

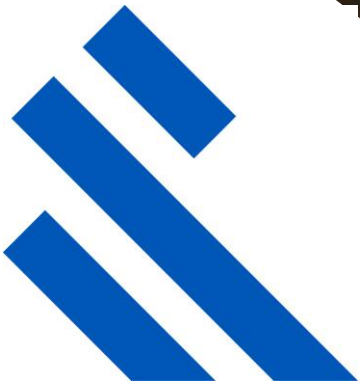


Arlington Microgrid A Learning Experience for the Utility Marketplace

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OVERVIEW

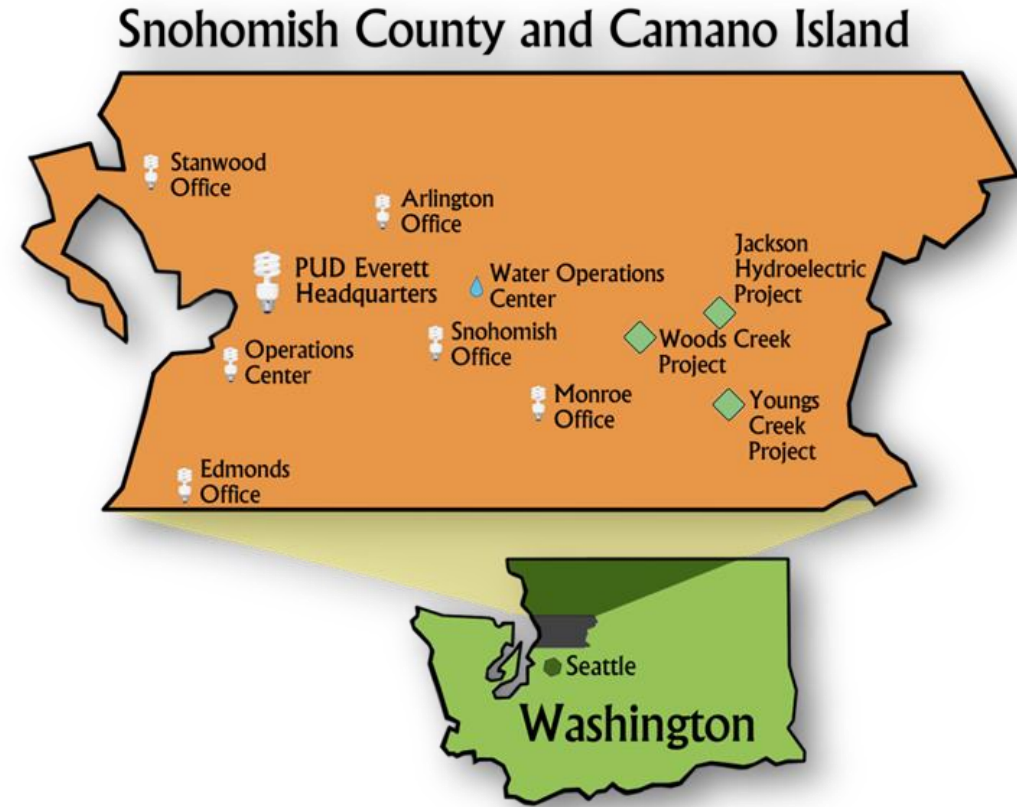
Provide a high level overview of the history of Snohomish County Public Utility District and the twists and turns of the Arlington Microgrid Project

AGENDA

- ▶ About SnoPUD
- ▶ Project Development Process
- ▶ Project Evolution
- ▶ Current State

About Snohomish County PUD

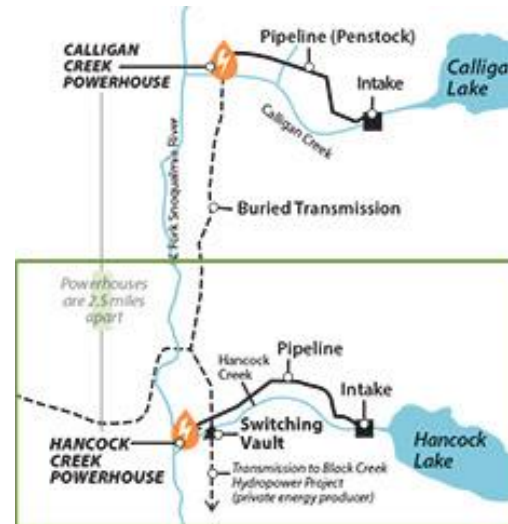
- ▶ Snohomish County population – approximately 805,000
- ▶ Electric System distributes power to almost 332,000 customers
- ▶ Largest PUD in Washington State
- ▶ 12th largest PUD in the country
- ▶ Three elected commissioners
- ▶ About 85% of Power from BPA



SnoPUD Generation

► Five Hydro Plants:

- Jackson Hydro Project – 100MW
- Young's Creek Hydro Project – 8MW
- Woods Creek Hydro Project – 650kW
- Hancock Creek Hydro – 6MW
- Calligan Creek Hydro – 6MW



SnoPUD Generation – Cont'd

- ▶ Two Energy Storage Projects:
 - MESA 1
 - ▶ 2MW/1MWh Lithium Ion
 - MESA 2
 - ▶ 2.2MW/8MWh Vanadium Redox Flow



MESA1 and MESA 2

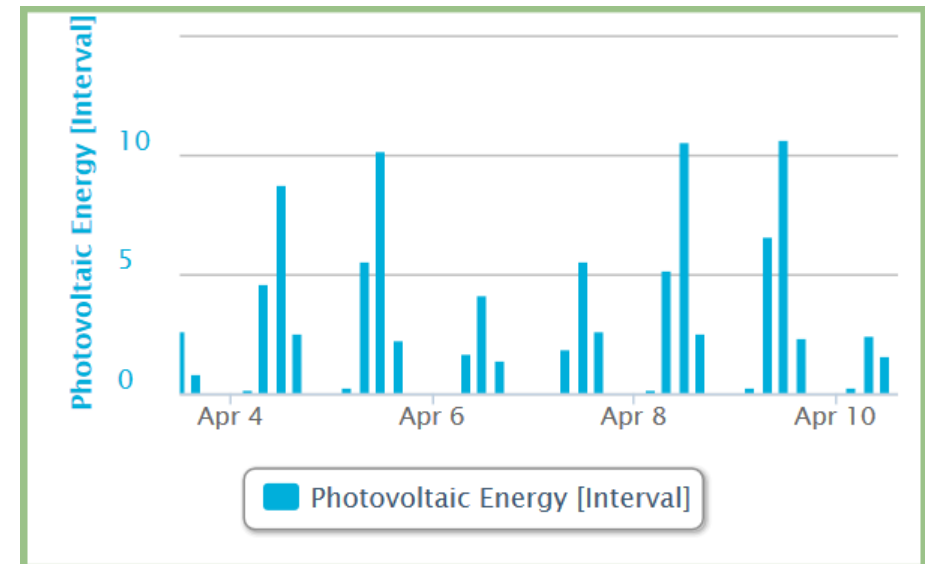
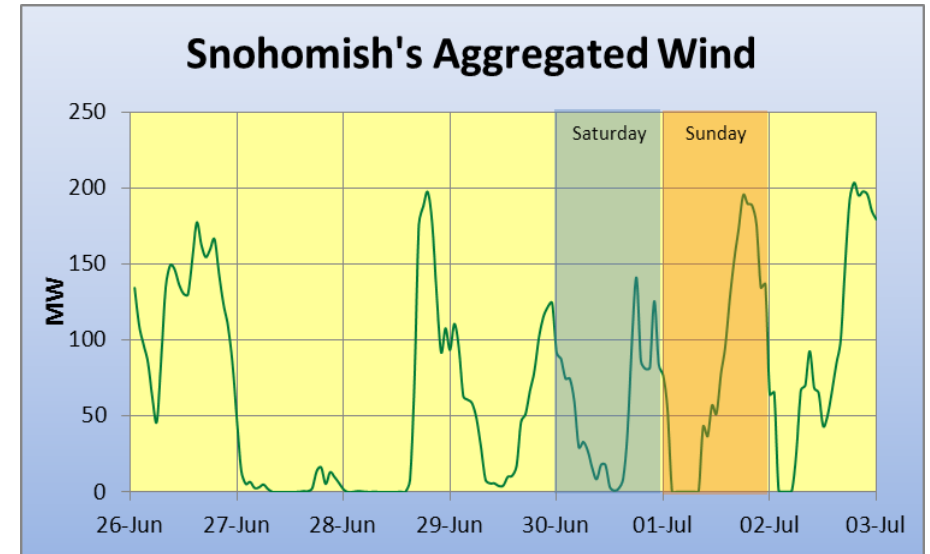
► DERO

- Distributed Energy Resource Optimizer
- Securely aggregates and optimizes the economic value of distributed energy resources

► Energy Imbalance Mitigation

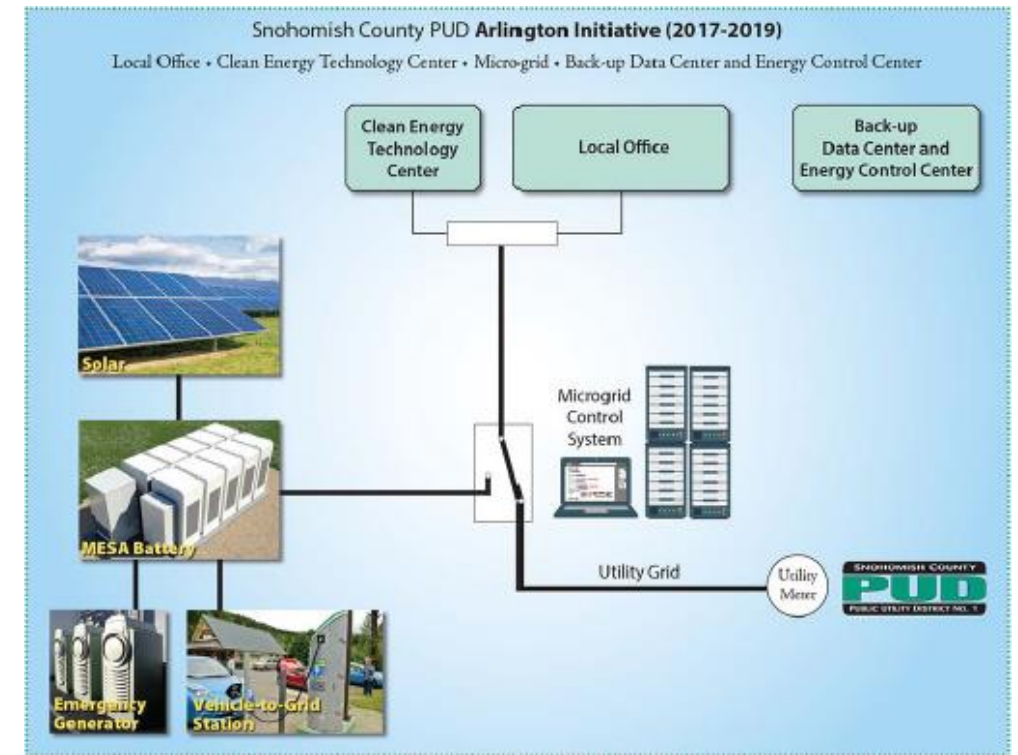
► Wind Variance

► Energy Arbitrage



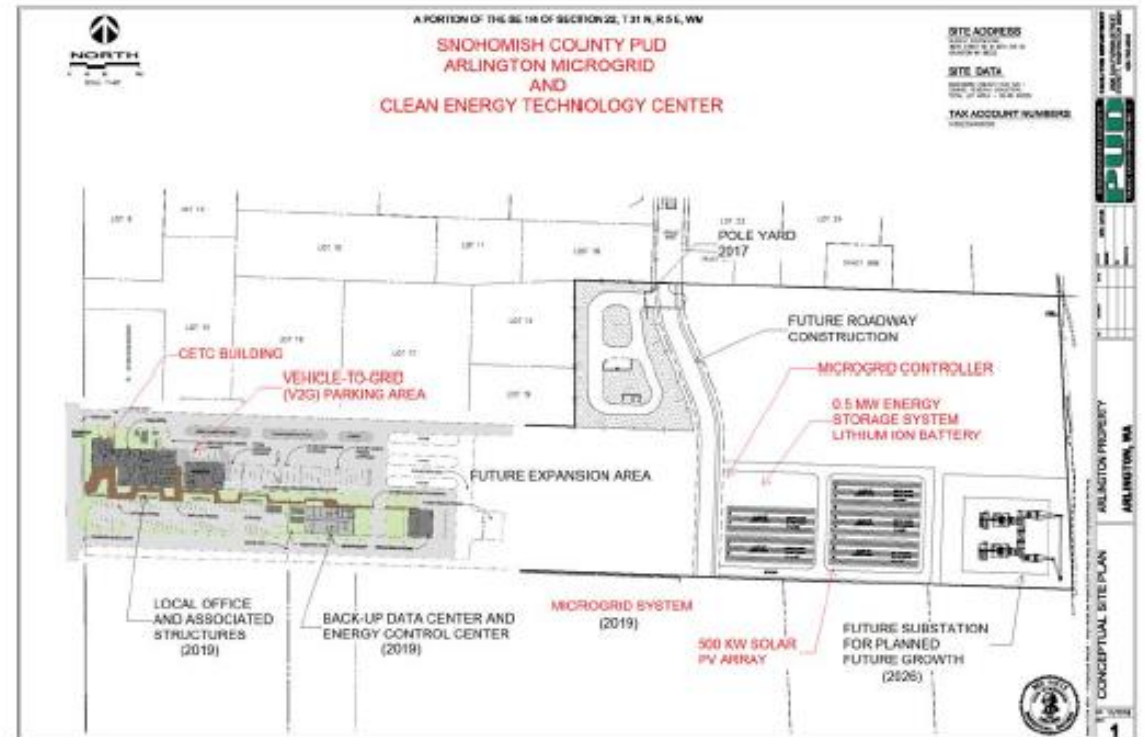
Arlington Microgrid – Development

- ▶ Request for Statement of Qualifications
 - July 2017
- ▶ WA State Clean Energy Fund 2 (CEF2)
- ▶ Scope Developed by PUD
- ▶ BESS 500kW/1000kWh
- ▶ 500kW Fixed PV
- ▶ 5 Vehicle to Grid (V2G) Charging Stations
- ▶ Supplemental Generation
 - Capstone
 - Other Technology

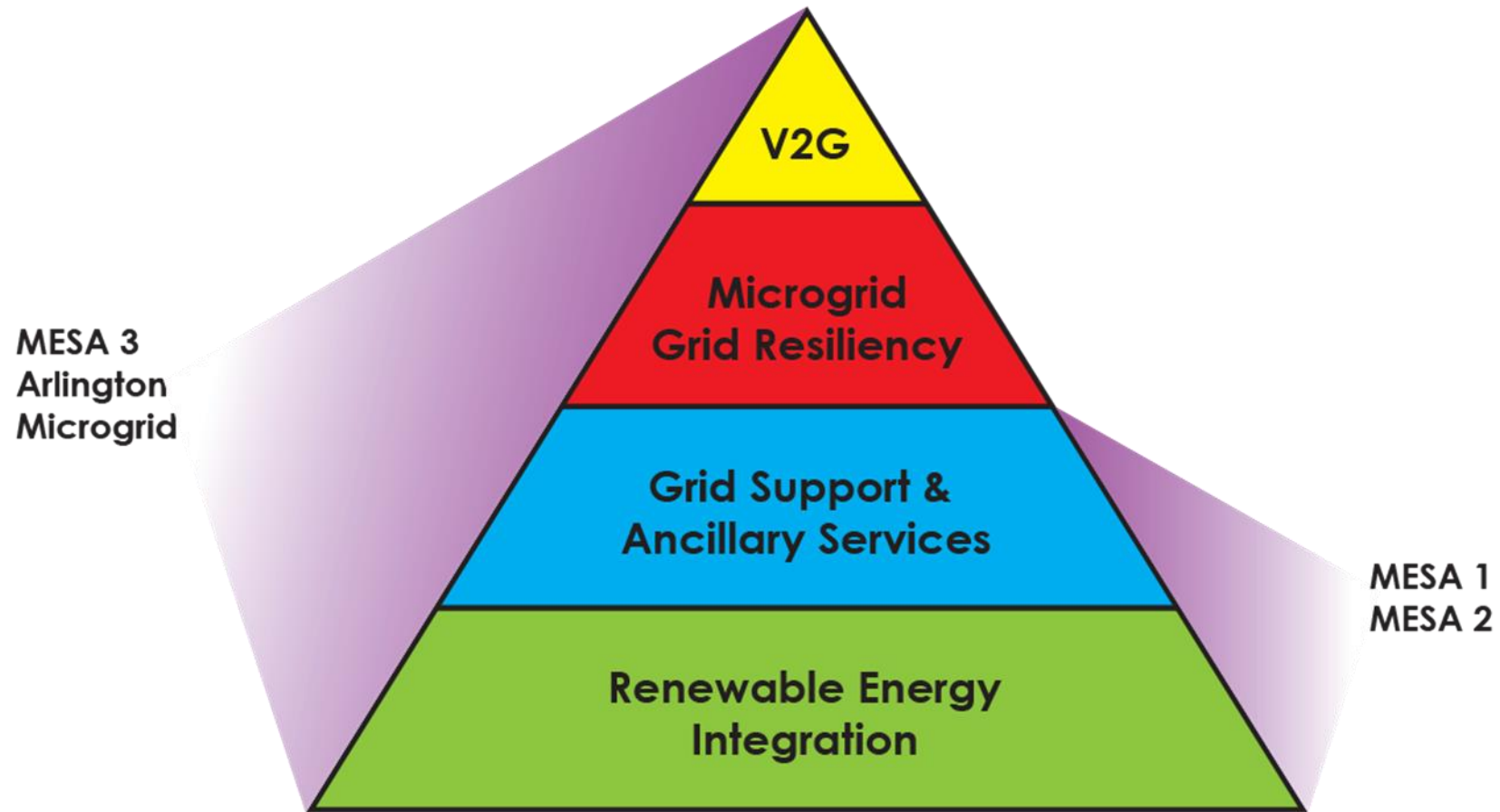


Arlington Microgrid – Round 1

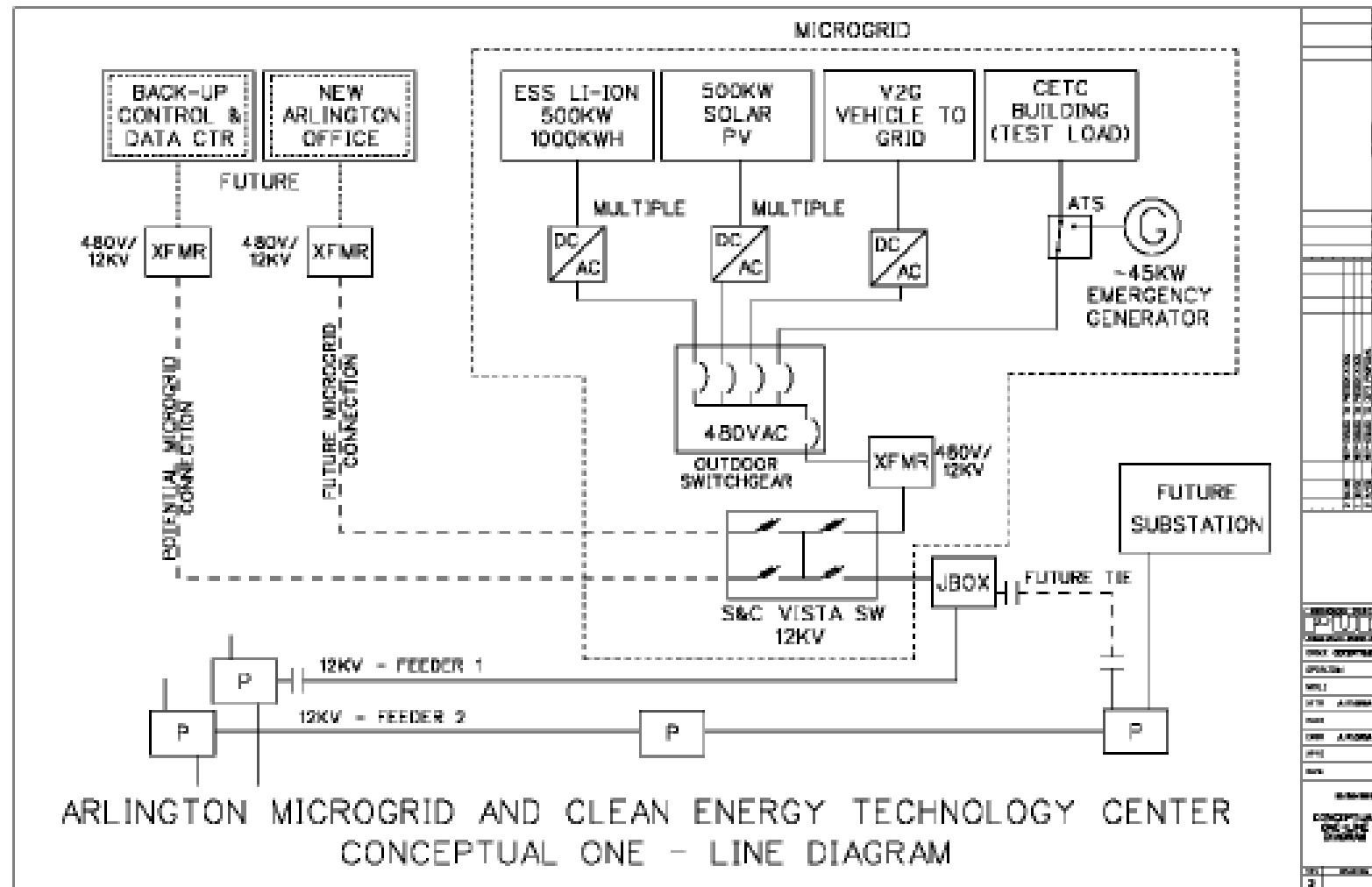
- ▶ Project Goals
 - ▶ Grid Resiliency and Disaster Recovery
 - ▶ Renewable Energy Integration
 - ▶ Grid Support and Ancillary Services
 - ▶ V2G Demonstration
- ▶ Results Verified
 - U WA Engaged
 - Modeling and Performance Verification



Arlington Microgrid – Round 1

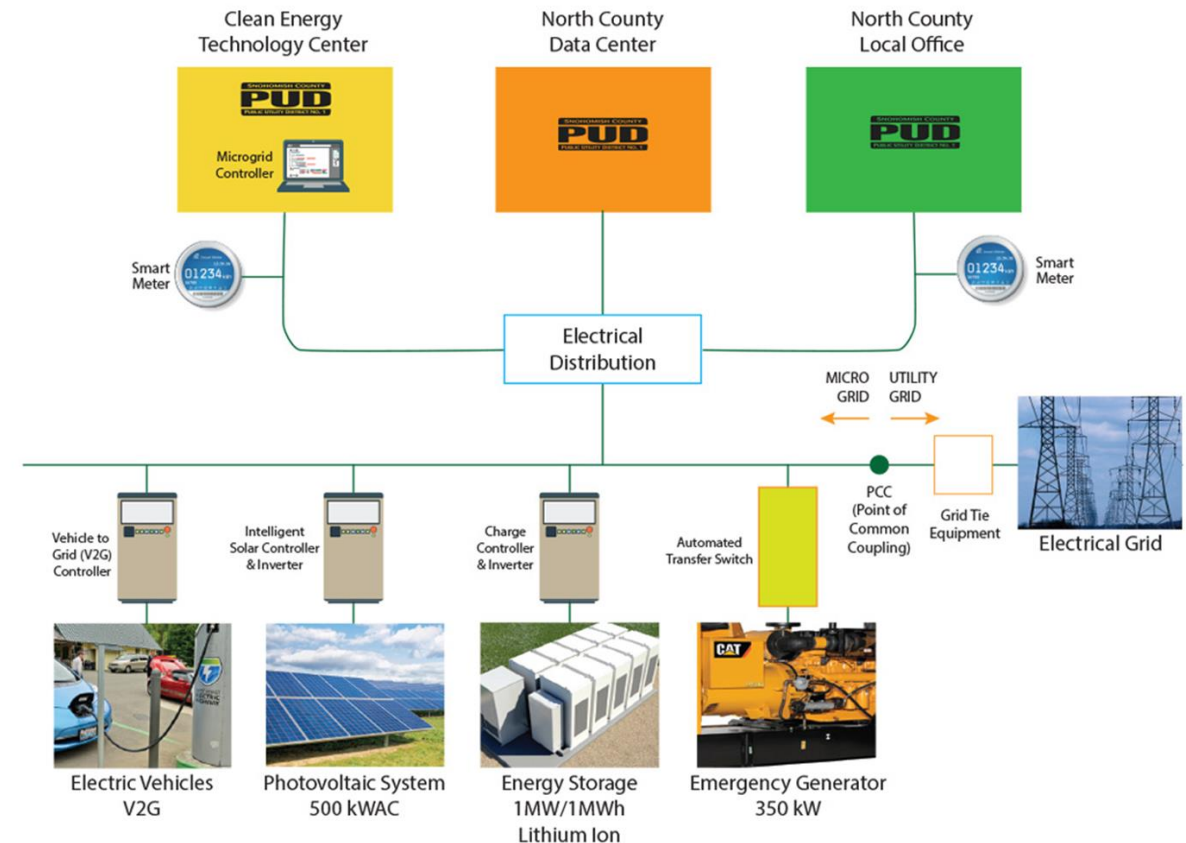


Arlington Microgrid – Round 1

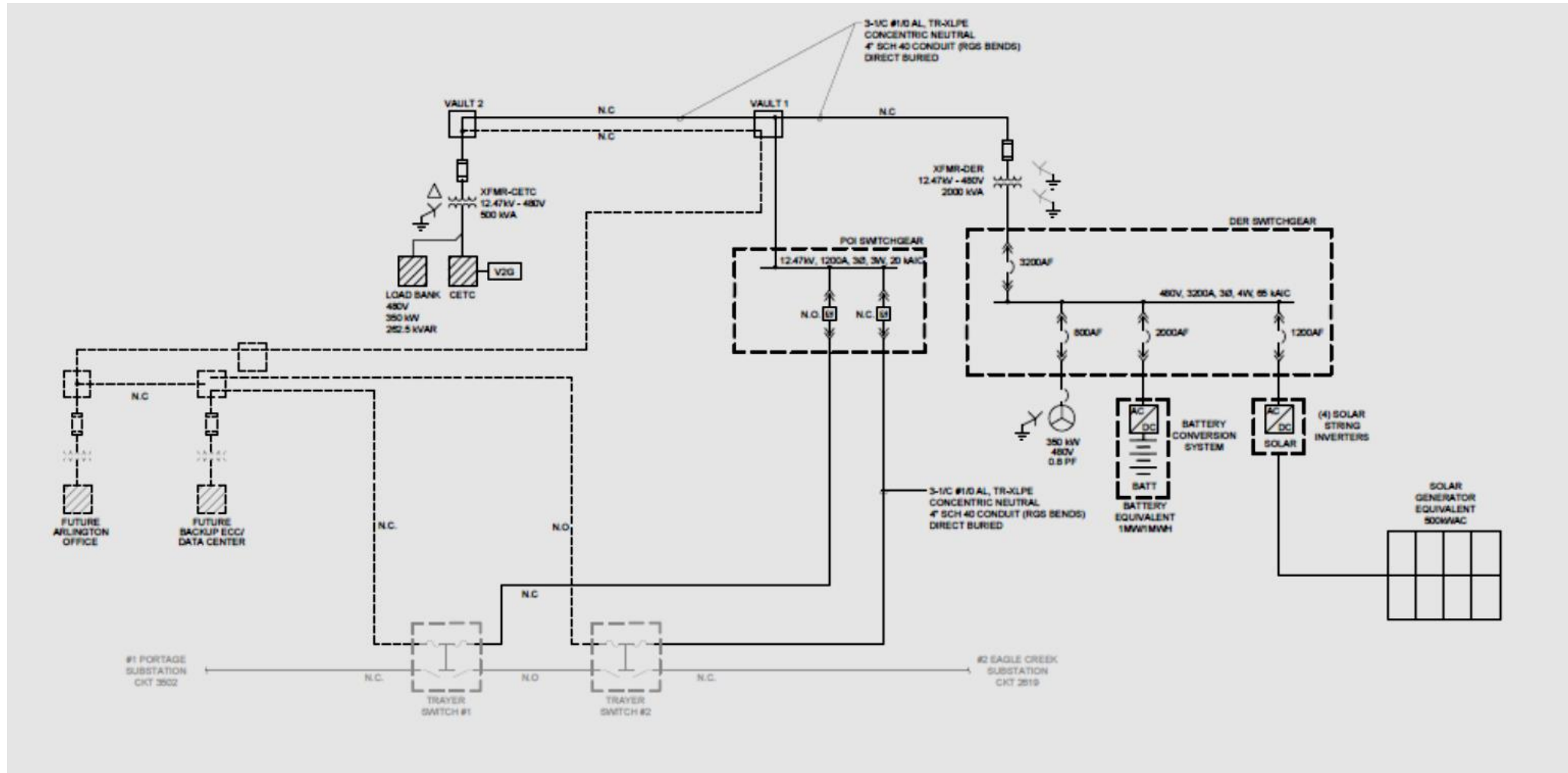


Arlington Microgrid – Evolution

- ▶ Reprogram Arlington Office Project
 - Size and Schedule Delayed
- ▶ Microgrid Topology Development
 - Serve CETC and Modular Data Center
 - Behind the POI
- ▶ Right-size Standby Generator
 - Diesel vs. Capstone
- ▶ Upsize BESS
 - 1MW/1MWh
- ▶ Add Load Bank for Testing



Arlington Microgrid – Evolution

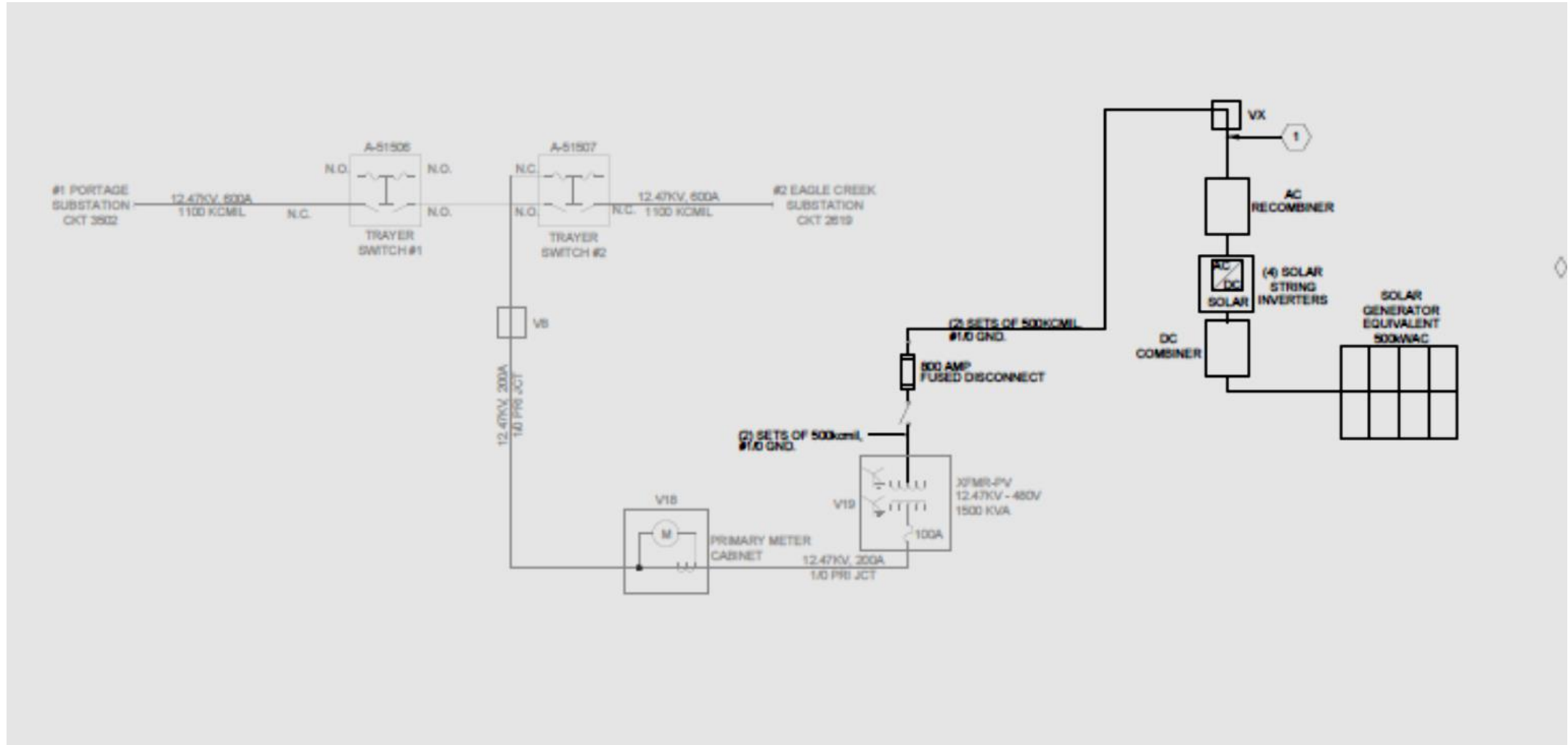


Arlington Microgrid – Evolution

- ▶ Solar Portion of Project Accelerated – Stand Alone
- ▶ Community Solar Incentives
 - Renewable Energy System Incentive Program – \$0.16/kWh
 - Program Requires in Service by June 2019
 - Whole or Portion of Panels Purchased by PUD Customers
- ▶ Separate Solar Procurement
- ▶ Bid Evaluation Criteria
- ▶ Out for Bid Today

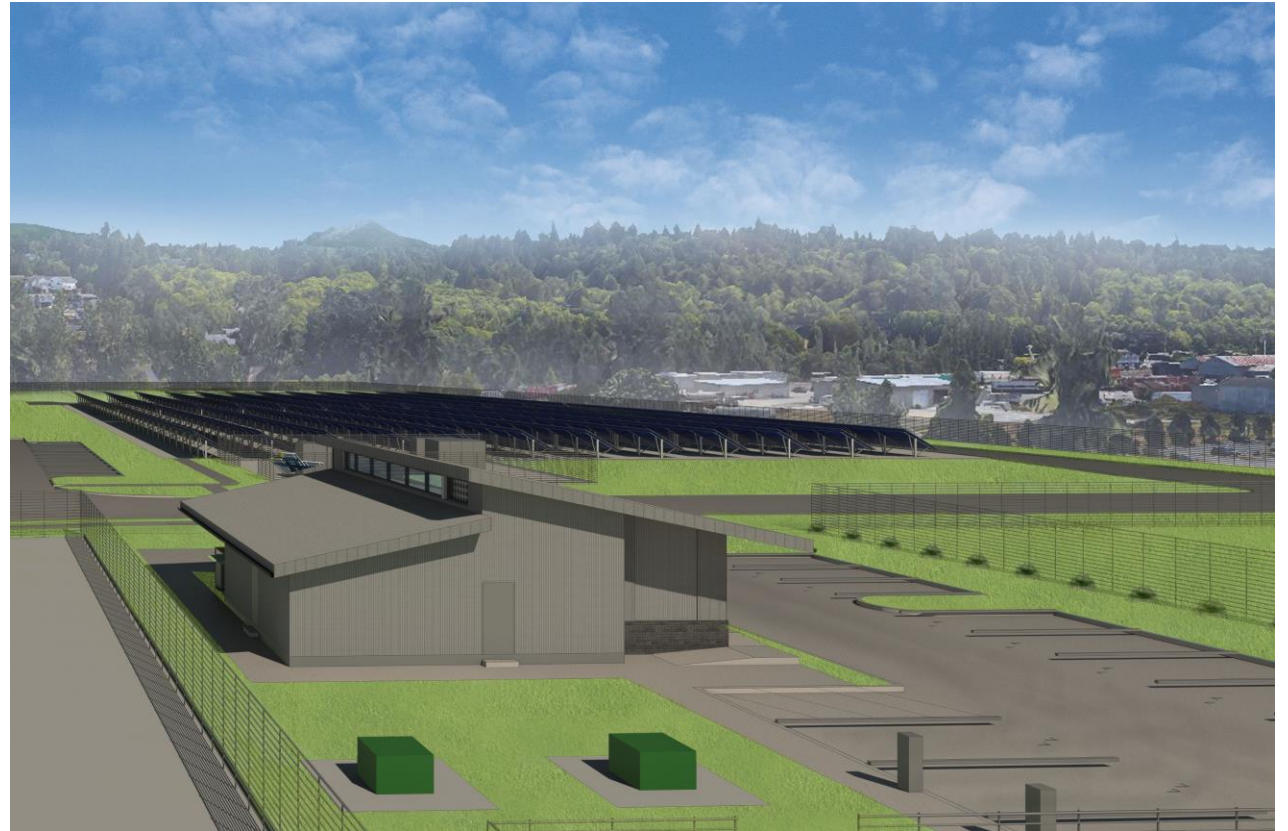


Arlington Microgrid – Evolution

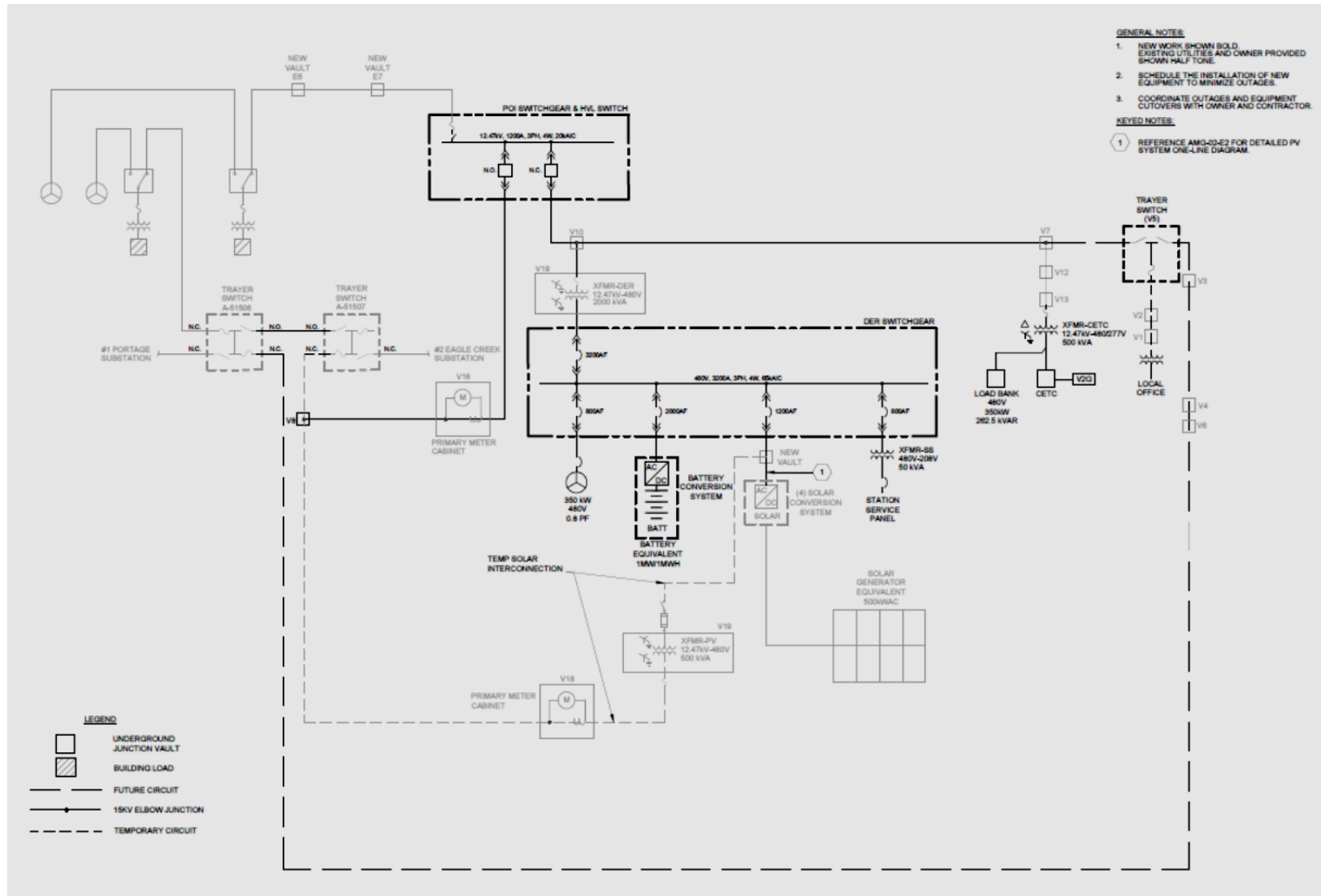


Arlington Microgrid – Evolution

- ▶ The Rest of the Microgrid
- ▶ Equipment and Controls Procurement
 - Switchgear
 - BESS
 - Microgrid Controller
 - Standby Generator
 - Load Bank
- ▶ Balance of Plant



Current State



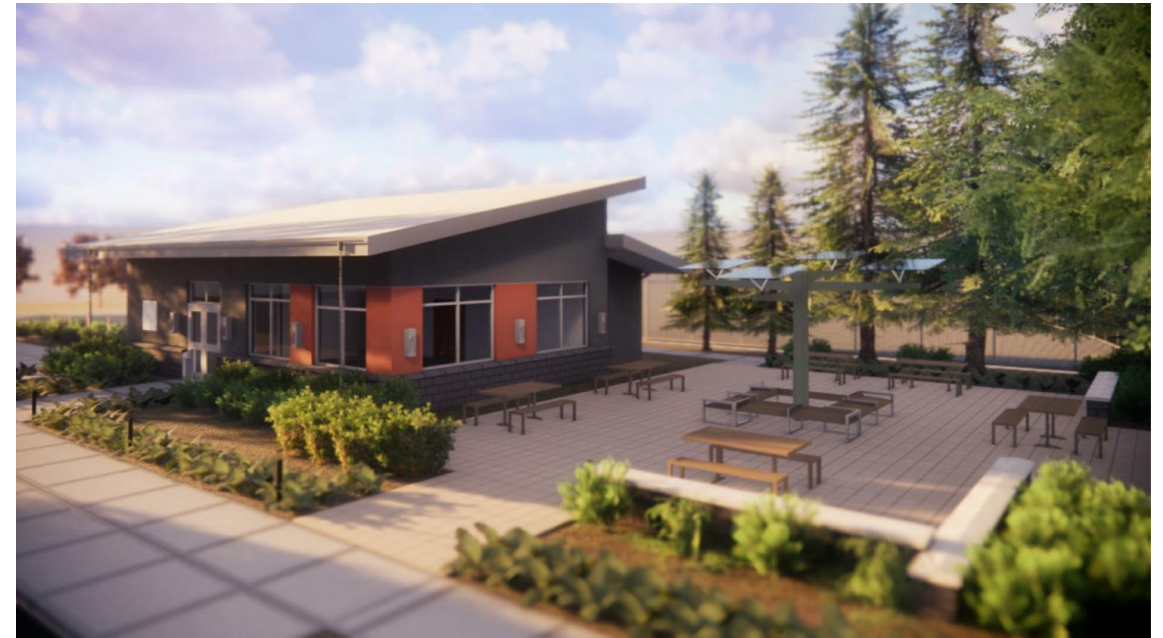
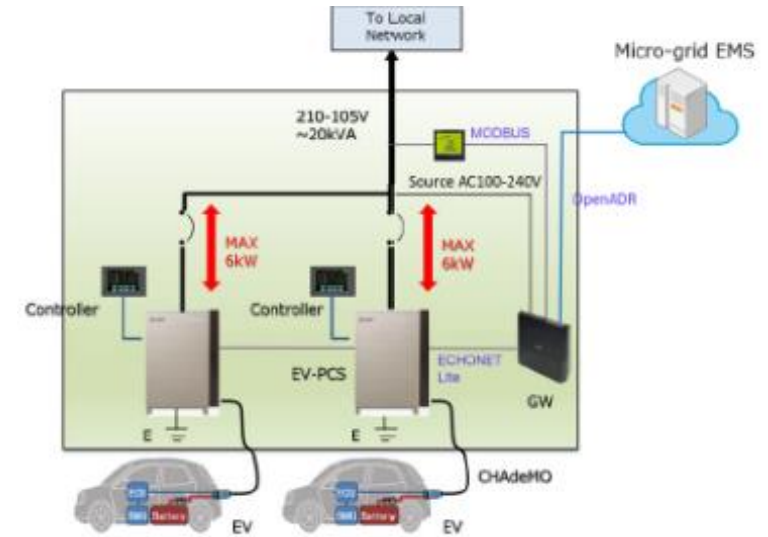
Current State

- ▶ Construction Underway
- ▶ Site Utility Installation



V2G

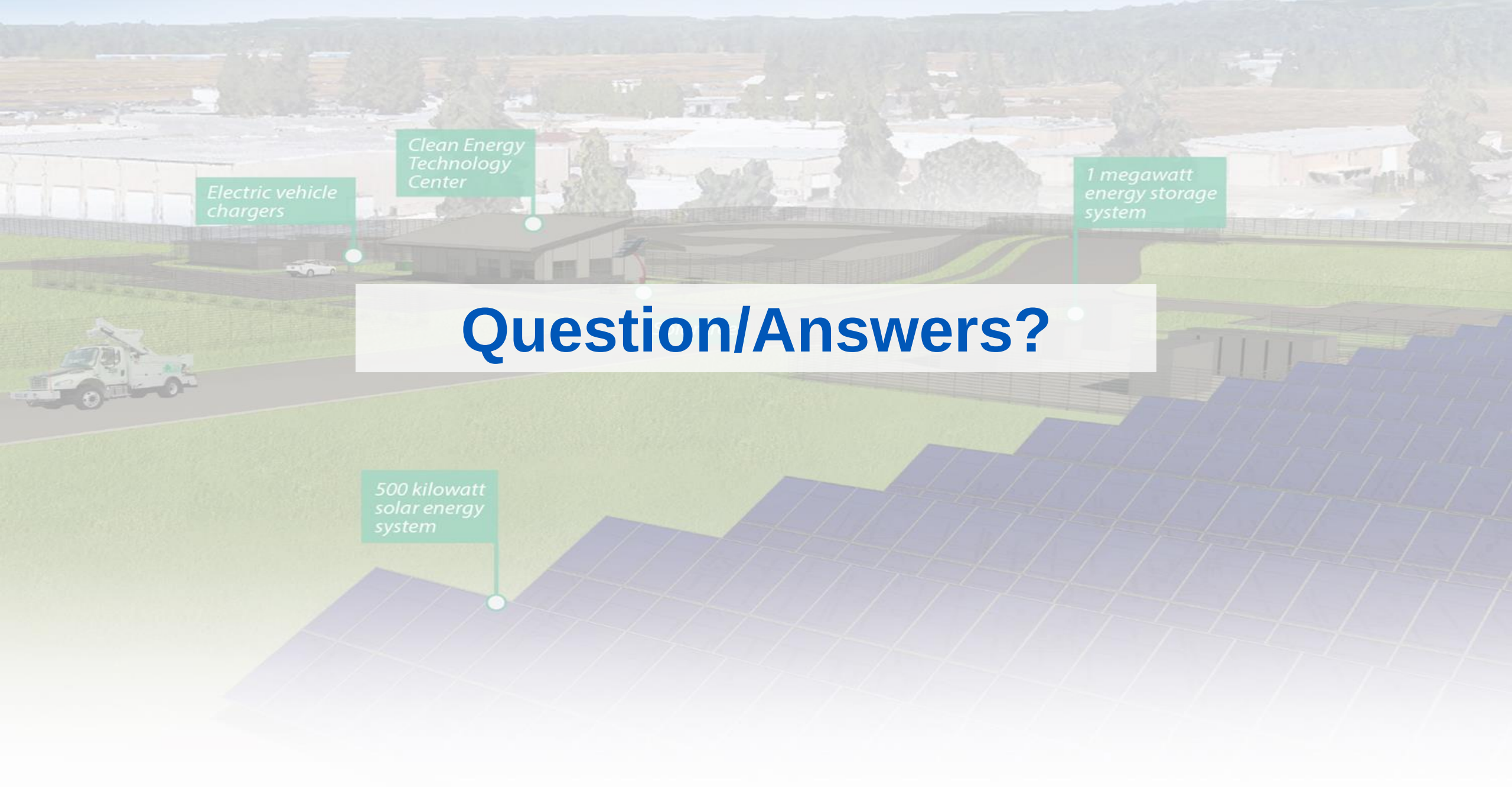
- ▶ V2G Fleet Vehicle Charging Stations
- ▶ Two 6kW Bi-Directional Units
- ▶ Charge/Discharge
- ▶ V2H
- ▶ EV Warranty
 - UL Standards
 - More Work Ahead





SUMMARY

- ▶ If you've Seen One Microgrid, You've seen One Microgrid
- ▶ Be Flexible and Embrace Change
- ▶ Be on the Lookout for Incentives
- ▶ V2G is in Early Development Stages



Question/Answers?



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