1MW wind turbine has a larger, optimized rotor to capture roughly 15% more energy annually
- KEA's entire fleet of 17 smaller, first-generation turbines are decommissioned
- 1 new EWT 1,000 is expected to produce approximately 2,500,000 kWh per year
- Installing wind turbines is expensive because of the special cranes and equipment that must be shipped in to lift and secure the turbines into place
- It is more economical to install multiple turbines at one time, thus saving on installation costs



Phase I Solar

Phase I of the project began operating in July 2020 and integrated solar energy into the Kotzebue Electric Association (KEA) system

- The project replaced 532 kilowatts (kW) of first-generation wind turbines with 532 kW of solar. Co-located at the KEA wind site
- The cost of this project was $1.9 million
- U.S. Department of Energy through the NANA Regional Corporation, Tribal Energy Program, provided $600,000 in funding
- The Northwest Arctic Borough, through the Village Initiative Fund, provided an additional $600,000 in funding
- KEA provided $700,000 of capital funds for the project

532 kW Project Completed in July 2020
($1.9 million project cost)

Phase II Solar

- KEA is now collecting solar energy and learning to maximize the solar resource
- KEA installed an additional 540 to 650 kW of solar power. This project was completed in July of 2023 making KEA's Solar Farm the second largest solar farm in Alaska. (2 million project cost).
- Funding for this project came from Round 14 of the Renewable Energy Fund.

- KEA currently has a 1-megawatt 950kwh lithium ion battery that was installed in 2015 that is nearing the end of its useful life.
- Kotzebue Electric Association (KEA) will be increasing energy storage by purchasing an additional 4-megawatt (MW)/8 - 12 (MWh) lithium-ion battery
- This additional capacity will allow the battery system to power all of Kotzebue for approximately 120 minutes.
- The “grid-forming” ability of the battery will allow KEA to shut off the diesel generators when sufficient renewable power is available

Project Cost: $15 million, awarded 9 million from OCED in NWAB Regional Grant, awarded 3 million Lisa Murkowski CDS appropriation, awarded $800,000 from Denali Commission for non-federal matching, awarded $150,000 NWAB VIF for Design funding, & $400,000 AEA R13

SAFT 950kWh Battery Container in Substation

Benefits of Renewable Energy

- Reduce Cost to Generate Electricity – Up to 50% Savings
- Reduced Maintenance Costs
- Reduced Costs in Regulatory Compliance
- Reduced Costs for Heating With Beneficial Electrification

Photo Courtesy Pierre Lonewolf