Transmission Policy for the Future

October 2021

Rob Gramlich

www.gridstrategiesllc.com

@RobGramlichDC

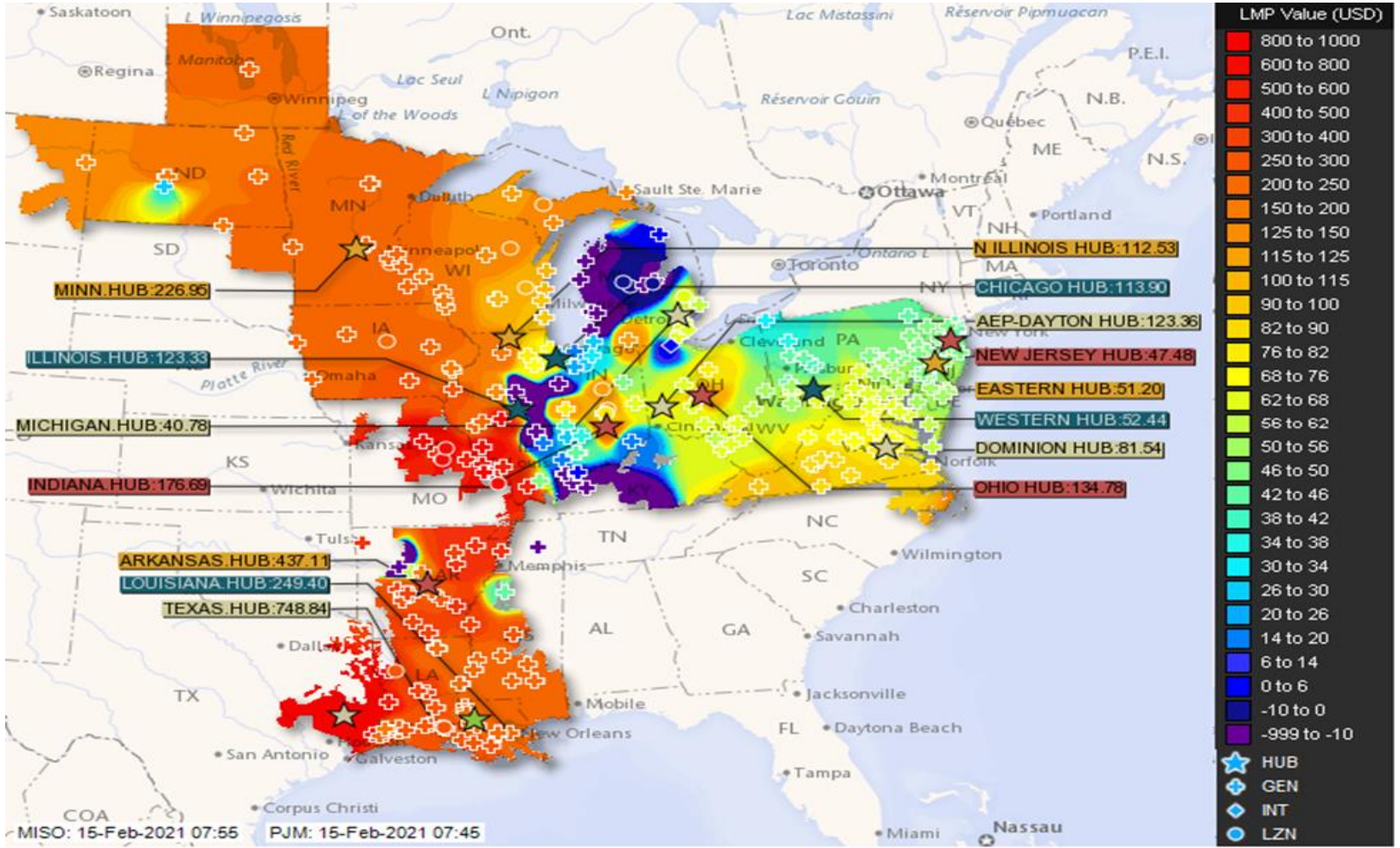
Grid Strategies LLC

Interregional Transmission Keeps the Lights On in Winter Storm Uri Feb 2021

MISO imported 13 GW, ERCOT only 0.8 GW (East to West flow)

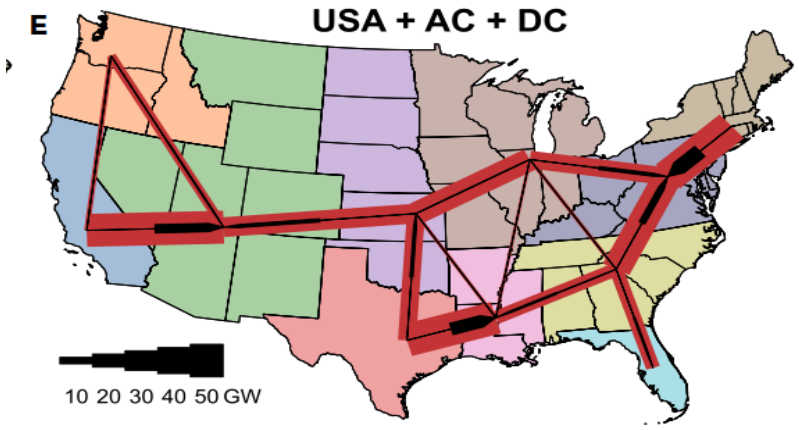
Eastern polar vortex incidents in 2014, 2018 served by Midwest power (West to East flow)

For transmission planning and cost allocation—who is the beneficiary???

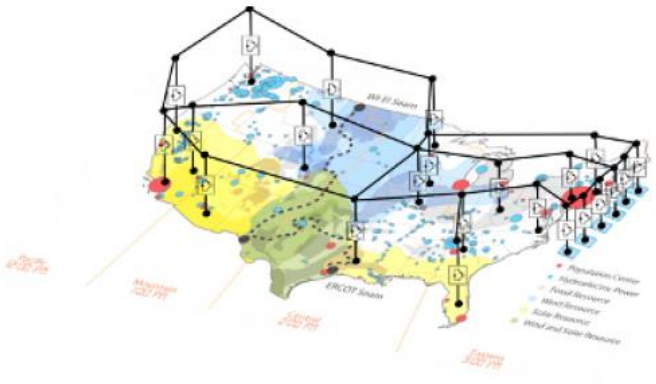


Low-cost decarbonization requires large scale transmission

10s of GWs of power transfer back and forth across and between regions
2-3x increase in national transmission capacity



https://www.cell.com/joule/fulltext/S2542-4351(20)30557-2



https://cleanenergygrid.org/wp-content/uploads/2020/11/Macro-Grids-in-the-Mainstream-1.pdf

Modeled flows NREL Seam study

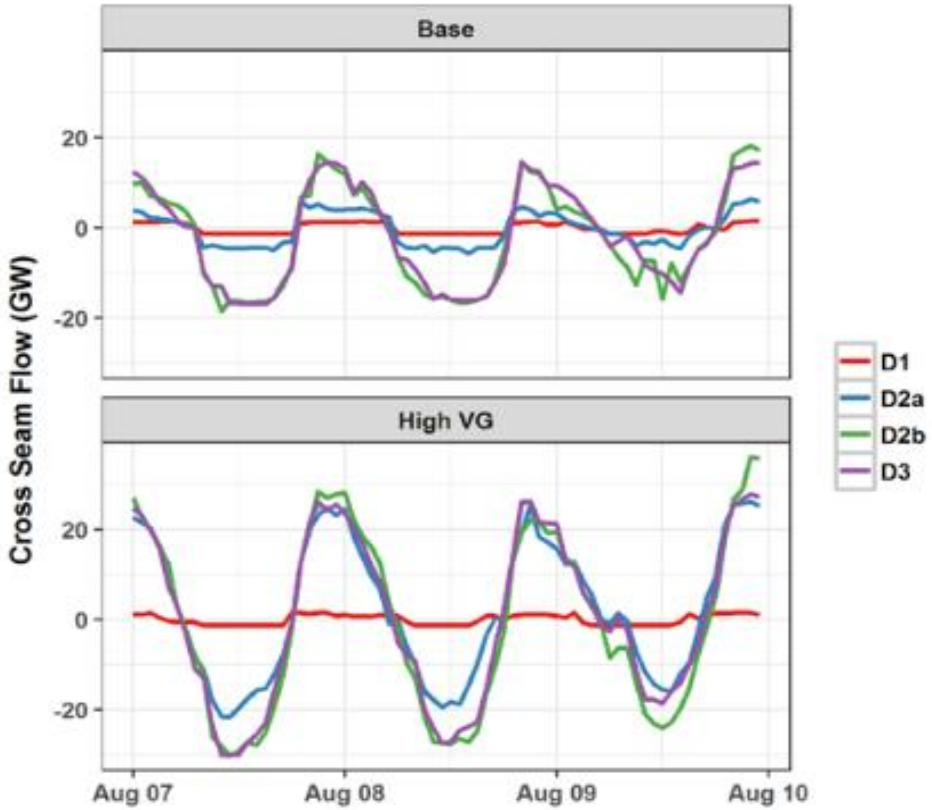


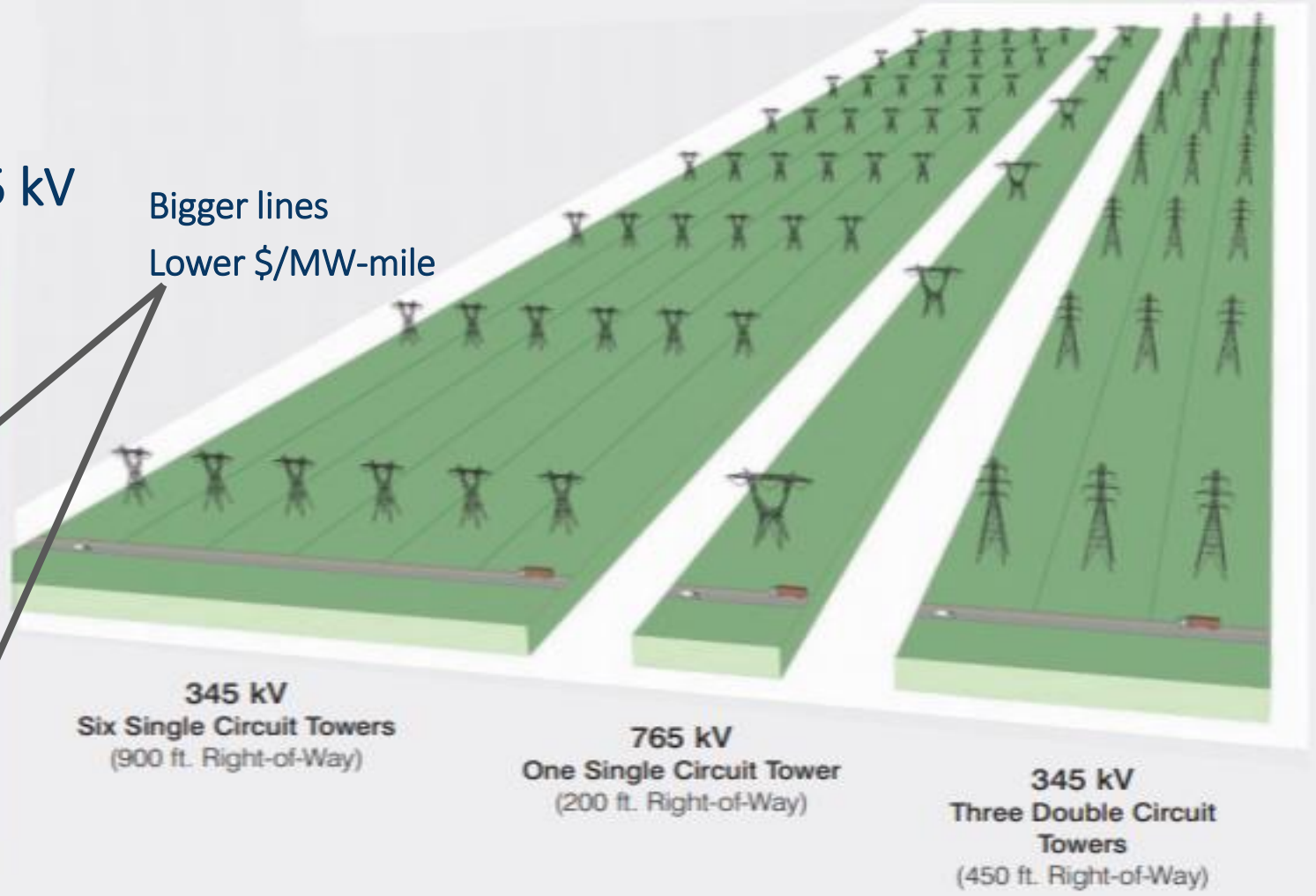
Fig. 3. Cross-seam transmission power flow (B2B and HVDC) during the coincident peak load period. A positive flow is a net export from the EI to the WI; a negative flow is a net import into the EI from the WI. Times are Eastern Standard Time.

Bigger is lower cost in transmission

765kv lines have ~1/6 the losses as 345 kV

Transmission Voltage (kV)	Cost per Mile ($/mile)	Capacity (MW)	Cost per Unit of Capacity ($/MW-mile)
230	$2.077 million	500	$5,460
345	$2.539 million	967	$2,850
500	$4.328 million	2040	$1,450
765	$6.578 million	5000	$1,320

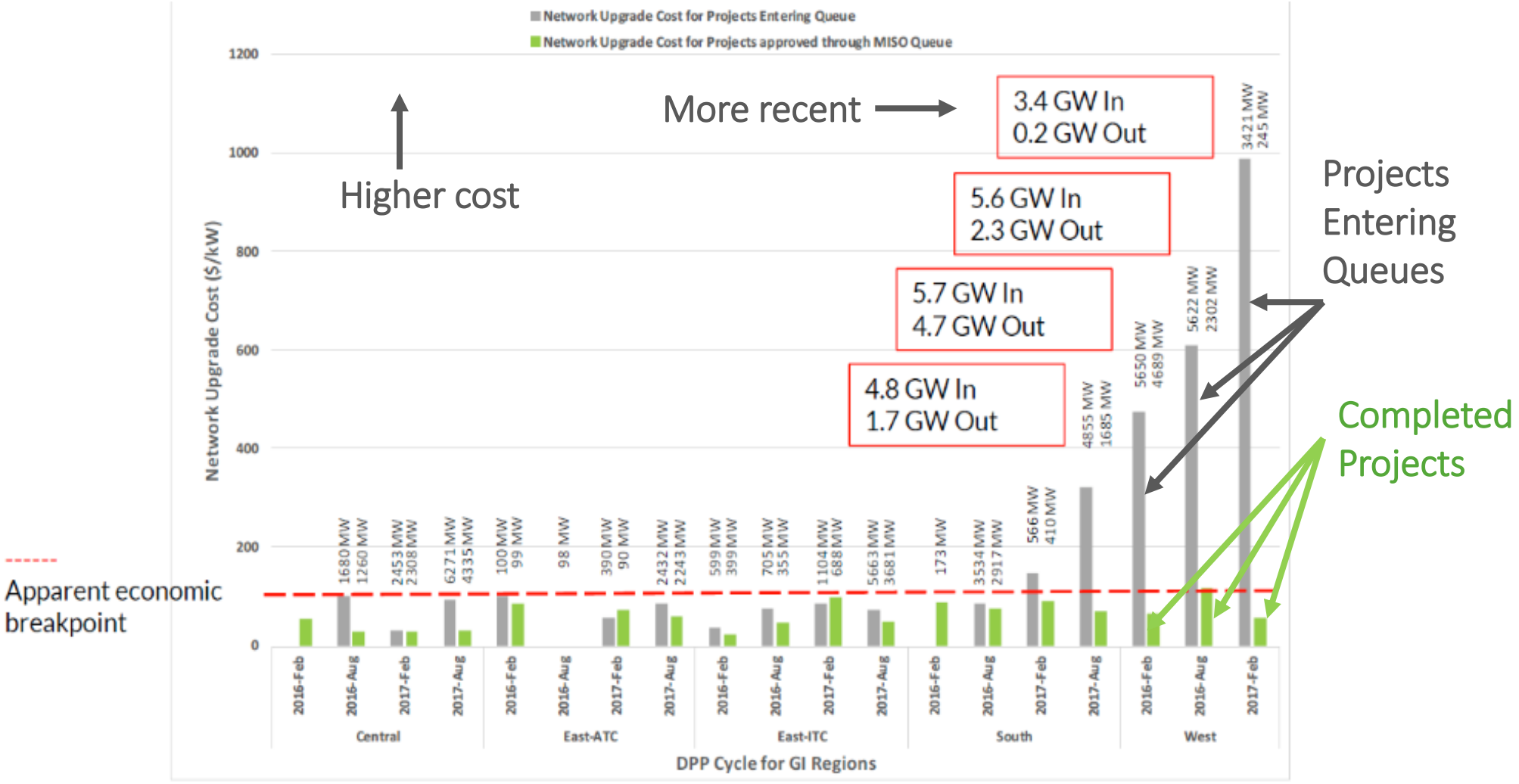
Bigger lines
Lower $/MW-mile



p. 4 https://web.ecs.baylor.edu/faculty/grady/_13_EE392J_2_Spring11_AEP_Transmission_Facts.pdf

~800 GW of clean energy stuck in interconnection queues

Planning a HV network through an interconnection process costs more than regional planning



Widespread lack of effective transmission planning

TABLE 2. PLANNING AUTHORITIES CURRENT USE OF EFFICIENT PRACTICES

	Proactive Generation & Load	Multi-Value	Scenario-Based	Portfolio-Based[30]	Joint Interregional Planning
ISO-NE[31]	✗	✗	✗	✓	✗
NYISO[32,33]	✗	✗	✗	✗	✗
– PPTPP only	✓	✓	✓	✓	✗
PJM[34.35]	✗	✗	✗	✗	✗
Florida	✗	✗	✗	✗	✗
Southeastern Regional	✗	✗	✗	✗	✗
South Carolina Regional	✗	✗	✗	✗	✗
MISO (excl. MVP, RIIA)[36]	✗	✗	✗	✗	✗
SPP (ITP)[37,38]	✗	✓	✗	✓	✗
CAISO[39,40]	✓	✗	✓	✗	✓
– TEAM only	✓	✓	✓	✓	✓
WestConnect	✗	✗	✗	✗	✗
NorthernGrid[41]	✗	✗	✗	✗	✗

First, get the most out of the existing grid

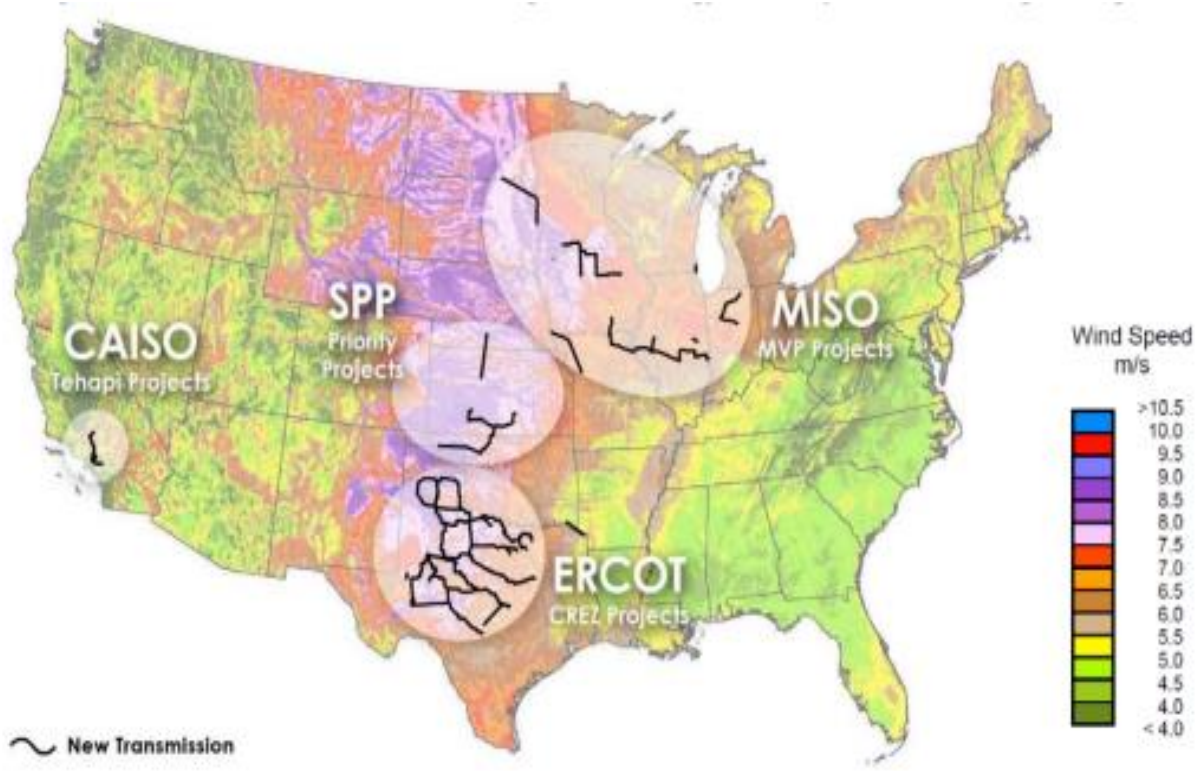
with Grid-Enhancing Technologies (GETs)
See www.watt-transmission.org

- GET some Dynamic Line Ratings, topology optimization, storage-as-transmission, power flow control
- GETs are
  - VERY low cost, $0.5m - $25m
  - deployable in MONTHS
  - scalable
  - modular
  - mobile and re-deployable
- FERC shared savings incentive

Big transmission CAN be built!

Recent US Large-Scale Expansions

- MISO MVP, SPP priority projects, ERCOT CREZ
- 3:1 Benefit-Cost ratios
- Winning formula:
  - Pro-active multi-benefit planning
  - Broad, beneficiary pays allocation



Major FERC Transmission Planning Reform (1/2)

- Nation-wide rule requiring planning methods (next slide)
  - With follow-through and FERC approvals required
- Cost allocation to reflect all beneficiaries, not just next generator in queue
  - “Participant funding” reform
- Interconnection queue processes

Likely New FERC Planning Requirements (2/2)

1. **Plan for anticipated future generation as well as load**
   - Question is how to do this, who decides
   - LSEs required to declare future resource plans?
   - How to make sure load forecasts include electrification estimates
2. **Multi-benefit, de-silo—congestion, resilience, public policy**
3. **Portfolio plan, not just line-by-line**
   - Include all technologies including Grid-Enhancing Technologies
4. **Scenario based, consider severe weather and resilience, pursue least regrets option**
5. **Joint interregional**
   - Also minimum interregional capacity
6. **Benefit-cost analysis**
   - Maximize net benefits, all benefits included

Transmission Policy in the 117th Congress

- 30% Investment Tax Credit for “regionally significant” transmission
- Loans and grant funding for large scale >1000 MW transmission, $8b
- Anchor tenant loans. $2.5 billion
- Power Marketing Administration loan authority
- DOE studies and helping with planning. $100m
- Smart Grid Investment Grants for GETs
- $800m funding for states to constructively engage in transmission planning, and economic development incentives for host communities
- Restoring federal backstop siting to original intent
- More being added???

Executive Agency Transmission Initiatives

Sec. Granholm: "deploy, deploy, deploy"

- Improve federal permitting
  - DOT: highways
  - DOI: federal lands
- Federal backstop siting
  - DOE and FERC
- Grid Deployment Authority
- WAPA Transmission Infrastructure Program loans
- Loan guarantees—DOE Loan Program Office