



Smart Grid Technology Panel

PNWER Economic Leadership Forum
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PNNL is operated by Battelle for the U.S. Department of Energy



US DOE National Laboratories



PNNL in Washington State



4,722

Employees in WA



7,180

Jobs Generated
In WA



\$1.01B

Annual Spending



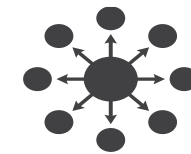
\$1.46B

Total Economic
Output



265

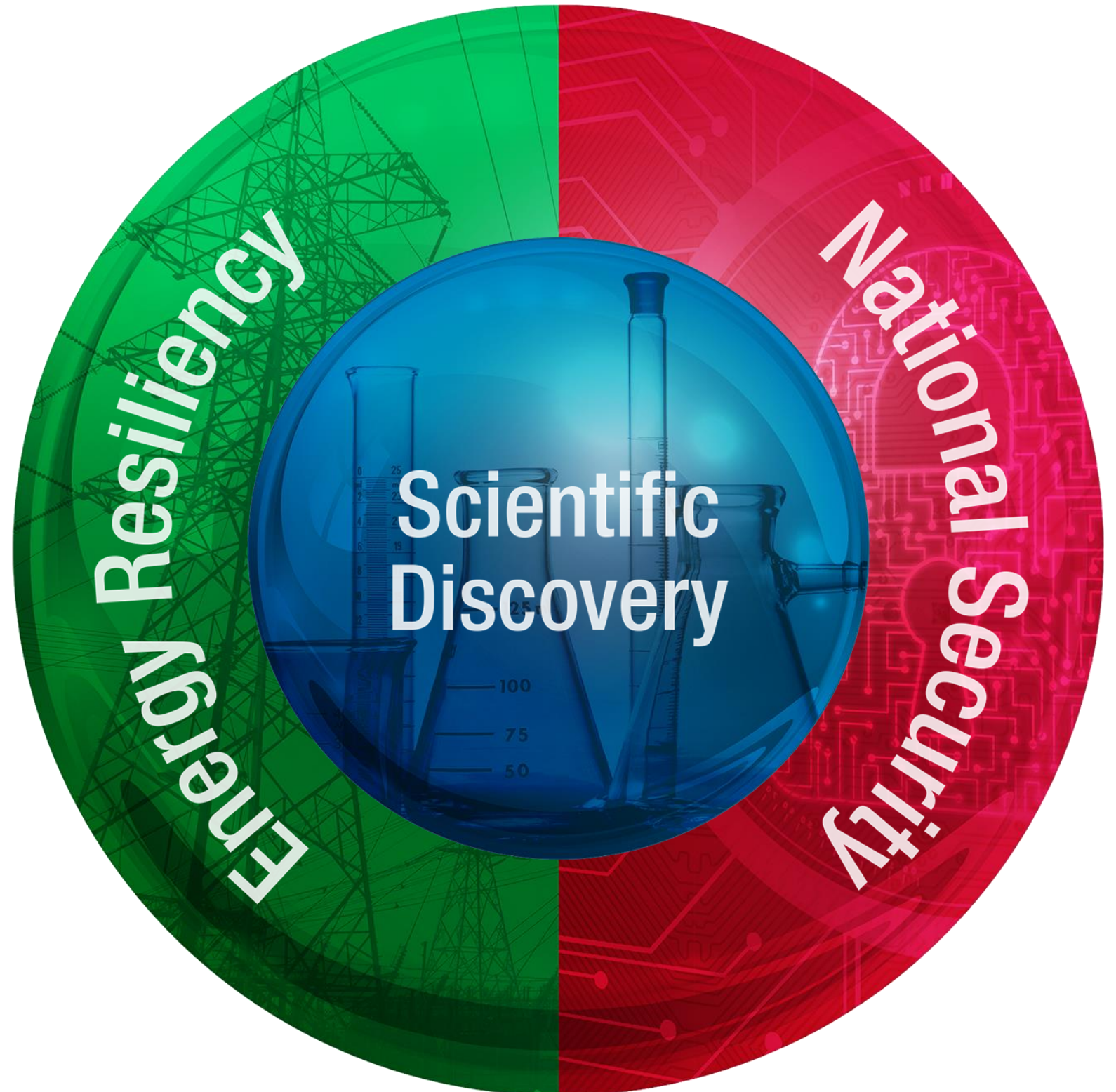
Inventions 2019

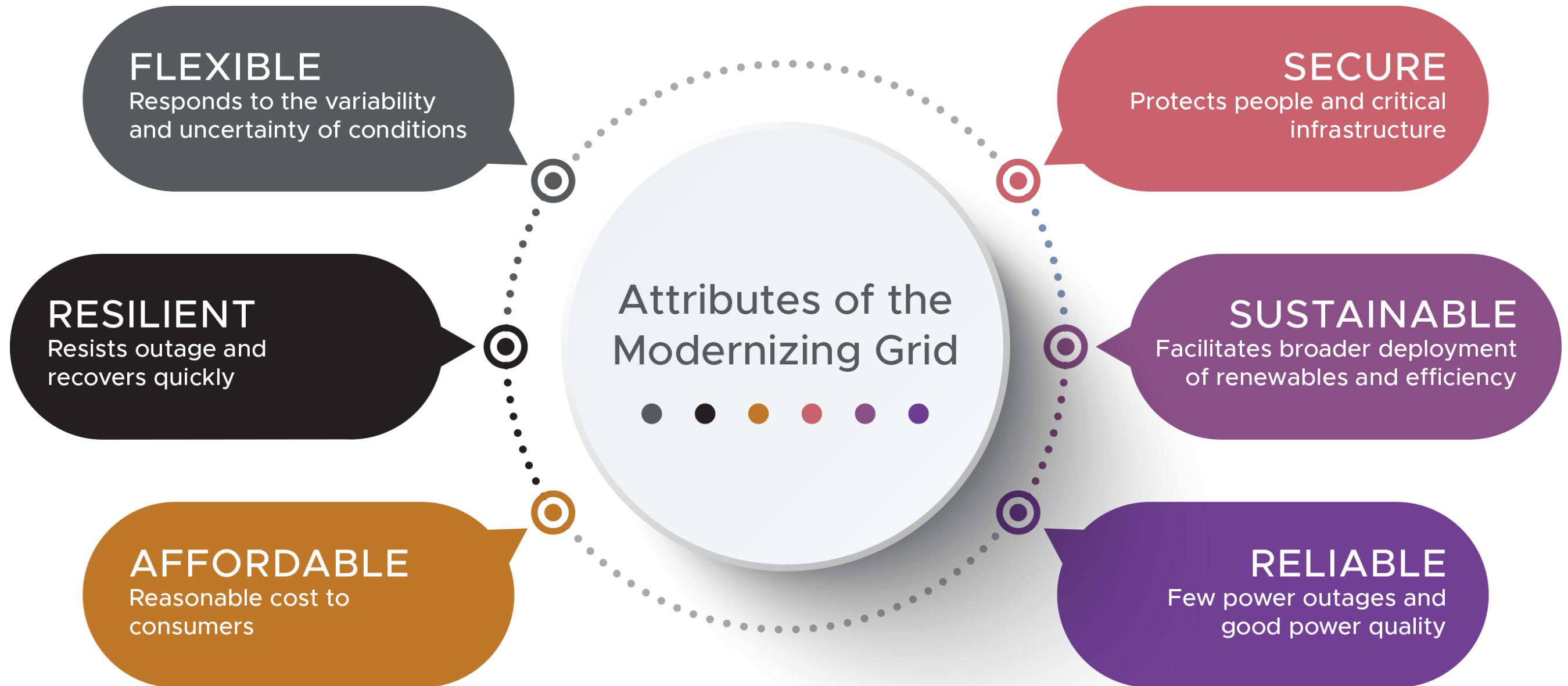


193

Companies
with PNNL
Roots (since
1965)

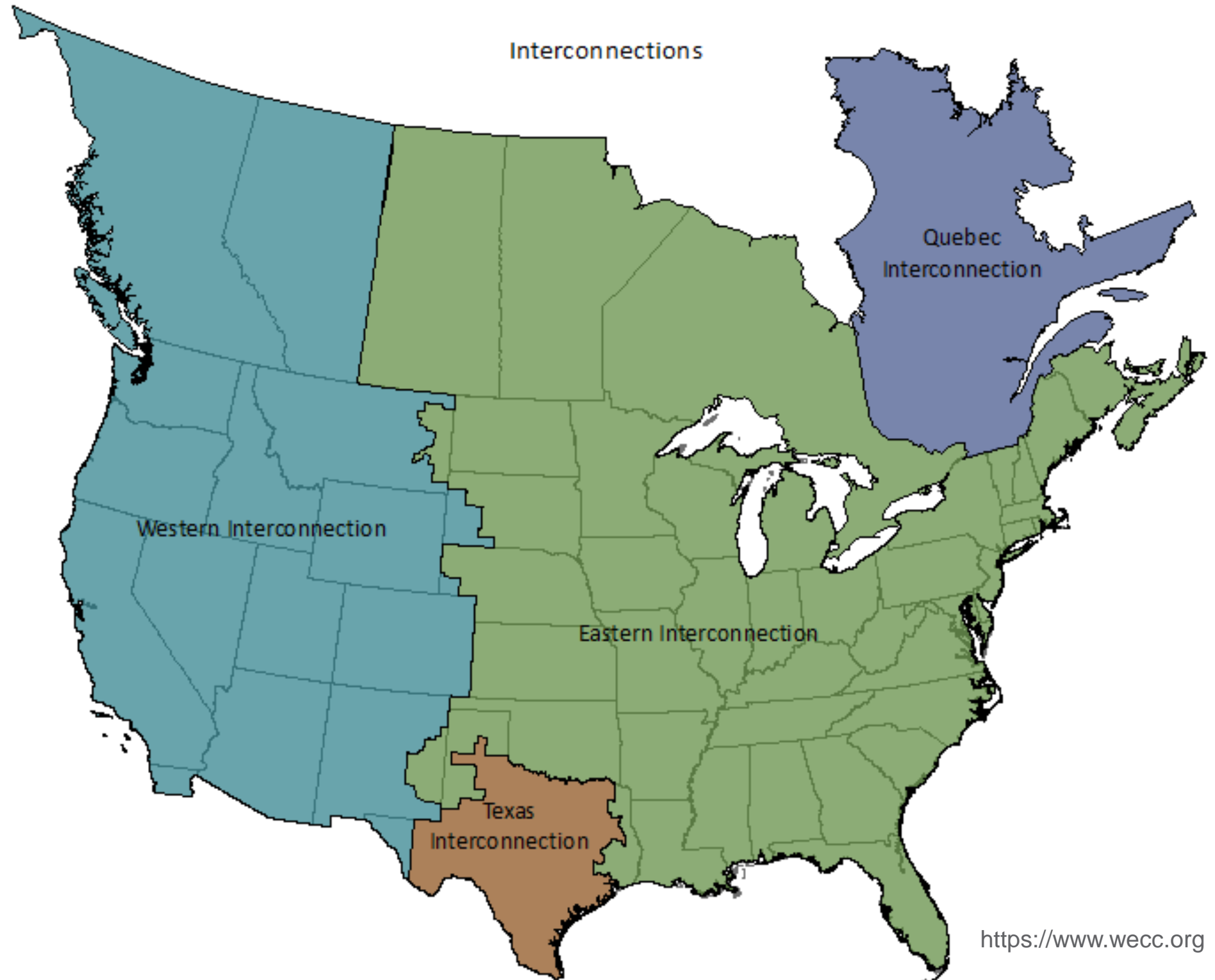
PNNL is addressing
complex challenges
and providing
solutions to critical
national needs



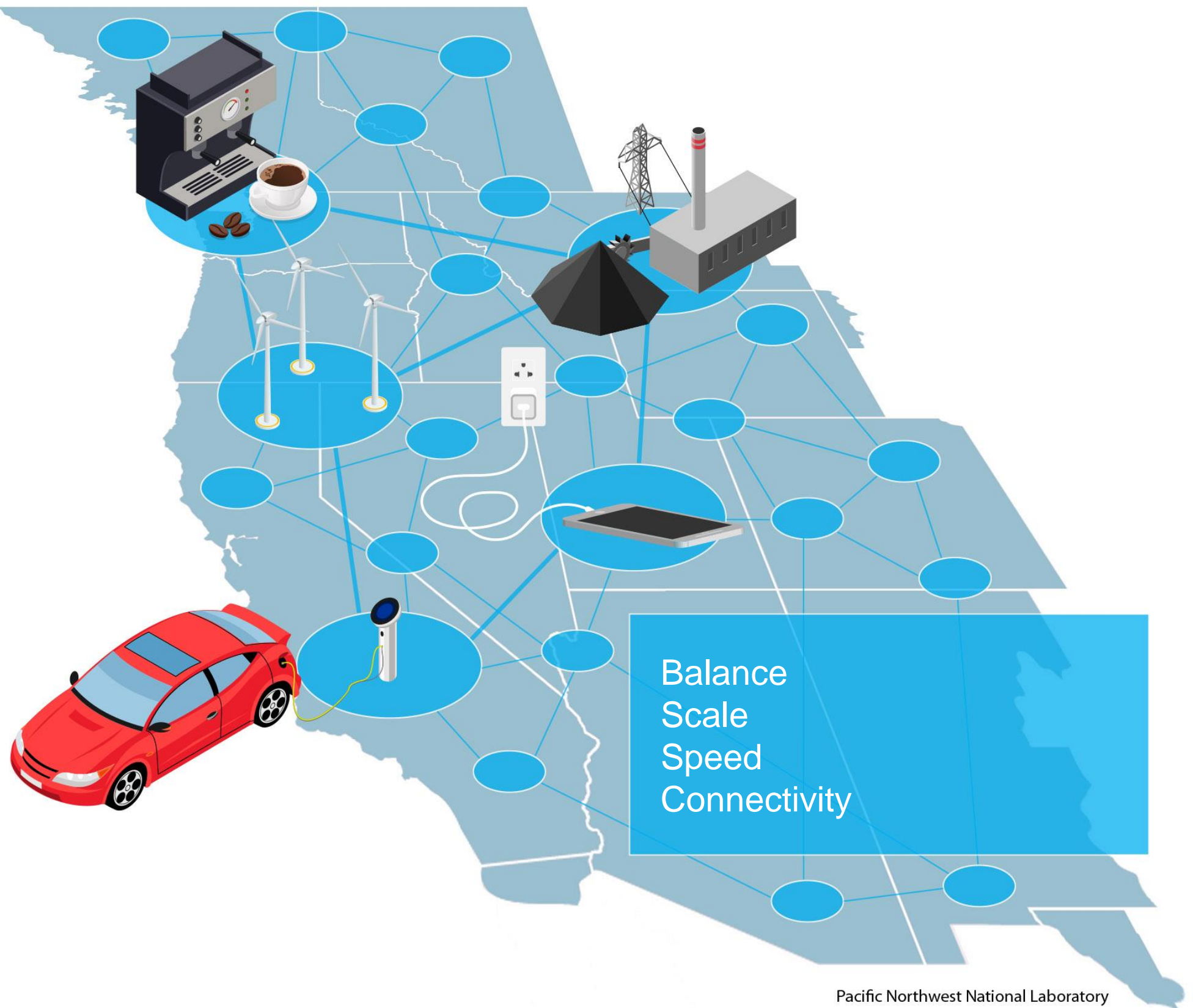


The Four Machines

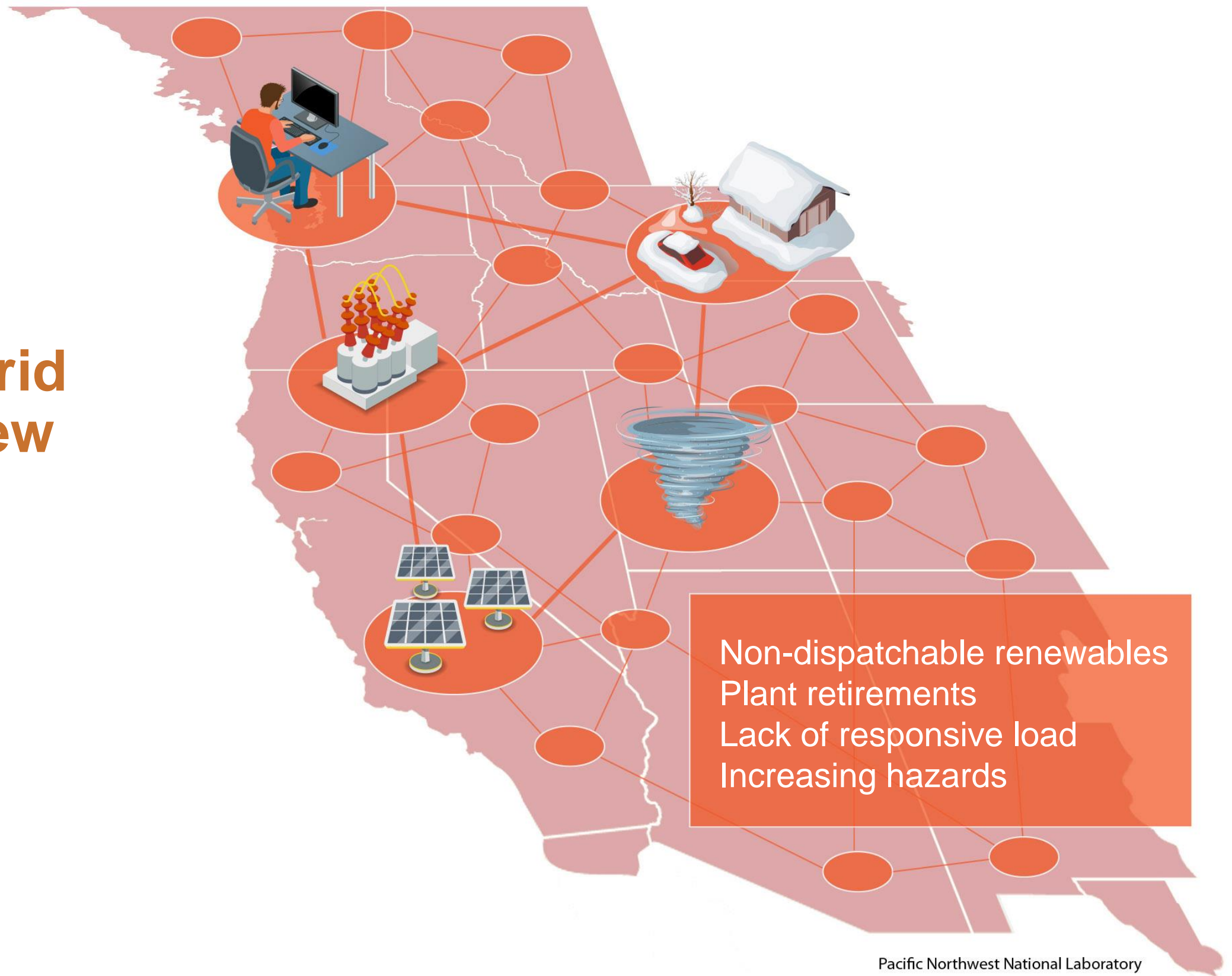
Each of the four
North American
Interconnections
each operate as a
synchronized
machine, with all
devices at the same
frequency ~ 60 Hz



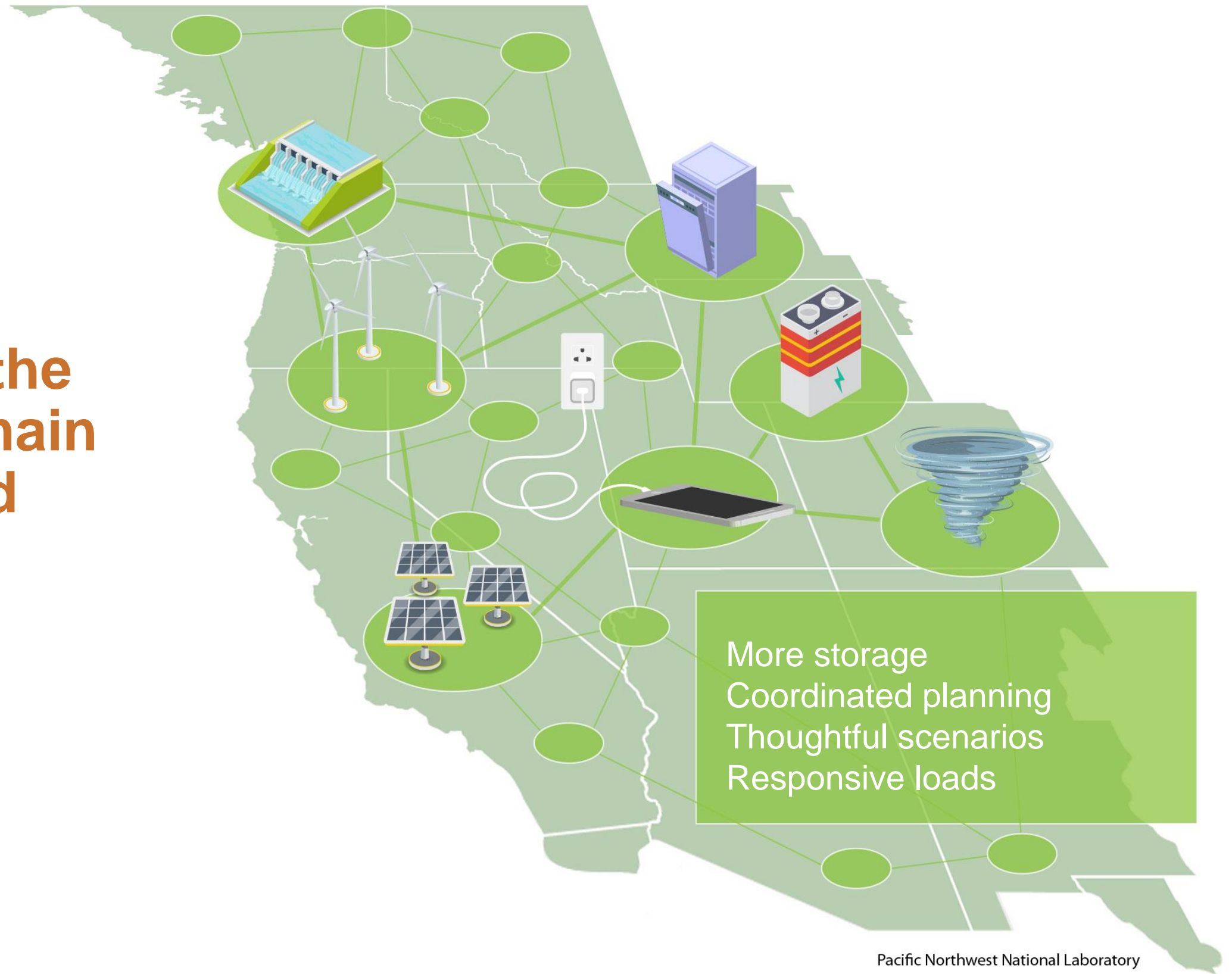
Today's Power System



Rapidly changing grid provides new challenges



Modernize the Grid to Remain Flexible and Resilient



Thank you!



**Pacific
Northwest**
NATIONAL LABORATORY

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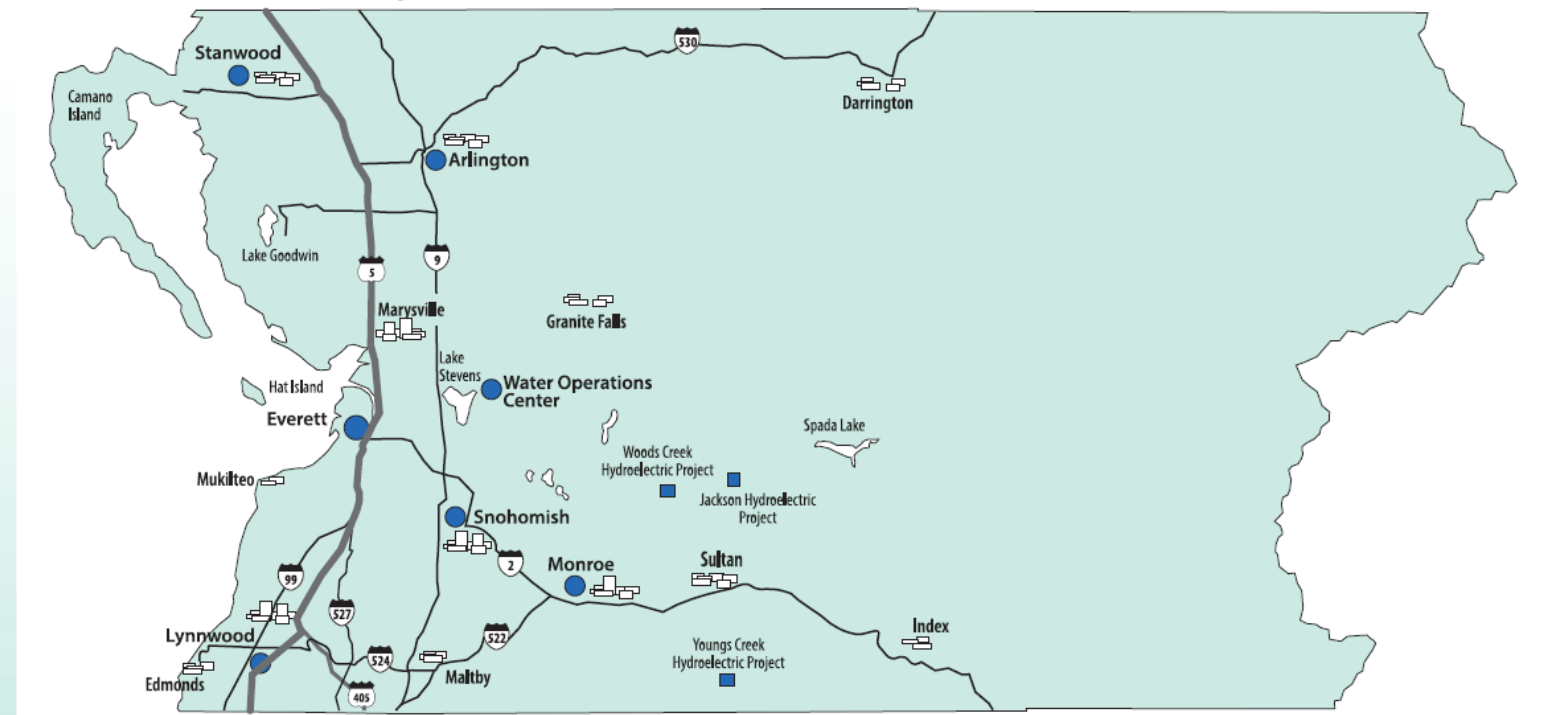
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Snohomish County PUD Background

- Largest Public Utility District in Washington State
- 13th largest publicly owned utility in the US
- Over 350,000 electric customers, 21,000 water customers
- Covers 2,200 square miles in Snohomish County and Camano Island
- Expecting about 20,000 new customers over next 7 years
- Directed by 3 Elected Commissioners



Utility of the Future Strategic Initiatives

- **Electric Vehicle Strategy**
 - Education and awareness, support customer EV adoption, grid optimization
- **Distributed Energy Resource Planning/Non-wires Solutions**
 - Cross-functional team developing DER and energy efficiency based solutions to address traditional distribution system issues
 - DER can include solar, batteries, energy efficiency and demand control
 - Transactive energy: Facilitate energy exchanges between customers
- **Arlington Microgrid**
 - Renewable energy integration
 - Disaster preparedness
 - Vehicle-to-grid
- **Solar**
 - Community Solar at Arlington Microgrid
 - Leverage community solar learnings to inform future solar offerings
- **Distribution Automation (DA)**
 - Deployment field devices and communication system to optimize grid and increase reliability
 - 10 circuits deployed, 13 additional circuits under deployment
- **Advanced Distribution Management System (ADMS)**
 - Advanced applications for DER management, fault restoration and storm response
- **Advanced Metering Infrastructure (AMI)**
 - Incentivize deployment of DER and shape customer usage behavior
 - Rate structure re-design

