Advocating for essential policy support

We recognize the important role that supportive government policies play in the development and deployment of lower-emission technologies, including those that are part of our Low Carbon Solutions business.

Clear and consistent policies, along with advancements in technology, can act as an accelerator for lower-emission alternatives, which is why we actively participate in climate-related policy engagements around the world, including our work with the IPCC.

We focus on practical policy solutions that consider both sides of the "and" equation: rising global demand for affordable, reliable energy, and scalable development of technologies with lower greenhouse gas emissions.

Understanding life-cycle emissions to better inform policy decisions

We have been working with the MIT Energy Initiative to develop a new life-cycle approach tool that covers pathways of multiple technologies representing most sources of greenhouse gas emissions. This tool, called the Sustainable Energy System Analysis Modeling Environment (SESAME),[1] is based on well-referenced, peer-reviewed public sources. It will evolve to perform full life-cycle analyses for more than 1,000 technology pathways, from primary energy sources to final products or services including those from the power, transportation, industrial, and residential sectors. To date, a series of SESAME-related publications in peer-reviewed journals have been released exploring areas such as the U.S. electric power systems.[2,3,4]

For example, a coordinated and transparent economy-wide price on carbon such as a carbon tax would enable all technologies to compete and cost-effectively lower carbon emissions intensity by focusing on reducing emissions per unit of energy while delivering meaningful emission reductions. Broad adoption of an economy-wide price on carbon could also help spur the development of global carbon markets as envisioned in Article 6 of the Paris Agreement.

In the absence of economy-wide carbon pricing, well-designed sector-based policy options, along with technology advancements, could also be an effective way to reduce emissions. We support the approaches outlined below, which help address greenhouse gas emissions in hard-to-decarbonize sectors of the economy, including manufacturing, transportation, and power generation.

Manufacturing

To reduce industrial emissions in the manufacturing sector, our focus is on both carbon capture and storage and hydrogen. To drive investment and deploy these technologies at the pace and scale needed for a net-zero future, governments must establish durable regulatory and legal frameworks as well as incentives similar to those available for more established lower-emission technologies such as solar and wind. The U.S. Inflation Reduction Act (IRA), enacted in 2022, provides some of the government support described in this document. The IRA leverages a life-cycle assessment approach as the method for assessing the greenhouse gas emissions of low-carbon hydrogen and transportation fuels, and it defines the value of corresponding credits by the emissions intensity achieved on a life-cycle basis.

We support a policy and regulatory framework for carbon capture and storage that would:

- Sustain long-term government support for research and development.
- Provide standards to ensure safe and secure CO_2 storage.
- Allow for fit-for-purpose CO_2 injection well design standards.
- Provide legal certainty for geologic storage ownership.
- Ensure a streamlined permitting process for carbon capture and storage facilities.
- Provide access to CO_2 storage capacity owned or controlled by governments.
- Allow for high-quality offsets generated from carbon capture and storage, low-carbon, and carbon-removal projects.

We are participating in several studies, including the National Petroleum Council's report on low-carbon hydrogen, to assess emissions during hydrogen production and transportation as well as the benefits of hydrogen on a full life-cycle intensity basis versus alternatives.

Transportation

A holistic low-carbon transport policy that combines a market-based, technology-neutral fuel standard with a life-cycle vehicle CO_2 emission standard could drive emission reductions across the entire vehicle fleet.

We advocate for a carbon intensity-based fuel standard approach that can be extended to the aviation and marine sectors. We are a lead participant in developing the American Petroleum Institute's policy framework that includes actions to reduce life-cycle emissions in the U.S. transportation sector.

Power generation

A technology-neutral clean-energy standard or carbon-intensity standard could reduce CO_2 emissions in the electricity sector by setting targets based on carbon intensity and incentivizing necessary infrastructure and lower-emission options. These include natural gas, renewables, and bioenergy, as well as negative-emission technologies like carbon capture and storage and direct air capture.

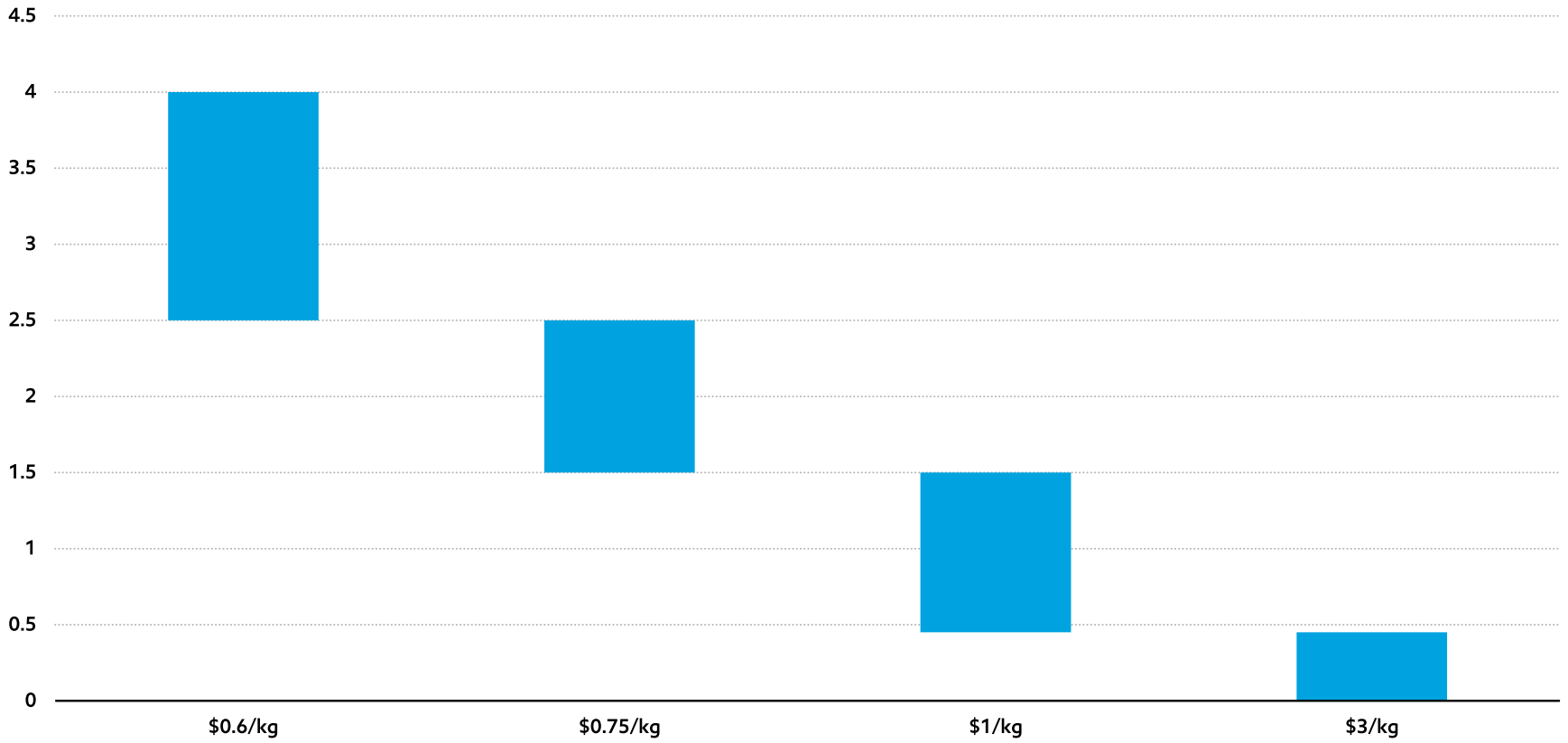
We participated in the U.S. Chamber of Commerce's development of policy principles to underpin a U.S. clean energy standard for the electricity sector. We continue to support engagement with the U.S. government on this issue.

As part of our participation in policy discussions, we engage through trade associations and industry collaborations, including the Oil and Gas Climate Initiative. We are also actively engaged in the development of studies and reports designed to better inform policy decisions. For example, we have leadership roles on two National Petroleum Council reports, one focusing on hydrogen and the other on natural gas.

We use various communication channels including this report, press releases, ExxonMobil.com, and the Exxchange advocacy portal to clearly and transparently articulate our climate-related policy positions. These positions inform and provide the basis for our lobbying and advocacy efforts.

U.S. Inflation Reduction Act 45V credit by GHG intensity[5]

Well-to-Gate GHG Intensity, kg CO_2eq/kg H_2



Our international affiliates are also engaged in climate-related policy developments and initiatives. For example, our Imperial Oil affiliate in Canada will work alongside our partners, the Government of Canada, and the Government of Alberta toward the goal of achieving net-zero GHG emissions from oil sands operations by 2050,[6] collectively reducing an estimated 68 Mt/CO_2e per year.[7]

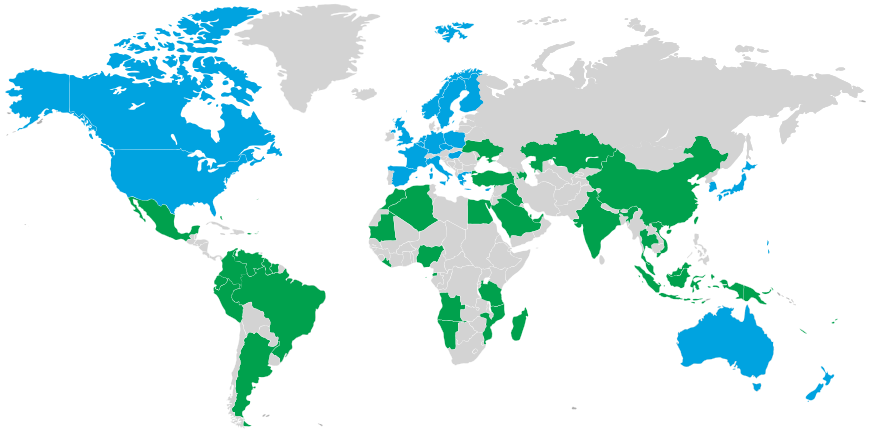
Policy impact

Our Global Outlook seeks to identify potential impacts of climate-related policies by using various assumptions and tools, including applications of a proxy cost of carbon, to estimate potential impacts on global energy demand.

Separately, we use proprietary greenhouse gas pricing where we operate and invest. Where policy provides greenhouse gas pricing, we align with and apply such greenhouse gas pricing to evaluate investment opportunities and estimate operating costs, where appropriate, for specific greenhouse gas emissions sources. International accords and underlying regional and national regulations covering greenhouse gas emissions continue to evolve with uncertain timing, outcome, and potential business impact. Where greenhouse gas pricing policy currently does not exist, we assume a price informed by the Global Outlook proxy cost of carbon.

Greenhouse gas emissions pricing where ExxonMobil operates or invests[8,9]

The greenhouse gas pricing we use for planning is similar to ranges provided by the third parties referenced below.



($/metric ton CO_2 - 2023$ Real)	World Bank Carbon prices	EM GHG Emissions Prices	IEA WEO STEPS CO_2 prices	
		2023-2050	2030	2050
Advanced economies	4-96	4-150	<136	<162
Emerging economies	1-13	2-100	<29	<55

Ranges provided for jurisdictions where ExxonMobil operates or invests.

ExxonMobil's GHG emissions pricing for 2023-2030 is based on currently stated existing or anticipated policies; pricing for 2030-2050 reflects presumed regional policies for both advanced and emerging economies.

ExxonMobil's GHG emissions pricing is in 2023 USD and has not been adjusted for future inflation.

For 2023 and 2024, we have not applied GHG emission prices to our operations or investments in countries where there is no existing GHG emission price. We do apply anticipated prices within the range identified in the table in those countries beginning in 2025.

ExxonMobil's GHG emissions prices include CO_2 and other GHGs (e.g., methane), where appropriate.

Footnotes

1. E. Gencer, S. Torkamani, I. Miller, T. Wu, F. O'Sullivan, Sustainable energy system analysis modeling environment: analyzing life-cycle emissions of the energy transition, Applied Energy 277 (2020) 115550. https://sesame.mit.edu/.
2. E. Kasseris, N. Goteti, S. Kumari, B. Clinton, S. Engelkemier, S. Torkamani, T. Akau, E. Gencer, Highlighting and overcoming data barriers: creating open data for retrospective analysis of US electric power systems by consolidating publicly available sources, Environmental Research Communications 2 (2020) 115001.
3. I. Miller, E. Gencer, H. Vogelbaum, P. Brown, S. Torkamani, F. O'Sullivan, Parametric modeling of life-cycle greenhouse gas emissions from photovoltaic power, Applied Energy 238 (2019) 760-774.
4. I. Miller, M. Arbabzadeh, E. Gencer, Hourly power grid variations, electric vehicle charging patterns, and operating emissions, Environmental Science & technology 2020, 54, 16071-16085.
5. H.R.5376 – Inflation Reduction Act of 2022, SEC. 45V. Credit for production of clean hydrogen.
6. Scope 1 and 2.
7. 2023 Imperial Oil Advancing Climate Solutions Report: https://www.imperialoil.ca/-/media/imperial/files/publications-and-reports/advancing-climate-solutions-report.pdf.
8. World Bank: State and Trends of Carbon Pricing 2023, https://openknowledge.worldbank.org/entities/publication/58f2a409-9bb7-4ee6-899d-be47835c838f. Reference World Bank ranges are consistent with existing carbon pricing for those jurisdictions as of March 31, 2023.
9. IEA World Energy Outlook 2023. IEA ranges have been adjusted for 2023$ Real.