U.S. DEPARTMENT OF ENERGY | Office of Policy

The *Inflation Reduction Act* Drives Significant Emissions Reductions and Positions America to Reach Our Climate Goals

Summary

The *Inflation Reduction Act of 2022* represents a historic, $369 billion investment in the modernization of the American energy system. The U.S. Department of Energy's (DOE) preliminary assessment finds that this law—in combination with other enacted policies and past actions—will help drive 2030 economy-wide greenhouse gas (GHG) emissions to 40% below 2005 levels. The legislation would get the U.S. a significant way towards our overall 2030 climate goals, positioning the U.S. to reach 50-52% GHG emission reductions below 2005 levels in 2030 with continued executive branch, state, local, and private sector actions not included in this analysis. Examples of continued executive branch actions include implementation of the recently enacted CHIPS Act as well as updates to standards that drive energy efficiency and pollution reduction from the transportation, power, building, and industrial sectors.

DOE estimates that the clean energy provisions of the *Inflation Reduction Act of 2022* and the *Bipartisan Infrastructure Law of 2021* together could reduce emissions by approximately 1,000 million metric tons (MMT CO_2e) in 2030, or about a gigaton. Considering the other climate and energy provisions of these laws brings the total to nearly 1,150 MMT CO_2e. These expected emissions reductions are equivalent to the approximate combined annual emissions released from every home in the United States.

In addition to these pollution-reduction benefits, these measures would lower energy costs for consumers, enhance energy security, and improve human health. Moreover, by stimulating investments in domestic supply chains, manufacturing, and clean energy deployment, these laws will create hundreds of thousands of high-quality jobs and new economic opportunities. The laws also address historical inequities in our nation's energy system by lowering the cost of and expanding access to clean energy technologies and by providing relief to communities that have suffered from disproportionate exposure to energy-related pollution.

Introduction

The *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* together represent historic investments in the modernization of the nation's energy system, totaling more than $430 billion. The specific provisions in these two laws will lower energy costs for consumers, enhance the nation's energy security, improve human health, mitigate climate change, create high-quality jobs and new economic opportunities for communities, and address historical inequities in our energy system.

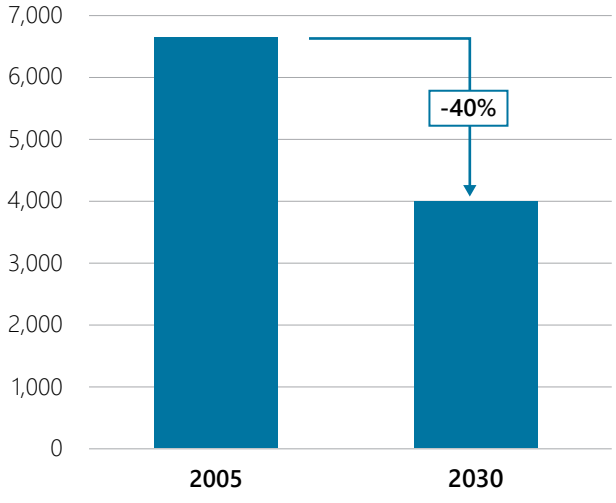
In this issue brief, DOE estimates the potential impact of the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* on GHG pollution. These preliminary estimates, which focus on the clean energy provisions of the two laws, are based on DOE's understanding of the many programs and incentives created by the legislation. The issue brief also includes impacts associated with provisions pertaining to oil and natural gas as well as agricultural conservation and forestry—sourced from federal agency partners and external analysts.

DOE has employed multiple modeling and assessment tools to develop these estimates. See the appendix for an overview of this methodology.

Dramatically Reducing Greenhouse Gas Pollution

DOE's preliminary assessment finds that the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law*, in combination with past actions, are projected to drive 2030 economy wide GHG emissions to 40% below 2005 levels. Specifically, DOE estimates that the two laws could help reduce nationwide GHG pollution by nearly 1,150 MMT CO_2e in 2030, in comparison to a business-as-usual scenario. DOE's focus in this analysis is on the clean energy provisions of these two laws, which are estimated to reduce emissions by approximately 1,000 MMT CO_2e in 2030.

The *Inflation Reduction Act* and *Bipartisan Infrastructure Law* target every aspect of the energy system—thereby amplifying the GHG-reducing effect of any given provision. For example, electricity use in transportation, buildings, and industry yields emissions reductions in part due to corresponding decarbonization of the power sector.



Net Economy-wide GHG Emissions Over Time (MMT CO_2e)

Estimating pollution reduction by sector is challenging, given the complexity of these interactions. Nonetheless, DOE's analysis projects GHG impacts across all sectors, with the power sector representing the largest source of potential GHG reductions through 2030, as illustrated in the figure. Many of the programs in question are intended to jump-start longer-term pollution reductions through catalytic investments. As such, DOE expects the pollution reductions from these provisions to increase across all sectors beyond 2030, ensuring continued progress toward the nation's 2050 net-zero emissions goal.

The *Inflation Reduction Act* and *Bipartisan Infrastructure Law* contain numerous clean energy programs and incentives. DOE's assessment suggests that the tax incentives in the *Inflation Reduction Act*, supporting clean electricity, clean transportation, building-envelope and equipment efficiency, clean fuels, carbon capture, manufacturing, and supply chains, will be effective in driving near- and long-term pollution reductions. Beyond the tax package, DOE expects the many grants, loans, and other programs featured in the two laws to have notable pollution-reduction impacts. These programs are diverse, targeting the power, industry, buildings, and transportation sectors.

Beyond the clean energy provisions, the laws also include new programs and policies related to agricultural conservation and forestry as well as oil and natural gas ("Other sectors" in figure). DOE draws on analysis from federal agency partners and external analysts to conclude that those provisions collectively result in significant net GHG pollution reductions. While oil and natural gas leasing provisions may lead to some increase in GHG pollution in 2030, those possible increases are dwarfed around 35-to-1 by the net estimated pollution reduction associated with the two laws. Moreover, the *Inflation Reduction Act* contains significant investments to support agricultural conservation and forests, investments that are expected to contribute to over 10% of the overall GHG benefits of the legislation.

Notably, these estimates do not include executive branch energy and climate activities underway now and over the next decade. Nor do they include future state, community, or private sector activities. That suite of activities will deliver future emissions reductions, beyond those estimated here.

Key Drivers of Emissions Reductions across Sectors

Focusing on the clean energy as well as agriculture and forestry provisions of the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law,* DOE identifies the following key drivers.

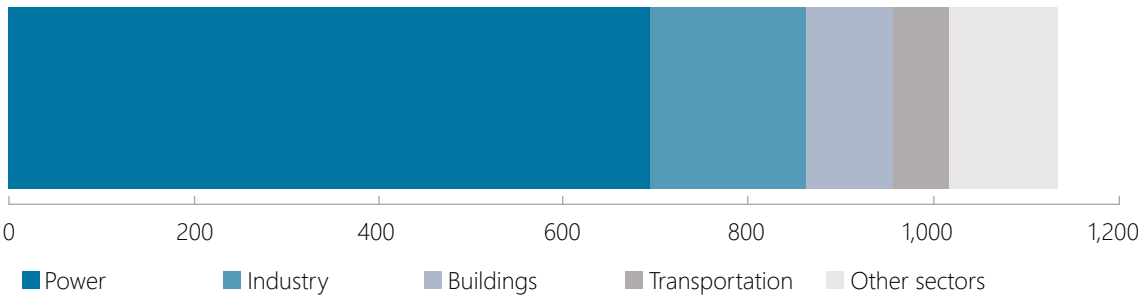
Power

DOE's assessment finds that the new and extended tax incentives in the *Inflation Reduction Act* will drive near-term power-sector pollution reductions by accelerating the growth of clean electricity generation, including wind and solar power. Various transmission programs and authorities, as well as a new tax incentive for energy storage, will help ensure that these new resources are reliably delivered to customers. Meanwhile, a new production tax credit in the *Inflation Reduction Act* and the Civil Nuclear Credit program established by the *Bipartisan Infrastructure Law* will support the maintenance of the country's existing nuclear power fleet, ensuring that America does not lose these important clean power resources.

The combined effects of the *Inflation Reduction Act* and *Bipartisan Infrastructure Law* will also drive technology innovation, enabling longer-term reductions in power-sector emissions. Enhanced funding for loans, research and development, and demonstration will support innovation and new deployments for a range of technologies, including nuclear, carbon capture and storage (CCS), long-duration energy storage, clean hydrogen, direct air capture, geothermal, and more. Long-term extensions of existing tax incentives and new and augmented tax incentives that collectively cover each of these technologies will help ensure strong commercial interest and provide a basis for potential large-scale deployment.

Industry

DOE finds that programs that support direct emissions abatement at industrial facilities and within manufacturing and recycling processes, incentives for clean fuels, and procurement measures for low-carbon materials all work together to drive industrial-sector emissions reductions. The *Inflation Reduction Act's* $5.8 billion Advanced Industrial Facilities Deployment Program plays a significant role, providing financial assistance for facilities to use advanced industrial technologies, such as electrification, low-carbon fuels, carbon capture, and



Estimated Emissions Reductions in 2030 from *Inflation Reduction Act* and *Bipartisan Infrastructure Law* (2030, MMT CO_2e)

other advanced-manufacturing processes. This will drive emissions reductions in key, emission-intensive industrial sectors, such as iron and steel, cement, and chemicals. The *Inflation Reduction Act* also leverages the purchasing power of the federal government to support demand for low-carbon construction materials through procurement provisions and supports standardizing Environmental Product Declarations to make it easier for the federal government as well as other climate-conscious buyers to select and purchase cleaner materials. The hydrogen production tax credit will leverage the hydrogen hub and demonstration investments from the *Bipartisan Infrastructure Law* to drive hydrogen production and subsequent use in subsectors, such as ammonia, petroleum refining, biofuels, heavy-duty transportation, and steel. Similarly, the extension and enhancement of the tax credit for industrial applications of CCS will leverage *Bipartisan Infrastructure Law* investments in CCS demonstrations and CO_2 transportation infrastructure to abate emissions in ethanol, cement, and refining.

Buildings

Tax incentives for more efficient homes and commercial buildings, rebate programs for home efficiency and electrification, and funding to assist with state and local building-code adoption and compliance are key *Inflation Reduction Act* measures that will reduce direct emissions from buildings. These build on additional ongoing activities pursued by DOE with the U.S. Department of Housing and Urban Development—such as DOE's actions to update appliance and equipment standards this year and save consumers an average of $100 on their annual energy bills. Reductions also come from a variety of *Bipartisan Infrastructure Law* programs, including $3.5 billion in Weatherization Assistance Program funding and support for the Energy Efficiency and Conservation Block Grant Program, State Energy Program, Capitalization for Efficiency Revolving Loan Funds, and Efficiency and Renewable Energy Grants for public schools. Many of these provisions support the electrification of buildings with efficient equipment that takes advantage of low-carbon electricity, such as electric heat pumps for heating, air conditioning, and hot water. Other investments in efficient windows, doors, and insulation materials, regardless of a building's heating-fuel type, will generate further emissions reductions. These investments in our nation's buildings, which can operate for 100 years or longer, will ensure lower emissions, lower costs, and improved comfort for decades beyond 2030.

Transportation

Tax credits for clean cars, trucks, vans, SUVs, commercial vehicles, and heavy-duty vehicles will help drivers and fleets adopt advanced technologies that lower operating costs and reduce emissions. The *Inflation Reduction Act's* Clean Vehicle Credit will support the transition to a clean transportation future, reducing GHG emissions and local air pollution while accelerating the expansion of American supply chains for critical minerals and battery production. Together with *Bipartisan Infrastructure Law* investments of $7 billion to strengthen the American battery supply chain, the *Inflation Reduction Act* establishes a production tax credit to manufacture battery modules and creates programs to support advanced vehicle technologies and revitalize automotive manufacturing facilities. Moreover, the *Inflation Reduction Act* will help more Americans access clean transportation through tax credits for lower-income drivers who purchase previously owned, clean vehicles.

Expanding upon the states' efforts to deploy charging infrastructure, funded in part by the *Bipartisan Infrastructure Law,* an alternative refueling tax credit will help install charging equipment in low-to-moderate-income and rural communities. In addition, electric U.S. Postal Service trucks will help reduce pollution from mail deliveries. To further decarbonize all modes of transportation, the *Inflation Reduction Act* creates tax credits to facilitate the use of clean fuels including

biodiesel, renewable diesel, advanced biofuel, and sustainable aviation fuel. It also provides incentives to deploy alternative-fuel infrastructure and advanced aviation technology, and to reduce diesel emissions from freight and ports.

These investments build on efforts by the U.S. Department of Transportation and the Environmental Protection Agency to update fuel economy and tailpipe emissions standards for vehicles, which will work in concert with these new investments to drive toward meeting the President's goal of 50% zero emissions vehicles sold in 2030.

Agriculture and Forestry

Combined with the *Bipartisan Infrastructure Law* and other investments already underway, the *Inflation Reduction Act* makes a once-in-a-generation investment in part through the U.S. Department of Agriculture that will support agricultural producers, rural communities and their infrastructure needs, while responding and adapting to the climate crisis. Recognizing the critical role American agriculture and forestry play in addressing the climate crisis, the *Inflation Reduction Act* will invest $21 billion in climate-smart farmers, ranchers, and forest landowners working to reduce GHG pollution, increase storage of carbon in soils and trees, and make their operations more productive. The *Inflation Reduction Act* will also invest $5 billion to protect communities from the risks of extreme wildfires, conserve forests with significant carbon sequestration benefits, and cool communities vulnerable to the threats of extreme heat. These investments will give farmers, ranchers, forest landowners and rural communities the resources and tools they need to prepare for and adapt to a changing climate, saving lives, property, and livelihoods.

Addressing National Priorities

In addition to climate benefits, the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* will help modernize the nation's energy system, lower energy costs for consumers, enhance energy security, and improve human health. By stimulating investments in domestic supply chains, manufacturing, and clean energy deployment, these laws will create hundreds of thousands of high-quality jobs and new economic opportunities. And the laws address historical inequities in our nation's energy system by lowering the cost of and expanding access to clean energy and by providing relief to communities that have suffered from disproportionate exposure to energy-related pollution.

Below are a few examples of how specific provisions within the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* will work in concert to address these priorities:

- **Lowering energy costs for households and businesses:** The *Inflation Reduction Act* includes tax credits designed to help more Americans invest in equipment that can save them money and protect them from the volatility of fossil-fuel prices. These include tax credits for heat pumps, rooftop solar, and new and used electric vehicles. For example, a typical household that invests in rooftop solar can expect to save $9,000 over the lifetime of the solar system.[1] Households that install a heat pump can save $500, and in some cases nearly $1,000, on their annual utility bills.[2] Furthermore, tax incentives for clean power generation can result in reduced retail electricity rates, saving all consumers—even those who do not purchase any incentivized equipment—money on their bills.

[1] See: https://www.energy.gov/policy/articles/president-bidens-agenda-building-better-america-will-lower-energy-costs-working

[2] See: https://www.energy.gov/policy/articles/president-bidens-agenda-building-better-america-will-lower-energy-costs-working

- **Benefits for disadvantaged communities:** Provisions in the *Inflation Reduction Act* direct targeted support to disadvantaged communities and lower-income households. The $3 billion Environmental and Climate Justice Block Grants and $27 billion Greenhouse Gas Reduction Fund, for example, will support communities with disproportionate energy burdens and pollution exposure. Collectively, these provisions will advance projects that reduce the adverse health impacts of pollution and mitigate the effects of climate change, ensuring that all communities can share in the benefits of clean energy technologies.
- **Investments in energy communities:** Multiple provisions direct investments to communities that currently host, or previously hosted, fossil energy infrastructure. These include $4 billion in investments under the Advanced Energy Project Credit directed to industrial or manufacturing facilities located in these communities and more than $10 billion for rural electric cooperatives to deploy clean electricity, providing economic opportunities and benefits for regions that may be disproportionately affected by the transition to a decarbonized economy.
- **Workforce development and high-quality jobs:** The infrastructure created through the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* will expand the clean energy workforce. To receive the maximum value of the tax credits, clean energy projects must meet wage and apprenticeship requirements, ensuring that workers on those projects are paid prevailing wages and creating new opportunities for skilled workers to launch their careers.
- **Domestic manufacturing of clean energy technologies:** Many provisions support domestic manufacturing of clean technologies, through both direct funding and new incentives for domestically manufactured equipment. For instance, the Advanced Manufacturing Production Tax Credit in the *Inflation Reduction Act*, along with several provisions in the *Bipartisan Infrastructure Law*, incentivize or provide funding for the domestic production of the full clean energy and storage supply chain, as well as supporting critical minerals production. *The Inflation Reduction Act*'s deployment incentives complement direct manufacturing support by including a 10% bonus for clean electricity projects meeting domestic content criteria and increased consumer incentives for vehicles that meet domestic supply-chain requirements. This combined support for the supply and demand of domestic-made products offers a strong incentive for manufacturers to build clean energy supply chains in America.

The above list is a sampling of the many benefits of the *Inflation Reduction Act* and the *Bipartisan Infrastructure Law* and is not intended to be comprehensive. DOE looks forward to conducting additional analysis and working with other stakeholders in the months ahead to further assess the prospective impacts of these and other programs and policies.

To fully realize the benefits of the *Inflation Reduction Act* and *Bipartisan Infrastructure Law*, federal agencies must act decisively to implement these laws. DOE, like other federal agencies, is already hard at work implementing critical components of the *Bipartisan Infrastructure Law*. State governments, local governments, Tribes, civil society, and the private sector all have important roles to play in our collective effort to modernize the American energy system. An all-of-society approach will help maximize the positive returns from these historic programs and investments.

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