LIVE-WIRE: EASTERN STATES UNPLUG NATIONAL LAW FROM SUSTAINABLE POLICY

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I. TRANSMISSION REMISSION

This Article analyzes an increasing number of Eastern U.S. states' attempts to legally manipulate land-use law precedents to frustrate and now block the recent federal infrastructure laws. The federal circuit courts and state supreme courts have upheld these states' reserved legal power to block federal infrastructure or climate change policies. The stakes are large: This blockage impacts the interstate electric power grid, the most important technology in the United States, as well as what President Biden deemed his most important legislative achievements.

Few in an election year tell the U.S. President that there is an omission or mistake in the Administration's most significant legislative achievement. Princeton University Professor Jesse Jenkins' REPEAT forecast was relied on and employed by the Biden Administration in 2022 to convince barely fifty U.S. senators to enact the Biden Administration's Inflation Reduction Act ("IRA").[1] After enactment, Professor Jenkins' assessment changed to forecast long-term concerns: "According to Jesse Jenkins, an engineering professor at Princeton, the U.S. will miss out on more than 80 percent of the recent climate bill's potential emissions reductions if we can't build out transmission lines quickly."[2]

1. *See* JESSE D. JENKINS ET AL., REPEAT, ELECTRICITY TRANSMISSION IS KEY TO UNLOCK THE FULL POTENTIAL OF THE INFLATION REDUCTION ACT 4 (2022), https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf [https://perma.cc/A463-D8VW].

2. *See* Jerusalem Demsas, Not Everyone Should Have a Say, ATLANTIC (Oct. 19, 2022), https://www.theatlantic.com/ideas/archive/2022/10/environmentalists-nimby-permitting-reform-nepa/671775/ [https://perma.cc/ak54-paah]; Scott Patterson, *The Professor Helping Guide Billions in Climate Spending*, WALL ST. J., https://wsj.com/articles/the-professor-helping-guide-billions-in-climate-spending-96d3d17c [https://perma.cc/E5EQ-8P7V] (July 8, 2023, 5:59 PM) (noting a potential increase in the use of fossil fuel-fired power plants, compared to if the IRA had not been enacted, in order to keep up with the increasing demand for electricity).

In point of fact, as analyzed in detail in this Article, the United States legally "can't build out transmission lines quickly." Focusing on unanticipated major legal impasses in the Eastern U.S., this Article analyzes how and where critical efforts to build needed transmission infrastructure are legally blocked by Eastern states and cities, and what has been attempted to circumvent such blockages, with various results in the courts. This Article, in its final two parts, analyzes and creates legal 'work-arounds' under existing U.S. law and precedents to circumvent this otherwise intractable and growing state bottleneck of national infrastructure policy.

The Biden Administration set in motion an unprecedented rapid electrification of the entire U.S. economy through three laws enacted sequentially in 2021, 2022, and 2023. This Article examines how each of those three laws suffers from a critical omission now legally plaguing this most significant infrastructure program in the last half century. Consequently, while U.S. electricity use in response to this legislation is forecast to quickly more than double from approximately 17.7% of primary energy use to an unprecedented 40–50% of primary energy use,[3] renewable energy alternatives cannot be quickly interconnected to new transmission infrastructure to reach consumers, and the legislative omissions to cause transmission to keep pace with increasing electric demand is now forecast to substantially contribute to climate warming rather than reduce it.[4]

These new laws are consequently forecast to wrench and strain the American power sector at its seams in the next decade while substantially increasing, rather than mitigating, fossil fuel use, contributing more to climate change. Shortly after these laws were implemented, a majority of the Commissioners of the Federal Energy Regulatory Commission ("FERC"), which regulates the U.S. electric transmission grid, testified before the U.S. Senate Energy and Natural Resources Committee in 2023. The Commissioners predicted how the

3. *See* RFF Live, *Future Generation: Exploring the New Baseline for Electricity in the Presence of the Inflation Reduction Act*, RESOURCES FOR THE FUTURE, at 05:38 (Feb. 15, 2023), https://www.rff.org/events/rff-live/future-generation-exploring-the-new-baseline-for-electricity-in-the-presence-of-the-inflation-reduction-act/; *see also U.S. Energy Facts Explained*, ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/us-energy-facts/ (July 15, 2024) (presenting that electric power now is 13.2 quadrillion BTU/year within a total energy production in the United States of 74.7 quadrillion BTU/year).

4. *See* U.S. DEP'T OF ENERGY, TRANSFORMING THE NATION'S ELECTRICITY SYSTEM: THE SECOND INSTALLMENT OF THE QUADRENNIAL ENERGY REVIEW 9 (2017), https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review%20Summary%20for%20Policymakers.pdf [https://perma.cc/XJ2D-QM4R] (presenting that more than 99% of greenhouse gas emissions related to electric power generation emanate from burning fossil fuels to produce power).

rapid electrification of the entire U.S. economy without sufficient transmission infrastructure in place to deliver new renewable and other energy would compromise the reliability of the critical electric power system in the United States[5]:

- FERC Acting Chairman Willie Phillips:
    - "We face unprecedented challenges to the reliability of our nation's electric system."[6]
- FERC Commissioner Mark Christie:
    - "The United States is heading for a very catastrophic situation in terms of reliability."[7]
    - "The arithmetic doesn't work. . . . This problem is coming. It's coming quickly. The red lights are flashing."[8]
- FERC Commissioner James Danly:
    - There is a "looming reliability crisis in our electricity markets."[9]
    - "FERC has allowed the markets to fall prey to the price distorting and warping effects of subsidies and public policies that have driven the advancement of large quantities of intermittent renewable resources onto the electric system."[10]
    - "The subsidies available to renewable generators are so lucrative that, when participating in procurement auctions, they are able to offer at a price of zero instead of their actual cost. The market signal thereby created is that these new

5. *See* Ethan Howland, *FERC Commissioners Tell Senators of Major Grid Reliability Challenges, with Some Blaming Markets*, UTIL. DIVE (May 5, 2023), https://www.utilitydive.com/news/ferc-grid-reliability-senate-energy-hearing/649523/ (quoting FERC Commissioner Mark Christie stating that power plants are retiring faster than they are being replaced and "[t]he arithmetic doesn't work").

6. *Id.*

7. *Id.*

8. *Id.*

9. *Id.*

10. *Id.*

> resources can be built for *free*, and thus the cost of power is also free."[11]

This Article analyzes the legal battle over transmission infrastructure that concerns the single most important U.S. technology—the U.S. power grid. While the Infrastructure and the Inflation Reduction Acts, the major accomplishments of the Biden Administration, require the entire economy as well as new vehicles to convert from fossil fuels to electric power in the next decade, these Acts face significant hurdles as courts have interpreted the Constitution to allow states to unilaterally block interstate power infrastructure.

This Article analyzes the constitutional "'separation of powers" impasse now blocking implementation of essential U.S. infrastructure, particularly pronounced in the Eastern United States This Article analyzes how 90% of continental U.S. states could now legally employ their rivers and interstate highways as invisible legal barriers, arbitrarily blocking additional power infrastructure serving adjacent states. Legally immobilizing the most critical national U.S. technology, this impasse undermines U.S. contributions to international climate policy.

The renewable electricity promoted and subsidized by the Biden Administration laws to replace all U.S. electric power generation now using fossil fuels by 2035[12] requires substantially more land to generate an equivalent amount of power than conventional fossil-fuel electricity.[13] However, critical legal control of the land on which to generate and transmit new sustainable electric power to consumers remains under exclusive local and state control.[14] The U.S. legal system reserves to states and cities significant power to control infrastructure land-use pursuant to the Tenth Amendment of the Constitution.[15] Courts have

11. *Full Committee Hearing to Conduct Oversight of FERC: Hearing Before the S. Comm. on Energy & Nat. Res.*, 118th Cong. (2023) (written testimony of James Danly, Comm'r, Fed. Energy Regul. Comm'n), https://www.energy.senate.gov/hearings/2023/5/full-committee-hearing-to-conduct-oversight-of-ferc.

12. *See* Patrick Whittle & Cathy Bussewitz, *Biden Faces Steep Challenges to Reach Renewable Energy Goals,* ABC NEWS (Mar. 3, 2021, 12:30 PM), https://perma.cc/D7YY-VXK6.

13. *See* SAMANTHA GROSS, BROOKINGS INST., RENEWABLES, LAND USE, AND LOCAL OPPOSITION IN THE UNITED STATES 3 (2020), https://www.brookings.edu/wp-content/uploads/2020/01/FP_20200113_renewables_land_use_local_opposition_gross.pdf. *But see* Hannah Ritchie, *How Does the Land Use of Different Electricity Sources Compare?*, OUR WORLD IN DATA (June 16, 2022), https://ourworldindata.org/land-use-per-energy-source [https://perma.cc/TDQ3-BC9K] (arguing that transitioning to renewables "might require more land, but perhaps not much more").

14. *See infra* Section V.B.

15. *See infra* Part IV (discussing legal mechanisms to transmit new renewable power).

upheld this exclusive constitutional local land control regarding transmission infrastructure necessary to deliver electric power.[16]

This legal separation of local and state power from federal policy creates a significant legal barrier, thus derailing a unified policy. This is particularly evident in Eastern states where a state's size matters. The eight smallest states by geographic area in the continental United States are located in New England and the Mid-Atlantic region,[17] and seven of the eight most densely populated states in the United States are also found in these regions.[18] These most densely populated states demand a more abundant and concentrated quantity of delivered electric power to serve their more densely congregated populations, often importing power over additional transmission infrastructure through adjoining states.[19]

Not sufficiently addressed by the three Biden Administration infrastructure laws are constitutional conflicts surrounding the exercise of adjoining state Tenth Amendment powers regarding the transmission of interstate infrastructure in the Eastern United States. This Article analyzes the 2021–2023 once-in-a-half-century Biden national legislation designed to preempt traditional state and local power over siting electric power infrastructure, which, in fact, does not accomplish this if a state chooses not to agree.[20] This Article analyzes why and how these major legislative achievements of the Biden Administration, costing an unprecedented over $1 trillion, could legally fail regarding power infrastructure implementation. This Article dissects this state-federal legal conflict, creating multiple barriers to site essential power transmission infrastructure to address climate change. This Article's final sections apply legal triage, creating legal 'work-arounds' under existing U.S. law to circumvent this otherwise intractable bottleneck handicapping sustainable national policy.[21]

This Article begins analyzing the unprecedented recent legislation: Part II of this Article analyzes each misstep in the delicate choreography of the three significant law changes addressing climate and sustainable renewable energy—the 2021 Infrastructure Act,[22] the 2022 Inflation

16. *See infra* Section II.D.

17. *See* Size of States, STATE SYMBOLS USA, https://statesymbolsusa.org/symbol-official-item/national-us/uncategorized/states-size (last visited Apr. 13, 2025).

18. *See U.S. Population Density Mapped*, VIVID MAPS (Aug. 23, 2018), https://vividmaps.com/us-population-density/ (displaying that the densest state populations are in the District of Columbia, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Maryland, and Delaware).

19. *See infra* Part IV (discussing legal mechanisms to transmit new renewable power).

20. *See infra* Part II (analyzing what new laws do not enable and their legal gaps).

21. *See infra* Part V (introducing moving power outside of the box).

22. Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021).

Reduction Act, [23] and the 2023 Debt Ceiling Limit legislation[24]—which collectively provide hundreds of billions of additional infrastructure dollars.[25] Part II showcases legally why money is not the 'critical path' limitation for effective delivery of sustainable low-carbon U.S. electricity to address national policy. Part II further examines the long-term implications of the current laws' separation of state, federal, and local powers that now block successful new power infrastructure implementation.

Part III analyzes the repercussions of these recent landmark climate law changes—which, instead, are now forecasted to dramatically increase, rather than decrease, climate warming in the next decade.[26] The Princeton University climate change modelers, on whom the Biden Administration relied, now counter-intuitively predict that these laws will substantially expand use of fossil-fuel-fired electric power generation compared to business-as-usual.[27] Part III traces the modelers' finding that more than 80% of the sustainability accomplishments pledged for this legislation by the Biden Administration will not be realized.[28] This Article analyzes how this is playing out with states in the Eastern part of the country blocking adjacent states' access to sustainable power infrastructure under the new laws.

Part IV of this Article analyzes legal conflicts with implementing and delivering sustainable energy infrastructure in the eastern United States, and what has and has not worked. Part IV analyzes the legal separation of powers challenges after recent Supreme Court "Major Question Doctrine" decisions further crimping federal executive branch discretion and legal choices regarding energy and climate. A 2023 U.S. Department of Energy study delineates the magnitude of the transmission infrastructure challenge to renewably electrify the entire U.S. economy, stating: "[E]lectricity loads in 2050 are nearly double those in 2020," resulting in "significantly more transmission investments" to serve greater demand from "heating and transportation [that] will become further electrified. . . . [,] replac[ing] building heating systems currently powered by wood, oil, propane, or natural gas to electricity . . . .

23. Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat 1818 (2022).

24. Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, 137 Stat. 10 (2023).

25. *See infra* Part II (discussing the Inflation Reduction Act and Infrastructure Act funding).

26. *See infra* Part III.

27. *See* JENKINS ET AL., *supra* note 1, at 12 (providing figure showing "Power Sector Annual CO_2 Emissions").

28. *See id.* at 8 (presenting figure showing "Annual Change in Net U.S. Greenhouse Gas Emissions Relative to No IRA (Bipartisan Infrastructure Law Only").

The replacement of gas and diesel-powered vehicles with electric vehicles will also increase overall system demand."[29]

Part V analyzes why, after the recent Supreme Court decision in *West Virginia v. EPA*,[30] the U.S. legal system truly cannot site the transmission infrastructure rapidly necessary to deliver sustainable electric power. Part V quantifies the increase in climate-changing emissions forecast to occur in the next decade, warming the climate for what new studies reveal could be up to 1000 years.[31] To reclaim a workable path forward on U.S. power, Part V presents legal and implementable 'work-arounds' to reposition the U.S. electric sector under existing current U.S. law.

II. WHAT NEW LAWS DO NOT ENABLE AND THEIR LEGAL GAPS

In a two-year period from 2021–2023, there were three major new laws enacted that the Biden Administration highlighted as the core of its first-term accomplishments. During each statute's consideration in Congress, amendments were proposed that would have bridged a key gap to allow the United States to meet its then-current climate change reduction pledges. In each instance, an unusual bipartisan group of Democratic and Republican legislators blocked those amendments. The result: The forecasting group at Princeton University, on which President Biden relied to get his key domestic legislation enacted, revised its forecast to conclude that legislative oversight will sacrifice 80% of what was promised for the legislation,[32] as examined below.

A. 2021 Infrastructure Investment and Jobs Act: Omissions

President Biden characterized the 2021 Infrastructure Investment and Jobs Act ("IIJA") as "the most significant long-term investment in our infrastructure and competitiveness in nearly a century."[33] The legislation was presented to the Congress as sufficiently extending

29. *See* U.S. DEP'T OF ENERGY, NATIONAL TRANSMISSION NEEDS STUDY: DRAFT FOR PUBLIC COMMENT 72 (Feb. 2023), https://www.energy.gov/sites/default/files/2023-02/022423-DRAFTNeedsStudyforPublicComment.pdf.

30. 597 U.S. 697 (2022).

31. *See Short-Lived Greenhouse Gases Cause Centuries of Sea-Level Rise*, NASA, https://climate.nasa.gov/news/2533/short-lived-greenhouse-gases-cause-centuries-of-sea-level-rise/ (Oct. 22, 2024).

32. *See* JENKINS ET AL., *supra* note 1.

33. Lesley Clark et al., *What the Infrastructure Deal Means for Energy*, E&E NEWS BY POLITICO (July 30, 2021, 7:29 AM), https://www.eenews.net/articles/what-the-infrastructure-deal-means-for-energy/.

electric transmission infrastructure. Coupled with the 2022 IRA,[34] the two laws committed more than $430 billion to the nation's energy system.[35] An independent study concluded that the U.S. high-voltage transmission network must expand by 60% before 2030 and triple its capacity by 2050 to connect the necessary wind and solar power.[36] The associated transmission capital cost was commensurately unprecedented—$360 billion through 2030 and $2.4 trillion by 2050.[37]

Pursuant to the Constitution, for more than two centuries, the Tenth Amendment reserves for each individual state the power to unilaterally block any additional power transmission technology, facility, or line traversing its state to benefit another state.[38] The IIJA in 2021 attempted to federally preempt state and local control over siting interstate transmission lines if state energy regulatory agencies rejected high-priority transmission proposals or failed to act on them within a year.[39] Previous efforts to do so had been overturned and stricken by two federal circuit courts.[40] The 2021 IIJA purported to legislatively supersede the Fourth Circuit's prior ruling in *Piedmont Environmental Council v. FERC*[41] to allow FERC to exercise "backstop" siting authority for transmission lines in priority areas known as National Interest Electric Transmission Corridors ("NIETC").[42]

The IIJA was assumed to have superseded *Piedmont Environmental Council* when it amended section 216(b)(1)(C) of the Federal Power Act[43] to provide FERC authority to grant permits when a state commission: (i) has not yet decided an application by one year after the application date

34. *See infra* Section II.B.

35. U.S. DEP'T OF ENERGY, OFF. OF POL'Y, DOE/OP-0018, THE *INFLATION REDUCTION ACT* DRIVES SIGNIFICANT EMISSIONS REDUCTIONS AND POSITIONS AMERICA TO REACH OUR CLIMATE GOALS 1 (2022), https://perma.cc/E5EP-Z7N9.

36. Clark et al., *supra* note 33.

37. *Id.*

38. *See infra* Section II.D.

39. *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 313–14 (4th Cir. 2009); Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 40105, 135 Stat. 429, 933–34 (2021).

40. *See Piedmont*, 558 F.3d at 320; Cal. Wilderness Coal. v. U.S. Dep't of Energy, 631 F.3d 1072, 1080, 1107 (9th Cir. 2011).

41. *See* 558 F.3d at 320.

42. *See* Infrastructure Investment and Jobs Act § 40105; Jonathan D. Brightbill & Madalyn Brown, *Will the Infrastructure Investment and Jobs Act Accelerate Transmission Development?*, WINSTON & STRAWN LLP (Jan. 4, 2022), https://www.winston.com/en/winston-and-the-legal-environment/will-the-infrastructure-investment-and-jobs-act-accelerate-transmission-development.html [https://perma.cc/GLN6-53F3] (exploring "how such backstop siting authority is likely to affect state Public Utility Commissions (PUCs) permitting decisions").

43. 16 U.S.C. § 824p(b)).

or relevant NIETC designation; (ii) conditioned its approval on the proposed project not significantly reducing transmission capacity constraints, interstate commerce congestion, or economic infeasibility; or (iii) denied an application.[44] The IIJA amended section 216(e) of the Federal Power Act, granting permit holders the right to use eminent domain to acquire necessary rights-of-way after exhausting good-faith efforts of engaging early with stakeholders in such a permitting process.[45]

However, this exposed an uncured critical path omission. The IIJA creates federal eminent domain for private transmission holders of FERC permits to acquire and exercise a right-of-way for siting transmission lines.[46] However, these eminent domain powers are only authorized to be exercised over privately owned land.[47] There is no eminent domain power granted by the IIJA over state-owned lands. Of note, as a more comprehensive reform to curtail existing state authority over transmission siting, Senator Joseph Manchin (D.–W. Va.) introduced legislation, although it was not accepted by a majority in Congress.[48]

And here remains the legal omission left by the IIJA, analyzed in the final Subsection D below, after first analyzing the similar gaps left in the two subsequent 2022 and 2023 legislative accomplishments of the Biden Administration.[49] Notwithstanding the critical path omission, FERC in 2023 started the process to grant new transmission authority for proposed construction or modification of electric transmission facilities in NIETCs, pursuant to the IIJA's revised section 216 of the Federal Power Act.[50]

44. *See* Infrastructure Investment and Jobs Act § 40105(b).

45. *Id.* §40105(c) (amending 16 U.S.C. § 824p(e)(1)).

46. 16 U.S.C. § 824p(e)(1).

47. *See id.* at 824p(f)(1).

48. *See* Jim DiPeso, *POTOMAC: FERC Approves Grid Interconnection Reforms*, NEWS DATA CLEARING UP (July 28, 2023), https://www.newsdata.com/clearing_up/clearing_it_up/potomac-ferc-approves-grid-interconnection-reforms/article_30fbaf7a-2d6e-11ee-a0ec-af8203201261.html [https://perma.cc/J2SH-YUUG] (noting calls from Senator Manchin for "reforms to speed up legal challenges to energy projects, including deadlines for filing court challenges and for agencies to complete court-ordered fixes to permits"). Manchin noted that "[b]ig, interstate transmission lines just aren't getting built," adding that transmission is an important reliability tool. *Id.* "As we've seen in Texas and other parts of the country, the areas that need the power aren't just blue states with aggressive climate targets that some of us may not agree with," he said. *Id.*; *see also* Catherine Morehouse, *Senators Clash Over Policy to Increase FERC Transmission Siting Authority*, UTIL. DIVE (July 15, 2021), https://www.utilitydive.com/news/senators-clash-over-policy-to-increase-ferc-transmission-siting-authority/603354/ (quoting Senator Joe Manchin: "We've had the current system in place for 15 years and we know it's not working. We know it's not working.").

49. *See infra* Section II.D.

50. Applications for Permits to Site Interstate Electric Transmission Facilities, 88 Fed. Reg. 2770 (proposed Jan. 17, 2023) (to be codified at 18 C.F.R. pts. 50, 380).

B. 2022 Inflation Reduction Act: A Second Lost Opportunity

Months after the enactment of the IIJA, the Biden Administration enacted the Inflation Reduction Act in August 2022 after Vice President Kamala Harris cast the tie-breaking vote in the Senate.[51] The IRA contains unprecedented incentives to subsidize the electric power sector, including extension of the existing technology-specific Production Tax Credits ("PTC") and Investment Tax Credits ("ITC") through 2024 before these tax credits become technology-neutral.[52] The IRA offers bonus credits for domestic products incorporated, apprenticeship training, payment of prevailing wages, and siting in "justice" or low-income communities;[53] commencing in 2025, technology-neutral Clean Electricity PTCs and ITCs also provide similar bonus credits for meeting prevailing wage amounts[54] and apprenticeship[55] provisions.[56] The IRA's extensive bonus structure provides a 500% increase to achieve the PTC's elevated 2.75 cents per kWh-produced credit value and a 30% credit value for the ITC when renewable energy projects meet prevailing wage and apprenticeship requirements.[57] An automatic five-fold potential increase in the credit amount applies for the operation of new eligible renewable energy facilities with a net output capacity of less than 1 megawatt (Mw).[58]

The IRA allows renewable energy developers to receive clean and renewable energy tax incentives as a direct payment until 2024, without

51. *See* Chris Megerian & Lisa Mascaro, *Vice President Kamala Harris Matches Record for Tiebreaking Votes in Senate*, AP NEWS, https://apnews. com/article/kamala-harris-tiebreaker-vote-db39d642bc423f4984b0ad7b32139ecb (July 17, 2023) (noting that Harris cast the deciding vote for the Inflation Reduction Act).

52. *Summary of Inflation Reduction Act Provisions Related to Renewable Energy*, EPA [hereinafter *IRA Summary*], https://www.epa.gov/green-power-markets/summary-inflation-reduction-act-provisions-related-renewable-energy (Jan. 28, 2025).

53. *See* Inflation Reduction Act of 2022, Pub. L. No. 117-169, § 13103, 136 Stat 1818, 1921 (to be codified at 26 U.S.C. § 48.

54. *Id.* § 13101(f) (to be codified at 26 U.S.C. § 45(b)(6)–(7)).

55. *Id.* (to be codified at 26 U.S.C. § 45(b)(8)). On apprenticeship, see BENJAMIN COLLINS, CONG. RSCH. SERV., R45171, REGISTERED APPRENTICESHIP: FEDERAL ROLE AND RECENT FEDERAL EFFORTS (2021).

56. *Id.* §§ 13701, 13702 (to be codified at 26 U.S.C. §§ 45Y, 48E).

57. *IRA Summary*, *supra* note 52. The Inflation Reduction Act bonus structure for eligible renewable energy projects meeting wage and apprenticeship requirements to increase the PTC by up to 500% (adjusted for inflation) and the ITC to a 30% credit value. *Id.* Separate bonuses can be earned for clean energy projects located in targeted energy communities and for those incorporating domestic content to increase the PTC to a value of 3.0 cents per kWh or an ITC credit value of 40%. *Id.*

58. Inflation Reduction Act § 13101(f) (to be codified at 26 U.S.C. § 45(b)(6)).

requiring positive tax revenue or tax-equity financing.[59] However, it does not fundamentally address the power of states and localities to block necessary infrastructure improvements.[60] Still in place are significant state legal barriers to siting and implementing renewable energy transmission infrastructure.[61]

C. The 2023 Debt Ceiling Opportunity

1. NEPA Review of Energy Infrastructure Before the New Debt Act

Power generation and transmission projects often trigger a pre-construction federal review that can require a great amount of time and resources prior to obtaining necessary siting, construction, and operating permits. Environmental review and environmental impact statements ("EISs") have been embedded in both federal and many state laws since the early 1970s.[62] Section 102(C) of the federal National Environmental Protection Act requires agencies to produce pre-construction environmental impact studies, evaluating the environmental impact and any adverse environmental effects of their actions where a "major [f]ederal action[] significantly affect[s] the quality of the human environment."[63]

This affects only a small number of federal actions: The Council on Environmental Quality estimated that approximately 95% of agency actions requiring possible environmental review escape such review based on categorical exclusions implemented by government agencies, while approximately 5% proceed only to much more abbreviated Environmental Assessments ("EAs"), leaving less than 1% of all reviewed projects that are required to undertake a full EIS.[64] Full EISs now typically number fewer than 200 filed each year by all federal

59. *Id.* § 13101 (to be codified at 26 U.S.C. § 48). In terms of additional structural financing provisions, there is a provision for the ITC not to reduce low-income housing tax credit basis, a 20% bonus ITC for renewable energy serving covered federal affordable housing programs, and a 10% bonus ITC for facilities in low-income communities for three years. *Id.* §§ 13102, 13103.

60. *See id.*; *see also Fact Sheet: Biden-Harris Administration Releases Permitting Action Plan to Accelerate and Deliver Infrastructure Projects on Time, on Task, and on Budget*, WHITE HOUSE (May 11, 2022), https://perma.cc/XT72-C4QU.

61. *See infra* Section V.C. (analyzing sustainable power sacrificed).

62. *See* National Environmental Policy Act of 1969, § 102(C), 42 U.S.C. § 4332(C).

63. *Id.*

64. U.S. GOV'T ACCOUNTABILITY OFF., GAO-14-370, NATIONAL ENVIRONMENTAL POLICY ACT: LITTLE INFORMATION EXISTS ON NEPA ANALYSES 8 (2014), https://www.gao.gov/assets/670/662546.pdf [hereinafter GAO] (implying that environmental impact assessments are rare contrary to general expectations).

government agencies.[65] Federal court cases challenging agency compliance with NEPA are filed on fewer than 100 of these decisions annually, with approximately half challenging the adequacy or completeness of the EIS that is prepared.[66] A 2023 news article concluded about NEPA compliance and litigation contesting it:

> Their weapon of choice is often the National Environmental Policy Act and its state equivalents, which require developers to issue environmental-impact statements prior to any large-scale project. These reports have become behemoths, averaging 1,600 pages and taking years to complete . . . . [P]resident [Obama]'s signature infrastructure and economic-recovery act would end up being bogged down in more than 192,705 NEPA reviews. Now President Joe Biden's signature legislation may suffer the same fate.[67]

In 2011, in the federal government's second attempt to construct a transmission line amid western and eastern state resistance, the Ninth Circuit ruled that the U.S. Department of Energy inadequately consulted on a congestion study as required by the Federal Power Act's section 216, and also failed to consider the environmental effects of NIETC designation[68] required by NEPA.[69] The Energy Policy Act of 2005 ("EPAct 2005") designates NIETCs[70] and FERC siting authority[71] as "major federal action," triggering NEPA's EIS and subsequent environmental

65. Letter from Robert H. Abrams et al., Law Professors, to Chairman Bishop et al., H. Comm. on Nat. Res. (Apr. 24, 2018), https://progressivereform.org/publications/law-professor-letter-house-nepa-hearing-042418/.

66. *Id.*

67. *See* Demsas, *supra* note 2.

68. *See* Grid Deployment Off., *National Interest Electric Transmission Corridor Designation Process*, U.S. DEPT. OF ENERGY, https://www.energy.gov/gdo/national-interest-electric-transmission-corridor-designation-process (Feb. 14, 2025) (explaining NIETC designation process).

69. Cal. Wilderness Coal. v. U.S. Dep't of Energy, 631 F.3d 1072, 1079 (9th Cir. 2011).

70. *Id.* at 1098, 1105 (finding DOE assertion insufficient to satisfy environmental impact statement requirements: "We cannot accept DOE's unsupported conclusion that its final agency action that covers ten States and over a 100 million acres does not, as a matter of law, have some environmental impact.").

71. *See* Piedmont Envt'l Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 317, 321 (4th Cir. 2009) ("Once FERC receives a permit application, it will be required under NEPA to assess the environmental effects of the project. The assessment will likely prompt the preparation of an EIS or an EA. Any deficiencies in project-specific environmental assessments may be challenged at the appropriate time.").

review statutes in most states,[72] as well as other required state energy commission transmission siting approvals.[73]

Cost and time for EIS completion are significant factors for sustainable power projects: A NEPA task force report "estimated that an EIS typically cost[s] from $250,000 to $2 million," whereas "an EA typically costs from $5,000 to $200,000."[74] From 2000–2012, the average preparation time for an EIS was 4.6 years, having increased on average at a rate of thirty-four days per year.[75] Litigation often alleges NEPA violations: For example, in 2022, a multi-state solar photovoltaic power developer legally challenged the first tranche of multiple separate offshore wind power projects in the Northeast on NEPA noncompliance grounds.[76]

2. Climate Amendments to the Debt Ceiling Legislation

To reconcile raising the United States debt ceiling, concessions were made to weaken the half-century-old NEPA, but again, without solving the state and local government transmission facility siting critical path issues. In the "reform" provisions in Title III of the Debt Ceiling reform legislation, to speed up the NEPA process, the law imposes a 1-year limit on Environmental Assessments; a 2-year EIS maximum time limit; a page limit of 150 pages, or 300 pages if extraordinarily complex, for EISs; a seventy-five page limit for EAs, and acceleration of court review.[77] The

72. 42 U.S.C. § 4332(C).

73. *See* Jonathan Brightbill et al., *What Infrastructure Act Means for Transmission Line Projects,* LAW360 (Jan. 13, 2022, 5:08 PM), https://www.law360.com/articles/1455049/what-infrastructure-actmeans-for-transmission-line-projects.

74. GAO, *supra* note 64, at 13–14.

75. Piet deWitt & Carole deWitt, *Preparation Times for Final EISs 2012*, *in* ANNUAL NEPA REPORT 2012 OF THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PRACTICE 11, 11, 13 (Judith Charles et al. eds., 2013), https://ceq.doe.gov/docs/get-involved/NAEP_2012_NEPA_Annual_Report.pdf (noting that the average completion time for an EIS was about 4.6 years in 2012). The average completion time for an EA issued by DOE was thirteen months. GAO, *supra* note 64, at 15.

76. First Amended Complaint for Declaratory and Injunctive Relief at 5, *Allco Renewable Energy Ltd. v. Haaland*, No. 1:21-cv-11171 (D. Mass. Feb. 23, 2022).

77. *See* Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, §321, 137 Stat. 10, 40 (2023) (codifying NEPA reforms); *see also* Lauren Bachtel, *Debt Ceiling Legislation Includes First NEPA Reform in Over 50 Years*, LINKLATERS (June 2, 2023), https://www.linklaters.com/en-us/knowledge/publications/alerts-newsletters-and-guides/2023/june/05/debt-ceiling-legislation-includes-first-nepa-reform-in-over-50-years (reporting on the Debt Ceiling Act imposing time and page limits and an enforcement mechanism); Jim Tankersley & Alan Rappeport, *New Details in Debt Limit Deal: Where $136 Billion in Cuts Will Come From*, N.Y. TIMES, https://www.nytimes.com/2023/05/29/us/politics/debt-ceiling-agreement.html (June 2, 2023) (reporting on the bill's environmental impact as both sides agreeing to "new measures to get energy projects approved more quickly").

debt ceiling legislation further provides the lead federal agency with additional methods to circumvent the EIS process.[78] Categorical exclusions, which can be adopted from other agencies, allow projects to bypass EIS mandates, thus eliminating the need for NEPA review. [79] This effectively reduces the scope of projects needing NEPA-based environmental evaluation.

The 2023 Debt Ceiling Act's modification to the "major federal action" definition strengthened requirements to trigger NEPA:[80] While court precedents had previously demanded ongoing control with the potential for mitigation, the law now requires substantial agency control and responsibility.[81] The amendments also exclude actions with minimal federal influence, wherein a federal agency lacks control over the project's result.[82] The Debt Ceiling Act narrows the range of environmental impacts that might prompt NEPA application, excluding "extraterritorial activities or decisions," essentially agency activities or decisions that exclusively affect areas beyond the United States' jurisdiction.[83] Amendments to the Debt Ceiling Act now allow project sponsors to prepare EAs and EISs with their choice of consultants, but the lead federal agency must still evaluate and take responsibility for the contents, potentially reducing objectivity in the NEPA process. [84]

Although the federal NEPA reforms within the Debt Ceiling Act diminish the comprehensiveness of all environmental NEPA reviews and broaden the range of excluded impacts and projects, the act fails to address the critical path for transmission siting. First, numerous states

78. *See* Ankur K. Tohan et al., *Debt Ceiling Legislation Serves as a Vehicle for Substantive Changes to NEPA,* K&L GATES HUB (June 5, 2023), https://www.klgates.com/Debt-Ceiling-Legislation-Serves-as-a-Vehicle-for-Substantive-Changes-to-NEPA-6-5-2023 ("The new legislation codifies an agency's ability to adopt categorical exclusions listed in another agency's NEPA procedures if that category of proposed agency action applies to the project at hand.").

79. *See* Bachtel, *supra* note 77 (discussing how the "legislation allows agencies to adopt a categorical exclusion listed in other agencies' NEPA procedures").

80. *See generally* STEVEN FERREY, *The National Environmental Policy Act*, *in* ENVIRONMENTAL LAW: EXAMPLES AND EXPLANATIONS 95 (9th ed. 2022) [hereinafter FERREY, ENVIRONMENTAL LAW].

81. Jay C. Johnson et al., *NEPA Amendments: Highlights and Practical Implications*, VENABLE (June 8, 2023), https://www.venable.com/insights/publications/2023/06/nepa-amendments-highlights-and-practical (explaining that "[t]he new definition appears narrower, as it turns on whether a project is subject to federal control, not whether it is potentially subject to such control" (emphasis removed)).

82. Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, §321, 137 Stat. 10, 46 (2023). *See generally* FERREY, ENVIRONMENTAL LAW, *supra* note 80, at 129–130.

83. 40 C.F.R. § 1508.1(w)(2)(vi) (2024) (defining exceptions to major Federal action or action).

84. 40 C.F.R. § 1506.5(b)(2) (informing Agency responsibility for environmental documents).

maintain their individual state environmental review procedures according to state regulations unaltered by amendments to federal laws.[85] There are several key state permits to obtain; state Environmental Impact Reports—distinct from federal EISs—to draft in many states; and key local permits to obtain.[86] States can withhold state environmental permits. Second, these federal NEPA modifications do not impact the constitutionally reserved state and local authority of the Tenth Amendment to govern land use, zoning matters, and eminent domain decisions over private and public land within their respective states.

D. The Key Law Change That Congress Would Not Adopt

There were sequential recurring opportunities in 2021, 2022, and 2023 to add more federally preemptive statutory substance to each of these three bills. In 2021, as an amendment to the IIJA to curtail existing state authority over transmission siting, amendments were offered by Senator Joseph Manchin (D.–W. Va.), although they were not accepted.[87] In a second effort, Senator Manchin, after passage of the 2021 IIJA, proposed a bill associated with the 2022 IRA but separately proceeding through budget reconciliation, to further strengthen section 216 of the Federal Power Act federal siting authority contained in the Infrastructure Act.[88] However, since this would also strengthen one-stop siting for infrastructure for any type of power, including fossil fuel power, some Democratic members opposed the Manchin amendment, which was not adopted.[89] Republicans anticipated a more expansive permitting package aimed at simplifying the process of building and developing energy projects.[90] Senator Manchin's efforts to amend the

85. *States and Local Jurisdictions with NEPA-like Environmental Planning Requirements*, NEPA.GOV https://ceq.doe.gov/laws-regulations/states.html (last visited Apr. 13, 2025) (noting the several jurisdictions that established state or local environmental review requirements since NEPA's passage in 1969).

86. *See* STEVEN FERREY, LAW OF INDEPENDENT POWER § 6:136 (61st ed. 2023).

87. Morehouse, *supra* note 48.

88. Richard L. Roberts et al., *Manchin Permitting Reform Legislation: Electric Transmission Implications,* STEPTOE (Sept. 28, 2022), https://www.steptoe.com/en/news-publications/manchin-permitting-reform-legislation-electric-transmission-implications.html [https://perma.cc/D5A3-G4B7] (describing the Section 216 Amendments). *See generally* Press Release, Senator Joe Manchin, Senate Passes Manchin's Bipartisan Infrastructure Bill (Aug. 10, 2021), https://perma.cc/3RDZ-A5EL (providing a summary of the bipartisan infrastructure bill section by section);

89. *See* Roberts et al., *supra* note 88 (providing an example of the bill's divisiveness, such as the Center for Biological Diversity opposing it).

90. Mary Clare Jalonick & Associated Press, *Challenges From the Right and Left Threaten to Derail the Debt Ceiling Deal No One Really Likes*, FORTUNE (May 29, 2023, 5:12

IRA in late 2022 to streamline transmission siting with federal authority also were rejected by Congress.[91]

Finally, in 2023, both Democrats and Republicans in Congress tinkered with NEPA without doing much to remedy the massive, unprecedented transmission queue congesting the building of necessary transmission infrastructure.[92] These amendments and those to the IIJA will not block any state from denying interstate transmission lines passing through its state, when so motivated by almost any rationale. The IRA provides unprecedented hundreds of billions of additional dollars.[93] However, money is not the critical path limitation for sustainable low-carbon power. The Debt Ceiling limit increase weakened NEPA environmental review, but environmental review also is not the critical path limitation.[94]

The potential critical path constraint is the U.S. Constitution and decades of Supreme Court interpretation of the separate state and local jurisdiction over the U.S. power system. The Tenth Amendment to the Constitution reserves to the states decisions about local land use for transmission and other purposes. The Federal Power Act vests control over electric power transmission infrastructure siting in the states, not in the federal government.[95] Supreme Court precedent upholds and

AM), https://fortune.com/2023/05/29/challenges-right-left-threaten-derail-debt-ceiling-deal-no-one-really-likes-biden-mccarthy/ ("Rep. Garret Graves, a McCarthy ally who was one of the negotiators, said the bill brings 'transformational changes into the permitting and environmental review process' for the first time in four decades.").

91. *See* Li Zhou, *The Democratic Infighting Over Joe Manchin's "Side Deal," Explained*, VOX (Sept. 13, 2022, 4:20 PM), https://www.vox.com/policy-and-politics/2022/9/13/23351561/joe-manchin-permitting-reforms-progressives-inflation-reduction-act ("The decision has prompted pushback from more than 70 House members, including many progressives, and Sen. Bernie Sanders (I-VT)."); *see also* Timothy Gardner, *U.S. Senator Manchin Unveils Energy Bill That Some Democrats Slam*, REUTERS (Sept. 21, 2022, 7:28 PM), https://www.reuters.com/business/energy/us-senator-manchin-releases-permitting-bill-speed-energy-projects-2022-09-21/ (reporting on Democrats' criticisms).

92. *See* U.S. DEP'T OF ENERGY OFF. OF POL'Y, QUEUED UP… BUT IN NEED OF TRANSMISSION 1 (2022), https://web.archive.org/web/20240307175151/https://www.energy.gov/sites/default/files/2022-04/Queued%20Up%E2%80%A6But%20in%20Need%20of%20Transmission.pdf ("[A] large amount of potential clean power capacity is struggling with the wait times and costs of connecting to the transmission grid, and the construction of new high-voltage transmission lines has declined over the last decade."); *see also* Herman K. Trabish, *Gridlock in Transmission Queues Spotlights Need for FERC Action on Planning*, UTIL. DIVE (July 19, 2021), https://www.utilitydive.com/news/gridlock-in-transmission-queues-spotlights-need-for-ferc-action-on-planning/603128/ ("Requests for wires to deliver clean energy are stacking up on wait lists for utilities and system operators, and may not be in place when needed to help meet U.S. policy goals.").

93. *See supra* note 33–37 (discussing the IRA and Bipartisan Infrastructure Act funding).

94. *See infra* Part V (moving power outside of the box).

95. *See* 16 U.S.C. § 824.

reinforces such separations. The Court's recent decision interpreting local zoning laws, *Murr v. Wisconsin*, deferred to local judgment on enforcing and interpreting the regulation of new construction on land.[96]

The Supreme Court historically holds that states retain "traditional and primary power over land and water use."[97] The exercise of jurisdiction over land use in the American legal system is primarily carried out at the local level, rather than by federal or state entities.[98] The judiciary commonly grants local land-use regulation broad deference, only overturning it when there is no rational purpose to support local ordinance enactment.[99] Local boards' decisions on land-use matters are respected because legal precedent maintains that "[a] local board of appeals brings to the matter an intimate understanding of the immediate circumstances, of local conditions, and of the background and purposes of the entire by-law."[100]

III. HOW THREE YEARS OF NEW "SUSTAINABILITY" LEGISLATION OPERATES IN REAL TIME *COUNTERINTUITIVELY* TO WARM CLIMATE

The forecasting and modeling team on whom the Biden Administration relied to convince Congress to enact the multiple pieces of sequential 2021–2023 legislation showcased above, more recently changed its forecast to take account of the transmission siting omission in this legislation.[101] That team from Princeton now forecasts this omission will frustrate more than 80% of the climate mitigation

96. 582 U.S. 383, 397, 401 (2017).

97. Solid Waste Agency v. U.S. Army Corps of Eng'rs, 531 U.S. 159, 174 (2001) (noting that "the States' traditional and primary power over land and water use" raises "federalism questions").

98. John R. Nolon, *Historical Overview of the American Land Use System: A Diagnostic Approach to Evaluating Governmental Land Use Control*, 23 PACE ENV'T L. REV. 821, 821–22 (2006)*; see also* Ecogen, LLC v. Town of Italy, 438 F. Supp. 2d 149, 157 (W.D.N.Y. 2006) (quoting Greene v. Town of Blooming Grove, 879 F.2d 1061, 1063 (2d Cir. 1989).

99. *See, e.g.*, *Ecogen*, 438 F. Supp. 2d at 156–57 ("In order to prevail on its substantive due process claim, Ecogen must establish that the Moratorium, at least insofar as it prohibits Ecogen's construction of a substation, bears no rational relationship to any legitimate governmental purpose." (citing Richardson v. Twp. Of Brady, 218 F.3d 508, 513 (6th Cir. 2000))).

100. Fitzsimonds v. Bd. of Appeals of Chatham, 484 N.E.2d 113, 116 (Mass. App. Ct. 1985); *see also* Manning v. Bos. Redevelopment Auth., 509 N.E.2d 1173, 1179 (Mass. 1987) (granting "substantial deference" to local administrative agency's interpretation of local zoning law); Village of Euclid v. Ambler Realty Co., 272 U.S. 365, 397 (1926).

101. *See* Patterson, *supra* note 2.

promised.[102] The Wall Street Journal noted the attempt by the White House to distance the Princeton model's latest conclusions:

> When Jenkins's team determined that the Inflation Reduction Act would be a failure unless huge changes were made to the electric grid, John Podesta, the White House's clean energy adviser, called him out by name. "Jesse Jenkins at Princeton, I think maybe a little overstated, said we'll get 20% of the benefits of the IRA if we can't fix particularly this transmission problem," Podesta said in May during a talk at the Bipartisan Policy Center in Washington, D.C. A spokesman for the White House declined to comment.[103]

In fact, rather than just not decreasing climate warming as rapidly, the legislation is now forecast to dramatically increase U.S.-caused climate warming in the next decade.[104] All of this results from the omission in all three pieces of legislation of an effective transmission-siting legal mechanism to keep pace.[105] More than doubling the historical pace of electricity transmission expansion over the last decade is now required in order to interconnect new renewable resources at a sufficient pace to supplant fossil-fuel-fired electric power for electric vehicles, heat pumps, and other electrification. The Princeton University REPEAT team subsequently warned about the IRA's shortcomings:

> Failing to accelerate transmission expansion beyond the recent historical pace (~1%/year) increases 2030 U.S. greenhouse emissions by ~800 million tons per year, relative to estimated reductions in an unconstrained IRA case. . . . Over 80% of the potential emissions reductions delivered by IRA in 2030 are lost if transmission expansion is constrained to 1%/year, and roughly 25% are lost if growth is limited to 1.5%/year. . . . If electricity transmission cannot be expanded fast enough, power sector emissions and associated pollution and public health impacts could increase significantly as gas and coal-fired power plants produce more to meet growing demand from electric vehicles and other electrification spurred by IRA.[106]

102. *See id.*
103. *Id.*
104. *See* discussion *infra* Section V.C.
105. *See supra* Sections II.A–B.
106. JENKINS ET AL., *supra* note 1, at 4.

Translating this to comprehensible metrics: How much is an extra 800 million tons per year of U.S. power sector CO_2 emissions under the current likely transmission build-out rate? A lot. As shown in the Princeton University forecast, new U.S. transmission infrastructure is needed during the key next decade predominantly to serve new solar and wind electric power generation.[107] Gaps in the laws enacted between 2021 and 2023 to facilitate that new transmission infrastructure will substantially limit additional wind and solar power, thus causing by default greater CO_2 emissions from the remaining fleet of existing coal- and natural gas-fired power plants continuing to operate rather than close in order to supply power for rapidly increasing electrification.[108]

Critical to understand is how this asynchrony between rapid electrification and stalled infrastructure necessary to shift to renewable zero-carbon electric power will telescope as electric demand increases rapidly for building heating and space conditioning, for industry, and for vehicle transport. As illustrated in the Princeton REPEAT's study's graphs and figures, breaking down which existing plants will run to bridge this electric supply gap caused by additional electric demand reveals that an additional 110–250 million tons per year (tpy) of carbon-emitting coal will be burned because of the IRA even if transmission expansion continues at slower recent rates.[109]

Correspondingly, because of this unprecedented electrification, natural gas use will increase by 4% rather than decrease, and will remain elevated for more than the next decade even if transmission expansion continues at recent rates.[110]

The Princeton University REPEAT group also graphed various levels of constraint on expansion of the U.S. transmission system, and how each approximately half-of-one-percent decrease in annual electric transmission capacity expansion substantially limits additional reductions of U.S. greenhouse gas ("GHG") emissions.[111]

What is sacrificed compared to what was pledged? The Biden Administration forecast that the U.S. power sector needs to and will shoulder two-thirds of all reduction of U.S. CO_2 climate-warming emissions in the next decade.[112] The Princeton University REPEAT group modelling suggests that rather than reducing power sector climate

107. *See id.* at 9 (displaying figure showing "Annual Average Capacity Additions").

108. *See id.*

109. *See id.* at 10 (displaying figure showing "U.S. Coal Consumption").

110. *Id.* at 11 (displaying figures showing "Change in U.S. Natural Gas Consumption vs 2021").

111. *Id.* at 7 (displaying figure showing "Impact of Transmission Expansion Constraints on Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)").

112. *See* U.S. DEP'T OF ENERGY, *supra* note 29, at 2–3.

emissions, the 2021–2023 climate legislation will increase GHG emissions in the next decade.[113] The modelling illustrates the direct correlation between accelerated transmission build-out and the extent to which solar and wind power will increase in use in the United States over the next decade.[114] It further shows the reduced amount of renewable wind and solar power that will not be effectively implemented at current transmission infrastructure siting rates.[115]

Correspondingly, the Princeton REPEAT modelling shows that power sector CO_2 emissions will be greater each year during the critical 2025–2035 period of climate warming with the IRA enacted than if the IRA had not been enacted and business-as-usual continued.[116] The quantitative shortfall modelled by the Princeton University REPEAT team after enactment of the IRA shows that more than 80% of the pledges made by proponents supporting the IRA will not be realized in fact.[117]

IV. LEGAL MECHANISMS TO TRANSMIT NEW RENEWABLE POWER

The critical path omission and enduring impediment in the IIJA and the IRA is the lack of rapid acceleration for legal siting of new transmission infrastructure to connect new generation, including solar, wind, and hydropower, to consumers. In this void, there are several states' lessons to site transmission infrastructure successfully and not successfully playing out in the key eastern half of the United States, examined below.

A. North Atlantic & New York

1. Clean Path

New York's Clean Path Project represents one of the country's largest renewable energy projects as it combines clean-energy generation, energy storage, and innovative transmission.[118] The public-private

113. *See* JENKINS ET AL., *supra* note 1, at 12 (providing figure showing "Power Sector Annual CO_2 Emissions").

114. *Id.* at 13 (presenting figure showing "Electricity Generation").

115. *Id.*

116. *Id.* at 12 (displaying figure showing "Power Sector Annual CO_2 Emissions").

117. *Id.* at 8
(presenting figure showing "Annual Change in Net U.S. Greenhouse Gas Emissions Relative to No IRA Bipartisan Infrastructure Law Only").

118. Amy Varghese, *Clean Path NY: Toward a More Sustainable Future*, RIVER REPORTER (Apr. 19, 2023, 12:58 PM), https://riverreporter.com/stories/clean-path-ny-toward-a-more-sustainable-future,93733 (describing Clean Path NY as "one of the largest renewable energy projects in the country—combining clean-energy generation, energy

partnership between the New York Power Authority ("NYPA"), energyRe, and Invenergy as part of implementing New York's Climate Leadership and Community Protection Act ("CLCPA"), aims to decarbonize New York's grid, fortifying it for the future.[119] The project, which as of April 2023 was moving through the New York Public Service Commission's approval process, entails a 175-mile underground transmission line costing $11 billion that will transmit 1,300 megawatts of wind and solar from a northern New York county south to New York City, amounting to 7.5–7.9 million megawatt hours of renewable energy annually.[120] Moreover, the Clean Path Project plans to deliver such renewable energy generation using existing underground rights-of-way, starting in 2027.[121] The project, as a result, would reduce New York's fossil fuel-fired electric generation by 20–22% per year on average.[122]

The Clean Path Project prioritized meaningful ongoing community engagement, engaging with local voices from stakeholders and communities throughout every project stage.[123] Civil society groups across New York broadly supported the project as planners worked with communities to develop workforce development initiatives, especially in distressed communities.[124] The project would create 8,300 new jobs, $4.7

storage and state-of-the art transmission to comprehensively decarbonize and fortify New York's electric grid for the future").

119. *Id.* (reporting "Clean Path NY is a core example of how private- and public-sector investments can come together to tackle the most complex and pressing issues of our time").

120. *Id.* (providing the project status and details); Zoya Teirstein, *A New York Power Line Divided Environmentalists. Here's What it Says about the Larger Climate Fight*, GRIST (May 11, 2022), https://grist.org/energy/a-new-york-power-line-divided-environmentalists-heres-what-it-says-about-the-larger-climate-fight/ (describing Clean Path Project).

121. Varghese, *supra* note 118 (describing the Clean Path Project work with communities, renewable energy generation, and use of existing rights-of-ways); Teirstein, *supra* note 120.

122. Varghese, *supra* note 118 (describing that "[u]pon completion, Clean Path will deliver 7.9 [million] megawatt-hours of emissions-free energy annually and reduce fossil fuel-fired electric generation from New York's electric sector by 20 to 22 percent per year on average").

123. *Id.* (describing that "meaningful ongoing community engagement is core to Clean Path NY's ethos and development").

124. Teirstein, *supra* note 120 (noting that the Clean Path Project "has broad support from civil society groups across the state"); *see also* Varghese, *supra* note 118 (noting the project works with communities, includes renewable energy generation, delivering it underground through existing rights-of-way, and also workforce development initiatives). "The project includes an economic and environmental justice element in that 40 percent of the community benefits must be spent in distressed communities identified in the 2020 census." *Id.*

billion in in-state economic development, and a planned $270 million community investment fund.[125]

This project was successful compared to others described below, because of several factors. It was sited underground, avoiding visual impact. Second, it utilized existing rights-of-way, which avoids additional *de novo* geographic environmental impact. Third, this new transmission line was not used to transmit power for another state; it served New York City. Fourth, longer-term, it could move power in both directions in an effort to further decarbonize the New York state economy. The line could also bring electricity from the *de minimis* New York coastline to upstate, as offshore wind projects get developed and their power can reinforce power supply throughout the state. Fifth, it uses one-quarter billion dollars of funds redirected as assistance to benefit less affluent communities.

2. Champlain Hudson Power Express

The Champlain Hudson Power Express ("CHPE") funnels a bountiful amount of clean energy from Hydro-Québec dams in Canada into New York City through a 339-mile transmission line buried under the Hudson River.[126] Starting in 2025, the project will transmit 1,250 megawatts of Canada's clean power to New York City.[127] It is planned to traverse on the New York side of Lake Champlain (the border between upstate New York and Vermont) to eventually arrive at the very small amount of the

125. Varghese, *supra* note 118 ("Clean Path NY will catalyze $4.7 billion in in-state economic development, create 8,300 well-paying, in-state jobs, save New Yorkers up to $9.9 billion in avoided system costs, and create opportunities for local supply chains to support the fast-growing green economy.").

> The project will also create a $270 million Community Investment Fund dedicated to advancing workforce and economic pathways into the green economy. It will expand access to public health and deliver solutions in energy efficiency, electrification retrofits, decarbonization and conservation with a focus on disadvantaged and lower-income communities across the state.

Id.

126. Teirstein, *supra* note 120 (explaining the project "will funnel clean energy into the city via a transmission line, part of which will be buried under the Hudson River"). "To meet its climate goals, the city has approved the construction of a 339-mile power cable carrying that excess hydropower from Québec all the way to Queens." *Id.*

127. *Id.* (discussing CHPE's benefits).

> New York City will get 1,250 megawatts of clean power from Canada starting in 2025. That electricity, plus the power from the Clean Path line, are expected to supply more than a third of the city's annual electricity consumption. The hydro will also do what wind and solar generated in the state can't: provide a source of reliable power that keeps energy flowing into the city when the sun isn't shining, and the wind isn't blowing.

Id.

New York continental coastline bordering Manhattan Island and Long Island of New York City, as shown in Figure 1. It is expected to supply 20% of New York City's demand with Canadian renewable power.[128] This $6 billion project began construction at the end of 2022 and is planned to be completed and operational in 2026.[129]

New York will receive approximately $1.4 billion in new tax revenue over the first 25 years of the project, benefiting 73 municipalities and 59 school districts;[130] 34 of these municipalities passed resolutions of support for the project.[131] In addition to helping all of the communities through which it passes en route to New York City with tax benefits, it will also reduce pollution by displacing in-state fossil-fuel-fired power generation facilities' emissions.[132] For New York City as the recipient power destination, this project has multiple benefits:

- It increases the use of renewable energy.
- New York was previously blocked by several states to its west, which refused to site new transmission infrastructure to serve New York.[133]
- Buried infrastructure will make New York's aging energy grid safer and more reliable.[134]

There is something for every community touched by this project, which was selected by the New York State Energy Research and Development Agency ("NYSERDA") through a competitive Request for Proposals ("RFP") process to transport Canadian renewable energy hundreds of miles directly into the most southern extent of New York

128. Miranda Willson, *How a $6B Transmission Project Made it in New York*, E&E NEWS BY POLITICO (Mar. 1, 2023, 6:55 AM), https://www.eenews.net/articles/how-a-6b-transmission-project-made-it-in-new-york/.

129. *Id.*

130. Press Release, Champlain Hudson Power Express, Champlain Hudson Power Express Approved by New York State Public Service (Apr. 14, 2022), https://chpexpress.com/news/champlain-hudson-power-express-approved-by-new-york-state-public-service-commission/.

131. N.Y. STATE ENERGY RSCH. & DEVELOPMENT AGENCY, PROPOSAL NARRATIVE: CHAMPLAIN HUDSON POWER EXPRESS PROJECT, RESPONSE TO REQUEST FOR PROPOSALS 1-5 (2021), https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Clean-Energy-Standard/Tier4-Step-2-Bid-Submission-Response/Champlain-Hudson-Power-Express.pdf [hereinafter NYSERDA].

132. *Id.* at 12-7.

133. *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304 (4th Cir. 2009).

134. NYSERDA, *supra* note 131, at 12-9.

City.[135] Prior to the April 2023 vote approving the project, opponents from environmental and community groups denounced the project as "outsourc[ing] clean energy and jobs to a different country."[136] Other arguments included Indigenous groups' concerns about the dam's environmental harms on Indigenous communities and environmentalists' concerns that hydropower is not as clean as its proponents claim.[137] Through the April 2023 vote, New York regulators helped the CHPE pass the last hurdle[138] and, although not required for CHPE's permits, a pair of studies designed by Hudson River communities also provided assurances that CHPE construction would not harm drinking water.[139]

135. *See* Press Release, Champlain Hudson Power Express, *supra* note 130 (explaining that New York State Public Service Commission's (PSC) 2022 approval of CHPE "follows a year-long process that included a Request for Proposals (RFP) and selection process by NYSERDA followed by an extensive PSC review process and public comment period, during which close to 4,000 statements were filed in support of CHPE—including from advocates across organized labor groups, environmental organizations, higher education institutions, major business and real estate companies, and more"). Transmission Developers CEO Donald Jessome states that the "vote is a win for New York and moves forward a project that will create thousands of in-state jobs, reduce harmful pollutants, and invest nearly $189 million in protecting our environment, our neighborhoods, and our planet—all while delivering renewable, reliable, power." *Id.*

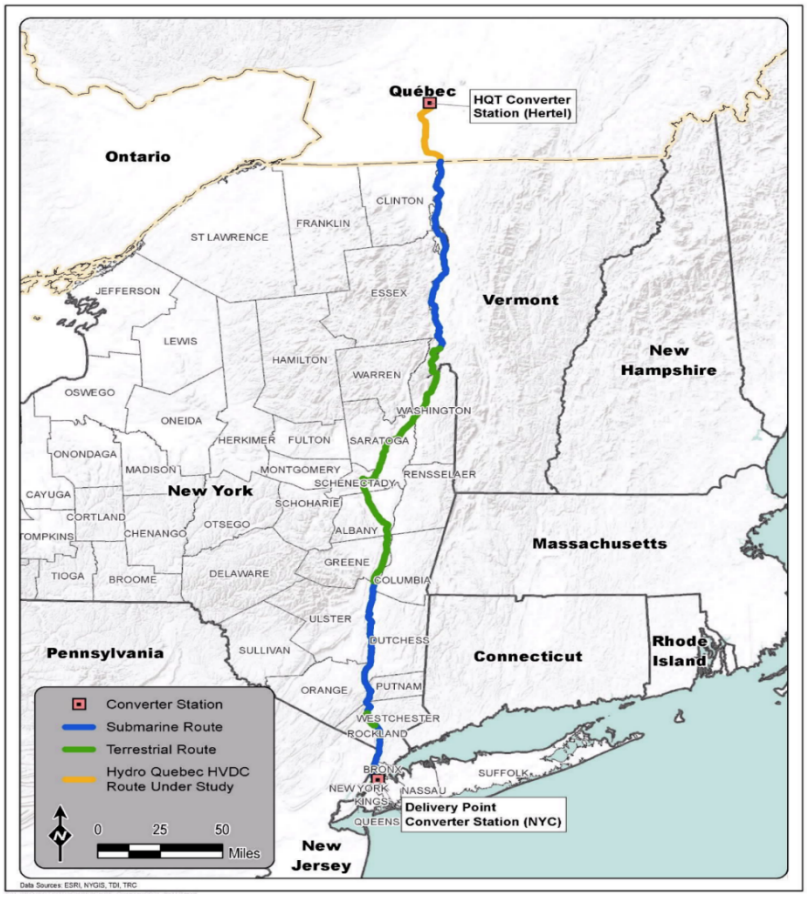
136. *See* Teirstein, *supra* note 120.

137. *See id.*

138. *See id.* ("Those groups did not succeed in stopping CHPE. The April vote by New York regulators was the last hurdle standing in its way.").

139. Lissa Harris, *Studies: Champlain Hudson Construction Won't Affect Drinking Water*, TIMES UNION, https://www.timesunion. com/hudsonvalley/news/article/chpe-construction-hudson-drinking-water-test-18078489.php [https://perma.cc/B9D9-DXCM] (May 4, 2023, 11:51 AM) ("Both the Hudson 7 and Transmission Developers agree that the work would never have happened if the municipalities hadn't organized. The studies were not required by CHPE's permits, which come from the state Public Service Commission as well as the U.S. Army Corps of Engineers and the Department of Energy."). Sean Murphy, a consulting manager, said, "It was a hard process to do these two studies. But I think they remove a lot of the uncertainty[.] . . . Hopefully, the plant operators can take some comfort from seeing the studies." *Id.*

Figure 1[140]



CHPE ultimately moves forward as a rare fifteen-year "success story in a country where major transmission lines have often stalled."[141] This line supplies one-third of New York City's power with under-appreciated

140. NYSERDA, *supra* note 131, at 5-3 (depicting figure).

141. Willson, *supra* note 128 ("Fifteen years later, the Champlain Hudson Power Express (CHPE) is on the way to completion—making it a rare success story in a country where major transmission lines have often stalled."); *see also Hydro-Québec's $6 Billion New York Line on Track for 2026 Start*, BLOOMBERGNEF (Apr. 20, 2023), https://about.bnef.com/blog/hydro-quebecs-6-billion-new-york-line-on-track-for-2026-start/ ("There aren't many projects moving forward. CHPE is a success, but it took 15 years to get all the approvals. It should not take this long. It is also a wake-up call. Maybe we ought to change the way we do things, because a lot more of these will need to be built.").

baseload power from the north to supplement all of the New York upstate intermittent wind, as well as planned offshore wind energy in the Atlantic Ocean off the coast of New York.[142] Because the transmission line is run entirely through New York state, there is no intermediating U.S. state that could potentially block this transmission line. This line occurs at a time when the federal government has provided substantial recent legislative funding for sustainable power and the transmission infrastructure to move it where needed, as discussed above.

B. New England

New England, as much or more of any of the Independent System Operators ("ISO") shown below in Figure 6, plans in the next twenty-five years to approximately double its use of renewable "clean" power while eliminating all fossil fuels other than some existing natural gas facilities.[143] The new power addition challenge is more demanding and intensified because of the significant number of retirements of existing New England power generation supply occurring in the ISO region.[144]

Some of the grants emanating at the federal level from the IIJA are also not benefiting New England. The Infrastructure Investment and Jobs Act of 2021 sets in motion $50 billion for projects in competitively selected geographic hubs for the creation and distribution of renewable hydrogen fuels in the United States.[145] Even with requirements for geographic diversity in grant awards and applications from New England, New England applications did not benefit from any awarded grants.[146]

1. New England Clean Power Link

Following the 2021 IIJA's support for energy grid infrastructure innovations, Connecticut, Maine, Massachusetts, New Hampshire,

142. NYSERDA, *supra* note 131, at 1-9.

> There's no way to get green power from the cleaner grid in upstate New York down to the city efficiently. Three natural gas-fired power plants came online between 2019 and 2021 to help New York City make up the slack as Indian Point's [nuclear] reactors wound down. But regulators hoped they would be a short-term fix.

Teirstein, *supra* note 120.

143. *See* U.S. DEP'T OF ENERGY, *supra* note 29.

144. *See ISO New England Status of Non-Price Retirement Requests, Retirement De-list Bids and Substitution Auction Demand Bids*, ISO NEW ENG., https://www.iso-ne.com/markets-operations/markets/forward-capacity-market (Feb. 28, 2024).

145. *See* Alan Krupnick et al., *A First Look at the Hydrogen Hubs Decisions*, RESOURCES (Oct. 19, 2023), https://www.resources.org/common-resources/a-first-look-at-the-hydrogen-hubs-decisions/.

146. *See id.*

Rhode Island, and Vermont—the six New England states—jointly took part in the recently launched New England States Regional Transmission Initiative.[147] The states pursue a regional approach to seek new grid infrastructure investment and federal support, such as from the U.S. Department of Energy ("DOE") and through the 2022 IRA, to advance innovation without imposing costs that over-burden electricity customers.[148] As New England faces unique winter energy patterns in a region situated at the endpoint of an over-stressed U.S. natural gas pipeline system within the continental United States, a multi-state approach optimizes transmission infrastructure investments, provides cost savings, and increases winter reliability.[149]

The coalition of New England states works together to chase federal funding for multi-state electricity transmission infrastructure, seeking federal funding from the IIJA as well as the pool of $250 million from the Energy Department.[150] Specifically, the states seek transmission investment that "reduce[s] the region's reliance on imported fossil fuels in winter months[,] help[s] insulate electricity customers from the wild swings in the fossil fuel markets currently leading to high electricity prices throughout New England," and "take[s] advantage of diverse energy sources."[151] As part of the initiative, Vermont's Department of

147. *See* Press Release, Conn. Dep't of Energy & Env't Prot., Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont Working Together on Multi-State Transmission Infrastructure (Jan. 25, 2023), https://portal.ct.gov/DEEP/News-Releases/News-Releases---2023/CT-ME-MA-NH-RI-and-VT-Working-Together-on-Multi-State-Transmission-Infrastructure [https://perma.cc/39TP-XYY3] (reporting on the coalition of New England states' efforts to encourage transmission infrastructure investment).

148. *See id.* (discussing how investment in grid infrastructure "will be crucial to advance innovative and collaborative projects without shifting costs or over-burdening electricity customers" in order to achieve the New England states' energy policy requirements and goals). "DOE anticipates awarding up to $2 billion in total in its first funding cycle, with additional funding available in subsequent rounds." *Id.*; *see also* Nathanael Greene & Jacqueline Ennis, *Now We All Have to Be Wind, Solar, and Transmission Builders*, NRDC (Dec. 26, 2022), https://www.nrdc.org/bio/nathanael-greene/now-we-all-have-be-wind-solar-and-transmission-builders (arguing that "clean energy advocates need to shift from working to make renewables and transmission cheaper to working to make them easier to build").

149. Brent Addleman, *New England States Chasing Federal Funding for Electricity Transmission Line,* CTR. SQUARE (Jan. 25, 2023), https://www.thecentersquare.com/connecticut/article_d7fe56c8-9cf1-11ed-86c9-83f9451f19b1.html ("By utilizing a regional approach . . . transmission infrastructure investments will be optimized and allow for cost savings and more winter reliability for residents and businesses.").

150. *Id.* (noting the "potential for more than 14 gigawatts of offshore wind in federal waters off New England ").

151. Press Release, Conn. Dep't of Energy & Env't Prot., *supra* note 147 (listing states' interest in transmission investments). In fact, New England's electricity prices are some of the highest in the continental United States. *See* Greg Cunningham, *Why Are New*

Public Service received support from other New England states to request DOE funding for the New England Clean Power Link.[152]

Shown in Figure 2, this will be a 1,000 Mw (fully permitted with an interconnection agreement) buried HVDC transmission project which starts at the Canadian border and proceeds 154 miles to connects to ISO-NE system Coolidge substation in Ludlow, Vermont, with the first two-thirds of its distance buried in Lake Champlain's lake bottom, and the final one-third buried along road rights-of-way that are owned by the state.[153] This will even better connect New England with Canadian hydropower imports throughout the region, and subsequently enable New England capably to "export offshore wind power to Canada in periods of high production."[154] Vermont receives about a quarter of its electricity from Hydro-Québec and stands to gain roughly $7.5 million annually for the next forty years from the power line to dedicate to Lake Champlain cleanup efforts.[155]

England's Electricity Prices Increasing This Winter?, CONSERVATION L. FOUND. (Jan. 5, 2023), https://www.clf.org/blog/why-new-england-electricity-prices-are-increasing/ (emphasizing that fossil fuels make New England's electricity expensive); *see also* Miriam Wasser & Mara Hoplamazian, *Why Electricity Prices Are Rising Unevenly Across New England*, WBUR (Sept. 8, 2022), https://www.wbur.org/news/2022/09/08/new-england-electricity-prices-natual-gas-utility-auctions ("Natural gas accounts for about 38% of the country's electricity, though here in New England, it's more like 53%. And the price of our main source of energy is anything but stable."); Sharon Udasin, *New England Grapples with Sky-high Electricity Rates as Ukraine War Squeezes Gas Supply*, HILL (Jan. 8, 2023, 4:27 PM), https://thehill.com/policy/equilibrium-sustainability/3802915-new-england-grapples-with-sky-high-electricity-rates-as-ukraine-war-squeezes-gas-supply/ (noting that "New Englanders are contending with some of the highest electricity rates in the country . . .").

152. Press Release, Conn. Dep't of Energy & Env't Prot., *supra* note 147 (discussing New England states' support for Vermont's New England Clean Power Link).

153. Don Jessome, CEO Transmission Developers, Presentation at Raab Associates, Ltd.: New England Electricity Restructuring Roundtable (June 9, 2023), http://www.raabassociates.org/main/roundtable.asp?sel=168.

154. *See* Press Release, Conn. Dep't of Energy & Env't Prot., *supra* note 147 (reporting on Clean Power Link); *see also* Mara Hoplamazian, *Sununu Announces Support for Proposed Transmission Lines for Canadian Hydropower*, N.H. PUB. RADIO (May 3, 2023, 6:09 PM), https://www.nhpr.org/nh-news/2023-05-03/gov-sununu-announces-support-for-proposed-transmission-lines-for-canadian-hydropower (noting that New England Clean Power Link applied for the DOE's Transmission Facilitation Program). "If the project is chosen by the Department of Energy, it will need to get permits from state and federal regulators to move forward. National Grid said 2026 is the earliest construction could start." *Id. See also id.* (reporting that "Hydro-Quebec is now facing the possibility of power shortfalls," such that "[t]he power producer may need to fix up power plants, build wind farms, and consider building new dams and transmission lines").

155. Sarah Mearhoff, *Final Reading: Phil Scott Says New England Power Project 'Has Legs Again,'* VTDIGGER (Feb. 14, 2023, 8:09 PM), https://vtdigger.org/2023/02/14/final-reading-phil-scott-says-new-england-power-project-has-legs-again/; *see also* Hoplamazian, *supra* note 154 (reporting on Vermont's connection to the Twin States project).

Figure 2[156]

Here again, the host communities can still charge and collect taxes and lease charges even where the line resides buried and cannot be seen. Vermont will earn $930 million in tax and lease revenue over forty years, and Vermont ratepayers will benefit from $136 million in less expensive Canadian hydropower electricity costs over forty years.[157] The project proponents will also make (from transmission charges assessed to all New England ratepayers) a $202 million contribution to Vermont's Clean Water Fund, plus $61 million to support habitat restoration and

156. *See* US DEP'T OF ENERGY, DOE/EIS-0503, FINAL NEW ENGLAND CLEAN POWER LINK PROJECT ENVIRONMENTAL IMPACT STATEMENT APPENDIX M COMMENT RESPONSE DOCUMENT (2015), https://web.archive.org/web/20240407020815/https://www.energy.gov/sites/prod/files/2015/10/f27/Final%20NECPL%20EIS%20Appendix%20M%20CRD%202015-10-26.pdf.

157. *See About the Project*, NEW ENGLAND CLEAN POWER LINK: PROJECT DEVELOPMENT PORTAL, http://www.necplink.com/about.php (last visited Apr. 13, 2025).

recreation improvements in Lake Champlain, plus a $109 million contribution to Vermont's Clean Energy Development Fund.[158]

Such a proposal exemplifies the states' collaborative focus on incentivizing offshore wind development and hydroelectricity importation, as "the cooperative effort seeks to: encourage the economic and environmental benefits" of renewables; "facilitate a regional and balanced approach to transmission that has the opportunity to lower costs to electric customers"; "harden the grid to improve reliability"; and "alleviate the concern that traditional offshore 'point-to-point' interconnections to land would 'use up' the available onshore transmission infrastructure."[159] Government officials across Massachusetts, Connecticut, and Rhode Island expressed their support for New England states' collaboration on transmission development, describing the ability to pool resources to jointly pursue transmission investments as an innovative, transparent, modern, and cost-effective way to progress climate goals.[160] Thus, the approach of having cross-state collaboration not only optimizes transmission infrastructure investments but also provides the additional benefit of winter reliability through access to greater amounts of baseload renewable hydropower for residents and businesses across New England.[161] However, grid

158. *Id.*

159. *See* Press Release, Conn. Dep't of Energy & Env't Prot., *supra* note 147 (discussing cooperative effort's goals).

160. *See id.* (quoting government official's support for collaborative transmission development). Commissioner Katie Dykes of the Connecticut Department of Energy and Environmental Protection said, "New England is pioneering the innovative partnerships, technologies, and approaches the nation needs to modernize the transmission system, unlock clean energy, and ensure price stability and affordability by providing reliable clean electricity in the face of fossil fuel-driven price spikes and climate disruption." *Id.* Massachusetts Department of Energy Resources Commissioner Patrick Woodcock said:

> The Healey-Driscoll Administration looks forward to building a more transparent, modern, and cost-effective electric transmission system with its New England partners to enable the state and region to meet its ambitious climate and clean energy goals and improve electric reliability[.]. . . Given the recent volatility in oil and natural gas pricing, it is imperative that we transition to a regional electricity system that can support the delivery of both affordable and reliable clean energy to residents and businesses, and we appreciate the collaboration of all the New England states as we continue to work together.

Id. Rhode Island Acting State Energy Commissioner Christopher Kearns stated that:

> Rhode Island is proud to be part of this collaboration with the other New England States, to take part in this opportunity to pool our resources, work together and jointly pursue transmission investments[.] . . . This will help our regional New England grid make the transition to clean energy, reduce our collective carbon emissions significantly, and deliver a major victory in our fight against climate change.

Id.

161. *See id.* (presenting benefits of pursuing a regional approach).

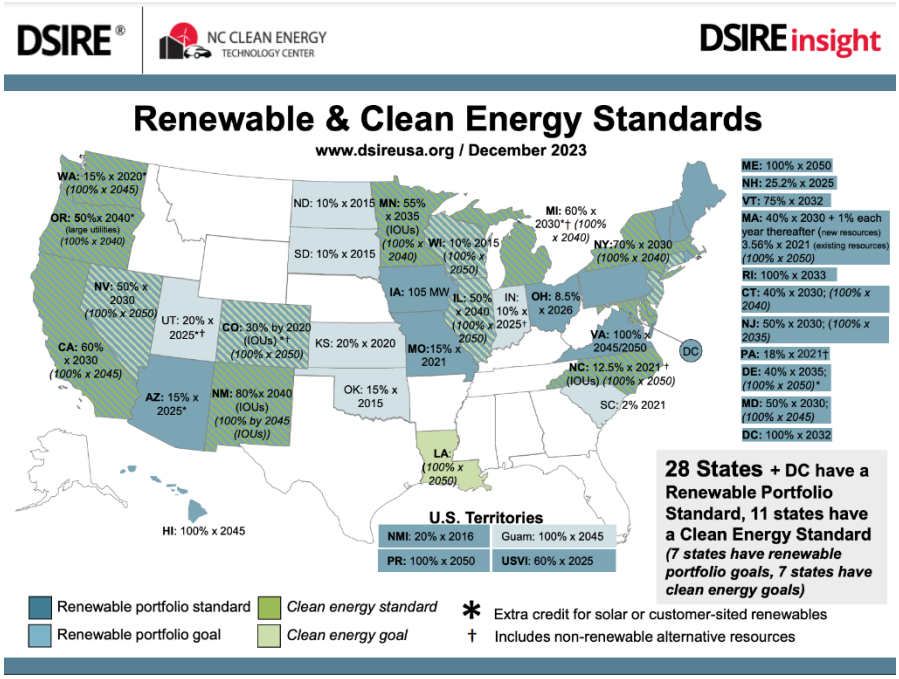
investments require federal support in order to achieve energy policy mandates advancing clean electricity standards without passing costs onto constituents.[162]

New York and four of the six New England states (excluding Vermont and New Hampshire) are among the minority of U.S. states that have goals to achieve 100% clean energy in the next few decades, as shown in Figure 3.[163] Some of these states have set this target achievement date to occur in less than a decade.

162. *See* Addleman*, supra* note 149. The coalition also coordinates with ISO New England in efforts to "spur economic and environmental benefits of offshore wind, facilitate a regional and balanced approach to power transmission in an effort to lower electricity costs, and harden reliability in the power grid." *Id.*; *see also* Abigail Dillen, *A Roadmap for the Clean Energy Future We Need,* EARTHJUSTICE (Dec. 22, 2022), https://earthjustice.org/experts/abigail-dillen/a-roadmap-for-the-clean-energy-future-we-need ("There is no question that we need more transmission to meet our climate goals, and that new policies and practices are required to support this buildout.").

163. *See* Amanda Levin & Sam Krasnow, *Putting 100% Clean Power Within Reach: A Post-IRA Pathway*, NRDC (Jan. 23, 2023), https://www.nrdc.org/bio/amanda-levin/putting-100-clean-power-within-reach-post-ira-pathway (explaining that "more states will need to advance clean electricity standards and goals in line with the national targets of 80 percent clean by 2030 and 100 percent clean power by 2035").

Figure 3. Target Year for States that Have Set 100% Clean Electricity Standards or Goals[164]



Of note, this prospective effort is in contrast to the prior transmission efforts to serve southern New England states via transmission lines built through the Northern New England states bringing renewable hydropower from Canada. All of the New England states collectively control their wholesale power and transmission assets through the six-state ISO-NE.[165] Moreover, the six New England states are more similar than any other block of states (e.g., states in MISO, SWPA, SEPA, PJM). The three northern New England states do not have much or any designation for supply from offshore wind power initially transmitted to landfall within their states, as do the three southern New England states, shown in Figure 7 of the Department of Interior Bureau of Ocean Energy

164. *See Renewable Portfolio Standards and Clean Energy Standards*, DSIRE (Dec. 2023), https://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2023/12/RPS-CES-Dec2023-1.pdf.

165. *See Power Sales and Markets: ISO-NE*, FERC, https://www.ferc.gov/industries-data/electric/electric-power-markets/iso-ne (Dec. 19, 2024); *see also infra* Figure 6.

Management ("BOEM") Atlantic Ocean federal wind power lease areas which are in various stages of development.[166]

Canadian hydropower has a premium value as a renewable source. Canadian hydropower is baseload power that can generate most hours of the year.[167] The average capacity factor among recently built wind projects was over 40%, considerably higher than projects built earlier.[168] The capacity factors for wind power onshore are modelled by Lazard as 38–55%; wind offshore 48–52%, and fixed solar power 13–23%.[169]

From this proposal, Vermont would benefit from clean-up funds amounting to an estimated $7.5 million/year for forty years. One-third of a billion dollars from this provision is a substantial amount of money for a state as small as Vermont, with only 647,000 people.[170] New Hampshire[171] and Maine[172] previously blocked transmission interconnection through their states to bring Canadian hydropower to southern New England states, as examined in the next sections.

2. Northern Pass Transmission

To contrast what transmission siting has not succeeded in accomplishing, Massachusetts in 2018 selected Northern Pass Transmission as the winner of a competitive solicitation.[173] Northern Pass Transmission is a subsidiary of Eversource, which is a distribution

166. *See* BUREAU OF OCEAN ENERGY MGMT., U.S. DEP'T OF THE INTERIOR, OUTER CONTINENTAL SHELF ENERGY LEASES MAP BOOK 2 (2019), https://www.boem.gov/sites/default/files/renewable-energy-program/Mapping-and-Data/Renewable_Energy_Leases_Map_Book_March_2019.pdf.

167. *See* KYLE AARONS & DOUG VINE, CTR. FOR CLIMATE & ENERGY SOLUTIONS, CANADIAN HYDROPOWER AND THE CLEAN POWER PLAN 12 (2015), https://www.c2es.org/wp-content/uploads/2015/04/canadian-hydropower-clean-power-plan.pdf ("Due to its rapid response time and storage capacity, hydropower can be used for baseload and peak generation. When a facility is not being called on to generate electricity, water will continue to collect in its reservoir. This can be used at a later time on as-needed basis, effectively providing a source of energy storage to the electricity system.").

168. *Land-Based Wind Market Report: 2022 Edition*, ENERGY MKTS. & POL'Y BERKELEY LAB (Aug. 2022), https://emp.lbl.gov/publications/land-based-wind-market-report-2022.

169. *See* LAZARD, LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS—VERSION 14.0, at 16–17 (2020), https://www.lazard.com/media/kwrjairh/lazards-levelized-cost-of-energy-version-140.pdf.

170. *Quick Facts—Vermont*, U.S. CENSUS BUREAU (July 1, 2024), https://www.census.gov/quickfacts/fact/table/VT/PST045222.

171. *See* discussion *infra* at Section IV.B.2.

172. *See* discussion *infra* at Section IV.B.3.

173. *See* Paul L. Joskow, *Facilitating Transmission Expansion to Support Efficient Decarbonization of the Electricity Sector* 20 (MIT Ctr. for Energy & Env't Pol'y Rsch., Working Paper No. 009, 2021), https://ceepr.mit.edu/wp-content/uploads/2021/09/2021-009.pdf (describing the project).

and transmission utility with subsidiaries in Massachusetts, Connecticut, and New Hampshire.[174] Northern Pass Transmission would supply zero-carbon energy bundled with supporting transmission service, which was supported by long-term power purchase agreements with Hydro-Québec for hydropower produced in Québec, Canada, and transmitted intra-country by new lines:

> Northern Pass was to be a bundled transmission-hydroelectric power supply project designed to partially meet Massachusetts electricity decarbonization commitments. Its winning bid proposed to build a 192 mile HVDC transmission line to connect the Hydro-Quebec network with the New England network, along with a converter station, AC transmission facility, and substation upgrades elsewhere in New England, to support the delivery and distribution of 1,090 MW of hydroelectric power produced by [Hydro-Québec] to Massachusetts distribution utilities.[175]

"Northern Pass would be compensated for the costs of these transmission facilities through a FERC regulated tariff . . . . separate from ISO-NE's regulated open access transmission tariffs" in order to isolate the rest of the New England region ratepayers from paying for any of the costs of this particular project which involved very large infrastructure cost.[176]

The HVDC portion of the transmission project would be located entirely in New Hampshire; the costs of the transmission facilities were to be paid for by Massachusetts consumers.[177] A permit for the HVDC portion of the Northern Pass project was subsequently rejected by the energy regulatory agency in New Hampshire, and this rejection was upheld, when challenged, by the New Hampshire Supreme Court in 2019.[178] Without the state permit, totally at the discretion of the state,

174. *Id.*
175. *Id.*
176. *Id.* at 20.
177. *Id.* at 20–21 ("The HVDC portion of the project was to be located entirely in New Hampshire, though none of the clean energy supplied by Hydro-Quebec would have been credited to utilities or consumers in New Hampshire since the counterparties to the contract with Hydro-Quebec and the costs of the transmission facilities were to be credited to and paid for by Massachusetts consumers.").
178. Appeal of N. Pass Transmission, LLC, 214 A.3d 590, 592 (N.H. 2019)*; see also* Justin Gundlach, *Transmission Siting Woes Are Slowing the Clean Energy Transition in New England*, A.B.A. (June 27, 2022), https://www.americanbar.org/groups/environment_energy_resources/publications/trends/2021-2022/july-aug-2022/transmission-siting-woes/.

the project was abandoned and the below project was pursued alternatively.

3. New England Clean Energy Connect ("NECEC")

An alternative HVDC project through Maine to connect with Hydro-Québec to access the contracted hydroelectric power was then selected that would build 145 miles of new HVDC line, new alternating current ("AC") lines, upgrades to existing AC lines throughout New England, a new substation, and a new converter station.[179] A majority of the project's new lines use existing rights of way to mitigate additional adverse impacts affecting additional land.[180] The costs will be allocated to Massachusetts ratepayers through regulated transmission tariff charges, separate from ISO-NE's regulated open access transmission tariff.[181]

Central Maine Power ("CMP") proposed the New England Clean Energy Connect ("NECEC") following in the wake of the Northern Pass decision to block transmission access through New Hampshire.[182] The NECEC project plans to deliver 9.45 million MWh per year from Hydro-Québec to Massachusetts utilities, costing roughly $1 billion, transmitting 320-kV in direct current, and selling power to Massachusetts utilities from existing hydroelectric facilities.[183] The

179. *See New England Clean Energy Connect*, NS ENERGY (Aug. 1, 2020), https://www.nsenergybusiness.com/projects/new-england-clean-energy-connect/.

180. Gundlach, *supra* note 178.

181. Ethan Howland, *Maine DEP Suspends Permit for 1.2 GW Avangrid Power Line to Import Power from Hydro-Québec*, UTIL. DIVE, https://www.utilitydive.com/news/avangrid-nextera-necec-transmission-maine-ballot/608877/ (Nov. 24, 2021) [hereinafter Howland, *Maine DEP Suspends Permit*].

182. Viggo C. Fish, *Transmission Capacity is Key to Meeting Inflation Reduction Act's Climate Goals*, N.H. BUS. REV. (Oct. 6, 2022), https://www.nhbr.com/transmission-capacity-is-key-to-meeting-inflation-reduction-acts-climate-goals/ (reporting on the NECEC).

183. Ethan Howland, *In Win for Avangrid, FERC Orders NextEra to Install Seabrook Circuit Breaker, Opening Path for NECEC Line*, UTIL. DIVE (Feb. 3, 2023), https://www.utilitydive.com/news/-avangrid-ferc-nextera-seabrook-necec-transmission/641928/ [hereinafter Howland, *In Win for Avangrid*] (describing the NECEC project as a planned "145-mile power line in Maine that is designed to deliver 9.45 million MWh a year from Hydro-Québec to Massachusetts utilities"). "The 320-kV, direct current project grew out of a request for proposals by Massachusetts regulators for renewable energy." *Id.* "The power sales to the Massachusetts utilities via the NECEC line will come from existing hydroelectric facilities." Howland, *Maine DEP Suspends Permit*, *supra* note 181; *see also* Jake Bittle, *Clean Energy Transmission Line in New England Gets Go-Ahead from Jury,* CANARY MEDIA (May 3, 2023), https://www.canarymedia.com/articles/transmission/clean-energy-transmission-line-in-new-england-gets-go-ahead-from-jury (explaining that "[t]he Maine project itself was a kind of Plan B for Massachusetts after New Hampshire regulators killed a transmission line from Quebec through the latter state's White Mountains").

project planned to utilize existing rights-of-way for two-thirds of the 147-mile line, with the remaining third, about fifty-two miles, requiring new lines that cut a right-of-way through state-owned land.[184]

Despite the project relying heavily on existing construction rather than new development, it still faced criticism from opponents calling for rejection of the project.[185] Arguments centered on the environmental impact on nearby communities, as the dam's inherent turbulence not only contributes to GHG emissions but also directly impacts public health.[186] Specifically, rotting vegetation under reservoirs may lead to the presence of "unacceptably high" levels of methylmercury contamination throughout the food chain, persisting for thirty to fifty-five years and forcing communities to abandon the wild foods they have historically relied on or face harmful health effects.[187] Moreover, the Sierra Club also argued that the project does not consider the impact of the reservoir's rising and lowering levels, such that the Hydro-Québec dams could flood an area of boreal forest land exceeding the size of Vermont.[188] The Sierra Club concluded that international corporations do not care for local communities or local environments, negating any solutions they may

184. Gundlach, *supra* note 178 (noting that existing ways would require some trees to be cleared, but the new line requires cutting through forestland). Central Maine Power's attempt to lease a one-mile portion of the right-of-way crossing state-owned land subjected the project to legal challenges; despite the legal uncertainty, the project began construction soon after receiving regulatory approvals from federal and state agencies, including ISO-New England. *Id.*

185. *See, e.g.*, Tony Donovan & Becky Bartovics, *Sierra Club Fires Back on Quebec Hydro*, COMMONWEALTH BEACON (Sept. 15, 2018), https://commonwealthmagazine.org/opinion/sierra-club-fires-back-on-quebec-hydro/ (refuting the claims asserted in Hydro-Québec and Central Maine Power's response to critics).

186. *See id.* "Hydro-Quebec's 'stored energy,' as reservoirs, is neither green nor clean." *Id.*

187. *Id.* (postulating that Hydro-Québec does not "take into account the impact from raising and lowering water levels in reservoirs as well as the turbulence inherent in dams that further expands releases of greenhouse gas emissions"). "The 2016 Harvard research, in a study of dozens of dams proposed or under construction in Canada—which relies on hydropower for three-fifths of its electricity—has also found that 99 percent of these projects expose indigenous populations to unacceptable levels of methylmercury." *Id.*

188. *Id.* (calling Central Maine Power's transmission line an "onslaught on the people and environment of Maine" and a "travesty").

> Our forest provides a benefit to clean air and water that no scar of a transmission line kept open for years with herbicides and cutover can possibly amend. To suggest that it is a clean way for Massachusetts to don a renewable energy cloak going into the future is patently ridiculous and mendacious.

Id.

present; rather, the Sierra Club seeks to provide solid solutions that renewable energy resources provide.[189]

Massachusetts sought clean dispatchable power that "can be turned on and off at will" as its legislation focuses on ensuring reliable and cost-effective electricity delivery, as wind and solar elevate their roles in the power sector.[190] Moreover, Maine's goal of electrifying and decarbonizing its transportation and building sectors makes the need for new transmission lines even more pertinent, as it would have a peak load of almost 10,000 MW.[191] Avangrid, a utility company developing the NECEC project, regards the project as a key investment equaling nearly 10% of the $10.9 billion rate base of its existing eight Northeast retail utilities.[192] Similarly, Hydro-Québec stands to benefit from the NECEC line by selling power to the Massachusetts utilities at a starting price of $51.51/MWh, totaling about $490 million a year in annual revenue.[193]

Despite NECEC's potential to bring in renewable power, the project faced multiple hurdles, illustrating the difficulty in building transmission lines to serve the region or neighboring states.[194] The

189. *Id.* (arguing that "solutions are not to be found from international corporations that have little care for local communities or our environment"). "Sierra Club is taking the lead on solutions found in the certainty that renewable energy resources provide." *Id.*

190. Gundlach, *supra* note 178 (noting dispatchable power "ensure[s] that electricity can be delivered reliably and cost-effectively even as wind and solar become the workhorses of the power sector and fossil fuel-fired power plants are decommissioned"). The Massachusetts Act to Promote Energy Diversity directs state electricity distribution companies to secure large volumes of clean electricity capacity, such as 1.2 gigawatts from Hydro Québec's reservoirs. *Id. See generally* 2016 Mass. Acts ch. 188.

191. *See* Howland, *Maine DEP Suspends Permit*, *supra* note 181.

> The need for new transmission lines could be even higher if Maine successfully electrifies and decarbonizes its transportation and building sectors, according to Competitive Energy Services (CES), a Portland, Maine-based company. CES estimates Maine's electricity use would grow from about 12 million MWh annually and a 2,000 MW peak load to 40 million MWh annually with a peak load of almost 10,000 MW if it meets its decarbonization goals, the company said in a FERC filing earlier this month. To meet its decarbonization goals, Maine will need roughly 5,000 MW of offshore wind, 2,000 MW of wind in northern Maine and up to 8,000 MW of solar, according to Richard Silkman, CES CEO.

Id.; *see also* Mike Specian, *Weatherization Is Key to Effective, Low-Cost Building Electrification*, ACEEE (June 14, 2023), https://www.aceee.org/blog-post/2023/06/weatherization-key-effective-low-cost-building-electrification (reporting that reducing strain on the electric grid is important "because high peak load drives the need for additional power plants, transmission lines, and distribution system upgrades").

192. Howland, *Maine DEP Suspends Permit, supra* note 181.

193. *Id.* "The utilities will also pay a $9.16/kW monthly transmission fee that increases over the life of the 20-year contracts, which have been approved by Massachusetts regulators." *Id.*

194. *See* Ethan Howland, *Maine Supreme Court Opens Pathway for Avangrid's $1B New England Transmission Project*, UTIL. DIVE (Aug. 31, 2022),

proposed transmission line inspired utilities and local opposition groups to unite in their opposition by financing efforts to terminate the project with a ballot measure.[195] Environmental activists and nuclear and gas-fired generators both supported a ballot initiative, highlighting the immense challenge transmission developers face from opponents.[196] Environmentalists and landowners believed the project would destroy valuable acres of forest and also viewed it as inefficient because it delivers power from existing dams, thus not helping to reduce overall greenhouse gas emissions. [197] Additionally, Indigenous activists contested importing power from dams located on unceded First Nations land.[198]

NextEra Energy Resources actively objected to the NECEC project by refusing to install a necessary circuit breaker at its New Hampshire facility for the NECEC transmission project and by paying $20 million to a political action committee supporting a 2021 referendum seeking to ban

https://www.utilitydive.com/news/maine-supreme-court-avangrid-cmp-necec-transmission-nextera/630886/ [hereinafter Howland, *Maine Supreme Court Opens Pathway*]; *see also* Howland, *Maine DEP Suspends Permit*, *supra* note 181 (recounting that the NECEC project would power about 1.2 million homes and would account for about 8% of the New England's electricity, according to Oliver Kleinbub, director of energy services for ESAI Power, a consulting firm based in Wakefield, Massachusetts). "Avangrid has faced multiple hurdles to its NECEC project." *Id.* "The NECEC project is a poster child for how difficult it can be to build transmission lines in the United States, according to Larry Gasteiger, executive director of WIRES, a trade group for utilities, grid operators and other companies in the transmission sector." *Id.* Gasteiger argued, "Future projects need to be expedited—not face additional delays and risks—if we hope to have a chance of achieving our ambitious goals within a timetable that is becoming more urgent every day." *Id.*

195. Gundlach, *supra* note 178 (explaining that despite an initial defeated challenge, the efforts succeeded in the second attempt when Maine voters agreed to prohibit the development of any "high-impact" transmission projects prospectively and retroactively unless a two-thirds majority of the legislature voted to approve it). "The 38 percent of Maine residents who voted split 59 percent in favor and 41 percent against the measure, the governor certified the result days later, and work on the NECEC line was halted." *Id.*

196. *See* Fish, *supra* note 182 (reporting on how Maine's ballot measure receiving support from not only nuclear and gas-fired generators but also environmental advocacy groups like the Sierra Club reflects an ironic pairing that highlights the immense challenge transmission developers face).

197. *See* Bittle, *supra* note 183 ("[T]he Maine project has faced criticism on several fronts. Landowners and environmentalists have argued that it would destroy valuable acres of forest . . . ."); *see also* Howland, *Maine DEP Suspends Permit*, *supra* note 181 (explaining that the Natural Resources Council of Maine "opposes the NECEC line because it delivers power from existing dams, and therefore wouldn't help reduce overall greenhouse gas emissions").

198. *See* Hoplamazian, *supra* note 154 (presenting Indigenous activists arguments against Northern Pass importing power from Hydro-Québec, because the dam projects are on unceded First Nations land). *Id.* ("In 2021, a coalition made up of five First Nations tribes filed a lawsuit against Hydro-Quebec aiming to stop a power line project in Maine.").

major, "high-impact" transmission lines;[199] Vistra spent $2.2 million and Calpine spent $1.7 million to oppose the NECEC line, which threatened such generators' income as the project would reduce ISO-NE's energy and capacity prices.[200] In comparison, the project developers, along with Hydro-Québec, contributed a total of $66.5 million to defeat the initiative.[201] Their combined contributions to the political action committees represented the most ever for a Maine ballot initiative or referendum.[202]

The financial efforts to defeat the initiative proved unsuccessful when, on November 2, 2021, approximately 59% of Maine voters supported the following ballot question: "Question 1: Citizen's Initiative—Do you want to ban the construction of high-impact electric transmission lines in the Upper Kennebec Region and to require the Legislature to approve all other such projects anywhere in Maine, both retroactively to 2020, and to require the Legislature, retroactively to 2014, to approve by a two-thirds vote such projects using public land?"[203]

199. *See* Howland, *In Win for Avangrid*, *supra* note 183 (claiming that NextEra delayed replacing the circuit breaker in an effort to block the NECEC project). "In a complaint at the Federal Energy Regulatory Commission, Avangrid and its subsidiary NECEC Transmission contend NextEra is slow-walking a circuit breaker upgrade at the Seabrook nuclear plant in New Hampshire to block the transmission line [but] NextEra denies the allegations." Howland, *Maine DEP Suspends Permit*, *supra* note 181; *see also id.* (explaining that five power companies—Avangrid, Hydro-Québec, NextEra Energy Resources, Calpine, and Vistra—have spent $96.3 million trying to convince Mainers how to vote on a ballot initiative that seeks to kill the NECEC); Howland, *Maine Supreme Court Opens Pathway, supra* note 194 (explaining that the ballot measure applies to projects, including NECEC, that had not started construction by mid-September 2020).

200. Howland, *Maine DEP Suspends Permit, supra* note 181 (noting that "power plant owners NextEra ($20 million), Vistra ($2.2 million) and Calpine ($1.7 million) have contributed nearly $24 million to a PAC supporting the ballot measure").

> Generators in New England, like NextEra, stand to lose income if the NECEC project comes online. In New England, NextEra owns 2,285 MW, Calpine has 2,028 MW and Vistra owns 3,361 MW. Combined, the companies own about a quarter of the generating capacity in ISO New England's (ISO-NE) markets. The NECEC project will generally reduce energy and capacity prices in ISO-NE, ESAI Power's Kleinbub said.

Id.

201. *Id.* ("The five companies have contributed $96.3 million through Oct. 22 to political action committees (PACs) trying to influence voters, according to the Maine Commission on Governmental Ethics and Election Practices, an agency overseeing campaign finance in the state.").

202. *Id.* ("The contributions account for almost all the PAC expenditures, which are the most ever for a ballot initiative or referendum in Maine, according to Jonathan Wayne, the commission's executive director.").

203. ME. DEP'T OF THE SEC'Y OF STATE, MAINE CITIZEN'S GUIDE TO THE REFERENDUM ELECTION 2 (2021), https://www1.maine.gov/sos/sites/maine.gov.sos/files/content/assets/11-21citizensguide.pdf (informing Maine voters about the questions on the November 2, 2021 Referendum Election ballot).

Subsequently, Maine's Department of Environmental Protection ("DEP") suspended Avangrid's NECEC permits on November 24, 2021, which stayed in place under further court instruction.[204] That same day, fifty Maine lawmakers wrote a letter to Massachusetts Gov. Charlie Baker urging him to pursue NECEC alternatives, describing the NECEC project as "poorly sited."[205]

On August 29, 2022, the Maine Judicial Supreme Court determined that Avangrid could proceed with the NECEC despite the ballot initiative if the company showed that it had already engaged in "substantial" construction on the partly built project.[206] The Maine Judicial Supreme Court reasoned that Avangrid should have an opportunity to show whether it already undertook "substantial" construction because retroactive application of Maine's ballot initiative would violate Maine's

> Besides killing the NECEC line, the measure would bring the Maine legislature into the transmission process by requiring a vote on 'high-impact' power lines. Those are defined in the ballot question as power lines that are at least 50 miles long, are direct current lines or at least 345-kV, and not mainly being built for grid reliability. Transmission lines and pipelines that cross public land would need a two-thirds vote by both chambers of the legislature per the initiative.

Howland, *Maine DEP Suspends Permit*, *supra* note 181. "The ballot initiative's requirement for state legislative approval could make it harder for future transmission projects in Maine to move forward . . . ." *Id.*

204. Howland, *Maine DEP Suspends Permit*, *supra* note 181 (explaining that "[t]he suspension of the partly built project will be in place until a court grants an injunction allowing construction to move ahead or the legal issues around the line and a ballot initiative earlier this month that banned the project are resolved"). As an alternative, environmental groups highlighted LD 1710 "as evidence that transmission projects that benefit the climate and Maine can clear the state legislature," which "directs the Maine Public Utilities Commission (PUC) to issue a solicitation for a double-circuit, 345-kV transmission line to deliver new renewable energy from Aroostook County in northern Maine to the ISO-NE grid." *Id.*

205. *Id.* ("In a letter to the governor, they said they opposed the 'poorly sited' NECEC project but were open to other transmission lines.").

> The lawmakers explained that the referendum in Maine "specifically focuses on a poorly sited project, the NECEC," and expressed confidence that well-planned projects can be readily approved. They cited an example from earlier this year when the Maine Senate and House unanimously approved legislation supporting a transmission line that would connect northern Maine clean energy projects with the ISO-New England system.

Bipartisan Group of Maine Lawmakers Urge Massachusetts Gov. Charlie Baker to Terminate NECEC, ME. HOUSE DEMOCRATS (Nov. 23, 2021), https://www.maine.gov/housedems/news/bipartisan-group-maine-lawmakers-urge-massachusetts-gov-charlie-baker-terminate-necec.

206. Howland, *Maine Supreme Court Opens Pathway*, *supra* note 194 (quoting court's reasoning that the company's right to build the line cannot be taken away retroactively as long as the company shows it undertook "significant, visible construction in good faith, according to a schedule that was not created or expedited for the purpose of generating a vested rights claim").

constitution and trigger Avangrid's "vested rights."[207] Avangrid had spent approximately $575 million on the NECEC project.[208]

Next, FERC on February 1, 2023, ordered NextEra Energy Resources to install a circuit breaker at the Seabrook Station because not only was it necessary for the NECEC transmission line, but the failure to upgrade the circuit breaker also threatened grid reliability.[209] Subsequently, NextEra entered into an engineering and procurement agreement with NECEC Transmission, which projects that the NECEC line will go into operation by the end of 2024; as part of the agreement and the operation date, NextEra plans to use a fall 2024 refueling outage to replace the circuit breaker.[210]

Notably, in May 2023, a jury unanimously ruled in favor of the project moving forward.[211] As a result, the project could proceed in its plan to "deliver around 1,200 megawatts of power from hydroelectric dams in Quebec to the New England states, satisfying around 8% of typical demand on the region's grid."[212] Joe Curtatone, president of the Northeast Clean Energy Council, a business association that represents

207. *Id.* (noting that NextEra Energy Resources also sought to reject the Hydro-Québec utility contracts but failed to persuade the Massachusetts Supreme Judicial Court).

208. *Id.* (alerting that Avangrid "seems to have met those conditions, but a trial court will make a decision on remand, according to the court"). Howland, *Maine DEP Suspends Permit, supra* note 181 ("If the line isn't built, Avangrid would likely have to write off at least some of its NECEC expenditures, Paul Patterson, an equity analyst with Glenrock Associates, said.").

209. Howland, *In Win for Avangrid*, *supra* note 183 (noting agency reasoning for ordering NextEra to install the circuit breaker). The agency reasoned that Seabrook's interconnection agreement "does not permit Seabrook to refuse to replace the breaker when replacement is needed for reliable operation of the Seabrook Station and given the concerns in the record related to the impact of any unreliable station operation on the reliable operation of the system." *Id.* Additionally, FERC did not agree with NextEra's argument of the potential for daily revenue loss in the case that it needed to replace the breaker due to an extended outage at the plant and thus rejected NextEra's request for Avangrid to pay opportunity and legal costs. *Id.*

210. Bittle, *supra* note 183 ("Avangrid, the company building the transmission line, said on an earnings call last week that it will know by midyear when it can resume building the project, citing a need to renew permits."); Howland, *In Win for Avangrid, supra* note 183 (reporting that "NextEra expects to replace the circuit breaker during a fall 2024 refueling outage under an engineering and procurement agreement between the company and NECEC Transmission, an Avangrid subsidiary").

211. Bittle, *supra* note 183 (reporting on NECEC legal victory).

> [T]he jury considered only whether Avangrid had acted in good faith when it started constructing the project in 2021 or whether the company had only been trying to give itself a legal shield against the results of the referendum. The jury deliberated for only three hours before delivering a unanimous verdict in Avangrid's favor.

Id.

212. *Id.*

renewable power companies, described the judicial support for the NECEC project as a win for clean energy and the best way to reach that state's ambitious clean-power goals, making meeting climate goals more likely and achievable in a region that still relies on natural gas for about half of its power needs. [213]

This project leaves a mixed message. Any ballot referendum based on delay or laches could have been challenged earlier and disqualified before it appeared on the ballot and was approved by a majority of Maine voters to stop the project. In other areas of law, when a permit granted is still being contested, statutes (in this example, in Massachusetts) provide that construction proceeds at the risk of the permit(s) applicant.[214]

4. The Twin States Clean Energy Link

Twin States Clean Energy Link involves collaboration between National Grid, the non-profit Citizens Energy Corporation, the International Brotherhood of Electrical Workers ("IBEW"), and the Northeastern Vermont Development Association.[215] The project would employ Canadian hydropower to balance other variable intermittent renewable resources in New England.[216] Notably, National Grid already owns and operates transmission lines in the region, thus supporting the Twin State Clean Energy Link's plan to use existing routes with rights-of-way for power lines to move 1,200 megawatts of hydropower through buried power lines along state roadways between Québec and New England.[217] National Grid believes that the use of existing power lines will make New Hampshire residents more supportive of the project

213. *Id.* (describing Massachusetts's support for the project and how "[u]nlike the rest of the country, the region also burns significant amounts of oil to generate electricity and heat").

> Avangrid will also undertake about $200 million in upgrades to existing infrastructure in the New England grid, while adding customer incentives like rural broadband upgrades and ratepayer rebates, according to Curtatone. These upgrades, in addition to the cheap hydropower from Quebec, should mean widespread cost savings for New England residents.

Id.

214. *See* Massachusetts Wetlands Protection Act Regulations, 310 MASS. CODE REGS. 10.05(3)(d)(4) (2024).

215. *See* Hoplamazian, *supra* note 154 (listing partners).

216. *Id.* ("National Grid says that the project would 'almost serve like battery storage,' using Canadian hydropower to balance variable renewable resources in New England, and wouldn't need to be 'always on.'").

217. *Id.* "National Grid says it would help keep the power grid more reliable, save customers billions of dollars and create thousands of construction jobs. The project will also dedicate $100 million towards 'community benefit programs' that could take the shape of energy assistance, weatherization or neighborhood renewable energy developments." *Id.*

because it does not need to acquire land to create new transmission routes.[218] Moreover, the Twin States Clean Energy Link could provide bidirectional transmission flow, supporting clean energy development in New England by bringing Canadian hydropower into New England, while also bringing any surplus electricity from New England back to Québec.[219]

The Twin State project, which features large-scale hydropower from Canada, is highly controversial.[220] Some argued that Vermont should not structure so much of its renewable energy around electricity from Hydro-Québec because doing so does not actually translate to bringing new local clean power online.[221] Environmental groups also scrutinized the project, arguing that Canadian hydropower "damages habitats for marine ecosystems, releases methane, erodes coasts and can harm people."[222] Similarly, the project is alleged to present Indigenous concerns as Hydro-Québec built dams on ancestral territories and once again would make major changes without notifying or receiving approval from the Indigenous groups residing there.[223]

Moreover, the New Hampshire House of Representatives had a proposed bill, HB609-FN, retained in committee as of June 2023, that would shift the Site Evaluation Committee's duties, making decisions about transmission line projects, instead to the Public Utilities Commission.[224] Elsewhere, environmental activists are opposing major

218. *Id.* John Lamontagne, a National Grid spokesperson, claimed "New Hampshire communities would receive significant new benefits in the form of property tax revenues, while experiencing minimal impacts." *Id.*

219. *Id.* ("National Grid also says it could help support clean energy development in New England, because the transmission lines would be bi-directional, meaning they could bring Canadian hydropower into New England, but also bring extra electricity from New England back to Quebec."). Sam Evans-Brown, executive director of Clean Energy New Hampshire, said that "the bi-directional capability is the most interesting part of the project." *Id.* Evans-Brown stated: "Really what we're talking about is not necessarily just a source of generation, but it's a source of flexibility and the ability to move power to where it's needed[.] . . . That could be north to south as it has traditionally been, or it could be south to north as we start to build out more renewable sources here in New England." *Id.*

220. *Id.* ("Large-scale hydropower from Canada has been somewhat controversial in Vermont, which already gets about a quarter of its electricity from Hydro-Quebec.").

221. *Id.* (presenting Vermont Public's report that "some advocates say structuring so much of the state's renewable energy around that resource does not actually help bring new clean power online").

222. *Id.*

223. *Id.* ("The Pessamit Innu First Nation opposed the Northern Pass when it was being discussed in New Hampshire. Almost one third of the hydro dams in Quebec were built on that First Nation's ancestral territory," and undertaken without permission).

224. *See id.* ("In New Hampshire, the Site Evaluation Committee, which makes decisions about projects like transmission lines, is under scrutiny. A bill proposed in the New Hampshire House of Representatives this year would have overhauled that process and

transmission projects because of their alleged negative environmental impacts, and there could be NEPA legal challenges to new or expanded federal actions in the power sector.[225]

Second, parties are poised to challenge the new DoE authority in the IIJA to attempt to federally preempt state transmission siting authority, should new federal power attempt to be used, such as by arguing a lack of eminent domain authority and denying other necessary state permits.[226] The proposed New England NECEC transmission line, which would span from Canada and run through Maine to Massachusetts, encountered opposition from state politics, environmental groups, and Indigenous tribes.[227]

Despite the urgency of needing transmission build-out to meet state or federal climate or other policy goals, clean energy projects continue to get delayed or canceled, highlighting the importance of early engagement

shifted the committee's duties to the Public Utilities Commission. That bill was retained in its committee."); *see also* H.B. 609, 2023 Leg., Reg. Sess. (N.H. 2023).

225. *See* Clark et al., *supra* note 33; *see also* Demsas, *supra* note 2.

226. Michael Wigmore et al., *Feds May Need Power to Take State Lands for New Grid*, LAW360 (Oct. 20, 2021, 4:12 PM), https://media.velaw.com/wp-content/uploads/2021/10/22104432/Feds-May-Need-Power-To-Take-State-Lands-For-New-Grid.pdf [https://perma.cc/EG9R-HWT2] (arguing that a grant of eminent domain over state lands is necessary to successfully invoke FERC's backstop authority). "The authority to site new transmission infrastructure rests with the states, and every state has historically had the power to prevent construction of transmission infrastructure it opposes." *Id.* "[E]ven if FERC grants a permit for a transmission project under its backstop authority, a state opposing the project can still prevent its construction, by simply denying the necessary real estate instruments." *Id. See also* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 315, 325 (4th Cir. 2009) (holding that FERC did not *have* backstop siting authority when a state takes "the final administrative act of denying a permit").

227. Donovan & Bartovics, *supra* note 185 (presenting environmental arguments against the proposed Central Maine Power's transmission line); David Iaconangelo, *Northeast Transmission Fight Shows Biden's Renewable Dilemma*, E&E NEWS BY POLITICO (Aug. 27, 2021, 7:09 AM), https://www.eenews.net/articles/northeast-transmission-fight-shows-bidens-renewable-dilemma/ (reporting on how the New England Clean Energy Connect (NECEC) power line proposal, which would import Canadian hydropower from Québec dams into Massachusetts, upended Maine's politics). "While the fight is distinctive to Maine, it echoes transmission challenges playing out around the country that threaten to derail President Biden's target to decarbonize the power sector by 2035." *Id.* "If Maine voters decide to reject power line in November, the analysts added, FERC's new powers would be 'insufficient' to overcome their rejection." *Id. See also* Fred Bever, *Coalition of Indigenous Tribes in Quebec Are Suing to Stop Hydro-Quebec Powerline Construction*, ME. PUBLIC (July 6, 2021, 6:10 PM), https://www.mainepublic.org/environment-and-outdoors/2021-07-06/coalition-of-indigenous-tribes-in-quebec-are-suing-to-stop-hydro-quebec-powerline-construction (presenting how Indigenous tribes took issue with the transmission line because although it "would not directly cross tribal lands, more than a third of the dam system providing electricity for the project are on lands the tribes never ceded to the province").

with potential local opponents to mitigate such results.[228] Environmental groups such as Earthjustice argue that urgency does not warrant ignoring environmental review requirements and public engagement.[229] Successful transmission projects work with communities in advance, include movement of renewable energy generation, delivering a substantial amount of it underground through existing rights-of-way, include workforce development initiatives and elements denominated as environmental equity provisions, and often create large amounts of additional funds for state or local governments. When transmission projects are moving hydropower, they also provide baseload time-reliable power, a very valuable quality not accompanying intermittent weather-dependent wind and solar-generated power.[230]

V. MOVING POWER OUTSIDE THE BOX

This Part analyzes revitalized federal legal efforts to preempt state and local land-use power over their infrastructure, ongoing, unresolved eminent domain legal barriers that sacrifice renewable energy, and

228. *See* Dillen, *supra* note 162 ("Right now, we have roughly a terawatt of renewable energy trying to connect to the grid to power our homes, offices and cars, and transmission constraints and interconnection roadblocks stand in the way."). "A 2022 MIT study, which examined 53 large-scale clean energy projects that were delayed or canceled, concluded that 'early engagement with potential local opponents can avoid extended delays or project cancellations.'" *Id.*

229. *Id.* (arguing to "reject the false choice between quickly ramping up transmission and protecting communities from harmful permitting decisions"). "Urgency cannot become a pretext for gutting requirements for environmental review and public engagement as we embark on the greatest U.S. infrastructure build-out in nearly a century." *Id.* "For example, in Maryland robust, upfront engagement was key to securing both approval for 1654 MW of offshore wind (projects that can power a million homes) and commitments to ensure that the projects are constructed and operated in a responsible manner." *Id.* Recommendations that can "get us a very long way" include the need for "strong final rules that ensure grid operators: [i]dentify and address transmission needs to meet future energy demands; [k]eep costs down and maximize benefits to consumers; [o]ffer meaningful opportunities for affected communities to engage; [b]ring stakeholders together to identify and resolve the cost allocation issues that have plagued many projects; and [s]peed up the interconnection process." *Id.*; *see also* Center for American Progress et al., *Principles for Accelerating Clean Energy Deployment Through Transmission Buildout in an Equitable Clean Energy Future*, EARTHJUSTICE (Dec. 15, 2022), https://earthjustice.org/wp-content/uploads/transmission_principles_12.15.22.pdf (providing a suite of recommendations that the Biden administration, FERC, and Congress can implement to help clear current transmission planning, siting and cost allocation barriers); Alexandria Trimble, *Environmental Groups Release Roadmap to Accelerate Transmission Infrastructure,* EARTHJUSTICE (Dec. 14, 2022), https://earthjustice.org/press/2022/environmental-groups-release-roadmap-to-accelerate-transmission-infrastructure (reporting on groups outlining "steps that FERC and Congress can take while protecting opportunities for community input").

230. AARONS & VINE, *supra* note 167, at 5–6.

potential mechanisms under existing U.S. law to work around remaining barriers.

A. Rejuvenating Federal Power Marketing Administrations

There was quiet discussion of the Biden Administration mobilizing two federal agencies to expand their transmission undertakings. The federal power marketing administrations that market and deliver hydropower generated by federally owned dams built during the Great Depression have statutory authority to develop transmission facilities across large swaths of the continental United States.[231] Section 1222 of the Energy Policy Act of 2005 authorizes the U.S. Department of Energy's federal siting authority for transmission lines, subject to specific criteria, in states under Western Area Power Administration ("WAPA") and Southwestern Power Administration ("SWPA") operations, while also granting DOE jurisdiction to own or join with other parties to own, construct, and develop new or upgraded transmission lines and to accept contributed funds.[232] Section 1222 of the Act does not expressly limit these lines to only serve their original purpose of transmitting federal hydropower from federal lands.[233] In theory, the possibility exists to use

231. *See* RICHARD J. CAMPBELL, CONG. RSCH. SERV., R45548, THE POWER MARKETING ADMINISTRATIONS: BACKGROUND AND CURRENT ISSUES (2019).

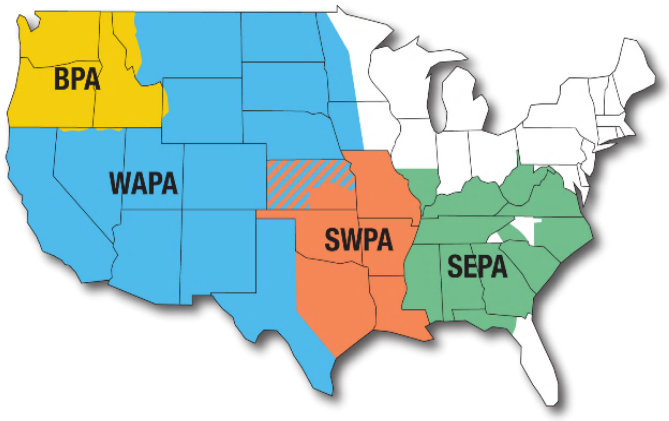
232. Energy Policy Act of 2005 § 1222, 42 U.S.C. § 16421; *see also* AVI ZEVEN ET AL., COLUM. UNIV. SCH. OF INT'L & PUB. AFFS. CTR. ON GLOB. ENERGY POL'Y, BUILDING A NEW GRID WITHOUT NEW LEGISLATION 26 (2020), https://www.energypolicy.columbia.edu/wp-content/uploads/2020/12/GridAuthority_CGEP_Report_111522.pdf (providing that the Federal Power Marketing Administrations have the legal right to promote and distribute hydropower from federally owned dams and create new transmission facilities across vast areas of the United States without worrying about state-level regulations because of the ability to use federal eminent domain). "Section 1222 provides a pathway for overcoming state-level regulatory obstacles that might prevent new transmission projects from getting built." *Id.* at 24; *see also* Steven Ferrey, *Dislocating the Separation of Powers State 'Thumb' on the Biden Sustainability Initiatives & Law*, 54 ARIZ. ST. L.J. 755, 816 (2022) (describing how the federal government rather than municipalities exercises power generation technology siting authority throughout 30% of U.S. land, predominately in the western states); Wigmore et al., *supra* note 226 (highlighting that the "Energy Policy Act gave the Federal Energy Regulatory Commission new backstop siting authority, in an attempt to overcome state opposition to construction of transmission infrastructure"). *See generally* EDISON ELEC. INST., STATE GENERATION & TRANSMISSION SITING DIRECTORY: AGENCIES, CONTACTS AND REGULATIONS (2013).

233. *See* 16 U.S.C. § 825s ("The Secretary of Energy is authorized, from funds to be appropriated by the Congress, to construct or acquire, by purchase or other agreement, only such transmission lines and related facilities as may be necessary in order to make the power and energy generated at said projects available in wholesale quantities for sale on fair and reasonable terms and conditions to facilities owned by the Federal Government, public bodies, cooperatives, and privately owned companies."); 43 U.S.C. § 485i ("The Secretary is authorized to perform any and all acts and to make such rules and regulations

these administrations to move other power for other purposes within the geographic areas covered by these federal power marketing administrations.

Might these federal administrations circumvent the northeast states' efforts, examined above, to block additional interstate transmission infrastructure? As shown in Figure 4, this WAPA and SWPA area includes seventeen of the lower forty-eight states west of the Mississippi River, notably excluding the Pacific Northwest, while including part of two additional Midwest states.

Figure 4. Federal Power Marketing Administrations[234]



The federal government reports that there are new transmission improvements needed in several transmission regions of the United States, shown in Figure 5, noting: "The largest growth in interregional transfer capacity occurs between the Plains and Midwest, the Midwest

as may be necessary and proper for the purpose of carrying the provisions of this subchapter into full force and effect."); *see also* ZEVEN ET AL., *supra* note 232, at 24 ("[S]ection 1222 is not limited to projects that transmit federal hydropower; nor does it require that the constructed facilities interconnect with WAPA or SWPA's transmission systems. The only geographic limitation in section 1222 is that new projects be located within a state in which WAPA or SWPA operates . . . ."). *See generally* 42 U.S.C. § 16421(b).

234. *Power Marketing Administrations Map,* W. AREA POWER ADMIN., https://www.wapa.gov/about-wapa/regions/pma-map/ [https://perma.cc/HDG4-QBRM] (Nov. 15, 2024) (visualizing the four marketing administrations' geographical domain).

and the Mid-Atlantic, and between New York and New England."[235] Despite the U.S. Department of Energy finding that "the Mid-Atlantic, and between New York and New England" are a priority for transmission infrastructure improvements/additions, the Mid-Atlantic region, New York, and New England are not within WAPA or SWPA. None could be served by either of these two geographically constrained federal power marketing administrations constructing new transmission facilities. Therefore, revitalization of WAPA or SWPA to circumvent state transmission corridor objections does not extend geographically east of the Mississippi River into the Eastern portion of the United States or into the Mid-Atlantic, New York, or New England.

Figure 5. DoE Designation of U.S. Transmission Regions[236]

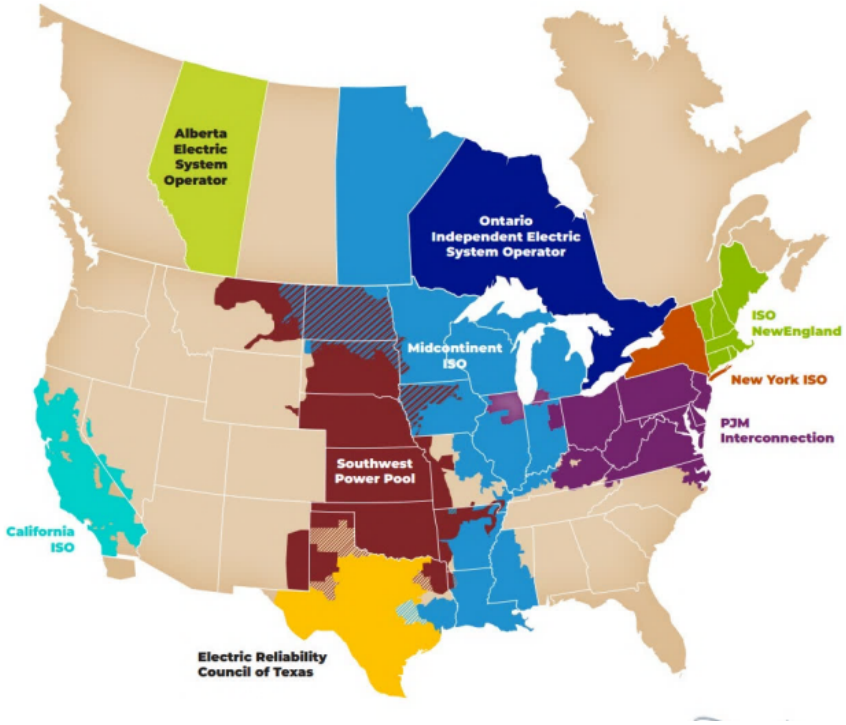
The U.S. Department of Energy concluded that there is a doubling of electricity demand requiring a dramatic increase of necessary electricity transmission upgrades in areas not served by WAPA or SWPA, such as the North Atlantic and New England regions:

235. U.S. DEP'T OF ENERGY, *supra* note 29, at iii.
236. *Id.*

> ISO-New England's FGRS (2022) notes that, in addition to changes in electricity supply, regional goals and legislation regarding heating and transportation will also change the way electricity is used throughout New England over the next decade and beyond. Heating and transportation will become further electrified. Policy initiatives to replace building heating systems currently powered by wood, oil, propane, or natural gas to electricity will have a significant impact to the power grid . . . . [and] will significantly increase the total demand on the New England grid. The replacement of gas and diesel-powered vehicles with electric vehicles will also increase overall system demand. . . . Brinkman et al. (2021) simulate a scenario . . . so that electricity loads in 2050 are nearly double those in 2020. The result is significantly more transmission investments . . . . NREL's Solar Futures Study (Ardani et al. 2021) came to a similar conclusion.[237]

237. *Id.* at 72.

Figure 6. ISO and RTO Transmission Management Areas[238]



These DOE transmission *planning* regions in Figure 5 do not mirror precisely nor closely resemble the federally FERC-regulated ISOs and RTOs that *manage actual* electric system real-time transmission shown in Figure 6. This further disconnects the Eastern and Northeast U.S. states from benefiting from either WAPA or SWPA jurisdiction.

B. Public Land and Eminent Domain as a Potential Barrier

What was not sufficiently appreciated in crafting the 2021 IIJA[239] and the 2022 IRA[240] is that the land under rivers form the boundaries of most states: rivers define part of the boundaries of nearly all lower forty-

238. *Id.* at 11.
239. *See* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021).
240. *See* Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat 1818 (2022).

eight states, including every state east of the Mississippi River.[241] Electric transmission towers must be anchored to the land beneath or appurtenant to those rivers[242] and/or in state-protected buffer zones in order for transmission lines to cross rivers.[243] Either route over or under a river or stream requires permission and easements from state and local authorities to install new transmission infrastructure over such state or local land. No legislation, including the three 2021–2023 major pieces of legislation enacted during the Biden Administration,[244] provides any federal legal preemption authority regarding crossing rivers or utilizing state land for an interstate line.

Many states exercise state authority over any alteration or construction in broadly defined wetland areas surrounding rivers, creeks, and estuaries. For example, the Massachusetts Wetlands Protection Act requires state permits to alter in any way, including construction, any vegetated bordering wetlands in the vicinity of any of these waterways, as well as any alteration within a 100-foot buffer zone around any protected area and a 200-foot buffer zone from either side of any river.[245] Towns can increase, but not diminish, these buffer zones that require permits to make any alteration within them.[246] There is no yet-recognized federal legal mechanism available to preempt any uncooperative state regarding the use of any state land for new transmission infrastructure. Are there such uncooperative states? Such opposition occurred in New Hampshire, Vermont, and Maine—half of the six New England states and 100% of the New England states through which Canadian renewable power could access New England—against assisting their other, more densely populated, neighbor states in New England.[247] In addition,

241. Wigmore et al., *supra* note 226 (stating that "[a]ll but four of the lower 48 states, including every state east of the Mississippi River, have at least part of their boundaries defined by rivers").

242. *See generally* Ken Baker, *Non-Virtual Reality: Do You Ever Notice the Forest of Utility Poles*, FREMONT NEWS MESSENGER (Jan. 15, 2019, 1:32 PM), https://www.thenews-messenger.com/story/news/2019/01/15/telephone-poles-life-begins-very-tall-straight-tree/2570557002 ("The typical utility pole runs about 40 feet in length, of which 6 feet is buried in the ground. In urban environments they are commonly spaced about 125 feet apart . . . ."); AM. ELEC. POWER, WHAT'S ON A POLE?, https://docs.aep.com/docs/safety/What'sonPole_AEP.pdf (last visited Apr. 13, 2025).

243. *See, e.g.*, 310 MASS. CODE REGS. 10.01–10.02, 10.58(2) (2024) (providing under state law a 200-foot state- or local-controlled wetlands buffer zone on either side of a river or stream, requiring either to place a transmission pole or tower within the buffer zone or to tunnel a line under through the buffer zone to traverse a river).

244. *See supra* Part II.

245. *See* MASS. GEN. LAWS ch. 131, § 40 (2024); 310 MASS. CODE REGS. 10.02(2)(b), 10.58(2)(c) (2024).

246. *See* 310 MASS. CODE REGS. 10.01(2).

247. *See supra* Sections IV.B–C.

Virginia and Pennsylvania blocked additional transmission facilities to serve New York and other North Atlantic states,[248] and Arizona blocked lines to serve California.[249]

The Supreme Court has upheld the "equal-footing doctrine," which grants each state ownership and control of the bottoms of all navigable waters within its territory,[250] a decades-long established legal principle.[251] Although a significant portion of river water is classified as navigable U.S. water subject to exclusive federal jurisdiction, states retain authority over the land under and adjacent to that same river or creek water.[252] Notwithstanding the federal preemptive authority contained in the IIJA,[253] granting limited federal power to exercise eminent domain over private lands for transmission siting, there is no express grant of authority in any statute for the federal government to grant eminent domain over state land.[254]

And despite FERC and DOE in the final year of the Biden administration proceeding to use the 2021-enacted IIJA to preempt state transmission authority, long after enactment of the IIJA, in one sentence in the Federal Register related to proposed rules, in 2023 FERC actually acknowledged that there was no federal authority to acquire or exercise eminent domain over any state- owned or -controlled land created by the IIJA: "Federal and State-owned land was expressly excluded from the purview of section 216(e) and thus could not be acquired via eminent domain."[255] Thereby, the federal government conceded that there is no justification or defense if, over state opposition, it attempts to employ the IIJA to utilize or upgrade transmission facilities on state land or acquire state-owned or state-controlled land by eminent domain. Thus, any state, at any time, for any reason, can refuse to grant necessary rights-of-way for a transmission line to cross any in-state land or state-border river land owned or controlled by the state. This calls into serious legal question whether FERC's expansion of Section 216 of the Federal Power

248. *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304 (4th Cir. 2009).

249. *See* Cal. Wilderness Coal. v. U.S. Dep't of Energy, 631 F.3d 1072 (9th Cir. 2011).

250. *See* PPL Montana, LLC v. Montana, 565 U.S. 576, 590–91 (2012).

251. *See* Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212, 229 (1845) (quoting Martin v. Waddell's Lessee, 41 U.S. (16 Pet.) 367, 410 (1842)).

252. *See* Sackett v. EPA, 598 U.S. 651, 672, 678–79 (2023).

253. *See* Infrastructure Investment and Jobs Act § 40105, Pub. L. No. 117-58, 135 Stat. 429, 933 (2021).

254. *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304 (4th Cir. 2009); *Cal. Wilderness Coal.*, 631 F.3d 1072.

255. Applications for Permits to Site Interstate Electric Transmission Facilities, 88 Fed. Reg. 2770, 2771 (January 17, 2023).

Act[256] under the IIJA[257] may not be able to assist transmission lines to gain interstate access through uncooperative states.

C. Sustainable Power Sacrificed

The country's recent federal infrastructure legislation seeks to address climate change and meet environmental goals.[258] For the IRA's and IIJA's success to reduce GHG emissions by at least half over the next five years by reducing power sector carbon emissions 66% below 2005 levels by 2030, it requires scaling up various zero-carbon-energy generating technologies by at least an unprecedented 400%, while dramatically driving down fossil fuel demand and consumption.[259] It is

256. *See supra* Section II.A.

257. *See* Infrastructure Investment and Jobs Act § 40105(c), Pub. L. No. 117-58, 135 Stat. 429, 934 (2021).

258. *See* Levin & Krasnow, *supra* note 163 (emphasizing that "[d]ecisive and immediate action is required to achieve 80 percent emission reductions by 2030 and keep 100 percent clean power by 2035 within reach."). Fish, *supra* note 182 (explaining that the need for new transmission development is long overdue). "[T]he Independent System Operator of New England (ISO-NE) . . . found that without additional transmission expansion, overloads will occur on approximately 50 percent of New England's transmission lines in the coming decades." *Id.* "The IRA will likely expand electrification beyond the levels included in the ISO-NE's analysis, adding further urgency to the need for new transmission development." *Id.* "[T]he urgency of the climate crisis, and the availability of financial incentives under the Inflation Reduction Act, many of which sunset after 10 years, should compel an accelerated rate of development—a new era of electrical infrastructure development." *Id. See also* Christy Walsh, *After a Good Year for Transmission Reform, Hard Work Ahead*, NRDC (Dec. 19, 2022), https://www.nrdc.org/bio/christy-walsh/after-good-year-transmission-reform-hard-work-ahead (noting that "projects face unconscionable delays in arcane interconnection queue processes first established decades ago that make it difficult for large numbers of smaller wind and solar plants to connect to the grid").

> It is also vital to update transmission planning policies that have failed to accommodate a generational shift to renewable energy resources. Various estimates say we need to double or triple the rate at which we are building out the electric transmission system to deliver on the promises of the recently enacted Inflation Reduction Act. Longer, higher-capacity transmission lines that connect the whole country can provide grid operators access to potentially lifesaving electricity resources when generators are knocked offline during extreme weather or other events—boosting reliability and grid resilience. Finally, we need grid-enhancing advanced technologies to make the grid more intelligent and efficient.

Id.

259. *See* Fish, *supra* note 182 ("It will require scaling clean energy-generating technologies—including wind, solar, geothermal and batteries, as well as less-established technologies like advanced nuclear reactors—at an unprecedented level."). To compare the significance of such efforts, "[c]onsider that it took over a century to develop the fossil-fuel infrastructure in place today." *Id.* Transmission capacity sufficient to accommodate the electrical demand increase is critical in order to expand renewable generating assets and consequently drive down fossil fuel consumption and demand. *Id.* If the regional grid does not expand and upgrade, then not only does its vulnerability to brownouts and blackouts

often assumed that CO_2 degrades after 100 years to no longer pose a warming threat.[260] However, CO_2 degradation has not been studied for a century to know if this is true. Moreover, more recent scientific research suggests that CO_2 emitted in the next decade will remain in the atmosphere and warm the Earth not for a century, but for more than 1,000 years:

> [E]ven if human-caused emissions of carbon dioxide were to stop entirely, their associated atmospheric warming and sea-level rise would continue for more than 1,000 years. These effects—essentially irreversible on human timescales—are due in part to carbon dioxide's residence time . . . . [E]ven if the world were to stop emitting carbon dioxide starting in 2050, up to 50 percent of the gas would remain in the atmosphere more than 750 years afterward.[261]

If this recent research represents the still-to-be-determined, more accurate scientific reality, all CO_2 emitted in the next decade from power generation could contribute to significant warming of the climate, remaining unabated long-term for the next millennium. To transition to lower carbon emissions, substantial required amounts of additional zero-carbon power generation capacity, interconnected with unprecedented rapid substantial added transmission infrastructure, are needed to move that new sustainable power.[262] To interconnect the needed 300% increase

increase but also the region's reliance on fossil fuels continues and militates the IRA's decarbonization potential. *Id*; *see* Greene & Ennis, *supra* note 148 (explaining that in order to fulfill the goals of the IRA by 2030, the United States needs to increase the use of renewable energy by four times the current level, prioritizing the construction of larger, interstate transmission lines instead of the smaller local ones the United States typically builds); Dillen, *supra* note 162 ("Both the Inflation Reduction Act (IRA) and the Infrastructure Investments and Jobs Act (IIJA) give a huge boost to clean energy development and deployment and dramatically buy down the cost of reducing U.S. greenhouse gas emissions by at least half over the next seven years."); Levin & Krasnow, *supra* note 163 (reporting that "NRDC's modeling finds that the IRA's historic clean energy tax incentives, grants, and other provisions of the IRA can bring down power sector carbon emissions to 66 percent below 2005 levels by 2030").

260. *See* Steven Ferrey, *The Second Element, First Priority*, 24 B.U. J. SCI. & TECH. L. 41, 47 (2018).

261. NASA Science Editorial Team, *Short-Lived Greenhouse Gases Cause Centuries of Sea-Level Rise*, NASA, https://climate.nasa.gov/news/2533/short-lived-greenhouse-gases-cause-centuries-of-sea-level-rise/ (Oct. 22, 2024).

262. *See* Greene & Ennis, *supra* note 148 (graphing NRDC's analyses on pathways to net-zero GHG emissions, concluding "solar and wind capacity must *double once more* by 2030," which requires building at an "unprecedented rate of 60 GW of solar and 40 GW of wind per year for the next decade"). "Under business-as-usual projections, transmission

in sustainable electric power sought under current federal laws by the federal government to be implemented over the next five years by 2030, and a 1300% increase by 2050, an 800% increase (compared to business-as-usual) for new transmission infrastructure simultaneously is required.[263]

Such a fundamental rapid change of technology and infrastructure is necessary according to Princeton modelers to not sacrifice 80% of the IRA's promised carbon emission reductions, requires doubling the past decade's rate of transmission expansion and accomplish in ten years what by comparison "took over a century to develop the fossil-fuel infrastructure in place today."[264] The IRA's financial incentives 'sunset' after ten years.[265] With a power transmission critical path bottleneck frustrating meeting such targets, the power grid, by default, will serve the now-occurring substantially greater power demand by default through extended operation of its existing fossil fuel-fired generation for

capacity will only grow 12% by 2030 and 17% by 2040. This is not nearly enough to meet the demands of our transitioning energy system." *Id.*

263. *See id.* (showing that "over 80% of the potential carbon emissions reductions of the Inflation Reduction Act by 2030 will be lost if transmission growth is limited to its recent growth rate").

264. *See* Fish, *supra* note 182 (explaining the IRA's significance). The IRA devotion of over $350 billion to clean energy and climate-focused financial initiatives "has the potential to reduce the country's greenhouse gas emissions by roughly 40 percent below 2005 levels by 2030." *Id.* Such a reduction "equates to roughly 1 billion fewer tons of emissions (CO2 equivalent) annually produced in the United States and within roughly half a billion tons of achieving the 50 percent reduction goal the United States signed on to at the 2020 Glasgow Conference of the Parties, or COP." *Id.* "According to the REPEAT Project, over 80 percent of the IRA's potential emissions reductions modeled to occur by 2030 will be lost if transmission expansion does not increase." *Id.* "[T]he interconnection of renewable generation" requires removing existing transmission constraints to build out new transmission capacity and meet the "increased demand from electric vehicles, heat pumps and other electrification that is expected to be spurred by the IRA." *Id.*; Greene & Ennis, *supra* note 148 (highlighting that the dramatic expansion developing, permitting, and constructing electric transmission infrastructure needed to achieve the IRA's goals often takes years to develop).

265. *See* Fish, *supra* note 182 (postulating that the Inflation Reduction Act's financial incentives that sunset after ten years should compel a new era of electrical infrastructure development); Walsh, *supra* note 258 (stating that "[a]dding connections between regions will help prevent blackouts and lower power costs").

> According to a recent study from GE Consulting, consumers in the Eastern U.S., could save $2 billion in electricity costs in 2023 and $4 billion in 2040 if more transmission lines moving power across states and regions are built. The study found that without the additions, existing transmission grid constraints could trigger power outages for 600,000 customers in New York City during an extended heat wave in 2035. No customers would lose power if the capacity to move more power across states and regions is expanded.

Id.

a still indefinite number of years rather than their planned retirement.[266] The unmet legal challenge is to rapidly accelerate siting and permitting of needed power sector infrastructure to meet this now already occurring rapid increase in electricity demand .[267]

D. Despite Transmission Gaps, Positive U.S Power Emission CO_2 Reduction Can Be Realized

Notwithstanding the 'critical path' transmission infrastructure shortfall still not effectively addressed by recent legislation, the United States has done better addressing climate change mitigation than many other countries. This move to renewable energy in the United States. has reduced the U.S. share of GHG emissions this century, while the three other largest four nations in the world by population—China, India, and Indonesia—have done the opposite, emitting massively more amounts of CO_2.[268] Vastly increasing GHG emissions in China and India are overwhelming reductions occurring in all of the major OECD countries on three continents combined—the United States, Germany, Japan, and the U.K.[269] In the 2021–2022 timeframe, Indonesia increased its GHG emissions, in relative terms, more than any other country in the world.[270] China has been ordering centralized coal-fired electric plants at unprecedented rates: In 2022, it permitted plants at the rate of two every week for the entire year,[271] a trend that continued through 2023.[272]

266. *See* Greene & Ennis, *supra* note 148 ("If we miss these targets, we will be left with an exceedingly narrow range of ways to achieve net-zero, relying on riskier and more expensive pathways. . . . [U]nder NRDC's 'Constrained Renewables' scenario, we see a higher deployment of natural gas, carbon sequestration, and biofuels to meet the gap. If these options curb carbon at all, they will almost certainly come with major equity, public health and biodiversity costs.").

267. *See id.* ("Being clean energy advocate[s] in a post-IRA world will require shifting our focus from incentives and standards to a transformation of the siting and permitting process into one that is efficient, protective, and just, from the federal level all the way down to the local level.").

268. *See* Robert Bryce, *Carbon Myopia*, SUBSTACK: ROBERT BRYCE (July 11, 2023), https://robertbryce.substack.com/p/carbon-myopia.

269. *Id.*

270. M. CRIPPA ET AL., JOINT RESEARCH CENTRE, SCIENCE FOR POLICY REPORT: GHG EMISSIONS OF ALL WORLD COUNTRIES 4–5 (2023), https://edgar.jrc.ec.europa.eu/booklet/GHG_emissions_of_all_world_countries_booklet_2023report.pdf (finding that of the countries that contribute at least 1% of the world's GHG emissions, Indonesia saw the largest relative increase (10%) between 2021 and 2022).

271. Bryce, *supra* note 268.

272. *See* Global Energy Monitor, *New Coal-Fired Power Capacity by Country*, GLOBAL COAL PLANT TRACKER (Jan. 2025), https://docs.google.com/spreadsheets/d/1j35F0WrRJ9dbIJhtRkm8fvPw0Vsf-JV6G95u7gT-DDw.

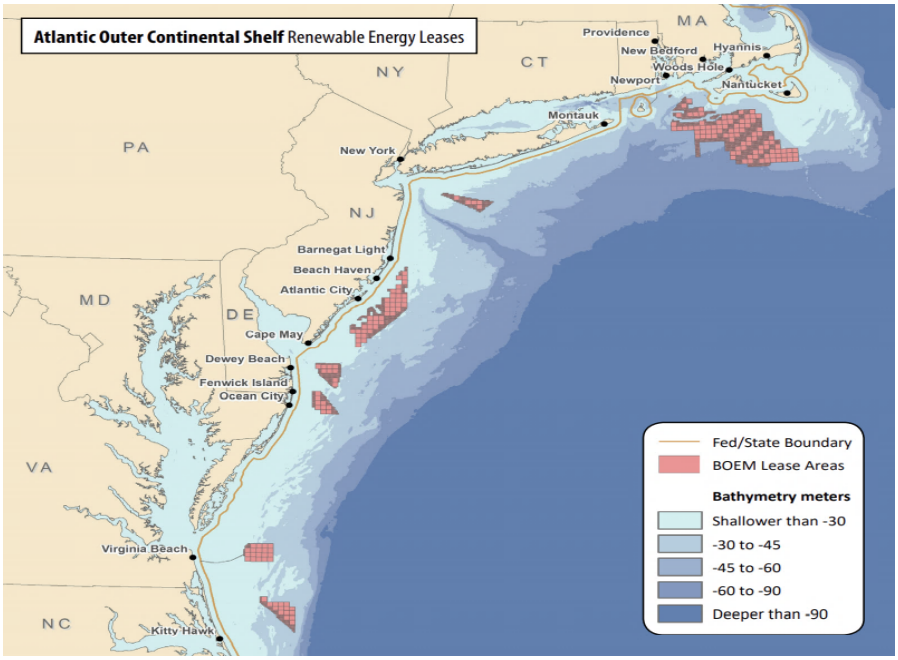
The Statistical Review of World Energy confirms that the United States on an absolute basis has reduced its carbon emissions more than any other country during the first 22 years of this century—a reduction of U.S. carbon emissions by approximately 915 million tons, greater than the combined reductions of Germany (-219 Mt), the U.K. (-221 Mt), and Japan (-164 Mt).[273] Moving in a different direction, several countries, excluding China, added nearly 19 GW of new coal capacity in 2022—the biggest contributors being India, Japan, and Indonesia.[274]

The U.S. share of global CO_2 emissions has fallen dramatically this century: In 2000, the United States was responsible for around 24% of global CO_2 emissions.[275] In 2022, that percentage had fallen to around 14% of global emissions, due to both U.S. emission reductions and increases in China's & India's emissions from 18% to around 38%.[276] Over the prior decade, CO_2 emissions in Vietnam increased 7.6% per year, in Indonesia by 3.9% per year, and in Bangladesh by 6.4% annually.[277]

The key challenge for the U.S. power system is not technological, but legal: The 'critical path' transmission infrastructure bottleneck was not resolved by the three new U.S. infrastructure laws enacted in 2021-2023.[278] The Princeton University REPEAT group forecasts this transmission infrastructure impasse will sacrifice 80% of what the Biden Administration legislation pledged would be achieved by its approximately $400 billion dollars of federal subsidies in this decade.[279]

273. Bryce, *supra* note 268.
274. *Id.*
275. *Id.*
276. *Id.*
277. *Id.*
278. *See* discussion *supra* Part II.
279. Brad Plumer & Lisa Friedman, *A Swaggering Clean-Energy Pioneer, With $400 Billion to Hand Out*, N.Y. TIMES, https://www.nytimes. com/2023/05/11/climate/jigar-shah-climate-biden.html (May 11, 2023).

Figure 7[280]



When technology is not the issue, and money and subsidies are available, the challenge becomes "location, location, location." Given omissions regarding key land-use jurisdiction in recent federal legislation, one legal pivot is to shift the location of new zero-carbon generation to reach beyond locations within state legal discretion or control. Legal 'work-arounds' are implementable under existing U.S. law by shifting location for new proven renewable power technology that minimizes transmission bottlenecks. For example:

- Site new wind power generation supply location at least three miles offshore in federal ocean lease areas shown in Figure 7 proximate to eastern states; the federal government exclusively permits transmission lines until they reach land in a receptive eastern state[281]

- Focus policy and incentives to place solar photovoltaic panels on already interconnected existing buildings that do not

280. BUREAU OF OCEAN ENERGY MGMT., *supra* note 166, at 2.
281. *See generally* FERREY, *supra* note 86, § 3:22.

> require additional transmission infrastructure or permits to transmit power over existing interconnected lines; twenty-eight states provide Renewable Portfolio Standard renewable energy credit incentives for such roof-mounted solar projects[282]

There are legal options to coordinate rapidly increasing net new power demand as the U.S. economy electrifies at a pace more rapid than the forecast time needed to permit, environmentally review under NEPA, site, and construct new renewable power transmission infrastructure. Until sufficient renewable power supply and transmission infrastructure are in place, net increased power demand also could be offset though an equivalent amount of building and industrial energy efficiency initiatives that save consumers the cost of electricity otherwise not most efficiently consumed.[283] Those efficiency investments can be ramped-up quickly by state, local, and/or federal government policy and incentives without years of NEPA EIS review and expense, and without additional local permitting where added efficiency is installed on consumers' sides of the utility meters inside existing buildings they occupy and utilize.

Under existing law some of these alternatives are implementable to avoid the looming transmission 'critical path' bottleneck through a combination of local, state, and federal policies. If they are set in motion now, it still is not too late to make necessary shifts in law and policy to salvage various energy goals. Most importantly, this shift of location circumvents multi-year state-federal legal conflicts over exercise of individual state Tenth Amendment land-use jurisdiction for necessary new permits, new eminent domain exercise for new transmission infrastructure,[284] or uncertain NEPA review[285] confronting interstate infrastructure for the most critical U.S. technology.

282. *See supra* Figure 3; Bob Hinkle, *Prioritizing Energy Efficiency to Combat the Climate Crisis*, UTIL. DIVE (Dec. 20, 2022), https://www.utilitydive.com/news/prioritizing-energy-efficiency-to-combat-the-climate-crisis (explaining that energy efficiency is ready to implement with no permitting or need to first build transmission lines); *see also Energy Efficiency Policies and Programs,* U.S. DEP'T OF ENERGY, https://perma.cc/GF2W-Q8SM (declaring that local zoning laws may be structured to encourage energy-efficient buildings). *See generally* FERREY, ENVIRONMENTAL LAW, *supra* note 80.

283. *See generally* FERREY, *supra* note 86, § 3:22.

284. *See* discussion *supra* Section V.B.

285. *See* discussion *supra* Section II.C.1.