

MODELING THE INFLATION REDUCTION ACT USING THE ENERGY POLICY SIMULATOR

MEGAN MAHAJAN, OLIVIA ASHMOORE, JEFFREY
RISSMAN, ROBBIE ORVIS, ANAND GOPAL

AUGUST 2022

EXECUTIVE SUMMARY

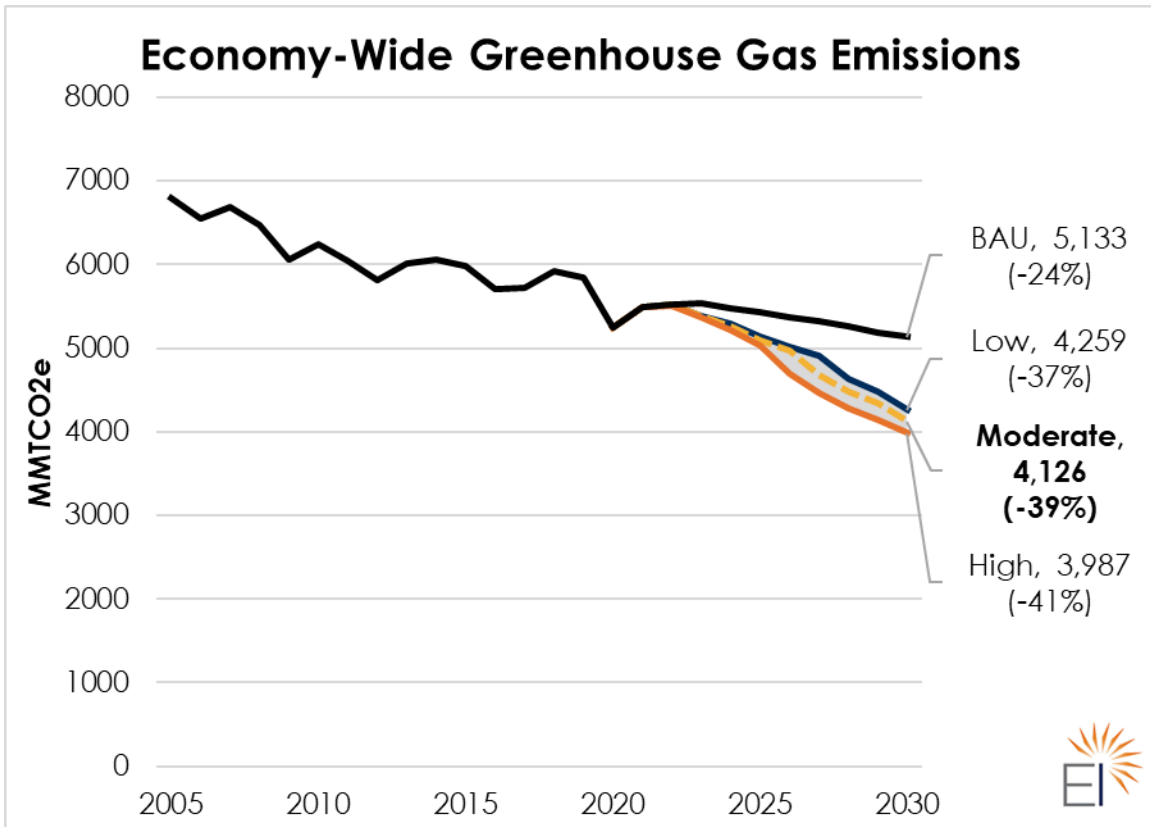
On July 27, 2022, the United States Senate released legislative text for the Inflation Reduction Act (IRA), which includes \$369 billion in funding for climate and clean energy provisions. These emissions-reducing provisions run the gamut from clean energy and electric vehicle tax credits to large-scale investments in domestic manufacturing of clean technologies and environmental justice. The IRA also requires auctions for oil and gas on federal lands and waters prior to auctions for renewable energy projects and requires completion of several 2022 lease auctions that were previously canceled.

Energy Innovation modeled the IRA to estimate its impact on emissions reductions, job creation, and public health, using our free and open-source [U.S. Energy Policy Simulator](#) (EPS).

We find that **the IRA is the most significant federal climate and clean energy legislation in U.S. history, and its provisions could cut greenhouse gas (GHG) emissions 37-41 percent below 2005 levels.** If the IRA passes, additional executive and state actions can realistically achieve the U.S. nationally determined commitments (NDCs) under the Paris Agreement.

Further, for every ton of emissions increases generated by IRA oil and gas provisions, at least 24 tons of emissions are avoided by the other provisions.

Under a business-as-usual (BAU) scenario (i.e., including all enacted federal and state policies to date) our modeling forecasts the U.S. would reduce emissions 24 percent compared to 2005 levels by 2030.



In other words, the IRA would enable the U.S. to close 50-66 percent of the emissions gap between BAU and the NDC in 2030.

In absolute terms, U.S. emissions in 2030 are projected to be **2,500 million metric tons (MMT) to 2,800 million metric tons** lower than 2005. The IRA provisions could also generate enormous public health and jobs benefits, preventing up to 3,900 premature deaths from air pollution in 2030 and creating up to 1.5 million jobs in 2030. These benefits accrue despite an increase of 50 MMT in oil and gas production emissions in 2030 from the new oil and gas leasing requirements. Finally, the IRA could increase GDP by 0.84-0.88 percent in 2030.

INTRODUCTION

The newly released IRA legislative text includes \$369 Billion in funding for climate and clean energy provisions. These emissions-reducing provisions include clean energy and electric vehicle tax credits, large-scale investments in domestic clean technology manufacturing, and environmental justice measures. The IRA also requires several auctions for oil and gas on federal lands and waters

prior to auctions for renewable energy projects, and requires completion of several 2022 lease auctions that were previously canceled.

To help understand its net effect, Energy Innovation modeled climate and energy provisions of the IRA using the U.S. EPS, the open-source and peer-reviewed climate policy model that estimates climate and energy policy impacts using publicly available data.

Our findings confirm that passing the IRA will reduce GHG emissions an estimated 870-1,150 million metric tons carbon dioxide equivalent (CO₂e) in 2030 despite the oil and gas leasing requirements. Those reductions would put U.S. emissions at 37-41 percent below 2005 levels and make significant progress towards achieving the 2030 U.S. NDC of 50-52 percent below 2005 GHG emissions.

The IRA could create at least 1.5 million new jobs in 2030 concentrated in the manufacturing, construction, and service industries. Through greater clean energy deployment, the bill could avoid up to 3,900 premature deaths and up to 100,000 asthma attacks annually by 2030.

While this analysis covers the vast majority of the IRA's climate and energy provisions, including all those that could significantly reduce GHG emissions, it is not entirely comprehensive. Some provisions or funding mechanisms were excluded from modeling due to difficulty translating certain spending categories or incentives into emissions reductions. These programs could likely yield small additional greenhouse gas emissions reductions beyond what we have modeled.

RESULTS AND KEY FINDINGS

Our modeling includes four core scenarios: A business-as-usual (BAU) Scenario that holds current policy constant, along with Low, Moderate, and High Scenarios that make different assumptions about the efficacy of certain provisions within the IRA.

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

Our model results are discussed below, including emissions projections, jobs, and health impacts. Modeling may change as negotiations unfold and included provisions evolve.

Greenhouse Gas Emissions

In 2030, U.S. GHG emissions are projected to drop to 37-41 percent below 2005 levels due to the IRA provisions, relative to a 2030 target of 50-52 percent in the U.S. NDC. In other words, the IRA would enable the U.S. to close 50-66 percent of the emissions gap between BAU and the NDC in 2030.

Scenario	2030 GHG Emissions (AR4 GWP-100 CO ₂ e)	Percent Below 2005 Emissions in 2030
Business-as-usual	5,133	-24%
Low	4,259	-37%
Moderate	4,126	-39%
High	3,987	-41%

Table 1: GHG Emissions Reductions

Figure 1 below presents emissions trajectories for each of the scenarios we modeled and highlights the range between our Low and High scenarios.

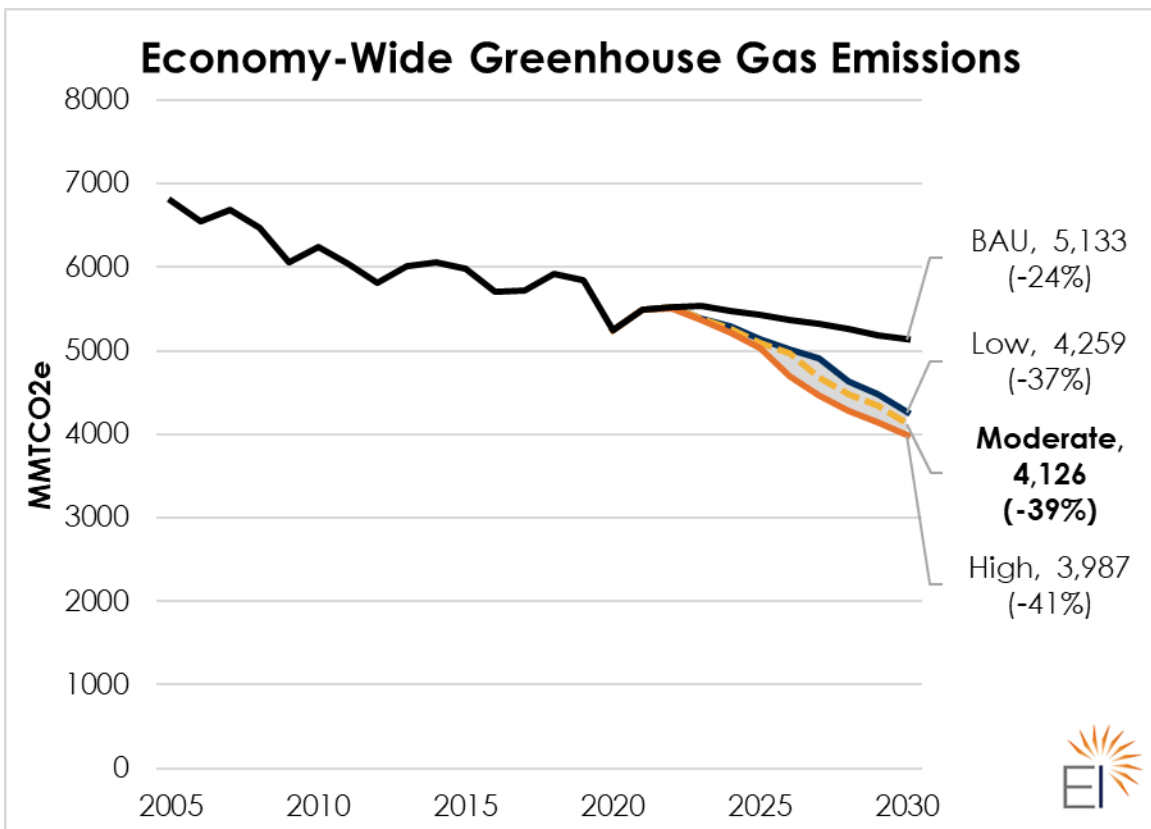


Figure 1: 2022-2030 GHG Emissions Trends by Scenario

Jobs and GDP

The IRA earmarks billions in funding for climate and energy provisions, which could generate significant domestic job growth. Our modeling finds the provisions could create 1.4 million to 1.5 million additional jobs in 2030. Based on the IRA text, our modeling assumes these provisions are paid for through corporate taxes. Finally, the IRA could increase GDP by 0.84-0.88 percent in 2030.

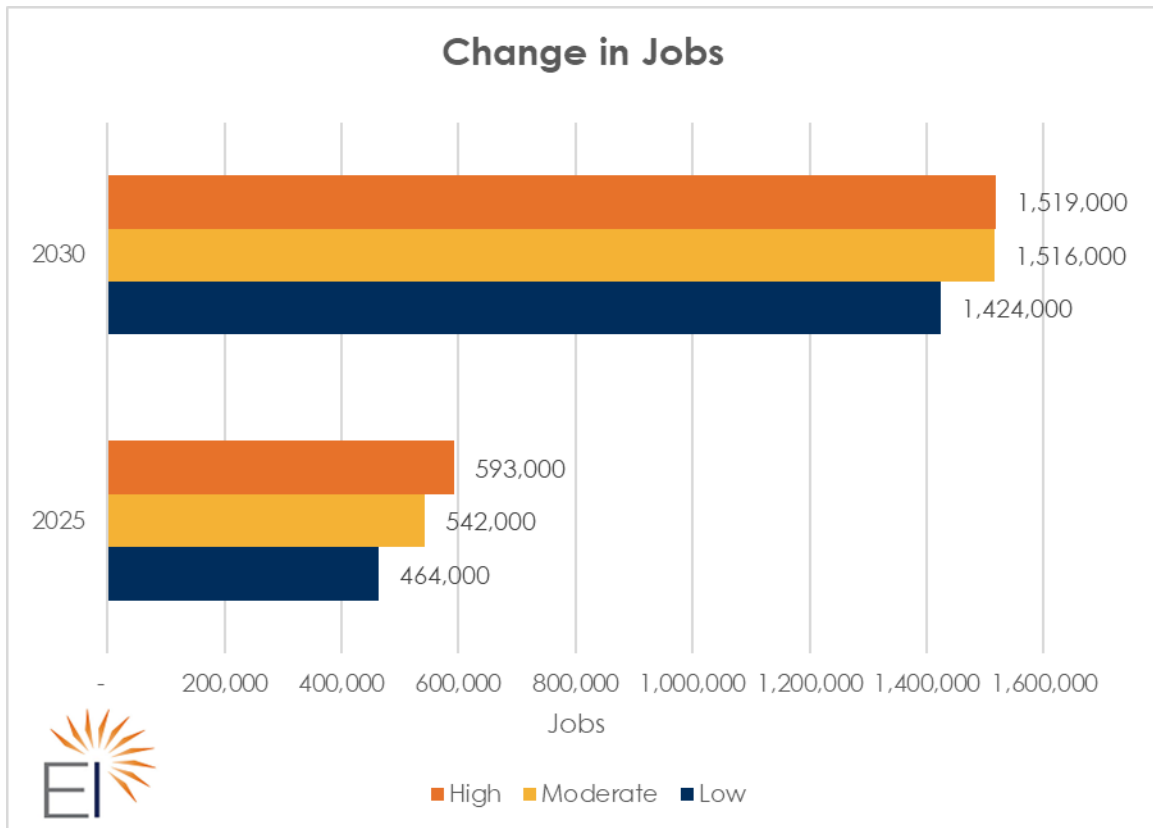


Figure 2: Annual Job-Years Created Through 2030

Public Health Impacts

In addition to significantly reducing GHG emissions, the IRA could cut particulate emissions that lead to negative health outcomes. We find that avoided air pollution in the modeled scenarios could lead to between 3,700 to 3,900 avoided deaths in 2030, in addition to 99,000 to 100,000 avoided asthma attacks, and 405,000 to 417,000 avoided lost workdays.

Scenario	Avoided Premature Mortalities in Year 2030	Percent Change in Deaths by Race - White	Percent Change in Deaths by Race - Black	Percent Change in Deaths by Race - Asian	Percent Change in Deaths by Race - Other Race or Multiple Races
Low	3,731	-0.11%	-0.14%	-0.15%	-0.22%
Moderate	3,682	-0.11%	-0.13%	-0.14%	-0.22%
High	3,894	-0.12%	-0.14%	-0.15%	-0.23%

Table 3: Avoided Deaths

As a percentage decrease, avoided deaths are concentrated in communities of color, which have historically experienced the most harm from air pollution. Disadvantaged communities are often located in close proximity to polluting infrastructure and on balance, the bill’s provisions reduce health burdens more in communities of color.

Net 2030 emissions increases from oil and gas leasing provisions are unlikely to exceed 50 MMT

We modeled upstream and downstream U.S. emissions from the additional oil and gas production on federal lands and waters, which would result from the IRA provisions. Our method includes the following:

- Using recent historical rates to estimate actual oil and gas production relative to public lease offerings
- Production emissions, including methane leakage, quantified in GWP-100 equivalents of carbon dioxide
- Changes in U.S. production on non-federal property and end-use emissions mediated through domestic and global markets for oil and gas

The biggest uncertainty in our final emission values estimates stem from how added U.S. supply of oil and gas on federal property affects production on non-federal property, and filters through markets to U.S. demand.

For oil, most literature on the subject suggests that added U.S. supply from federal lands and waters are mostly offset by supply adjustments on non-federal property as well as supply adjustments by OPEC, causing no changes in U.S. demand due to the global nature of the market. Natural gas markets are less global in nature, but the dynamics are similar because production from federal lands and waters is such a small share of U.S. and global supply.

However, based on our interpretation of a [recent Resources for the Future paper](#), we make a worst-case assumption that 25 percent of every additional unit of oil and gas produced in the U.S. is added to U.S. consumption.

We find that the IRA oil and gas supply provisions could increase emissions by up to 50 MMT in 2030 in this scenario. We choose conservative assumptions because locking in long-lived natural gas and oil-burning infrastructure could increase emissions in the post-2030 timeframe. This increase is relative to 870-1,150 MMT reductions in 2030. In other words, for every one ton of emissions caused by oil and gas leasing provisions, at least 24 tons of emissions are avoided by other IRA provisions. Thus, despite increased oil and gas extraction, the IRA overwhelmingly reduces emissions.

METHOD

Energy Innovation used the U.S. EPS to estimate the net effects of IRA provisions on U.S. GHG emissions through 2030. The open-source, publicly accessible EPS tool developed by Energy Innovation can assess the impacts of policy packages on emissions, costs and savings, jobs, gross domestic product, and public health. It is available online at <https://us.energypolicy.solutions>.

For this analysis, Energy Innovation used a customized model built on EPS version 3.4 to accurately model the IRA's provisions, though these scenarios are not available online.

Our BAU Scenario relies heavily on the EIA's Annual Energy Outlook Low Economic Growth Scenario for energy demand in buildings and industry, transportation service demand, and fuel prices, and is adjusted to reflect the current situation with high energy prices due to the Russian invasion of Ukraine and supply chain constraints. The Low Economic Growth scenario closely aligns with the latest projected GDP trajectory from the Congressional Budget Office.

The modeling includes the major provisions below.

Selected Major Provisions Included in Modeling

- Clean energy tax credits and funding programs
- Nuclear electricity production tax credit
- Clean vehicle tax credits and funding programs
- Methane Emissions Reduction Program
- Advanced Industrial Facilities Program
- Carbon capture and sequestration tax credits
- Building efficiency and electrification tax credits and funding programs
- Environmental product disclosure and green procurement government programs
- Clean manufacturing tax credits
- Requirements for increased oil and gas lease sales
- Forestry and agricultural emissions reduction funding programs
- Greenhouse Gas Reduction Fund

Table 4: Bill Sections Included in Modeling

Annual increases in clean power generation from tax credits were determined based on scenario model results from the ReEDS capacity planning model and consultation with experts from the University of California, Berkeley. For credit values with base and bonus amounts, we vary assumptions on bonus credit eligibility across our scenarios based on historical data and potential growth in bonus credit eligibility (e.g., increase union representation or domestic content shares).

CONCLUSION

Passing and implementing the IRA could reduce emissions an estimated 37-41 percent below 2005 levels by 2030. In other words, the IRA would enable the U.S. to close 50-66 percent of the emissions gap between BAU and the NDC in 2030. Realistic executive, state and local actions could lead the U.S. to its 2030 NDC commitment.

The bill's provisions also greatly encourage domestic manufacturing of the clean energy technologies that will need to be deployed at a rapid rate across the economy, helping to onshore jobs. Hence, the IRA's climate benefits provide substantial economic and public health co-benefits for Americans by generating at least 1.4 million jobs in 2030 and avoiding more than 3,600 deaths in 2030. The avoided deaths and public health benefits disproportionately benefit low-income communities of color who have borne the brunt of fossil fuel pollution.

In summary, if the Inflation Reduction Act of 2022 becomes law, it will be the largest and most consequential U.S. climate legislation in history.