The Resource Adequacy Value of Interregional Transmission

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Grid Strategies

Report tackles…

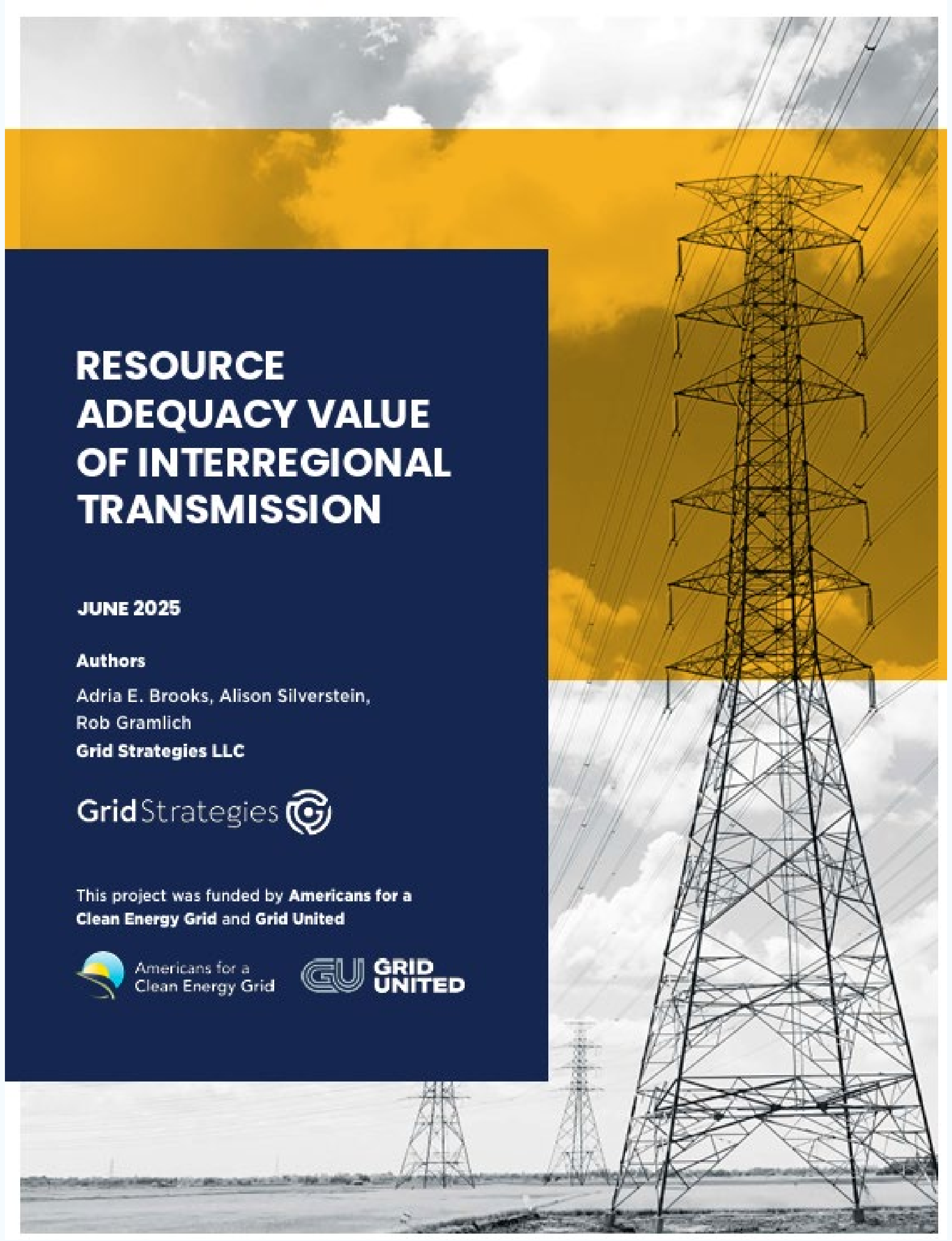
Part I | The role of transmission in supporting resource adequacy

Part II | Capturing the value of interregional transmission for resource adequacy

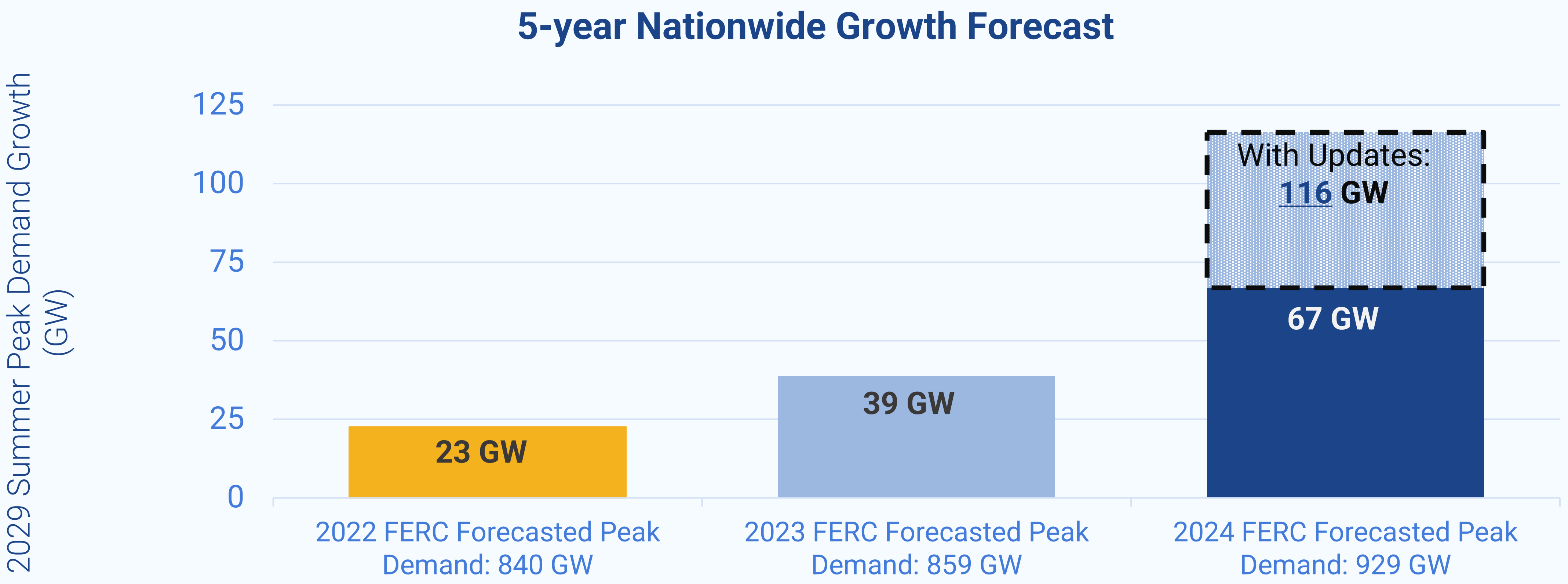
Part III | Recommendations

Appendix | Current resource adequacy and transmission accreditation practices

https://gridstrategiesllc.com/reports/



To meet load growth across the country, all means of capacity expansion should be enabled



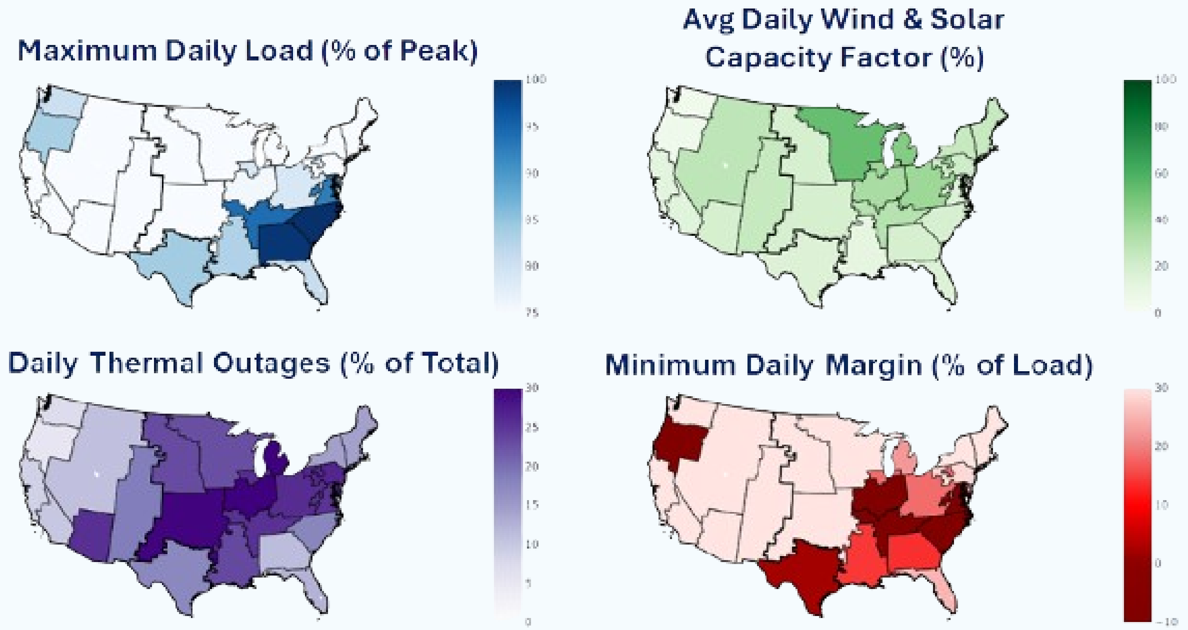
https://gridstrategiesllc.com/wp-content/uploads/National-Load-Growth-Report-2024-April-Update-Presentation.pdf

Interregional transmission supports resource adequacy

Interregional transmission enables neighboring regions with different resource mixes and times of peak load to share resource capacity.

- Interregional transmission allows capacity resources to be shared between regions, even **without building new generation**.
- Consumers benefit from this sharing of reserves, both in terms of **improved reliability and reduced costs**.
- These reliability and economic benefits are heightened during grid stress events, as interregional transmission assets tend to be **available nearly 100% of the time**.

Example: Load and generation availability differed across regions during Winter Storm Elliot. Neighboring regions had excess capacity which could have been imported to support regions where load exceeded available supply.



Source: NERC, “Interregional Transfer Capability Study” (2024)

System planners incorporate <u>some</u> capacity value of interregional transmission into RA assessments

Capacity value and associated RA contributions of firm and non-firm imports used in regional planners' RA assessments

Region	Import type	Nameplate capacity (MW)	Accredited capacity (MW)	Reported reduction in RA metric	Reduction in reserve margin	Equiv. capacity value (accredited / nameplate)
Tennessee Valley Authority	Non-firm		4,750		8%	
Southern Company	Non-firm		2,714		1.75%	
Desert Southwest (APS, AEPCO, EPE, PNM, SRP, TEP)	Non-firm		1,379	LOLE: 0.04 day/yr NEUE: 0.34 ppm		
Public Service Colorado	Non-firm		390		4.70%	
Idaho Power	Non-firm	100	14			14%
MISO	Firm	1,986	1,935		1.60%	97%
	Non-firm	12,000	4,351		3.50%	36%
SPP	Firm	2,255	2,255		3.60%	100%
CAISO	Firm		1,700		3.80%	
PJM	Firm	1,485	1,269		1.10%	85%
	Non-firm		2,937		1.50%	
NYISO	Firm		1,600		5.1%	
	Non-firm		3,500 (max)	LOLE: 0.42 day/yr		
ISO-NE	Firm	1,936	1,870		6.0%	97%
	Non-firm	3,980	2,175	LOLE: 0.724 day/yr	7.0%	55%

Notes | Unless otherwise stated, all capacity value calculations are estimated by the authors using industry reported information. Blank cells indicate the calculation was not performed, not reported, or cannot be estimated from reported information.

Many system planners have calculated the reduction in LOLE or planning reserve margin (PRM) associated with the ***fleet of interregional ties*** that currently exist between regions.

- However, not many system planners have calculated the LOLE / PRM reduction from an ***individual transmission facility.***
- Nor have they converted that LOLE / PRM reduction ***into a capacity value.***

Emerging methods to calculate the capacity value of interregional transmission

There is no consistent method to accredit interregional transmission for their RA value…

- Planners need a capacity value method that they can easily integrate into their RA assessments.
- Otherwise, they will likely fail to attract/retain this capacity, missing reliability/economic benefits.

…but proven methods have emerged, such as effective load carrying capability (ELCC)

- ELCC quantifies the capacity value based on changes in RA metrics (e.g., LOLE).
- This method has been successfully applied in several recent facility and/or RA studies to derive the capacity value of interregional transmission.

Capacity value and associated RA contribution of interregional transmission facilities

Transmission Facilities	Accrediting region	Number of associated facilities	Nameplate capacity (MW)	Accredited capacity (MW)	Reported reduction in LOLE (day/yr)	Capacity Value (accredited / nameplate)
North Plains Connector	WECC			1,800	0.088	**60%**
	SPP	1	3,000	1,350	0.087	**45%**
	MISO			400	0.070	**13%**
Three Corners Connector	PSCo	1	1,800	715	0.09	**40%**
	SPP			1,362	0.054	**76%**
Grain Belt Express Phase 1	MISO	1	2,500	2,116	0.06	**85%**
	SPP			450		**18%**
Boardman to Hemingway	Idaho Power	1	750	700	0.006	**93%**
CAISO Interties	CAISO	45	39,923	16,148		**40%**
NS-NB Reliability Intertie Project	Nova Scotia	1	300 (est.)	200		**67%**
North Sea Link	NESO	1	1,400	1,316		**94%**
NESO - Ireland Interties	NESO	3	1,500	1,050		**70%**
NESO – France Interties	NESO	3	4,000	2,680		**67%**
Nemo Link	NESO	1	1,000	800		**80%**
Viking Link	NESO	1	1,400	1,204		**86%**
BritNed	NESO	1	1,000	840		**84%**
ISONE - Maritimes	ISONE	2	980	770	0.469	**78%**
ISONE - HQ Phase II	ISONE	1	1,400	1060	0.556	**76%**
ISONE - HQ Highgate	ISONE	1	200	160	0.137	**80%**
ISONE - NYISO Ties	ISONE	8	1,400	730	0.454	**52%**
Soo Green	ComEd	1	2,100	2,016	0.1	**96%**
Champlain Hudson Power Express	NYISO	1	1,250	1,250	0.008	**100%**

Notes | Because transmission lines can be accredited differently in multiple directions, the importing capacity is listed for the named entity in the Accrediting region column. Blank cells indicate the calculation was not performed, not reported, or cannot be estimated from reported information.

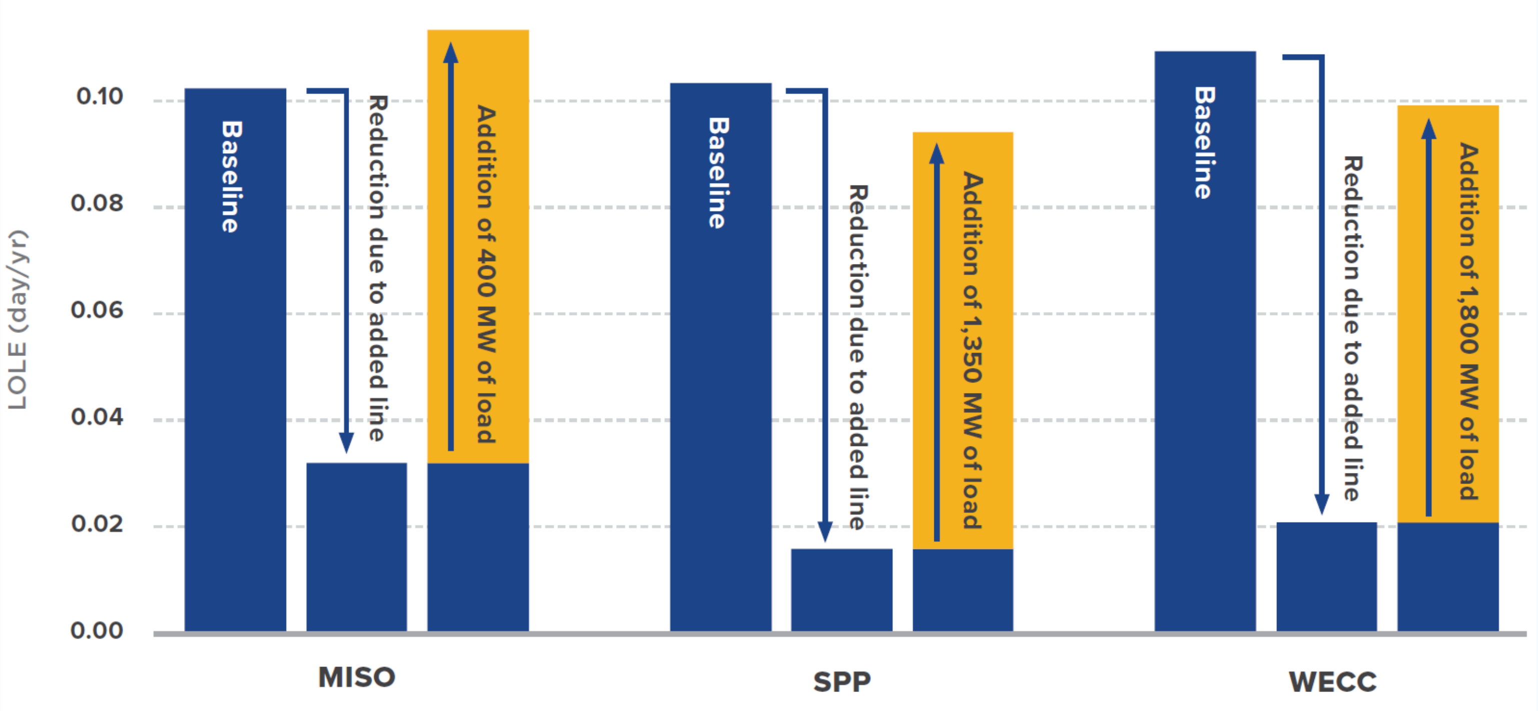
Accreditation above nameplate is possible for transmission lines

Transmission can be accredited separately in both directions, without the addition of new generation in either system.

Capacity value is created by the load and generation diversity between regions, which enables imports during scarcity events.

	ELCC (MW)	Capacity Value
MISO	400	13%
SPP	1,350	45%
WECC	1,800	60%
Total	**3,550**	**118%**

ELCC accreditation of the 3,000 MW North Plains Connector, which terminates in MISO, SPP, and WECC



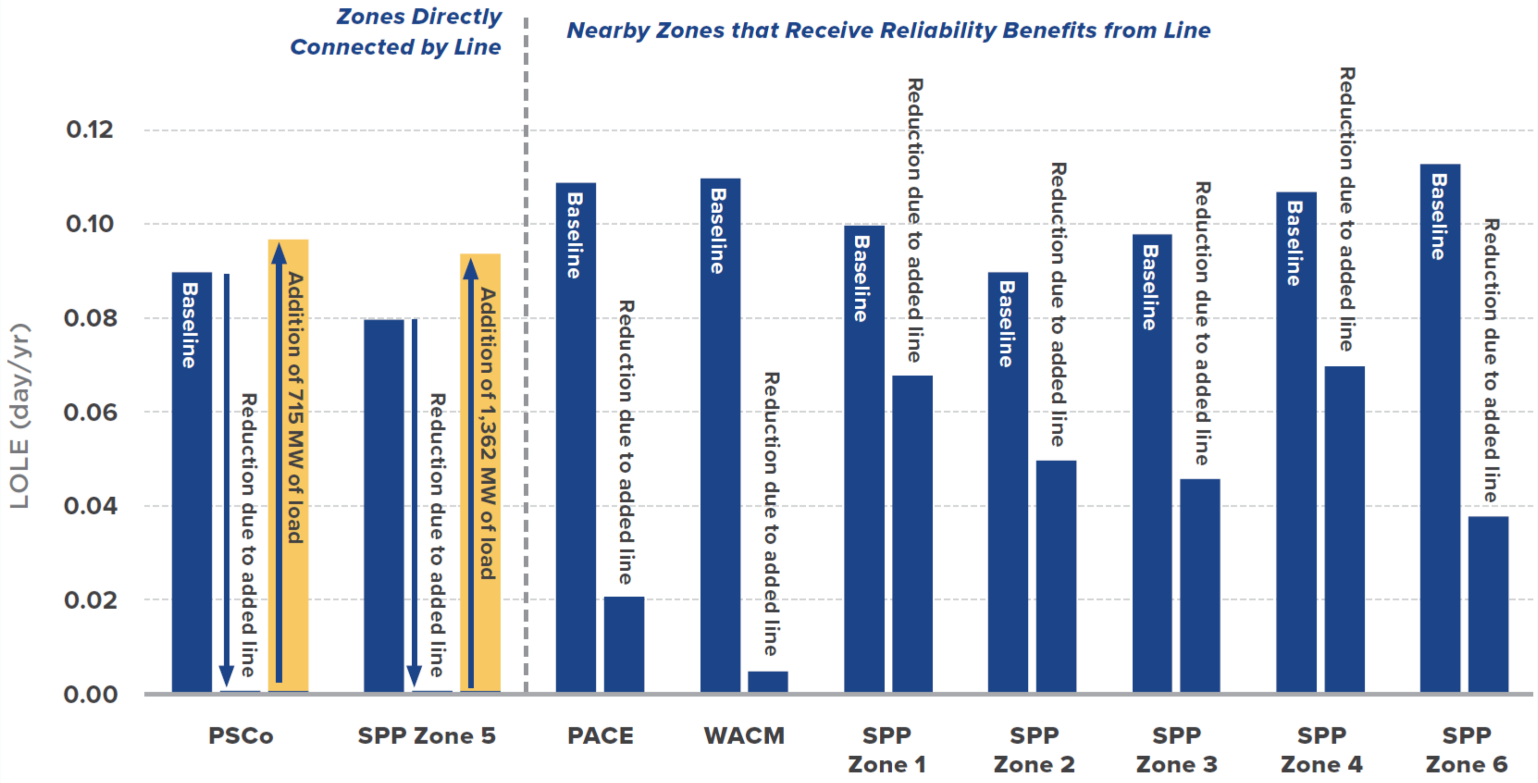
Data Source: Astrapé Consulting, "North Plains Connector (NPC) Evaluation: Final Report" (2024)

Transmission also reduces LOLE in non-terminating regions

Transmission lines also contribute to resource adequacy and earn capacity accreditation in regions to which they are not directly connected.

	ELCC (MW)	Capacity Value
PSCo	715	40%
SPP Zone 5	1,362	76%
Total	**2,077**	**115%**

ELCC accreditation of 1,800 MW Three Corners Connector, which terminates in Public Service Company of CO (PSCo) and SPP Zone 5



Data Source: Astrapé Consulting, "Three Corners Connector Project Evaluation: Final Report" (2024)

Options for valuing interregional transmission capacity in resource adequacy: from recognition to compensation

System planners could account for the capacity contribution of interregional transmission by…

A Planning for a lower reserve margin

B Converting LOLE, etc. reductions to ELCC values

These RA accreditation methods are based in current industry practice, and are similar to the benefits that FERC requires transmission planning regions to consider as part of long-term regional planning under Order No. 1920 in the form of either reduced loss of load probability or planning reserve margin…

C Assigning capacity value directly to the asset

…but in the interregional case, this method enables market sales of that transmission capacity as a capacity resource in an RA regime.

Accrediting capacity value enables investment and development. Without (1) a benefit to LSEs associated with their RA obligations or (2) direct compensation to developers, there is less incentive to build these resources. Valuation and compensation methodologies can apply to both regulated assets and merchant interregional transmission, or hybrids of the two.

Recommendations for system planners and regulators

1 Account for transmission-enabled imports in resource adequacy assessments

- Include the RA contribution of transmission-enabled imports using LOLE or reserve margin reductions.
- Use neighbor-specific, stress-period data and probabilistic methods for imports.

2 Quantify transmission capacity value of major interregional facilities

- Use LOLE or expected unserved energy to calculate the capacity value of major interregional lines.
- Apply seasonal and neighbor-specific accreditation.
- FERC could expand the NERC *Interregional Transfer Capability Study* to support this effort.

3 Enable procurement and development of interregional lines that support RA

- Support regulated or merchant transmission with RA value via rate-base recovery, load serving entity obligation reduction, or direct compensation.
- Regulatory oversight may be needed to ensure procurement decisions benefit ratepayers.

This report was prepared for Americans for a Clean Energy Grid and Grid United.

The full report is available: https://gridstrategiesllc.com/wp-content/uploads/GridStrategies_RAValueInterregionalTx_250601.pdf