“SREE VYAA”
OLD CROW OFF GRID SOLAR PROJECT

HOMER International MICROGRID Conference | 8th Annual | #HIMC2020

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September 2020

VUNTUT GWITCHIN FIRST NATION

- The owner of this project is the VGFN a self governing nation
- VGFN signed a modern land claim settlement with the Canadian Government in 1993
- The Vuntut Gwitchin Government have the authority to protect and manage VGFN settlement lands
- Funding and building this green energy project is a demonstration of reconciliation by Canada to the First Nation
- VGFN Development Corporation will own this plant

LOCATION, LOCATION, LOCATION!

- Fly in/out community
- Off-grid diesel existing supply
- Utility- ATCO Electric Yukon
- Community of 300 people
- A quarry (no other materials)
- $0.60 /kWh electricity

LOCATION, LOCATION, LOCATION!

- Project design initiated 2017
- Construction started 2018
- Commissioned September 2020
- 450 kW AC installed capacity (1MW DC)
- 350 kWh BESS (to come)
- ABB Microgrid (to come)
- First EPA in Yukon
- $8,000,000 Capital Cost

3eyond Consulting has project managed this project from initiation to completion

BBA have been the design and owners engineers throughout

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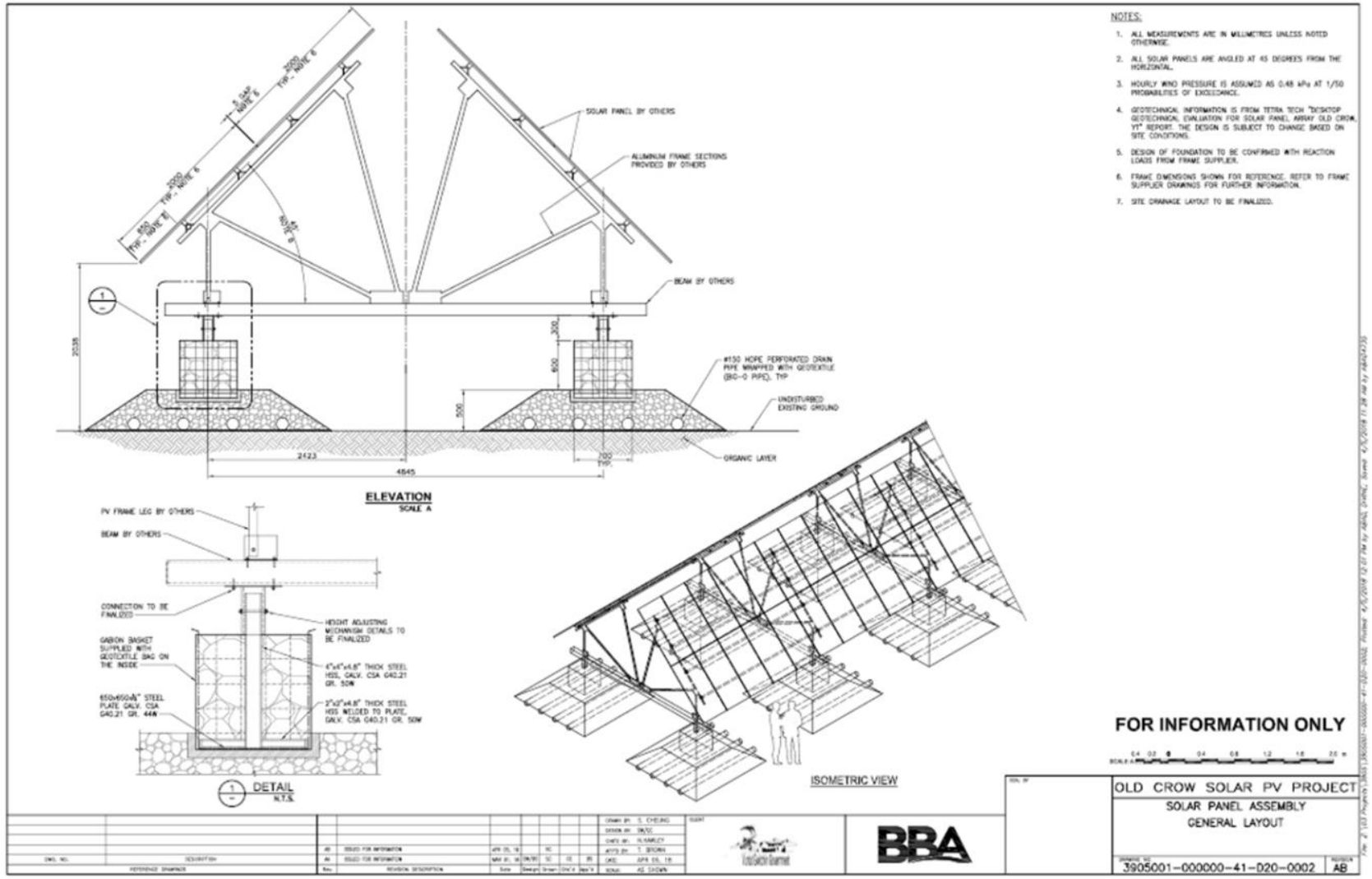
UNIQUE BACK TO BACK DESIGN

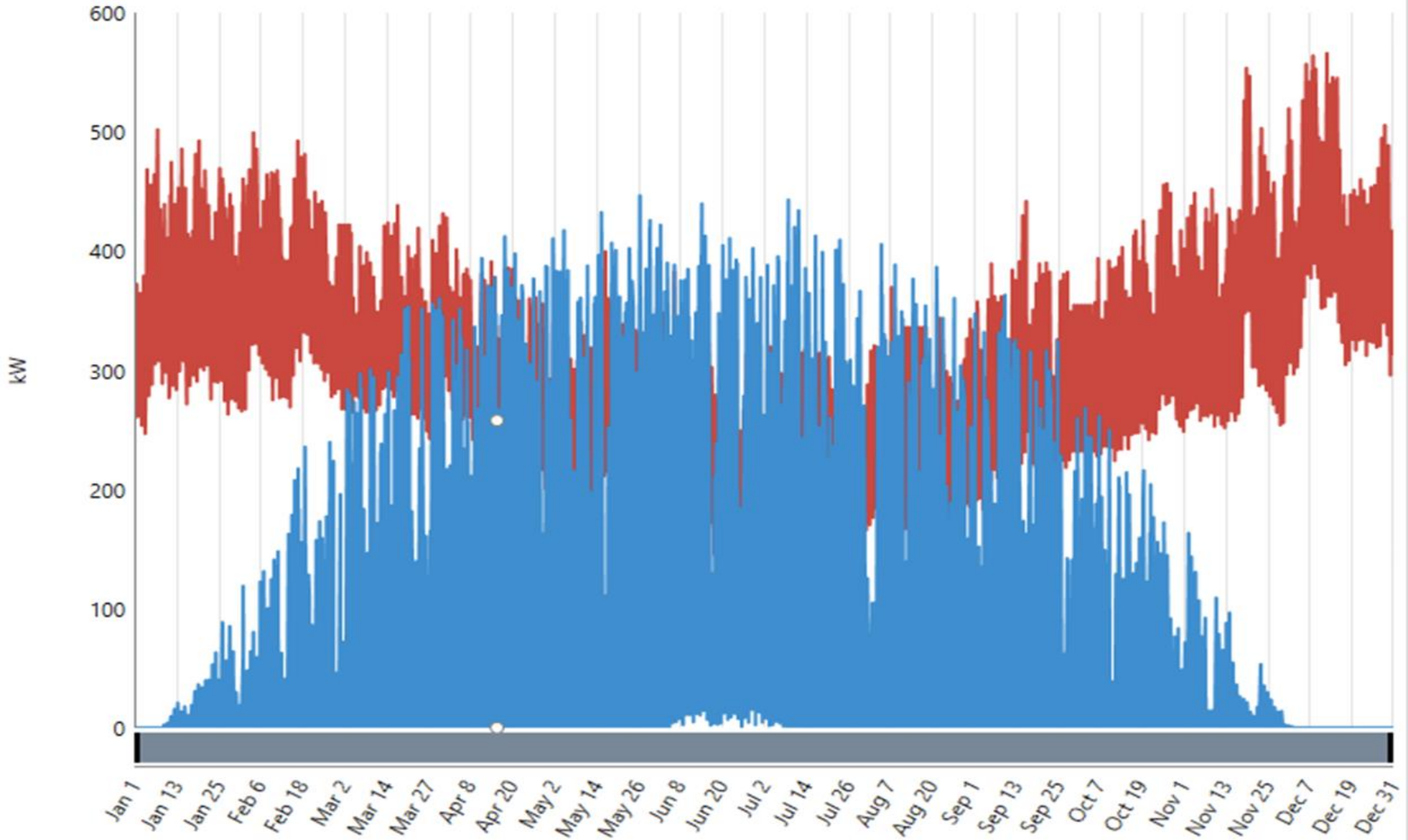
- Reduce wind loading and reduce costs of foundation
- Spread electricity production throughout the day
- 45º tilt for optimal solar production with East-West configuration
- Adds 5 hours/day “diesels off”



HOMER ENERGY MODELLING

Annual forecast

11 months of generation!



LESSONS LEARNED

Price increased 30% after initiation of construction

- Performance based contract for E-Building didn’t work
- ATCO delta distribution system required additional grounding needs for the star PV system
- Quarry rock could not meet typical sub-station insulating crushed rock specifications
- Panel frame manufacturers went out of business – switch from aluminum to steel

LESSONS LEARNED

- Construction period very unpredictable start dates (spring)
- Nothing is specified (or CSA approved) for -55ºC (-67ºF),
- Local electrical inspectors accommodate
- Commissioning is very complex, and harder due to remote site, documented reports critical - Covid 19 prevented FAT engineer going to site to commission – ATCO stepped in to help

LESSONS LEARNED

- Award winning project – ACEC National Awards
- Very few local skilled construction workers
- Ran out of gravel – limited operating time for quarry
- Welding needs stretched local skills
- Managing site supervision remotely
- Building frame foundations on organics resulted in cracking

LESSONS LEARNED

- Trying too hard to save money for the client raises the cost risk factor – not everything paid off
- Contractors used to the arctic can be very helpful in finding solutions for engineering problems
- Vuntut Gwitchin Government's excellent Economic Development skills were a major strength (Air North, Porcupine etc)
- Designing for IPP owners requires more explanation of design concepts than for utilities

LESSONS LEARNED

- Due to the site remoteness the primary contractor role changed hands through different stages of the project causing confusion
- Having a performance contract for the supply of the DC equipment and panels created an artificial boundary when the design engineers (for the AC) should have also overseen the design of the DC by the contractors

THE TEAM:

- Vuntut Gwitchin First Nation
- Vuntut Gwitchin Government
- Community of Old Crow
- 3eyond Consulting
- BBA Engineering
- Porcupine Construction (VGG)
- Solvest (Whitehorse)

MAHSI CHOO!

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