

INAUGURAL STRATEGY TOWN HALL

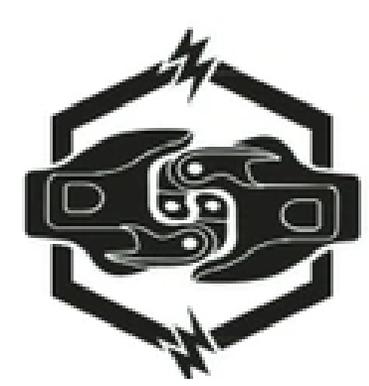
Rail-Grid Collaborative

(<https://www.rail-grid.org>)



December 16, 2025

Follow-up Strategy Session: January 13, 2026



Some High-Level Questions

- Should public policy makers and the electric power sector concern themselves with the future growth and sustainability of rail transportation?
- What role(s) might railroads play in the transformation of the electric grid? Can utilization of railroad rights of way help accelerate expansion of the power grid to meet surging electricity demand?
- Is there life after diesel? What are feasible prospects for rail electrification and what forms might electrification take?
- There are significant questions for all of us---see our website.



The Rail Perspective

- Nick Little is an experienced rail, transportation and supply chain educator with global experience. Nick recently retired as Director of Michigan State University Center for Railway Research & Education and began his career at British Railways.
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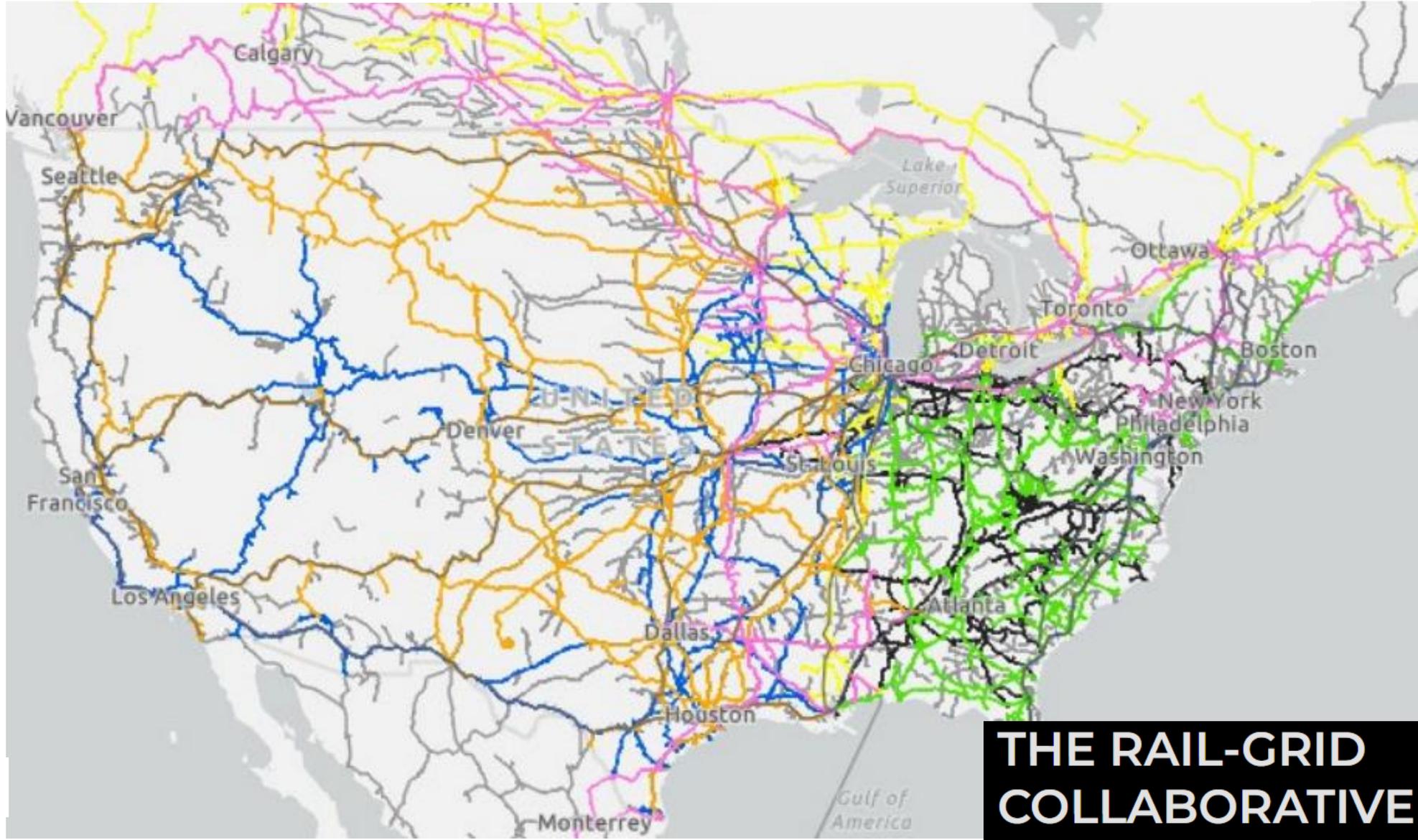


Co-Location Rationale and Opportunity

- The need for transmission is substantial and growing
- Electrification of everything is occurring
 - Home heating
 - EVs
 - Data centers
- Co-location in transportation rights-of-way could be an important element of building out the grid.
 - Corridors exist to connect rural and urban areas
 - Siting and permitting can be expedited.

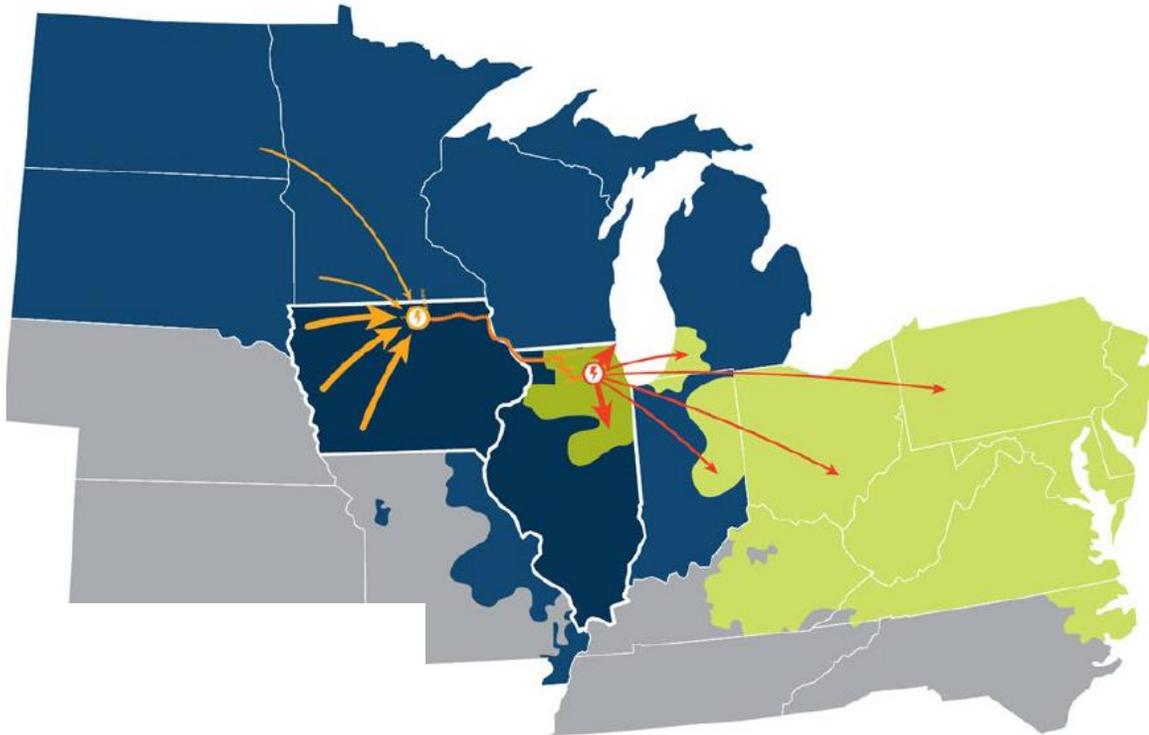


Rail Networks: Operational and Abandoned





Efficient Use of Rail ROW



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Rail Considerations

- Railroads are private or publicly-traded companies with extensive ROWs
- The rail and electric sectors both prioritize public safety
- Co-location proposals follow well-established processes with contracts and fees specific to each railroad
- If a mutually acceptable agreement can be found, collaborating with rail may have advantages over DOTs
- Planning, design and engineering considerations are key for co-locating in the highly-engineered rail ROW
- Co-located projects must not interfere with the track structure, communications infrastructure, anti-collision technology, or railroad crossing warning devices



What rail brings to the table

- Nearly 140,000-mile network in Canada, Mexico and the U.S.
- 6 Class I railroads have 2/3 of the rail ROW
- Freight rail accounts for 40% of long-distance ton-miles, more than any other mode of transportation
- Safest and most fuel-efficient way to move freight over land
- Hundreds of Short Lines

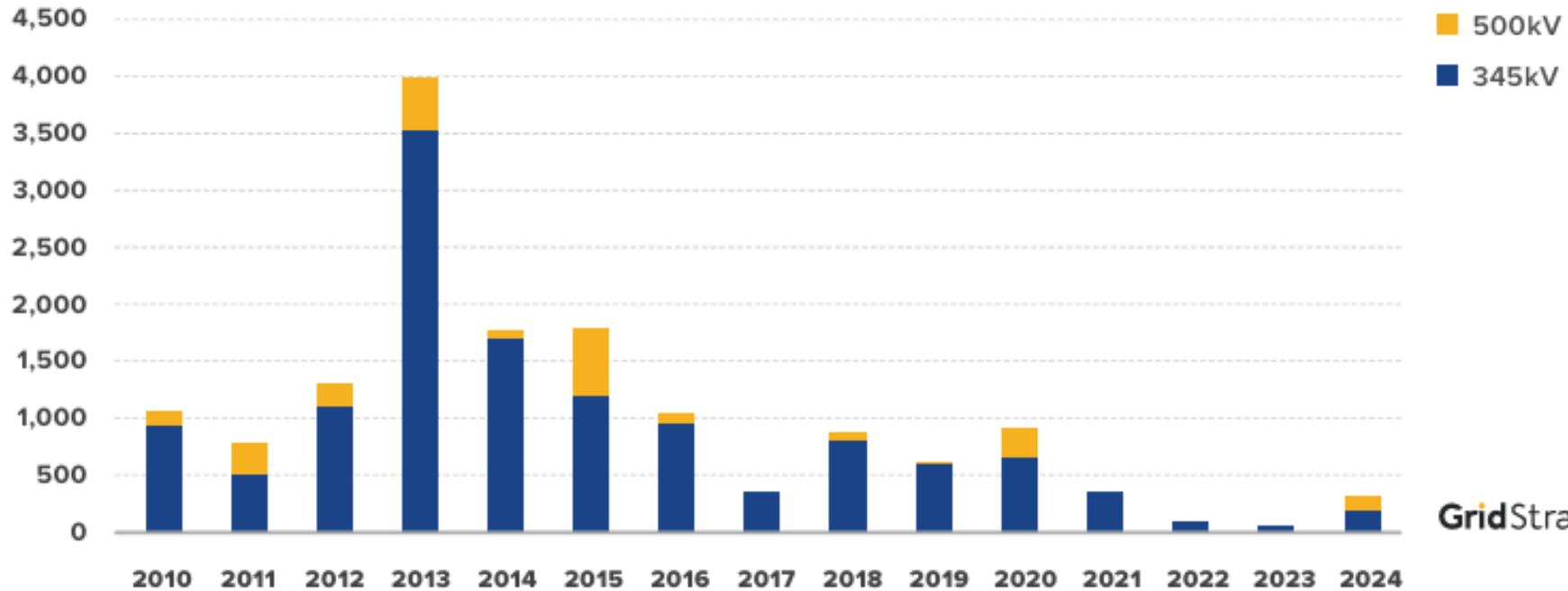


The Transmission Perspective

- Jay Caspary, a consultant for Grid Strategies, is a power systems engineer with more than 45 years' experience. Jay led regional and interregional planning at Southwest Power Pool. Jay's passion is effective long-range transmission planning with a focus on right-sizing, HVDC technology and deploying Alternate Transmission Technologies to get the most out of the existing bulk power grid.
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Miles of New 345kV+ Transmission Built Recently

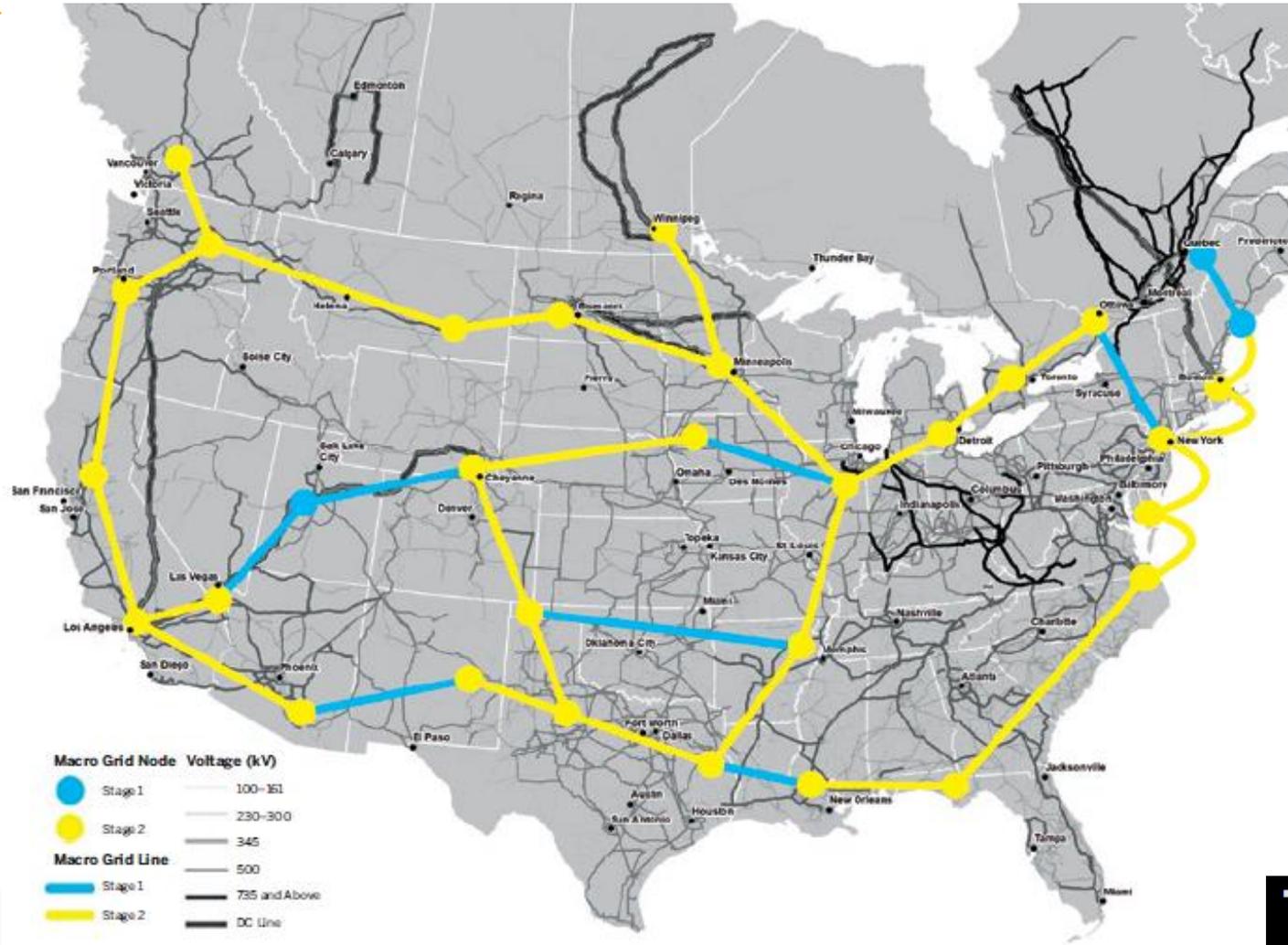


GridStrategies 

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ESIG Macro Grid Vision from 2022



Source: Energy Systems Integration Group.

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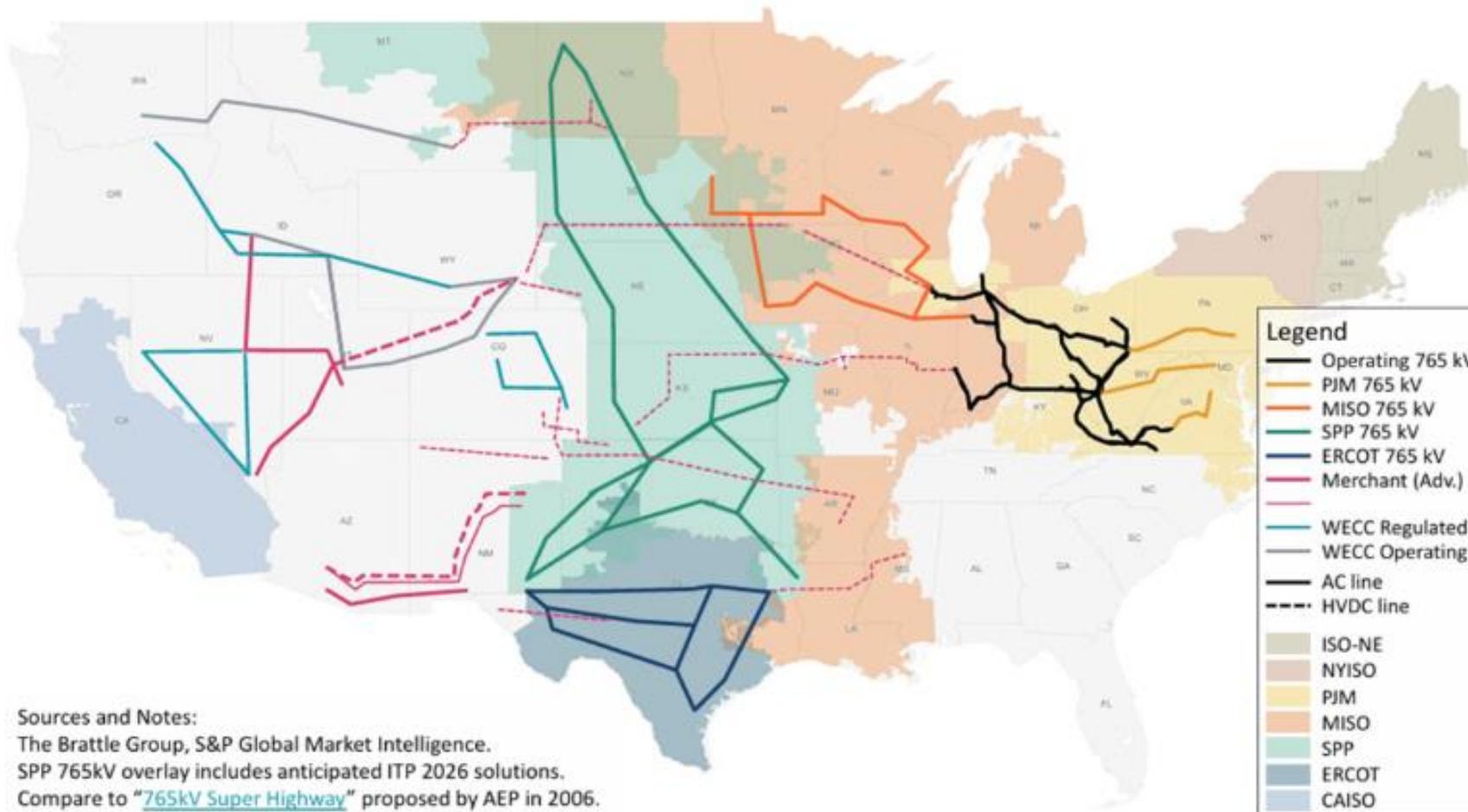
Approved 765kV Regional Plans in MISO



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Regional 765kV plans and merchant projects



Sources and Notes:
The Brattle Group, S&P Global Market Intelligence.
SPP 765kV overlay includes anticipated ITP 2026 solutions.
Compare to "[765kV Super Highway](#)" proposed by AEP in 2006.

The 765 kV systems planned by PJM, MISO, SPP, and ERCOT are adjacent to each other!

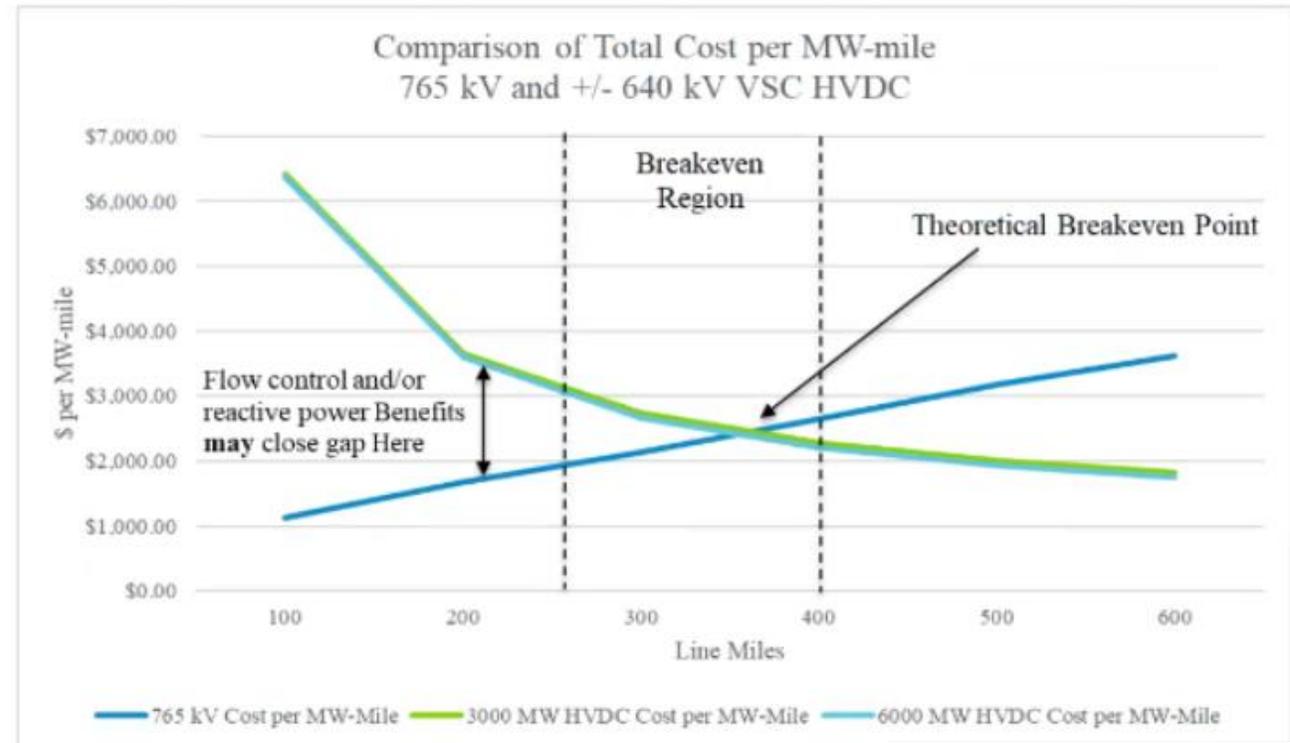
- They could (should?) be planned to be connected, which would create an interregional Macro Grid
- Then should also be integrated with HVDC lines, including into ERCOT and WECC



HVDC more cost effective at <250 miles

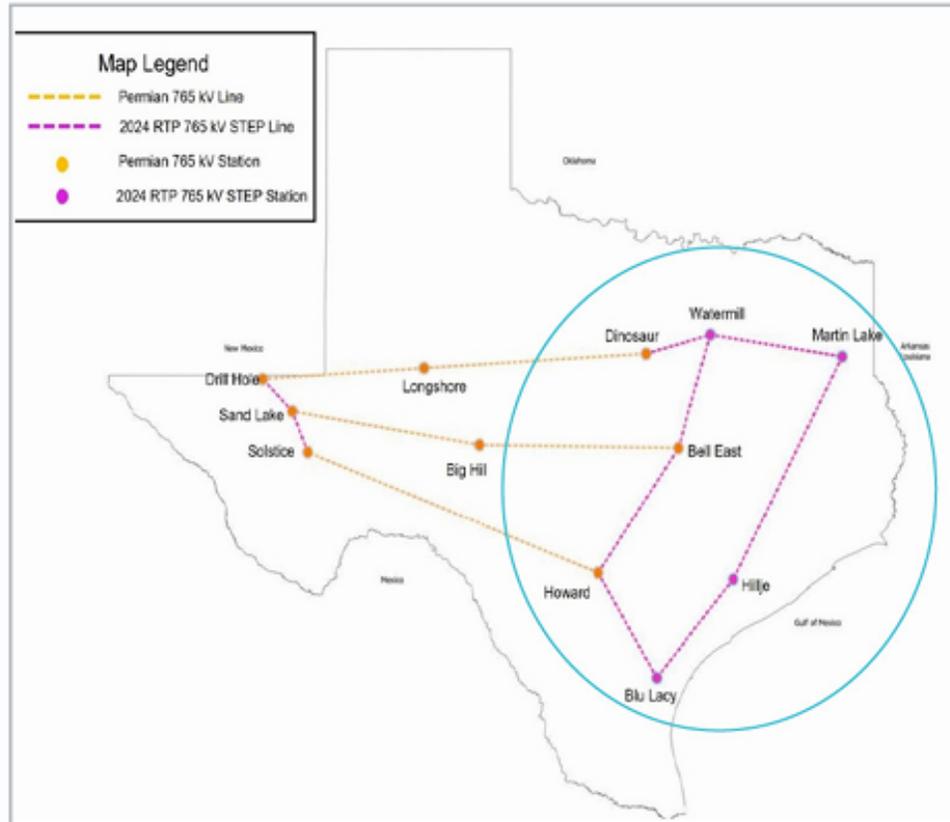
Line length is directly linked to HVDC cost-effectiveness

- For lines longer than 400 miles, HVDC tends to have a lower cost per MW-mile.
- For lines shorter than 250 miles, EHV AC tend to have a lower cost per MW-mile.
- For lines longer than 250 miles but shorter than 400, the cost of HVDC versus EHV AC should be determined on a case-by-case basis.

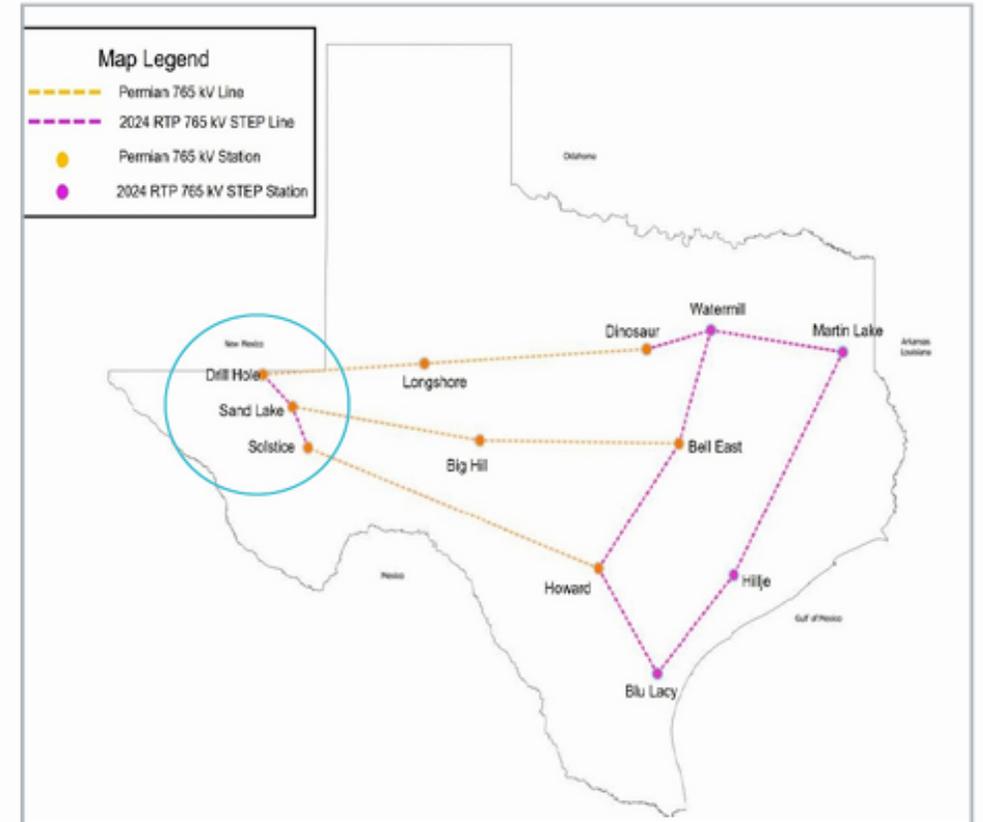




Approved 765kV Regional Plans in ERCOT



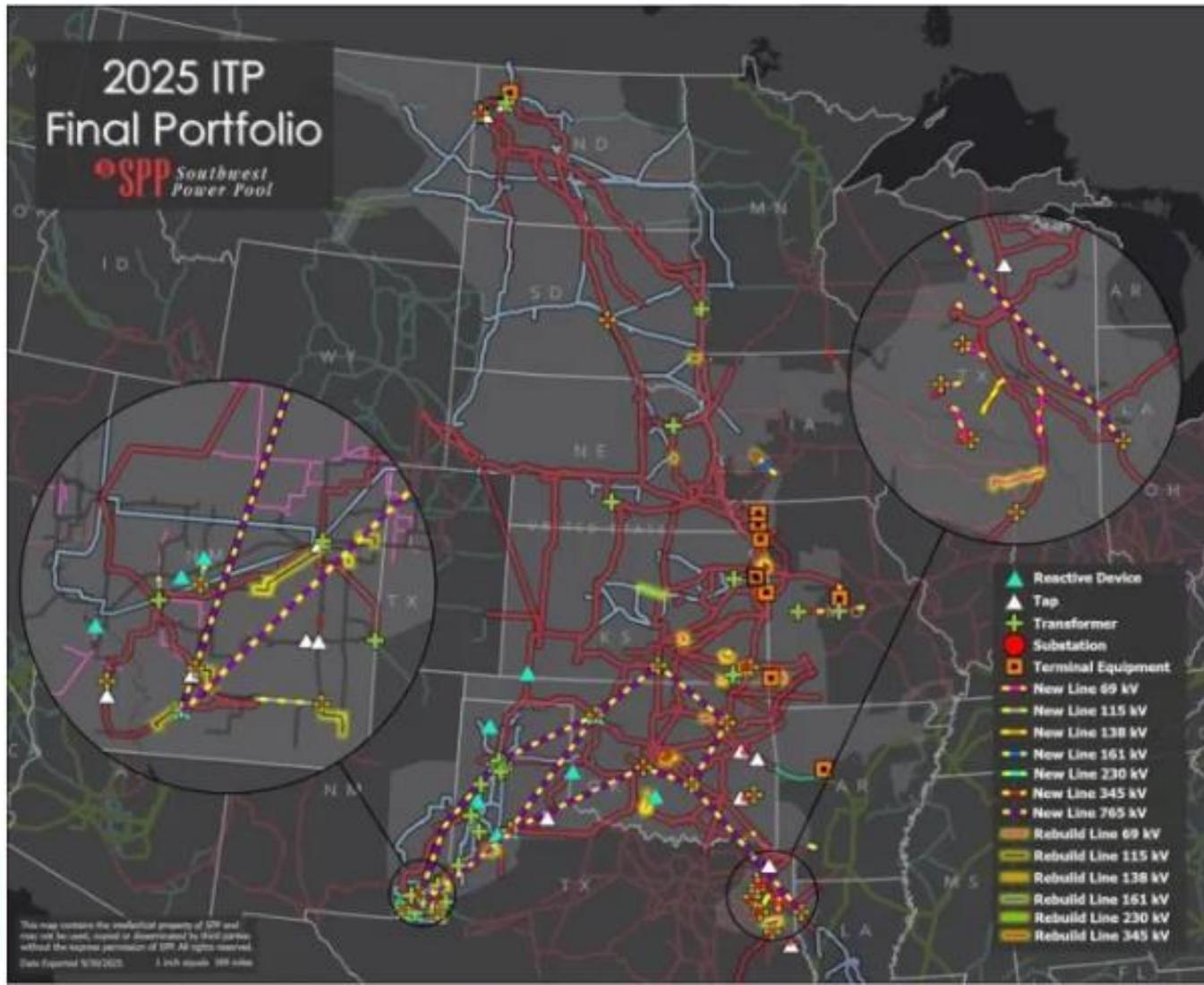
AEP Texas, CPS Energy, Oncor and CNP Texas 765-kV STEP Eastern Backbone Regional Planning Group Project



Oncor and AEPSC Drill Hole to Sand Lake to Solstice 765-kV Line Regional Planning Group Project



Approved 765kV Regional Plans in SPP



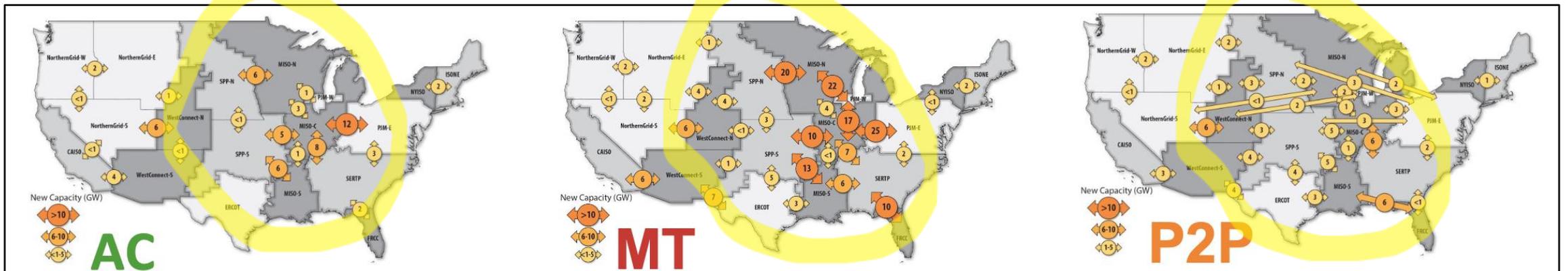
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DOE Transmission Planning Study Key Takeaway: Midwest has greatest need and opportunity

- High Opportunity Transmission (HOT) interfaces represent transmission capacity expansion [2020-2035] results between regions across many scenarios. Transmission projects that align with these HOT interfaces could be strong candidates for further study and serve as a starting point for accelerated transmission expansion.

What new transmission capacity is present in at least 75% of the 15 (+1) sensitivities?



AC = Alternating Current scenario

MT = Multi-Terminal HVDC scenario

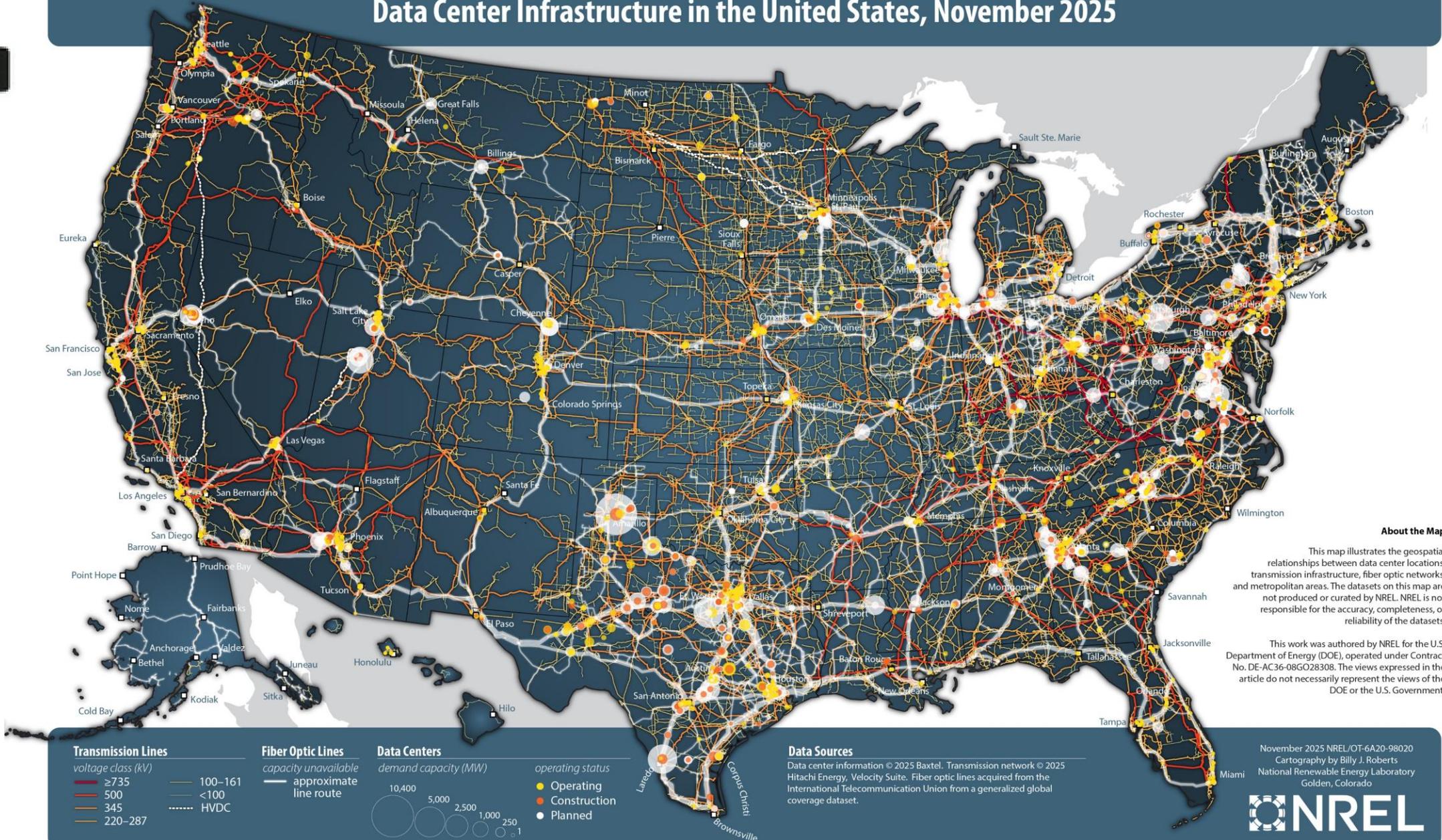
P2P = Point to point HVDC scenario

Source: DOE GDO, National Transmission Planning Study [webinar](#)

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Data Center Infrastructure in the United States, November 2025



Transmission Lines
voltage class (kV)

- ≥735
- 500
- 345
- 220–287
- 100–161
- <100
- - - - HVDC

Fiber Optic Lines
capacity unavailable
approximate
line route

Data Centers
demand capacity (MW)

- 10,400
- 5,000
- 2,500
- 1,000
- 250
- 1

operating status

- Operating
- Construction
- Planned

Data Sources
Data center information © 2025 Baxtel. Transmission network © 2025 Hitachi Energy, Velocity Suite. Fiber optic lines acquired from the International Telecommunication Union from a generalized global coverage dataset.

About the Map
This map illustrates the geospatial relationships between data center locations, transmission infrastructure, fiber optic networks, and metropolitan areas. The datasets on this map are not produced or curated by NREL. NREL is not responsible for the accuracy, completeness, or reliability of the datasets.

This work was authored by NREL for the U.S. Department of Energy (DOE), operated under Contract No. DE-AC36-08GO28308. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government.

November 2025 NREL/OT-6A20-98020
Cartography by Billy J. Roberts
National Renewable Energy Laboratory
Golden, Colorado





Co-location Methodology included in Needs Study



Figure S-3. Select highway ROW routes assessed. Each route is categorized by dominant direction. Blue routes are north-south and black routes are east-west.



Questions

- Can utilization of railroad rights of way help accelerate electric transmission's expansion, and help meet surging electricity demand and ensure electric reliability?
- Will HVDC co-location affect the pace of rail electrification in any meaningful way, or will rail operations, finances, and interoperability be more powerful influences?
- Is there life after diesel? What form might electrification feasibly take? How will utilities and other generators serve cross-market or interregional rail operations?
- How will AI and other technology applications stimulate or alter the expansion, operations, or relationship between railroads and the electric grid?
- Should major railroads anticipate or prepare for changes in their motive power or other operations, given electrification of transportation competitors?
- What role(s) might rail play as part of the future electric eco-system and the transitions occurring on the energy side? Are there joint undertakings that could improve rural economic development



Selected Resources

- [Cost and Benefit Risk Framework for Modern Railway Electrification Options | FRA \(1/15/25\) \(USDOT/Federal Railroad Administration\)](#)
- [Reinventing the Right of Way: Policy, Technological, and Economic Implications of Siting Transmission Lines Along Transportation Corridors, \(National Academies of Sciences, Engineering, & Medicine, April 2025\)](#)
- [Gaps Analysis from the Volpe Center and Pacific Northwest National Laboratory \(2025\)](#)
- [US Railroading: What sectors future power suppliers will need to know \(Power Magazine\)](#)
- [The U.S. National Blueprint for Transportation Decarbonization: Actions for the Rail Sector, USDOE \(2024\)](#)
- [The Electric System Today: Basics for Railroaders - Railway Age \(July 2023\)](#)
- Assoc. American Railroads/HDR Consulting, Study of Catenary Electrification of the North American Railroad Network (2025); (["AAR, HDR Tear Apart Catenary" - Railway Age](#))



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