Metlakatla Power & Light

1.8 MW Wind Turbine Project

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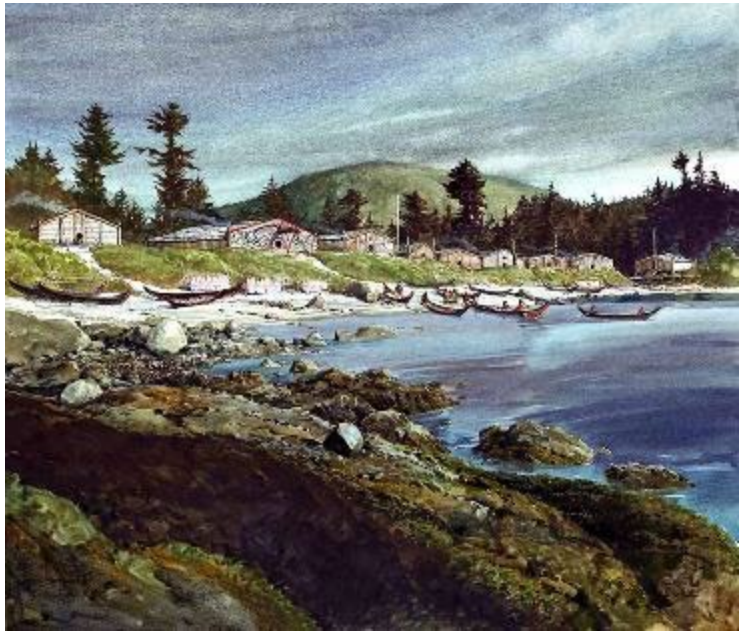
Tribal Services, Baker Tilly Advisory Group, LLP

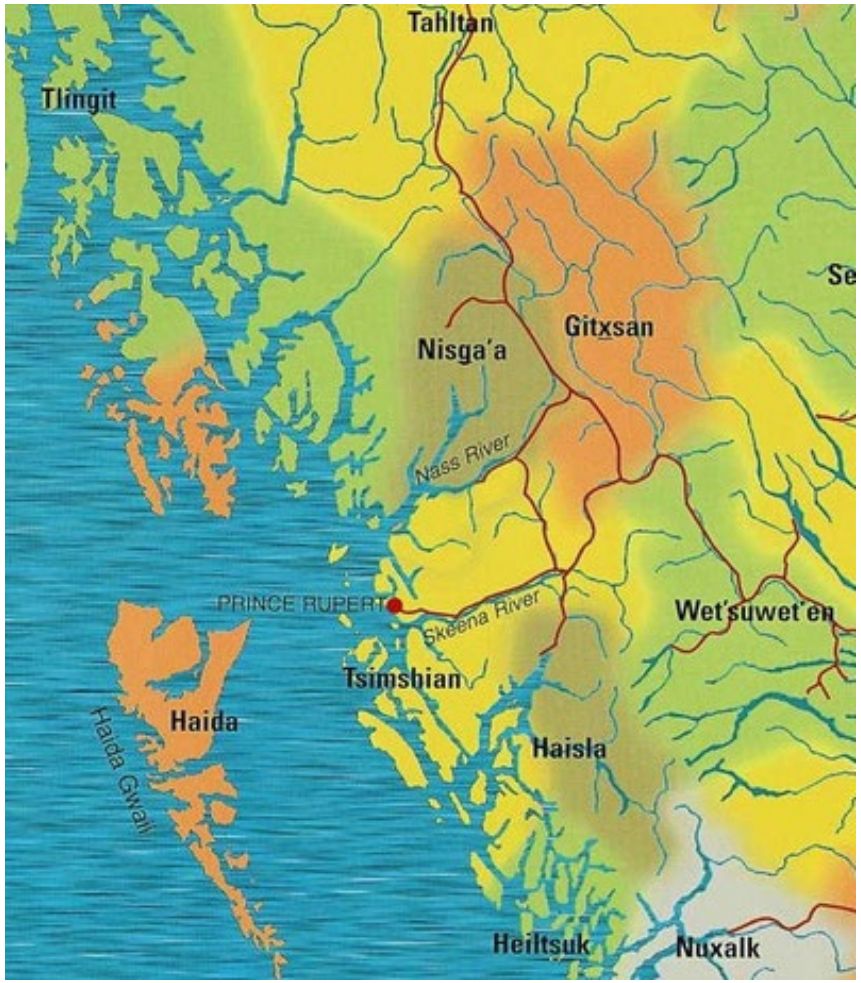
Outline

- Background on MIC, Ts'msyen culture and MP&L
- Generation Projects: Wind Turbine et. Al
- Energy Storage
- Transmission (intertie)
- Distribution Projects
- Transportation Projects
- Utilities Consolidation
- Workforce Development

Brief Tribal History

The Tsimshian are one of the largest First Nations peoples in northwest British Columbia. Some Tsimshian migrated to the Annette Islands in Alaska, and today approximately 1,450 Alaskan Tsimshian people are enrolled in the federally recognized Metlakatla Indian Community, sometimes also called the Annette Islands Reserve. The Tsimshian honor the traditional Tlingit name of Tak'waan for this recent location.





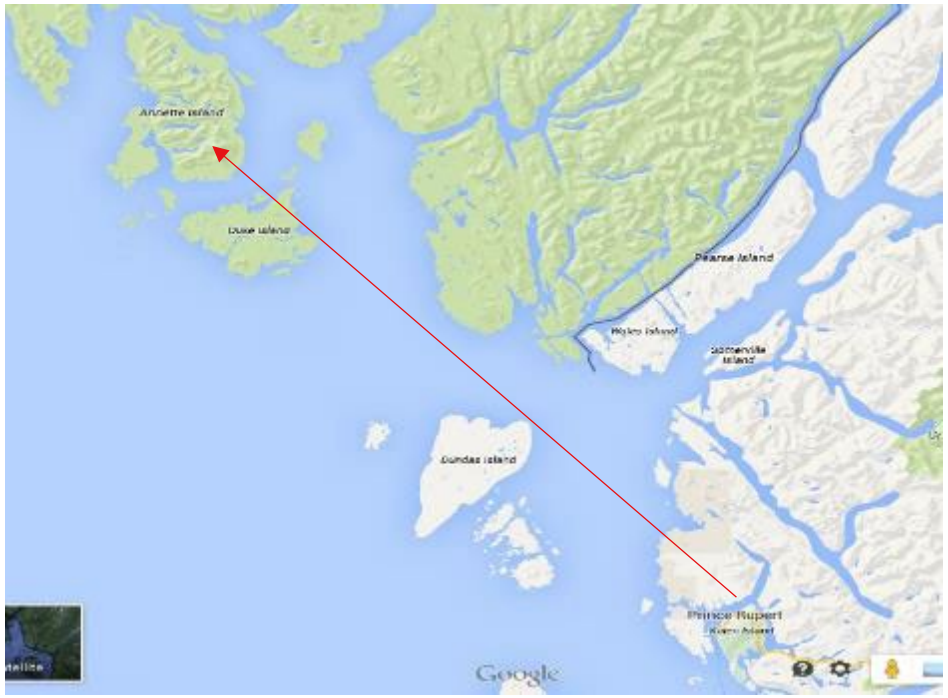
Brief Tribal History

- Tsimshian society is matrilineal kinship-based, which means identity, clans and property pass through the maternal line.

- Their phratry-based societal structure is defined by unique histories and sub-crests, further delineating individual and related lineages.

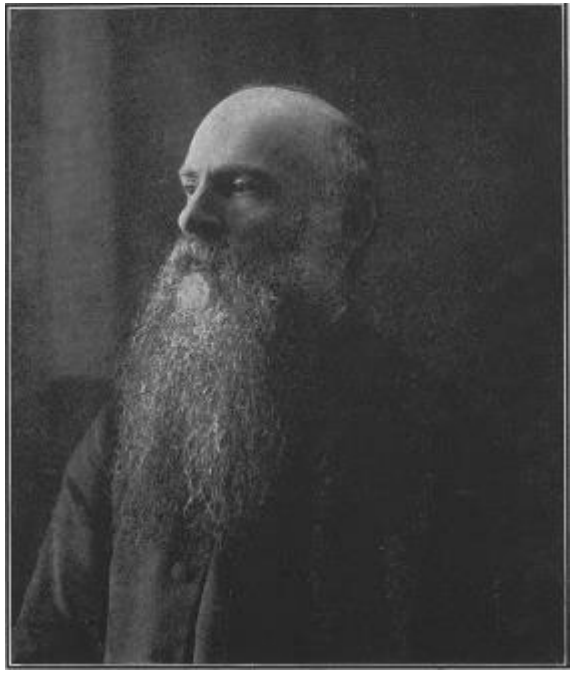
Brief Tribal History

Throughout the second half of the 19th century, epidemics of infectious disease contracted from Europeans ravaged their communities, as the First Nations had no acquired immunity to these diseases. The 1862 Pacific Northwest smallpox epidemic killed many of the Tsimshian people. Altogether, one in four Tsimshian died in a series of at least three large-scale outbreaks. In 1835, the total population of the Tsimshian peoples was estimated at 8,500. By 1885, the population had dropped to 4,500, 817 of whom moved to Alaska two years later following Missionary William Duncan.



Brief Tribal History

In the 1880s the Anglican missionary William Duncan, along with a group of the Tsimshian, left Metlakatla, British Columbia and requested settlement on Annette Islands from the U.S. government. After gaining approval, the group founded New Metlakatla on Annette Islands in southern Alaska. These territories were well known to the Tsimshian as ancestral areas. Duncan appealed to Congress to grant the community reservation status, which it did in the late 19th century



Brief Tribal History

The Metlakatla Indian Community Annette Islands Reserve, exists by the authority of the Constitution and By-laws of the MIC as approved on August 23, 1944, by the Secretary of Interior. MIC is an Indian Tribe organized under provisions of Section 16 of the Indian Reorganization Act. 25, U.S.C. Section 476; and the reserve is held in trust by the United States for the benefit of MIC under rules and regulations as prescribed by the Secretary of the Interior, 25 U.S.C. Section 495.

From the 1950's through the 1990's MIC had a relatively robust economy based on logging, fishing and seafood packaging. Due to federal restrictions, the over extraction of timber, lack of reinvestment in the packing plant and electric infrastructure, combined with climate change effects on fishing, the MIC economy experienced a major decline from which it is just now beginning to recover.

Brief Tribal History

In the 1970s, the Metlakatla Indian Community (MIC) voted to retain their rights to land and water and opted out of the Alaska Native Claims Settlement Act (ANCSA); thus, MIC has the only Native reservation in Alaska. The Metlakatla Tsimshian maintained their reservation status and holdings exclusive of the ANSCA. They do not have an associated Native Corporation as do most Native Alaskans.

MP&L Quick Facts

- **Energized:** 1927, officially formed in 1957, 1975, 2018 (First Tribal Renewable Microgrid 1998)
- **Employees:** 12 FTE, 1 PTE
- **Meters in Service 2023 :** 951
- **Distribution Line Miles:** 40
- **Customers per Line Mile:** 24
- **Substations:** 3
- **Generation:** 11.35 MW with 1.2 MW BESS
  - Diesel Assets - 3500 Series CAT 2.2 MW (rebuilt by crew) 2 new EMD 5.0 MW H2 capable
  - Hydro Assets - Purple Lake 3, 1.3 MW Francis Turbines, 1, 1.25 MW Pelton Turbine
  - BESS – 1.2 MW LiON
- **Demand Peak 2023:** 3.8 MW Winter Peak
- **Energy MWh Sales 2023:** 17,779

MP&L Board of Directors

Kevin Hudson

Denise Hudson

David Boxley

Lorna Porter

Keolani Booth

MP&L Smart Grid Projects With Source of Funding

I. Rebuild of Wicket Gates at Purple Lake Hydro Plant (ICDBG funded)

II. Bypass of Purple Lake substation (ARPA funded)

III. NTIA Grant for Electric/Fiber Intertie, (partially NTIA funded)

IV. NAB loan for EMD and BESS projects, plant rebuild, controls (unfunded)

V. 1.8 MW Wind Turbine installation (DOE funded with MPL cost share)

VI. Gift of 12.47 transformer from KPU for intertie ($3MM value)

VII. EV Charging Station with E-BUS for Ferry (FTA funded)

VIII. Private LTE network for emergencies (CPF funded)

IX. Undergrounding of C-line circuit (unfunded)

   I. **$23 MM so far in grants received for rebuild of RE distribution system**

   II. New grants applied for

X. Utilities Consolidation (TEDC)

XI. Chester Lake Dam raise pre-development (FEMA)

XII. Hydrogen Production pre-development (EMDP)

XIII. USDA RDLG for Broadband start-up (USDA)

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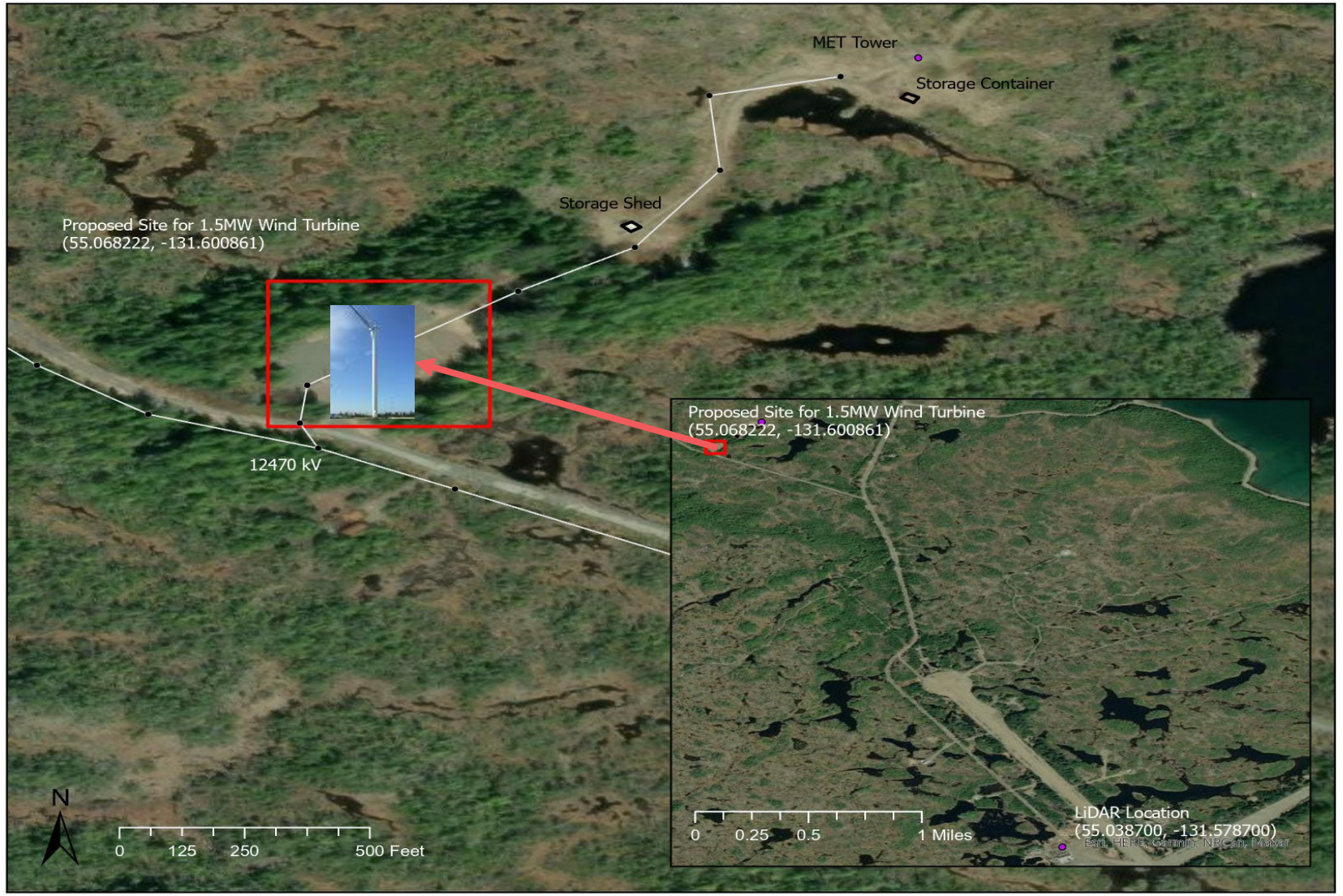
#1 Generation Projects

Project Summary

- Two-years data from anemometry shows average wind speed of 6.6 m/s
- Install 1.8 MW direct drive turbine at 85m hub height, 72m rotor.
- We expect 4,000,000 kWh annual production adding roughly 25% more renewable energy to the MPL portfolio.
- Coupled with new BESS creates robust power plant to store renewable energy for micro-grid use or power sales of renewable energy to KPU

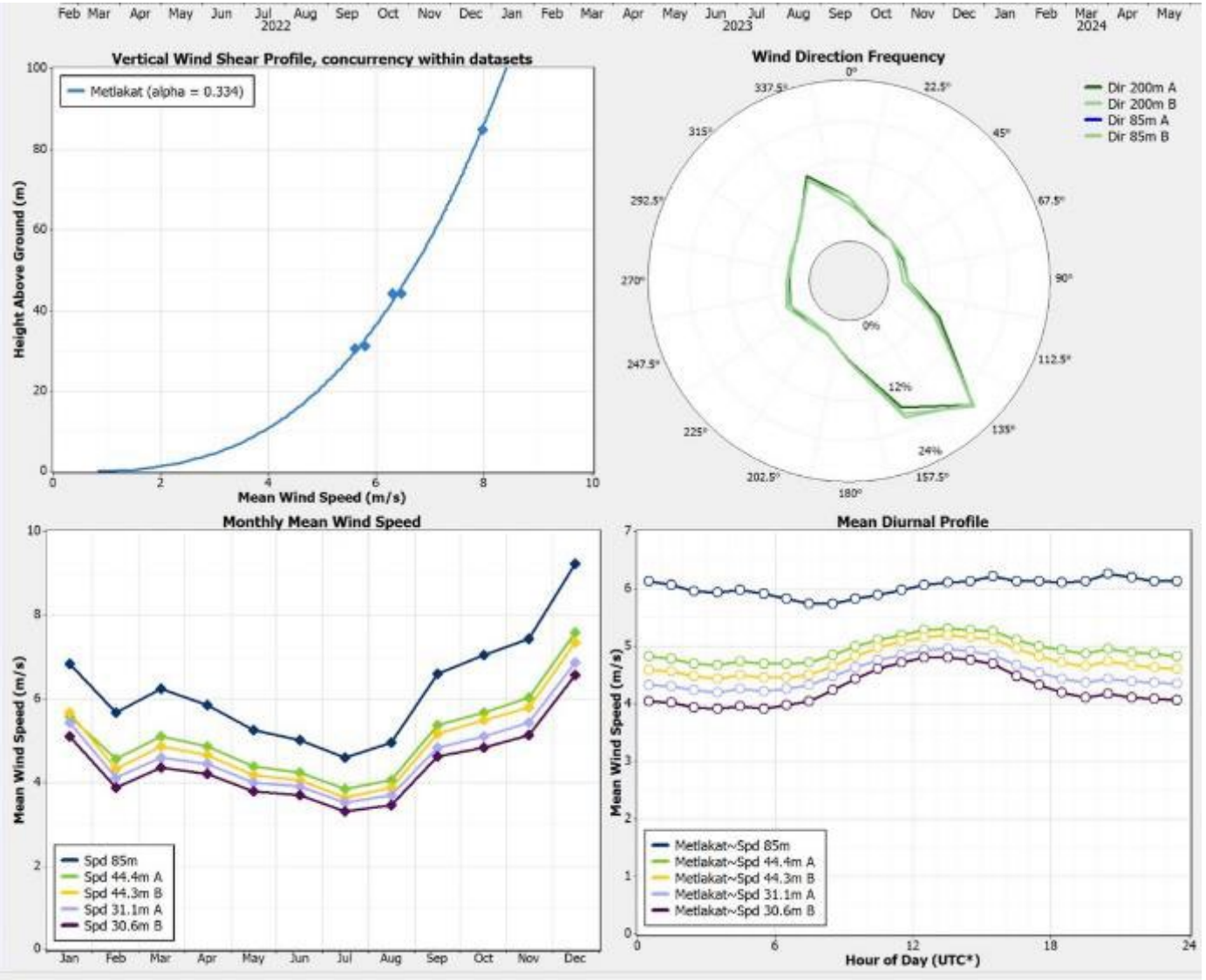
Location of Project

Location of Project



- Located off airport road in close proximity to MET tower
- Distribution line at site will provide interconnect point
- Intermittency will be balanced with BESS

Resource from 2+ years Anemometry



- Two-years data from anemometry shows average wind speed of 6.6 m/s (44m tower to 80m hub height)
- LIDAR for 6 months to understand wind shear
- Strong directional pattern for optimization of vane
- Longer the length of measurement is showing continuous increases in wind speed over long term correlation

Project Progress

- Have a negotiated contract for NEPA study likely an Environmental Assessment required including avian study due to many eagles on island
- Have a draft TSA to review
- Have spent significant time working on logistical issues for transport to island
- Have an island transport route and plan
- We own the distribution so no interconnection issues (yahoo for tribally owned utilities)

Project Participants

- Vensys USA: Turbine supplier and EPC
- Cameron and Associates (current GM): Overall technical management
- Tongass Engineering: Civil design and construction
- WES Engineering: Electric design and balance of plant
- Baker Tilly Advisory Group: Project management, Financial management and grant reporting and compliance
- MP&L Crew: Turbine install and O&M

Project Summary

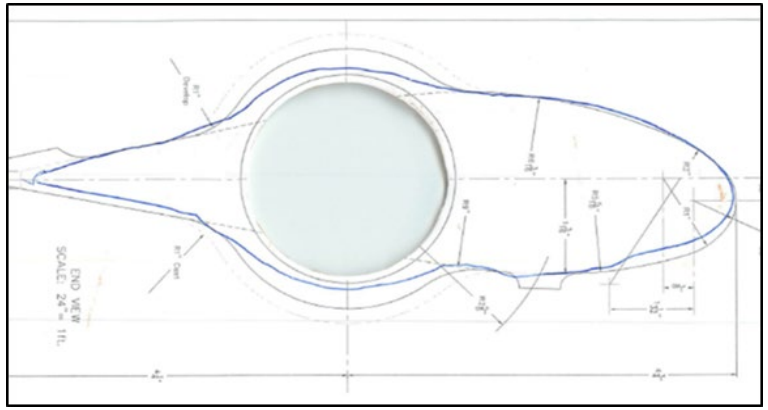
- Remanufacture and install key components of two 1.2 MW Francis Hydro Turbines
- Rebuild, replace and convert aging and poorly engineered diesel plant with 2 new H2 capable EMD 5.0 MW gensets, facilities and switchgear
- Procure and install a 1.8 MW Vensys direct drive turbine and interconnect to distribution C- Line

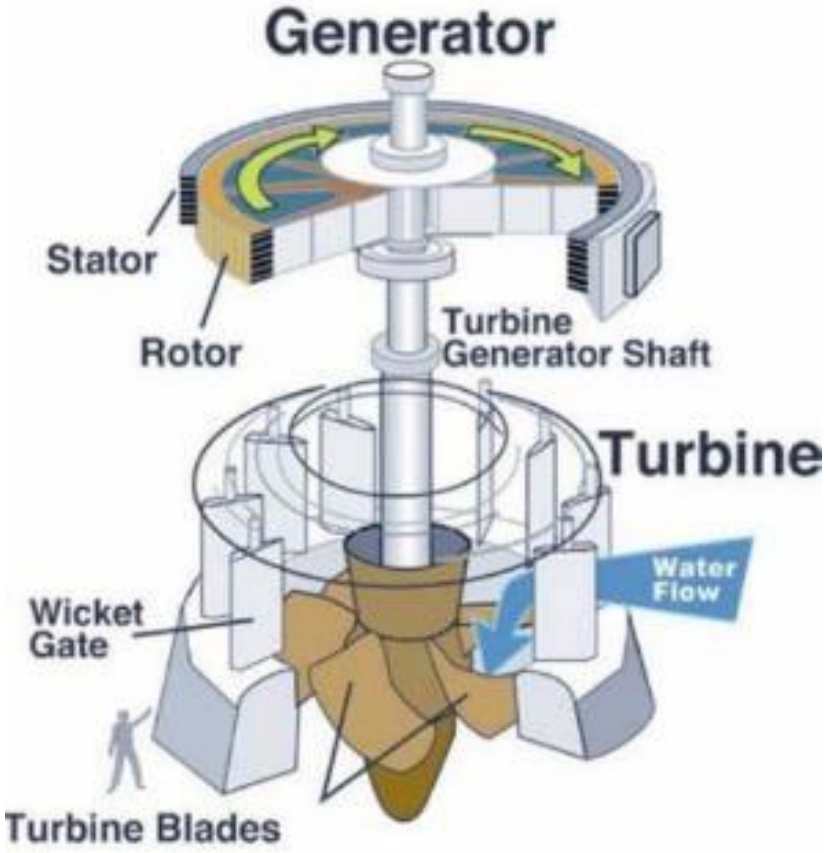
Goals

- Increase turbine energy production by 20%, continued low dependency on generation from diesel powered generators,
- Create robust power plant for future power sales of green hydrogen renewable energy
- Supplement hydro electric plant with wind turbine energy for 100% renewable power

Turbine Remanufacture to Original Specifications at Purple Lake Hydro Power Plant

- Rebuild wicket gates on units #1 and #3
- Replace worn internal components – bearings, rings, etc.
- Clean and inspect in-place components such as the spiral case, regulating components, etc.
- Onsite construction and repair of external components





Replace Two 40 Year-old Failed Diesel Units With Two 3.7MW EMD H2 Capable Diesel Generator Sets

- Rebuild of Centennial powerplant
- Installation of 2 EMD 5.0 units
- Water cooling radiator systems
- Diesel as a pilot fuel for hydrogen injection up to 80% resulting in zero emissions generation

Dam Raise at Chester Lake Addition of New Penstock and 200 kW Pelton Turbine for Dedicated Hydrogen Production

- Preliminary design for 10’ raise to reduce spillage
- Dam raise provides opportunity for new penstock
- Highly efficient Pelton turbine installed for dedicated H2 production
- Anionic electrolyzer produces 99.99% pure hydrogen for use in generators and sale to end use customers

#2 Energy Storage

Project Summary

- Replace MP&L‘s aging lead-acid battery system with a 1.2 MW Lithium Ion (Li-ION) battery system.
- Develop modular H2 storage system as energy carrier for power plant

Goals

- Provide frequency regulation for micro-grid
- Integrate wind as a variable resource into overall micro-grid storing excess wind in BESS
- Store excess water as H2 energy for emission free operation of EMD diesel plant for micro-grid use and energy sales to KPU

Battery Energy Storage System

- Removal and recycling of current batteries adding significant shop space
- Installation of 1.2 MW of state-of-the-art lithium-ion based storage system
- Installation of control system to optimize energy sources and allow addition of new sources of generation

Hydrogen as Stored Energy

- Significant amounts of water are lost over the Chester Dam spillway
- Electrolytic green 99.9% pure hydrogen can be generated inexpensively from this wasted water
- Modern electrolyzers pressurize and store hydrogen as it is produced

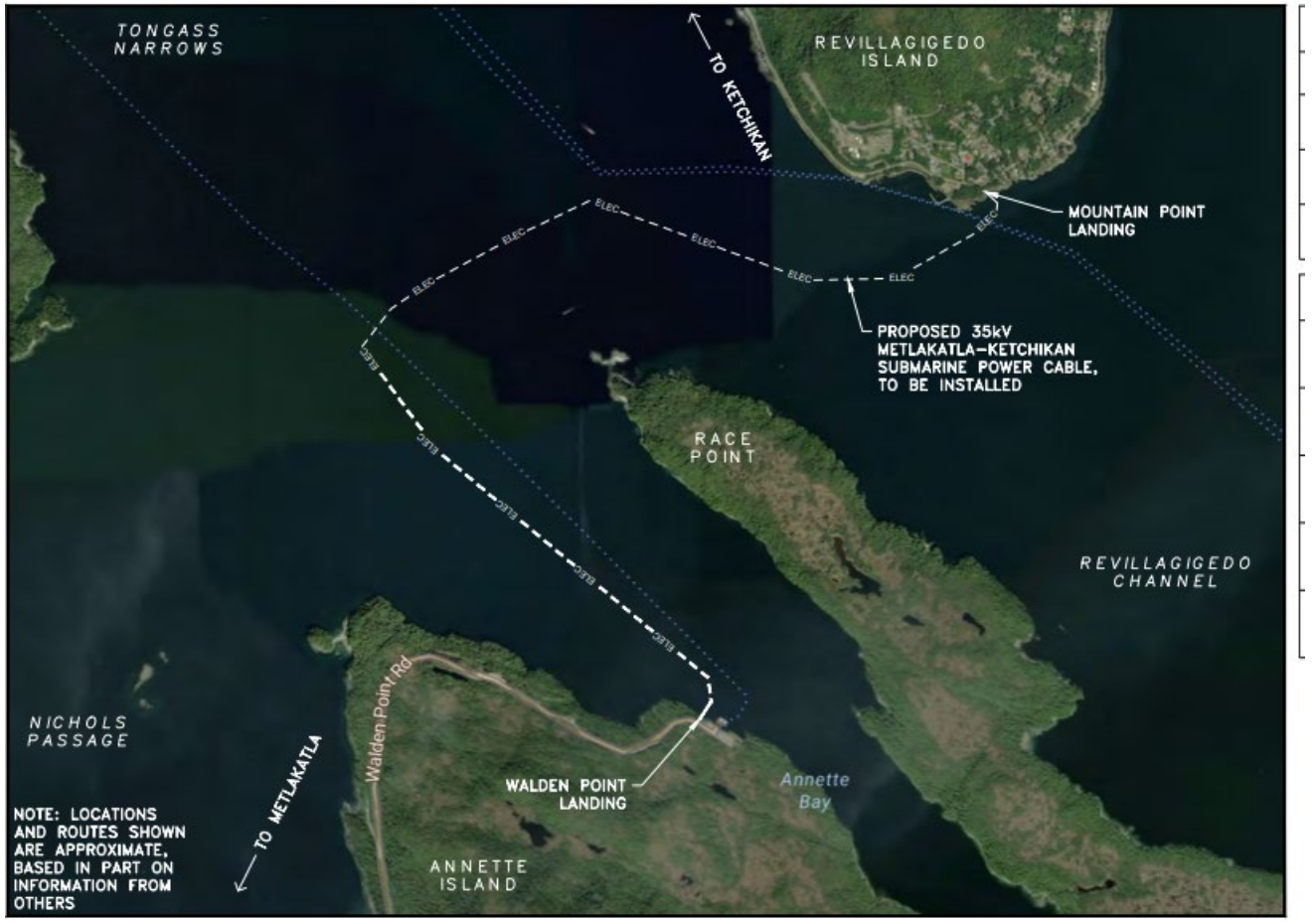
#3 Transmission

Project Summary

- 50 years in the making…now under construction to connect Metlakatla Power and Light's electric grid to Ketchikan Public Utility's grid

Goal

- Reduce MPL's generation costs by significantly reducing or eliminating the use of diesel generators
- Provides a market to sell MPL's renewables into KPU and eventually SEAPA market

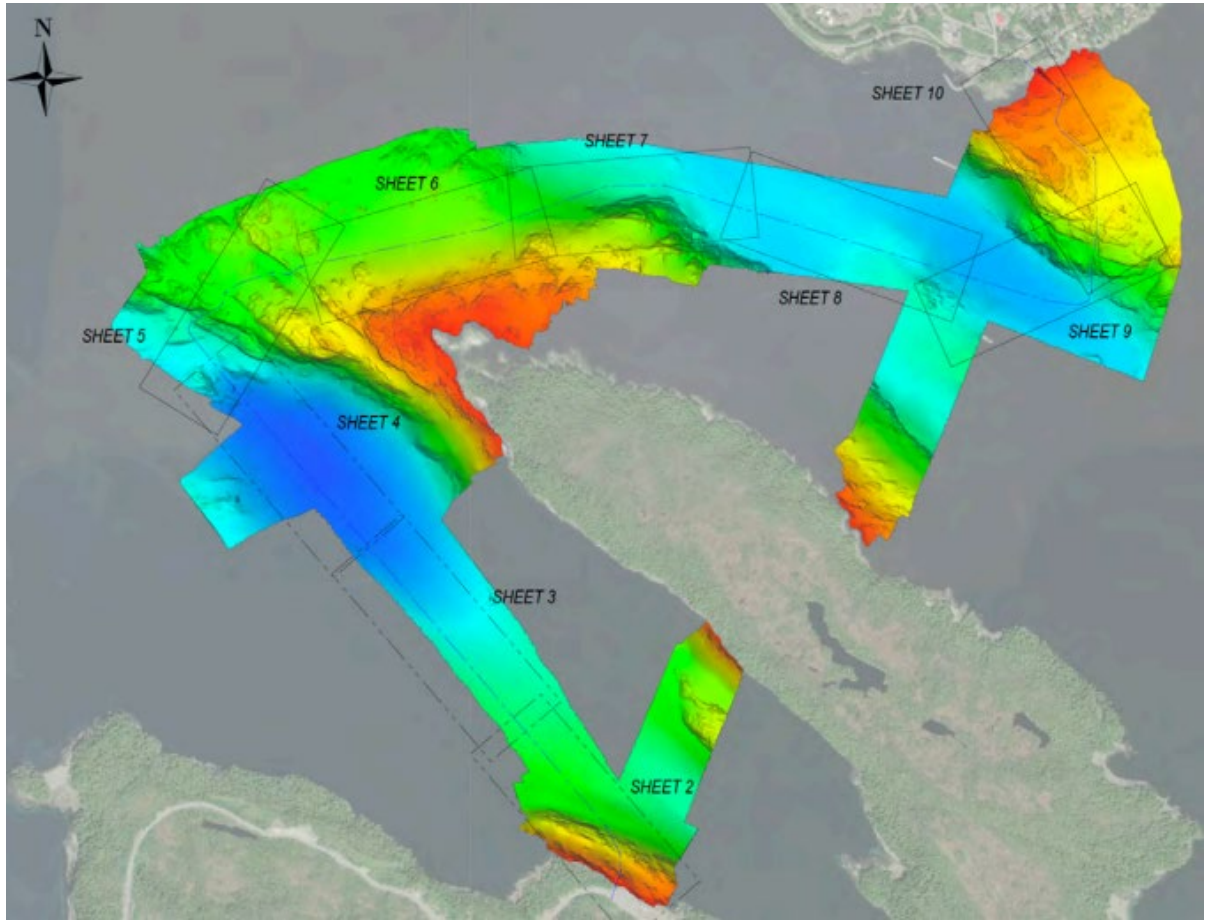


1 AERIAL PROJECT OVERVIEW
IMAGE SOURCE: BING MAPS, ACCESSED APRIL 2024

Project Outcomes

- Significant increase in energy reliability
- Reduced consumption of diesel fuel by 5% over 10-year average usage
- Opportunistic power sales revenue
- Significant capacity building for MP&L staff
- Conservation of resources through shared buy and sell among the communities

Intertie Project



- Connect to KPU substation via conduit on Revillagigedo Island
- Submarine cable across Revillagigedo Channel and Annette Bay, around Race Point
- Overhead transmission line extension at Walden Point
- Upgrade of transmission lines between Centennial Power Plant and Chester Lake Power Plant

#4 Distribution

DISTRIBUTION UPGRADES

Chester Circuit Back to Centennial Plant

- With new intertie, 35 kV extends back to Centennial plant
- Chester power plant needs to be brought into new circuit
- Build double circuit back to Centennial from Chester

Undergrounding of C-line Circuit

- Ties purple plant back to Centennial plant avoiding heating entire town before restoring power
- Approximately 2 miles of undergrounding required

#5 Transportation

EV Bus and Charging Project

- A single 2-lane 14-mile road connects town of Metlakatla to ferry landing
- Dozens of automobiles travel to the ferry every week to drop off and pick up passengers
- A single electric bus can eliminate much of that traffic
- MP&L applied for and received a grant from FTA for this purpose

EV Bus and Charging Infrastructure

- Procure electric bus and charging station and locate at MIC municipal building
- Install level-2 charging station at municipal building and eventually at ferry landing
- Ridership is free
- Operational costs will be embedded and recovered in MP&L rates

#5 Smart Grid FTTP

Fiber Intertie and Fiber to the Premises

- The proposed intertie route will include 96 ct fiber optic cable to connect MPL and KPU substations and the MIC to super-fast, low-cost, and reliable internet
- Applied for and won NTBG grant to do design
- Won NTIA Broadband grant award for $11M

Service Area Design

- All Metlakatla households, tribal buildings and other establishments planned to be served by the Fiber-to-the-Premise (FTTP)
- The fiber lines mainly will be carried on MP&L electricity poles, but there will be portions that will be underground, including intertie
- FTTP is the fastest and most future-proof technology
  - Construction on island is 85% complete

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Service Area Design

#5 Workforce Development

Utilities Consolidation

- Create cost of service study for Water-Sewer-Solid Waste and Broadband utilities
- Create cost recovery rates for all utilities and incorporate into a consolidated new billing system
- Create organizational chart and leadership structure for each utility department
- Develop workforce development plan and funding for staff training and certification

Highschool and Community College Training

- Develop Highschool utilities curriculum
- Develop Apprenticeship and scholarship program with adequate funding
- Develop workforce development plan and funding for staff training and certification

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Thank You!