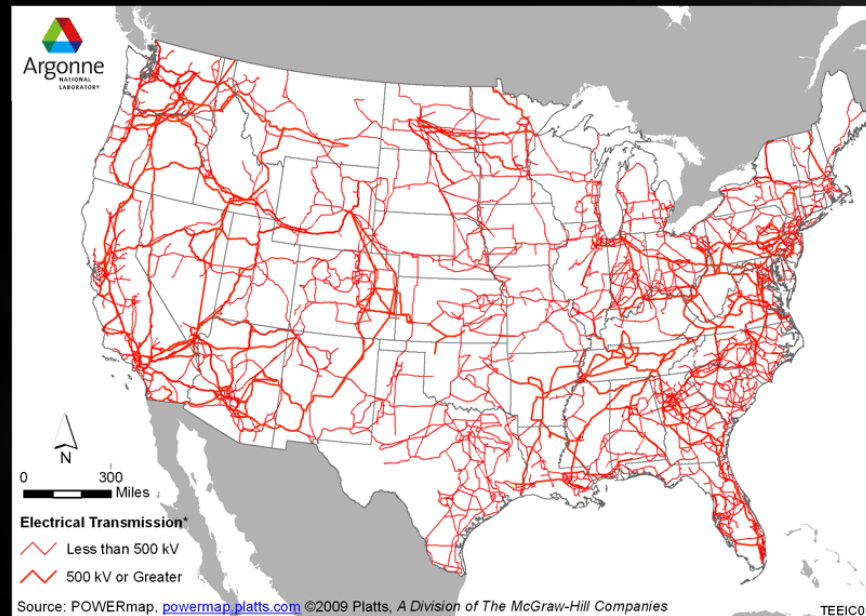


Visioning the 21st Century Electricity Industry: *Strategies and Outcomes for America*



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U. S. Department of Energy*

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Visions for the Future

We all have “visions,” in one form or another:

- Corporations call them strategic plans
- RTOs ... transmission expansion plans or Order 1000 plans
- State PUCs ... integrated resource plans
- Employees ... career goals



Would we all --
industry, regulators,
vendors, & consumers --
benefit from a
shared vision?

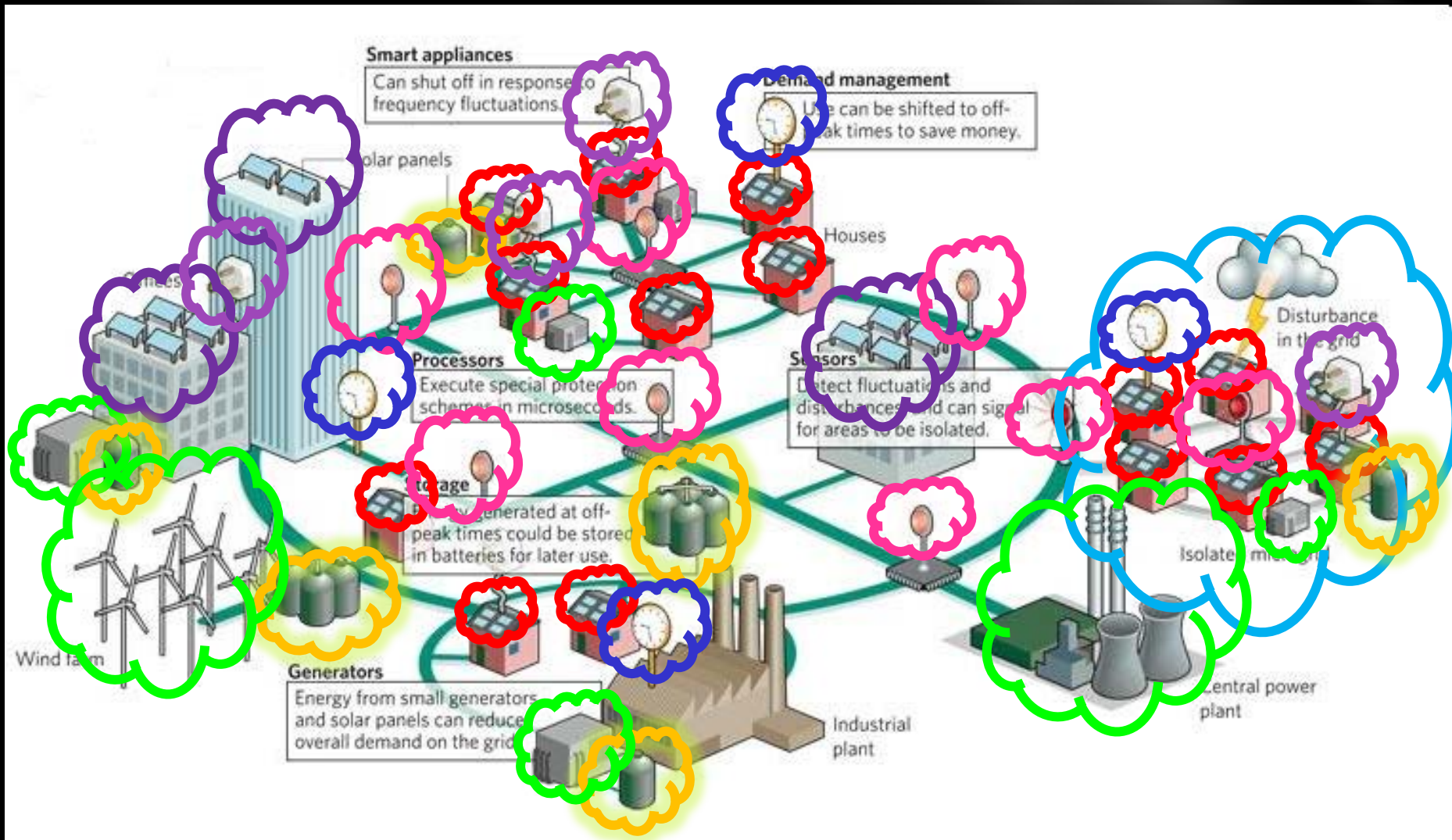


Artist: Paolo Frattesi

DOE asks your help...

to develop a shared vision
of the future grid --
aiding us all to row
in the same direction.

Our Future?



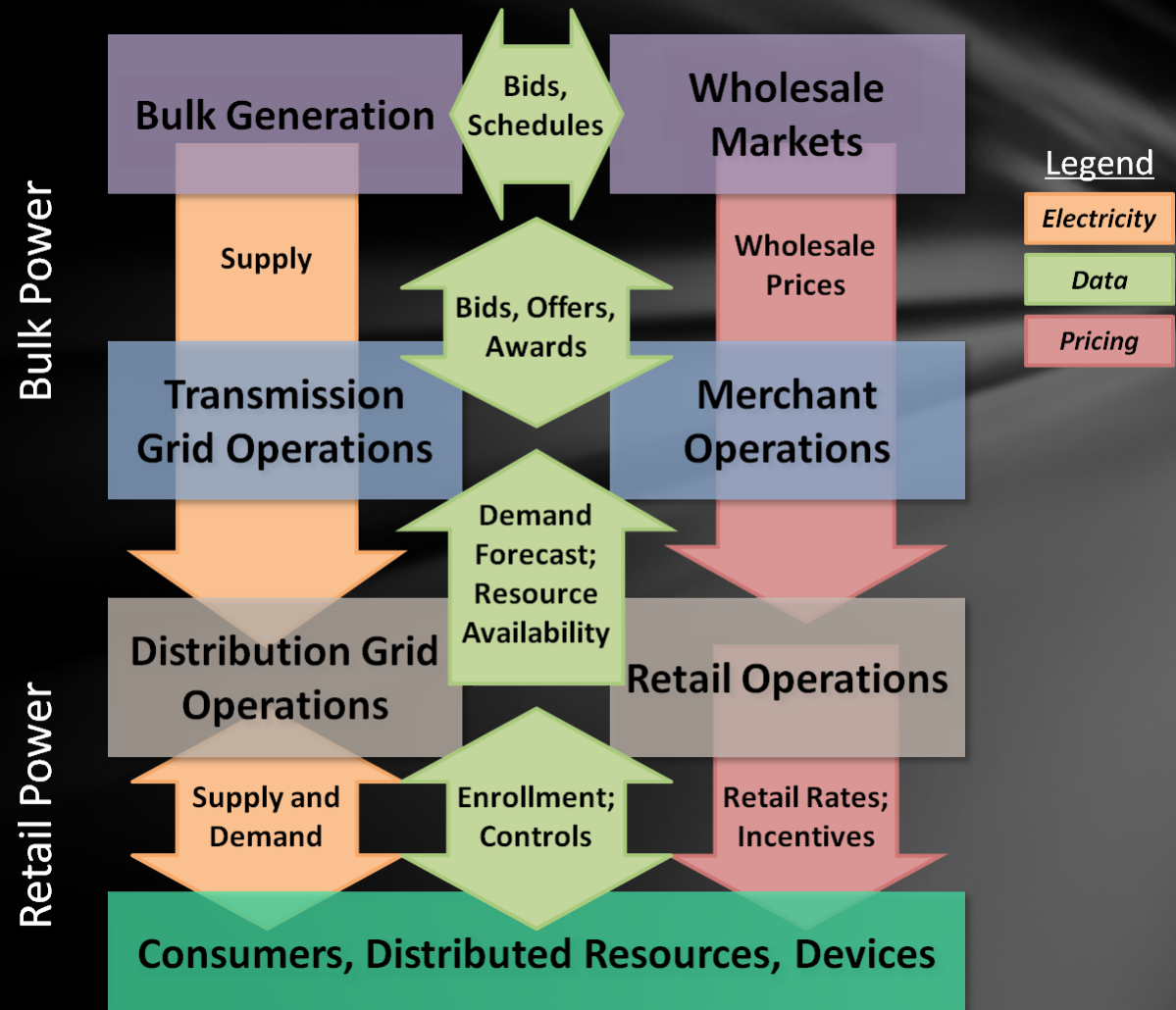
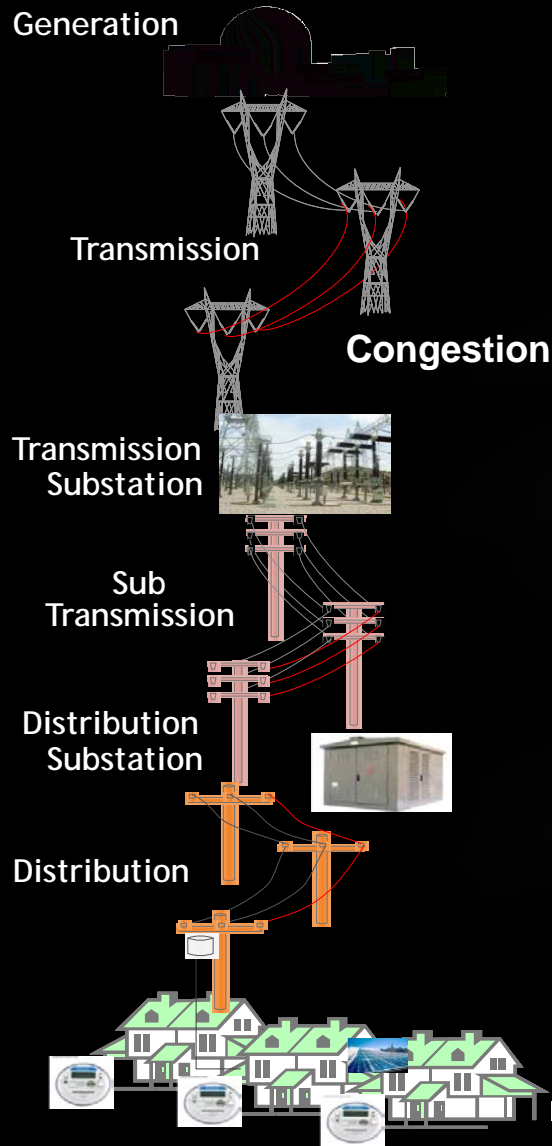
DOE's Grid Tech Team: Draft Vision

1. Enable a seamless, cost-effective electricity system, from generation to end use;
2. Capable of meeting
 - the clean energy demands, and
 - capacity requirements of this century;
3. While allowing consumer participation and electricity use as desired.

1. Seamless, Cost-Effective System

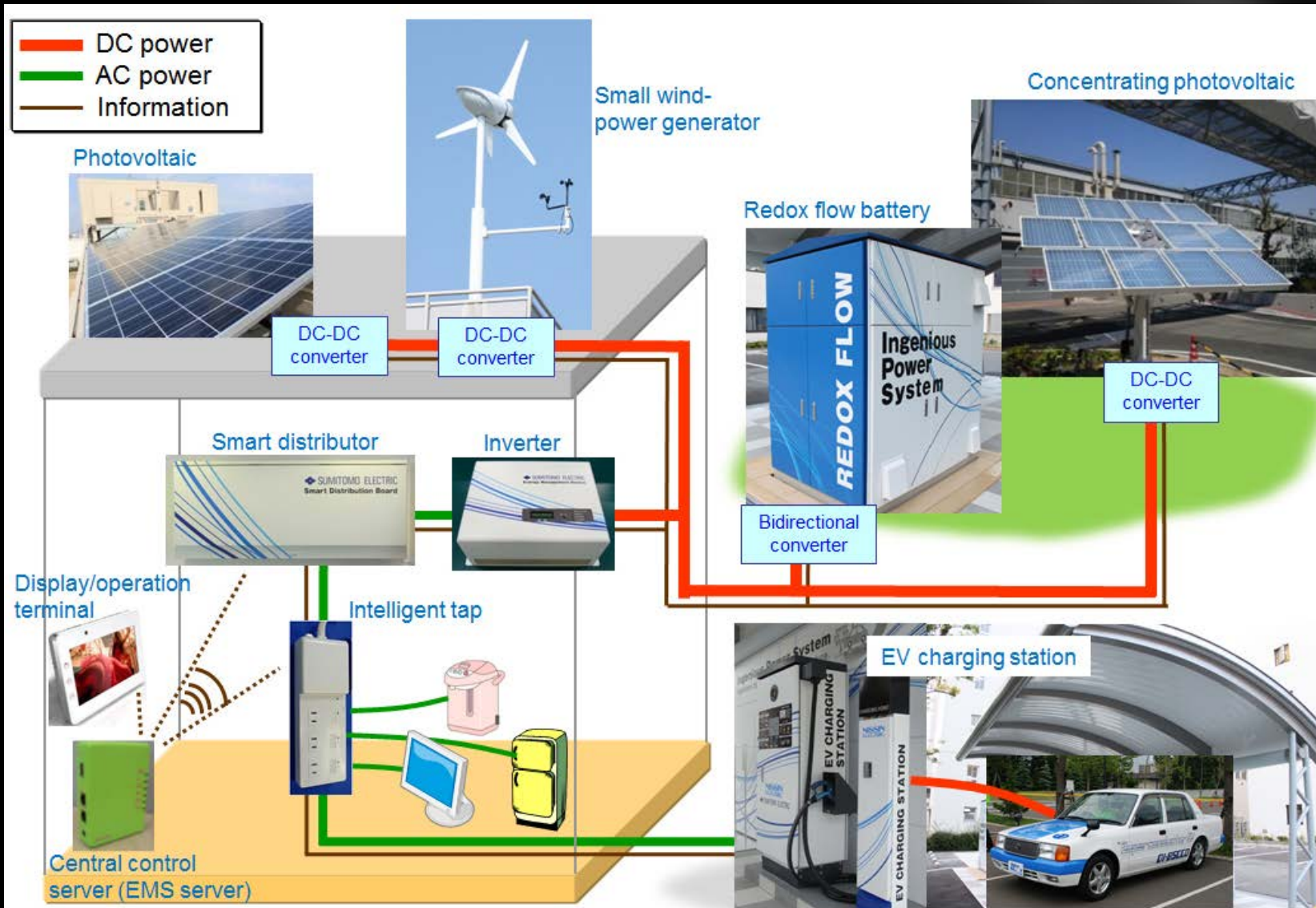
- A 100% holistically designed system (including AC-DC hybrid configurations)
- Optimizing asset utilization and operating efficiency
- Regionally diverse, while meeting essential requirements of a shared national vision
- Providing the power quality for a range of needs
- A reliable, secure, and resilient grid
- Enabling new products, services, and markets
- Global competitiveness and leadership

Effective grid modernization requires seamless, end-to-end integration

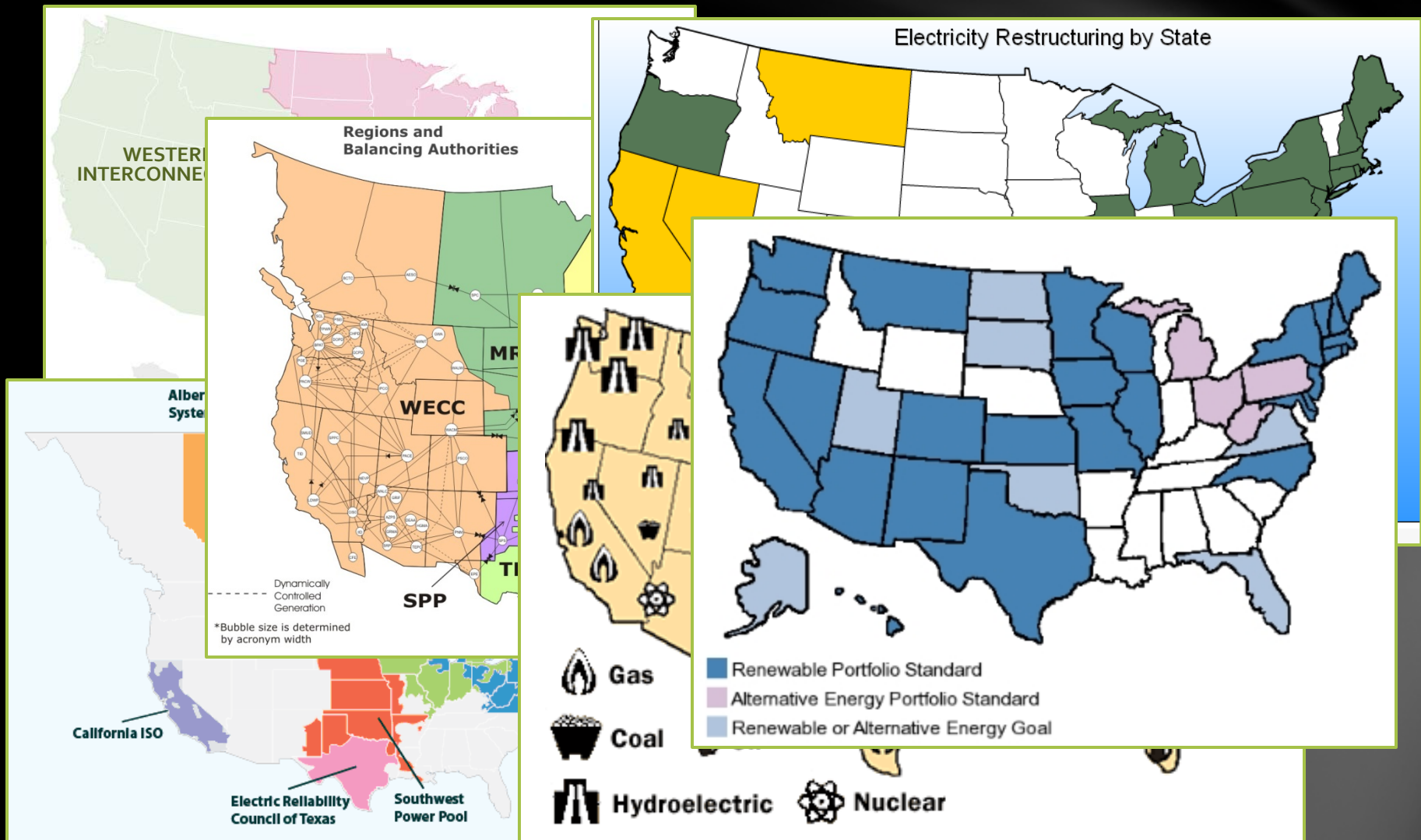


Adapted from OATI

AC-DC Hybrid System



Regional Diversity: Regulatory...Resource...Policy



2. Meet Clean Energy Demands & Capacity Requirements

- Significant scale-up of Clean Energy (80% by 2035)
- Accommodating all generation and storage options

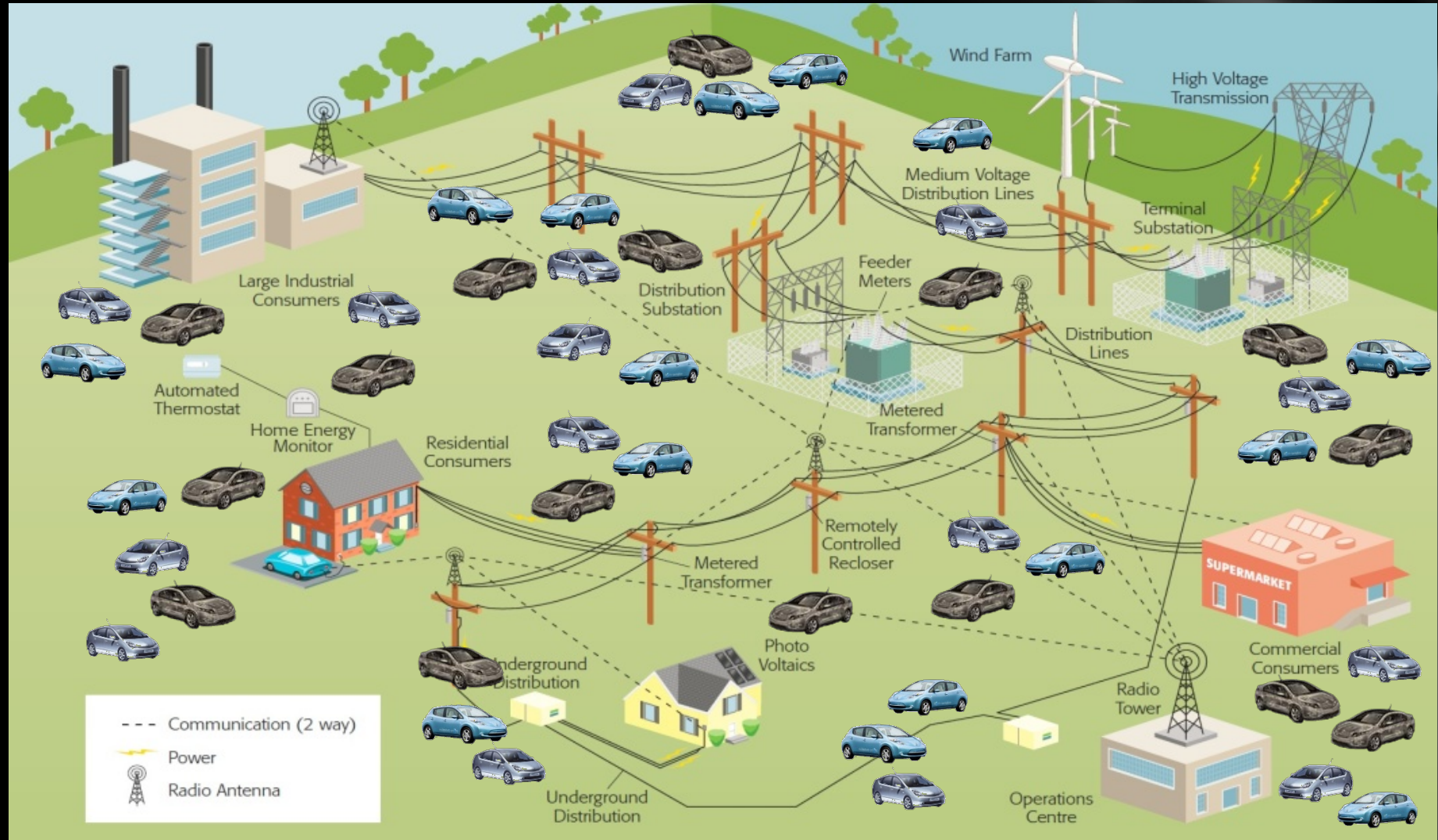
Significant scale-up of Clean Energy (80% by 2035) + Accommodating all Generation & Storage



3. Consumer Participation

- Enabling informed participation of consumers;
- Allowing 100% customer participation and choice;
- Including distributed resources, demand response, demand-side management, electrification of transportation, and energy efficiency.

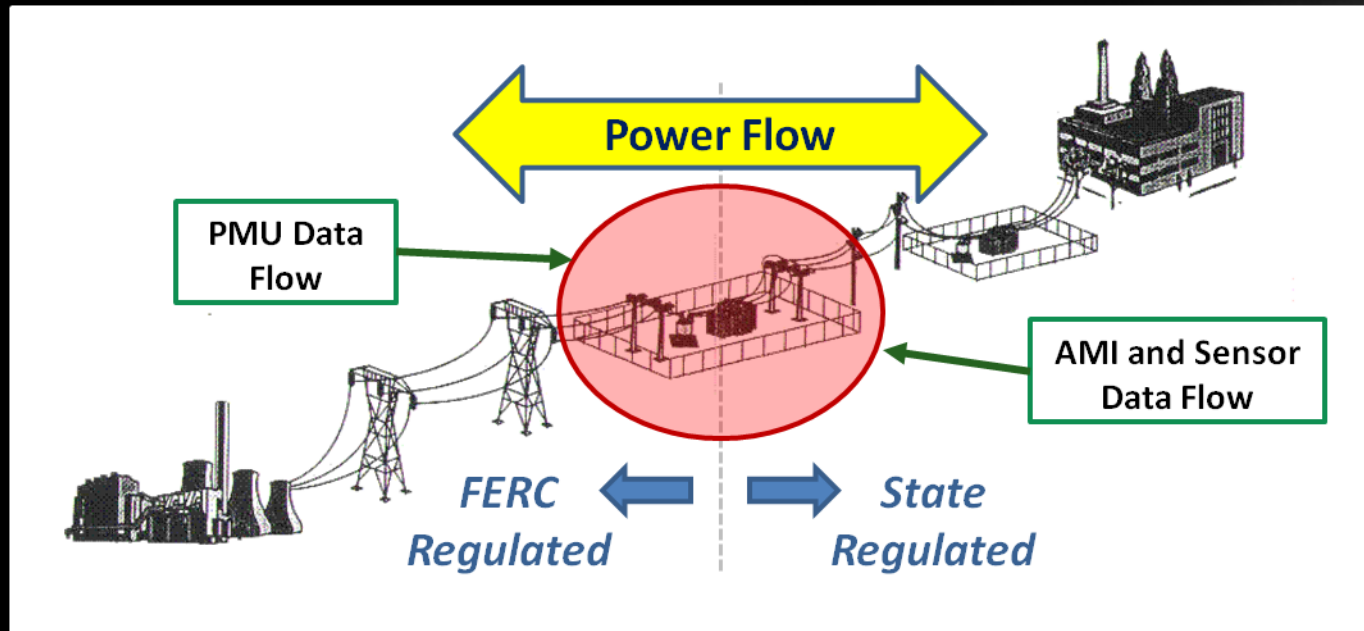
Smart & Efficient Homes, Distributed Generation ... and Electric Vehicles



How do we get from here
to a seamless,
cost-effective
electricity system...

Implementation Option: Electricity Systems Hub

*New functionalities, protocols, designs, and operations required at the **substation level** will be the “pinch point” for end-to-end integration*



Blurring of transmission and distribution presents numerous challenges and opportunities for innovation and outreach



The End