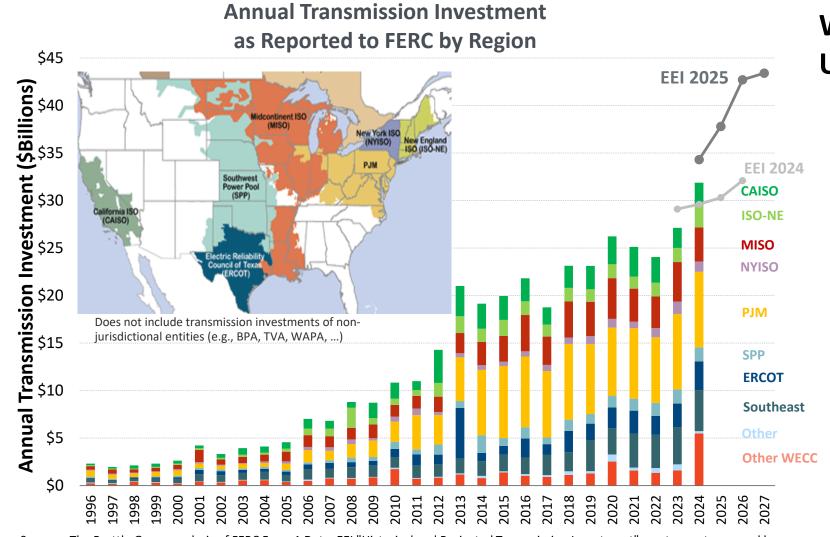
# Annual U.S. Transmission Investments 1996-2024



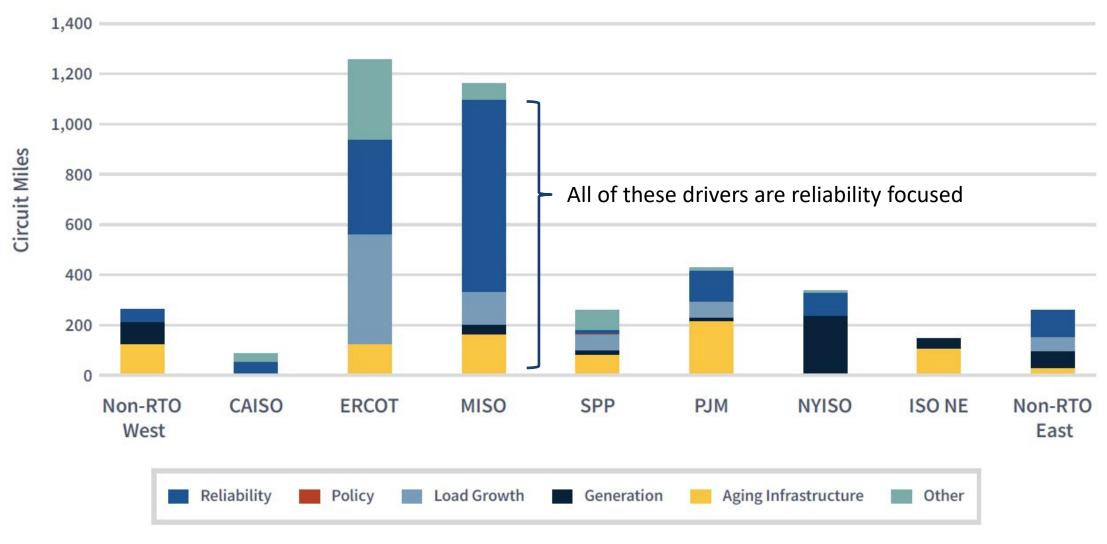


Sources: The Brattle Group analysis of FERC Form 1 Data; EEI "Historical and Projected Transmission Investment" most recent accessed here https://www.eei.org/-/media/Project/EEI/Documents/Resources-and-Media/bar\_actual\_and\_projected\_trans\_investment.pdf

# We crossed \$30 billion in annual U.S. transmission investments!

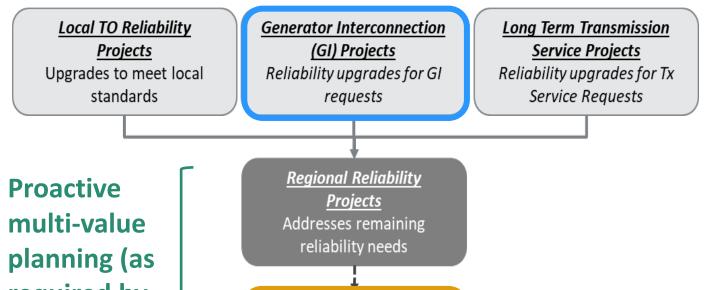
- Equipment cost increases likely account for the majority of the recent increases, with reemerging load growth behind the higher level of projected investments
- Most of it is justified solely based on reliability needs (without benefit-cost analysis); 50% based on "local" utility criteria (aging assets; without going through regional planning processes)
  - Over the next decade, MISO's LRTP projects will add over \$30 billion justified based on multi-value benefit-cost analysis (now required by FERC Order 1920)

#### 2023 Transmission Investments by Driver



Source: FERC Staff Report: 2023 State of the Markets (March 21, 2024), Figure 15 (based on C3 Group data)

# Much of the U.S. Continues to Rely on Siloed, Reliability-focused **Transmission Planning Processes**



#### These solely reliability-driven processes account for > 90% of all transmission investments

 None involve any assessments of economic benefits (i.e., cost savings offered by the new transmission)

**Incremental generation** interconnection has become the primary tool (and efficiency barrier) to support public policy goals

Planning for economic & public-policy needs results in less than 10% of all U.S. transmission investments

#### Interregional planning processes are largely ineffective

- Essentially no major interregional transmission projects have been planned and built in the last decade
- Numerous national studies show that more interregional transmission is needed to reduce total system costs

required by **FERC Order** 1920) can achieve more cost-effective planning

outcomes

Regional Economic & Public **Policy Projects** 

Often addresses only a narrow set of remaining needs

Joint RTO Interregional Planning **Processes** 

View of remaining needs is often narrow, resulting in few to no projects

### Brattle Group Publications on Transmission

Tsuchida, et al., <u>Incorporating GETs and HPCs into Transmission Planning Under FERC Order 1920</u>, prepared for ACORE, April 2025.

Pfeifenberger, et al., Proposal to Develop Optimal Transmission Planning in Alberta, prepared for AESO, April 2025.

DeLosa, et al., Strategic Action Plan, prepared for the Northeast States Collaborative on Interregional Transmission, April 2025.

Gramlich, Hagerty, et al., Unlocking America's Energy: How to Efficiently Connect New Generation to the Grid, Grid Strategy and Brattle, August 2024.

DeLosa, Pfeifenberger, Joskow, Regulation of Access, Pricing, and Planning of High Voltage Transmission in the US, MIT-CEEPR working paper, March 7, 2024.

Pfeifenberger, How Resources Can Be Added More Quickly and Effectively to PJM's Grid, OPSI Annual Meeting, October 17, 2023.

Pfeifenberger, Bay, et al., The Need for Intertie Optimization: Reducing Customer Costs, Improving Grid Resilience, and Encourage Interregional Transmission, October 2023.

Pfeifenberger, Plet, et al., The Operational and Market Benefits of HVDC to System Operators, for GridLab, ACORE, Clean Grid Alliance, Grid United, Pattern Energy, and Allete, September 2023.

Pfeifenberger, DeLosa, et al., The Benefit and Urgency of Planned Offshore Transmission, for ACORE, ACP, CATF, GridLab, and NRDC, January 24, 2023.

Brattle and ICC Staff, Illinois Renewable Energy Access Plan: Enabling an Equitable, Reliable, and Affordable Transition to 100% Clean Electricity for Illinois, December 2022.

Pfeifenberger et al., New Jersey State Agreement Approach for Offshore Wind Transmission: Evaluation Report, October 26, 2022.

Pfeifenberger, DeLosa III, <u>Transmission Planning for a Changing Generation Mix</u>, OPSI 2022 Annual Meeting, October 18, 2022.

Pfeifenberger, Generation Interconnection and Transmission Planning, ESIG Joint Generation Interconnection Workshop, August 9, 2022.

Pfeifenberger and DeLosa, <u>Proactive, Scenario-Based, Multi-Value Transmission Planning</u>, Presented at PJM Long-Term Transmission Planning Workshop, June 7, 2022.

Pfeifenberger, Planning for Generation Interconnection, Presented at ESIG Special Topic Webinar: Interconnection Study Criteria, May 31, 2022.

RENEW Northeast, A Transmission Blueprint for New England, Prepared with Borea and The Brattle Group, May 25, 2022.

Pfeifenberger, New York State and Regional Transmission Planning for Offshore Wind Generation, NYSERDA Offshore Wind Webinar, March 30, 2022.

Pfeifenberger, The Benefits of Interregional Transmission: Grid Planning for the 21st Century, US DOE National Transmission Planning Study Webinar, March 15, 2022.

Pfeifenberger, 21st Century Transmission Planning: Benefits Quantification and Cost Allocation, for NARUC members of the Joint Federal-State Task Force on Electric Transmission, January 19, 2022.

Pfeifenberger, Spokas, Hagerty, Tsoukalis, <u>A Roadmap to Improved Interregional Transmission Planning</u>, November 30, 2021.

Pfeifenberger, Tsoukalis, Newell, "The Benefit and Cost of Preserving the Option to Create a Meshed Offshore Grid for New York," Prepared for NYSERDA with Siemens and Hatch, November 9, 2022.

Pfeifenberger et al., <u>Transmission Planning for the 21st Century: Proven Practices that Increase Value and Reduce Costs</u>, Brattle-Grid Strategies, October 2021.

Pfeifenberger et al., <u>Initial Report on the New York Power Grid Study</u>, prepared for NYPSC, January 19, 2021.

Van Horn, Pfeifenberger, Ruiz, "The Value of Diversifying Uncertain Renewable Generation through the Transmission System," BU-ISE, October 14, 2020.

Pfeifenberger, Newell, Graf and Spokas, "Offshore Wind Transmission: An Analysis of Options for New York", prepared for Anbaric, August 2020.

Pfeifenberger, Newell, and Graf, "Offshore Transmission in New England: The Benefits of a Better-Planned Grid," prepared for Anbaric, May 2020.

Tsuchida and Ruiz, "Innovation in Transmission Operation with Advanced Technologies," T&D World, December 19, 2019.

Pfeifenberger, "Cost Savings Offered by Competition in Electric Transmission," Power Markets Today Webinar, December 11, 2019.

Chang, Pfeifenberger, Sheilendranath, Hagerty, Levin, and Jiang, "Cost Savings Offered by Competition in Electric Transmission: Experience to Date and the Potential for Additional Customer Value," April 2019 and "Response to Concentric Energy Advisors' Report on Competitive Transmission," August 2019.

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Chang, Pfeifenberger, "Well-Planned Electric Transmission Saves Customer Costs: Improved Transmission Planning is Key to the Transition to a Carbon-Constrained Future," WIRES&Brattle, June 2016.

Newell et al. "Benefit-Cost Analysis of Proposed New York AC Transmission Upgrades," on behalf of NYISO and DPS Staff, September 15, 2015.

Pfeifenberger, Chang, and Sheilendranath, "Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid," WIRES and Brattle, April 2015.

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Chang, Pfeifenberger, Newell, Tsuchida, Hagerty, "Recommendations for Enhancing ERCOT's Long-Term Transmission Planning Process," October 2013.

Pfeifenberger and Hou, "Seams Cost Allocation: A Flexible Framework to Support Interregional Transmission Planning," on behalf of SPP, April 2012.

Pfeifenberger, Hou, "Employment and Economic Benefits of Transmission Infrastructure Investment in the U.S. and Canada," on behalf of WIRES, May 2011.

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