U.S. House Committee on Energy and Commerce
Subcommittee on Energy
Markup of 13 Bills
Documents for the Record
June, 5 2025

1. A letter from the American Public Power Association, addressed to Rep. Balderson, submitted by Rep. Balderson.
2. A report by Energy Innovation entitled, "Assessing Impacts of the 2025 Reconciliation Bill on U.S. Energy Costs, Jobs, Health, and Emissions," submitted by Rep. Castor.
3. A presentation by NERA prepared for the Clean Energy Buyers Association entitled, "Economic Impacts of Repealing Technology-Neutral Tax Credits," submitted by Rep. Castor.
4. A report by the Rhodium Group entitled, "Ways and Means Brings the Hammer Down on Energy Credits," submitted by Rep. Castor.
5. An issue brief by Resources for the Future entitled, "Projected Impacts of Repealing the Section 45Y and 48E Technology-Neutral Clean Electricity Tax Credits," submitted by Rep. Castor.
6. A report by the Princeton REPEAT Project entitled, "A Fork in the Road: Impacts of Federal Policy Repeal on the U.S. Energy Transition," submitted by Rep. Castor.
7. An issue brief by the Center for Climate and Energy Solutions entitled, "Economic Impact of FEOC, Proposed Tax Credit Restrictions," submitted by Rep. Castor.
8. An article from E&E News entitled, "FERC Will Lose 9% of Workforce, Chair Says," submitted by Rep. DeGette.
9. The unedited hearing transcript from the 9/13/2023 Energy, Climate, and Grid Security Subcommittee hearing entitled, "Keeping the Lights On: Enhancing Reliability and Efficiency to Power American Homes," submitted by Rep. Castor.
10. A letter from the Natural Resources Defense Council submitted by Rep. Castor.
11. A letter signed by 117 groups in opposition to H.R. 1949, submitted by the Minority.
12. An article from E&E News entitled, "FERC Official Rejects Republican Bill Targeting Biden Rules", submitted by the Minority.
13. A letter from the Industrial Energy Consumers of America in opposition to H.R. 1949, submitted by Rep. Castor.
14. A letter from 80 environmental groups in opposition to H.R. 1949, submitted by Rep. Castor.
15. An article from the Center on Global Energy Policy at Columbia SIPA entitled, "What China's Retaliatory Tariff Means for U.S.—China LNG Trade," submitted by Rep. Castor.
16. An article from the New York Times entitled, "Electricity Prices Are Surging. The G.O.P. Megabill Could Push Them Higher." Submitted by Rep. Castor.

17. A report from the Energy Venture Analysis titled “Impact Analysis of U.S. Natural Gas Exports on Domestic Natural Gas Pricing”, submitted by Rep. Pfluger.

AMERICAN PUBLIC POWER ASSOCIATION
Powering Strong Communities

June 4, 2025

Representative Troy Balderson
U.S. House of Representatives
2429 Rayburn House Office Building
Washington, D.C. 20515

Dear Representative Balderson:

The American Public Power Association (APPA) appreciates the opportunity to submit a letter in support of H.R. 3616, the Reliable Power Act, which would require the Federal Energy Regulatory Commission (FERC) to review federal agency actions that are likely to have significant negative impacts on the reliability and adequacy of the bulk-power system. APPA appreciates your work on this legislation and your efforts to support grid reliability and resource adequacy.

APPA is the national trade organization representing the interests of the nation's 2,000 not-for-profit, community-owned electric utilities. Public power utilities are in every state except Hawaii. They collectively serve over 55 million people in 49 states and five U.S. territories, and account for 15 percent of all sales of electric energy (kilowatt-hours) to end-use consumers. Public power utilities are load-serving entities, with the primary goal of providing the communities they serve with safe, reliable electric service at the lowest reasonable cost, consistent with good environmental stewardship. This orientation aligns the interests of the utilities with the long-term interests of the residents and businesses in their communities. While public power utilities serve some of the nation's largest cities, nearly 1,600 of the 2,000 in operation serve rural communities.

The Reliable Power Act

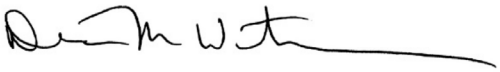
APPA supports efforts in Congress to provide FERC with a formal role in determining the potential reliability impacts of federal regulations. Further, APPA believes that, should FERC determine a proposed regulation would adversely impact the reliable operation of the bulk-power system, the issuing agency should be required to make necessary modifications. Given the critical responsibility of FERC to assist electric customers in obtaining reliable, safe, secure, and economically efficient energy services at a reasonable cost, APPA believes FERC must have the appropriate authority to determine and mitigate significant reliability impacts of major regulations. This would allow electric utilities, including public power utilities, to comply with

such regulations without adversely affecting regional or local electric system reliability. [*See APPA Resolution 24-03, "In Support of Electric Reliability."]*

APPA believes it appropriate for the North American Electric Reliability Corporation (NERC), which has years of experience conducting long-term reliability assessments, to initially assess whether the bulk-power system is at risk of being unable to supply future energy demands before FERC can exercise authority to review regulations. APPA appreciates that the Reliable Power Act provides NERC with appropriate flexibility in conducting the long-term reliability assessment, so it can continue to improve its techniques, analysis, and solutions as the needs of the grid evolve.

APPA supports H.R. 3616, the Reliable Power Act, and encourages the subcommittee members to approve it. We look forward to working with you to strengthen grid reliability and ensure public power utilities can continue to provide reliable, affordable, and sustainable electricity to their communities.

Sincerely,



Desmarie M. Waterhouse
Senior Vice President of Advocacy and Communications & General Counsel

Attachment:

APPA Resolution 24-03, "In Support of Electric Reliability."

Resolution 24-03

Sponsors: California Municipal Utilities Association; Illinois Municipal Electric Agency; Pennsylvania Municipal Electric Association; Colorado Association of Municipal Utilities, Irrigation and Electrical Districts Association of Arizona; NMPP Energy, Michigan Municipal Electric Association; Tennessee Valley Public Power Association; American Municipal Power; Ohio Municipal Electric Association

In Support of Electric Reliability

The American Public Power Association (APPA) strongly supports efforts to maintain and improve the reliability of the nation's electric grid. Electricity is the lifeblood not only of the individual communities that public power utilities serve, but also of our nation's economic and national security. Maintaining reliable service is the number one priority for electric utilities, despite increasing challenges from extreme weather, physical and cyber security threats, changes in generation mix, and increased load due to electrification. Public power utilities lead the industry in reliability, usually delivering more reliable electric service compared with other types of utilities.

Even with a strong record of delivering reliable service, public power utilities know there is more work to be done amid growing threats to electric reliability. In addition to external threats like extreme weather and cyber or physical attacks, public power utilities must also ensure reliability as local, state, and/or federal policies impact the generation mix, causing premature retirements of fossil fuel assets, and impact load growth by promoting the electrification of transportation, industrial processes, and home appliances. APPA believes that federal policymakers should consider electric reliability paramount and should take it into account in making important policy decisions, including major federal regulations.

As part of the Federal Energy Regulatory Commission's (FERC) mission to protect consumers in obtaining reliable, safe, secure, and economically efficient energy services at a reasonable cost, FERC must have both the authority and obligation to analyze the potential reliability impacts of major proposed and final federal regulations, including those proposed by the Environmental Protection Agency. Without such a process in place, federal policymakers could finalize regulations or laws that could significantly harm electric reliability, putting at risk the health, safety, and economic prosperity of all Americans, including those served by public power.

Additionally, Federal Power Act section 202(c) gives the Secretary of Energy the authority to issue must-run orders to individual power plants during emergencies, including a sudden increase in electricity demand or a shortage of electricity. These must-run orders temporarily allow generation facilities to exceed their emissions limitations under environmental regulations.

NOW, THEREFORE BE IT RESOLVED: That the American Public Power Association (APPA) strongly supports efforts to maintain and improve the reliability of the nation's electric grid; and

BE IT FURTHER RESOLVED: That APPA believes the Federal Energy Regulatory Commission (FERC) should be given the authority, and has an obligation to, analyze the potential reliability impacts of major proposed and final federal regulations; and

BE IT FURTHER RESOLVED: That APPA supports efforts by Congress to enact legislation that would provide FERC with a formal role in determining the potential reliability impacts of major proposed and final federal regulations; and

BE IT FURTHER RESOLVED: That APPA believes that should FERC determine a major proposed or final federal regulation would adversely affect the reliable operation of the bulk electric system, it must proactively work with the issuing agency, which should be required to make the necessary modifications to the proposed or final federal regulation to allow electric utilities, including public power utilities, to comply with such regulations without adversely impacting regional or local electric system reliability.

Adopted at the Legislative & Resolutions Committee Meeting
February 27, 2024
Sunsets in March 2032

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ASSESSING IMPACTS OF THE 2025 RECONCILIATION BILL ON U.S. ENERGY COSTS, JOBS, HEALTH, AND EMISSIONS

The United States House of Representatives is advancing its 2025 budget Reconciliation legislation, which seeks to repeal or modify many existing clean energy tax credits and funding programs. On May 12th, text was released from the final set of committees, providing a first look at what policies and policy changes the eventual budget Reconciliation bill may include.

The legislation includes several changes to policy, funding, and tax credits that affect energy manufacturing and deployment. The current text claws back unobligated funding, expands new oil and gas leasing, changes and eliminates existing energy and manufacturing tax credits, and repeals certain Clean Air Act programs. In particular, the Reconciliation text drastically changes and terminates existing clean energy tax credits passed by Congress in 2022. To date, these credits have generated $321 billion in new private investment across 2,369 domestic clean-energy facilities, representing 4.7 percent of all US private investment in the first quarter of 2025.[1] An additional $522 billion private sector investment has been announced across 2,217 facilities.

As currently written, the Reconciliation legislation undercuts these nearly 5,000 projects, risking billions in investments, dampening economic growth, eliminating jobs, and raising energy bills for people and businesses. Uncertainty about the continuation of these programs has already resulted in $6.9 billion worth of project cancellations between January and March 2025.

Energy Innovation used its open-source, peer-reviewed Energy Policy Simulator to analyze the potential effects of the policy changes included in this legislation. This analysis compares a "Current Policies" scenario that includes all current legislation and regulations to a "EI Reconciliation May 2025" scenario that includes select Reconciliation provisions from each of the following U.S. House Committees: Agriculture, Energy and Commerce, Natural Resources, Transportation and Infrastructure, and Ways and Means. A full discussion of the provisions modeled is included in the Appendix.

We find the Reconciliation text as drafted would increase cumulative energy costs by more than $16 billion across all American households annually in 2030, swelling to more than $33 billion in higher energy costs by 2035. This increase happens even if oil and gas production rise and help reduce fossil fuel prices, as envisioned by the bill. The changes envisioned by this bill create near-term impacts that persist over time, costing America's workforce more than 830,000 jobs in 2030 and nearly 720,000 jobs in 2035 as new investment in domestic energy falters and GDP shrinks by $117 billion in 2030 and $135 billion in 2035. Between 2025 and 2034, the Reconciliation budget window, cumulative GDP decreases by more than $1 trillion.

[1] As of May 2025

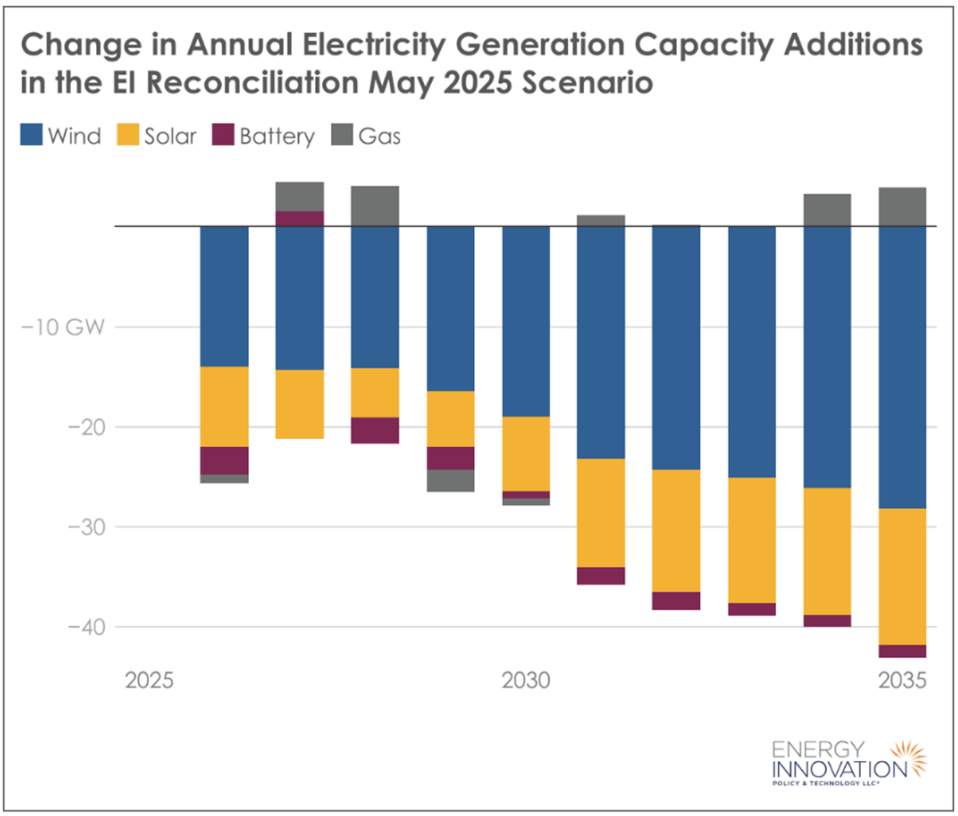
Less Electricity Supply

The current Reconciliation text includes numerous changes to the technology-neutral section 45Y production tax credit (PTC) and section 48E investment tax credit (ITC). These changes include an earlier phaseout timeline for the credits, new language tethering credit eligibility to a placed-in-service date instead of a commence-construction date (effectively ending the credits four years earlier and making it such that many projects already in the planning phase would be affected), restrictions on taxpayer eligibility, and changes to rules on the use of components, subcomponents, and critical minerals from Foreign Entities of Concern (FEOC).

Collectively, these changes would significantly slow deployment of new electricity generating capacity at a time of rapidly growing electricity demand – total U.S. demand is forecast to increase 15.8 percent, or 128 GW, in the next four years. Making new clean electricity less economic will decrease new market-driven capacity, threatening the ability of utilities to bring new capacity online in time to meet demand forecasts – clean energy composed more than 90 percent of all new capacity added to the U.S. grid in 2024, while gas turbine manufacturers face delivery backlogs until at least 2029.

Compared to the Current Policies scenario, the Reconciliation bill would decrease total new electricity capacity additions by 114 gigawatts (GW) by 2030 and 302 GW by 2035. This includes a 33 GW decrease in solar capacity (of which 4 GW is distributed solar), 78 GW decrease in wind capacity, and 7 GW decrease in battery storage capacity by 2030; new capacity installations fall by 95 GW for solar (of which 5 is distributed), 205 GW for wind, and 14 GW for battery storage respectively by 2035.

Without these new resources, the cost of meeting growing demand increases considerably; we find a roughly 50 percent increase in wholesale power prices by 2035 from the loss of new capacity and higher fossil fuel prices.



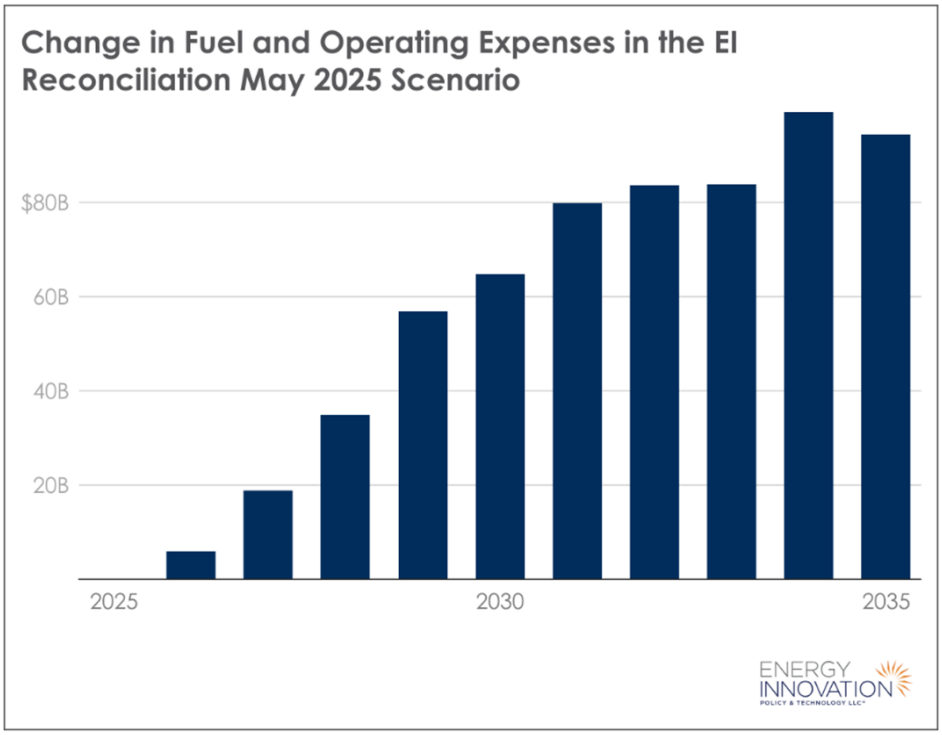
Higher Energy Spending

Reduced clean energy investment will increase fuel and operating expenses across the country. Wind and solar have no fuel costs and lower operation and maintenance (O&M) costs than fossil-fueled power plants, which means they push down overall power prices compared to non-renewable generation sources. Changes in federal energy tax credits and fossil fuel land leasing would decrease deployment of low-cost clean electricity and increase the share of electricity coming from fossil fuel power plants, thus increasing electricity generation prices. The higher demand for fossil fuels raises prices for those fuels which, in turn, makes electricity generation using those fuels even costlier. While gas generation is currently cost competitive with clean energy, the U.S. Energy Information Administration (EIA) data forecasts gas prices could rise 91 percent by 2026, threatening to raise overall electricity generation prices even further unless clean energy continues to be added to the grid.

Furthermore, repealing other incentives and existing standards, including U.S. Environmental Protection Agency and National Highway Traffic Safety Administration standards on vehicle tailpipe emissions and fuel economy increases energy spending. Battery electric vehicles, which existing incentives and standards support, are about three times as efficient as their gasoline and diesel counterparts. As a result, cutting incentives and standards leads to more gas and diesel vehicles, which in turn cost vehicle owners more to operate.

This modeling also assumes that new oil and gas land leasing provisions in the Reconciliation bill increase overall domestic production of these fuels, which reduces overall prices. It also includes lower royalty rates as included in Reconciliation text. However, more internal combustion engine vehicles on the road mean more demand for gasoline and diesel. Similarly, greater reliance on natural gas in the power sector increases natural gas prices. This higher demand increases prices for those fuels, more than offsetting any decrease in prices that arise from new oil and gas drilling and production. The net effect of supply and demand increases is to raise oil and natural gas prices and consumption, which further increases household energy costs.

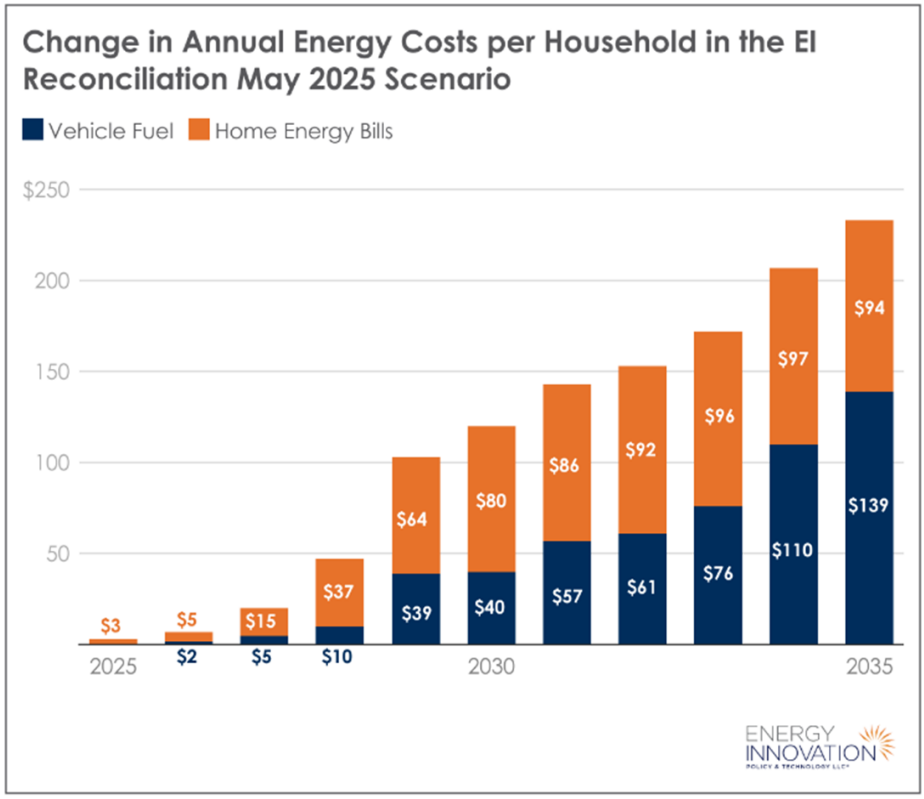
As a result of greater reliance on more expensive fossil fuels, the EI Reconciliation May 2025 scenario forecasts higher total energy spending, increasing fuel and O&M costs $65 billion in 2030, rising to $94 billion in 2035.



Proposed tax credit changes would also make new clean electricity more expensive. When utilities and market operators need to bring additional capacity online for reliability, these changes will result in that new capacity being more expensive, and that increased cost is passed through directly to consumers.

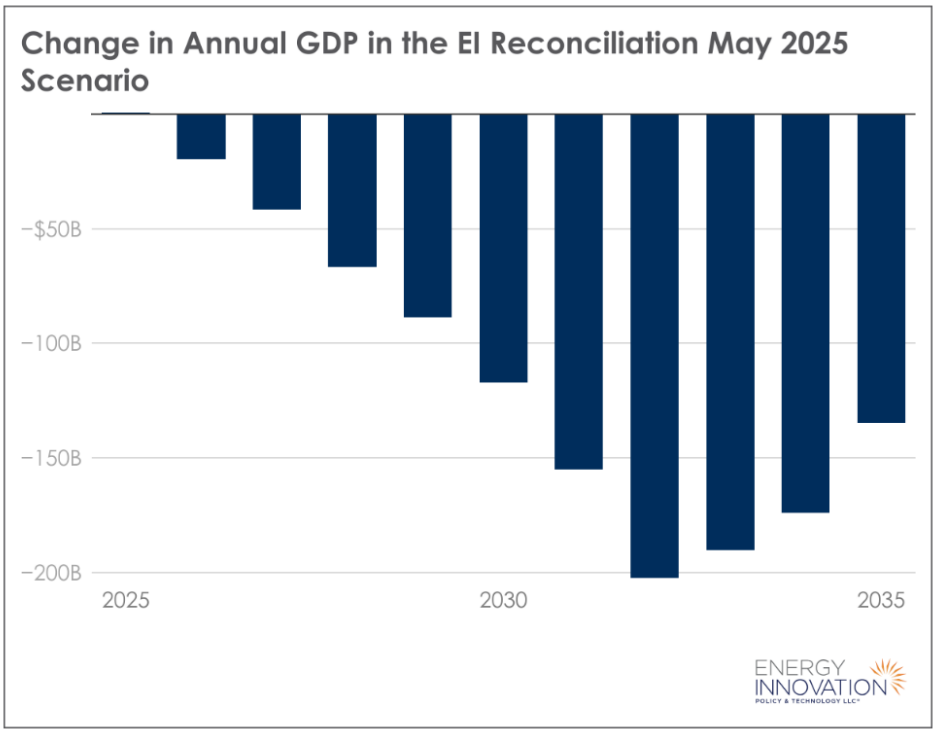
Increased capital, fuel, and operating expenses from changes to the tax credits would result in higher electricity rates for American households, which will be forced to pay more for their electricity. These effects would increase annual energy spending on a per household basis by an average of $120 per year in 2030 and more than $230 per year in 2035, with costs continuing to increase in subsequent years.

As noted above, this is true even after accounting for fossil fuel prices declining due to increased U.S. oil and gas production because of the legislation. In other words, price reductions from higher production are more than offset by greater demand for those fuels and impacts on electricity costs, forcing households to pay more for their energy under the EI Reconciliation May 2025 Scenario.

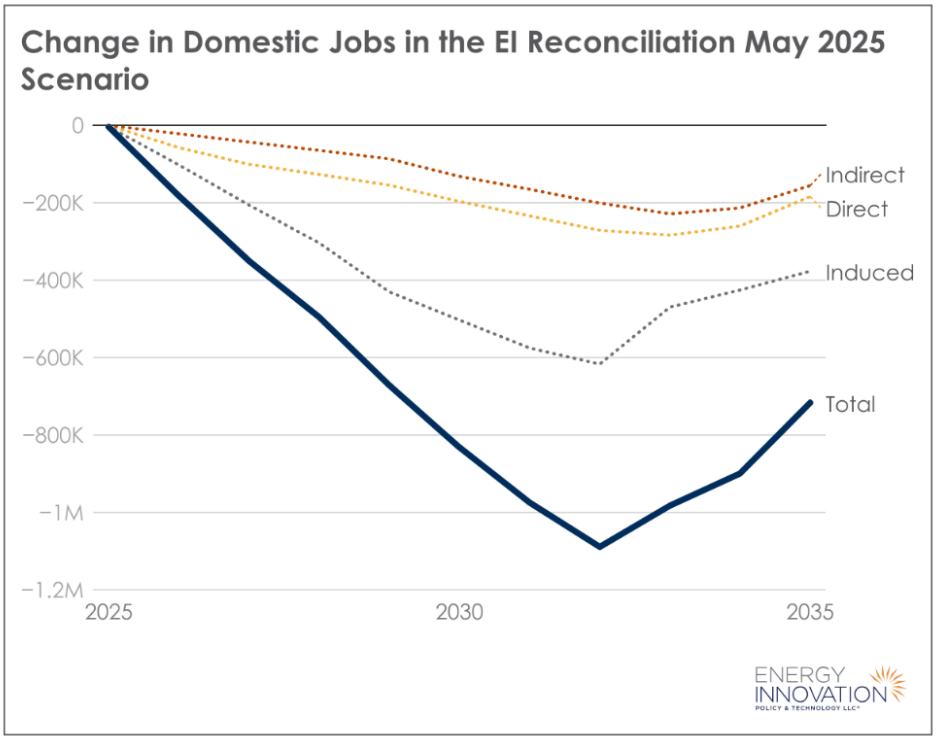


Less Manufacturing Investment And Fewer Jobs

Changes to funding and tax credits in Reconciliation legislation will cause developers to cancel a significant number of the announced clean energy manufacturing facilities while significantly decreasing clean electricity generation deployment. Cumulative GDP falls by more than $1 trillion as a result of fewer clean energy manufacturing and construction projects.



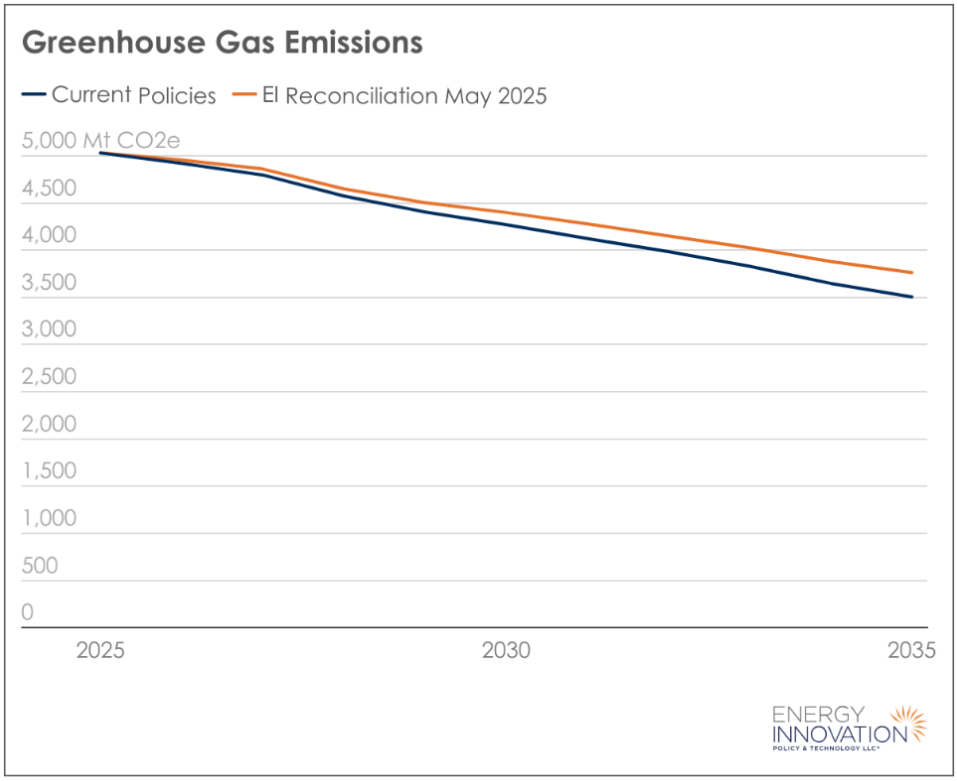
Cutting private sector investment costs our economy significant job losses in the EI Reconciliation May 2025 scenario. We find this legislation would cost Americans more than 830,000 jobs compared to the Current Policies scenario in 2030, and nearly 720,000 jobs in 2035. This includes losing direct and indirect jobs from decreased investments in clean energy projects and lower demand for the inputs to those projects, as well as from induced economic activity (e.g., high fuel costs mean consumers have less money to re-spend in the economy).



These numbers are likely conservative because they do not account for the significant potential cancellation of planned clean energy manufacturing facilities. As of May 2025, $522 billion of outstanding investment has been announced across 2,217 facilities, which is expected to create more than 680,000 operational and construction jobs. Many of these announced investments are at risk of being cancelled if the Reconciliation text is passed as drafted.

Higher Pollution And Negative Health Impacts

The EI Reconciliation May 2025 scenario also increases air pollution, particularly from power plants and vehicles. Under the proposed legislation, emissions would increase by nearly 130 million metric tons of carbon dioxide equivalent (Mt CO_2e) in 2030, rising to nearly 260 Mt CO_2e in 2035 – the equivalent of adding 56 million cars to the road. Higher local air pollution would harm public health, leading to nearly 350 additional premature deaths annually by 2030 and nearly 670 by 2035.



Methodology

The Current Policies scenario includes the IRA, the Infrastructure Investment and Jobs Act (IIJA), and the CHIPS and Science Act, as well as finalized U.S. EPA rules including oil and gas methane standards; tailpipe carbon dioxide (CO_2) standards for light-, medium-, and heavy-duty vehicles; and power plant CO_2 standards. It also includes any state-level renewable portfolio or clean energy standards, state carbon pricing schemes, and adoption of the Advanced Clean Cars I and II rules as well as the Advanced Clean Trucks rule.

The EI Reconciliation May 2025 Scenario models select Reconciliation provisions from each of the following U.S. House Committees: Agriculture, Energy and Commerce, Natural Resources, Transportation and Infrastructure, and Ways and Means. This scenario repeals the EPA tailpipe CO_2 standards for light-, medium-, and heavy-duty vehicles based on May 2025 Reconciliation Bill text from the Energy and Commerce committee. All other EPA rules modeled in the Current Policies scenario are left in place. A full discussion of the provisions modeled is

included in the Appendix. It does not reflect changes in the share of technologies that are produced domestically after Reconciliation such as potential cancellations of domestic manufacturing projects, meaning these estimates are likely conservative and impacts are likely greater than reported here.

For more information on how we modeled changes in federal clean energy tax credit and other federal funding programs, see Appendix A. Model settings for this analysis are also available on request. Documentation on the EPS model architecture and methodology can be found on Energy Innovation's website.

APPENDIX A:

This appendix contains detail on the provisions in the 2025 Reconciliation Bill that were modeled in this assessment. The appendix is organized by U.S. House committee.

Ways and Means	
Sec. 112002. Termination of Clean Vehicle Credit	§112002(a) terminates the clean vehicle tax credit under I.R.C. §30D in 2027 rather than 2032. This credit provided up to $7,500 to taxpayers for the purchase or lease of qualifying clean vehicles. §112002(b) adds a special rule for taxable year 2026 wherein vehicles only qualify for the credit if the cumulative number of covered vehicles sold by the manufacturer of that vehicle is under 200,000 as of December 31, 2025. Using data from Marklines and Cox Automotive, we find this disqualifies most clean vehicles from qualification, as several manufacturers have hit this limit. See Appendix B: 2026 Qualification for 30D Credits for a summary table of OEM qualifications for credits. If vehicle qualification criteria remain unchanged, only two vehicles would qualify for credits in 2026. We phase out federal incentives for battery electric-, plugin hybrid-, and fuel cell cars and SUVs according to this updated schedule, leaving only sales-weighted state-level incentives.
Sec. 112003. Termination of Qualified Commercial Clean Vehicles Credit	§112003 terminates the commercial clean vehicle tax credit under I.R.C. 45W in 2026 rather than 2032. This credit provided up to $7,500 or $40,000 to taxpayers for the purchase or lease of new vehicles under or over 14,000 pounds gross vehicle weight rating. We phase out federal incentives for battery electric-, plugin hybrid-, and fuel cell vehicles according to this updated schedule.
Sec. 112006. Termination of Residential Clean Energy Credit	§112006 phases out the residential clean energy credit under I.R.C. §25D in 2026 rather than 2035. This credit covered 30 percent of the costs of new, qualified clean energy property for homes, such as solar panels, wind turbines, batteries, and heat pumps. We calculate annual distributed energy capacity additions in AEO 2023's Reference and No IRA scenarios, then subtract the difference from the Current Policies scenario's projected capacity.
Sec. 112008. Phase-out and Restrictions on Clean Electricity Production Credit	§112008 accelerates the phaseout of the clean electricity tax credit under I.R.C §45Y, moves from a commenced construction to a placed in service timeline, applies restrictions to the requirements for qualifying facilities, and revokes credit transferability. The foreign entities restrictions in this section restrict qualifying taxpayers and forbid recipient taxpayers from receiving material assistance from prohibited foreign entities in the form of payments from, or components, subcomponents, or critical minerals included in

	property extracted, processed, recycled, manufactured, or assembled by a prohibited foreign entity. We conclude that as written these requirements are sufficiently prohibitive as to prevent any taxpayer from earning the credits in the window before the accelerated timeline established in §112008 concludes. As a result, we assume the new restrictions will be binding, preventing newly built clean electricity plants from qualifying for the tax credit as of 2026 for any projects not currently under construction.
Sec. 112009. Phase-out and Restrictions on Clean Electricity Investment Credit	§112009 accelerates the phaseout of the clean electricity investment tax credit under I.R.C §48E, applies restrictions to the requirements for qualifying facilities, and revokes credit transferability. For the same reasons as with §112008, we assume the new restrictions will be binding, preventing newly built clean electricity plants from qualifying for the tax credit as of 2026.
Sec. 112011. Restrictions on Carbon Oxide Sequestration Credit	§112011 places restrictions on the carbon oxide capture credit under I.R.C. §45Q. It forbids the issuance of carbon oxide capture credits to foreign entities and repeals the transferability of the credits. Unlike the foreign entities requirements in §§112008–112009, this provision does not forbid material assistance from foreign entities. We do not believe the foreign entities restriction in §112011 will have a material impact on the taxpayers being issued the carbon oxide credit. Additionally, due to the nature of taxpayers being issued carbon oxide credits, we do not believe the repeal of transferability will have a material impact on the credit's use. As a result, we model no change to carbon oxide sequestration in our EI Reconciliation May 2025 scenario.
Sec. 112012. Phase-out and Restrictions on Zero-emission Nuclear Power Production Credit	§112012 accelerates the phaseout of and places restrictions on the nuclear power production tax credit under I.R.C. §45U. It forbids the issuance of nuclear power production credits to foreign entities and repeals the transferability of the credits. We assume that the limited foreign entities provisions and the repeal of transferability will have no impact on the collection of the credit due to the nature of the taxpayers producing nuclear power. We assume that the credit phases out in line with the schedule established in §112012(a), reaching zero percent in 2032.
Sec. 112013. Termination of Clean Hydrogen Production Credit	§112003 terminates the clean hydrogen production tax credit under I.R.C. 45V in 2026 rather than 2032. No facilities for which the construction begins after December 31, 2025 qualify for the credit. The Current Policies scenario assumes hydrogen production aligns with the Current Policy scenario of Evolved Energy Research's Annual Decarbonization Perspective report, with 63 percent and 3 percent of U.S. hydrogen supplied by electrolyzers and reforming with carbon capture, respectively, by 2040.[2] With the early termination of the 45V

[2] https://www.evolved.energy/us-adp-2024

	credit, we assume production remains stagnant at 2025 levels through midcentury.
Sec. 112014. Phase-out and Restrictions on Advanced Manufacturing Production Credit	§112014 terminates tax credits for advanced manufacturing under I.R.C. §45X a year early in 2031, removes wind components from eligibility after December 31, 2027, repeals the transferability of the credits, and applies foreign entities restrictions. The foreign entities restrictions in this section forbid recipient taxpayers from receiving material assistance from prohibited foreign entities in the form of payments from, or components, subcomponents, or critical minerals included in property extracted, processed, recycled, manufactured, or assembled by a prohibited foreign entity. We find that the restriction is sufficiently prohibitive to prevent any taxpayer from earning the credits. The Current Policies scenario does not include §45X tax credits for all eligible technologies, but the EPS does explicitly include tax credits for domestic battery manufacturing. The Current Policies scenario reads in the expected growth in U.S. battery manufacturing capacity to track government tax credit outlays for production, and we assume manufacturers pass 50 percent of their tax credit revenue through to consumers in the form of lower battery prices (for vehicles and grid batteries). The EI Reconciliation May 2025 Scenario assumes all planned battery manufacturing capacity that is not currently under construction will be cancelled, and no battery manufacturing facilities receive §45X starting in 2026. Note that this methodology tracks the change in government outlays and the change in battery costs due to more restrictive §45X tax credits. It does not track the lost manufacturing jobs as a result of fewer battery facilities.
Energy and Commerce	
Sec. 42113	§42113 rescinds unobligated funds for the reduction of methane emissions from oil and gas operations and delays collection of the Methane Fee until 2034. We use information from EPA's Regulatory Impact Assessment[3] of the Waste Emissions Charge to find the emissions reductions and revenue collection attributable to the fee (leaving EPA's OOOO rules for oil and gas operations in place). We remove these impacts in the EI Reconciliation May 2025 Scenario.
Sec. 42201 and Sec. 42301	These sections repeal EPA tailpipe rules for light-, medium-, and heavy-duty vehicles as well as the NHTSA rule for CAFE standards for passenger light-duty vehicles. The Current Policies scenario uses vehicle sales shares by technology (e.g., battery electric, gasoline, plug-in hybrid) from EPA's Regulatory

[3] https://www.epa.gov/system/files/documents/2024-11/wec-ria-final_11-2024.pdf

	Impact Assessments. We remove the binding sales shares requirements from the baseline to order repeal of the rules.
Transportation and Infrastructure	
Sec. 100004. Registration Fee on Motor Vehicles	§100004 establishes $250 and $100 annual registration fees imposed on the owner of electric and hybrid vehicles registered for operation by State transportation departments. These fees are increased on an annual basis to account for inflation each fiscal year. We add annual fees to the calculation of the net present cost of vehicle technologies used to inform consumer choice in the EPS transportation structure.
Natural Resources	
Sec. 80105. Reinstate Reasonable Royalty Rates	See Appendix C: Natural Resources Methodology
Sec. 80143. Coal Royalty	See Appendix C: Natural Resources Methodology
Sec. 80171. Mandatory Offshore Oil and Gas Lease Sales	See Appendix C: Natural Resources Methodology
Agriculture	
Sec. 10102. Conservation	§10102(d)(1)-(2) expand funding for agricultural conservation by approximately $10.7 billion from 2026 to 2031. We balance this funding with rescissions in §10105(d)(4) to calculate change in the uptake of climate mitigation opportunities in the agriculture sector. §10102(d)(4) rescinds the unobligated balances of IRA §21001(a) appropriated funds for agricultural conservation. We assume that all $7.95 billion appropriated for fiscal year 2026 are rescinded, as well as 30 percent of fiscal year 2025 appropriations, in line with the $9.7 billion in unobligated Department of Agriculture tracked by Atlas.[4] We add in the $10.7 billion in expanded funding from §10102(d) to calculate a net change in appropriated funding in each fiscal year. We then use curve fitting of CBO outlay projections for conservation programs[5] and appropriated funds to estimate the share of each year's appropriated funds outlaid in subsequent years. We assign conservation funds to various mitigation opportunities from lowest to highest marginal cost using cost estimates from EPA's non-CO2 emissions report.[6] Lastly, we compare the emissions reduction potential for all funds appropriated under IRA with those assumed to be obligated and divide emissions reductions between methane and nitrous oxide based on each pollutant's share of U.S. agricultural emissions.

[4] https://www.cbpp.org/research/climate-change/with-federal-climate-funding-at-risk-policymakers-should-protect-benefits

[5] https://www.cbo.gov/system/files/2024-06/51317-2024-06-usda.pdf

[6] https://www.epa.gov/global-mitigation-non-co2-greenhouse-gases/global-non-co2-greenhouse-gas-emission-projections

Sec. 10105. Secure Rural Schools; Forestry	§10105(d)(1) rescinds the unobligated balances of IRA §23002(a) appropriated funds for grants for non-federal forest landowners. We use CBO projections of IRA budgetary effects to estimate the unobligated balances of these funds as the sum of outlays from 2026 to 2031 divided by the total budget authority of the program.[7] §10105(d)(1) rescinds $101 million in unobligated balances from IRA §23002(a) appropriated funds for state and private forestry conservation. We calculate the change in annual outlays due to each of these rescissions and compare it with the total IRA budget authority under each section. We then assign outlays to various mitigation opportunities from lowest to highest marginal cost using cost estimates from EPA's non-CO2 emissions report and sum to estimate the change in forest management emissions changes over the program lifetime.[6]

[7] https://www.cbo.gov/system/files/2022-08/hr5376_IR_Act_8-3-22.pdf

APPENDIX B: 2026 QUALIFICATION FOR 30D CREDITS

Parent group (controlled group)	Over/under 200k cap?	2025 30D-qualifying vehicles[8]
Tesla	Over	Cybertruck Model 3 Model X Model Y
General Motors	Over	Cadillac LYRIQ Cadillac OPTIQ Cadillac VISTIQ Chevrolet Blazer Chevrolet Equinox Chevrolet Silverado GMC Sierra EV
Ford Motor Co.	Over	Ford F-150 Lightning
Toyota Motor Co.	Over	
Hyundai Motor Group	Over	Genesis Electrified GV70 Hyundai IONIQ 5 Hyundai IONIQ 6 Kia EV6 Kia EV9
Stellantis	Over	Chrysler Pacifica Jeep Wagoneer
BMW	Over	
Nissan Motor Co.	Over	
Volkswagen Group	Over	
Volvo/Geely	Under	
Mercedes-Benz Group	Under	
Honda Motor Co.	Under	Acura ZDX Honda Prologue
Rivian Automotive	Under	
Mitsubishi Motors	Under	
Subaru Corp.	Under	
Mazda Motor Corp.	Under	
Lucid Group	Under	
Jaguar Land Rover	Under	
Fisker Inc.	Under	
VinFast	Under	
Ferrari	Under	
McLaren Automotive	Under	
Karma Automotive	Under	
Moke	Under	
Lordstown Motors	Under	
Mullen Automotive	Under	

[8] Not all configurations or model years may qualify

APPENDIX C: NATURAL RESOURCES METHODOLOGY

Offshore Leasing (Title VIII; Part VIII; Sec. 80171)

In 2023, the Bureau of Ocean Energy Management (BOEM) published the 2024–2029 National Outer Continental Shelf Oil and Gas Leasing Proposed Final Program.[9] The proposal includes a total of three oil and gas lease auctions in the Gulf of Mexico over five years.

This leasing program stands in contrast with the House Natural Resources Committee's portion of the 2025 reconciliation text. §80171 would require "not fewer than 30 lease sales in the Gulf of America during the 15-year period [after enactment of the law]" and "not fewer than 6 lease sales in the Cook Inlet…during the 10-year period [after enactment of the law]." Each Gulf lease sale would offer "not fewer than 80,000,000 acres" and each in the Cook Inlet "not fewer than 1,000,000 acres."

Royalty Rates (Title VIII; Part VIII; Secs. 80105, 80143)

§80105 of the House Natural Resource Committee's portion of the 2025 reconciliation text would return oil and gas royalties to 2022 levels. This results in lowering onshore leasing royalties from 16.67 percent to 12.5 percent and offshore royalties from 16.67–18.75 percent to 12.5–18.75 percent. We model the decrease in federal royalty rates as a decrease in taxes on the share new of oil and gas produced on federal land in line with methodology from Resources for the Future.[10] We also decrease coal royalties from 12.5% to 7% in line with Sec. 80143.

Onshore Leasing (Title VIII; Part VIII; Secs. 80101, 80121, 80122)

§80101 of the House Natural Resources Committee's portion of 2025 reconciliation text would require the Secretary of the Interior to "immediately resume quarterly onshore oil and gas lease sales...in each of the following states: Wyoming, New Mexico, Colorado, Utah, Montana, North Dakota, Oklahoma, Nevada, Alaska," alongside any other state with land available for oil and gas leasing. The Secretary is required to offer "not less than 50 percent of all parcels nominated…through the submission of an expression of interest."

We expect production to increase due to resumed lease sales, but the size of the increase is uncertain as expressions of interest could vary significantly with oil prices and demand projections. Therefore, we do not model changes in onshore leasing in this study. For an analysis of return to onshore leasing levels during the first three years of the first Trump administration, see prior Energy Innovation modeling.[11]

Modeling Summary

We developed two scenarios to determine the incremental impact of expanded oil and gas drilling in line with the 2025 reconciliation text against an IRA backdrop. The Current Policies scenario assumes a continuation of the least amount of additional federal oil and gas leasing allowed under current law. The EI Reconciliation May 2025 scenario assumes the least amount of additional federal leasing allowed under the reconciliation text.

- Current Policies: Assumes the 2024–29 five-year offshore plan is implemented through 2029, and biannual, 60-million-acre auctions continue through 2050.

[9] https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2024-2029_NationalOCSProgram_PFP_Sept_2023_Compliant.pdf

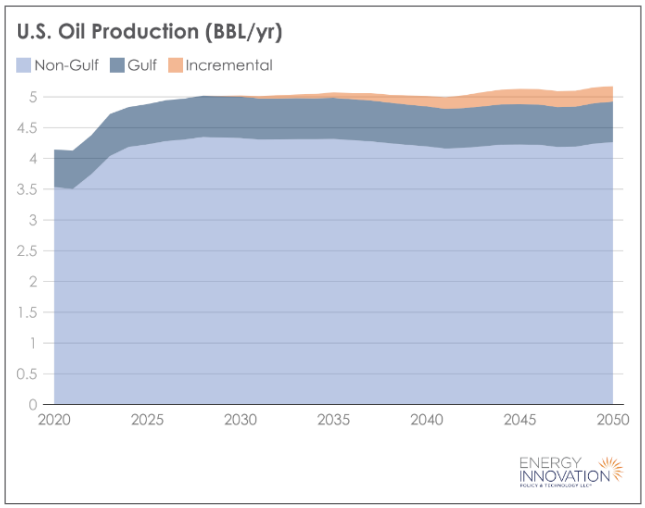
[10] https://www.resources.org/common-resources/if-then-new-cuts-to-oil-and-gas-royalty-rates-in-budget-reconciliation-will-reduce-federal-revenues

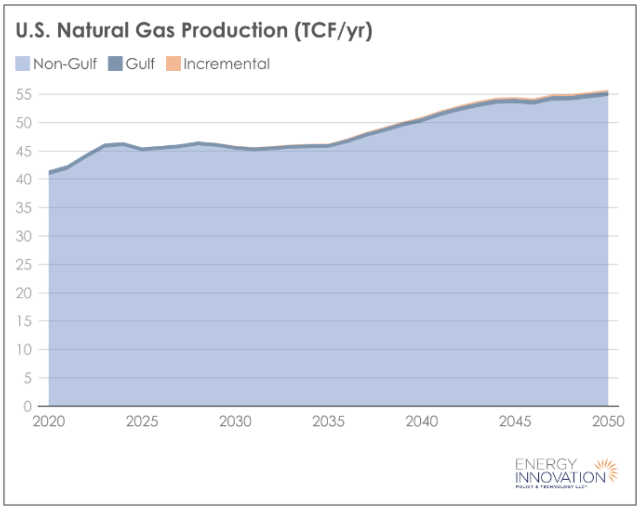
[11] https://energyinnovation.org/wp-content/uploads/The-Second-Half-of-The-Decisive-Decade-Potential-U.S.-Pathways-on-Climate-Jobs-and-Health.pdf

- EI Reconciliation May 2025: Assumes offshore leasing expands to levels proposed under the Natural Resources Committee text, with semi-annual, 80-million-acre Gulf auctions through 2040 and six one-million-acre auctions in the Cook Inlet. Assumes royalty rates are returned to pre-IRA levels.

Results

We calculated the incremental change in production associated with new leasing required by the Reconciliation text and fed this increase into the U.S. EPS. The additional, incremental production in the EI Reconciliation May 2025 scenario is equivalent to a six-percent increase above Current Policies oil production and a one-percent increase above Current Policies natural gas production by 2050. 88 percent of new, incremental oil production and 96 percent of new, incremental gas would come from leases in the Gulf. This incremental production amounts to approximately a third of existing Gulf production of oil and gas.





This incremental increase in production would result in lower oil and gas prices before accounting for changes in prices from demand changes. Natural gas prices fall approximately 0.2 percent by 2030 and one percent by 2035 from incremental production. Gasoline prices would fall around 0.1 percent by 2030 and 0.4 percent by 2035 (~0.3 cents per gallon in 2030 and 1.4 cents per gallon in 2035). Falling prices would reduce average household energy bills by three dollars per year in 2030 and $12 per year in 2035 before incorporating increases in prices from demand changes. Incorporated into the context of the full EI Reconciliation May 2025 scenario, these changes are overshadowed by greater increases in the price of oil, natural gas, and petroleum products due to shifting demand towards fossil fuels and away from electrification and low-cost renewable electricity generation.

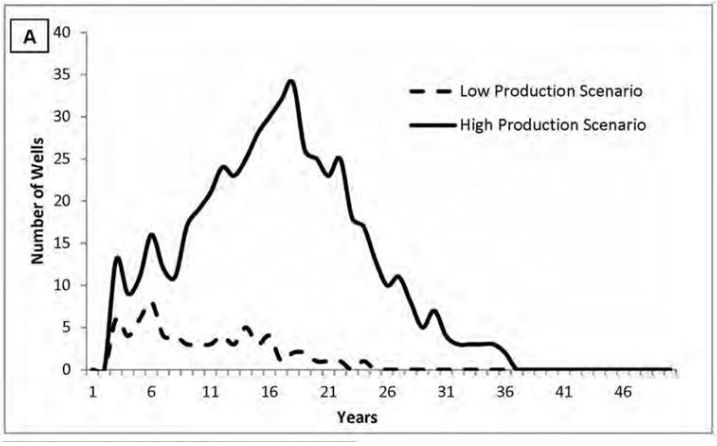
The reduction in coal, oil, and gas royalties would cost the government approximately $10.5 billion in direct lost revenue over the budget window from 2025 to 2035.

Methodology

We begin by determining the number of leases in each sceanrio. In the Current Policies scenario, we assume lease auctions continue at the biannual rate set out in the 2024–2029 OCS Proposed Final Program, with offerings of 60 million acres put up every other year. In the EI Reconciliation May 2025 scenario, we assume 30 sales for Gulf leases are held from 2025 to 2040 acocording to the schedule established in §80171(a)(1)(D), alongside six Cook Inlet sales from 2026 to 2032, according to the schedule established in §80171(a)(2)(D). We assume these offerings are additional to the five lease sales dictated in the 2024–2029 National Outer Continental Shelf Oil and Gas Leasing Program remain in place, as established by §80171(b).

We then calculate production intensities to convert these land offerings to estimated lease sales. We source program area sizes from Table 5-2 in the 2023–2028 Proposed Program[12] and Table 11-2 in the 2017–2022 Proposed Program,[13] and source anticipated production levels from Table 5-2 in the former. This yields production intensity by area, which we divide by the number of lease sales proposed in each program area to yield the per-lease estimated ultimate recovery (EUR) per unit land area leased.

Next, we produce well-drilling profiles for new leases using BOEM data on the timeline of well completions for a given area of development. Typically, wells on leased land are drilled over a period of approximately 30 years, peaking after about 15 to 20 years. We take the average of the Low and High Production Scenarios from the BOEM data in the following figure.



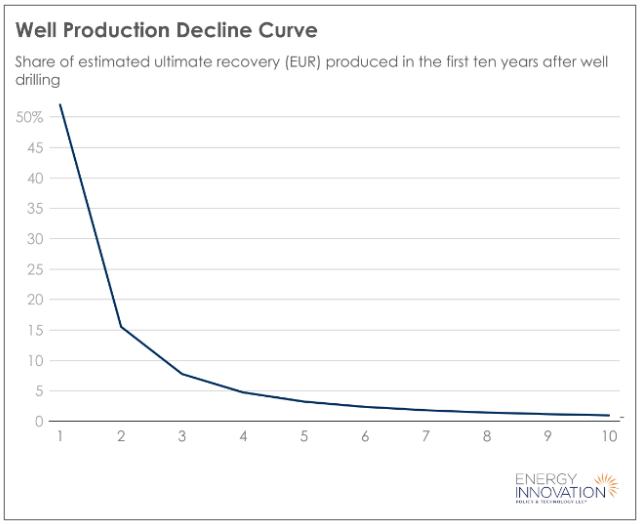
We then estimate production depletion profiles[14] to reflect the varying amount of product produced over the lifetime of each well. For example, around half of an average well's total product is produced in the first year after drilling. We averaged production profiles from EIA's AEO 2021[15] and then used curve fitting to find decline parameters matching the average profile. Multiplying this depletion curve by the BOEM drilling profile and dividing by the average total number of drills results in the cumulative production profile that determines the share of EUR recovered by age of the lease.

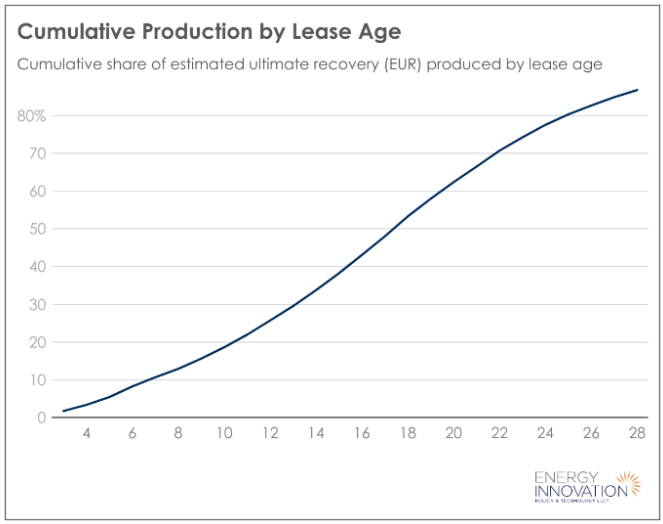
[12] https://www.boem.gov/sites/default/files/documents/oil-gas-energy/national-program/2023-2028_Proposed%20Program_July2022.pdf

[13] https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2017-2022/2017-2022-Proposed-Program-Decision.pdf

[14] https://www.eia.gov/analysis/drilling/curve_analysis/

[15] eia.gov/analysis/drilling/curve_analysis/2021/excel/AEO2021_decline_curves.xlsx





Next, we reduce our calculated incremental production to account for rebound effects on state and private land. Data from Resources for the Future indicates that 52 to 72 percent of emissions from increased production on public lands is offset by decreases in production elsewhere. 30 percent of this rebound effect is due to decreases in production on state and private land – i.e., other domestic production decreases. As a result, we reduce our estimated incremental production values by 19 percent (62 percent of 30 percent).[16]

We then calculate the change in domestic fuel prices resulting from the incremental increase in production and reduced royalties. To do so, we estimated the percent price impact per percent change in U.S. production using data from the U.S. EIA's AEO 2025 Reference and High Oil and Gas Supply scenarios.We also reduced oil and gas taxes in line with reduced royalties for newly leased acreage, using data on the area of new production from Resources for the Future.[17] Lastly, we reduced the cost of petroleum-derived fuelss in line with the share of each fuel's cost that comes from crude oil – these shares ranged from approximately 40 to 60 percent.

Lastly, we combined these supply-driven fuel price changes with demand-driven changes calculated from AEO 2023's Reference and No IRA scenarios and AEO 2025's Reference and Alternative Transportation scenarios. We input the increased production values and estimated price and tax changes into the EPS to simulate changes in economy-wide energy use, spending, and downstream impacts from changes in pollution.

[16] media.rff.org/documents/WP_20-16__Dec_2021.pdf

[17] resources.org/common-resources/if-then-new-cuts-to-oil-and-gas-royalty-rates-in-budget-reconciliation-will-reduce-federal-revenues

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Economic Impacts of Repealing Technology-Neutral Tax Credits

Prepared for Clean Energy Buyers Association (CEBA)

May 13, 2025

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Introduction

- NERA Economic Consulting (NERA) was engaged by the Clean Buyers Energy Association (CEBA) to examine the impacts of technology-neutral tax incentives, including macro-economic impacts and delivered electricity prices to residential and other ratepayers. The technology-neutral tax incentives analyzed in this study include the §45Y production tax credit (PTC) or the §48E investment tax credit (ITC) to incentivize clean energy investments across various generating technologies. The PTC and ITC incentives analyzed include the bonus credits for the prevailing wage and apprenticeship requirements but do not include the bonus credits that relate to domestic content requirements, or for projects located in energy communities.*
- To evaluate the impacts of the technology-neutral tax incentives, NERA has used N$_{ew}$ERA state-level macro-economic model and electricity rate model.
- The delivered electricity price impacts are estimated are for select states under two electricity market outlooks: (i) An electricity market outlook with incremental electricity demand from growth in data centers and technology-neutral tax incentives; and (ii) An electricity market outlook with incremental electricity demand from growth in data centers in the absence of technology-neutral tax incentives.
- The following slides detail the electricity market modeling approach, scenarios that were evaluated, the key inputs to those scenarios, key results on delivered electricity prices and additional information about the N$_{ew}$ERA model. It is our understanding that these results will be used by CEBA to inform key stakeholder discussions on the technology-neutral tax incentives.

* See previous study: https://cebuyers.org/wp-content/uploads/2025/02/CEBA_Electricity-Price-Impacts-of-Technology-Neutral-Tax-Incentives-With-Incremental-Electricity-Demand-From-Data-Centers_February-2025.pdf

NERA's Modeling Framework and Delivered Electricity Price Estimation Approach

The study scenarios are not intended to model any specific regulation.

- **Transmission Capacity:** The study does not model endogenous transmission line expansions.
- **Tax Incentives:** The study considers the §45Y production tax credit (PTC) and the §48E investment tax credit (ITC) to be technology-neutral, without additional credits applied for domestic content or facilities location in energy communities.
- **Policy Modeling:** The scenarios presented are not designed to model specific policies, and the resulting electricity price impacts may vary based on different model inputs and assumptions. The macroeconomic impacts does not incorporate funding source for the tax incentives.
- **Capacity Additions:** The modeling does not incorporate real-world siting or technology-specific constraints (for e.g., the availability of gas turbine technology) that might exist with respect to building new generating capacity. The model builds generating capacity in regions where it deems it to be economically feasible while satisfying electricity market and regulatory constraints.

1 Overview of the Modeling Approach

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NERA's Modeling Framework and Delivered Electricity Price Estimation Approach

Impacts were estimated using a state-level macroeconomic model with a detailed electricity dispatch model and a state-level rate model.

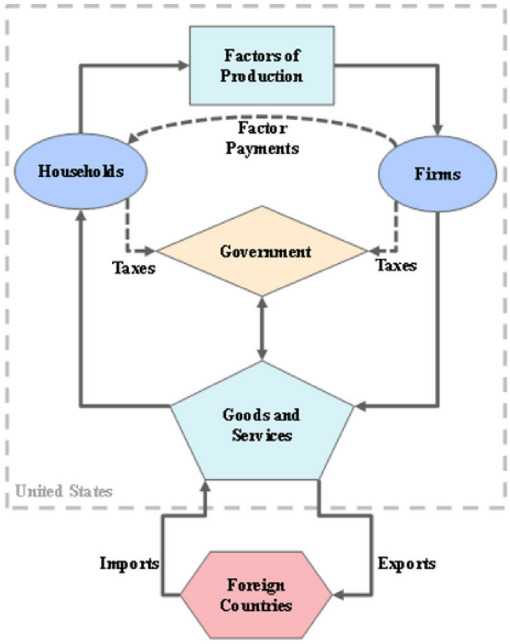
- NERA used NewERA energy-economy modeling framework that includes a state-level top-down macroeconomic model linked with a detailed bottom-up electricity dispatch model. A state-level rate model is used electricity price impacts.
- The inputs for the N_{ew}ERA macroeconomic and electric sector models are drawn from EIA's AEO 2023 publication.
- The incremental demand from deployment of data centers were based on a 2024 EPRI study.[1]
- The technology-neutral tax incentives are generally consistent with EIA's modeling assumptions and applied to the capital and the operating costs of qualifying generating units.
- The macroeconomic model, simulates all key economic interactions in the U.S. economy, including those among industries, households, and the government while the electricity sector model projects least-cost dispatch decisions for the various generating units, regional fuel, electricity, capacity and permit prices.
- The modeling framework produces integrated projections of the energy and macroeconomic impacts, with demand response, of a scenario with the technology-neutral tax incentives compared to a scenario that excludes these incentives.
- The electricity system outputs from N_{ew}ERA serve as inputs to NERA's state-level rate model. The state-level rate model produces delivered electricity price by rate-payer class (residential, commercial, industrial) based on electricity market type in the state (competitive vs. cost-of-service).

[1] EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 28, 2024, available at https://www.epri.com/research/products/3002028905

N_{ew}ERA Macroeconomic Model

The NewERA macroeconomic model is a forward-looking, dynamic, computable general equilibrium model.

- The N_{ew}ERA macroeconomic model captures the flow of goods and factors of production within the economy.
- Households in the model supply factors of production (e.g., labor and capital) to firms who in turn provide households with payments for the factors of production.
- Firm output is produced from a combination of production factors and intermediate inputs of goods and services supplied by other sectors of the economy (both domestic and foreign).
- Each firm's final output is either consumed within the U.S. or exported abroad.
- The government agent receives taxes from both households and firms, contributes to the production of goods and services, and purchases goods and services.
- The model solves for a state of equilibrium, whereby demand for goods and services equals their supply, and investments are optimized for the long term
- The model is solved for periods from 2023 to 2044 in 3-year time steps and includes 12 economic sectors. [1]
- The model outputs demand, supply and prices of all goods and services, and trade effects alon with gross regional or state product, aggregate consumption, sectoral output and investment levels.



[1] Coal mining (COL), Natural gas distribution (GAS), Petroleum refining (OIL), Crude oil production (CRU), Electricity (ELE), Agriculture (AGR), Commercial transportation other than trucking (TRN), Commercial trucking (TRK), Energy-intensive sectors (EIS), Motor vehicle manufacturing (M_V), Other manufacturing sectors (MAN) and Services (SRV).

N_{ew}ERA Electricity Sector Model

The NewERA electricity sector model is a bottom-up dispatch and capacity expansion model.

- The N_{ew}ERA electricity sector model is a bottom-up dispatch and capacity expansion model with unit-level information on generating units in 63 U.S. regions (and 11 Canadian regions) with regional demand and capacity requirement representation.
- The model produces a least-cost projection of market activity, satisfying demand and all other constraints (emission limits, transmission limits, fuel availability and regulations) over the model time horizon, projecting unit-level generation and investment decisions, regional fuel and electricity prices.
- Electricity generators are represented at the unit-level (with over 17,000 generating units in the U.S. represented in the model) along with unit-level characteristics such as capacity, utilization, outages, emission rates and technology costs.
- The model can retire units if they cannot remain profitable, build new generating capacity to meet increasing electricity demand and reserve margin requirements. The operation of existing units by the model depends on the policies in place, electricity demand and operating costs (particularly energy prices).
- The model is solved for periods from 2023 to 2044 in 3-year time steps.

State-Level Delivered Electricity Rate Model

The rate model is a bottom-up construct that estimates ratepayer-specific delivered electricity price by state

- The rate model uses regional model outputs from the NewERA electricity sector model aggregated to state-level outputs to calculate delivered electricity sector prices.
- The delivered electricity prices in the rate model are estimated based on type of electricity market structure in state and the input components based on the type of structure
  - **Cost-of-Service (COS):** The input components include the incremental cost to serve load (operating plus investment costs), renewable energy credit (REC) costs as well as a return on equity.
  - **Competitive:** The input components include the wholesale, capacity and REC costs.
- Additionally, the calculation of delivered electricity prices for both types of market structure includes transmission losses and a rate-payer specific transmission and distribution (T&D) margin.
- The state-specific delivered electricity prices by ratepayer is calculated as a weighted average estimate based on the share of COS vs. competitive market share for the state.

2

Overview of the Key Modeling Assumptions

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Overview of Technology-Neutral Tax Incentives

The technology-neutral tax incentives are broadly consistent with the U.S. EIA's AEO 2023 modeling assumptions

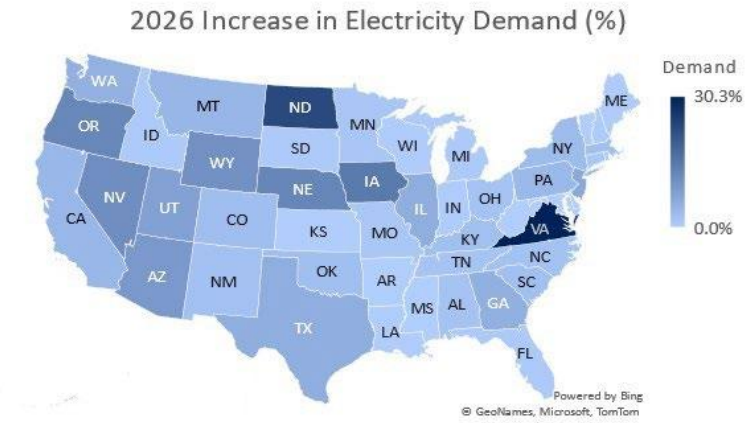
- For this study, two types of tax incentives are incorporated: §45Y production tax credit (PTC) and the §48E investment tax credit (ITC) to model the impact of the tax incentives on renewable technologies.
- The ITC was assumed to apply to capital-intensive technologies while the PTC was assumed to apply to other technologies. [1]
  - The PTC was applied to new solar PV, solar PV with storage, onshore wind, onshore wind with storage projects
  - The ITC was applied to new biomass, geothermal, hydroelectric, solar thermal, offshore wind and new nuclear
- The full value of the credit assumed to apply until 2033, 75% in 2034, 50% in 2035 and zero thereafter
- Additionally, the §45U zero-emission nuclear PTC was applied to existing nuclear resources with the full value of the credit assumed to apply from 2024 to 2032 and zero thereafter
- All technologies were assumed to be eligible for the base credit plus the bonus credits for prevailing wage and apprenticeship requirements.
- It was assumed that none of the technologies would be eligible for the bonus credits from meeting domestic content requirements (except for offshore wind) and bonus credits for location in energy communities.

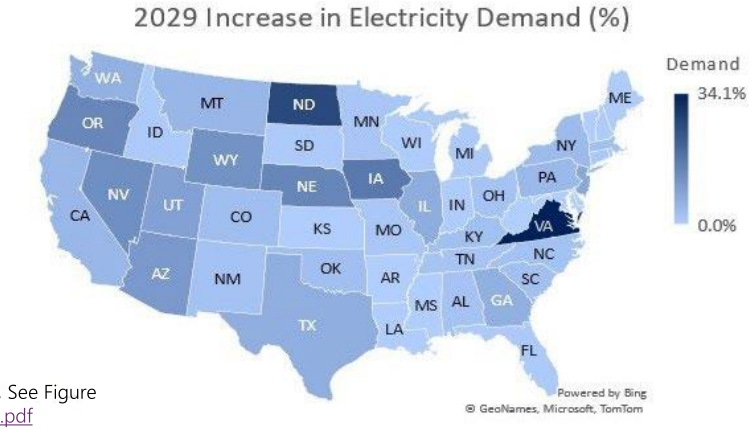
[1] U.S. EIA, AEO2023 Issues in Focus: Inflation Reduction Act Cases in the AEO2023, March 2023, available at https://www.eia.gov/outlooks/aeo/IIF_IRA/pdf/IRA_IIF.pdf;
U.S. EIA, Assumptions to the Annual Energy Outlook 2023: Renewable Fuels Module, March 2023, available at https://www.eia.gov/outlooks/aeo/assumptions/pdf/RFM_Assumptions.pdf

Incremental Electricity Demand from Data Center Growth

The incremental demand from data center growth have varying impacts on the regional electricity demand.

- NERA's assumption for the incremental demand from growth in data centers for this study are based on the Moderate Growth scenario in the 2024 EPRI study which uses a survey approach of expert assessment to forecast future demand.[1]
  - The EPRI study projects state level electricity consumption from U.S. data centers from 2023-2030 to grow at an average annual growth rate of 5% with incremental demand of about 179 TWh and 205 TWh in 2026 and 2029.
  - Moderate Growth scenario in the 2024 EPRI study is at the lower end of the academic and industry future projections of annual energy use by date centers.[2]
- The incremental electricity demand was assumed to be spread equally across all 8,760 hours in a year assuming the data centers run continuously consistent with their operations. Regional peak demand is increased by the average hourly incremental demand in a year.
- The U.S.-wide increase in total electricity demand (with the incremental demand from data center growth) is 4.3% (2026) and 4.8% (2029).





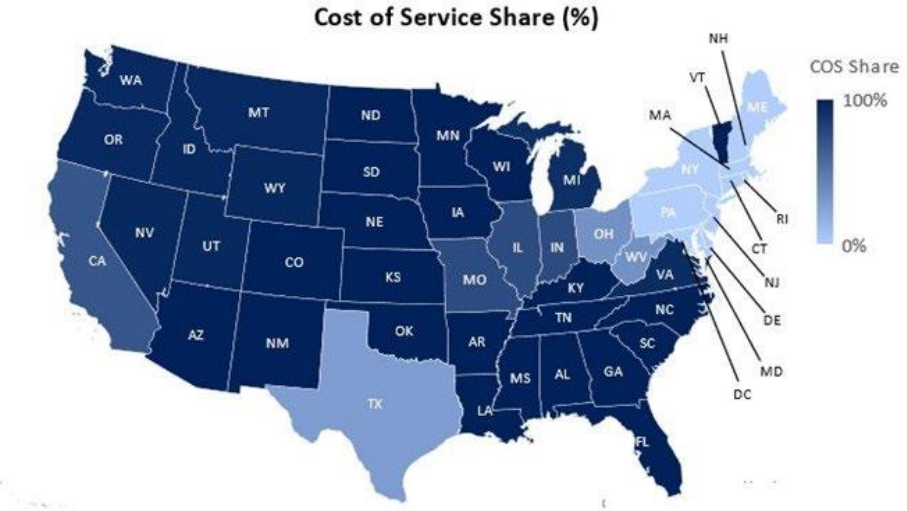
[1] EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 28, 2024, available at https://www.epri.com/research/products/3002028905

[2] Berkeley Lab, Energy Analysis & Environmental Impacts Division, 2023 United States Data Center Energy Usage Report, December 2024., See Figure 1.1., pg. 12, available at https://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report.pdf

Electricity Market Structure Assumptions

State-level electricity market structure are either cost-of-service and/or competitive.

- The electricity market structure of each individual state can be either cost-of-service and/or competitive.
- The share of demand (or generation) of cost-of-service or competitiv is based on EIA's AEO 2023 modeling assumptions.[1]
- Each state is located in a broader electricity market that is bigger thai the state in general. The state-level market impacts will be influenced by neighboring state impacts.
- Most of the states in the U.S. have either a fully cost-of-service or partial cost-of-service electricity market structure.
- States with a fully competitive electricity market structure are primaril concentrated in the Northeast.



[1] U.S. EIA, Assumptions to the Annual Energy Outlook 2023: Electricity Market Module, March 2023, available at https://www.eia.gov/outlooks/aeo/assumptions/pdf/EMM_Assumptions.pdf

3 Overview of Scenarios Analyzed

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Scenarios Analyzed for Impacts from Tax Incentives

Two scenarios were analyzed for the study to assess the impacts of the technology-neutral tax incentives.

Scenario	Electricity Demand	Technology-Neutral Tax Incentives
1. With Tax Incentives	Electricity demand from data centers	Includes technology-neutral tax incentives
2. Without Tax Incentives	Electricity demand from data centers	Excludes technology-neutral tax incentives ("repealing technology-neutral tax credits")

- The study evaluated two scenarios with and without different technology-neutral tax incentives for solar, solar with storage, solar thermal, onshore and offshore wind, geothermal, biomass, hydroelectric, and existing and new nuclear generating technologies.
- Both scenarios include incremental electricity demand from data centers.
- The technology-neutral tax incentives were applied to the eligible technologies in the scenario. The incentives have the effect of reducing the capital costs of the clean energy technologies.
- The macro-economic and electricity price impacts for this study are presented for two representative years (2026 and 2029).

4 Summary of Electricity Price Impacts

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Repealing Technology-Neutral Tax Credits Raises Energy Costs and Burdens the Economy

- Absence of Energy Credits Creates Significant Dependence on Conventional Energy Sources to Meet Demand
  - This model assumes no constraints on gas infrastructure or availability of equipment (such as gas turbines) – a modeling assumption that masks near-term critical supply chain challenges.
  - Gas turbine manufacturers are already struggling to meet surging demand with long delays.*
- Significant Dependence on Conventional Energy Sources Drives Up Electricity Prices, Directly Harming Households and Businesses: The increase in natural gas demand drives up gas prices, which cascades into higher electricity costs across the economy.
  - **Households and businesses are forced to respond** by cutting back on output, including reducing electricity consumption.
  - Higher energy costs hit energy-intensive sectors (EIS) especially hard. Iron and steel, chemicals, cement, aluminum, and non-ferrous metals face steep cost burdens that **threaten their competitiveness and viability**. Even less energy-intensive sectors, such as petroleum refining and agriculture, face mounting pressure as energy-related costs rise.

- *Gas turbine manufacturers struggling to meet surging demand from data centers – report, March 24, 2025. By Zachary Skidmore. https://www.datacenterdynamics.com/en/news/gas-turbine-manufacturers-struggling-to-meet-surging-demand-from-data-centers-report/*

Note: *Job impacts in the NewERA model are measured as "job-equivalents." The number of annual job-equivalents equals total labor income change divided by the average annual income per job. This does not represent a projection of the numbers of workers that may need to change jobs and/or be unemployed, as some or all of the loss in labor income could take the form of lower wages and be spread across workers who remain employed.*

Repealing Techology-Neutral Tax Credits Raises Energy Costs and Burdens the Economy

- **Results of Inflated Energy Prices Halt Economic Growth:** As commercial and industrial activity declines, demand for labor and capital falls, leading to wage losses, declining household income, and shrinking investment.
- Households are hit on multiple fronts: rising utility bills, reduced employment, and falling incomes constrain consumer spending and overall economic resilience.
- The combined effect is shrinking of the economy in many states: declines, household financial strain intensifies, and output contracts in key industries, with potential job losses. The scale and severity of these impacts vary by state but are significant and far-reaching.
- **Conclusion:** Without American Energy Credits the system is restricted to traditional energy sources making energy more costly to meet the demand and acts as a drag on the economy and stokes inflation.

Note: *The results from the NewERA electricity sector model are for broader regions known as power pools which are then disaggregated to state level results using a mapping of electricity demand from the power pools to individual states. The energy-intensive sectors represented in NewERA include pulp and paper, chemicals, glass, cement, iron and steel, alumina, aluminum, and mining.*

Higher energy costs disproportionately impact energy using economic sectors. Energy-intensive sectors such as iron and steel production, chemicals, cement, aluminous and other non-ferrous metals all are impacted by higher cost the most. The EIS sector includes these energy-intensive manufacturing industries.

Other sectors, petroleum refinery and agricultural, are relatively less energy intensive than the EIS sector, but also faces energy cost burden depending on the intensity of energy usages.

Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Grand Canyon State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.2% increase to households and 4.7% increase to businesses
- **Higher Electricity Prices:** 12.7% increase to households and 17.0% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $340 loss in household income
  - $0.93 billion decrease in state GDP
  - 6,700 lost jobs

Natural Gas Prices:
2026: 0.6% (Res.), 1.4% (C&I)
2029: 2.1% (Res.), 4.7% (C&I)

Electricity Prices:
2026: 10.5% (Res.), 14.6% (C&I)
2029: 14.9% (Res.), 19.9% (C&I)

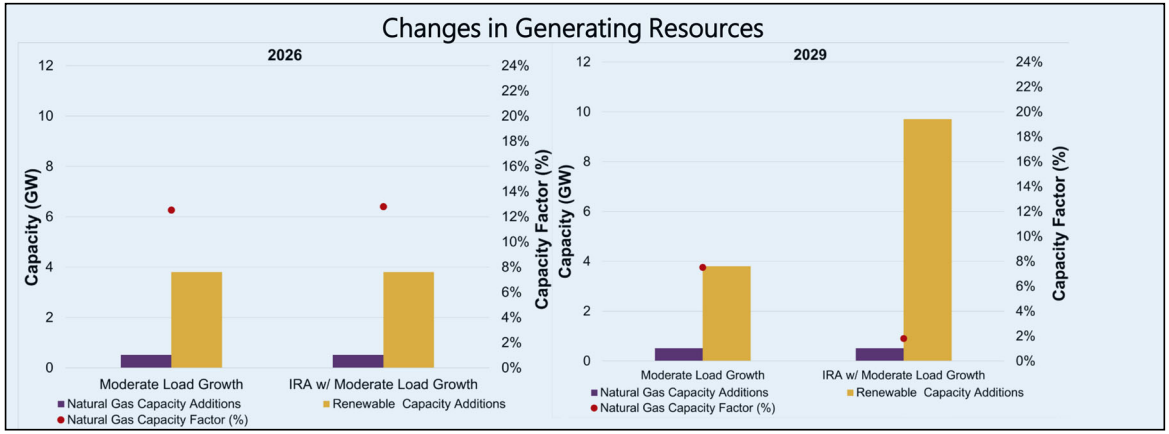
Production Loss for Energy-Intensive Sectors:
2026: ~0.00%
2029: 0.39%

Full-time Equivalent Job Losses:
2026: 2,400
2029: 7,400

GDP Loss:
2026: $0.68 billion
2029: $0.86 billion

Household Income Loss:
2026: $310
2029: $310

Agriculture Output Loss:
2026: ~0.00%
2029: 0.14%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Golden State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 3.5% increase to businesses
- **Higher Electricity Prices:** 7.2% increase to households and 8.5% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $350 loss in household income
  - $4.78 billion decrease in state GDP
  - 44,200 lost jobs

Natural Gas Prices:
2026: 0.6% (Res.), 1.0% (C&I)
2029: 2.2% (Res.), 3.4% (C&I)

Electricity Prices:
2026: 5.8% (Res.), 7.1% (C&I)
2029: 10.2% (Res.), 12.2% (C&I)

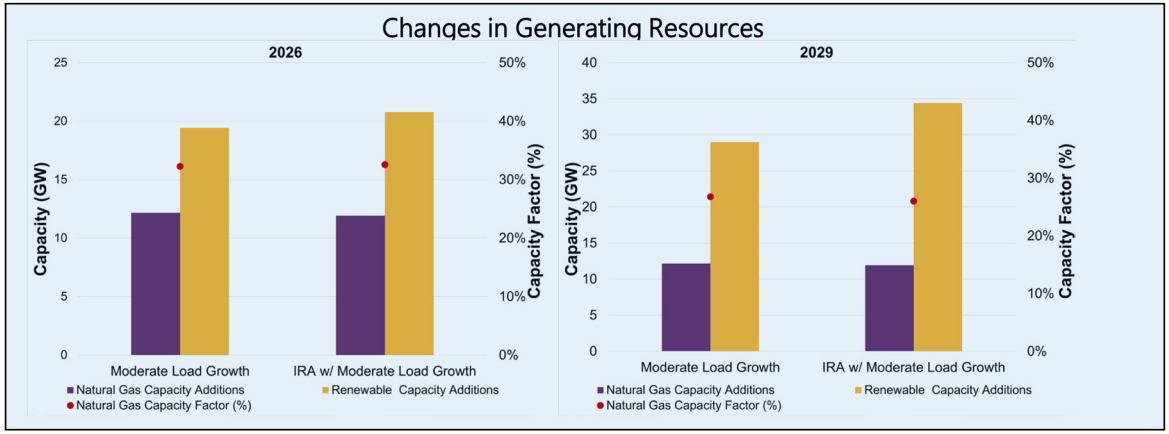
Production Loss for Energy-Intensive Sectors:
2026: 0.32%
2029: 0.38%

Full-time Equivalent Job Losses:
2026: 39,900
2029: 35,000

GDP Loss:
2026: $5.2 billion
2029: $2.9 billion

Household Income Loss:
2026: $250
2029: $340

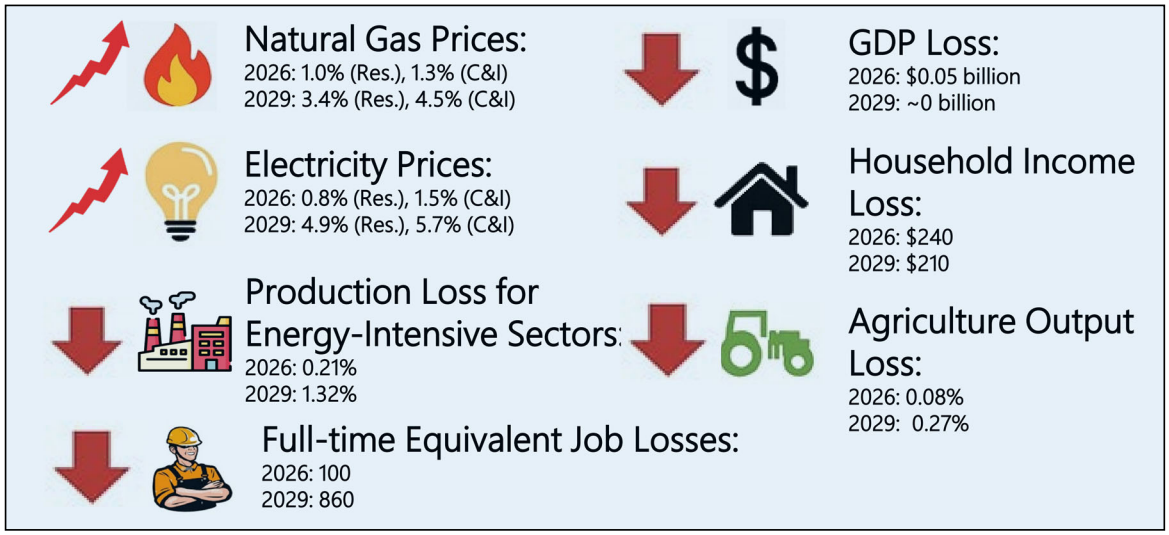
Agriculture Output Loss:
2026: 0.25%
2029: 0.07%

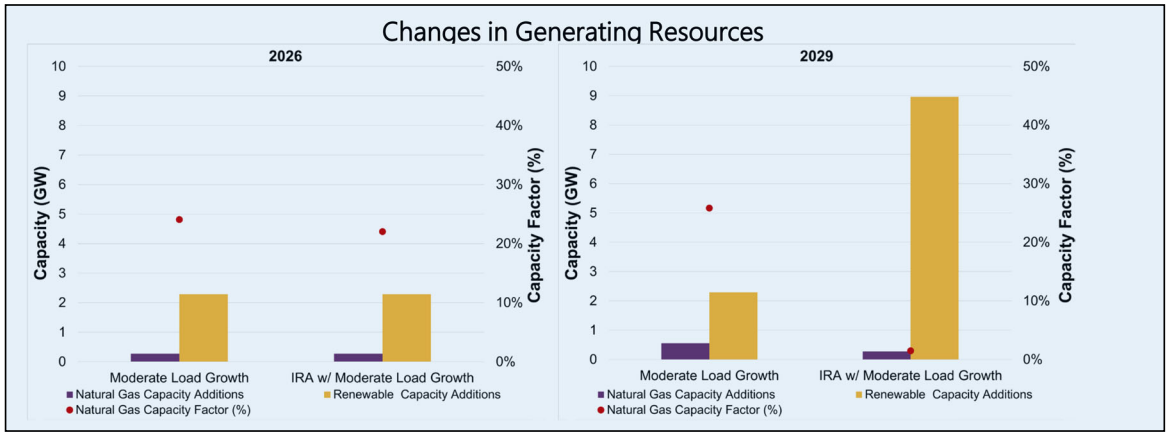


Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Centennial State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.5% increase to householdsand 4.6% increase to businesses
- **Higher Electricity Prices:** 4.7% increase to households and 5.6% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$190 loss in household income
  - –$0.17 billion decrease in state GDP
  - –1,950 lost jobs





Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Hawkeye State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.7% increase to households and 5.4% increase to businesses
- **Higher Electricity Prices:** 5.3% increase to households and 6.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $370 loss in household income
  - $0.59 billion decrease in state GDP
  - 5,000 lost jobs

Natural Gas Prices:
2026: 1.3% (Res.), 2.0% (C&I)
2029: 3.7% (Res.), 5.5% (C&I)

Electricity Prices:
2026: 5.7% (Res.), 7.3% (C&I)
2029: 5.7% (Res.), 7.1% (C&I)

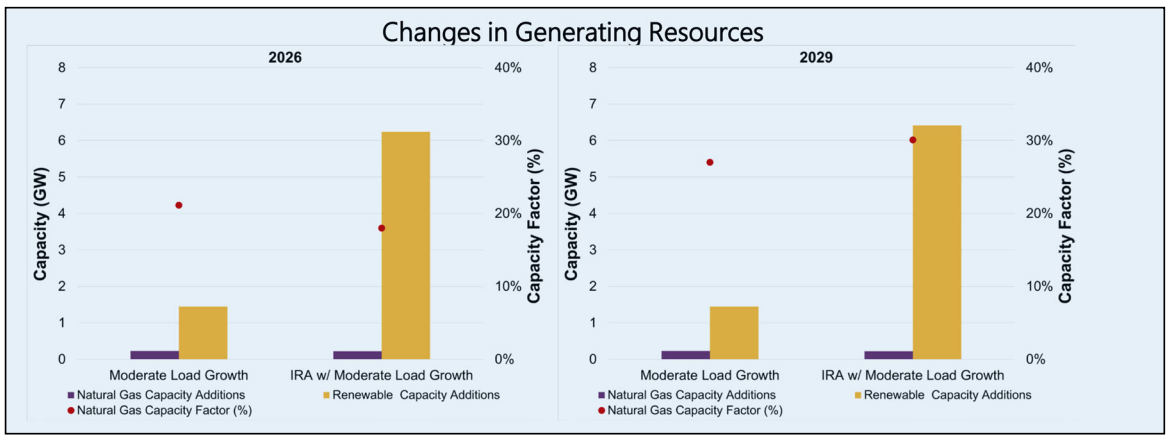
Production Loss for Energy-Intensive Sectors:
2026: 0.54%
2029: 0.77%

Full-time Equivalent Job Losses:
2026: 4,750
2029: 3,630

GDP Loss:
2026: $0.54 billion
2029: $0.44 billion

Household Income Loss:
2026: $270
2029: $320

Agriculture Output Loss:
2026: 0.28%
2029: ~0.00%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Sunflower State**

KANSAS

2026-2032 Averages

- **Higher Natural Gas Prices:** 3% increase to households and 5.5% increase to businesses
- **Higher Electricity Prices:** 14.3% increase to households and 16.7% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $420 loss in household income
  - $0.60 billion decrease in state GDP
  - 5,250 lost jobs

Natural Gas Prices:
2026: 0.7% (Res.), 1.6% (C&I)
2029: 2.9% (Res.), 5.4% (C&I)

Electricity Prices:
2026: 13.1% (Res.), 15.2% (C&I)
2029: 15.4% (Res.), 18.2% (C&I)

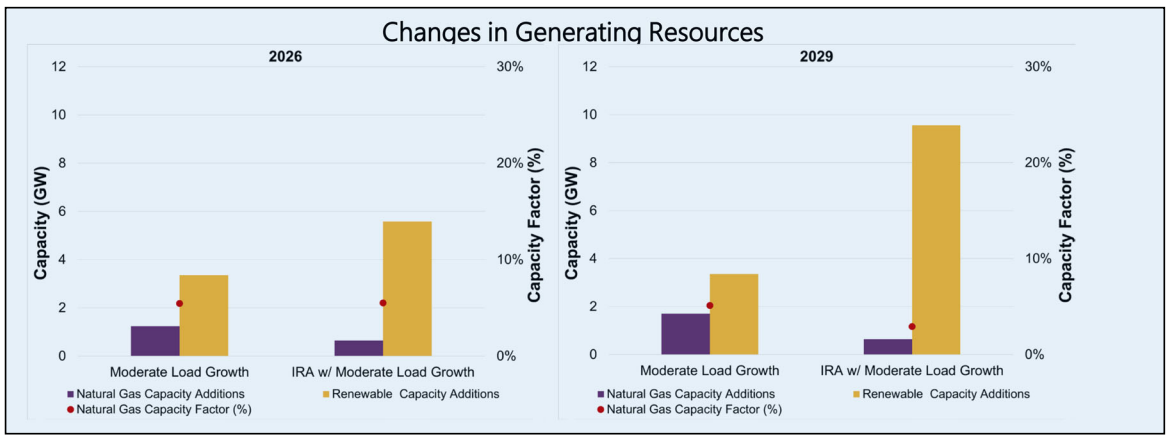
Production Loss for Energy-Intensive Sectors:
2026: 0.22%
2029: 0.97%

Full-time Equivalent Job Losses:
2026: 1,990
2029: 8,670

GDP Loss:
2026: $0.25 billion
2029: $0.86 billion

Household Income Loss:
2026: $360
2029: $360

Agriculture Output Loss:
2026: -1.44%
2029: 1.06%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Pine Tree State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.7% increase to households and 5.4% increase to businesses
- **Higher Electricity Prices:** 20% increase to households and 19.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$110 loss in household income
  - –$0.06 billion decrease in state GDP
  - –750 lost jobs

Natural Gas Prices:
2026: 0.8% (Res.), 1.2% (C&I)
2029: 2.0% (Res.), 3.2% (C&I)

GDP Loss:
2026: $0.01 billion
2029: ~0 billion

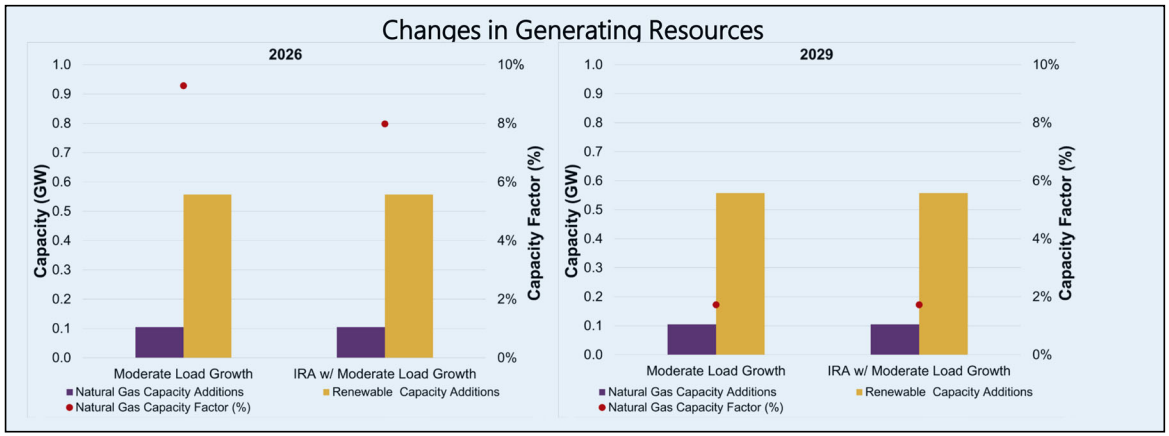
Electricity Prices:
2026: 18% (Res.), 16.8% (C&I)
2029: 19.5% (Res.), 18.4% (C&I)

Household Income Loss:
2026: $50
2029: $90

Production Loss for Energy-Intensive Sectors:
2026: 0.12%
2029: 0.16%

Agriculture Output Loss:
2026: ~0%
2029: ~0%

Full-time Equivalent Job Losses:
2026: 150
2029: 20



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Tar Heel State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.5% increase to households and 4.4% increase to businesses
- **Higher Electricity Prices:** 13% increase to households and 20.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$240 loss in household income
  - –$0.64 billion decrease in state GDP
  - –2,790 lost jobs

Natural Gas Prices:
2026: 0.9% (Res.), 1.6% (C&I)
2029: 2.5% (Res.), 4.5% (C&I)

Electricity Prices:
2026: 13.9% (Res.), 21.7% (C&I)
2029: 14.0% (Res.), 21.7% (C&I)

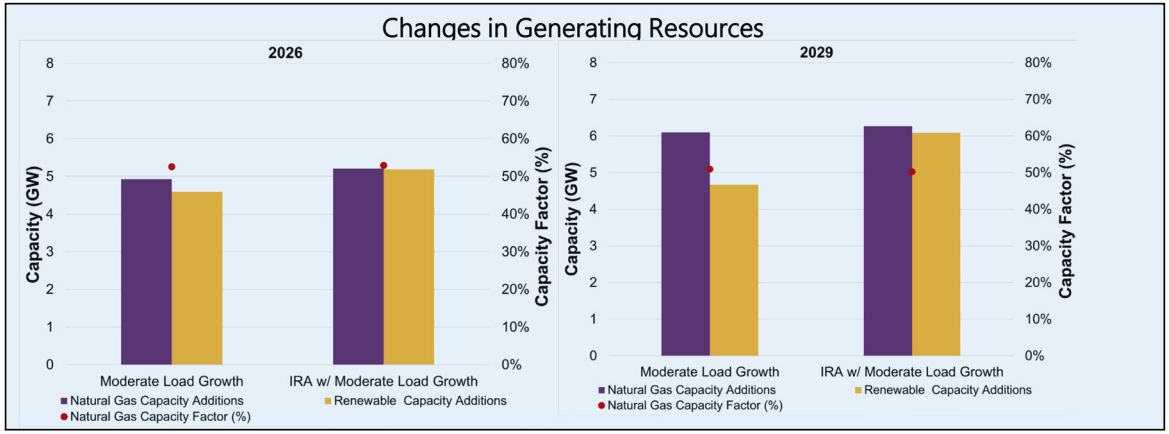
Production Loss for Energy-Intensive Sectors:
2026: ~0%
2029: 0.16%

Full-time Equivalent Job Losses:
2026: 2,580
2029: 4,920

GDP Loss:
2026: $0.56 billion
2029: $0.70 billion

Household Income Loss:
2026: $170
2029: $190

Agriculture Output Loss:
2026: ~0%
2029: 0.17%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Cornhusker State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.4% increase to households and 5.3% increase to businesses
- **Higher Electricity Prices:** 15.5% increase to households and 18.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $374 loss in household income
  - $0.43 billion decrease in state GDP
  - 4,180 lost jobs

Natural Gas Prices:
2026: 0.9% (Res.), 1.6% (C&I)
2029: 3.2% (Res.), 5.1% (C&I)

Electricity Prices:
2026: 12.7% (Res.), 15.7% (C&I)
2029: 16.8% (Res.), 19.2% (C&I)

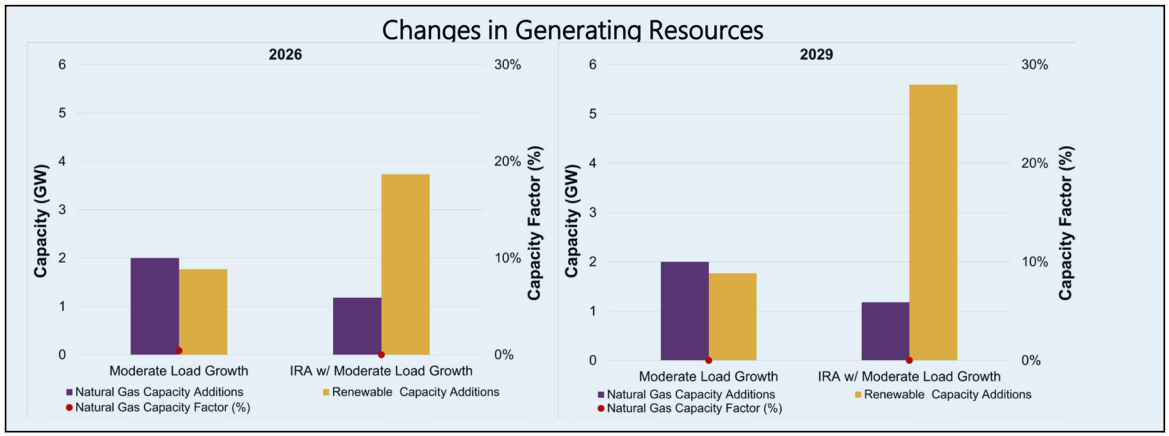
Production Loss for Energy-Intensive Sectors:
2026: 0.41%
2029: 1.85%

Full-time Equivalent Job Losses:
2026: 280
2029: 7,260

GDP Loss:
2026: $0.10 billion
2029: $0.66 billion

Household Income Loss:
2026: $350
2029: $290

Agriculture Output Loss:
2026: -1.41%
2029: 1.19%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Silver State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3% increase to households and 4.4% increase to businesses
- **Higher Electricity Prices:** 7.3% increase to households and 10.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $270 loss in household income
  - $0.32 billion decrease in state GDP
  - 2,090 lost jobs

Natural Gas Prices:
2026: 0.9% (Res.), 1.3% (C&I)
2029: 2.9% (Res.), 4.2% (C&I)

Electricity Prices:
2026: 4.5% (Res.), 7.1% (C&I)
2029: 7.1% (Res.), 10.0% (C&I)

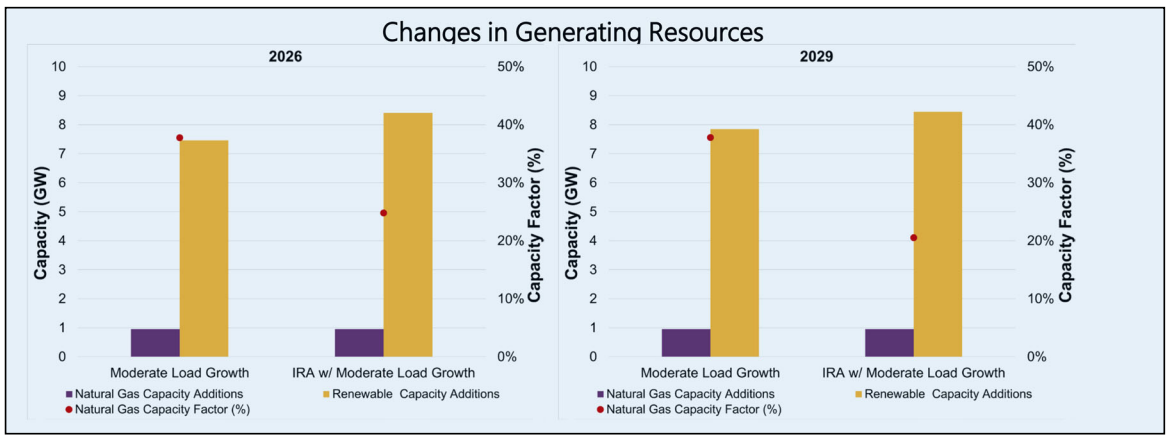
Production Loss for Energy-Intensive Sectors:
2026: ~0.00%
2029: 2.04%

Full-time Equivalent Job Losses:
2026: 1,030
2029: 2,870

GDP Loss:
2026: $0.13 billion
2029: $0.33 billion

Household Income Loss:
2026: $250
2029: $240

Agriculture Output Loss:
2026: ~0.00%
2029: 0.52%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Granite State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2% increase to households and 2.9% increase to businesses
- **Higher Electricity Prices:** 3.5% increase to households and 3.6% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $250 loss in household income
  - $0.16 billion decrease in state GDP
  - 1,980 lost jobs

Natural Gas Prices:
2026: 0.7% (Res.), 1.0% (C&I)
2029: 2.0% (Res.), 2.9% (C&I)

Electricity Prices:
2026: 2.2% (Res.), 2.3% (C&I)
2029: 3.2% (Res.), 2.9% (C&I)

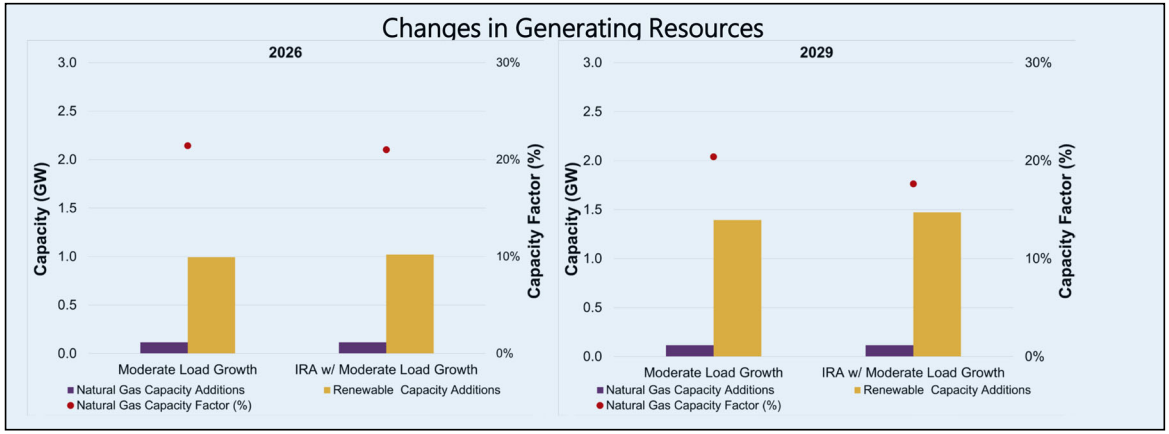
Production Loss for Energy-Intensive Sectors:
2026: 0.28%
2029: 0.42%

Full-time Equivalent Job Losses:
2026: 1,860
2029: 2,030

GDP Loss:
2026: $0.17 billion
2029: $0.14 billion

Household Income Loss:
2026: $160
2029: $200

Agriculture Output Loss:
2026: 2.16%
2029: 3.62%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Garden State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.9% increase to households and 3.3% increase to businesses
- **Higher Electricity Prices:** 13.3% increase to households and 18.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$1,040 loss in household income
  - –$3.24 billion decrease in state GDP
  - –22,180 lost jobs

Natural Gas Prices:
2026: 0.7% (Res.), 0.8% (C&I)
2029: 2.8% (Res.), 3.2% (C&I)

Electricity Prices:
2026: 13.6% (Res.), 18.3% (C&I)
2029: 12.1% (Res.), 16.4% (C&I)

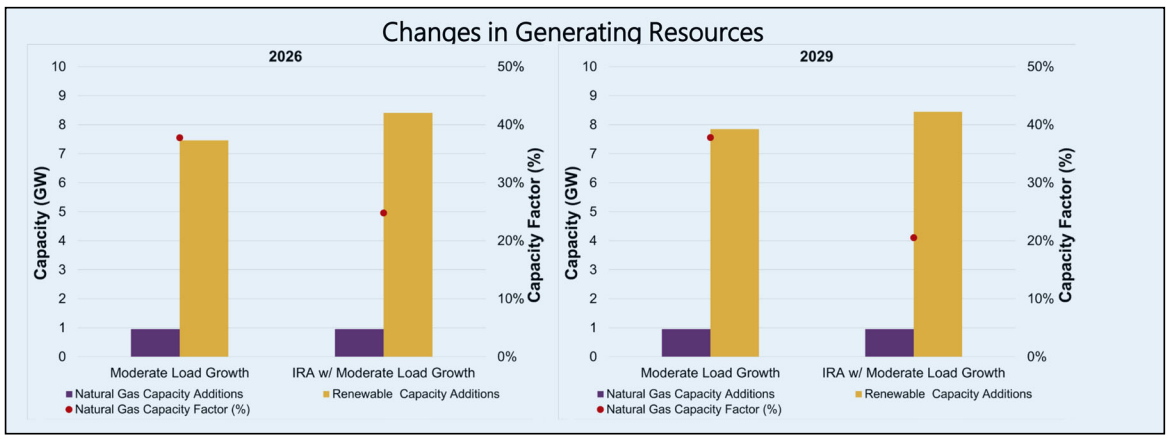
Production Loss for Energy-Intensive Sectors:
2026: 0.39%
2029: -0.68%

Full-time Equivalent Job Losses:
2026: 32,800
2029: 11,780

GDP Loss:
2026: $4.29 billion
2029: $1.86 billion

Household Income Loss:
2026: $870
2029: $1,080

Agriculture Output Loss:
2026: 4.23%
2029: 1.39%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Empire State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 3.8% increase to businesses
- **Higher Electricity Prices:** 6.5% increase to households and 7.9% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $650 loss in household income
  - $3.45 billion decrease in state GDP
  - 20,300 lost jobs

Natural Gas Prices:
2026: 0.6% (Res.), 1.1% (C&I)
2029: 2.2% (Res.), 3.7% (C&I)

Electricity Prices:
2026: 2.5% (Res.), 3.1% (C&I)
2029: 8.3% (Res.), 10.2% (C&I)

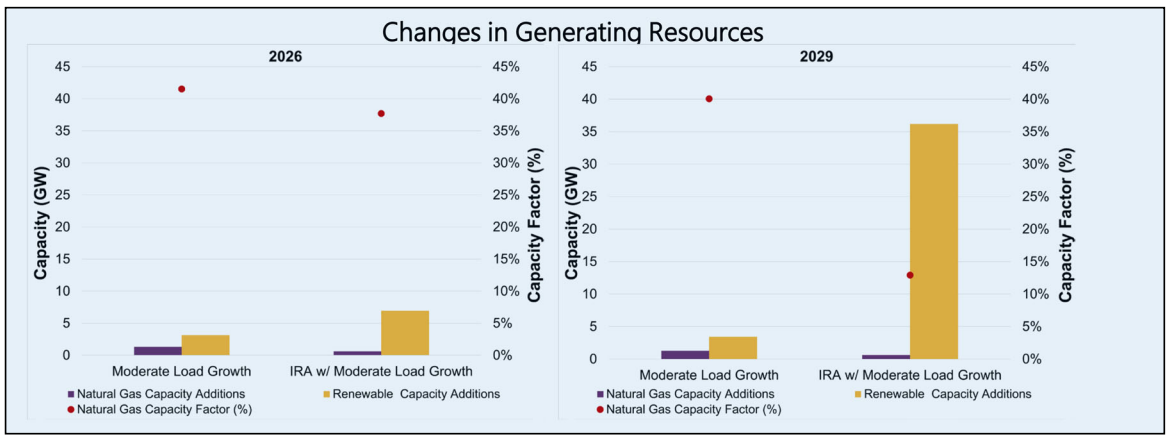
Production Loss for Energy-Intensive Sectors:
2026: 0.02%
2029: 0.11%

Full-time Equivalent Job Losses:
2026: 16,180
2029: 17,020

GDP Loss:
2026: $3.4 billion
2029: $2.67 billion

Household Income Loss:
2026: $540
2029: $630

Agriculture Output Loss:
2026: 0.67%
2029: 1.76%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Buckeye State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.1% increase to households and 4.5% increase to businesses
- **Higher Electricity Prices:** 6.3% increase to households and 9.5% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $80 loss in household income
  - $1.83 billion decrease in state GDP
  - 5,890 lost jobs

Natural Gas Prices:
2026: 0.9% (Res.), 1.3% (C&I)
2029: 3.0% (Res.), 4.4% (C&I)

GDP Loss:
2026: $1.7 billion
2029: $1.35 billion

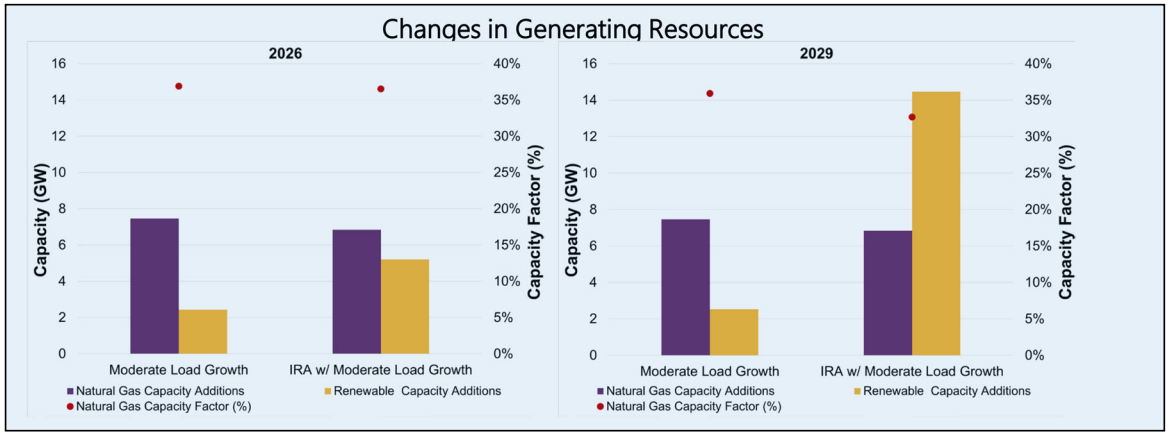
Electricity Prices:
2026: 4.7% (Res.), 8.1% (C&I)
2029: 6.6% (Res.), 9.4% (C&I)

Household Income Loss:
2026: $90
2029: $70

Production Loss for Energy-Intensive Sectors:
2026: 0.25%
2029: 0.47%

Agriculture Output Loss:
2026: 0.22%
2029: 1.07%

Full-time Equivalent Job Losses:
2026: 4,210
2029: 5,650



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Beaver State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 3.2% increase to households and 5.1% increase to businesses
- **Higher Electricity Prices:** 4% increase to households and 5.2% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$230 loss in household income
  - –$0.25 billion decrease in state GDP
  - –1,910 lost jobs

Natural Gas Prices:
2026: 1.2% (Res.), 2.0% (C&I)
2029: 3.1% (Res.), 5.1% (C&I)

GDP Loss:
2026: $0.01 billion
2029: $0.30 billion

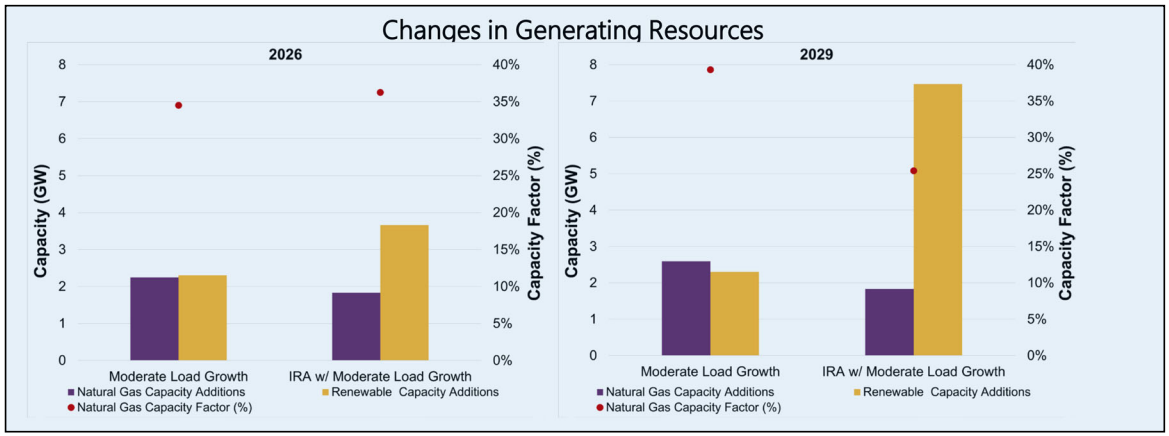
Electricity Prices:
2026: 1.3% (Res.), 2.5% (C&I)
2029: 4.4% (Res.), 5.6% (C&I)

Household Income Loss:
2026: $170
2029: $170

Production Loss for Energy-Intensive Sectors:
2026: ~0%
2029: 0.37%

Agriculture Output Loss:
2026: -0.27%
2029: 0.05%

Full-time Equivalent Job Losses:
2026: 2,130
2029: 3,180



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Keystone State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.6% increase to households and 3.3% increase to businesses
- **Higher Electricity Prices:** 6.3% increase to households and 10% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $30 loss in household income
  - $0.74 billion decrease in state GDP
  - 6,680 lost jobs

Natural Gas Prices:
2026: 0.7% (Res.), 0.9% (C&I)
2029: 2.4% (Res.), 3.1% (C&I)

Electricity Prices:
2026: 3.8% (Res.), 6.3% (C&I)
2029: 6.6% (Res.), 10.9% (C&I)

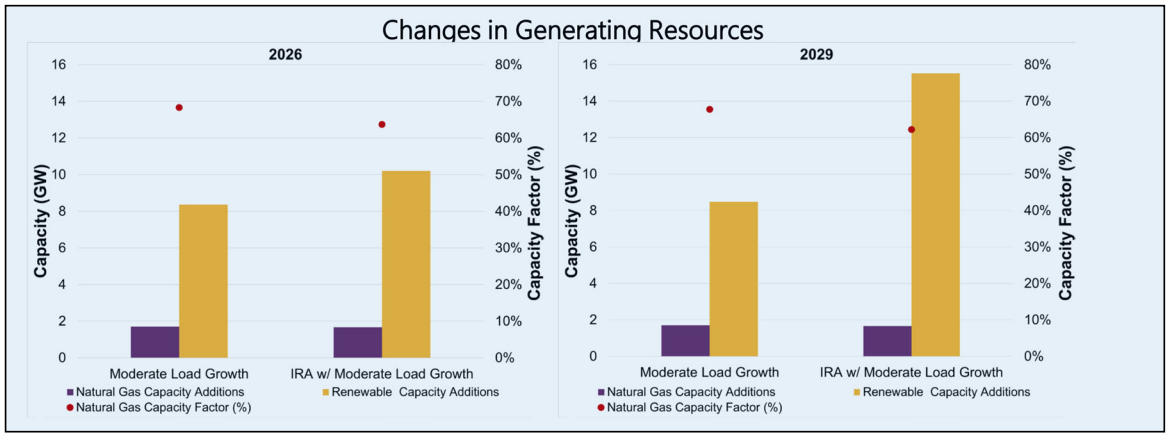
Production Loss for Energy-Intensive Sectors:
2026: 0.65%
2029: 0.46%

Full-time Equivalent Job Losses:
2026: 16,380
2029: 3,610

GDP Loss:
2026: $0.62 billion
2029: $0.36 billion

Household Income Loss:
2026: $120
2029: $70

Agriculture Output Loss:
2026: 3.95%
2029: 4.47%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Ocean State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.1% increase to households and 2.8% increase to businesses
- **Higher Electricity Prices:** 8% increase to households and 10.4% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$430 loss in household income
  - –$0.21 billion decrease in state GDP
  - –1,860 lost jobs

Natural Gas Prices:
2026: 0.7% (Res.), 0.9% (C&I)
2029: 2.0% (Res.), 2.8% (C&I)

Electricity Prices:
2026: 7.2% (Res.), 9.5% (C&I)
2029: 9.4% (Res.), 11.9% (C&I)

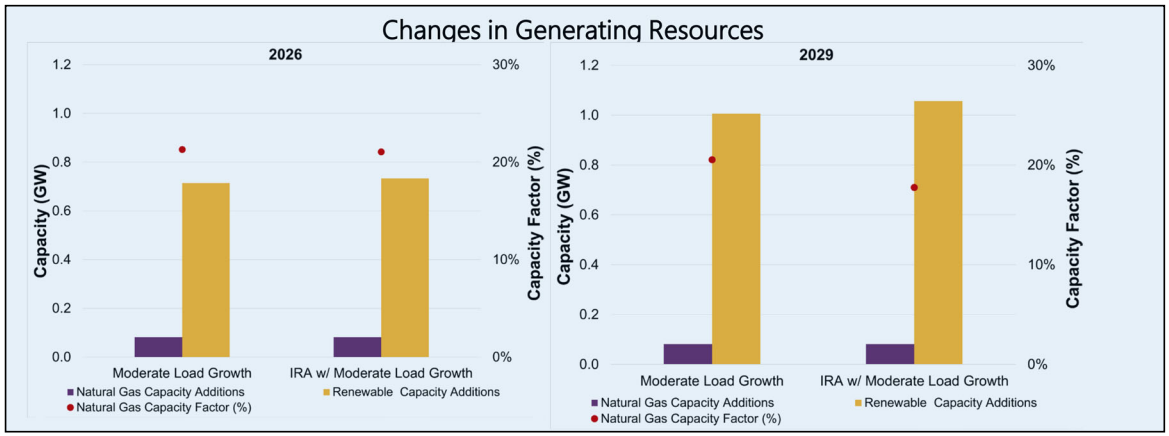
Production Loss for Energy-Intensive Sectors:
2026: 0.67%
2029: 0.31%

Full-time Equivalent Job Losses:
2026: 2,980
2029: 540

GDP Loss:
2026: $0.31 billion
2029: $0.07 billion

Household Income Loss:
2026: $270
2029: $448

Agriculture Output Loss:
2026: 2.98%
2029: 2.0%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Palmetto State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.4% increase to households and 5.2% increase to businesses
- **Higher Electricity Prices:** 11.5% increase to households and 17.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $370 loss in household income
  - $0.62 billion decrease in state GDP
  - 4,860 lost jobs

Natural Gas Prices:
2026: 0.8% (Res.), 1.9% (C&I)
2029: 2.5% (Res.), 5.4% (C&I)

Electricity Prices:
2026: 11.8% (Res.), 17.9% (C&I)
2029: 11.2% (Res.), 17.5% (C&I)

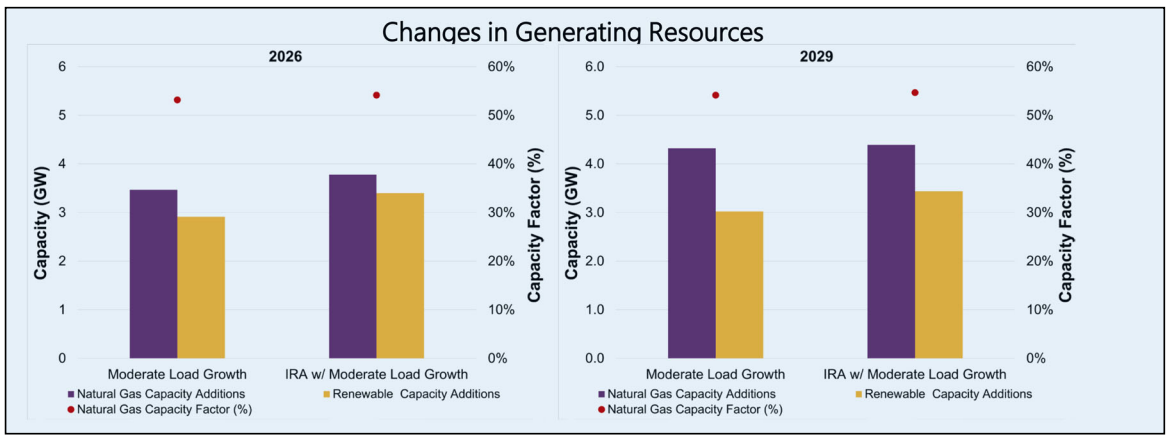
Production Loss for Energy-Intensive Sectors:
2026: 0.14%
2029: 0.14%

Full-time Equivalent Job Losses:
2026: 5,040
2029: 1,910

GDP Loss:
2026: $0.59 billion
2029: $0.42 billion

Household Income Loss:
2026: $280
2029: $330

Agriculture Output Loss:
2026: 3.09%
2029: 0.56%



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Old Dominion State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 4.1% increase to businesses
- **Higher Electricity Prices:** 8% increase to households and 11.8% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $350 loss in household income
  - $1.34 billion decrease in state GDP
  - 4,280 lost jobs

Natural Gas Prices:
2026: 0.6% (Res.), 1.1% (C&I)
2029: 2.1% (Res.), 4.1% (C&I)

GDP Loss:
2026: $1.16 billion
2029: $1.03 billion

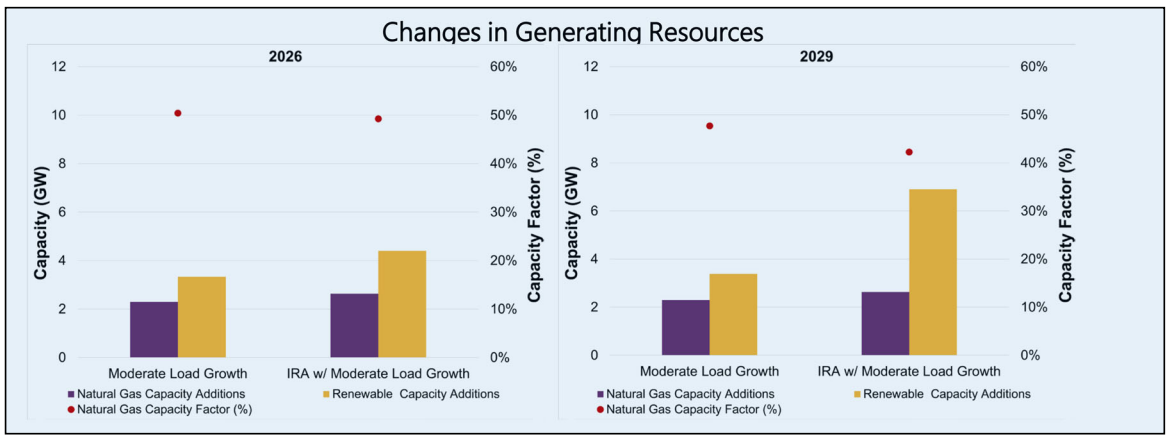
Electricity Prices:
2026: 5.8% (Res.), 9.2% (C&I)
2029: 8.7% (Res.), 12.7% (C&I)

Household Income Loss:
2026: $290
2029: $330

Production Loss for Energy-Intensive Sectors:
2026: 0.25%
2029: 0.51%

Agriculture Output Loss:
2026: 0.38%
2029: 1.01%

Full-time Equivalent Job Losses:
2026: 4,530
2029: 2,180



Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Green Mountain State**

2026-2032 Averages

- **Higher Natural Gas Prices:** 2.4% increase to households and 5.3% increase to businesses
- **Higher Electricity Prices:** 7.7% increase to households and 9.4% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $290 loss in household income
  - $0.08 billion decrease in state GDP
  - 820 lost jobs

Natural Gas Prices:
2026: 0.8% (Res.), 2.0% (C&I)
2029: 2.4% (Res.), 5.4% (C&I)

GDP Loss:
2026: $0.07 billion
2029: $0.07 billion

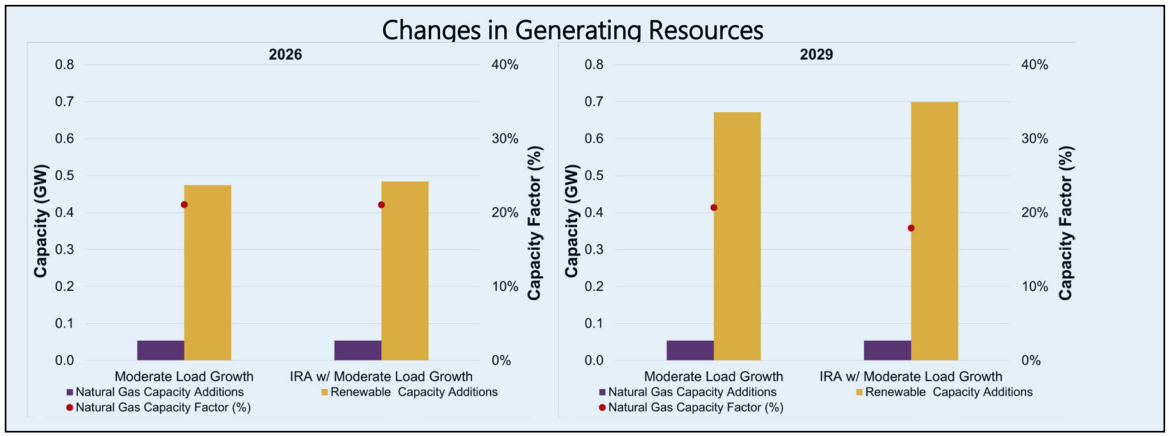
Electricity Prices:
2026: 6.0% (Res.), 7.6% (C&I)
2029: 8.7% (Res.), 10.4% (C&I)

Household Income Loss:
2026: $210
2029: $250

Production Loss for Energy-Intensive Sectors:
2026: 0.25%
2029: 0.35%

Agriculture Output Loss:
2026: 0.98%
2029: 1.37%

Full-time Equivalent Job Losses:
2026: 680
2029: 720



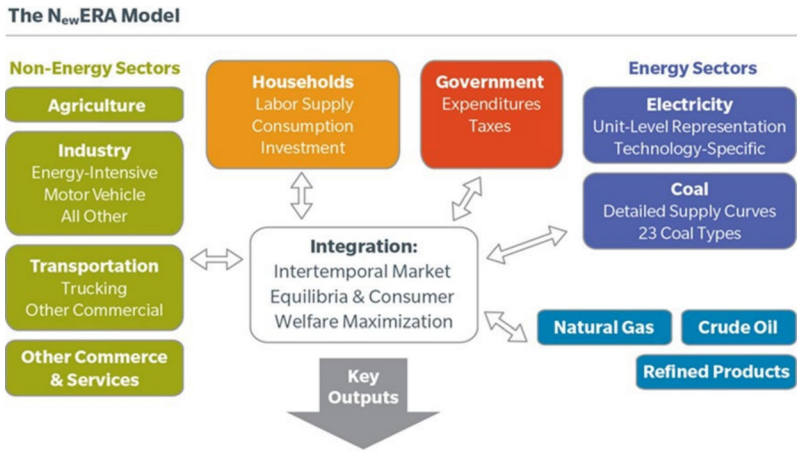
Appendix:
Additional Results
About the N$_{ew}$ERA Model
Technology-Neutral Tax Incentives

NERA

ECONOMICS. EXPERTS. EXPERIENCE.

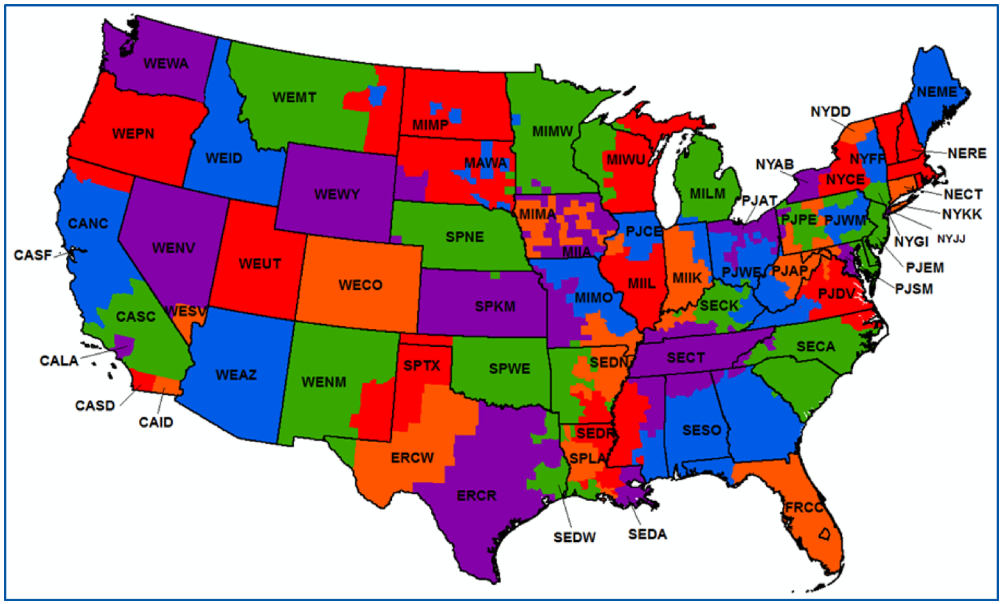
NewERA Modeling Framework: Overview and Model Solution

- Energy-economy modeling framework that integrates a bottom-up representation of the U.S. electricity sector with a top-down dynamic CGE model.
- The CGE model simulates all key economic interactions in the U.S. economy, including those among industries, households, and the government.
- In the model, industries and households maximize profits and utility, respectively, with foresight about future economic conditions.
- The model is based on the circular flow of goods, services, and payments in the economy and is based around the decisions of a representative household that characterizes the economic behavior of an average consumer.
  - Households provide labor and capital to businesses, taxes to the government, and savings to the financial markets, while also consuming goods and services and receiving government subsidies.
- The economic sectors in the model, in aggregate, account for all the production and commercial activities of the economy.
  - Each economic sector uses labor, capital, energy resources, other sector's outputs, and imported inputs to produce their own specific category of goods or services.
- The model also incorporates the government which collects revenues from taxes imposed on labor and capital which are are used to pay for government services
- The model solves for equilibrium such that demand for goods and services equals their supply, and investments are optimized for the long term.



NewERA Electricity Sector Model: Overview and Model Solution

- Bottom-up dispatch and capacity expansion model
  - Unit-level information on generating units in 63 U.S. regions
  - Detailed coal supply curves by coal type
  - Regional electricity demand and capacity requirements
- Least-cost projection of market activity
  - Satisfies demand and all other constraints over model time horizon
  - Projects unit-level generation and investment decisions and regional fuel and electricity prices
- Data sources
  - Model calibrated to U.S. Energy Information Administration's *AEO 2023*
  - Other electricity sector data from EIA, EPA, NERC, and LBNL.
- Required to meet many electricity market and regulatory constraints
  - Regional demand, reserve capacity requirements, fuel availability, forced retrofits, RPS or emissions regulations
  - Flexible to a variety of user-specified constraints, from unit-specific actions to market-wide regulations
- Finds the least-cost way to satisfy all constraints
  - Uses perfect foresight of market conditions
  - Chooses investments and operation of units to minimize present value of costs over the entire model period



State-Level Delivered Electricity Rate Model

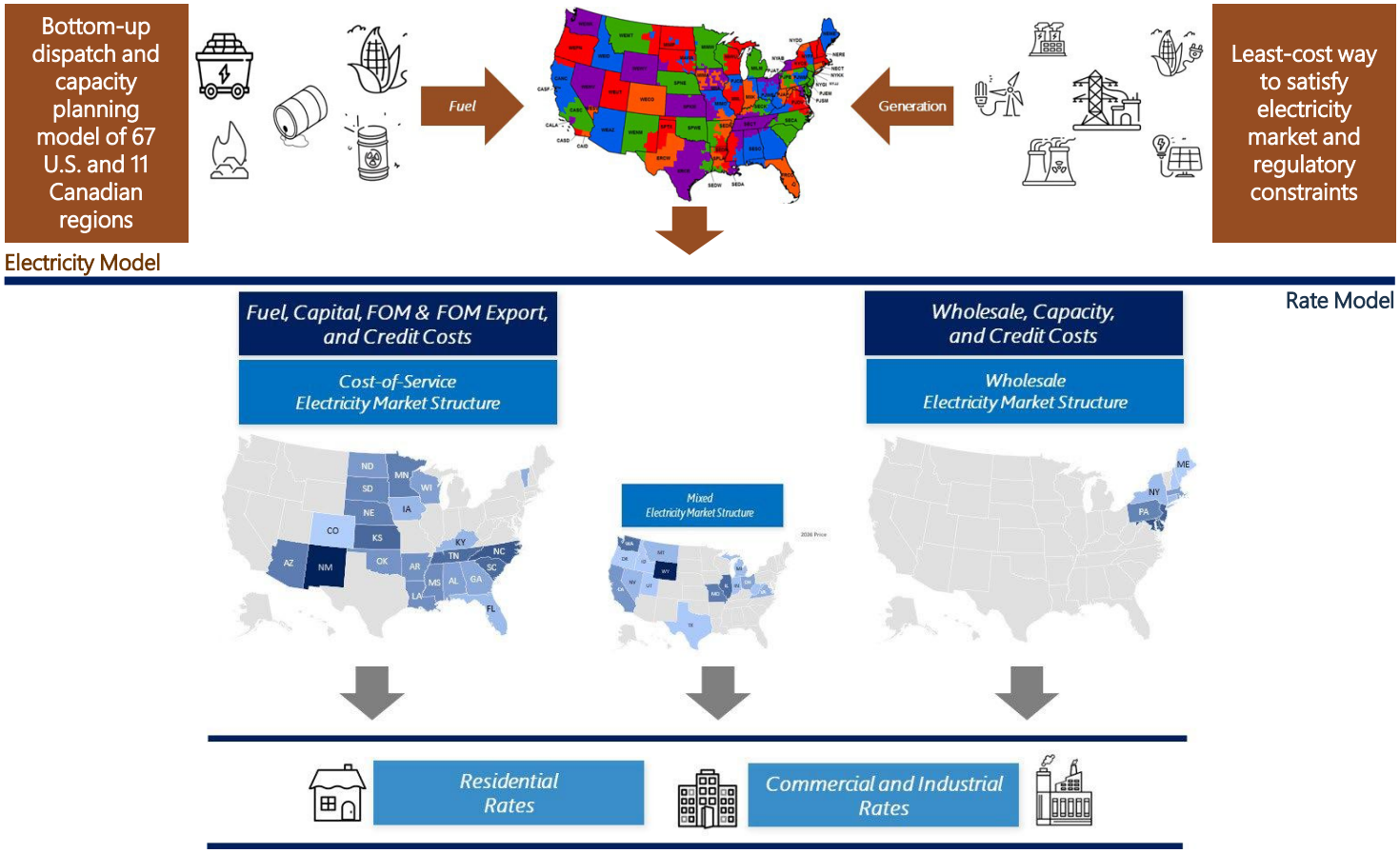
- NERA's rate model uses regional model outputs from its electricity model to calculate delivered electricity sector prices.
- The regional model outputs are aggregated to the state level using a mapping of the model's regions to individual states.
- The inputs to the rate model includes wholesale, capacity and renewable energy credit (REC) prices, cost of service and electricity sales.
- The delivered electricity prices are calculated in the rate model based on the electricity market structure applicable in each state
  - In a **competitive** market, electricity prices are set through an auction process where power generators submit bids for the price, they are willing to sell electricity, and the price is set by the last generator needed to met demand at a given time
    - The delivered electricity price is based on the wholesale energy, capacity and renewable energy credit (REC) costs plus a T&D margin
      - **Wholesale** energy costs represent the costs of operating the marginal electricity generator in the electricity market region
      - **Capacity** costs represent the costs associated with ensuring enough generating capacity is available to meet both the expected peak demand plus an additional reserve margin in the electricity market region
      - **Credit** costs represent the cost of procuring RECs to meet the RPS requirements of the state(s) that are in the electricity market region

State-Level Delivered Electricity Rate Model (2)

- In a **cost-of-service (COS)** market, electricity prices are set based on the total costs to serve load
  - The delivered electricity price is based on the cost of service (operating and investment costs of the generating resources in the market region) plus a T&D margin. The cost-of-service components include the fuel costs, capital costs, fixed and variable operating and maintenance (O&M) costs, net exports and credit costs.
    - **Fuel** costs represent the delivered fuel costs for the generating resources in the electricity market region
    - **Capital** costs represent the costs to build new generating resources in the electricity market region
    - **FOM+VOM** costs represent the sum of the fixed and non-fuel variable O&M for the generating resources in the electricity market region
    - **Export** costs represent the net costs of exporting power from the electricity market region. The costs to serve load is lower with higher electricity exports as the revenue earned from exports can be used to offset fixed operating costs in the electricity market region
    - **Credit** costs represent the cost of procuring RECs to meet the RPS requirements of the state(s) that are in the electricity market region

- The T&D margin is estimated as the difference between the historical actual 2023 delivered price and the wholesale price in 2023 projected by its electricity model. The T&D margin for each ratepayer class is assumed to remain unchanged in outlooks with and without the technology-neutral tax incentives.
- For each state, the delivered price for each state (and for each future model year) is calculated assuming that it is wholly competitive and wholly COS and then these prices are weighted by the competitive/COS shares for the state.
  - For example, if a state is 95% COS, the delivered price = 95%*COS delivered price + 5%*Competitive delivered price

Rate Estimation Methodology Illustration



Technology-Neutral Tax Incentives Modeled

§45Y Production Tax Credit (PTC)

- **Base Credit:** 0.3 cents/kWh, adjusted annually for inflation.
- **Bonus Credit:** Increases to 1.5 cents/kWh if all projects meet prevailing wage and apprenticeship requirements.
- **Phaseout:** No phaseout is assumed after 2032.

§48E Investment Tax Credit (ITC)

- **Base Credit:** 6%
- **Bonus Credit:** Increases to 30% if all renewable projects meet prevailing wage and apprenticeship (PWA) requirements.
- **Additional Credits:**
    - Onshore and offshore wind projects qualifies for a 10% additional credit by meeting domestic content requirements.

Technology-Neutral Tax Incentives Modeled

Energy Type	Incentive Type	Duration	Rate	Availability
Standalone Solar	Production Tax Credit (PTC)	First 10 years of operation	1.5 cents/kWh	N/A
Solar with Storage	Production Tax Credit (PTC)	First 10 years of operation	1.5 cents/kWh	N/A
Solar Thermal	Investment Tax Credit (ITC)	N/A	30%	N/A
Onshore Wind	Production Tax Credit (PTC)	First 10 years of operation	1.5 cents/kWh	N/A
Offshore Wind	Investment Tax Credit (ITC)	N/A	40% (10% additional domestic content bonus)	N/A
Geothermal	Investment Tax Credit (ITC)	N/A	30%	Starting in the 2025 online year
Biomass	Production Tax Credit (PTC)	First 10 years of operation	1.5 cents/kWh	Starting in the 2025 online year
Hydroelectric	Investment Tax Credit (ITC)	N/A	30%	Starting in the 2025 online year
Nuclear (Existing)	Production Tax Credit (PTC)	2024 to 2032	Base Value: 0.3 cents/kWh (increased to 1.5 cents/kWh with labor	N/A
Nuclear (New)	Production Tax Credit (PTC)	N/A	Base Value: 0.3 cents/kWh (increased to 1.5 cents/kWh with labor	No phaseout after 2032

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Rhodium Group

Energy & Climate

Ways and Means Brings the Hammer Down on Energy Credits

May 13, 2025

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The House Ways and Means Committee issued its proposed language for inclusion in Congress's massive budget reconciliation package. It's the opening attempt to reduce spending in order to partially cover the cost of nearly $5 trillion in proposed extensions and expansions of the tax cuts initially passed in 2017. While we are still analyzing the package, our preliminary analysis shows that the impact of the proposal is likely to be similar to the impact of a full repeal of the energy tax credits initially extended and expanded in 2022. This will raise energy costs for American households by as much as 7% in 2035, stifle energy technology innovation, increase pollution, and could put a meaningful portion of half a trillion dollars of new manufacturing, industrial, and clean electricity investments across the country at risk.

The opening salvo in the budget reconciliation debate

After the House and Senate agreed to a budget framework last month, work commenced on sorting out how exactly to meet the budget targets established in that bill. House Ways and Means released its contribution, which per the resolution cannot add more than $4.5 trillion to the deficit over the next ten years. The Joint Committee on Taxation, the scorekeepers of the federal fiscal impacts of policy, reckons the Committee's efforts to extend components of the 2017 Tax Cuts and Jobs Act and add new tax cuts, including modified tax rates, no tax on tips or Social Security benefits, changes to deductions and the alternative minimum tax exemption, as well as extending and increasing the state and local tax deduction cap, would increase the deficit by $5.6 trillion. This means Ways and Means needs to find at least $1.1 trillion in savings to meet the budget target. As a result, the Committee has, among other things, chosen to cut most energy-related tax credits way back to make up the difference.

Last year, House Speaker Mike Johnson argued that his members should use "a scalpel and not a sledgehammer" to make changes to energy-related tax credits. In recent months, he's walked that back to "somewhere between a scalpel and a sledgehammer." In fact, as a starting point, Ways and Means committee chair Jason Smith (R-MO) and other

bill drafters have come down firmly on the sledgehammer end of the spectrum, targeting cuts to a host of provisions, including many that have attracted Republican support in recent weeks and months and historically have enjoyed bipartisan backing.

Major changes in the Ways and Means proposal that will affect energy include:

- Termination of a number of tax credits at the end of 2025, including credits for clean vehicles (with a limited exception for some vehicles in 2026), commercial clean vehicles, previously owned clean vehicles, alternative fuel refueling properties, energy efficiency and clean energy improvements for homes, and clean hydrogen

- Statutory phase-out of the clean electricity production and investment tax credits beginning in 2029 through 2031 on a placed-in-service basis—a shift from the current commence construction deadlines. *De facto* sunsetting of the credits as early as 2026 (one year after passage of the bill) with imposition of highly restrictive and administratively complex (and potentially unworkable) limits on sourcing of components, subcomponents, and critical materials used at a facility, or 2027 with the phase-out of the ability for clean energy developers to transfer or sell the tax credits they generate to other entities.

- Sunset of the advanced manufacturing production credit after 2031, except for wind components, which sunset after 2027; application of similarly strict sourcing requirements aligned with those proposed for the clean electricity credits; and removal of transferability

- Repeal of transferability, which reduces options for monetizing the credits, and implementation of foreign sourcing limits for a host of other credits

- Phase-out of the zero-emitting nuclear credit beginning in 2029 through 2031; extension of clean fuels credit through 2031 with changes to what fuels could potentially qualify

Beyond the specific policy changes, the proposal will also require a hollowed-out federal bureaucracy to propose and finalize extremely complicated and unprecedented implementation rules before investors and developers will have the certainty they need to make investment decisions. It took the first Trump administration nearly three years to finalize regulations for implementing the 45Q tax credits for carbon capture, rules which pale in comparison to the complexity of what will be required to implement key portions of the Ways and Means proposal.

Impacts of the provisions

Since Ways and Means just released a draft of the bill yesterday, we have yet to fully model the proposal in its current form. In December, we modeled a potential legislative pathway that fully repealed all major energy components of the Inflation Reduction Act beginning on January 1, 2025. For some credits like clean vehicles and residential clean energy, the Ways and Means proposal offers just one more year of credits compared to our repeal scenario. For the technology-neutral clean electricity tax credits, the Ways and Means proposal's harshest restrictions on material from foreign entities of concern (FEOC) are likely to begin in 2026—so two more years of credit would be available compared to

our repeal scenario. Because of the high degree of consistency with the Ways and Means proposal and our previous modeling, our prior work provides useful insights into the expected direction and magnitude of impact of these policy changes. As discussed above, the administrative complexity of implementing these rules also likely puts significant downward pressure on near-term investments, further aligning our previous modeling with this proposal. We plan to refine our modeling after the Ways and Means mark-up to reflect where the committee lands.

We compare modeling outcomes with and without these changes to quantify the impact of the proposal—in both cases holding constant a "rollback" regulatory environment as a baseline where all major Biden-era environmental regulations are removed. The Trump administration and Congress have taken numerous actions to follow through on these rollbacks, the latest of which is the House Energy and Commerce reconciliation bill attempt to repeal EPA tailpipe regulations for light, medium and heavy duty vehicles. Such legislative moves are unprecedented and likely to face scrutiny from the Senate parliamentarian, though Senate Republicans could make another unprecedented move and opt to ignore her ruling.

Whatever comes of these congressional machinations, we expect the rules we identified in our December rollback scenario to be removed from current law in the near future, so we consider the impacts of efforts to change tax policy compared to a baseline where the regulations are rolled back. We report a "baseline" policy case reflecting regulatory changes made by the Trump administration and Congress and then a "repeal" policy case that estimates the incremental impact of revision and removal of energy-related provisions of the IRA beginning in 2025.

As we detail in our December note, rolling back regulations alone will meaningfully impact the energy system, increasing energy bills for consumers and businesses, reducing clean energy deployment, and increasing greenhouse gas emissions. In this note, we focus only on the impacts of changes akin to those proposed by Ways and Means legislation. As part of budget reconciliation, several committees have proposed policy changes that will impact the energy system, including the House Energy and Commerce's proposed recission of funding for a number of grant programs established as part of the Inflation Reduction Act, new fees on EVs proposed by the Transportation and Infrastructure committee, and the Natural Resource committee's proposed changes to energy production public lands. We will assess the aggregate impact of the entire reconciliation bill as the complete legislation takes shape.

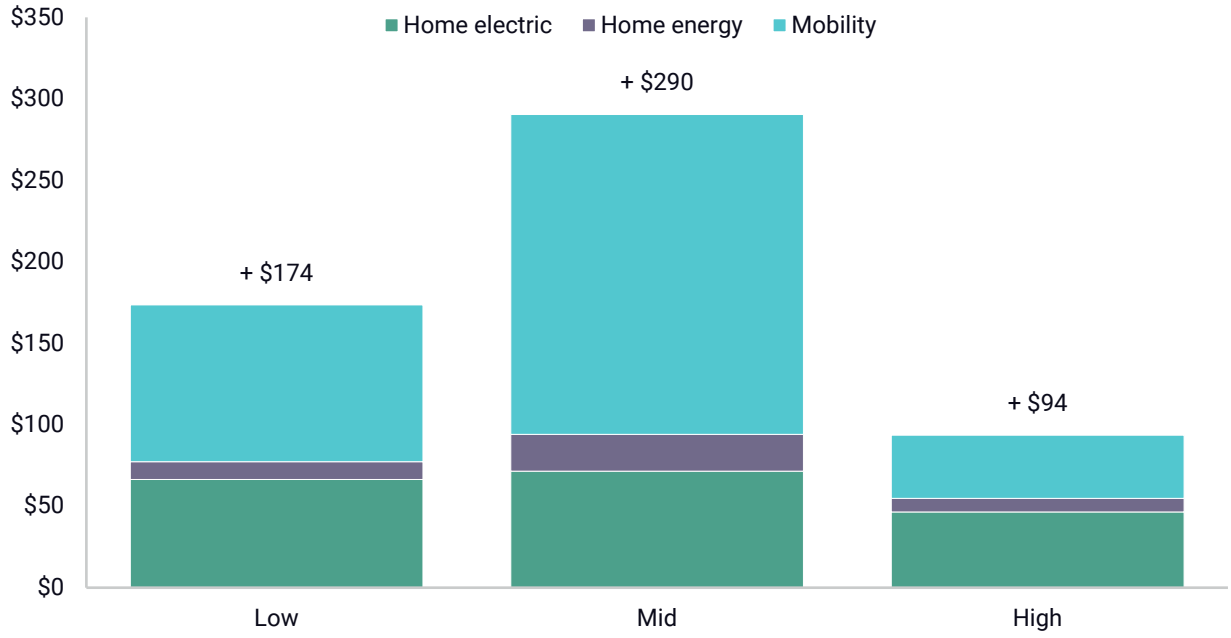
As in the past, to understand the range of potential impacts, we use the same three main emissions scenarios reported in Taking Stock 2024: a low-emissions scenario that pairs cheap clean energy technologies with more expensive future fossil fuel prices and slightly slower GDP growth; a high-emissions scenario that pairs more expensive clean technologies with cheap fossil fuels and as-anticipated GDP growth; and a mid-emissions scenario that cuts the difference between the two. To model these policy pathways and emissions scenarios, we use RHG-NEMS, our version of the National Energy Modeling System developed by the US Energy Information Administration.

Energy prices and costs rise for households and businesses

An often-stated goal of these changes is to bring costs down for American households. We find that repealing the energy tax credits has the opposite effect, increasing household

energy costs by $95-290 in 2035—a 2-7% increase in costs that year (Figure 1). Repealing tax credits effectively acts as a energy tax increase. Higher spending on mobility energy, including motor gasoline, diesel, and electricity for charging electric vehicles, make up 41-68% of that increase. There are a couple of reasons for this. First, with fewer electric vehicles on the road (discussed further below), consumers will buy more liquid fuels, especially motor gasoline. Relatedly, this increase in demand for gasoline drives up prices at the pump by 1-5% (Figure 2), increasing costs for all drivers. Domestic crude oil production increases very modestly (less than 1%), while crude oil imports increase more meaningfully (5-11%). Electricity bills make up 25-50% of the increase, with households paying $46-72 more each year to power their homes.

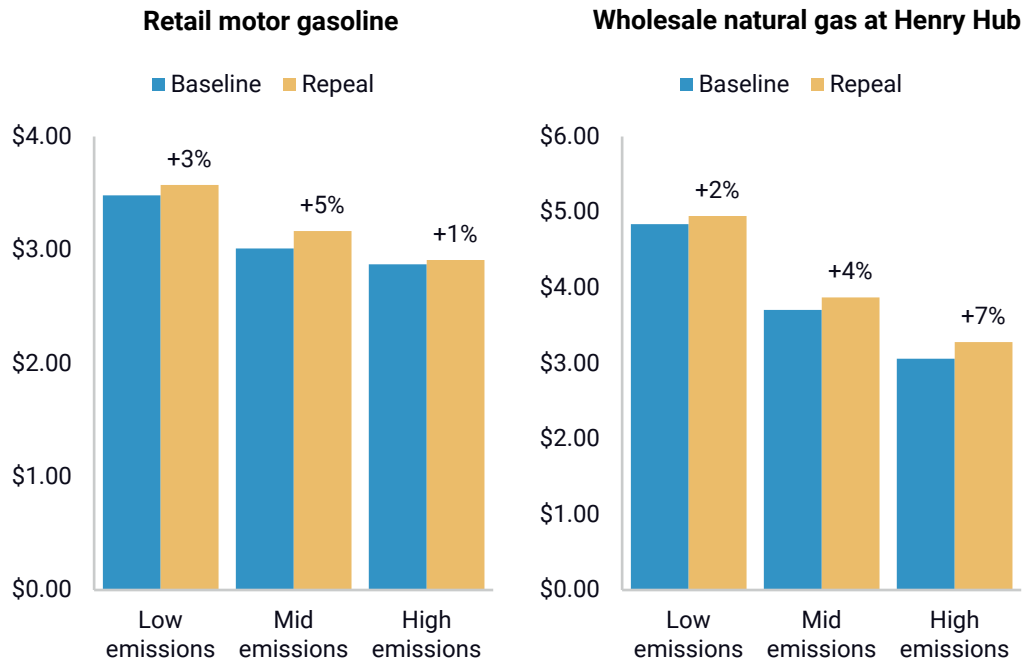
FIGURE 1
Change in national average annual household energy expenditure in 2035, repeal compared to baseline
2022 USD



Source: Rhodium Group

Increasing demand for natural gas, particularly driven by more gas demand for power generation, increases wholesale natural gas prices by 2-7% in 2035, despite 6-8% higher gas production (Figure 2). That leads to higher retail prices for all consumers across the economy.

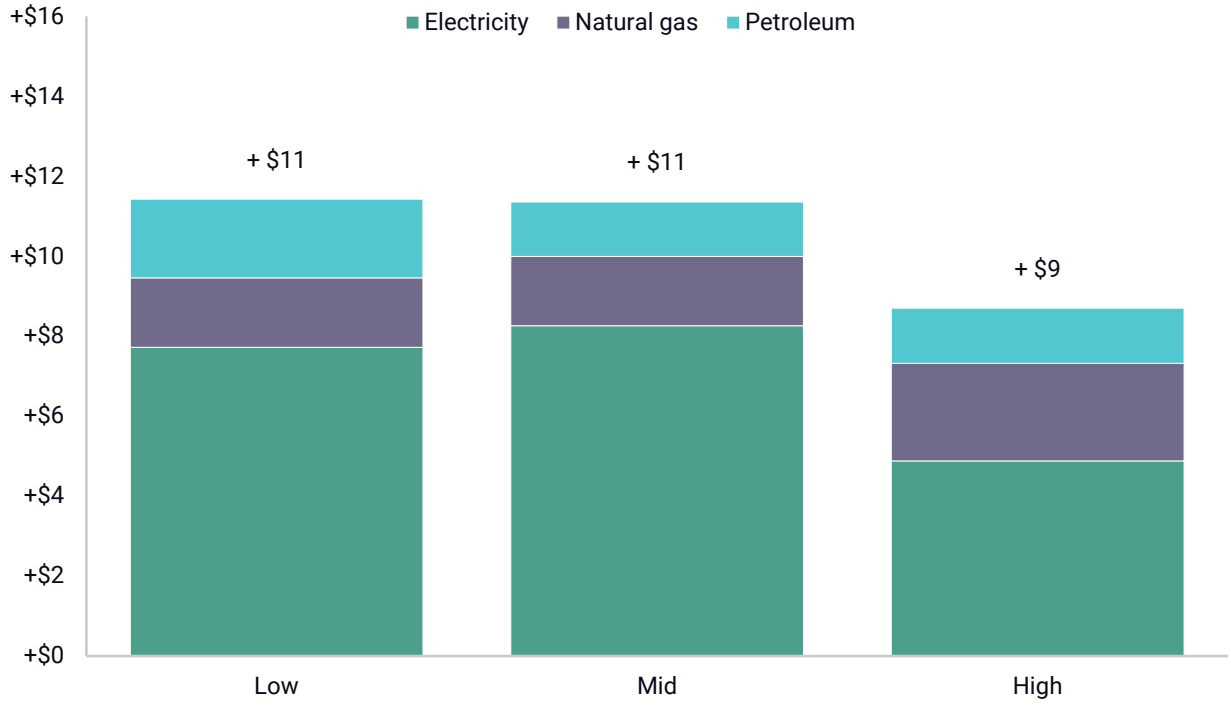
FIGURE 2
Fossil fuel prices in 2035
2022 USD per MMBtu



Source: Rhodium Group

Despite the administration's stated desire to bolster domestic manufacturing, we find that repealing tax credits places extra burden on industrial producers through higher fuel costs. These higher costs drive up industrial expenditures by $9-11 billion in 2035 (Figure 3). Electricity bills comprise 56-73% of this increase—a consequence of industrial electricity rates rising by 7-12% in 2035. Natural gas expenditures increase by $2 billion on average due to higher wholesale prices. At a time when trade policy turbulence is driving uncertainty around inflation, consumer confidence and the continued economic growth increasing energy costs could add to the turbulence.

FIGURE 3
Change in total industrial energy expenditures in 2035, repeal compared to baseline
2022 billion USD



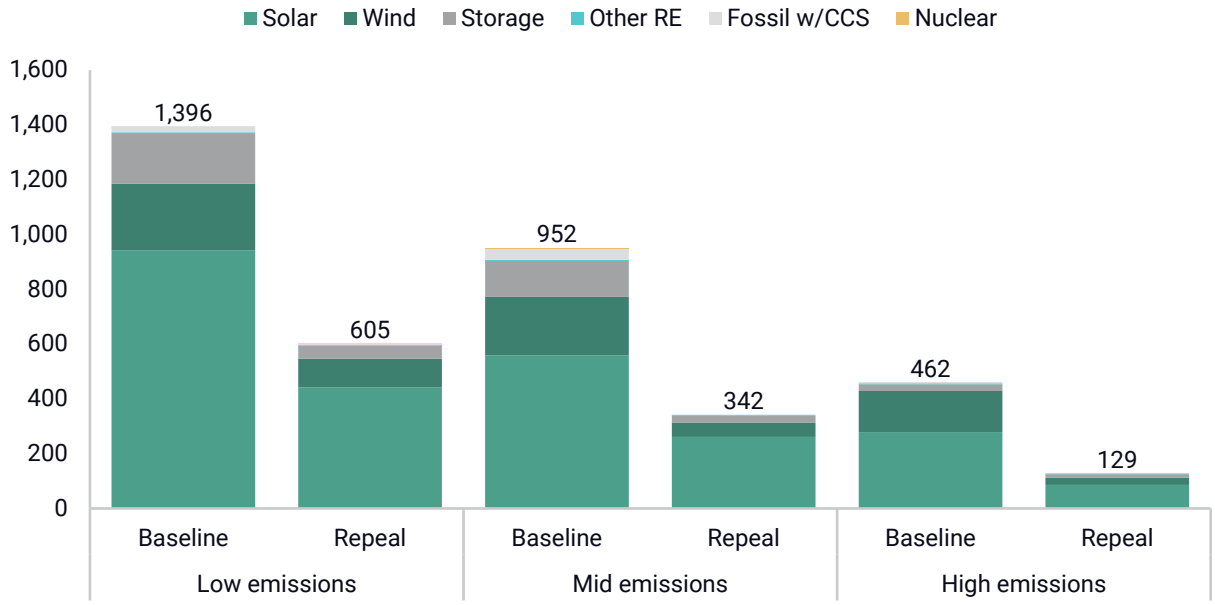
Source: Rhodium Group

Stalled progress on clean energy deployment

An outright repeal of the energy tax credits similar to the Ways and Means proposal reduces the amount of new clean capacity installed on the grid from 2025 through 2035 by 57-72% (Figure 4). The lion's share of the decline in capacity comes from lower growth of renewables and storage, and there is no meaningful uptick in non-renewable clean capacity. A part of this decline is made up for by modestly less coal capacity retiring by 2035, though the coal fleet still shrinks by at least half from today's levels, and no new coal plants are built. Gas capacity expands by as much as 9% in 2035, and both new and existing gas plants run more, compared to the baseline.

Our previous modeling is best suited to estimate the impact of policy change on commercially available technologies, but there are important impacts beyond commercial technologies as well. The near full repeal of energy tax credits in the Ways and Means language have an outsized effect on innovative emerging clean technologies like enhanced geothermal, advanced nuclear, long duration storage, and fusion. Developers of these technologies are counting on the long-term availability of the tax credits in current law to support initial projects that are unlikely to be placed in service before 2028. The FEOC constraints on clean electric credits and manufacturing tax credits will make it harder to develop and scale supply chains to accelerate technology deployment and drive down costs. The Ways and Means proposal will stifle innovation at a time when the US needs all the power it can get to meet surging electric demand.

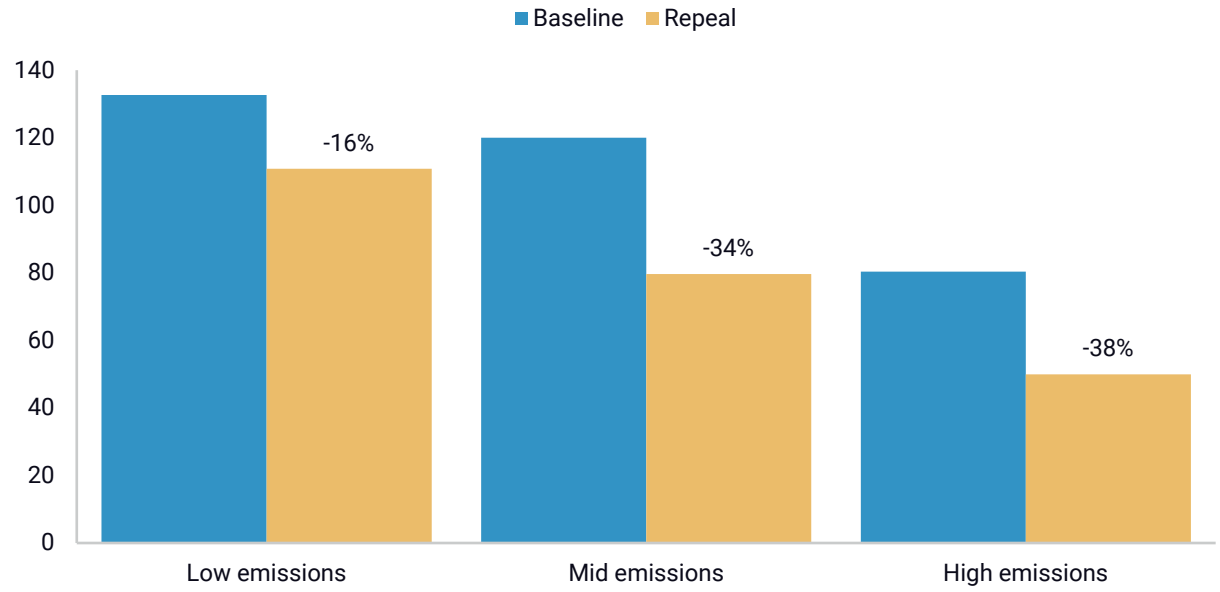
FIGURE 4
Cumulative new clean additions to the grid, 2025-2035
GW



Source: Rhodium Group

In our baseline, electric vehicle sales already slow meaningfully from removal of EPA tailpipe regulations and the revocation of waivers that prevent California from pursuing more stringent standards. Repealing the clean vehicle tax credits reduces EV sales by another 16-38% in 2035 compared to baseline (Figure 5).

FIGURE 5
Number of light-duty electric vehicles on the road in 2035
Million vehicles, % change from baseline



Source: Rhodium Group

Manufacturing growth threatened

Taking a major step back on domestic deployment of clean energy technologies will likely impact the future of announced manufacturing facilities that produce these technologies. As reported in the Clean Investment Monitor's Q1 2025 update, six manufacturing facilities totaling nearly $7 billion in investments were cancelled last quarter. In The State of US Clean Energy Supply Chains in 2025 released last month, the Clean Investment Monitor found that domestic manufacturing of key clean technology components including solar modules, battery modules and cells, and zero-emitting vehicles are scaling up above current levels of demand for these technologies and toward deployment levels we see in our modeling of current policy through 2035.

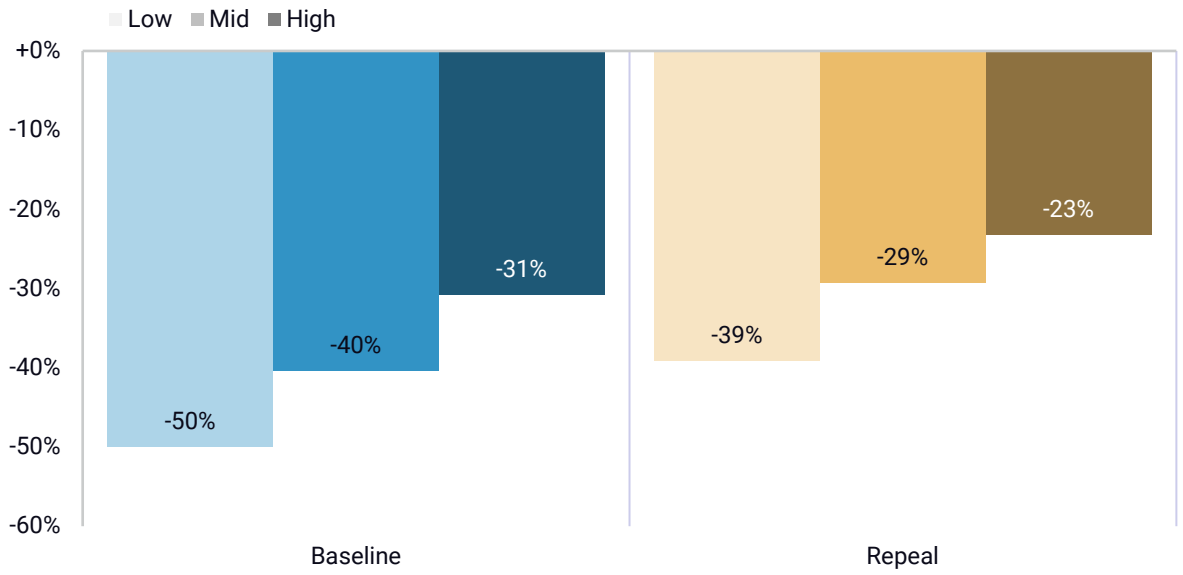
Between investments in these manufacturing facilities as well as investment dollars flowing from installing clean electricity and industrial facilities, $321 billion was invested from mid-2022 through the first quarter of 2025—but a total of $522 billion in investment remained outstanding as of Q1. Steep reductions in clean energy technology deployment plus the proposed material sourcing constraints on clean manufacturing tax credit eligibility could put a meaningful amount of that $522 billion in outstanding investment at risk.

Meaningfully higher greenhouse gas emissions levels

The net result of proposed tax policy changes on the energy system leads to a meaningful reduction in the pace of decarbonization. Repealing the energy tax credits increases emissions by 500-730 million metric tons in 2035 relative to the baseline and more than a gigaton compared to Taking Stock 2024. In the high emissions scenario, repeal leads to emissions that are only 23% lower than 2005 levels in 2035 (Figure 6), or just 4 percentage

points lower than annual emissions in 2024—effectively no progress on decarbonization. In the low emissions scenario, emissions are 39% lower than 2005 levels.

FIGURE 6
Change in US greenhouse gas emissions from 2005 levels in 2035
Percent change



Source: Rhodium Group

What's next?

The House Ways and Means Committee is considering this proposal today. Whatever moves out of that committee is one step closer to the House floor and a vote of the full House, and we'll be tracking the bill as it evolves throughout the process. The latest Joint Committee on Taxation revenue effects estimate of the full suite of policy changes in the current Ways and Means proposal is still nearly $800 billion below its spending target, so there's certainly room for the proposal to evolve in response to ongoing member conversations.

Meanwhile, the Senate Finance Committee (the equivalent tax-writing committee on the Senate side) has a meaningfully different deficit reduction target to achieve and a different set of stakeholders' interests to balance. How the two chambers will get to passage individually and then in agreement with each other remains a very open question.

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ACKNOWLEDGMENTS

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RESOURCES *for the* FUTURE

Projected Impacts of Repealing the Section 45Y and 48E Technology-Neutral Clean Electricity Tax Credits

Issue Brief 25-06 by **Aaron Bergman**, **McKenna Peplinski**, **Kevin Rennert** and **Nicholas Roy** — March 2025 (Updated May 2025)

The Inflation Reduction Act replaced an assortment of technology-specific tax credits for clean electricity with two "technology-neutral" tax credits, the 45Y and 48E tax credits (named after their sections in the tax code). The 45Y tax credit is a "production" tax credit, which pays a set amount for every unit of electricity generated, while the 48E tax credit is an "investment" tax credit that pays a fraction of the capital cost for a qualifying generation or storage technology. Unlike previous iterations, these tax credits apply to any technology that can produce electricity with zero emissions.[1] Importantly, the expiration of these tax credits is based on the overall carbon intensity of the electricity sector rather than any specific year.

As the new administration and Congress contemplate proposals for the budget reconciliation process, these and other tax credits in the Inflation Reduction Act are on the table for potential repeal. In this issue brief, we explore the consequences of a repeal of these tax credits for retail electricity prices, consumer electricity bills, government expenditures, clean electricity, and emissions.

In addition to our reference case, we examine three additional scenarios to assess the impacts of high and low natural gas prices, as well as high electricity demand, on the consequences of a repeal. These scenarios encompass the main parameters known to affect electricity prices. Natural gas prices have displayed wide variation historically, and greater exports of natural gas would put upward pressure on electricity prices. Increased electricity demand, driven by electrification of end-uses or to power data centers and artificial intelligence, would also put upward pressure on electricity prices. We use a high-demand scenario taken from the National Renewable Energy Laboratory's Electrification Futures Study to account for these factors.

We find that repealing these tax credits is modeled to:

- Increase nationally averaged electricity rates by roughly 5–7 percent across modeled scenarios in 2030, reaching a peak of 6–10 percent higher in 2035. These rate impacts translate into a $75–$100 increase in national average annual electricity bills in 2030, with a peak increase of $100–$160 per year (real 2023 dollars). Rate increases differ significantly by region, with the highest impact seen in the upper plains states ($300–$400 per year increases in the West North Central census region).
- Reduce tax expenditures by $227–$315 billion dollars over the ten-year budget window (2025–2034, cumulative nominal dollars). After 2035, the annual reduction in tax expenditures is between $48–$63 billion per year, declining to $24–$47 billion per year in 2040.
- Increase power sector carbon dioxide emissions by 350 Mt–400 Mt CO_2 in 2035, with a cumulative increase in power sector emissions of 3,500 Mt–4,500 Mt CO_2 between 2025 and 2040.
- Reduce wind generation capacity in 2035 by 125 GW–225 GW and solar capacity in 2035 by approximately 175 GW.[2]

1 For more details, see **here** and **here**.

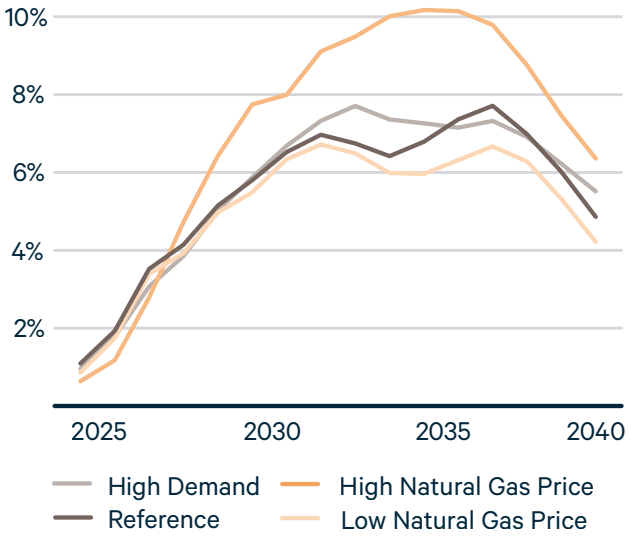
2 This is a coincidental convergence in 2035. The range increases to 175–225 GW in 2036 and remains at that level through the end of the projection period.

1. Price Impacts

Figure 1 shows national projections for percent change in retail electricity prices. As the effects of the repeal compound, electricity prices increase by 6 percent in 2030 in all but the high natural gas price scenario, which has an 8 percent increase. After 2030, the price increase in the high natural gas price scenario reaches 10 percent, while the other scenarios stay between 6–8 percent. Price impacts are higher in the high natural gas price scenario because the repeal of the tax credits leads to greater reliance on natural gas, and the high gas prices are passed on to consumers through higher electricity prices.

Nationally, residential electricity bills increase by roughly $75 per year by 2030, and by values ranging from $75–$145 per year by 2035, with the highest average bill increase in the high natural gas price scenario (all values in real 2023 dollars). Figure 2 shows the effects of repeal on annual residential electricity bills by census region.[3] There is substantial variation across regions, reflecting the amount of renewable electricity generation that would otherwise have been incentivized by the tax credits in those regions. For example, the repeal of the tax credits leads to the greatest increases in electricity bills ($300–$400/year) in the upper plains states (the West North Central region). This increase is due to substantially less wind generation being built in those states under a repeal of the tax credits and instead being replaced with higher-priced generation. Regions losing a higher fraction of wind than solar, such as the West North Central region, tend to show the greatest increase in electricity prices in our modeling. This is because wind usually chooses to take the production tax credit (rather than the investment tax credit), which lowers the cost of generation during the tax credit's ten-year duration. Solar, in contrast, at least in the early years of our projection, chooses the investment tax credit, which reduces the capital cost of the project but not the cost of generation, and capital costs are amortized over the lifetime of the project.

Figure 1. Percent Change in National Average Retail Electricity Prices



2. Tax Expenditures

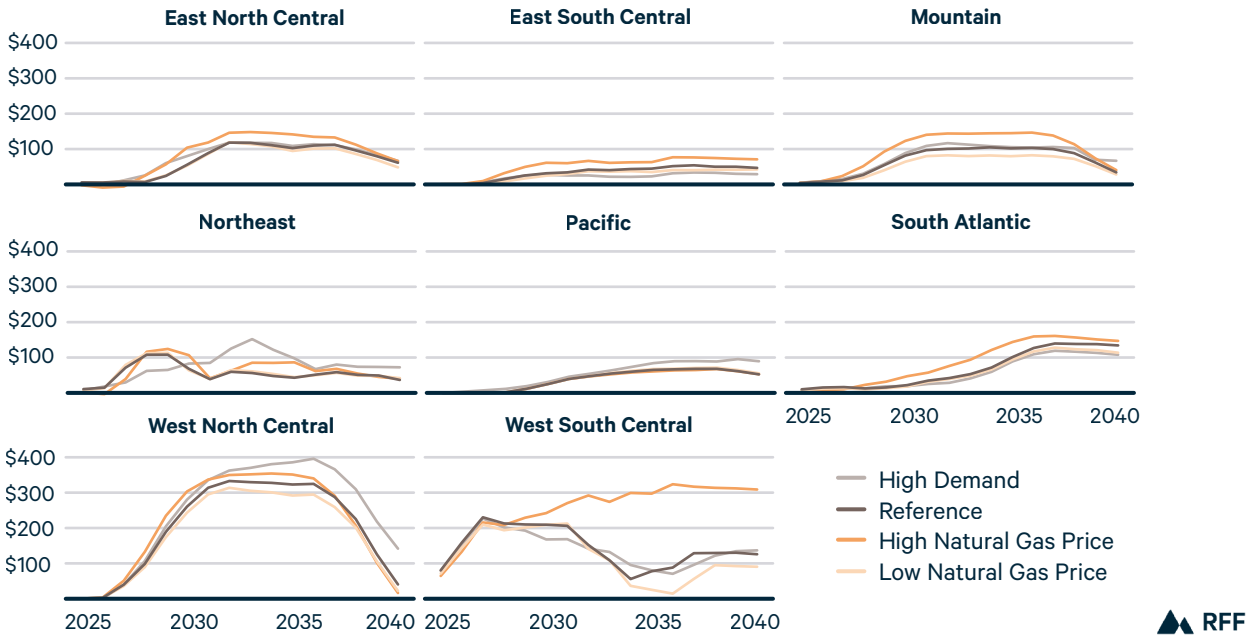
Figure 3 shows tax expenditures per year in each of the four scenarios. Across the scenarios, we find that roughly 60 percent of the $227–$315 billion cumulative reduction in tax expenditures over the 2025–2034 period is due to the production tax credit (45Y). The total annual reduction in tax expenditures for both tax credits is between $48 and $63 billion in 2035. The high electricity demand and high natural gas price scenarios are projected to have the greatest deployment of renewable energy with the 45Y and 48E tax credits in place and accordingly see the highest decline in tax expenditures from their repeal.

3. Clean Electricity and Emissions

Figure 4 shows the reduction in wind and solar capacity by region due to repeal of the 45Y and 48E credits. Wind capacity is reduced mainly in the center of the

3 We aggregate the New England and Mid-Atlantic census regions into a combined Northeast region due to their small sizes. See Figure 6 for a map of the US Census Regions.

Figure 2. Change in Average Annual Electricity Bills, by region

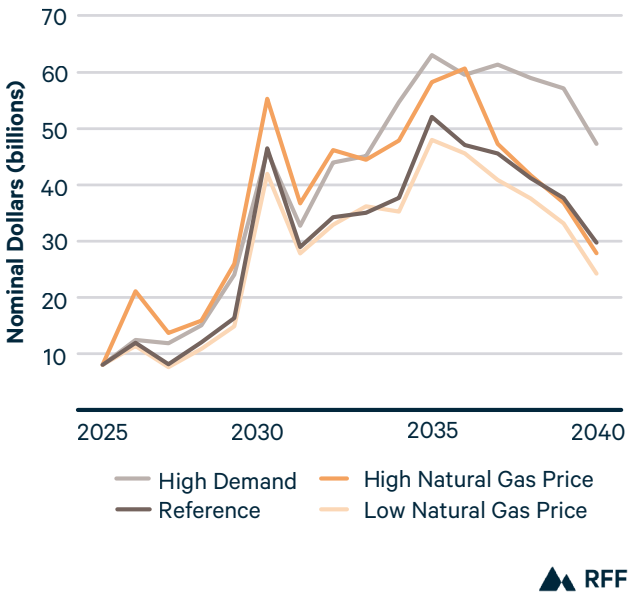


country, with the greatest reductions in the upper plains states (the West North Central Region). Solar power is reduced mainly in the Southeast and, to a lesser extent, the upper Midwest and Texas. These changes lead to an increase in nationwide emissions of 350 Mt–400 Mt CO_2 in 2035, shown in Figure 5, with a cumulative increase in emissions of 3,500 Mt–4,500 Mt CO_2 between 2025 and 2040.

4. Methodology

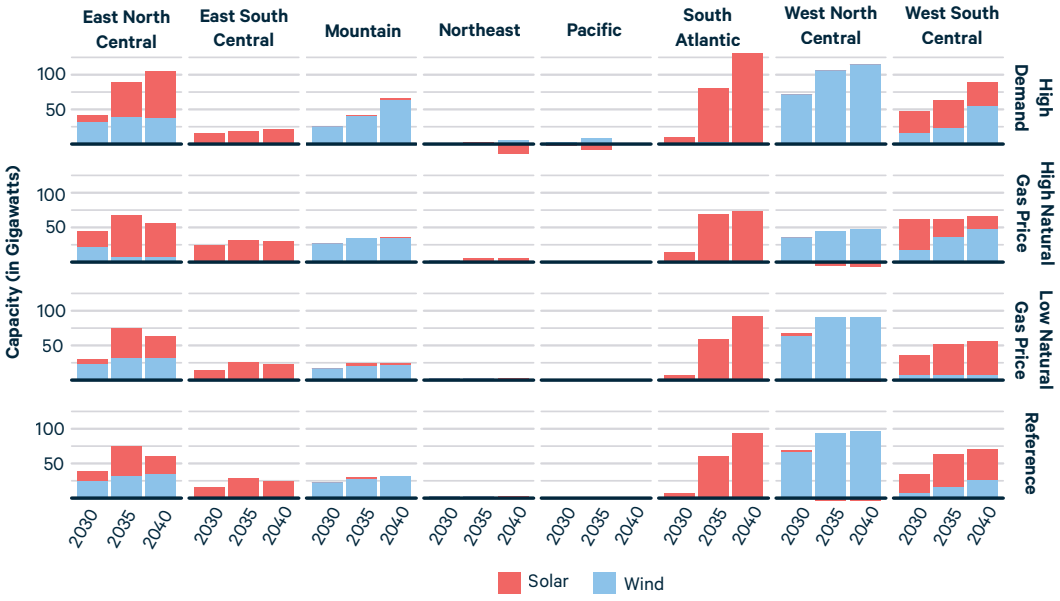
RFF's **Haiku power sector model** is used for modeling analysis of energy policy with a focus on the electric sector.[4] It has been deployed in various formulations for over two decades to analyze market-based mechanisms such as carbon pricing, tradable performance standards, and clean energy tax credits. We solve the model as a linear program for the lower 48 states with a 31-year time horizon (2019–2050), with each year divided into 24 time blocks across three seasons. We input data for existing electricity capacity and regionalized projections of future capital and operating costs from AEO 2021 and NREL-ATB 2023. The model does not represent barriers to the deployment of wind and solar such as interconnection queues.

Figure 3. Reduction in Tax Expenditures, by year



4 Previous publications using the Haiku model can be found **here**.

Figure 4. Reduction in Wind and Solar Capacity



For the purposes of this analysis, the model is most similar to the analysis done for the 2023 carbon score found **here**. Retail prices incorporate constant transmission costs on a per MW of capacity basis and assume 100 percent pass-through of subsidies. Residential electricity bills are calculated using the ratio between overall electricity prices and residential prices, by region, in the US Energy Information Administration's Annual Energy Outlook (AEO) 2023 reference case. Retail prices and electricity bills are shown with a three-year centered rolling average to smooth the results and more closely reflecting rate and price adjustments in practice. The tax credits include a 3 percent haircut to represent the cost of monetizing the credits. The domestic content bonus is represented as a 0.5 percent annual increase in the credit starting in 2030, until it reaches 2050, when it is assumed all projects would qualify. The energy community bonus is calculated on a state-by-state basis based on the percentage of land that qualifies for the nonemployment requirements **from this data**.

Tax expenditures are calculated in real 2023 dollars in the model and are inflated using Congressional Budget Office's **January 2025** projections for the GDP deflator, assuming a constant rate of inflation after 2035.

Figure 5. Increase in Annual Power Sector CO_2 Emissions

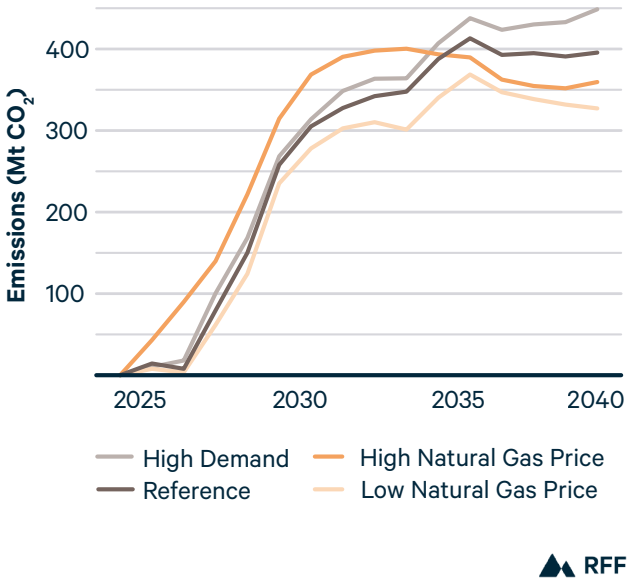
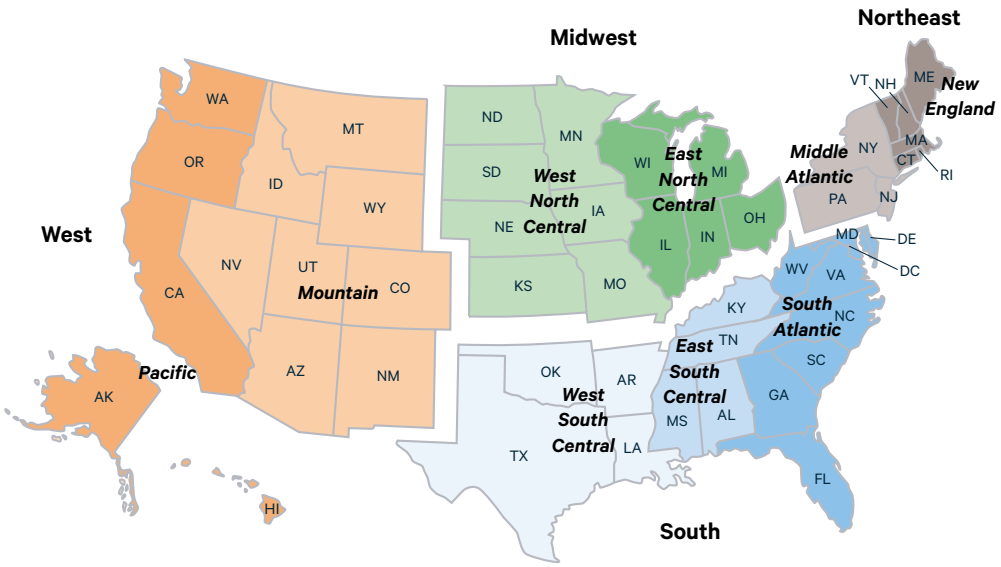


Figure 6. US Census Regions



Source: Rainer Lesniewski via **Shutterstock**.

The four scenarios we examine are based on the AEO 2023 reference case (Reference), the AEO 2023 high oil and gas supply case (Low Natural Gas Prices), the AEO 2023 low oil and gas supply case (High Natural Gas Prices), and the NREL Electrification Futures Study (High Demand Case). Our reference case does not include EPA's regulation of power plants under section 111 of the Clean Air Act.

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EVOLVED ENERGY RESEARCH

A Fork In The Road: Impacts of Federal Policy Repeal On The U.S. Energy Transition

May 2025

A Fork In The Road: Impacts of Federal Policy Repeal On The U.S. Energy Transition

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This version: May 23, 2025

Access and download data from this report and other resources at **repeatproject.org**

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EVOLVED ENERGY RESEARCH

Forward

This report summarizes REPEAT Project's analysis of the impacts of changes in federal policy proposed by the administration of President Donald Trump and the Republican majority in Congress on the U.S. energy transition. President Trump and Congressional Republicans have vowed to repeal and replace many of the legislative and regulatory policies created by the Biden Administration and 117th Congress to accelerate the transition to a cleaner U.S. energy system. If completed, these repeals may reshape the U.S. policy landscape once again. REPEAT Project continues to assess the impact of specific policy changes as legislative and regulatory changes are proposed and enacted. In this report, we assess three policy scenarios meant to bracket the range of likely outcomes:

A trio of **Continued Policies** scenarios ('Conservative', 'Mid-range', and 'Optimistic') assume the continuation of the full suite of policies enacted under the Biden Administration, including the combined impact the Inflation Reduction Act of 2022 (IRA) and the Infrastructure Investment and Jobs Act of 2021 (IIJA). This scenario also includes a set of regulatory policies enacted by the Biden Administration, including: Environmental Protection Agency (EPA) greenhouse gas emissions regulations on power plants, light and heavy vehicles, and oil and gas sector methane pollution; Department of Energy (DOE) efficiency standards; and Department of Transportation (DOT) vehicle fuel economy standards. The range of outcomes spanned by the three scenarios reflect uncertainty about the effectiveness of policy provisions and the potential impacts of constraints on siting, interconnection, supply chains and other rate-limiting factors.

An **Executive Repeal** scenario assesses the impact of executive actions the Trump administration has stated it will take to unwind Biden-era climate and clean energy policies. This includes repeal of all EPA greenhouse gas regulations, DOT vehicle fuel economy standards, and DOE efficiency rules. The scenario also assumes executive agencies freeze distribution of all unspent funding made available by the IRA and IIJA.

A **Full Repeal** scenario includes all of the executive actions included in the Executive Repeal scenario and also assumes full repeal of all tax incentives created by the Inflation Reduction Act at the end of 2025. On May 22, 2025, the U.S. House of Representatives passed the partisan budget bill, H.R. 1, which substantially repeals nearly all of the tax credits enacted by the IRA to support clean electricity, fuels, vehicles and manufacturing. The bill also rescinds all unobligated funding for clean energy and climate programs enacted by the IRA and the IIJA. **The potential impact of H.R. 1 is thus substantively similar to this Full Repeal scenario**.

We also provide a **Net-Zero Pathway** benchmark scenario. This scenario reflects a transition to net-zero greenhouse gas emissions across the economy by 2050.

Given the significant uncertainty about future outcomes, **all results in this report should be considered approximate**. REPEAT Project updates our analysis regularly as new data and inputs become available and new policies are proposed and enacted.

Note that this work has not been subject to formal peer review.

Summary

Full repeal of current federal energy and climate policies would:

- Increase U.S. greenhouse gas emissions by roughly 0.5 billion metric tons per year in 2030 and more than 1 billion metric tons per year in 2035.
- Raise U.S. household and business energy expenditures by $25 billion annually in 2030 and over $50 billion in 2035.
- Increase average U.S. household energy costs by roughly $100 to $160 per household per year in 2030 and roughly $270 to $415 per household per year in 2035.
- Reduces cumulative capital investment in U.S. electricity and clean fuels production by $1 trillion from 2025-2035.
- Imperil a total of $522 billion in announced but pending investments in U.S. clean energy supply and manufacturing.
- Reduce annual sales of electric vehicles by roughly 40% in 2030 and end America's battery manufacturing boom.
- Result in 8.3 million less battery electric and plug-in hybrid light vehicles on US roads in 2030.
- Substantially slow electricity capacity additions, raising national average retail electricity rates and monthly household electricity bills by about 9% in 2030 — and as much as 17% in some states (including TX, OK and PA).
- Kill off the nascent clean hydrogen, CO_2 management, and nuclear power sectors.

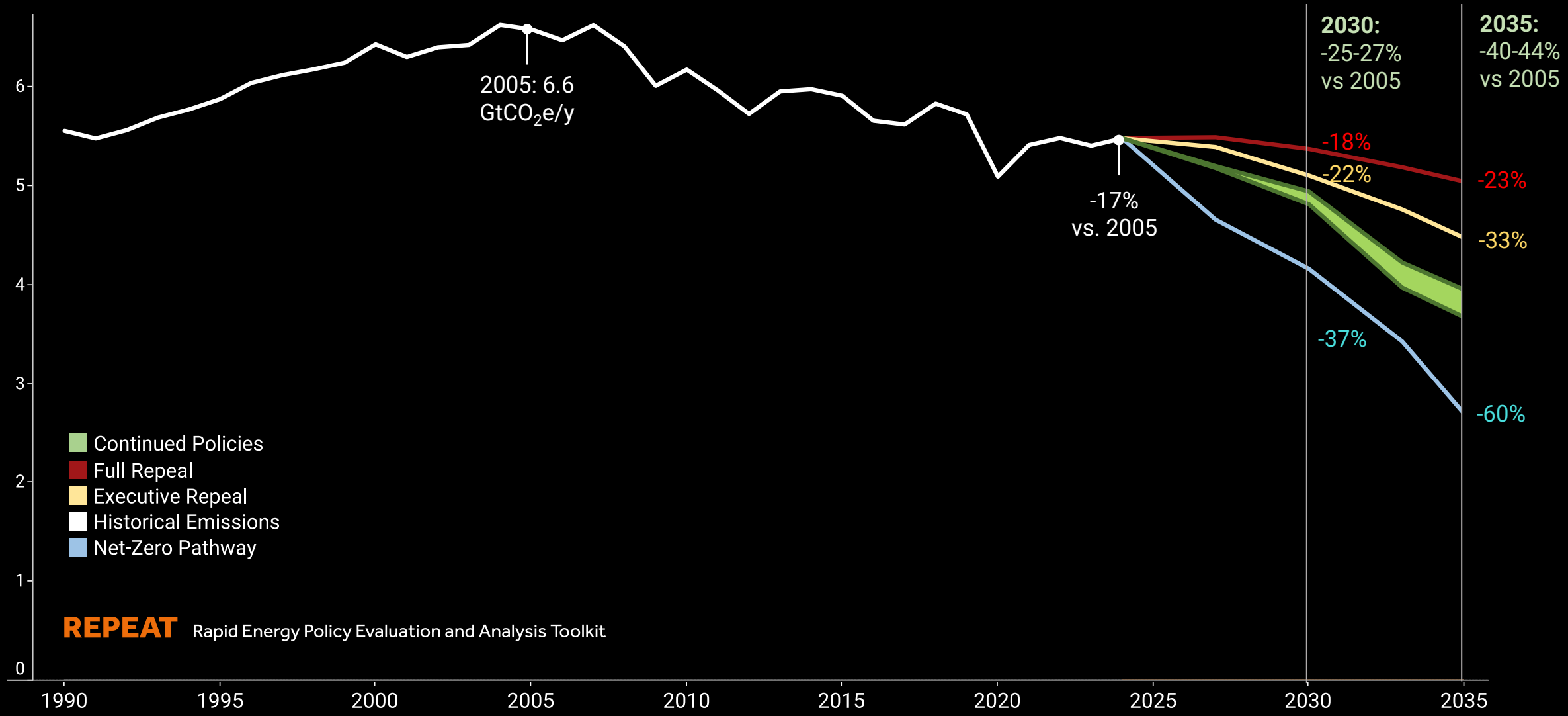
Greenhouse Gas Emissions

A fork in the road

repeatproject.org

Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)

billion metric tons CO2-equivalent (Gt CO2-e)



A fork in the road

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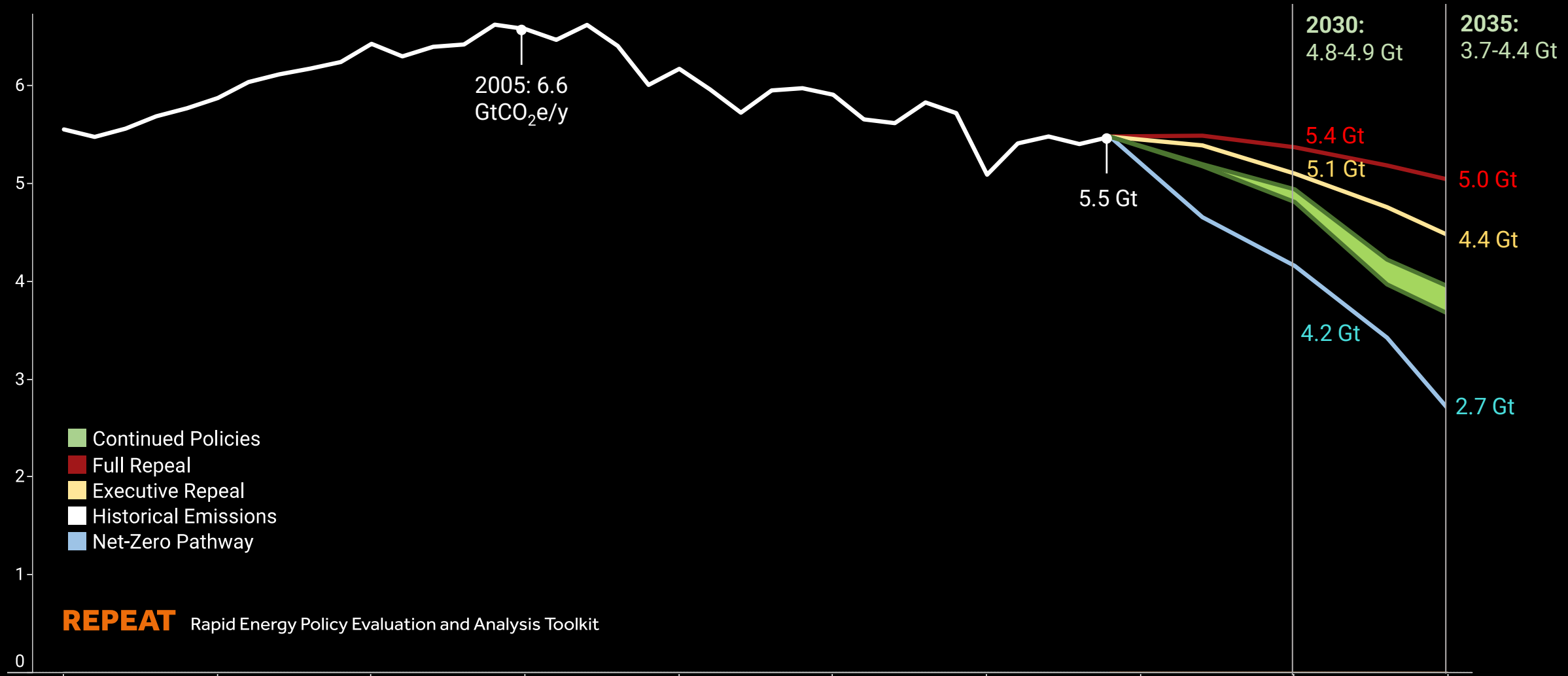
Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)

billion metric tons CO2-equivalent (Gt CO2-e)



Changes in sectoral emissions

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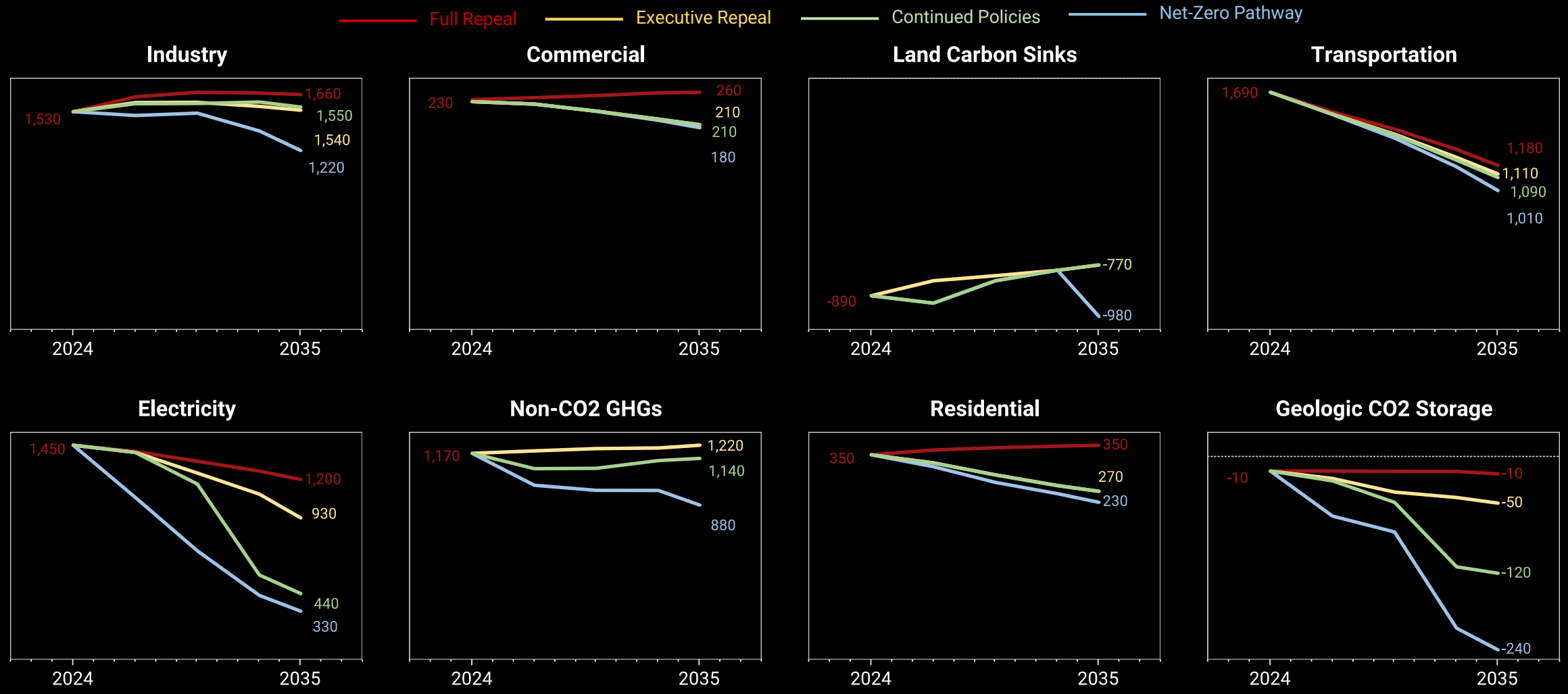
Modeled U.S. Greenhouse Gas Emissions By Sector

million metric tons CO2-equivalent (Gt CO2-e)



Increases in emissions by sector

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Change in Sectoral Emissions Due to Repeal of Continued Policies[1]

million metric tons CO2-equivalent (Mt CO2-e)

1 – Comparison is vs Continued Policies – Mid-range case

Energy Costs and Consumption

Repeal raises US energy costs

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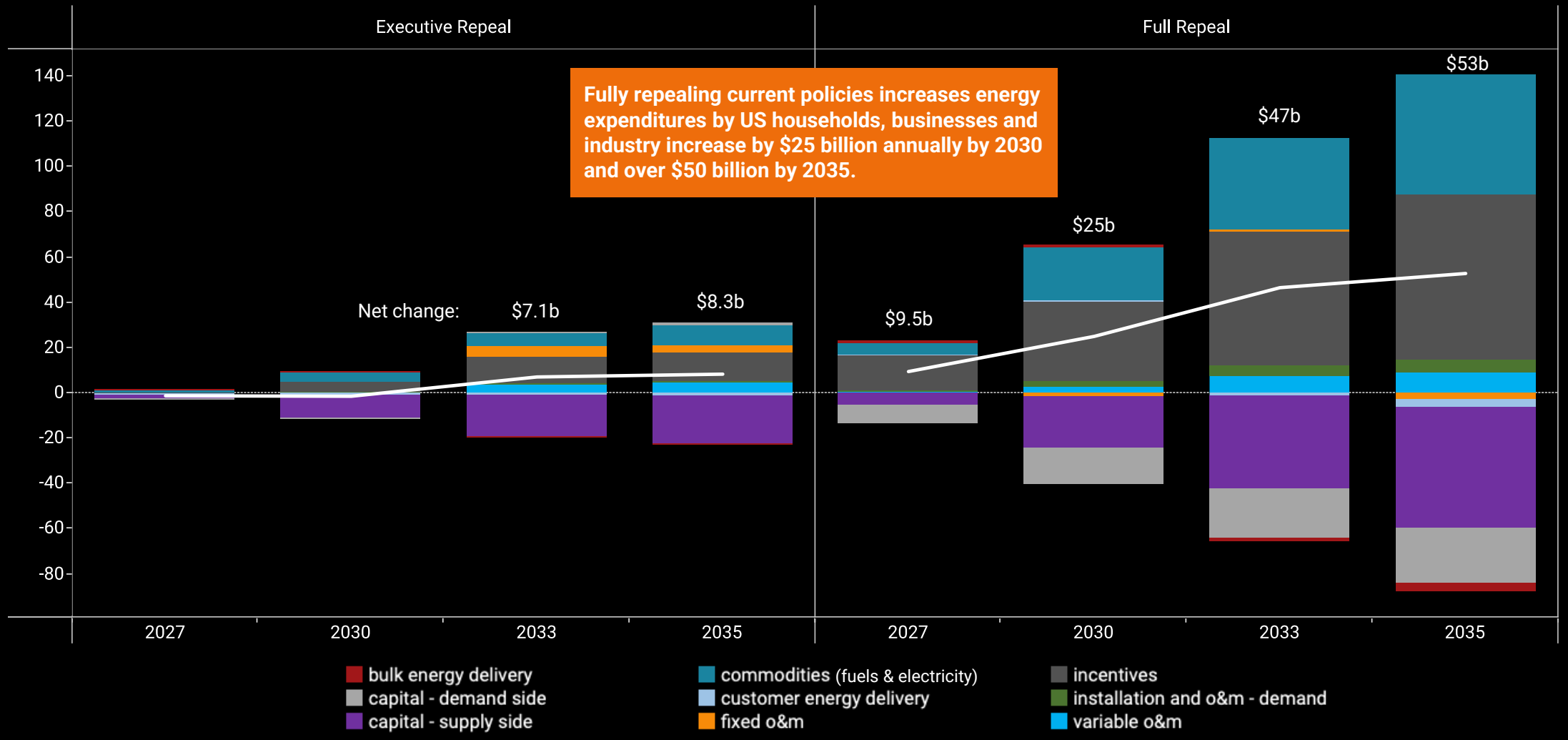
Change in Annual US Energy Expenditures Due to Repeal of Continued Policies[1]

Billions of 2022 dollars



1 – Note: REPEAT Project's modeling suite does not capture endogenous changes in coal, natural gas, or petroleum product prices as a function of changes in demand. Increases in consumption of fossil fuels under repeal scenarios would likely further increases prices and thus total energy expenditures beyond the levels depicted here.

Household energy expenditures rise

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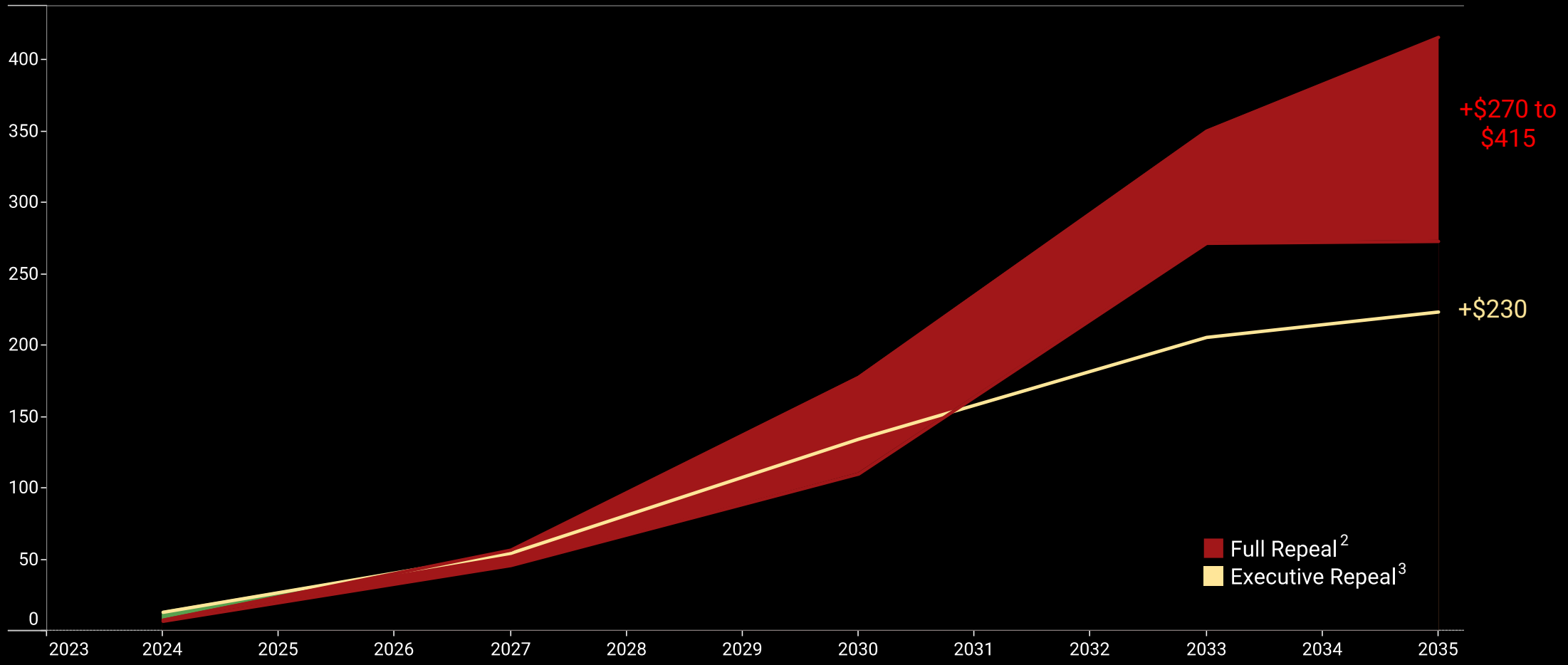
Change in Average Household Annual Energy Costs[1]

2022 dollars per year



1 – Note: REPEAT Project's modeling suite does not capture endogenous changes in coal, natural gas, or petroleum product prices as a function of changes in demand. Increases in consumption of fossil fuels under repeal scenarios would likely further increases prices and thus total energy expenditures beyond the levels depicted here.

2 – Low end of range reflects difference between Full Repeal and Continued Policies – Conservative and high end reflects difference vs Continued Policies – Optimistic.

3 – Comparison to Continued Policies – Mid-range.

Retail electricity prices increase

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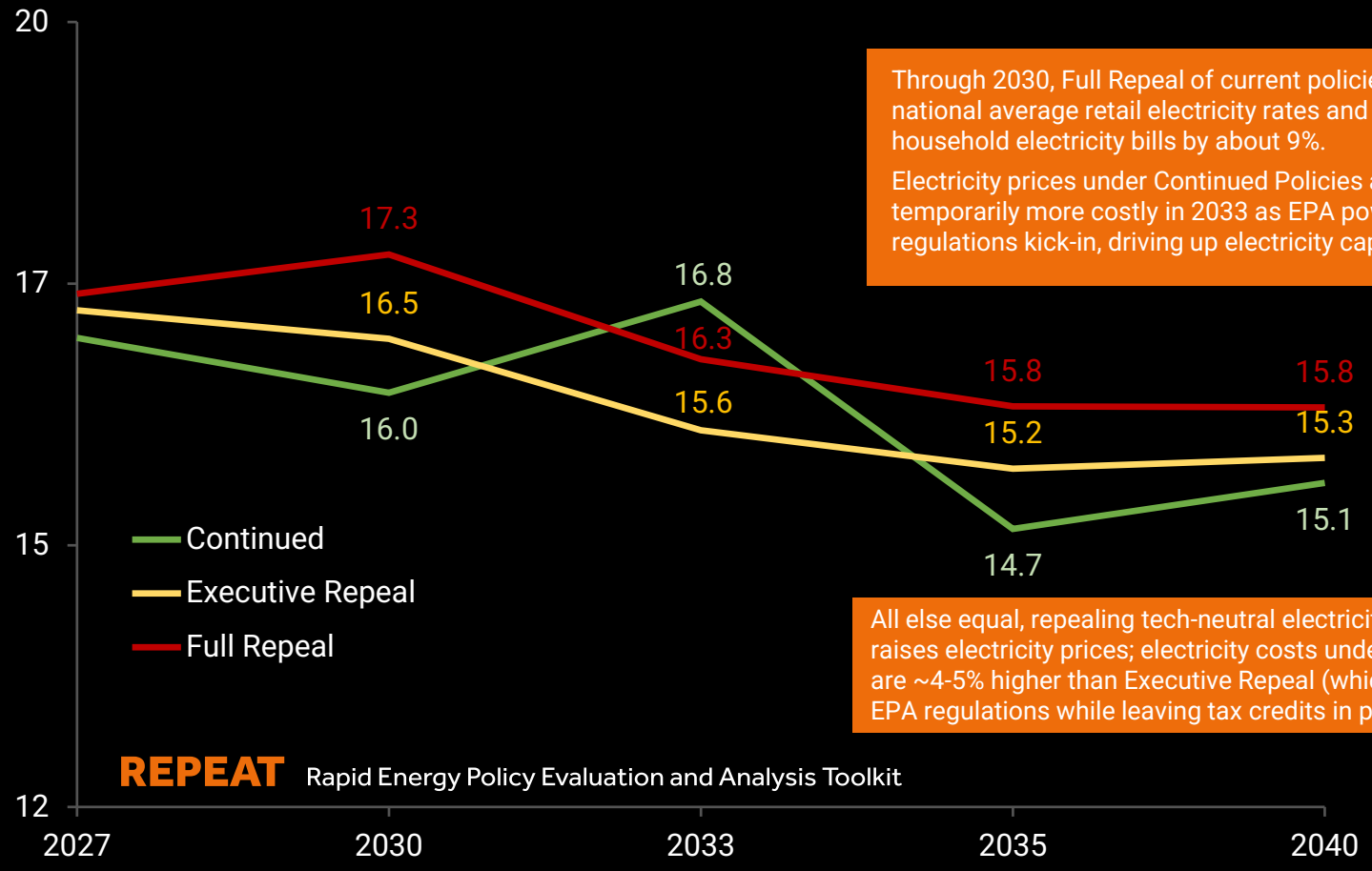
National Average Retail Electricity Price[1]

2022 cents per kWh



Through 2030, Full Repeal of current policies increases national average retail electricity rates and monthly household electricity bills by about 9%.

Electricity prices under Continued Policies are temporarily more costly in 2033 as EPA power plant regulations kick-in, driving up electricity capacity prices.

All else equal, repealing tech-neutral electricity tax credits raises electricity prices; electricity costs under Full Repeal are ~4-5% higher than Executive Repeal (which removes EPA regulations while leaving tax credits in place).

REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

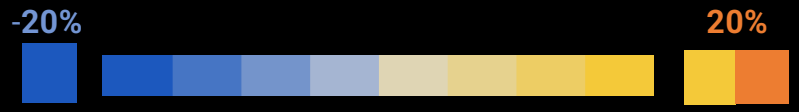
National Average Household Monthly Electricity Bill Estimate[2]

1. Source: Retail electricity price is based on EPA's Retail Price Model involving calculations for regulated and deregulated wholesale market structures. External inputs are from EIA AEO 2024 and the PUDL Project.
2. Source: National average monthly household consumption is from EIA AEO 2022 with scaling factors from EIA AEO 2025.

Retail rates in states with deregulated wholesale markets are more sensitive to EPA power plant regulations

In states dominated by competitive wholesale markets (e.g. TX, PA), the **relative costs of the Continued Policies and Repeal scenarios are primarily driven by capacity and energy market price increases**. In these markets, marginal wholesale prices are passed on to consumer rates. For example, in TX & PA, Full Repeal raises electricity rates by about 17% in 2030. By 2033 however, rates in Continued Policies become more expensive in the ERCOT, PJM and Northeast regions, as EPA regulations trigger coal plant retirements, greater reliance on gas power plants, and increased capacity & energy market prices. By 2035-2040, more new wind, solar and battery capacity is built, stabilizing prices under Continued Policies and making rates higher under Repeal in most states.

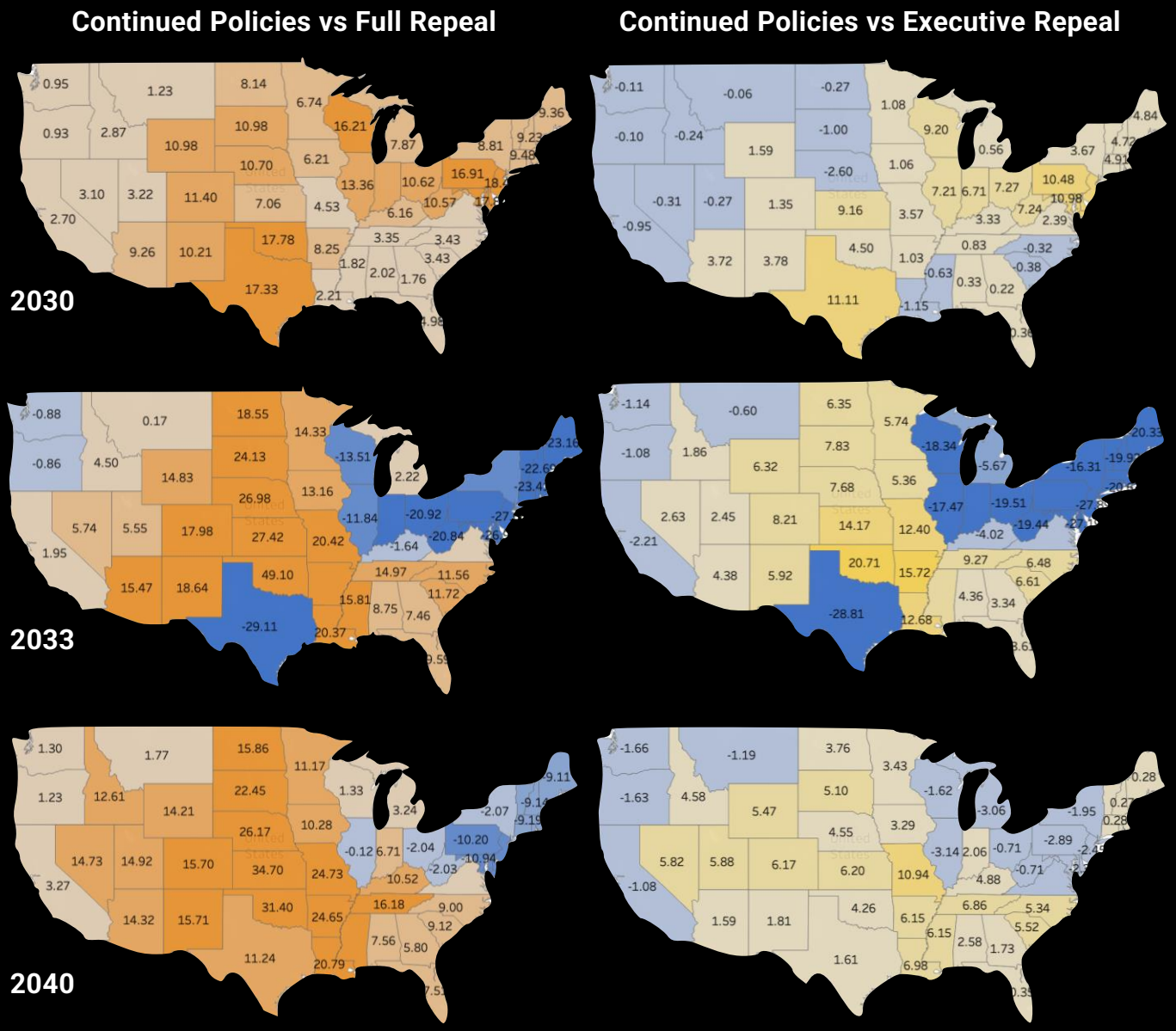
For states dominated by regulated utilities (e.g. in the Great Plains, Southwest & Southeast), both **Repeal scenarios consistently lead to higher electricity rates**. This is because average costs increase due to slower wind, solar and storage capacity additions, which means supply fails to keep up with new demand and the generation mix leans on higher-cost fossil generators.



Continued Policies is more expensive | No difference between scenarios | **Full or Executive Repeal is more expensive**

Difference in State Average Retail Rates

percent difference

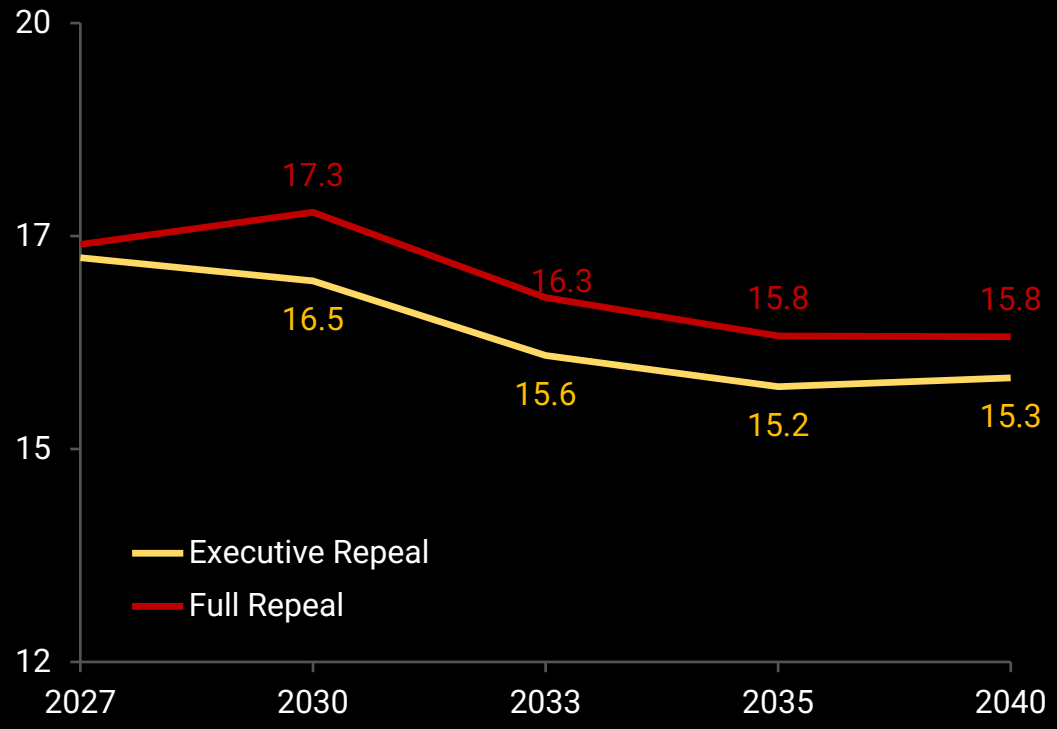


Repealing tech-neutral tax credits increases electricity rates ~4-5% on average and as much as 24% in certain states.

While both Repeal scenarios continue to rely more on coal plants with the repeal of EPA regulations, eliminating the tech-neutral tax credits in the Full Repeal scenario increases overall costs through a shift to fossil fuels with higher generation costs and removal of subsidies lowering cost of new electricity supply. This effect is especially pronounced in states with regulated wholesale markets, where increases in average generation costs are directly passed to consumers.

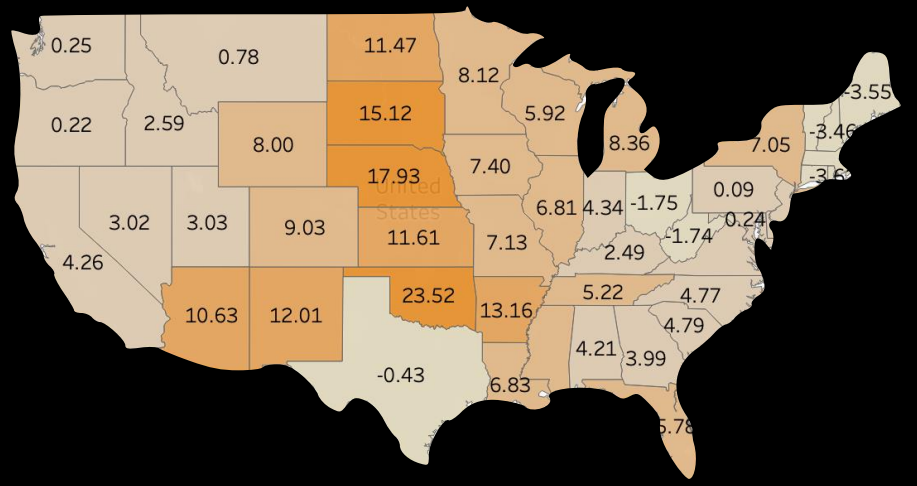
National Average Retail Electricity Price[1]

2022 cents per kWh



Difference in State Average Retail Rates in 2033 for Full Repeal vs Executive Repeal

percent difference



REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

Fuel consumption higher under repeal

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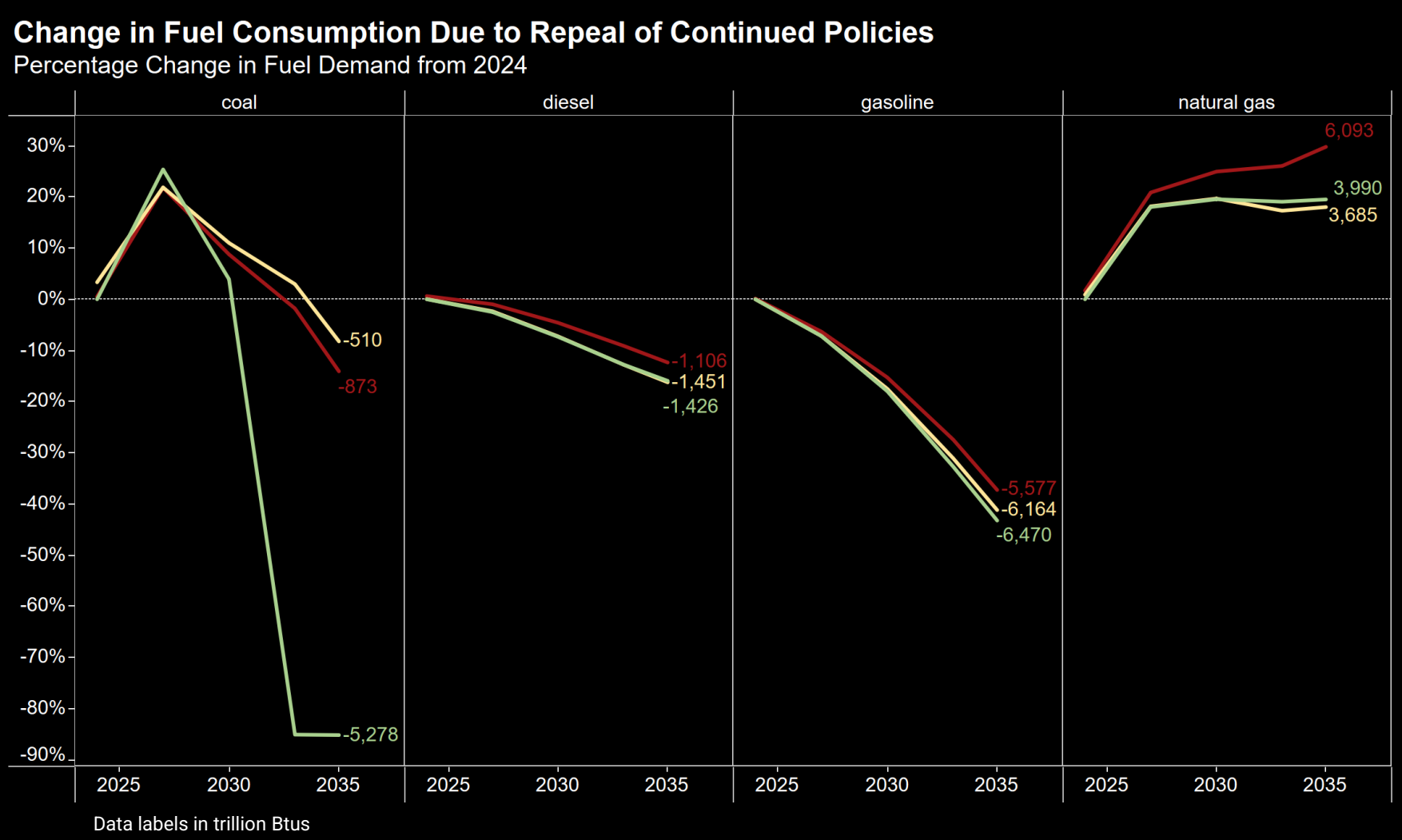


Fuel use increases under Repeal scenarios, as reduced sales of EVs, efficient appliances, and renewable electricity increase consumption of coal, motor fuels and natural gas.

REPEAT Project's modeling suite does not capture endogenous changes in coal, natural gas, or petroleum product prices as a function of changes in demand. Increases in consumption of fossil fuels under repeal scenarios would likely further increases prices and thus total energy expenditures not shown in this analysis.

For example, Rhodium Group estimates that increases in fuel consumption under repeal of current policies would increase retail gasoline prices 1-5% in 2035 (an increase of ~3-15 cents/gallon) and Henry Hub natural gas prices would increase 2-7%.

Energy Related Investment

Repeal eliminates up to $1 trillion in investment

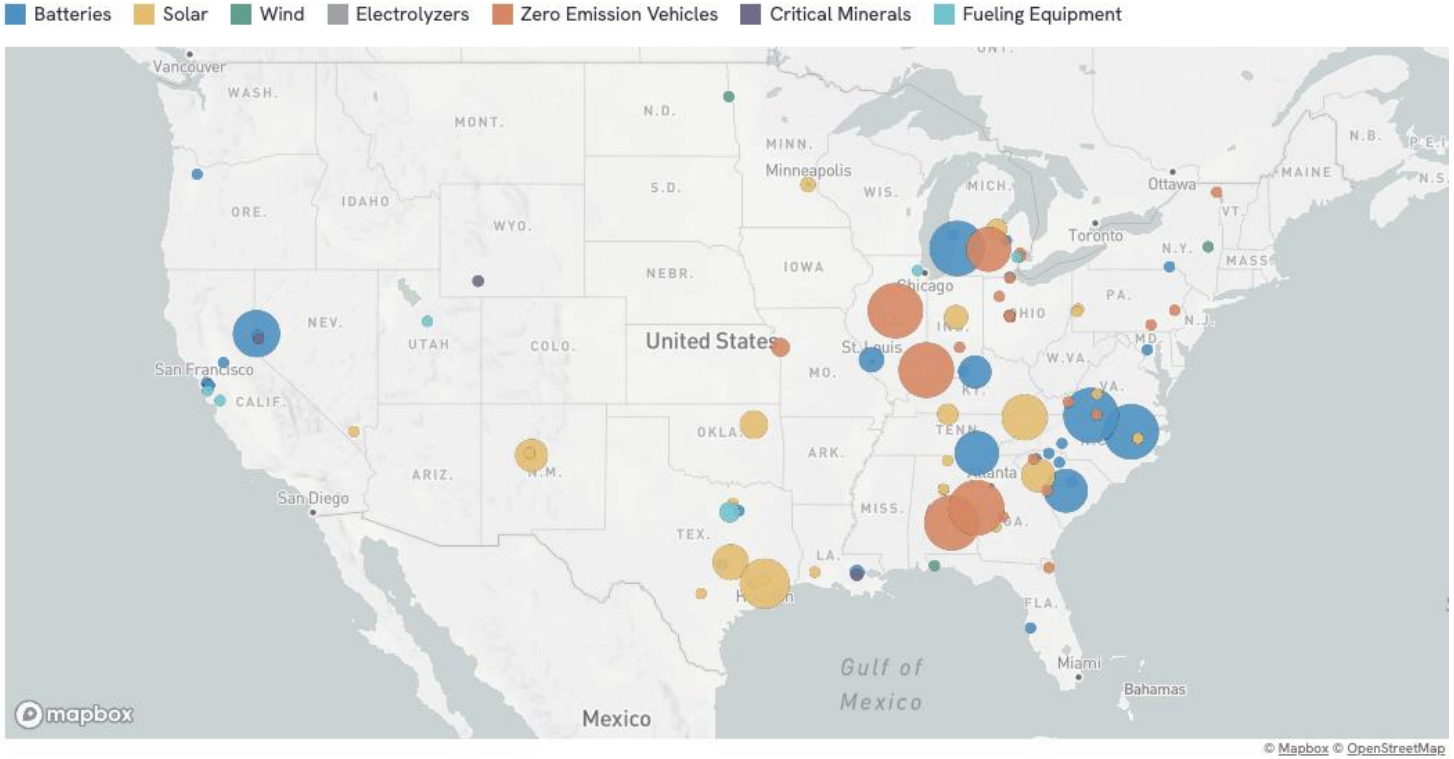
Change in Capital Investment by Sector Due to Repeal of Continued Policies
Billions of 2022 dollars

Full Repeal reduces cumulative capital investment in electricity and clean fuels production by **$1 trillion** from 2025-2035.

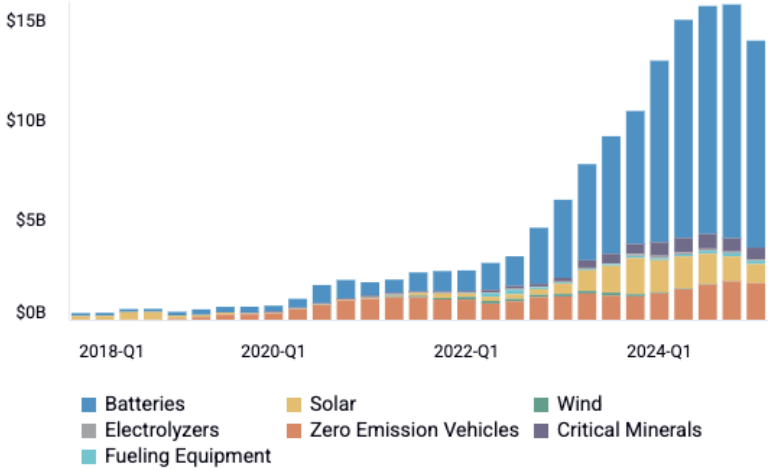
Capital investment in these sectors falls by a cumulative **$0.5 trillion** during this period under Executive Repeal.

Repeal halts U.S. manufacturing boom

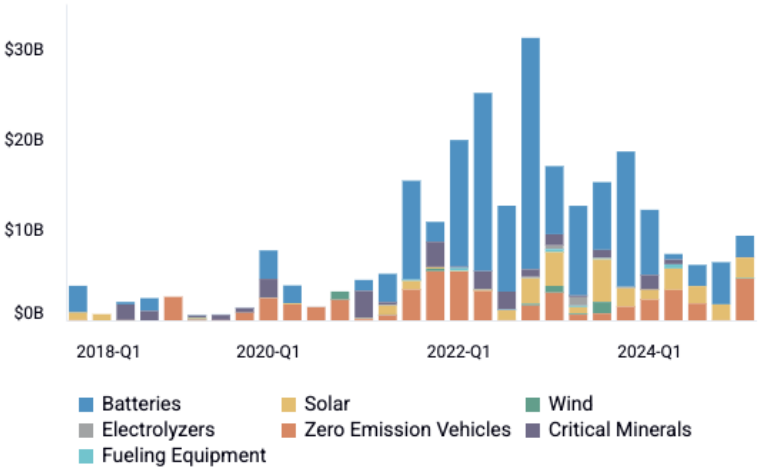
Recent Manufacturing Investment Announcements (Last 4 Quarters)
Scaled by announced investment



Actual Manufacturing Investment by Technology
2023 USD



Manufacturing Announcements by Technology
2023 USD



Current policies have driven a boom in advanced manufacturing and critical minerals production investment across the United States, including $14 billion of actual investment closed in Q1 2025 alone.

However, Repeal imperils another $29 billion of pending manufacturing investments announced over the last four quarters.

Including announced investments in clean energy supply, **a total of $522 billion in announced but pending investments are at stake if current policies are repealed**, including $388 billion located in districts represented by Republican members of Congress.

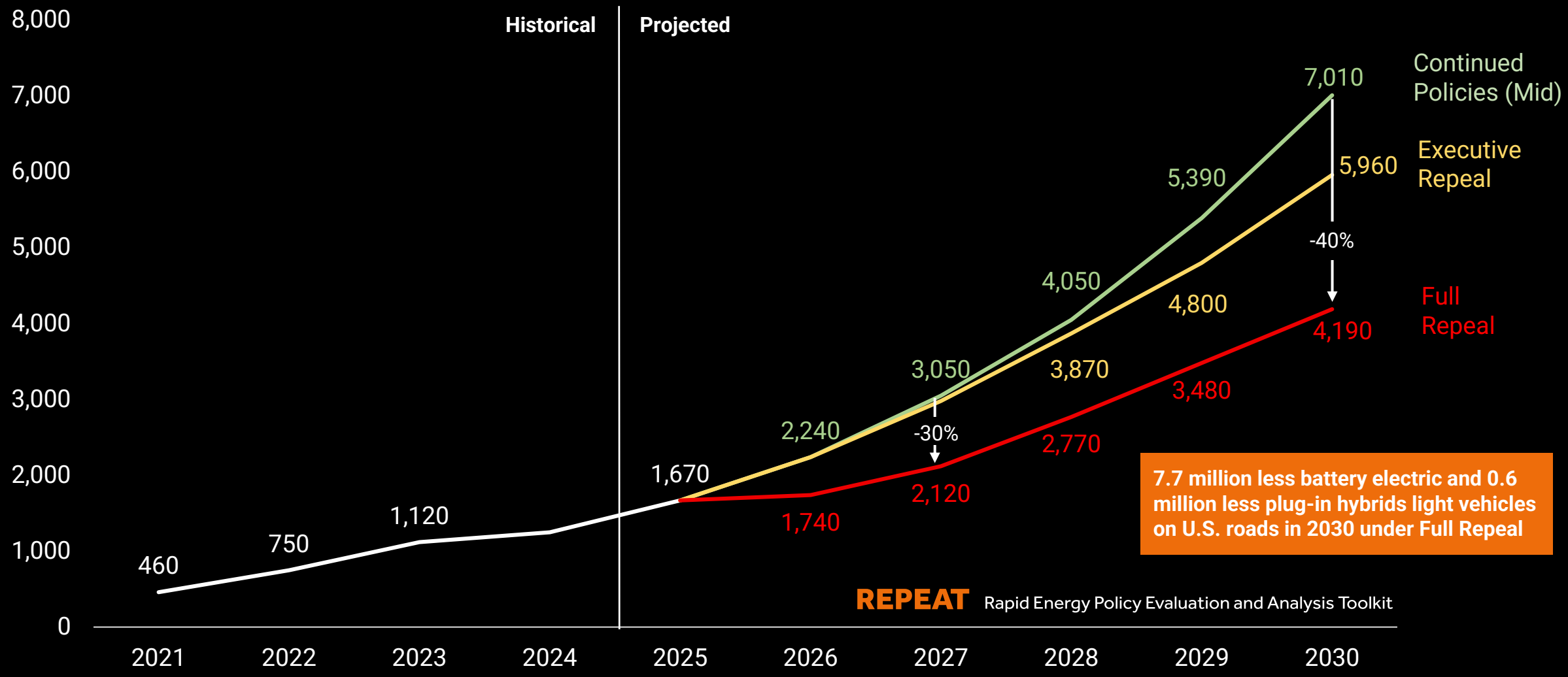
Graphics and data source: Rhodium Group and MIT CEEPR, Clean Investment Monitor: Q1 2025 Update, May 13, 2025

Vehicle Sales and Manufacturing

Electric vehicle sales contract

repeatproject.org

Battery electric light duty vehicles sales
Thousand vehicles per year[1]



7.7 million less battery electric and 0.6 million less plug-in hybrids light vehicles on U.S. roads in 2030 under Full Repeal

REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

1. Values rounded to nearest 10,000 vehicles

Repeal slows, doesn't stop EV transition

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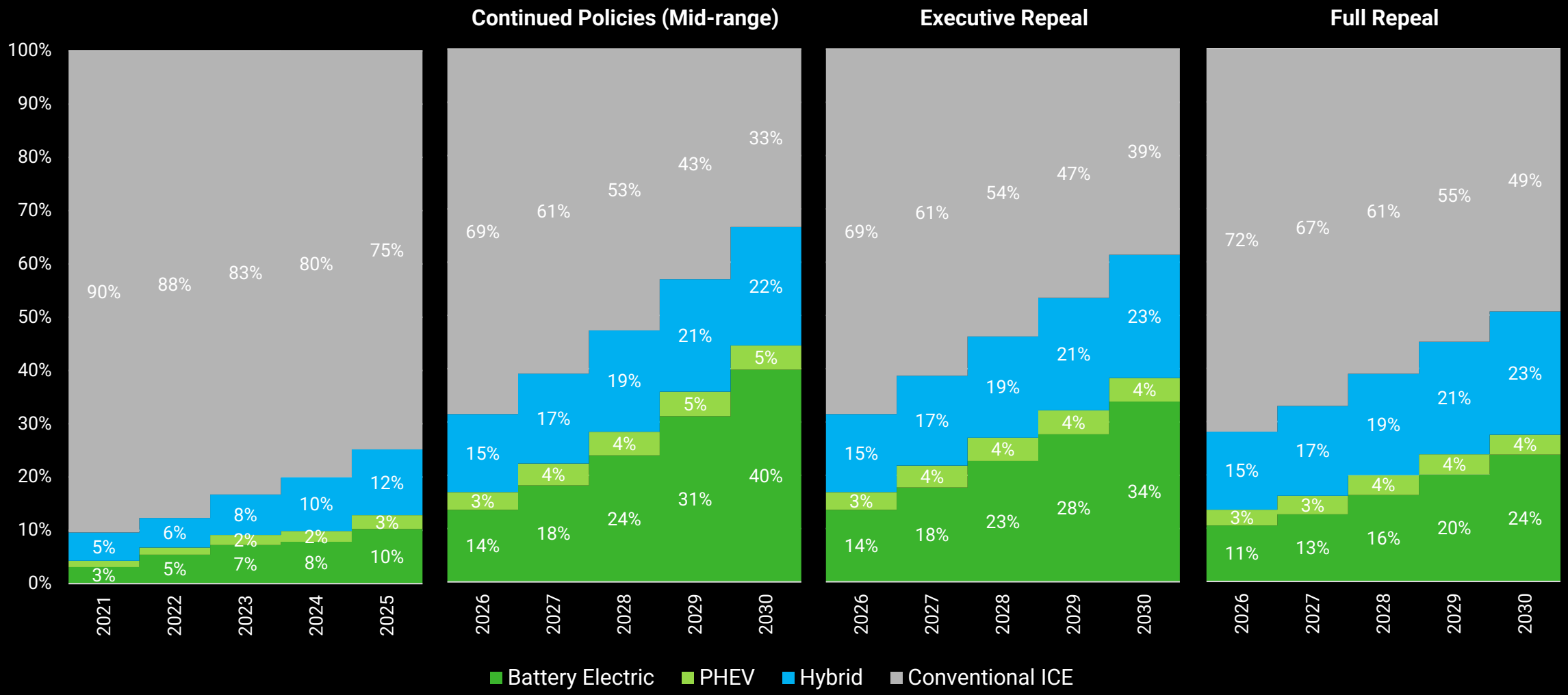
Light duty vehicle sales share by prime mover
Percent of annual sales



Slower EV sales, slower stock changes

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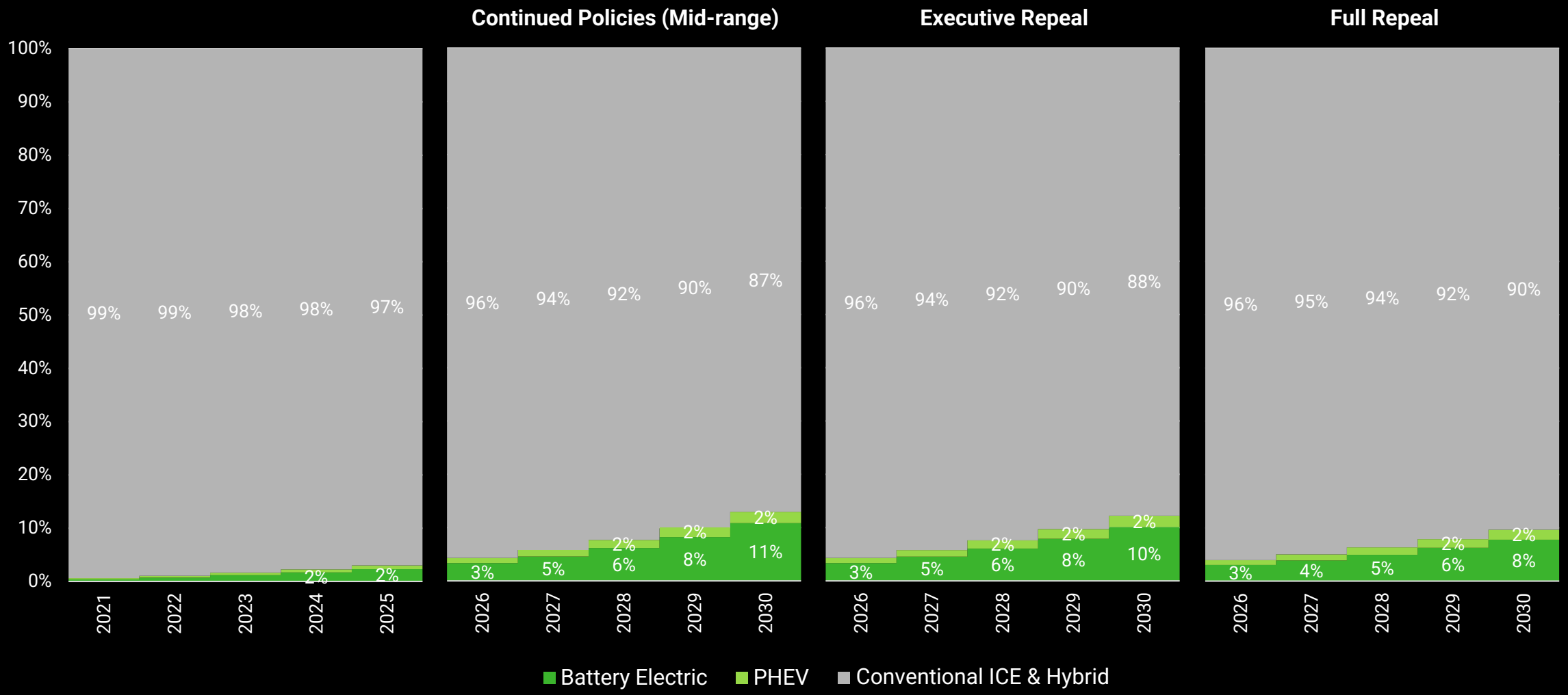
Light duty vehicle sales share by prime mover
Percent of annual sales



Current tax credits help build a Made-in-USA battery supply chain

The 30D New Clean Vehicle Tax Credit is a key component of a broader, pro-manufacturing industrial strategy to build a Made-In-USA electric vehicle assembly, battery manufacturing and critical minerals supply chain and to eliminate the influence of Chinese firms, the Chinese Communist Party, or other foreign entities of concern from U.S. supply chains.

To secure eligibility for the 30D tax credit, clean vehicles must: (1) be assembled in North America; (2) use battery components substantially sourced from North America; and (3) use critical minerals produced, processed or recycled in North America or free trade agreement countries allied with the United States. Additionally, new clean vehicles are disqualified from any portion of the 30D credit if they contain battery components manufactured by a Foreign Entity of Concern (FEOC) or critical minerals extracted, processed, or recycled by a FEOC. Foreign entities of concern are defined as individuals, businesses, or government entities either subject to the jurisdiction of the government of a covered nation (China, Iran, North Korea, and Russia) or owned by, controlled by, or subject to the direction of a covered nation's government.

Where 30D provides a strong 'demand pull' for vehicles and batteries manufactured in North America without Chinese influence, the 45X Advanced Manufacturing Production Tax Credit directly incentivizes investment in U.S. battery manufacturing and critical minerals mining, processing, and recycling.

Together, this pair of tax incentives have succeeded in supporting over $85 billion of capital investment in electric and plug-in hybrid vehicle assembly and battery manufacturing facilities currently operating or under construction across the United States. These facilities directly employ roughly 100,000 Americans today, a figure that could double as plants reach planned manufacturing volumes and complete ongoing construction.[1]

Summary of 30D New Clean Vehicle Tax Credit Requirements

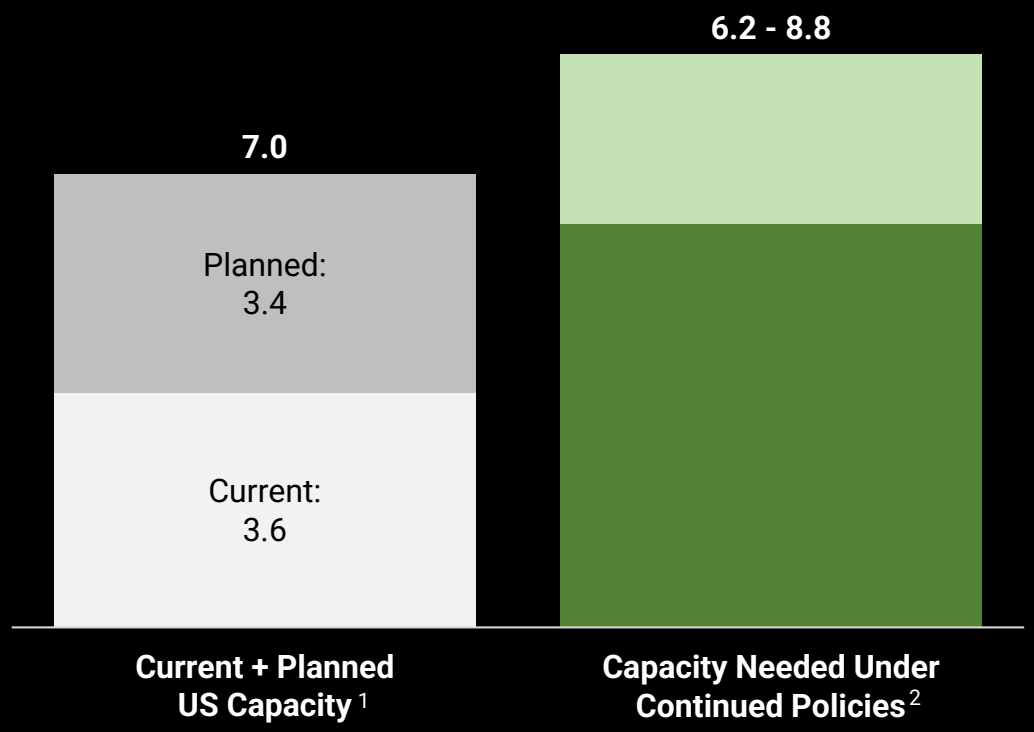
Year	Critical minerals requirement	Battery components requirement	50% Value Added Test for Critical Minerals	Impracticable-to-trace FEOC exemption
2023	40%	50%	Yes	Yes
2024	50%	60% (FEOC begins)	Yes	Yes
2025	60% (FEOC begins)	60%	Yes	Yes
2026	70%	70%	Yes	Yes
2027	80%	80%	No	No
2028	80%	90%	No	No
2029-2032	80%	100%	No	No

1. Data source: The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025

Source: Zero Emission Transportation Association (ZETA), "Overview of Final 30D New Clean Vehicle Tax Credit Requirements."

Planned investments in US EV manufacturing are sized to meet demand if current policies persist

US electric vehicle assembly capacity needed in 2030 vs current and planned capacity
Million vehicles per year manufacturing capacity

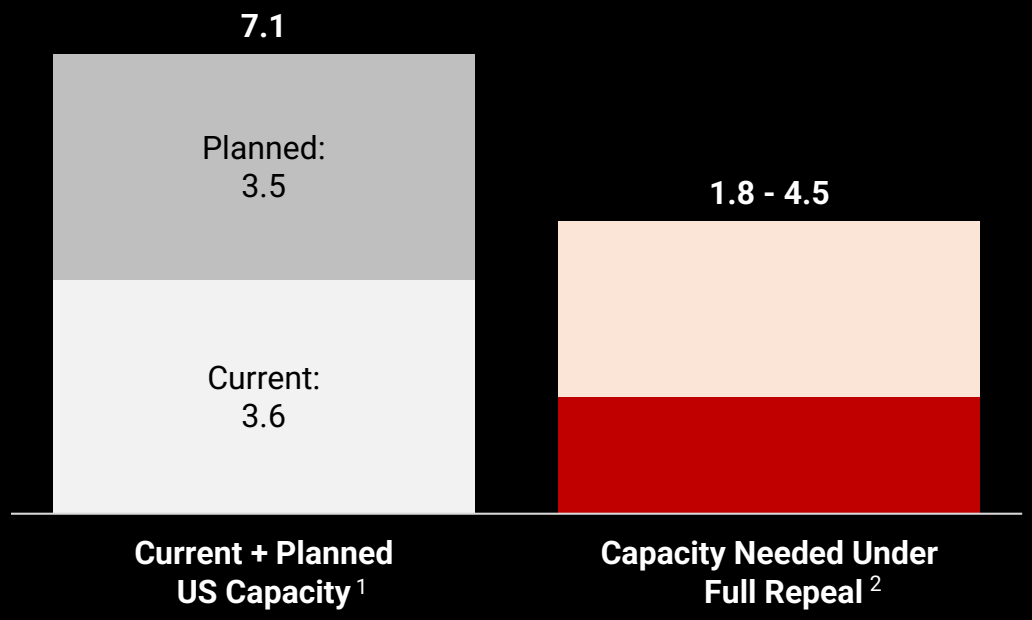


Announced manufacturing capacity additions and expansions would nearly double US capacity to produce electric vehicles by 2030 and are well sized to meet expected demand for Made-in-USA vehicles under a continuation of current policies.

1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025
2. Assumptions: 75% factory utilization rate for auto assembly facilities (as per US auto industry long-term average); US-assembled vehicles represent 60-85% of annual EV and PHEV sales in Current Policies scenarios (vs 70% share in 2024).

Repealing clean vehicle tax credits would destroy demand for new US EV manufacturing

US electric vehicle assembly capacity needed in 2030 vs current and planned capacity
Million vehicles per year manufacturing capacity



If policies supporting projected market demand for EVs are repealed, demand could potentially be met entirely with current assembly plant capacity. This calls into question the economic viability of all additional manufacturing plants that have been announced or are under construction across the US and would potentially result in the idling of some existing EV assembly plants and workers.

1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025
2. Assumptions: 75% factory utilization rate for auto assembly facilities (as per US auto industry long-term average); US-assembled vehicles represent 28-70% of annual EV and PHEV sales in IRA Repeal scenario, where 28% assumes no expansion in US production from 2024 levels and 70% assumes maintenance of 2024 market share.

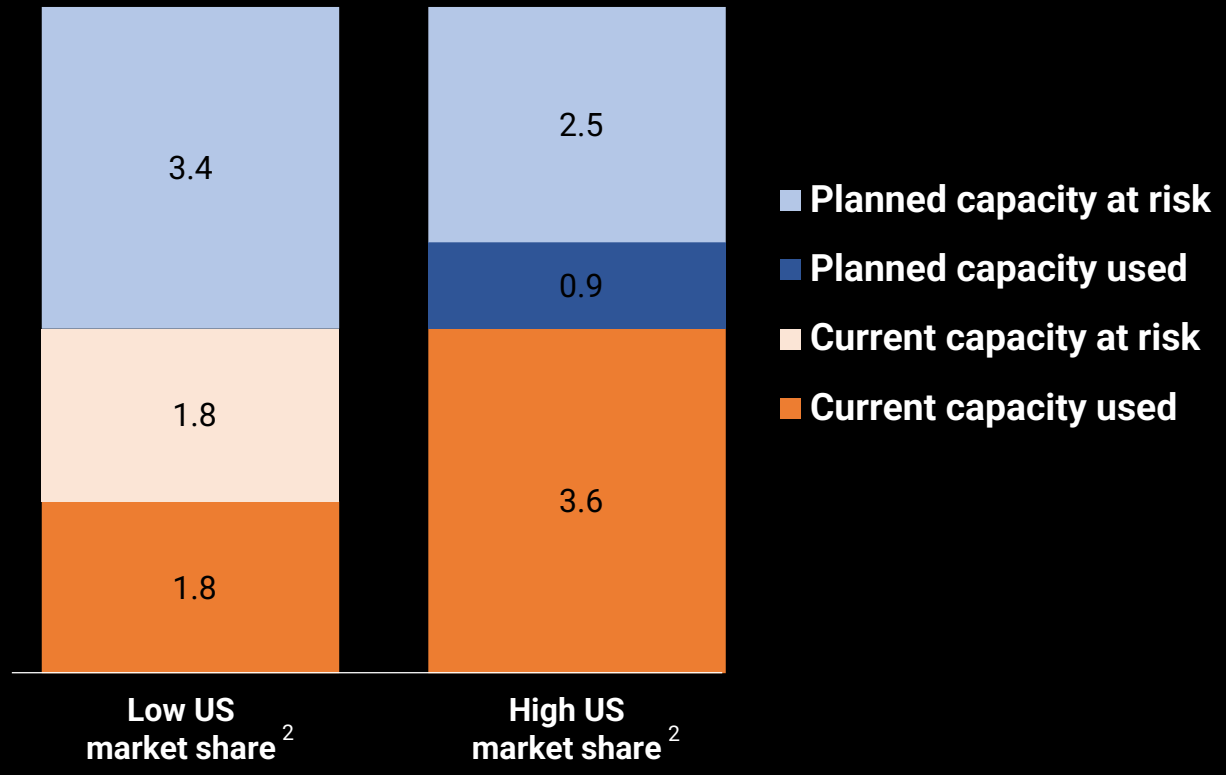
If clean vehicle credits are repealed, both planned and current vehicle assembly plants could be at risk

If clean vehicle tax credits are repealed, as much as 100% of planned construction and expansion of US EV assembly and half of *existing* capacity could be at risk of cancellation or closure.

If the share of EVs manufactured in the US remains at 2024 levels, nearly three-quarters of planned projects would be unnecessary.

Current and planned US electric vehicle assembly capacity utilized or at risk in 2030 under Full Repeal

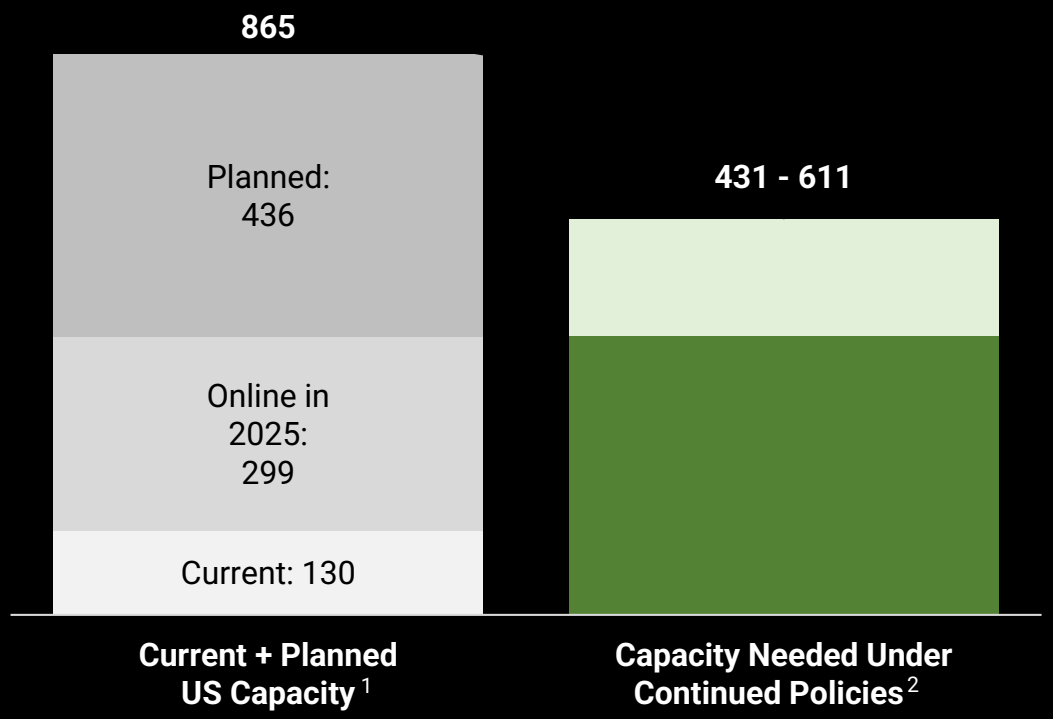
Million vehicles per year manufacturing capacity[1]



1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025
2. Low US market share: 28% consistent with continuation of 2024 US production volumes; high US market share: 70% consistent with continuation of 2024 US market share.

Planned expansion of US battery cell manufacturing exceeds demand under Continued Policies

US battery cell manufacturing capacity needed in 2030 vs current and planned capacity
Gigawatt-hours (GWh) of battery cells per year manufacturing capacity

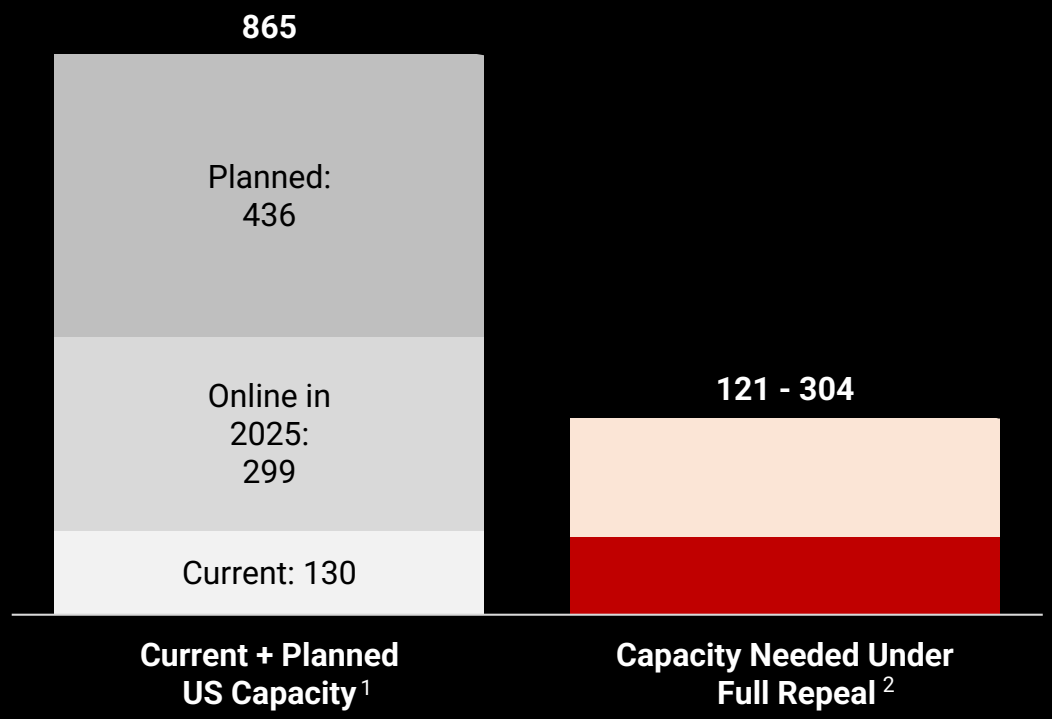


Currently planned construction of US battery cell manufacturing demand already exceeds requirements to supply electric vehicles assembled in the United States under a continuation of current policies.

1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025. Projects expected to be completed in 2025 from "EV Battery Manufacturing Capacity Will Rise When 10 New Plants Come Online This Year," *Inside Climate News,* 2/20/2025.
2. Assumptions: 75% factory utilization rate for battery cell assembly facilities (as per US auto industry long-term average); all vehicles assembled in USA source battery cells from the USA; US-assembled vehicles represent 60-85% of annual EV and PHEV sales in Current Policies scenarios (vs 70% share in 2024).

Without EV tax credits, planned battery cell manufacturing would result in large overcapacity

US battery cell manufacturing capacity needed in 2030 vs current and planned capacity
Gigawatt-hours (GWh) of battery cells per year manufacturing capacity



New battery cell manufacturing capacity expected to come online in 2025 will bring US production capacity to more than 400 GWh per year, well in excess of demand under Full Repeal, making all other planned additions unnecessary.

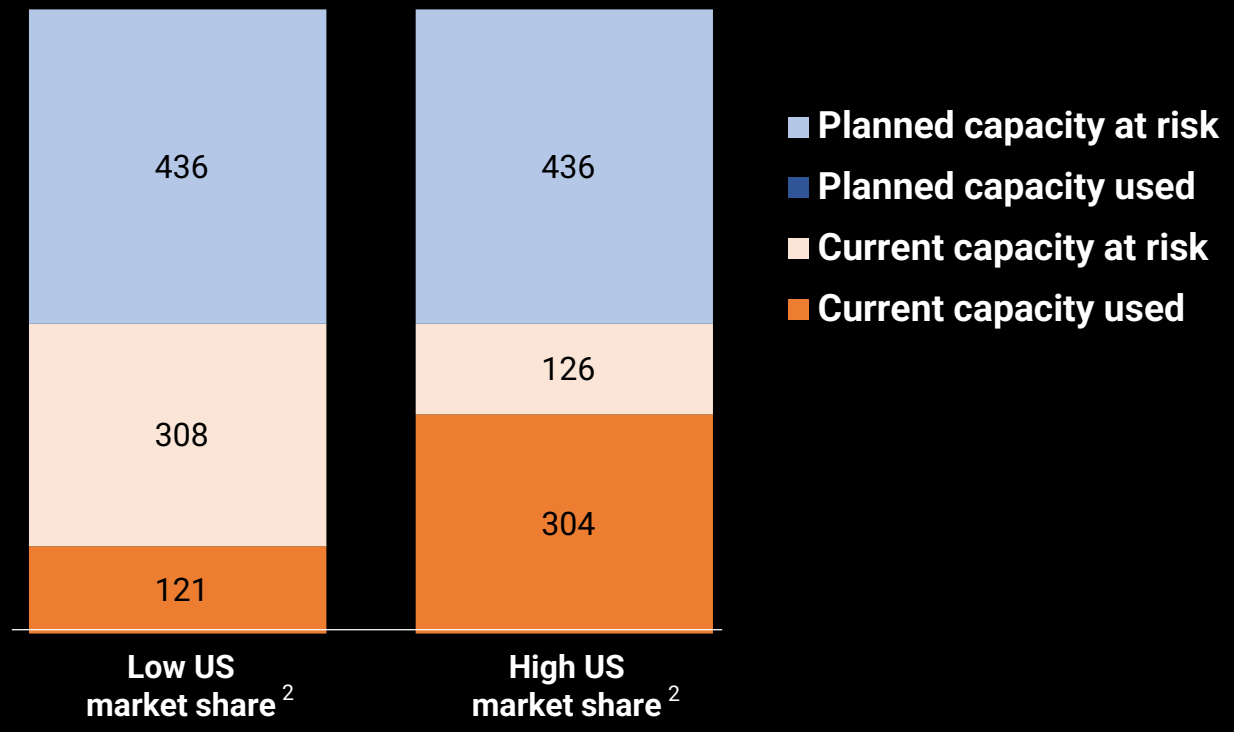
1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025. Projects expected to be completed in 2025 from "EV Battery Manufacturing Capacity Will Rise When 10 New Plants Come Online This Year," *Inside Climate News,* 2/20/2025.
2. Assumptions: 75% factory utilization rate for battery cell assembly facilities (as per US auto industry long-term average); all vehicles assembled in USA source battery cells from the USA; US-assembled vehicles represent 28-70% of annual EV and PHEV sales in IRA Repeal scenario, where 28% assumes no expansion in US production from 2024 levels and 70% assumes maintenance of 2024 market share.

Repealing clean vehicle tax credits will end America's battery manufacturing boom

Without clean vehicle tax credits, between 29% and 72% of battery cell manufacturing capacity currently operating or online by the end of 2025 would be unnecessary to meet automotive demand and could be at risk of closure, in addition to 100% of other planned facilities.

Current and planned US electric vehicle assembly capacity utilized or at risk in 2030 under Full Repeal

Million vehicles per year manufacturing capacity[1]



1. Current and planned manufacturing capacity from The Big Green Machine: Tracking North American Clean Energy Supply Chain, database accessed 2/13/2025. Projects expected to be completed in 2025 from "EV Battery Manufacturing Capacity Will Rise When 10 New Plants Come Online This Year," *Inside Climate News,* 2/20/2025. Current capacity in this plot includes projects under construction and expected to be operation in 2025.
2. Low US market share: 28% consistent with continuation of 2024 US production volumes; high US market share: 70% consistent with continuation of 2024 US market share; all vehicles assembled in USA source battery cells from the USA

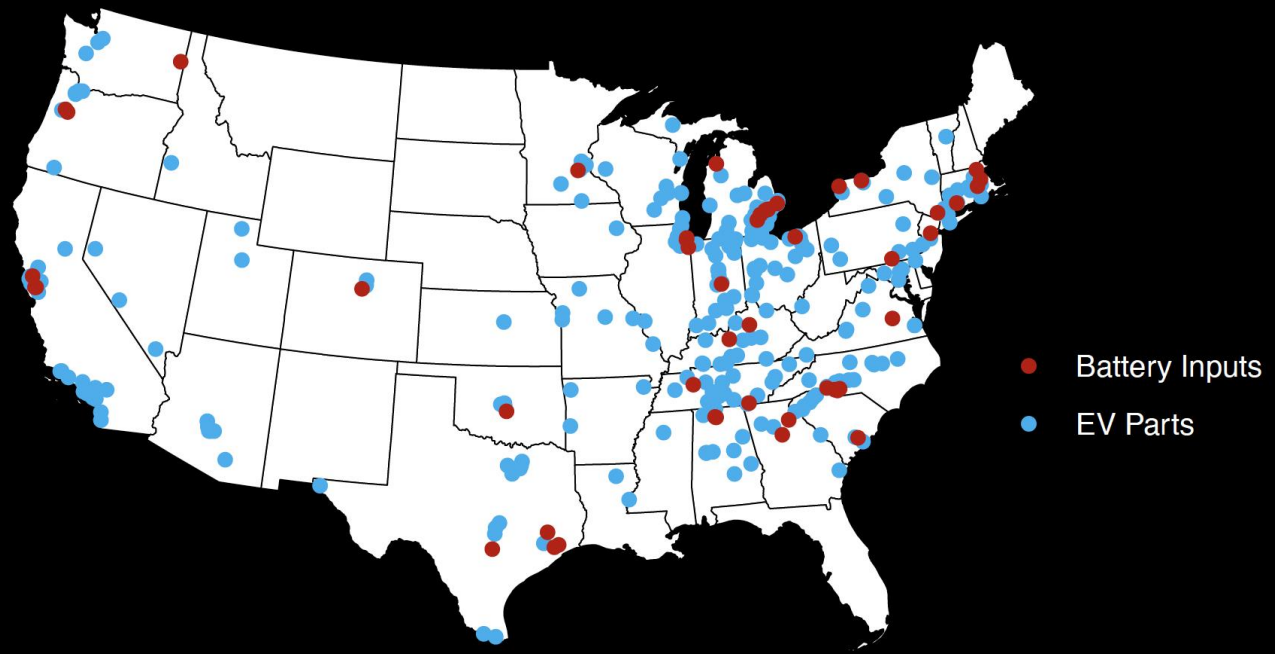
Impacts on EV and battery component suppliers and critical minerals production

A substantial reduction in demand for US-produced electric vehicles and battery cells would also have broader implications for the US EV and battery component supply chain and demand for critical minerals production, processing and recycling in the United States.

While quantifying these impacts is beyond the scope of this report, it is clear that repeal of tax incentives for electric vehicle adoption would have two damaging effects on this broader supply chain:

- First, overall demand for electric vehicle assembly and battery cell and pack manufacturing would decline significantly, as discussed above.
- Second, the loss of the battery component and critical minerals sourcing requirements enshrined in the 30D new clean vehicles tax credit would further reduce demand for battery inputs produced in the United States.

Operating US suppliers of inputs, components and parts for batteries and electric vehicles[1]



1. Source: Blue Green Alliance Foundation, accessed 2/24/2025. Battery Inputs facilities include operating facilities directly supplying 30D eligible materials and components for EV batteries, excluding cell and pack assembly. EV Parts facilities represent suppliers of non-battery components to electric vehicle assembly facilities. Data set is not exhaustive.

Electricity Sector

A new era of demand growth begins

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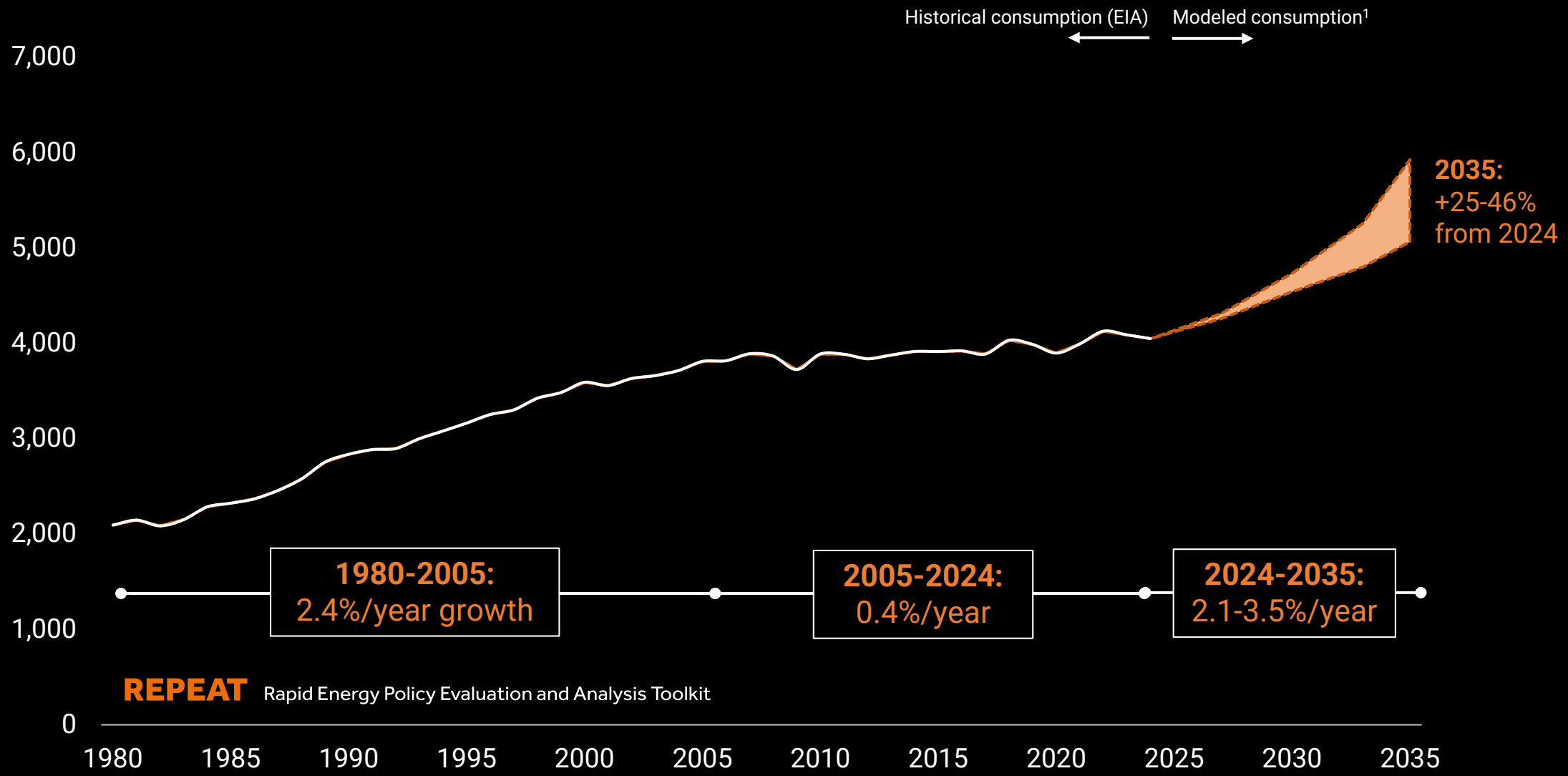
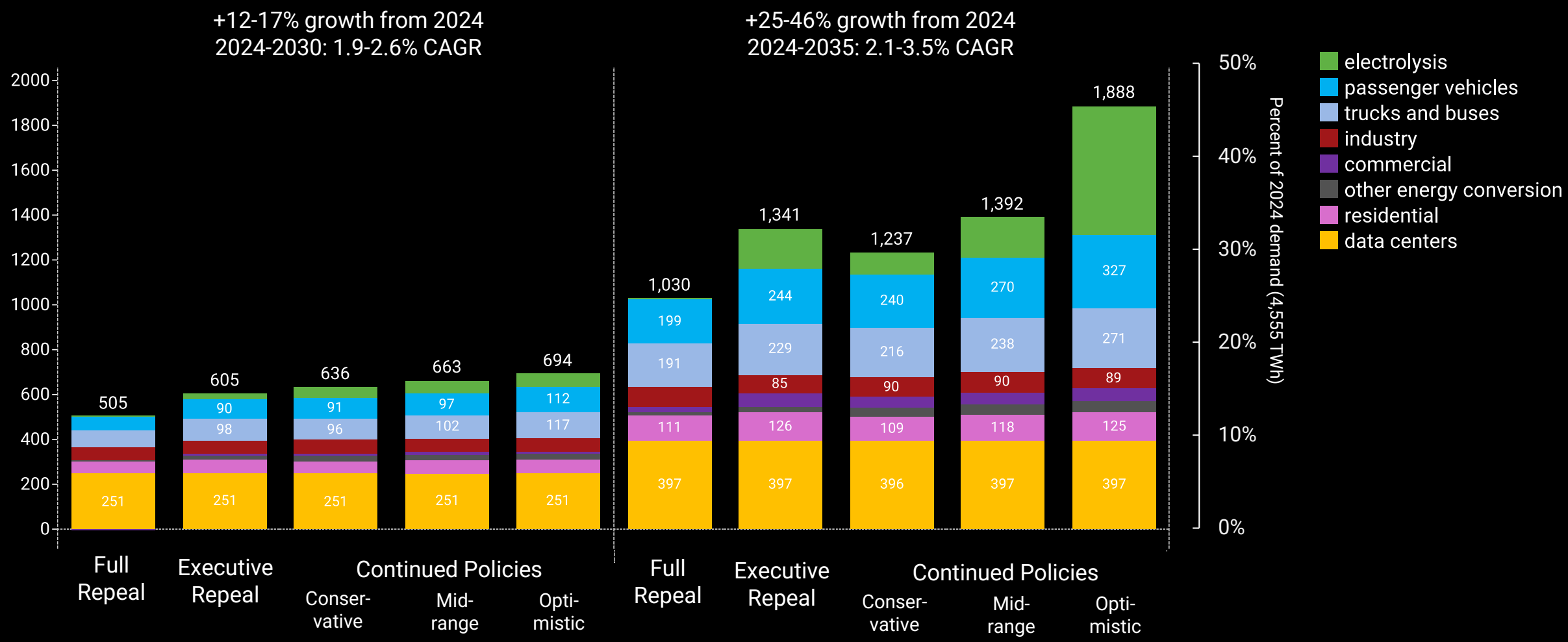
Total Annual U.S. Electricity Consumption
Billion kilowatt-hours (or terawatt-hours)[1]



1 – Low range of modeled growth reflects repeal of current Biden-era policies (Full Repeal). High reflects continuation of Biden era policies (Continued Policies – Optimistic)

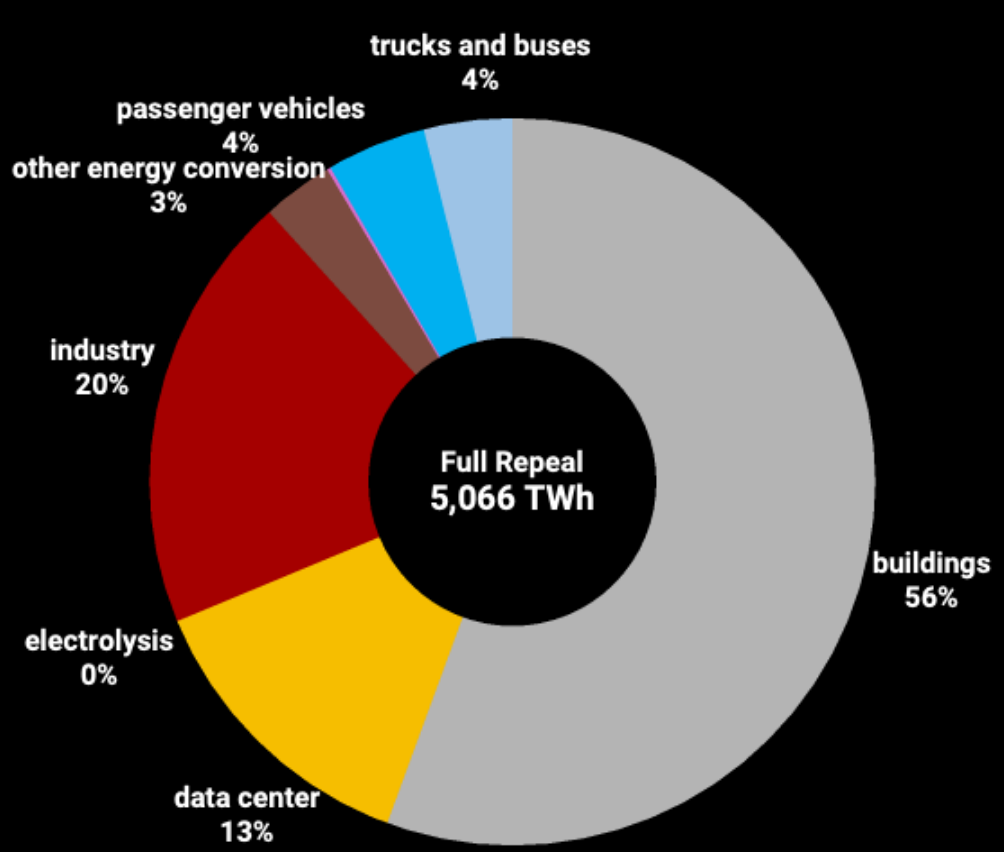
Drivers of demand: it's not just data centers

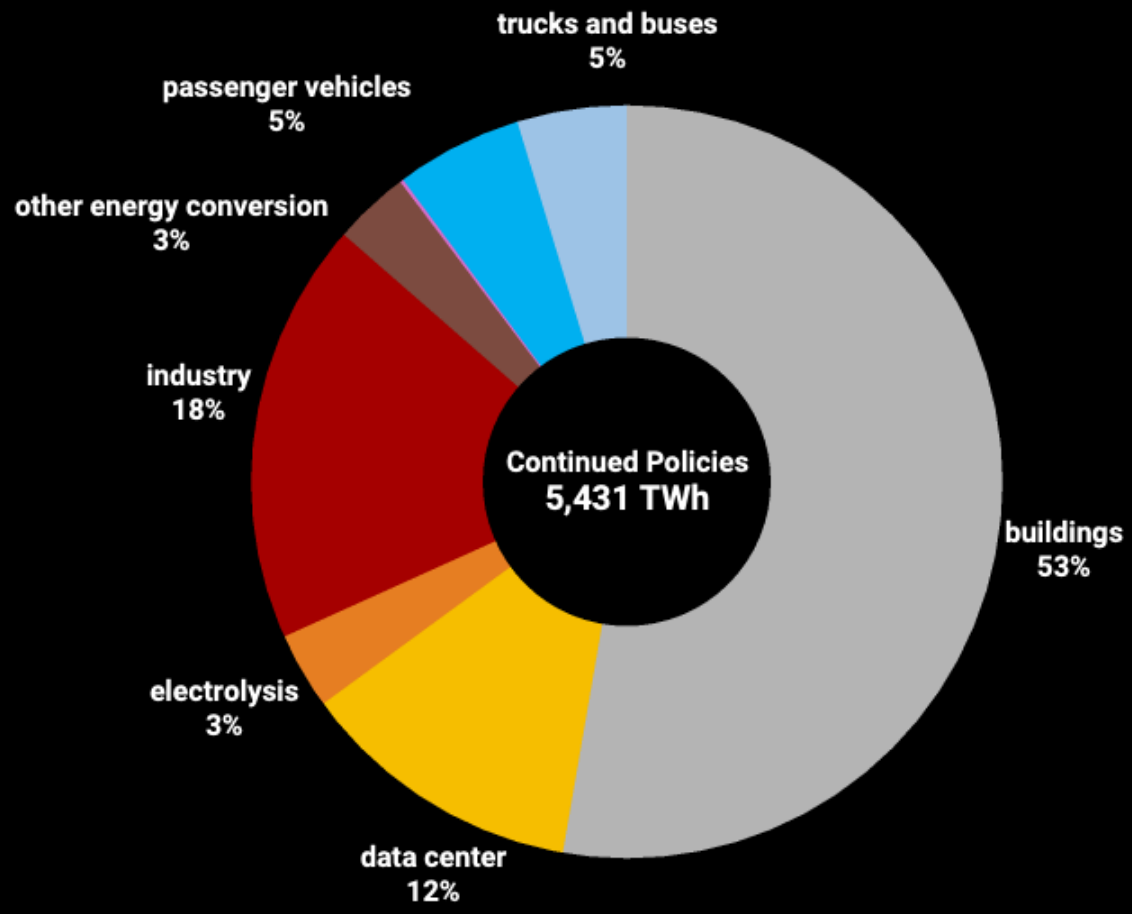
Increase in Annual U.S. Electricity Consumption By Use Vs 2024
Billion kilowatt-hours (or terawatt-hours)[1]



Consumption from EVs may rival data centers

Composition of Annual U.S. Electricity Consumption in 2035
Percent total consumption





Growing clean electricity supply

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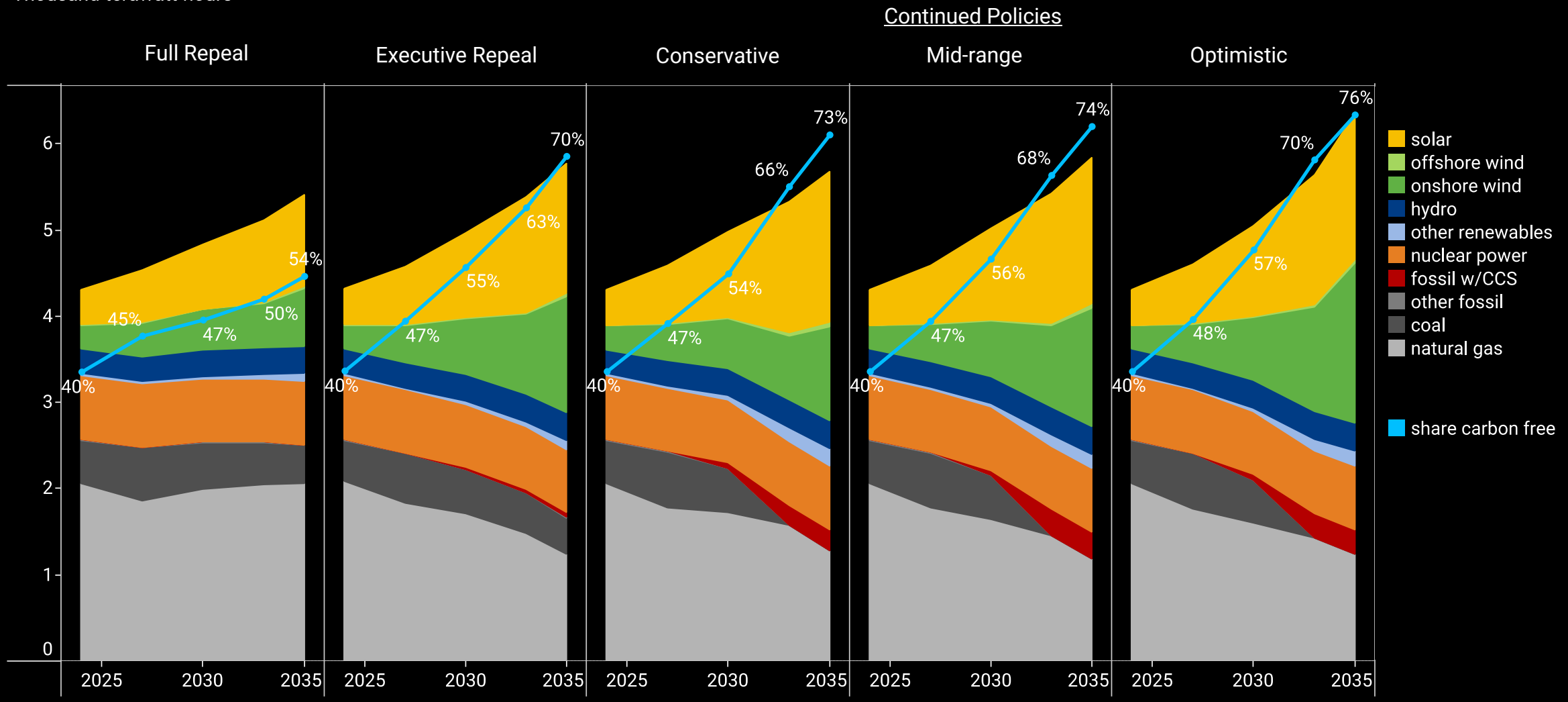
Electricity Generation by Resource

Thousand terawatt-hours



An evolving electricity mix

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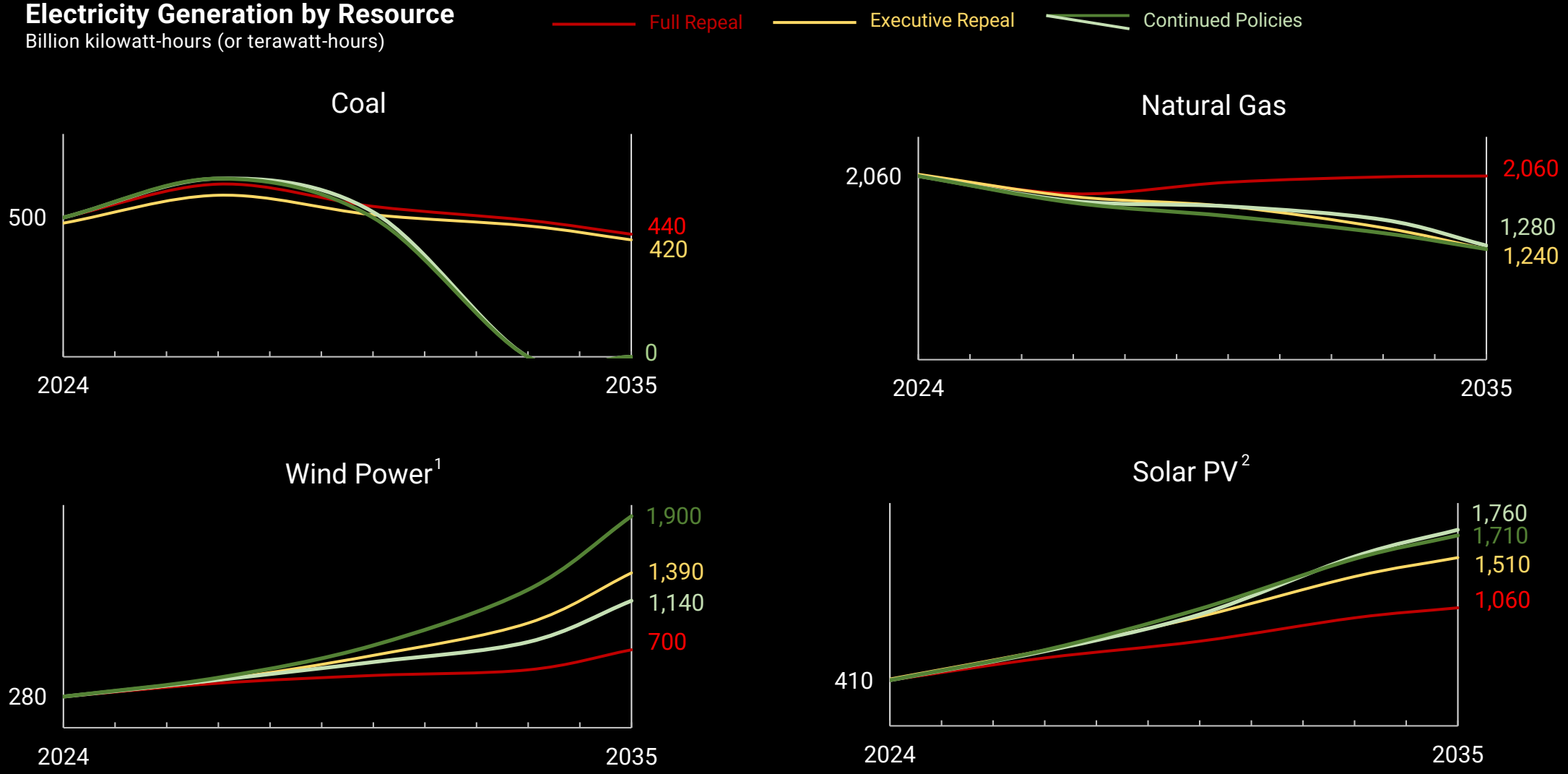
Electricity Generation by Resource
Billion kilowatt-hours (or terawatt-hours)

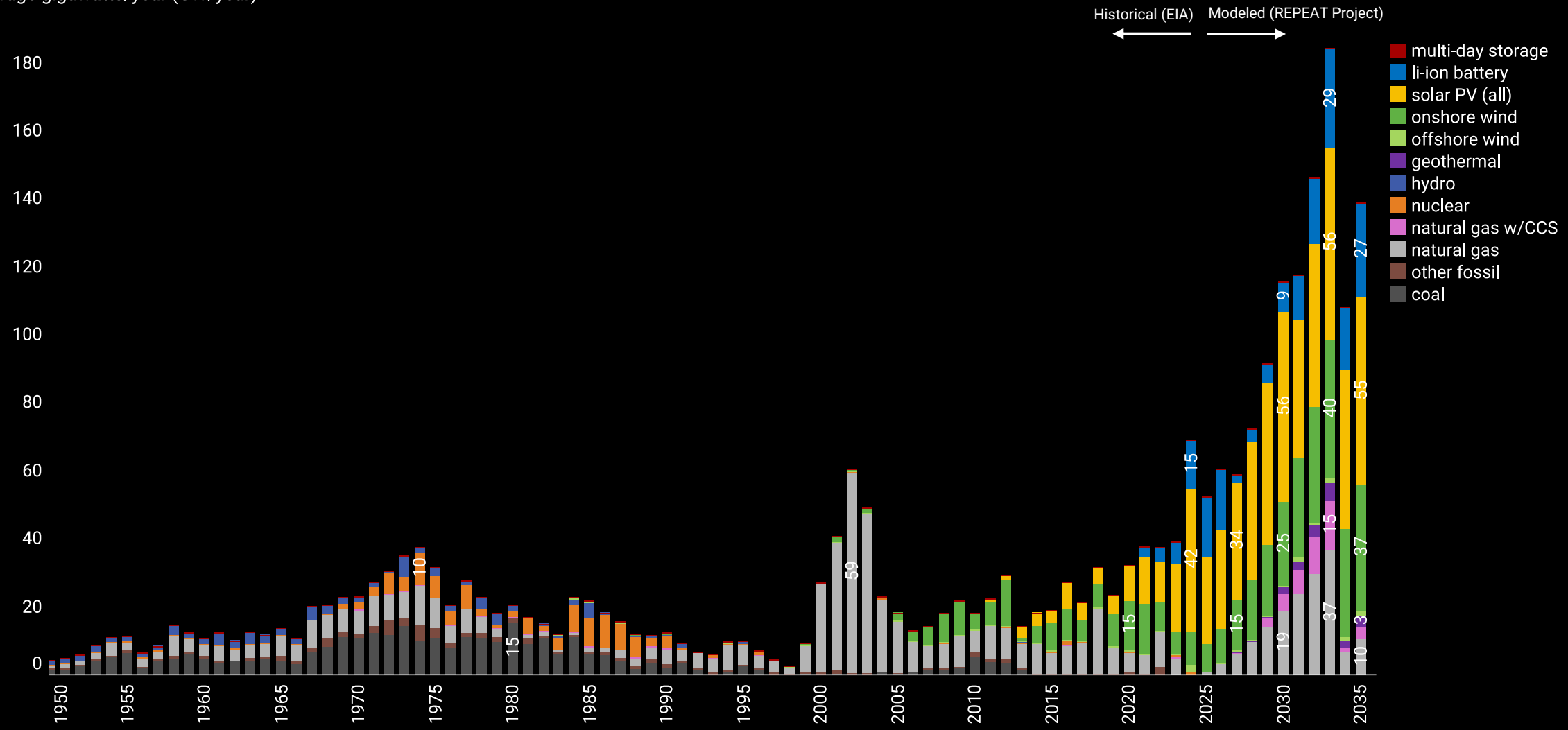


Labels rounded to nearest 10 terawatt-hours
1 - Includes onshore and offshore wind
2 - Includes distributed and utility-scale solar

Current policies accelerate capacity additions

Historical and Modeled Capacity Additions for Continued Policies Mid-range

average gigawatts/year (GW/year)



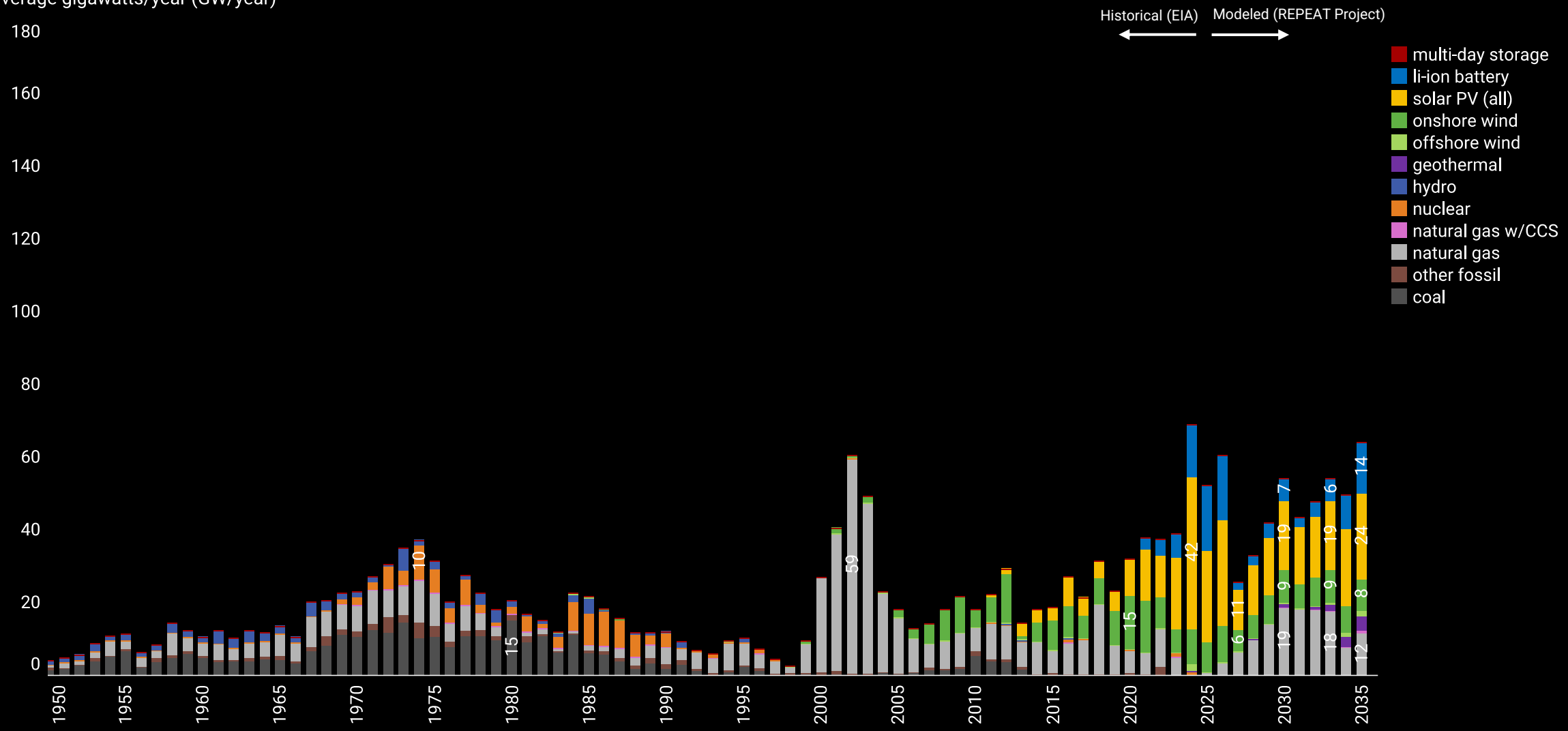
REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

Peak annual historical capacity additions labeled for each technology category

New capacity additions slow under repeal

Historical and Modeled Capacity Additions for Full Repeal

average gigawatts/year (GW/year)

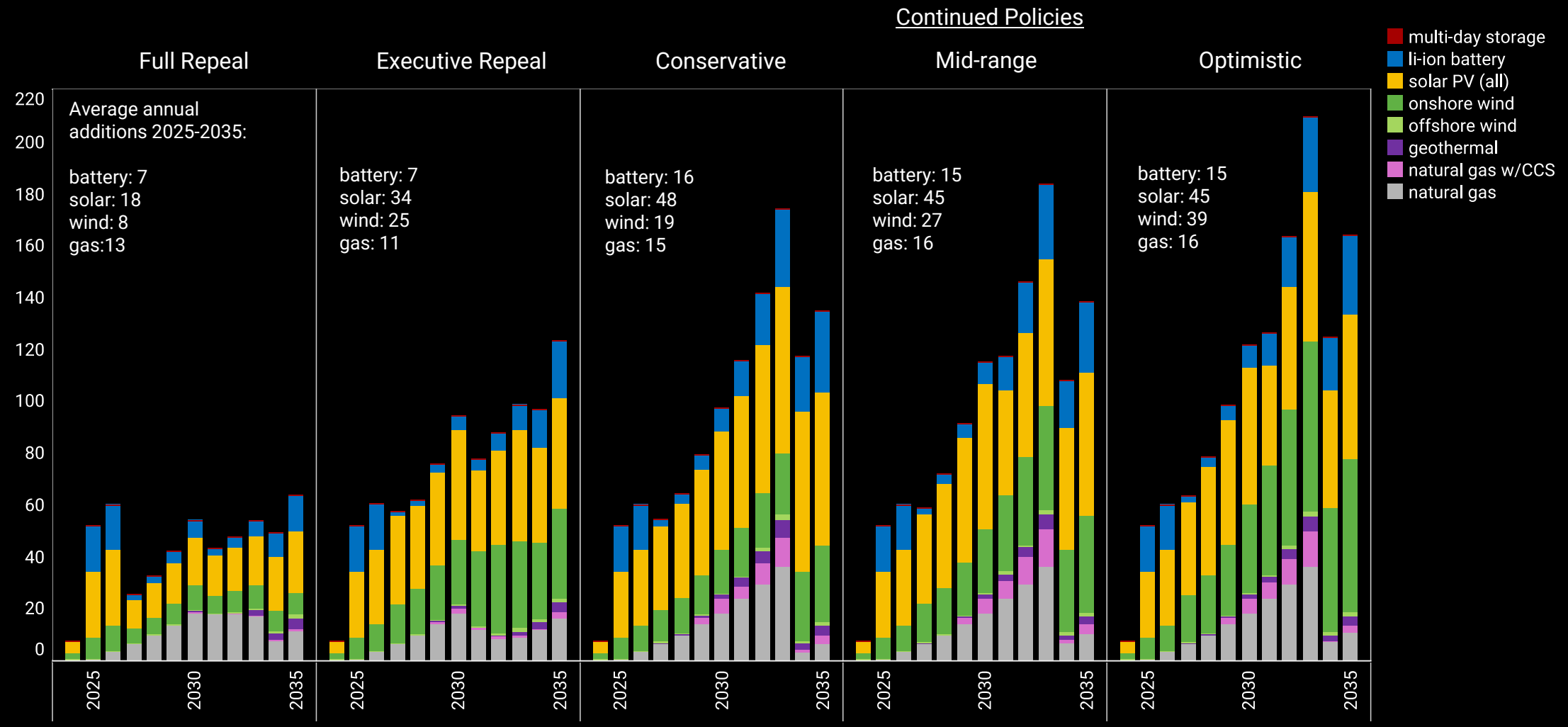


REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

Peak annual historical capacity additions labeled for each technology category

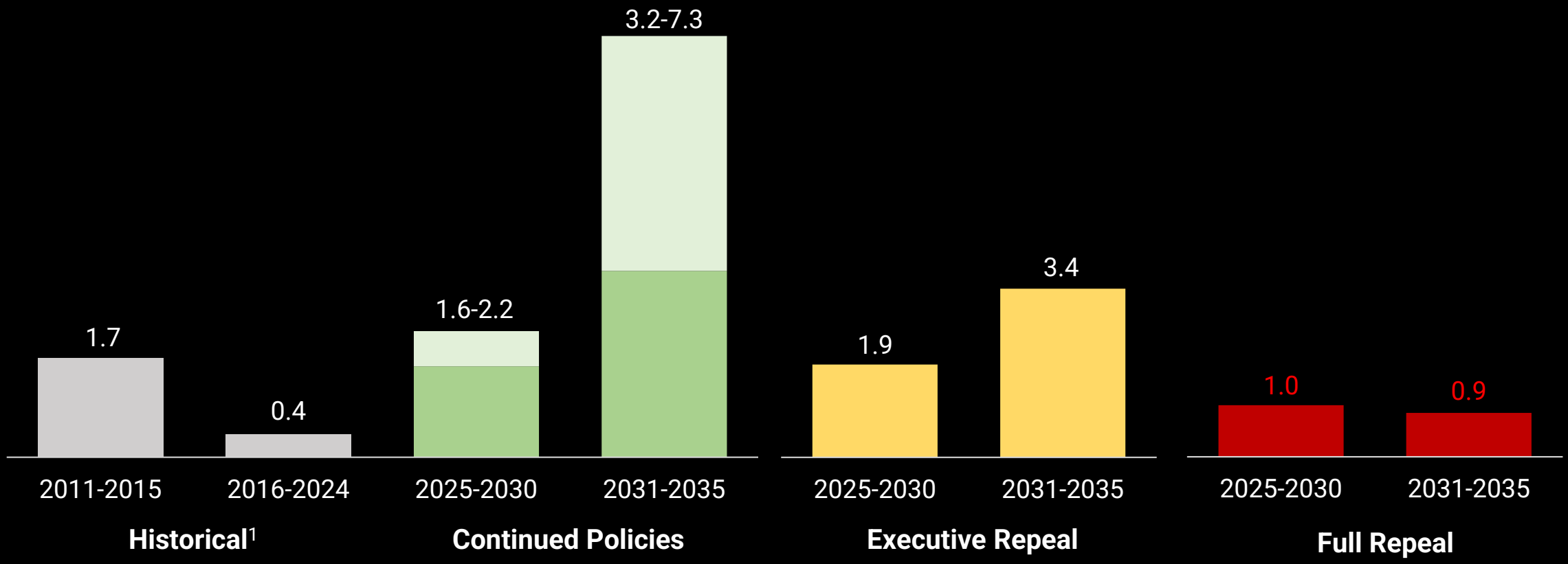
Annual electricity capacity additions

Comparison of Modeled Annual Average Capacity Additions
average gigawatts/year (GW/year)



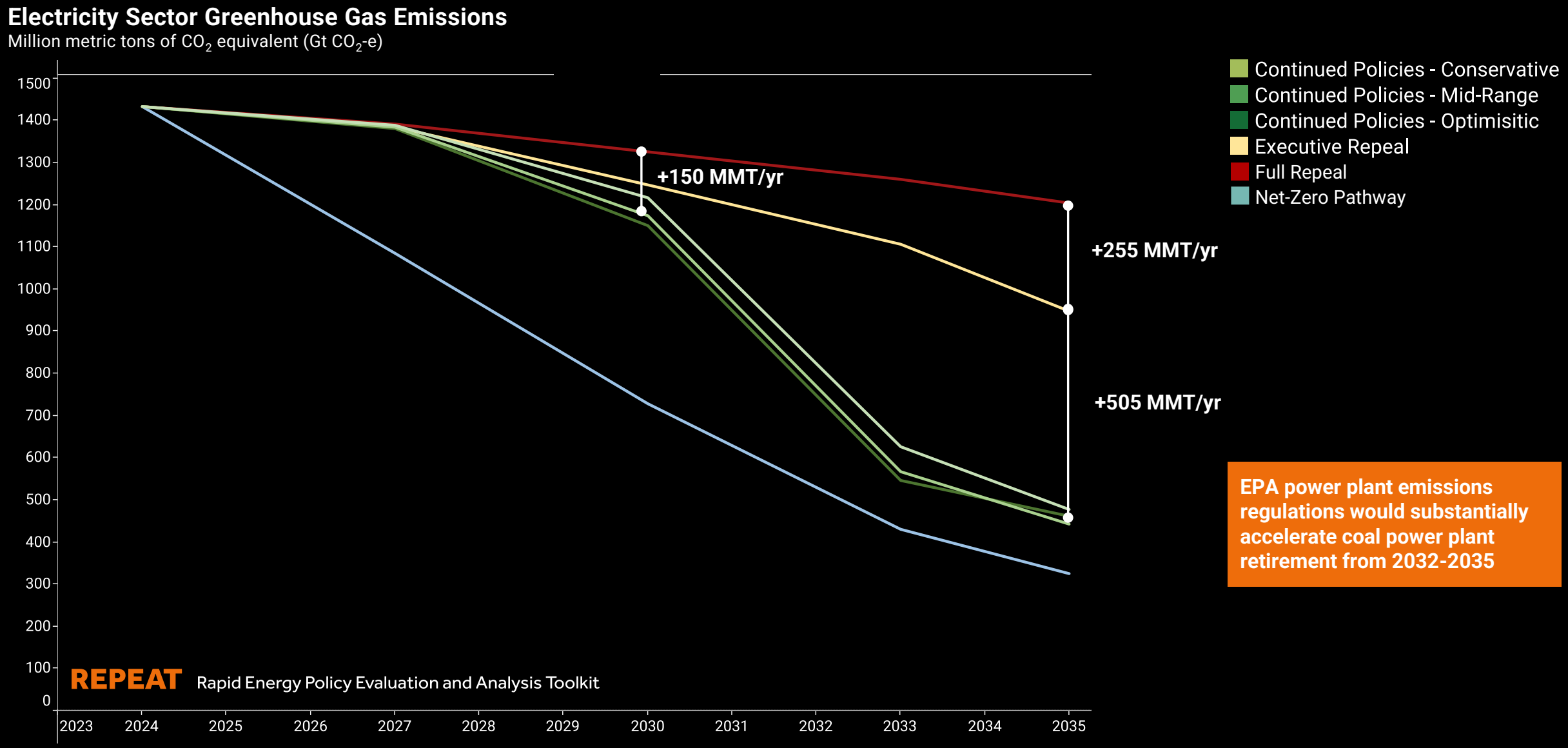
Accelerating transmission build-out

Average annual pace of high voltage transmission expansion
Thousand circuit miles per year



1 – Source: Orennia via Nat Bullard

Repeal substantially increases electricity emissions

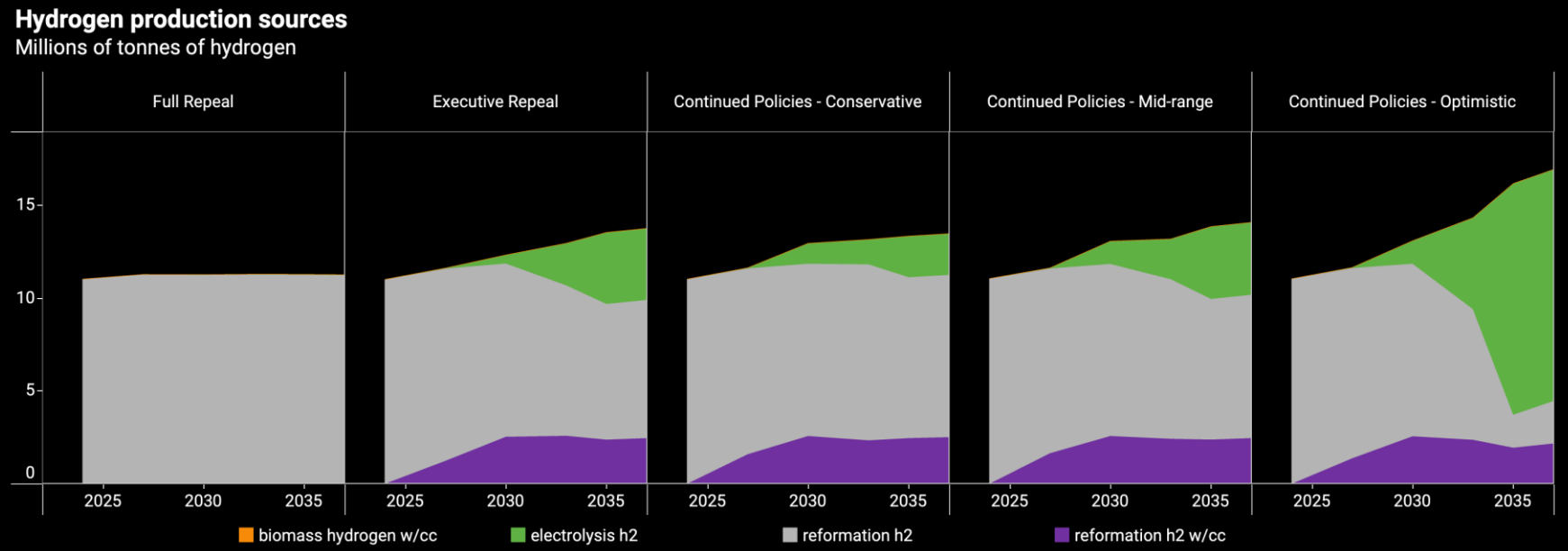


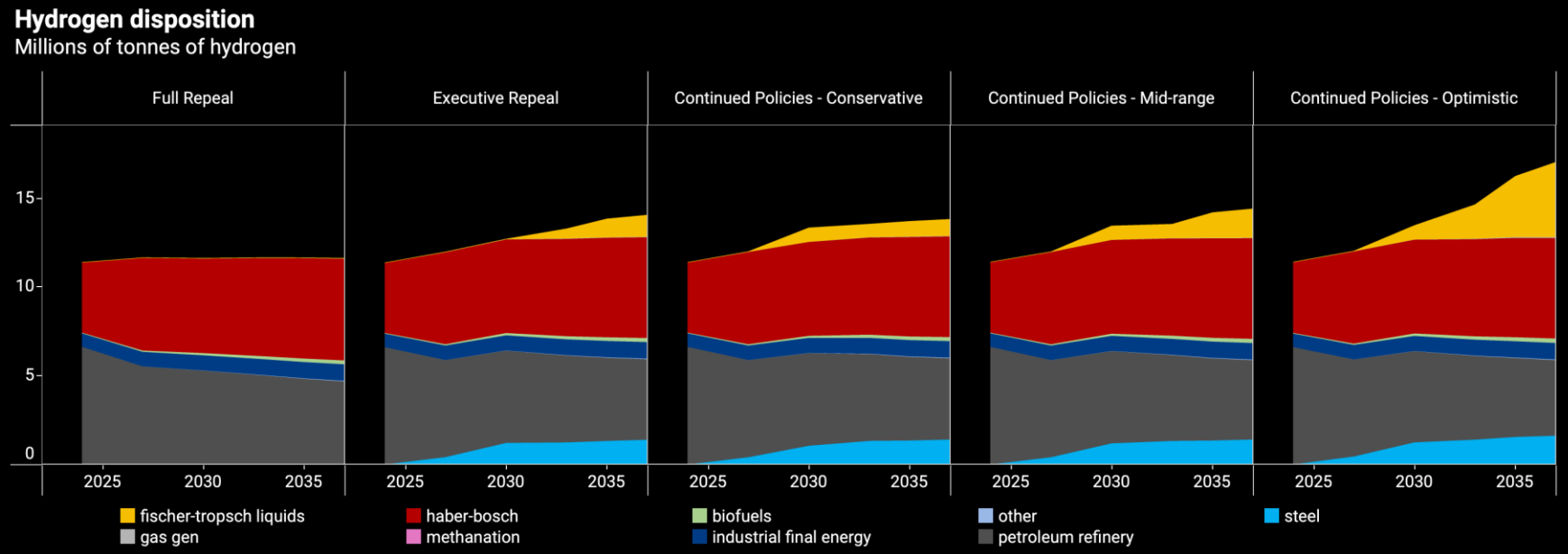
EPA power plant emissions regulations would substantially accelerate coal power plant retirement from 2032-2035

Hydrogen and CO_2 Management

Repealing 45V credit kills clean hydrogen sector

repeatproject.org





Without 45Q, CO_2 management sector won't scale

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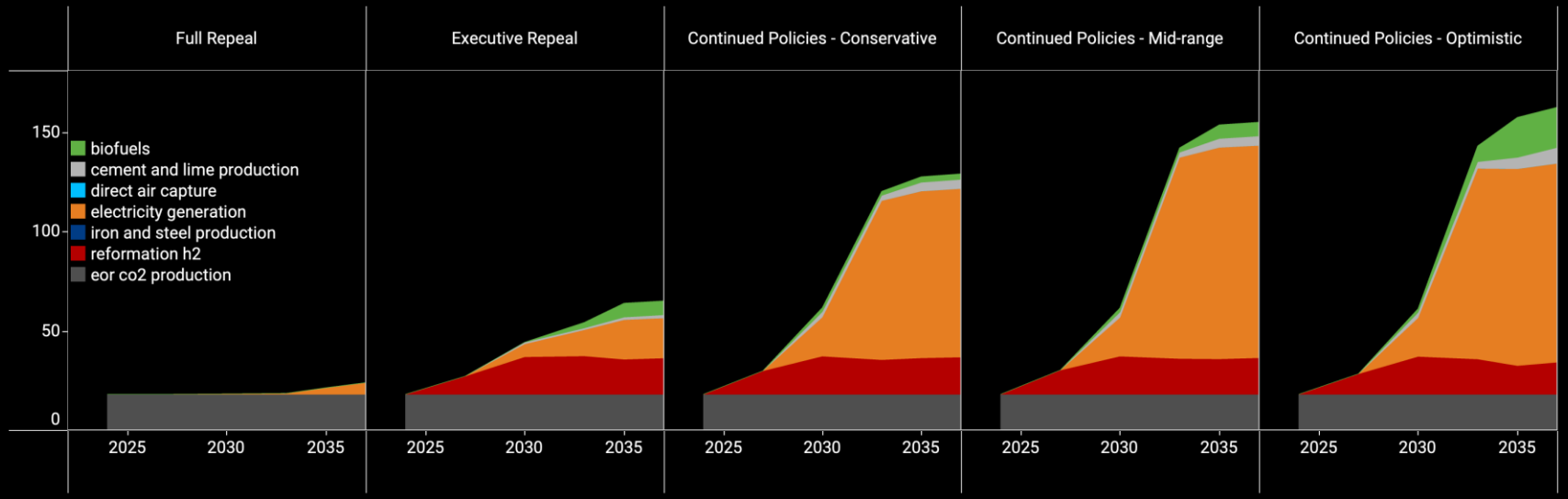
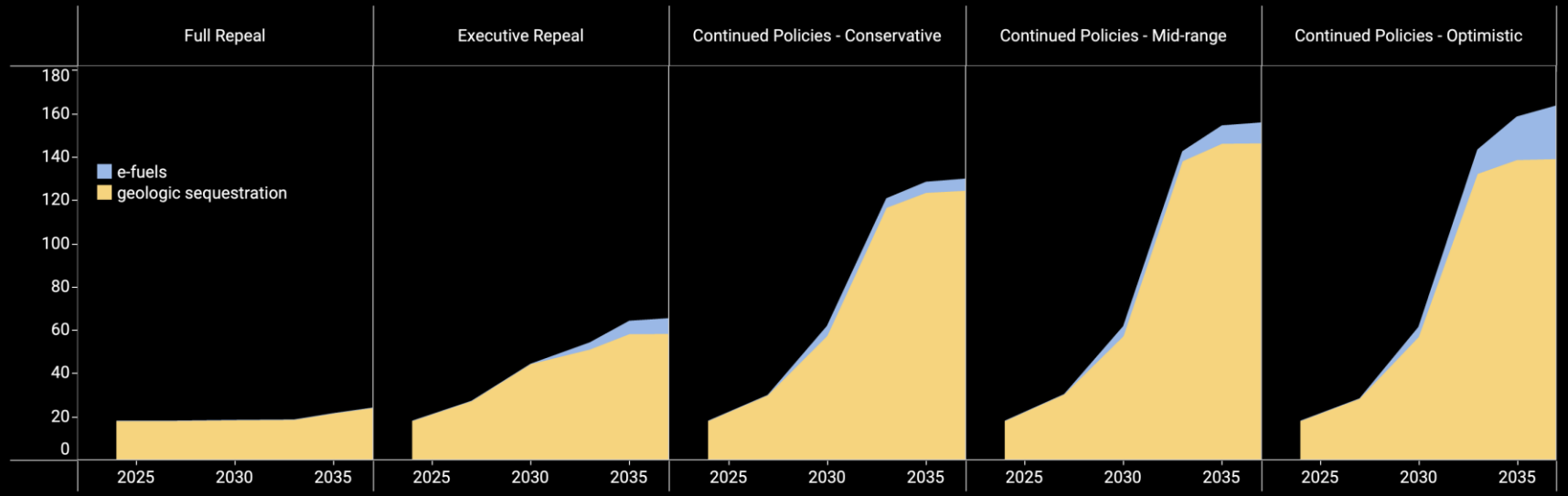
Captured carbon dioxide production sources
Millions of tonnes



Captured carbon dioxide disposition
Millions of tonnes



About REPEAT Project

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REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

REPEAT Project provides regular, timely and independent environmental and economic evaluation of changes in federal energy and climate policies as they're proposed and enacted, offering a detailed look at the United States' evolving energy policy landscape and impacts on the nation's energy transition, economy, and environment.

Led by Princeton University Prof. Jesse D. Jenkins, REPEAT Project is a joint project of the Princeton University ZERO Lab (Zero-carbon Energy Systems Research & Optimization Laboratory) and Evolved Energy Research. Funding for the REPEAT Project is provided by the Hewlett Foundation.

Approach: we employ geospatial planning and analysis tools coupled with detailed macro-energy system optimization models to **rapidly evaluate federal policy and regulatory proposals at politically-relevant spatial resolutions** (e.g., state, county, and finer resolutions). This is a refinement of methods used in the landmark Princeton *Net-Zero America* study.

Goal: provide independent, timely, and credible information and analysis for broad educational purposes, including as a resource available publicly for stakeholders, decision-makers, and the media.

Impact: since 2021, REPEAT Project has played a central role in informing debate, media coverage, and public understanding of the impacts of proposed and enacted legislation and regulatory changes. The project continues to provide regular analysis of pending and finalized changes in federal energy and climate policy, impacts on the U.S. energy sector and economy, updates on progress towards climate goals, and other analysis at **repeatproject.org**

PRINCETON UNIVERSITY
ZERO LAB
Zero-carbon Energy Systems Research and Optimization Laboratory

EVOLVED ENERGY RESEARCH

The REPEAT Project Team

REPEAT Rapid Energy Policy Evaluation and Analysis Toolkit

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Darmouth College: Prof. Erin Mayfield;
Binghamton University: Prof. Neha Patankar.

Website development by **Hyperobjekt**

For more, see **repeatproject.org/about**

Statement of interests: Jesse D. Jenkins is part owner of DeSolve, LLC, which provides techno-economic analysis and decision support for clean energy technology ventures and investors. A list of clients can be found at https://www.linkedin.com/in/jessedjenkins. He serves on the advisory boards of Eavor Technologies Inc., a closed-loop geothermal technology company, Rondo Energy, a provider of high-temperature thermal energy storage and industrial decarbonization solutions, and Dig Energy, a developer of low-cost drilling solutions for geothermal heating and cooling, and he has an equity interest in both companies. He also serves as a technical advisor to MUUS Climate Partners and Energy Impact Partners, both investors in early-stage climate technology companies.

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Greenline Insights

C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

ISSUE BRIEF

Economic Impact of Tech-Neutral Tax Credit Provisions in the 2025 Reconciliation Bill

May 21, 2025

Ashna Aggarwal, Jonah Kurman-Faber, George Rakushkin

Executive Summary

The House Ways & Means Committee's 2025 budget Reconciliation bill proposes major rollbacks to the Inflation Reduction Act's tech-neutral clean energy tax credits, particularly Sections 45Y and 48E. To assess the impact, we developed custom deployment models for five policy scenarios, each evaluated independently using the Energy Policy Simulator (EPS) by Energy Innovation to estimate net economic and emissions effects at the national level, as well as within a select number of states.

The most disruptive scenario involves restrictions on projects using components linked to Foreign Entities of Concern (FEOCs). These "material assistance" rules would disqualify a large share of clean energy projects, leading to **1.4 million cumulative jobs lost,**[1] **$237 billion in GDP decline, and a 6% increase in national emissions through 2035**. An early sunset of the 45Y and 48E credits is similarly damaging, eliminating long-term certainty and stalling investment in major clean energy projects. This scenario results in nearly **1 million cumulative jobs lost and $177 billion in GDP losses** through 2035.

Other rollbacks are less severe but nonetheless significant. Removing credit transferability leads to **237,000 cumulative jobs lost and $49 billion in GDP decline, disproportionately affecting smaller developers**. The only provision with no measurable impact is the FEOC entity-level restriction, which targets project ownership rather than component sourcing. As an alternative, a hypothetical storage mandate for wind and solar was modeled, which projects **88,000 cumulative jobs lost and $37 billion in losses,** with minimal emissions impacts.

State-level findings follow similar trends, with the largest losses concentrated in clean energy investment hubs like Texas, North Carolina, Louisiana, and Indiana. State-level economic losses reach as high as **over 170,000 jobs and $20 billion in GDP**, in some cases. These results suggest that, to varying degrees, each major provision of the proposed Reconciliation bill threatens to cause large economic losses across a wide variety of technologies, industries, and geographies**.**

[1] In this study, jobs are measured as job-years, or one job for one year.

Introduction

In pursuit of deficit reduction targets set by the broader congressional budget, the House Ways & Means Committee (Committee) has sought to dramatically scale back domestic clean energy incentives. Among other changes, the Committee's 2025 budget Reconciliation bill would roll back key clean energy provisions of the Inflation Reduction Act—most notably the tech-neutral tax credits 45Y (Clean Electricity Production) and 48E (Clean Electricity Investment). These credits apply uniformly across zero-emission technologies and are central to accelerating nationwide deployment of new clean energy. In some cases, new provisions would also affect the 45U nuclear production credit, particularly for existing reactors.

The modeled rollback scenarios—including restrictions on involvement from Foreign Entities of Concern (FEOCs), a repeal of credit transferability, and an accelerated phase-down of the credits—introduce significant investment uncertainty across the energy and manufacturing sectors. These regulatory shifts would not only narrow the eligibility window for future projects, but also risk disrupting supply chains, undercutting project financing mechanisms, and eroding investor confidence at a time when long-term planning and predictability is critical to achieving the nation's energy abundance and reliability goals.

Recent analysis has found that repealing or otherwise significantly hampering the tech-neutral tax credits, as the Committee's 2025 budget Reconciliation bill proposes, would lead to significant energy cost increases, large decreases in GDP, and substantial job loss.[2] This analysis provides additional comparative estimates on which provisions of the bill are the most damaging for the economy at the national and select state levels.

[2] *Assessing Impacts of the 2025 Reconciliation Bill on U.S. Energy Costs, Jobs, Health, and Emissions*, Energy Innovation, May 2025; *Ways and Means Brings the Hammer Down on Energy Credits*, Rhodium Group, May 2025; *Projected Impacts of Repealing the Section 45Y and 48E Technology-Neutral Clean Electricity Tax Credits*, Resources for the Future, May 2025.

Overview of Approach

We use a combination of custom-built models and the Energy Policy Simulator (EPS), developed by Energy Innovation, to evaluate the net impacts of scaling back or removing key tech-neutral tax credits. For each technology—solar PV, wind, battery storage, nuclear[3], and geothermal—policy scenarios are translated into deployment trajectories outside of the EPS. These technology-specific pathways are then input into EPS to assess the resulting economic and emissions impacts.

The analysis evaluates five scenarios, each modeled independently to reflect the isolated effect of a single policy change to the IRA's tech-neutral tax credits. These scenarios are designed to align with proposed legislative language or circulating policy drafts. A detailed explanation of scenario development is included in the Appendix.

Table 1. Overview of Modeling Scenarios

Scenario	Description
FEOC Entity-Level (Foreign Ownership/Influence)	Models restrictions that disqualify projects based on ownership by Foreign Entities of Concern (FEOCs), as defined by statute.
FEOC Component-Level (Material Assistance)	Assesses eligibility restrictions for projects that incorporate components, subcomponents, or critical minerals sourced with material assistance from FEOCs.
Transferability Removal	Simulates a repeal of the transferability provision, which currently allows developers to sell clean energy tax credits to unrelated third parties.
Early Sunset / Phase Down	Models an accelerated phaseout of Sections 45Y and 48E, with credits stepping down from 2029 and ending entirely by 2032.
Additional Storage Requirement (Hypothetical)	Based on a draft policy concept (not included in the Ways & Means text), this scenario requires projects with a capacity factor below 40% to pair with progressively scaled amounts of co-located energy storage beginning in 2028.

The results of multiple scenarios cannot be summed. They each represent a hypothetical scenario where that provision, and only that provision, is enacted. This allows for comparative analysis on the relative scale of net economic impacts of each provision.

[3] While nuclear is not the primary focus of this modeling, recent guidance and developer activity suggest that some new projects—including Small Modular Reactors (SMRs) and major retrofits—could be affected by the proposed restrictions on 45Y and 48E. Additionally, certain existing reactors may seek to qualify for the 45U production credit, and some of the proposed restrictions affecting 45U are captured in this analysis.

National Findings

Across the five rollback scenarios, impacts range from negligible to severe. Entity-level FEOC restrictions have no measurable effect, reflecting minimal disqualifications under current market conditions. In contrast, component-level FEOC bans represent the most disruptive scenario, disqualifying a broad swath of clean energy projects and resulting in over 1.4 million jobs lost[4], $237 billion in GDP losses, and a 17% emissions increase in some states between now and 2035.

Table 2. National Impacts by Scenario through 2035

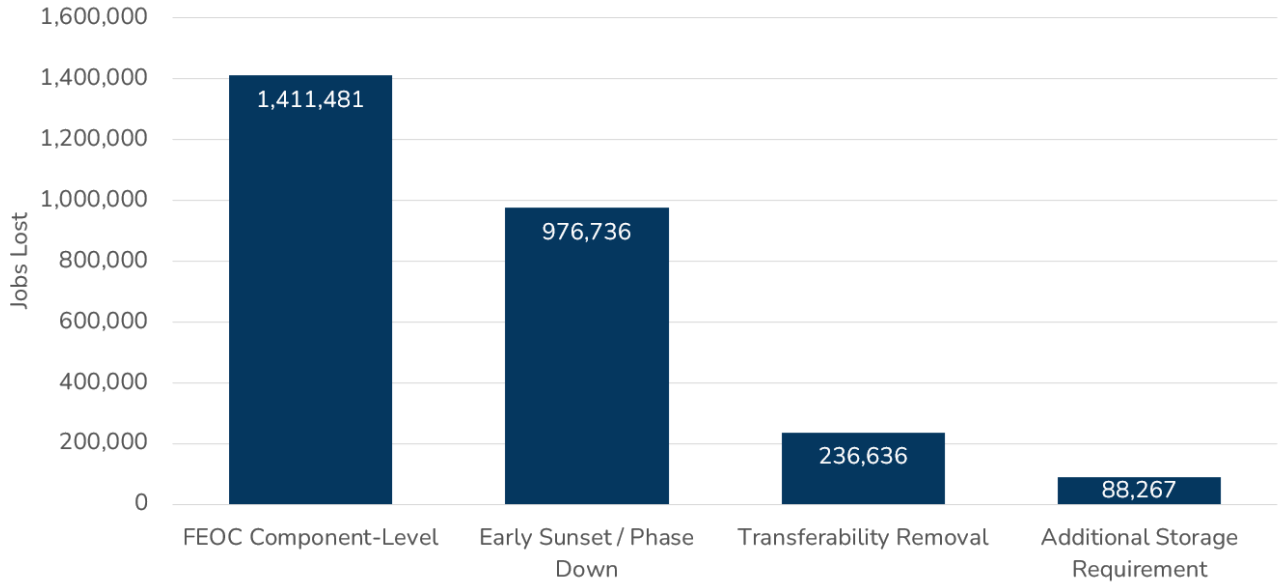
Scenario	Jobs Lost *Economy-wide cumulative job-years lost*	GDP Lost *Economy-wide cumulative GDP lost, 2024 USD*	Wages Lost *Economy-wide cumulative wages lost, 2024 USD*	Emissions Increase in 2035 *Percent Increase in Annual MMT CO2e in 2035*
FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
FEOC Component-Level ("Material Assistance")	1,411,481	$237 billion	$162 billion	6%
Transferability Removal	236,636	$49 billion	$28 billion	1%
Early Sunset/Phase Down	976,736	$177 billion	$117 billion	6%
Additional Storage Requirement	88,267	$37 billion	$13 billion	0.5%

An early phase-down of 45Y/48E credits poses the second most significant threat overall, with nearly one million jobs lost, $177 billion in GDP reductions, and disproportionate impacts on long lead-time projects.

Provisions that impose sweeping rollbacks or disqualifications, such as FEOC component-level requirements and early sunset provisions, impact widespread eligibility across all major technologies (solar, wind, battery storage, and nuclear). This generates cascading losses across construction, manufacturing, the energy supply chain, and the broader economy, and large amounts of capital investment are cancelled.

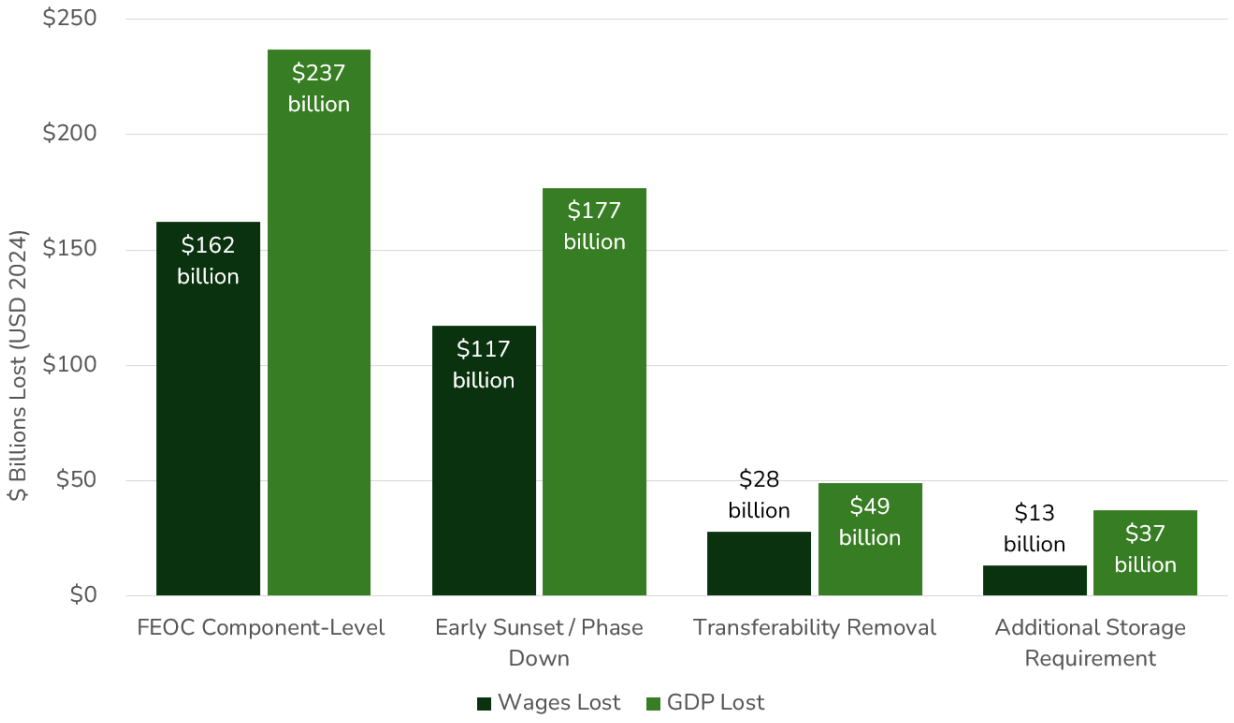
[4] Jobs in this study are measured as job-years, or one job for one year.

Figure 1. National Job Losses by Scenario, Cumulative through 2035



Removing transferability cuts off a key financing mechanism—especially for smaller developers—leading to an estimated 237,000 jobs lost and $49 billion in GDP decline. By contrast, a hypothetical storage mandate for low-capacity-factor resources, as an alternative provision, adds compliance costs and deployment friction, with roughly 88,000 jobs and $37 billion in GDP at risk, but minimal emissions impact.

Figure 2. National Wage and GDP Losses by Scenario, Cumulative through 2035



State-Level Findings

State results are prioritized for nine jurisdictions with large concentrations of clean energy deployment and manufacturing: Indiana, Iowa, Kansas, Louisiana, North Carolina, South Carolina, Texas, Utah, and West Virginia. Together these states represent a substantial share (48%) of recently announced capital investments according to data from Rhodium Group–MIT/CEEPR's Clean Investment Monitor, making them especially vulnerable to the economic fallout of tax credit rollbacks. All sub-national figures that follow refer only to this group; national totals reflect the full U.S. economy. See the Appendix for State-Level Results for these nine states.

Jobs Lost

Employment impacts are most severe under the FEOC Component-Level restrictions, Early Sunset/Phase Down, and Transferability Removal scenarios. These policy changes threaten significant job losses in states with high levels of clean energy deployment and manufacturing capacity. Texas experiences the largest employment declines across all scenarios, losing over 170,000 jobs under both the FEOC Component-Level and Early Sunset scenarios, and nearly 165,000 under Transferability Removal. These outcomes reflect the state's leadership in wind and solar deployment, as well as its extensive energy-related supply chains. Other states such as North Carolina and Indiana also face substantial employment impacts, losing 112,000 and 54,000 jobs respectively under the FEOC Component-Level scenario. In the Southeast and Midwest, states like South Carolina, Louisiana, and Iowa see cumulative job losses ranging from 20,000 to 80,000 depending on the scenario—highlighting how deeply clean energy deployment drives local labor markets even in smaller states.

GDP Lost

Economic losses broadly mirror employment trends, with the Transferability Removal and Early Sunset scenarios producing the most widespread contractions. Texas leads in overall GDP losses, with $21.5 billion lost under Transferability Removal and similarly large impacts under Early Sunset and the Additional Storage Requirement scenarios. These outcomes stem from the scale of Texas's installed and planned clean energy infrastructure, where changes to federal incentives translate into direct reductions in investment and economic activity. North Carolina, Indiana, and Louisiana also see significant GDP losses, ranging from $10 to $18 billion under the more severe rollback scenarios. Even smaller states such as Utah and Kansas show noticeable losses, particularly under FEOC Component-Level and Early Sunset scenarios, as diminished project viability reduces construction activity and related economic multipliers.

Increase in Emissions

Emissions impacts are most pronounced under the FEOC Component-Level and Early Sunset scenarios, both of which delay or cancel zero-emissions energy buildout and thereby increase reliance on fossil fuels. North Carolina experiences the steepest rise in annual emissions in 2035, with a 17% increase under the FEOC Component-Level scenario and nearly the same under Early Sunset. The state also sees a 13% increase in emissions under Transferability Removal, suggesting that a wide range of policy changes could meaningfully disrupt its clean energy transition. Emissions increases are also notable in Texas, Indiana, Iowa, and Louisiana, each showing 5–8% higher annual emissions in 2035 under the more aggressive rollback scenarios. Even in states with more modest clean energy deployment, the direction of impact is consistent: every modeled rollback scenario results in higher emissions, with no case yielding climate or pollution benefits.

Appendix: Methodology

In most cases, we use the external scenario models to estimate changes in clean energy deployment (capacity additions) relative to an IRA-induced baseline. This structure is designed to reflect how each policy change alters the incentives created by the IRA's tech-neutral credits. As a result, the modeling is often more representative of the investment tax credit (48E) structure—where project viability is closely tied to upfront capacity deployment—than the production tax credit (45Y), which rewards electricity generation over time. While both credits are modeled through the same tech-neutral framework, our capacity-based approach provides a clearer picture of how each scenario reshapes near- and medium-term buildout trajectories.

The following sections describe the methodology for each scenario in greater detail.

FEOC Entity-Level ("Foreign Ownership/Influence"): Project developers themselves are assessed for disqualification under the taxpayer-level provisions. Using data primarily from the Clean Investment Monitor, the top 25 developers in each clean energy technology—including utility-scale solar, land-based wind, and battery storage—are identified, and SEC filings, corporate records, and other public sources are reviewed to examine ownership structure. For geothermal, which remains in early commercial deployment, additional research is carried out to identify a smaller group of leading developers. This analysis allows for flagging of companies that may be considered "foreign-influenced" or "specified foreign entities" under the new rules. While the scenario does not capture every disqualification pathway described in the Reconciliation bill (e.g., board representation and debt exposure), it approximates the entity-level restrictions by focusing on ownership and control as the primary disqualifying factor.

FEOC Component-Level (Material Assistance): Project eligibility is prioritized under the "material assistance" clause. International trade data is used to estimate the share of key components—such as solar panels, inverters, tracking systems, and wiring—that are imported from FEOC countries, primarily China. These shares are adjusted based on transshipment risk and indirect exposure (e.g., components produced in Southeast Asia but owned or controlled by Chinese firms). Each component is evaluated against a strict FEOC sourcing cap, and the resulting pass/fail status is weighted by the component's cost share to estimate system-level exposure. While this scenario approximates the intent of the proposed legislative text, it does not capture all forms of "material assistance" that could trigger disqualification—such as use of intellectual property, technical services, or licensing agreements from prohibited foreign entities. Nonetheless, it provides a structured and component-specific estimate of potential project exposure under the sourcing restrictions.

Transferability Removal: Transferability is repealed for tech-neutral tax credits two years after the bill's enactment. Assuming enactment in 2026, this means provision takes effect for projects that begin construction in 2028 or later, which we assume will impact projects placed in service in 2030. Facility-level capital investment data is gathered from the Clean Investment Monitor and each project is assigned a monetization rate based on size. Large facilities are assumed to monetize a larger fraction of their credit value, while smaller projects receive lower rates to reflect limited tax liability and restricted access to tax equity. An estimation is made on the total value of the tech-neutral credits each facility receives under full monetization, which is then used to calculate the shortfall created by reduced monetization without transferability. Projects falling below an assumed threshold are disqualified from claiming the tax credit, allowing for estimation of the share of deployment and capital investment at risk.

Early Sunset / Phase Down: The national Energy Policy Simulator is used to phase down 45Y and 48E credits beginning in 2029, applying a placed-in-service interpretation of eligibility. Projected deployment under this timeline is compared to a baseline in which the credits remain in place through 2032. The resulting gap captures the impact of curtailing these incentives ahead of schedule.

Additional Storage Requirement: A model is developed to assess how a hypothetical co-location mandate for energy storage would affect new capacity. The policy requires certain resources—defined by a capacity factor threshold of 40%—to pair with 2 to 4 MWh of storage per MW of generation. Affected technologies are identified using the NREL Annual Technology Baseline data and adjusted for natural hybridization trends based on historical Energy Information Administration data. The final estimate reflects the incremental capacity subject to the storage mandate and assumes partial compliance based on user-defined scenarios.

Appendix: State-Level Results

Note: state-level EPS models are run independently and do not fully account for cross-state offsets, so their results may not sum to national totals.

State	Scenario	Jobs Lost	GDP Lost	Wages Lost	Emissions Increase
		Economy-wide cumulative job-years lost	*Economy-wide cumulative GDP lost, 2024 USD*	*Economy-wide cumulative $ wages lost, 2024 USD*	*Percent Increase in Statewide Annual MMT CO2e in 2035*
Indiana	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	54,269	$9.7 billion	$4.6 billion	5.7%
	Transferability Removal	38,814	$6.7 billion	$3.2 billion	4.5%
	Early Sunset/Phase Down	50,282	$8.9 billion	$4.2 billion	5.4%
	Additional Storage Requirement	32,618	$5.8 billion	$2.7 billion	4.5%
Iowa	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	24,190	$2.6 billion	$1.8 billion	7.6%
	Transferability Removal	18,480	$1.2 billion	$1.3 billion	8.0%
	Early Sunset/Phase Down	20,964	$2 billion	$1.6 billion	7.6%
	Additional Storage Requirement	14,685	$1.4 billion	$1.1 billion	7.4%
Kansas	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	18,889	$1.2 billion	$0.2 billion	4.7%
	Transferability Removal	14,560	$0.4 billion	$0.4 billion	0.4%
	Early Sunset/Phase Down	27,897	$1.6 billion	$1 billion	3.8%
	Additional Storage Requirement	13,183	$0.4 billion	$0.1 billion	3.2%
Louisiana	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	77,682	$13.1 billion	$6.8 billion	5.3%
	Transferability Removal	48,575	$7.5 billion	$4.1 billion	3.0%
	Early Sunset/Phase Down	61,288	$10.5 billion	$5.4 billion	3.8%
	Additional Storage Requirement	43,282	$7.2 billion	$3.7 billion	2.4%

State	Scenario	Jobs Lost	GDP Lost	Wages Lost	Emissions Increase
		Economy-wide cumulative job-years lost	*Economy-wide cumulative GDP lost, 2024 USD*	*Economy-wide cumulative $ wages lost, 2024 USD*	*Percent Increase in Statewide Annual MMT CO2e in 2035*
North Carolina	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	112,191	$18.8 billion	$9.5 billion	17.0%
	Transferability Removal	81,895	$14 billion	$7 billion	13.3%
	Early Sunset/Phase Down	109,718	$18.4 billion	$9.3 billion	16.9%
	Additional Storage Requirement	78,413	$13.4 billion	$6.6 billion	12.7%
South Carolina	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	41,178	$4.2 billion	$2.9 billion	9.0%
	Transferability Removal	23,042	$1.8 billion	$1.4 billion	5.3%
	Early Sunset/Phase Down	31,175	$2.8 billion	$2.1 billion	7.1%
	Additional Storage Requirement	5,118	$1 billion	$0.1 billion	3.8%
Texas	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	172,696	$17.6 billion	$10 billion	6.4%
	Transferability Removal	164,993	$21.5 billion	$11.9 billion	6.9%
	Early Sunset/Phase Down	173,471	$21.3 billion	$11.6 billion	6.7%
	Additional Storage Requirement	159,397	$19.6 billion	$10.8 billion	6.5%
Utah	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	33,223	$5.1 billion	$2.6 billion	7.8%
	Transferability Removal	25,196	$3.7 billion	$2 billion	5.3%
	Early Sunset/Phase Down	32,660	$5.1 billion	$2.6 billion	9.0%
	Additional Storage Requirement	18,276	$3 billion	$1.4 billion	2.9%
West Virginia	FEOC Entity-Level ("Foreign Ownership/Influence")	*negligible*	*negligible*	*negligible*	*negligible*
	FEOC Component-Level ("Material Assistance")	10,712	$1.2 billion	$0.7 billion	5.7%
	Transferability Removal	8,057	$0.9 billion	$0.6 billion	4.9%
	Early Sunset/Phase Down	9,914	$1.1 billion	$0.7 billion	5.7%
	Additional Storage Requirement	5,898	$0.6 billion	$0.4 billion	4.2%

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E&E NEWS By POLITICO

FERC will lose 9% of workforce, chair says

By Francisco "A.J." Camacho

04/18/2025 06:15 AM EDT

The Federal Energy Regulatory Commission will likely lose 9 percent of its employees as part of the Trump administration's efforts to shrink the federal workforce, Chair Mark Christie said Thursday.

Fifty-five employees out of the agency's 1,500 have opted for deferred resignations, Christie said. The administration has also offered early retirements and implemented a government-wide hiring freeze.

Christie emphasized that FERC is "working hard" to keep key experts in place, including those who work on natural gas permits.

"We don't want to lose people who are essential to get those permits out," he said. "There are a lot of functions here that are very important."

Christie, speaking at a press briefing, also offered cautious support for the Trump administration's directive to automatically sunset energy regulations.

“A regulatory housecleaning is a great idea,” he said. The agency, he said, has already begun combing through decades-old “zombie proposals” that were never finalized and suggested several rules he would be happy to rescind or amend.

But legal analysts have raised concerns about the implications of President Donald Trump's executive order, which requires energy regulators to implement "zero-based regulatory budgeting."

Issued April 9, the order directs FERC and other energy agencies to sunset regulations unless they are affirmatively extended through public review and cost-benefit analyses. Regulations not extended within a year of enactment would automatically lapse unless justified through a formal process.

Former FERC General Counsel Matthew Christiansen said the order effectively requires FERC to conduct individual notice-and-comment proceedings for every regulation it wishes to extend — an enormous task given the agency's sprawling mandate under laws like the Federal Power Act and the Natural Gas Act.

On Thursday, Christie made clear that the effectiveness of the effort hinges on legal durability.

“Everything we do — whether it's a rescission, whether it's putting a sunset provision on it — has to be done in accordance with law. Otherwise, you're just spinning your wheels,” he said, warning that skipping proper procedures would almost certainly lead to reversals in federal court.

Nevertheless, Christie took the opportunity to single out Order 679 as a prime target for review. The order offers rate incentives to transmission developers that demonstrate that their projects will improve reliability or reduce power costs, typically through a regional planning process or state approval.

Christie has long compared the incentives to “FERC candy” taken from consumers and redistributed to transmission owners.

“If it's up to me and we're going to put a one-year sunset on something, I'd start with that,” he said.

Clearing the renewables backlog

Christie's comments came on the same day that he and the other commissioners moved forward with implementing Order 2023, a sweeping rule opposed by some Trump allies and supported by renewable energy advocates.

The rule aims to speed up the connection of new energy projects — mostly wind and solar — to the grid.

At Thursday's meeting, FERC unanimously approved the New York Independent System Operator's plans for interconnection reform under Order 2023. Only two weeks earlier, the commission granted the first grid operator compliance plan from ISO New England.

“It's getting more generation on the grid faster and more efficiently. That's good because it's going to be the answer to all the new demand we're seeing in this country, and it's going to lower prices,” Commissioner David Rosner, a Democrat, told POLITICO's E&E News after the Thursday meeting.

The U.S. power grid is grappling with soaring demand, potentially increasing by 128 gigawatts — equal to 76 million homes — in the next five years due to electrification and significant data center investments from technology companies. As of April 2024, approximately 2,600 gigawatts of energy projects were awaiting grid connection, but the wait averages five years, and roughly three-quarters of the projects get abandoned.

The landmark Order 2023 requires transmission providers nationwide to prioritize projects based on their readiness, rather than on when they applied for grid connection. The rule also tightens timelines for completing interconnection studies and adds financial penalties for delays.

Former FERC Commissioner Bernard McNamee, a Trump appointee, criticized Order 2023 in his chapter for Project 2025, a conservative blueprint that the second Trump administration often pulls from.

“Socializing such costs is a form of subsidy for generators and will cause further price distortions in [regional transmission organizations] and [independent system operators] that will make it less economical for reliable, dispatchable resources like coal, nuclear, and natural gas to stay operational and support reliability,” McNamee wrote.

But two years ago, then-Commissioner Christie, a Trump appointee himself, called Order 2023 “major progress” and voted for it.

In the Thursday press briefing, however, Christie said that the interconnection queue is only part of the problem.

He said leadership and staff at grid operators, particularly PJM Interconnection, were receiving “misplaced” blame. PJM is the country's largest grid operator serving mid-Atlantic and Great Lakes states.

“Nearly 50 gigawatts of new generation have been approved for their generator interconnection agreements [since July 2023]. PJM is done. They've approved it. It's not a queue problem,” Christie said. “The developer can't get financing, doesn't have site control, supply chain problems — whatever the problem is, it's not because PJM has not approved the project for construction. It is a reason apart from PJM.”

In its compliance plan, ISO New England preserved its ability to prioritize transmission upgrades in congested areas such as northern Maine, which is seeing a flood of wind farm proposals.

NYISO's plan, approved in some part on Thursday, includes adaptations to the interconnection process, but full details were not immediately available. Still, FERC indicated it was part of a broader push to implement Order 2023 across all major grid operators.

This is an unedited transcript. The statements within may be inaccurate, incomplete, or misattributed to the speaker.

RPTR GIORDANO

EDTR HUMKE

KEEPING THE LIGHTS ON: ENHANCING RELIABILITY AND EFFICIENCY TO POWER AMERICAN HOMES

WEDNESDAY, SEPTEMBER 13, 2023

House of Representatives,

Subcommittee on Energy, Climate, and Grid Security,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 10:01 a.m., in Room 2123, Rayburn House Office Building, Hon. Jeff Duncan [chairman of the subcommittee] presiding.

Present: Representatives Duncan, Curtis, Burgess, Latta, Guthrie, Griffith, Johnson, Bucshon, Walberg, Palmer, Lesko, Pence, Armstrong, Weber, Balderson, Pfluger, Rodgers (ex officio), DeGette, Peters, Fletcher, Matsui, Tonko, Veasey, Kuster, Schrier, Castor, Sarbanes, Cardenas, and Pallone (ex officio).

Also Present: Representatives Carter, and Hudson.

Staff Present: Kate Arey, Content Manager and Digital Assistant; Sarah Burke, Deputy Staff Director; Sydney Greene, Director of Operations; Rebecca Hagigh, Executive

Assistant; Nate Hodson, Staff Director; Tara Hupman, Chief Counsel; Sean Kelly, Press Secretary; Peter Kielty, General Counsel; Emily King, Member Services Director; Elise Krekorian, Professional Staff Member, Energy; Mary Martin, Chief Counsel, Energy and Environment; Brandon Mooney, Deputy Chief Counsel for Energy; Kaitlyn Peterson, Clerk, Energy and Environment; Karli Plucker, Director of Operations; Carla Rafael, Staff Assistant; Emma Schultheis, Staff Asistant; Olivia Shields, Communications Director; Peter Spencer, Senior Professional Staff Member; Michael Taggart, Policy Director; Dray Thorne, Director of Information Technology; Waverly Gordon, Minority Deputy Staff Director and General Counsel; Tiffany Guarascio, Minority Staff Director; Kris Pittard, Minority Professional Staff Member; Emma Roehrig, Minority Staff Member; Kylea Rogers, Minority Policy Analyst; Andrew Souvall, Minority Director of Communications, Outreach and Member Services; Medha Surampudy, Minority Professional Staff Member; Tuley Wright, Minority Staff Director, Energy, Climate, and Grid Security; and Geneva Wolfe, Minority Intern.

Mr. Duncan. I am going to ask everyone to take their seat.

The Subcommittee on Energy, Climate, and Grid Security will now come to order.

Chair will recognize himself for 5 minutes for an opening statement.

First off, thank you all for being here today. We are going to pause just a minute and remember the folks in Hawaii and California, Florida, Vermont, everywhere that has been affected, and ask that you keep them in your prayers. And so subcommittee today is on keeping the lights on, enhancing reliability and efficiency to power American homes.

Our goal in the Energy and Commerce Committee is to enact policy that delivers affordable, reliable, and clean energy to all Americans. Unfortunately, energy policy coming out of the Biden administration prioritizes the green transition over security and reliability.

This July, the North American Electric Reliability Corporation, or NERC, released a report that identified energy policy as one of the biggest threats to the reliability of the grid. The report specifically cites actions by policymakers to pursue renewable energy as a threat to grid security.

There is a looming resource adequacy crisis. We all need to take this warning seriously and do more than to ensure reliability and affordability of the energy system. FERC has allowed the distortion of market incentives such as State and Federal subsidies aimed at promoting the deployment of renewables to interfere with electricity price formation. This has contributed to early retirement of reliable generation assets like nuclear and natural gas.

Other factors contributing to these early retirements are realistic environmental policies like EPA's unlawful Clean Power Plan 2.0 and the agency's overarching power

plant electricity generating unit strategy.

NERC predicts power plants will have to comply with standards by limiting their hours of operation, taking more reliable generation off the grid. According to NERC, the vast majority of this country faces potential blackouts. These vulnerabilities are not a result of severe weather or lack of transmission capacity, but it is because of reliable dispatchable firm generation units are being retired at an alarming rate. Prices have skyrocketed, and reliability has been compromised. Americans are paying more for less. We must focus on preserving resource adequacy.

My bill which we are reviewing today, the Guaranteeing Reliable Infrastructure Development, or GRID Act, would amend the Federal Power Act to require coordination between FERC and any Federal agency promulgating a regulation that could threaten the reliability of the bulk power system. I hope all my colleagues on this committee will join me in this important effort.

As we heard in our field hearing in Moore County, North Carolina back in June, the Biden administration is also pursuing energy efficiency standards that put reliability at risk; in particular, their proposed distribution transformer standards.

DOE already mandates distribution transformers be manufactured at an incredibly high efficiency standard. They are already at 99.53 percent efficient. This new rulemaking will increase the efficiency by only a fraction of a percentage point, but significantly disrupt the production of transformers, which utilities already have difficulty producing.

I know many of us on this committee have heard from our utility providers and developers about the shortage of transformers that allow manufacturing and residential development production to happen.

To address this supply chain crisis, we are reviewing Congressman Hudson's bill today, which will prohibit the DOE from proposing new efficiency standards for distribution transformers until 5 years after the enactment of this Act. It is also clear this administration is using appliance and efficiency standards as part of their agenda to electrify everything and pursue climate objectives over consumer choice.

These new standards will increase the cost of appliances for Americans and limit the availability of consumer options. Congresswoman Lesko's bill would address this issue by amending the Energy Policy and Conservation Act to prohibit the DOE from proscribing any new or amended efficiency standards that are not technologically feasible or economically justified.

The Biden administration has used efficiency standards to target gas appliances disproportionately despite the latest DOE numbers that indicate electricity costs 3.3 times higher than natural gas.

The whole-of-government approach to the green energy transition has driven up the cost of energy and household necessities for Americans and jeopardized our energy security. I look forward to hearing from our witnesses today on how we can reverse course and their perspectives on the bills we are reviewing today.

So I will now recognize Ranking Member DeGette for 5 minutes to give her opening statement.

[The prepared statement of Mr. Duncan follows:]

******** COMMITTEE INSERT ********

Ms. DeGette. Thank you very much, Mr. Chairman, as well as the thoughts you have given to some of the areas affected by extreme weather.

We just learned a few minutes ago that our dear colleague, Mary Peltola's husband, Gene, was killed in a plane crash last night. So let's please keep her and all of her family in our thoughts.

Mr. Duncan. Thank you for telling me that. You reminded me or told me about it when we first started.

Ms. DeGette. You bet.

Mr. Duncan. And I failed, and I apologize. I'm sorry.

Ms. DeGette. Don't apologize. It is great. Thanks.

So, Mr. Chairman, reliable electricity is one of the most important facets of our lives, and I think that you would, frankly, be hard pressed to find anybody in this room that disagrees with that. It is critical that the Federal Government work with stakeholders to ensure that Americans have access to the energy they need when they need it.

When Americans flip a switch, they expect the lights to turn on, as they should. And that is why it is so critically important. And, frankly, as we face down the worsening climate crisis, reliability is even more important than ever.

This summer, as you know, we saw record-breaking heat gripping large parts of the United States. If electricity reliability were impacted in a serious way, this summer would not have just been deadly; it would have been catastrophic.

In fact, a study published earlier this summer found that, in a city like Phoenix, Arizona, a prolonged power outage during the summer could kill thousands and severely

harm half of the city's population. It is clear a reliable source of electricity is paramount to our Nation's health and well-being.

I think that one of the ways to ensure we have reliable electricity is through energy efficiency. If we increase energy efficiency, we cut down on the energy we consume, and this allows us to get more out of our current energy supply and, in turn, promoting reliability.

I also want to note that not only do energy efficiency measures and standards stretch our energy supply, but they also save consumers money in the long run. In fact, the congressionally mandated standards proposed by the Biden administration would collectively save Americans $570 billion over the next 30 years.

So, when I look at the bills that we are discussing today, I, frankly, don't see bills that are focused on reliability. Instead, what I see is bills that, in the name of reliability, would gut energy efficiency standards that are saving Americans money and that are cutting down on our energy use. I see bills that not only seek to uphold the status quo, but, in some cases, sadly, to roll back progress we have made in slashing emissions, cleaning our air, and saving consumers money.

H.R. 4167 would prohibit the Department of Energy from issuing a final rule for energy efficiency standards in distribution transformers for 5 years, somehow in the name of addressing a supply chain issue. DOE has just proposed a rule. It has a process for incorporating feedback, and it will make changes to the final rule if they are necessary to ensure reliability.

I agree, the supply chain must be addressed, but I struggle with the idea of delaying a rule before the DOE has finished its process and without addressing the root of the issue.

The DOE Appliance and Equipment Standards Reform and Consumer Protection Act would create duplicative, burdensome requirements for energy efficiency standards, as well as set a disastrous precedent for rolling back standards that are already making a difference. This bill continues the disturbing trend against commonsense standards to save money and protect consumers' health and well-being.

Finally, the GRID Act would give FERC veto power over any regulation it claims would affect reliability. This bill would strip Federal agencies of their ability to do their jobs. So I fear, while some of the bills may be well-intentioned, they just simply don't address the root of reliability.

Instead, if we truly want to address reliability issues, let's find solutions that address the root causes, and let's start talking about one of the best ways to ensure reliability, and that is transmission. We want to talk about reliability, but there is no discussion of how to get more transmission online expeditiously.

Increased transmission means more generating projects can get connected to the grid. Increased transmission will mean it can ensure energy gets to where it is needed when it is needed, and, in an emergency, it can come from elsewhere to ensure reliability.

So, Mr. Chairman, I am looking forward to the hearing that I know you are planning on transmission. I think it will be a great hearing, but I do look forward to the conversation today.

And I yield back.

[The prepared statement of Ms. DeGette follows:]

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Mr. Duncan. Gentlelady yields back.

I now recognize the chair of the full committee, Chairman Rodgers, for 5 minutes for an opening statement.

The Chair. Thank you, Mr. Chairman.

America's electrical grid is critical in every part of our lives. It keeps our hospitals, military bases, homes, and businesses powered. An unreliable grid threatens our safety, our health, and our economy.

In addition, common household appliances are essential for feeding our families, washing our clothes and dishes, and heating our homes. We must ensure American families have the freedom of reliable, affordable, and efficient energy sources and home appliances.

Right now, however, these vital American resources are being undermined. Regulatory restrictions by the Biden administration are forcing a rush-to-green agenda on people that is dangerous, expensive, and jeopardizing reliability, from shutting down baseload power sources that keep our electric grid reliable to banning appliances like gas stoves.

I am deeply concerned by the motivation behind these policies and the direction that they are taking our country, especially as people suffer paying more for everything. Nationwide residential electric bills have increased 27 percent since President Biden took office. In California, the average residential electricity prices are nearly double the nationwide average, and they are continuing to skyrocket.

It is making life harder for families and adding to their stress and anxiety, yet the administration pushes on with their war on American energy by taking steps to mandate

only 100 percent intermittent, weather-dependent power sources like wind and solar. While there is certainly a place for these resources in our energy mix, relying on 100 percent electric will increase cost and risk life- threatening blackouts.

According to the North American Electric Reliability Corporation, the United States is currently at an elevated risk of blackouts. Furthermore, people should be able to choose and afford the home appliances and vehicles that best meet their needs. It should not be dictated by the President or his radical allies.

This forced transition jeopardizes our energy security and affordability. It is sending our jobs overseas. It is making us dangerously beholden to China and ultimately will not slow down or impact climate change.

Since day one of this Congress, we have offered a clear vision that ensures American energy independence will secure our grid, lower emissions, and improve people's lives. The three bills before us today are the next phase of that vision. The GRID Act, led by Chairman Duncan, will enhance interagency coordination and rein in EPA's abuse of the Federal regulatory process to shut down our most reliable power plants. This bill ensures agencies like FERC can rely and comment on EPA policies that will weaken the reliability of our bulk power system.

To help address the current transformer shortage equipment that is vital to grid infrastructure, Representative Hudson is leading on H.R. 4167. This bill will ensure a steady supply of transformers for new homes and businesses, replace those damaged in fires and floods, and minimize the risk of blackouts and other service interruptions.

Representative Lesko is leading on the DOE Appliance and Equipment Standards Reform and Consumer Protection Act to ensure Americans, not the Federal Government, are able to decide for themselves what home appliances best meet their needs. This

builds on her bipartisan work with H.R. 1640, the Save Our Gas Stoves Act, which passed out of the House earlier this year with a vote of 249 to 181.

The list of life-changing appliances and products under attack by this administration includes furnaces, hot water heaters, dishwashers, ceiling fans, washing machines, light bulbs, and air conditioners. All of these have helped raise our standard of living more than any other country in the world.

This bill will prohibit DOE from imposing new efficiency mandates on appliances unless they are proven to save money and improve performance and end these backroom deals that have allowed radical environmental activists to dictate the types of appliances that Americans are allowed to have in their homes.

A reliable, affordable, and efficient energy grid is necessary for an economy that is strong. With it, we can better safeguard people's food and medical supplies and keep transportation and communication systems running. And I look forward to discussing how we can work together to secure our grid, reduce supply chain risk and equipment shortages, and make sure that people continue using home appliances that are both energy efficient and affordable.

I thank our witnesses for being here today and the bill sponsors.

And I yield back.

[The prepared statement of The Chair follows:]

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Mr. Duncan. I thank the chairwoman, and now go to the ranking member of the full committee, Mr. Pallone from New Jersey, for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman.

Energy efficiency is an important tool that lowers energy costs for American families, increases reliability, and it helps us achieve our climate goals. It is because of these benefits that bolstering and strengthening energy efficiency has long been a bipartisan priority of this committee. That past bipartisan work helped produce the Department of Energy's long and successful history of making our homes and businesses more energy efficient, saving consumers money, and helping reduce energy consumption across the country.

But it is unfortunate that energy efficiency is no longer a bipartisan issue and that we are here today to discuss three Republican bills that gut DOE's ability to push for commonsense energy efficiency standards. The three bills target DOE's energy efficiency efforts and limit other Federal agencies from doing their jobs. Taken together, they are a radical departure from bipartisan productive work on energy efficiency and are designed to prop up industry and harm consumers.

The DOE Appliance and Equipment Standards Reform and Consumer Protection Act is an industry wish list masquerading as consumer protection. This bill adds duplicative and cumbersome standards and tests to DOE's already rigorous efficiency rulemaking process. If this bill becomes law, it puts all existing and future attempts at energy conservation into jeopardy.

H.R. 4167 is another dangerous bill that prohibits DOE from finalizing efficiency standards for electric distribution transformers. These standards promise significant

energy savings, estimated to save consumers about $15 billion. It ignores the very process that Congress created in the Energy Policy and Conservation Act, and prevents DOE from doing its job by borrowing DOE from finalizing standards, even if the Department of Energy finds that these standards will save Americans money and decrease energy usage.

And then the Guaranteeing Reliable Infrastructure Development Act gives the Federal Energy Regulatory Commission an effective veto over any other Federal agency's rules and regulations. This is an unprecedented power grab designed to thwart any progress in the energy sector in addressing emissions and efficiency. It would also state that utility commissions would have to -- would be badgering the FERC and other Federal agencies with potentially false claims about any proposed agency rule throughout the entire government.

Now, with these three bills, committee Republicans are deliberately trying to delay and weaken popular energy efficiency programs to do the bidding of their polluter friends. Once again, Republicans are putting polluters over people, and the American people are paying the price with higher energy bills.

It is clear Republicans want to return to the policies of the Trump years on energy efficiency. For 4 years, the Trump administration sat on its hands and ignored the law, missing 26 different deadlines for efficiency standard determinations, including for distribution transformers.

In order to play catchup, the Biden administration has aggressively moved forward on past and planned energy efficiency actions that will save Americans $570 billion. That is a lot of money. And, unfortunately, these Republican bills would simply return us to the world where efficiency standards suffer from extreme delays. These actions

will only increase energy costs for middle-class Americans and stifle our efforts to address the climate crisis.

At a time when House Democrats are focused on lowering costs for American families, House Republicans want to gut agencies that are trying to put dollars back in middle-class Americans' pockets. And it is not just limited to these bills. They are supporting drastic funding cuts across the government. They want to cut DOE's energy efficiency and renewable energy account by $466 million.

They want to repeal major energy saving and emissions-reducing programs from the Inflation Reduction Act. These proposals are so extreme and severe that even their industry friends are pushing back. Earlier this month, industry groups and energy efficiency advocates came together to circulate a letter expressing serious concern with the drastic proposed cuts to vital Department of Energy efficiency programs.

It is time that Republicans recognize that their misguided efforts to undermine energy efficiency standards only increase costs for American consumers and further hinder our ability to aggressively combat the worsening climate crisis. I wish we were able to come together and, once again, build on our past bipartisan work in this space. But it is clear that Republicans want to move in the opposite direction.

And, with that, I yield back the remainder of my time,

Mr. Speaker -- Mr. Chairman.

[The prepared statement of Mr. Pallone follows:]

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Mr. Duncan. I thank the ranking member, and will now conclude the member opening statements.

Chair would like to remind members that, pursuant to committee rules, all members' opening statements will be made part of the record.

I would like to thank our witnesses today for being here and taking time to testify before the subcommittee.

Each witness will have an opportunity to give an opening statement. There are lights in front of you, 5 minutes for that. As it is approaching, it will change to yellow and then red. Red, if you can just wrap up. So please try to follow that throughout the day.

Witnesses on the first panel, the Honorable Gene Rodrigues, Assistant Secretary of Electricity at the Office of Electricity for the U.S. Department of Energy; and Dr. David Ortiz, director of Office of Electric Reliability at the Federal Energy Regulatory Commission.

Appreciate you guys being here. I will now recognize Mr. Rodrigues for 5 minutes to give an opening statement.

STATEMENTS OF GENE RODRIGUES, ASSISTANT SECRETARY FOR ELECTRICITY, OFFICE OF ELECTRICITY, U.S. DEPARTMENT OF ENERGY; AND DAVID ORTIZ, DIRECTOR, OFFICE OF ELECTRIC RELIABILITY, FEDERAL ENERGY REGULATORY COMMISSION

STATEMENT OF GENE RODRIGUES

Mr. Rodrigues. Thank you.

Good morning, Chairman Duncan, Ranking Member DeGette, and members of the subcommittee. I thank you for the opportunity to testify before you today.

My name is Gene Rodrigues, and I am the Assistant Secretary for the Office of Electricity at the Department of Energy.

Reliability, resilience, security, affordability, and efficiency are all important elements of the core tenets of the Department of Energy. In my capacity as the Assistant Secretary, I oversee the vital work of my office and coordinate with other offices and partner with industry to support our shared mission of ensuring a reliable power grid for all the American people.

There is nothing more important than keeping the lights on. Energy reliability is the backbone of our economy, and it is the foundation of our national security.

Now, I recognize that concerns have been raised that recent proposals around efficiency standards could adversely affect those goals. Well, I am here today to assure you that DOE views reliability as a critical part of our mission, and it informs decisions made throughout the Department, including for efficiency standards.

By way of example, if I may, I would like to provide you with an overview on some

of our work on distribution transformers. Now, as you are all aware, DOE proposed amended efficiency standards for distribution transformers in January of this year. No later than 6 years after issuance of any final rule establishing or amending a standard, Congress requires DOE to either publish a proposed rule with new standards, or a determination that standards do not need to be amended. DOE last published a final rule on distribution transformers back in 2013. We are currently under a consent decree requiring the rulemaking to be completed by June 2024.

Now, throughout this ongoing rulemaking proceeding, it has been absolutely clear that the Department's focus has not been limited solely on the technical parameters of their proposed efficiency standard, but also on ensuring a robust, secure supply of components for the grid. This is enabled by a strong domestic manufacturing industry, which reduces dependence on foreign supply. And that is why DOE expressly asks stakeholders for comment on timelines required for compliance with the proposed standard, as well as comments on the availability of key components.

But that proposed efficiency standard is only one element of the Department's overall efforts on distribution transformers. As we speak, the Department of Energy, in collaboration with our industry partners and in coordination with the whole of government, is actively engaged in many initiatives to bolster and secure the resiliency of America's supply chain for distribution transformers for decades to come.

We have shepherded industry and U.S. Government working groups to identify issues and propose practical solutions. These voluntary collaborations between industry and DOE help to reduce one-off, inflexible design specifications that slow production down and hamper the sharing of transformers between utilities when needed.

We have provided national projections of the long-term demand growth for

distribution transformers to provide America's manufacturers with investment certainty that will help them to expand capacity.

We have connected manufacturers with suppliers of difficult-to-source grid components. We have utilized legislation passed by this Congress to provide funds for distribution transformers, such as the 10 million in transformer rebates and 10 billion in 48(c) tax credits. These will play a critical role in increasing domestic production for energy products.

President Biden included support for using the Defense Production Act to ensure robust supply chains for transformers, which would allow us to move forward if and when DPA appropriations are made to increase production capacity, support workforce training, among other efforts.

And my own Office of Electricity is stewarding the research and development necessary to foster the next generation of American-made transformers that are flexible, adaptable, and rely less on insecure materials and supply chains.

So thank you again for this opportunity to speak with you. I know that each and every one of us in this room -- every one of us share the same goal of ensuring the reliability of the power grid for the American people.

With that in mind, I am pleased to answer any questions that you may have that would assist you in your deliberations on the legislation at hand.

Thank you.

[The prepared statement of Mr. Rodrigues follows:]

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Mr. Duncan. Assistant Secretary, thank you for that.

And we will now recognize Dr. Ortiz for 5 minutes.

STATEMENT OF DR. DAVID ORTIZ

Dr. Ortiz. Chairman Duncan, Ranking Member DeGette, Chair Rodgers, Ranking Member Pallone, and members of the subcommittee, thank you for the opportunity to testify today.

My name is David Ortiz, and I am the Director of the Office of Electrical Reliability of the Federal Energy Regulatory Commission.

I am here today as a commission staff witness, and my remarks do not necessarily reflect the views of the Commission or any individual commissioner. My testimony summarizes the Commission's oversight of the reliability of the bulk power system and recent Commission activity implementing that authority. I then address draft legislation, referred to as the Guaranteeing Reliable Infrastructure Development Act, or GRID Act.

In the Energy Policy Act of 2005, Congress amended the Federal Power Act to add section 215, pertaining to bulk power system reliability. Section 215 requires the Commission to select an electrical reliability organization that is responsible for proposing, for Commission review and approval, reliability standards to help protect and improve the reliability of the Nation's bulk power system.

The chairman's reliability priorities are protecting the grid from cyber and physical attacks, preparing for extreme weather, and ensuring reliability as the resource mix

changes. I would like to highlight a number of FERC's recent activities in this area. Since 2008, FERC established and then improved upon the set of critical infrastructure protection, or CIP standards, which include a comprehensive baseline set requirements for cyber and physical security.

In January, we finalized a rule requiring NERC to develop enhanced cybersecurity standards regarding internal network security monitoring. There has been a mandatory physical security reliability standard since 2014.

In December, FERC directed NERC to conduct a study evaluating the efficacy of that standard. NERC submitted the required study in April. FERC and NERC hosted a joint technical conference on physical security in August. And, after receiving and reviewing post-conference comments, FERC will determine appropriate next steps.

Since 2011, seven major heat and cold weather events put stress on the bulk power system and resulted in some degree of load shedding. In August 2021, FERC approved modified reliability standards pertaining to cold weather preparedness for electric generators and requiring that system operators exchange information related to the generator's capability to operate under such conditions.

In June, the Commission issued a final rule directing NERC to submit proposed new or modified reliability standards that require transmission providers to prepare for extreme heat and cold weather events.

The changing resource mix has also presented a number of reliability challenges. In particular, the growth of inverter-based resources requires a rethinking of the way the interconnected electric grid has been planned and operated for more than a century.

In a November notice of proposed rulemaking, FERC proposed to direct NERC that NERC develop new or modified reliability standards that address reliability gaps related to

inverter-based resources, including data sharing, model validation, planning and operational studies, and performance requirements.

Turning to the GRID Act, the GRID Act would establish a process that triggers mandatory FERC review and comment on certain covered agency actions. The proposal could pertain to a wide variety of proposed Federal agency actions that potentially impact bulk power system operations. Therefore, it is difficult to anticipate the range of covered agency actions that could trigger FERC review and comment.

As a general matter, FERC and the ERO, NERC, have the necessary expertise to understand and comment on the potential effect of proposed regulatory actions on the reliability of the bulk power system.

However, fulfilling the goal of the GRID Act would require detailed interconnection wide modeling analysis beyond FERC's capabilities. Further, FERC may not have the underlying data or authority to obtain such data necessary to conduct a meaningful assessment of the proposed action's impact on the grid.

Other organizations have these capabilities, resources, and data. The Department of Energy's national laboratories have deep expertise in the electric transmission system and its underlying technologies, computing power, policy expertise, and related sciences, and are well-positioned to engage with agencies to evaluate the reliability impact of proposed actions.

In conclusion, FERC will continue to work with the utility industry to execute its responsibilities under section 215 of the Federal Power Act to protect and enhance the reliability and security of the electric grid. Further, with regard to proposed GRID Act, FERC stands ready to serve and assist to the best of its ability in this manner.

Thank you for allowing me to testify today. I would be glad to address any

questions you may have.

[The prepared statement of Dr. Ortiz follows:]

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Mr. Duncan. I want to thank both of our witnesses or panelists for their opening statements.

We will now move into the question and answer portion, and I will recognize myself first for 5 minutes.

We continue to be warned of the risk of a looming reliability crisis here in the United States. Earlier this year, during a Senate Energy and Natural Resources hearing, the head of the North American Electric Reliability Corporation stated he agreed that United States is headed for a reliability crisis. During the same hearing, the CEO of PJM stated he agrees there is an increasing risk of reliability crisis.

This summer, the FERC commissioners testified in front of this subcommittee where the same concern was raised. Commissioner Danly went so far as to say there will be, in time, a catastrophic reliability event.

Dr. Ortiz, NERC's "Reliability Risk Report," released in July this year, reflected these concerns. It specifically identified energy policy as one of the biggest threats to reliability. NERC has clearly stated there is a problem.

Do you concur with their findings, and is FERC obligated to take action on this looming threat?

Dr. Ortiz. Thank you for the -- thank you for the question, Chair Duncan.

The Reliability Issues Steering Committee issues a periodic report, biennial report, that delineates key risks that the ERO -- that NERC then establishes a plan by which it will address. The Reliability Issues Steering Committee report issued included, as you noted, the risk of energy policy as a factor potentially affecting electrical reliability.

By energy policy, they meant that the changing resource mix could have impacts

primarily on resource adequacy throughout the country. This is a matter of fact that has been established by several of the independent system operators that have also addressed this -- that have also made -- have expressed their concerns regarding resource adequacy as well.

So I would agree that, from the perspective of NERC's report, that energy policy, in so much as it affects resource adequacy, is a potential reliability concern.

Mr. Duncan. The NERC report cites several factors contributing to this looming resource adequacy crisis. Price distortion in the wholesale markets caused by subsidies and unrealistic environmental regulations contribute premature retirement of reliable generation assets.

My bill, the GRID Act, would require coordination between FERC and the Federal agency that proposes regulation that would threaten the grid reliability.

Do you think that there are Federal regulations that threaten grid reliability?

Dr. Ortiz. Based on your opening comment, Congressman, I presume you are talking about the section 111(d) proposed rulemaking from the Environmental Protection Agency. Is that an example of the kind of rulemaking that you are --

Mr. Duncan. Yes.

Dr. Ortiz. -- concerned about?

So, for proposed rulemakings like that, the -- you know, there is -- you know, it is -- for -- whenever there is a proposed rulemaking, the actual outcome is fundamentally uncertain.

The EPA, in its own reliability impact or its own technical analysis, acknowledges that the rule is likely to result in increased retirements of resources. And then it also projects that certain replacement resources will also be made available. Each of those

outcomes is uncertain. The degree to which that there are retirements of resources on its face raises a reliability concern that merits some consideration.

Mr. Duncan. Shift gears here.

The consequence of these policies and premature retirements are even more concerning considering the constraints on our natural gas supply due to lack of infrastructure. Lack of pipeline capacity significantly hurts States like South Carolina.

Do you agree, Dr. Ortiz, that expanding interstate natural gas infrastructure is critical for reliability?

Dr. Ortiz. I will provide a brief answer, and then, if it would -- if it would please the chair, I would be happy to take it -- take that question back, because the interactions between the gas system and electric system are incredibly complex.

The Commission had -- has hosted two New England Gas-Electric Forums. In New England, there is an acute interaction independence on the gas system. Obviously there is a dependence on the gas system for electrical reliability throughout the country, but New England is particularly acute.

And what we have found is that the interactions between those systems are incredibly tight. And so increased gas capacity is something that is likely going to be needed for the additional gas capacity that is likely to be online.

Mr. Duncan. Essence of time -- in the essence of time, I will just stop you right there, because I ask you to stay for the second panel. We are going to delve into events like the December 24th event that happened in South Carolina all the way through the Ohio River Valley. We will talk about Texas. We will talk about the need for dispatchable energy and where some of the shortfalls were with the generation mix you have mentioned earlier.

So I will conclude saying that there is no substitute for reliable dispatchable generation. I hope we all can recognize that and work together.

And, with that, I recognize the -- Ranking Member DeGette for 5 minutes.

Ms. DeGette. Thank you very much, Mr. Chairman.

Dr. Ortiz, you were just talking to the chairman about the 111(d) rule. That is a draft rule that has not been finalized. Is that correct?

Dr. Ortiz. That is correct.

Ms. DeGette. And is the comment period still open for that?

Dr. Ortiz. I believe the comment period is closed.

Ms. DeGette. Okay. But -- so what will happen now is the agency will take all of the comments and then come up with a final rule, which has not yet been released. Is that right?

Dr. Ortiz. It has not yet been released.

Ms. DeGette. Yeah. But H.R. 4167 would stop all of that, because it would just simply delay everything for 5 years. Is that right?

Dr. Ortiz. Which -- I am -- I am not familiar with the numbers.

Ms. DeGette. It is the 111(d) rule.

Dr. Ortiz. Oh, it is the GRID Act?

Ms. DeGette. Uh-huh.

Dr. Ortiz. The GRID Act --

Ms. DeGette. I don't need you to describe --

Dr. Ortiz. Oh, okay. All right.

Ms. DeGette. What I just need to say, it has a 5-year delay, right?

Dr. Ortiz. No, I don't believe it does.

Ms. DeGette. That is not the one that has the 5-year delay?

Dr. Ortiz. No.

Ms. DeGette. Okay. Mr. Rodrigues, President Biden invoked the Defense Production Act to increase the domestic production of distribution transformers. Is that right?

Mr. Rodrigues. That is correct.

Ms. DeGette. And that is because we are all concerned about the transformer supply chain issues. Is that right?

Mr. Rodrigues. That is correct.

Ms. DeGette. And we have -- in the Bipartisan Infrastructure Law and Inflation Reduction Act, there are rebates and tax credits available that would aid investments in the electric grid components. Is that right?

Mr. Rodrigues. That is absolutely correct.

Ms. DeGette. Now, in your testimony, you mentioned that DOE is working with Federal partners to find actions and resources to alleviate the problem.

Can you talk very briefly about what actions and resources that DOE has identified?

Mr. Rodrigues. Yes. We are actually working on two paths, one using the authorities and granted to us now. We are trying to see what creative and aggressive approaches we can take to do anything and everything that will assist in the manufacturing and delivery of distribution transformers. That includes -- gosh, there is a whole host of things. Let me give you two quick examples.

One is a convening of industry, which is the manufacturing sector, and the utilities to work together to find ways to take some of the chokepoints away. And the other are

direct action by my sister office, MESC, which is doing stuff like helping to connect manufacturers with hard-to-source products, helping them to apply for the 48(c) grants, $10 billion of tax credits available, and $10 million of direct rebates for efficient transformers.

So much more, but those are good examples.

Ms. DeGette. So do some of these efforts take additional money than the money that was -- that came out through the infrastructure law and Inflation Reduction Act?

Mr. Rodrigues. To be perfectly frank, the answer to that is yes.

Ms. DeGette. And so, if Congress gave you additional funds that you needed to improve this situation, what additional steps or actions could you take?

Mr. Rodrigues. We have been working behind the scenes to be prepared. If and to the extent Congress sees fit to give us additional appropriations under the Defense Appropriation Act, what we will be doing is working directly with American manufacturing industry and American labor to help them to increase their production capacity.

That goes to three elements. Number one, helping them to get -- secure and retain the labor necessary work; number two, upgrading American manufacturing facilities to help them produce more product efficiently; number three, the Defense Production Act appropriation would allow us to find ways to work to get not just the supply side, but the demand side -- utilities working together to find ways to, quite frankly, streamline the design process for transformers, which will increase throughput.

Ms. DeGette. So, if we are able to fix these supply chain issues, then that is going to help increase reliability dramatically. Is that right?

Mr. Rodrigues. Absolutely. Dramatically might even be an understatement.

Ms. DeGette. Thank you. I yield back.

Mr. Duncan. Gentlelady yields back.

And I will now go to Dr. Burgess for 5 minutes.

Mr. Burgess. Thank you. And thanks to our witnesses for being here.

Dr. Ortiz, thank you for referencing the Energy Policy Act of 2005, one of the first pieces of legislation on which I was able to work on this committee back in the day.

It has been -- it has been an enduring piece of legislation. You referenced the reliability part. Of course we were just coming off of the 2003 power outage in the northeast, so it was on a lot of people's minds that that would be important. So we do need to keep in mind a lot of the policies that we make are enduring, and they do persist over time.

So, Dr. Ortiz, back home in Texas, it was in all the papers, but we have had a real hot summer. Not really a surprise, because Texas is supposed to be hot during the summertime, so the -- part of the blessing there is it generated a lot of solar power with the intense rays of the sun coming down. So that was a good thing.

The same time, every afternoon, like clockwork, the sun would go down. And, when the sun set, the power component from the solar panels dropped. And, I mean, this is just physics. It is not a surprise. It shouldn't have alarmed anyone. But that is also the point at which people are getting home from work and realizing this house is hot as Hades, and I am going to crank the AC down, which then put additional strain upon the grid.

So there were several -- probably ten or eleven warnings that ERCOT, the Electric Reliability Council of Texas, issued because of getting dangerously close to that supply-demand part of the curve where -- where I guess some bad things happen if the

lines cross.

So we saw that in one State, but are there concerns on the national level, more and more dependence upon renewables, wind and solar, sometimes not the highest degree of reliability, or sometimes predictable that there is going to be a drop-off after sunset?

Is there anyplace where that has affected Federal policy, and do we need to be concerned about the Federal policy that has incentivized the industry to invest in renewables at the expense of more reliable generation?

Dr. Ortiz. I only have 2 minutes and 28 seconds, sir, but I will be as brief as I can.

So what you are -- I think you correctly noted that, you know, solar and wind and other resources that have come online are predictable in many ways. But, you know, as you said, the sun does go down. You are not going to dispatch any -- a solar facility at nighttime.

And the impact that those resources have with respect to reliability has to do with the requirement, then, to ramp in the evening. There has always been an evening ramp. People would always come home and then turn on their appliances and do things. So that is nothing new. But the scope and scale of that ramp has become much more significant.

And this is most profound in California where -- you know, where it is known affectionately as the duck curve. But PJM has noted that they are going to have a 70-gigawatt ramp sometime in the next -- I think in 2035 is their projection. As a point of reference, the total load in PJM last week on a couple of the hot days was about 140 gigawatts, so that is half of the load on a hot day coming up on -- in the course of several hours.

That puts an incredible strain on primarily the flexible resources that are able to meet that, and that is natural gas capacity. That kind of ramping -- and that is why I kind of hesitated on my response to the chairman's question -- puts a different kind of strain on the pipeline and gas system than just having, you know, baseload plants. It is a much more comparable --

Mr. Burgess. I am going to run out of time, so I do need -- I hate to interrupt you --

Dr. Ortiz. Yeah.

Mr. Burgess. -- because I like where you are going with this, but we have done a lot as far as tax credits for wind and solar when they were in their infancy. But is it not now time -- those industries have matured. Is it not now time to withdraw or to dial back some of those subsidies in the Tax Code to allow for the production of more reliable forms of energy?

Dr. Ortiz. So I can't speak to, you know, subsidies and items like that. I will say, though, that wherever you have a significant amount of this happening at the distribution level with consumer choice, you are going to see this. So it isn't just a Federal set of issues. It very much goes down to State-level policies as well.

Mr. Burgess. So you propose eliminating consumer choice. Is that your answer?

Dr. Ortiz. I didn't say that. Actually, I said that, wherever you have consumers making these choices, then you have these -- this magnitude of items -- you know, you have the potential for this occurring.

Mr. Burgess. I will submit some other questions in writing.

Thank you --

Dr. Ortiz. Okay.

Mr. Burgess. -- Mr. Chairman. I will yield back.

Mr. Duncan. I thank the gentleman from Texas.

I will now go to the gentleman from California, Mr. Peters, for 5 minutes.

Mr. Peters. Thank you, Mr. Chairman, for hosting this hearing on electric reliability.

Just to Mr. Burgess' point on subsidies, I actually do philosophically agree on subsidizing industries in their infancy. We should also look at the oil and gas industry and the subsidies that we give them, and I am happy to start up a conversation that includes all the mature energy industries if we want to go down that road.

I do say, in terms of electrical reliability, that we still aren't talking about, in terms of keeping the lights on and reliability, the important topic of electric transmission and building a modern, interconnected electric grid.

A few months ago, we had the opportunity to improve the reliability of our electric grid by including transmission reforms -- specifically, our BIG WIRES Act -- in the debt ceiling agreement. And I think, in good faith, some of my colleagues said they weren't familiar enough with that issue and wanted to study it more, and that we would study it in this term in the Congress in the committee.

Even though there have been six recent studies showing that -- the need and benefits of interregional transmission, that is fine. Unfortunately, we don't seem to have that on the hearing schedule yet, and we are not considering legislation on expanding transmission, even as the risks continue to increase.

Just last week, the Electric Reliability Council of Texas entered emergency operations due to a record-breaking heatwave. A study in July found that the heatwave

combined with the grid failure in Phoenix -- I think Ms. DeGette mentioned this -- could kill thousands of people and send half the people in the city to the emergency room. In early 2023, Winter Storm Elliott caused blackouts across North Carolina and Tennessee, which could have been avoided if available power in the Midwest was able to be diverted to the region.

Since 2014, North America has built or is near building just seven gigawatts of high-capacity interregional transmission lines, less than half of that in the United States. This comes as top reliability experts warn of insufficient transmission for large power transfers. By comparison -- so North America had seven. We are -- United States, about three.

South America has built or is nearing building 22 gigawatts; Europe, 44 gigawatts; and China, 260 gigawatts worth of high-capacity interregional lines, compared to our three or four in the United States.

Between 2016 and 2018, China has started and completed a single line over 2,000 miles long capable of carrying 12 gigawatts, nearly twice the build of the entire North American continent over a period several times as long. We gotta get our act together here.

Our lack of interregional transmission infrastructure is a threat to our economic and national security, and it is imperative that this committee take it seriously.

Mr. Ortiz, I want to ask you how -- what your feelings are and how important a robust transmission network is to enhancing reliability and keeping the lights on for the American people?

Dr. Ortiz. Thank you for the question, Congressman.

Transmission is, quite literally, the backbone of the grid, and the recently

published DOE Transmission Needs Study concluded that there is tremendous needs for transmission for a number of reasons -- replacing capacity -- I mean, replacing aging equipment, as well as interconnecting resources, among other benefits. I would turn it to the DOE for more --

Mr. Peters. Right. Not just about expanding capacity, but more reliability, more security on a better grid.

Can you tell us: In terms of equipment, what about distribution transformers? How could we best address this shortage we are seeing in that? Mr. Ortiz, or whichever you think? Mr. Rodriguez?

Mr. Rodrigues. The end state that we need is more investment in American manufacturing of the materials, components, systems, and the transformers themselves. And we are working along that timeline.

But, in the near term, what we need to be doing is focusing on practical solutions that will reduce the strain on the supply chain. So that includes working with industry, as we are doing now, to have the power sector find ways to better share the supplies they have and to reduce the number of one-off type of signs, but also working with the manufacturing sector to help them to, quite frankly, make investments for a 21st century manufacturing process in this country.

Mr. Peters. Can we expect -- and I hope we can -- that the work you are doing will result in recommendations for Congress to take whatever action we need to support that effort?

Mr. Rodrigues. I cannot foresee whether it will wind up with recommendations to Congress specifically, but they are focused on practical solutions. My intent is to make sure that, if Congress should be involved, it will be involved.

Mr. Peters. Thanks. I hope you will let us know if there is something we could do.

And, Mr. Chairman, my time has expired. I yield back.

Mr. Burgess. [Presiding.] Gentleman yields back. The chair thanks the gentleman.

Chair now recognizes the chairwoman of the full committee, Ms. McMorris Rodgers, for questions.

The Chair. Thank you, Mr. Rodrigues and Dr. Ortiz.

You know, I am very concerned about the state of our Nation's electric grid. And we see electricity prices continuing to skyrocket since the beginning of 2021, almost 30 percent higher today. Our electric grid is becoming increasingly unstable. NERC has issued warnings that two-thirds of the Nation is at an elevated risk for a blackout as our most reliable and affordable power plants are being retired and replaced with weather-dependent wind and solar.

In 2023, EIA projects that 15.6 gigawatts of baseload generation will be shut down, which is enough electricity to power more than 10 million homes.

So, first, Mr. Rodrigues, do you agree that baseload power plants' retirements pose a threat to grid reliability?

Mr. Rodrigues. I apologize for the way I need to answer this, but, in and of itself, retirement of power plants does not pose a threat. I believe the point of agreement between us is that, if things aren't done in a thoughtful, deliberative fashion, you can cause reliability concerns around the ability to have power delivered at the time we need it.

The Chair. Right. Well, it suggests that it is not being done in a thoughtful

manner, then, because it seems that we are shutting down baseload, and reliability is absolutely being jeopardized.

Mr. Ortiz, has FERC been allowed -- has FERC been asked to model the impact of baseload power plant closures on the electric grid?

Dr. Ortiz. Not to my knowledge, no.

The Chair. Okay. And another question, Dr. Ortiz: Are intermittent wind and solar generation reliability sources of electricity during extreme weather scenarios when demand -- oh -- are there -- is there reliable sources of electricity during extreme weather scenarios when demand for power is spiking?

Dr. Ortiz. I am sorry. Could you repeat the question, Congresswoman?

The Chair. Are intermittent wind and solar generation reliable sources of electricity during extreme weather scenarios?

Dr. Ortiz. If I may, I would prefer to take that back to be able to look more closely at the data.

The Chair. Okay. Mr. Rodrigues, I look forward to hearing back just what your analysis is as far as being dependent upon wind and solar when we have these extreme weather events.

Okay. Mr. Rodrigues, under President Biden, DOE has been moving aggressively to regulate dozens of home appliances that we all rely on to cook for our families, wash dishes, heat our homes. And, yet, these regulations are really like a hidden tax. It is raising the cost of appliances. Unfortunately, we are seeing some weakened performance, eliminating choices like natural gas stoves, for example.

So yes or no: Would you support an amendment to the law to prohibit energy standards that increase costs for consumers?

Mr. Rodrigues. The phrase increase costs to consumers is, quite frankly, a difficulty for me, because, like any investment that you make that has a return year after year after year after year, if we look at a truncated, what is the first cost, then there would -- probably no purchase that any American would make. I think the better view is to take a look at the lifecycle costs, but the lifecycle benefits as well.

The Chair. Okay.

Mr. Rodrigues. Because that is what really helps Americans to reduce their energy bills.

The Chair. Okay. Do you believe American consumers should pay more for a dishwasher, for example, to offset the social costs of carbon emissions or the global effects of climate change?

Mr. Rodrigues. I believe the American people should and actually enjoy the fact that there are products available that, while they might cost a little more at the outset than old, dated technology, they save them money every year, every time -- every time the lights go on, every time you wash your clothes.

That is --

The Chair. Thank you. --

Mr. Rodrigues. -- a financial reservation.

The Chair. Thank you. As a follow up to that, then, does DOE plan to look back on any of the prior standards to see if they have actually saved consumers energy and money?

Mr. Rodrigues. We actually have done that. And, as a matter of fact, it is one of the great American success stories. The amount of money saved by consumers is only half the story, though.

The fact that we are reducing the amount of energy consumed means that it makes available resources that we have today more able to meet the needs of the American people.

The Chair. Thank you.

Mr. Rodrigues. So it is a reliability --

The Chair. Thank you. I would like to look at that.

Mr. Rodrigues. -- aspect as well.

The Chair. I would like to look at that. Thank you.

Do you have any idea how many of name-brand American appliance manufacturers have actually been bought by China in the last nearly 20 years since this requirement put into place?

Mr. Rodrigues. I know there are people in our Department who look at that. I do not have that information with me today. I could look that up.

The Chair. Thank you. I was a little surprised that my GE microwave is actually Chinese owned.

I yield back, Mr. Chair.

Mr. Duncan. [Presiding.] Gentlelady yields back.

I now go to, I guess, Ms. Matsui, 5 minutes.

Ms. Matsui. Thank you very much, Mr. Chairman. And thank you very much for this hearing today.

Make no mistake, we are facing a serious shortage of transformers in this country. This shortage is threatening the reliability of our grid and delaying the clean energy transition.

However, H.R. 4167, the Protecting America's Distribution Transformer Supply

Chain Act, is not a serious solution to this problem.

Mr. Rodrigues, the Department of Energy has been working with industry stakeholders for over 2 years to address the transformer shortage. Yes or no: Would H.R. 4167 increase the supply of transformers in this country?

RPTR SCHOETTLE

EDTR ROSEN

[10:59 a.m.]

Mr. Rodrigues. My assessment is no, it would not increase the supply.

Ms. Matsui. Okay. That is right. This bill would prevent DOE from finalizing new efficiency standards for transformers. It does nothing to address the current shortage of transformers. To address the transformer shortage, we need to incentivize new domestic manufacturers of transformers here in the United States. And you wrote about this in your testimony, but you didn't mention the Protecting America Distribution Transformers Supply Chain Act.

Yes or no, does this bill do anything to incentivize American manufacturing?

Mr. Rodrigues. It does not.

Ms. Matsui. Okay. Would the bill create American jobs or train the skilled workers necessary to produce transformers in this country?

Mr. Rodrigues. As currently drafted, it does not.

Ms. Matsui. Energy efficiency is also an invaluable tool for preserving grid reliability. LEDs, for example, use 90 percent less energy than incandescent bulbs. This reduces peak energy demand and helps utilities to keep the lights on when electricity is most needed.

Dr. Ortiz, yes or no, over the last 15 years, U.S. demand for electricity has been relatively flat, has it not?

Dr. Ortiz. According to the Annual Energy Review published by the Energy of Information Administration, electricity demand has been relatively flat.

Ms. Matsui. Okay. Over that same period, though, real U.S. GDP has grown by more than 130 percent. How did U.S. demand for electricity stay flat, and what role did efficiency play in that?

Dr. Ortiz. I'm not -- Congresswoman, I'm not an expert in this area, but among the factors reported by EIA for this growth in -- I don't know exactly the term -- but for that effect, efficiency is one component.

Ms. Matsui. Okay. Thank you. Mr. Rodrigues, yes or no, have DOE efficiency standards reduced electricity demand?

Dr. Ortiz. Yes, it has.

Ms. Matsui. Okay. Mr. Rodrigues, yes or no, have DOE efficiency standards contributed to reducing peak electricity demand?

Mr. Rodrigues. Yes, it has.

Ms. Matsui. Mr. Rodrigues, in reducing peak demand, have DOE efficiency standards continued to making the grid more reliable?

Mr. Rodrigues. Yes, it does.

Ms. Matsui. Okay. Thank you. Energy efficiency standards have a long track record of success in saving Americans money, and resistance to these standards is nothing new. When Congress enacted new standards for light bulbs in 2007, there was an industry-led outcry, but how would inflate costs for consumers. Fifteen years later, the cost of energy efficiency bulbs has plummeted, and the average household can save over $200 per year by switching the LED lighting.

Mr. Rodrigues, can you talk briefly about the switch to LED lighting, and how the post-2007 efficiency standards helped save consumers money?

Mr. Rodrigues. I absolutely can and would be proud to. The switch from old

incandescent lighting to LED lighting has benefited Americans in many ways. These bulbs use 90 percent less energy than old technology and last up to 25 times longer and have other features that make them, quite frankly, a better fit in anyone's home or business.

The DOE, according to our analysis, expects consumers to have saved about $3 billion -- $3 billion in annual electricity bills over old technology. That breaks down to about $225 in energy cost reduction per year for every American home by using LED.

Ms. Matsui. Okay. Thank you. The bills we are considering today are premised on the misguided idea that DOE efficiency standards are unfeasible and unjustified. The Appliance and Equipment Standards Reform and Consumer Protections Act specifically prohibits DOE from issuing efficiency standards that are not technologically feasible and economically justified. It seems reasonable.

However, Mr. Rodrigues, you point out in your testimony that DOE is already prohibited by law from prescribing standards that are not technologically feasible and economically justified. Is that correct?

Mr. Rodrigues. That is absolutely correct.

Ms. Matsui. Okay. Thank you very much. And my time has expired. I yield back.

Mr. Duncan. [Presiding.] The gentlelady's time has expired. I will now go to Mr. Latta from Ohio for 5 minutes.

Mr. Latta. Thanks, Mr. Chairman. And thanks to our witnesses for being with us today.

As I have traveled across my district and met with electric utilities and cooperatives, a prime issue that has been raised is the supply chain crunch over the

distribution of transformers. Since the COVID-19 pandemic, the lead time for procuring new transformers has only gotten worse. This means that in the event of an emergency, utilities will have a harder time maintaining or restoring continuous power to their customers. They don't have an adequate supply of replacement transformers.

Additionally, many utilities are second-guessing the agreements they have made with other localities that are in need of transformers due to their own fears of being impacted by this crunch. That is why it is baffling to me to see the Biden administration put out new efficiency standards that would make the supply chain crisis worse.

This new standard would leave us with no domestic producer electrical steel for EVs, no producer of electrical steel for power transformers, and a distribution transformer market reliant on one producer that doesn't have enough capacity to meet the current demand. You know, thankfully we are considering legislation that would restore common sense to this process and delay the implementation of this new standard. I'm proud to be a cosponsor of the H.R.4167.

In listening to the testimony, before I get into my other questions, I would like to just ask a question I have asked before: With the administration looking at the year 2035, saying that the United States should be totally reliant on EVs in this country, by 2035, we are going to need more power or less power in this country? If I could just get a yes or no answer from both of you.

Mr. Rodrigues. All projections that I have seen and read state that as we continue to move forward and advance in America, we are going to need more power.

Mr. Latta. Thank you.

Dr. Ortiz. I concur.

Mr. Latta. Thank you. So you both agree we are going to need more power.

Assistant Secretary Rodrigues, your office is tasked with ensuring the reliability of the Nation's security grid. Given the challenges facing our country's electric grid, including the age of most of the grid's infrastructure, the ever-increasing demands and supply chain challenges, and distribution transformer lead times, why would DOE propose a new energy efficiency rule that put domestic steel manufacturers who are critical to ensuring an adequate supply of transformers out of business?

Mr. Rodrigues. There is a two-part response to that. Part one is, we are mandated through legislation and a consent decry ordered by the court to take up the rule. The second part, which really gets to the heart of what you are asking is this: What the DOE is doing is not just complying with these mandates, but actually putting signals in the market that give certainty to manufacturers so that they can make the investments necessary to develop the products and services right here at home using American labor to supply and meet America's needs.

Mr. Latta. You know, it is by coincidence, in the last several hours, I had some meetings with some power generators and distributors in the State of Ohio. And just by coincidence, one of them mentioned this, and it is a very interesting fact, this is what they are looking at, of a 12 MVA substation transformer. In 2019, the county that they needed to put it in was $395,000. That same transformer today that they need to put in another county is $863,000, so in a 4-year inflation rate of 21.6 percent.

So you know, again, when we are looking at these things -- in Washington, these things come out and it is pretty easy when they write a regulation or rule, but these are facts that actually affect people back home. Because the next thing, who is going to pay for this? It is going to end up, it is going to be the consumer out there, and it is going to make it harder for people to heat their homes, cool their homes in the summertime. So

I really worry about that.

Dr. Ortiz, in my last about minute here, ever since the recent high profile physical attacks on power substations across the country, I am very concerned about the security and reliability of these assets as bad actors at home and abroad seek to take advantage of the United States vulnerable energy infrastructure, we must ensure that our grid is protected, and we keep the lights on for Americans.

What is FERC doing to specifically address direct threats to distribution substations?

Dr. Ortiz. Thanks for the question, Congressman. I will be quick. With respect to attacks on distribution substations, the Commission has an office of Energy infrastructure Security that engages directly with States regarding best practices for security. I do not direct that office, but would be happy to take questions back and work with my colleagues to provide a full response.

Mr. Latta. I would appreciate that, because this is something that the chairman of our subcommittee led down to North Carolina that we were at and had a very good hearing down there. But this is a real threat to your infrastructure, but in also making sure that electricity gets out to the public. So thank you very much to our witnesses, and Mr. Chairman, I yield back.

Mr. Duncan. Gentleman yields back. I will now go to Mr. Tonko for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair, and thank you to the ranking member for hosting this hearing. And I thank both of our witnesses for their testimony.

Secretary Rodrigues, I want to make certain I understand this connection between grid reliability and energy efficiency. As you indicated in your testimony, the proposed efficiency improvements for transformers may seem small, but when you consider nearly

all of the electricity generated in the country passing through transformers over the course of the long lives of this equipment, we are talking about a lot of lost energy; is that correct?

Mr. Rodrigues. That is absolutely correct.

Mr. Tonko. And as we have seen this summer, certain regions have struggled to maintain reliability for several reasons, including, perhaps, extreme heat and weather events. So we know these types of events coupled with increasing electrification if not properly planned for will create greater stresses on the grid in the years ahead. Is that correct?

Mr. Rodrigues. That is absolutely correct.

Mr. Tonko. So Secretary Rodrigues, how can reducing inefficiencies in the electricity system, whether that is line losses or transmission lines, or losses from transformers help improve overall reliability?

Mr. Rodrigues. Your question actually is perfect because it shows a system understanding of the grid. Number one, it is how much power you need to produce, but how much power you need to produce at any point in time is driven by two things: Number one, how much is being consumed? And that is where efficiency standards help Americans with their pocketbook, but also help to support the reliability of the grid because it helps to ensure we have adequate resources.

Number two, along the way, the grid itself transports energy over long distances. Advancements in technology that we are working around in my office will help to reduce line losses, meaning less wasted energy in the transport from where it is generated to where it is delivered. All of these things -- all of these things support resource adequacy.

Mr. Tonko. Thank you. And ultimately, if we only have one tool by which to manage the grid and it is cranking up supply, of course it will be more difficult to balance a dynamic and complex system, but when we start addressing energy demand through end-use efficiency and demand response programs, writing more tools to our reliability toolbox as you indicated. And similarly improving the grid's performance is another important tool to alleviate pressure on the grid. So I believe it is very shortsighted to prevent the Department from finalizing any transformer rule in the next 5 years.

Personally, I believe we should embrace this as an opportunity to begin to plan for, and build the grid of the future with equipment that will enhance -- enhance reliability, and because DOE's proposed rule would not go into effect for several years, there is time to build the investments necessary to build the domestic manufacturing supply chain. And we have already given DOE some tools to help. For example, the Inflation Reduction Act includes the 48(c) tax credit, which could be used to improve and expand transformer and electrical steel manufacturing.

Secretary Rodrigues, can these incentives help ensure domestically reduced, high-performing grid equipment is ready and available by the time any proposed standards goes into effect?

Mr. Rodrigues. Yes, they can, and they are doing that.

Mr. Tonko. Well, I thank you for your responses. And you know, I believe that we need to do this in a very science-based and evidence-driven manner, and I appreciate all the work done by the Department for implementing what is a huge transformational opportunity for this country.

With that, Mr. Chair, I yield back.

Mr. Duncan. Gentleman yields back.

I will now go to Mr. Guthrie from Kentucky for 5 minutes.

Mr. Guthrie. Thank you, Mr. Chair. I thank the witnesses for being here. And I can assure you that everybody on this committee, if not everybody in Congress, knows how the grid works. We are fully understanding of that. And like Mr. Latta -- so he took some of my questions. I spent a lot of time back home. So we have two big taxpayer payer subsidized battery plants coming into my district. So I know companies got their battery plant subsidized, but a lot of people around them didn't.

And so, our frustration is this, I have said it before, I said to your -- to Secretary Granholm, is every time we seem to bring up issues with going to all-electric vehicles that are real issues, that we just get dismissed away. Oh, you are just naysayers.

One matter a fact, one of our colleagues said that if dismiss this, you are just pro-Chinese. Said it at the last meeting, and I didn't think about it until I was leaving, and I wish I would have thought of it then because I would have said it when she was in the room, is if you are telling businesses what they have to build, and you are telling consumers what they have to buy, that is far more Chinese-like than what we are proposing on our side.

And so it is the concerns that we just dismiss everything away. The biggest part of it in my area in Bowling Green, Kentucky, there is a big battery plant -- we are glad that it is going to be built there -- but for it to even expand, it is going to have to increase our grid. TVA has already said that we are concerned about economic development in the area, and it just seems like so we subsidized the battery plant. And even if you have the smartest people in the room, they just think they are smartest, they are the smartest, you can't think of everything that has to be subsidized to make that work.

And so I can tell you some of the automotive companies, their suppliers need to

switch from internal combustion into -- matter a fact, they are telling them they need to do both: You have the electric and internal combustion because they are not sure -- obviously, the consumer doesn't dismiss all these issues and we have seen the Secretary, we have seen the chairman of Ford Motor Company try to drive electric cars, and they can't charge them. And so consumers look at that and go, why would I buy a car like that if the Secretary of Energy can't charge her car? And so, that was pretty negative, actually, to the electric car, what had just happened recently.

And so, the problem is, do you just as a country are we just going to subsidize everything? That is what we get to is -- to move forward. It is just really frustrating as we look forward. And then you see these rules that the hearing is about today coming down, and every one of my electric suppliers says their biggest issue is getting transformers. And then we have new rules. I know you are saying you think these aren't going to impact the distribution of those, but I can tell you people on the ground feel that way. They may not be in the room here in Washington D.C., but people who are trying to buy these and move these forward, who I think would be very valuable for you to listen to, really have concerns about where this is going. If you like to comment on that, I appreciate it.

Mr. Rodrigues. I apologize. My head was bobbing up and down. I absolutely agree with you. Talking to people on the ground is absolutely important, and that is why I personally and other members of the Department have been with, so far, the majority of the American distribution transformer manufacturers in their offices talking to them about what they are facing, speaking with every and every one of the power associations, EPRI, APPA, NRECA. We are working this in a way that has very practical implications. You all have the very difficult job of trying to figure out big policy

decisions.

What I am trying to do, and what the Department of Energy is trying to do, and what our sister agencies at the Department of Labor, Department of Commerce are trying to do is to work with people on the ground to find near-term solutions to lesson and alleviate this crunch that we are feeling, but also, build in long-term solutions so that we are not continually fixing the same problem over and over. That comes from grid modernization, and that also comes from the modernization on the components on the grid. Transformers being one of them.

Mr. Guthrie. You get to the point, though, if -- because this is kind of some of the problems with government subsidies. People chase subsidies. So they move to subsidies. And I appreciate what you said, that you are sending a signal that this is where we are going so people can long-term invest, but if you get to a point -- and I know people have told you that because you are testifying to that. And I absolutely believe you.

But I have heard differently from different groups and we are probably not talking to the same level of people, just people out moving forward. And what you fear, you get to the point a couple years down the road or a year down the road and you say, Well, this is really going to delay transformers. So we are going to suspend. We are going to waive -- that happens all the time here. And industry just doesn't know where to go when that moves forward. And I can tell you move from two thirds of all cars being EV in 9 years, which is -- everybody other than people in Washington think that is impossible, but people have to invest to that because that is the rule. And you get 2 or 3 years down the road, and you say that is not going to happen, we got to waive the rule or change the rule whatever.

It is just chaos. It is chaos in the investing community, and it costs money. It costs money and it costs people the ability to live productive lives because they are always chasing their -- so it is a real concern. And I know that you are concerned about it as well. And I just wanted to share that. He asked my questions. So I just wanted to share my concerns.

Mr. Rodrigues. Thank you. I will take that back. But please rest assured that the work of the Department of Energy is not about trying to take choices away from consumers. It is trying to give them more options, more choices for technologies, for products, for services that will actually save them money and help the reliability of the grid at the same time. We will do our darndest on that, and you have my commitment to that and to work with you all on that.

Mr. Guthrie. Appreciate it Secretary. I yield.

Mr. Duncan. Gentleman's time has expired. I will now go to Ms. Schrier for 5 minutes.

Ms. Schrier. Thank you, Mr. Chairman, and thank you witnesses. I would love to discuss the transformer shortage that every single utility in my district has experienced and is frustrated with. The transformer supply chain issues in consideration here today are having very real consequences for my constituents, power companies, businesses all over my 10,000 square-mile district.

As we have heard from my colleagues on both sides of this room, lacking access to transformers has forced utilities to delay projects, cancel projects. Really it is hampering security and opportunities for economic growth. This includes residential and commercial pursuits, like new affordable housing, or clean energy projects. It also makes existing infrastructure vulnerable in the case of storms and other emergency

events like wildfires, which have become more prevalent and will continue to be even more prevalent given the change in climate.

It even is impacting our ability to establish the network of EV charging stations as Mr. Guthrie was just referring to, that we are going to need in order to support so many more electric vehicles on the road. And these utilities, they are hard at work. They are repairing and reusing what they can. They are refurbishing old transformers. They are just scraping to get by.

And I want to give just a real-life example of the supply/demand mismatch. One public utility in my district described their current backlog of 50 kiloamp distribution in transformers. And while they have 28 transformers on hand, they have 208 transformer requests in the next 90 days alone. And they still have 490 units on backorder with very unpredictable delivery times. And that is scary.

In addition, transformers that the substations use to power whole blocks of the grid, the large-power transformers, are and have been in critically low supply. These take years to build, cost I believe hundreds of thousands to millions of dollars to build, require custom designs, and are produced by only a handful of manufacturers. A one utility in my district, it is 5 years of lead time for one of these.

Assistant Secretary Rodrigues, I know that your office is very familiar with the supply-chain issues surrounding large power transformers. Utilities take it upon themselves to develop these solutions in the industry like sharing spare equipment and lending crews in the midst of unexpected outages. At this time, I would really call this a crisis.

What is DOE doing to help facilitate initiatives like industry sharing, and what plans have you implemented to help us going forward?

Mr. Rodrigues. Thank you for that question. And as someone who has spent nearly a quarter of a century inside the utility, I share that ethic and that concern that keeping the lights on is the most important mission in the utility industry around this country. So as we work on this, I am going to expand my answer a little bit, because it is not just my office. It is not just the Department of Energy working on this. We have the National Economic Council, Department of Labor, Department of Commerce, including the National Institute for Standards and Technology.

All of the power associations working with us and DT manufacturers and also the manufacturer of -- the one U.S. manufacturer, grain oriented electrical steel. We are meeting. We are working together. And we are collaborating. Not just coordinating, but collaborating on solution sets. And I say solution sets because there is no one-size-fits-all answer for this issue. We are going to have to work through it. It is a roll-up-your-sleeves type effort.

So one thing we are doing is trying to inform better manufacturer design specification. So right now, as we sit here in this room, one of the things that we uncovered as we were working with utilities around this, because utilities don't all talk to each other at the same time, there are some 80,000 -- 80,000 different sets of design specs for distribution transformers. That doesn't make sense. And so the utilities are working with us as we speak. Their engineers are all working together to figure out what things we can bucket to try to allow more interoperability, interchangeability. Those are kind of near-term solutions. We are also designing more flexible large power transformers, and we are also working to help the utilities in their sharing processes. We are attacking it hammer and tongs every way we can.

Ms. Schrier. Thank you. I have like one second left. I thank you for that.

And just mention the Defense Production Act, which may be something to call upon, especially once you get this all streamlined in terms of design and flexibility.

Thank you. I yield back.

Mr. Duncan. Gentlelady yields back. I will now go to the chair on the Environmental Subcommittee, Mr. Johnson, for 5 minutes.

Mr. Johnson. Thank you, Mr. Chairman. And gentlemen, thank you for joining us on our panel today, lots of important things to talk about.

You know, by now it is obvious that we are headed for a grid reliability crisis in our country. The RTOs are telling us this. The power generating companies are telling us this. I don't have time here today to go through it all, but I am cochair of the House Coal Caucus, and we published this 18-page report. And Mr. Chairman, if it is okay, I would like to ask unanimous consent to enter this into the record.

Mr. Duncan. Without objection. So ordered.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Johnson. But it lays out warning after warning from the experts, and lists the onslaught of Federal regulation taking us to this point of a reliability crisis. It is a simple math problem. We are retiring baseload dispatchable generation too fast with no adequate replacement. It is unfortunate, actually, that instead of preserving our coal fleet and expanding our gas and nuclear assets, where instead we hear terms like efficiency standards and demand response.

Now, my friends, these are code words for telling Americans they need to use less energy. And usually, this means also decreasing their standard of living in order to do so. This just is not going to work. We are the greatest economy on the planet and our economy demands energy security. We simply can't address the myriad of environmental challenges by burdening the American people by telling them to use less electricity.

So Mr. Rodrigues, would you agree that with EV's data centers and widespread electrification on multiple fronts, that electricity demand is going to go up significantly in the next two decades?

Mr. Rodrigues. I believe electricity demand is going to go up.

Mr. Johnson. Okay. Great. So would it be accurate to say that even if we squeeze as much electricity efficiency as we can out of our country and economy, we would still have to build out new baseload-power-generating capacity to meet that increasing demand into the 2030s and well beyond?

Mr. Rodrigues. You and I are on exactly the same page. There is no one single bullet answer that fixes it. It can't just be efficiency. And that is why at the Department, we are working on things like carbon capture --

Mr. Johnson. Okay. So we are going to have to build out new capacity.

Next, Mr. Ortiz, you are the director of the FERC, Electric Reliability Office. And you have got your job cut out for you, ensuring our Nation's grid reliability is on your watch. I know you take that seriously, so I will be entering into the record a letter that one of your commissioners at FERC, James Danly, wrote to the EPA saying that when EPA proposed its new source performance standards rule, I quote, the EPA did not consult the commission. This was in regards to electric reliability impacts from their proposed rule.

Does it concern you, Mr. Ortiz, at all? Because you run the reliability office. Does it concern you that the EPA did not consult you and your commission on this proposed ruling?

Dr. Ortiz. Congressman, as you know -- oh, I don't know if you know, but there is an interagency review process.

Mr. Johnson. Well, I know. But are you concerned that one of your commissioners said that they did not consult FERC?

Dr. Ortiz. No, I am not concerned that --

Mr. Johnson. You are not concerned that FERC didn't weigh in? You have the reliability office so I would think that you would be concerned.

Dr. Ortiz. The question you asked was, are you concerned?

Mr. Johnson. Is it true that FERC wasn't able to adequately weigh in before the rule was proposed?

Mr. Ortiz. Agencies do not typically get into the business of developing rules in collaboration with other agencies.

Mr. Johnson. Well, that is a -- that is earth shattering because when a FERC commissioner says here that he wasn't consulted, nor his fellow commissioners, that

seems to me to be a breakdown. I mean, how are you supposed to ensure grid reliability, which is your job, how are you supposed to do that if you are not consulted about rules that are going to affect grid reliability? Are you willing to let the EPA claim they have your seal of approval amidst all this confusion?

Dr. Ortiz. I don't believe that the EPA has made that claim, sir.

Mr. Johnson. You don't think they have made that claim? They said they consulted with you, and your commissioners say that they haven't.

Mr. Ortiz. I would have to look more closely at their --

Mr. Johnson. All right. Well, please do that and get back to us because I think we need an answer from you, because you are responsible for grid reliability. I would like to hear back from you.

Mr. Chairman, I yield back.

Mr. Duncan. Gentleman yields back. I will now go to the ranking member, Mr. Pallone, for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman.

Director Ortiz, I want to ask some questions about how FERC could implement the GRID Act. This bill allows for FERC to review proposed Federal actions that are likely to have a significant impact on the bulk power system. It also allows for a State public utility commission to initiate a process that would require agencies to turn over detailed information on decisions to FERC, and for FERC to issue detailed comments to an agency on their proposed action.

You know there are 50 different State public utility commissions, and it is easy to imagine that one of them finds something it doesn't like in nearly any Federal rule of regulation, from basically any agency. So does FERC currently have the staffing

capability to make judgements on the impact of every Federal regulation or determination of the bulk power system, and if a State POC were to object to every Federal rule, does FERC have the capacity to provide detailed comments on each rule back to these agencies?

Dr. Ortiz. Thank you for the question, Congressman. Let me take up your -- a response through a couple of ways, and I think a more detailed response regarding how the commission may implement such legislation best for technical assistance. But, you know, there is a couple pieces. One is that determination piece. And, you know, the law is written as I think extreme electric reliability impacts, or no negative electric reliability impacts on the bulk power system. We would have to come up with a standard for that extreme reliability impacts in order to be able to implement effectively the rule.

And then reliability goes far beyond a resource adequacy analysis. It goes to broader interconnection-wide effects having to do with just the behavior of the system on a second-by-second basis. I have a very, very capable team of engineers, but I, you know, currently do not have the interconnection-wide models, nor some of the data that I think, at least personally, would be necessary to truly implement that. It is not to say that we couldn't build that capacity or engage with others to get it. So I mean, I think there is a number of technical implementation details. But you know, I think from the standpoint of the commission, if we were to be able to work those out, it would be feasible to implement the rule.

Mr. Pallone. Thank you. And then building on that, Assistant Secretary Rodrigues, it sounds like GRID Act could really stand in the way of DOE's work. How will this bill affect DOE's ability to meet statutory obligations and timelines for updating and

finalizing new standards?

Mr. Rodrigues. Thank you for that question. First, let me state that at the Department of Energy, we are absolutely -- we absolutely believe that interagency coordination is a good thing. However, as your question foretells, what the GRID Act does is by creating, quite frankly, a vague standard around a significant negative effect, we believe that the practical real-world impact will be State commissioned -- some State commission somewhere will take every single rule, every single proposal that comes before us and put it into this process. That will slow down and probably make it impossible for us to meet our legislative and court-ordered mandates, a timing for standards that we have on the list now. But more importantly, I think what it does is it delays improvements that actually help the American people by making the grid more reliable.

Mr. Pallone. I appreciate that. Now, let me ask you again, can you detail DOE's process for efficiency standards rulemaking? How does DOE engage with stakeholders in what is already factored into proposed rules? Isn't DOE already required to ensure rules are technologically feasible and economically justified?

Mr. Rodrigues. Absolutely that is the case. Though technologically feasible and economically justified are, in fact, we are legislatively mandated to go through that. But I think the most important part for every member here to understand is that we have not just a rigorous process, but a very deliberative process in which at every step of the way, DOE reveals its assumptions, its modeling, everything that goes into our consideration. And that is revealed to all participants, all stakeholders in the process, so that they can inform us their perspectives, their contrary analysis, et cetera.

The process grinds slow, but it ensures that every voice is heard, every perspective

the weighed, and in a deliberative fashion, so that the end result of a rule, whether a rule is propounded, amended, or decided that we don't have to make a change. It is done on the basis of not just DOE analysis, but everyone else's stakeholder analysis as well.

Mr. Pallone. Thank you. Thank you, Mr. Chairman.

Mr. Duncan. Thank the ranking member. I will now go to Indiana's Dr. Bucshon for 5 minutes.

Mr. Bucshon. Thank you, Mr. Chairman. And thanks to the witnesses. I just want to say the administration's energy policies are not practical, and, frankly, not doable, and everybody knows it. Secretary Granholm kind of proved that herself by trying to take an electric car across America, and you saw the result of that without any infrastructure in place, even after months of planning. Imagine a citizen in Sullivan County, Indiana without the benefit of a whole cadre of staffers planning their trip to try to travel to grandma's house in a nearby State with the current infrastructure in place. So it is ridiculous.

I have to say this hearing is timely for my constituents. Increasing electrical bills are starting to create some concerns within communities across the Hoosier State, and in drawing attention to the media. Just in the last week, I read several articles and State publications discussing rising cost, real-world concerns. While the cost of electricity has risen 19 percent nationwide since 2012, it has risen 35 percent in Indiana.

And part of that is we depend on coal in Indiana. The short-term answer is that producers have been forced to move away from that, an affordable and locally available source of energy to alternative sources when there isn't yet the proper infrastructure in place to do so. I am not going to argue merits of coal versus other sources of energy. Every energy source as we know has pros and cons, which I am very familiar. And I

believe in an all-of-the-above approach.

In fact, last week I spent touring and learning about some of the energy production sites across my district from a coal mine to a hydro-powered dam on the Ohio River. We discussed wind, solar, natural gas.

I heard firsthand from the industry that a rush to green agenda is coming with an unsustainable price tag, which means higher bills for my constituents. I support diversification of energy supplies, but we cannot put policy before practicality. Affordable energy and reliable energy is the key.

What I can't seem to figure out is the disconnect between the administration's Department of Energy's priorities and the actual real-world experiences of everyday Americans, particularly in my district. Over and over again, you put out rules that fail to consider practical realities. For example, implementing standards on coal fire power plants with unrealistic deadlines that force closures within a few short years.

I understand the people want to get rid of coal, but we have to have other infrastructure in place to replace it. We don't. For all these reasons I am pleased to see that the GRID Act would ensure that Federal agencies cannot finalize regulations that are likely to have a significant negative impact on the reliability of our bulk power system without considering and responding to input from FERC and the relevant electrical reliability organization on such reliability impacts.

Mr. Rodrigues, I am going to change subjects here. But I am a little bit -- I was recently in North Carolina where they had the -- for a field hearing where they had to shut down because transformers were attacked by what is considered, I think, domestic terrorism. So can you give me real specific -- and then -- let me say this -- I was at Center Point Energy in Houston, and we were talking with them about their large

transformers and what would happen if something went down to one of their ones -- roughly 2 million people would lose power, and they said it would take 2 years to replace it with the current supply-chain situation we are in.

Are there any real specific examples of what DOE is doing to strengthen and diversify the supply chain for distribution transformers, since we only have one company left producing electrical steel in the United States? Are there things we are doing actively to support this?

Mr. Rodrigues. Yes, sir. Let me start with the pocketbook issues first. There is $10 million in rebates for more efficient transformers on market right now. $10 billion in 48(c) tax credits. So that is foundational. The things that we are doing out of my office, as we speak, are again, I talked about this collaboration -- it has probably been done before, but I do not know of a collaboration that has been more congenial and more focused than the one we have right now with the power sector to try to find ways to ensure that we can improve the ability of the manufacturers' existing capacity to meet the needs of the utilities today, and some of that means changing standards, et cetera.

Mr. Bucshon. Sure.

Mr. Rodrigues. The other part of that is the longer-term view, as I referenced earlier. We can't keep treading water and fixing this problem over and over again.

Mr. Bucshon. Right.

Mr. Rodrigues. So we are working on design solutions that use more readily available products and materials that can be sourced right here in America to build transformers in the future.

Mr. Bucshon. Thank you.

Mr. Rodrigues. Sure. May I say one last word? Flexibility.

Mr. Bucshon. Yeah, I am out of time. But --

Mr. Rodrigues. Oh, I am sorry.

Mr. Bucshon. I just wanted to get this in. For example, the city of Washington, Indiana have shared how the supply-chain issues have delayed, or even prohibited, new housing developments, infrastructure upgrades, and the community's overall growth because of this issue of transformers and the supply-chain issues. So I am happy to hear that you are working collaboratively with the industry to solve this problem.

And I yield back, Mr. Chairman.

Mr. Duncan. The gentleman's time has expired.

I will now go to Texas, Mr. Veasey, for 5 minutes.

Mr. Veasey. Thank you, Mr. Chairman. You all know that Texas has a very rapidly growing population, and what that accompanied in a load growth coupled with extreme weather events and driving increased utility demand, it comes along with all that growth we have. We like the growth, but we have a lot of things we have to manage because of it.

The constituents I represent know too well that Texas has a major electric reliability challenge, especially during the summer when we were warned repeatedly that ERCOT and our grid could not meet all of the demand. Just last week, ERCOT filed a request for emergency order under section 202(c) of the Federal Power Act to ensure reliability of the bulk power system due to the extreme heat that we were experiencing.

In its request, ERCOT noted that it is concerned that a post-contingency overload could occur on a transmission line. And so what that means is that is ERCOT worried that a transmission line that runs power from south Texas to the rest of the State could overload with electricity, and that would put the transmission line itself at risk of

essentially frying.

Rather than risk the line tripping or breaking down, ERCOT cut the flow of power running over the system right when people needed it most. And worst yet, ERCOT has known about this congestion for a while now. And I want to be clear, transmission is reliability. And I am disappointed that none of the bills before us today do anything to enhance grid reliability. It is time that we fix the grid. And I am proud cosponsor of the FASTER Act that would align incentives to improve the sitting, planning, and permitting process for interregional transmission lines.

I have a question for Dr. Ortiz. I understand that ERCOT is a bit of a unique situation, but how would creating a minimum transfer requirement between regional transmission organizations increase reliability in the United States grid?

Dr. Ortiz. Thanks for the question, Congressman. Indeed, interregional transfer capacity through a number of extreme events has been shown to be particularly effective. For example, during winter storm Uri, the PGE minor (ph) connection was able to transfer significant amounts of energy to MISO, and then to SPP, which helped to maintain the stability of their systems. This was less so the case during winter storm Elliott because of the nature of that event.

Texas, as you know, suffered significantly during winter storm Uri in part because of -- because of lack of connections. But I think that that was a minor concern given some of the other factors.

So there is demonstration of the need and opportunity for this on a very real level. And so, the commission last December held a technical conference that delved into detail on this, and is continuing to work through that record. And further, Congress has directed NERC to perform a study of interregional transfer capacity and the benefits to

submit that study within 18 months, and then for the commission to review that, and then to make recommendations in a report to Congress. We are looking forward to working through both the NERC study as well as our own proceeding to come to a -- to resolve and answer some of these questions.

Mr. Veasey. Let me also ask you, because you mentioned in your testimony that you don't believe FERC has the capacity to successfully implement the GRID Act being discussed today. Do you believe that the current processes at FERC allow for adequate input in the regulatory process, or does Congress need to give this more attention?

Dr. Ortiz. The Commission operates through a robust notice-and-comment process for all of its proceedings, including the ones that my office helps the Commission to implement regarding reliability standards. We have a team that is built to do that. What the GRID Act could require us to do, if Congress were to choose, would be to perform somewhat more in depth and detail electric reliability analyses that we currently don't perform that other aspects of the government as I know, to my testimony, do. It is not to say that it would be an impossibility to build that capacity, but it is, you know, not necessarily a part of the regulatory process at this stage.

Mr. Veasey. Yeah. Thank you very much. Mr. Chairman, I yield back.

Mr. Duncan. Gentleman yields back. I will now go to Mr. Walberg from Michigan for 5 minutes.

Mr. Walberg. Thank you, Mr. Chairman, and thanks to the panel for being here.

Energy reliability has become a major concern in the last few years. We no longer worry about just losing electricity when an ice storm hits Michigan and knocks down power lines and a windstorm takes place. We also have to consider the possibility on hot days in the summer when our grid might not be able to handle everyone running

their air conditioner, or charging up their EVs. This is a serious problem. I believe it is self-inflicted to many degrees.

Worsening by the ongoing supply-chain issues, problems with coordination and regulations coming out of the Biden administration that our decreasing electricity generation with impunity while increasing demand. I am glad to see that some are awakening, some of my friends in the utility industry as well as auto manufacturers are now at least talking behind closed doors about the problems of going as rapidly in the direction that we are being asked to go, and the government is pushing and mandating.

I am glad to read a report just last week from 1,600 scientists talking about the fact that there is no climate emergency. They weren't saying there was no climate change. But the emergency that is causing us to do things so rapidly that is diminishing our quotient for success in this country and moving forward, and having things that we never experienced before, while the rest of the world goes around doing the same stuff. I am glad to see some finally standing up and speaking out against what we are doing.

Secretary Rodrigues and Dr, Ortiz, I am concerned by what appears to be a lack of coordination within DOE and across government when it comes to grid reliability. The transformers supply chain, as we talked about, that crisis is the perfect example. Over the last 2 years, average lead times were procuring distribution, have transformers increased from an average of 12 weeks to 16 months or longer, which is having a significant impact on grid reliability and the overall health of the Michigan economy that I am definitely concerned with.

Secretary Rodrigues, as the Assistant Secretary for the Office of Electricity, did you consult with your colleague, the Director of the Office of Energy Efficiency and Renewable Energy prior to that office proposing stringent new efficiency standards that would limit

the supply of transformers?

Mr. Rodrigues. Within the Department of Energy, I consult on a frequent and regular basis with my colleagues at the leadership level at EERE. More importantly, my staff of experts share our learning, our tools, our analysis not just with EERE, but across the organization as well.

Mr. Walberg. But you did consult with EERE?

Mr. Rodrigues. No. I just said we do consult on a frequent and regular basis.

Mr. Walberg. But prior to proposing stringent new efficiency standards that would limit the supply of transformers, that was the crux of my question.

Mr. Rodrigues. Yeah. The efficiency standard, first, doesn't limit the supply of transformers. It is a proposal for in the future increasing the efficiency of distribution transformers. But the answer to your question is, my staff, my team of experts with our tools and our resources, in fact, do consult with EERE on a regular basis.

Mr. Walberg. Well, let me move on from there because the result seems to be actual limiting. But nonetheless, did you consult with FERC on the impact of the transformer shortage?

Mr. Rodrigues. There is ongoing coordination between -- and communication between every Federal agency on these issues. I personally --

Mr. Walberg. Dr. Ortiz, let me jump here. Dr. Ortiz, were you consulted by anyone at DOE on the impact of the transformer supply shortage or the imposition of new efficiency standards?

Dr. Ortiz. Personally, regarding the new efficiency standards for distribution transformers, the answer is no.

Mr. Walberg. I wish I -- I guess we will have to save this question. Let me

move. Secretary Rodrigues, the DOE and EPA entered into an MOU last spring that provides a framework for interagency cooperation and consultation on electric sector resource adequacy and operational reliability. It includes FERC consultation. How is this MOU being implemented, and what have you learned so far?

Mr. Rodrigues. Yes. Thank you for that question. I think that was an important move on the part of both agencies. There has always been ongoing collaboration and communication between EPA and DOE. But what this did is to formalize that process. So thus far, there have been not one, but so far, two formal meetings between our agencies, and quite frankly, three of the experts from my own organization working with EPA. What we do is we provide them with the insight from our research and development, our tools, our analysis, et cetera. So that they may use that to make better informed decisions.

Mr. Walberg. Thank you. I look forward to the outcome, and I yield back.

Mr. Duncan. The gentlemen's time has expired. In the essence of time, we have a second panel. I just ask Members and panelists to try to finish up in 5 minutes. Ms. Castor is recognized from Florida.

Ms. Castor of Florida. Thank you, Mr. Chairman, very much, and gentlemen for appearing before the committee. Reliability and affordability in how we power our lives is very important to my constituents back home in Florida. And we are reminded recently with the powerful category 3 hurricane. We, in Florida, lost about -- 250,000 Floridians lost power. And I want to thank all the line workers and everyone who worked to get the power back on quickly as possible.

But, you know, I do not believe that reliability is incompatible with moving to cleaner cheaper energy. It is not like we are going to do it like this. This is -- it is going

to take all of us working together to get there. But I have just seen too much evidence that heavily polluting fossil fuel plants and outdated dirty appliances are -- they really are a -- a lag. They are really complicating our ability to move forward with cleaner, cheaper energy and to get more innovative technologies and lower cost, clean energy onto the grid.

I think hearing it over and over again really ignores the reality of what is happening because natural gas power plants, for example, have proven to be particularly vulnerable during extreme weather events, whether we are talking about hurricanes or winter storms. And moreover, the high cost of gas is really wearing on my neighbors back home. It is very apparent in Florida because we are touted as the sunshine State, yet the utilities have kept us really hooked on gas. 75 percent of our electricity generation in the sunshine State is gas.

What has that meant? Massive electric bill increases over the past year, especially since Putin invaded Ukraine. So we are looking for these innovative techniques and expansion of transmission to get cleaner resources onto the grid. Just 2 weeks ago, DOE rolled out its first tranche of funding for the transmission siting, and economic grant initiative. It is about $760 million through the Inflation Reduction Act, designed to help overcome the permitting challenges that slow the deployment of transmission infrastructure. I am really proud that the Select Committee on the Climate Crisis helped put this initiative together that was included in this Inflation Reduction Act.

Assistant Secretary Rodrigues, can you discuss why the rapid buildout of new transmission lines is essential for grid reliability, and how is that preplanning initiative, this new transmission siting and economic development grant initiative, how is that going, and what do you need from stakeholders moving forward to make it work?

Mr. Rodrigues. Thank you very much, and I want to jump on the one word you used in there that is the most essential thing that I want every Member to think about. Preplanning. The idea here that we are trying to do for the Department of Energy is to help them modernize American's grid by working with industry, by working with folks like yourself, so that we can take the steps today that will ensure that as we move into the future where there is going to be more demand and more innovation, that the grid remains as reliable, as resilient, as secure, and affordable as it is today.

Two things around transmission, if I may. Number one, yes, it is absolutely necessary that we start working on and thinking about today everything from the permitting process, et cetera, for new transmission for more interconnectivity. America needs a grid where we all can share in the work of reliability. But may I add one thing that I hope as you all work together on reliability, that you consider as well? There are advanced grid technologies available today -- available today, that can and should be used to enhance the throughput and the reliability and the safety of existing transmission corridors. We are working on both of those in the Department of Energy. We are working with industry to help prove those out, and quite frankly, we are working with utilities and grid planners to help them get the confidence they need to make these investments today. I hope that you all look at that as well.

Ms. Castor of Florida. So how is the preplanning effort going, this new transmission siting and economic development initiative? And then I hear you on the grid enhancing technologies. Are you able to work with stakeholders to bring in the GETs, the grid enhancing technologies, as part of this preplanning initiative?

Mr. Rodrigues. Yes. We are working on it as a roll-up-your-sleeves initiative. Every person in my office knows that I only talk about reliability and resilience with the

word affordability, and that is part of the answer. So far, it is going pretty darn well. I am so proud of the sister agency -- not agency, sister office in the Grid Deployment Office and the work they are doing. They are rolling out solutions as we speak, but probably more importantly, helping that -- helping industry to make the investments needed through that. Also, my friends in MESK are helping on that as well. This is a whole Department-of-Energy approach. We are trying --

Ms. Castor of Florida. Can you give us an example one part of the country or a certain State where you think where you think there is great promise or -- I am sorry. Am I over?

Mr. Duncan. Yeah.

Ms. Castor of Florida. Sorry. I yield back. Thank you.

Mr. Duncan. Thank you. The gentlelady's time has expired. Now, Mrs. Lesko from Arizona is recognized.

Mrs. Lesko. Thank you, Mr. Chair, and thank you to both of you for being here to testify. Both Congress Members DeGette and Peters both mentioned a study highlighted in a Washington Post article titled, Phoenix Power Outage Amid a Heat Wave Could Possibly Kill Thousands.

Well, that is exactly why we need Chairman Duncan's grid reliability bill in my estimation. And in fact, that article also said Phoenix, which I represent part of Phoenix, Arizona, has a reliable grid. Well, part of the reason that Phoenix has a reliable grid is we have a diversity in energy sources. In fact, in Arizona, in 2022, natural gas powered 42 percent of our electricity. Nuclear, 29 percent; Coal 12 percent; solar, 10 percent; hydro, 5 percent; and wind, 1 percent. And I do think the combination of diverse energy sources and new technology will help secure our grid reliability.

I look forward to supporting your bill, Mr. Chairman. The GRID Act, as it addresses a very crucial issue. It is an important step to address the reliability, abuse, and overreach of the Biden administration, in my estimation.

Another area I think this committee must fix is the broken market system in the ISOs and RTOs, have developed which does not prioritize or incentivize grid reliability at times. James Robb, CEO of NERC, the North American Electric Reliability Corporation, stated in Senate testimony, quote, "Unless reliability and resilience are appropriately prioritized, current trends indicate the potential for more frequent and more serious long duration reliability disruptions, including the possibility of national consequence events," unquote.

RPTR GIORDANO

EDTR HUMKE

[11:59 a.m.]

Mrs. Lesko. To me, this is the clearest warning imaginable, and this must be addressed.

These blackouts that have occurred, in my estimation, are caused by a lack of the right kind of generation to power the grid. This is primarily a result of poor policy choices.

Mr. Ortiz, these reliability issues are well documented, dating back as far as 2014, when DOE issued a warning concerning the bomb cyclone, which nearly crashed the entire national electricity grid.

What additional authorities does FERC need to guarantee that we build additional baseload-generating resources?

Dr. Ortiz. Thanks for the question, Congressman.

The FERC's -- FERC has jurisdiction over the electric transmission system as well as the reliability of the electric transmission system.

We also, through our regulated markets -- the regulated markets have the responsibility for implementing reliability standards within their footprint as well as managing on behalf of the States that they are -- that are members, resource adequacy. And of course that differs in quite a bit.

FERC's role there is to ensure just and reasonable rates. It isn't to make choices regarding either resource adequacy or the kinds of resources that are constructed. FERC is a fuel-neutral, all-of-the-above agency that is -- and that has been stated on the record

by the chairman and the commissioners. And, therefore, you know, I don't have -- I don't have a response regarding additional FERC authorities.

Mrs. Lesko. Do you have any specific actions that FERC could take with your authorities that would address grid reliability?

Dr. Ortiz. I can highlight actions that we have taken, in particular, to address reliability associated -- reliability concerns associated with the changing resource mix. We first direct -- we directed NERC to identify and register inverter-based resources, which are largely solar and wind resources, could also be batteries as well, so that they are required to comply with reliability rules.

And then we also -- we also are in the process of completing a proceeding to direct NERC to update its reliability rules to take into account the behavior of those resources to ensure that the planning is adequate, to ensure reliability as they are being integrated.

Furthermore, in our recent final rule regarding interconnection, we -- two components of that rule place a requirement for interconnecting nonsynchronous resources -- inverter-based resources, in particular -- to provide accurate validated models as a condition of interconnection, as well as to be able to have certain ride-through capabilities during disturbances, which NERC has identified as a key reliability risk.

So we have very much taken up the mantle of making sure that we improve reliability right now.

Mrs. Lesko. Thank you.

And my time has expired. I yield back.

Mr. Duncan. Gentlelady yields back.

I will now go to Mr. Sarbanes for 5 minutes.

Mr. Sarbanes. Thanks, Mr. Chairman.

Thank you all for being here today. We really appreciate it.

Since 1975, as you know, the Department of Energy's energy conservation standards program has put out very reasonable, feasible, energy-saving standards for a whole variety of household appliances -- dishwashers, stoves, light bulbs, washing machines, dryers, refrigerators, et cetera. Even though the energy savings for any one of these appliances might be small, as we have already heard today, the sum of these energy savings can have a very significant impact on energy costs and save the average family hundreds of dollars annually.

So, Mr. Rodrigues, I am trying to get some sense of it, like quantify what that looks like. If you take those individual appliance energy savings cumulatively across all the appliances that have these standards across the country, can you give me a sense of how much energy we are saving because of those standards and because of the standards program?

Mr. Rodrigues. I can, actually. And it is a startling statistic that I think everyone should know. On a lookback basis, by 2020, the efficiency standards have saved Americans more than $1 trillion from energy that otherwise would be wastefully used. By 2030, we expect that number to be $2 trillion.

Mr. Sarbanes. So, aside from all of the other important reasons to do this -- reducing our carbon footprint, cleaning the air, addressing pollution, et cetera -- just the bottom line economic savings that it represents to families across the country is really gargantuan if you put it into terms that you just did. And this matters not only to the consumers, but, when we consume less energy, as I indicated, we are

relieving stress on the grid.

I mean, you have talked a lot today. You have had a lot of questions about grid reliability, how to kind of manage the portfolio in ways that creates stability across the system.

I am concerned, though. One of the bills we have talked about already, but that we are considering here today would hamper DOE's ability to finalize energy efficiency standards for appliances by adding what I view as very cumbersome and unnecessary standards and tests to DOE's already robust rulemaking process.

I mean, as you have described quite effectively today, you have got a good system for looking at these standards and a track record of incorporating all of the various considerations that need to be made so this is being deployed in a sensible and rational way that benefits Americans. And I want to commend you on that.

But tell me if -- by legislation we are talking about today or in other ways, if the Department of Energy's ability to finalize appliance energy efficiency standards is hobbled or compromised, how would the resulting loss of energy savings impact the demand on the electricity grid and its reliability? I assume it would put more pressure that we don't need to have there, correct?

Mr. Rodrigues. Absolutely the case. It puts more pressure on the grid, because what will happen is it delays efficiency in the consumption of energy.

The second thing it does is it creates uncertainty in the marketplace for those manufacturers and distributors who produce and distribute efficient products for the American people so that we can save money in their homes.

And, lastly, but not least, while the savings that have accrued so far will endure because efficient appliances are there, we rob the next generation of Americans of their

ability to save energy in their homes and businesses to make them more productive, make them more comfortable, make them more safe.

Mr. Sarbanes. Well, I appreciate your administering these standards in a way that makes sense, and we want to continue to support that. And, as I say, I have concerns that some of the proposals being put forward here today undermine or would undermine your ability to do that. That is why I am hesitant to support them.

And, with that, Mr. Chairman, I yield back.

Mr. Duncan. Gentleman yields back.

Now recognize the gentleman from Texas, Mr. Weber, for his 5 minutes of questioning.

Mr. Weber. Thank you, Chairman.

Mr. Rodrigues, I will start with you. Is there a danger -- of course you are aware of the transformers amorphous steel regulation now. Is there a danger that putting that into place, that requirement, will outpace the development of us trying to get our supply chains back and really working well?

Mr. Rodrigues. I think not. And let me tell you why. I can understand why you would ask that question.

But one of the explicit questions asked of all the stakeholders in the process was whether or not the timing of the adoption of any such rule -- and, again, recall that rule might not be adopted. But the timing was something that was explicitly asked so that every stakeholder, everyone who had an interest and an idea and insight in this process could provide their information to the Department's folks working on the standard about what the timing should be.

So I trust that this process works. It is the most transparent process I have ever

seen in my life. And I come from California, so I know regulation.

I will tell you that I believe that, because of the considerations that are already legislatively mandated and the participation of every stakeholder who brought his or her analysis to the table, I think there is almost no chance.

Mr. Weber. When was that rule first -- when was the idea first promulgated?

Mr. Rodrigues. I am sorry. Say that one more --

Mr. Weber. When was that idea first promulgated?

Mr. Rodrigues. I apologize. What idea?

Mr. Weber. To make transformers out of amorphous steel.

Mr. Rodrigues. Oh, the idea is not to make transformers that use amorphous steel as their core. It was propagated by the requirement, both legislative and court-ordered requirement, that we review the existing standards, which hadn't been reviewed since earlier --

Mr. Weber. What was the timeline on that? When did that happen?

Mr. Rodrigues. The existing -- the last time this was looked at was --

Mr. Weber. I am talking about the first time.

Mr. Rodrigues. The first time for this current standard?

Mr. Weber. Uh-huh.

Mr. Rodrigues. Oh, I don't have the exact date, but whenever the rule was promulgated --

Mr. Weber. Would you say 1 year, 2 years, 3 years previous?

Mr. Rodrigues. It -- it has probably been -- and I apologize, because I didn't work specifically on that phase of this process, so I don't know for sure. But I would tell you that the process is such that folks in the office of Department of Energy are continually

looking at what the advancements are in technology.

Mr. Weber. But what -- I get that, but what I am concerned about the timeframe is: Are we going to have a requirement that our supply chains, quite frankly, aren't going to catch up with?

Let me move on, because I am getting ready to run out of time here.

What about permit processes? When you have got somebody who is going to -- hopefully will be getting some more transmission plants -- some energy transmission plants built -- energy production, electric transmission, what if they are not -- what if their permits take so long -- do you worry about our baseload requirements might be jeopardized because the permit process is so long?

Mr. Rodrigues. That -- yeah. I am going to share with you -- I think you and I are on the same page about this. If you look out the window today, you would see that the permitting process for new transmission, it takes so long. Now, I understand it is a deliberative process, but it takes --

Mr. Weber. Well, I am talking about generation and, of course, resulting transmission.

Mr. Rodrigues. Yeah. And so what we are dealing with right now is, within the Department of Energy, we are doing work to speed up -- speed up the transmission permitting processes in all the various jurisdictions we get.

Mr. Weber. Do you think that investors are hesitant to commit because they never know how long the permitting process is going to take?

Mr. Rodrigues. I --

Mr. Weber. Is it too cumbersome in your opinion even in some instances?

Mr. Rodrigues. I can't speak for the mind of the investors, but I will say it is in

the Secretary of Energy's not just wish list, her demand list of all of us that the permitting process must move in a more expedient fashion so that the folks who would invest in it have more certainty about the timelines.

Mr. Weber. Okay. Golly, I have got so many questions. Should American choices -- let me go back to gas stoves and appliances and some of the other regulations.

Should American consumers' buying patterns and/or choices be considered, or is it all just about the consumption of energy?

Mr. Rodrigues. The consumer benefit is a core part of that --

Mr. Weber. I am not asking about the benefit. I asked about their choices.

Mr. Rodrigues. Yep. And, absolutely, consumer choice is something supported by the Department of Energy. All efficiency standards do is pave the way for more efficient products that benefit Americans by, number one, helping them use --

Mr. Weber. Well --

Mr. Rodrigues. -- waste less energy --

Mr. Weber. -- let me break in very quickly. I was an air conditioning contractor for 35 years, and the SEER ratings that first came out really in Texas, people were really griping about them.

I will yield back, Mr. Chairman.

Mr. Duncan. Gentleman's time has expired.

Now I will go to Mr. Cardenas, California, for 5 minutes.

Mr. Cardenas. Thank you very much, Chairman Duncan, and also Ranking Member DeGette for holding this hearing.

And thank you to our witnesses for being here. I appreciate your answers and your expertise.

To begin, I want to acknowledge that, as a Member of Congress, we are here to protect the health, well-being, and quality of life of our constituents, the American people. That includes examining, protecting, and strengthening the tools that we already have in place that do just that.

One example of the tool that has proven effective for the American people is the national appliance standards program. Standards within this program are popular and good for the American people. Energy efficiency standards drive innovation and reduce electricity waste, enhancing reliability, reducing greenhouse gas emissions, and lowering utility costs for the American households.

Unfortunately Republicans have turned a blind eye to these irrefutable benefits and have chosen to put forward three anticonsumer bills that stifle energy efficiency programs.

Assistant Secretary Rodrigues, in your testimony, you explained the process for issuing energy conservation standards. Could you please explain how the DOE Appliance and Equipment Standards Reform and Consumer Protection Act would impact the DOE's process for issuing energy conservation standards?

Mr. Rodrigues. Thank you.

At the heart of my assessment of the impact of these bills on the Energy Policy and Conservation Act is this: We have a process right now that is the most transparent; the most deliberative; and, quite frankly, the most analytically sound process to ensure that any standard that is adopted is technologically feasible, economically justified, and results in a significant conservation of energy. Every one of those things are important to the American consumer.

And we bring in, as I have said many times, in an inclusive and transparent

process -- every step of the way, all stakeholders are invited to provide their perspectives. It is the old adage. If it ain't broke, don't fix it. My belief is that anything in these bills that would slow down or hinder or hamper our ability to move forward with standards under the existing EPCA approach is harmful to the American people.

Mr. Cardenas. Thank you.

One of the proposed bills states that, in determining whether imposition of an energy conservation standard is economically justified, the Secretary may not consider estimates of the social costs or social benefits associated with incremental greenhouse gas emissions.

What would be lost if DOE can no longer evaluate greenhouse gas reduction in its rulemaking?

Mr. Rodrigues. I see it like this. The American people deserve deliberative processes that look at all the costs and all the benefits. I think it is, quite frankly, arbitrary to say, We will not consider some of the benefits, or, We will not consider some of the costs.

I believe the process that we have today considers each and every element that should be considered in terms of cost-benefit analysis, and the American people deserve to have that kind of rigorous analysis in place.

Mr. Cardenas. I think it makes sense that, in anything that we do, looking at the short-term and long-term cause and effects and benefits definitely should be done, especially in a transparent process as we have today. Thank you.

You have been in the industry for years. What happens when we ignore GHG emissions and their climate impacts? For those who are listening, that is greenhouse gas.

Mr. Rodrigues. I have been -- as you point out, I have been in the industry and around the industry for over three decades now. Every utility CEO I know is cognizant of the fact that utility emissions are part of the pollution problem, part of the greenhouse gas solution.

We want to have a DOE that helps the utility industry to move along and find its way to, quite frankly, that next level of service to the American people.

Mr. Cardenas. Thank you.

I also have concerns about the Guaranteeing Reliable Infrastructure Development Act, which would effectively give FERC veto power over agency action.

In your testimony, you explained that there are opportunities for stakeholder and public comment during the standards rulemaking process, which is tremendously transparent. As it stands, can FERC participate in the comment period during the rulemaking process as it is today?

Mr. Rodrigues. I will defer to you for that answer since it is a question about your jurisdictional authority.

Dr. Ortiz. Yeah. I suppose, Congressman, that you are directing that to me.

Mr. Cardenas. Sure. Yeah.

Dr. Ortiz. Okay. FERC has the capability to comment on rulemakings. Nothing, I don't believe, bars that. It is general practice not to. And often, if there is a reliability concern in our rulemaking, we will hear that from our industry stakeholders.

Mr. Cardenas. But FERC can communicate --

Dr. Ortiz. It could --

Mr. Cardenas. -- in one way or another?

Dr. Ortiz. -- yes.

Mr. Cardenas. They are not limited?

Dr. Ortiz. No.

Mr. Cardenas. Okay.

Dr. Ortiz. And Commissioner Danly did it himself.

Mr. Cardenas. Okay. If this were enacted and veto power was fully deferred, how would that disrupt the balance of fairly considering other stakeholders' comment?

Dr. Ortiz. I don't -- I don't know if I have a good answer for that question other than to acknowledge that, you know, the Administrative Procedures Act requires agencies to fully consider actions if the Commission provides comments that are more particularly robust than perhaps other comments on electrical reliability. Any other agency, any covered agency would have to respond per the legislation.

Mr. Cardenas. Thank you.

My time having expired, I yield back.

Mr. Duncan. Gentleman now yields back.

I now go to the chair of the Oversight and Investigations Subcommittee, Mr. Griffith, for 5 minutes.

Mr. Griffith. Thank you very much. And I apologize for that I have been upstairs doing an Oversight and Investigations hearing, but that has now concluded.

And I know that you all have talked some about grid reliability, but I want to ask a couple of questions in that direction. I don't think these have been asked.

So Director Ortiz, according to the Energy Information Administration, more than 220 coal-powered plants have closed since 2014. While a good bit of this capacity was replaced with natural gas plants, some was replaced with nondispatchable generation, like wind and solar.

Does FERC take the rate of retirement and wait for dispatchable generation into account when they promulgate new reliability standards?

Dr. Ortiz. The reliability standards are developed through a process that occurs primarily -- first at NERC, and industry, and they are developed by industry, and then submitted to Commission for approval.

Within the deliberations at NERC that our team monitors, they consider -- these are utility representatives that take into account a wide range of both technical, as well as kind of environmental -- environmental meaning the state of the utility industry, when working through options for what those standards look like.

So, you know, not to point to any specific standard, I can attest that the development of those standards is a very robust process that takes into account many, many factors.

Mr. Griffith. All right. And I appreciate that.

What can you tell us about the EPA's interaction with FERC when the EPA is promulgating regulations that could affect the bulk power system?

Specifically, what happens if EPA tells you what they are doing and then you make a recommendation or a comment and then they reject that? Is there any recourse to the administration to resolve that difference of opinion?

Dr. Ortiz. That is a legal question. I am an electrical engineer, sir, so I would probably --

Mr. Griffith. Okay.

Dr. Ortiz. -- have to take that back and have -- ask our general counsel's office to provide a more fulsome response.

Mr. Griffith. Well, could you do that for me, because obviously, you know, we

are concerned about grid reliability, and we want to make sure that, as we move forward, if there is a conflict in the administration, there is some way to resolve it, particularly if you all are saying that it may be affecting the reliability of our electrical system, okay?

Dr. Ortiz. Certainly.

Mr. Griffith. Thank you. I appreciate that.

So I am a proud sponsor or cosponsor of Representative Hudson's bill where we are talking -- that we are talking about here today on banning the increase in transformer standards.

Assistant Secretary Rodrigues, you talk in your testimony about how you all are administering a tax credit program for companies to replace their transformers. What has the uptake on that been?

Mr. Rodrigues. I apologize for not knowing that information as I sit here today. I would have to go back and ask the MESC office, who is administering that program, but I will absolutely do that for you, sir.

Mr. Griffith. Be good to know if the program is being taken up.

And, as a part of that -- and you may not have this information either, which is fine. I mean, folks back home may not understand. We ask all kinds of wild questions, and you can't be prepared for everything, and I understand that and appreciate that.

But are the companies who are looking for transformers able to find them that meet the current or the proposed standard? And are those transformers made in the United States of America or elsewhere?

Mr. Rodrigues. The good news on distribution transformers is that the majority of the transformers manufactured in use -- for use here in the United States are produced by domestic manufacturers. And we are doing everything we can to assist them to

increase their capacity, because what we don't want to do is, as with the demand for transformers increases, quite frankly, to have people look overseas for them.

So the good news is that the MESC office is not just working on getting those incentives out there, but we are providing concrete, you know, face-to-face support on everything from labor, getting -- it is hard -- I don't know if you have been to a distribution transformer manufacturing facility.

Mr. Griffith. I have. I have got several of them in the district.

Mr. Rodrigues. Excellent. As have I. You know it is hard work being done by good American folks who are doing really good work out there.

Mr. Griffith. Yeah.

Mr. Rodrigues. But it is also work that takes training. It is about a 6-month timeframe before you get really good at it. And retaining those folks is not easy. And there are other jobs out there that, quite frankly, aren't as hard.

So what we are trying to do around that is to ensure that we help the distribution manufacturers, which are local in nature, to try to expand -- expand their scope. And may I say this last thing, because it is important to me, as --

Mr. Griffith. All right. You get it out, and I want to get something out quick --

Mr. Rodrigues. Okay.

Mr. Griffith. -- before my time is out.

Mr. Rodrigues. But also to find veterans to work in these facilities.

Mr. Griffith. And so what I would say back is my companies tell me they are having a hard time finding the electric steel, the steel that is used in those transformers --

Mr. Rodrigues. Yes, sir.

Mr. Griffith. -- from an electric source. There is only one left. And, if we keep

raising the standards, we will have none.

I yield back.

Mr. Duncan. Gentleman yields back.

I now will go to the acting ranking member, Ms. Fletcher from Texas, for 5 minutes.

Mrs. Fletcher. Well, thank you so much, Mr. Chairman.

And thank you to our witnesses for being here. This is an incredibly important hearing today. It is important to my constituents in Texas. We have had a lot of Texans on our committee already talk today about the challenges that we have seen over the summer in particular, but obviously, as you know, and referenced earlier, Winter Storm Uri and some of the challenges that we have seen in recent years.

You know, throughout the last month when I was at home, I lost count of the number of times that I got a notice from my electricity provider or from ERCOT or from another source asking me to conserve energy at home because of concerns about the grid and because we really couldn't -- weren't sure that we would be able to have the ability to meet demand at those peak hours.

And, you know, as we discussed and you all have already said, losing power isn't something that is theoretical for us. This isn't a concern that we imagine, but this is something that we are very much still living with from Winter Storm Uri. People in my hometown in Houston and across the State of Texas are carrying with them the memories of that storm and are deeply concerned about reliability and resiliency of our grid.

And I think it is important just to remember that that storm led to the death of more than 200 Texans, and it threatened the health and safety of more than 4.3 million people who lost power, many for several days, including me at home. And then of

course we had to boil our water and deal with all the other concerns that come from a long power outage.

And unfortunately, several years later, we have seen very little action from ERCOT, which is the State's power grid operator, as you all know. And, just last week, after, you know, this extreme heat in Texas all summer, ERCOT issued its second highest alert for the first time since Winter Storm Uri. And we narrowly averted rolling blackouts in Texas last week.

So, you know, we were able to do this by asking people to conserve, and, you know, to reduce our energy consumption, everything from, you know, turning up the thermostat to not running your appliances. And I think it is really important in this hearing today, where we are talking about energy efficiency, that that is part of the solution that we are asked to do as individuals and collectively. So I am a little bit disappointed that the legislation that we are taking up today undermines the ability of DOE and EPA to finalize regulations that are related to energy efficiency.

And I want to spend the time that we have first touching on something you mentioned in your testimony, Dr. Ortiz, just about the work that FERC has done to improve the ability of the grid to withstand these extreme weather events. And could you just talk a little bit about the role that efficiency plays in shaving off peak demand and avoiding grid stress in these kinds of moments?

Dr. Ortiz. So thanks for the question, Congressman.

So, you know, energy efficiency at the consumer level is, you know, not part of the jurisdiction of the agency. To the degree that efficiency measures reduce peak demand, you know, they obviously put a downward pressure on resource adequacy in the planning context, and then also on required reserves in the operating context.

Mrs. Fletcher. Okay. Thank you.

And I want to take the minute and a half I have left to touch on one other topic. It is something that, you know, we have talked around a little bit today, but I do think it is really important that one of the things we have talked about for years and that we are talking about in this hearing is kind of the nexus of gas and electric reliability.

And could you just talk a little bit, again, Dr. Ortiz, about the importance of natural gas reliability to the reliability of the bulk power sector, and a little bit about some of the gaps and the laws and regulations around gas reliability?

Dr. Ortiz. Oh, great. It looks like I have 50 minutes to go on, so I am happy.

So natural gas system reliability is fundamentally crucial to electric reliability, and it has only grown more so, and to the degree that I think we are coming to a situation where the interactions between those systems are so tight and so linked that there is a real rethinking that needs to occur. And the Commission has explored this in its New England Gas-Electric Forums.

And then, in addition, as a result of a lot of the gas failures that occurred during Winter Storm Uri, at the request of the Commission, the North American Electric Standards Board issued a recent report recommending a number of changes to gas system planning and operations to help better support reliability.

Those are very complex. I am not a gas expert, so I don't -- I can't quite go too far, but just to say that -- to reiterate your point that the reliability of the natural gas system is fundamentally critical to the reliability of the electric system.

Mrs. Fletcher. Well, thank you so much for that.

And I know I have gone over my time, so I appreciate it, Mr. Chairman.

I appreciate both of you and your testimony today. Thank you so much.

Mr. Duncan. You are the ranking member. I give some lenience.

I will now go to Mr. Balderson, I believe, for 5 minutes.

Mr. Balderson. Thank you, Mr. Chairman.

And thank you both for being here today.

My first question is for Dr. Ortiz. Dr. Ortiz, I would like to follow up on a point that Chairman Johnson raised earlier.

In the EPA's proposed rule, new source performance standards for greenhouse gas emissions, the EPA states that it elevated the reliability implications of the proposal and consulted with the Department of Energy and FERC in the development of these proposals.

As we have discussed, Chairman Danly stated, I was not asked what I thought of the proposed rule's effect on electric reliability, and I am not aware of my fellow commissioners having had their feedback solicited.

Commissioner Danly also points out that the opinion of the Commission's staff does not and cannot constitute the opinion of the Commission.

Dr. Ortiz, in a yes or no answer, do you believe the EPA properly engaged with FERC on this proposed rule, specifically on its potential reliability implications?

Dr. Ortiz. The EPA executed its responsibilities under -- through the Office of Management and Budget to seek FERC input on a rule. FERC provided comments on a rule that the EPA largely implemented.

Mr. Balderson. To the best of your knowledge, how many times has the EPA officially consulted with FERC on the effects of their regulations on the grid reliability, and does this include requesting feedback from the actual commissioners?

Dr. Ortiz. By official, Congressman, what exactly do you mean?

Mr. Balderson. By official, I would speak somebody from the hierarchy of the EPA. So -- and, if I need to go to another route as far as who would know, I can further that later.

Dr. Ortiz. And so, speaking on behalf of myself, I interact periodically with staff members at the EPA. With respect to any interactions among EPA hierarchy, I would probably request that you ask the commissioners themselves.

Mr. Balderson. Thank you.

I think this underscores the need for greater coordination between FERC and Federal agencies to ensure long-term reliability of our electric grid and the bulk power system. So I appreciate Chairman Duncan and his work on the GRID Act.

My next question is for the Assistant Secretary. Thank you, sir, for being here today. And, Mr. Chairman Griffith brought this point up just a little bit also in his last question. As you know, Cleveland-Cliffs is the only domestic producer of grain-oriented electric steel, or GOES, and nonoriented electric steel, or NGOES. The steel is produced in Butler, Pennsylvania, and in my hometown and in my district of Zanesville, Ohio.

If your Department's rule on efficiency standards for distribution transformers were to go into effect, Cleveland-Cliffs will be forced to stop investing in NGOES and GOES production and wind down those two facilities until the rule is implemented.

This means there will be no domestic producer of electric steel for electric vehicles, no domestic producer for power transformers, and a distribution transformer market reliance on one producer that imports from Asia and is nowhere close to having the capacity to meet the demand.

Did the Department of Energy consider any of these downstream impacts on this -- this rule will have?

Mr. Rodrigues. The answer to that is yes under what is technologically feasible that -- the supply and materials there. Might I point out I visited Butler, Pennsylvania and sat down -- not just toured the plant, but actually sat down and had a face-to-face conversation with the leadership there, really excellent gentlemen, all.

And --

Mr. Balderson. I will vouch for that. Yes, he is.

Mr. Rodrigues. Yeah. One of the things I did, you know, face to face, eye to eye, asked is about their commitment to continuing to produce GOES for the American manufacturing industry. They are committed to doing that, and we are committed to helping them in any way we can to continue to produce that, because even if this transformer rule goes into effect as it was originally proposed, which we all know there has been a robust process around it, that may either change or amend what is out there, or even come to the conclusion that there should be a disposition that it shouldn't be changed at this point, but even if it were to go into effect as proposed, there will still be a market for good American GOES steel for large power transformers, which we are also very concerned about.

Mr. Balderson. Do you know where those would come from? I mean, what -- are you telling me that Cleveland-Cliffs has made that commitment to you, the leadership team, that they would continue even if this rule is implemented?

Mr. Rodrigues. I would ask that you speak to them, but my takeaway from the conversation is that they are committed to doing everything they can to continue to be America's producer of grain-oriented electric steel.

Mr. Balderson. Okay. And this -- thank you, Mr. Chairman. I will yield back my remaining time -- my time --

Mr. Johnson. [Presiding.] The gentleman yields back.

The chair now recognizes the gentleman from Texas, Mr. Pfluger, for 5 minutes.

Mr. Pfluger. Thank you, Mr. Chairman.

Nothing more important than keeping the lights on. I think that is what you said, Assistant Secretary Rodrigues. Couldn't agree with you more.

I want to focus on the GRID Act. I am very, very concerned about the policies that this administration has done, especially to the two tenets -- two of the four tenets that you mentioned in your testimony -- in your personal testimony here, which are reliability and affordability. And I kind of want to focus on that.

Assistant Secretary Rodrigues, are you the subject matter expert for the administration, for the President on electricity?

Mr. Rodrigues. I would say that no single person is the subject matter expert --

Mr. Pfluger. You are the Assistant Secretary for Electricity?

Mr. Rodrigues. I am.

Mr. Pfluger. Are you the top-ranking electricity expert in Department of Energy that reports to the President?

Mr. Rodrigues. I am the top-ranking person --

Mr. Pfluger. Thank you.

Mr. Rodrigues. -- and I report through DOE. I don't report --

Mr. Pfluger. Yeah. I got it. The Secretary was not quite sure she was the subject matter expert on energy when she sat here a little bit ago, so I just wanted to start with that.

Give the administration a grade on affordability.

By the way, what do you pay in your electricity bills this month?

Mr. Rodrigues. Oh, gosh, I don't know the exact amount, because I use auto pay. It actually --

Mr. Pfluger. Okay.

Mr. Rodrigues. -- streamlines my process for each utility --

Mr. Pfluger. Every constituent of mine knows exactly what they are paying for their electricity bill. It is double what it was last year.

Give yourself a grade for your affordability tenet.

Mr. Rodrigues. Oh, thank you for that -- asking that question.

I would say the grade should be more work needed.

Mr. Pfluger. More work needed. I agree with that. I think it is an F- myself, because we are not in a place where we have affordability, which is a major tenet. And I agree with your testimony.

Do you know how much electricity we use in this country annually?

Mr. Rodrigues. I don't have that figure at my fingertips.

Mr. Pfluger. Well, you are the subject matter expert on electricity for the Department of Energy?

Mr. Rodrigues. Yeah, I am chosen not for my memorization skills, but for my connection to industry and the ability to find practical solutions that help the American people.

Mr. Pfluger. We are in desperate need of practical solutions, which we don't have. It is very disappointing to know that the Assistant Secretary for Electricity doesn't know how much -- I have asked that question to every single official that comes in here. Not a single Biden administration official knows that.

I want to show this chart right here. My colleague from Texas was mentioning

the crisis we had last week. I was actually in -- on a trading floor of a private company that distributes electricity on the day this was happening. Let's talk about reliability here.

We have been told this myth that, if we only put more unreliables -- renewables on the grid, that they will perform, but where were they last week? You know, we had less than 10 percent by wind.

I am not against wind. We have a ton of wind in my district, but the point of this chart is that 70 percent of the grid last week was serviced by fossil fuels, and the policies that are coming out of either Department of Energy, FERC -- we are not dealing with the EPA right now -- they have to address affordability, which is, in my opinion, an F- for the past 30-something months of the administration -- 28 months. And they have to address reliability.

We can take the chart down.

Dr. Ortiz, during the June 13th appearance before the committee, Commissioner Danly referenced what he believed was a looming resource inadequacy. In your testimony -- for the grid. In your testimony, you highlight the concern that renewable energy may cease to inject energy into the grid during normal disturbances.

So my question is: When we flip on the lights, how will FERC work to -- work with other agencies to ensure that we solve this looming resource inadequacy crises by prioritizing reliable sources?

Dr. Ortiz. So your question is how we prioritize to ensure that the grid is reliable.

My job is to help the Commission implement section 215 of the Federal Power Act, which makes, you know, me responsible for advising the Commission on reliability. We have seen -- with respect to your reference to my testimony, that refers to a

particular characteristic of inverter-based resources, and NERC has written a number of reports on this. There was two significant events in west Texas.

Mr. Pfluger. I have some more questions, so let's --

Dr. Ortiz. Yeah. Well, okay. And so we work very hard to ensure this.

In addition, we have seen tremendous failures of fossil resources during cold weather, and then we have -- we have --

Mr. Pfluger. I am going to keep going.

Dr. Ortiz. We have implemented standards --

Mr. Pfluger. I want to enter a letter into the record, Mr. Chairman.

Mr. Johnson. Without objection, so ordered.

Mr. Pfluger. And this gets to the point of the proposed rulemaking.

And, by the way, Mr. -- Dr. Ortiz, can you supply the interagency comments that FERC sent to the EPA that my colleague, Mr. Walberg, asked for.

Dr. Ortiz. Oh, we can work with -- you mean the comments that we submitted, then, through the OMB pass back process?

Mr. Pfluger. The one that was just referenced in the last package.

Dr. Ortiz. Yeah. We will work with the General Counsel's Office --

Mr. Pfluger. Okay.

Dr. Ortiz. -- to make sure that the committee has those.

Mr. Johnson. Gentleman --

Mr. Pfluger. It is important.

Mr. Johnson. Will the gentleman suspend?

Mr. Pfluger. Yes.

Mr. Johnson. We need to see a copy of the letter that you are referring to. We

have been --

Ms. DeGette. Could I see it before you put it in the record?

Mr. Pfluger. You bet.

Ms. DeGette. Thank you.

Mr. Pfluger. Let me get it on -- I have got a remarkable -- in the digital age here, so let me show you a copy real quick here. Letter for the record. I'll show it to the camera right here.

Ms. DeGette. You could just show it to me.

Mr. Johnson. Can you send it to --

Mr. Pfluger. There we go.

Mr. Johnson. Yeah.

Mr. Pfluger. See that?

Mr. Johnson. Can you send it to staff, please?

Mr. Pfluger. I actually have the fax here.

Mr. Johnson. Thank you.

Mr. Pfluger. It is imperative that the Department of Energy and FERC know how much electricity we use in this country when making --

Mr. Johnson. Gentleman may continue.

Mr. Pfluger. -- reliability decisions that are good for our affordability and good for our national security.

I yield back.

Mr. Johnson. Gentleman yields.

Now the chair recognizes the gentleman from North Dakota, Mr. Armstrong, for 5 minutes.

Mr. Armstrong. Before I get into my questioning, I just want to address a couple things that were mentioned earlier, and regardless of the different debates, I think it is important to recognize that products that use marginally less energy are never going to be a substitute for generation.

And, earlier, there were talks about PJM exporting power to MISO and SPP during significant weather events. That only works if the donor RTO has the sufficient generation. You can have all the interconnection in the world, but if the generation isn't there, transmission is a second thought.

And I know this because, during the Texas winter storm, it was 27 degrees below zero in North Dakota. That event happened from the Canadian border all the way to the Gulf of Mexico.

So Director Ortiz, one of the goals of the Office of Electric Reliability is to coordinate with ISOs and RTOs, among other entities, to facilitate electric reliability and security. Can you briefly explain what that coordination looks like?

Dr. Ortiz. So the Office of Electric Reliability's responsibilities have to do with implementing section 215, which, as I stated in my testimony, has to do with certifying and overseeing the electrical reliability organization, which is NERC. My office and my staff work closely with NERC and its stakeholders, which are heavily represented by the RTO -- which the RTOs participate significantly in across their various committees. And, through those processes, we are able to identify the technical issues and work through solutions to reliability issues.

Mr. Armstrong. So you are aware of FERC evaluating RTO load forecasting, and can you briefly explain how this forecast has an impact on generating units?

Dr. Ortiz. I didn't actually say that, but -- but the -- but the Commission also

engages closely with the RTOs regarding their planning processes as part of its work on ensuring just and reasonable rates.

And so, on that matter, regarding their -- where they are -- the degree their load forecaster requiring them to take actions with their stakeholders, that is a question for the director of the Office of Energy Market Regulation.

Mr. Armstrong. And I bring that up because I don't think we talk about the economics of power generation nearly enough when we have this conversation. We talk about reliability, resiliency, transmission, all of that. And, during a hearing earlier with the commissioners earlier this year, I mentioned that I have serious concerns about purposeful skewing of load forecasting to benefit weather- dependent generation over baseload or dispatchable sources.

Generators in North Dakota have raised concerns that MISO has been underforecasting load, which incentivizes distributed generation at the expense of baseload generation.

Load forecasts that are based on preferred political outcomes rather than reliability jeopardize the overall well-being of the grid. And we know that the Sierra Club and the NRDC have evaluated influencing PJM forecasting, because these organizations claim that PJM is a muting -- is muting price signals that are essential to attracting -- their words -- the right kind of resources, also known as renewables.

Meanwhile, the North American Electric Reliability Corporation, has noted that RTOs, like MISO, can face challenges in meeting above-normal peak demand if wind generator energy output is lower than expected. So the Sierra Club and the NRDC want RTOs to have a lower load forecast to support the development of wind, but at the same time, the Nation's chief reliability evaluator says that this can make the grid more

unreliable.

In its after-action report of the 2022 winter storm, SPP explicitly mentioned that the importance of fuel assurance and resource adequacy are essential parts of responding to future reliability events.

So shouldn't resource adequacy be a foundational to this conversation?

Dr. Ortiz. NERC has made it clear throughout its history that resource adequacy and operating reliability are two tenets of reliable operations.

Mr. Armstrong. Mr. Rodrigues?

Mr. Rodrigues. Yeah, absolutely. Resource adequacy is one critical component in reliability overall.

Mr. Armstrong. Do you think their oversight or do you think there should be more oversight or more independent auditing over the auction process?

Mr. Rodrigues. I honestly don't have an opinion about that. The -- my expertise and the focus of my office and my work is really on ensuring reliability through making an American grid that is up to 21st century standards. The market mechanisms is not something I work on.

Mr. Armstrong. The problem with the market mechanisms is, if they are underselling it, we are still going to need to get power. And, if we are underforecasting it, we are still going to end up needing the power. And they have to figure out how to keep the lights on for the other 360 days a year. So the 5 days a year when it is 35 below in North Dakota, when we really need it, that they can actually supply the power we need when the sun is not shining and the wind is not blowing.

And, with that, I yield back.

Mr. Duncan. [Presiding.] The gentleman yields back.

I will now go to Mr. Carter from Georgia for 5 minutes.

Mr. Carter. Thank you, Mr. Chairman.

And thank both of you for being here today.

You know, I wanted to -- I am waiving on to this committee. And I serve on Energy and Commerce Committee, but I am not on this subcommittee. But I wanted to be here, because I find it astonishing that, in 2023, we are facing a reliable energy crisis in this country. I just find that to be astonishing.

But we have heard about it. We have heard about blackouts. We have heard about brownouts. We have heard about the rolling brownouts. It is -- and, again, I just find it to be unbelievable.

But it seems that the current administration has pushed for policies that exasperate the situation. Department of Energy and EPA signed a joint MOU, and you have talked about that. And I have got some questions about it.

But, yet, you signed that MOU, and then the EPA immediately issues rules to take generation off of the grid. You know, I think we have -- you have heard it from the committee members that we are in favor of wind and solar. We want to see it. But, before you start subtracting reliable forms of energy, we have got to make sure that we can replace it there.

In fact, in May, FERC Commissioner Mark Christie talked about electrical -- electricity reliability, and he said, The problem generally is not the addition of intermittent resources, primarily wind and solar, but the far too rapid subtraction of dispatchable resources, especially gas and coal.

We had Commissioner James Danly, who testified before this committee, and he said he believes it is a looming resource adequacy crisis that we are going to be facing

here. And we want our country to grow. We want it to thrive. But we have got to have the lights on in order to do it.

Mr. Ortiz, I want to ask you: Earlier, my colleague was talking about the MOU, the interagency comments that FERC sent to EPA dealing on the EPA rule that affected power plants. You said that the EPA largely implemented the terms of this. What did they ignore? Can you define what largely --

Dr. Ortiz. Yes, I can. So the -- with respect to -- we had a number of -- it wasn't a long list of comments, but a number of comments. And, regarding reliability, we noted that EPA had made -- had claimed to have made a reliability analysis based upon a forward-looking resource adequacy assessment. And we -- we -- you know, I don't have any -- you know, it is their modeling regarding resource adequacy. But the point that we made to them was that resource adequacy is only one piece of the puzzle, and looking at this at the kind of level that they did could -- might have not revealed certain reliability issues.

Mr. Carter. You know, I have got to be -- and sorry to interrupt, but I have got to be quite honest with you. I am not getting a warm, fuzzy feeling that you all are communicating well. Should I?

Dr. Ortiz. We communicate through the official channels through the OMB pass back process.

Mr. Carter. Is that a yes or a no? Are you all communicating well?

Dr. Ortiz. And I am not here to make a judgment. I am here to execute the laws and the requirements through many things that we --

Mr. Carter. Okay. All right. Throughout this hearing here today, a number of my colleagues have commented about the lack of coordination between EPA and

Department of Energy and FERC. And I echo those concerns.

FERC's mission is to assist consumers in obtaining reliable, safe, secure, and economically efficient energy services at a reasonable cost. Let's talk about a reasonable cost. With the cost of energy continually rising for almost every American -- and I have certainly seen it in south Georgia. It has been a hot summer. It has been almost unbearable. And my constituents have been calling. They need help with their electric bills. I mean -- and, look, we have got good, reliable energy in Georgia. We have got great providers. But the price is just -- it is just unaffordable for a lot of people.

Can you tell me what input FERC has to provide to ensure these rules result in economically efficient energy at a reasonable cost?

Dr. Ortiz. As you noted by citing FERC's charge, we are here to ensure just and reasonable rates for electricity. Regarding those impacts on other rules, unfortunately, I would have to take that back. As I mentioned before, I am an electrical engineer, not an economist, nor expert in markets. So, with your permission, I would be happy to work with my colleagues to provide a robust answer to your question.

Mr. Carter. And I appreciate that very much, and I will look forward to getting that.

Mr. Chairman, thank you again for allowing me to waive on, and I yield back.

Mr. Duncan. I thank the gentleman for waiving on.

And that concludes the first panel. I want to thank the witnesses for being here. There will be some follow-up questions, you heard some members who had run out of time and wanted to send. We ask that you will submit answers to those within 10 business days.

And so we are going to adjourn the first panel.

And we will now take a brief moment while we seat the second panel. So bear with us.

As they said in the military, smoke 'em if you got 'em.

[Recess.]

Mr. Duncan. All right. I am going to call the next panel into order.

We want to thank our witnesses for being here today and taking time to testify before the subcommittee.

Again, you will have an opportunity for opening statement. Try to stay within 5 minutes. We are going to try to stay on time. We do have votes about 1:30, so we are going to try to get as far as we can.

So, having said that, our second panel is in place.

I introduce them: Mr. Kevin Messner, executive vice president, Chief Policy Office at the Association of Home Appliance Manufacturers.

And I am going to skip the next one. I will come back to it.

Mr. Andrew deLaski is executive director at the Appliance Standards Awareness Project.

Mr. Ben Lieberman, senior fellow for the Center of Energy and Environment at Competitive Enterprise Institute.

And then a friend of mine, Bob Paulling, he is president and CEO of Mid-Carolina Electric Cooperative, and he is here on behalf of the National Rural Electric Cooperative Association. Just a side note. He is also a fellow Clemson football player, held some records for PATs as a kicker there, was on the national championship team in 1981, and go Tigers.

So, having said that, I recognize Mr. Messner for 5 minutes.

STATEMENTS OF KEVIN MESSNER, EXECUTIVE VICE PRESIDENT AND CHIEF POLICY OFFICER, ASSOCIATION OF HOME APPLIANCE MANUFACTURERS; B. ROBERT "BOB" PAULLING, PRESIDENT AND CEO, MID-CAROLINA ELECTRIC COOPERATIVE, ON BEHALF OF THE NATIONAL RURAL ELECTRIC COOPERATIVES ASSOCIATION; BEN LIEBERMAN, SENIOR FELLOW, COMPETITIVE ENTERPRISE INSTITUTE; AND ANDREW DELASKI, EXECUTIVE DIRECTOR, APPLIANCE STANDARDS AWARENESS PROJECT

STATEMENT OF KEVIN MESSNER

Mr. Messner. All right. Thanks.

Man, I am not a football kicker, so thank you.

Good afternoon, Chairman Duncan, Ranking Member DeGette, and members of the subcommittee.

I am Kevin Messner. I am the executive vice president and chief policy officer of the Association of Home Appliance Manufacturers.

Just wanted to start off by saying we appreciate the subcommittee's attention to the Energy Policy and Conservation Act. EPCA is not a law that people generally sit around the dining room table and discuss around the country. But it does impact people's lives every single day.

From the time we wake up in the morning and put on clean clothes, pull orange juice out of the refrigerator, cook breakfast, and then when we come home at night and prepare dinner and then load the dishwasher, we are impacted by home appliances. Home appliances make our lives easier, safer, and healthier.

The essence of EPCA has not been changed since the end of the Cold War. Since EPCA was signed into law by President Reagan, the Berlin Wall has fallen. We have got internet, email, and we have smartphones.

Just imagine. This law was written when we were still using typewriters and when people were using corded phones. Today, appliances are connected to your smartphone.

In 1987, when EPCA's appliance program was written, microwave ovens were surging in popularity. Today, we have all kinds of new connected features.

AHAM and our members have supported a system of Federal standards that improve energy and water conservation, a national program that benefits consumers by preventing inefficient and costly conflicting State requirements.

Home appliances have undergone continual and significant improvements in energy efficiency over the last three decades, and the energy and water efficiency gains across all the core major appliances have been dramatic.

Refrigerators are being produced with more room inside and use half the energy they did 20 years ago. In fact, the most commonly purchased refrigerator today uses about the same energy as a 50-watt light bulb.

Clothes washers' capacity today is 50 percent larger than it was in 2000, while energy consumption has dropped a staggering 70 percent. Clothes washers of an average efficiency can save a household more than 5,000 gallons of water and more than $150 in utility costs compared to a 10-year-old washer.

In the last example, dishwashers, they only use just 3.5 gallons of water. The flow rate of a faucet is about 2 gallons per minute. So that means, if you wanted to hand wash a full load of dishes and use less water, you would have to do that in one

minute.

Because home appliances have undergone so many standard changes over the years, further tightening of standards is producing diminishing returns. Plus, the reality of the laws of physics that require some amount of energy and water for home appliances to keep food cold and to clean and dry clothes and dishes has to be recognized.

Despite the significant progress to date on appliance efficiency, EPCA requires DOE to continue to review standards every 6 years with no end in sight. AHAM believes the law should not require DOE to create regulations just based on the passage of time.

Instead, regulations should be developed when there are opportunities to conserve energy in a cost-effective way that preserves consumer choice and appliance features.

AHAM and its members strive to work together to improve the implementation of the Federal energy and water conservation program, ensuring that consumers will continue to have access to safe, reliable, affordable, high-performing, and fully featured appliances.

I want to thank this subcommittee for its interest in modernizing EPCA so that DOE can appropriately prioritize work on the appliance standards program, maximize energy and water savings, and improve transparency and stakeholder engagement. EPCA modernization is the best way to assure the continued success of the program while still recognizing the realities of limited opportunities for further energy and water savings that are economically justified, technologically feasible, and preserve product features and performance.

I look forward to answering any questions you may have.

[The prepared statement of Mr. Messner follows:]

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Mr. Duncan. I thank you for that.

And I will now recognize Mr. Paulling for 5 minutes.

STATEMENT OF B. ROBERT "BOB" PAULLING

Mr. Paulling. Thank you, Mr. Chairman, Ranking Member DeGette, and members of the subcommittee for holding today's legislative hearing and inviting me to attend.

My name is Bob Paulling. I am CEO of Mid-Carolina Electric Cooperative, a distribution electric cooperative providing power to nearly 60,000 consumer members in the central region of South Carolina, including a portion of Chairman Duncan's district.

I have over 38 years of experience in the utility industry. I graduated with a bachelor of science in electrical engineering from Clemson University in 1985. Go Tigers.

Like all co-ops, we are invested in the communities we serve. We are deeply committed to delivering safe, reliable, and affordable electricity to our members. I am here on behalf of the community and the members that we serve to talk about Federal policies affecting the reliability of the electric grid and the challenges we face to keep the lights on.

Unfortunately the ability for our co-op to provide reliable and affordable electricity is under greater strain than ever before. There are five core challenges to reliability that I would like to highlight for the subcommittee today.

Primary messages I hope you will take away is that, if we fail to act on these

challenges as a Nation, we will struggle to keep up. Blackouts may become a routine part of our lives. Jobs and industry will flee not only South Carolina, but the country. That is a future we cannot accept.

The first challenge is electrifying the economy. As a Nation, we are headed toward a future that depends significantly more on electricity to power our economy. South Carolina has been a leader of electrification, recruiting a parade of economic development projects in recent years tied to the production of electric vehicles and the components that power them, their batteries.

We must prepare for this rapid rise in demand for electricity. We must act soon to expand the power generation, preserve existing resources, reduce the red ape and regulations that stand between us and our prosperous future.

The second and third challenges I would like to bring forth is the disorderly retirement of existing generation and the availability of natural gas. Last December's power supply crisis on Christmas weekend is a perfect example of these combined threats to reliability. Unseasonably low temperatures dried up the supply of natural gas available for power generation while also driving the demand for electricity to record highs. The grid could not rely on other baseload power sources for generation, resulting in rolling blackouts.

Fortunately for our members, we did not have to shut off their power with temperatures outside hovering in the low teens, but we cannot be content on having weathered this near miss, nor can we choose to be complacent. We have to build new generation and add capacity without prematurely shutting down existing power plants, which is not the direction EPA is headed with their recent power plant rules.

The fourth challenge I see is project permitting and environmental review.

Current Federal permitting costs and timelines are unreasonable and unacceptable. They present significant obstacles to building new electric-generating assets and other energy infrastructure, including transmission lines that will be required to accommodate additional generation and natural gas pipelines necessary for reliable and affordable natural gas power generation.

Please understand that the intermittent renewables must have online distributor -- dispatchable generation backing them up.

Further compounding our dilemma remains the ability for nearly anyone to bring a lawsuit challenging permitting and construction. This too must be addressed.

And, finally, we are facing with reliability -- issues with reliability as a result of supply chain delays and new proposed efficiency regulations for distribution transformers. As a pedal is pushed on electrifying the economy, we are in need of installing new transformers, increasing substation capacities, and upgrading wire and other equipment.

The problem is electric cooperatives are waiting a year or longer on average to receive these critical grid components, which is basically double the time it used to be. We have been constructing a substation for over 2 years, and we are still waiting on key components to energize that substation. And the situation that has already been bad has been made far worse uncertain with Department of Energy's proposed rule shifting majority of the transformer market to amorphous core in only a few short years.

There are ways to do this that increase efficiencies, allow us to keep up with benefits of electrification initiatives and lessen strain on the grid. But Department of Energy's proposal just isn't it.

I want to thank the committee for a chance to appear before you all today, and I

am looking forward to answering your questions.

[The prepared statement of Mr. Paulling follows:]

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RPTR SCHOETTLE

EDTR ROSEN

[1:08 p.m.]

Mr. Duncan. Thank you for that. I will now recognize Mr. DeLaski.

STATEMENT OF ANDREW DELASKI

Mr. deLaski. Thank you, Chairman Duncan, Ranking Member DeGette, and Members of the subcommittee for the opportunity to testify before you here today. My name Andrew deLaski, and I am the executive director of the Appliance Standards Awareness Project. ASAP advocates for appliance equipment and lighting standards that save energy and water, reduce economic and environmental burdens for low- and moderate-income households, and cut planet warming emissions and other air pollution.

ASAP's steering committee includes representatives from environmental and efficiency nonprofits, consumer groups, utility sector, and State government. ASAP is housed within the American Council for an Energy Efficient Economy, a nonprofit 501(c)(3) organization, focused on leading and advancing energy efficiency policies, programs, and technologies across the Nation.

The hearing in here today focuses on the critical issues of reliability and efficiency of our power system is very timely. Appliance standards have done more to cut energy waste in U.S. buildings than any other Federal effort. Reduced electricity waste translates into lower peak demand levels, enhancing the reliability of our power grids. It means lower household utility bills delivering pocketbook benefits for families.

We estimate that peak demand was 130,000 megawatts lower in the year 2020 than it would have been if we didn't have existing appliance efficiency standards that improves reliability, it reduces the chance of blackouts, and makes our grids more reliable. Annual household utility bills are about $500 lower because of existing standards. That is real money, especially for households on tight budgets.

We can do much more. Updated standards due in the months and years ahead could add significant additional peak demand reductions of a 90,000 megawatts of peak demand reduction benefits by our estimates, and add hundreds of dollars in annual bill savings for consumers, further enhancing reliability and reducing costs for consumers.

As of 2021, the UE had missed 28 legal deadlines for reviewing and potentially updating standards. Since then, the UE has been catching up, and the process is working well. Unfortunately, the three bills before you today would harm good reliability and efficiency rather than help. They would introduce needless new delays and hurdles for completing improved efficiency standards.

First, Representative Hudson's bill, H.R. 4167, would delay the Department of Energy's consideration of new standard of distribution transformers by 5 years. This is unnecessary because pandemic-related supply chain problems are starting to abate. They aren't abated, but they are starting to abate. We are starting to see some significant investments by manufacturers in new capacity for manufacturing.

Regardless, new standards would not take effect for several years. Meanwhile, the Department of Commerce reports that U.S. dependence on imports from Asia from high-quality electrical steel have been risings -- this is the steel used in transformer cores, that underscores the need to create a clear market incentive for U.S. production for the supply chain of transformers.

Kicking the can down the road on the efficiency standard decision would be worse than counterproductive. It would force manufacturers of both electrical steel and transformers to either defer investments to upgrade their manufacturing or hedge their investment bets because they don't know where the rules are headed. So ongoing regulatory uncertainty is the enemy of innovation. DOE has built a strong and thorough record in the current rulemaking process. As we see robust input from a range of effective industries, including transformer manufacturers, electrical steel producers and utilities, it has got a lot of input. Now is time for decisionmaking.

Second, the so-called EPCA reform bill is a wolf in sheep's clothing. While some language in this bill may seem reasonable at first glance, it would gut the National Efficiency Standards Program. It would mean that every new standard could not likely increase upfront product costs, have any effect on product characteristics, like cycle or charging time, or make any one manufacturer or distributor -- make it harder for them to compete, among the many other requirements, regardless of the utility bill savings or the grid benefits achieved by improved standards.

Any existing standard on the books today could now be revoked. Again, creating regulatory -- on-again, off-again regulations isn't helping anybody.

Taking a belt-and-suspenders approach to stop new standards, the bill would set unreasonably high minimum savings and low maximum payback periods. If this bill had been the law since the late 1970s, none of the benefits that consumers have gotten from efficiency standards today, none of the benefits we have for the grid would have ever been achieved. We would have no efficiency standards.

Finally, the GRID Act would grant extraordinary and unheard-of power to the FERC, and to some degree, each of the State regulatory commissions to override Federal

regulatory decisions made by DOE, the EPA, the Department of the Interior, the Department of Commerce, the Department of Defense, you name it, and every other Federal agency. This would not only delay the agency rulemaking process, it would make FERC the final decisionmaker on a range of topics that are outside its expertise. These bills would take us backwards. We urge the committee to reject them.

So in summary, I want to say that appliance efficiency standards have been an effective policy for cutting costly energy waste, for enhancing grid reliability, and saving consumers money. DOE's process for catching up on what has been a very big backlog of legal reviews for considering updates is working well, and the three bills before you -- before the Committee today would undermine that process.

Mr. Duncan. I am going to need you to wrap up.

Mr. deLaski. -- larger revocation of existing standards. We urge the committee to reject these bills. Thank you.

[The prepared statement of Mr. deLaski follows:]

******** COMMITTEE INSERT ********

Mr. Duncan. Thank you. Mr. Lieberman, you are recognized for 5 minutes.

STATEMENT OF BEN LIEBERMAN

Mr. Lieberman. Chair Duncan, Ranking Member DeGette, and Members of this subcommittee, thank you for the opportunity to testify today. My name is Ben Lieberman, and I am a senior fellow at the Competitive Enterprise Institute, a nonpartisan public policy organization that concentrates on regulatory issues from a free-market perspective.

I work in CEI's energy and environment department where I cover a number of regulatory programs, including Department of Energy's appliance efficiency standards. Prior to joining CEI in 2018, I was a staff member on this committee, where I also worked on DOE's appliance regulations, as well as other issues. When I was here, the problem of appliance overregulation was already serious enough that we held hearings like this and considered some measures to reform it.

However, over the last two years, and especially thus far in 2023, things have really gone too far. As we all recall, the year began with the commissioner on the Consumer Product Safety Commission telling the media that a ban on gas stoves was a real possibility followed up by strenuous denials from the Biden administration that any such ban was in the works. But within weeks of those denials, the administration launched a second regulatory attack on stoves, this time from DOE.

The pending stove efficiency standards joined other DOE proposals affecting furnaces, dishwashers, clothes washers, refrigerators, ceiling fans, and most recently,

water heaters. CEI has filed comments critical to several of these proposed rules and are party to litigation regarding another. Each of these regulations is a bad deal for consumers in its own way. I would like to highlight a few of the worst ones now.

For example, the proposal for dishwashers is especially counterproductive because dishwashers have already been badly overregulated. The past four, that is four rounds of successively tighter standards for energy and water use have increased the time it takes to do a normal cycle of dishes from about 1 hour to 2 or more. Cleaning performance has also been compromised, but now the agency is proposing a fifth round of even tougher limits.

The best interest of consumers would be better served if the agency were working to fix the problems with existing dishwasher regulations, which one of the bills would help facilitate, do that rather than doubling down with new ones.

I would also like to mention quickly air conditioners. They suffer at the hands of one but two agencies, DOE and EPA. DOE efficiency standards for central air conditioners took effect this year, and led to a noticeable jump in equipment costs. At the same time, EPA refrigerants target the refrigerant that are used in these systems. If I were to guess what the next consumer backlash to appliance regulations would be, like stoves were in 2023, my guess would be air conditioners in maybe as soon as next summer.

And lastly, I am sure this subcommittee has heard enough about the relative merits of gas versus electric stoves, and I will spare you the details, except to reiterate again that I always think the choice should lie with the consumer. But I would like to note that stoves have gotten caught up in the larger war on natural gas. Stoves, as well as furnaces and water heaters, which are also subject to pending rulemaking, come in

both natural gas and electric versions.

And the Biden administration has, as part of the climate agenda targeted the residential use of natural gas in favor of electrifying everything. And it is using DOE efficiency standards to give electric alliances an advantage over gas versions, despite gas being the preference of many homeowners. The use of appliance standards to skew the market away from gas versions and towards full electrification is not just bad news for consumer choice, but also has implications for the grid. Consider that currently nearly half of homes are heated with natural gas. That is a lot of BTUs being supplied by gas. But if the electrification agenda is successful and many of these gas heaters are replaced by electric, that would add significantly to electric demand, especially on the coldest winter days.

At the same time, there is documented and growing risk to electric reliability across the Nation, especially as baseload generation sources by coal and natural gas are being retired and replaced by wind and other intermittent renewable sources. In other words, the same Biden administration climate agenda that favors electric stoves and furnaces and water heaters over gas is also making dependence on them increasingly risky. We are putting more of our eggs in one basket, and at the same time, we are making that basket flimsier.

In conclusion, it makes sense at this point to sunset the appliance efficiency standards program altogether. Ending it has no downside for consumers. Keep in mind, those who want extra efficient appliances, or have bought into the idea that electric appliances are environmentally superior to natural gas are free to do so any time, without or without government interference. Federal regulations only serve to force the politically correct option on every consumer, whether they like it or not.

Now, if Congress chooses to keep the current program in place, it should make several important changes to it. That includes raising the bar on new standards to prevent the ones most likely to be more trouble than they are worth, and simplifying the process for revisiting and changing existing standards that have proven harmful to consumers. I would note that a recent National Academy of Sciences report recommended DOE make more of an effort to scrutinize past efficiency regulations in order to learn --

Mr. Duncan. I need you to wrap up.

Mr. Lieberman. From past mistakes, and to require the agency to show that existing standards are inadequate before starting the process of starting now ones. Perhaps most importantly, Congress should clarify that appliance standards programs not be used as a climate policy tool and that any environmental agenda cannot take precedence over the best interest of consumers. I believe many of these --

Mr. Duncan. I am going to ask you wrap up.

Mr. Lieberman. -- reform bill, and I look forward to talking about that bill.

[The prepared statement of Mr. Lieberman follows:]

******** COMMITTEE INSERT ********

Mr. Duncan. Thank you. All right. That concludes the opening statements, and we will delve into some more of this through the questions. We now are moving into the question portion. I will recognize myself for 5 minutes.

Mr. Paulling, your testimony expressed concerns related to South Carolina's current power supply situation. I talk about these same concerns all the time here in Washington with my colleagues. I am glad you are here to give sort of a boots-on-the-ground perspective. South Carolina is the third fastest growing State in the country. We have seen an influx of business and industry come to South Carolina in the past decade. And this is great, but our power generation resources have simply not kept up with demand. I am concerned for what that means for the future of new businesses, residential coming into the South Carolina. It is clear we need a lot more power supply.

Can you give us a perspective on this? What Federal policies are contributing to this situation?

Mr. Paulling. Absolutely, Chairman. Unfortunately, we have not built any new generation in South Carolina in nearly two decades. We had the VC summer plant that failed for various reasons, and we had not brought in new generational line. And we have grown by leaps and bounds. Again, for population growth, everybody wants to move to South Carolina and we welcome it. We had robust economic development, and all these loads have been bigger and bigger and bigger as far from an electrical standpoint.

Most of them have been electrical vehicles, those type things. We are just in a shortage right now of baseload generation. We have built solar. We are going to

continue to build solar. Everybody needs to understand when you build solar, you have got to have a spinning generator backing it up. People don't understand, it is much like most of you all flew an airliner coming in. You are coming in, and the pilot has to continually get on the throttle and back off the throttle, keep the speed of the plane constant. Power systems are the same way. It happens a lot faster. So as the cloud cover goes over those solar panels, you have got to have a spinning generator to push forward, pull back, push forward. It is a continuous balance. All that is good. All of that needs to be maintained.

But our issue in South Carolina is the adequate capacity of natural gas. Every pipeline is fully subscribed. We have got to figure out how to build more pipelines within the State of South Carolina and build some significant natural gas generation to solve our needs. That is the bridge fuel. A decade from now, technology will take place. There will be nuclear reactors and those type of things. But we can't afford to wait that long, Mr. Chairman. We have got to act now and get natural gas. Not just for electric generation, but just for general industry, it needs natural gas.

Mr. Duncan. Volkswagen came in, 4,000 jobs, needed natural gas in South Carolina.

Mr. Paulling. Right.

Mr. Duncan. Just about a deal breaker. I haven't talked to a single-power generator utility that doesn't like wind and solar as part of the energy matrix. But in South Carolina, it is mainly solar. It starts at zero every day.

Mr. Paulling. Right.

Mr. Duncan. And it ends at zero every day. And as we saw on Christmas Eve, and we see throughout the day, if you look at the whole year, you will see solar peaks and

valleys during the way.

Mr. Paulling. Correct.

Mr. Duncan. Where it doesn't reach that bell-shaped curve peak on an optimal day, and you have to have that dispatchable energy. Last Christmas, South Carolina faced a power supply crisis, many utilities in South Carolina -- and you mentioned in your opening testimony -- across the southeast all the way up to Ohio were forced to implement rolling blackouts. How did utilities in our State respond to this, and how can we prevent that from happening in the future?

Mr. Paulling. Chairman, we were lucky. We were fortunate it happened on Christmas Eve, because if you think about what was going on in our State and throughout the southeast, a lot of industry was shut down for Christmas break. On our system alone, we had probably 30 to 35 megawatts of schools, on a normal school day would have been online. So had this happened on a Tuesday in January, we would have had blackouts all over the southeast. So we were lucky and we were fortunate. So we need to realize that, recognize that, and keep that from happening again.

As far as our system is concerned, when I went to bed Friday night, we had a cold wave come through, we had a few storms. I got notification from our balancing authority, which is Santee Cooper and Duke Energy, Hey, we are good, transmissions, is good, all the generators are up and running. Something happened during the night. A transmission line tripped off a generating station, had to be shut down because of some steam leak or something.

So when I get up at 5:45 on Christmas Eve, I get a notification from our power suppliers says, Hey, we are going to have rolling blackouts, and by the way mid-Carolina, your block is going to be probably lunch time, and the substations that we are going to

turn off is really the northern west part of our system, which is the outskirts of Columbia, South Carolina, where all the Christmas shopping takes place. So we would have been shut down on Christmas Eve during lunchtime.

And you say, Well that is cool. It is 15 minutes off, 15 minutes on. It doesn't work that way. When the lights go off, one quick example is -- we had one subdivision that actually tripped out on load. Normally runs a 65-amp fuse. We replaced it with a 100-amp fuse. It blew. We had to cut the subdivision in half, and it took almost 2-1/2 hours to get that one subdivision back up and running. Had we had our half system shut down, it would have been 8 or 9 o'clock that night before we got everybody back up and running. You are looking at frozen pipes. Folks in the south, we don't know how to insulate our homes for cold weather. Thank goodness. It would have been a catastrophe.

Mr. Duncan. I had flown from Montana back home the day before Christmas Eve. It was minus 34 in Montana. Flew through Denver, got stuck there. It was minus 20. It was cold all over the country. And South Carolina wasn't alone. Thanks for your comments.

I will now recognize Ranking Member DeGette for 5 minutes.

Ms. DeGette. Yeah. It is cold out there in the west. So energy efficiency standards, one of the things they are intended to do is to save consumers energy and money in the long run. And they have, and also, they are not implemented without just cause. So, Mr. deLaski, I want to ask you a couple of questions. DOE has a process for determining whether standards economically justified, technologically feasible, or would result in significant energy savings; is that right?

Mr. deLaski. That is correct.

Ms. DeGette. And DOE would modify its standards if one of the standards they promulgated didn't meet those criteria; is that right?

Mr. deLaski. That is correct. DOE has to consider that as work on -- working on updated standard.

Ms. DeGette. Right. They are not going to just willy-nilly do these standards if they don't meet the criteria?

Mr. deLaski. That is correct.

Ms. DeGette. Now, in your testimony, you mentioned the benefit of energy efficiency standards for low- and moderate-income households. Can you expand upon that a little bit?

Mr. deLaski. Yes. If you think about it, energy efficiency innovation often shows up in the most expensive products first. What the standards do is ensure that energy innovation show up in full range of choices available to consumers, including the value price products at the entry point of the market, where the most price conscious consumers are going to be shopping. Also, low-income households are disproportionately renters.

Ms. DeGette. Right.

Mr. deLaski. Landlords have no incentive to buy a more expensive appliance, even a dollar more expensive, to save their tenant more money. So it is really important for low-income households, especially tenants, that we increase the efficiency standards to save them money and reduce their bills.

Ms. DeGette. Right. Now, I want to talk for a few minutes about transformers and transmission. Mr. Paulling, I have particular affection for you because I am also a tiger, a Colorado College Tiger, though, but still.

Mr. Paulling. Go Tigers.

Ms. DeGette. Go Tigers. You know, and also I have a really wonderful working relationship with my rural electric co-ops, too, in Colorado. And you guys face a lot of different challenges. One way to alleviate some of the challenges that you face is if we have additional Federal investments in the distribution transformer supply chain. Is that right?

Mr. Paulling. That is correct. Can I give a you brief history of amorphous transformers in the State of South Carolina and transformers in general?

Ms. DeGette. Yes. Go ahead.

Mr. Paulling. So I got in the industry in 1980s. Prior to that, a transformer was simply a commodity item. You just bought it on lost cost. Low bid, low bid, low bid. In the 80s, we started really understanding energy efficiencies and losses and those type things. So we changed the narrative and started devaluating transformers for total ownership cost, life of the transformer, how much does it cost up front?

There is two types of losses in transformers. One is no-load loss. In other words, the transformer is sitting there just to energize. It takes energy to keep it humming. And then as the transformer uses -- as the consumer uses the transformer is loaded, the more inefficient the transformer is, the more losses.

Ms. DeGette. Right.

Mr. Paulling. So we went through that. I heard earlier that there is 80,000 different transformer designs. In South Carolina, there is about six because our engineering association with the co-ops, we developed it over the years and we streamlined it. And we went through a period of time in 1993 to 1997 where we bought amorphous core transformers from General Electric. General Electric had a plant in

Hickory, North Carolina, and we bought them. And we had a number of issues with them, and mainly the size. The amorphous core transformer has a rectangular winding versus a circular winding. So it has to just be larger in physical size. So instead of having a, you know, 300-pound transformer, you have a 600-pound transformer trying to put it on a little small pole out there.

So we actually had to change our system design to use larger poles and do different things. So we have been through the amorphous transformers. I contend that the transformer today is many, many, many times more efficient than it was even 15 years ago. The standard to build a transformer more efficiently, I am all for. But don't push us into a, you know, another type of design that is really unproven.

Ms. DeGette. But Federal investment really helped?

Mr. Paulling. I can't speak to that because I don't know how the Federal investment really feeds into that process.

Ms. DeGette. Well, let me ask you this: If you could get some new transmission lines to help address reliability, that would probably help, too?

Mr. Paulling. Transmission lines?

Ms. DeGette. Yeah.

Mr. Paulling. Every utility -- systems are interconnected. The more robust those interconnections are, the better we are all.

Ms. DeGette. Thank you very much. I yield back.

Mr. Duncan. Thank you for that. And I will now go to Mr. Johnson for 5 minutes.

Mr. Johnson. Thank you, Mr. Chairman, and thanks to our panelists for being here. Some really important things we are talking about today. If my colleagues and

the panelists will indulge me for a quick history moment here. I know a few of us in this room, but certainly none of our staff, may be old enough to remember, but the 1973 oil crisis was launched by Saudi Arabia and others leading to an all embargo against the United States and other countries who supported Israel in the Yom Kippur War. Some of us with gray hair, I won't mention any names, might actually remember that. It was a crisis, a gasoline crisis skyrocketed. American families suffered, and lawmakers were scared across the spectrum.

Congress responded with what we call the Energy Policy and Conservation Act of 1985 signed into law by President Ford, a Republican, I might note. Now, I want to take a step back, though, and I think as Federal lawmakers, especially on my side of the aisle, we should view this as a cautionary tale. It shows just what can happen when you legislate in a crisis and delegate authority after authority to the executive branch.

Now, almost 50 years into the law's existence, with several changes having been made since then, you now can go to the DOE website to see where, and I quote, the U.S. Department of Energy has the authority to regulate the energy efficiency level of ceiling fans. Ceiling fans, I kid you not. From oil crisis to ceiling fans. Talk about mission creep. We started with addressing a major foreign policy and economic crisis, and ended up with bureaucrats in Washington telling my constituents, all of your constituents, the maximum flow for their shower and how their ceiling fans should operate. And the list goes on and on, whether it is gas stoves, thermostats, or water heaters, how did we ever end up where the Federal Government can tell you which kind of device and appliance to buy for your home?

And now this administration has taken this a step further to use those standards as a way to shoehorn in their goals of societal electrification, regardless of true efficiency,

the availability of proven technology, convenience, or cost.

So, Mr. Lieberman, let me start with you. I know Congress established the authority for these appliance standards decades ago, long before I got here. But is it time to repeal or significantly curtail them, especially with so many examples of abuse of this authority to drive an agenda?

Mr. Lieberman. Incidentally, there is just not just regulations for ceiling fans, but separate regulations for ceiling fan lights --

Mr. Johnson. Right.

Mr. Lieberman. As well. I think that it is high time to sunset the program. As I said, consumers who want to buy ultra efficient appliances are free to do so. Manufacturers make just about every appliance, appliances -- models that go well beyond the efficiency standards for those whom it makes sense. But for many it doesn't make sense. The problem with EPCA is it has some reasonable limitations, for example, said you can't set a standard unless it saves a significant amount of energy.

Mr. Johnson. Right.

Mr. Lieberman. But it didn't define significance so it has been defined downward so that the agency does anything significant if they want to regulate it. So a lot of the reforms aren't really changing EPCA, but just strengthening some of the vague language.

Mr. Johnson. Let me continue with you, can you outline how these standards have now morphed into pursuing unrelated electrification and climate goals instead of purely conserving resources and saving consumers money? You kind of alluded to it in your answer. You want to expand on that?

Mr. Lieberman. All of the proposed rules this year, clothes washers, dishwashers, refrigerators, ceiling fans, water heaters, stoves, they all include climate

benefits as part of the overall benefits. That is just taking the eye off the ball in terms of what is best for consumers. You are now saying that consumers don't necessarily come first.

Mr. Johnson. I have got one final question for you. I represent a rural working-class Appalachian district. Could these rules, as we just talked about, as they become more onerous, could they constitute a public health concern, in your view, as costs go up and Americans can't afford the water heaters, the new stoves, rewiring their homes for these appliances, is that a -- could this constitute a health crisis?

Mr. Lieberman. Just about all of these standards will raise the upfront cost of the appliance, and for some low-income homeowners, that could be prohibited. For those who aspire to own a home, almost every appliance in the house is going to be more expensive.

Mr. Johnson. If nothing more, a mental health crisis as that stress increases. Mr. Chairman, I yield back.

Mr. Duncan. I thank the gentleman. Lay of the land, we are going to get to Mr. Tonko, Ms. Lesko. We are going to take a break, go vote and come back. We will reconvene afterwards.

Mr. Tonko is recognized for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair. Mr. deLaski, I am hoping that you can help make this very clear for everyone. Can you explain the role efficiency improvements can play in reducing energy demand, and therefore enhancing the reliability of the grid?

Mr. deLaski. Absolutely. We estimate that existing standards have reduced electricity demand, peak electricity demand by 130,000 megawatts, and update the standards, including those for air conditioners which are the most important for reducing

peak demand. New standards could reduce demand by 90,000 megawatts. When you bring demand down, that reduces probability that on a hot summer day you are going to have an outage or other problems. So standards have brought the peak demand down that helps reduce the probability of reliability problems.

Mr. Tonko. And I believe it is accurate to say that some of the greatest potential beneficiaries of energy efficiency are low-income households, which spend a higher percentage of their incomes on energy bills. So again, Mr. deLaski, can you explain some of the barriers that may exist that prevent low-income Americans from experiencing all of these benefits?

Mr. deLaski. One of the most significant benefits is the split incentive between the landlord and the tenant, right, so that a landlord, particularly a private landlord has every incentive to keep their costs down, but the tenant pays the utility bill most commonly. So one of the things the standards do is ensure that all the full range of choices on the market include a basic level of energy efficiency performance, delivering benefits to all households, including tenants and people across the income spectrum.

Mr. Tonko. All right. Thank you for that. This is certainly why minimum efficiency standards raise the floor and help all Americans. But DOE also has a wonderful program, the Weatherization Assistance Program, dedicated to enabling the low-income households to overcome some of these barriers to efficiency improvements, and this program works. Households receiving weatherization services save, on average, $372 every year on their energy bills. This is so important for vulnerable Americans that may otherwise have to choose between paying their energy bills and other essentials like food and medicine.

But despite the weatherization program's great track record, we know it can be

strengthened. Last year, I proposed a bill that would have allowed each home in the program to receive more funding. This would reflect the recent realities of increased costs of construction materials and inflation.

Similarly, the bill would also support weatherization readiness, which would be able to provide assistance to homes in such poor condition that they cannot enter into the Weatherization Assistance Program. It has been estimated that as many as 25 percent of eligible households are unable to receive weatherization services and that the readiness fund can help many of those households.

So Mr. deLaski, I know you are here to discuss the standards program, but I hope you might be able to offer a reaction to some of the reforms that I just outlined on the Weatherization Assistance Program. Is this an area Congress should explore to ensure low-income Americans are able to fully experience the benefits of this effort for energy efficiency?

Mr. deLaski. Absolutely. The weatherization program and ensuring that households are ready to be weatherized is a fundamental need that we need to pursue. And it complements the energy efficiency standards, but very essential that we improve weatherization programs and make it accessible to more households to be able to bring their bills down and help people, you know, make ends meet month to month.

Mr. Tonko. Well, within that 25 percent of eligible households, I have talked to folks in my district who, you know, know of the benefits from talking to neighbors and friends. And I just think, if we can get them to qualify by offering the readiness fund, it is a benefit for everyone.

So with that, I thank you, and I thank the chair. And I yield back.

Mr. Duncan. Gentleman yields back. I will now go to Arizona's Mrs. Lesko.

Mrs. Lesko. Thank you, Mr. Chair, and thank you to all of you being here to testify in front of us today. I have a bit of breaking news for the committee. I have been informed that the energy efficiency advocates and appliance industry groups have reached an agreement that if implemented by Department of Energy, should preserve a full line of gas appliances with the features consumers enjoy and inspect.

So I want to thank the members of this committee that voted for my Save Our Gas Stoves Act. I hope that the Department of Energy has taken notice of my bill, the Save Our Gas Stoves Act and the strong bipartisan vote it received on the House floor. I am proud that we worked across the aisle to pass the bill out of the House.

My hope is that this agreement will show that the Biden administration has no intention of banning gas stoves. This would be a win for common sense and the American people. EPCA, the Energy Policy and Conservation Act, is broken. And environmental activists are exploiting the fact through sue and settle backroom deals, and I do think this must end. That is why I am glad to sponsor, and once again, introduce a new bill to protect consumer choice on all appliances and plumbing products.

I don't know about you, but I hate when the Federal Government restricts the water pressure in my shower head and messes with the effectiveness of my dishwasher. Unless we pass comprehensive reforms, we will be right back here dealing with the same broken process. The reforms in my bill are long overdue. This bill will address future attempts by the Biden administration, or any administration, to impose regulatory overreach and reduce consumer choices. Most importantly, this bill will finally establish a minimum standard for energy savings for any future rulemaking.

We are putting real energy saving dollars back into the energy efficiency standards. The bill is common sense, energy efficiency is a good thing, but only if it

helps the consumer save money and the product still works. The bill will establish a standard that any future rule must save the consumer at least 10 percent. More importantly, it will establish a low-income household index where the savings for low-income households must be significant. Finally, the bill will only allow future rules that are technologically feasible and economically justified.

Mr. Messner, I believe AHAM was part of the agreement I spoke about. Given your experience with the gas stoves rule, why is it important we reform EPCA, the Energy Policy and Conservation Act with commonsense approaches?

Mr. Messner. Thank you, Congresswoman, and thank you for your leadership with the Save Our Gas Stoves Act.

EPCA -- I think the process that we have kind of been going through in seeing some of the proposed rules that have come out by the Department of Energy just exposed some of the need to reform EPCA. EPCA has a lot of the things that people talk about that are important about protecting features, and consumer choice, and economic justification, and technological feasibility. It has all that in the law, but it is just that DOE has to consider these factors.

So over the years, over the last 30 years, it has become apparent in that DOE is going to be proposing some rules that are out of step with some of these considerations, that those considerations should be -- there should be more requirements that they need to address these things instead of just consider them, and then move forward with potentially standards that doesn't protect the features that people want. If they don't have products that people want to buy, then we have kind of all failed.

Mrs. Lesko. Well, thank you. Mr. Lieberman, can you comment on the importance of establishing a firm, measurable standard for energy savings?

Mr. Lieberman. The upside of these standards for consumers is the energy or water saving. That has to be weighed against the downside, higher upfront costs, potential diminution of product features, performance, reliability, longevity. And if the upside is very, very small, then it is quite likely that these are standards that are going to be more trouble than they are worth. For example, the proposed gas stove rule, or the proposed rule for gas stove was estimated to save gas cook top stove owners $1.51 per year. That is been revised downward I have heard. We will have to see this new negotiated agreement comes up with. That is a very, very modest upside given the risks, especially for people who like cooking with gas and are concerned that gas stoves will have to eliminate some of their favorable features. So benefiting consumers ought to be pretty obvious and having a minimum savings is part of that.

Mrs. Lesko. Thank you. And I yield back.

Mr. Duncan. Gentlelady yields back. We are going to go vote. So we will stand in recess to the call of the chair.

[Recess.]

[2:18 p.m.]

Mr. Duncan. We will call the Energy Subcommittee back to order. And I will recognize Mr. Cardenas, our new ranking member here for 5 minutes.

Mr. Cardenas. In minutes, I become ranking member. Thank you, chairman. Thank you Chairman Duncan and also Ranking Member DeGette for holding this hearing. And I want to thank the panel, our second panel today, of witnesses and experts to enlighten us with what is going on out there in the real world.

It is interesting to me that Republicans are so dead set on weakening agency's ability to regulate, when I can think of many examples of standards and regulations protecting the health and well-being of American children, men, and women across our country for generations now.

Take lead gasoline as an example. Despite knowing that lead was a poison, industries, such as automaker industries and oil companies and chemical giants, said that Well, low levels of exposure to lead in gasoline wouldn't harm the public. Well, in 1973 the EPA began an effort to phase out leaded gasoline. And within a decade, new vehicles were designed to run on unleaded gasoline.

To each one of the panelists here, do you agree that it was a good idea to take lead out of gasoline across America? Start to my left.

Mr. Messner. Well, that -- I represent the appliance manufacturers, so it would just be a personal opinion, not what I represent.

Mr. Cardenas. Sure. Good idea or bad idea?

Mr. Messner. I am really not an expert on that, but I would say it would be a bad idea to ingest lead and have lead in anything that you want -- it is not a good chemical to

be -- to have ingested.

Mr. Cardenas. Okay. Thank you.

Mr. Paulling. Yeah. I think taking lead out of gasoline is one of those things you could prove that is beneficial to all, in my opinion.

Mr. Cardenas. Beautiful. Thank you.

Mr. deLaski. I have two children and I am very happy they grew up without lead in gasoline.

Mr. Cardenas. Thank you.

Mr. Lieberman. Good to see leaded gasoline go, but the substituted compound was MTDE which caused problems of its own, so we need to think big picture.

Mr. Cardenas. Absolutely. I couldn't agree with you more about we need to think big picture, especially when it comes to the health and wellbeing of the American people. Imagine if Congress meddled with the EPA's process rendering them unable to do their job. So getting the lead out would have not happened had they not been allowed to do so.

While banning lead in gas is different than energy efficiency standards, it is a reminder that when we allow experts like the DOE or EPA to regulate and to do their job when we prioritize the health and safety of consumers, is a good benefit for all. Allowing the DOE to do its job will protect the health of consumers by cutting down emissions. It will also save consumers money.

As many of us recognize, enhancing energy efficiency directly contributes to the affordability of the grid. According to the Department of Energy, its energy efficiency actions under the Biden/Harris administration will save Americans about $570 billion over the next 30 years. That is good money for Americans to be able to keep in their own

pockets. Those utility savings are significant for families, particularly those that are low- and moderate-income families in all of our districts.

Mr. DeLaski, in your testimony, you discussed the impact that energy efficiency standards have on American families. For constituents at home who may be struggling to wrap their heads around the relationship between federal efficiency standards and utility bills, can you break down how strong efficiency standards translate to lower utility bills for households, particularly those that are low- and moderate families?

Mr. deLaski. The typical household spends about $500 less a year on utility bills as an existing efficiency standards. Updating those standards in the months and years ahead has the potential to reduce utility bills on an annual basis for an average household by hundreds of dollars. That is real money that helps households, particularly ones on tight budgets make ends meet month to month.

Mr. Cardenas. Yes, especially those families who their only income might be Social Security, like many of our seniors. So thank you for that answer. My district has nearly 140,000 renters, and as you mentioned, renters are not always able to choose their appliances. Can you expand how robust appliance standards help ensure that renters benefit from savings on their utility bills from more efficient appliances?

Mr. deLaski. Often, a landlord doesn't have an incentive to buy an even slightly more expensive appliance because they are not going to be the one who saves on the utility bill. It is the renter who is going to save, who typically pays the utilities. So the standards ensure that landlords are buying reasonably efficient appliances to help keep costs and down, and that benefits renters who are disproportionately lower-income households.

Mr. Cardenas. Okay. My time expiring, I yield back, Mr. Chairman.

Mr. Duncan. Gentleman yields back. It is interesting that the same year they took lead out of gasoline, Jimmy Carter's administration and President Biden and Senator Biden voted for coal as a power generation source for this country, not oil and gas.

I will now recognize Mr. Walberg for 5 minutes.

Mr. Walberg. Thank you, Mr. Chairman, and thanks to the panel for being here. We are in the midst of a drastic push towards all electric vehicles, in spite of the fact that we have seen some very significant failures, including with our Energy Secretary and her attempt to drive electric vehicles on a tour this past week that just didn't work out well, including police had to be called at one point in time, and it didn't work well.

And then Ford Motor Company president took an extended trip to, I believe, California, never made it in his EV vehicle because of significant challenges with charging and the ability to do that. So we have seen auto companies lose billions of dollars. It is reported last week that General Motors lost $60,000 per EV last year. That is a loss leader. The rest of us make up that slack.

Consumers not there yet as well. Talking across my district with farmers, factory workers, contractors, et cetera, they are not ready for it yet. They feel the government is pushing them into something that they are not unwilling to look at, but to be mandated and neither is our electric grid ready for it.

Under the current DOE standard, an average electric vehicle requires 0.364 kilowatt hours of energy per mile driven. That means if Michiganders were to transition entirely to EVs in our State, the State would need an additional 44.7 billion kilowatt hours of generation per year to support just the light-duty fleet. I understand that the transition to all EVs will not happen overnight, but we must acknowledge the feasibility of adding such significant demand on our electric grid while the Biden administration

simultaneously decreases generation through their heavy-handed policies.

Mr. Paulling, like South Carolina, Michigan has also seen significant investment in EV manufacturing, but I fear that we are barreling towards a reliability crisis if we don't balance this massive increase in demand with increased supply of reliable dispatchable generation. As it stands, can our energy distribution system handle the projected loads and all the EV fleet would require?

Mr. Paulling. I can speak for Mid Carolina Electric Cooperative. What we have done is we have done our best to prepare our system for the influx of electric vehicles. We have not seen a significant influx of electric vehicles, but one of the main things we did was we put a rate structure in place to make sure there is no cross-subsidization going on. That is the most important to me. Somebody living in these apartments we are talking about, low income, doesn't need to power somebody's Tesla. So that is the main thing we did. Other thing is we have planned, as best we can, to have our distribution system as robust as possible. The other thing I am doing right now is saying, Hey, we have got to have generation in place because the train has left the station, these EVs are coming, timing of it we don't know. But we really need to build baseload generations so folks can charge these cars. We, as a utility, have not gotten into the charging arena. We want the marketplace to take care of that.

If somebody wants to put a charging station in, they got to pay the freight. They got to buy the transformer. They got to put in the infrastructure. So again, we are agnostic to whether they come or not, but recognize that they are coming and we need to be prepared for them. But to answer your question, overall, no the grid is not even close to being capable to have the capacity if they come full speed in the next 10 to 15 years.

Mr. Walberg. Yeah. In fact, I think we have gone away from it. We put ourselves backwards.

Mr. Lieberman, in your testimony you discuss how DOE's energy and water limits for dishwashers have had an adverse impact on consumers, and that the efficiency savings from those regulations might even be negligible because of performance losses. Can you elaborate more on why that is and, if Representative Lesko's legislation would prevent similar regulations from going into effect?

Mr. Lieberman. Well, dishwashers have been regulated four times. Now, we are onto the fifth, and as Mr. Messner said, we are reaching, if not already at the point of diminishing, and maybe even negative returns. The time it takes to do a normal cycle on your dishwasher is more like 2 hours rather than 1. Now many models have a quick wash cycle, but that is not optimal. I think most people would like the normal cycle to get the job done in an hour, rather than two. The energy savings just isn't worth it for many consumers in terms of the reduced performance of the dishwasher.

Something else that hasn't gotten enough attention is whether appliances aren't lasting as long because of these appliance efficiency regulations, the over-engineering that has to go into squeezing out a little bit more efficiency maybe creating more fickle systems that aren't as durable as older systems. I have worked with some appliance mechanics, technicians, repairmen and they tell me that they don't make them like they used to.

Mr. Walberg. Well, I am not looking forward to washing dishes myself again as much as I did as a kid. I hope we stop and think and get this right. I yield back.

Mr. Duncan. Gentleman yields back. I now go to Mr. Balderson from Ohio for 5 minutes.

Mr. Balderson. Thank you. Mr. Chairman. Mr. Paulling -- I want to thank all of you for being here, but my first question is to Mr. Paulling. In the first panel, I discussed with the Assistant Secretary Rodrigues about the implications of their distribution transformer efficiency proposal. In our back and forth with the Assistant Secretary, he said, Even if we were to go -- even if the rule would go into effect as proposed, there would still be a market for good American GOES steel.

I would like to enter into the record a letter from the CEO of Cleveland Cliffs, Mr. Chairman.

Mr. Duncan. Without objection, so ordered.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Balderson. Thank you. The CEO of Cleveland Cliffs discussing his concerns with the proposed rule. If this rule is implemented, and I am reading from his letter, if this rule is implemented as proposed, it will mean the end of the highest efficiency electrical steel production in the United States. Without a market for this GOES, Cleveland Cliffs production of both GOES and NOES would be completely unsustainable. The company would have no choice but to discontinue the production of GOES for this market. GOES for the power -- GOES for the power transformer market, and NOES for needed for electric vehicles and other applications.

I just wanted to set the record straight, if implemented, the Department of Energy's proposal directly threatens 1,500 good-paying union jobs in Butler, Pennsylvania and Jamesville, Ohio. I am a cosponsor of Congressman Hudson's Protecting America's Distribution Transformer Supply Act, which prohibits the EPA from imposing new efficiency standards for distribution transformers for 5 years.

I am coming, Mr. Paulling, I apologize. I know folks across the supply chain have expressed concerns regarding the Department's distribution transformer role. Can you discuss your concerns with moving away from GOES to a different type of steel, question one. And how will this create uncertainty in the transformer market?

Mr. Paulling. The most important component to a utility system is our transformers, whether that be a substation transformers that transmission voltage to distribution voltage or the transformer that changes from distribution voltage and to usable voltage in the home or business, with that, the most critical component we have. And when a transformer goes bad, existing transformer, we have to have one to replace it with. We can't say, Well, we will get you one in three weeks, just do the best you can.

Or if a new subdivision comes along, we can't tell the developer well we will wait 2 years before we can start building homes. So that supply chain is just the most intricate thing that we have, and if we disrupt that by going to amorphous steel -- again, I mentioned earlier, I was part of the amorphous steel experiment and did not work out. It is just the physics of it, it won't work. But it is not only the thousands of jobs that you talked about, but it is all, think about how many people work at ERMCO or Howard Industries, or those other transformer manufactures that for them to change processes and start winding amorphous core steel, they not going to be able to do without retooling their entire plants to do this. So if all of a sudden you disrupt and go to amorphous steel, it is a disaster. I wish I had facts and figures behind it. But just from distribution perspective, I know if my cooperative, they probably would run me off first thing because I couldn't supply the needs of my members, so it is critical.

Mr. Balderson. Thank you. Mr. Paulling, do you think it would be good policy for the agencies responsible for ensuring grid reality, such as FERC in the North American Electrical Rehability Corporation, and the actual operators of the bulk power system to report back to Congress on the potential issues that threaten grid reliability?

Mr. Paulling. I think a lot of the situation we are in is because the right hand doesn't know what the left hand is doing. In my organization we know everything that goes on affects every part of the organization. So these entities need to speak. They need to have it. And everybody needs to get around the table and work together to make things happen. If we don't, we are falling further behind.

Mr. Balderson. That follows up my next question to you. Would you agree there should be a greater coordination between FERC and Federal agencies to consider the consequences on the bulk system?

Mr. Paulling. Absolutely. And it is all about reliability and affordability, and safety, and all those type things. But until they begin to figure somehow how to work together and a truly partnership basis, we won't move forward.

Mr. Balderson. Okay. Thank you. Mr. Chairman, I will yield back.

Mr. Duncan. Gentleman yields back. I now go to the gentleman from Alabama who didn't have a great day Saturday, but roll tide, Mr. Palmer.

Mr. Palmer. I thank the gentleman for his sympathy, but we will get over it.

I want to stay on the physics issue, and this is one of the things I have tried to explain constantly to my Democratic colleagues. I worked for two international engineering companies. One company was environmental systems. We did everything from [inaudible] aerospace to, in some cases, nuclear work. And the physics don't work for intermittent power, and it creates, I think, a threat to grid reliability, the North American Electric Reliability Corporation updated their risk assessment from 2021, where the number one risk was changing the resource mix, in other words shutting down hydrocarbon energy generation going to wind and solar. We were losing generative capacity to such extent that they are now warning parts of the country that never experienced blackouts, like from the Midwest down to the south, a warning that this could occur.

The updated, it is still changing the resource mix is the number one threat. The number two threat is resource adequacy and performance. What I want to point out is that wind and solar, as everybody knows, is intermittent. So you can't schedule electricity production, and even wind and solar only have like a 40 -- wind would have a 40 percent, solar 30 percent less capacity. You know, traditional hydrocarbon production is 85 to 90 percent. It is reliable. You can maintain a consistent baseload.

You can meet peak demand, and that would include nuclear as well, which I think we do have a bipartisan agreement on advanced nuclear.

So I think that is one of the biggest issues that we have got to deal with along with something else that has been mentioned in this hearing, and that is the supply-chain issue. If we haven't learned anything else from the war in Ukraine, it should simply be this: that no Nation should be relying on an adversarial nation for something that is critical to its economic security and national security as energy. And we could completely eliminate our reliance on hydrocarbon energy, which we will not do, by the way, it is not feasible in the short-term, and become 100 percent renewable would make us 100 percent reliant on China, because we don't produce batteries here. We assemble batteries from parts from China. So I will let you respond to this in just a moment.

But I want to respond to Mr. Lieberman. I am concerned that the Department of Energy is ignoring impact of efficiency standards like for the dishwashers and the gas range tops and gas hot water heaters. They are ignoring this for low-income families. And they say over 10 years, you will recover, basically, pennies on the dollar. I grew up dirt poor. My mom and dad could not afford a new range top. They could not afford a new water heaters. We heated our house with coal burning in a heater sitting in our kitchen, but if we had had a gas heat, we couldn't afford to replace it.

And it amazes me how out of touch some of my colleagues are with how people are having to live today. Median household income has about $9,000 a year less buying power than it did just 3 years ago, before this administration came into office. Would you comment on this? I mean, to tell people, Yeah, go ahead and replace your gas range, your water heater and everything, and over 10 years, you will come out a little bit ahead. I beg to differ. I mean, most people would have to put it on credit card and

pay the interest on it in addition to the higher cost for the appliance.

RPTR GIORDANO

EDTR HUMKE

[2:37 p.m.]

Mr. Lieberman. Well, I don't think we are going to resolve the disputes over whether these appliance standards are good for low-income households or bad. I think they clearly are bad.

The fallback position is, oh, they are renters, they don't have to buy the appliances. But more expensive appliances will raise --

Mr. Palmer. Bullcrap.

Mr. Lieberman. -- tax as well.

Mr. Palmer. Yeah. Don't -- low-income people are not all renters.

Mr. Lieberman. And they aspire to own a home, and we are making appliances more expensive and putting home ownership out of reach --

Mr. Palmer. And who do you think is going to pay for the appliance if they are renters? It will be reflected in their rent. I mean, people need to wake up to what is happening to them in this country right now.

Mr. Lieberman. One other point I would make with regard to this push towards electrification. The Department of Energy came out with something in the Federal Register a few days ago that shows the per-unit energy cost of differing energy sources. Natural gas is three times cheaper per unit energy than electricity is. So certainly keeping natural gas in the mix is absolutely essential to energy affordability.

Mr. Palmer. Mr. Chairman, with your indulgence, 15 seconds, I just want to point out that The Economist magazine reported that there were 68,000 people died in

Europe last winter because they couldn't afford their household utilities. They were classified as excess winter deaths. That is more than died from COVID in the exact same time period. There are consequences for this.

I yield back.

Mr. Duncan. Gentleman's time has expired.

I will now go to the chairwoman of the full committee. Washer State had a great Saturday against Wisconsin.

Ms. Rodgers for 5 minutes.

The Chair. That is right. It was a good win. Thank you, Mr. Chairman.

Mr. Lieberman, do you agree with me that the law that authorizes DOE's appliance standard program is broken and should be reformed?

Mr. Lieberman. I think the events of this year say yes. A lot of appliances that have already been very, very heavily regulated are now the subject of an avalanche of new regulations. We will see what the result of those proposed rules are, but I would say the system is broken.

The Chair. Certainly, all across the country, Americans started taking notice when Department of Energy proposed to ban natural gas stoves. Are you aware of other products that use natural gas that Department of Energy plans to ban?

Mr. Lieberman. Well, there are regulations for stoves, for water heaters, and for furnaces, all of which come in natural gas and electric versions. And I would argue those proposed rules tip the balance very strongly in favor of electric versions to the detriment of consumers that would benefit from the gas versions.

The Chair. I am growing more and more concerned about the regulatory restrictions that really work against American manufacturing, and I wondered -- I wanted

to ask, Mr. Lieberman, if you would share any insights you might have on appliances and where they are being manufactured. We recently redid our kitchen and, you know, were buying new appliances. And one of the -- you know, I learned that the GE microwave was -- when I talked to the GE folks, they are like, oh, no, that is actually -- that was a brand that was bought by China. That is manufactured in China.

Just can you speak to what you have seen as far as the manufacturing of appliances? Are they being made here, or elsewhere, and is this a valid concern?

Mr. Lieberman. Well, one thing I would point out, the proposed water heater standard, the latest one, would -- may end a certain type of water heater being on the market, and the American manufacturer of that particular type of water heater is very concerned about that.

So these standards do have an impact. Generally, and for a number of reasons beyond just these DOE standards, there has been a lot of outsourcing of appliance manufacturing over the last 20 years or so. Even well-known American brands often are made overseas. And even appliances that may be technically made in America, that usually means assembled in America from components that come from one or more countries.

So it is not easy to find American-made products. You have to do your homework. And there is some appliances, such as window-unit air conditioners, where there virtually aren't any American manufacturers anymore.

The Chair. Thank you.

Mr. Paulling, I wanted to ask about natural gas. And, in so many ways, the natural gas has been such a success story in the United States. It has really been the reason that we have been able to lead the world in bringing down carbon emissions.

One of the best things that we could do for the rest of the world if we wanted to focus on reducing carbon emissions would be to unleash American natural gas.

I wanted to ask if you would speak to the role natural gas has played and is playing in impacting grid reliability.

Mr. Paulling. Sure. And I will address from a South Carolina perspective first.

In 2005, the utilities took measures of carbon emissions, and then we set goals and standards where we were going to be from -- in 2030, 2040, 2050. But, in 15 short years, South Carolina's cooperative system and Santee Cooper, we have -- we are about 40 percent less in our carbon emissions. And that is simply from shutting down a couple of coal plants, building a natural gas plant, and have purchase power agreements from natural gas. So that is where that is coming from.

So that is the beginning. But I tell you, if these new 111(b) and (d) standards are put in place, all that will stop, because we -- it is unproven technologies. Carbon sequestration, green hydrogen, the things that are being proposed, they are undoable. We don't know how much they are going to cost. We don't know where the hydrogen is going to come from.

So what we need to do until that technology matures -- and hopefully one day, it will. But, until that time, we have to use natural gas as a bridge fuel. And that is not just in South Carolina. That is really across the whole Nation and the whole -- the real issue we have in South Carolina is all of our pipelines are fully subscribed.

So we have got to do something about permitting. We have got to do something about somebody -- and I will say it from South Carolina. Anybody that can fog a mirror can bring a lawsuit against a project. And that is -- we have got to figure out what to do about that.

But natural gas is the bridge fuel that we have to contend with. I mentioned earlier that, if you put in -- I am all for solar, but solar can't stand on its own, because it comes and goes. It fluctuates. You have to have a spinning generator that can ebb and flow whenever a cloud cover comes over that solar farm or when the lights -- you know, when the sun goes down. So you have got to have it there, but it is -- again, natural gas is going to be a very important portion of our portfolio going forward.

The Chair. Thank you. Thank you all for being here.

Mr. Paulling. Sure.

The Chair. I yield back, Mr. Chairman.

Mr. Duncan. Gentlelady yields back.

And I now go -- we won't talk about what happens in Blacksburg, but I will talk -- I will recognize the gentleman from Virginia, Mr. Griffith.

Mr. Griffith. It was a sad, wet day. That is all I can say. Sad, wet day.

All right. So let me pick up with this appliance thing, because I am sitting here listening, and that is one of the reasons I like to be in here, and I apologize I wasn't in here sooner, juggling all kinds of things.

But I heard Mr. Palmer's talking about how his family was poor and that they used coal in a stove. And I want to start with you, Mr. Lieberman, but, Mr. Messner, might get your input on this, too.

Here is the concern I have. Representing a coal-producing region where, if you are driving down in the mountains of south West Virginia, there is some coal. It might not be the hottest-burning coal, but it is right there on the side of the road. And most everybody in a small community is going to know where there is an old mine that you can get into if you work at it a little bit.

If we keep making the price of these appliances go up and we don't let people use affordable appliances, isn't it only reasonable to expect that poor folks are going to do what they need to do, and they are going to find that coal whether it is on the side of the road or not? And I dare say not a sheriff in south West Virginia would stop somebody who is on the side of the road collecting poor-quality coal. But, if they can burn it, they will.

Isn't that what we are pushing these people towards?

Mr. Lieberman. Well, certainly, when appliances become more expensive, that is very, very difficult for low-income households. And it is not just the higher costs. They have higher financing to pay for them. So this is a -- this is a hardship for low-income households.

Mr. Griffith. Yeah. And I don't see -- I mean, it seems very uncaring to make this stuff cost so much when we have done a tremendous amount to clean up the air and the water of our country already. I am not saying we can't do more, but we do need to take into account the cost.

Would you not agree with that, Mr. Messner?

Mr. Messner. I agree with it 100 percent. So two -- one example. Clothes washers, the DOE proposed rule, DOE's own data would have increased -- said that it would increase the clothes washer by $150. But it is not just appliance standards where this comes into play. There is also a lot of things -- I will give one other example. California is about to enact a bill that will add about $300 to a clothes washer by dealing -- putting -- forcing a filter to go on it.

So that would essentially double the cost of an entry point product for a clothes washer that the low-income and low-income household might rely on in order to buy a

new close washer into the future. So it is an onslaught of really regulations that go -- proposed regulations and legislation that goes too far across the country, quite honestly, that we have to deal with.

Mr. Griffith. Well, and people just aren't going to pay attention to some of these regulations. They are going to find ways to work around it. Now, you are not going to be washing any clothes with coal, but -- but I will tell you the last round of regulations on washing machines, I had a lady out of Bluefield, Virginia, who told me she was putting a hose into her washing machine to get it the extra water because the machine wouldn't allow it in because of the new regs. So she put a hose in there to redo it.

I wrote a column about that. I do a weekly column. I wrote a column about that when these new regulations came out and said, I guess we are going to see more of that.

And I got several responses from constituents who said, Oh, yeah, we are doing that, too.

So, I mean, sometimes you just take these things to the point of absurdity, and people -- good, commonsense people are going to figure a way around it, or they are going to wash their clothes a lot more, one of the two. I mean, that is -- you know, or they are not going to be able to afford it, and they go to the laundromat when they can afford it, and unfortunately are not able to wear clean garments on all occasions.

All right. I had never planned to go in that direction.

That was -- the reason I was going to Mr. Paulling, just to talk about the fact that there have been more than 220 coal plants that have closed since 2014. And, while a lot of that was replaced with natural gas, some of that capacity was replaced with wind and solar. And I think you hit it on the head in your testimony when you said that, you

know, the problem is our timelines aren't matching up. We are getting rid of the coal-fired power plants, and now they are after the natural gas plants, claiming we are going to bring in all these new ways to create power, and our timelines are not matching up.

So, in light of that, how has the closure of dispatchable power plants affected your members?

Mr. Paulling. Well, we have been fortunate enough to stay just ahead of it, but we are very close to that threshold right now.

My contention is pretty simple, common sense. Don't shut a generation station down, no matter what the fuel, until you get adequate replacement plus reserves. Then shut it down. But that takes time. That takes effort.

One of the -- we are in the Santee Cooper balancing authority. We buy power from Santee Cooper and Duke Energy. Santee Cooper has got a coal generating station that they want to shut down, and we just can't do it yet, because every -- every time there has been a large load event, whether it be hot or cold, those four coal plants of that generating station are running around the clock.

So we can't close them down, but what they have to do is they have to go through some permitting to get the effluent water taken care of. So we need to go to those -- you know, go ahead and go through those exercises and get it done so we can continue to burn those -- burn that coal and keep the lights on until, again, adequate replacement generation is up and running, plus reserves, reserves meaning that, if a generator goes down, then you have got room so you won't have to blackout.

The way it all works is all these transmission systems are tied together. And, if one of -- if the frequency drops below, then they are going to automatically disconnect

and leave that utility on an island, and it is -- that is blackout for everyone. So --

Mr. Griffith. Yeah.

Mr. Paulling. All that has got to be taken care of.

Mr. Griffith. That makes common sense to me, but unfortunately the Biden administration doesn't consider all of the consequences when they have men and women in the ivory towers come up with some of these rules.

I yield back.

Mr. Duncan. Gentleman yields back.

I would like -- this concludes the hearing.

Both panels, I would like to thank all the witnesses for being here today. I apologize for the break with the votes, but that is just the way it goes sometimes here in the United States House of Representatives.

Members will have additional questions. I am sure they will submit those in writing. I would remind members they have 10 business days to submit additional questions for the record, and I ask the witnesses do their best to submit responses within 10 business days upon receipt of the question.

I ask unanimous consent to insert in the record documents included on the staff hearing documents list.

And, without objection, that will be the order.

And, without objection, seeing no other members, we will stand adjourned.

[Whereupon, at 2:51 p.m., the subcommittee was adjourned.]

April 29, 2025

Dear Chair Guthrie, Chair Latta, Ranking Member Pallone, and Ranking Member Castor,

On behalf of the Natural Resources Defense Council and our more than 3 million members and online activists, we write in response to the hearing of the Committee on Energy and Commerce, Subcommittee on Energy, titled "Assuring Abundant, Reliable American Energy to Power Innovation." Thank you for the opportunity to share our thoughts on this important topic.

We wholeheartedly agree with Chairs Latta and Guthrie that "Our nation is at an energy crossroads. It's clear that securing our electric grid and powering AI will require abundant and reliable energy for decades to come." In addition to AI and data centers, onshoring of manufacturing and increased electrification are leading to rapidly growing electricity demand. Add to this an aging power grid, increasing extreme weather, and a changing power supply, and it is clear that we must reform the ways that we plan, build, and operate the power grid to ensure reliable, affordable, and secure energy for Americans.

Unfortunately, most of the bills to be discussed at today's hearing would do just the opposite. These bills arbitrarily advantage fossil fuel generation, even when it is not the most reliable or affordable option, exacerbate climate change, and cause electric bills to skyrocket. Several bills also introduce unnecessary bureaucracy and paperwork, slowing down the very processes we need to speed up to build energy infrastructure – or to address climate change. At the same time, these bills reduce the opportunities for people to weigh in on energy projects in their backyards and abdicate the government's responsibility to ensure that new and existing energy infrastructure is in Americans' public interest. Rather than ushering in an era of abundant power, these bills are likely to keep old, polluting, expensive fossil fuel plants online while stymying development and innovation.

Instead of focusing on last-ditch efforts to save the energy sources of the past, Congress should be tackling the problems of the future. We need creative solutions to ensure that clean, cheap power can be constructed at the scale and speed needed – lowering electric bills, improving public health, and reducing our climate impact. We need policies that better plan and build long-distance transmission, so that we can move energy in a way that meets load growth challenges with lowest cost and greatest benefit. And we need to address backlogged interconnection queues once and for all. These are the innovative solutions that will lead to abundant, reliable American energy to power innovation, and we are eager to collaborate with the Committee to address the barriers to meeting these goals.

In this letter, first we discuss some of the specific legislation included in the hearing notice. Then we lay out the case for why the solutions for reliable, affordable, and abundant power can – and should be – the same ones that will lead to cleaner air and a healthier environment.

PART I: DISCUSSION OF PROPOSED LEGISLATION[1]

Reliable Power Act

This bill requires the Federal Energy Regulatory Commission (FERC) to review any new federal agency regulation that could impact the reliability of the electric grid. It requires the Electric Reliability Organization (i.e., the North American Electric Reliability Corporation, or NERC) to perform an annual long-term assessment, focused specifically on "non-intermittent, dispatchable generation." If NERC finds that there is an "inadequacy" of non-intermittent, dispatchable generation, NERC must notify FERC, who must review all new "covered agency actions," particularly those promulgated by the Environmental Protection Agency (EPA) and Department of Energy (DOE) (e.g., emissions regulations affecting power plants). FERC and NERC must comment on all such agency actions, and a federal agency cannot finalize such regulations until FERC deems that they are not likely to "have a significant impact on the state of generation adequacy or the reliability of the bulk power system."

The "Reliable Power Act" ignores the unquestioned reliability value of renewable energy and energy storage, arbitrarily advantages fossil fuels, creates unnecessary bureaucratic delay, and likely will raise costs and pollution across the country. Grid regions are already equipped to fairly evaluate the reliability of *all* resources and have maintained reliability for nearly a century as the resource mix has undergone significant transitions, including the transition to cleaner energy. But this bill weaponizes "reliability" to block policies that would reduce pollution or speed the transition to clean energy, potentially allowing fossil fuel interests to veto well-researched agency rules. By requiring long-term assessments of "non-intermittent, dispatchable generation" (i.e., fossil fuel plants), the bill could entrench coal and gas, even when cheaper, cleaner, more reliable alternatives are available. It ignores the role that modern grid solutions—like storage, demand response, and regional and interregional coordination—can play to provide reliability at a lower price and with fewer emissions. Finally, this bill would impose duplicative review requirements, likely slowing down urgent rulemakings and straining already over-stretched government employees.

HR 1047, GRID Power Act

This bill requires FERC to promulgate a rule within 180 days authorizing transmission providers (i.e. public utilities, Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs)) to prioritize certain "dispatchable power projects" in the interconnection queue if they "improve grid reliability and resource adequacy."

The" Grid Power Act" could actually *jeopardize* reliability by disadvantaging the very resources that can be built most quickly. Clean energy resources and battery storage, which make up nearly 95% of the resources in the nation's interconnection queues, are the fastest to construct. For example, building battery storage takes an average of 20-30 months, whereas gas plants generally take 40-50 months and could take over five years given the gas turbine shortage.

To address mounting load growth and keep the United States at the cutting edge of manufacturing and AI development, the nation needs new capacity as fast as possible – but allowing gas power plants to skip over renewables and storage in the queue would only cause delays in getting new capacity online and improving resource adequacy. Furthermore, queue jumping harms resources already in the interconnection queue by using up cheaper transmission headroom, forcing queued resources to pay a premium for upgrades to the grid after they are cut in line. These network upgrades can cost millions of dollars and can force projects to drop out of the queue, leading to further delays and higher costs.

As in the "Reliable Power Act," this bill is an effort to arbitrarily tip the cards in favor of the fossil fuel industry and flies in the face of long held standard of open access to the transmission system. It also distracts from fixing the real problems: the slow speed of interconnection queues, which are delaying all types of resources from coming online more quickly and building enough transmission to ensure that there is space on the grid for these resources to connect. Existing generation plus the 2.6TW in interconnection queues as of 2024 is more than enough energy to power America's future. If transmission providers, FERC, and Congress are serious about solving resource adequacy challenges, they should focus on building more transmission and speeding up interconnection. Full implementation of FERC Order 2023 is an important first step, but more can be done, as will be discussed with respect to the "Expediting Generator Interconnection Procedures Act of 2025" later in this letter.

Power Plant Reliability Act of 2025

This bill requires power generators to give 5 years notice to FERC, NERC, and "affected" state commissions or transmission organizations before retiring. It also allows any state, transmission organization, or NERC to file a complaint with FERC that "any interstate service of any public utility is inadequate or insufficient" or will likely become so in 5 years. Then, FERC can require an electric generator that would otherwise retire to continue operating and can require a state or public utility to pay the generation owner for keeping the plant running.

The "Power Plant Reliability Act of 2025" could lock in unnecessary fossil generation for years, causing consumers to pay billions in extra costs and leading to significant additional climate and local pollution. By requiring states or utilities to pay an electric generation owner, this bill would be a massive expansion of FERC authority. It does not specify criteria or guardrails regarding *who* pays to keep a generator online, which could lead to consumers paying millions for a power plant to stay online even if it does not benefit them – and could be weaponized by a politicized FERC. The bill also ignores that DOE already has authority under Federal Power Act Section 202(c) to prevent generators from retiring if doing so would cause reliability problems.

This bill would also lead to more expensive and *less* reliable power. It requires NERC/states to file reliability complaints *five years* before a generator retires, when there is insufficient information to predict whether that retirement will violate a reliability standard. It also presupposes that the best solution to that potential violation is to leave the generator online

rather than, for example, replacing it with more efficient resources. This could raise electricity prices by keeping expensive power plants online rather than building new, cheaper ones. It could also chill new investment in generation, making it harder to keep up with load growth and threatening reliability.

Unlocking our Domestic LNG Potential Act of 2025

This bill gives FERC sole authority to authorize imports and exports of natural gas and liquefied natural gas (LNG), removing the important role the Department of Energy (DOE) plays in analyzing whether these imports/exports are in the public interest of the American people. Furthermore, it *compels* FERC to find that these imports or exports are in the public interest, wholly removing the federal government's responsibility to weigh the costs and benefits of approving additional gas exports. At a time when domestic energy demand and energy reliability concerns are rapidly rising – the subject of this very hearing – removing laws meant to protect American consumers is particularly ill-advised.

As made abundantly clear in DOE's December 2024 updated LNG export study, continuing to approve LNG exports would impose a triple cost on U.S. households: raising gas prices, electricity prices, and prices of manufactured goods. The study also found that, under any scenario, increased LNG exports would increase climate-warming emissions given the large methane and carbon dioxide emissions emitted during the entire LNG lifecycle: fracking, pipeline transport, liquefaction, overseas shipping, and combustion. What's more, the gas liquefaction process releases cancer-causing chemicals, harming communities and livelihoods along the U.S. Gulf Coast and along the LNG value chain. Congress should be finding ways to protect Americans from high energy bills, climate disasters, and deadly pollution, but this bill would do just the opposite.

Improving Interagency Coordination of Natural Gas Pipelines Act

This bill amends the National Environmental Policy Act (NEPA) process for any project seeking authorization under section 3 or section 7 of the Natural Gas Act. Such projects include not only the construction or extension of natural gas pipelines but also LNG export authorizations and LNG terminal construction. For these projects, the bill amends three primary aspects of the NEPA process. First, it requires FERC to invite agencies to join the NEPA review process as "participating agencies," creates extensive paperwork requirements, and entirely bars non-participating agencies from the NEPA process. This means non-participating agencies cannot conduct a supplemental NEPA review or even submit a comment. Second, this bill allows FERC to conditionally approve projects based on remote surveys and wait to conduct in-person surveys until after project approval. Third, this bill allows the applicant to fund a third-party contractor to help review the application.

The "Improving Interagency Coordination of Natural Gas Pipelines Act" would erode NEPA review while creating inefficiencies. First, NEPA gives a seat at the table to all interested parties, but this bill would allow FERC to eliminate the voice of non-participating agencies and therefore ignore legitimate environmental concerns. Second, requiring all state and federal agencies to adhere to FERC's timeline does not guarantee a shortened NEPA

timeline but rather will only create excessive paperwork that will distract FERC and participating agencies from the substantive work. Third, conditional approval based on a remote survey is essentially a de facto permanent approval of a project, since conditional approval gives the applicant the power of eminent domain and allows construction to begin and damage to occur. Remote surveys can miss concerns that in-person surveys can identify, but they create inefficiency by introducing a two-step survey process. Finally, third-party contractors cannot be relied upon to be unbiased in their review of applications. The applicant (e.g. the pipeline owner) funds the third-party contractor's work, which creates a strong incentive for the contractor to support the applicant and undermines the integrity of the review process.

Expediting Generator Interconnection Procedures Act of 2025

This bill requires FERC to initiate within 180 days and finalize within 18 months a rulemaking to address "inefficiencies and ineffectiveness" in processing interconnection requests. The rule would require transmission providers to use modeling assumptions based on resources' "actual operating abilities and practices," select "cost effective" solutions, and expedite interconnection queue studies by employing best practices including automation and advanced computing.

We support this bill because it identifies and aims to address one of the key root causes of reliability and resource adequacy concerns: the slow speed of interconnection queues across the country. Interconnection queues across the U.S. hold nearly 3 Terawatts of new capacity, more than double the size of the existing grid and enough to meet projected demand. Nearly 95% of this new capacity is from clean energy technologies like solar and battery storage. While FERC's Order 2023 was a big step forward in streamlining interconnection procedures and Order 2023 implementation is key, this legislation acknowledges that FERC can do more to address the problem. Moreover, by putting all types of power generation and storage on an even playing field, this bill would ensure that reforms are made to the interconnection process that lead to the most reliable and lowest cost energy for Americans.

PART II: RELIABLE, ABUNDANT POWER IS ALSO CLEAN, HEALTHY POWER

While many of these bills seek to arrest innovation and increase costs by taking us back to the supposed good old days of gas and coal, the United States can meet growing electricity demand with the technologies of the present and future. We know it's possible, and the examples are rapidly growing. For example, on March 2, 2025, Texas' power grid – which is largely isolated from the rest of the country – broke its own record when it met over 76% of the state's electricity demand with wind and solar. Texas' new record tracks with other grids with access to world-class wind and solar, like California (150% of demand met with renewables, meaning they were exporting power) and the Southwest Power Pool (90% of demand met with renewables). As the cost of battery storage continues to rapidly decline,

renewables and storage will become an increasingly prevalent and affordable source of flexible power. And that's just the technologies of the present – there are countless new clean technologies in various stages of development, and American innovation can and should play a critical role in researching these technologies and getting them to market.

Grid operators already know how to operate high-renewable grids, and storage plays an increasingly important role. Yes, wind and solar generation are inherently different than gas or coal power plants: solar panels produce more energy when the sun is shining, and wind turbines produce more energy when the wind is blowing. But this is old news. Grid operators *already* account for the intermittent nature of renewables by calculating renewables' reliability value on a regular basis and planning accordingly. Moreover, battery storage provides similar reliability value to natural gas plants and can replace gas generation if deployed at sufficient scale. For example, in the last 3 years Texas and California have installed over 13 GW of grid-scale battery storage—the equivalent of a dozen nuclear power units. This has kept their systems reliable, even while temperatures and power demand broke records, and even as Texas has retired 61% of its coal fleet.

What's more, in extreme weather, renewables have stabilized the grid even as gas infrastructure has failed. First, let's take extreme heat, which is becoming increasingly common due to climate change. Historically, in most areas of the country, the grid has struggled most on hot summer afternoons when air conditioner use peaks. Summer 2024 was the hottest summer on record, but solar and battery storage met record peak power demand in regions where temperatures repeatedly hit triple digits. The afternoon, when air conditioner demand spikes, is also when solar production peaks, leading to diminishing reliability risk and lower prices for consumers. Next, let's turn to extreme cold, when gas power plant failures have threatened reliability. For example, Winter Storms Uri (2021) and Elliott (2022) caused major failures of the bulk power system when natural gas power plants and wellheads froze, and pipelines could not operate. Their failures were due not to a lack of domestic natural gas supply, but to insufficient weatherization throughout the natural gas supply and power generation system. Meanwhile, wind delivered nearly 4x what was expected during Elliott, minimizing blackouts.

Renewables are not only reliable: they also save consumers a lot of money. When gas and coal run less often, prices go down because fuel is the largest cost of fossil plants whereas renewables have zero marginal cost. That's why, on average, states producing high amounts of power from renewables have cheaper electricity rates: 10 out of the 12 states with the highest share of electricity from renewables have some of the lowest electricity prices in the country. Meanwhile, the unreliability of gas in cold temperatures has caused multi-billion-dollar price spikes as grid operators have scrambled to arrange backup for unreliable gas plants.

Keeping old fossil fuel infrastructure online would raise costs for consumers, and increasing LNG exports would further exacerbate the problem. For example, bills like the "Reliable Power Act" or the "Power Plant Reliability Act of 2025" could keep fossil fuel generators online even when they are not needed, forcing consumers to pay to keep them in operation

even when those same consumers' power is coming from cheaper renewables. And bills like the "Unlocking our Domestic LNG Potential Act of 2025" that encourage additional LNG exports without guardrails to protect consumers would further raise the cost of gas used in domestic power generation. By exporting increasingly large quantities of LNG, Americans are forced to increasingly compete with foreign buyers for gas, subjecting domestic gas – and therefore electricity – prices to the higher prices and volatility of international markets.

We know that fossil fuel infrastructure causes significant public health and climate harms; bills that prop up fossil fuel production and generation will have real impacts on Americans' health and safety. Extensive literature links adverse health impacts to pollution from fossil fuel power plants. In addition to carbon dioxide, sulfur dioxide, and nitrogen oxide emissions, these plants also produce mercury and other heavy metals, particulate matter, and toxic runoff. From 1999-2020, U.S. coal power plants alone were responsible for over 460,000 premature deaths. LNG export terminals are a growing source of health impacts: in addition to methane and carbon dioxide, they release volatile organic compounds (VOCs), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO) and particulate matter (PM), which cause cancer, heart disease, asthma and other health problems. In fact, a recent study found that currently-operating LNG terminals cause approximately $957 in avoidable health costs each year, and this could rise to $2.33 billion if all terminals planned as of 2024 were built. The U.S. power sector is also a huge contributor to climate change; the United States is the world's second largest greenhouse gas contributor, and the power sector makes up a quarter of those emissions.

Putting in place policies that get more clean energy online can be a win-win solution for reliability and public health, but Congress must focus on the real challenges: building well-planned, adequate transmission and quickly connecting resources to the grid. Long-distance, high-voltage transmission lines can create a grid that is "bigger than the weather" by connecting regions across the country. With increased connectivity, weather-stressed regions can import energy from their neighbors, leading to fewer outages. Also, interregional transmission reduces congestion and can ensure that load growth from manufacturing, end-use electrification, and data centers can be met with the most efficient and low-cost resources, saving customers up to $10.6 billion annually. Flexible demand, energy efficiency, and advanced transmission technologies can also help meet increased demand. And, as previously discussed, policymakers should hold grid operators responsible for interconnecting new resources quickly enough to keep up with demand and remove barriers to connecting storage to the grid.

Thank you for the opportunity to share our thoughts, and we look forward to continued collaboration with the committee on these important issues.

Talia Calnek-Sugin
Senior Energy Policy Advocate
Sustainable FERC Project
Natural Resources Defense Council (NRDC)

June 5th, 2025

The Honorable Bob Latta
Chairman
House Energy and Commerce
Subcommittee on Energy
2125 Rayburn House Office Building
Washington, D.C., 20515

The Honorable Kathy Castor
Ranking Member
House Energy and Commerce
Subcommittee on Energy
2322A Rayburn House Office Building
Washington, D.C., 20515

Dear Chairman Latta and Ranking Member Castor:

In advance of House Energy and Commerce Subcommittee on Energy's markup, on behalf of our millions of members and supporters, the undersigned write to express our **opposition to H.R. 1949, Unlocking our Domestic LNG Potential Act of 2025, and any related measures that would accelerate the expansion of liquefied methane gas (otherwise known as liquefied natural gas, or LNG) exports.** The facts are clear, expanded LNG exports perpetuate the climate crisis, raise costs for consumers, and harm communities.

This legislation would strip away the federal government's ability and responsibility to examine the full impacts of LNG expansion on the economy, consumer energy costs, the climate, and local communities. LNG exports negatively impact Americans by exacerbating climate change, perpetuating environmental injustices, and raising energy prices for households, small businesses, and manufacturers. These impacts must be taken into account when DOE decides whether to approve future LNG export authorizations. This provision, however, would remove DOE's legal obligation to assess whether LNG exports are in the public interest and their impact on everyday Americans and the U.S. economy.

Rather than passing legislation that invests in a clean economy, reduces energy costs for families and small businesses, and ensures approved energy projects must be truly in the public interest, the House Majority is instead using valuable committee time to consider additional giveaways to the fossil fuel industry. Following unprecedented growth in LNG exports in recent years, the fossil fuel industry is already raking in record profits at the expense of consumers and future generations, yet their allies in Congress are putting forward legislation to lock us into ever-increasing gas extraction, higher and more volatile energy prices, and devastating environmental, health, safety, and climate impacts – particularly impacting frontline communities. H.R. 1949 would revoke DOE's ability to ensure that new LNG exports do not raise costs to U.S. consumers, accelerate the climate crisis, or jeopardize the health and safety of communities living alongside fossil fuel infrastructure. The legislation is a dangerous handout to the oil and gas industry that would expedite the approval of LNG exports by removing the first three sections of the Natural Gas Act, which require a public interest determination for LNG exports to countries with whom the United States does not have an existing free trade agreement. Instead of requiring a rigorous review process consistent with good governance practices, this provision directs the Federal Energy

Regulatory Commission (FERC) to deem gas exports in the public interest without requiring any consideration of impacts on the American public.

Among other considerations, it is critical that LNG export decisions take lifecycle greenhouse gas emissions into account. There are eight operating LNG export facilities and over 30 additional projects proposed or under construction, the full buildout of which would be equivalent to the annual climate pollution from 920 coal plants or 814 million gasoline-powered cars. In every scenario modeled by the DOE in its 2024 studies, additional LNG exports increase global methane pollution and LNG exports would displace more renewables than coal globally. This jeopardizes the commitments of countries receiving imports of LNG, and would lock in decades of highly polluting fossil fuels when cleaner, cheaper alternatives exist. The proposed language would undermine the federal government's ability to even consider these consequences or the findings of the most recent studies from the DOE on the impacts of LNG exports when deciding whether a project should be approved.

The expansion of LNG exports is also a glaring environmental injustice. Sited primarily in low-income communities and communities of color along the Gulf Coast, existing and proposed LNG export facilities are already increasing toxic pollution in areas overburdened by industrial pollution from the fossil fuel industry. This buildout has decimated tourism and local industries like fishing and shrimping, which would only be made worse by approving more LNG export projects. It is critical that the Department of Energy take these considerations, along with the increasing impacts of climate change, into account when making its public interest determination.

Consumers across the U.S. are suffering from rising energy costs exacerbated by LNG exports. Skyrocketing energy costs can be traced to increases in LNG exports, as can increases in prices of consumer goods. DOE found that additional LNG exports would increase domestic wholesale natural gas prices by more than 30 percent, raising consumer prices as a result. A new report released by the Center for Energy and Environmental Analysis (CEEA) found that despite record levels of US natural gas production in the first quarter of 2025, US natural gas prices have more than doubled since President Trump was elected. These cost increases disproportionately burden people of color and low-income or otherwise disadvantaged communities and households. It is imperative that federal agencies retain the authority to consider domestic consumer impacts when determining whether additional exports are in the public interest.

We write to urge the rejection of any efforts to weaken laws and regulations that protect Americans from the negative impacts of LNG exports. We hope that you will join us in opposing this legislation.

Sincerely,

198 methods
350.org
350 Bay Area Action

350 Hawaii
350 New Orleans
350 Wisconsin
A Community Voice
Action for the Climate Emergency
Alaska Wilderness League
Alliance of Nurses for Healthy Environments
American Indian Movement Southern Ontario
Beaver County Marcellus Awareness Community
Berks Gas Truth
Better Brazoria: Clean Air & Water
Better Path Coalition
Beyond Extreme Energy
Black Millennials 4 Flint
Bold Alliance
Carrizo Comecrudo Tribe of Texas
Catskill Mountainkeeper
Center for Biological Diversity
Center for Coal Field Justice
Center for Oil and Gas Organizing
Chesapeake Climate Action Network AF
Chispa Texas
Clean Water Action
Climate Action Campaign
Climate Code Blue
Climate Conversation Brazoria County
Climate Equity Policy Center
Climate Hawks Vote
Climate Reality Project Greater New Orleans Chapter
Commission Shift
Common Defense
Concerned Citizens of St. John
Cook Inletkeeper
Dayenu: A Jewish Call to Climate Action
Delaware Riverkeeper Network
Earth Action Inc
Earth Ethics, Inc.
Earthjustice
Earthworks
Environmental Protection Network
Evergreen Action
Fenceline Watch

Food & Water Watch
For a Better Bayou
FracTracker Alliance
FreshWater Accountability Project
Friends of the Earth
Global Alliance for Incinerator Alternatives (GAIA)
Greater New Orleans Interfaith Climate Coalition
Green America
GreenLatinos
Greenpeace USA
Habitat Recovery Project
Healthy Gulf
Hip Hop Caucus
Inclusive Louisiana
Indigenous Environmental Network
Ingleside on the Bay Coastal Watch Association
Institute for Policy Studies Climate Policy Program
Interfaith Power & Light
Justice Is Global
League of Conservation Voters
Louisiana Bucket Brigade
Louisiana League of Conscious Voters
Maine Conservation Voters
Make Polluters Pay
Methane Action
Micah Six Eight Mission
Midwest Building Decarbonization Coalition
Natural Resources Defense Council
New Energy Economy
No False Climate Solutions PA
North Carolina League of Conservation Voters
Nuclear Information and Resource Service
Ocean Defense Initiative
Ohio Environmental Council Action Fund
Oil Change International
Oilfield Witness
Oregon Physicians for Social Responsibility
Oxfam America
Pacific Environment
Physicians for Social Responsibility National
Physicians for Social Responsibility PA
Plastic Pollution Coalition

Port Arthur Community Action Network (PACAN)
Private Equity Stakeholder Project
Progress Texas
Property Rights and Pipeline Center
Public Accountability Initiative/LittleSis
Public Citizen
Rise to Thrive
Save RGV
Science and Environmental Health Network
Sierra Blanca Legal Defense Fund
Sierra Club
Silvix Resources
Society of Native Nations
South Texas Environmental Justice Network
Southern Environmental Law Center
SouthWings
Sunrise Movement
Sunrise New Orleans
Texas Campaign for the Environment
The Conservation Angler
The Last Plastic Straw
Three Rivers Waterkeeper
Third Act
Turtle Island Restoration Network
Union of Concerned Scientists
Utah Physicians for a Healthy Environment
Vessel Project of Louisiana
Waterkeeper Alliance
WE ACT for Environmental Justice
Zero Hour

E&E NEWS

FERC official rejects Republican bill targeting Biden rules

By Nico Portuondo

09/14/2023 06:30 AM EDT

A Federal Energy Regulatory Commission official pushed back on Republican calls for the agency to take on a wider role in energy rulemaking now overseen by EPA and other agencies.

David Ortiz, director of the Office of Electric Reliability, said FERC does not currently have the capacity to take on consistent oversight of other agencies' energy decisions, as a Republican bill discussed during the hearing would require.

"The commission's capacity is not sufficient to perform a detailed prospective assessment of the possible negative impacts, and potential mitigations, of a covered agency action on electric reliability," said Ortiz during a hearing of the Energy and Commerce Subcommittee on Energy, Climate and Grid Security.

The "Guaranteeing Reliable Infrastructure Development (GRID) Act," from subcommittee Chair Jeff Duncan (R-S.C.), would require FERC to review relevant regulatory actions from other agencies to ensure those actions do not affect grid reliability.

The issue became especially relevant after Commissioner James Danly, a Republican appointee, sent a letter to EPA asking why FERC commissioners weren't consulted on EPA's proposed rule to dramatically cut greenhouse gas emissions from power plants.

Danly argued in the letter that EPA only consulted with FERC staff for a rule that could alter the reliability of the electric system "drastically."

Republicans and Danly have argued the replacement of baseload fossil generation with variable renewables could present an unprecedented reliability problem in the nation's grid and potentially lead to devastating blackouts.

"This bill ensures agencies like FERC can review and comment on EPA policies that will weaken the reliability of our bulk power system," said full committee Chair Cathy McMorris Rodgers (R-Wash.).

However, Ortiz said during the hearing that although FERC could eventually take on the role with more dedicated staff and funding, such a reliability oversight role would be better suited for regional grid system operators or the Department of Energy's national laboratories.

He also said that such a level of collaboration isn't common practice between federal agencies. Committee Democrats similarly called it improper for FERC to have power over other regulators.

Transformer bill

Lawmakers also discussed H.R. 4167, the "Protecting America's Distribution Transformer Supply Chain Act," from Rep. Richard Hudson (R-N.C.), which would ban the Department of Energy from implementing any new regulations on electric transformers used in grid infrastructure for five years.

Republicans argue new regulations or restrictions on transformers is an absurd proposal, given the fact that utilities are already fighting tooth and nail to get today's transformers due to supply chain problems.

But Gene Rodrigues, DOE's assistant secretary for electricity, said the agency was working in lockstep with utilities to ensure greater domestic production of transformer materials and that a proposed rule on transformers wouldn't affect supply.

“The efficiency standard doesn’t limit the supply of transformers, it's a proposal in the future to improve the efficiency of those transformers," said Rodrigues.

Industrial Energy Consumers of America (IECA)
The Voice of the Industrial Energy Consumers

1050 Connecticut Avenue, NW, Suite 500 • Washington, D.C. 20036
Telephone (202) 223-1420 • www.ieca-us.org

April 24, 2025

The Honorable Brett Guthrie
Chairman
House Committee on Energy and Commerce
Washington, DC 20515

The Honorable Frank Pallone
Ranking Member
House Committee on Energy and Commerce
Washington, DC 20515

Re: Manufacturers Oppose H.R. 1949, the Unlocking our Domestic LNG Potential Act of 2025

Dear Chairman Guthrie and Ranking Member Pallone:

On behalf of our member companies, the Industrial Energy Consumers of America (IECA) strongly oppose H.R. 1949, the Unlocking our Domestic LNG Potential Act of 2025. H.R. 1949 is anti-consumer and inconsistent with the intent of Congress to deliver affordable and reliable natural gas and electricity. The stakes are high. For every one dollar increase in the Henry Hub natural gas price, consumers pay on average $34 billion more for natural gas and $20 billion more for electricity, or $54 billion annually.[1] One hundred percent of our member companies are from the manufacturing sector.

First, H.R. 1949 removes the long-standing Natural Gas Act (NGA) consumer protection provision that requires the U.S. Department of Energy (DOE) to evaluate whether applications to export to non-free trade agreement (NFTA) countries are inconsistent with the public interest. Approximately 80 percent of all LNG exports are to NFTA countries. Under this provision, the DOE is required to evaluate, among other things, whether an application to export to NFTA countries impacts the public interest, which includes impacts to domestic prices of natural gas, electricity, and reliability. H.R. 1949 eliminates DOE authority and oversight and gives FERC an exclusive authority and mandates that FERC "shall deem the exportation and importation of natural gas to be consistent with the public interest."

[1] Natural Gas, U.S. Energy Information Administration (EIA), https://www.eia.gov/naturalgas/

Second, the DOE has already approved very significant volumes to NFTA countries, which equals 57.9 percent of 2024 net supply.[2] The Energy Information Administration (EIA) forecasts LNG exports to increase 92 percent by 2027 (see Figure 1). For perspective, the U.S. only exports 10 percent of its gasoline. For crude oil we export 1,504,021 thousand barrels annually, while importing 2,411,293 thousand barrels, for a net import of 18.8 percent of production.[3]

Third, LNG customers are countries who will pay any price to keep the lights on in their country. They are insensitive to price. No matter how high U.S. prices will go, they will buy away our natural gas even when our winter inventories fall and prices rise. The LNG 20-year contracts shift supply and price risk from LNG buying countries to U.S. consumers and the economy. No U.S. entity has 20-year contracts, not even electric utilities.

Fourth, EIA data proves that LNG export volumes are highest during our winter peak heating season months of November through February, which accelerates a reduction in U.S. inventory, increasing the prices of U.S. natural gas and electricity and reducing reliability. The severity of the problem increases as export capacity increases (see Figure 2).

As manufacturers who compete with China and are price sensitive, Chinese company LNG contracts represent 36.8 percent of U.S. LNG operating capacity.[4] We believe that U.S. consumers should be a priority over LNG customers, but LNG contracts flip the priority.

We need Congress to protect U.S. consumers and the economy – not LNG exports. We ask that you oppose H.R. 1949 and urge the DOE to implement a policy to insulate U.S. consumers from the impacts of LNG exports. IECA has proposed the "America First LNG Inventory Policy" as a policy solution.[5]

Sincerely,

Paul N. Cicio
Paul N. Cicio

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[2] Summary of LNG Export Applications of the Lower 48 States, U.S. Department of Energy, https://www.energy.gov/fecm/articles/summary-lng-export-applications-lower-48-states
[3] Petroleum & Other Liquids, U.S. Energy Information Administration (EIA), https://www.eia.gov/petroleum/
[4] China LNG Contracts with U.S., https://www.ieca-us.org/wp-content/uploads/11.13.24_China-US-LNG-Contracts.pdf
[5] America First LNG Inventory Policy, Industrial Energy Consumers of America, https://www.ieca-us.org/wp-content/uploads/04.22.25_LNG-Inventory-Policy-to-Insulate-the-US-Market-from-LNG-Export-Impacts_FINAL.pdf

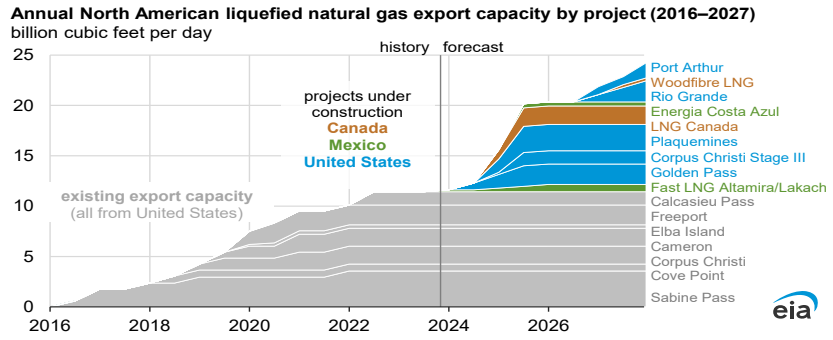
President & CEO

cc: House Committee on Energy and Commerce

The Industrial Energy Consumers of America is a nonpartisan association of leading manufacturing companies with $1.3 trillion in annual sales, over 12,000 facilities nationwide, and with more than 1.9 million employees. One hundred percent of IECA members are manufacturing companies whose competitiveness is largely determined by the cost and reliability of natural gas and electricity. IECA's sole mission is to reduce and avoid energy costs and increase energy reliability through advocacy in Congress and regulatory agencies, such as the Federal Energy Regulatory Commission (FERC). IECA membership represents a diverse set of industries including chemicals, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, insulation, glass, industrial gases, pharmaceutical, consumer goods, building products, automotive, independent oil refining, and cement.

Figure 1

LNG Exports Increase 92% by 2027

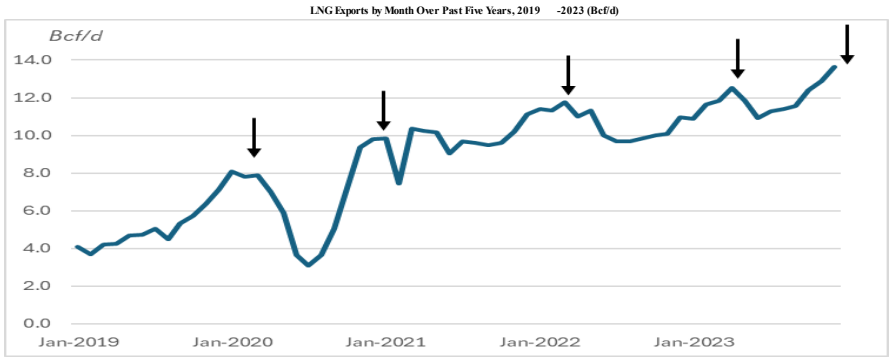


Industrial Energy Consumers of America (IECA)
The Energy Voice of Industrial Energy Consumers

7

Figure 2

LNG Exports are Highest During Winter Months Which Increases Natural Gas and Electricity Prices (EIA)



Industrial Energy Consumers of America (IECA)
The Energy Voice of Industrial Energy Consumers

5

April 30th, 2025

Dear Representatives:

In advance of House Energy and Commerce Subcommittee on Energy's hearing "Assuring Abundant, Reliable American Energy to Power Innovation," on behalf of our millions of members and supporters, the undersigned write to express our **opposition to H.R. 1949, Unlocking our Domestic LNG Potential Act of 2025, and any related measures that would accelerate the expansion of liquefied methane gas (otherwise known as liquefied natural gas, or LNG) exports.** The facts are clear, expanded LNG exports perpetuate the climate crisis, raise costs for consumers, and harm communities.

This legislation would strip away the federal government's ability and responsibility to examine the full impacts of LNG expansion on the economy, consumer energy costs, the climate, and local communities. LNG exports negatively impact Americans by exacerbating climate change, perpetuating environmental injustices, and raising energy prices for households, small businesses, and manufacturers. These impacts must be taken into account when DOE decides whether to approve future LNG export authorizations. This provision, however, would remove DOE's legal obligation to assess whether LNG exports are in the public interest and their impact on everyday Americans and the U.S. economy.

Rather than passing legislation that invests in a clean economy, reduces energy costs for families and small businesses, and ensures approved energy projects must be truly in the public interest, the House Majority is instead using valuable committee time to consider additional giveaways to the fossil fuel industry. Following unprecedented growth in LNG exports in recent years, the fossil fuel industry is already raking in record profits at the expense of consumers and future generations, yet their allies in Congress are putting forward legislation to lock us into ever-increasing gas extraction, higher and more volatile energy prices, and devastating environmental, health, safety, and climate impacts – particularly impacting frontline communities. H.R. 1949 would revoke DOE's ability to ensure that new LNG exports do not raise costs to U.S. consumers, accelerate the climate crisis, or jeopardize the health and safety of communities living alongside fossil fuel infrastructure. The legislation is a dangerous handout to the oil and gas industry that would expedite the approval of LNG exports by removing the first three sections of the Natural Gas Act, which require a public interest determination for LNG exports to countries with whom the United States does not have an existing free trade agreement. Instead of requiring a rigorous review process consistent with good governance practices, this provision directs the Federal Energy Regulatory Commission (FERC) to deem gas exports in the public interest without requiring any consideration of impacts on the American public.

Among other considerations, it is critical that LNG export decisions take lifecycle greenhouse gas emissions into account. There are eight operating LNG export facilities and over 30 additional projects proposed or under construction, the full buildout of which would be equivalent to the annual climate pollution from 920 coal plants or 814 million gasoline-powered cars. In every scenario

modeled by the DOE in its 2024 studies, additional LNG exports increase global methane pollution and LNG exports would displace more renewables than coal globally. This jeopardizes the commitments of countries receiving imports of LNG, and would lock in decades of highly polluting fossil fuels when cleaner, cheaper alternatives exist. The proposed language would undermine the federal government's ability to even consider these consequences or the findings of the most recent studies from the DOE on the impacts of LNG exports when deciding whether a project should be approved.

The expansion of LNG exports is also a glaring environmental injustice. Sited primarily in low-income communities and communities of color along the Gulf Coast, existing and proposed LNG export facilities are already increasing toxic pollution in areas overburdened by industrial pollution from the fossil fuel industry. This buildout has decimated tourism and local industries like fishing and shrimping, which would only be made worse by approving more LNG export projects. It is critical that the Department of Energy take these considerations, along with the increasing impacts of climate change, into account when making its public interest determination.

Consumers across the U.S. are suffering from rising energy costs exacerbated by LNG exports. Skyrocketing energy costs can be traced to increases in LNG exports, as can increases in prices of consumer goods. DOE found that additional LNG exports would increase domestic wholesale natural gas prices by more than 30 percent, raising consumer prices as a result. A new report released by the Center for Energy and Environmental Analysis (CEEA) found that despite record levels of US natural gas production in the first quarter of 2025, US natural gas prices have more than doubled since President Trump was elected. These cost increases disproportionately burden people of color and low-income or otherwise disadvantaged communities and households. It is imperative that federal agencies retain the authority to consider domestic consumer impacts when determining whether additional exports are in the public interest.

We write to urge the rejection of any efforts to weaken laws and regulations that protect Americans from the negative impacts of LNG exports. We hope that you will join us in opposing this legislation.

Sincerely,

350.org
Action for the Climate Emergency
Alaska Wilderness League
Alliance of Nurses for Healthy Environments
Berks Gas Truth
Better Brazoria: Clean Air & Water
Better Path Coalition
Black Millennials 4 Flint
Bold Alliance
Carrizo Comecrudo Tribe of Texas

Catskill Mountainkeeper
Center for Biological Diversity
Center for Coal Field Justice
Center for Oil and Gas Organizing
Chesapeake Climate Action Network AF
Chispa Texas
Clean Water Action
Climate Action Campaign
Climate Code Blue
Climate Conversation Brazoria County
Climate Equity Policy Center
Climate Hawks Vote
Commission Shift
Common Defense
Cook Inletkeeper
Dayenu: A Jewish Call to Climate Action
Delaware Riverkeeper Network
Earth Action Inc
Earth Ethics, Inc.
Earthjustice
Earthworks
Environmental Protection Network
Evergreen Action
Food & Water Watch
For a Better Bayou
FracTracker Alliance
FreshWater Accountability Project
Friends of the Earth
Green America
GreenLatinos
Greenpeace USA
Habitat Recovery Project
Healthy Gulf
Hip Hop Caucus
Ingleside on the Bay Coastal Watch Association
Interfaith Power & Light
Justice Is Global
League of Conservation Voters
Louisiana Bucket Brigade
Maine Conservation Voters
Make Polluters Pay
Natural Resources Defense Council

New Energy Economy
No False Climate Solutions PA
North Carolina League of Conservation Voters
Nuclear Information and Resource Service
Ocean Defense Initiative
Ohio Environmental Council Action Fund
Oil Change International
Oregon Physicians for Social Responsibility
Oxfam America
Pacific Environment
Physicians for Social Responsibility National
Port Arthur Community Action Network (PACAN)
Private Equity Stakeholder Project
Progress Texas
Property Rights and Pipeline Center
Public Accountability Initiative/LittleSis
Public Citizen
Rise to Thrive
Save RGV
Science and Environmental Health Network
Sierra Blanca Legal Defense Fund
Sierra Club
Silvix Resources
Society of Native Nations
Southern Environmental Law Center
SouthWings
Sunrise New Orleans
Texas Campaign for the Environment
The Conservation Angler
Three Rivers Waterkeeper
Third Act
Turtle Island Restoration Network
Union of Concerned Scientists
Utah Physicians for a Healthy Environment
Vessel Project of Louisiana
Waterkeeper Alliance
WE ACT for Environmental Justice
Zero Hour

Natural Gas

What China's Retaliatory Tariff Means for US–China LNG Trade

Blog by Anne-Sophie Corbeau & Erica Downs • February 7, 2025

This Energy Explained post represents the research and views of the author. It does not necessarily represent the views of the Center on Global Energy Policy. The piece may be subject to further revision.

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On February 4, the Trump administration imposed an additional 10 percent tariff on all Chinese imports into the United States. China's Ministry of Commerce responded by announcing new tariffs on US imports, including a 15 percent tariff on US liquefied natural gas (LNG), which will take effect on February 10. In doing so, Beijing is reprising a move from the 2018–19 US–China trade war when it placed a 10 percent tariff (later increased to 25 percent) on US LNG.

US LNG sellers and Chinese buyers both have room to navigate this new political landscape, even if China's US LNG imports fall to zero as they did from March 2019 to April 2020. But they both have more at stake now due to the large number of new long-term LNG contracts signed in 2021–23, which are set to increase significantly Chinese companies' offtake of US LNG over the next four years. Contracted US LNG supplies amount to 35 bcm, six times what China imported in 2024.

Small But Growing US–China LNG Trade

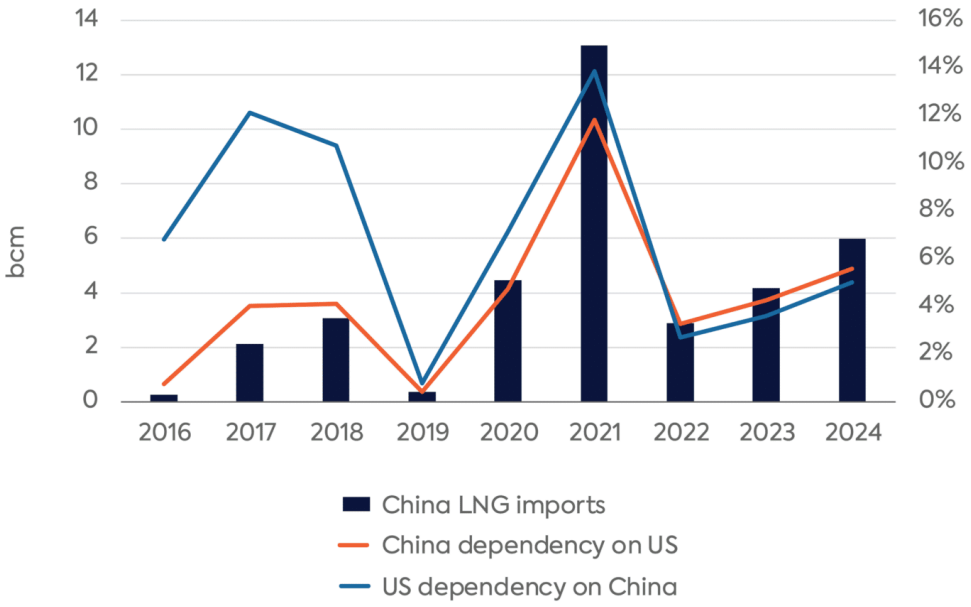
China is currently the largest LNG importer in the world, and the US is the largest LNG exporter. In 2024, only 6 percent of China's LNG supply (6 billion cubic meters [bcm]) came from the US, while exports to China

accounted for 5 percent of US LNG exports (Figure 1). The two countries are not significantly dependent on each other in this arena.

While China was already a large LNG importer in the late 2010s, when the first LNG trade disruption happened, its dependency on US LNG was limited to around 4 percent and 3 bcm (half of 2024 volumes) due to established contractual relationships with Australia, Indonesia, Malaysia, and Papua New Guinea. Interestingly, no Chinese company was a foundation customer of any of the first six US LNG export projects due to their unfamiliarity with Henry Hub indexation and uncertainty surrounding the two countries' future relationship. The first contract between China (CNPC) and the US (Cheniere) was signed only in 2018, with a portion of the supply beginning in 2018 and the balance in 2023.

In 2021, China was the fastest-growing LNG importer and the US the fastest-growing LNG exporter, resulting in surging imports of US LNG by China. This trend reversed completely in 2022, when US LNG supplies (including volumes resold by Chinese buyers) were redirected to Europe, resulting in lower US LNG volumes going to China.

Figure 1: US LNG exports to China



Source: S&P Global.

China's Dependency on US LNG over the Next Four Years

China signed many long-term LNG contracts with US projects between 2021 and 2023. As some of these projects come online in 2025 (Plaquemines and Corpus Christi, though commercial operations at the former will not start before the end of 2026), China's import levels of US LNG are expected to rise (Table 1). Others have not yet taken a final investment decision (FID) (Lake Charles and Calcasieu Pass 2). Assuming all of these projects move forward, US LNG would represent up to a quarter of all of China's contracted LNG.

Table 1. Contracts between US LNG projects and Chinese companies

Date	Buyer	Seller	Quantity (mtpa)	Start	Duration (years)
Existing LNG projects and projects under construction					
Feb-18	PetroChina	Cheniere	1.2	2018	25
Oct-21	ENN	Cheniere Energy	0.9	Jul-22	~13
Nov-21	Sinochem	Cheniere Energy	0.9–1.8	Jul-22	17.5
Nov-21	Foran Energy Group	Cheniere Energy	0.3	2023	20
Nov-21	Sinopec	Venture Global LNG	4.0*	Plaquemines LNG	20
Nov-21	UNIPEC	Venture Global LNG	1	Mar-23	3
Dec-21	CNOOC	Venture Global LNG	2	Plaquemines LNG	20
Dec-21	CNOOC	Venture Global LNG	0.5	Mar-23	3
Apr-22	ENN	NextDecade	1.5	Rio Grande LNG	20
Jul-22	China Gas	NextDecade	1	Rio Grande LNG (T2)	20
Jul-22	Guangdong Energy	NextDecade	1–1.5**	Rio Grande LNG (T1)	20
Jul-22	PetroChina	Cheniere Energy	1.8	Corpus Christi Stage 3	25
Feb-23	China Gas Holdings	Venture Global	1	Plaquemines LNG	20
			17.1–18.5		
Planned LNG projects					
Mar-22	ENN NG	ET LNG	1.8	Lake Charles LNG	20
Mar-22	ENN Energy	ET LNG	0.9	Lake Charles LNG	20
Jun-22	China Gas	ET LNG	0.7	Lake Charles LNG	25
Feb-23	China Gas Holdings	Venture Global	1	CP2***	20
Jun-23	ENN	Cheniere	1.8	SPL Expansion Project****	20
Nov-23	Foran	Cheniere	0.9	SPL Expansion Project	20
			7.1		

Source: Companies' announcements.

*The contract with Sinopec consists of two contracts of 2.8 and 1.2 mtpa, respectively, but they are often aggregated and reported with a total of 4 mtpa.

** Right to buy an additional 0.5 mtpa.

***CP2: Calcasieu Pass 2.

****SPL: Sabine Pass Liquefaction.

China's Response

Beijing's response to President Trump's new blanket China tariff, which includes imposing a 10 percent tariff on some US imports and a 15 percent tariff on others, is probably aimed at reminding the Trump administration that it has the capacity to harm the US (something it sig-

nalled repeatedly after the election) while avoiding an escalation of trade tensions. The value of China's imports of US LNG in 2024 ($2.4 billion) is just a tiny fraction of the total value of China's US imports during that year ($163.6 billion). This measured response likely leaves room for negotiations, which almost certainly appeals to Beijing given both Chinese officials' mantra that no one wins a trade war and China's struggling economy. Indeed, one reason why Beijing decided the tariffs will not take effect until February 10 could be to buy time to negotiate a reprieve, perhaps during a phone call between Trump and China's leader Xi Jinping that the White House says still needs to be scheduled.

Additionally, the fact that China's tariff on US LNG is less than the 2019 level may reflect the still-very-tight global gas markets and the potential expense of replacing contracted US LNG with spot LNG. There is little spare capacity in both Russian and Central Asian pipeline gas to replace 6 bcm of US LNG. But given low US gas prices, US LNG imports are still cheaper than spot LNG, even with a 15 percent tariff. If China were to reduce its total LNG imports in 2025, the move would trigger a welcome downward pressure on Asian and European spot prices.

The Choices Facing China's LNG Buyers

The destination flexibility of US LNG makes it easier for Chinese firms with US LNG contracts to minimize the impact of Beijing's new LNG tariff by simply reselling the US LNG to other markets. Chinese LNG buyers have increasingly acted as portfolio players, notably in 2022 when spot prices were high and LNG was resold to Europe. In addition, some Chinese LNG importers might be happy to keep US LNG in their portfolios due to its flexibility. Should the crisis extend into 2026 and

especially 2027, Chinese LNG players will have access to more LNG supplies given the wave of projects coming online.
Simultaneously, China's new tariff on US LNG and the prospect of increasing US–China trade tensions are likely to make Chinese companies cautious about signing new long-term contracts with US LNG export projects. Among other effects, this may hamper some US LNG projects planning to take FID after President Trump lifted the pause on US LNG export permits.

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Electricity Prices Are Surging. The G.O.P. Megabill Could Push Them Higher.

The combination of a data center boom, rising gas exports and cuts to clean energy tax breaks could spike American energy bills, analysts say.

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By Brad Plumer and Rebecca F. Elliott

June 4, 2025

The cost of electricity is rising across the country, forcing Americans to pay more on their monthly bills and squeezing manufacturers and small businesses that rely on cheap power.

And some of President Trump's policies risk making things worse, despite his promises to slash energy prices, companies and researchers say.

This week, the Senate is taking up Mr. Trump's sweeping domestic policy bill, which has already passed the House. In its current form, that bill would abruptly end most of the Biden-era federal tax credits for low-carbon sources of electricity like wind, solar, batteries and geothermal power.

Repealing those credits could increase the average family's energy bill by as much as $400 per year within a decade, according to several studies published this year.

The studies rely on similar reasoning: Electricity demand is surging for the first time in decades, partly because of data centers needed for artificial intelligence, and power companies are already struggling to keep up. Ending tax breaks for

solar panels, wind turbines and batteries would make them more expensive and less plentiful, increasing demand for energy from power plants that burn natural gas.

That could push up the price of gas, which currently generates 43 percent of America's electricity.

On top of that, the Trump administration's efforts to sell more gas overseas could further hike prices, while Mr. Trump's new tariffs on steel, aluminum and other materials would raise the cost of transmission lines and other electrical equipment.

These cascading events could lead to further painful increases in electric bills.

"There's a lot of concern about some pretty big price spikes," said Rich Powell, chief executive of the Clean Energy Buyers Association, which represents companies that have committed to buying renewable energy, including General Motors, Honda, Intel and Microsoft.

A study commissioned by the association found that repealing the clean electricity credits could cause power prices to surge more than 13 percent in states like Arizona, Kansas, New Jersey and North Carolina and lead to thousands of job losses nationwide by 2032.

Trump administration officials, along with many in the gas industry, disagree. They argue that Mr. Trump's efforts to make it easier and cheaper to drill and to build pipelines will lower electricity prices over the long term. They also say wind and solar power technologies have already received subsidies for decades and that expanding them too rapidly risks making the electric grid less reliable.

Meta's Eagle Mountain Data Center under construction in Utah last November.
Christie Hemm Klok for The New York Times

"President Trump's agenda is to lower the cost of oil production in the United States, lower the cost of natural gas production in the United States — that ultimately will lead to lower average prices and at the same time profitability for businesses," said Ben Dietderich, an Energy Department spokesman.

He added that "prices are going to move up and down in the short term," but that the administration was focused on policies "that will deliver long-lasting prosperity."

While government forecasters expect electricity prices to rise quickly over the next two years, they predict gasoline prices for cars will fall, offsetting some household costs. Oil prices have already declined nearly 20 percent since Mr. Trump took office, partly because of concerns that his tariffs could slow global economic growth.

Still, the threat of rising electricity bills has made some lawmakers nervous about scrapping federal support for clean energy.

“Given rising energy demand, it is imperative that any modifications to the tax code avoid worsening the economic pressures that American households and businesses already face,” Senator Lisa Murkowski, Republican of Alaska, wrote in a letter with three fellow Republicans in April. Repealing some tax breaks “would translate into immediate utility bill increases, placing additional strain on hardworking Americans,” they wrote.

Why electricity prices have been rising

Since 2022, U.S. residential electricity prices have risen 13 percent on average, outpacing inflation, according to the Energy Information Administration. In New England, the Mid-Atlantic and the West Coast, prices are increasing even faster.

The shocks are also being felt in places like Ohio, where this month rates are rising by 26 percent, on average — hundreds of dollars more per year for many families — as energy-hungry data centers flood the state.

The causes of rising rates are complex. In California, utilities face soaring costs from worsening wildfires. Elsewhere, power companies are spending tens of billions of dollars to upgrade aging electric grids and prepare for weather disasters, electric vehicles and growing amounts of renewable energy. Transmission and distribution costs have been soaring and now make up nearly 40 percent of power bills.

One big driver has been fluctuating natural gas prices. After Russia invaded Ukraine in 2022, gas prices spiked and so did electricity bills. While gas prices fell to record lows last year, they are expected to nearly double this year and climb further in 2026, as demand rises at home and the U.S. sells more of its gas abroad.

Dropping fire retardant on the Palisades fire in Los Angeles in January. Loren Elliott for The New York Times

The United States already exports roughly 11 percent of its gas in the form of liquefied natural gas, or L.N.G., much of it to European and Asian countries willing to pay a premium. U.S. export capacity is set to nearly double by 2028 while tech companies are demanding ever more gas power for data centers.

“L.N.G. was already a tidal wave of demand and now you’ve just got on top of it these other forces,” said Gordon Huddleston, president and partner of Dallas-based Aethon Energy, one of the largest privately held gas producers in the country. “Every real estate guy in Dallas is running around developing a data center.”

On top of that, the cost of building gas power plants has nearly tripled since 2022, and power companies now face wait times of five years or more for new gas turbines. Tariffs are also making it more expensive to drill for natural gas by raising the cost of equipment such as steel pipe.

Many businesses fear a strain.

“Whenever there’s an inadequate supply of natural gas or electricity, manufacturing’s the first thing to be curtailed,” said Paul Cicio, president of the Industrial Energy Consumers of America, a trade association that represents energy-intensive manufacturers in steel, aluminum, plastics, chemicals and paper.

Mr. Cicio said that this past winter, pipeline operators told some of his member companies to curb their gas use because of inadequate supplies.

In 2020, 34 million households reported difficulties in paying their energy bills or said they kept their homes at unsafe temperatures because of cost concerns.

The crunch comes as the Trump administration wants to end the Low Income Home Energy Assistance Program, a $4 billion federal fund that helps 6.2 million people from Texas to Maine pay for high heating and cooling bills. The White House called the program “unnecessary,” and said families would be helped by policies that lowered energy prices.

“We’ve got millions of families that are already struggling to pay their bills,” said Mark Wolfe, executive director of the National Energy Assistance Directors Association. “Now you bring in extreme temperatures, record heat, and it’s a very bad situation.”

A fight over power bills

There are several competing ideas to ease electricity prices.

One strategy, popular with the oil and gas industry, is to expand gas production and ease permitting for new pipelines.

Natural gas “is still the most cost-effective energy solution out there,” said Toby Rice, chief executive of Pittsburgh-based gas producer EQT. One of the biggest drivers of rising prices, he said, was a lack of pipelines. “It’s the bottlenecks that have been created.”

The Cheniere Texas LNG facility in Portland, Texas. Callaghan O'Hare/Reuters

But many power companies and analysts argue that the clean electricity tax credits are essential for keeping a lid on power prices in the near term.

That's because companies were already planning to build a bunch of wind, solar and batteries in the next few years, which account for 95 percent of electric capacity waiting to connect to grids, and utilities can pass through savings from the tax credits for these projects to consumers. The Edison Electric Institute, a utility trade association, estimates that the tax breaks would save Americans $45 billion on their bills through 2031.

Another argument is that the tax credits can help protect against the risk of volatile gas prices by encouraging alternatives, including both renewable energy and longer-term technologies like nuclear or geothermal power.

"If we do anything to impede increased supply, that will clearly hurt the consumer," said Ron Silvestri, a portfolio manager at investment firm Neuberger Berman who specializes in power and energy infrastructure. Mr. Silvestri called the House's proposed rollbacks of clean-energy tax credits a "worst-case scenario."

Regardless of the fate of the energy tax credits, experts say rising electricity prices will continue to roil policy debates. Some industrial consumers are already urging restrictions on L.N.G. exports. Other groups are pressing state regulators to scrutinize utility spending on transmission upgrades, arguing that companies often inflate costs.

“We’re facing a huge affordability crisis in America,” said Charles Hua, a former Energy Department adviser who recently founded PowerLines, a nonprofit organization focused on modernizing utility regulations to cut power bills. “This issue is not going away.”

Ivan Penn contributed reporting

Brad Plumer is a Times reporter who covers technology and policy efforts to address global warming.

Rebecca F. Elliott covers energy for The Times with a focus on how the industry is changing in the push to curb climate-warming emissions.

A version of this article appears in print on , Section A, Page 12 of the New York edition with the headline: Energy Bills Are Rising, And the G.O.P. Megabill Could Lift Them Higher

MARCH 2024

Impact Analysis of U.S. Natural Gas Exports on Domestic Natural Gas Pricing

ENERGY VENTURES ANALYSIS

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Key Findings

1. The shale gas revolution resulted in a massive shift in U.S. natural gas supply and demand flows, ringing in a new era of low-cost natural gas supply and turning the U.S. into a global energy superpower.

2. Despite a record level of natural gas exports during the first six months of 2023, U.S. natural gas prices at Henry Hub averaged $2.48 per MMBtu, the lowest six-month average in over 35 years (outside of the COVID-19 pandemic).

3. Unique post-COVID-19 pandemic circumstances and U.S. coal market exposure to global markets—not U.S. LNG exports—were the primary factors behind domestic natural gas prices briefly increasing to 14-year highs in 2022.

4. Virtually unchanged LNG export terminal utilization from 2021 to 2023 and the substantial disconnect between domestic and international natural gas prices further highlight U.S. natural gas exports' minimal impact on domestic natural gas pricing.

5. Completion of U.S. LNG export terminals has had minimal impact on short-term domestic natural gas pricing due to their lengthy construction times as well as unique long-term financing and contracting structure.

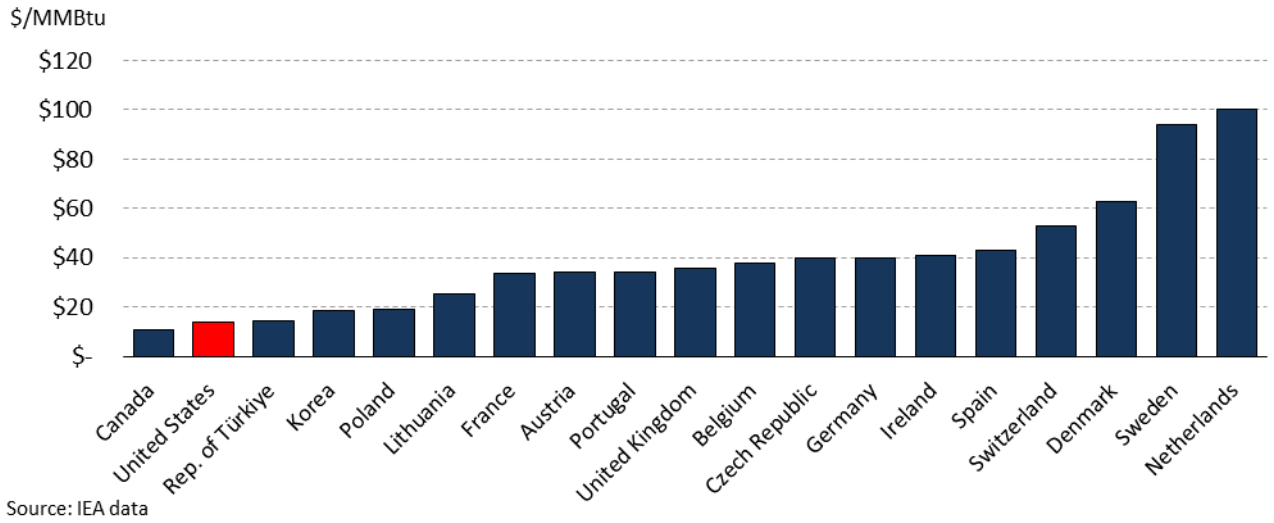
6. Increased U.S. natural gas exports have and will continue to create massive economic benefits for U.S. communities while providing global access to the reliable U.S. natural gas supply needed to further the global energy transition from higher greenhouse gas (GHG) emitting fuels to lower-GHG emitting natural gas.

7. Restricting natural gas infrastructure development will impede continued access to low-cost natural gas supply, regardless of U.S. LNG export levels.

Executive Summary

Over the last 15 years, the U.S. energy sector has undergone one of the most dramatic transformations in its history. The cost-effective combination of hydraulic fracturing and horizontal drilling enabled the economical exploration of previously inaccessible or cost-prohibitive natural gas and oil reserves across the United States. The increased low-cost supply base of both oil and natural gas ushered in the shale gas revolution around 2007. Since then, natural gas and oil production in shale plays has grown substantially, allowing the U.S. to become a net exporter of both natural gas and oil over the last six years. In 2023, the U.S. became the world's largest liquefied natural gas (LNG) exporter. Despite U.S. natural gas exports and domestic consumption reaching all-time highs in recent years, domestic residential natural gas prices remained among the lowest in the world. These trends illustrate that upstream production of America's abundant natural gas resources continues to effectively deliver affordable supplies in response to changing market conditions. Put simply, growing demand begets growing supply.

EXHIBIT ES-1: 2022 AVERAGE RESIDENTIAL NATURAL GAS PRICES BY COUNTRY



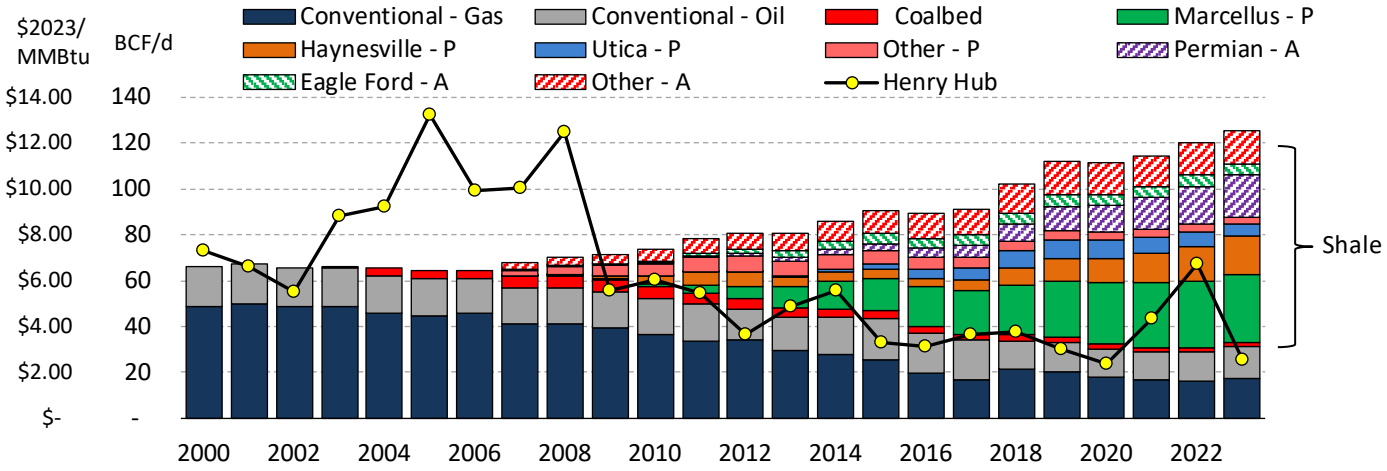
Source: IEA data

As the United States has risen to lead the world in LNG exports, critics of expanded export capacity have argued that this growth has increased financial burdens on U.S. natural gas consumers. In making this case, anti-export advocates point to the substantial rise in U.S. natural gas prices in 2022. This report provides an assessment of changes in the U.S. natural gas industry, essential context to the natural gas pricing anomaly of 2022, and a review of domestic and global benefits to U.S. natural gas exports.

Key findings of the report include:

- **The shale gas revolution resulted in a massive shift in U.S. natural gas supply and demand flows, ringing in a new era of low-cost natural gas supply and turning the U.S. into a global energy superpower**. Between 2007 and 2022, U.S. gross natural gas production from shale plays grew from virtually non-existent volumes to almost 90 billion cubic feet per day (BCF/d). Low-cost natural gas production from shale plays increased the U.S. total natural gas production and displaced higher-cost production from conventional natural gas and oil wells. The increased low-cost supply base of natural gas and oil enabled the United States to export more natural gas, crude oil, and petroleum products than it imported for the first time in its history. Natural gas prices at Henry Hub have averaged roughly $4.10/MMBtu for the last ten years, a reduction of more than 54% compared to the prior decade.

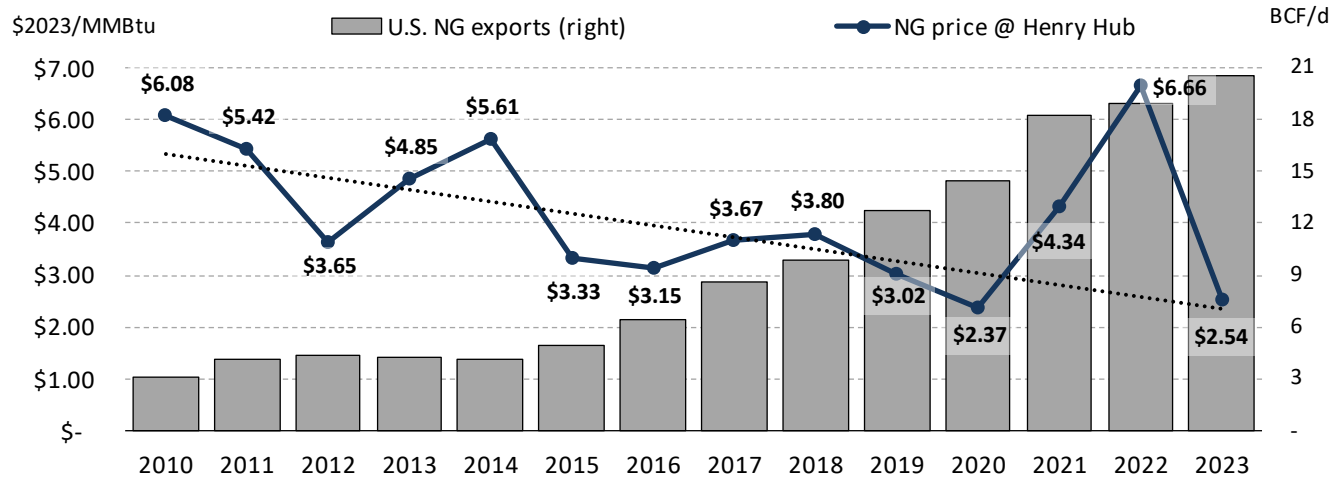
EXHIBIT ES-2: ANNUAL U.S. NATURAL GAS PRODUCTION VERSUS NATURAL GAS PRICES AT HENRY HUB



Source: EIA data; P - pure gas play; A - associated gas/primary oil play

- **Despite a record level of natural gas exports during the first six months of 2023, U.S. natural gas prices at Henry Hub averaged $2.48 per MMBtu, the lowest six-month average in over 35 years (outside of the COVID-19 pandemic).** The shale gas revolution and subsequent rise in Appalachian natural gas production massively changed the flow of the commodity across the U.S. natural gas pipeline network, increasing the amount of natural gas "trapped" in the South Central region. To take advantage of the surplus of natural gas in the region, U.S. companies developed new LNG export terminals along the Gulf and East coasts. Since the first LNG export terminal became operational in 2016, the U.S. has become the largest LNG exporter in the world, providing access to the U.S. low-cost natural gas while bringing massive economic benefits to the U.S. economy as a whole. Over the last 15 years, any substantial increase in natural gas demand from the industrial, electric power, or export sectors has been accompanied by a corresponding increase in U.S. natural gas production. For example, while LNG exports rose by roughly 14 Bcf/d between 2016 and 2023, dry gas production jumped by 31 Bcf/d. Despite total U.S. natural gas consumption almost doubling from 2010 to 2023, the 2023 average natural gas price of $2.54 per MMBtu was the second-lowest level in over 35 years, only exceeding 2020 COVID-19 pandemic lows by a few cents.

EXHIBIT ES-3: ANNUAL U.S. NATURAL GAS EXPORTS VERSUS NATURAL GAS PRICES AT HENRY HUB

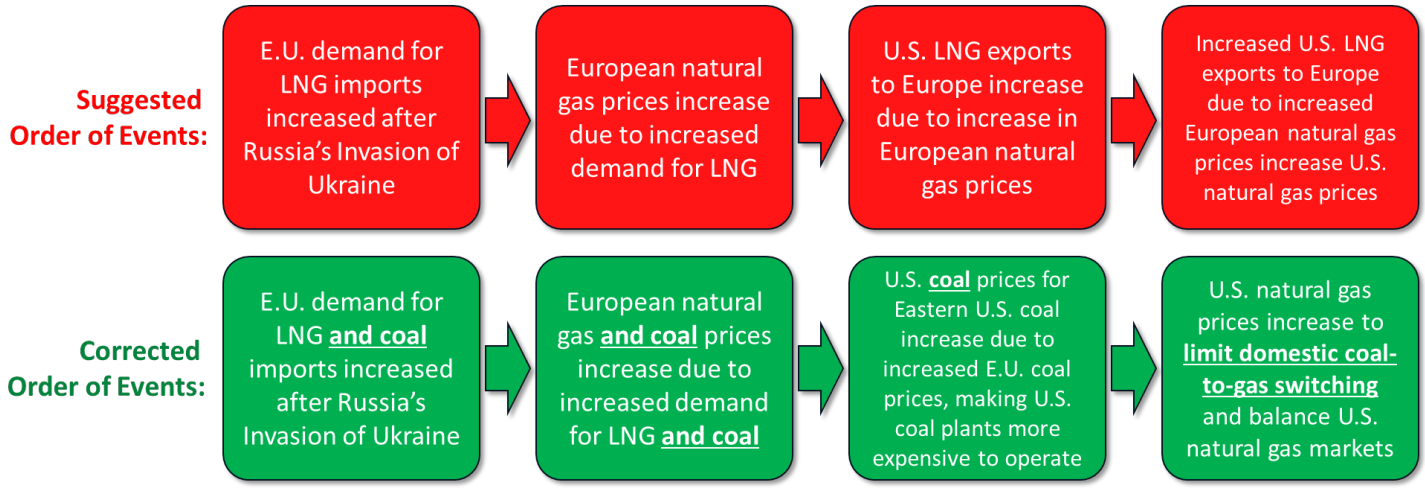


Source: EIA data; Note: trendline excludes 2022

- **Unique post-COVID-19 pandemic circumstances and U.S. coal market exposure to global markets—not U.S. LNG exports—were the primary factors behind domestic natural gas prices increasing to 14-year highs in 2022.** As domestic demand for energy commodities (i.e., coal, natural gas, and oil) returned during the summer of 2021, domestic production responded more slowly, due to issues such as supply chain challenges, increased corporate debt and a national labor shortage, causing fossil fuel inventories to dwindle rapidly. After Russia's February 2022 invasion of Ukraine upended the energy supply-demand balance in Europe, global coal and (albeit much later) natural gas prices rose to incentivize non-Russian imports into Europe. Due to the limited supply growth in the U.S. coal market, domestic coal prices rose rapidly, changing the relative economics of coal- and gas-fired power generators and causing increased amounts of natural gas to be consumed in the domestic power sector. Moreover, due to below-average domestic natural gas inventory levels, domestic natural gas prices then rose to match domestic coal prices, limiting additional coal-to-gas generation shifting in the power sector.

- **The virtually unchanged LNG export terminal utilization from 2021 to 2023** (**EXHIBIT *24***) **and the substantial disconnect between domestic and international natural gas prices** (**EXHIBIT *25***) **further highlight U.S. natural gas exports' minimal impact on domestic natural gas pricing**. Further, in 2022, the U.S. electric power sector accounted for the largest year-over-year increase in natural gas consumption – nearly three times as much as the increase in natural gas exports.

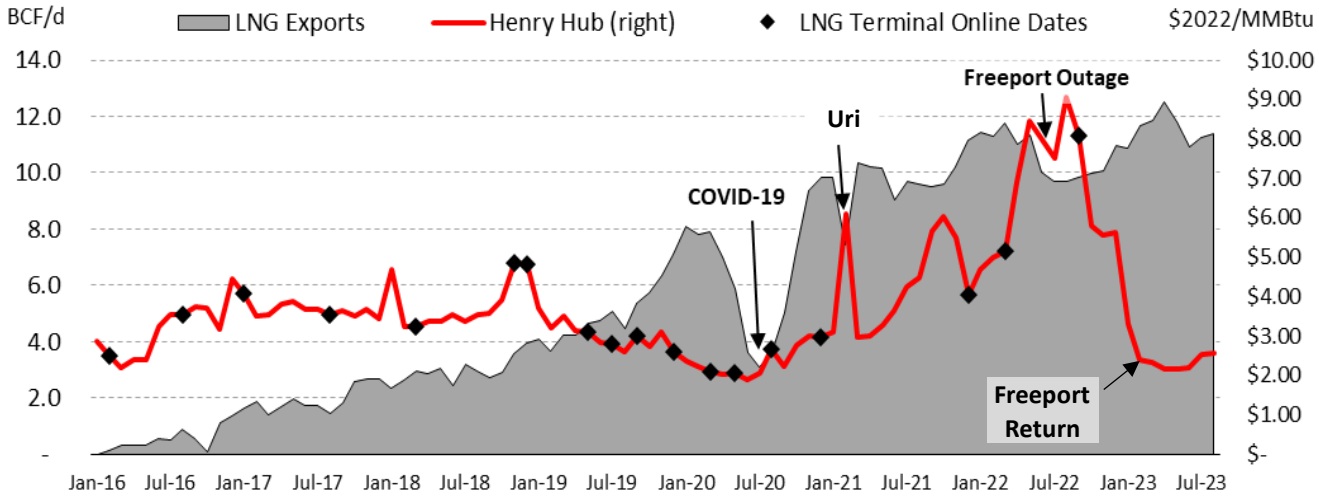
EXHIBIT ES-4: CORRECTED ORDER OF EVENTS OF 2022 U.S. NATURAL GAS PRICE ANOMALY



- **Completion of U.S. LNG export terminals has had minimal impact on short-term domestic natural gas pricing due to their lengthy construction times as well as unique long-term financing and contracting structure.** Due to their multi-year permitting and construction lead time, U.S. LNG export terminals must enter into long-term export contracts with off-takers for the majority of their capacity to ensure the financial viability of these multi-billion-dollar infrastructure projects. The lengthy project development process gives U.S. natural gas producers sufficient time to increase output to feed the new LNG export projects. As a result, the U.S. natural gas market already has accounted for the increased demand from a new LNG export terminal by the time the project is completed and loads its first vessel. Also, due to the long-term contracting nature for most of the scheduled LNG export volumes, the nominal natural gas flows to the new terminal are highly predictable and, therefore, priced into the U.S. natural gas market, resulting in little to no increase in domestic natural gas prices. However, unexpected losses of LNG flows can result in a sudden drop in natural gas prices, as shown by the Freeport LNG

incident and subsequent outage in the summer of 2022. Since natural gas is delivered on a continuous basis via pipelines, the unexpected loss of demand due to the Freeport LNG outage resulted in a substantial natural gas supply-demand market imbalance until the U.S. electric power sector absorbed the excess supply, returning domestic natural gas prices to pre-Freeport LNG outage levels. However, when Freeport returned to operation in February 2023, domestic natural gas prices were virtually unaffected, despite the 2.1 BCF/d increase in demand due to its predictable nature. This phenomenon is not unique to the LNG sector and can occur regardless of the source of demand.

EXHIBIT ES-5: U.S. LNG EXPORTS & TERMINAL COMPLETION DATES VS. NATURAL GAS PRICES AT HENRY HUB

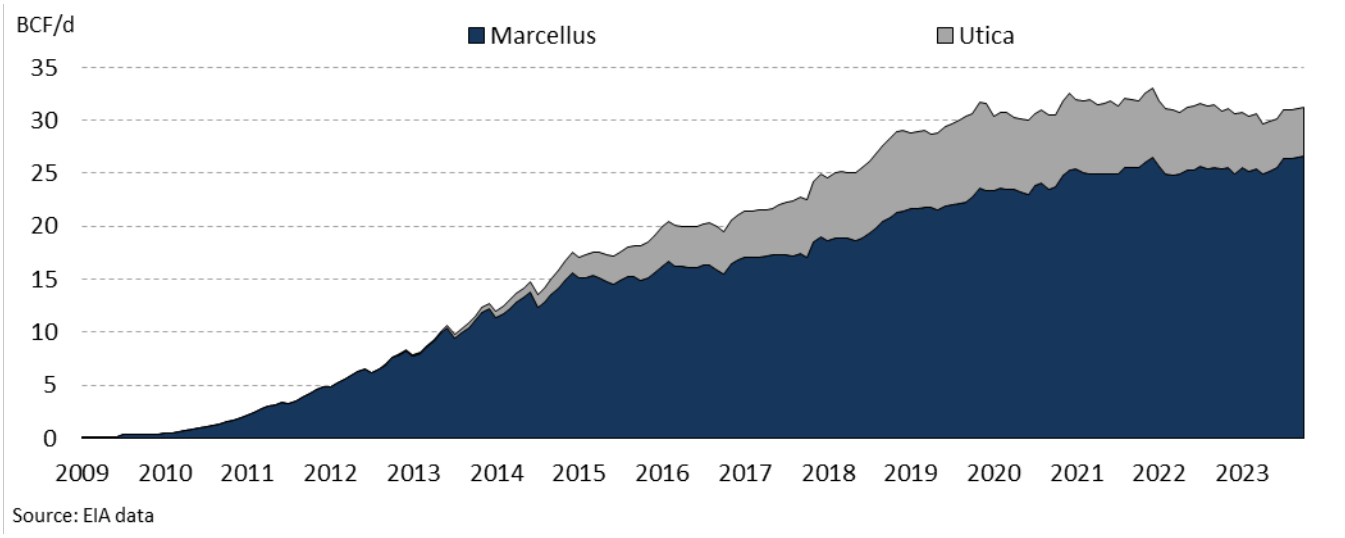


Source: EIA data

- **Increased U.S. natural gas exports have and will continue to create massive economic benefits for U.S. communities while providing global access to the reliable U.S. natural gas supply needed to further the global energy transition from higher greenhouse gas (GHG) emitting fuels to lower-GHG emitting natural gas.** The strong growth in U.S. natural gas production, transportation, and exports has brought substantial economic prosperity to regions (Haynesville, Permian, Bakken, Appalachia) previously known for high unemployment rates and low economic activity, benefitting local U.S. communities through royalty and tax payments, while increasing local employment. Increased U.S. natural gas exports will also allow for increased beneficial use of the fuel abroad as previously trapped natural gas will find its way into the global natural gas market. Access to U.S. natural gas also allows other countries to accelerate their transition away from coal, which was consumed at a record-setting level of 8.3 billion tonnes in 2022, to natural gas and renewables, reducing global GHG emissions while the economic benefits remain with U.S. communities.

- **Restricting natural gas infrastructure development will impede continued access to low-cost natural gas supply, regardless of U.S. LNG export levels.** In an LNG analysis conducted as part of its 2023 Annual Energy Outlook,[1] the U.S. Energy Information Administration (EIA) found that the continued expansion of U.S. natural gas infrastructure (e.g., gathering, lateral, intra, and interstate pipelines) was key to ensuring continued access to low-cost natural gas supply. Over the last few years, opposition by environmental groups and certain states toward new natural gas pipeline projects has slowed U.S. natural gas supply growth, especially in the Appalachian region, where natural gas production has not grown since late 2020 (**Exhibit ES-6**). This lack of sufficient pipeline takeaway capacity has resulted in increased volatility in domestic natural gas prices. Limiting the expansion of pipeline takeaway capacity will also limit future access to low-cost natural gas supply when current resources are depleted. Therefore, increased U.S. natural gas exports will encourage ongoing and future investment by U.S. companies in the natural gas supply, transportation, and storage infrastructure needed to enable continued domestic and abroad access to one of the world's lowest-cost natural gas supplies.

EXHIBIT ES-6: MONTHLY NATURAL GAS PRODUCTION IN THE APPALACHIAN REGION



Source: EIA data

[1] https://www.eia.gov/outlooks/aeo/IIF_LNG/

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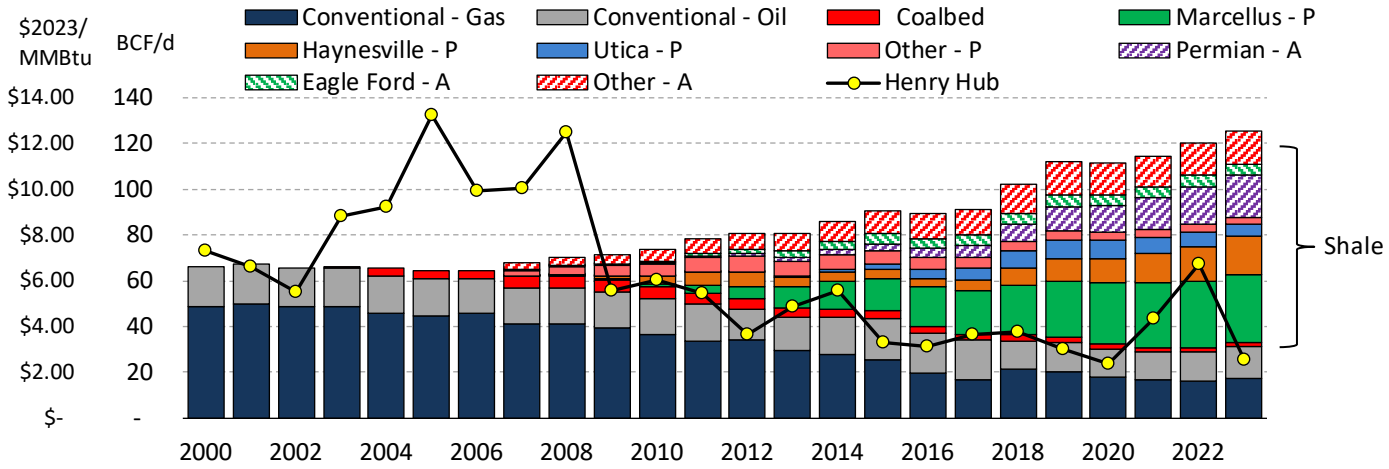
Introduction

Over the last 15 years, the U.S. energy sector has undergone one of the most dramatic transformations in its history. The cost-effective combination of hydraulic fracturing and horizontal drilling enabled the economical exploration of previously inaccessible or cost-prohibitive natural gas and oil reserves across the United States. The increased low-cost supply base of both oil and natural gas started the Shale Gas Revolution around 2007. Since then, natural gas and oil production in shale plays has grown substantially, as shown in **EXHIBIT *1***.

EXHIBIT 1: GROSS NATURAL GAS PRODUCTION BY SOURCE LOCATION



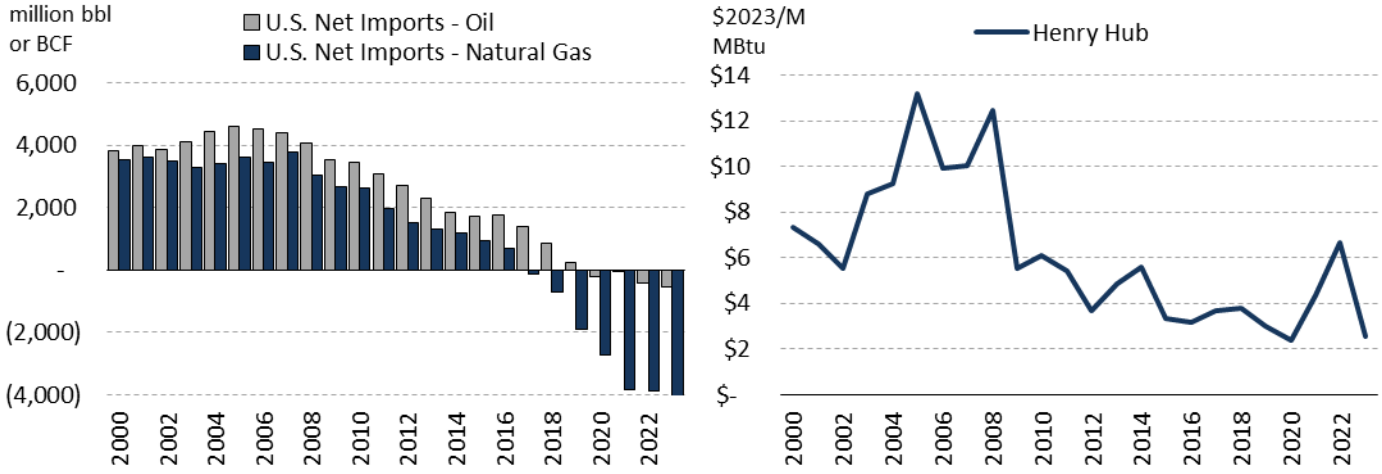
Source: EIA data; P - pure gas play; A - associated gas/primary oil play

Between 2007 and 2022, U.S. gross natural gas production from shale plays has grown from virtually non-existent to almost 90 billion cubic feet per day (BCF/d). Low-cost natural gas production from shale plays not only increased the U.S. total natural gas production but also displaced higher-cost production from conventional natural gas and oil wells.

Noteworthy is also the massive growth in natural gas production in shale plays primarily focused on oil exploration like the Permian, Bakken, or Eagle Ford basins, among others. This so-called associated natural gas production accounted for almost 30% of gross natural gas production in 2022.

As shown in **EXHIBIT *2***, the increased low-cost supply base of natural gas and oil enabled the United States to export more natural gas, crude oil, and petroleum products than it imported for the first time in its history.

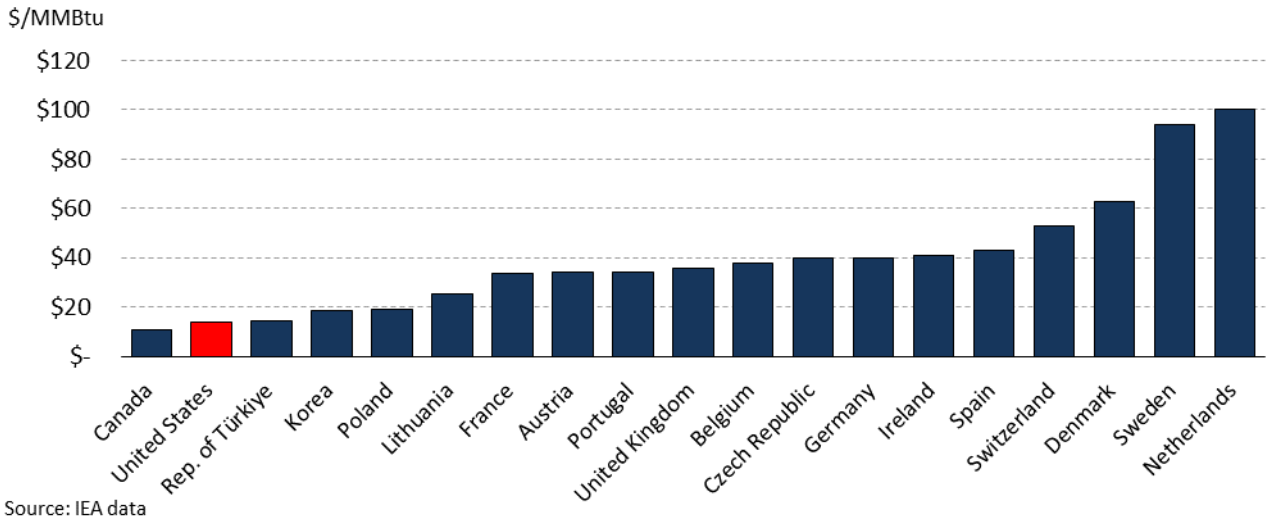
EXHIBIT 2: U.S. NET IMPORTS OF OIL & NATURAL GAS (LEFT) AND ANNUAL NATURAL GAS PRICES @ HENRY HUB (RIGHT)



Source: EIA data; 2023 annualized based on 11 months of data

In 2017, the U.S. exported more natural gas than it imported for the first time. Since then, the U.S. has become one of the world's largest exporters of liquified natural gas (LNG). In 2020, the U.S. also exported more crude oil and petroleum products than it imported for the first time. The massive increase in the low-cost supply of both oil and natural gas also resulted in dramatic reductions in domestic prices for the two products. For the last ten years, natural gas prices at Henry Hub in Southwestern Louisiana, one of the world's most prominent natural gas trading hubs, have averaged about $4.10/MMBtu, a reduction of over 54% compared to the first ten years of this century. Notably, U.S. natural gas prices are among the lowest in the world, as shown in **EXHIBIT *3***.

EXHIBIT 3: 2022 AVERAGE RESIDENTIAL NATURAL GAS PRICES BY COUNTRY



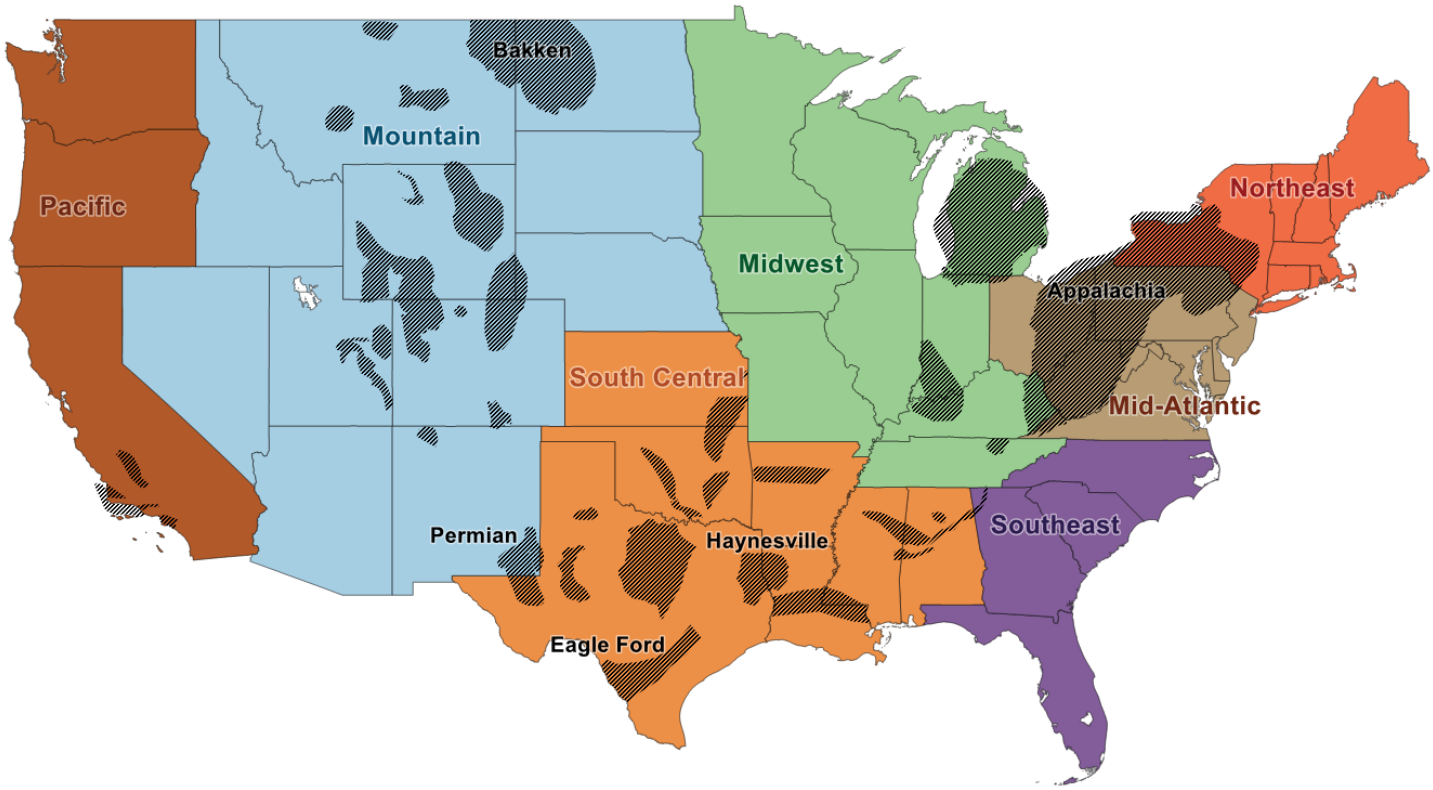
Source: IEA data

Due to the substantial structural changes in the U.S. natural gas and oil sectors, the U.S. has made considerable investments in increasing its natural gas export capacity, both via LNG export terminals along the U.S. East and Gulf coasts and via natural gas pipelines to Mexico. Additional LNG export terminals and cross-border pipeline projects are at various planning and development stages to expand the U.S. current natural gas export capacity. Critics of these projects question the necessity and overall impact of increased exports on U.S. consumers, claiming that they would lead to increased economic burdens on end-use customers. This report analyzes the historical impact of increased U.S. natural gas exports on U.S. natural gas consumers, highlights the unique situation of 2021 and 2022, and presents some of the many positive impacts of U.S. natural gas exports, both domestic and abroad.

Changes in Regional Natural Gas Production & Consumption since 2007

Before examining the impact of LNG and pipeline exports of natural gas on U.S. consumers and domestic natural gas prices, it is important to provide context and a brief historical review of the reasons behind the exponential growth of U.S. natural gas exports over the last decade. **EXHIBIT *4*** shows the regional division of the Lower-48 states by EIA natural gas storage region[2] and the major U.S. natural gas and oil plays.

EXHIBIT 4: EIA NATURAL GAS STORAGE REGIONS & MAJOR U.S. SHALE PLAYS

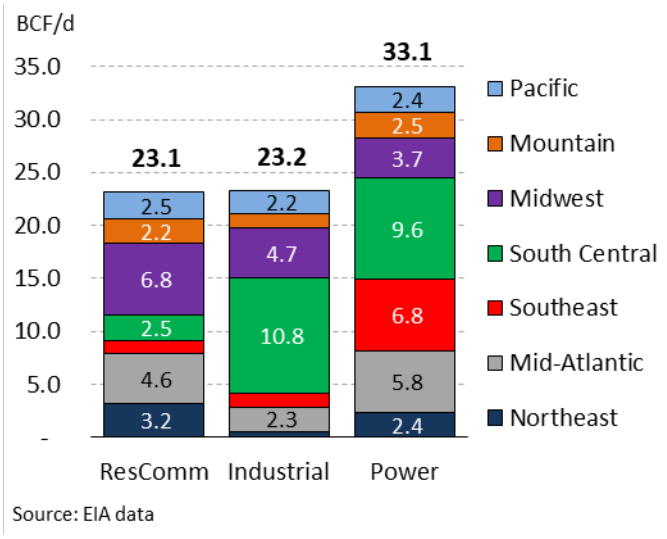


As shown in **EXHIBIT *1***, U.S. natural gas production has grown tremendously since the beginning of the Shale Gas Revolution around 2007. While virtually non-existent before 2008, Appalachian natural gas production (Marcellus, Utica, and Devonian shale plays) has grown to over 30 BCF/d or 31% of dry natural gas production by the end of 2022, which has created a massive paradigm shift in regional natural gas production and consumption patterns.

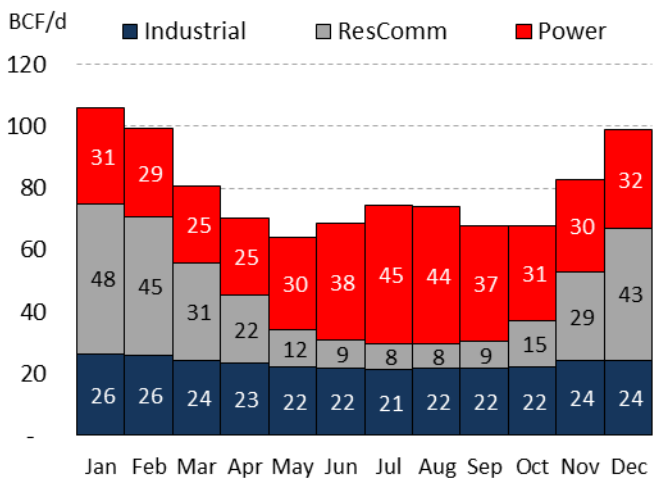
Almost all of the natural gas consumed domestically is consumed by end-use customers in the residential and commercial (ResComm), industrial, and electric power sectors. As shown in **EXHIBIT *5***, there exist notable regional differences in natural gas consumption by domestic end-use sector, as well as the monthly natural gas consumption pattern by end-use sector.

[2] EIA's "East" natural gas storage region has been further divided into Northeast, Mid-Atlantic, and Southeast, as shown in the map.

EXHIBIT 5: 2022 REGIONAL NATURAL GAS CONSUMPTION BY END-USE SECTOR (LEFT) & TOTAL U.S. 2022 MONTHLY CONSUMPTION BY END-USE SECTOR (RIGHT)



Source: EIA data



Source: EIA data

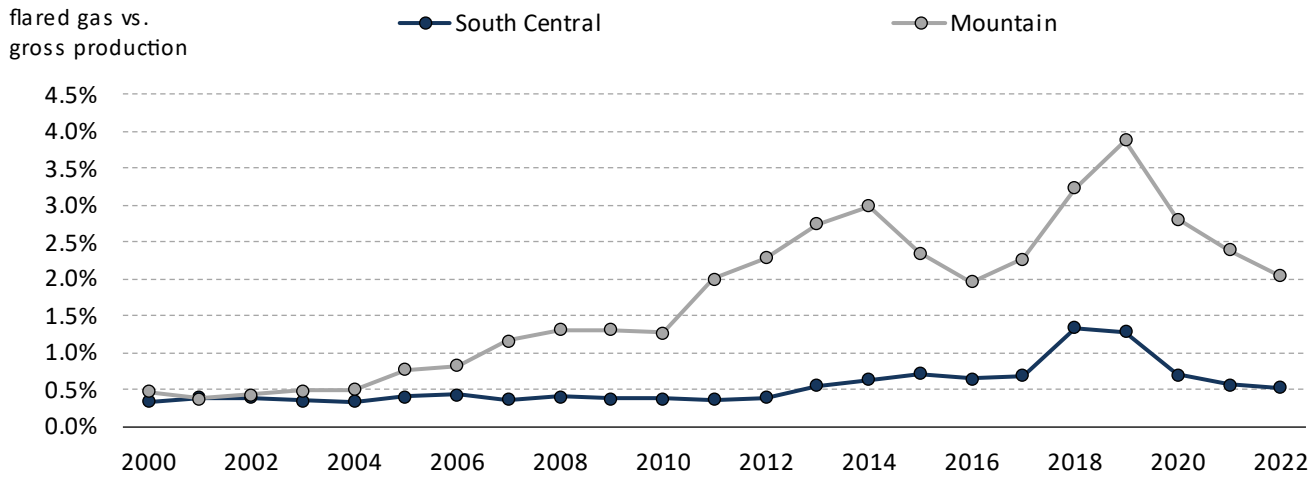
Residential and commercial (ResComm) natural gas consumption, primarily used for cooking and space heating, is disproportionately concentrated in the northern regions. The Midwest, Northeast, and Mid-Atlantic regions accounted for over 63% of ResComm natural gas consumption in 2022. Conversely, almost half of the industrial natural gas consumption is concentrated in the South Central region that includes the U.S. Gulf Coast. Similarly, the Southeast and South Central regions account for about half of the natural gas consumption in the U.S. electric power sector.

There also exist substantial differences in monthly consumption of natural gas between end-use sectors. Since natural gas in the ResComm sector is primarily used for space heating, its consumption peaks during the winter months. Conversely, natural gas consumption in the power sector peaks during the summer months when electricity demand peaks and natural gas is generally readily available.

Since the beginning of the shale gas revolution, the historic growth in Appalachian natural gas production and subsequent natural gas pipeline projects allowed the Northeast, Mid-Atlantic, and Midwest regions to be increasingly supplied by Appalachian natural gas. As a result, increasing amounts of natural gas produced in the South Central region from conventional and newly developed shale gas & oil resources were “stranded” in the region, causing regional natural gas prices to decline and disconnect from the natural gas price at Henry Hub. For example, natural gas prices at Waha hub (price point representative of the Permian basin) traded as low as $2.94/MMBtu below Henry Hub in May 2019. As a result of the lower prices, domestic natural gas consumption in South Central increased from about 17.5 BCF/d in 2010 to 22.9 BCF/d in 2022, primarily driven by growth in the industrial and electric power sectors.

Notably, as exploration activity in primarily oil shale plays like the Bakken Basin in North Dakota and the Permian Basin in West Texas and East New Mexico increased, so did the amount of flared and vented associated natural gas due to a lack of takeaway pipeline capacity and regional consumption. **EXHIBIT *6*** shows the natural gas flaring intensity by region.

EXHIBIT 6: FLARING INTENSITY BY PRODUCTION REGION



Source: EIA data

Although EPA increased the financial burden of flaring or venting excess natural gas, only increased pipeline takeaway capacity and natural gas export possibilities via pipelines to Mexico or LNG export terminals along the U.S. Gulf of Mexico resulted in a notable reduction in flared and vented natural gas over the last three years.

Overview of Historical U.S. Natural Gas Exports

As mentioned previously, the Shale Gas Revolution and subsequent rise in Appalachian natural gas production massively changed the flow of the commodity across the U.S. natural gas pipeline network, increasing the amount of natural gas "trapped" in the South Central region. To take advantage of the vast oversupply of natural gas in the region, U.S. companies developed new LNG export terminals along the Gulf and East coasts. **EXHIBIT *7*** shows the currently operational U.S. LNG export terminals.

EXHIBIT 7: OPERATIONAL U.S. LNG EXPORT TERMINALS

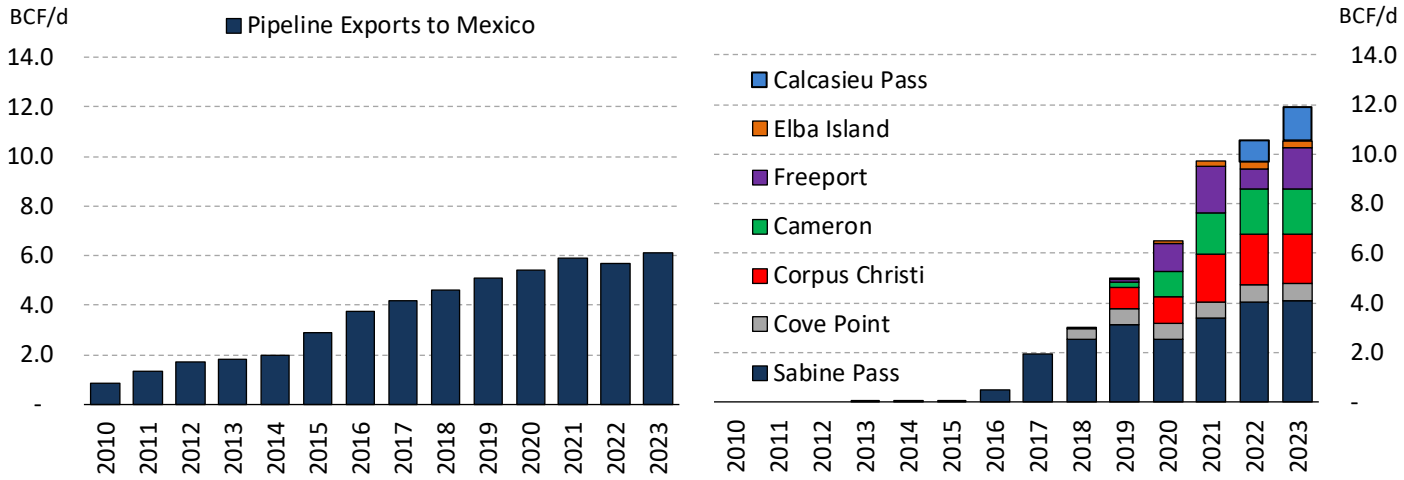
Operator	Project name	State	Online date	Export capacity *(BCF/d)*
Cheniere Energy	Sabine Pass	LA	Feb-16	4.55
Berkshire Hathaway	Cove Point	MD	Mar-18	0.76
Cheniere Energy	Corpus Christi	TX	Dec-18	2.40
Sempra LNG	Cameron	LA	May-19	1.98
Freeport LNG	Freeport	TX	Sep-19	2.13
Kinder Morgan	Elba Island	GA	Sep-19	0.36
Venture Global LNG	Calcasieu Pass	LA	Mar-22	1.58
			U.S. Total (end of 2022):	**13.76**

Cheniere Energy's Sabine Pass LNG export terminal located in Southwestern Louisiana became the first operational LNG export terminal in 2016, and has since grown to become the largest U.S. export terminal with a capacity of over 4.5 BCF/d. At the end of 2022, seven LNG export terminals were operational, totaling 13.76 BCF/d of export capacity. Notably, only two projects, Berkshire Hathaway's Cove Point and Kinder Morgan's Elba Island LNG terminals, totaling just over 1 BCF/d, are located outside Texas and Louisiana.

Additionally, U.S. companies invested significantly in increasing the natural gas pipeline capacity to neighboring Mexico, allowing associated natural gas production from the Permian Basin to be exported instead of flared. The recent Mexican pipeline network expansion, both intra-country and cross-border pipelines, allowed for increased U.S. natural exports to Mexico, which, in turn, displaced higher-cost Mexican natural gas production and LNG imports.

EXHIBIT *8* shows U.S. natural gas pipeline exports to Mexico (left) and LNG exports by terminal (right). Since 2014, U.S. natural gas pipeline exports to Mexico increased from about 2 BCF/d to over 5.7 BCF/d in 2022. With the start of operations at the Sabine Pass LNG export terminal in 2016, U.S. LNG exports have grown to 10.6 BCF/d in 2022. The Sabine Pass, Corpus Christi, and Cameron LNG export terminals accounted for over 83% of total LNG exports in 2022.

EXHIBIT 8: U.S. NATURAL GAS PIPELINE EXPORTS TO MEXICO (LEFT) & LNG EXPORTS (RIGHT)

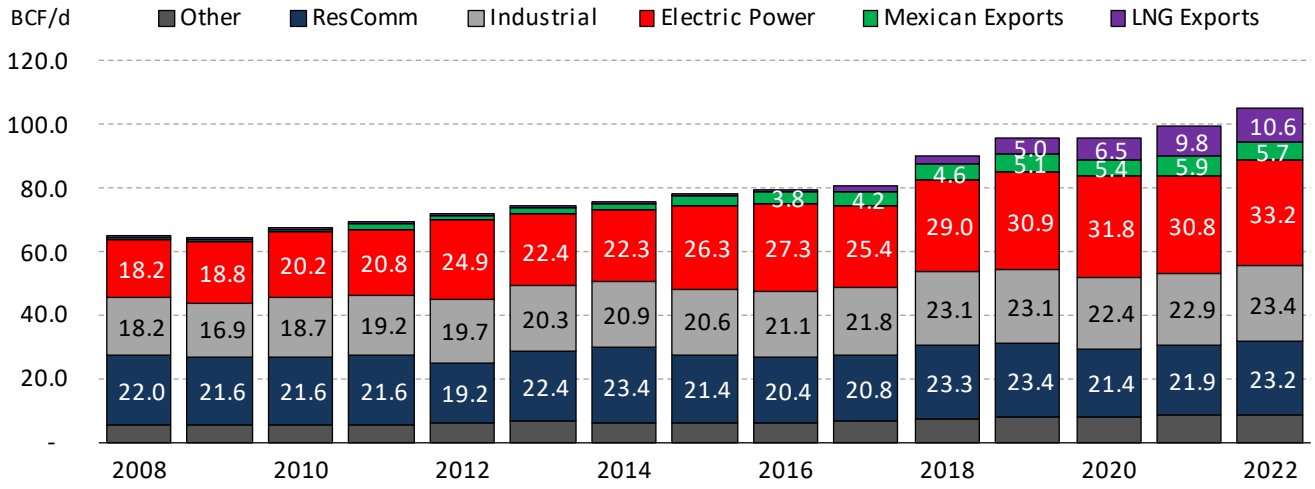


Source: EIA data

EXHIBIT *9* shows the total U.S. natural gas demand by end-use sector, pipeline exports to Mexico, and LNG exports[3]. Since 2008, U.S. natural gas demand has grown from roughly 66 BCF/d to over 107.4 BCF/d in 2022. U.S. pipeline and LNG exports have grown from around 2 BCF/d to almost 19 BCF/d over the same period, accounting for about 17% of total U.S. natural gas demand. The U.S. electric power sector has seen similar growth over the past 15 years, growing from about 18 BCF/d in 2008 to over 33 BCF/d in 2022, accounting for about one-third of total U.S. natural gas demand.

[3] Export values referenced in the chart are actual exports. Losses during liquefaction, storage, transportation, etc. are included in the "Other" category.

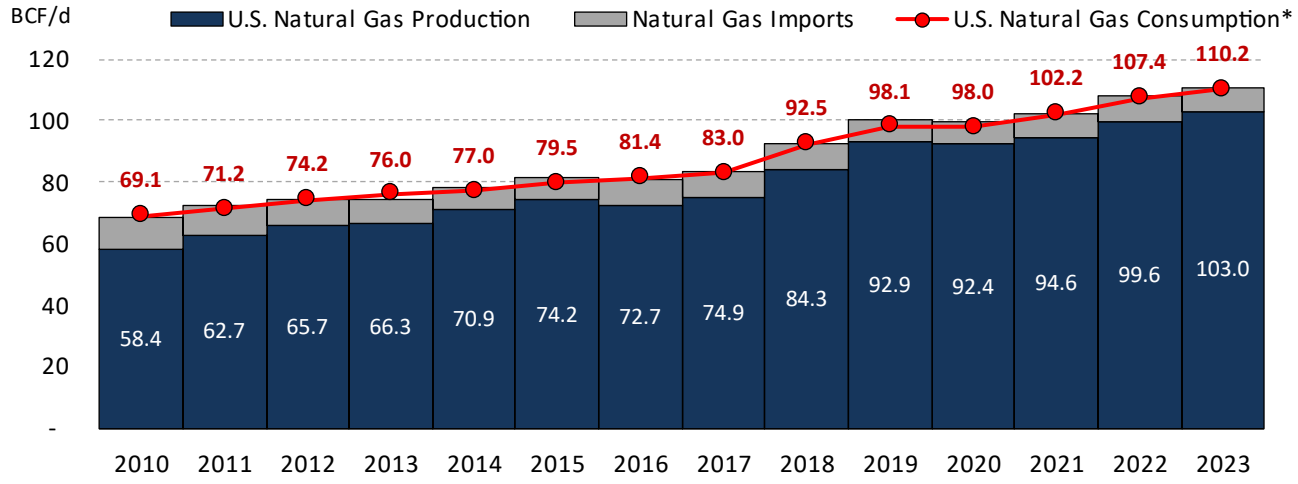
EXHIBIT 9: U.S. NATURAL GAS DEMAND BY SECTOR



Source: EIA data

Over the last 15 years, any substantial increase in natural gas demand has been followed by a continuous increase in U.S. natural gas supply, as shown in **EXHIBIT *10***. Despite U.S. natural gas production almost doubling from 2010 to 2023, natural gas prices during the first six months of 2023 have been at their lowest level since 2010 (excluding the COVID-19 period of April to September 2020). These supply-demand dynamics indicate a well-functioning market, particularly in light of the fact that prices have remained relatively stable throughout this period of enormous change in the U.S. energy system.

EXHIBIT 10: ANNUAL AVERAGE U.S. NATURAL GAS SUPPLY AND DEMAND



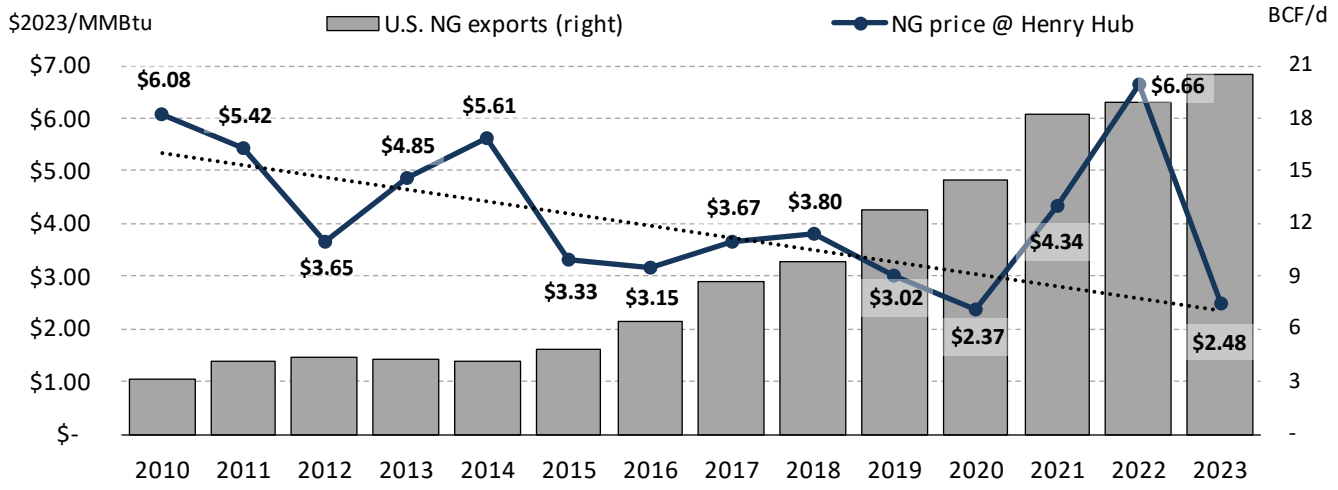
Source: EIA data; *includes LNG and pipeline exports

Review of Historical U.S. Natural Gas Price Formation

As shown in **EXHIBIT *11***, U.S. natural gas consumers have enjoyed the lowest natural gas prices in U.S. history over the last decade. Excluding the pricing anomaly of 2022, which this report will examine in more detail in the next chapter, U.S. natural gas prices at Henry Hub averaged $4.10/MMBtu over the last decade, a decline of over 54% from the first decade of this century, when natural gas prices averaged almost $9/MMBtu.

Furthermore, despite U.S. natural gas exports growing rapidly since 2016, natural gas prices have continued to decline. During the six years leading up to the rise in U.S. natural gas exports (2010 to 2016), natural gas prices at Henry Hub averaged $4.58/MMBtu. During the following six years (2017 to 2022), natural gas prices averaged less than $4.00/MMBtu. During the first half of 2023, when U.S. natural gas exports averaged a record 20.4 BCF/d, natural gas prices at Henry Hub averaged $2.43/MMBtu, the lowest 6-month average in this century outside of the height of the COVID-19 pandemic (April to October 2020). **EXHIBIT *11*** shows the annual average natural gas price at Henry Hub and U.S. natural gas exports.

EXHIBIT 11: U.S. NATURAL GAS EXPORTS & ANNUAL AVERAGE NATURAL GAS PRICES @ HENRY HUB

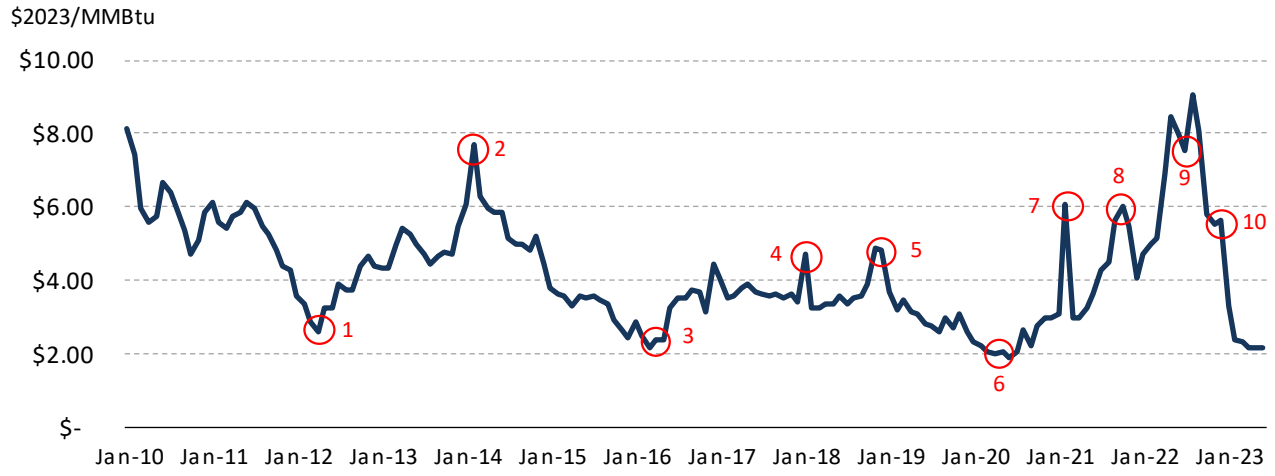


Source: EIA data; Note: trendline excludes 2022

To better understand why natural gas prices continued to decline over the last six years despite U.S. natural gas exports rising to record levels, it is worth examining the various factors influencing the value of natural gas in the United States and its regional differences.

As described and shown in **EXHIBIT *5***, natural gas is consumed in four major sectors across the U.S.: As a cooking and heating fuel in the residential and commercial sectors, as fuel input in many industrial processes and power generation, as well as a commodity for export. According to basic economic theory, any change in demand of a commodity, while the supply of said commodity is held constant, will impact the commodity's price. **EXHIBIT *12*** shows monthly natural gas prices at Henry Hub with select annotated events explaining the observed price impact.

EXHIBIT 12: MONTHLY NATURAL GAS PRICES @ HENRY HUB



Source: EIA data

1. Supply glut of Summer 2012
2. 2014 Polar Vortex
3. Supply glut of Summer 2016
4. 2018 Winter Storm
5. November 2018 Snowstorm
6. COVID-19 pandemic demand destruction
7. Winter Storm Uri (Feb 2021)
8. Post-COVID-19 Demand Recovery
9. Freeport LNG fire
10. Winter Storm Elliott

As evidenced in **EXHIBIT *12***, weather patterns differing from the norm have the largest impact on U.S. natural gas prices. Extreme cold weather events like Winter Storm Uri and Elliott can send natural gas prices soaring, as increased natural gas demand for heating in the ResComm and power generation in the electric power sectors outpaced natural gas supply. Conversely, warmer-than-normal winter weather can create a surplus of natural gas supply that suppresses natural gas prices well into the following summer. Natural gas supply disruptions due to hurricanes affecting production regions in South Central can also affect short-term natural gas prices.

Additionally, the major natural gas demand sectors have different noticeably different impacts on regional natural gas prices due to the regional differences in natural gas consumption described previously. **EXHIBIT *13*** shows the correlation coefficients[4] between regional natural gas prices and regional natural gas consumption by sector for the seven years leading up to the rise in U.S. natural gas exports and the last six and a half years, including and excluding the anomaly of 2022. In the table below, green correlation coefficients highlight a positive relationship, while red correlation coefficients highlight a negative or inverse relationship. The more saturated the color shading, the more significant the relationship.

[4] For reference, the correlation coefficient is a statistical measure of the strength of a linear relationship between two variables. Its value can range from -1 to 1. A correlation coefficient of -1 describes a perfect negative, or inverse, correlation, with values in one series rising as those in the other decline, and vice versa. A coefficient of 1 shows a perfect positive correlation, or a direct relationship. A correlation coefficient of 0 means there is no linear relationship.

EXHIBIT 13: REGIONAL CORRELATION COEFFICIENTS BY DEMAND SECTOR VS. REGIONAL NATURAL GAS PRICES

	2010 - 2016			2017 - 2023				2017 - 2023 (excl. 2022)			
	ResComm	Industrial	Power	ResComm	Industrial	Power	U.S. Exports	ResComm	Industrial	Power	U.S. Exports
Northeast	0.42	0.43	(0.31)	0.44	0.42	(0.05)	0.04	0.54	0.50	(0.20)	(0.33)
Mid-Atlantic	0.45	0.22	(0.63)	0.26	0.38	(0.04)	0.14	0.52	0.46	(0.41)	(0.34)
Southeast	0.41	(0.02)	(0.41)	0.11	0.12	0.24	0.21	0.43	0.14	(0.24)	(0.32)
Midwest	0.22	0.10	(0.49)	0.05	0.04	(0.00)	0.24	0.37	0.38	(0.40)	(0.33)
South Central	0.25	(0.44)	(0.28)	0.09	0.07	0.02	0.20	0.34	(0.22)	(0.21)	(0.22)
Mountain	0.19	0.03	(0.31)	0.27	0.18	(0.04)	0.32	0.37	0.12	(0.14)	0.08
Pacific	0.18	(0.26)	(0.03)	0.33	(0.32)	0.23	0.35	0.46	(0.20)	0.18	0.19

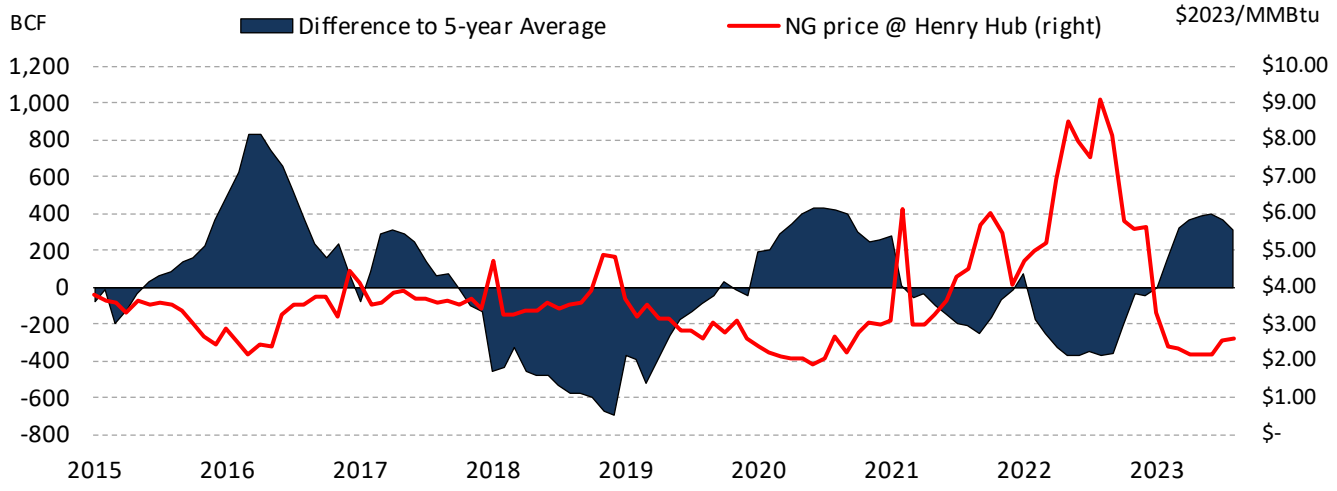
Note: correlation coefficients were calculated using monthly state-level EIA NG demand data aggregated on a regional level vs. $2023/MMBtu regional monthly average NG prices

Unsurprisingly, changes in natural gas demand in the ResComm sectors and regional natural gas prices are most strongly correlated in regions with significant ResComm demand during the winter heating season (e.g., Mid-Atlantic and Northeast regions). Conversely, the region with the highest industrial demand (i.e., South Central) shows a negative correlation between industrial demand and regional natural gas prices. As natural gas prices in the region decreased, industrial demand for the fuel increased as more industrial demand (re)located to the region.

Also evident from **EXHIBIT *13*** is the role the power sector (and, in addition, U.S. exports since 2017) plays in the overall supply-demand-price relationship of natural gas. As indicated by the negative correlation coefficient across all regions before 2017 and all but one region after that, power sector natural gas demand acts as a universal "balancing" factor for the overall U.S. natural gas market. As natural gas prices decline primarily due to short-term market oversupply, power sector natural gas consumption increases to consume the excess natural gas. On the other hand, as natural gas prices rise due to market "tightness", power sector natural gas consumption declines while other forms of electric generation (primarily coal) increase. Since 2017, a similar effect has been observed for the relationship between U.S. natural gas exports and regional natural gas prices.

One of the most accurate and widely used indicators for current natural gas supply-demand balances and their effect on natural gas prices is the current U.S. natural gas storage level versus the previous 5-year average, as shown in **EXHIBIT *14***.

EXHIBIT 14: LONG-TERM U.S. NATURAL GAS STORAGE DIFFERENCE VS. 5-YEAR AVERAGE & HENRY HUB NG PRICE



Source: EIA data

In the U.S., excess natural gas supply during the non-winter season (i.e., injection season – April through October) is stored in physical and geological storage facilities across the country. U.S. natural gas storage is also considered a significant source of natural gas supply during the winter months (withdrawal season – November through March), when natural gas consumption generally outpaces domestic natural gas production. Comparison to historical inventory levels at similar

points in time (e.g., 5-year average) allows natural gas market participants to assess if the current natural gas market balance is either "tight" (i.e., supply shortfall) or "loose" (i.e., excess supply).

As shown in **EXHIBIT *14***, historically, excess natural gas storage levels (positive difference to the 5-year average) coincide with low(er) natural gas prices. In contrast, periods of tight natural gas storage levels (negative difference to the 5-year average) coincide with high(er) natural gas prices. As explained previously, natural gas demand changes in the ResComm sector and fundamental changes in domestic production levels are primarily responsible for short-term storage surpluses or shortfalls, while more flexible demand sectors such as electric power and, more recently, exports allow for a rebalancing of natural gas inventories and the natural gas market as a whole.

The Natural Gas Pricing Anomaly of 2022

As described extensively in the previous section, natural gas prices (and, at large, all commodities) are affected by changes in demand and supply of the commodity. To better understand what happened in 2022, we need to review two fundamental economic principles—the interrelationship between supply, demand, and prices and the substitution effect.

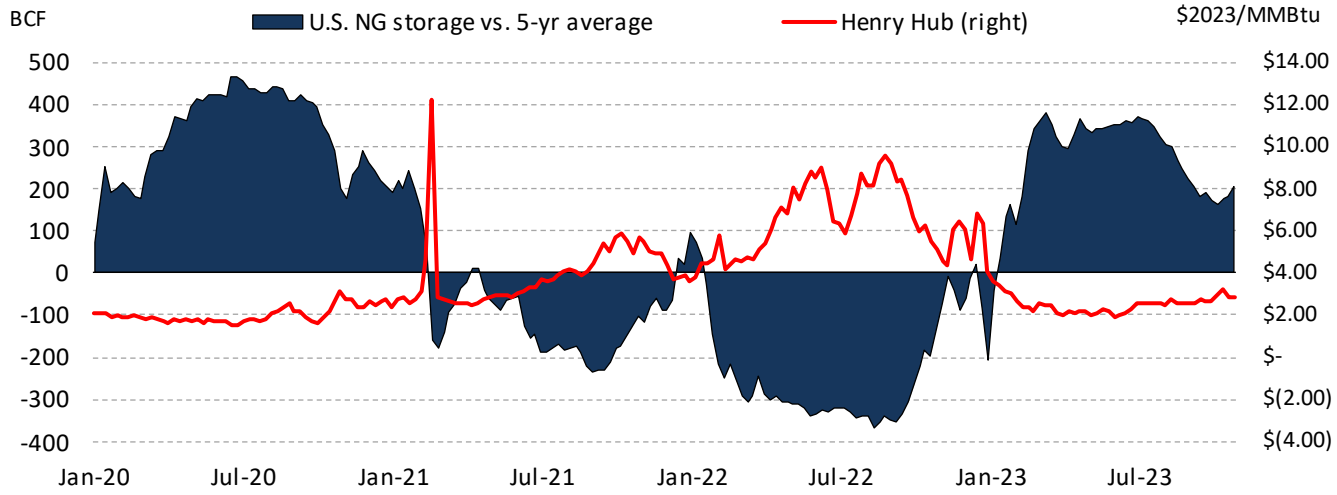
In general, as demand rises, prices rise, incentivizing increased supply. As a result of increased supply, market prices return to the so-called equilibrium price where demand and supply curves intersect. Vice versa, as demand declines, prices for the commodity decline, discouraging excess supply levels. As supply declines, prices increase until the market returns to equilibrium. Since there are significant differences in how fast supply and demand can change (increasing supply usually involves hiring and training new personnel, buying more input materials and supply, and expanding output capability, among other things), the time it takes for a market to return to equilibrium generally depends on how fast supply can increase or decrease. Therefore, as the old market saying goes, "The cure to high prices is high prices."

Another critical economic mechanism to review is the substitution effect. In general, as the price for one commodity rises, consumers of said commodity will increase the consumption of another commodity that can be used to substitute the commodity with rising prices. Therefore, as the price for one commodity rises, the incremental demand for the commodity declines as more consumers switch to the substituting commodity, which, in turn, will limit the price increase the primary commodity will experience. As explained in this section, neither of these economic market principles held true in 2022, resulting in the highest annual average natural gas price since the commodity market crash of 2008.

To understand what happened in 2022, we must first examine what happened in the lead-up to the period in question. In 2020, the COVID-19 global pandemic upended daily life across the globe. Demand for certain commodities plummeted overnight as people were ordered to stay home to protect against the virus. For example, demand for petroleum products fell to record lows in April 2020, causing crude oil prices to fall below $0 per barrel as refineries could not intake any additional crude oil due to the disappearance of diesel and gasoline demand across the country. Unemployment and corporate debt rose as companies tried to adjust their output to new demand levels caused by the pandemic.

As pandemic restrictions waned in 2021 and economic activity slowly returned to normal, demand for virtually all goods and services rose once again. However, corporate debt and a nationwide labor shortage caused by the pandemic limited the responsiveness of supply across the entire energy sector. Additionally, Winter Storm Uri in February 2021 resulted in a massive short-term natural gas supply disruption while demand soared to meet the increased demand in the ResComm and electric power sectors. As a result, the natural gas sector quickly consumed the massive storage surplus of almost 500 BCF versus the 5-year average accumulated during the first few months of the pandemic and fell to a storage shortfall of over 230 BCF in September, as shown in **EXHIBIT *15***.

EXHIBIT 15: 2020-2023 U.S. NATURAL GAS STORAGE DIFFERENCE VS. 5-YEAR AVERAGE & HENRY HUB NG PRICE

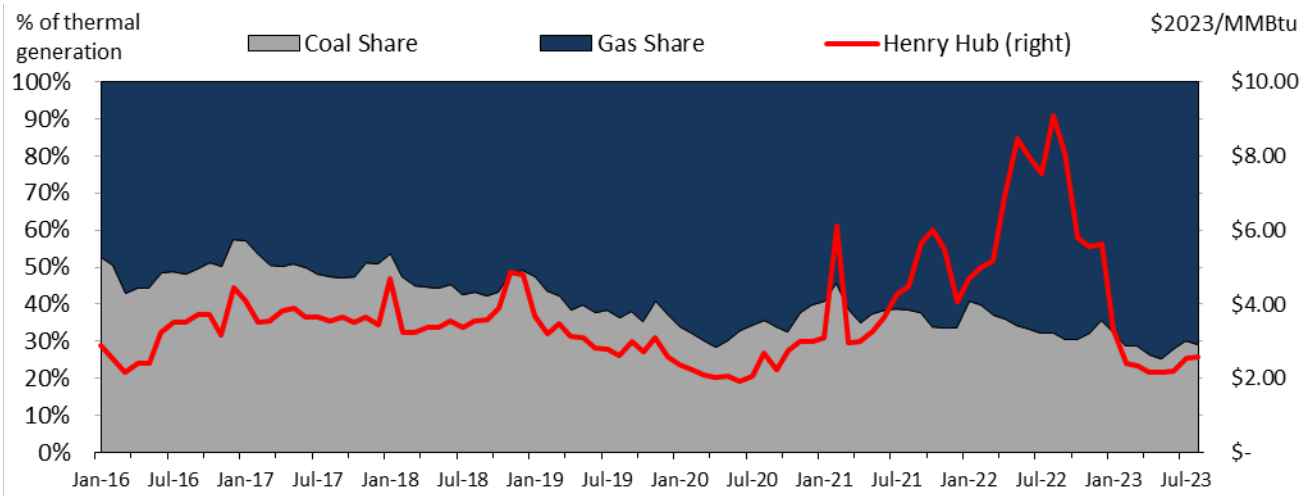


Source: EIA data

Due to the labor shortage and the large, accumulated debt of natural gas exploration companies, corporate austerity in capital spending resulted in a delayed supply response to the increasing natural gas prices as natural gas demand returned in 2021. U.S. natural gas prices at Henry Hub doubled from about $2.50/MMBtu in March 2021 to over $5.00/MMBtu at the end of September, while the shortfall of natural gas inventories to the 5-year average continued to widen. Once U.S. natural gas production responded towards the end of Q3 of 2021, the storage shortfall began to decline, resulting in prices falling below $4.00 in December 2021.

Due to a lack of substitution possibilities, the ResComm sector tends to be the most inflexible, or "inelastic," of the major natural gas demand sectors. As temperatures fall, residential and commercial customers increase their natural gas consumption for heating, largely irrespective of price, since the only choice for a home or building with natural gas heating is heat or no heat, which, in some circumstances, is literally a decision of life or death. On the other hand, due to its competition with coal, the U.S. power sector is arguably the most flexible or elastic of the major natural gas sectors. **EXHIBIT *16*** shows the competition between coal and natural gas in the U.S. power sector and the relationship to natural gas prices at Henry Hub.

EXHIBIT 16: U.S. COAL AND NATURAL GAS POWER GENERATION SHARE VS. HENRY HUB NG PRICE



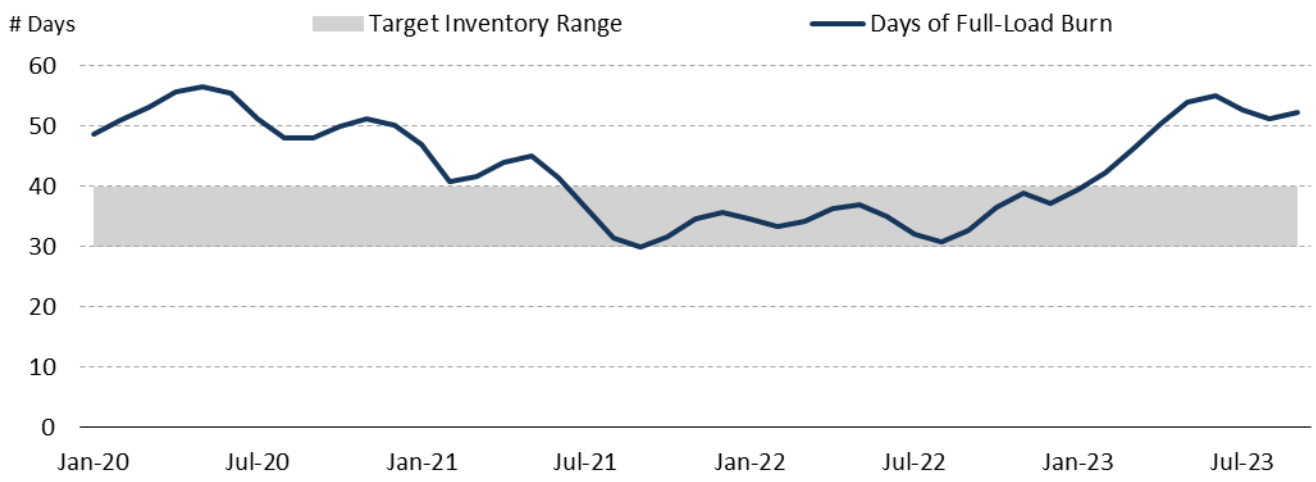
Source: EIA data

The above exhibit shows a strong correlation between coal and gas generation share and U.S. natural gas prices. As natural gas prices increase, the operating cost for natural gas-fired power plants increases, making them less economical to run than some of their coal-fired counterparts. As natural gas prices continue to rise, more and more natural gas generation and, therefore, natural gas consumption is displaced by increased coal generation.

In 2021, as natural gas prices began to rise and natural gas production could not quickly respond, increasing amounts of natural gas generation were displaced by coal generation, effectively limiting how fast and how high natural gas prices could rise during that summer. Once domestic natural gas production responded to the higher demand and prices, reducing the natural gas storage shortfall, natural gas prices fell, and natural gas generation quickly took back market share from its coal-fired counterparts.

However, it is important to highlight that this notable shift from natural gas to coal generation during the summer of 2021 had trickle-down effects that the U.S. natural gas market would feel for most of 2022. U.S. coal companies felt the same effects of the labor shortage and corporate debt caused by the COVID-19 pandemic, which limited production response from their natural gas counterparts. However, due to slower response in coal supply and delivery adjustments during the height of the pandemic, U.S. coal plants entered 2021 with on-site coal inventories well above their target levels, as shown in **EXHIBIT *17***.

EXHIBIT 17: MONTHLY U.S. COAL INVENTORIES AT COAL POWER PLANTS VS. TARGET LEVELS[5]



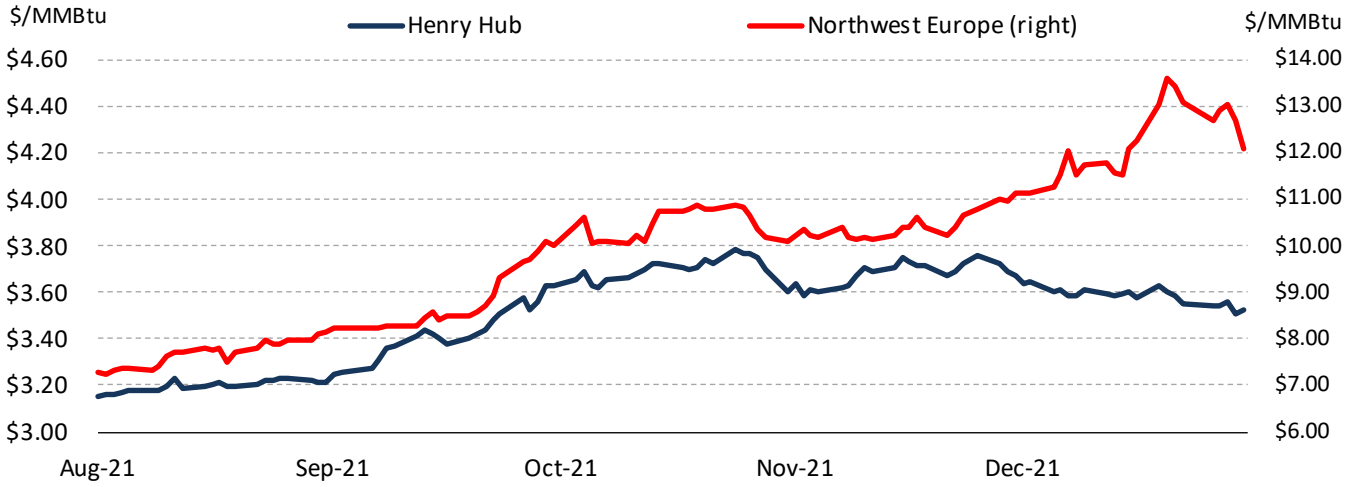
Source: EVA Coal Stockpile Report

As natural gas prices began to rise in 2021 and more natural gas-fired power plants were being displaced by coal-fired plants, coal inventories began to decline rapidly, from over 55 days of full-load burn to 30 days by September 2021. According to EIA, in September 2021, coal inventories fell to their lowest levels in over 40 years[6], limiting utilities' capacity to fuel switch in response to rising natural gas prices. As natural gas production rose and natural gas prices fell, some power generation shifted back to natural gas, allowing coal inventories to partially recover before the start of 2022.

Also worth highlighting is the relationship between U.S. and European natural gas prices. **EXHIBIT *18*** shows the daily natural gas prices for the U.S. (at Henry Hub) and Northwest Europe (at Title Transfer Facility – TTF).

[5] Days of Full-load burn measures the number of days a coal plant can operate at 100% given the current size of on-site fuel inventory.
[6] https://www.eia.gov/todayinenergy/detail.php?id=50558

EXHIBIT 18: U.S. VERSUS EUROPEAN DAILY NATURAL GAS PRICES: AUGUST TO DECEMBER 2021



Source: Bloomberg

Due to the proximity and price advantages, the United States is the primary supplier of LNG to the European market. However, before the Russia-Ukraine War, Europe received most of its natural gas at a lower cost than LNG from Russia via pipeline. Therefore, U.S. LNG has historically been Europe's marginal natural gas supply. As a result, any change in U.S. natural gas prices was and still is often reflected in European natural gas prices. As U.S. gas prices rose throughout September and into October, European natural gas prices followed suit. However, U.S. and European natural gas prices disconnected in November 2021 as increased U.S. natural gas production caused prices to fall. Meanwhile, Europe required additional natural gas from other LNG exporting countries, as signaled by increasing European natural gas prices. If European natural gas prices, in fact, dictated U.S. natural gas prices, as some critics of increased U.S. natural gas exports allege, that price disconnect would not have materialized.

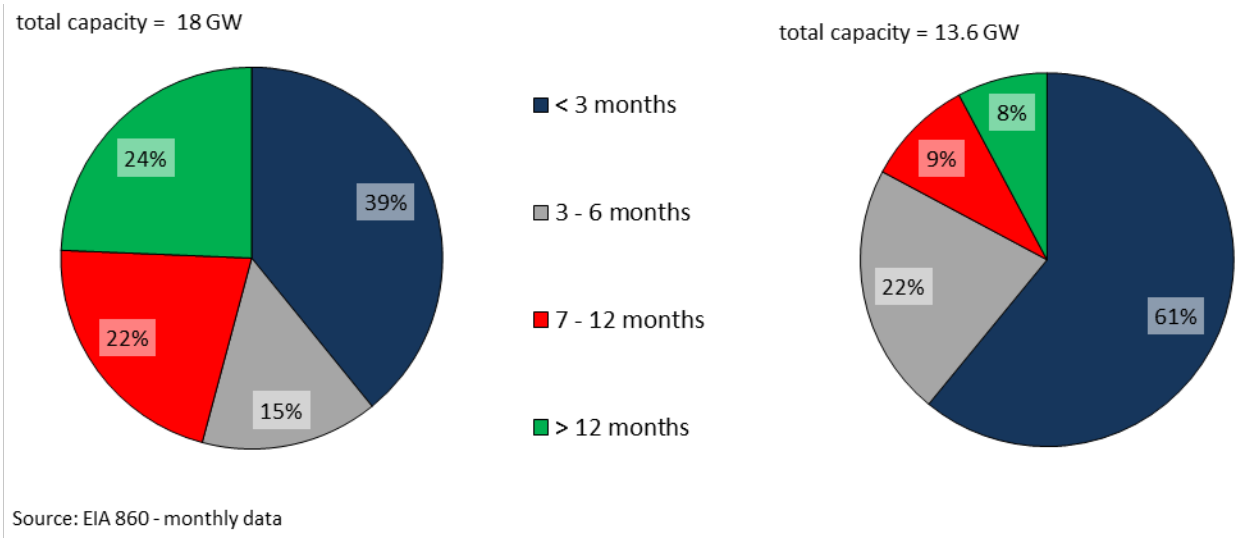
In summary, as the U.S. energy sector entered 2022, natural gas inventories just rebalanced against the 5-year average due to the slow return of domestic natural gas production. Meanwhile, coal inventories at U.S. coal-fired power plants were at the low end of their target levels, with the coal supply chain (mining and transportation) still operating at well-below pre-pandemic levels. As electricity demand and natural gas for heating increased during January and February, so did natural gas prices.

However, due to the low coal inventories entering 2022, many regulated utilities limited coal consumption at their coal plants to their scheduled coal deliveries since coal production and transportation increases were still severely limited. As a result, the substitution effect between coal and natural gas in the U.S. power sector disconnected, as shown in **EXHIBIT *16***. Therefore, despite rising natural gas prices due to the rapidly increasing natural gas inventory shortfall, natural gas consumption in the power sector continued to rise as coal generation was constrained by low inventories, further exacerbating the natural gas inventory shortfall. Despite natural gas prices reaching post-shale gas revolution record highs in the summer of 2022, natural gas generation in the power sector continued to rise. Increased electricity demand driven by above-average summer heat, over 14 GW of coal plant retirements in 2022 alone, the rest of the coal fleet limited by record-low inventories, and significantly delayed completion of new renewable energy projects due to supply chain issues post-pandemic, left natural gas as the only resource with the flexibility to increase electric generation output. To further prove the point, EIA reported in the summer of 2022, "in past years, the electric power sector has substituted natural gas-fired generation with coal-fired generation when natural gas prices have risen. However, in recent months, coal power

plants have responded less than in the past as an alternative source of generation, most likely as a result of continued coal capacity retirements, constraints in fuel delivery to coal plants, and lower-than-average stocks at coal plants." [7]

EXHIBIT *19* shows the magnitude of renewable energy project delays post-COVID-19 pandemic in 2021 and 2022. Between July 2021 and June 2022, over 60% of solar and almost 40% of wind projects experienced a delay of more than three months. Almost one-quarter of solar projects, or 4.5 GW, were delayed by over a year due to shortfalls in solar panel supply, increasing the reliance on natural gas power plants in 2021 and 2022 as coal plant retirements continued.

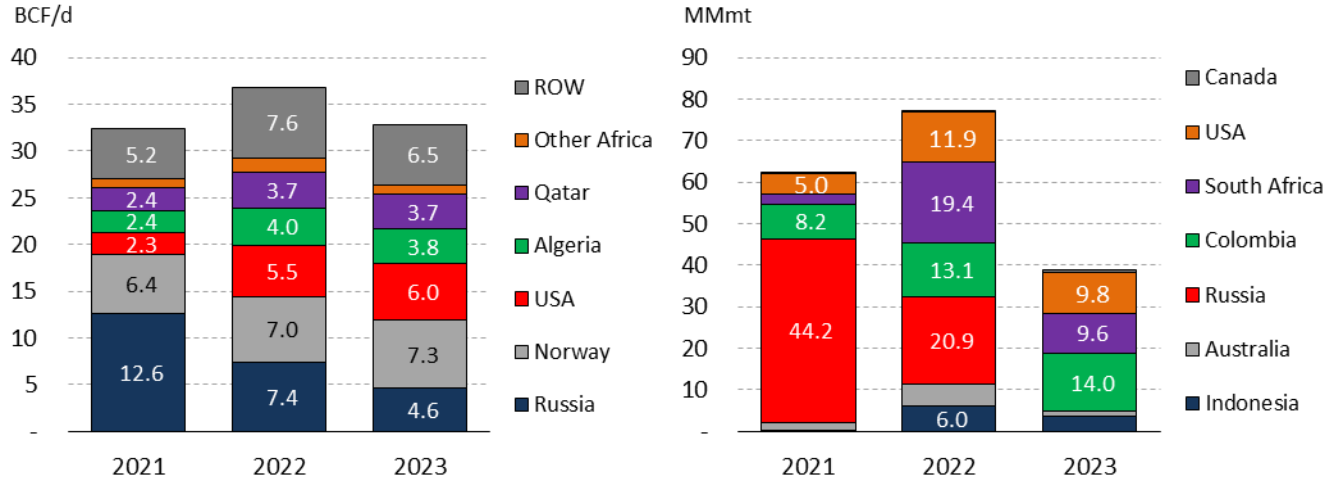
EXHIBIT 19: U.S. SOLAR (LEFT) AND WIND (RIGHT) PROJECT DELAYS BETWEEN JULY 2021 AND JUNE 2022



Source: EIA 860 - monthly data

Further exacerbating the energy market tightness in the U.S. and globally in 2022 was Russia's invasion of neighboring Ukraine beginning in February 2022. As shown in **EXHIBIT *20***, Russia was the primary supplier of thermal coal (used primarily in power generation) and natural gas to Europe before Russia's Invasion.

EXHIBIT 20: ANNUAL NATURAL GAS (LEFT) AND THERMAL COAL (RIGHT) IMPORTS BY ORIGIN COUNTRY INTO EUROPE



Source: EU trade data; ROW - Rest of World

Source: EU trade data

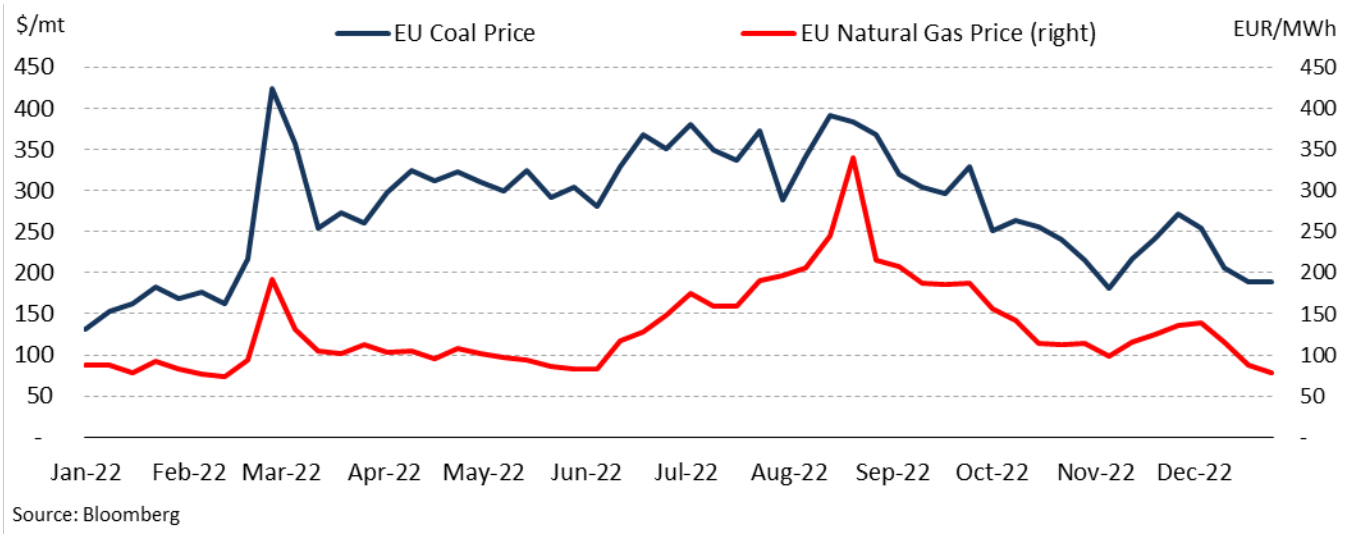
In 2021, Russia accounted for over 70% of thermal coal and almost 40% of natural gas imports into Europe. As Russia's invasion of Ukraine began, European countries and their Western allies began to impose sanctions on imports of Russia's

[7] https://www.eia.gov/todayinenergy/detail.php?id=52798

energy commodities, including coal, oil, and natural gas. Just one month later, European countries announced an import ban on all Russian coal beginning August 10, 2022. As a result, European coal prices jumped from $130/mt entering 2022 to over $400/mt the week following Russia's invasion of Ukraine, and averaged well above $320/mt for the following six months (March through September) to encourage additional coal imports from other countries.

Although European countries never officially imposed sanctions on Russian natural gas imports, serious supply concerns about natural gas pipeline flows from Russia to the E.U. persisted. To limit any increase in natural gas consumed in the European power sector, European natural gas prices had to rise in lockstep with European coal prices. As a result, European natural gas prices rose during the first half of 2022, albeit more modestly (except for the week of the invasion), averaging 100 EUR/MWh. European natural gas prices increased further during the summer of 2022 to minimize the amount of coal-to-gas-switching in the European power sector and preserve natural gas inventories. As shown in **EXHIBIT *21***, European natural gas prices reached a record high of 339 EUR/MWh at the end of August when Russia announced an unplanned maintenance outage at the Nord Stream natural gas pipeline, which directly connects Russia and Germany.

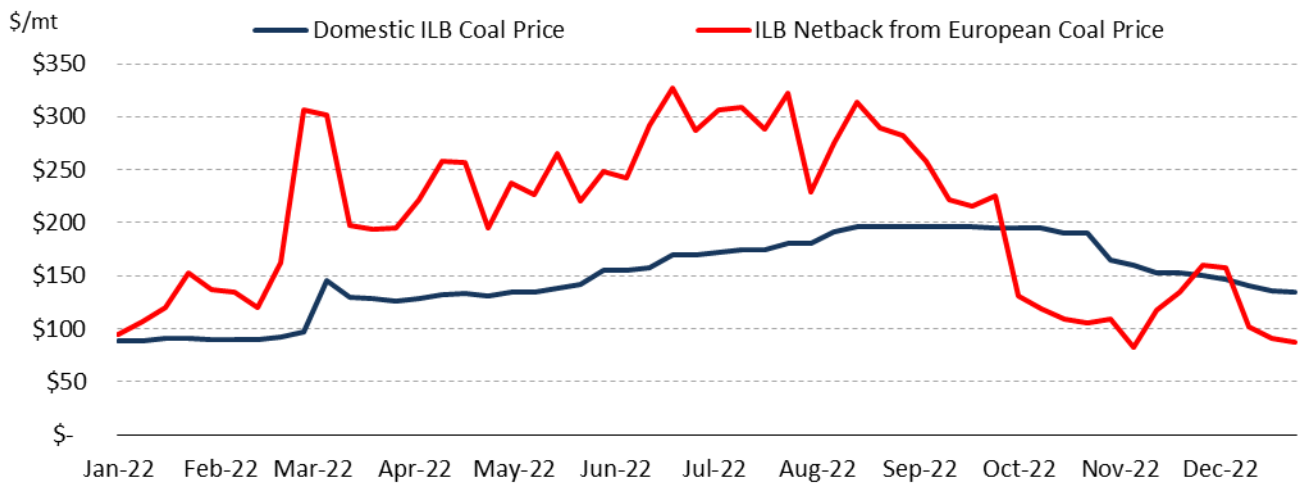
EXHIBIT 21: 2022 EUROPEAN COAL AND NATURAL GAS PRICES



Source: Bloomberg

The United States quickly materialized as one of the alternative supply sources for European coal imports due to U.S. coal quality characteristics and proximity. However, as mentioned previously, U.S. coal supply in 2022 was severely constrained. Additionally, most of the produced U.S. coal was already contracted for by U.S. electric utilities that required new inflows to at least maintain their already low coal inventories. Therefore, European coal buyers competed with domestic coal buyers for only a small amount of coal that was not already contracted for delivery in 2022, especially from the Eastern U.S. coal basins (i.e., Northern Appalachia – NAPP, Central Appalachia – CAPP, and Illinois Basin – ILB). As a result, U.S. coal prices began to increase significantly as the arbitrage to Europe for Eastern U.S. coal began to widen, as shown in **EXHIBIT *22***. At their peak during mid-2022, European coal prices more than tripled relative to their pre-war levels in January 2022.

EXHIBIT 22: U.S. ILB COAL PRICE VS. NETBACK TO EUROPEAN COAL PRICE

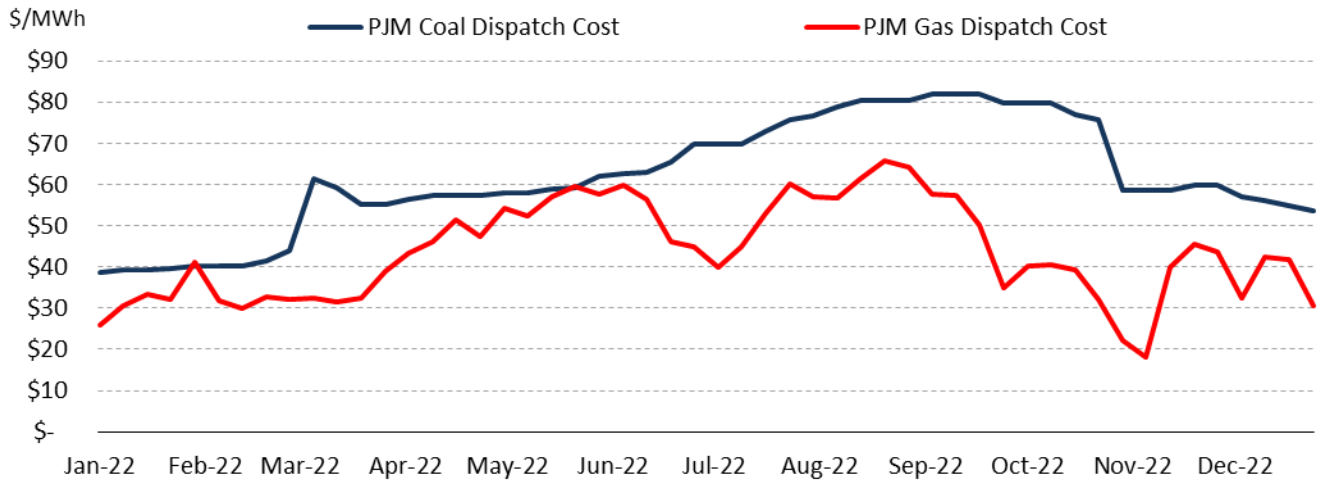


Source: EVA Global Thermal Coal Report

Following Russia's invasion of Ukraine, U.S. Eastern coal prices collectively jumped $40/mt week-over-week, increasing the dispatch cost for coal plants relying on U.S. coal with exposure to the export market. The arbitrage of U.S. coal exports to Europe remained well above domestic price until the end of Q3 2022, when European natural gas and coal prices began to fall as supply concerns for the commodities in Europe eased.

Due to the jump in U.S. coal prices and, in turn, the increased dispatch cost of U.S. coal plants, natural gas prices responded in kind to limit the amount of coal-to-gas switching in the power sector. **EXHIBIT 23** shows an example of coal versus natural gas dispatch economics for 2022 in the PJM Interconnection.

EXHIBIT 23: 2022 COAL VS. NATURAL GAS DISPATCH COST IN PJM



Source: EVA Coal-to-Gas Price Sensitivity Outlook: assumes NAPP coal, 10.5 HR, $4 O&M vs. Gas 7.5 HR, $2 O&M

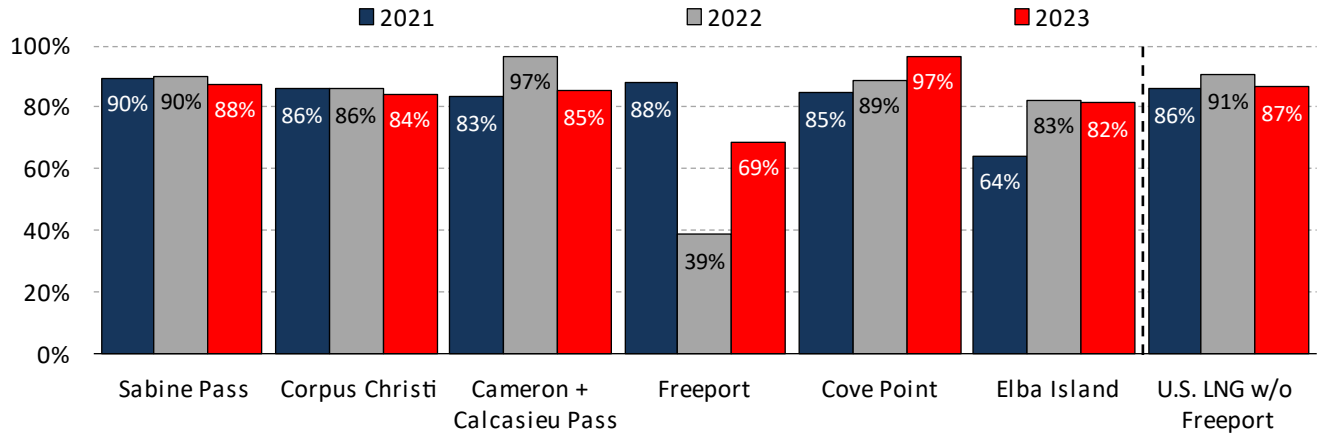
Although European natural gas and coal prices jumped at the end of February, with U.S. coal prices responding just a week later, U.S. natural gas prices did not begin to rise until early April increased U.S. power sector natural gas demand quickly increased the U.S. natural gas inventory shortfall versus the 5-year average, as shown in **EXHIBIT *15***. U.S. natural gas prices briefly dipped at the end of June when an explosion at the Freeport LNG export terminal halted all exports from the facility for the foreseeable future, allowing an additional 2.1 BCF/d of natural gas supply to flow into the power sector. However, as coal prices and the natural gas inventory shortfall remained high, natural gas prices quickly rebounded to limit further coal-to-gas switching. U.S. natural gas prices began to ease after milder-than-expected September weather significantly

reduced electricity demand and, in turn, natural gas consumption in the power sector, while steadily increasing natural gas supply allowed natural gas inventories to rise quickly, reducing the shortfall to the 5-year average.

In summary, it was not natural gas exports but rather a confluence of unusual coal market factors—limited domestic inventories, reduced fuel-switching capacity, and heightened demand for U.S. coal exports to Europe—that served as the primary factor behind increased domestic natural gas prices in 2022.

To further illustrate the limited impact of global natural gas prices on U.S. LNG exports, **EXHIBIT *24*** shows the approximate utilization of the seven U.S. LNG export terminals, as well as the average U.S. LNG utilization with and without the Freeport terminal.

EXHIBIT 24: AVERAGE ANNUAL LNG EXPORT TERMINAL UTILIZATION

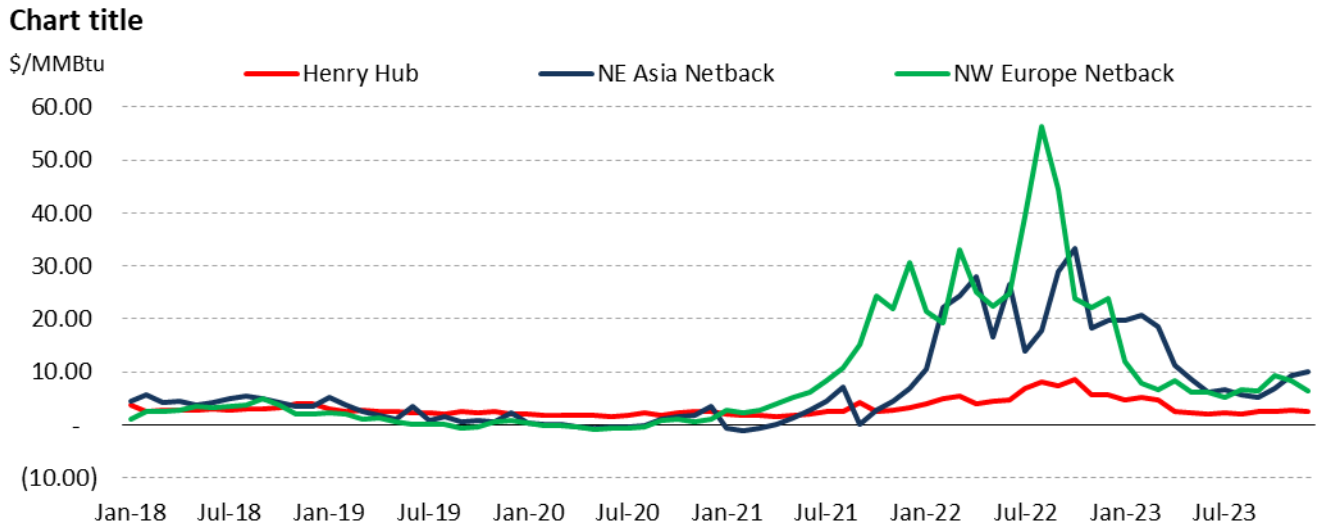


Source: EIA & Census data

Despite 2021 U.S. natural gas prices at Henry Hub averaging more than $2.00/MMBtu, or 35%, below 2022 levels, LNG terminal utilization was virtually unchanged between the two years. Excluding the Freeport LNG terminal due to the explosion and fire, which halted all exports from the facility for the second half of 2022, U.S. LNG utilization rates increased minimally year-over-year, from 86% to 91%, primarily driven by the recent completion of the Calcasieu Pass terminal and, therefore, a non-existent need for a planned maintenance outage in 2022. During the first eight months of 2023, when natural gas prices averaged less than $2.50/MMBtu, LNG export utilization remained at 87%.

The primary reason for the disconnect between domestic or international natural gas prices and LNG export terminal utilization is the massive discount of U.S. natural gas prices to their global counterparts due to the low-cost supply in the U.S. **EXHIBIT *25*** shows the U.S. LNG netbacks to the two major global LNG trading hubs, TTF in Northwest Europe and JKM (Japanese-Korean Marker) in Northeast Asia, versus the U.S. natural gas price at Henry Hub.

EXHIBIT 25: U.S. NATURAL GAS PRICES @ HENRY HUB VS. EUROPEAN & ASIAN NETBACK PRICING



Source: EVA Monthly Natural Gas Outlook

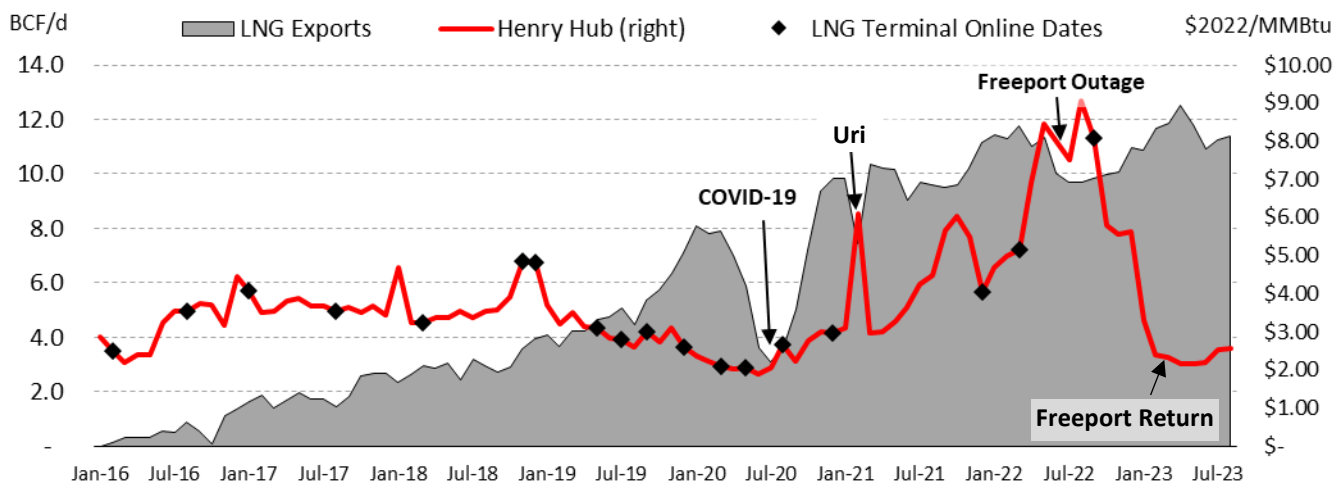
After global LNG netbacks languished below domestic natural gas prices for most of 2020, resulting in an LNG utilization rate of just 66%, the arbitrage to Europe opened during the summer of 2022, resulting in higher LNG export utilization rates in 2021. However, despite the LNG arbitrage to Northwest Europe rising to over $55/MMBtu, U.S. natural gas prices at Henry Hub did not rise above $10/MMBtu, highlighting the disconnect between global LNG prices and the impact of U.S. natural gas exports on domestic natural gas prices.

LNG Export Contracting and June 2022 Freeport LNG Fire

When examining the impact of LNG export terminals on domestic natural gas pricing, it is worth highlighting the difference from other energy commodities such as crude oil or coal. Due to their multi-year permitting and lengthy construction lead time, virtually all U.S. LNG export terminals have entered into long-term export contracts for virtually all of their expected LNG export capacity with foreign entities to ensure the financial viability of these multi-billion dollar infrastructure projects. Furthermore, due to the multi-year construction lead time, U.S. natural gas producers have sufficient time to increase natural gas output ahead of the new LNG export project coming online. As a result, the U.S. natural gas market already accounts for the increased demand from a new LNG export terminal by the time the project is completed and loads its first vessel. Also, due to the long-term contracting nature for most of the LNG export volumes scheduled to be exported, the nominal natural gas flows to the new terminal are highly predictable and, therefore, priced into the U.S. natural gas market, resulting in little to no increase in domestic natural gas prices. Conversely, any sudden loss of LNG flows will result in a sudden drop in natural gas prices, as shown by the Freeport LNG explosion, fire, and subsequent outage in the summer of 2022.

EXHIBIT *26* shows the weekly natural gas flows to U.S. LNG export terminals and the U.S. natural gas price at Henry Hub.

EXHIBIT 26: U.S. LNG EXPORTS & TERMINAL COMPLETION DATES VS. NATURAL GAS PRICES AT HENRY HUB



Source: EIA data

In June 2022, equipment malfunction and human error resulted in an explosion and fire at the Freeport LNG terminal in Freeport, Texas. Following the fire and explosion, the Freeport LNG terminal, which has a nominal export capacity of 2.1 BCF/d, was offline for repairs for over eight months and did not restart operations until February 2023. Since natural gas is delivered on a continuous basis via natural gas pipelines, the sudden loss of natural gas demand due to the Freeport LNG outage resulted in a substantial natural gas supply-demand market imbalance. As explained in detail earlier in this section, any sudden change in supply or demand of a commodity will result in an immediate price impact until the market rebalances. When natural gas prices fell following the Freeport LNG outage due to the brief market oversupply, consumption in other natural gas demand sectors, primarily in the U.S. electric power sector, quickly absorbed the additional 2.1 BCF/d of natural gas supply. As the market rebalanced, natural gas prices returned to pre-Freeport LNG outage pricing set by the domestic competition of coal and natural gas-fired power plants in the U.S. electric power sector described previously. However, when Freeport returned to operation in February 2023, domestic natural gas prices were virtually unaffected despite the staged return of 2.1 BCF/d of natural gas demand due to the foreseeable and predictable increase in natural gas demand.

Domestic & Global Benefits of U.S. Natural Gas Exports

A report discussing the potential impacts of increased U.S. natural gas exports on U.S. consumers would be incomplete without discussing some of the domestic and global benefits of U.S. natural gas exports. Although not exhaustive, this section provides an overview of the potential benefits of increased U.S. natural gas exports.

First, and arguably most important to U.S. consumers, the massive increase in domestic natural gas and crude oil production brought substantial economic growth to regions previously affected by low job availability and high unemployment rates. States like North Dakota, Texas, Louisiana, Arkansas, Ohio, and Pennsylvania have experienced massive growth in employment in the oil and natural gas sector. The increase in direct employment also resulted in employment and economic benefits in industries supporting the oil & natural gas industry, including supplies and maintenance materials used in oil and natural gas production (i.e., indirect jobs) as well as industries relying on the increased spending power of people employed directly or indirectly by the oil and natural gas industry, such as retail and hospitality sectors (i.e., induced jobs). Furthermore, increased oil and natural gas production activity has also brought a noticeable increase in local and state tax revenue through royalties, property taxes, sales tax, and income tax payments. These increased tax revenues often support vital local public services such as schools, libraries, and first responders. Future

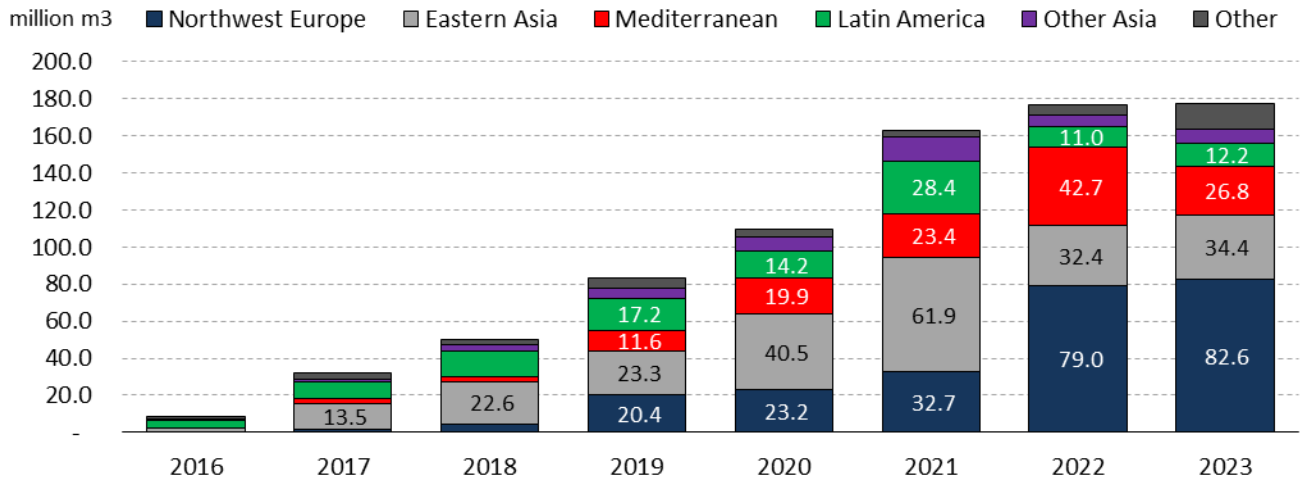
growth in U.S. natural gas exports helps protect these local economies against future economic decline as domestic ResComm and electric power sectors transition from natural gas to renewable energy.

Second, increased U.S. natural gas exports allow for previously flared and vented natural gas to be used efficiently in other sectors domestically and abroad. As shown in **EXHIBIT *6***, a substantial amount of natural gas produced in primary oil fields, such as the Permian and Bakken basins, is currently vented or flared due to the lack of existing takeaway capacity or nearby demand to consume the excess associated natural gas production. Increased U.S. natural gas exports to Mexico, which, in turn, will supply the newly proposed Mexican LNG terminals along the Pacific and Gulf coasts, will result in lower amounts of natural gas being wasted through venting or flaring and instead be used beneficially in other sectors around the world. As a result, the U.S. and global greenhouse gas (GHG) inventory will be reduced due to the increased beneficial use of natural gas.

Third, increased U.S. natural gas exports provided a much-needed alternative to Russian natural gas for U.S. allies across Europe in 2022 and beyond. In 2022, U.S. LNG exports to Europe proved essential for European countries to ensure adequate natural gas supply for the 2022/23 winter heating season while significantly reducing its imports of and payments for Russian natural gas supply, which, in turn, had and continues to have severe economic impacts on the Russian economy. This transatlantic collaboration in the face of an energy crisis emphasized the U.S.'s position as a reliable leader in energy, and the show of solidarity fortified American relations with the European continent. Additionally, increased certainty surrounding natural gas supply into Europe allowed Germany to advance its goal of retiring its remaining coal fleet by eight years to the end of 2030, as natural gas-fired power plants supplied by low-cost U.S. natural gas have gained market share over their coal-fired counterparts.

Fourth, future growth in U.S. LNG exports will likely be focused on supplying developed and developing countries in Africa and Asia. **EXHIBIT *27*** shows historical U.S. LNG exports by destination region.

EXHIBIT 27: U.S. LNG EXPORTS BY DESTINATION REGION



Source: Kpler Analytics

As previously mentioned, U.S. LNG exports to Northwest Europe significantly increased in 2022 as European countries displaced Russian natural gas deliveries. In 2021, most U.S. LNG cargoes left for shore in East Asia, primarily Japan and South Korea. Both countries have publicly announced that they will reduce their reliance on coal and nuclear power and replace it with LNG and renewables. Additionally, following Russia's invasion of Ukraine, both countries have sought to diversify their natural gas supply and will rely more heavily on U.S. LNG in the upcoming years as new U.S. LNG projects are completed.

Fifth, although increased U.S. LNG exports are unlikely to decrease global natural gas consumption, they will likely shift the economic benefit of global natural gas production. At its core, recipients of U.S. LNG exports provide substantial economic benefits to domestic, local, and state economies described previously by paying for U.S. LNG cargoes. As U.S. natural gas exports increase, not only do the economic benefits increase, but they also shift these economic benefits from other countries to the U.S. For example, increased U.S. LNG exports to Europe in 2022 and 2023 brought advantages to the U.S., as the economic benefits of natural exports to Europe shifted from the Russian to the U.S. economy. Due to the low cost of U.S. LNG compared to other countries, any increase in U.S. LNG exports has the potential to displace another country's LNG exports, shifting and increasing the economic benefit to the U.S.

Lastly, increased U.S. LNG exports also provide access to lower-cost natural gas supply in the global market. This allows other developing Asian countries, such as India, Malaysia, Vietnam, or Indonesia, to consider natural gas-fired power plants to meet their growing electricity demand. U.S. climate envoys have previously encouraged developing countries to transition their plans for future electricity generation from new coal to natural gas-fired power plants. While not as low-GHG intensive as renewable energy projects, every coal plant replaced by a natural gas-fired one reduces the power plant's GHG emission profile by more than 50%. Additionally, natural gas-fired power plants have proven superior to their coal-fired counterparts in efficiently integrating higher shares of renewable energy generation. The near-guarantee of future access to low-cost U.S. natural gas supply can prove essential to allow for a quicker transition to lower-GHG-intensive fuels and help mitigate the global impacts of climate change.

Conclusion

The goal of this report was to educate on U.S. natural gas price formation, present the regional differences in natural gas production and consumption following the Shale Gas Revolution, analyze the events surrounding the price anomaly of 2022, and provide an overview of some of the benefits associated with increased U.S. natural gas exports.

As U.S. natural gas exports increase and their overall share of U.S. natural gas consumption increases, their impact on domestic natural gas prices will depend on how the increase in export demand is supplied. EIA's AEO 2023 analysis found that access to a substantial low-cost natural gas supply and the decline in natural gas consumption in other end-use sectors[8] limited the increase in domestic natural gas prices. At the same time, increased U.S. natural gas exports provide massive economic benefits to local and state economies through employment and tax revenue. Increased global access to low-cost U.S. natural gas supply also has the potential to reduce climate-change-inducing GHG emissions in the U.S. and abroad by displacing higher-GHG-emitting energy sources such as oil or coal.

Lastly, as the events of 2021 and 2022 have shown, current U.S. policies have the potential to negatively impact U.S. natural gas price levels and volatility, regardless of the level of U.S. natural gas exports. Continued coal retirements in the U.S. power sector will limit the amount of natural gas consumption in the U.S. electric power sector that can be displaced by coal generation through the substitution effect, effectively removing the downward pressure on U.S. natural gas prices during periods of supply shortfall. Additionally, U.S. policies restricting investment in U.S. natural gas infrastructure (supply, transportation, storage) also reduce the benefit of increased natural gas supply and impede access to low-cost natural gas supply in the future when current resources are depleted.

[8] EIA's analysis forecasted declining natural gas consumption in the residential and commercial sectors due to electrification and in the power sector due to the increase of renewable generation from wind and solar.