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Energy Storage Deployment Program

Project Updates & Initiatives

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DOE Peer Review - 2022

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U.S. DEPARTMENT OF ENERGY

NNSA

AGENDA

DOE ESS Deployment Team Project Updates

- Alliant Energy – Decorah, IA
- Alaska Village Electric Cooperative (AVEC) – St. Mary's, Alaska
- Municipality of Villalba – Villalba, PR

Deployment Team Initiatives

- R&D Deployments

Alliant Energy – Decorah, Iowa

Total Project Cost	$2.9M
DOE Cost Share	$250k

Project Information:

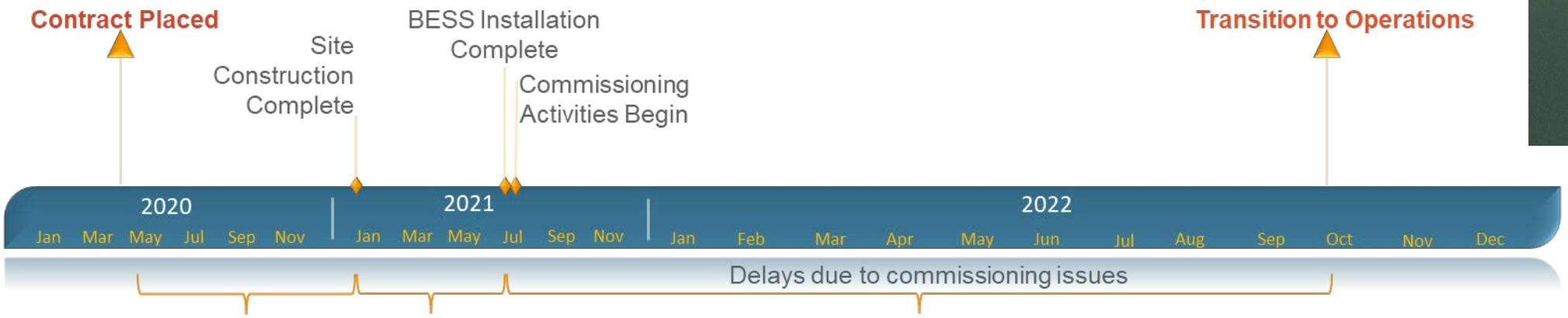
- Alliant Energy installed a 2.5MW, 2.9MWh BESS in order to increase hosting capacity (to accommodate increased solar penetration)

Updates/Challenges:

- System is scheduled to be fully operational end of September/early October
- Commissioning, vendor unresponsiveness, hardware and software

Lessons Learned:

- Understand who the vendors are in your BESS supply chain and who is responsible for commissioning of each item down to the component level
- Understand vendor North American support capabilities
- Safety system commissioning needs a lot of support
- System monitoring can get overcomplicated



Alaska Village Electric Cooperative (AVEC) – St. Mary's & Mountain Village, Alaska

Total Project Cost	**$1.59M**
DOE Cost Share	$493k

Project Information:

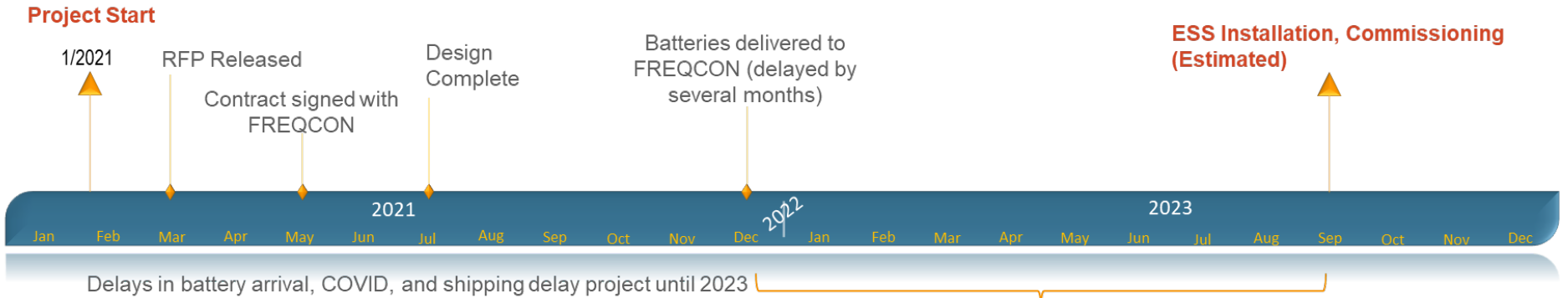
- AVEC is installing a 1MW/1MWh BESS as part of a Grid Bridging System (GBS) to tie two rural and remote Alaskan villages together electrically and improve the use of existing and new renewable resources such as wind and to also reduce the dependence on diesel generators

Updates/Challenges:

- Batteries have been assembled into modules and racks, tested, since replaced with newer batteries and await shipping of entire system
- Project was delayed for 1 year due to challenges in finding a shipping carrier to transport batteries to North America (from Germany) in time for a 2022 delivery to site.
- Challenges in moving freight (barges, trucking, etc.) in Alaska during the Winter months added to the delay

Lessons Learned:

- Although COVID, supply chain issues, and manpower have caused delays in many projects, selecting an overseas vendor (despite superior design/bid) has added to the delay



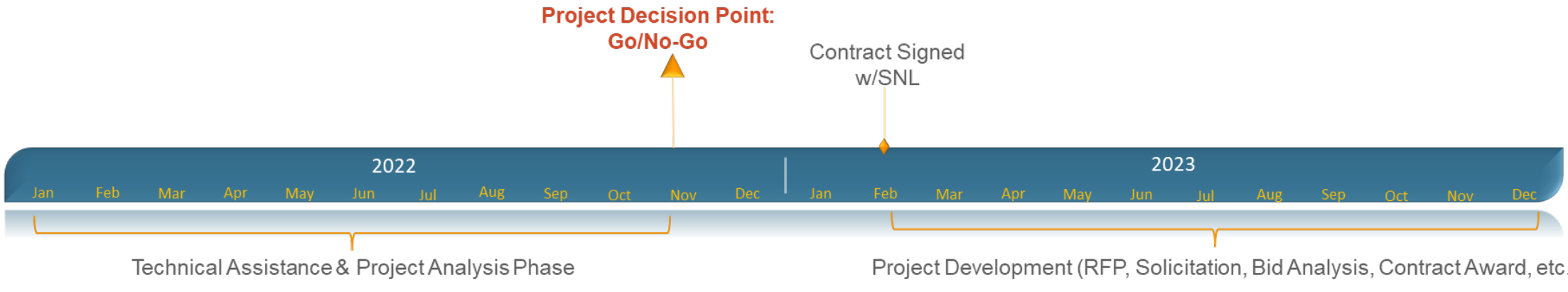
Municipality of Villalba – Villalba, Puerto Rico

Background:

- Villalba is one of five municipalities that formed the Mountain Energy Consortium (CEM) post Hurricane Maria
- Previous microgrid analysis was performed for all of the municipalities as part of a larger effort of Sandia supporting CEM
- Pilot microgrid deployments being assessed for Villalba

Updates:

- TA phase began in early '22 to identify locations for building level microgrids
- Currently finalizing the project analysis phase



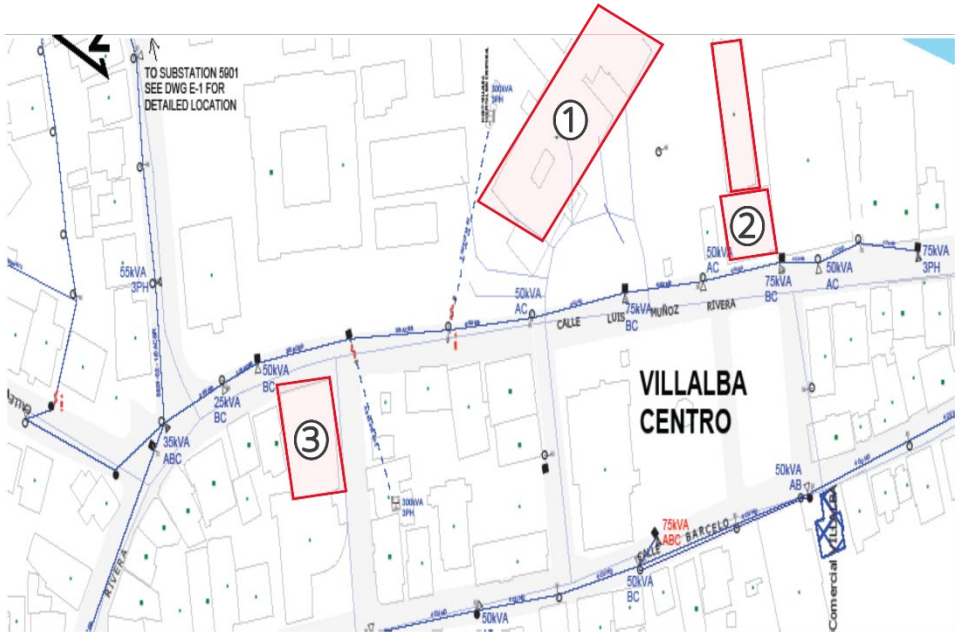
Municipality of Villalba – Villalba, Puerto Rico

Top Three Critical Loads – Potential Building Microgrids

#1 – Hospital

#2 – City Hall

#3 – Theater



Satellite View

Municipality of Villalba – Villalba, Puerto Rico

Critical Loads – Analysis

Critical loads identified by the Municipality of Villalba underwent a multistage analysis. Options ranged from grid connected, Power Purchase Agreement (PPA), supplemented with DOE funding designs, to permanently islanded systems with no grid connection

Analysis Criteria:

- Grid connected (During normal operations)
  - BESS + solar could provide non-outage services (demand reduction, net metering, etc.)
  - PPA/DOE cost share funded system – ***what can we accomplish with the money we have now***
  - Solar limited to roof-top capacity
  - Reduce diesel generator utilization during an outage
- Permanently Islanded (No grid connection)
  - Two additional types of analyses were requested:
    - BESS + solar with existing diesel fuel generator contribution up to the limits prescribed by Regulation 9028 – Final Microgrid Regulation (several technical requirements – see addendum A)
    - BESS + solar only

Municipality of Villalba – Analysis Results

Initial Analysis Results Captured In Cody Newlun' s Puerto Rico Poster Session

Deployment Team – R&D Deployments

Project Information:

- Utilize Sandia's Energy Storage Test Pad (ESTP) to deploy, operate, and evaluate non-Li-ion and/or lower TRL ESS

Background:

- Sandia currently owns two larger vanadium redox flow batteries (125kW/4hr) and a smaller module unit as well (8kW/4hr)

Updates:

- Unit being made operational will be the smaller unit
- Flow batteries are in place at the test pad, modifications to the enclosure (transportainer) is required and in progress
- Multi-dimensional R&D proposed:
  - Document set-up and commissioning process
  - Study of electrolyte chemistry and potential gas evolution under various load conditions
  - Replacement of stack membranes (potentially the stack itself)
  - Control schemas
  - Development of open source remote monitoring and analytics capabilities
  - Cyber security hardening
  - Investigation of mechanical equipment replacements (pumps, filters, etc.) effects on operational performance
  - Decommissioning process documentation

Thank You
Questions? Contact Our Team

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