

FEWER NEW MILES

The US Transmission
Grid in the 2020s

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SECTION 1 | Executive Summary

The U.S. electric grid is in need of significant and rapid transmission expansion to meet growing power demand, ensure resilience and reliability, and enable lowest cost electricity generation. The U.S. Department of Energy released The National Transmission Needs Study at the end of 2023, finding a median need for 57% growth in transmission infrastructure by 2035 compared to today's system through a review of transmission studies and scenarios.¹ New high-voltage transmission will be key to interconnecting more renewable energy to address climate change, as summer 2023 broke heat records again. The Net-Zero America Study at Princeton found that 80% of the potential greenhouse gas emissions reductions delivered by the Inflation Reduction Act (IRA) will be lost without doubling the current rate of transmission expansion. While the need for more transmission capacity is clear, utilities are not responding. Construction of new high-voltage transmission has slowed to a trickle over the past decade. Despite this decline in new construction, annual transmission spend has hit an all-time high — over \$25 billion per year — with 90% of this spend driven by reliability upgrades and the replacement of aging equipment.

The federal government has taken steps to incentivize the construction of new lines — the Federal Energy Regulatory Commission (FERC) published Order No. 1920 in May 2024 to transform regional transmission planning practices, and the U.S. Department of Energy (DOE) has taken action by issuing new rules to support siting, permitting, and funding for new lines. Section 3 describes these programs. However, a significant increase in federal funding and utility investment in new greenfield high-capacity projects is still needed to truly move the needle on transmission expansion and ensure a reliable and affordable transition to a cleaner grid. While new transmission is being built, utilities can fully avail themselves of Advanced Transmission Technologies (ATTs) such as reconductoring and Grid Enhancing Technologies (GETs) to upgrade existing transmission lines, congruent with the White House goal announced in April 2024 to “upgrade 100,000 miles of transmission lines over the next five years”.

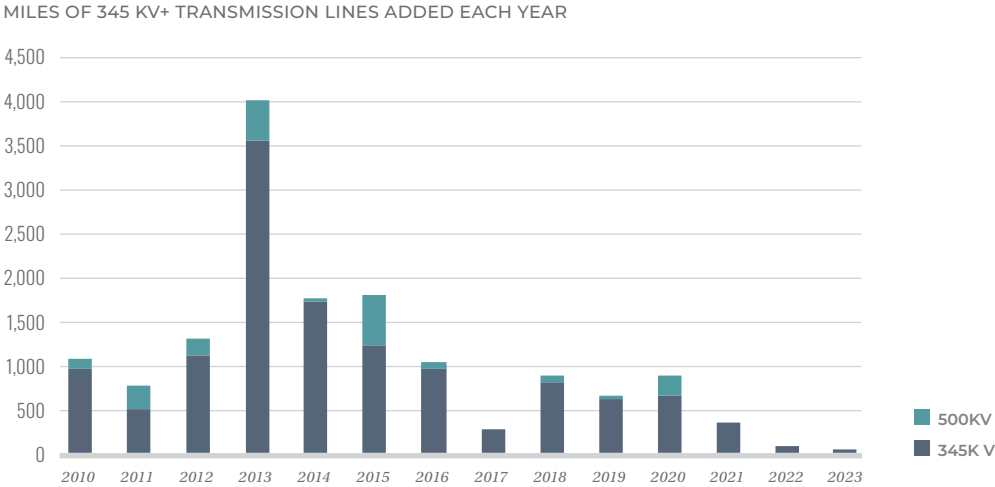
¹ U.S. Department of Energy, Grid Deployment Office. *National Transmission Needs Study* (October 2023). https://www.energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf (“National Transmission Needs Study”)

SECTION 2 | ANALYSIS OF TRANSMISSION INVESTMENT AND UTILITY SPENDING

Construction of new high-voltage transmission lines has continued to slow

Transmission spending hit an all-time high in 2023, but the U.S. only builds 20% as much new transmission in the 2020s as it did in the first half of the 2010s. This trend began over a decade ago, when the average of 1,700 miles of new high-voltage transmission built per year from 2010 to 2014 dropped to only 925 miles from 2015 to 2019, and has fallen further to an average of 350 miles per year from 2020 to 2023. **Only 55 new miles of high-voltage transmission were constructed in 2023.**²

FIGURE 1 Investment in new high-voltage lines peaked in 2013 and has steadily fallen over the last 10 years.³



² Note that this number for 2023 could see small adjustments, as C Three appears to continue to update the miles built in the previous year's data reported in FERC's Energy Infrastructure Updates.

³ Data is based on Grid Strategies analysis of FERC, Office of Energy Projects, [Energy Infrastructure Updates](#).

According to the FERC Energy Infrastructure Updates for 2024, only 125 new miles of high-voltage transmission have been constructed from January 2024 to May 2024, with all 125 new miles coming from the completion of the 500kV Delaney-Colorado Transmission Project that links California and Arizona.⁴

Despite this decline in new high-voltage construction, utility spending on transmission infrastructure is higher than ever

Annual transmission spending increased from ~\$10 billion in 2010 to ~\$20 billion in 2013, and has continued to rise to over \$25 billion in 2023.⁵ This trend in increased spending is projected to grow. The Edison Electric Institute estimates that investor-owned utilities will spend approximately \$92 billion on transmission construction over the next three years between 2024 and 2026.⁶ This is an average of over \$30 billion every year.



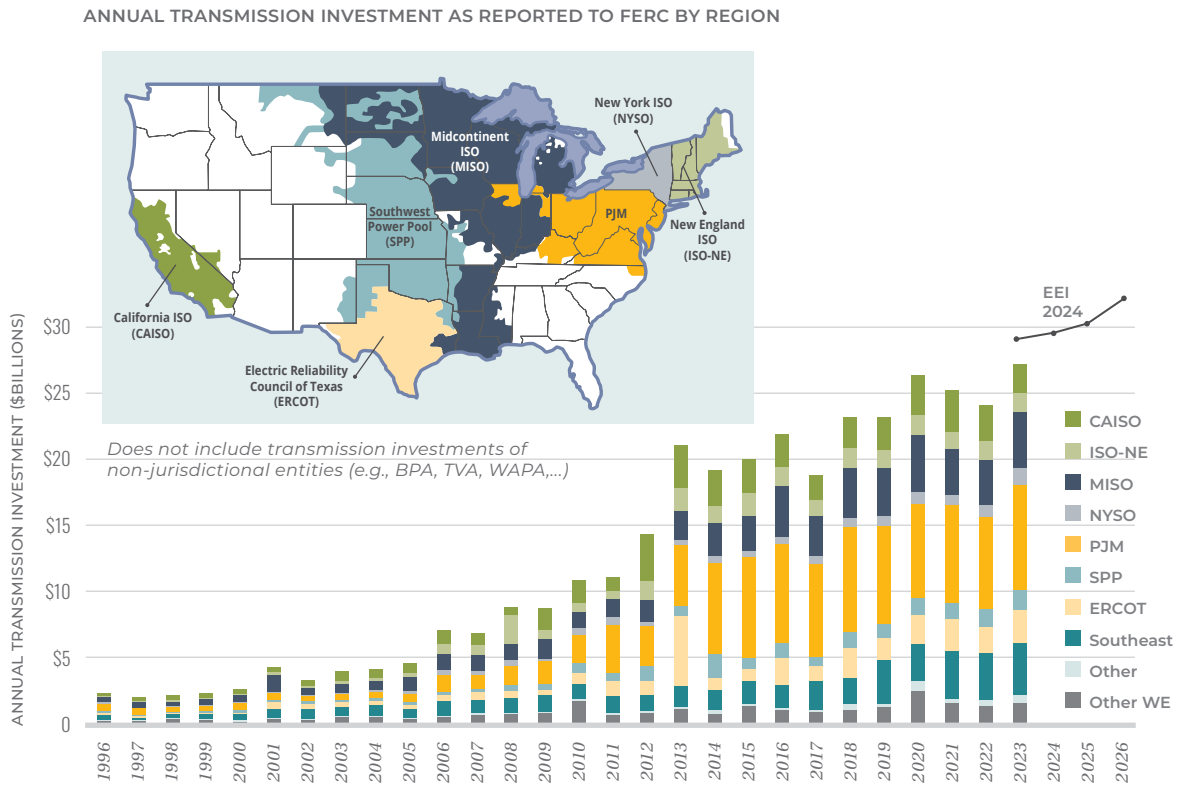
4 FERC, Office of Energy Projects. *Energy Infrastructure Update for April 2024* (June 2024). _

5 Brattle Group. *Annual U.S. Transmission investments, 1996-2023* (2023). <https://www.brattle.com/wp-content/uploads/2023/07/Annual-US-Transmission-Investments-1996-2023.pdf> ("Annual U.S. Transmission investment")

6 Edison Electric Institute. *Industry data* (2023). <https://www.eei.org/en/resources-and-media/industry-data#:~:text=Transmission%20and%20Distribution,spend%20%2429.1%20billion%20in%202023.>

FIGURE 2

Annual investment has eclipsed \$25 billion in 2023.⁷ Credit: The Brattle Group



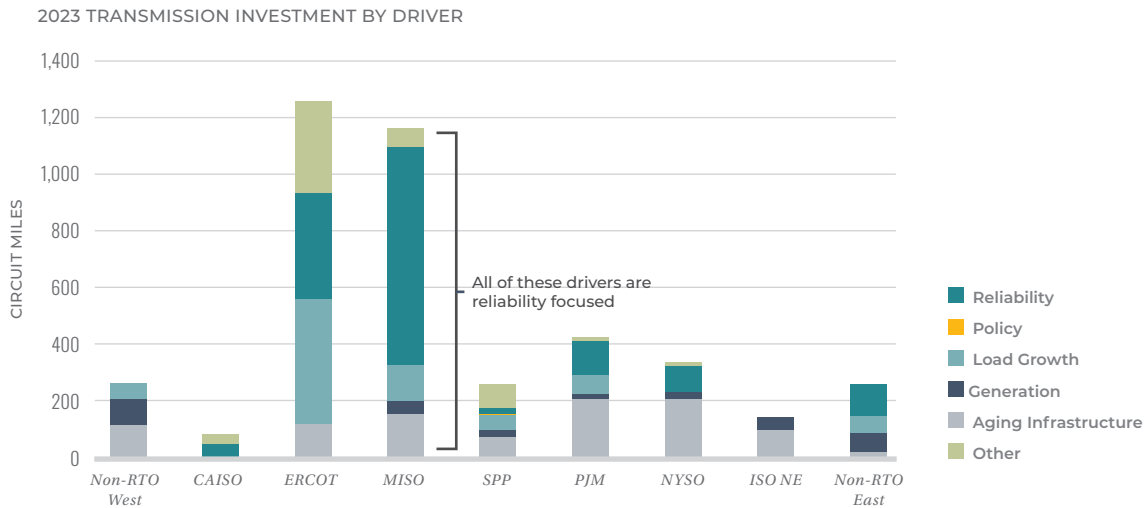
More than 90% of this spend is driven by lower-voltage reliability upgrades per research by the Brattle Group.⁸ About 50% of this spend is solely based on “local” utility criteria – investment that is usually below 345 kV and does not go through regional planning processes. A majority of this \$25+ billion solely addresses reliability needs and does not consider other transmission related values. Multi-value projects would maximize benefits to ratepayers while also helping achieve state policy goals or unlocking other economic benefits such as lower cost generation.

⁷ Annual U.S. Transmission investment, at 1.

⁸ *Id.*

FIGURE 2

90% of transmission investment is driven by lower voltage reliability needs, developed without regard for other values that can be served by transmission. Annual transmission investment continues to increase, but fewer than 10% of dollars are going towards the most cost-effective new high-voltage lines.⁹ Credit: The Brattle Group and FERC State of the Markets Report 2023



Building boom in the 2010s: Large scale new infrastructure can be planned to pay for itself

Massive greenfield projects in the 2010s are proof that comprehensive transmission planning processes can facilitate construction of new lines and yield results that increase net-benefits to ratepayers compared to reactive, siloed, “local” planning processes that focus almost solely on “just-in-time” piecemeal additions.

One example of proactive planning is Texas’ Competitive Renewable Energy Zone (CREZ) project. The Texas legislature saw economic opportunity in connecting the sparsely populated, but wind-rich areas of western Texas to load and passed a bill in 2005 that ordered the Public Utility Commission of Texas to develop a transmission plan to deliver renewable power to customers. The \$7 billion effort was designed to interconnect around 11.5 GW of new wind generation capacity. CREZ was completed in 2013, and wind curtailment fell from a previous high of 17% to 0.5%.¹⁰ Additional benefits arose that were unforeseen at the time of planning, including interest in developing

⁹ *Id.* at 2.

¹⁰ ERCOT, *The Texas Competitive Renewable Energy Zone Process*, (September 2017). https://cleanenergysolutions.org/sites/default/files/documents/jeff-billo_webinar-ercot-crez-process.pdf

solar capacity in West Texas, as well as load growth from shale oil and gas production in the region.¹¹

Another example of cost-effective largescale infrastructure is MISO's Long Range Transmission Planning (LRTP) Tranche 1 Portfolio. Recognizing a shift in its generation mix due to a steady increase in renewable generation, MISO developed the LRTP Tranche 1 Portfolio to ensure a reliable, resilient, and cost-effective regional transmission system that can meet demand in all hours while supporting a changing resource mix over the next 20 years. The portfolio includes 18 transmission projects in the Midwest subregion, with more than 2,000 miles of transmission and a total investment of \$10.3 billion, with a benefit-to-cost ratio of at least 2.6 for the portfolio. Projects in the Tranche 1 Portfolio are expected to deliver between \$23.2-52.2 billion in net benefits over the next 20-40 years.¹²

Despite a need to improve planning, some new high-voltage transmission is moving forward in the West. Merchant developers and utilities are driving a significant amount of this transmission development in the West. Many of these projects have taken well over 10 years to develop, pointing to a need to improve regional and interregional transmission planning and permitting, and development processes. For example, Pattern Energy broke ground in 2023 on the 550 mile SunZia line in the Southwest as a merchant project, over 15 years after the line was initially conceived. Pattern Energy co-developed this line with the New Mexico Renewable Energy Transmission Authority to deliver New Mexico resources to Arizona.¹³ Building also commenced in 2023 for the 730 mile Transwest Express line, a merchant project developed by the Anschutz Corporation that was first proposed 16 years ago in 2007.

There are several other merchant projects that are ready-to-go¹⁴ in the west, including the 275 mile SWIP North line, a merchant project developed by LS Power between Utah and Nevada, and the 213 mile Cross-Tie Transmission Line from Idaho to Nevada, a merchant project developed by TransCanyon. Utilities in the west have also made headway with new projects. NV Energy's Greenlink projects will allow for better interconnection of the state as well as new generation resources. PacifiCorp's Energy Gateway projects are a portfolio of lines currently under construction that will help

¹¹ The Brattle Group and Grid Strategies. *Transmission Planning for the 21st Century: Proven Practices that Increase Value and Reduce Costs* (October 2021). https://www.brattle.com/wp-content/uploads/2021/10/2021-10-12-Brattle-GridStrategies-Transmission-Planning-Report_v2.pdf

¹² MISO. *MTEP1 Report Addendum: Long Range Transmission Planning Tranche 1 Executive Summary* (June 2022). <https://cdn.misoenergy.org/MTEP21%20Addendum-LRTP%20Tranche%201%20Report%20with%20Executive%20Summary625790.pdf>

¹³ ACEG, *Ready-To-Go Transmission Projects in 2023* (September 2023) https://cleanenergygrid.org/wp-content/uploads/2023/09/ACEG_Transmission-Projects-Ready-To-Go_September-2023.pdf

¹⁴ *Id.* At 17.

deliver energy from Wyoming to the Southwest and Northwest. New high-voltage transmission lines are so valuable that utilities and independent developers in the West are developing significant projects despite the long period of time it takes. A coordinated, proactive and multi-value planning process, such as what is being undertaken through the WestTEC process,¹⁵ could streamline development and provide significant value across the West.

These examples demonstrate the value of and need for holistic and proactive multi-value transmission planning to produce the most cost-effective upgrades. If planned well, then new, high-capacity transmission can deliver net benefits to consumers that far outweigh the costs.



¹⁵ <https://www.westernpowerpool.org/about/programs/western-transmission-expansion-coalition>

SECTION 3

CHANGING COURSE TOWARDS TRANSMISSION EXPANSION

The federal government has recently taken steps to incentivize the construction of new lines — FERC issued Order No. 1920 in May 2024 to reform long-term planning practices, and the DOE has taken action to support siting, permitting, and funding for new lines through the new Transmission Facilitation Program (TFP) and proposed National Interest Electric Transmission Corridors (NIETCs), which were facilitated by the passage of the Infrastructure, Investment, and Jobs Act (IIJA) and Inflation Reduction Act (IRA) in Congress.

FERC Order No. 1920 requires long-term, multi-value regional transmission planning

In May 2024, FERC issued Order No. 1920, which ensures that each transmission system operator participates in a regional transmission planning process on a sufficiently “long-term, forward-looking, and comprehensive basis” to identify Long-Term Transmission Needs.¹⁶ Participation in long-term regional planning will ideally serve to focus planning efforts on the development of and investment in large multi-value high-voltage transmission lines that will provide the most benefits to ratepayers and shift investment away from the more inefficient line-by-line planning approaches that are common today. Order No. 1920 requires that planners identify a common set of benefits for proposed regional transmission projects or portfolios of projects, and then allocate the costs of said project across members of the region based on who benefits from the new lines.

DOE’s Transmission Facilitation Program (TFP) supports new lines

One of the biggest challenges to building large, high-voltage transmission lines is financing, because it can take over 15 years to build a single transmission line. Congress recognized this hurdle and allocated \$2.5 billion in the IIJA as revolving funds for the TFP. One financing tool the TFP uses is a “capacity contract” which allows the DOE to serve as an “anchor customer” by purchasing up to half of the maximum capacity of a

¹⁶ FERC Order No. 1920 (May 2024). 187 FERC ¶ 61,068 § C.3.273 (pp. 233).

new transmission line and then re-selling its capacity rights to others. In 2023 and 2024, the Grid Deployment Office within the DOE announced its first round of funding, which distributed \$1.3 billion across three high-voltage transmission lines that will add an estimated 3.5 GW of additional capacity to the grid: the Southline Transmission Project from Arizona to New Mexico, the Southwest Intertie Project North (SWIP North) from Idaho to Nevada, and the Cross-Tie Transmission Line from Nevada to Utah.¹⁷ Although these projects represent a step forward in new transmission construction, significantly more investment is needed to build new lines and realize transformational change, beyond the \$2.5 billion allocated under the TFP — this investment pales in comparison to the \$25+ billion spent on nationwide transmission investment in 2023.

DOE streamlines transmission planning and permitting

In May 2024, DOE released a list of 10 potential National Interest Electric Transmission Corridors (NIETC)¹⁸ which represent over 3,500 miles distributed across the country. A final NIETC designation would provide projects along corridors identified in the National Transmission Needs Study, released by the Department of Energy in October 2023,¹⁹ with federal government “backstop” siting and permitting authority if there is state and local opposition to projects. A NIETC designation also unlocks federal financing tools, specifically public-private partnerships through the \$2.5 billion Transmission Facilitation Program under the IJA and the \$2 billion Transmission Facility Financing Program under the IRA.

The federal government also finalized the Coordinated Interagency Transmission Authorizations and Permits (CITAP)²⁰ Program rule in April 2024. The rule aims to consolidate federal permitting for complex transmission projects under DOE, who will take the role of the lead agency coordinating the permitting process among all federal agencies, with a goal of reducing permitting timelines to two years.

¹⁷ U.S. Department of Energy, Grid Deployment Office. *Transmission Facilitation Program First Round Selections*. <https://www.energy.gov/gdo/transmission-facilitation-program-first-round-selections>

¹⁸ U.S. Department of Energy, Grid Deployment Office. *National Interest Electric Transmission Corridor Designation Process*. <https://www.energy.gov/gdo/national-interest-electric-transmission-corridor-designation-process>

¹⁹ *National Transmission Needs Study*.

²⁰ U.S. Department of Energy, Grid Deployment Office. *Coordinated Interagency Transmission Authorizations and Permits Program*. <https://www.energy.gov/gdo/coordinated-interagency-transmission-authorizations-and-permits-program>



Additional private investment is required to realize truly transformational change

The DOE programs are a great start to accelerating construction on new high-voltage transmission infrastructure, but they are in nascent stages. Federal funding is not yet high enough to truly move the needle on new high-voltage transmission expansion. As there is relatively little money between both the IIJA and IRA for new high-capacity lines, few new miles are expected to come from this legislation and accompanying DOE programs without further policy action. Recent examples of further legislative action include Senator Manchin and Senator Barrasso introducing the bipartisan Energy Permitting Reform Act in July 2024, and Senator Heinrich introducing The Grid Resiliency Tax Credit Act in June 2023 to incentivize construction of new transmission with an investment tax credit. Utilities are still currently incentivized to prioritize low-voltage upgrades focused on reliability and asset replacement. Both policymakers and regulators must capitalize on FERC's issuance of Order No. 1920 to ensure the momentum brought about by federal action truly changes the incentives for transmission investment and helps spur a massive investment in the construction of new high-voltage transmission lines to ensure a reliable and affordable transition to a cleaner grid.