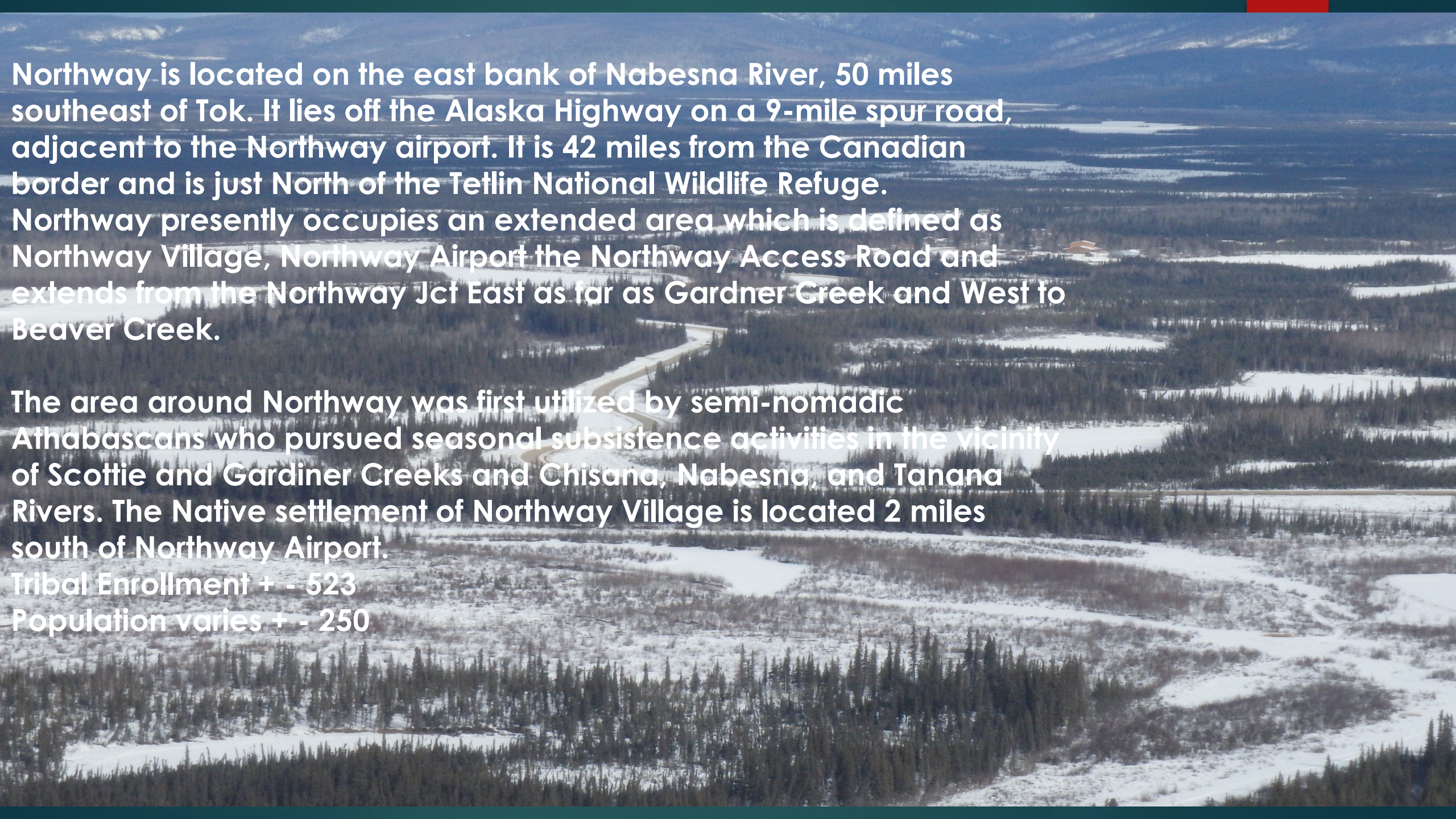
# MAKING NORTHWAY ALASKA RESILIENT AND SUSTAINABLE THROUGH ENERGY EFFICIENCY AND SOLAR PV POWER

A CLEAN ENERGY PROJECT MADE POSSIBLE BY THE FOLKS FROM TANANA CHIEFS CONFERENCE, THE ALASKA NATIVE TRIBAL HEALTH CONSORTIUM, THE U.S. DEPARTMENT OF ENERGY (DOE) OFFICE OF INDIAN ENERGY AND THE NATIONAL RENEWABLE ENERGY LABORATORY

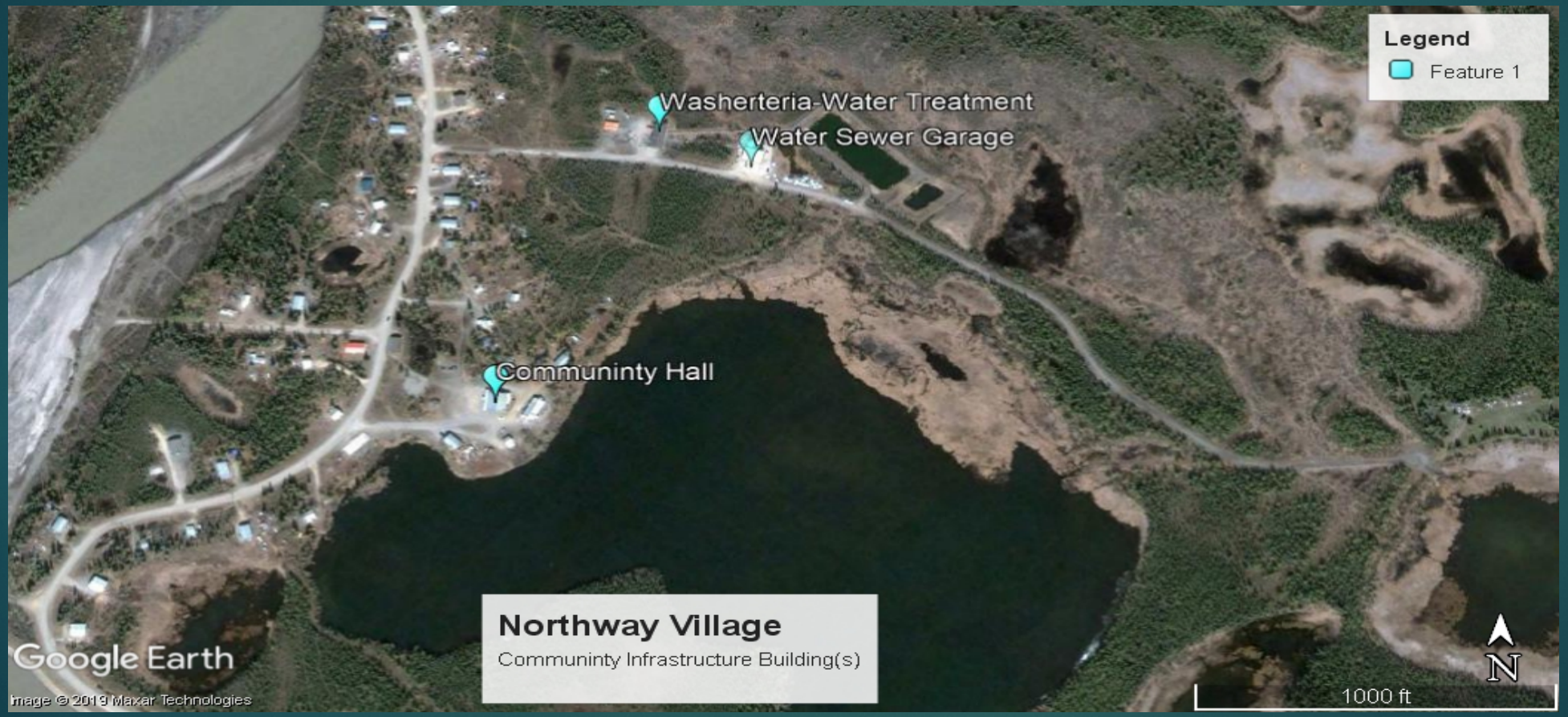


Northway is located on the east bank of Nabesna River, 50 miles southeast of Tok. It lies off the Alaska Highway on a 9-mile spur road, adjacent to the Northway airport. It is 42 miles from the Canadian border and is just North of the Tetlin National Wildlife Refuge. Northway presently occupies an extended area which is defined as Northway Village, Northway Airport the Northway Access Road and extends from the Northway Jct East as far as Gardner Creek and West to Beaver Creek.

The area around Northway was first utilized by semi-nomadic Athabascans who pursued seasonal subsistence activities in the vicinity of Scottie and Gardiner Creeks and Chisana, Nabesna, and Tanana Rivers. The Native settlement of Northway Village is located 2 miles south of Northway Airport.
Tribal Enrollment + - 523
Population varies + - 250


Northway is served by one stand alone generator system which powers the homes and business near Northway

# Project area; Northway's Community  Hall, Washeteria and Water Sewer Garage.



- Install the community's first clean energy system and reduce exclusive reliance on fossil fuels and the corresponding environmental, social, and health costs.
- Reduce energy usage in three tribally owned buildings by 25%
- Offset electricity use by 65%
- Displace 345,568 kBTU's annually.

# Initial project implementation

- Completely "off-the-grid", electricity is $0.56/kWh and heating oil is $3.00 per gallon in Northway.
- At these costs, Northway has taken advantage of every affordable energy efficiency measure we could implement on our own including installation of new doors and windows, perma chinking the Community Hall, installing new garage doors, LED lighting throughout tribal facilities and several residences, Energy Star boilers and equipment, and much more.
- When renovating the Community Hall in 2016, it is well documented that we wanted the building to be as energy efficient as possible and include the necessary infrastructure for supporting photovoltaic power.

- Technical Assistance from Office of Indian Energy and NREL
  - Energy Audits
  - Renewable Energy Site Assessments
- ANTHC helped reduce energy usage by:
  - Upgrading to LED lights
  - Programable Thermostats
  - Motion Detectors on Lights

# Objectives Completed

**Weatherization and upgrades to the Hall, the Washeteria and Garage**

***Perm a chink, new doors and windows Community Hall.***

***LED Lighting Installation-All Buildings***

***Programmable Thermostat/Occupancy Sensors-All Buildings***

***Install Vending Machine Miser-Washeteria***

***Glycol Heating Improvements and*** **replace pumps at the water treatment plant with high-efficiency variable speed pumps**

***Install Solar Photovoltaic Arrays***

# Identified Issues-Fixes

- After the solar system was activated a logger was also hooked up to monitor apparent benefits, we saw that while the system was reducing electricity usage we were also returning unused power to the AP&T grid which did not benefit Northway in any way.
- TCC and NVC staff started researching Battery Storage Systems to capture that unused energy from the solar system, the battery system was not included in the original work plan due to expense and general upkeep of a battery system.
- TCC after researching options suggested a storage system which was ordered and installed at the Community Hall

# Stroredge Inverter and 9.8 kWh Battery

- 8 kW Solar PV Grid Tied system SMA inverter
- New System uses 7.6kW Solaredge Inverter
- LG Chem RESU 10H battery

**RESU10H** — Solaredge compatible

| Electrical Characteristics | | |
|---|---|---|
| Total Energy | | 9.8 kWh @25°C (77°F) |
| Usable Energy[1] | | 9.3 kWh @25°C (77°F) |
| Voltage Range | Charge | 400 ~ 450 VDC |
| | Discharge | 350 ~ 430 VDC |
| Absolute Max. Voltage | | 520VDC |
| Max. Charge/Discharge Current | | 11.9A@420V / 14.3A@350V |
| Max. Charge/Discharge Power[2] | | 5kW |
| Peak Power (only discharging)[3] | | 7kW for 10 sec. |
| Peak Current (only discharging) | | 18.9A@370V for 10 sec. |
| Communication Interface | | RS485 |
| DC Disconnect | | Circuit Breaker, 25A, 600V rating |
| Connection Method | | Spring Type Connector |
| User interface | | LEDs for Normal and Fault operation |
| Protection Features | | Over Voltage / Over Current / short circuit / Reverse Polarity |
| Scalability (Total Energy, Max. Charge/Discharge Power, Peak Power (only discharging)) | | Max. 2 in parallel (19.6 kWh @25°C (77°F), 6.6KW, 7kW for 10 sec.) |

| Operating Conditions | |
|---|---|
| Installation Location | Indoor(Wall-Mounted) / Outdoor |
| Operating Temperature | 14 ~ 113°F (-10 ~ 45°C) |
| Operating Temperature (Recommended) | 59 ~ 86°F (15 ~ 30°C) |
| Storage Temperature | -22 ~ 131°F (-30 ~ 55°C) |
| Humidity | 5%~95% |
| Altitude | Max. 6,562ft (2,000m) |
| Cooling Strategy | Natural Convection |

| Certification | | |
|---|---|---|
| Safety | Cell | UL1642 |
| | Battery Pack | UL1973 / CE / RCM / TUV (IEC 62619) |
| Emissions | | FCC |
| Hazardous Materials Classification | | Class 9 |
| Transportation | | UN38.3 (UNDOT) |
| Ingress Rating | | IP55 |

※ Test Conditions - Temperature 25°C, at the beginning of life
※ Total Energy is measured under specific condition from LGC(0.3CCCV/0.3CC)
※ DC/DC Discharge Efficiency 94.5%

1) Value for Battery Cell Only (Depth of Discharge 95%), 2kW charge/discharge power.
2) LG Chem recommends 3.3kW for maximum battery lifetime
3) Peak Current excludes repeated short duration (less than 10 sec. of current pattern).

# Northway Solar PV Battery

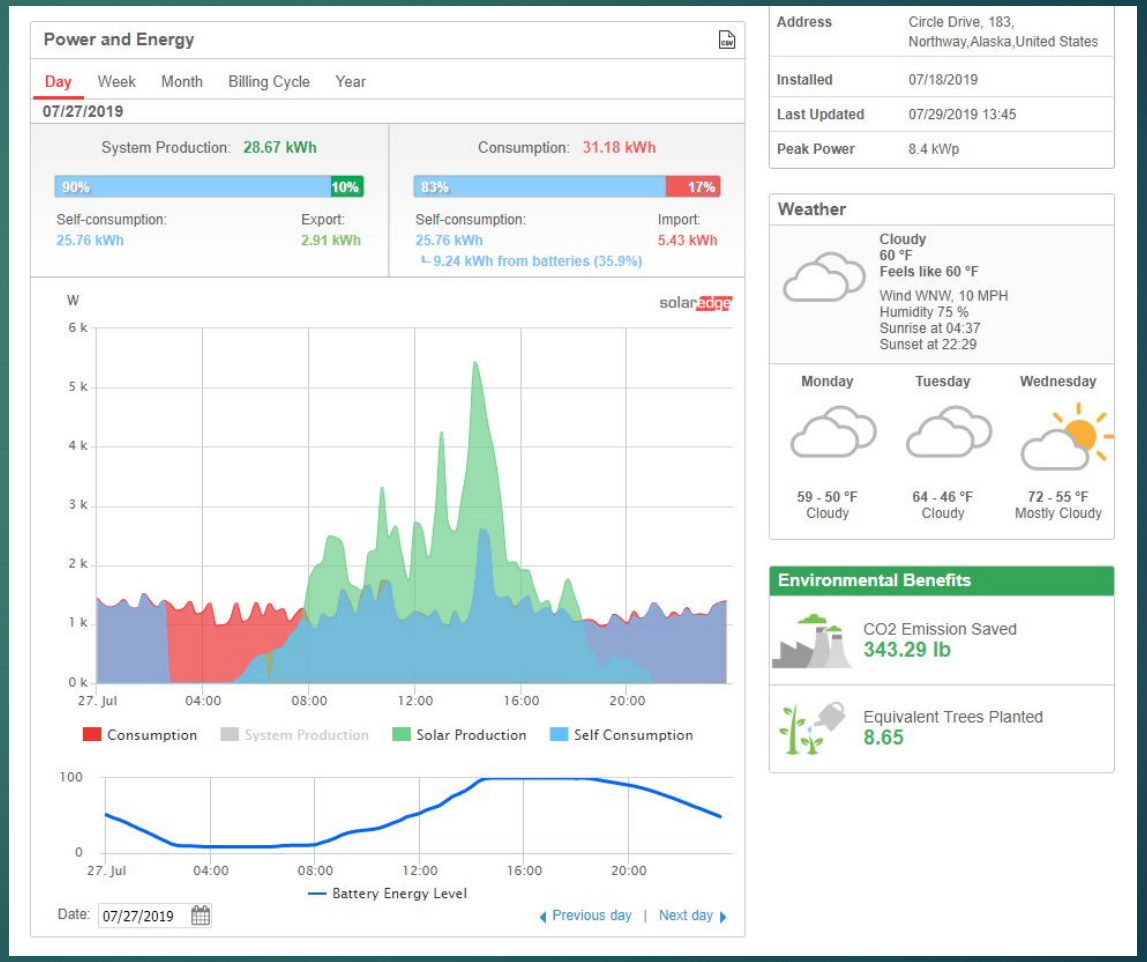
Light Green – Production Beyond Building Consumption

Shaded Green – Financial Benefit to the Tribe

# Northway Solar PV Battery

Light Green – Stored in PV Battery

Light purple – Battery Drawdown minimal draw from utility.



Questions?


Walter Northway Lady Warriors
"A Team" 2019

10 Wins 7 Losses

Coach Tasha Demit

Assistant Mikayla Demit

Thank you.