



US Power Grid Status

Rob Gramlich

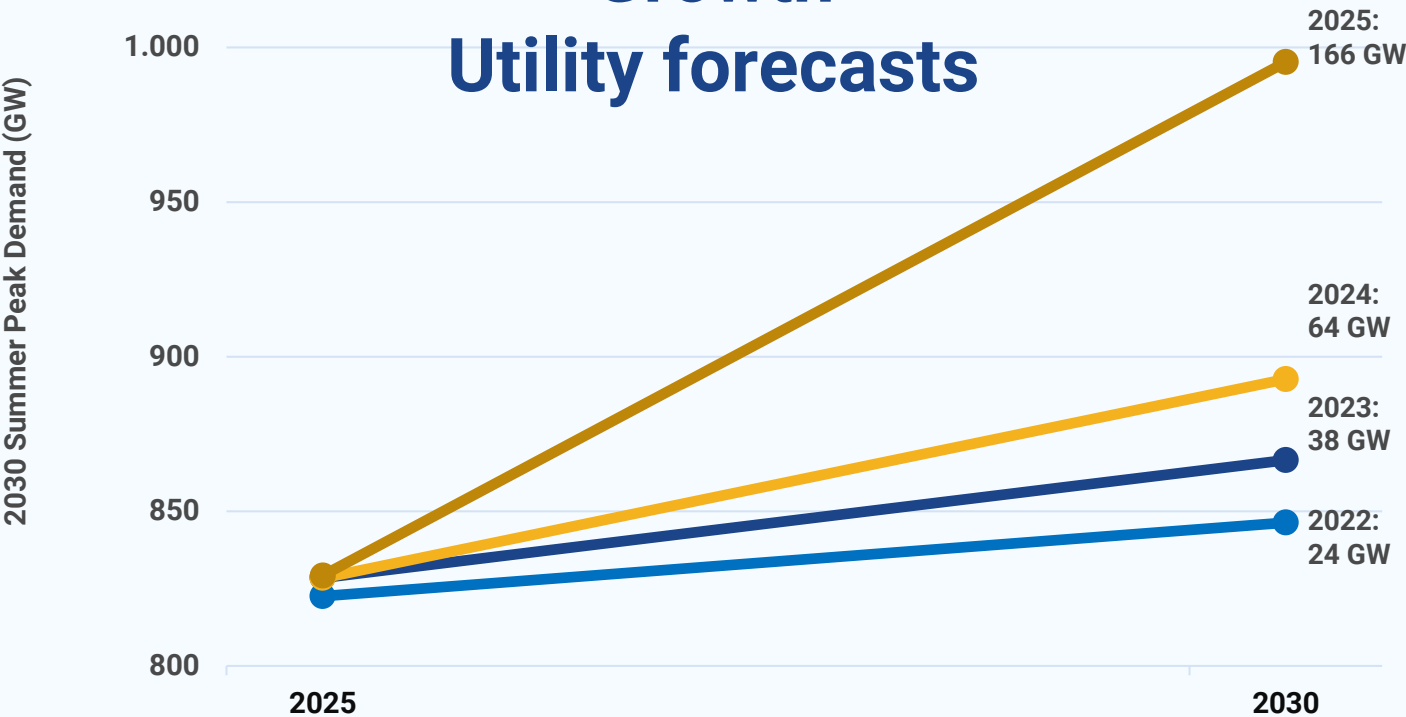
President, Grid Strategies

September 2026

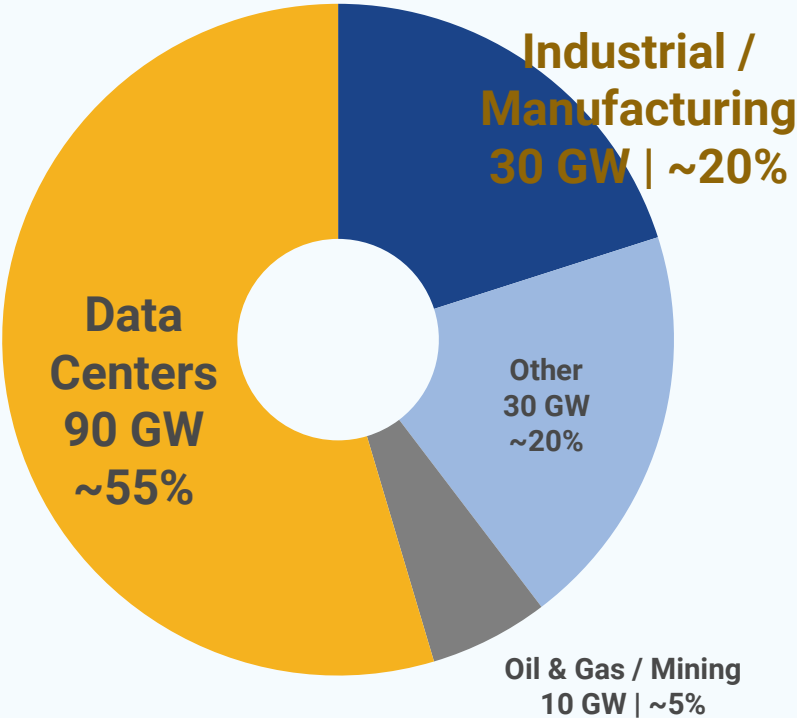
US Power Sector is Hot: Five-Year US Power Demand Growth Up Six-Fold to 166 Gigawatts

New demand =15x
the peak load of
New York City

5-year Nationwide Summer Peak Growth Utility forecasts



Drivers of demand growth

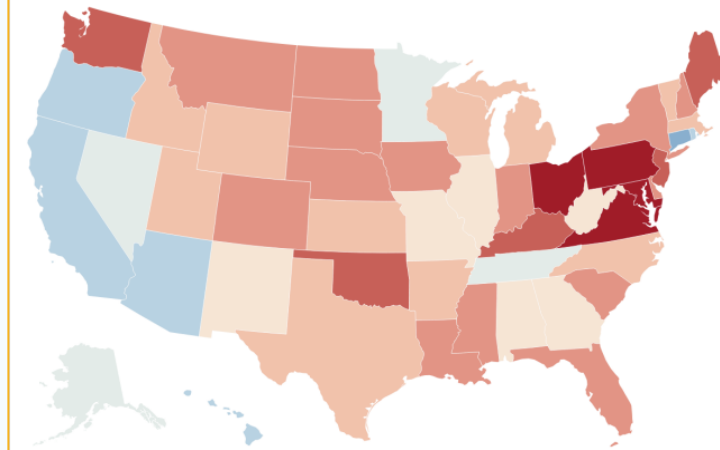
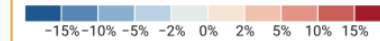


Affordability Challenge: Retail Rates Rising Faster than General Inflation

- Fuel / wholesale supply
- Asset replacement needs
- Higher capacity prices as supply-demand balance tightens
- Storm and fire damage
- Generation cost overruns
- Expensive equipment

Percentage Change in All-Sector Retail Electricity Prices: January 2025 to January 2026

Percentage change, adjusted for inflation in 2025\$



Source: EIA • Created with Datawrapper

Primary Drivers of Price Changes: 2024 to 2025

Stated reasons for price changes from 2024 to 2025 for those states with price increases or decreases of greater than 2%, after adjusting for inflation

	INCREASE >2%, 30 states	DECREASE > 2%, 4 states
Fuel / wholesale supply	21	4
Distribution cost	16	0
Generation CapEx	11	0
Transmission cost	11	0
Storm cost recovery	9	0
Capacity market prices	7	0
Extreme inflation	6	0
Clean energy policy	5	0
Wildfire cost	2	0
Other	2	2

Source: LBNL • Created with Datawrapper

Complicated industry structure, slow to respond to demand

Economic regulators

FERC

Regulates all transmission and wholesale power markets in RTO areas, and the wholesale transmission and power sales for utilities in non-RTO areas

State PUCs

Build and maintain safe, reliable, and high-quality electric infrastructure. Regulate most aspects of utilities outside of RTOs.

Market operators

ISOs/RTOs

Oversee electricity grid operations, wholesale market functions, and transmission planning across multi-state regions.

Reliability regulator

NERC

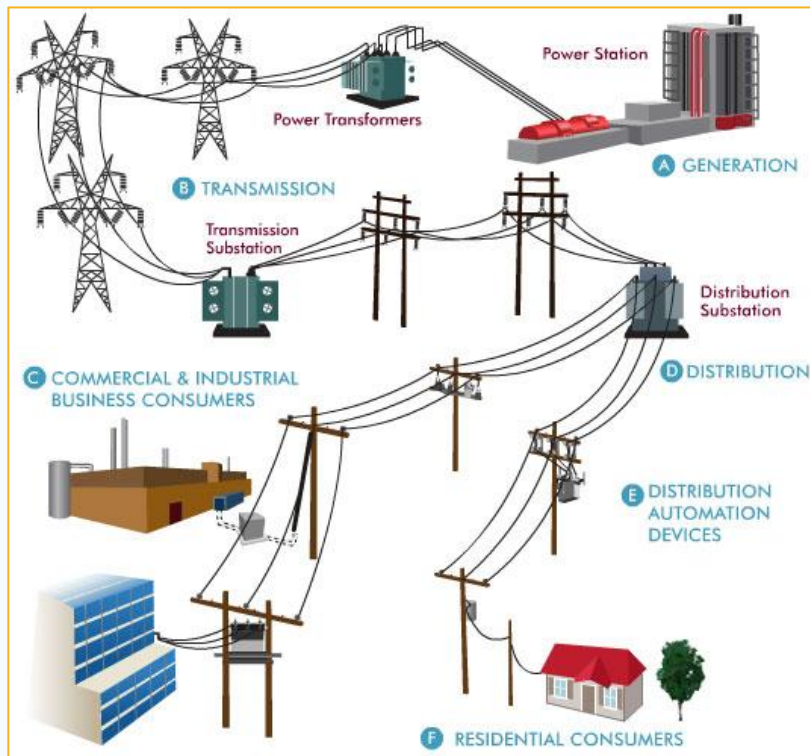
North American Electric Reliability Corporation ensures reliability of bulk power system

Other stakeholders

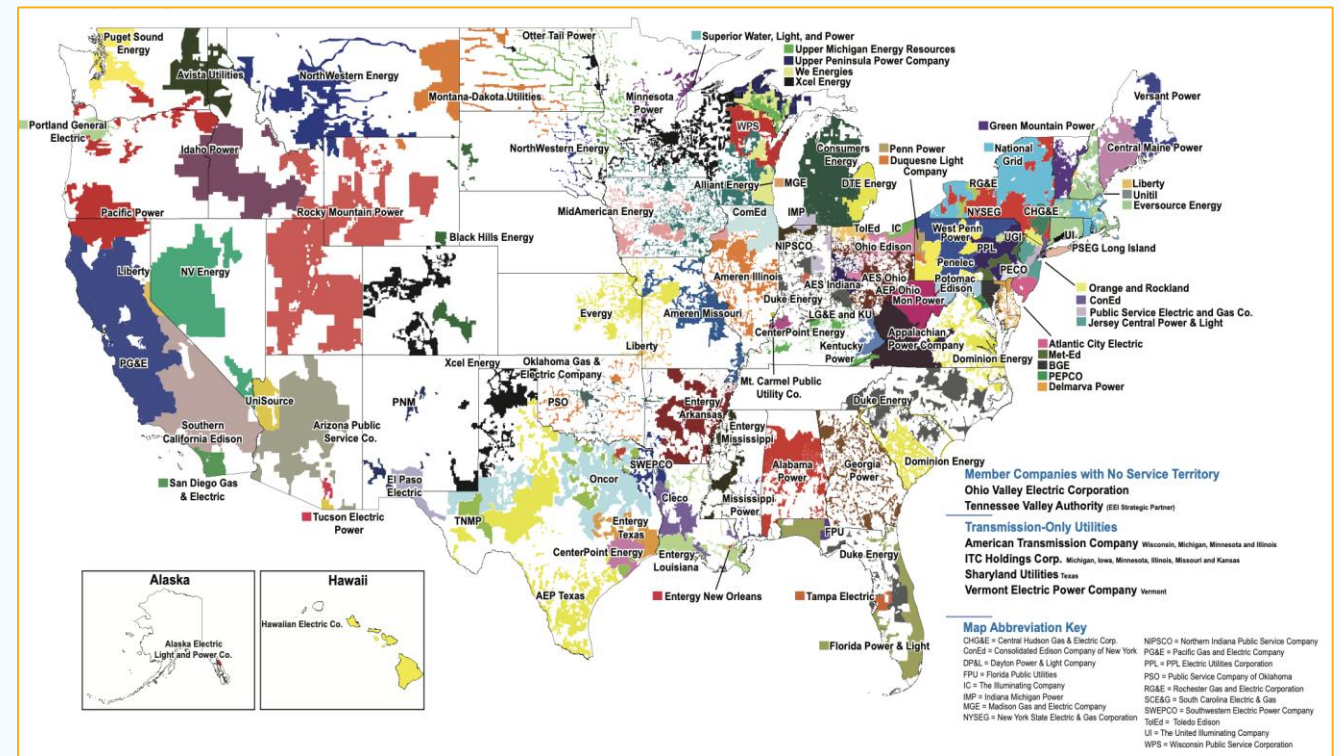
Includes those who develop and build transmission (i.e., utilities, independent developers), consumers (e.g., residential, commercial, industrial), independent power producers, environmental NGOs, and the clean energy industry.

Fragmented US Utility Industry Not Designed to Build Large Regional Networks

Utilities operate individual systems...

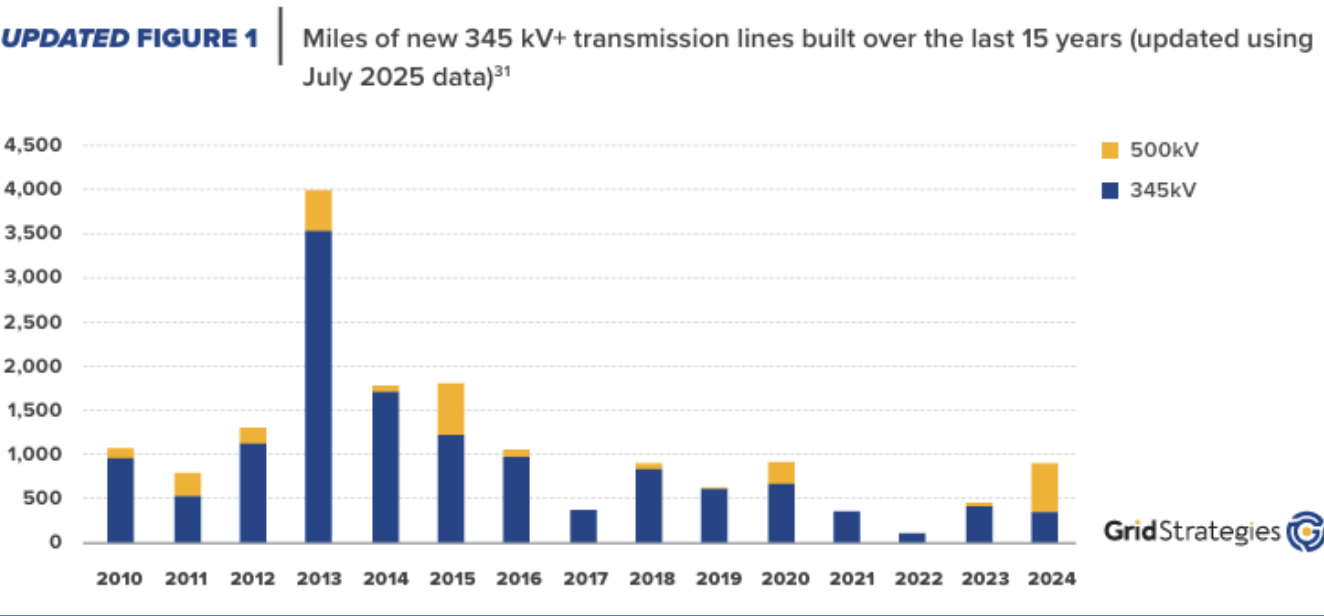


...with around 3000 separate utilities focused on their own small footprint



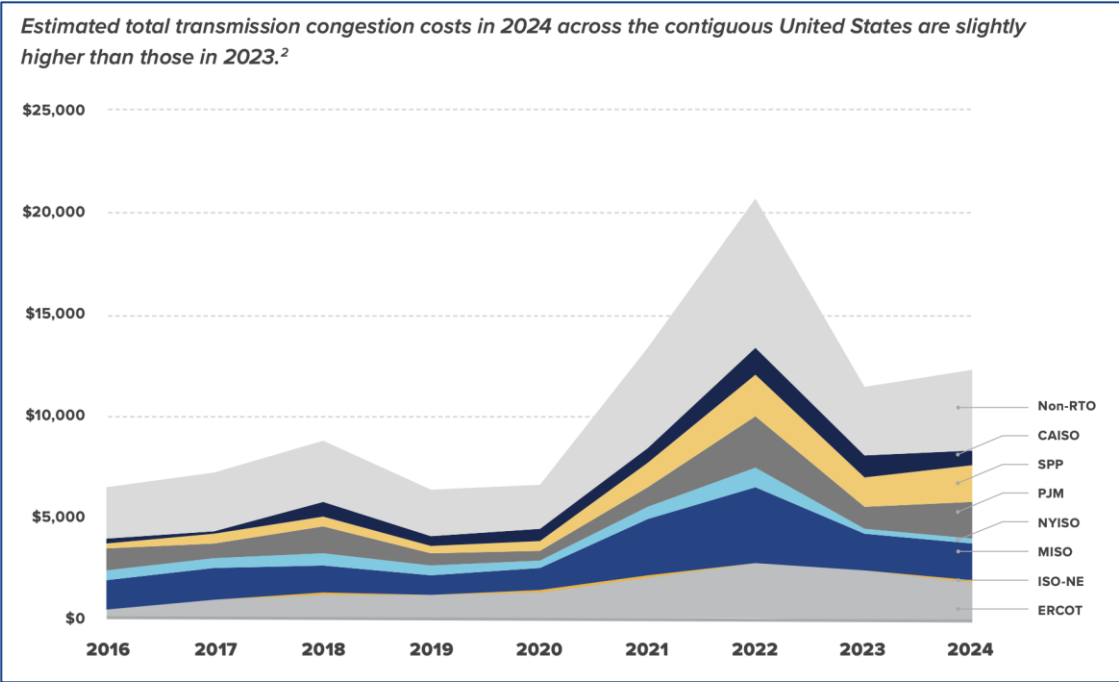
Very little long-distance transmission has been built recently

Many miles of new transmission in 2013, then dropped to a trickle



SOURCE | Grid Strategies LLC, [Fewer New Miles](#) (July 2025)

Congestion costs are rising



Big transmission CAN be built!

Address the 3Ps

Planning

- Proactive
- Alternative scenarios
- Portfolio of upgrades
- All technology options

Permitting

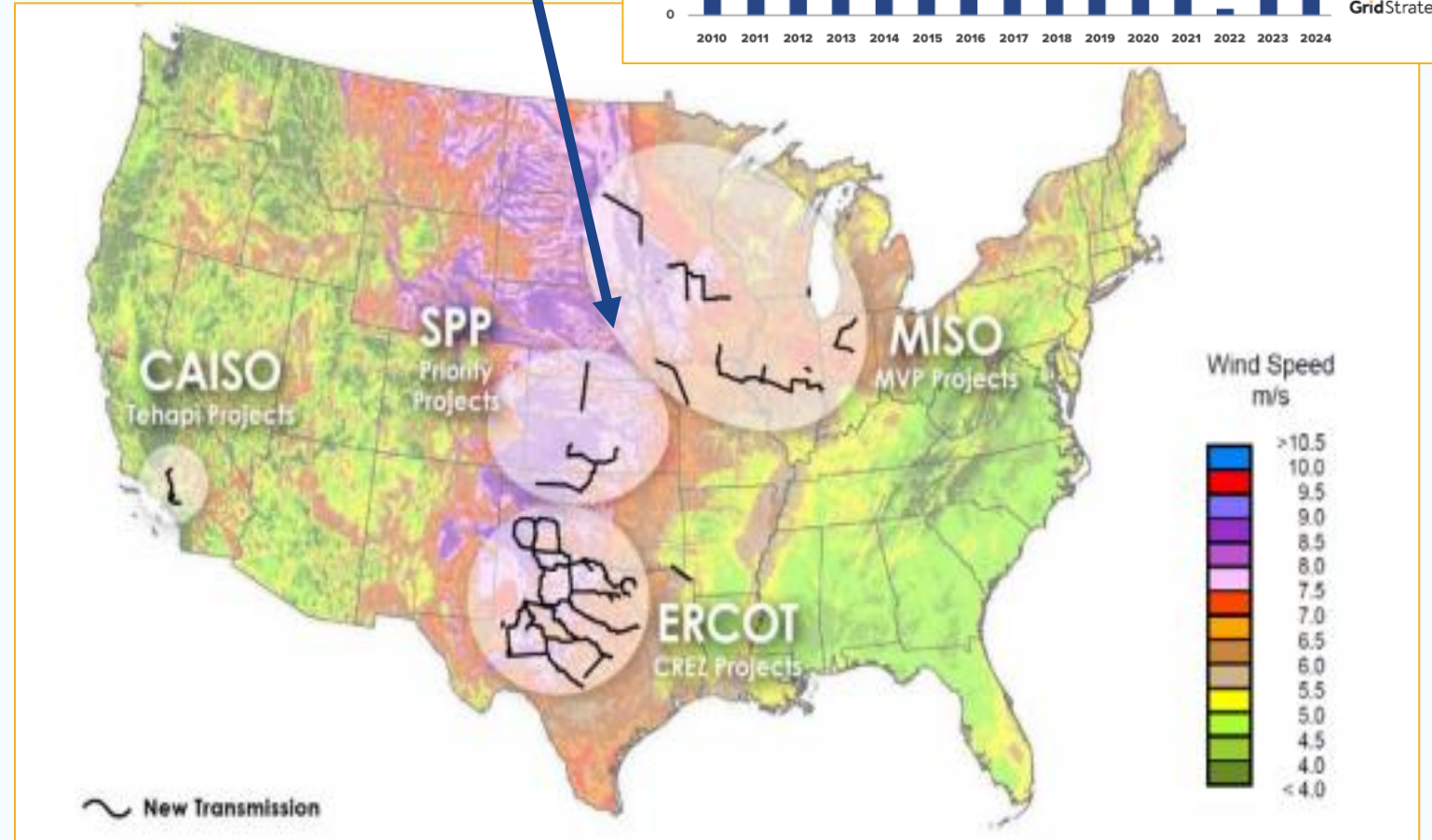
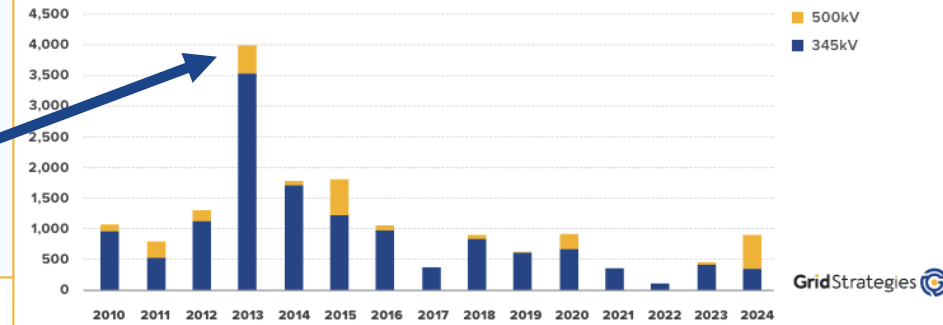
- FERC authority
- Environmental process

Paying

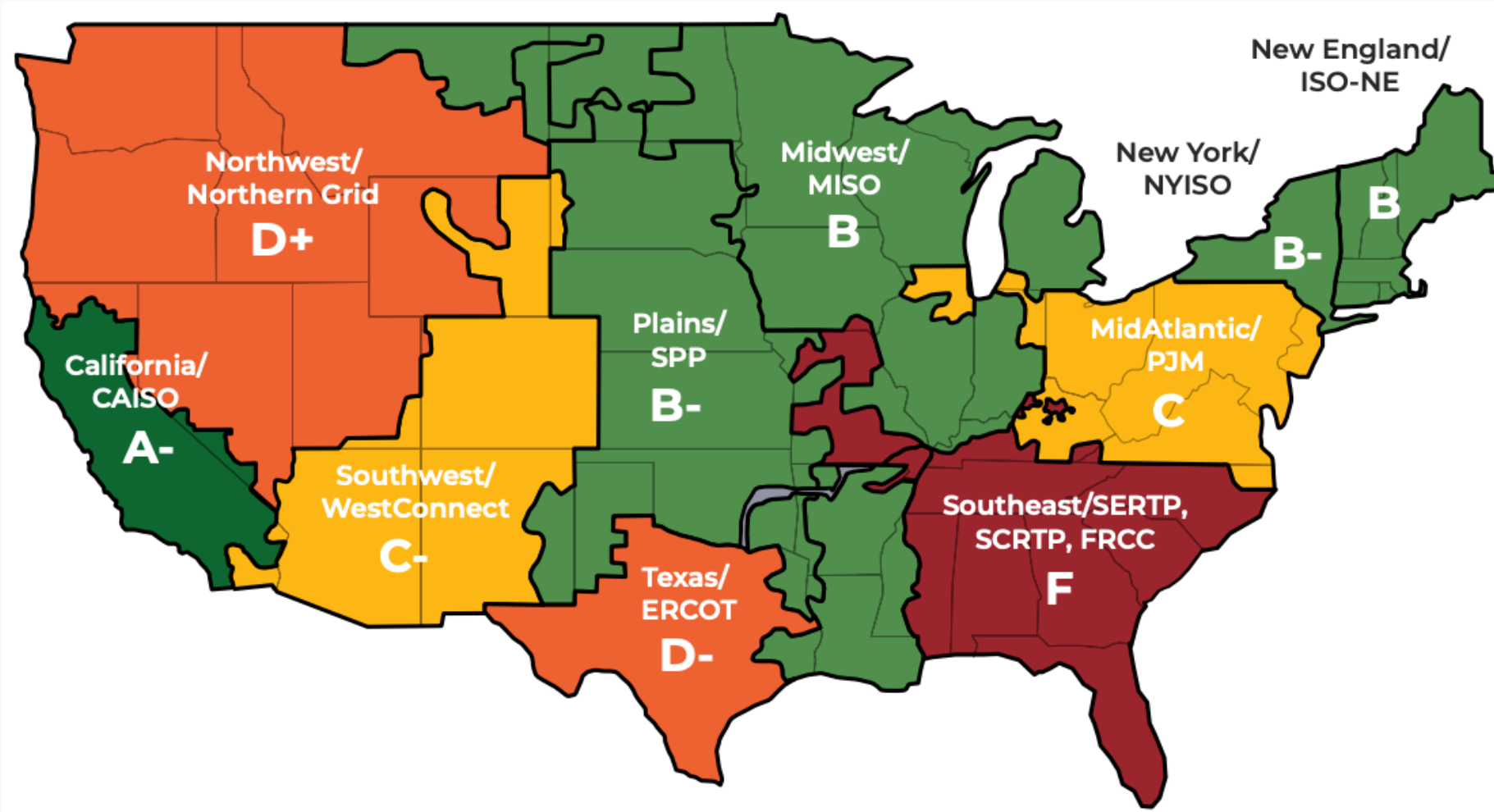
- Calculate benefits, allocate costs according to beneficiary

We did it in 2013,
we can do it again

UPDATED FIGURE 1 | Miles of new 345 kV+ transmission lines built over the last 15 years (updated using July 2025 data)³¹



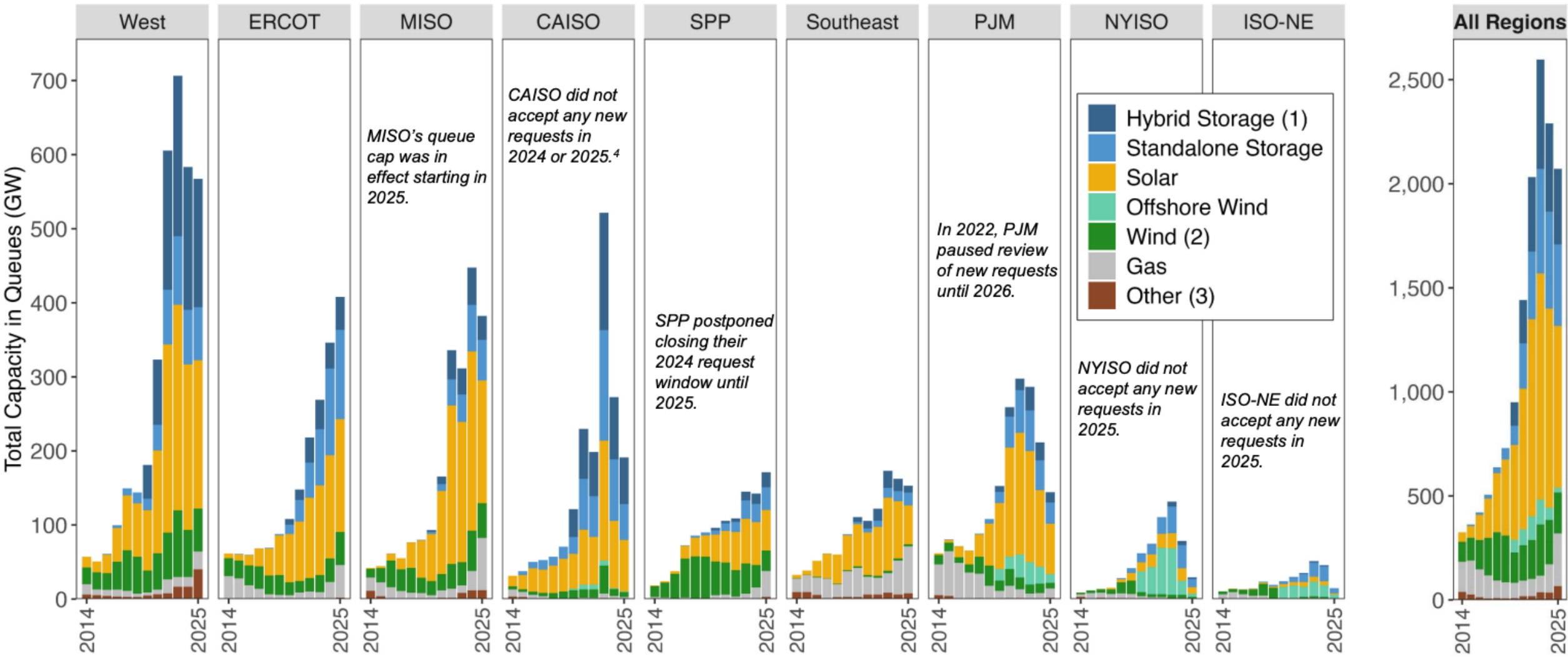
National Transmission Planning Report Card: Many low grades, some improvements



2025 Transmission
Planning Report
Card—Grid
Strategies & ACEG

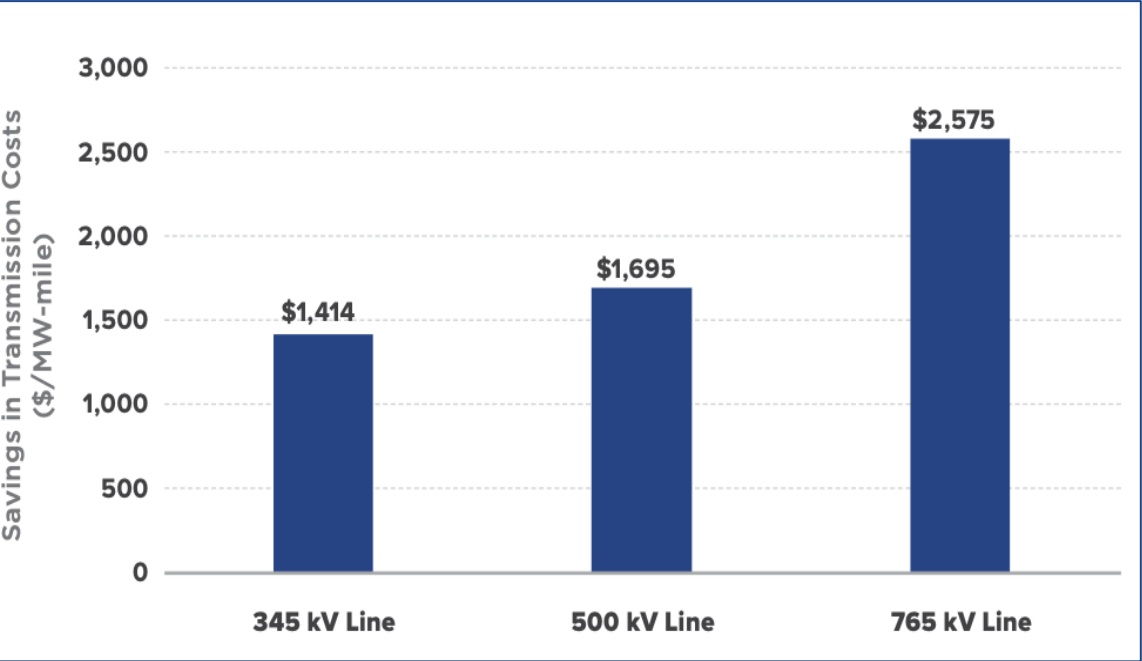
Generator Interconnection Requests Ballooning

Limited transmission capacity slows interconnection



High-voltage transmission delivers power at lower costs

Savings (\$/MW-mi) compared to 230 kV transmission lines



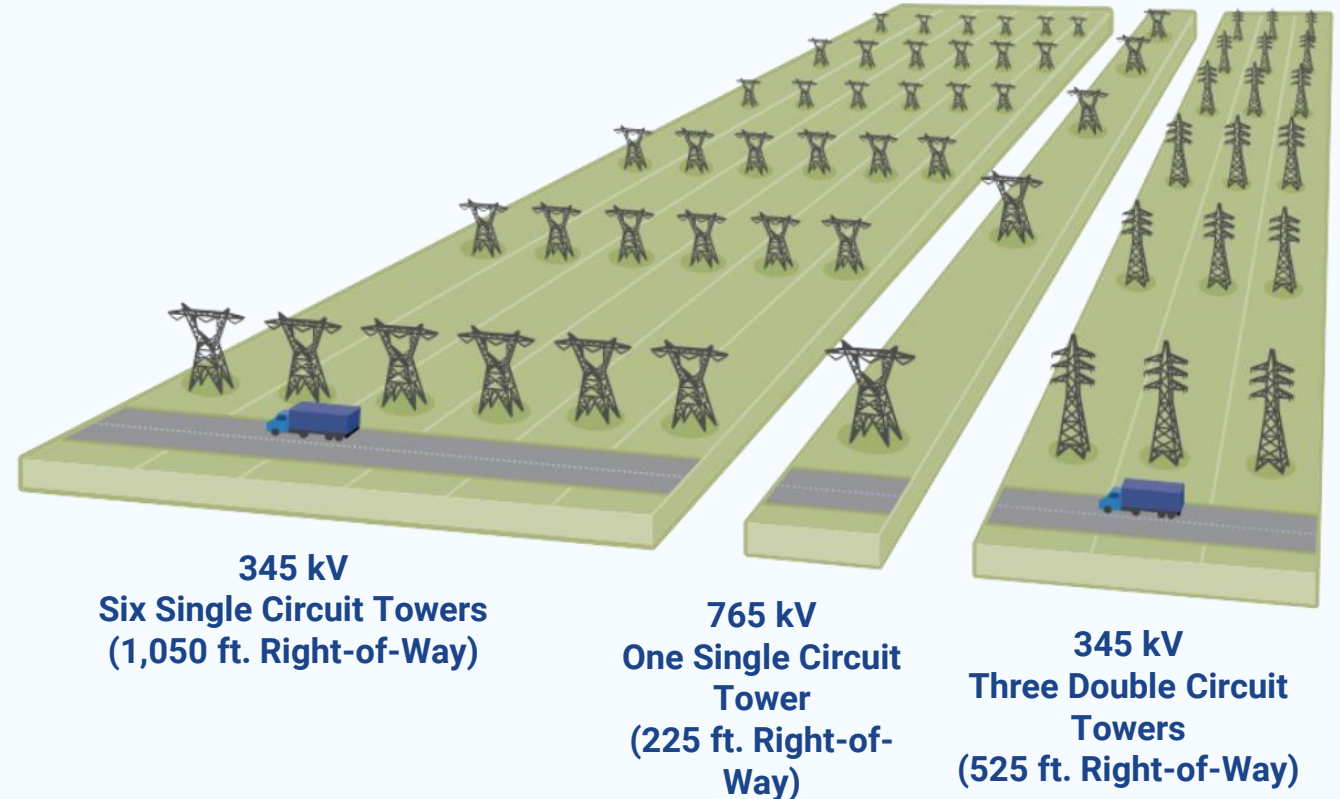
Cost to deliver power (\$/MW-mi) by voltage

Transmission Voltage (kV)	Cost per Mile (\$ Million /Mile)	Capacity (MW)	Cost per Unit of Capacity (\$/MW-Mile)
230	\$2.353	657	\$3,581
345	\$3.744	1,792	\$2,090
500	\$4.738	2,598	\$1,824
765	\$5.982	6,625	\$903

High-voltage transmission reduces land impacts

One 765 kV line can deliver approximately six times the power of a 345 kV lines while requiring nearly five times less land.

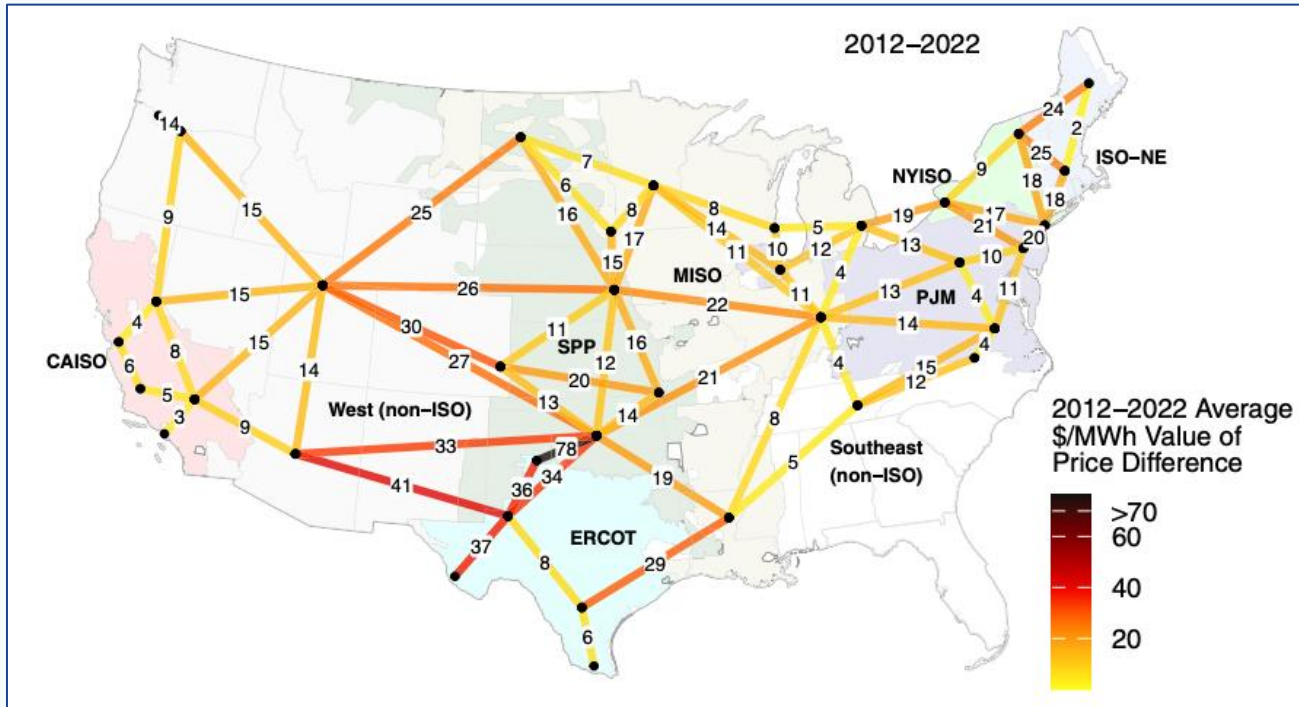
Right-of-way requirements for equivalent power transfers



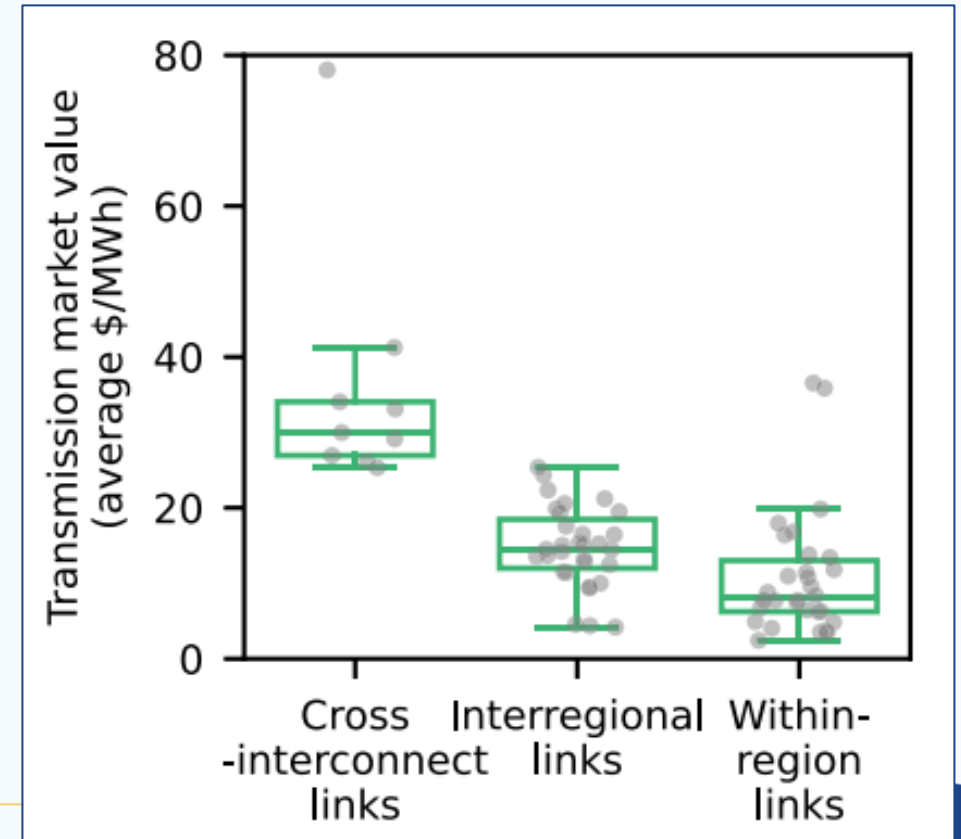
Interregional transmission provides significant value

From 2012-2022 the top 5% of hours accounted for half of the value of the line demonstrating the “insurance value” provided to consumers.

Average value of transmission (\$/MWh) (2012-2022)



Distribution of average transmission value by line type



Large transmission investments consistently provide net-benefits

Benefit-cost ratios for regional plans

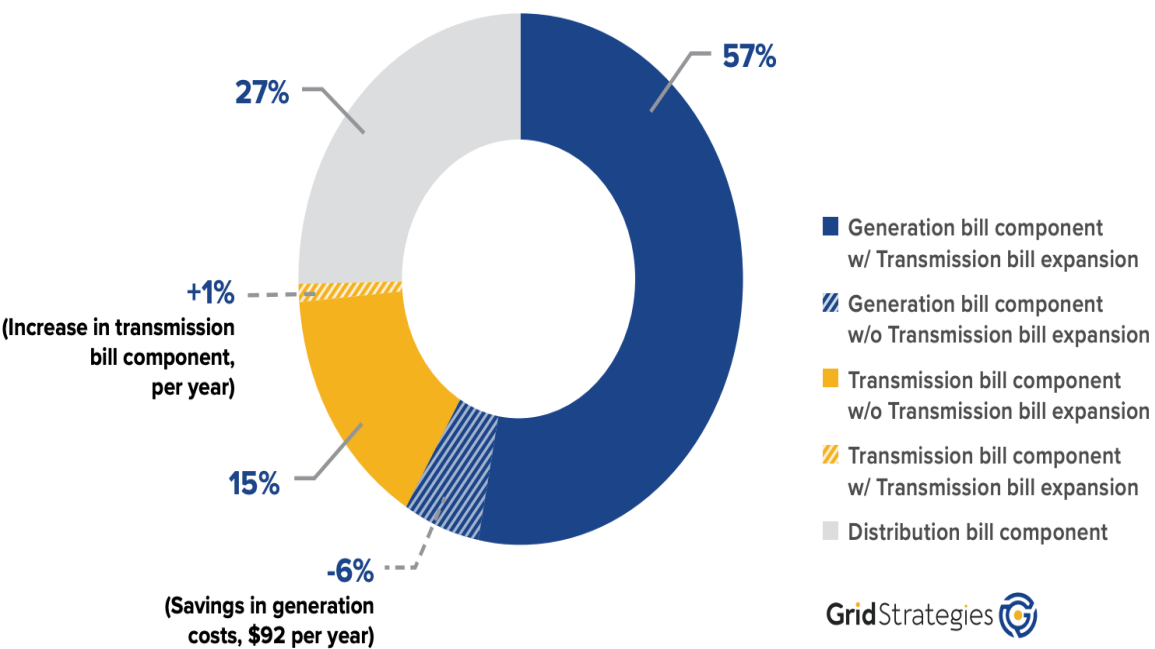
Region	Transmission Portfolio	Benefit to Cost Ratio
SPP	2023 ITP	\$2.29 to \$1
SPP	2024 ITP	\$6.50 to \$1
SPP	2025 ITP	\$5.70 to \$1
ERCOT	CREZ	\$12.20 to \$1
MISO	MVP	\$1.80 to \$1
MISO	L RTP Tranche 1	\$2.60 to \$1
MISO	L RTP Tranche 2.1	\$1.80 to \$1
Nationwide	Average transmission portfolio	\$2.41-\$4.45 to \$1

Benefit-cost ratios for interregional projects

Region	Transmission Project	Benefit to Cost Ratio
MISO, SPP, & the West	North Plains Connector	\$4.86 to \$1
SPP & the West	Three Corners Connector	\$3.32 to \$1
MISO & Texas	Southern Spirit	\$3.64 to \$1
Nationwide	NERC ITCS Prudent Additions	\$4.30-\$5.80 to \$1

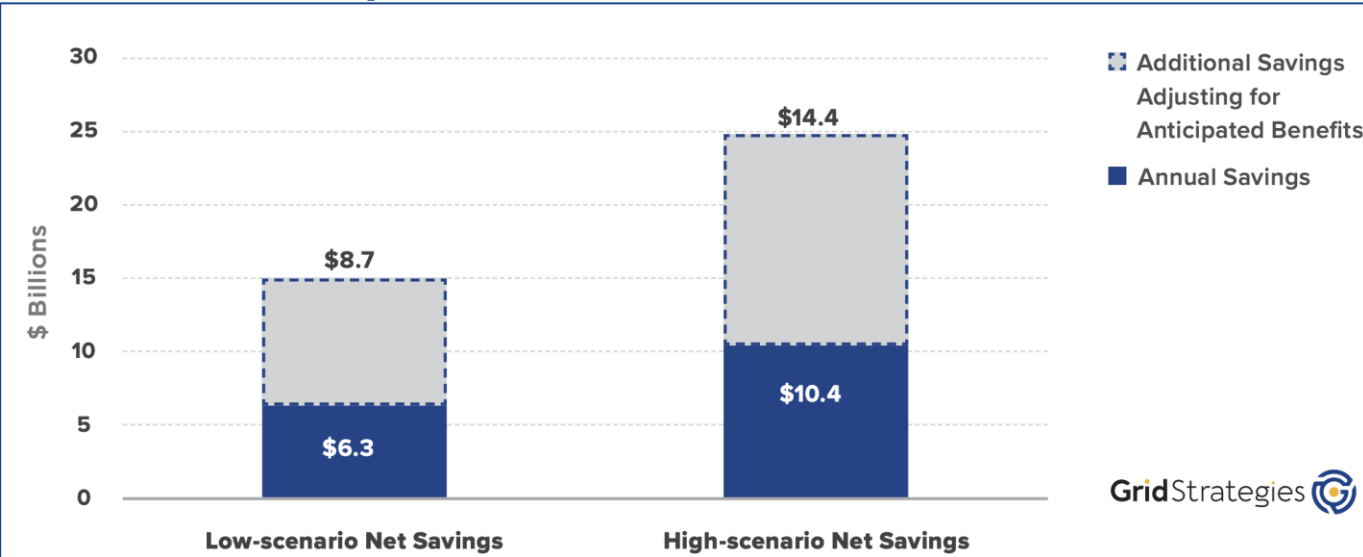
Transmission saves consumers money

National estimated residential electric bill savings from expanding transmission



- High-capacity transmission could save residential consumers \$6.3-\$10.4 billion per year.
- Expanded investment in the grid, could save between \$2,221-\$3,672 over the life of the transmission projects.

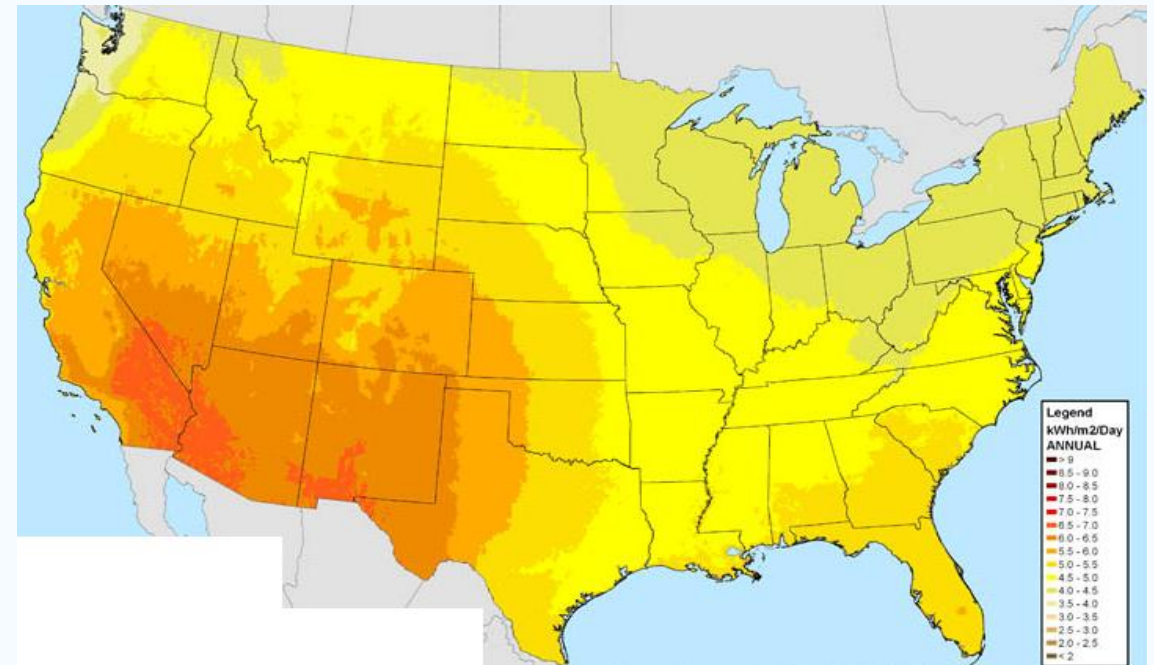
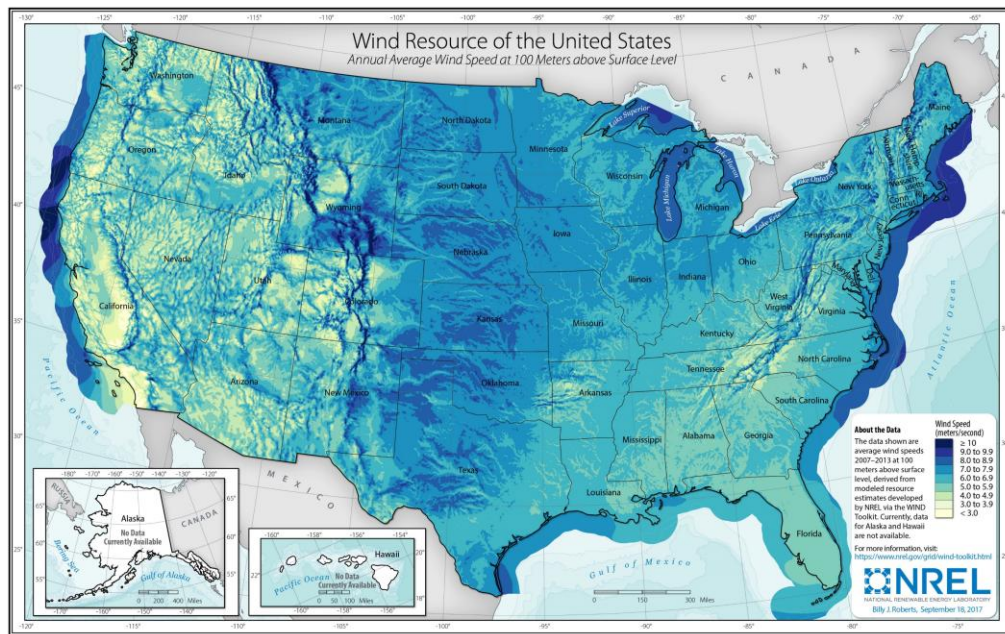
Components of an electric bill with and without well-planned transmission expansion



Transmission and Renewable Energy

Inescapable physical properties

1. Best onshore wind and solar far from load. 88% of wind in 15 central states
2. Regional exchange allows system balancing with higher penetration
3. As conventional generators retire, system inertia declines if transmission is weak



NREL Wind (left, 100m height) and Solar (right) Resource Maps

FERC Order 1920: Building for the Future Through Electric Regional Transmission Planning and Cost Allocation

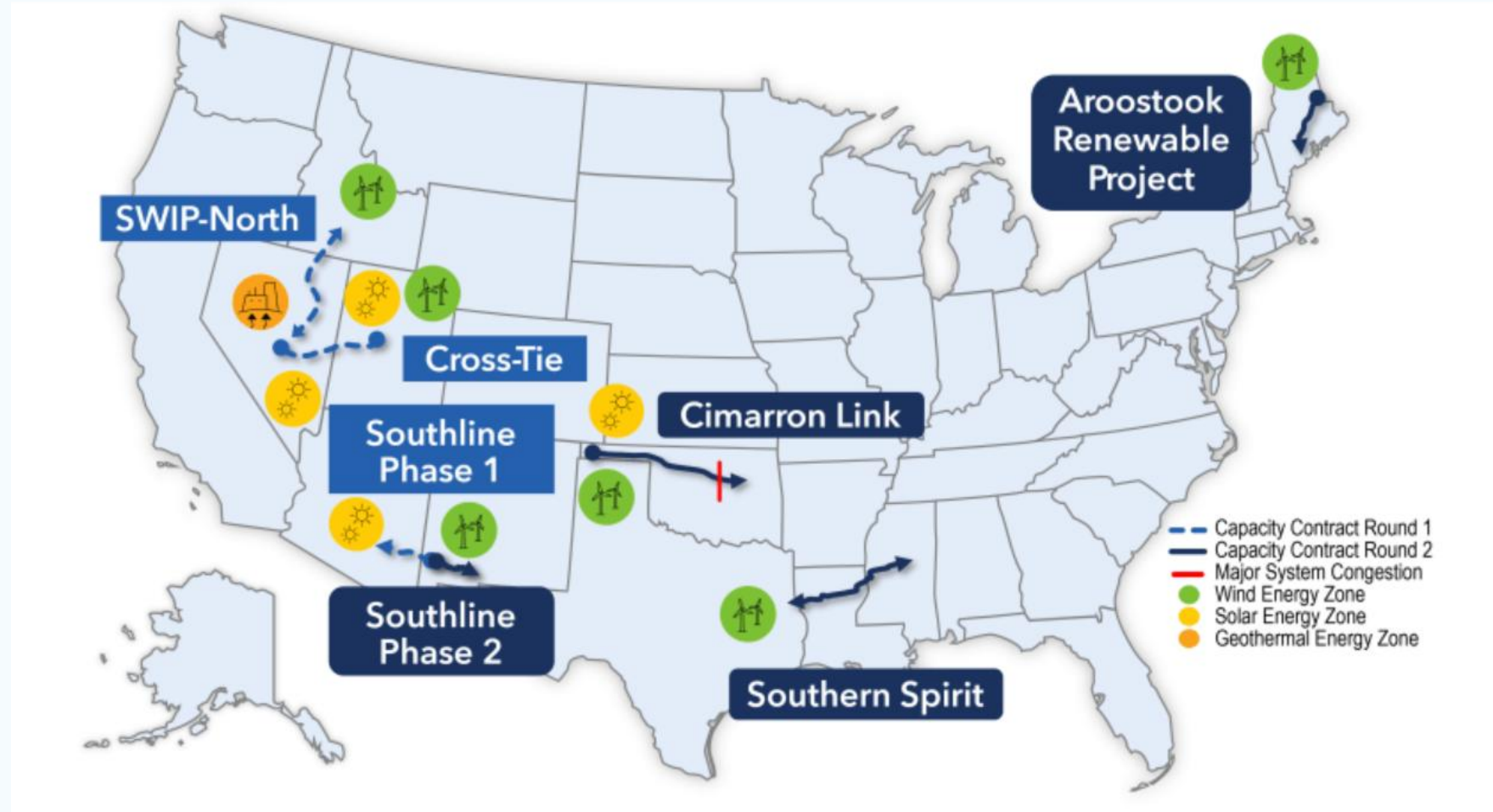
Requires all Transmission Providers to participate in long-term planning that includes:

- **20-year planning horizon, for anticipated load and generation**
- **Assessment of economic and reliability benefits of new transmission**
- **Benefits under alternative scenarios**
- **Clearly defined evaluation processes and selection criteria**
- **Ex-ante cost allocation methods**
- **Evaluation of network upgrades needed for generation interconnection**
- **Consideration of alternative transmission technologies**
- **Improved coordination between regional and local transmission planning**

Transmission Facilitation Program: Full \$2.5B obligated

Department considering if obligations will be honored on a “case-by-case basis”

Messaging of project benefits key to scrutiny



First, Get the Most Out of the Existing Grid

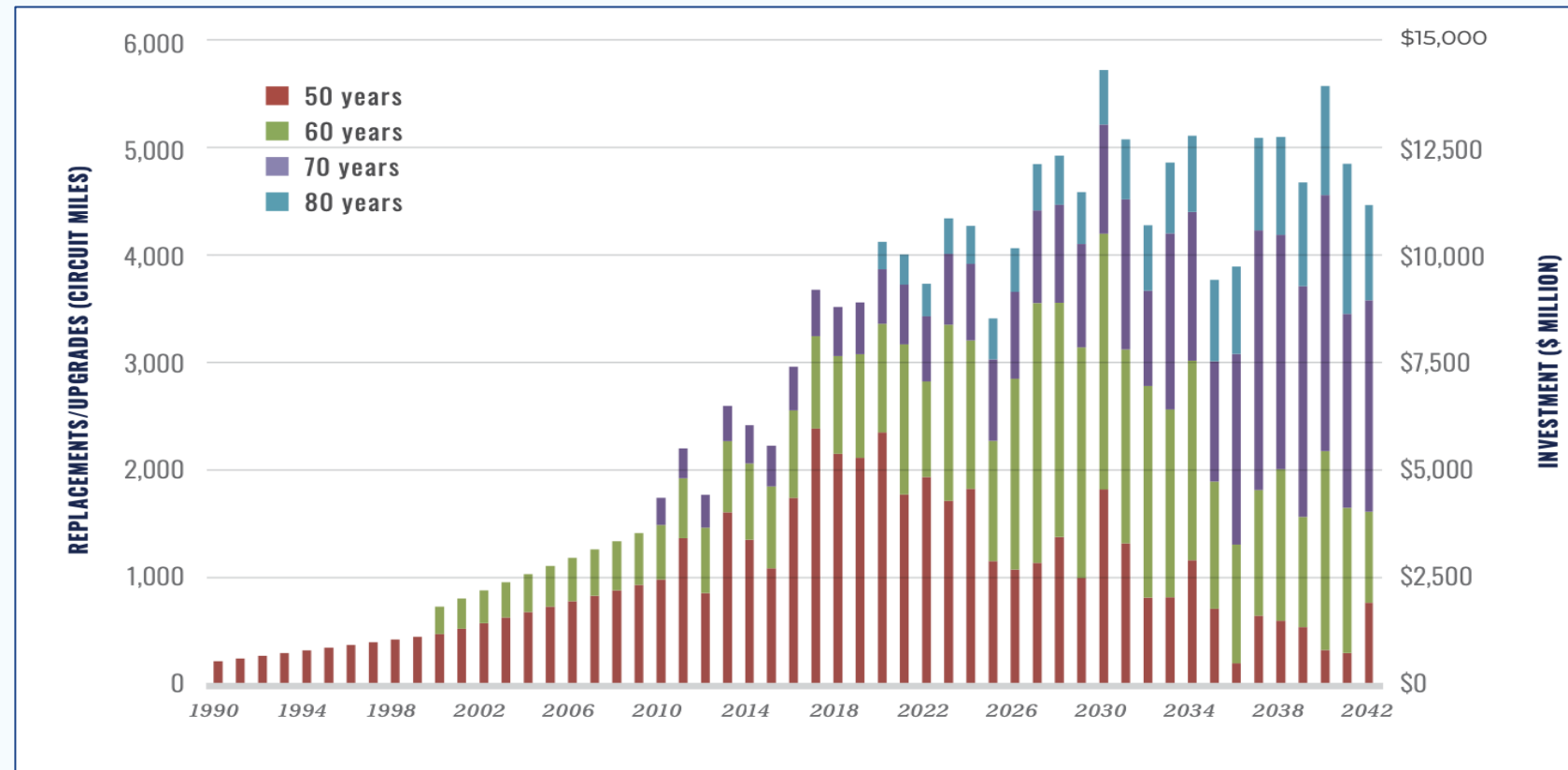
Grid-Enhancing Technologies

- Power Flow Control
- Dynamic Line Ratings
- Topology Optimization

High-Performance Conductors

- Composite core
- Superconductors

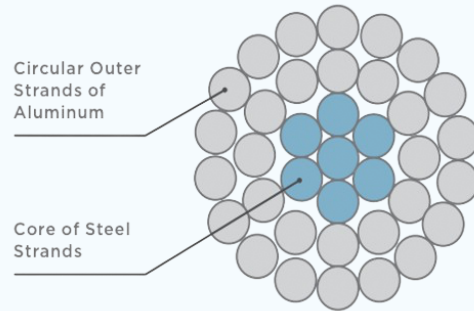
Huge opportunity to replace aging wires



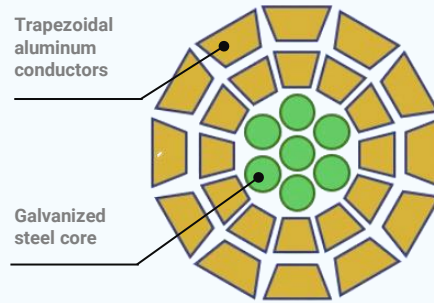
Conductor technology has evolved beyond traditional ACSR/ACSS to “High Performance Conductors” (HPCs)

Evolution of conductors

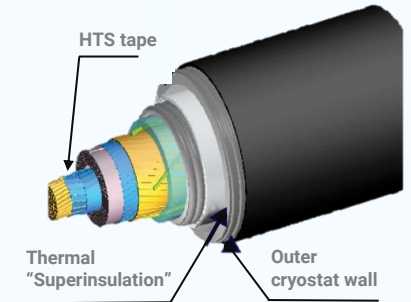
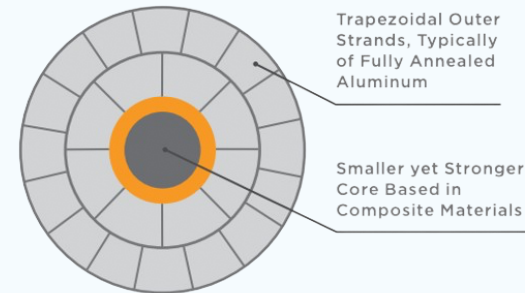
ACSR



ACSS (RW/TW)



HPCs (Carbon/composite core and superconductors)



Additional Capacity

(Compared to ACSR)

150-200%

150-300%

500-1,000%

Efficiency

(Compared to ACSR)

2-20%

20-40%

50-80%

Line sag

Thermal sag

Thermal sag

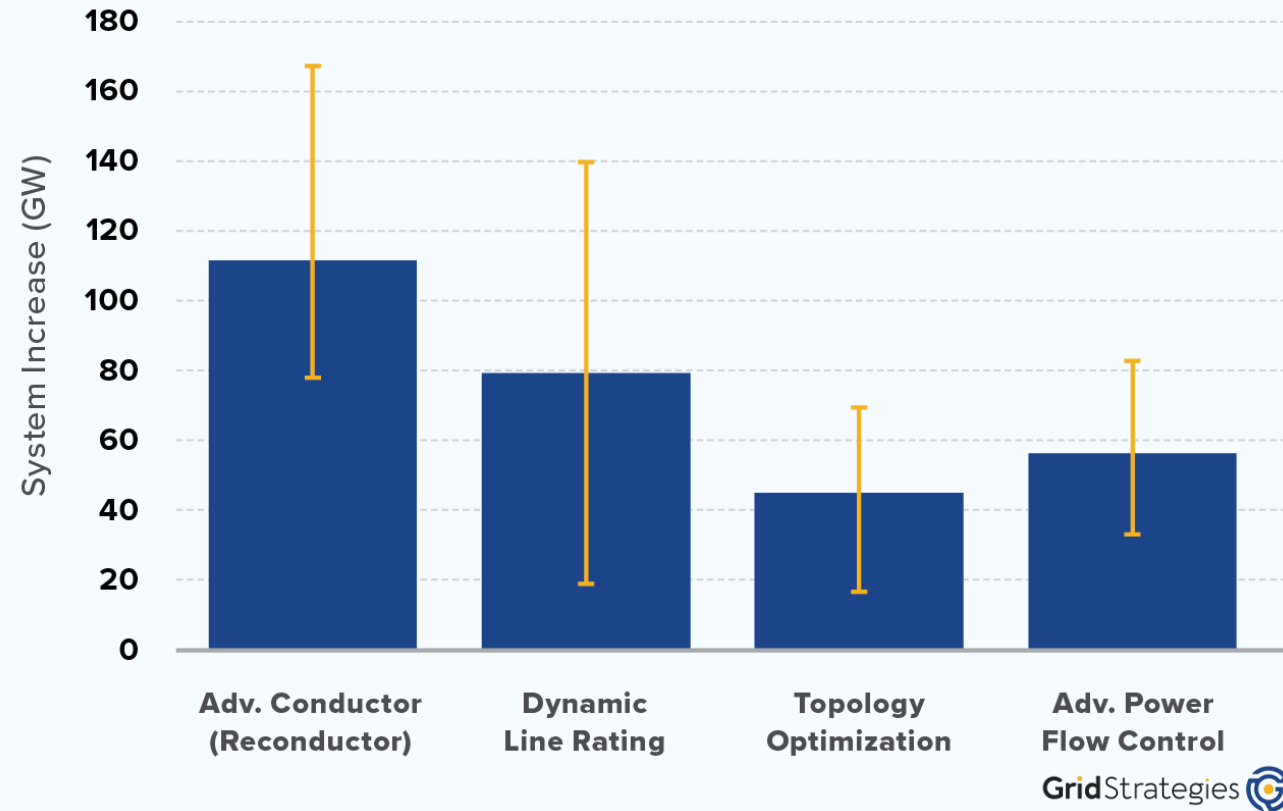
10% thermal sag

No thermal sag

ATTs Unlock New Grid Capacity Faster

- 1-3 months:
 - Dynamic Line Ratings (DLR) can be deployed to provide 20-40% additional capacity.
 - Transmission Topology Optimization (TTO) can reduce generation curtailments by 50%.
- 1-3 years:
 - Advanced Power Flow Control (APFC) can be deployed to unlock 100+ MW of additional capacity
 - High Performance Conductors (HPCs) can be used for reconductoring to 2x capacity

The U.S. Department of Energy estimates ATTs can individually unlock approximately 40-110 GW of new transmission capacity



Data Centers Want Full Transmission Connection.

Alternatives are inferior.

Option	Speed	Reliability	Industry is pursuing grid-connected models
1 On-site generation (behind the meter), disconnected from the grid	M	L	
2 Behind the meter gas or hybrid generation, but grid connected	M	H	
3 New load on the site of existing generation	H	H	
4 New load on the site of new generation	L	H	

Most data center developers are finding off-grid solutions to be extremely difficult and expensive

We offer research and advising on



Clean Energy
Integration



Business & Policy
Solutions



Regulatory
Engagement

Founded in 2017, Grid Strategies works on policy to enable decarbonization and an affordable, reliable electricity system. Transmission expansion is our main focus.

Our work

www.gridstrategiesllc.com

- Designing policy solutions and strategies for removing barriers to transmission and clean energy.
- Research on power system evolution to support affordable, reliable and clean electricity
- Analysis of utility plans and programs, and their impacts on ratepayers and climate goals
- Identification of business opportunities and obstacles for innovators in electricity.

