

OMB ANALYSIS: THE SOCIAL BENEFITS OF THE INFLATION REDUCTION ACT'S GREENHOUSE GAS EMISSION REDUCTIONS

Climate change is generating increased challenges to the environment, public health, and the economy. The Fourth National Climate Assessment¹ shows that, without substantial and sustained mitigation and adaptation efforts, climate change continues to create new risks and challenges to human health, safety, quality of life, and the economy. Economic and academic literature provides robust evidence that the welfare benefits of well-designed climate policies exceed the costs, providing a strong rationale for urgent action to address the risks of climate change. Preserving the planet's environment will benefit human health globally, reduce the risk of conflict and migration, and ensure the viability of ecosystems.

Climate change is affecting the Federal Government's ledger. Recent Office of Management and Budget (OMB) [assessments](#)² found that long-range budget projections for Federal revenues could be 7.1 percent lower annually by 2100, approximately \$2 trillion in today's terms.³

In another set of assessments OMB found that the Federal Government could spend between an additional \$25 billion to \$128 billion annually⁴ by the end of the century due to just six climate-related financial risks—disaster relief, flood insurance, crop insurance, healthcare expenditures, wildland fire suppression spending, and flood risk at Federal facilities—and considered only a limited scope of total potential damages to those programs.⁵ Many other risks to the Federal Budget are apparent but have not yet been quantified, such as the risks to national security, changes to ecosystems, and infrastructure expenditures, which can each have wide-ranging and diffuse effects to the budget.

President Biden has set an ambitious goal for the United States: to cut carbon pollution from 2005 levels at least in half by 2030 and rapidly reduce greenhouse gas emissions to net zero by 2050. This means that the United States will need to reduce reliance on unabated, carbon-intensive fossil fuel technologies and transition the economy to produce and make use of clean energy and other low-carbon goods and services.

The Inflation Reduction Act of 2022 represents the most aggressive action to combat the climate crisis and improve American energy security in our nation's history, lowering energy costs by hundreds of dollars per year for families through rebates and tax credits for efficient appliances and home upgrades, tax credits for rooftop solar systems, and tax credits for electric vehicles. It also invests in technologies like solar, wind, and clean hydrogen, with provisions that encourage domestic sourcing of materials. The law is projected to yield significant reductions to GHG emissions, with independent and official government projections agreeing it will reduce about one billion metric tons of annual emissions in 2030, with total annual emissions reaching about a 40 percent drop below 2005 levels in the year 2030.

¹ United States Global Change Research Program. (2018). Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II. (Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart, Eds.). doi:10.7930/NCA4.2018.

² OMB, 2022. Climate-Related Macroeconomic Risks and Opportunities. Council of Economic Advisors, Office of Management and Budget. https://www.whitehouse.gov/wp-content/uploads/2022/04/CEA_OMB_Climate_Macro_WP_2022.pdf

³ This analysis was conducted under a scenario in which climate change reduced U.S. GDP by 10.0 percent compared to a no-further-warming counterfactual, as projected by the Network for Greening the Financial System as the tail risk under policies prior to the passage of the Inflation Reduction Act.

⁴ Compared to historic spending prior to enactment of the Inflation Reduction Act.

⁵ OMB, 2022. Climate Risk Exposure: An Assessment of the Federal Government's Financial Risks to Climate Change. Office of Management and Budget. https://www.whitehouse.gov/wp-content/uploads/2022/04/OMB_Climate_Risk_Exposure_2022.pdf

This analysis is OMB’s first published estimate of avoided climate-related social costs resulting from a piece of legislation.⁶ It estimates the social impact that the Inflation Reduction Act would have from reducing GHG emissions by applying the interim social cost of greenhouse gases (SC-GHGs) to Inflation Reduction Act emission reduction models. It aims to help inform the potential impacts of the law and should be used in tandem with other analyses, such as scoring from the Congressional Budget Office.

Methods

Estimates of the social cost of carbon (SC-CO₂) and other greenhouse gases, as presented in the *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*⁷ (TSD), allow for a better understanding of the social benefits of reducing emissions of each of these pollutants. Collectively, these values are referenced as the “social cost of greenhouse gases” (SC-GHG), which are the monetary value of the net harm to society associated with adding a small amount of a specific GHG to the atmosphere in a given year. The dollar value is derived by monetizing, to the extent possible, the damages and benefits caused over time by a ton of emissions, such as health impacts and productivity losses.

Federal agencies began incorporating SC-CO₂ estimates in regulatory benefit-cost analyses conducted under Executive Order (E.O.) 12866 in 2008, and federal agencies have selectively used SC-GHG estimates in other applications outside of regulatory analyses. Executive Order 13990, on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, states that it is essential that agencies capture the full costs of GHG emissions as accurately as possible, to facilitate sound decision-making, recognize the breadth of climate impacts, and support the international leadership of the United States on climate issues.

Several organizations have modeled anticipated greenhouse gas (GHG) reduction estimates from the Inflation Reduction Act, if it were to be enacted. This novel OMB analysis applies interim⁸ SC-GHG estimates to three different Inflation Reduction Act emission reduction models to examine the potential range of climate benefits that the bill will deliver for society through 2050. Those three models were developed by Princeton University’s Rapid Energy Policy Evaluation and Analysis Toolkit⁹, Rhodium Group¹⁰, and Energy Innovation.¹¹ These models are very useful in illustrating the impacts of policies or legislation, but also have caveats and limitations. For instance, implementing the Inflation

⁶ Note that this application of the interim estimates of SC-GHG is distinct from the applications set forth in Executive Order 13990 (Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis).

⁷ USG, 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, February, https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

⁸ Interim SC-GHG estimates are the latest published values used by the Federal Government. Recent modeling suggests that these values likely underestimate the social costs of GHG emissions and the Federal Government is working to update and finalize updated SC-GHG estimates.

⁹ Jenkins, J.D., Mayfield, E.N., Farbes, J., Jones, R., Patankar, N., Xu, Q., Schivley, G., “Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022,” REPEAT Project, Princeton, NJ, August 2022. https://repeatproject.org/docs/REPEAT_Inflation_Reduction_Act_Preliminary_Report_2022-08-04.pdf

¹⁰ King, B., Kolus, K., Dasari, N., Wimberger, E., Hernodon, W., O’Rear, E., Rivera, A., Larsen, J., Larsen, K., “Taking Stock 2022: US Greenhouse Gas Emissions Outlook in an Uncertain World,” Rhodium Group, July 2022. <https://rhg.com/research/inflation-reduction-act/>

¹¹ Mahajan, M., Ashmoore, O., Rissman, J., Orvis, R. Gopal, A., “Modeling the Inflation Reduction Act Using the Energy Policy Simulator,” Energy Innovation, August 2022. https://energyinnovation.org/wp-content/uploads/2022/08/Modeling-the-Inflation-Reduction-Act-with-the-US-Energy-Policy-Simulator_August.pdf

Reduction Act will come with a set of challenges, and real-world GHG emissions reductions will be impacted by complicated economic interactions.

Of note in this analysis, each of these organizations’ modeled GHG emissions estimates due to the Inflation Reduction Act do not extend past 2030. To estimate GHG impacts through 2050, OMB’s analysis assumes 2030 annual reductions would continue at the same rate through 2050, which OMB believes is a conservative assumption that is consistent with its methodological approaches in other contexts. Also, Princeton University’s Rapid Energy Policy Evaluation and Analysis Toolkit Inflation Reduction Act projections produce a single set of GHG reduction estimates by year, whereas Rhodium Group and Energy Innovation estimates project a high and low range of GHG reduction estimates. To cover the widest range possible of impacts, this analysis highlights those potential impacts (and monetizes them using the SC-GHG) by using the highest and lowest emissions scenarios of the three models.

This analysis uses unrounded interim SC-GHG annual values from 2023 to 2050, discounted to present 2022 values (and in 2020\$) using a 2.5% discount rate, then applies those values to the GHG reduction estimates from the three models. For ease of visualization, rounded values are presented in Table 1, along with the results of the application.

Results

Results of the OMB analysis found that cumulative climate-related benefits from the Inflation Reduction Act will range between \$0.7 and \$1.9 trillion through 2050. These social benefits of the Inflation Reduction Act could reflect the mitigation of a number of harmful climate impacts reflected in the SC-GHG, including:

- Avoiding negative health impacts, including things like premature death;
- Reducing expensive property damage from sea level rise and natural disasters; and
- Reducing costs related to increasing temperatures.

As noted, the interim social cost of carbon estimates are currently significantly underestimated because they do not account for many important climate damage categories, such as ocean acidification, and because of such omitted damages and other limitations and assumptions, these values are likely significant underestimates of the full public benefits of reducing greenhouse gas emissions. These results also do not capture benefits that passing the Inflation Reduction Act will have on other sectors of the economy outside of the impacts that the bill will have on GHG emissions. Modeling of the Inflation Reduction Act impacts also focus on domestic GHG emissions reductions, where the Inflation Reduction Act will also likely have significant impacts on international GHG emissions. This focus on domestic emissions also suggests the quantifies benefits presented in this analysis are significant underestimates.

TABLE 1 – ANNUAL RANGE OF CLIMATE-RELATED BENEFITS FROM Inflation Reduction Act

Year	2023	2024	2025	2026	2027	2028	2029	2030
Interim SC-CO ₂ : discounting to PV in 2022, at 2.5% (\$)	78	78	77	76	76	75	74	73
High Range (\$ millions)	13,325	20,438	29,964	51,754	63,979	72,735	76,626	84,164
Low Range (\$ millions)	1,752	4,920	9,443	12,177	17,739	22,032	26,463	34,463
Year	2031	2032	2033	2034	2035	2036	2037	2038

Interim SC-CO ₂ : discounting to PV in 2022, at 2.5% (\$)	73	72	71	71	70	69	68	68
High Range (\$ millions)	83,362	82,549	81,726	80,895	80,055	79,208	78,354	77,496
Low Range (\$ millions)	34,134	33,801	33,464	33,124	32,780	32,433	32,084	31,732
Year	2039	2040	2041	2042	2043	2044	2045	2046
Interim SC-CO ₂ : discounting to PV in 2022, at 2.5% (\$)	67	66	65	65	64	63	62	61
High Range (\$ millions)	76,633	75,765	74,875	73,983	73,089	72,196	71,303	70,410
Low Range (\$ millions)	31,379	31,024	30,659	30,294	29,928	29,562	29,196	28,831
Year	2047	2048	2049	2050				
Interim SC-CO ₂ : discounting to PV in 2022, at 2.5% (\$)	61	60	59	58				
High Range (\$ millions)	69,519	68,628	67,740	66,855				
Low Range (\$ millions)	28,466	28,101	27,738	27,375				

**Figures may not add to cumulative totals due to rounding*

Cumulative Low (\$ millions), years 2023 through 2050 = \$745,095
Cumulative High (\$ millions), years 2023 through 2050 = \$1,917,623

The Inflation Reduction Act will not only help tackle the climate crisis, but also very likely improve the long-term fiscal health of the Federal ledger. As noted, OMB assessments released with the FY 2023 President’s Budget found that climate change could lead to an annual revenue loss of \$2 trillion in today’s dollars and \$128 billion in increased annual Federal expenditures caused by increases in floods, drought, extreme heat, wildfires, and hurricanes.

In the long-term, the Inflation Reduction Act will help avoid significant expenditures that the Federal government might otherwise expect to spend on programs like crop insurance, health insurance, and fire suppression due to climate change. The Inflation Reduction Act will help ease the burden that climate change has on the American public, strengthen our economy and in so doing will also reduce the future financial risks from climate change for the Federal Government and for taxpayers.