Electric Grid Organization

Transmission: the “interstate” of electricity
Generation for Washington DC

Where do we source electricity?

- Wind
- Hydro
- Petroleum
- Solar
- Natural Gas
- Nuclear
- Coal
Climate Goals

50% Emissions Reductions by 2030

United States

Greenhouse gas emissions in metric tons CO2

Increasing emissions

Decreasing

Pledge

1990  2000  2010  2020  2030

5.5 billion
Generation for Washington DC
Where do we source electricity?
Generation for Washington DC

- Petroleum
- Coal
- Natural Gas

- Wind
- Solar
- Hydro
- Nuclear
Generation for Washington DC

Petroleum  Coal  Natural Gas  Solar

Wind

Hydro

Nuclear
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


Legend:
- Red: Population Center
- Blue: Hydroelectric Power
- Gray: Fossil Resource
- Light Blue: Wind Resource
- Yellow: Solar Resource
- Green: Wind and Solar Resource

Time Zones:
- Pacific: 12:00 PM
- Mountain: 1:00 PM
- Central: 2:00 PM
- Eastern: 3:00 PM
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

2-3x as much transmission by 2050
$300 billion by 2035
Distant Renewables
Issues from Crossing Multiple Jurisdictions

State 1
State 2
State 3
Generation
Transmission
Distribution
End User
City A
City B
(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

- Current Generation: 1254 Gigawatts (GW)
- Stalled Generation: 2040 GW

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
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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)

- Clean Air Act
- Clean Water Act
- Environmental Justice Executive Order
- Noise ordinances
- U.S. Department of Transportation Act of 1966; Section 4(f)
- Section 106 of the National Historic Preservation Act
- Contaminated materials and substances
- Endangered Species Act
- Coastal Zone Management Act
- Migratory Bird Treaty Act
- Protection of Wetlands Executive Order
- Patuxent Research Refuge Executive Order
- Floodplain Management Executive Order
- Federal Flood Risk Management Executive Order
- Limited English Proficiency Executive Order
- Military Construction and Appropriations Act
- State Environmental Laws
- Local Environmental Laws
(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
(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

Outdated permitting practices → Stifled transmission growth → Delays in clean electricity generation
Questions?