

# ENERGY SECURITY BENEFITS OF CONGRESSIONAL CLIMATE AND CLEAN ENERGY POLICY

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## EXECUTIVE SUMMARY

Russia's invasion of Ukraine is leading many U.S. policymakers to consider how the U.S. and its allies could reduce demand for Russian fossil fuels and increase energy security. Nearly all solutions being proposed in the U.S., including increasing fossil fuel production, are long-term solutions, and will not provide much immediate benefit.

Because oil, and increasingly natural gas, are global commodities with fairly inelastic demand, policies to increase fuel production will have limited ability to bring price stability. For example, although the U.S. is producing oil at near record highs, prices are also nearing record highs given the situation in Ukraine and the fact that the market is largely controlled by OPEC, which often makes production decisions using factors other than maintaining low prices. Even before the COVID-19 pandemic in 2020, prices were higher than in 2015 and 2016 and similar to prices from the early 2000s. As a result, the only robust, long-term solution to increasing U.S. energy security and insulating consumers from volatile prices is reducing demand for fossil fuels like oil.

Clean energy technologies directly improve energy security. For example, every electric vehicle (EV) sold that displaces a new gasoline car saves around six barrels of oil per year. And

heat pumps for building heating directly reduce the need for natural gas. The climate and clean energy provisions Congress is discussing would catalyze the deployment of clean energy technologies, resulting in significant reductions in oil and natural gas demand.

As a result of incentives for vehicle electrification, we find that by 2027, the amount of reduced U.S. demand for oil would be greater than the U.S. amount of Russian oil demand in 2021, with about half that being achieved within 36 months or in 2025. By 2030, the reduction would be more than double the 2021 demand for Russian oil. Similarly, reduced demand for natural gas by 2030 would roughly equal 85 percent of all Russian natural gas supplied to the European Union. These reductions in fossil fuel demand would help insulate the U.S. from price volatility in the global energy market. They would also deliver significant economic benefits by reducing the cost of driving and lowering electricity rates, growing the clean electricity and clean vehicle industries, and creating hundreds of thousands of jobs and growing the economy.

The climate and clean energy provisions would also bring enormous emissions benefits, cutting greenhouse gas (GHG) emissions by nearly a gigaton in 2030 in our Moderate, or central, Scenario.

Policies to support deployment of clean energy technologies and growth of clean energy manufacturing are the key to U.S. energy security. The findings from our modeling underscore the role the climate and clean energy provisions Congress is now considering could have in securing U.S. energy independence and supporting our allies while also growing our economy and cutting our emissions.

## INTRODUCTION

The climate and clean energy provisions currently under discussion in Congress include a range of incentives and funding for deploying clean technologies, including tax credits for clean electricity and clean vehicles, rebates for reducing energy consumption and electrifying buildings, and support for domestic manufacturing of clean technologies, among many others.

To assess the impacts of these measures, Energy Innovation modeled the provisions using the U.S. Energy Policy Simulator (EPS). This modeling updates an earlier analysis completed in October 2021<sup>1</sup> by adding some previously omitted measures and updating several others. It represents a comprehensive assessment of the major provisions under consideration.

This analysis also focuses on the role these provisions would play in improving U.S. energy security by assessing how they would reduce U.S. demand for oil and natural gas, finding it would lead to significant reductions in both fuels.

We also discuss the impacts the provisions would have on emissions, clean electricity deployment, and uptake of EVs.

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<sup>1</sup> I.e., <https://energyinnovation.org/publication/modeling-the-infrastructure-bills-using-the-energy-policy-simulator/>.

## RESULTS AND KEY FINDINGS

Our model results are discussed below, including impacts on energy consumption and security, emissions reductions, clean electricity shares, and sales shares for light-duty EVs. Note that modeling results will continue to change as negotiations unfold and the included provisions evolve.

### SECURING U.S. ENERGY INDEPENDENCE THROUGH REDUCTIONS IN OIL AND GAS DEMAND

In light of the Russian invasion of Ukraine, policymakers are paying great attention to how the U.S., the EU, and other allies can wean off Russian fossil fuels, which are Russia's primary export and provide enormous revenue to the Russian government.

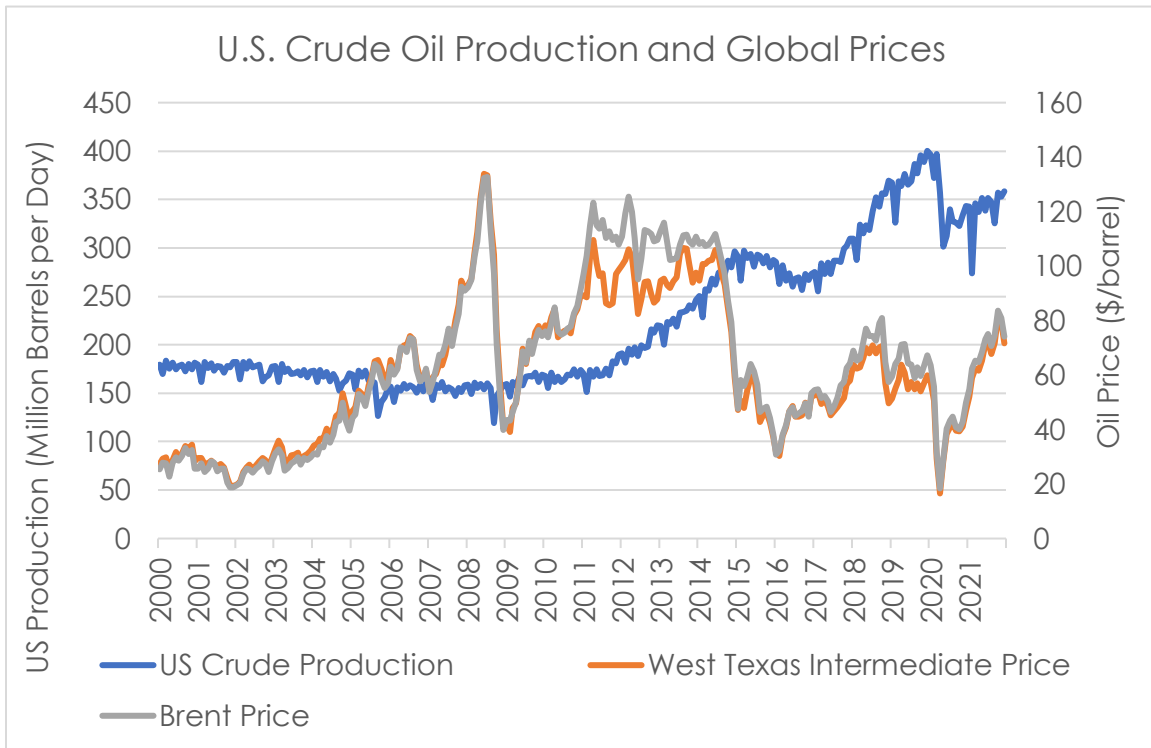
#### Near-term versus long-term options

It is critical to distinguish between near-term versus long-term options to cut demand for Russian fossil fuels. At this point, nearly all solutions being discussed are long-term solutions, including significant increased production of fossil fuels and large technological shifts. For example, there is very limited potential to significantly increase U.S. oil supply in the near term according to the industry itself, which cites at least a two-to-three-year timeline to grow production significantly.<sup>1</sup>

Short-term solutions are primarily relevant to Europe and are discussed extensively in a recent International Energy Agency (IEA) report. The 10-point plan to cut demand for Russian gas in the next year focuses on demand reduction, fuel substitution, and changes to market rules to allow for increased storage in anticipation of next winter.<sup>2</sup>

#### Supply and demand for global oil and gas

Oil, and increasingly, natural gas, are global commodities sold in the global marketplace. This means that prices are determined by the total amount of supply and demand on the global energy market. For the most part, companies extracting oil sell it for the highest price they can get, regardless of whether that means selling it domestically or internationally. Further, short-term demand tends to be fairly inelastic, with little ability for consumers to respond to price changes. While an individual country's supply and demand have some impact on global prices, those prices will always be subject to the actions of large producers like Russia. Consider the impact that Russia's aggression is having now on global oil prices even though it only supplied 10 percent of total global oil supply in 2020.<sup>3</sup> Between February 28 and March 4, 2022, Brent Oil prices, the benchmark for European oil prices, increased from roughly \$99 per barrel to around \$118/barrel, or 19 percent.<sup>4</sup> Furthermore, global oil prices are heavily influenced by the decisions of OPEC, whose supply targets are often based on factors other than maintaining low oil prices. So long as oil remains a global commodity, oil prices will be subject to the decisions of other countries and organizations, like OPEC.

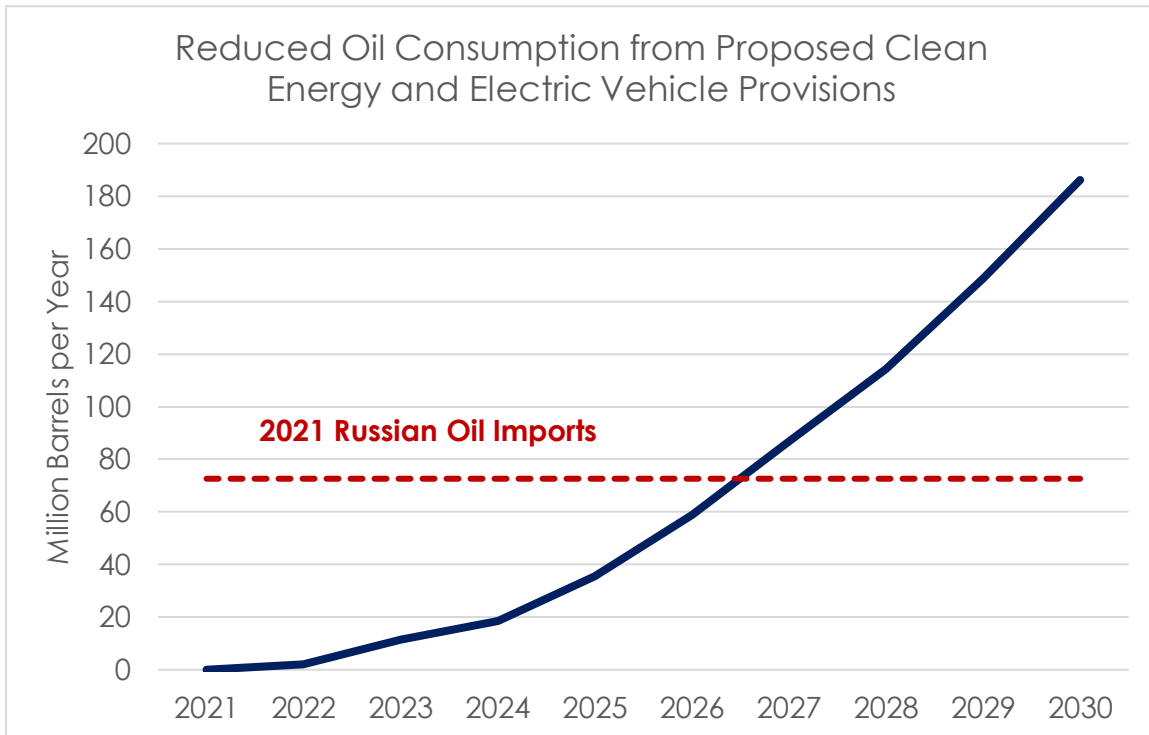


Similarly, although U.S. crude oil production is at near all-time highs, global oil prices continue to fluctuate dramatically. For example, as shown in the figure above, global oil prices were higher in 2021 than they were 20 years ago, despite a doubling of U.S. production. Even pre-pandemic prices of roughly \$70 per barrel were higher than prices in 2015 and 2016.<sup>5</sup> **This evidence clearly shows that we must focus on cutting demand for fossil fuels to protect U.S. consumers from global energy crises and promote energy security.**

Fortunately, the clean energy and climate provisions Congress is discussing would yield large reductions in natural gas and oil demand in the next decade, providing a robust long-term solution by reducing U.S. dependence on fossil fuels and helping to bring price stability to global fuel markets. In other words, these provisions will substantially and robustly improve U.S. energy security while lowering energy costs for consumers by capitalizing on lower EV travel costs and lower clean energy operating costs.

### Reductions in demand for oil would more than offset Russian oil imports

In the Moderate Scenario, driven by growth in EV sales from proposed tax credits, U.S. annual oil consumption decreases by more than 180 million barrels per year by 2030. In 2021, the U.S. imported nearly 73 million barrels of oil from Russia.<sup>6</sup> The decrease in oil consumption corresponding to increased transportation electrification would offset the reduction in supply from banning Russian oil imports by more than a factor of two. By 2025, reductions from this electrification would equal about half of U.S. Russian imports, and by 2027, reduced demand would be greater than all imports in 2021. Reductions in U.S. oil demand from electrification, coupled with continued transportation electrification in China and Europe are the best way to bring long-lasting price stability to the global oil market. Reductions in prices will be especially beneficial for low-income consumers in the Global South, who spend a disproportionate amount of income on energy.



### Reductions in demand for natural gas would equal 85 percent of EU imports of Russian gas

In the Moderate Scenario, primarily as a result of clean energy deployment, but also through electrification in buildings and industry, U.S. natural gas consumption is reduced by 4.7 trillion

cubic feet per year. This reduction is roughly equal to 85 percent of the EU’s 2021 Russian gas imports of 5.5 trillion cubic feet. Additional policies to support building electrification or limit the construction of new gas power plants would further allow the U.S. to cut power sector gas consumption at a level that would exceed current Russian gas imports to the EU.

Separately, the IEA highlighted how the EU could immediately reduce demand for Russian natural gas by more than half through a set of ten measures.<sup>7</sup> As with oil, reductions in natural gas demand in the U.S. would help bring some stability the natural gas market, which is increasingly a global market.

### **ACTION NEEDED NOW TO ADDRESS CAPITAL STOCK TURNOVER**

In order to achieve these reductions, these clean energy provisions should be enacted as soon as possible because of the capital stock turnover challenge. This refers to the fact that only a small share of the stock of technology, for example all the cars in the U.S., are replaced each year, and that to fully replace the vehicle stock can take many years. In the U.S., the average ownership lifetime of a vehicle is 13 years, meaning that even if we reached 100 percent sales of EVs by 2035, the stock wouldn’t be fully electrified until after 2050. The longer it takes for incentives to be available to consumers, the longer we delay the resulting emissions and energy reductions. If the incentives under discussion were passed immediately, it would result in nearly 61 million EVs on the road by 2030, freeing up those owners from dependence on fossil fuels.

### **SLASHING GREENHOUSE GAS EMISSIONS**

Emissions reductions from our modeling range from 740 to 1,230 million metric tonnes (MMT) in the year 2030, with the Moderate scenario resulting in 930 MMT reductions.

<b>Scenario</b>	<b>Annual GHG Emissions Reductions (2030)</b>	<b>Cumulative GHG Emissions Reductions (2022-2030)</b>
Low	740	4,100
Moderate	930	5,160
High	1,230	6,410

**Table 4: GHG Emissions Reductions**

## CONCLUSION

The climate and clean energy provisions Congress is now considering are transformational. They would dramatically reduce emissions by up to 1.2 gigatons in 2030 while slashing U.S. oil consumption and natural gas consumption. The reduced demand for oil would be four to five times greater than the amount of U.S. Russian oil imports in 2021. Because global energy markets, like the oil market and increasingly the natural gas market, are contingent upon the actions of all the market players, and because the oil market is largely controlled by OPEC, the U.S. cannot simply increase supply to improve energy security. The better approach, by far, is to reduce demand for those fuels. The clean electricity and EV provisions would significantly help in cutting energy demand and help improve U.S. energy security.

## METHODOLOGY

Energy Innovation used the U.S. EPS to estimate the impacts of the climate and clean energy provisions of the Infrastructure Bills (The Build Back Better Act and the Infrastructure Investment and Jobs Act) on U.S. GHG emissions, energy consumption, and clean energy deployment through 2030. This research updates an [earlier analysis](#) released in October 2021 by adding in additional provisions under discussion, updating assumptions for certain modeled provisions, and aligning the modeled provisions with the latest version of legislative text.

The EPS is an open-source, publicly accessible tool developed by Energy Innovation that can be used to assess the impacts of policy packages on emissions, costs and savings, jobs, gross domestic product, and health impacts. It is available online at <https://us.energypolicy.solutions>. For this analysis, Energy Innovation customized a version of the EPS to be able to accurately model the provisions included in the Infrastructure Bills.

The modeling includes major provisions under discussion, including those in the table below:

### Electricity

- Extended Clean Energy Tax Credits and New Tax Credits
- Civilian Nuclear Credit
- Transmission Tax Credit and Funding
- Rural Cooperative Support
- Federal Agency Funding

### Industry

- 45Q Tax Credits for Carbon Capture Utilization and Storage

### Transportation

- Tax Credits for EVs (light- and heavy-duty)
- Funding and Tax Credits for EV Chargers
- Funding for Electric Buses
- Funding for Federal Fleet Electrification

### Buildings

- Residential and Multifamily Efficiency Rebates

- Fees on Oil and Gas Methane Emissions
- Expanded Methane Royalties
- Funding for Abandoned Oil and Gas Well Capping
- 48C Advanced Clean Manufacturing Tax Credits
- Hydrogen Production Tax Credit
- Advanced Industrial Facilities Deployment Program
- Product Labeling and Green Procurement
- Weatherization Assistance Program Funding
- Energy Efficiency and Conservation Block Grant Funding
- Residential and Commercial Efficiency Tax Credits
- Funding for Distributed Solar

**Land**

- Funding for Forestry and Agriculture Emissions Reductions

**Other**

- Grants for Federal Agency Decarbonization
- Greenhouse Gas Reduction Fund

**Table 1: Provisions Included in Modeling**

Our modeling includes four core scenarios: a Business-As-Usual (BAU) Scenario that holds current policy constant and Low, Moderate, and High Scenarios that make different assumptions about the efficacy of certain provisions within the Infrastructure Bills. Our BAU Scenario relies heavily on the Energy Information Administration’s Annual Energy Outlook (AEO) 2021 High Oil and Gas Supply Scenario for energy demand in buildings and industry, transportation service demand, and fuel prices.<sup>ii</sup>

More information on data sources is available online at <https://us.energypolicy.solutions/docs/>.

The varying assumptions are outlined in the table below and discussed in detail in the following section:

Assumption	Description	Defaults		
		Low	Moderate	High
Clean Electricity Share from Tax Credits	% clean generation in 2030	61%	65%	69%
Percent of EV Sales Qualifying for Bonus Credits	%	50%	75%	100%

<sup>ii</sup> Energy Innovation reviewed past AEO releases and actual gas prices and found that the High Oil and Gas Supply scenarios were typically significantly more accurate at predicting gas prices than the reference scenarios, which is why we use this as our baseline.



Union Representation for Power Plant Construction	%	12.7%	15.9%	19.05%
Domestic Content Share, Onshore Wind	%	100 %	100%	100%
Domestic Content Share, Offshore Wind	%	100%	100%	100%
Domestic Content Share, Solar PV	%	16.9%	35.95%	55%
Domestic Content Share, Solar thermal	%	100%	100%	100%
Domestic Content Share, geothermal	%	100%	100%	100%
Domestic Content Share, MSW	%	100%	100%	100%
Domestic Content Share, storage	%	16.9%	36%	55%

**Table 2: Variations in Assumptions Across Scenarios**

Annual increases in clean generation were determined based on consultation with electricity sector experts. Projecting the share of vehicle sales that will qualify for bonus credits is difficult given uncertainty around the growth in domestic manufacturing, and we therefore explore a wide range between our Low and High Scenarios. For union representation and domestic content shares, we calculated values for the Low Scenario using historical data. The union representation values were then increased by 25 percent and 50 percent in the Moderate and High Scenarios. The High Scenario assumes 100 percent domestic content shares, with the Moderate Scenario representing the midpoint between Low and High.

## NOTES

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<sup>1</sup> Derek Brower and Myles McCormick, “Top Shale Oil Boss Warns US Can’t Replace Any Russia Shortfall,” *Financial Times*, March 4, 2022, <https://www.ft.com/content/1b517f6d-9056-41ba-9d1e-324e495b5041>.

<sup>2</sup> “A 10-Point Plan to Reduce the European Union’s Reliance on Russian Natural Gas,” International Energy Administration, March 2022, <https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas>.

<sup>3</sup> “Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA),” accessed March 7, 2022, <https://www.eia.gov/tools/faqs/faq.php>.

<sup>4</sup> “BRN00 | Brent Crude Oil Continuous Contract Overview,” MarketWatch, accessed March 7, 2022, <https://www.marketwatch.com/investing/future/brn00?countrycode=uk>.

<sup>5</sup> “Petroleum & Other Liquids - U.S. Energy Information Administration (EIA),” accessed March 7, 2022, <https://www.eia.gov/petroleum/index.php>.

<sup>6</sup> “U.S. Total Crude Oil and Products Imports,” accessed March 7, 2022, [https://www.eia.gov/dnav/pet/pet\\_move\\_impcus\\_a2\\_nus\\_ep00\\_im0\\_mbbbl\\_a.htm](https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbbl_a.htm).

<sup>7</sup> “A 10-Point Plan to Reduce the European Union’s Reliance on Russian Natural Gas”