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NATIONAL RENEWABLE ENERGY LABORATORY

Integrated Energy System Alternatives for Consideration

Integrated Nuclear-Renewable Energy Systems Foundational Workshop

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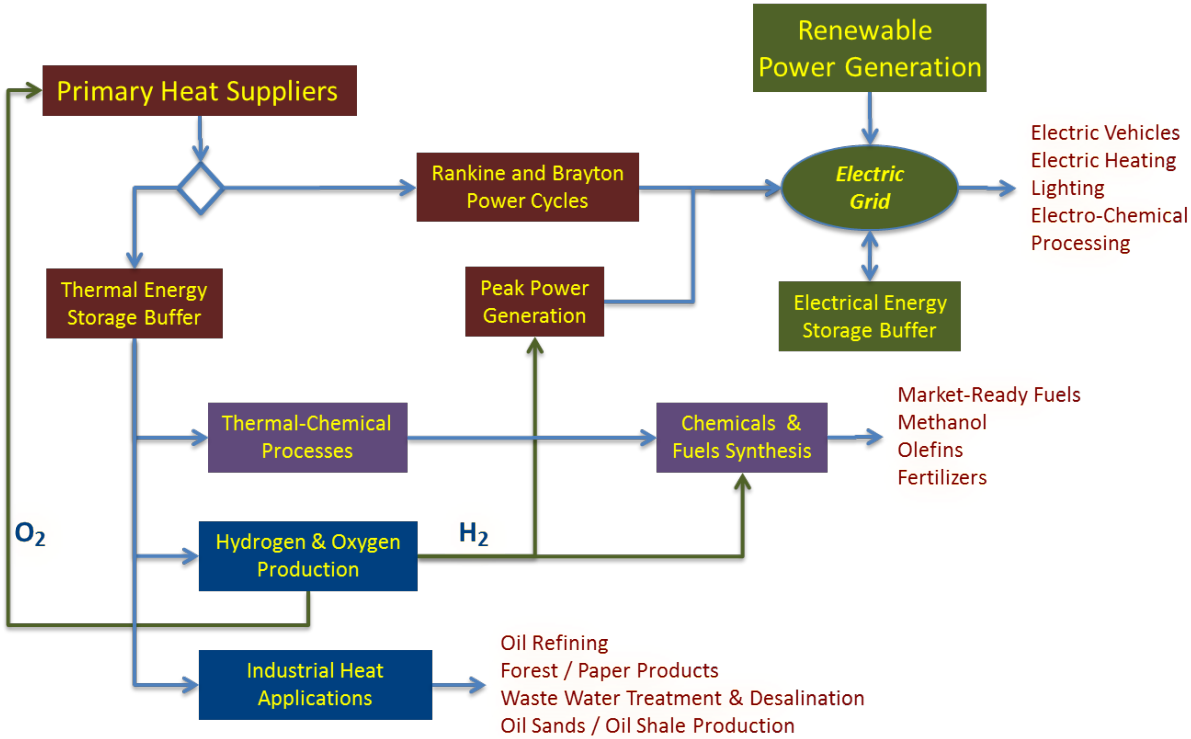
NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

Presentation Objective

- **Propose specific integrated nuclear-renewable energy systems for discussion**



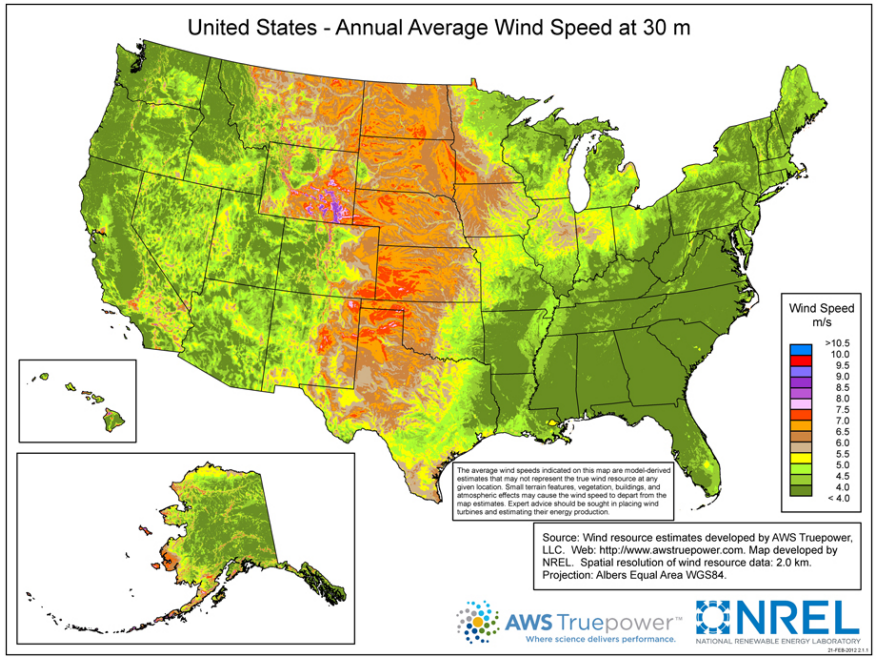
Credit: Ruth, et al "Integrated Nuclear-Renewable Energy Systems – Assessment and Deployment Roadmap Plan" In review

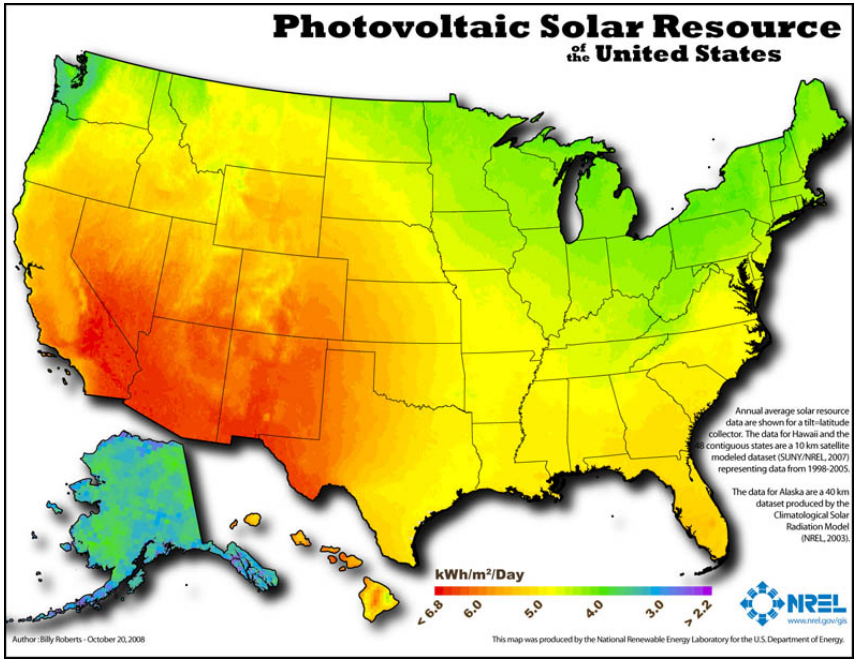
- **All options coupled behind the electrical transmission bus**

Opportunities Categorized Regionally

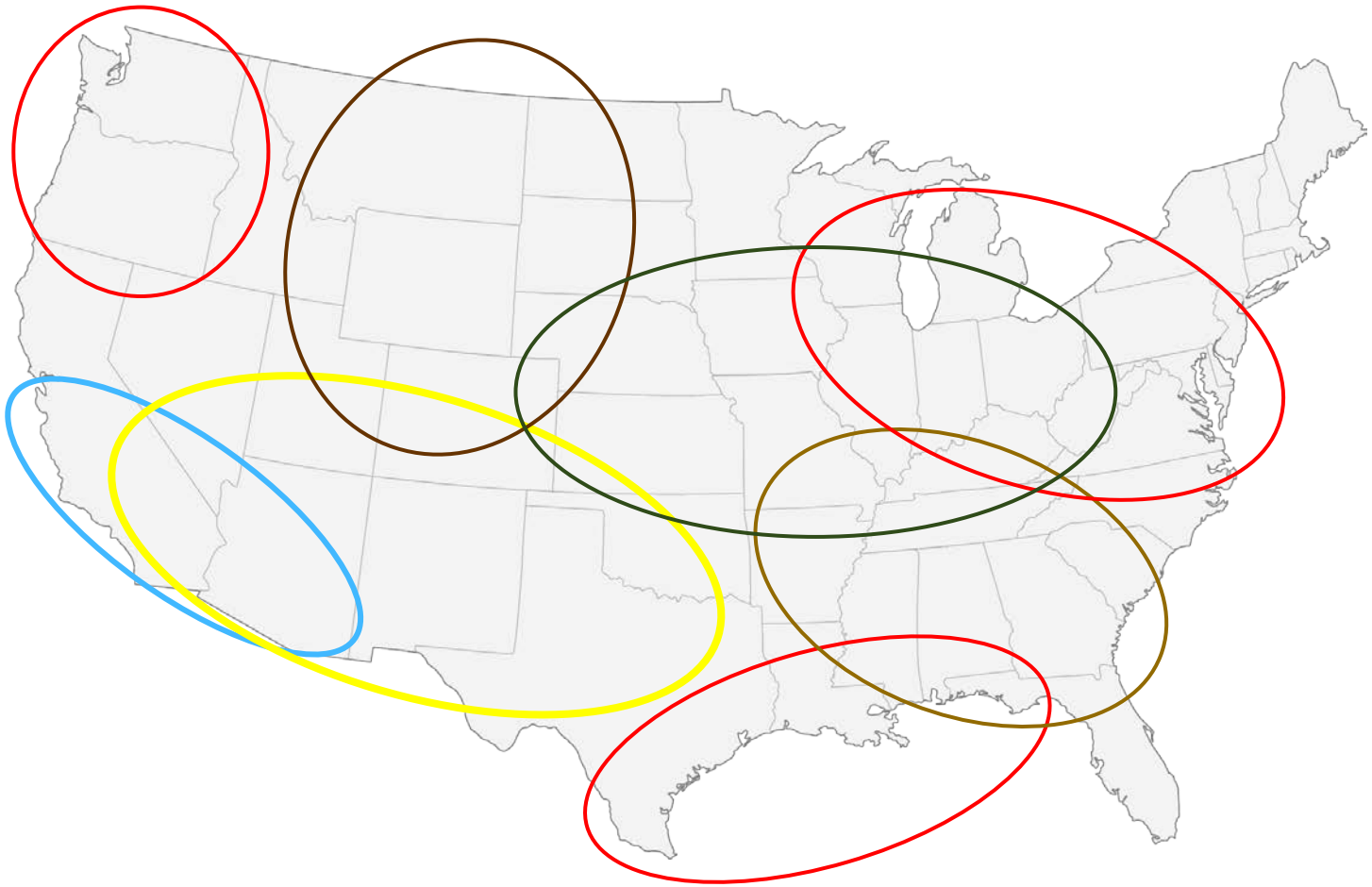
Regional categorization because of heterogeneity

- Resources
- Market opportunities
- Energy delivery options
- Policies
- Regulatory issues
- Others

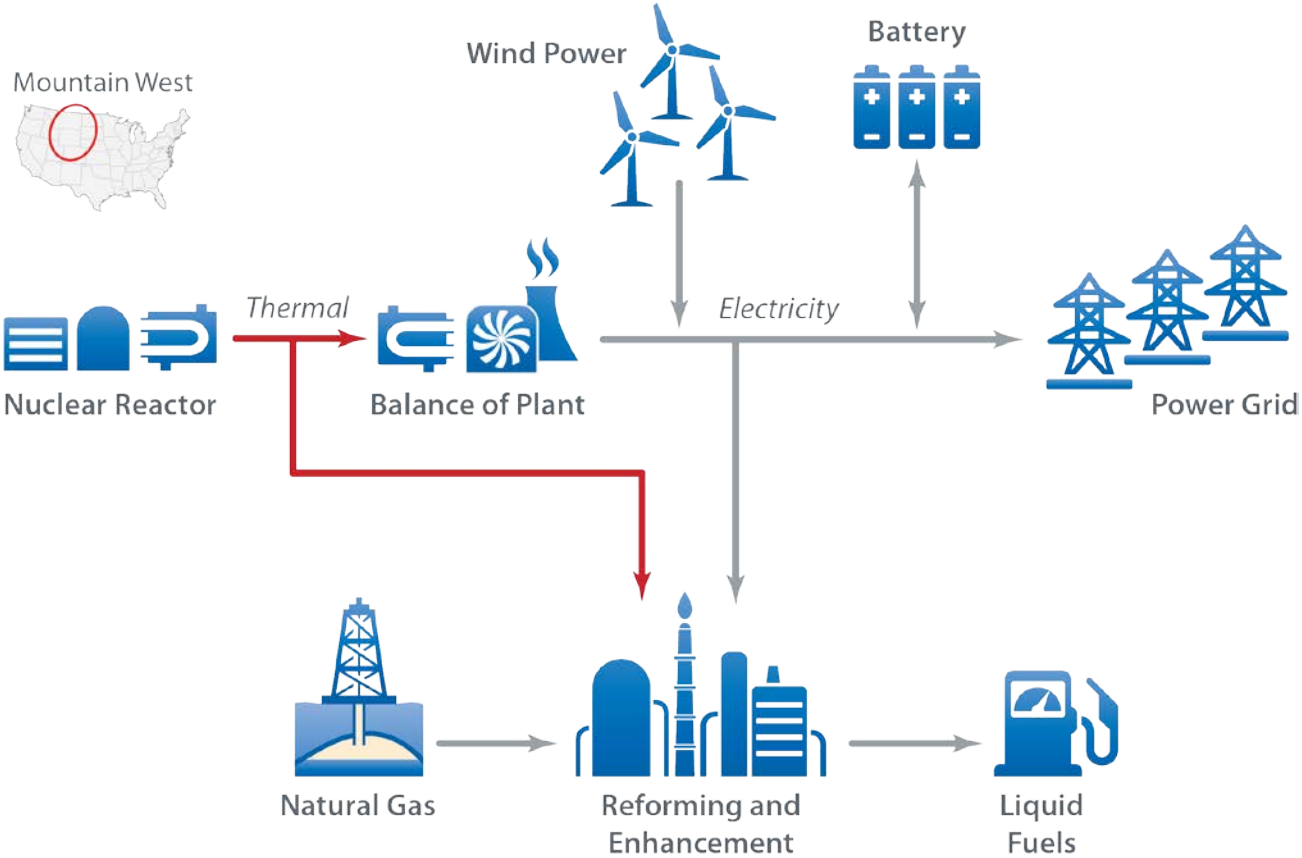




Eight Opportunities Identified

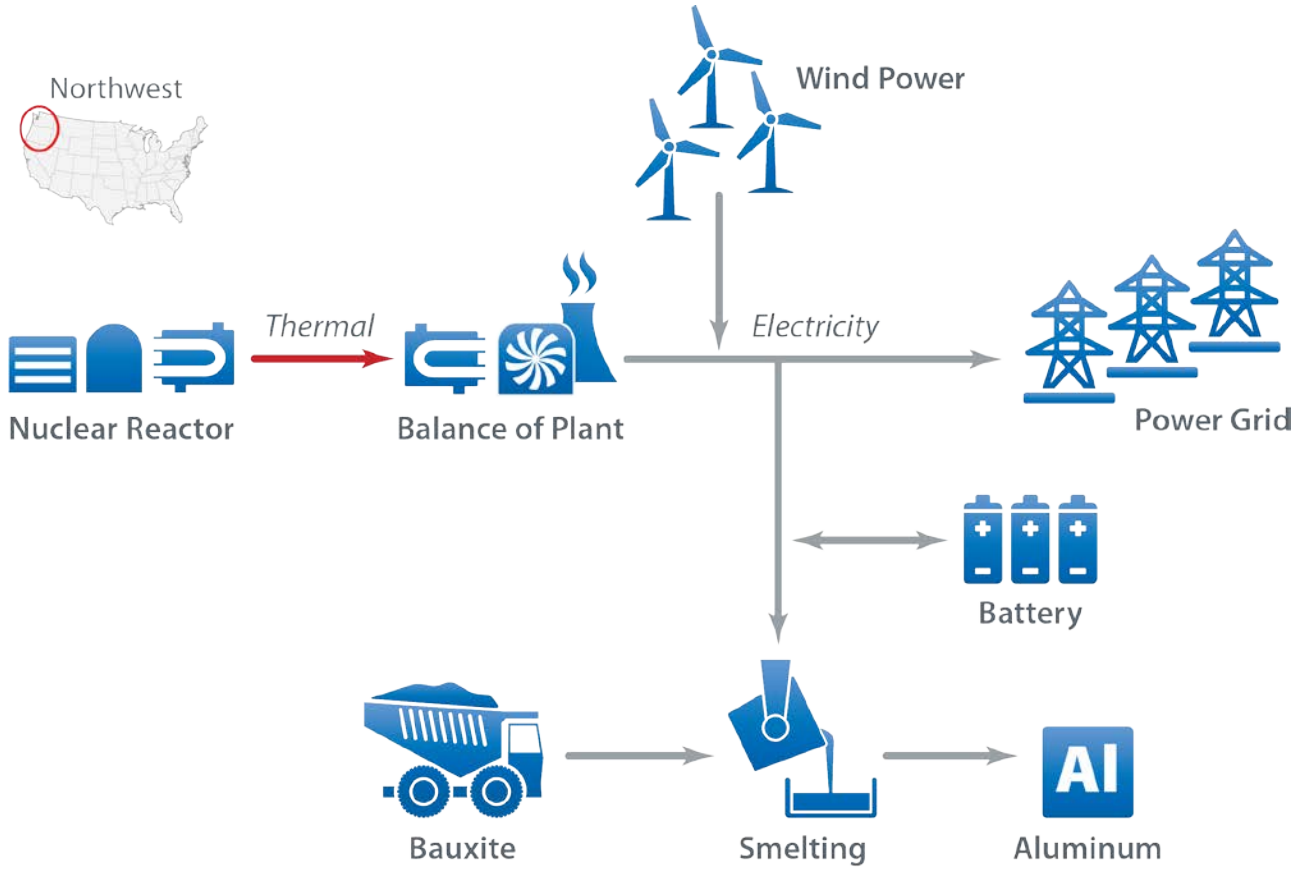


Mountain West



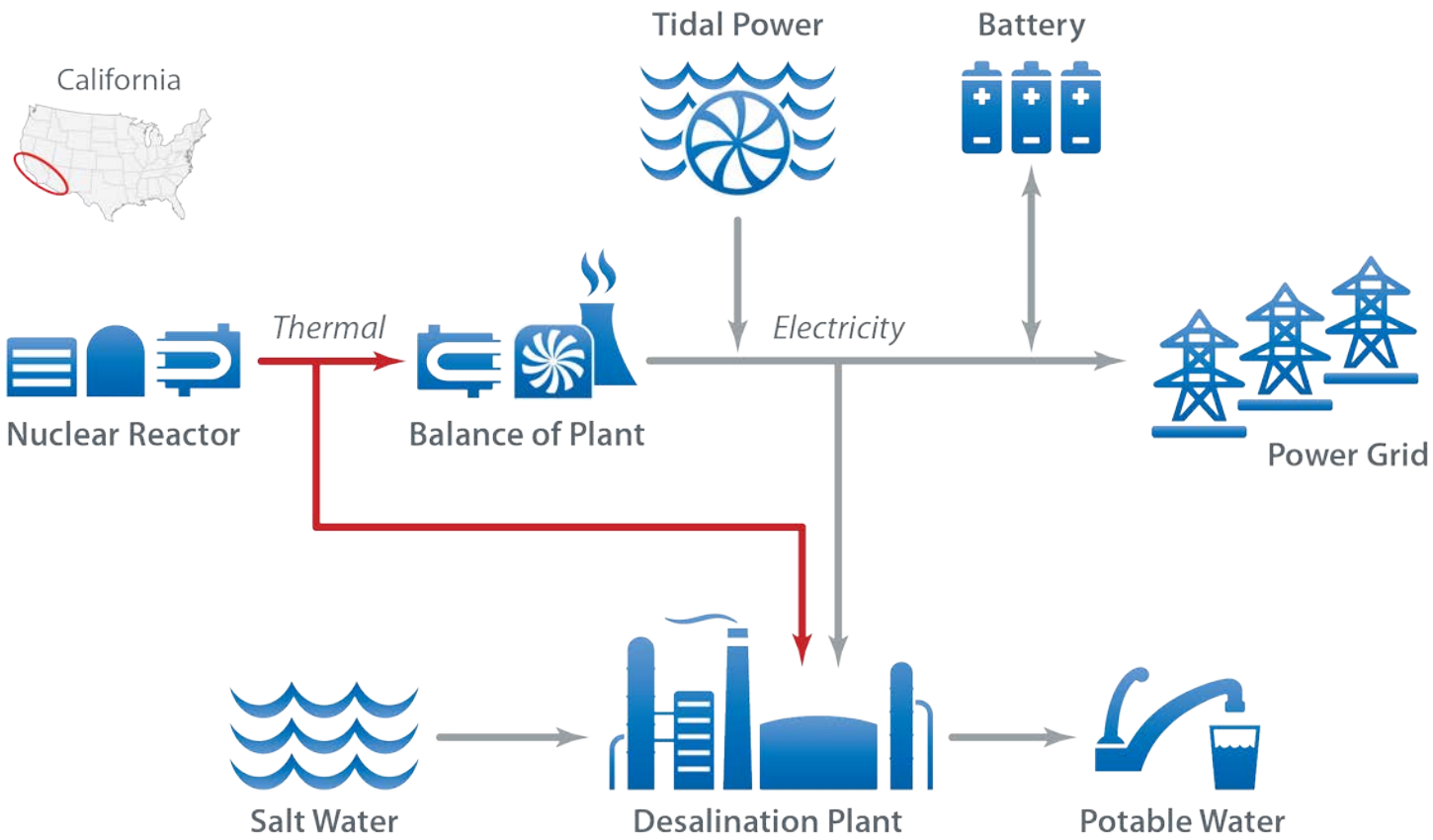
- **Natural gas and wind resources**
- **Transmission congestion**
- **LNG potential for rail and trucking**

Pacific Northwest



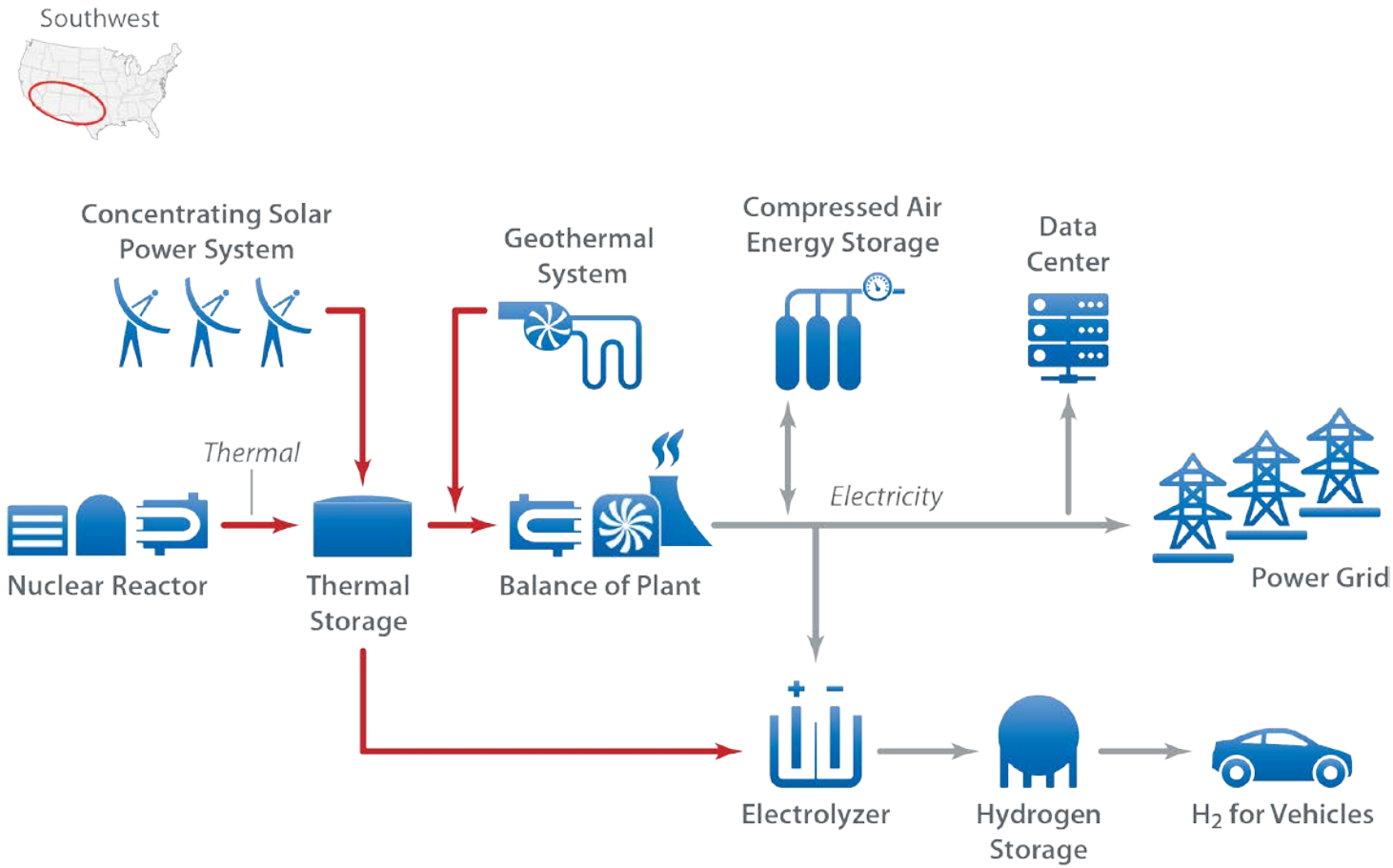
- **Extensive resources for electricity generation**
- **Traditional aluminum smelting and potential for exporting**

Southern California



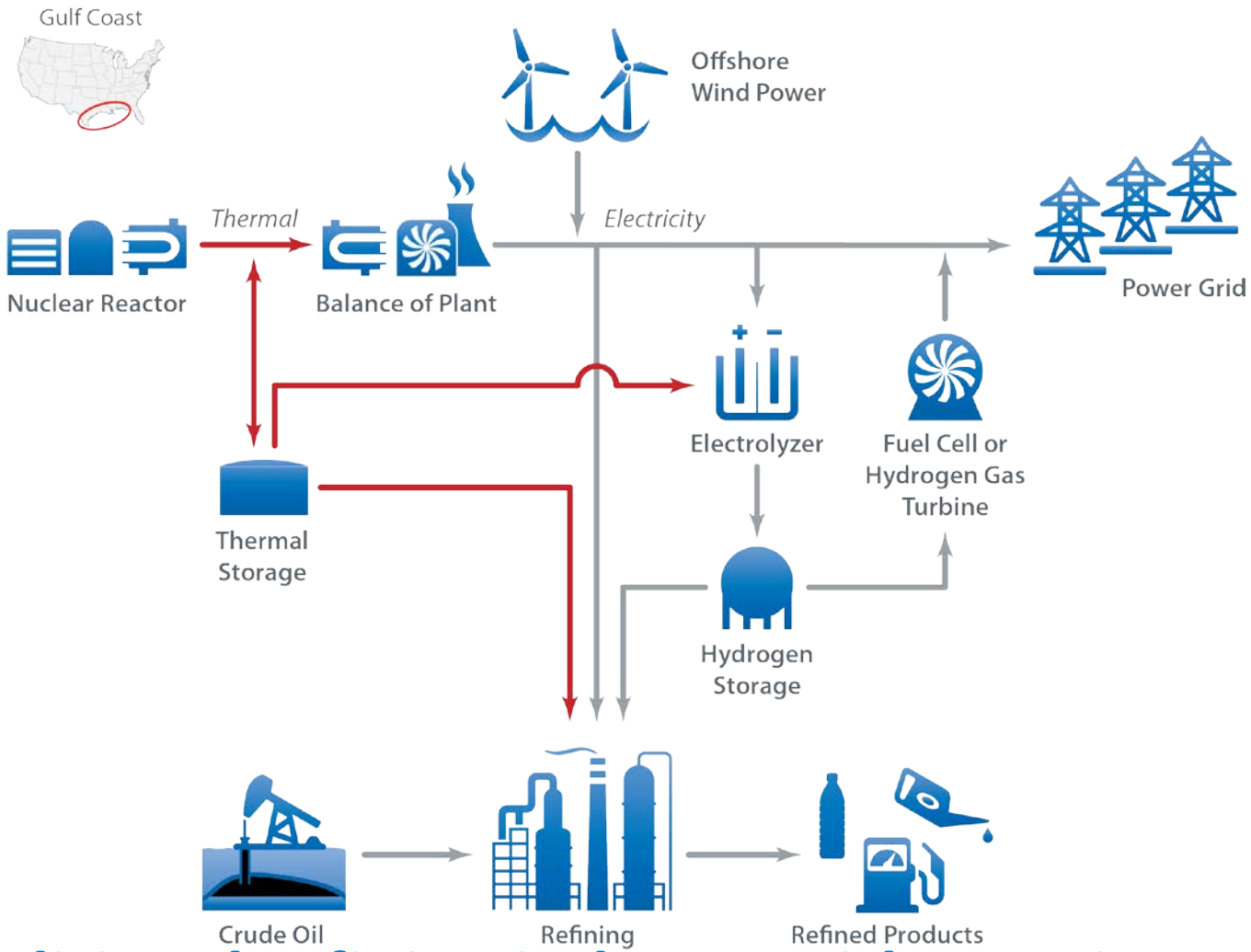
- **Power grid flexibility issues**
- **Coastal area with tidal power potential**
- **Fresh-water constrained**

Southwest



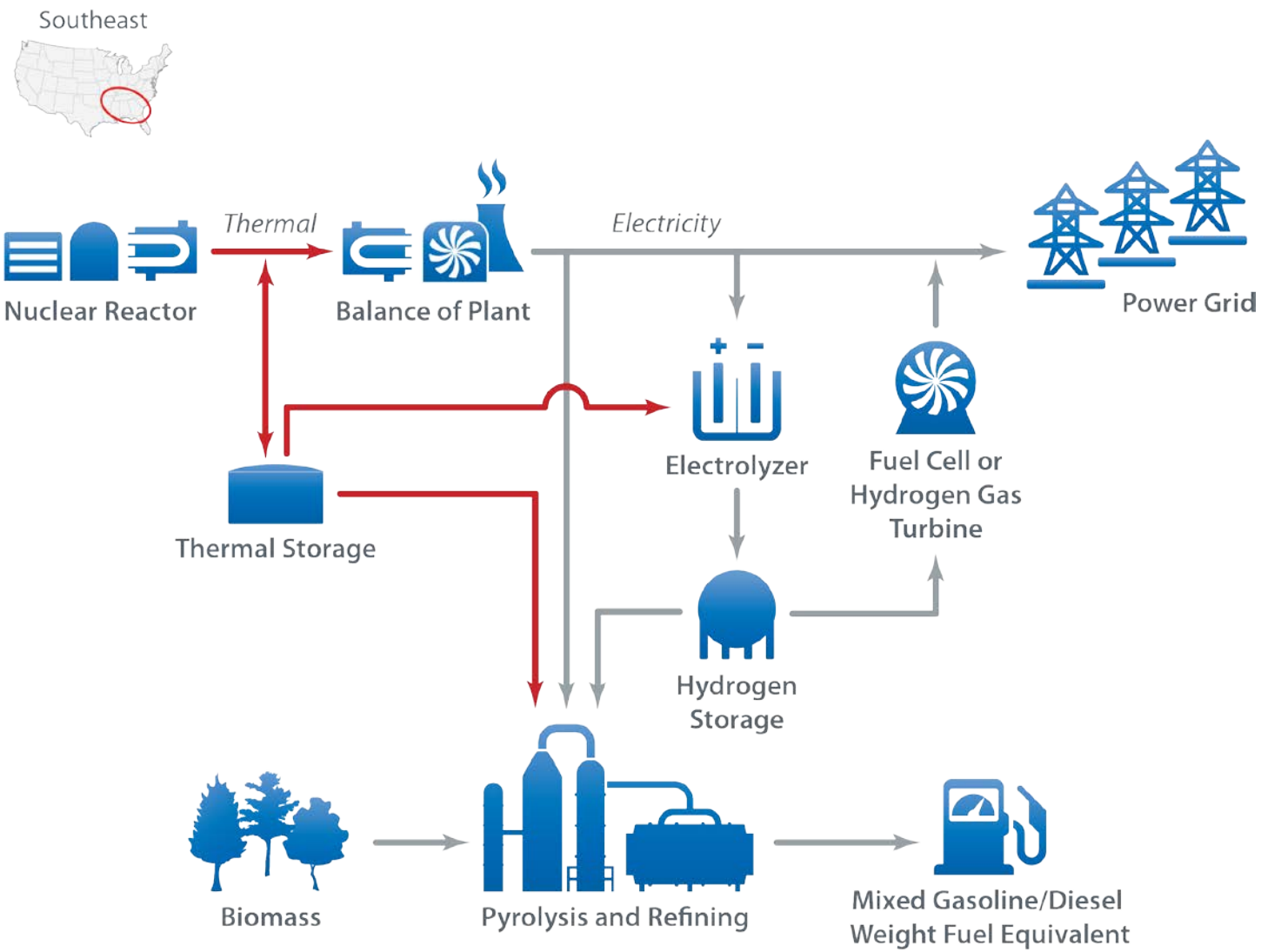
- **Concentrated solar power and geothermal resources**
- **Opportunities for large power demand centers**
- **Hydrogen vehicles limit emissions**

Gulf Coast



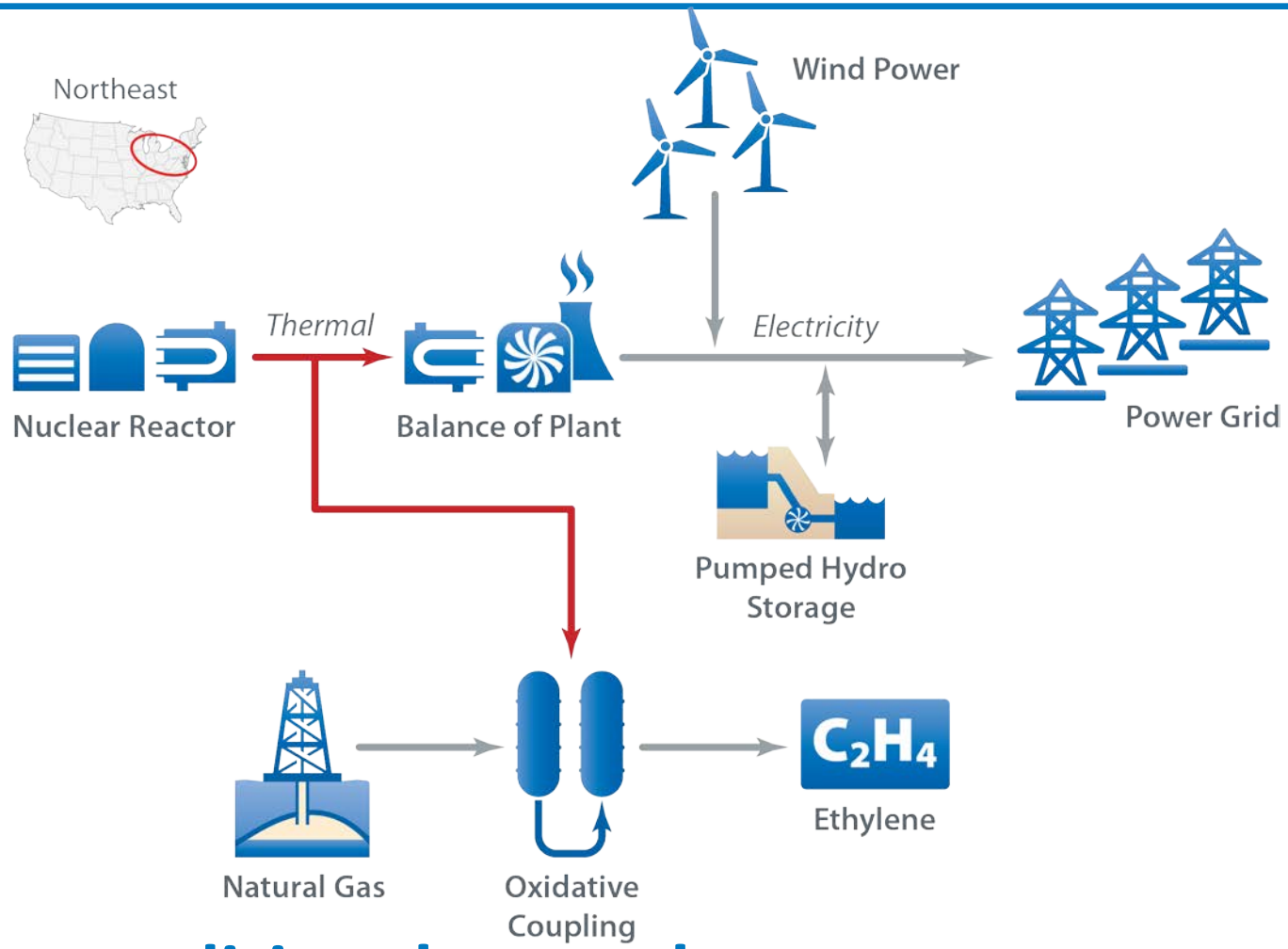
- **Traditional refining industry with growing need for hydrogen**

Southeast



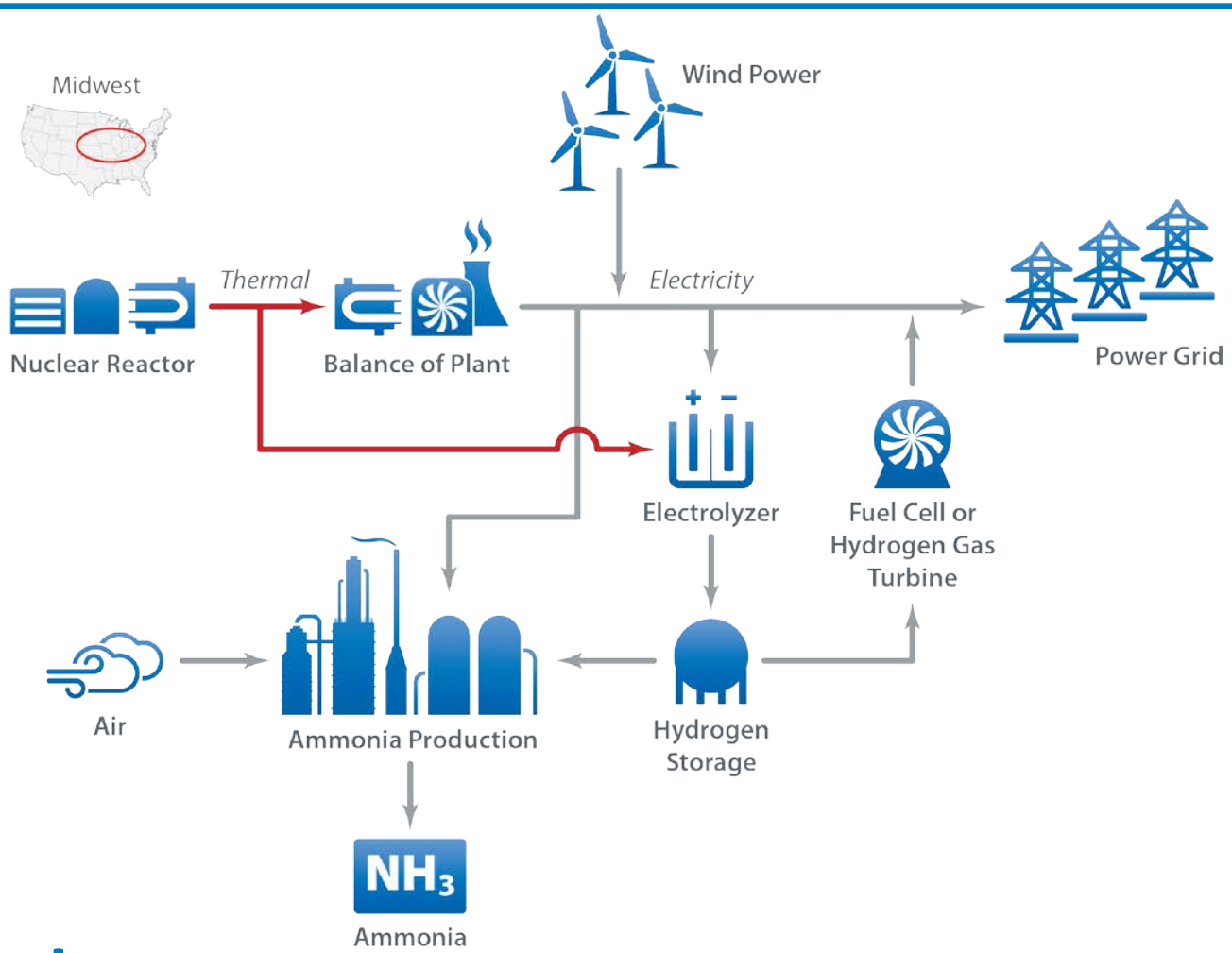
- **Biomass resource near refining centers**

Mid-Atlantic and Northeast



- **Non-traditional natural gas resources**
- **Chemical industry**

Midwest



- **Wind resources**
- **Fertilizer demand for farming**

Next Steps

Think about the eight opportunities proposed

- **Are they appropriate for the regions?**
- **Can you identify better options due to markets, resources, technologies, etc.?**
- **Did we miss a region that should be considered?**

- **Tomorrow**
  - Feedback in a gallery walk
  - Identification of priority opportunities

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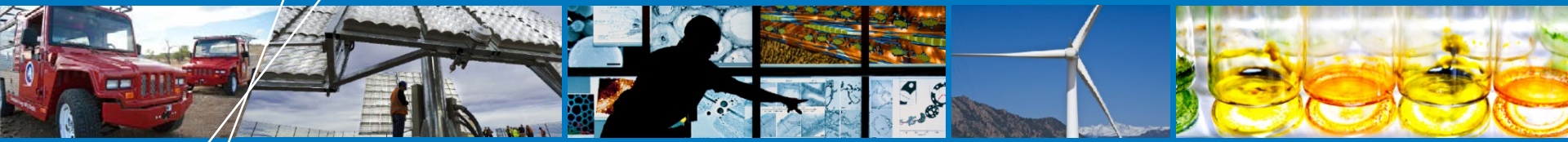

Questions?