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Horn Rapids Solar, Storage, & Training Project

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Project Overview

- Utility scale photovoltaic solar coupled with a battery energy storage system
- Largest utility scale solar in WA
- First utility scale solar-storage project in WA
- Utilized to train solar and battery storage technicians

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Project Partners

- Energy Northwest
- Potelco/Quanta
- Regional Education and Training Center (RETC)
- IBEW Local 77
- PNNL
- University of Washington's Clean Energy Institute

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Energy Northwest

- Joint Operating Agency in Washington State
  - Formed in 1957
    - Generation aggregator for Public Power
  - 27 Members
    - 22 Public Utility Districts
    - 5 Municipal Utilities
- Owner/operator of electrical generation facilities

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Energy Northwest

- White Bluffs Solar Station (38.7 kW_{DC})

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Energy Northwest

- Packwood Lake Hydroelectric (27.5MW)

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Energy Northwest

- Nine Canyon Wind Project (95.9MW)

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Energy Northwest

- Columbia Generating Station (1190MW)

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Energy Northwest

- Energy Services and Development
  - Member services
  - Operate and maintain Energy Northwest's non-nuclear assets
  - O&M services for other entities
    - Mason PUD 3 Olympic View Combustion Turbine
    - Tieton Hydroelectric Project
    - City of Portland Hydroelectric Facilities (2)

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Energy Northwest

- Energy Services and Development (cont.)
  - Advanced Technology
    - Demand Side Management
    - Energy Storage
    - Demand Voltage Reduction
  - Generation Project Development
    - Neoen 20MW solar project – marketing and development assistance
    - Electric Vehicle Infrastructure Transportation Alliance (EVITA)

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Energy Northwest

- Generation Project Development (cont.)
  - Horn Rapids Solar, Storage, and Training Project
    - Primary development/project management
    - Owner/operator of battery energy storage system
    - Project interconnection

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POTELCO INC
A QUANTA SERVICES COMPANY

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Potelco

- A Quanta Services, Inc. company
  - Over 350 MW of solar projects in United States
  - Full engineering, procurement, and construction of entire systems
- Horn Rapids Solar, Storage, and Training Project Partner
  - Developer of PV solar generation

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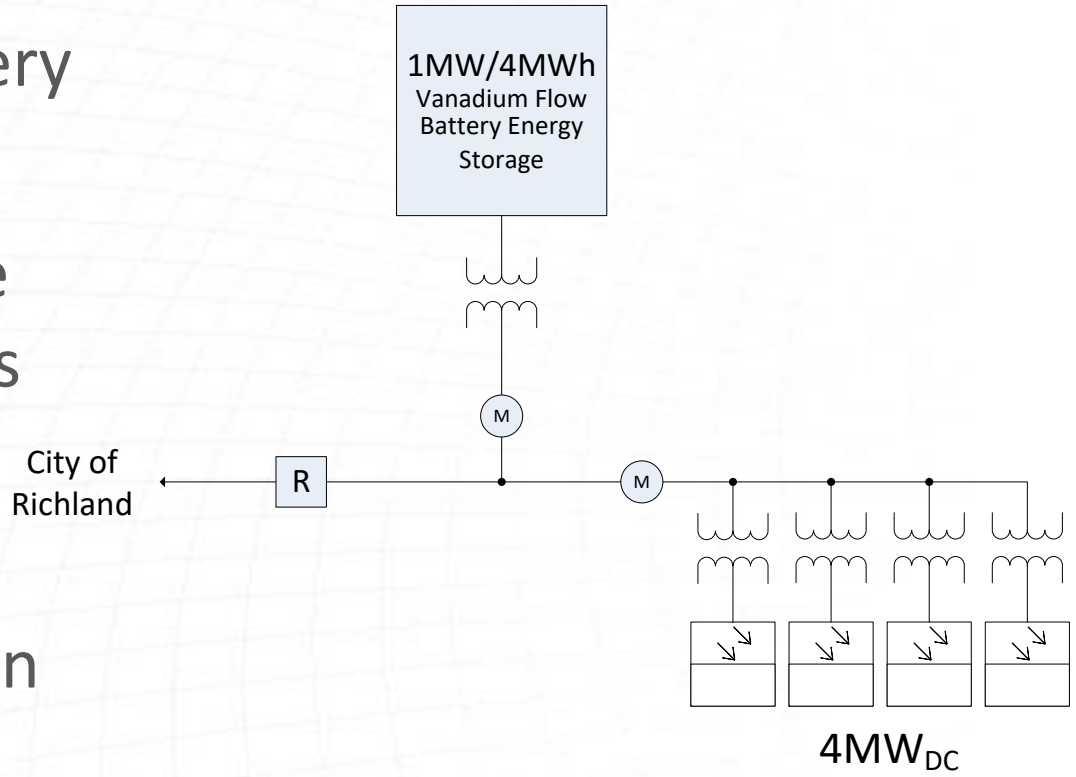
Project Details

- 4 MW_{DC} Solar
- 1 MW/4MWh Battery
- Solar will charge battery and provide power to local loads
- Interconnected with the City of Richland distribution system



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Project Details (cont.)

- Located in north Richland on IBEW property leased to the Regional Education Training Center (RETC)

- Vanadium Flow Battery Storage

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Vanadium Flow Battery

- Advantages
  - 20 Year Life
    - Available lifetime maintenance and warranty
    - End of life disposal included
  - Unlimited cycle life
  - No capacity reduction
  - Passive cooling

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Funding

- Energy Northwest awarded $3M WA Clean Energy Fund 2 grant
  - One of five utilities awarded a grant
  - Up to 50% of battery storage portion will be paid by WA Department of Commerce
  - Emphasis on the integration of solar and storage; workforce training

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Project Purpose

- Combination of solar and storage will provide a predictable renewable generation resource
- Extended duration of the storage will provide benefits to the offtaker such as demand response, load shaping, energy time shifting, and peak demand reduction
- Facility will be utilized in training curriculum administered by Regional Education Training Center (RETC) to train solar and battery storage technicians

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Project Purpose (cont.)

- Pacific Northwest National Laboratory (PNNL) will analyze the operation of the energy storage system to determine its optimum use
- Data collected from the project will be analyzed and published by PNNL and University of Washington's Clean Energy Institute (UW CEI)

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I-937

- Washington State's Energy Independence Act
- Some utilities required to use eligible renewable resources to meet annual targets
- Project will qualify for double renewable energy certificates for off-takers
- Qualifies for additional 20% renewable energy certificates when developer uses approved apprenticeship programs during construction

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Timeline

- Construction to start 2018
- Energization in 2019
- Data analytics 2019-20
- Commercial operation 2019-2038

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- Questions