Sustainable Solar Energy for Hughes Village Council, Hudotl'eekkaakk'e Tribe

A project to increase energy security and tribal resiliency in Hughes Alaska

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Tanana Chiefs Conference

Hughes, Alaska

- Koyukon Athabascan community
- 210 Air miles northwest of Fairbanks
- Fly in Only for Fuel using DC6's built in the 50's and 60's

Hughes, Alaska – Community Vision

“We are a community who value their subsistence way of life, our children and elders, and our healthy lifestyles. We will take direction from our elders through hands-on learning and story-telling. We are preparing our next generation to continue our work. We approach our work with open minds and open hears and the intention to build a community that is designed by its members to be a place safe from floods and reflective of our values and our lifestyles. We are continuously seeking a higher quality of life. “

Community Planning Progress

Community Planning Initiated in 2002, Successes:

-Construction of new teacher clinic (Completed)

-Construction of outdoor basketball court (Completed)

- VHF Radios for residents (Completed)

- Completion of a new landfill (Completed)

- Biomass Heating Project (Completed)

- Reduce Reliance on Imported Diesel fuel for electric generation (ongoing, Thanks DOE!)

Renewable Portfolio Standard

Renewable/Efficiency Portfolio Std: (Even *Texas* is doing it)

"**NOW THEREFORE BE IT RESOLVED** that the city of Hughes, Alaska and the Hughes Tribal Council recognize the importance of communities working together to improve their energy situation…[and] that these entities choose to establish a goal of 50% diesel displacement in our community by the year 2025….meaning that 50% of the electricity generated and sold by the local utility will be from renewable energy sources"

The Challenge?

How do we get Hughes from HERE… To …HERE

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Project Goals

1. Increase Tribal Energy Security and Resiliency

2. Development of a replicable PV-Diesel hybrid electrical system that can be deployed in other villages

3. Implement a financial model that allows tribal ownership, reduces energy costs and does not negatively effect the PCE contribution to electric rates

Hughes Village

Future Site of Hughes Solar PV Array

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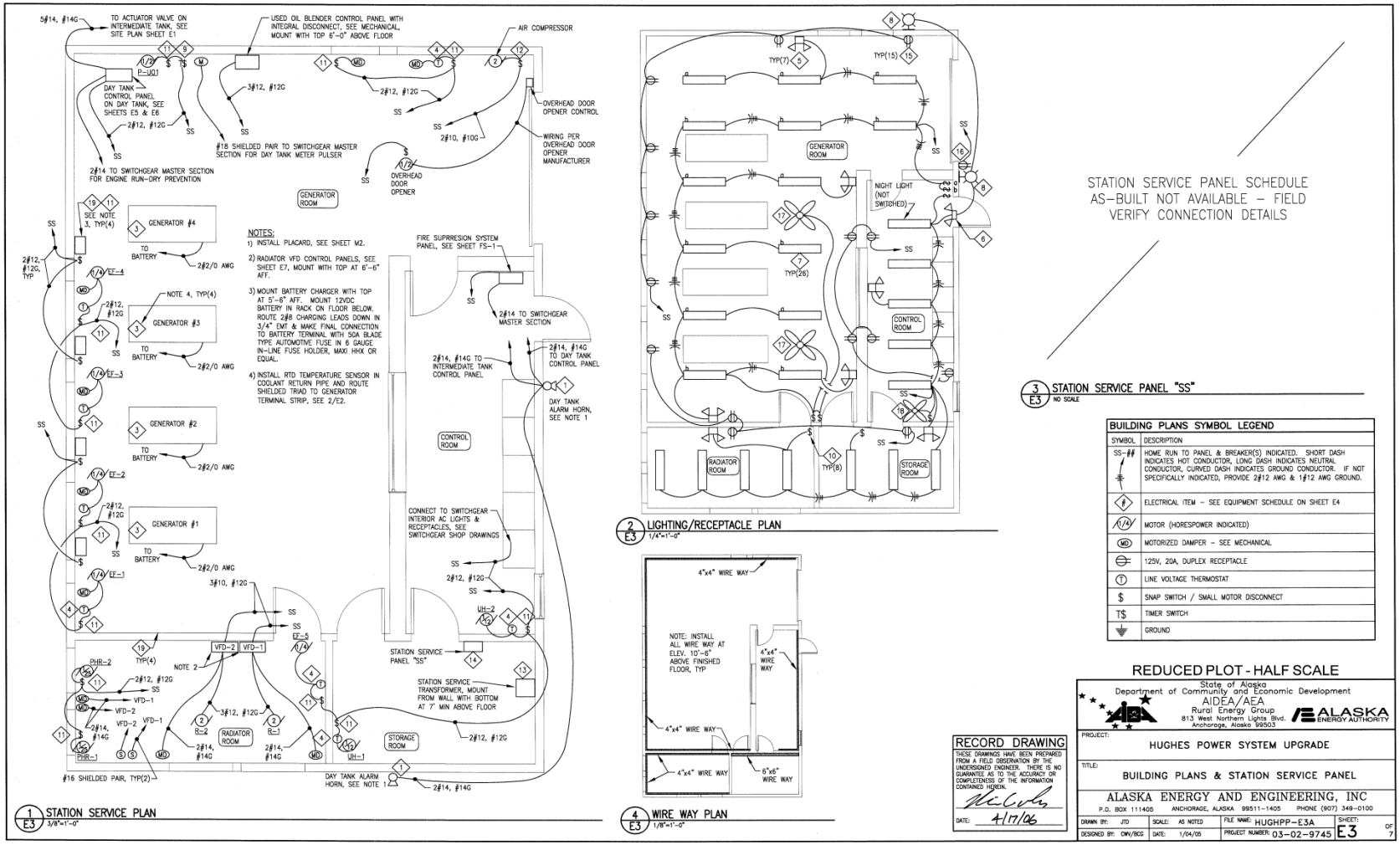
Hughes Village Power Plant



Hughes Gensets

Site of Solar PV Array

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Helical Pile

Project Timeline

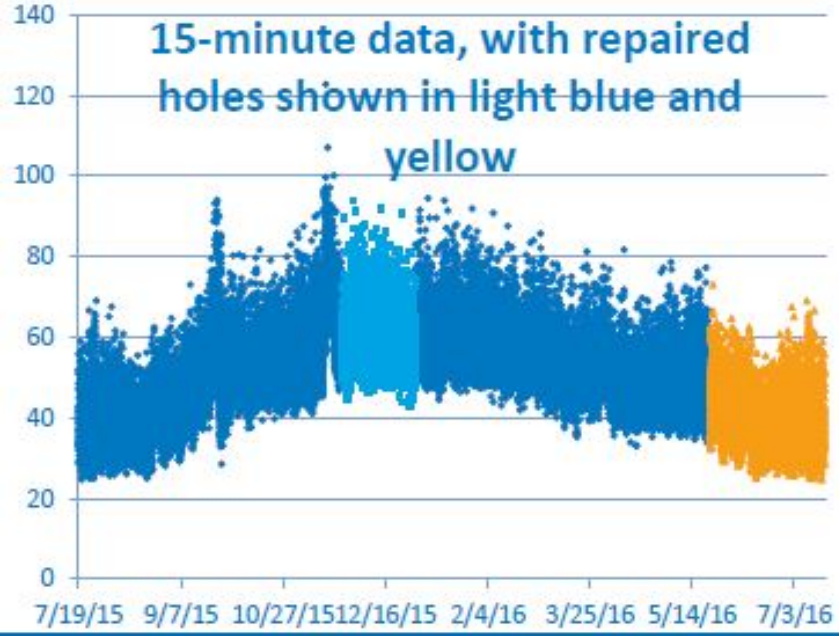
Fall 2016	Engage NREL tech assistance with Modeling
Winter 2016/17	Spec. engineering outline, create Engineering RFP, clear cut the area, work out PCE modeling
May ’17	Purchase Panels and Helical Pile, Order battery pack/control sys
June ’17	Begin moving gravel, create 1’ pad on tundra, 1st DC6 shipment get panels and pile on site
July ’17	Begin single-3 phase conversion work on electrical generation and distribution sys, begin to install helical pile
Aug ’17	Install solar PV racking and panels
Sept ’17	send jars of salmon to Jamie/Lizana to thank them for their patience…

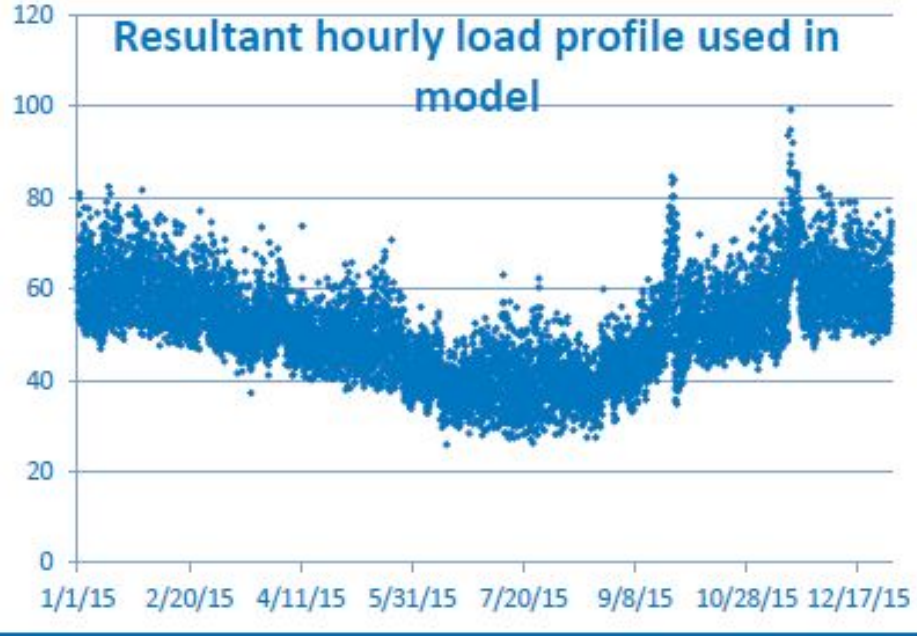
Project Timeline

Sept ‘17	Ship battery bank to Hughes and begin commissioning
Winter ‘17/’18	Begin to workout all of the unexpected Kinks in the system
Spring ’18	Attempt to turn the diesel generators off and run in battery only mode
Summer ’18	Create handbook for plant operators to assist with system, and potential service contract
June ’18 – Dec 19’	Collect data and make modifications as needed.

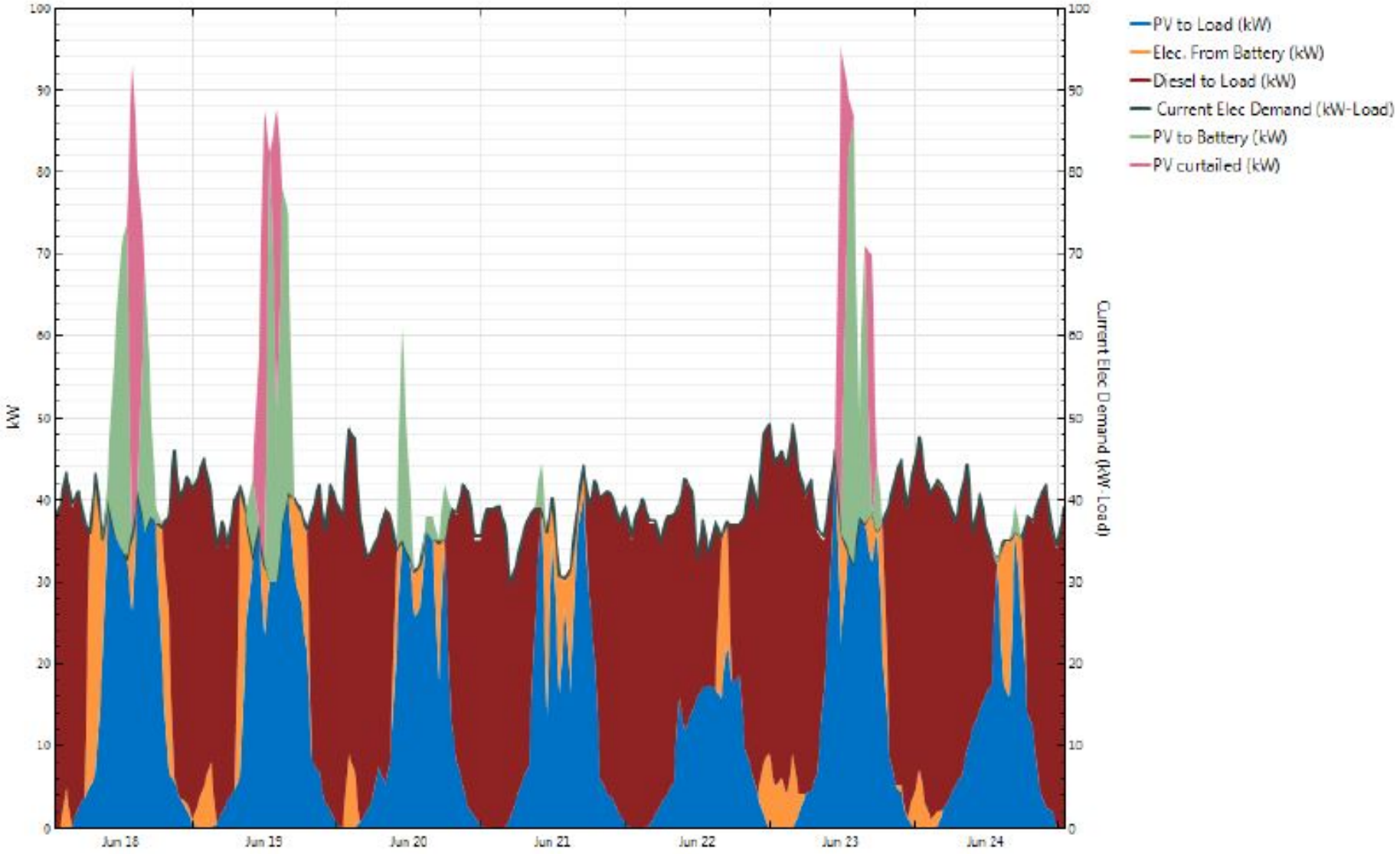
Electrical Load

- Daily power plant logs provided for multiple years
- 15-minute load data provided for ~254 days, spanning 7/19/2015 to 11/24/2015
- To get a full year, filled in missing hours from other times of the year
- Maximum 99 kW
- Average 51kW
- Total annual energy 448,062kWh





Dispatch – Nominal battery cost



Project Challenges

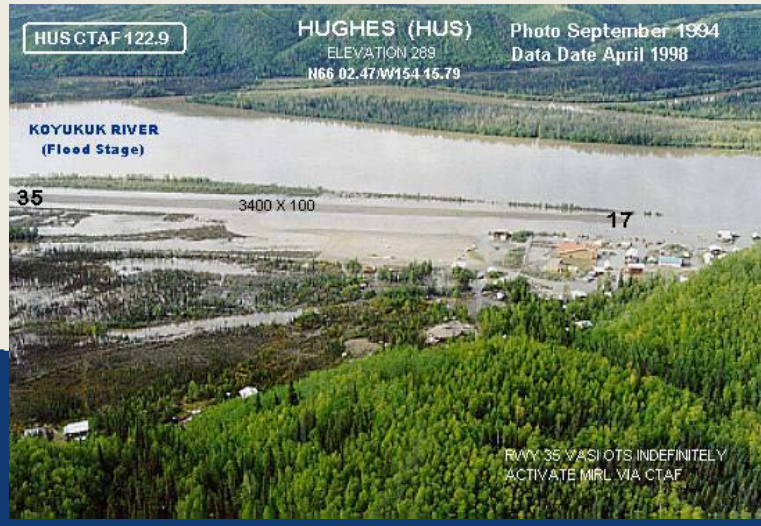
1. Cost effective design and battery bank that work with the soil

2. Single Phase limitation in the community of Hughes

3. Getting panels and battery bank out of the flood plain

4. Samsung Galaxy 7

5. Implementation of Effective Micro-grid Control System



Ana Basee' (Thank you!) Dept. of Energy for your support!

Questions?

Wilmer Beetus, 1st Chief, Hughes Village Council

Dave Messier, Tanana Chiefs Conference Rural Energy Coordinator

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