U.S. DEPARTMENT OF
ENERGY
Office of Electricity

Supporting Energy Resilience at the Port of Alaska

DOE – Office of Electricity

January 2020

Motivation

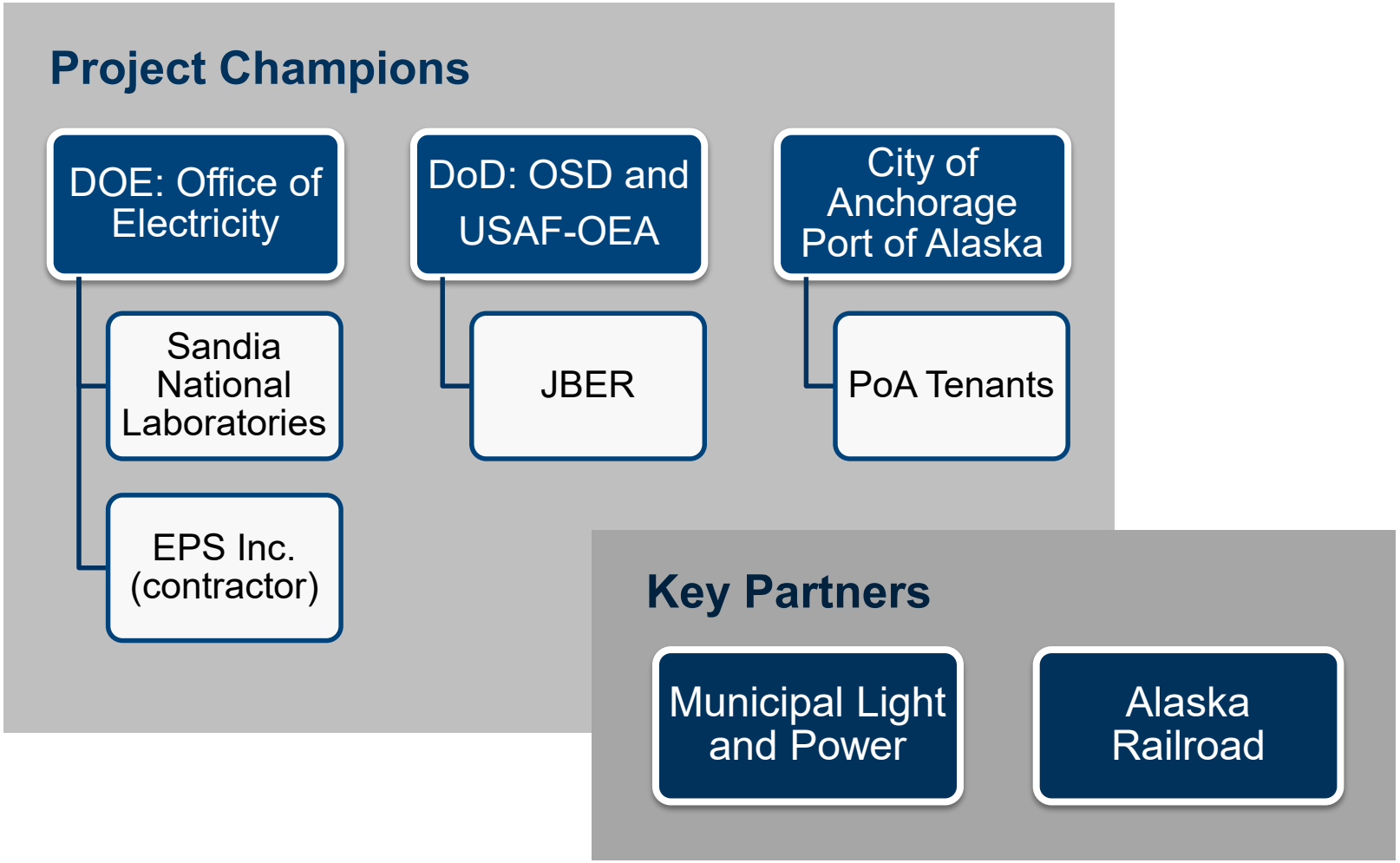
- **Exposure to environmental (seismic, climate, etc.) and other hazards**
- **High cost/consequence of short and prolonged grid outages**
- **High cost of electricity now and going forward**
- **Timing – opportunity to leverage Federal interest and resources**

Motivation

How did we get here?

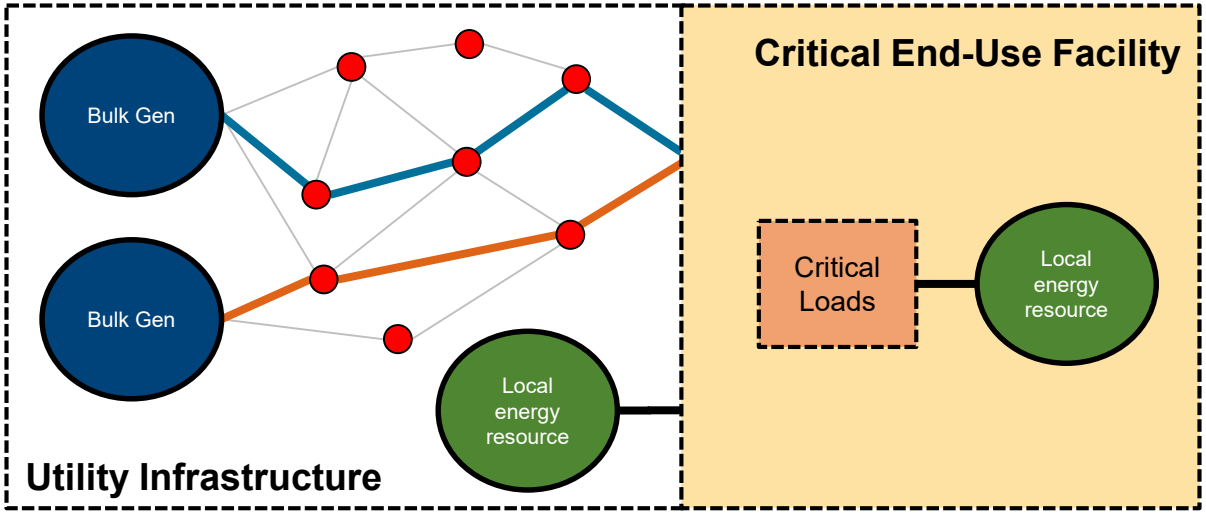
- **Evolving concept/opportunity identified by PoA**
- **DoD Regional Identification of Gaps in Operational Resilience (RIGOR) workshop – Anchorage, May 2019**
  - Specifically identified an opportunity to deploy an energy resource at PoA to increase resilience for PoA users as well as JBER
  - PoA provides critical services to Anchorage and AK, also supports defense mission
- **Department of Energy / Office of Electricity**
  - Provide assistance to help define path forward
  - Preliminary feasibility study
    - ✓ Advanced microgrid or similar at PoA: energy storage, PV, diesel generation (backup)
    - ✓ Provide actionable information to decision-makers: Technical options, cost, benefits, challenges.

Stakeholders



Reliability and Resilience

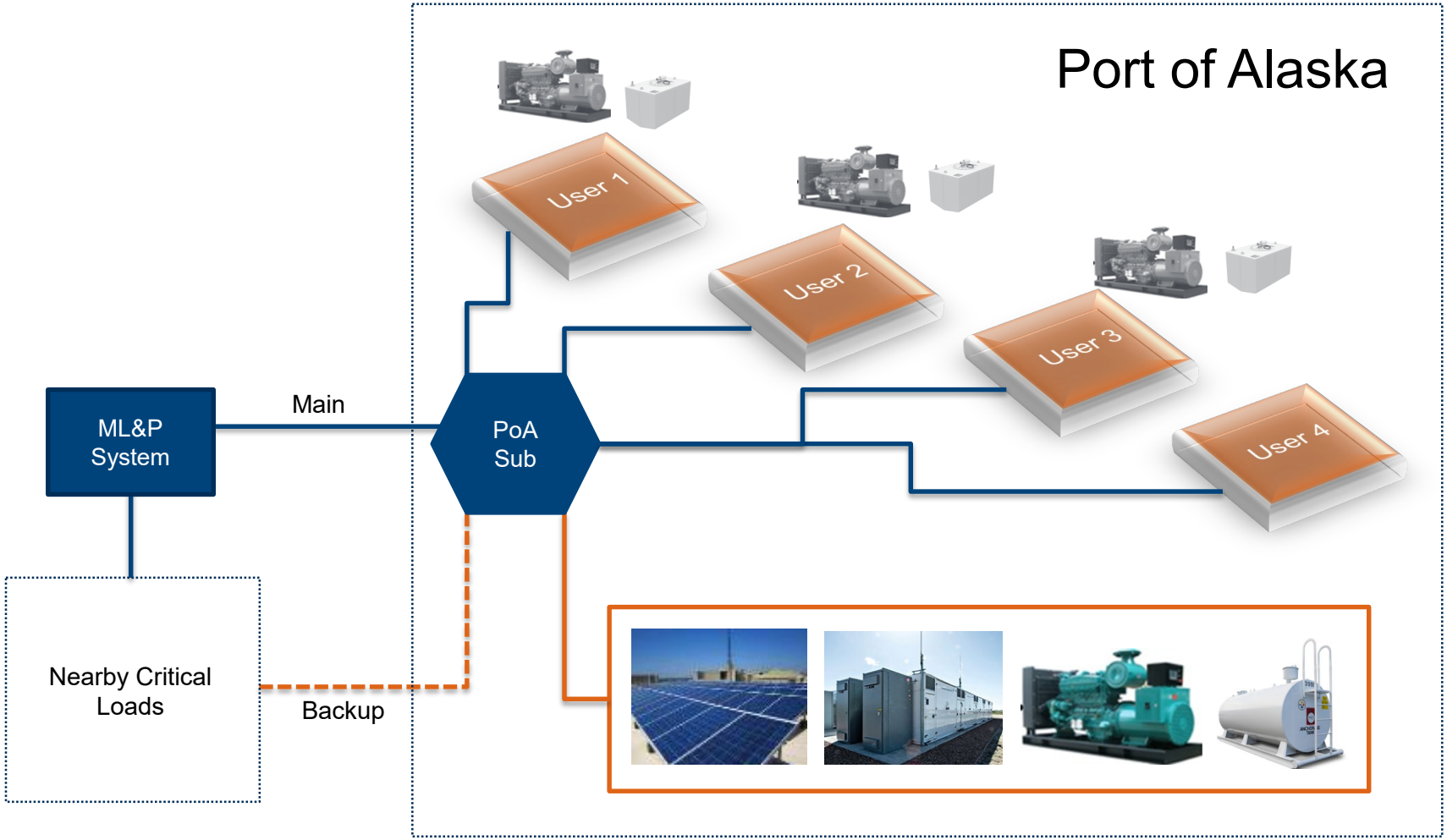
- **Existing utility supply infrastructure is <u>reliable</u> with respect to more common and expected events.**
- **Local energy resources or microgrids could provide <u>resilience</u> with respect to more severe events.**
  - Also provide options to manage peak demand, improve efficiency and integrate renewable energy



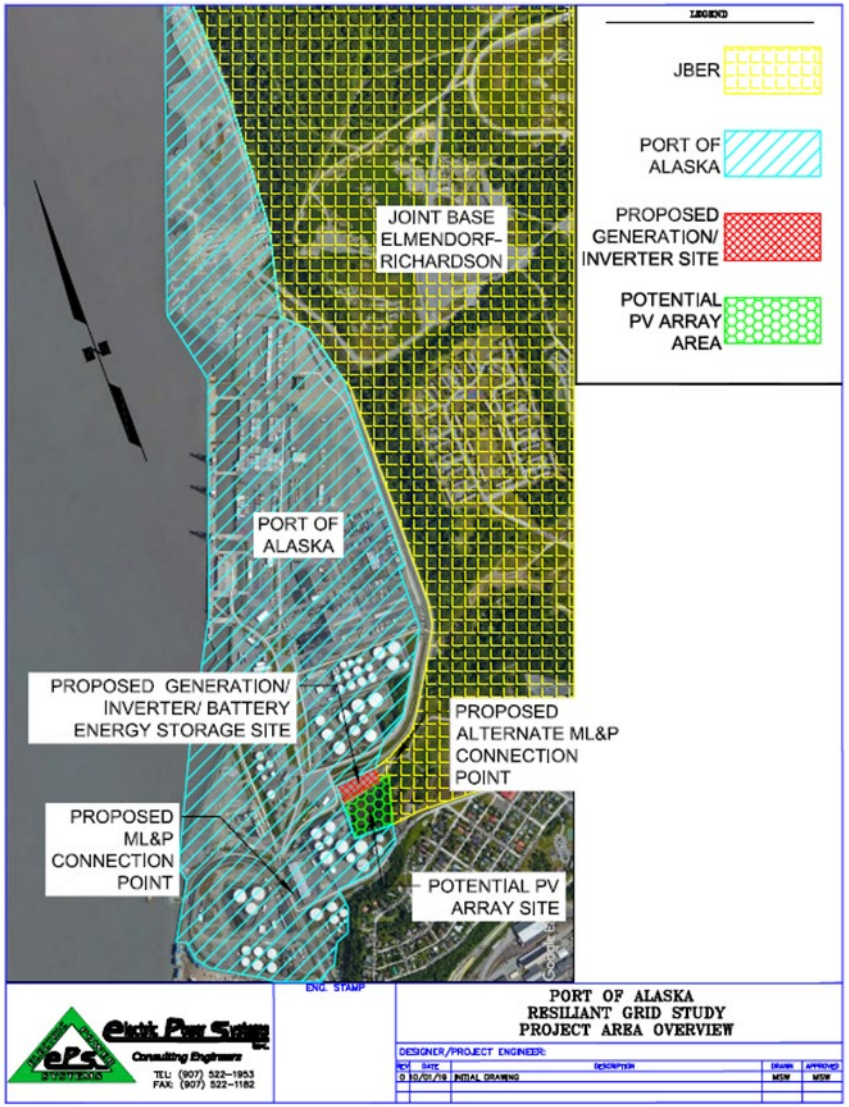
Preliminary Study Findings

- **Key utility service environment**
  - No provision for islanding parts of the local distribution system.
  - Default option for resilience: behind-the-meter emergency gensets.
  - Interconnection agreement required for net export to utility.
- **Loads to be served**
  - PoA peak load, including anticipated growth
  - Key load within JBER (relatively small demand), with dedicated feeder
  - ~6.85 MVA Peak, ~1.68 MVA Min
- **Energy system configuration**
  - Local microgrid within PoA footprint
    - ✓ PV (~2 MW), energy storage, size TBD based on more detailed short-term demand data
    - ✓ Dedicated and possibly rail-mounted gensets (~6.5 MVA)
    - ✓ Dedicated fuel storage and/or existing fuel infrastructure, size TBD
  - Utility interactive to deliver blue-sky benefits

What Would It Look Like?



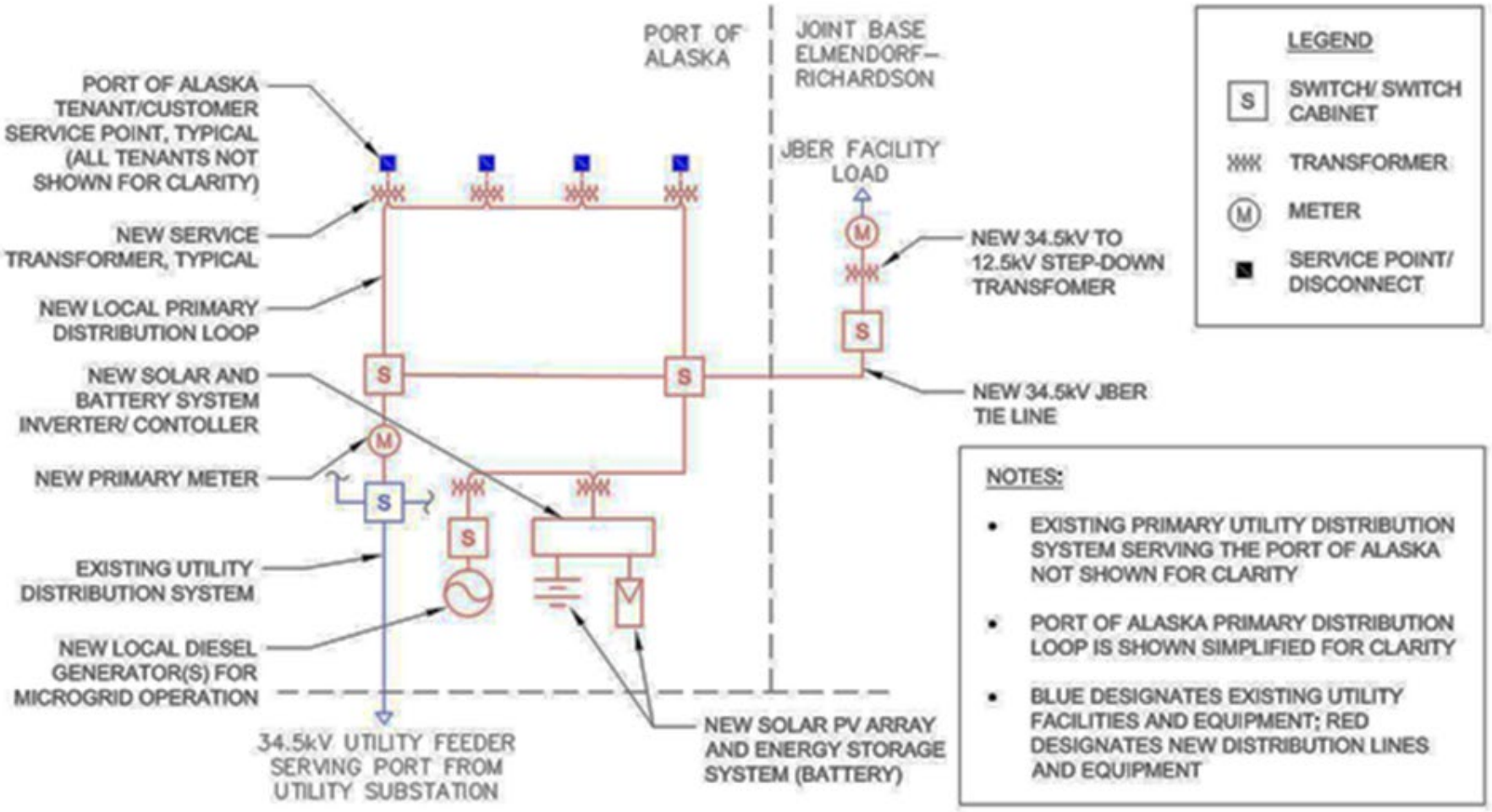
(3) Existing and Proposed Facilities



- **Candidate resources**
  - Energy storage: flywheel, batteries, other
  - PV, limited by size of land area
  - Advanced inverters (grid forming)
  - Backup diesel gensets, stationary and possibly railroad engines
  - Fuel supply options
- **Network**
  - Connection at 35 kV, Existing station (Plant 1)
  - New 35 kV back-up connection to JBER

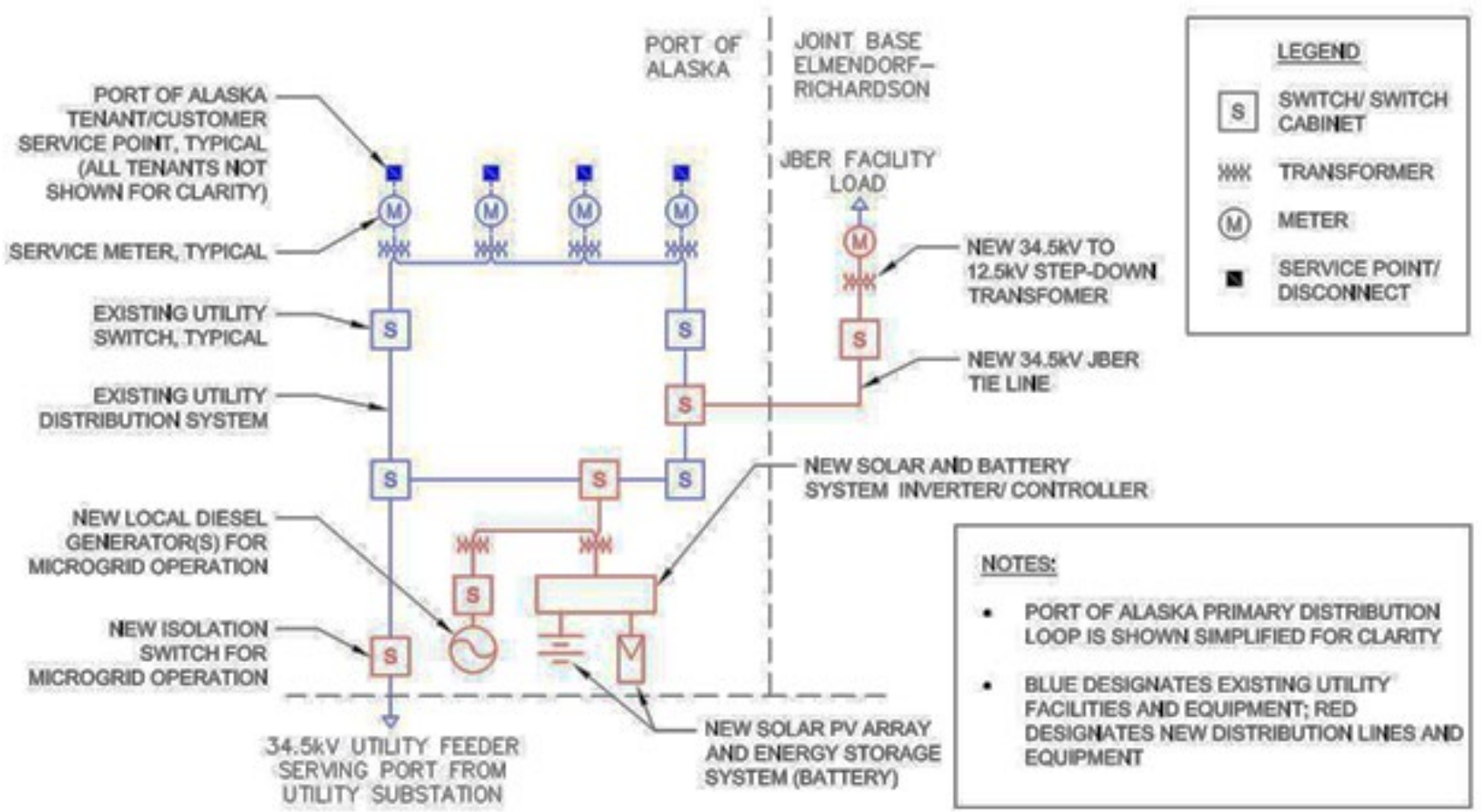
Preliminary

Baseline: Primary Metered Microgrid



Preliminary

Variation: Utility-Operated Microgrid



Preliminary

Risks and Challenges

- Design for resilience with respect to major events
- Microgrid capabilities to load requirements
- CAPEX and cost recovery
- Ownership model
- Other

Next Steps

- **Finalize the preliminary analysis**
  - Conceptual design and options
  - ROM cost estimate
  - Challenges and opportunities
- **Solicit comments from stakeholders**
- **If favorable, pursue next steps**
  - Detailed project specifications and cost estimates
  - Funding options, cost recovery mechanisms
  - Procurement
  - Deployment

Discussion