

The Sustainable Energy Interconnection

Challenges Facing the Future Electric Grid

Ryan Alimento



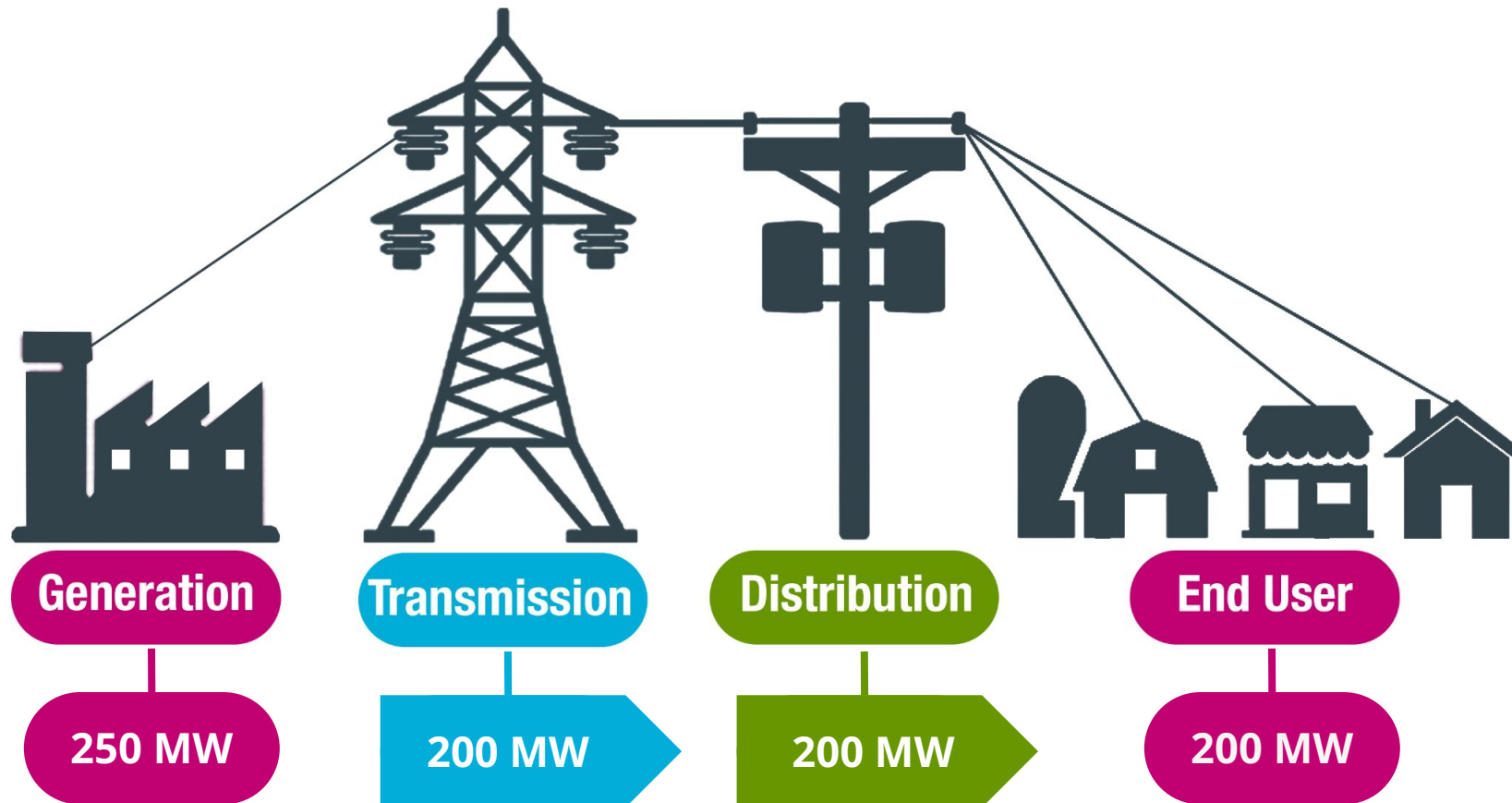
USC



ASTM
INTERNATIONAL

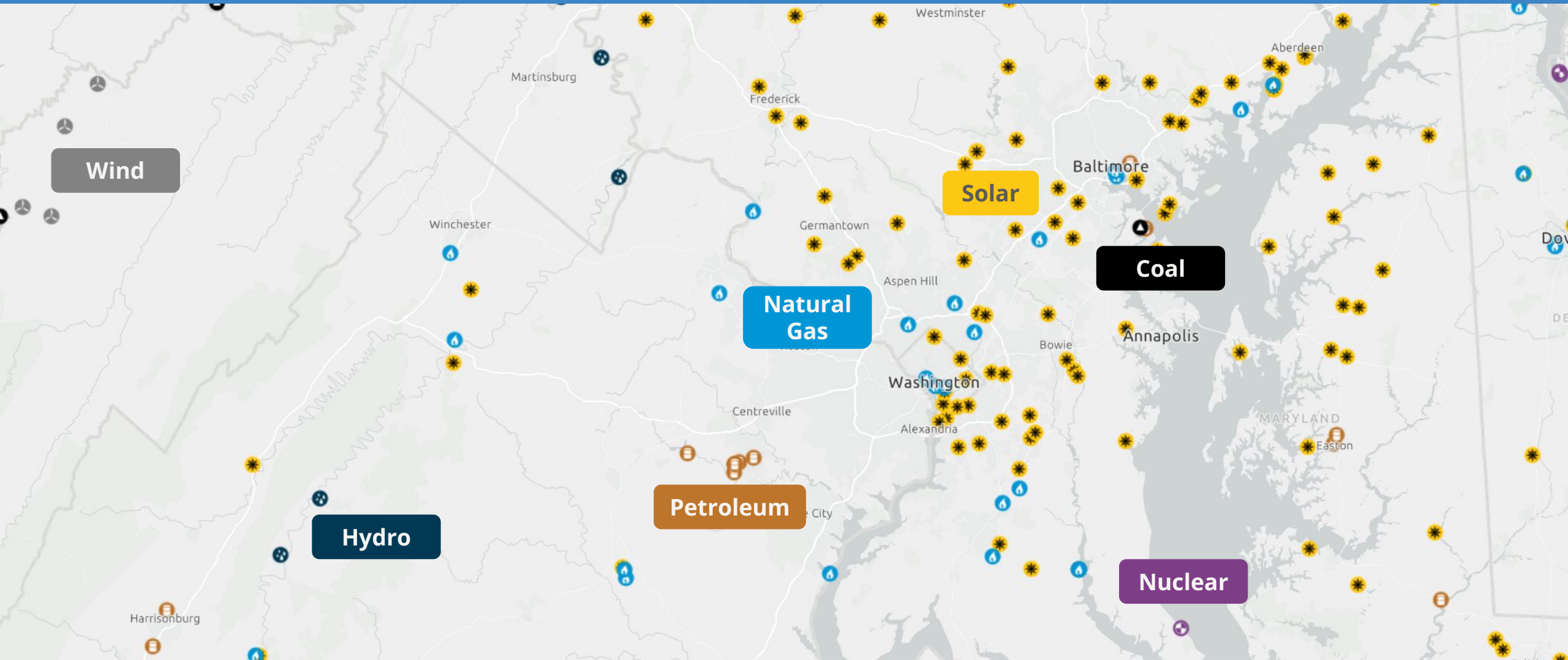
Electric Grid Organization

Transmission: the “interstate” of electricity



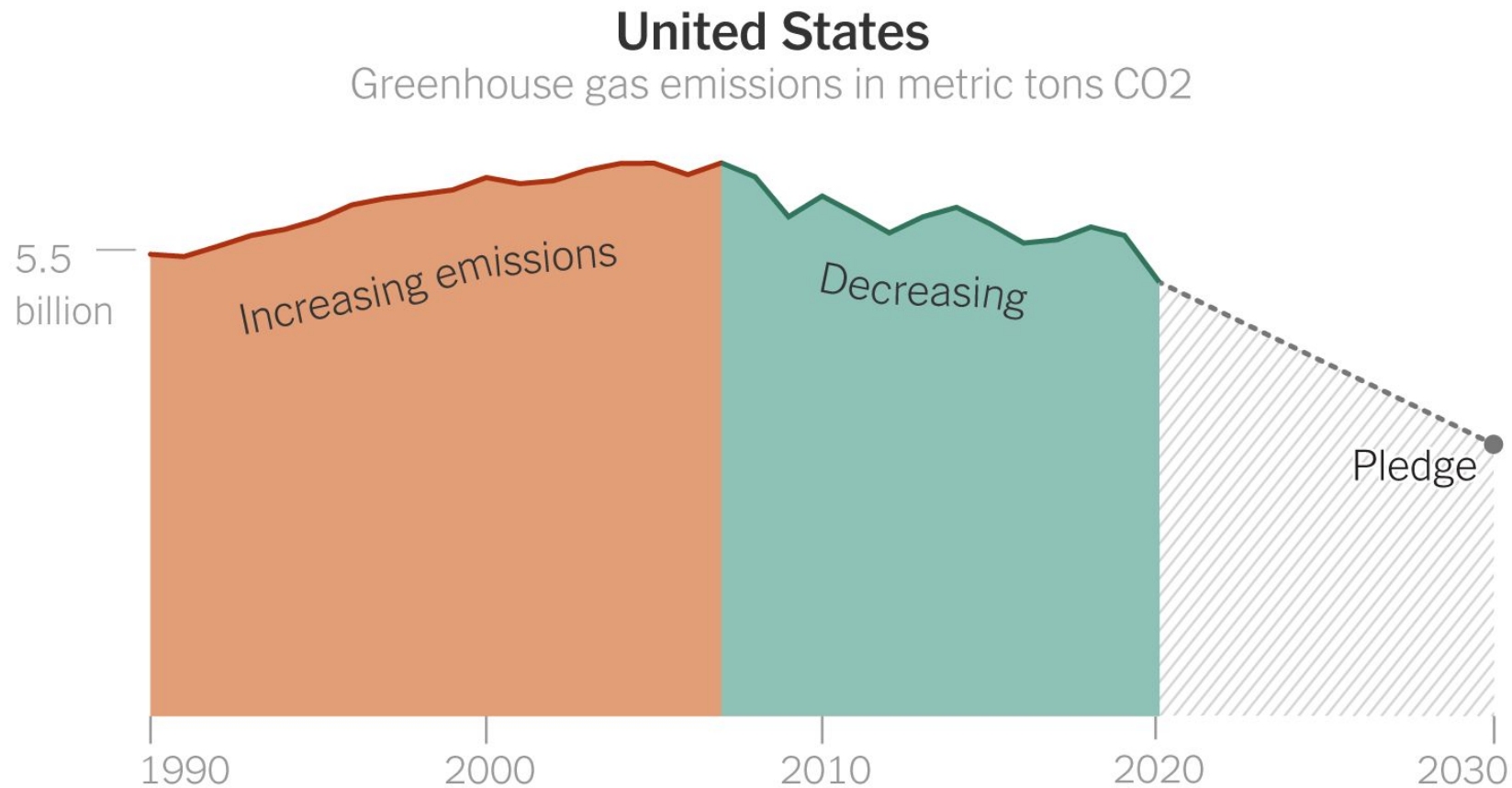
Generation for Washington DC

Where do we source electricity?



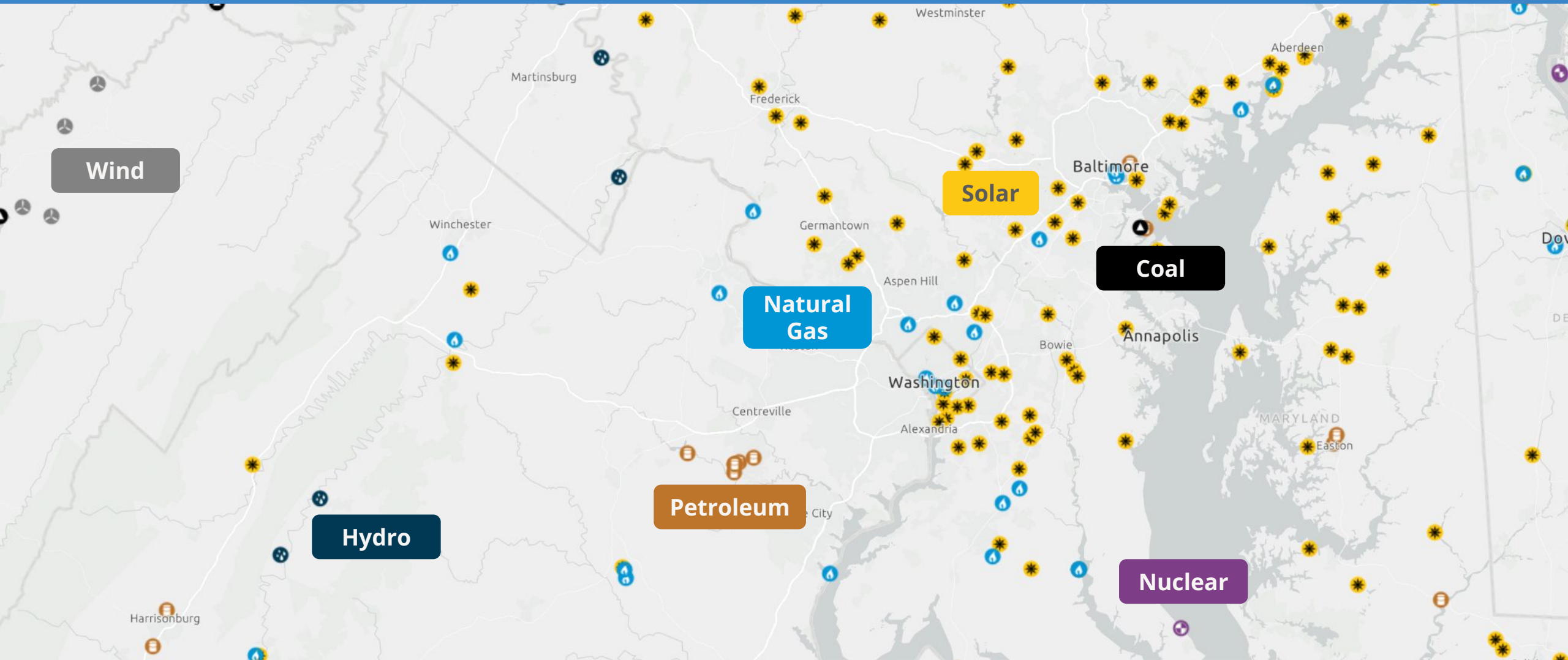
Climate Goals

50% Emissions Reductions by 2030



Generation for Washington DC

Where do we source electricity?

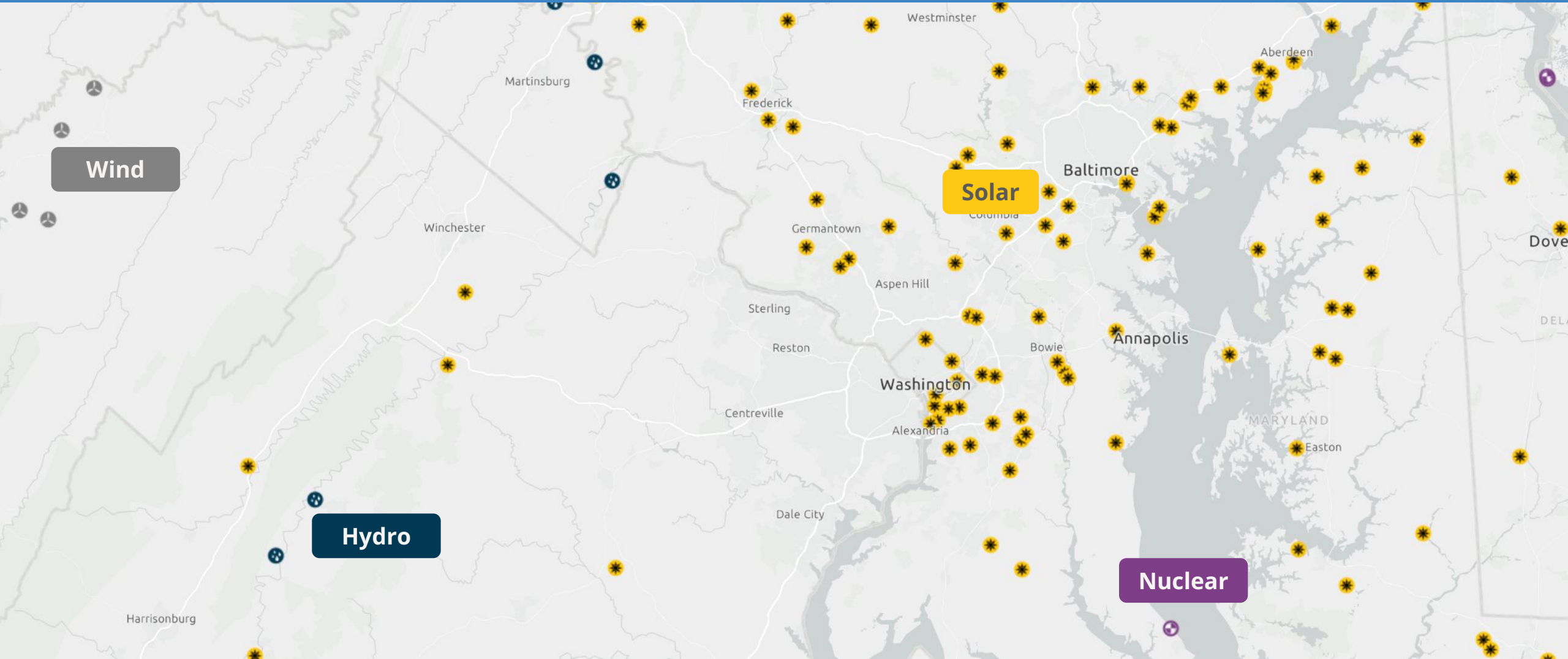


Generation for Washington DC

Petroleum

Coal

Natural Gas



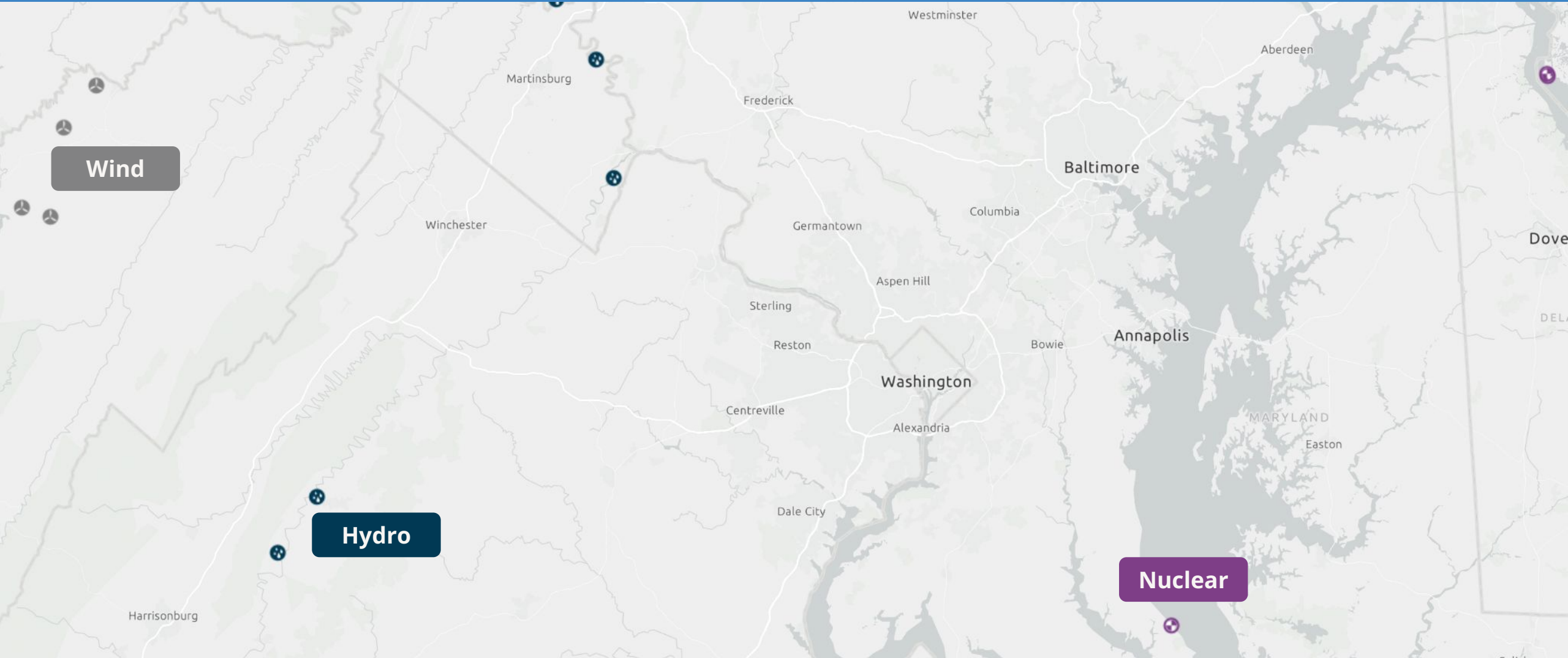
Generation for Washington DC

Petroleum

Coal

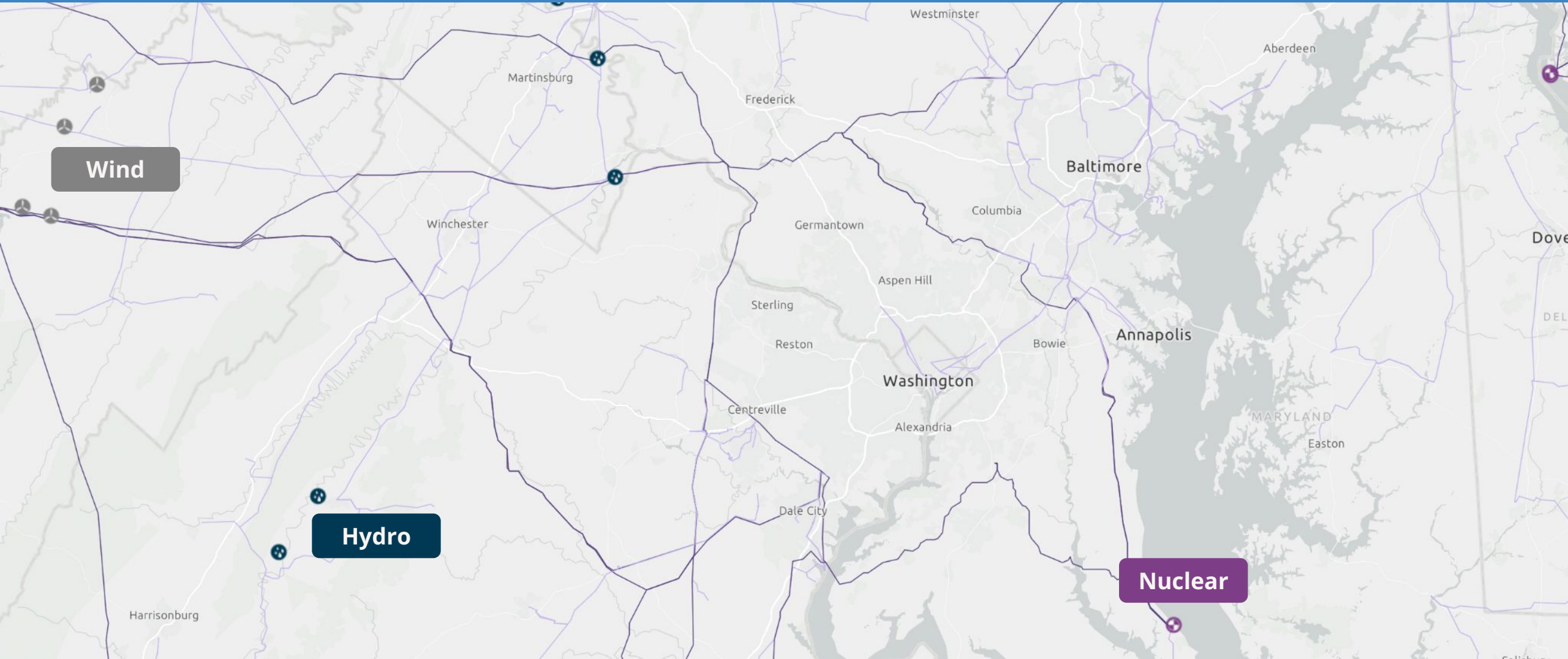
Natural Gas

Solar



Renewable Energy Travels Farther

Transmission connects supply with demand



Increasing Electrification

More electricity demand needs more electricity transmission



Electric Vehicles

Transportation
accounts for 29% of
GHG emissions



Electric Stoves

Gas stoves release
harmful indoor air
pollutants



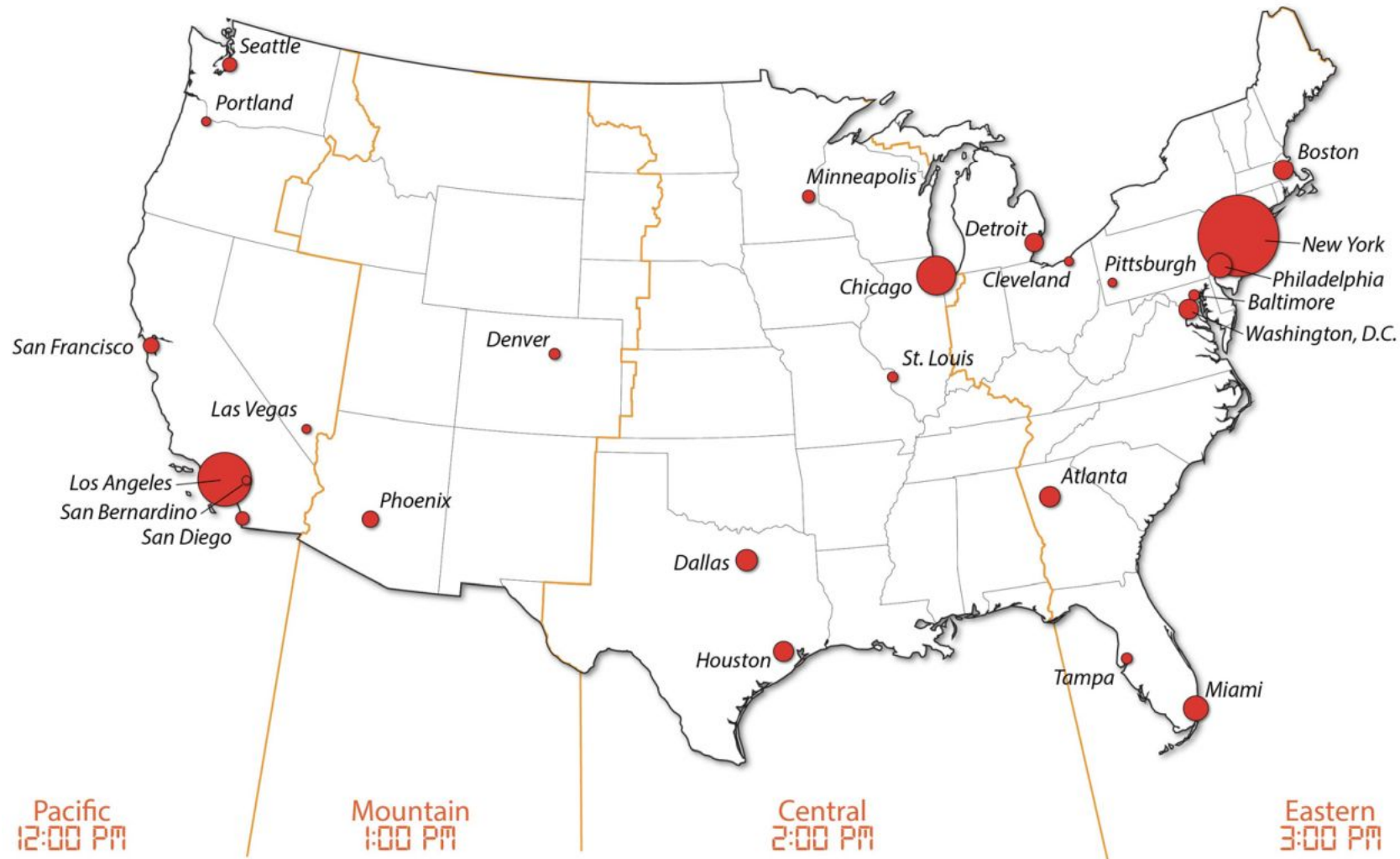
Electric Heating & Cooling

Electric heat pumps
need 50% less
electricity

3x

more energy demand predicted by 2050

25 Most Populated Cities

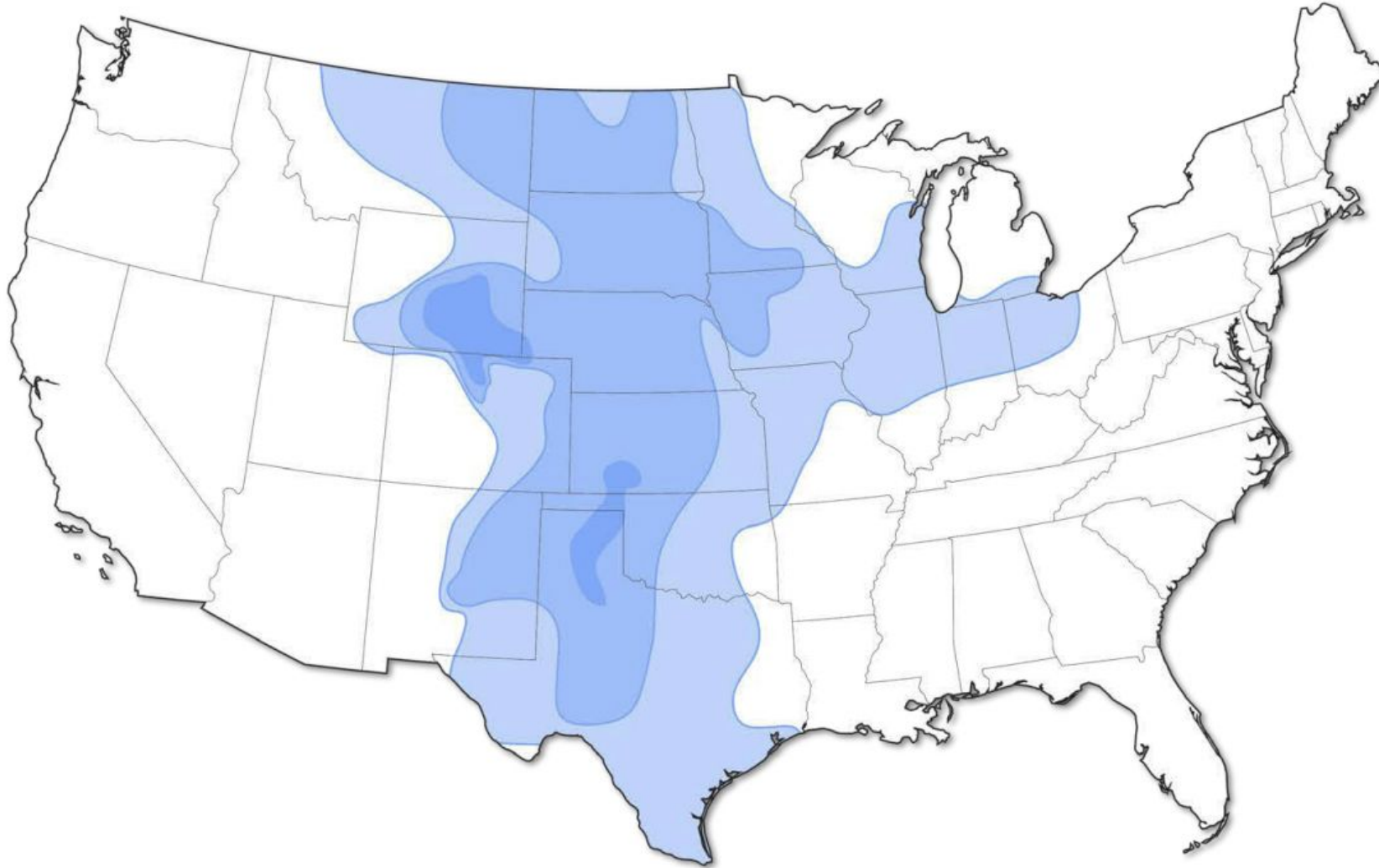


Fossil Fuel Resources



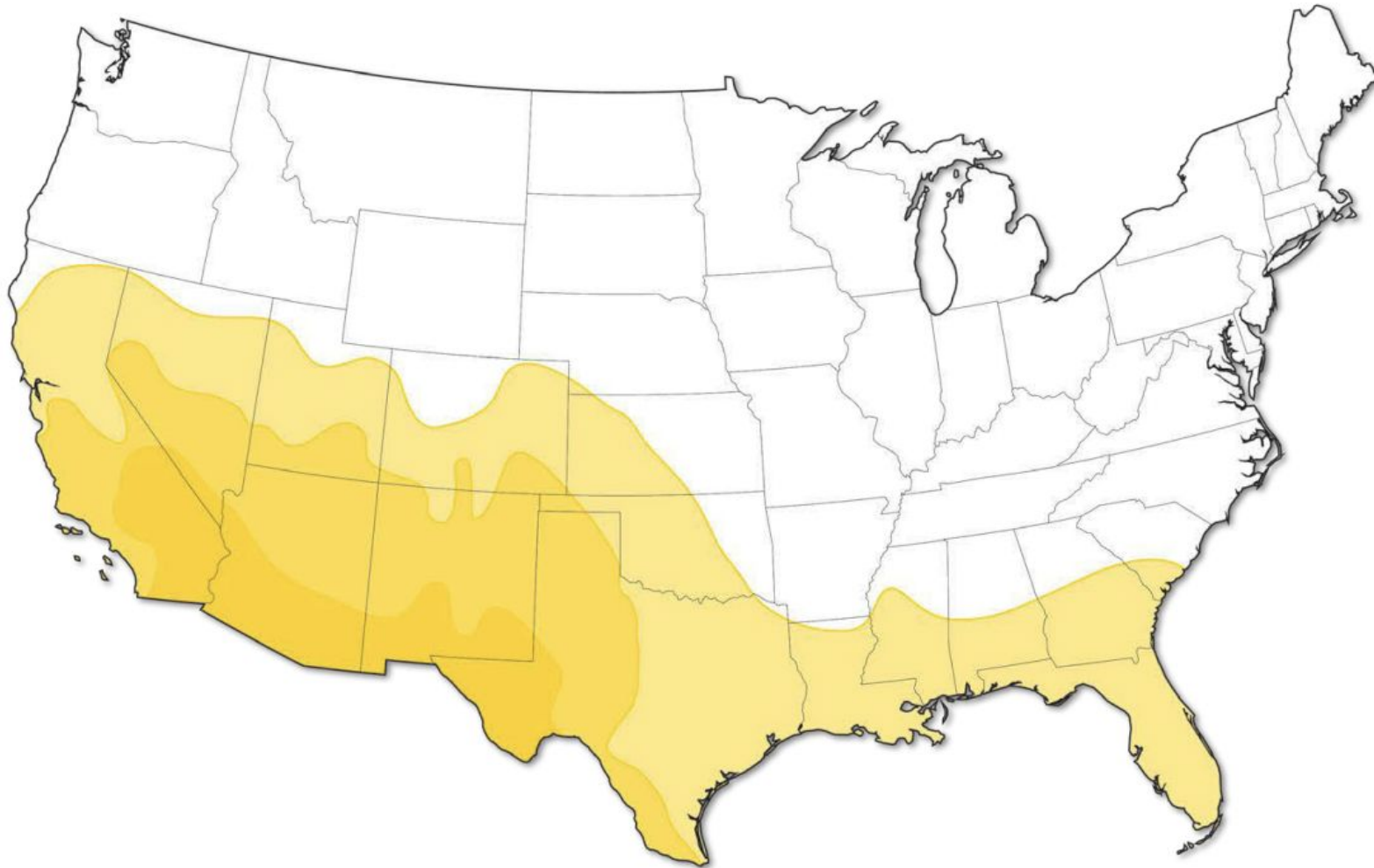
Wind Potential

Almost exclusively in the Midwest



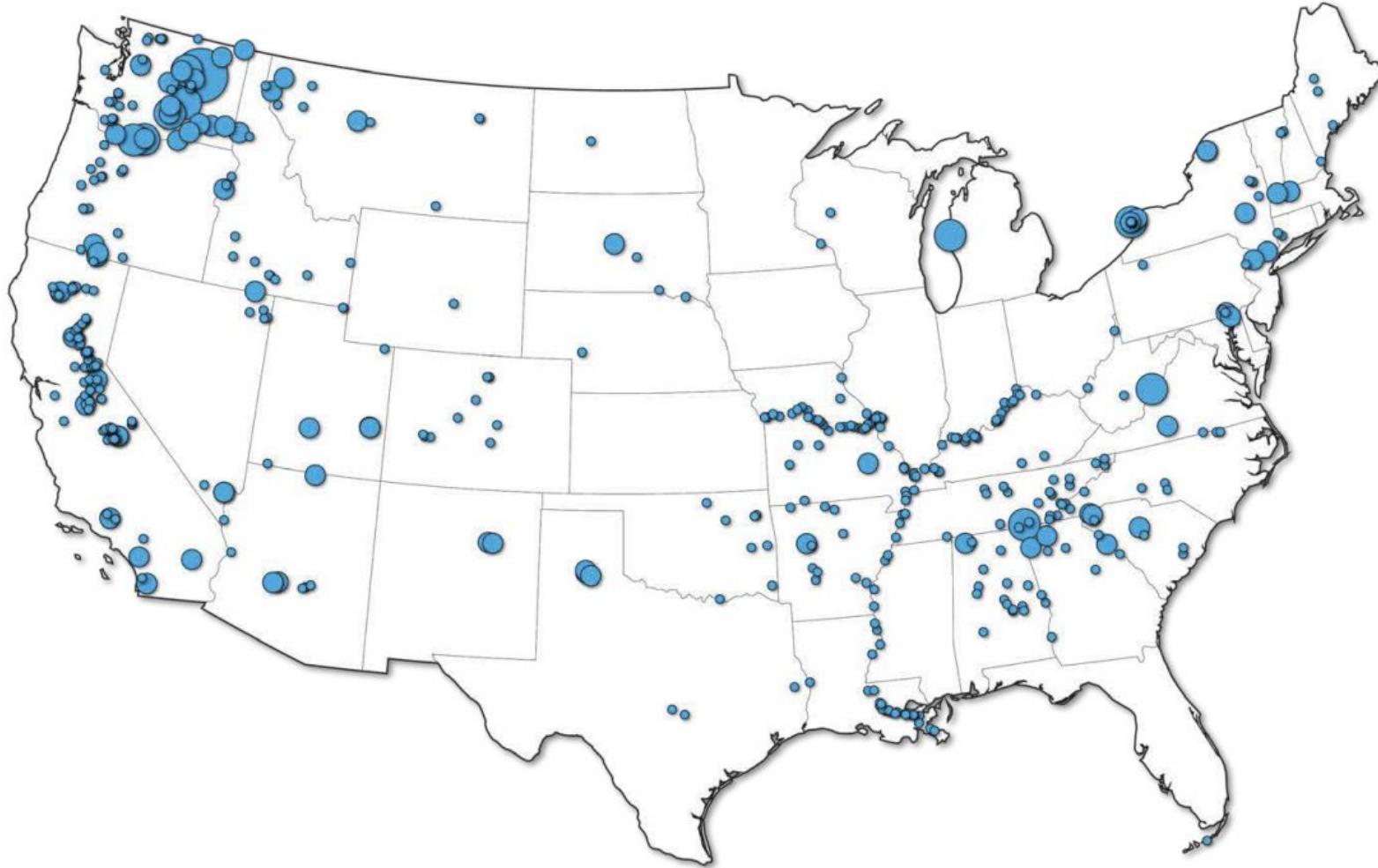
Solar Potential

Far from Northern Population Centers

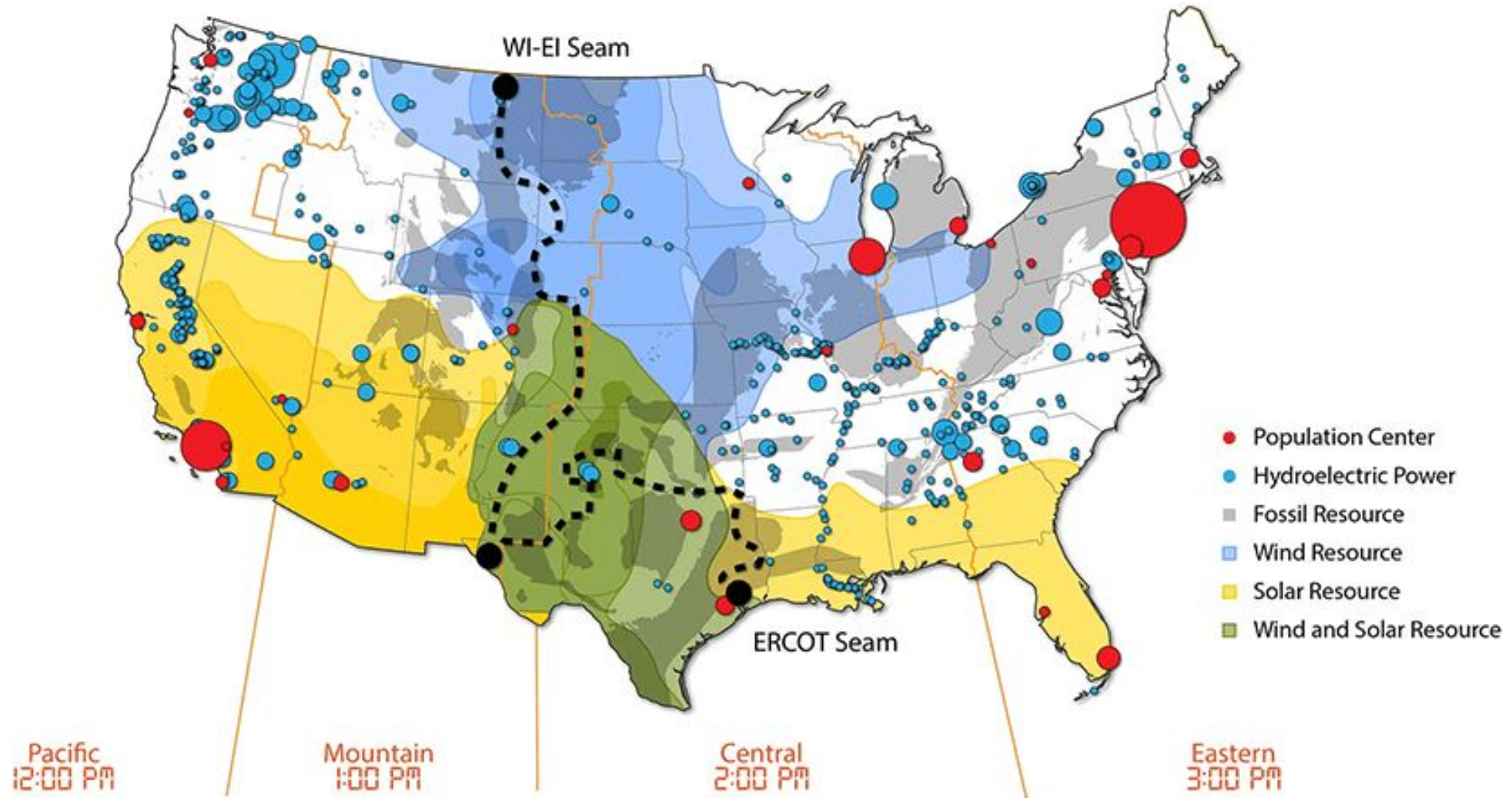


Hydropower

Mostly in the Pacific Northwest & Southeast

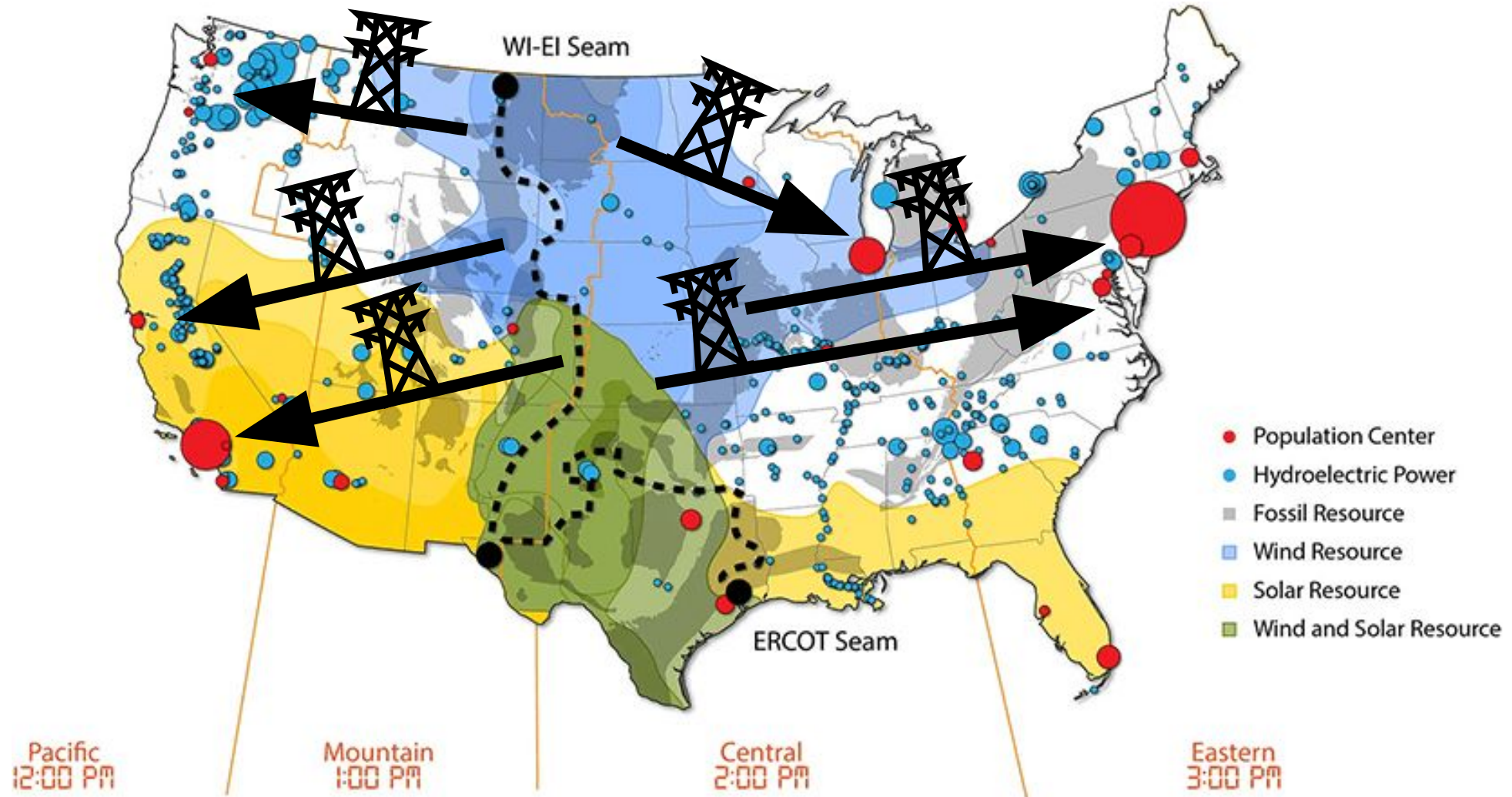


The Big Picture



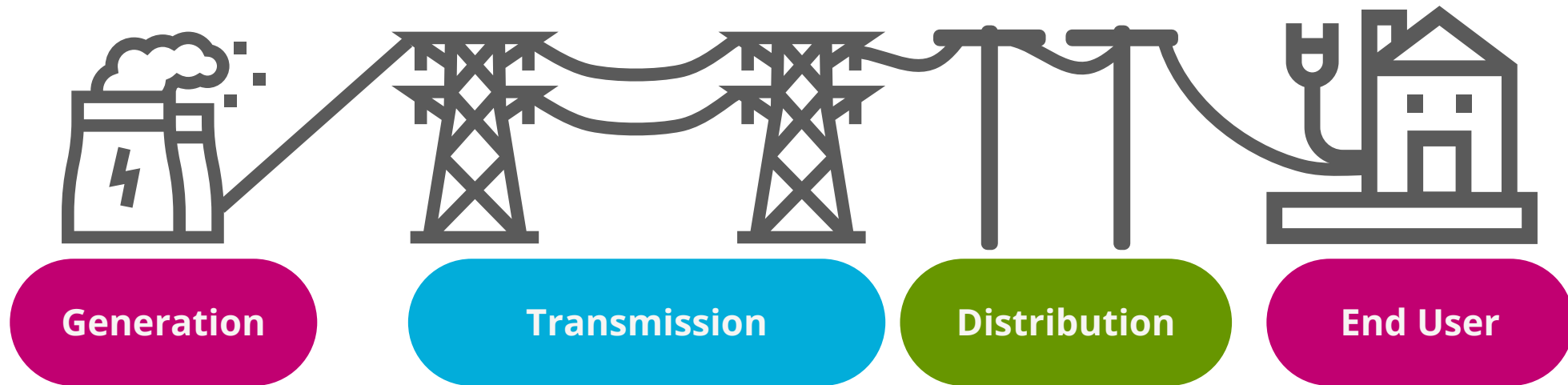
The Big Picture

Transmission Connects Renewable Supply with Demand



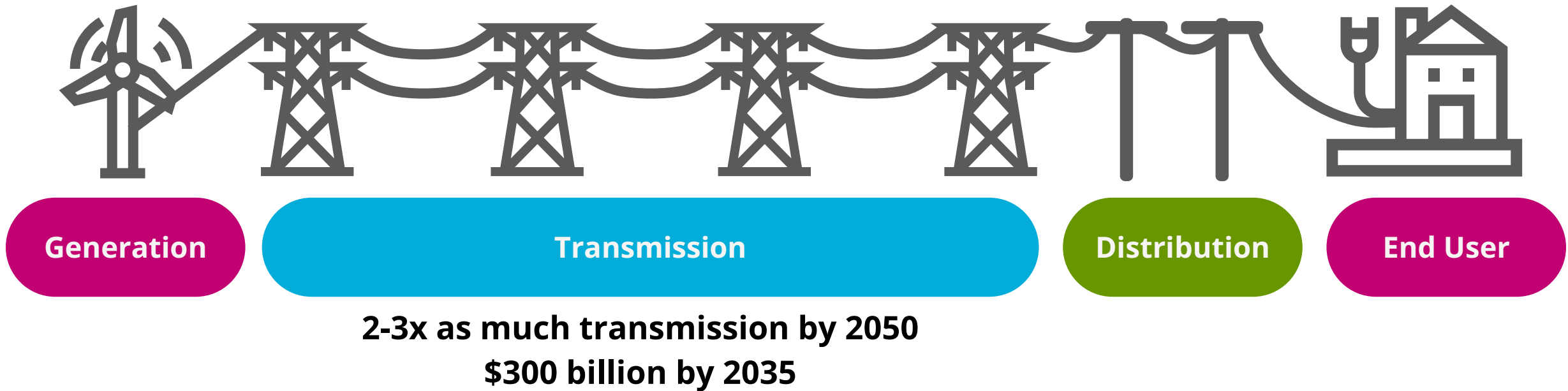
Nearby Fossil Fuels

Fossil fuel generation is more flexible



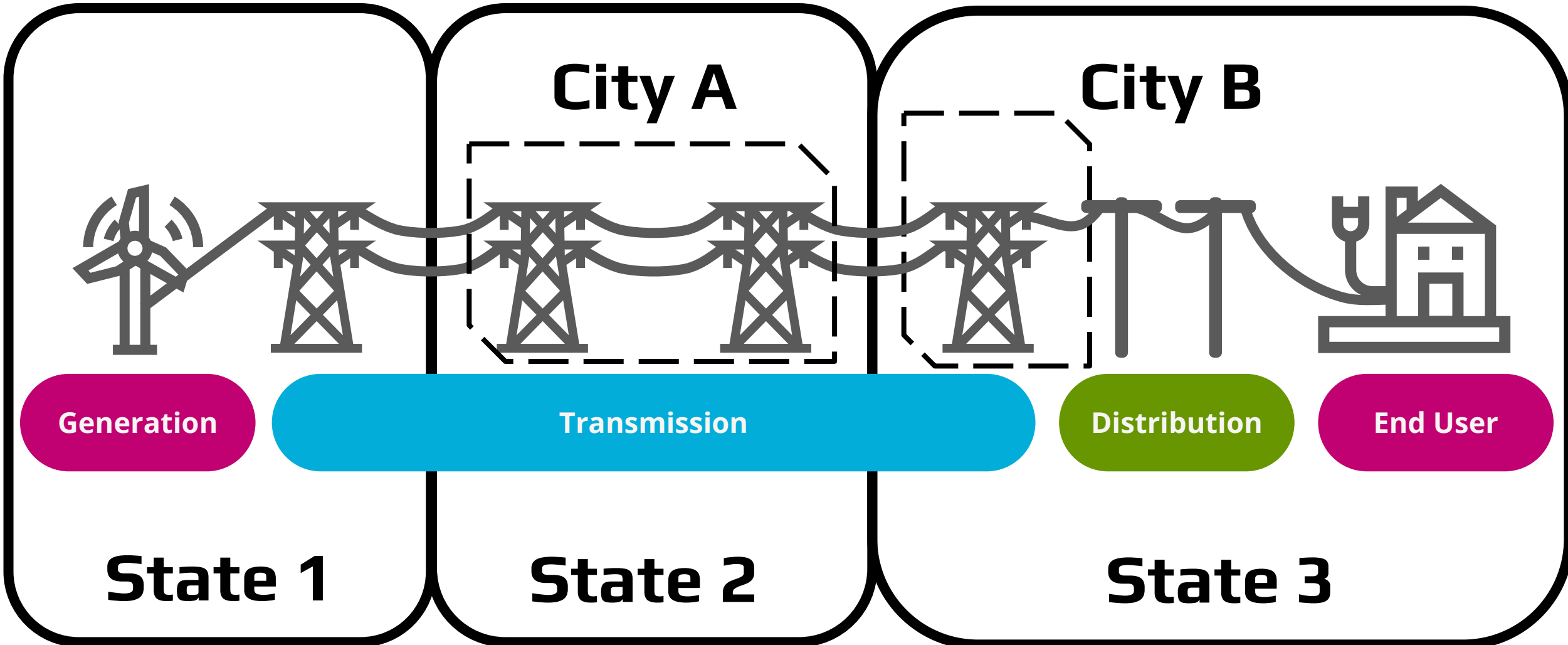
Distant Renewables

Need to build more transmission to connect generation & consumption



Distant Renewables

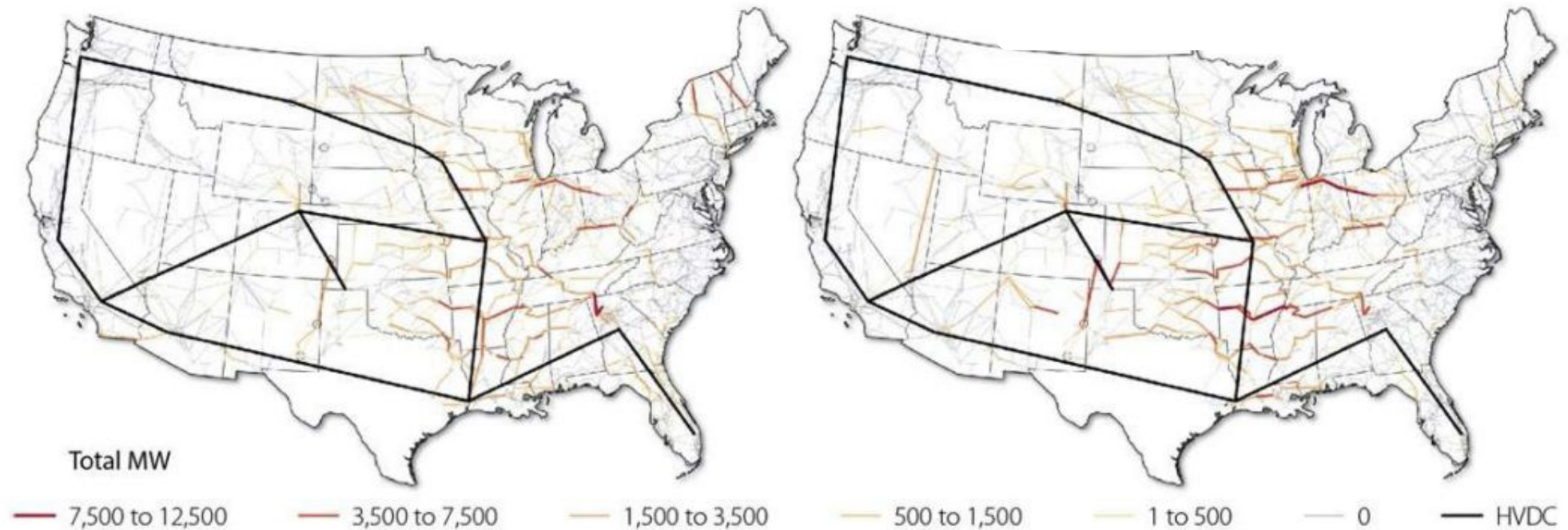
Issues from Crossing Multiple Jurisdictions



(1) Set a Goal

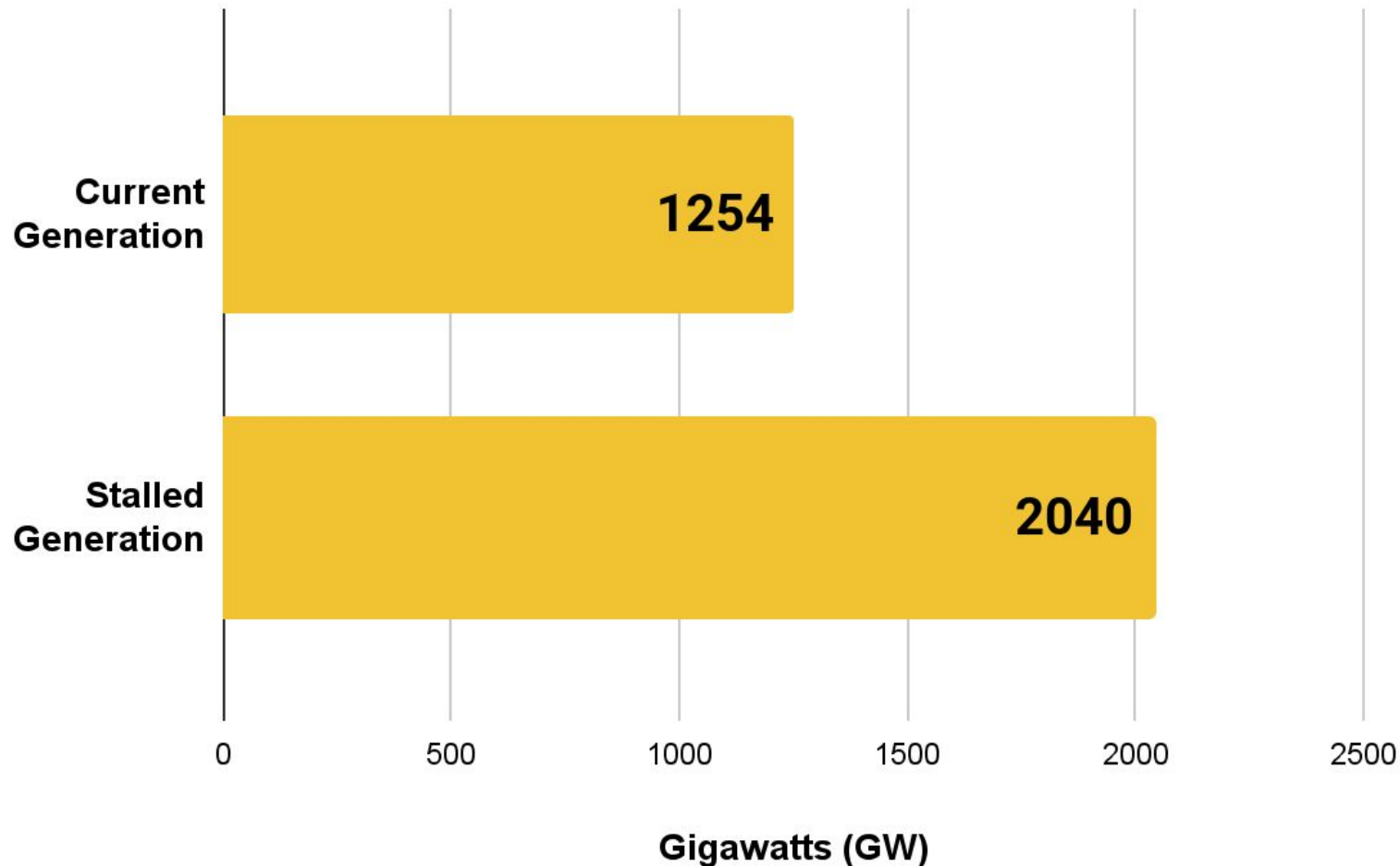
Complete Grid Interconnection by 2050

- Climate goals: 50% reduction by 2030, net zero by 2050
- We need the same for transmission



Transmission Stalls Clean Energy

A whole grid of generation is waiting for interconnection



New Generation: 1-2 years

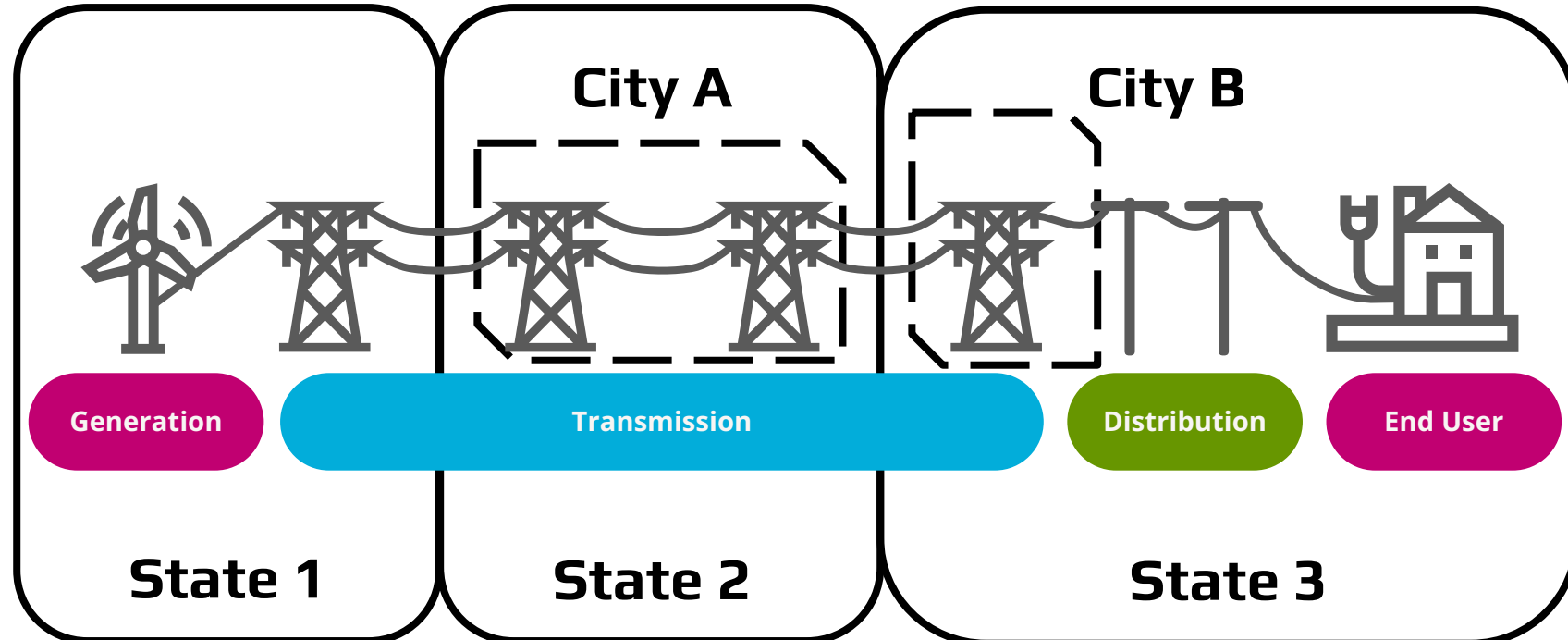


New Transmission: 5-10 years

What is Delaying Transmission?

The Short Answer: Permitting

- National Environmental Policy Act (NEPA)
- Inter-agency coordination
- State coordination
- Crossing state & private land
- Federal laws
- State laws
- Local laws

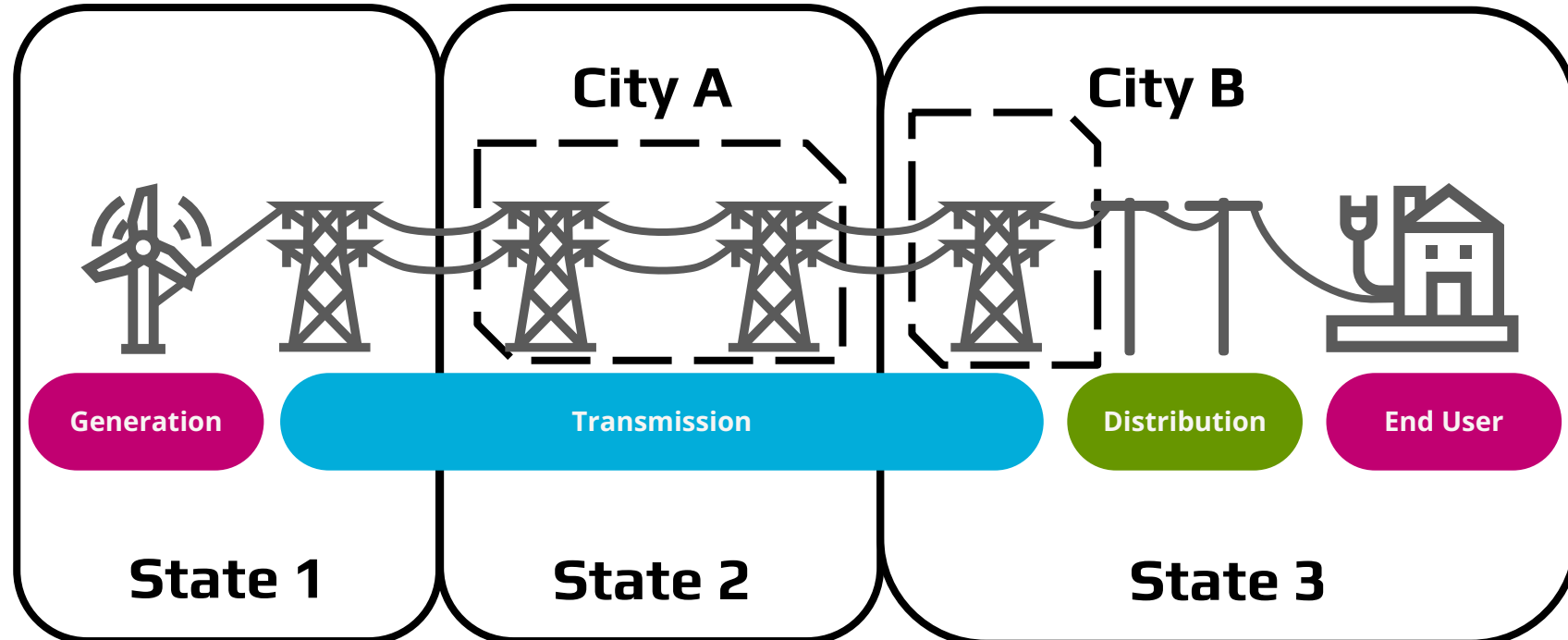


What is Delaying Transmission?

The Short Answer: Permitting

- **National Environmental Policy Act (NEPA)**

- Inter-agency coordination
- State coordination
- Crossing state & private land
- Federal laws
- State laws
- Local laws



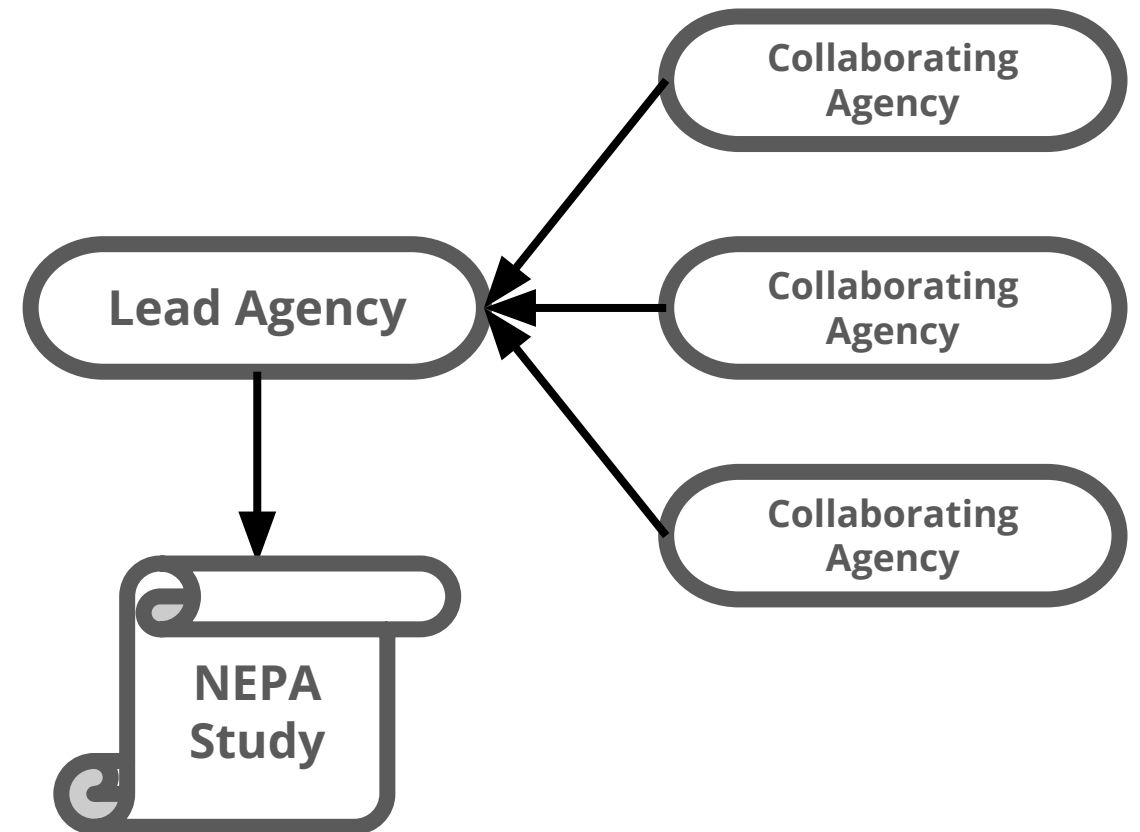
NEPA: A Summary

Requires agencies to consider an action's environmental effects

- NEPA is a procedural law
 - Study possible impacts & write a study

If multiple agencies are involved:

- Coordinating Agencies help with analyses
- Lead Agency sets manages & writes the study



Recent NEPA Reform

A Compromise to Avoid Default

Fiscal Responsibility Act of 2023:

- Set timelines and page limits on NEPA studies

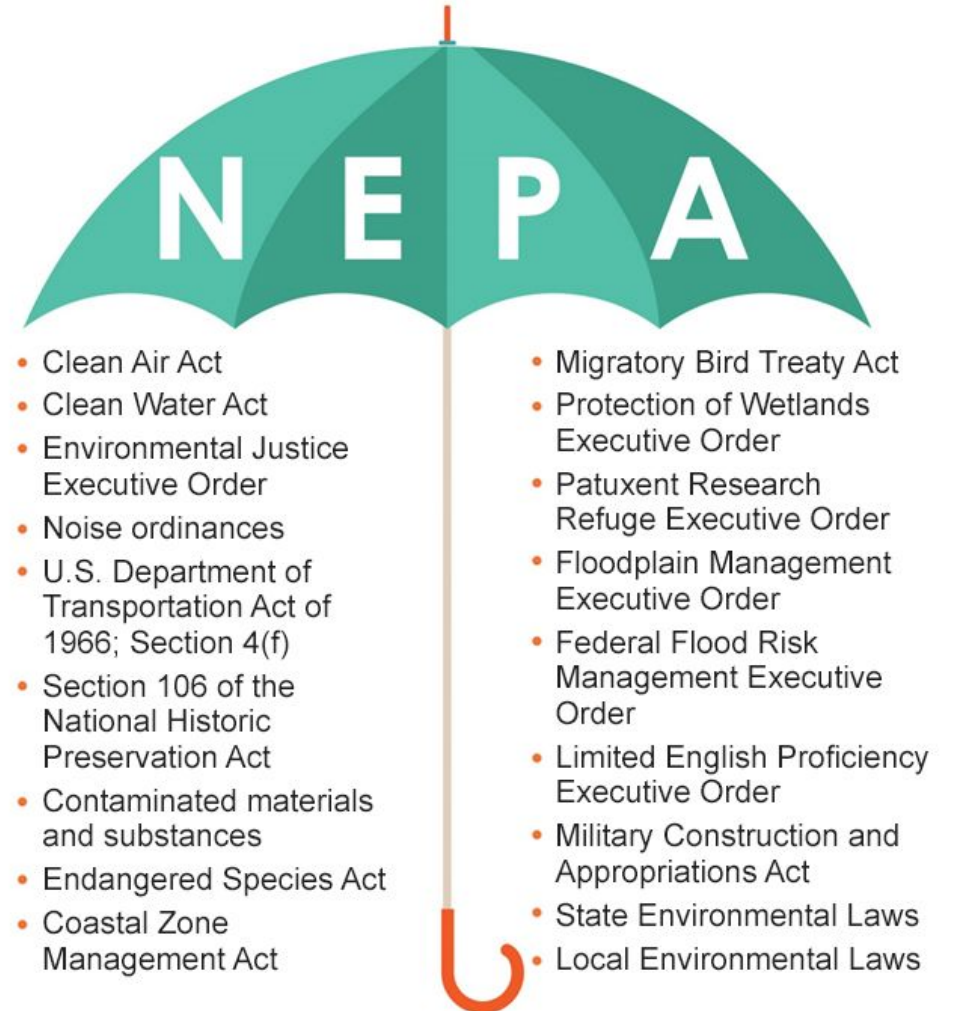
The longest EISs in each set have a stronger influence on the mean than on the median. Five EISs completed in 1994–1999 ran more than 2,000 pages, with the longest being about 3,600 pages. During 2011–2016, DOE completed 14 EISs that each had more than 2,000 pages; 6 of them were longer than 3,600 pages. The longest of these EISs, the *Final Programmatic EIS for Solar Energy Development in Six Southwestern States (Arizona, California, Colorado, Nevada, New Mexico, and Utah)* (Solar PEIS) (DOE/EIS-0403; 2012), included more than 11,000 pages. DOE was a co-lead with the Bureau of Land Management in preparing this EIS. If the Solar PEIS is excluded from the set, the average length of DOE EISs completed in 2011–2016 decreases from 2,500 pages to 2,200 pages.

EIS: Environmental Impact Statement

More NEPA Reform?

NEPA may not be the chief problem

NEPA-exclusive reform
addresses symptoms but
ignores root cause(s)



(2) Collect Data on NEPA

Use data to identify key roadblocks

- Council on Environmental Quality (CEQ) makes **mandatory** NEPA regulations
 - 2020: Track document costs
 - 7/31/2023 (proposed): Stop tracking costs



United States Government Accountability Office

Report to Congressional Requesters

April 2014

NATIONAL
ENVIRONMENTAL
POLICY ACT

Little Information
Exists on NEPA
Analyses

(3) Improve Inter-agency Communication

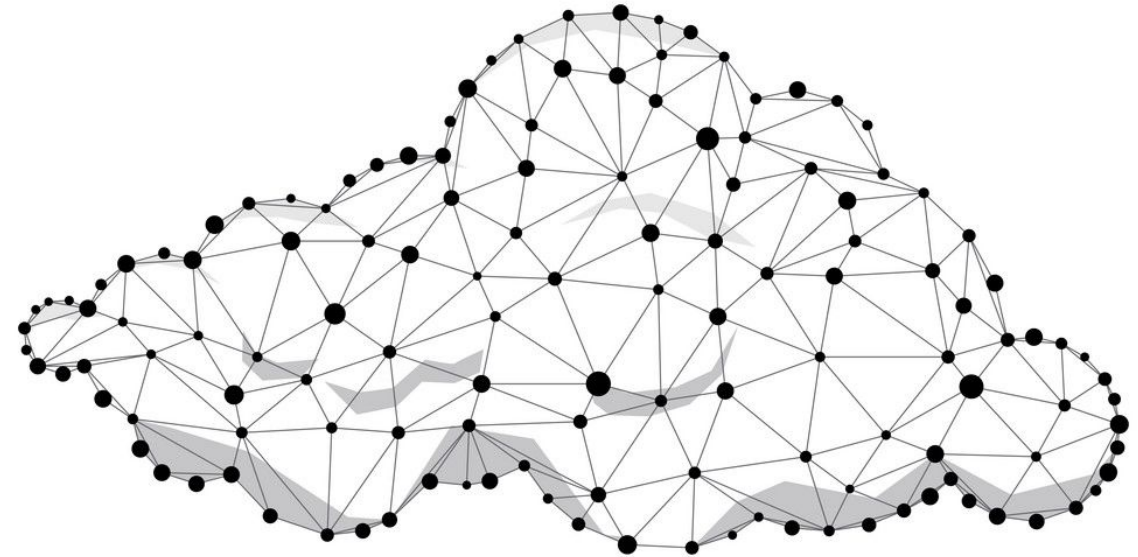
Use modern technologies & set standards

Fiscal Responsibility Act of 2023:

- \$500,000 to study “the **potential** for online and digital technologies to address delays in reviews”

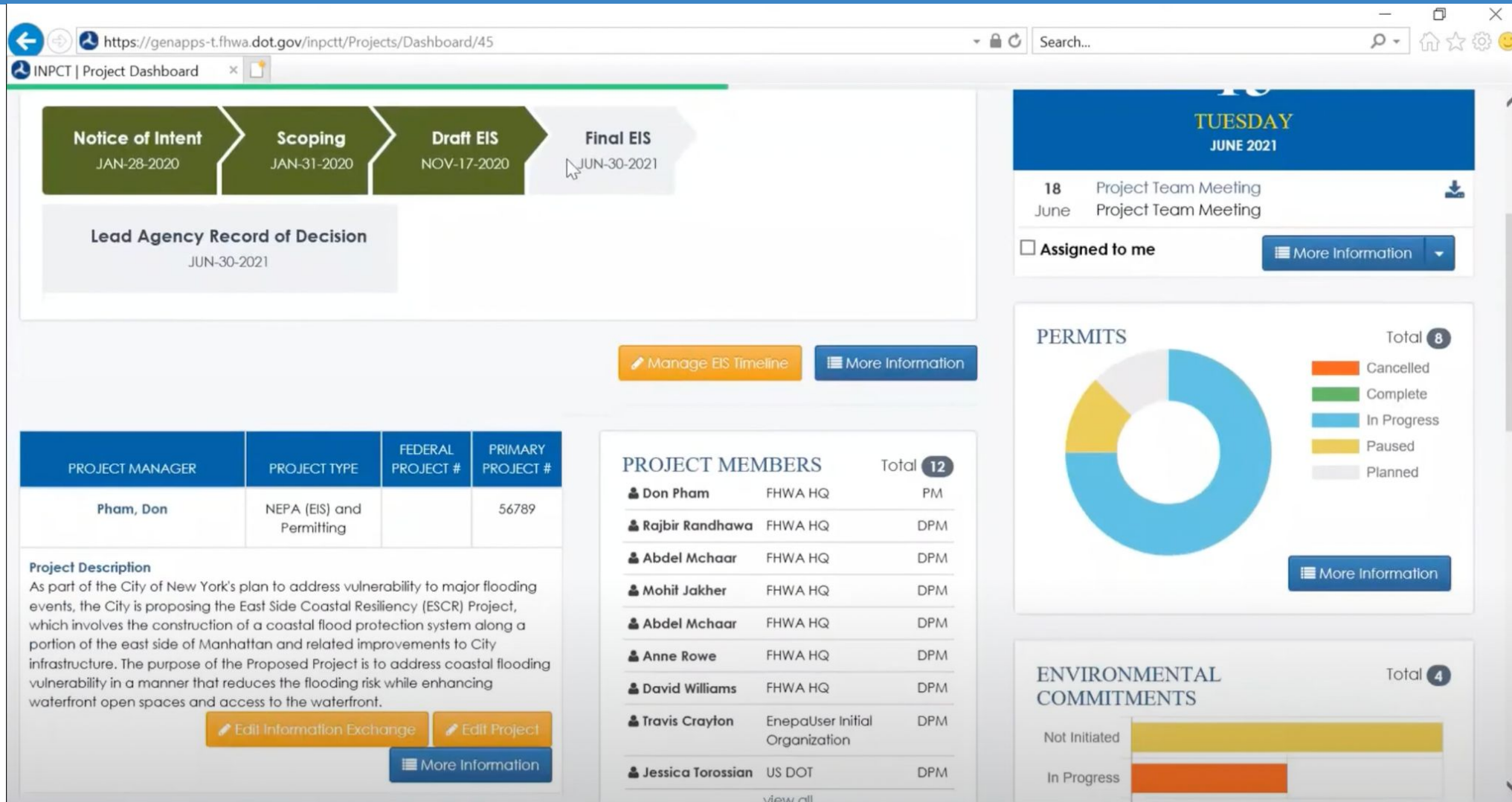
Ensure:

- Interactive, cloud-based data storage or
- Interactive, cloud-based NEPA documents



(3) Improve Inter-agency Communication

FHA's Interagency NEPA & Permitting Collaboration Tool



The Bottom Line





Questions?