Near-term Hydrogen and Electricity Infrastructure Integration

Electrolysis-Utility Integration Workshop
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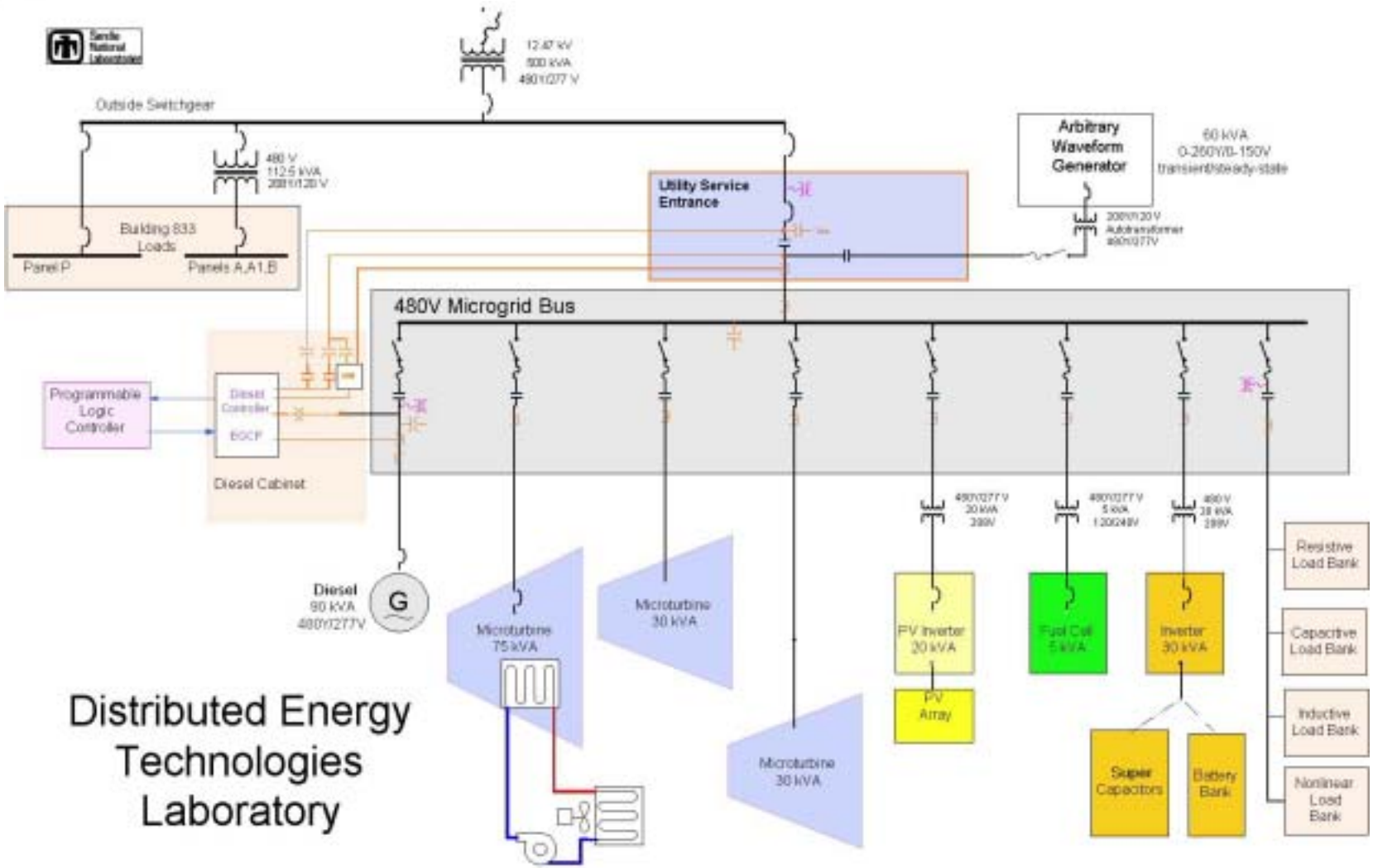

Distributed Energy Technologies Laboratory

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Integration Scenarios and Issues

- How and where can electrolysis systems be integrated in the grid?
  - Siting/location
  - Operational issues
  - Investments
  - Benefits
  - Ownership
- Objectives are
  - Capture “grid” benefits
  - Seek to reduce emissions

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Siting and Location

- Electrolysis systems can be sited at
  - Existing generating stations
  - Transmission substations
  - Distribution substations
- Each locations has different issues
  - Operational
  - Cost
  - Distribution (of H_2)
  - Ownership

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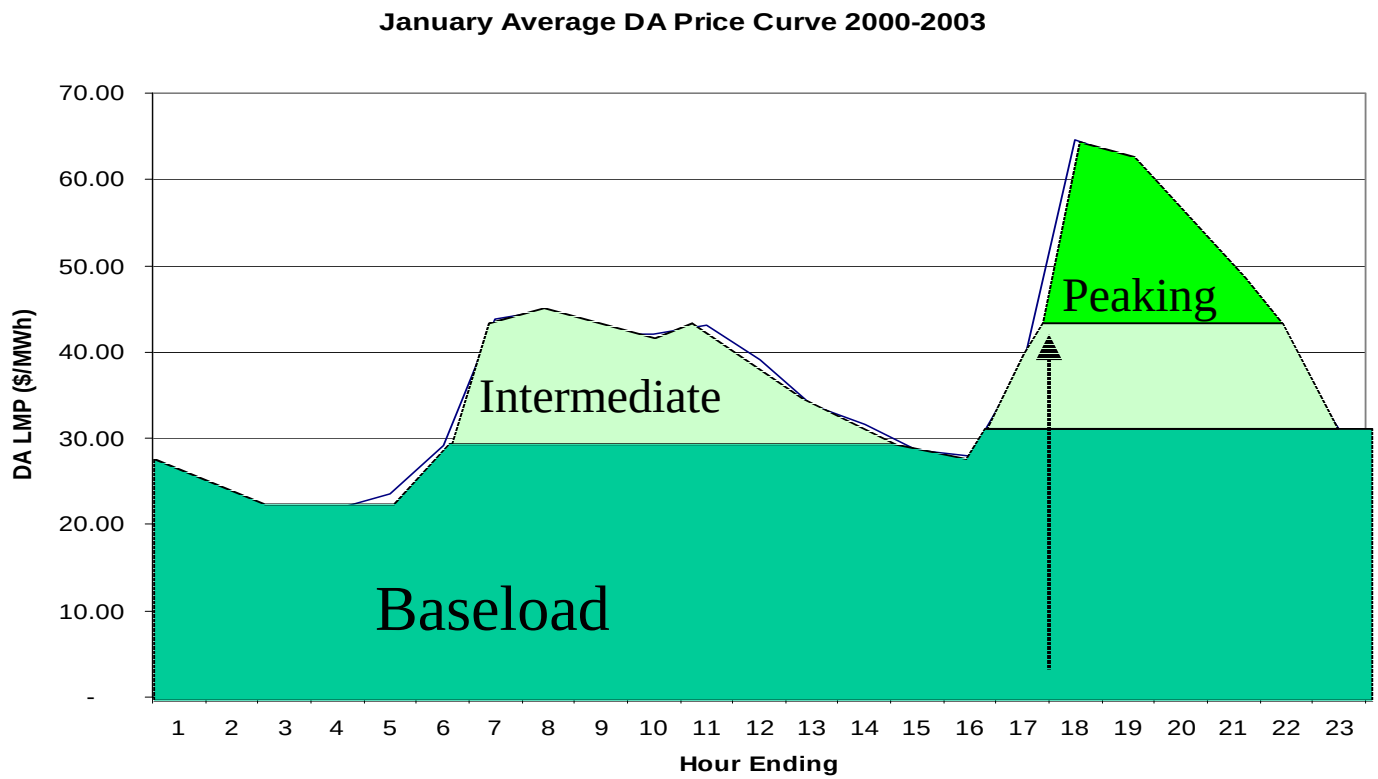
Generating Station

- Larger electrolysis system size and H_2 generating capacity
  - 50 - 100 MW electrolysis load
- Two H_2 options
  - Distribute to nearby H_2 demand center
    - Western generating stations are remote from urban areas
  - Utilize a hydrogen combustion process for electricity generation
    - Displace existing peaking or intermediate fossil-fueled generation with H_2-fueled generation

Load Leveling Scenario



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Transmission Substation Site

- Offers same size of electrolysis system opportunity, yet closer to urban areas
- Offers some congestion management possibilities
  - “Banking” excess capacity for short time periods
  - Offers same load leveling advantages
- Inverter has full four quadrant capability
  - Var management device at key transmission nodes

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Distribution Substation Site

- Smaller electrolysis system
  250 kW to 3 MW
- Closer to H_2 end user
  - ❖ Replicates existing gasoline pump business model
    - ➢ Ownership by non-utility entity with dispatch under utility control
- Locate electrolysis system on feeders with excess capacity

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