



Opportunities & Challenges in Grid Modernization for Industry

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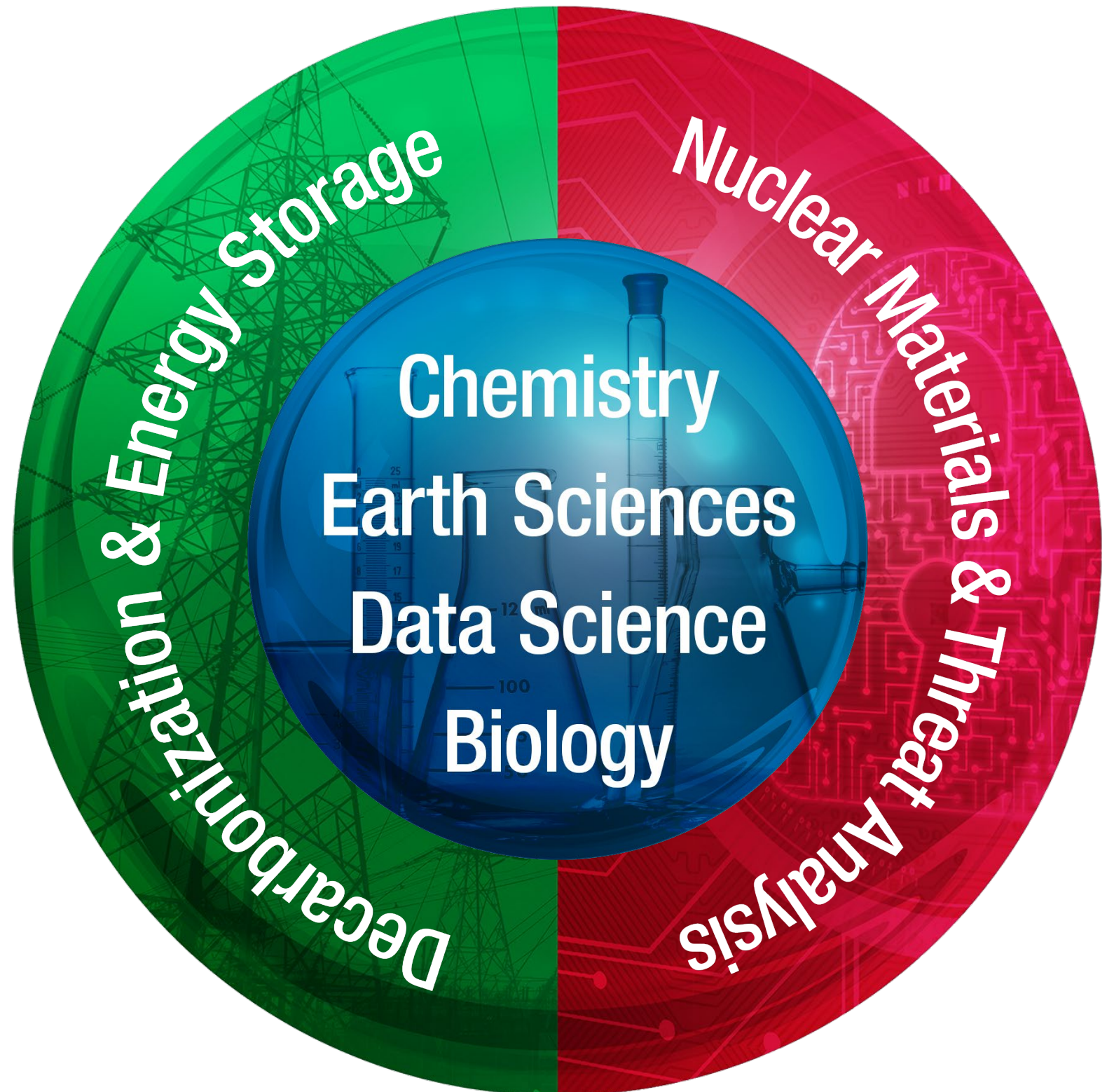
PNNL is operated by Battelle for the U.S. Department of Energy



DOE's 17 **national laboratories** tackle critical scientific challenges

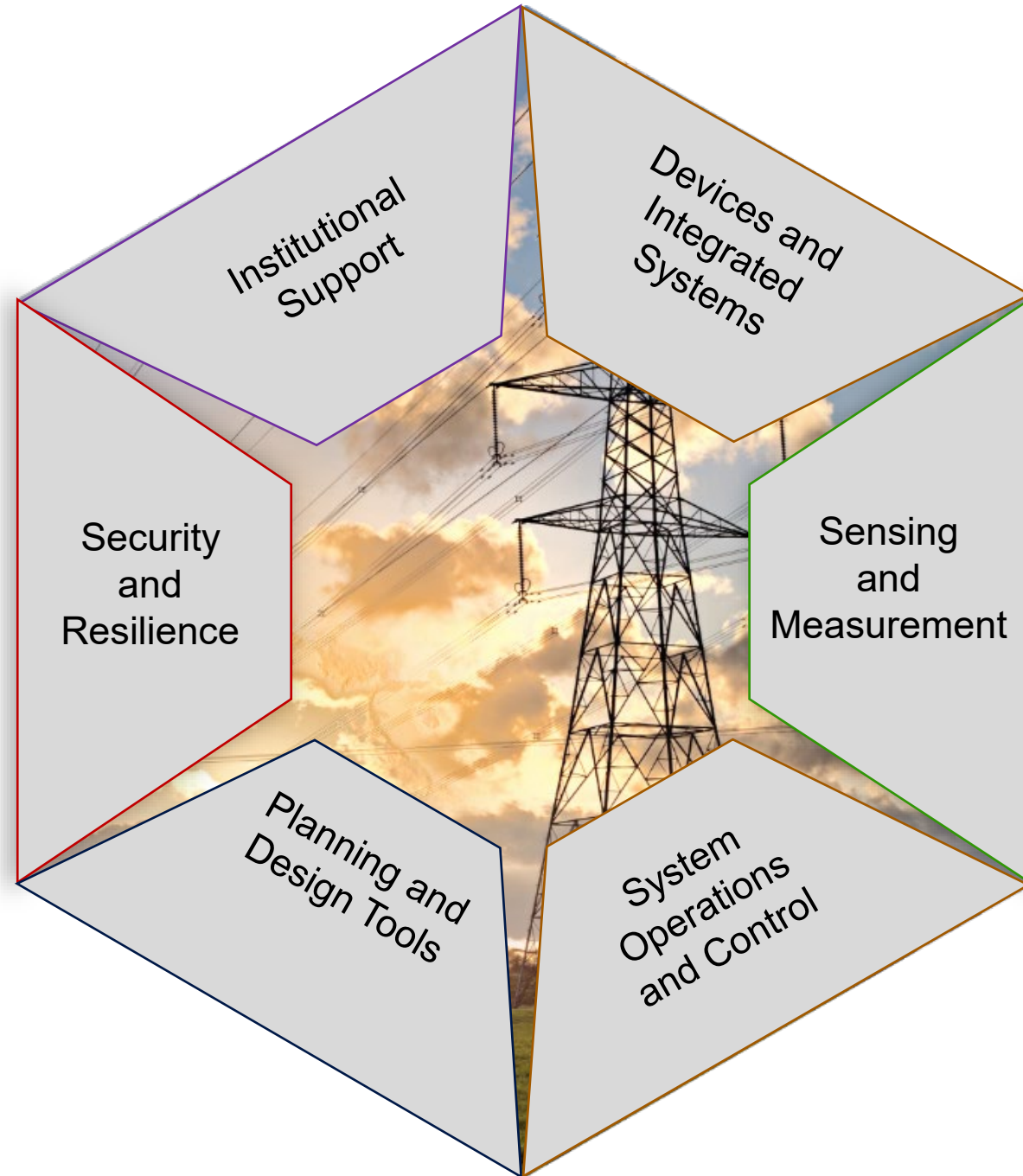


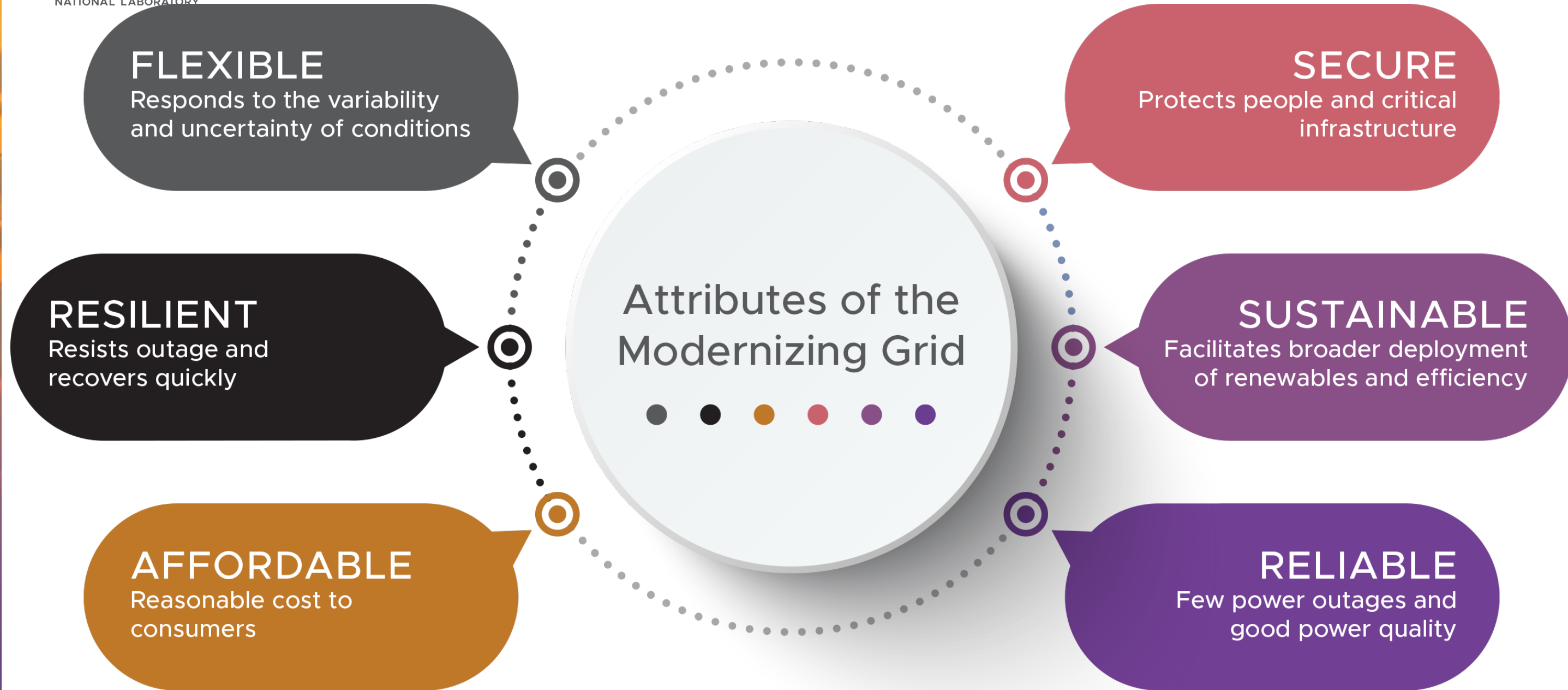
PNNL's distinguishing
strengths enable
mission **impact**





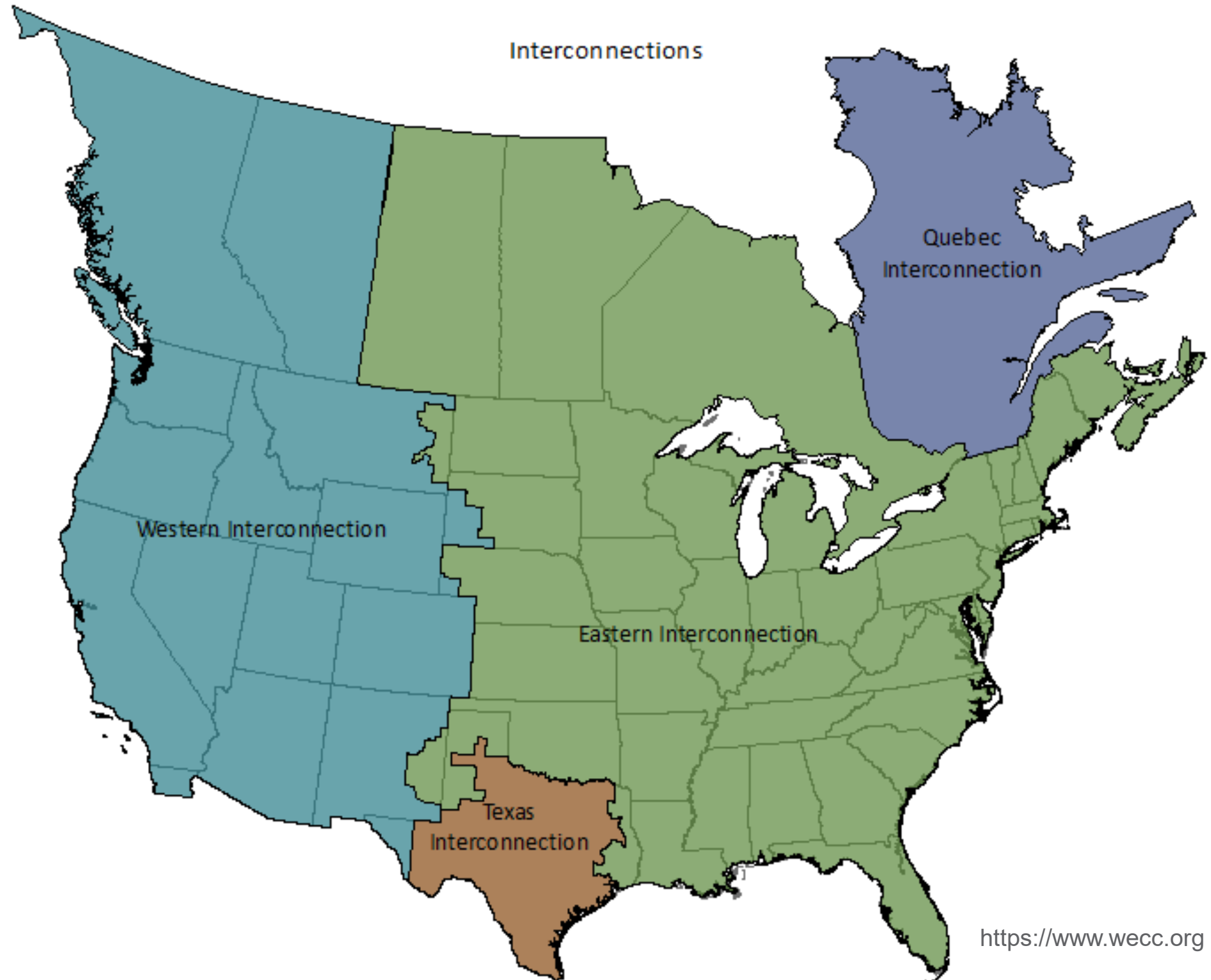
DOE's Grid Modernization Laboratory Consortium (GMLC)



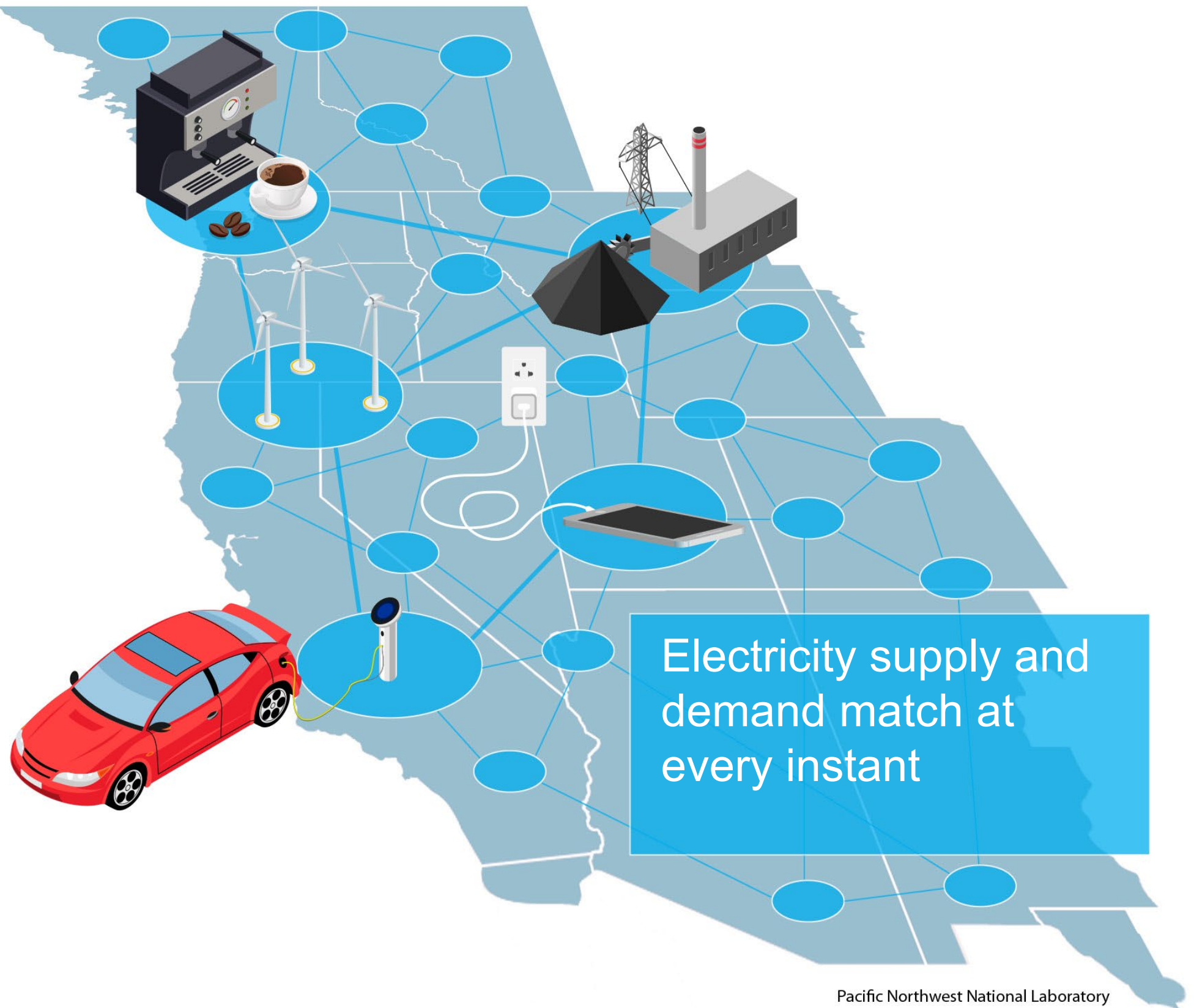


The Grid is Four Big North American Machines

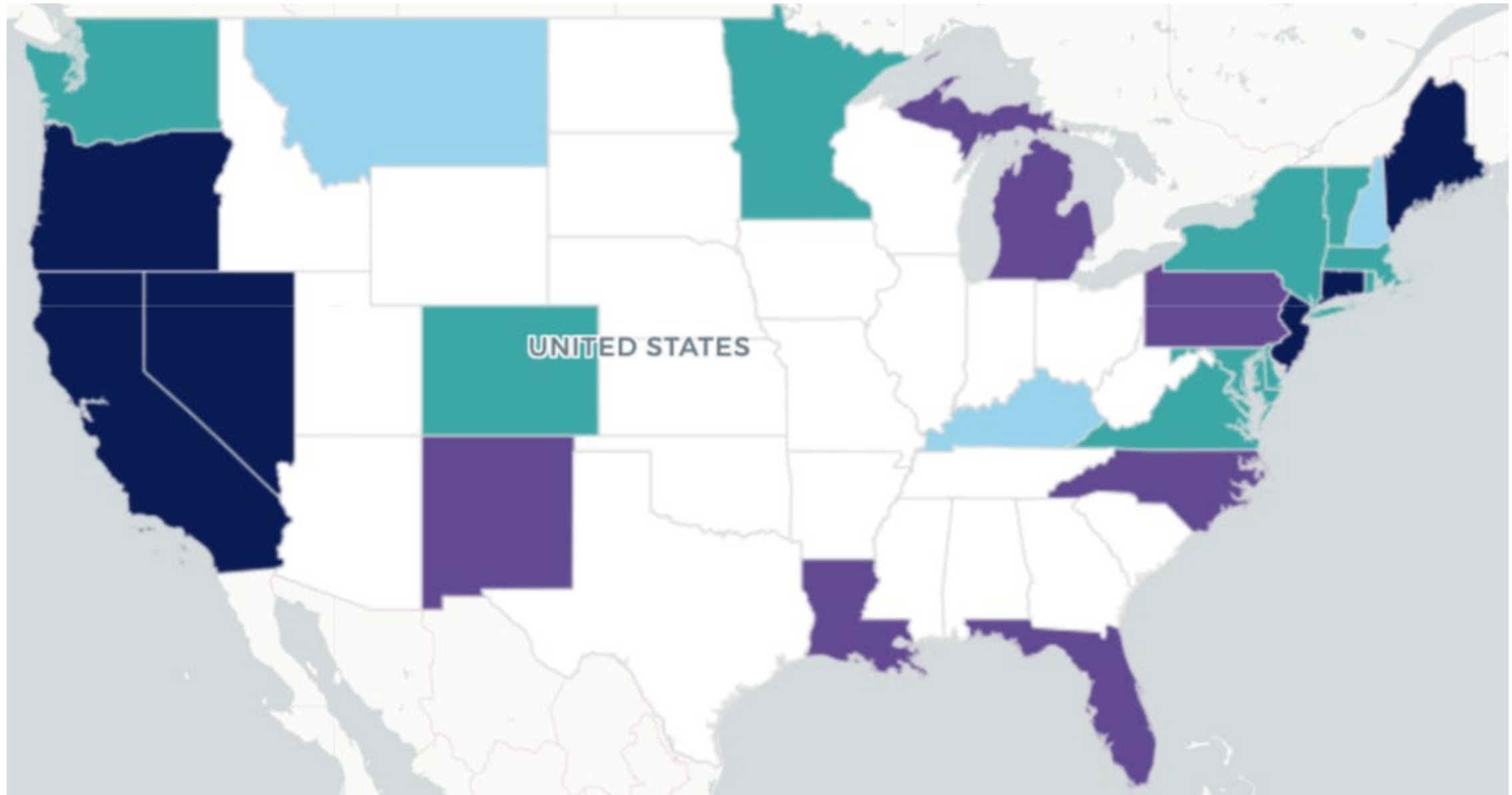
Each of the four
North American
Interconnections
each operate as a
synchronized
machine, with all
devices at the same
frequency (60 Hz)



The Balanced Grid



States with Green House Gas (GHG) policies, 2023



Source: www.c2es.org/document/greenhouse-gas-emissions-targets/

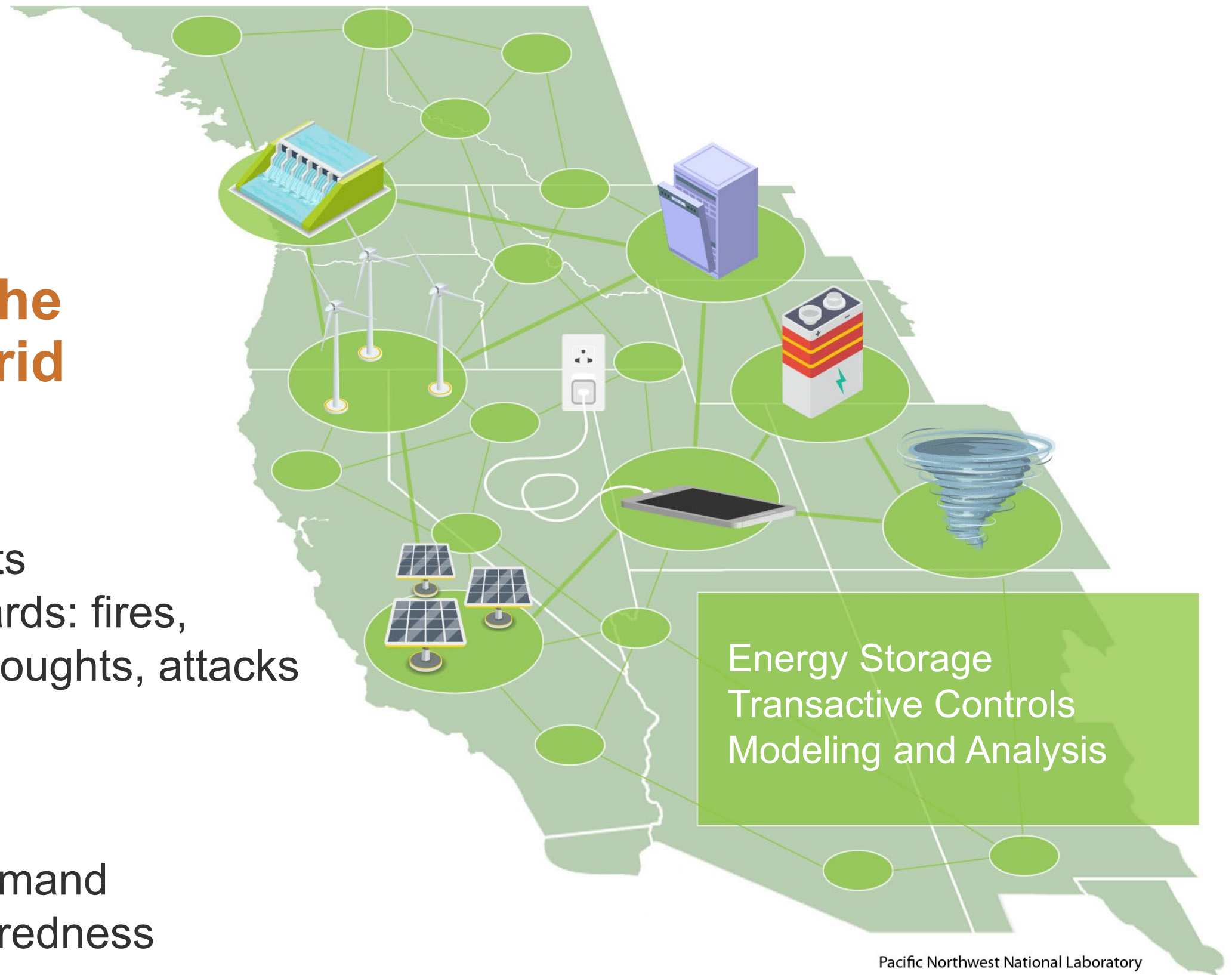
Balancing the changing grid

Challenges:

- Electrification
- Plant retirements
- Increasing hazards: fires, earthquakes, droughts, attacks

Needs:

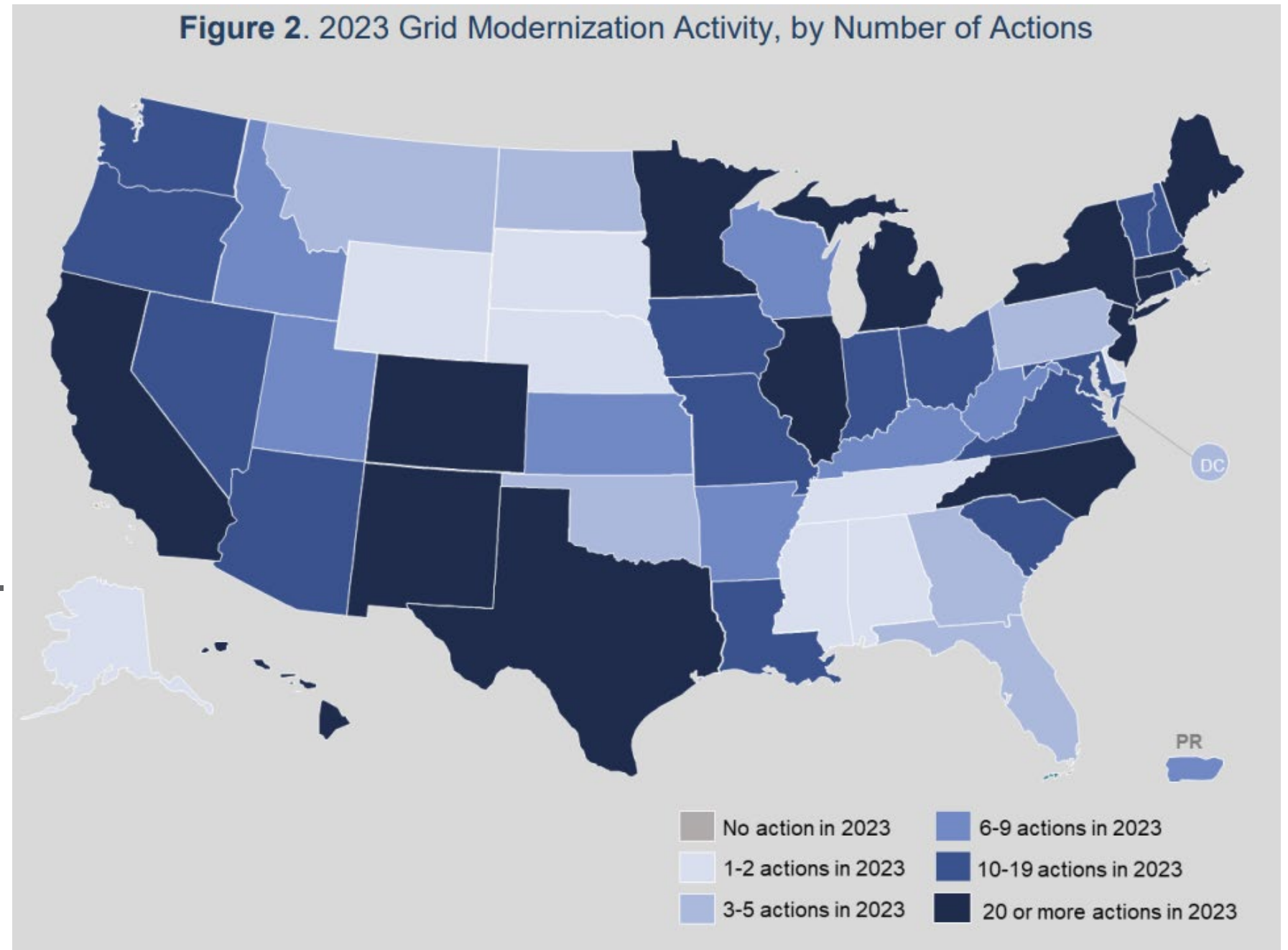
- Flexible supply
- Responsive demand
- Tools for preparedness



2023 grid modernization activity by state

Industry Actions:

- Address changing resource adequacy requirements.
- Conform with carbon-reduction policies.
- Invest in reliability and risk mitigation measures.
- Plan for increasing demand related to electrification and technology services.



Key Takeaways for DOD

- Understand state policies and trends at installations. They will drive utility requirements.
- Interconnection requirements may incorporate new balancing provisions.
- Procurement of new resources may be competitive with large corporate buyers in the mix.

Thank you!



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