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Washington, D.C. 20549

SCHEDULE 14A

**Proxy Statement Pursuant to Section 14(a)
of the Securities Exchange Act of 1934**

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EXXON MOBIL CORPORATION

(Name of Registrant as Specified In Its Charter)

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Energy and Carbon Summary**Executive summary**

ExxonMobil has a long history of responsibly meeting society's evolving need for energy in a reliable and sustainable manner. With a longstanding commitment to investments in technology and the ingenuity of its people, the Company is well positioned to continue to provide the energy that is essential to improving lives around the world, while managing the risks of climate change.

Report
April 19, 2021

About the *Energy & Carbon Summary*

The *Energy & Carbon Summary* outlines ExxonMobil's approach to managing climate risks, including Board of Directors oversight, technology investments and actions to reduce greenhouse gas emissions. It highlights the Company's commitment to advancing sustainable, effective solutions that address the world's growing demand for energy and the risks of climate change.

Positioning for a lower-carbon energy future

Under most third-party scenarios that meet the objectives of the Paris Agreement, oil and natural gas continue to play a significant role for decades in meeting increasing energy demand of a growing and more prosperous global population. ExxonMobil will play an important role in meeting society's need for energy and at the same time is committed to supporting efforts to mitigate the risk of climate change, as reflected in the four pillars of the Company's climate strategy:

- **Mitigating emissions in Company operations.**
- **Providing products to help customers reduce their emissions.**
- **Developing and deploying scalable technology solutions.**
- **Proactively engaging on climate-related policy.**

ExxonMobil's climate strategy**Mitigating emissions in Company operations**

Exxon Mobil's greenhouse gas emissions have declined approximately 13 percent from 2011 to 2020 due to energy efficiency improvements; reductions in flaring, venting and fugitive emissions; and the impact on the company's operations due to COVID-19.

At year-end 2020, the Company exceeded the emission reduction goals outlined in 2018. These included:

- 15 percent reduction in methane emissions versus 2016 levels, and
- 25 percent reduction in flaring versus 2016 levels.

The Company aims for industry-leading greenhouse gas performance across its businesses by 2030, and recently announced **new emission reduction plans for 2025**, which are projected to be consistent with the goals of the **Paris Agreement**.

The 2025 plans include a 15 to 20 percent reduction in greenhouse gas intensity of upstream operations compared to 2016 levels. This will be supported by a:

- 40 to 50 percent reduction in methane intensity; and
- 35 to 45 percent reduction in flaring intensity.

The Company's upstream operations also plan to align with the World Bank's initiative to eliminate routine flaring by 2030.

The 2025 emission reduction plans are expected to reduce absolute greenhouse gas emissions by an estimated 30 percent for the Company's upstream business. Similarly, absolute flaring and methane emissions are expected to decrease by 40 to 50 percent. The emission reduction plans cover Scope 1 and Scope 2 emissions from assets operated by the Company.

Providing products to help customers reduce their emissions

ExxonMobil is responding to product demand growth by delivering solutions that enable customers to meet product performance requirements while reducing greenhouse gas emissions. These products and solutions include: natural gas, lightweight materials and packaging, and advanced fuels and lubricants.

Developing and deploying scalable technology solutions

Commercially viable technology advances are required to achieve the Paris Agreement objectives. ExxonMobil's sustained investment in research and development is focused on society's highest-emitting sectors of industrial, power generation and commercial transportation, which together account for 80 percent of global energy-related CO₂ emissions, and for which the current solution set is insufficient.

ExxonMobil is working to develop breakthrough solutions in areas such as carbon capture, biofuels, hydrogen and energy-efficient process technology.

From 2000 through 2020, ExxonMobil has invested more than \$10 billion to research, develop and deploy lower-emission energy solutions, resulting in highly efficient operations that have eliminated or avoided approximately 520 million tonnes of greenhouse gas emissions — the equivalent of taking 110 million passenger vehicles off the road for a year.

Proactively engaging on climate related policy

Recognizing climate change is a global issue that requires collaboration among governments, private companies, consumers and other stakeholders to create meaningful solutions, ExxonMobil has participated in the Intergovernmental Panel on Climate Change (IPCC) since its inception in 1988, is a founding member of the Climate Leadership Council and is part of the Oil and Gas Climate Initiative.

The Company continues to engage in efforts to encourage sound and constructive policy solutions that reduce climate-related risks across the economy at the lowest cost to society, such as supporting the regulation of methane from new and existing sources.

Governance and oversight

Strong governance is essential to the long-term viability of ExxonMobil's business. Within the Company's robust governance framework, a rigorous risk-management approach is applied to identify and address risks associated with the business. Importantly, the Board of Directors and its various committees are highly engaged and have oversight of risk management, including as it applies to climate. The Board regularly receives updates from internal and third-party experts on climate science and policy, evaluates climate risk in the context of overall enterprise risk, including other operational, strategic, and financial risks, and considers the interactions among these factors, which includes in-depth analyses by Board committees.

Conclusion

The 2021 *Energy & Carbon Summary* contains additional detail on all of the areas described above. It updates and enhances last year's report, and includes a **Frequently Asked Questions** section as well as **metrics**, annual **Scope 1 and Scope 2 emission data**, and a new provision of **Scope 3 emissions**.

ExxonMobil supports the aims of the 2015 Paris Agreement and efforts to achieve net-zero emissions. The pillars of ExxonMobil's climate strategy, the investments the Company is making in lower-emission technologies, and the actions taken to reduce emissions across its operations are consistent with these global efforts.

ExxonMobil strives to deliver superior results while providing products and services that are essential to the health and welfare of billions of people around the world. The Company is committed to providing reliable and affordable energy to support human progress while advancing effective solutions that address the risks of climate change. ExxonMobil is working to be part of the solution.

Energy and Carbon Summary

Governance

Strong governance is essential to the long-term viability of ExxonMobil's business. Within the Company's robust governance framework, a rigorous risk management approach is applied to identify and address risks associated with its business, including the risks related to climate change.

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Climate change risk oversight

ExxonMobil's Board of Directors provides oversight of key risks, including strategic; reputational; financial; operational; safety, security, health and environment (SSHE); and legal compliance matters. The Board has a well-established and rigorous enterprise risk framework to oversee risks faced by the Company, including those related to climate change. The Board receives insights on risks and potential mitigations on relevant issues from both Company and external experts.

The Board routinely reviews the Corporation's environmental approach and performance. These reviews include briefings with internal and external subject-matter experts on scientific and technical research, public policy positions, emission reduction performance, and new technology developments. They also include at least one session each year where the full Board engages on the latest developments in climate science and policy. In addition, directors engage directly with shareholders to gather insights and share perspectives on issues of importance to the Company, including discussions regarding risks related to climate change.

The Board evaluates climate risks in the context of other operational, market, financial and reputational risks and considers the interactions of these additional factors. The Board is supported by its committees, which take more in-depth reviews of the context and interdependencies in risk evaluation. The role of these committees is described in greater detail below.

Led by the Lead Director, the Board also oversees the Company's response to critical issues. Recently, for example, the independent Lead Director, along with the full board, provided oversight as management guided the Company's response to the COVID-19 pandemic through a series of actions that helped protect its employees, the communities in which it works and people around the world.

Beyond the Board, the Management Committee, including the Chief Executive Officer, provides oversight of strategic risks and participates in briefings to broaden understanding and assess safeguards and mitigation options.



Coordination and support of board committees

As described above, the Board oversees a broad spectrum of interrelated risks with assistance from its committees. This integrated risk management approach facilitates

recognition and oversight of important risk interdependencies more effectively than relying on risk-specific committees. Consideration of climate-related risks is integrated within the activities of the committees.

Finance and Audit Committees

The **Finance** and **Audit** Committees oversee risks associated with financial and accounting matters. The Audit Committee also periodically reviews ExxonMobil's overall risk management approach and structure, which is applied to risks related to climate change, among other business risks.

Board Affairs Committee

The **Board Affairs Committee** oversees matters of corporate governance, including Board evaluation and director refreshment. It also coordinates identification of external experts, including those addressing the energy transition, to provide insights to the Board and sets the criteria for shareholder engagement with directors.

Compensation Committee

The **Compensation Committee** reviews executive compensation, which is designed to incentivize executives to maximize long-term shareholder value and requires decision-making that includes careful consideration of current and future risks, such as those related to climate change.

Public Issues & Contributions Committee

The **Public Issues and Contributions Committee (PICC)** oversees operational risks such as those relating to safety, security, health, lobbying activities, and expenditures and environmental performance, including actions taken to address climate-related risks.

Integrating risk management into executive compensation

Senior executive compensation is determined by the Compensation Committee. The compensation program is designed to incentivize effective management of all operating and financial risks associated with ExxonMobil's business, including risks related to climate change.

Performance shares with long vesting periods and a strong tie to Company performance are among the key design features that support this objective. Executive compensation is designed to support long-term sustainability of Company operations and management of all aspects of risk. Specifically, performance in managing risks related to climate change is recognized in two performance dimensions that are linked to the Company's performance share program: (1) Progress Toward Strategic Objectives, which includes reducing environmental impacts as one of five objectives, and (2) **Safety and Operations Integrity**, which includes environmental performance in addition to safety and controls. These performance dimensions are shown in the schematic on the right. The executive compensation program requires that these longer-term risks be carefully considered at all levels of the organization, ensuring stewardship beyond the Board and executive level, and is fundamental to success across the



Company. Details on the executive compensation program can be found in the annual **Proxy Statement**.

Board composition and evaluation

The Board is comprised of independent directors and the CEO. All members of the Audit, Board Affairs, Compensation and PICC committees are independent. Each highly qualified director brings a diverse perspective. The majority have scientific, technical and/or research backgrounds, creating a collective skillset that is well qualified to oversee climate-related issues. In addition, the Board benefits from the experience of a director who is a recognized expert in climate science.

The Board acts as a collective body, representing the interests of all shareholders. While individual directors leverage their experience and knowledge in Board and committee deliberations, Board decisions and perspectives reflect the collective wisdom of the group.

At least annually, the Board and each of the Board committees conduct a robust and thorough evaluation of their performance and effectiveness, as well as potential changes to the committees' charters. The independent Lead Director, as part of the role's recent enhancements, leads the evaluation.



The ExxonMobil Board of Directors, as of March 1, 2021. From top left: Michael Angelakis, Susan Avery, Angela Braly, Ursula Burns; second row: Kenneth Frazier, Joseph Hooley, Steven Kandarian, Douglas Oberhelman, Samuel Palmisano; bottom row: Jeffrey Ubben, William Weldon, Darren Woods and Wan Zulkiflee.

Board refreshment

The Board prioritizes its refreshment process and values a diverse slate of experienced and qualified Board members with the ability to serve over a period of many years.

The Board's refreshment process has been successful in identifying diverse, experienced and qualified Board candidates. ExxonMobil has added eight new independent directors in six years. Five of the last eleven independent directors to join the Board are female or racial/ethnic minorities. As of March 1, 2021, the average tenure of independent directors up for election in May 2021 was 4.9 years, well below the S&P 500 average of 7.9 years.¹

Qualifications sought for director nominees are documented in the Board's **Guidelines for the Selection of Non-Employee Directors available on [exxonmobil.com](https://www.exxonmobil.com)**. Important

director competencies, built from these qualifications, include experience in risk management and global business leadership, as well as financial and operational experience and scientific, technical or research experience.

Since January 2020, Joseph Hooley, Michael Angelakis, Wan Zulkiflee and Jeffrey Ubben have joined the Board, adding valuable expertise in capital allocation across industries, complex corporate transitions, the energy industry, investor perspectives, Asia-Pacific markets, and environmental, social and governance (ESG) practices.

Public Issues and Contributions Committee (PICC)

The Public Issues and Contributions

Committee (PICC) plays an integral role in the Board's oversight of climate-related risks. Like other committees, the PICC is able to work on key issues in greater detail than possible by the full Board.

The PICC is comprised of three independent directors who are appointed by the Board, and reviews and provides guidance on the Corporation's policies, programs and practices on key public issues of significance. It regularly reviews ExxonMobil's safety, security, health and environmental performance, including actions taken to identify and manage risks related to climate change. The broad and diverse set of backgrounds and areas of expertise of the individual PICC members ensures the committee is able to effectively evaluate and inform the Board on dynamic and complex issues.

The PICC, along with other members of the Board, makes annual site visits to operating locations to observe and provide input on operating practices and external engagement. In February 2020, the PICC and other members of the Board and management visited **ExxonMobil's integrated manufacturing complex in Beaumont, Texas**, which consists of a refinery, chemical plants, and lubricant blending and packaging facilities.

The visit included an overview of chemical and refinery operations, and highlighted the site's manufacturing complexity, reliability and process safety performance. The visit also included a tour of the central control building and operating units and the construction site of a project to increase the capacity to refine light crude oil produced in the United States. During the tour, directors reviewed firsthand the mitigating actions ExxonMobil has taken to address the risks of potential flooding along the Neches River where the refinery is located. Directors also had the opportunity to hear from employees and external guests, including elected officials and local/community leaders.

Through these visits, the PICC and directors review the effectiveness of the Company's risk management process and receive additional insight into how the **Operations Integrity Management System (OIMS)** helps protect employees, nearby communities, the environment and physical assets. The PICC uses this information, along with reports on safety and environmental activities of the operating functions, to provide recommendations to the full Board.



Members of the Board of Directors and senior executives toured the integrated manufacturing complex in Beaumont, Texas, in February 2020 as part of the annual Board trip.

1 Spencer Stuart (2020). 2020 U.S. Spencer Stuart Board Index, page 3.

https://www.spencerstuart.com/-/media/2020/december/ssbi2020/2020_us_spencer_stuart_board_index.pdf

Potential impact on proved reserves and resources considering 2°C scenarios

Report

April 19, 2021

Over the coming decades, oil and natural gas will continue to play a critical role in meeting the world's energy demand, even considering the Intergovernmental Panel on Climate Change (IPCC) Lower 2°C scenarios. The following analysis is intended to address the potential impacts to the Company's proved reserves and resources¹ through 2040 and beyond, considering the average of the IPCC Lower 2°C scenarios' oil and natural gas growth rates.²

Proved reserves

ExxonMobil believes that over the long term, proved reserves are one of the main drivers of intrinsic value of an integrated oil and natural gas company's upstream operations.³ At the end of 2020, ExxonMobil's proved reserves totaled about 15 billion oil-equivalent barrels, comprised of 60 percent oil and 40 percent natural gas⁴. These proved reserves are assessed annually and reported in the Company's annual report on Form 10-K in accordance with rules of the U.S. Securities and Exchange Commission. Based on currently anticipated production schedules, a substantial majority of ExxonMobil's year-end 2020 proved reserves are expected to have been produced by 2040. Since the average of the IPCC Lower 2°C scenarios implies significant use of oil and natural gas through the middle of the century, these reserves face little risk from declining demand.

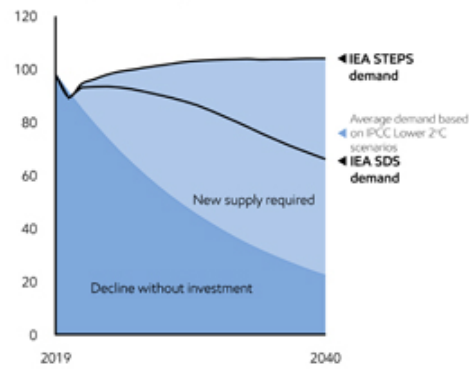
Significant investment still needed in 2°C scenarios

Considering the IPCC Lower 2°C scenarios average, global liquids demand is projected to decline from 98 million barrels per day in 2019 (note that 2020 demand of 88 million barrels per day was significantly impacted by COVID-19 restrictions) to about 75 million barrels per day in 2040. Without future investment and due to natural field decline, world liquids production would be expected to drop to about 22 million barrels per day in 2040, greatly exceeding the potential demand reduction. Natural gas field decline rates are generally similar to liquids.

With the potential 2040 imbalance (absent future investment), the substantial majority of ExxonMobil's proved reserves that are projected to be produced by 2040 are supported by ample demand, and therefore face little risk related to the average of the IPCC Lower 2°C scenarios. Considering the IEA's SDS (a well below 2°C scenario), the IEA estimated that almost \$12 trillion of investment will be needed for oil and natural gas supply for 2020-2040.⁵ Additionally, the IEA has reported that current industry investment levels are well below what is needed in these IEA scenarios, indicating a critical need for increased oil and natural gas investment versus 2020 levels.⁶

Global oil supply estimates

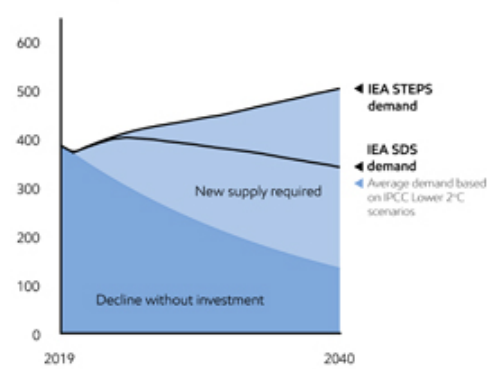
(Million oil-equivalent barrels per day)



Excludes biofuels; Source: IHS, IEA, IPCC SR1.5, EM analyses
2°C scenarios based on IPCC Lower 2°C scenarios

Global natural gas supply estimates

(Billion cubic feet per day)



Source: IHS, IEA, IPCC SR1.5, EM analyses
2°C scenarios based on IPCC Lower 2°C scenarios

For the remaining year-end 2020 proved reserves that are projected to be produced beyond 2040, the reserves are generally associated with assets where the majority of development costs are incurred before 2040. While these proved reserves may be subject to more stringent climate-related policies in the future, technology advancements and targeted investments could mitigate production-related emissions and associated costs. In addition, these assets have generally lower risk given the technical knowledge accumulated over many decades of production. Accordingly, the production of these reserves will likely remain economic even considering the average oil and natural gas demand under the IPCC Lower 2°C scenarios.

Resources

ExxonMobil maintains a large and diverse portfolio of undeveloped resources that provide considerable flexibility to develop new supplies to meet future energy demand and replenish the Company's proved reserves. The Company also continues to enhance the quality of this resource base through successful exploration, acquisitions, divestments, and ongoing development planning and appraisal activities.

Under the IPCC Lower 2°C scenarios, the world will continue to require significant investment in both liquids and natural gas. Based on these scenarios, and assuming ExxonMobil retains its current share of global production,⁷ the Company would need to replenish its existing proved reserves entirely by 2040 under the IPCC Lower 2°C scenarios average.

For ExxonMobil, the underlying economics of commercializing resources are dependent on a number of factors, including evolving government regulations, that are assessed annually using a dynamic resource development process. The best resource opportunities are advanced and assets with lower potential are monetized or exited. All investments are tested over a wide range of commodity price assumptions and market conditions. Notably, the IEA's estimates of future prices under its 2°C pathway fall within the range used to test investments.⁸

Reducing costs using technology to improve competitive position

Trillions of dollars of investment in oil and natural gas will be needed, even in 2°C scenarios. By leveraging high-impact technologies from ExxonMobil's research organization, costs and environmental impacts are reduced, positioning the Company's portfolio to compete successfully.

Examples of technology-enabled cost and environmental footprint reductions:

- Record-setting extended-reach wells in Sakhalin to significantly reduce drilling costs and environmental footprints.
- Full-physics modeling and next-generation completion designs for unconventional developments to reduce drilling and improve recovery.
- Combination of horizontal drilling with hydraulic fracturing to significantly reduce land surface footprint and cost.



The Yastreb drilling rig, Sakhalin Island, Russia

In light of the multiple and dynamic factors that influence governments' diverse approaches to regulate resources and decisions by industry to commercialize undeveloped resources, it is not possible to identify which specific assets will ultimately be developed.

However, the Company is confident that the size, diversity and continued upgrading of resources will enable the ongoing replenishment of proved reserves under a range of potential future demand scenarios and regional policy differences. Regional policies that constrain supply in one area could enhance returns in others.

Dynamic resource development planning

This process considers a wide range of variables over time, including as appropriate: the extent and quality of the resource, development concepts, fiscal terms, regulatory requirements, proximity to existing infrastructure, market conditions, enabling technologies, and policy developments, including climate-related policy.



ExxonMobil optimizes resource development plans in line with these variables and prioritizes developments that are competitively advantaged in delivering long-term shareholder value. A rigorous Decision Quality Framework is employed to inform development decisions ranging from developing the resource (which eventually moves to proved reserves), monetizing the resource by selling it to others, or exiting the asset.

With a very large resource base, this process can take decades as technologies are developed, market conditions change and competition evolves. Two examples illustrate this:

Liza phase 1 development

The Liza field was discovered in May 2015 offshore **Guyana**. ExxonMobil's approach to development planning enabled an industry leading start-up in less than five years following discovery.

Norway sale

In contrast, the Company monetized its Norway upstream assets through a December 2019 sale. After an evaluation of the Company's portfolio, the asset was divested to enable ExxonMobil to focus on investments with higher long-term strategic value.

¹ For the purposes of this report, proved reserves are year-end 2020 proved oil and gas reserves for consolidated subsidiaries and equity companies as reported in the Corporation's Annual Report on Form 10-K. Proved oil and gas reserves are determined in accordance with Securities and Exchange Commission (SEC) requirements. Proved reserves are those quantities of oil and gas which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible under existing economic and operating conditions and government regulations. Proved reserves are determined using the average of first-of-month oil and natural gas prices during the reporting year. For the purposes of this disclosure, resources are total remaining estimated quantities of discovered quantities of oil and gas that are expected to be ultimately recoverable. The resource base includes proved reserves and quantities of oil and gas that are not yet classified as proved reserves.

² To estimate global demand in 2040 for oil and natural gas, the average of the IPCC Lower 2°C scenarios' growth rates for oil and natural gas covering the period 2010-2040 have been applied to standard baseline estimates of oil and natural gas demand in 2010. In addition, the IEA STEPS and SDS scenarios for oil demand and natural gas demand were added.

³ IHS, 2017: *Climate-Related Financial Risk and the Oil and Gas Sector*, page 23.

⁴ Proved reserves are determined in accordance with SEC requirements using the average of first-of-month oil and natural gas prices during the reporting year (see footnote 1 for added detail). Although near-term changes in prices and capital expenditures can have an impact on reserve quantities from year to year, many factors can result in quantities being recognized again as proved reserves at some future point, such as a recovery in the SEC price basis, cost reductions, operating efficiencies, and increases in planned capital spend. This can result in proved reserves fluctuating across market cycles.

⁵ IEA, *World Energy Outlook 2020 Annex 5*, investment data.

⁶ IEA, *Energy Investment Report*, p.15.

⁷ Hypothetical cumulative production determined by proportioning ExxonMobil's 2020 average daily production (Form 10-K, page 9) and 2020 average daily global oil and gas production to estimated 2040 average daily production (assuming ExxonMobil's current market share and 100 percent proved reserves replacement to maintain its proved reserves consistent with its production ratio at the end of 2020) and implied oil and gas demand from the IPCC Lower 2°C scenarios average. Assumed linear decline of estimated average daily production through 2040.

⁸ IEA, *World Energy Outlook 2020*, table 2.2. Fossil fuel prices by scenario.

Positioning for a lower-carbon energy future

Report

April 19, 2021

Upstream

Oil and natural gas remain important energy sources even across the Intergovernmental Panel on Climate Change (IPCC) Lower 2°C scenarios. Natural gas is expected to play a key role in the projected demand shift from coal to lower-emission fuels for power generation and industrial use.

ExxonMobil is progressing 12 million tonnes per year of low-cost liquefied natural gas (LNG) supply opportunities to meet the growing global demand. This includes potential projects in Papua New Guinea (PNG), Mozambique and in the United States. As one of the largest natural gas producers in the U.S. and a significant producer of LNG around the world, the Company is well positioned to meet the future demand for these resources.

Rising oil demand will be driven by commercial transportation and the chemical industry's use of oil as a feedstock; fuel demand for light-duty vehicles is expected to decrease, reflecting efficiency improvements and growth in alternative fuels.



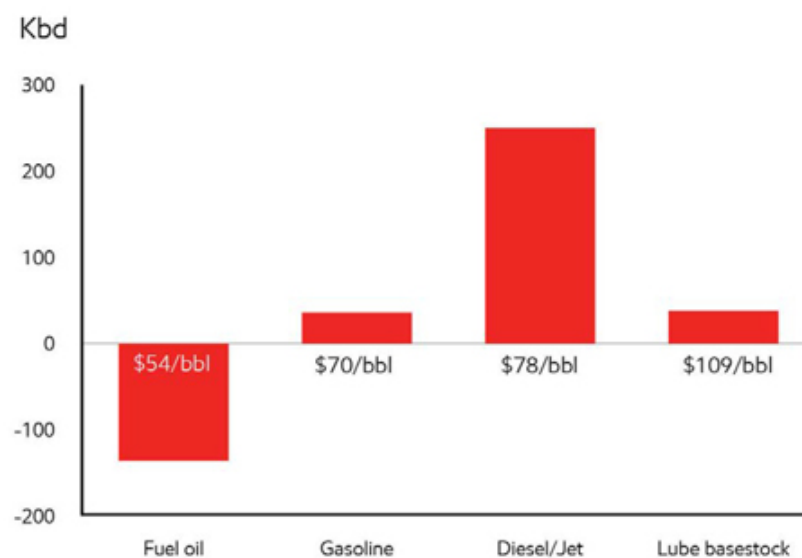
A tanker being loaded with LNG at ExxonMobil's terminal in Papua New Guinea.

Downstream

Global demand for commercial transportation fuels, higher-value lube basestock grades, and finished lubricants is expected to grow, while worldwide gasoline demand will likely peak and then begin declining. Over the past several decades, through the application of advantaged technologies, capital redeployment and divestment, ExxonMobil has created a resilient portfolio of manufacturing sites. Portfolio improvement activity included the divestment of 22 of 43 refinery sites since 2000. In addition, competitiveness has been improved by co-locating approximately 80 percent of refining capacity with chemical or lube basestock manufacturing. ExxonMobil's average refinery throughput is 75 percent larger than industry providing economies of scale for lower cost transportation fuel production. The Company invests in advantaged, integrated assets with proprietary process and catalyst technology to improve the yield of high-value products consistent with demand trends. This continuous high-grading of the portfolio has positioned the Company's downstream business to remain competitive across a wide range of future scenarios (see chart below).

ExxonMobil's downstream product shift

2027 vs. 2017



All columns reflect 2019 prices: Platts, Argus and IHS

Chemical

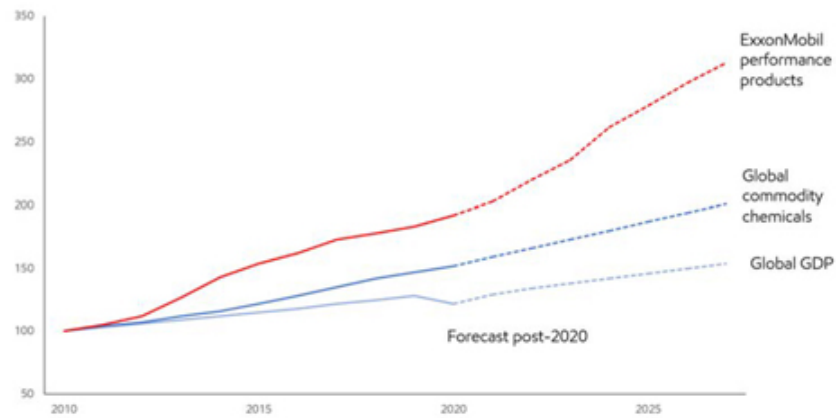
Worldwide demand for chemicals is expected to rise by approximately 40 percent by 2030, underpinned by global population growth, an expanding middle class and demand for increased living standards. These factors, together with a recognition of the lower greenhouse gas emissions of plastics versus alternatives,¹ correspond to an increase in demand for a variety of everyday products, from food packaging to appliances, vehicle parts to clothing. Many of **ExxonMobil's chemical products** help customers reduce their greenhouse gas emissions by making cars lighter and more fuel efficient, improving recyclability and extending products' shelf life, therefore, reducing waste. Due to robust growing demand, the Company's investment strategy is targeted at high-value sectors with approximately 70 percent of new planned capacity additions focused on its performance products (see chart below).

Potential new areas of investment

In addition to major capital investments in base business lines, the Company is also investing in significant research and development (R&D) programs that will create potential opportunities to enhance and expand its portfolio. These programs include R&D efforts in **CCS**, hydrogen, **advanced biofuels** and **energy-efficient manufacturing**.

Performance product sales growth

volume, indexed



¹ Lower overall greenhouse gas emissions of plastics over alternatives is over the full life cycle of the plastic. American Chemistry Council (ACC), 2018. *Life cycle impacts of plastic packaging compared to substitutes in the United States and Canada, theoretical substitution analysis*. Prepared by Franklin Associates for ACC. <https://plastics.americanchemistry.com/Reports-and-Publications/LCA-of-Plastic-Packaging-Compared-to-Substitutes.pdf>

Energy and Carbon Summary

Developing and deploying scalable technology solutions

Report

April 19, 2021

ExxonMobil's sustained investment in R&D plays an important role in positioning the Company to develop next generation solutions and progress breakthroughs in areas such as **carbon capture, biofuels and energy-efficient process technology**. These solutions are critical to addressing the risks of climate change, and have the potential to be used across multiple sectors including the power, industrial and long-distance heavy-duty transportation sectors.

33 members of National Academies of Science and Engineering awarded

A variety of disciplines in science and engineering are needed to provide affordable and scalable energy. ExxonMobil employs 20,000 scientists and engineers, including more than 2,000 Ph.D.s, who have a wide range of capabilities. The Company's scientists have authored more than 1,000 peer-reviewed publications and been awarded more than 10,000 patents over the past decade. ExxonMobil's patent portfolio is overseen by management to ensure an efficient and effective process is utilized to steward intellectual property.

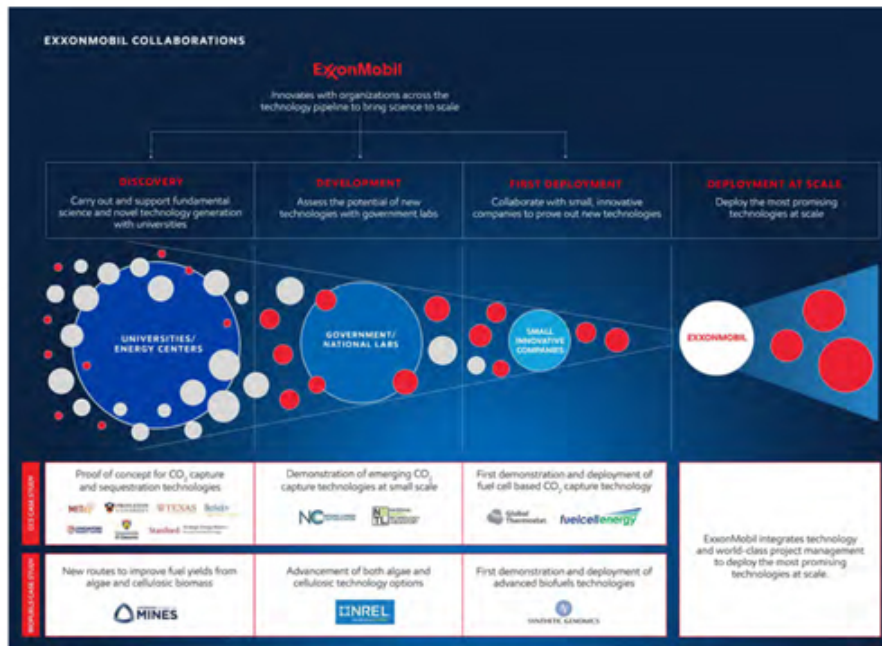
ExxonMobil collaborates around the world with over 80 universities, five energy centers, and U.S. national laboratories to advance emerging energy technologies. In 2019, the Company formed a research partnership with the U.S. Department of Energy and is working with the National Renewable Energy Laboratory and the National Energy Technology Laboratory to accelerate development of areas such as carbon capture and biofuels technologies. In addition, ExxonMobil became the first energy company to join the IBM Quantum Network to explore the future potential for quantum computing to solve real-world energy problems faster or more efficiently than classical computing.

ExxonMobil has worked with companies such as FuelCell Energy to facilitate development and deployment of lower-cost **carbon capture technologies**, and with biological experts at Synthetic Genomics Inc. (SGI) to develop renewable fuels. The Company's strengths in science and engineering across the innovation pipeline, combined with **extensive collaborations, provide a unique position to progress energy solutions from lab to scale.**

29 fellows of American Association for the Advancement of Science awarded

The Company actively monitors emerging and impactful technologies, including solar, wind, nuclear and natural sinks, which are a natural means of removing carbon from the atmosphere. Much of this is undertaken through academic collaborations, which help inform and identify potential future opportunities.

ExxonMobil has demonstrated its commitment to R&D through various price cycles and delivered a number of energy innovations. While deployment at scale takes time, the Company is confident it will be at the forefront of many future innovations to meet growing demand for energy with lower emissions.



Carbon capture and storage

Carbon capture and storage (CCS) is the process of capturing CO₂ that would have otherwise been emitted to the atmosphere from industrial facilities and power plants, transporting the captured CO₂ to a carefully selected storage site and then injecting the CO₂ into deep geologic formations for safe, secure and permanent storage. Direct air capture uses advanced materials to capture CO₂ from the atmosphere so that it can be stored in geological formations.

CCS is one of the most important low-carbon technologies required to achieve societal climate goals at the lowest cost. The Intergovernmental Panel on Climate Change (IPCC) estimated in its Fifth Assessment Report that the cost of achieving a 2°C outcome would increase by 138 percent if CCS were not included in the set of decarbonization solutions.¹ CCS is generally recognized as one of the only technologies that can enable negative emissions, via bio-energy with CCS (BECCS) or direct air capture methods. In many low-carbon transition scenarios, negative emissions technologies are needed to reduce atmospheric CO₂ concentration. CCS is also one of the only technologies that could enable some industry sectors to decarbonize, including the refining, chemicals, concrete and steel sectors. This could be achieved by directly capturing CO₂ emissions from these industrial sources or by using CCS in conjunction with hydrogen production to provide decarbonized fuel to these processes. [Click here for more information on the role of CCS under the IPCC Lower 2°C scenarios.](#)

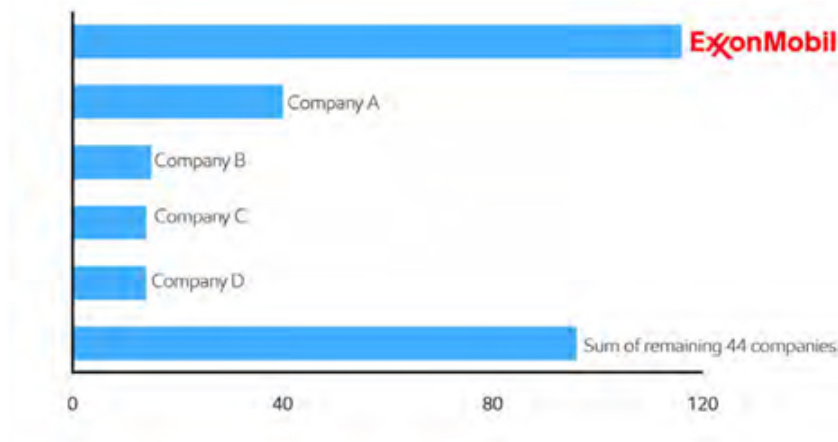
ExxonMobil is a global leader in **CCS** and has more than 30 years of experience **developing and deploying CCS technologies.** The Company has equity share of about one-fifth of the world's CO₂ capture capacity,² and has projects operating in the United States, Australia and Qatar. ExxonMobil's annual carbon capture capacity is about 9 million tonnes, the equivalent emissions of approximately 2 million passenger vehicles per year. Since CCS began in the early 1970s, ExxonMobil has cumulatively captured more CO₂ than any other company, accounting for approximately 40 percent of all the anthropogenic CO₂ that has ever been captured.³ The Company is working to expand capacity and is evaluating multiple opportunities that have the potential to be commercially attractive through the convergence of supportive policy and technology.

In the Netherlands, ExxonMobil is working to advance both the Port of Rotterdam CO₂ Transportation Hub and Offshore Storage (**PORTHOS**) project and the H-Vision study in the Rotterdam industrial area. With potential support from the European and Dutch governments, the initiatives could position ExxonMobil's Rotterdam refinery as an attractive location for a hydrogen project with CCS and for pilot testing ExxonMobil's

carbonate fuel cell technology. The Company is also researching more cost-effective approaches for deployment of direct air capture at scale, see below.

Cumulative CO₂ capture volume since 1970*

million tonnes



*Global CCS Institute. Data updated as of April 2020 and based on cumulative anthropogenic carbon dioxide capture volume. Anthropogenic CO₂, for the purposes of this calculation, means CO₂ that without carbon capture and storage would have been emitted to the atmosphere, including, but not limited to: reservoir CO₂ from gas fields; CO₂ emitted during production and CO₂ emitted during combustion. It does not include natural CO₂ produced solely for enhanced oil recovery.

ExxonMobil carbon capture capacity

(Equity, CO₂-equivalent emissions million tonnes per year)



In Belgium, ExxonMobil is part of a consortium at the Port of Antwerp, Europe's largest integrated energy and chemicals cluster, that is evaluating the feasibility of a cross-border collaboration to build CCS capacity and infrastructure. The Company is also progressing a potential expansion at its capture facility in LaBarge, Wyoming.

In addition, ExxonMobil supports multiple leading organizations that are working to accelerate CCS. Through its membership in the Oil & Gas Climate Initiative (OGCI), ExxonMobil is progressing the carbon capture, utilization and storage (CCUS) Kick-Start initiative to support large-scale commercial deployment of CCS via multiple low-carbon industrial hubs. ExxonMobil is also sharing its CCS expertise through participation in the Zero Emissions Platform (ZEP), which advises the European Union on the deployment of CCUS under the Commission's Strategic Energy Technologies

Plan. The ZEP was founded in 2005 and is a coalition of stakeholders united in the support for CCS as a key technology for addressing climate change.

As noted in **last year's Energy & Carbon Summary**, ExxonMobil contributed to the National Petroleum Council's report on at-scale deployment of CCS. The Council's policy, regulatory and legal recommendations set out a road map for accelerating the deployment of CCS investment in the United States. Alongside the Energy Advance Center and other organizations advocating for CCS policy, ExxonMobil worked throughout 2020 to advance many of the Council's recommendations, including seeking important clarifications to the Internal Revenue Code Section tax credit that is critical to promoting new CCS investment.

While focused on deploying existing technology in the near term where supportive policy exists, ExxonMobil also recognizes the longer-term need for new technologies to lower the cost of deployment. In 2019, the Company extended its relationship with FuelCell Energy to further develop carbonate fuel cell system technology for the purpose of capturing CO₂ from power plants and industrial facilities. The research by ExxonMobil and FuelCell Energy indicates this technology has the potential to capture CO₂ much more efficiently than conventional technologies, while at the same time producing hydrogen and electricity. To further progress this technology, ExxonMobil is working to prove this technology at scale through a demonstration unit at its Rotterdam refinery mentioned above.



FuelCell Energy reports its 14.9MW fuel cell platform in Bridgeport, Connecticut, has provided clean and reliable power since 2013.

The Company is also working with TDA Research in Golden, Colorado, to co-develop a new carbon capture adsorption process. The technology has the potential to offer several advantages over conventional approaches by reducing energy-intensive process steps. The technology has been tested at the National Carbon Capture Center (U.S. Department of Energy-sponsored research facility), and achieved up to 90 percent CO₂ capture from flue gas.⁴ Together with the University of California, Berkeley and the Lawrence Berkeley National Laboratory (LBNL), ExxonMobil published joint research in the peer-reviewed journal *Science* on the discovery of another new technology that could potentially capture more than 90 percent of CO₂ and could prove up to six times more effective than conventional approaches.⁵

In addition, the Company is exploring the potential to capture CO₂ directly from the air. When combined with geologic storage of CO₂, direct air capture could provide a path to negative emissions. In 2020, ExxonMobil extended a joint development agreement with Global Thermostat to further explore the process fundamentals and potential pathways to large-scale deployment of direct air capture technology. While more research and development is still required, direct air capture could have a significant role to play in global decarbonization efforts.



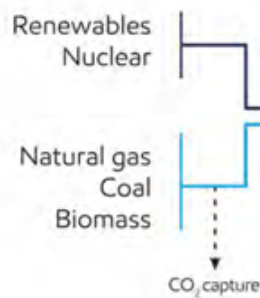
Global Thermostat direct air capture pilot unit.

Low-carbon hydrogen

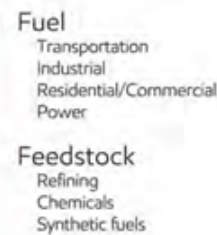
Hydrogen (H₂), as a low-carbon energy carrier, has received a great deal of attention recently. ExxonMobil expects future policies to incentivize low-carbon H₂ for a variety of clean energy applications. Low-carbon H₂ can be produced from low-carbon electricity via electrolysis of water, natural gas reforming coupled with CCS, or by other processes. Hydrogen can be useful in hard-to-decarbonize sectors, such as fuel for heavy-duty trucks and to produce high temperature industrial heat for steel, refining and chemical industries.⁶ Low-carbon H₂ from natural gas with CCS has cost and scale advantages compared to H₂ from electrolysis in the near and medium term.^{7,8} As a world leader in both natural gas production and CCS, ExxonMobil is well positioned to play an important role in this potential area of the energy transition.

Low-carbon hydrogen in the energy system

Primary energy



Energy uses



Advanced biofuels

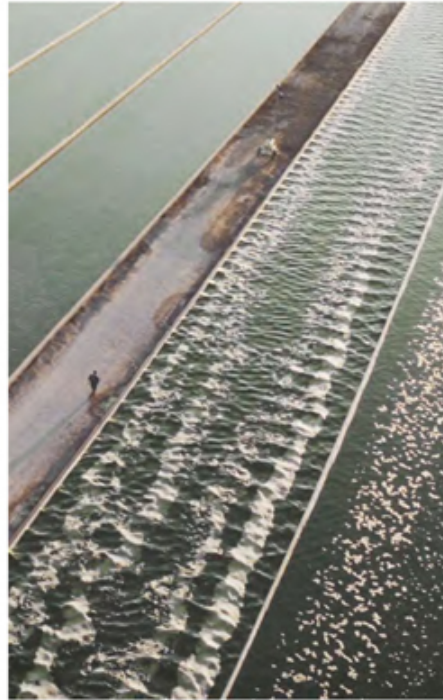
Heavy-duty transportation (trucking, aviation and marine) requires fuels with a high energy density that liquid hydrocarbons provide. The need for an energy-dense fuel could make certain alternatives, such as battery power, poorly suited for this sector. **Biofuels, such as those derived from algae**, have the potential to be a scalable solution and deliver the required energy density in a liquid form that could reduce greenhouse gas emissions by more than 50 percent compared to today's heavy-duty transportation fuels.⁹ ExxonMobil continues to progress research to transform algae and cellulosic biomass into liquid fuels (biofuels) for the transportation sector.

Together with Synthetic Genomics Inc., ExxonMobil has improved strains of algae that use CO₂ and sunlight to produce energy-rich bio-oil, which can then potentially be

processed at existing refineries, similar to crude oil, into renewable fuels. A key focus is developing novel genetic tools to overcome inherent inefficiencies in photosynthesis and improve bio-oil production. Needed biology modifications to the algae continue to be progressed, and the project team has demonstrated increased production in outdoor algae ponds.

Through key collaborations, ExxonMobil has also made significant progress that has more than doubled the yield of biodiesel from a variety of cellulosic sugars. Work with the national labs and academic institutions is helping to address the most challenging issues of scale for cellulosic biofuels and the Company continues to evaluate a wide range of options in this space.

In 2020, ExxonMobil signed an agreement with Global Clean Energy Holdings to purchase 2.5 million barrels of renewable diesel per year for five years, starting in 2022. The renewable diesel will be sourced from a refinery acquired by Global Clean Energy that is being repurposed to produce renewable diesel. In addition, the Company has completed a sea trial of ExxonMobil's first bio-based marine fuel, which can provide up to approximately 40 percent CO₂ emissions reduction compared to conventional marine fuels.



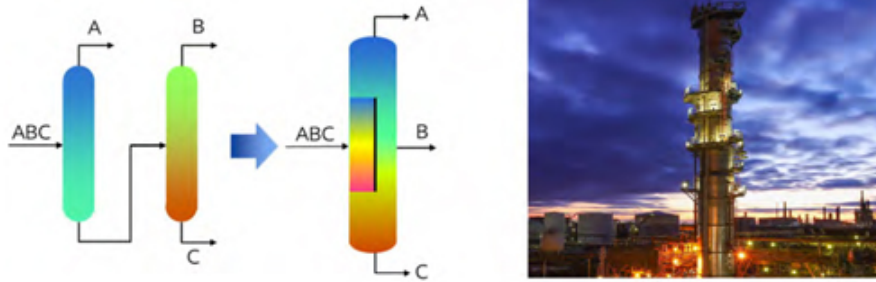
Process development to first deployment at Synthetic Genomics Inc. CAAF (California Advanced Algal Facility), in Calipatria, California.

Energy-efficient manufacturing

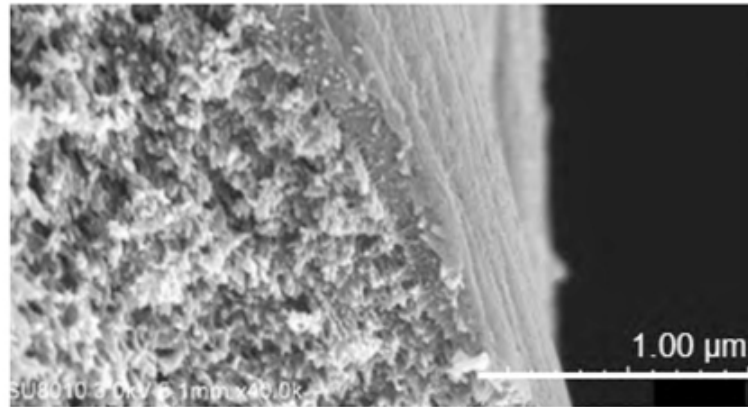
Taking the emissions out of manufacturing

The manufacturing sector of the economy – which produces fuel, plastic, steel, cement, textiles and other building blocks of modern life – accounts for about one-third of the world's energy-related CO₂ emissions.

Demand for industrial products is expected to grow as economies expand and standards of living rise in the developing world. **To meet this demand, the world will need manufacturing solutions that are more energy- and greenhouse gas-efficient than those currently available.** Since 2000, ExxonMobil has reduced and avoided nearly 350 million tonnes of its emissions through its energy efficiency and cogeneration projects and continues to target research in equipment design, advanced separations, catalysis and process configurations as part of broader efforts to develop energy-efficient manufacturing.



Concept of divided wall columns is applied to provide energy and capital savings by combining a series of distillation towers into one, as demonstrated at the Fawley Refinery xylene tower in the U.K.



Depiction of the surface of a molecular membrane. Membranes could enable the transition from high-energy to low-energy processes.

Energy-efficient manufacturing efforts

Rethinking equipment design: New equipment design may provide a step-change reduction in energy use even in traditional separation processes like distillation. For instance, use of divided wall columns – a concept discovered and developed by ExxonMobil – can combine a series of distillation towers into one, thereby providing significant energy and capital cost savings. Energy savings on the order of 50 percent were demonstrated at ExxonMobil’s Fawley Refinery in the U.K.¹⁰

Reimagining separations: ExxonMobil scientists and researchers from Georgia Institute of Technology and Imperial College London are working together on membrane technologies that could reduce carbon dioxide emissions and lower the energy required in refining thermal (distillation) processes. Research results published in the peer-reviewed journal *Science*¹¹ demonstrate the potential for non-thermal fractionation of light crude oil through a combination of class- and size-based “sorting” of molecules. Initial prototypes have shown that with gasoline and jet fuel they are twice as effective as the most selective commercial membranes in use today.

Life cycle analysis

Life cycle analysis (LCA) is the preferred scientific method to estimate the environmental impact of energy processes and products. It is important to include all emissions across the life cycle of each option when comparing different energy technologies. Every step that emits any type of greenhouse gas must be included to properly estimate the total emissions footprint. This includes emissions associated with production of the resource, conversion and transportation steps, and lastly, consumption of the fuel by the end user (e.g., in a vehicle or in a power plant).

ExxonMobil has been working with the MIT Energy Initiative to develop a new LCA tool that covers pathways of multiple technologies representing the majority of greenhouse gas emissions. This tool, called the Sustainable Energy System Analysis Modeling Environment (SESAME¹²), is based on well-referenced peer-reviewed sources in the public domain and can 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 have meaningful impact, greenhouse gas mitigation technologies must also be cost-effective. The use of techno-economic analysis (TEA) helps determine the most impactful and cost-effective ways to meet global energy needs while reducing greenhouse gas emissions. TEA also helps to transparently inform policy development.

TEA is currently being added to the SESAME model. Once completed, SESAME will compare both the emissions and costs of energy technologies across all sectors in a system-wide setting. It will be publicly available as a transparent and open-source web tool designed for both experts and general users.



Pictorial example of one pathway included in the SESAME tool: natural gas production and power generation to the end use in an electric vehicle.

¹ Edenhofer, O. et al (2014) *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.*
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

² *Global CCS capacity: Global CCS Institute, Global Status of CCS 2020, page 19.*
 ExxonMobil CCS capacity: ExxonMobil estimates.

³ *Global CCS Institute. Data updated as of April 2020 and based on cumulative anthropogenic carbon dioxide capture volume. Anthropogenic CO₂, for the purposes of this calculation, means CO₂ that without carbon capture and storage would have been emitted to the atmosphere, including, but not limited to: reservoir CO₂ from gas fields; CO₂ emitted during production and CO₂ emitted during combustion. It does not include natural CO₂ produced solely for enhanced oil recovery.*

⁴ *TDA Research, Pilot unit testing at NCCC of sorbent based CO₂ capture project, October 2020.*
https://netl.doe.gov/sites/default/files/netl-file/20VPRCC_Elliott.pdf

⁵ E. Kim, R. Siegelman, H. Jiang, A. Forse, J-H. Lee, J. Martell, P. Milner, J. Falkowski, J. Neaton, J. Reimer, S. Weston, J. Long, *Cooperative carbon capture and steam regeneration with tetraamine-appended metal-organic frameworks, Science 369 (6502) (2020) 392-396.*

⁶ *IEA, World Energy Outlook 2020, p. 122.*

⁷ *Goldman Sachs, Carbonomics: The Rise of Clean Hydrogen, July 2020.*

⁸ *IEA, The Future of Hydrogen - Seizing today's opportunities, June 2019.*

⁹ ExxonMobil estimates.

¹⁰ *B. Slade, B. Stober, D. Simpson, Dividing wall column revamp optimises mixed xylenes production, IChemE, Symposium Series No. 152, (2006).*

¹¹ *K. Thompson, R. Mathias, D. Kim, J. Kim, N. Rangnekar, J. Johnson, S. Hoy, I. Bechis, A. Tarzia, K. Jelfs, B. McCool, A. Livingston, R. Lively, M. Finn, N-Aryl-linked spirocyclic*

polymers for membrane separations of complex hydrocarbon mixtures, Science 369 (6501) (2020) 310-315.

¹² 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.*

Energy and Carbon Summary**Mitigating emissions in Company operations**

ExxonMobil has a robust set of processes to improve energy efficiency and mitigate emissions, including programs focused on reducing methane emissions, flaring and venting. These processes include, where appropriate, setting tailored objectives at the business, site and equipment level, and then stewarding progress toward meeting those objectives. This rigorous approach is effective to promote efficiencies and reduce greenhouse gas emissions in operations while striving to achieve industry-leading performance.

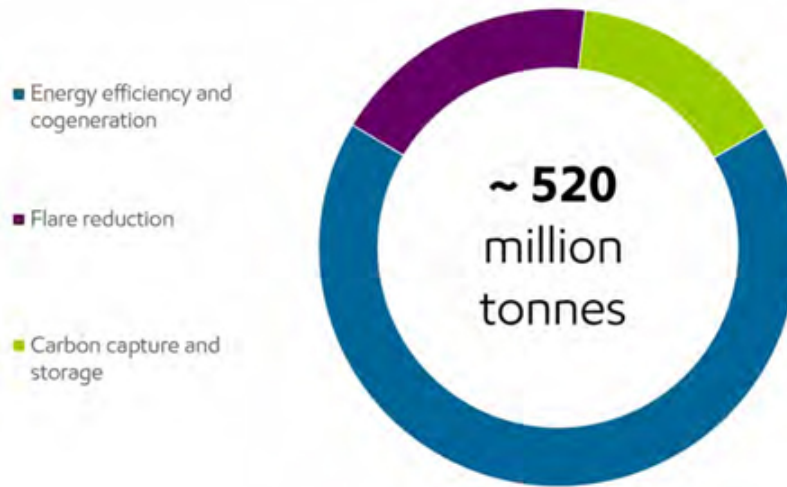
Report
April 19, 2021

ExxonMobil's greenhouse gas emissions have declined approximately 13 percent (see chart below) from 2011 to 2020. The greenhouse gas emissions from the base facilities that were in operations in 2011 have decreased nearly 27 percent (approximately 33 million tonnes), primarily due to portfolio optimization; energy efficiency improvements; reductions in flaring, venting and fugitive emissions; and the impact on the company's operations due to COVID-19. Meanwhile, the greenhouse gas emissions from acquisitions, expansions, new developments and facilities (shown as growth projects) was approximately 20 percent of total emissions in 2020.

The greenhouse gas emissions from the electricity used in ExxonMobil's operations represents more than 10 percent of net equity greenhouse gas emissions, and therefore, using energy more efficiently is a powerful tool to reduce emissions. An effective way to increase efficiency is through cogeneration, a process that simultaneously produces electricity while capturing useful heat or steam for industrial uses. ExxonMobil has interest in approximately 5,500 megawatts of cogeneration capacity in more than 100 installations around the world and is continuing to pursue additional economic cogeneration opportunities. In late 2020, a cogeneration unit began operating at the Strathcona refinery in Canada. It produces approximately 41 megawatts of power and is estimated to reduce greenhouse gas emissions by approximately 112,000 tonnes per year versus separate steam and power generation – the equivalent to taking nearly 24,000 vehicles off the road.

ExxonMobil estimated Scope 1 greenhouse gas emissions reduced and avoided¹

(Net equity, CO₂-equivalent emissions cumulative since 2000, millions tonnes)



ExxonMobil estimated Scope 1 & 2 greenhouse gas emissions¹

(Net equity, CO₂ -equivalent emissions, million tonnes)



¹ Calculations are based on the guidance provided in API's Compendium of Greenhouse Gas Emission Estimation Methodologies for the Oil and Gas Industry and IPIECA's Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions. Greenhouse gas emissions are reported on a net equity basis for business operations, demonstrating a share of emissions from any facility or operation in which ExxonMobil holds a financial interest, with the share reflecting the equity interest.

520 million tonnes of CO₂ emissions is equivalent to approximately 110 million passenger vehicles driven for one year according to the the U.S. EPA greenhouse gas equivalences calculator <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Energy and Carbon Summary

Metrics and targets

ExxonMobil has established programs to drive improvements in energy efficiency and mitigate greenhouse gas emissions.

These programs are supported by key performance metrics, which are utilized to identify and prioritize opportunities to drive progress.

Report

April 19, 2021

Exceeded 2020 reduction goals; progressing further greenhouse gas reductions

By the end of 2020, ExxonMobil delivered on its goal to significantly reduce methane emissions and flaring versus 2016 levels. The Company's goals included a 15 percent reduction in methane and a 25 percent reduction in flaring. Both goals were achieved through targeted improvements at facilities in the United States, Equatorial Guinea, Angola and Nigeria, eliminating approximately 6 million tonnes of CO₂ equivalent emissions (CO₂e).

New CCS deployment captured an additional 500,000 tonnes of CO₂e in Australia and Qatar in 2019. Through the Company's energy management systems, including the application of cogeneration, greater than 1 million tonnes of CO₂e were avoided from 2015 through 2020.

In 2018, ExxonMobil announced two 12-year agreements with Lincoln Clean Energy for the purchase of 500 MWs of wind and solar electricity. Sage Drew, the operator of the wind facilities, began generating power to the electricity grid in Texas (ERCOT) in December of 2019; and the solar plant is currently active. Both plants are expected to avoid approximately 800,000 tonnes of CO₂ per year by replacing 70 percent of power purchased by the Company from the ERCOT grid with carbon-free power. Additional power purchase agreements are being evaluated around the world.

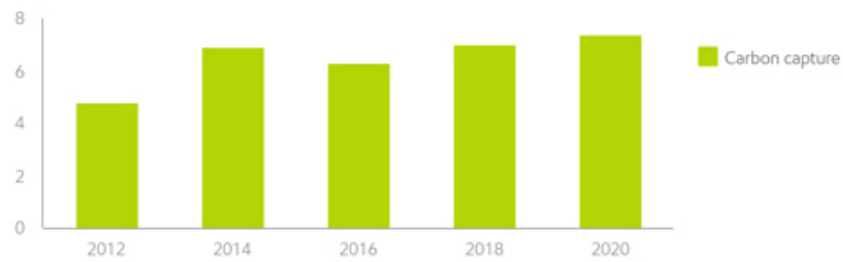
Since 2000, ExxonMobil has invested over \$10 billion in projects to research, develop and deploy lower-emission energy solutions. ExxonMobil also continues to expand collaborative efforts with other companies and academic institutions. See **Developing and deploying scalable technology solutions** for more information on these collaborations.



ExxonMobil has interests in more than 100 cogeneration facilities around the world, with the latest unit recently completed at Imperial's Strathcona refinery in Alberta, Canada.

Greenhouse gas emissions avoided from carbon capture*

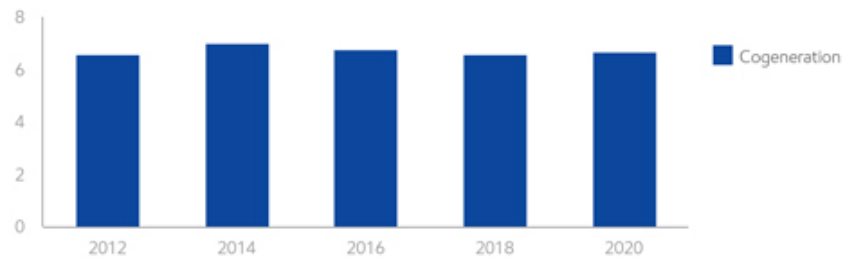
(Net equity, CO₂-equivalent emissions million tonnes per year)



*ExxonMobil estimates

Greenhouse gas emissions avoided from cogeneration*

(Net equity, CO₂-equivalent emissions million tonnes per year)



*ExxonMobil estimates

UP CLOSE

Taking actions to reduce methane emissions

ExxonMobil is committed to reducing methane emissions in its operations, as well as advancing technology and policy to make progress across our industry in a cost-effective manner.

Operations

ExxonMobil implemented a program across its U.S. unconventional production to reduce methane emissions from new and existing sources by:

- Enhancing leak detection and repair surveys
- Phasing out high-bleed pneumatic devices
- Monitoring liquid unloadings to avoid unplanned releases
- Improving facility designs

- Furthering training programs for operations management, superintendents, foremen, facility engineering personnel and those involved in leak inspections

In addition, the Company continues to mature and operationalize research and technology developments in these areas. For example, emerging aircraft leak detection is now part of routine monitoring campaigns. Continuous monitoring approaches are also under development.

Since initiating its voluntary methane reduction program, the Company has conducted nearly 23,000 leak surveys on more than 5.2 million components at more than 9,500 production sites. High-bleed pneumatic devices have been eliminated across U.S. unconventional production as of 2020. As a result of these actions, U.S. unconventional methane emissions have been reduced by approximately 34 percent as of 2020, compared to 2016, which is equivalent to about 63,000 tonnes.

Advocacy

ExxonMobil respects and supports society's ambition to achieve net-zero emissions by 2050, and continues to advocate for policies that promote cost-effective solutions to address the risks of climate change. In this regard, ExxonMobil submitted a letter to the U.S. Environmental Protection Agency rulemaking docket indicating support for reasonable, cost-effective regulations to manage methane emissions from new and existing sources. ExxonMobil submitted a similar statement to the European Commission as it was developing a methane strategy for the European Union. The Company also published a model framework for industry-wide methane regulations and urged stakeholders, policymakers and governments to develop comprehensive, enhanced rules to reduce emissions in all phases of production and across the full natural gas value chain.

In addition, ExxonMobil was a founding member, and remains highly involved in the **Methane Guiding Principles**¹ – an international multi-stakeholder initiative now comprising more than 20 companies and 15 supporting organizations that work together to address methane emissions across the full natural gas value chain. Under the Methane Guiding Principles, ExxonMobil is a primary sponsor of the IEA's **Methane Tracker**,² a web-based information portal that provides information on global emissions, mitigation measures, and regulatory approaches. The Company also participates in the Methane Guiding Principles' non-operated joint venture and policy-related work streams.

ExxonMobil supports strong measurement, reporting and verification standards as part of a broad suite of regulations to address oil and natural gas related methane emissions. To that end, the Company is actively engaged with organizations such as the Oil and Gas Climate Initiative, the Collaboratory for Advancing Methane Science, the Environmental Partnership, and the Methane Guiding Principles, mentioned previously, to continue to improve the accuracy and transparency of how industry approaches methane emissions measurement, reporting and verification. ExxonMobil participates in the recently formed International Association of Oil & Gas Producers/IPIECA/OGCI Task Force for Recommended Practices for Methane Emission Detection & Quantification Technologies.

ExxonMobil is also working with trade associations to encourage consensus on the need to develop policy positions and/or best practices on methane emissions inventory and management, as well as technology and innovation, most recently for example, with the American Exploration & Production Council (AXPC), the Natural Gas Supply Association (NGSA) and the Argentinean Institute for Oil and Gas (Instituto Argentino del Petróleo y del Gas, IAPG).

UNCONVENTIONAL PRODUCTION PROGRESS

~34%

methane reduction across U.S. unconventional production as of 2020

UNCONVENTIONAL PRODUCTION PROGRESS

~100%

high-bleed pneumatic devices phased out across U.S. unconventional production as of 2020

Research and technology

Reducing methane emissions in oil and natural gas operations is an important way to reduce global greenhouse gas emissions. Advances in technology can help detect and identify the sources, and improve the ability to respond quickly.

ExxonMobil is working to find new and better ways to monitor and **reduce methane emissions through a new collaboration, known as Project Astra**, involving universities, environmental groups and other industry partners. Together, the partners are working to develop an innovative sensor network in Texas that continuously monitors methane emissions across large areas to enable quick and efficient detection and repair of leaks. This high-frequency monitoring system will enable operators to more efficiently direct resources to a specific location and could provide a more affordable, efficient solution to reduce methane emissions.

In addition, the Company is testing novel analytical systems that can be deployed in helicopters, airplanes and drones to detect fugitive emissions. The Company is also exploring the use of satellite surveillance where data can be regularly updated each time satellites orbit the earth. These technology investments complement the Company's voluntary methane management program that includes structured leak detection and repair protocols, prioritized replacement of high-bleed pneumatic devices, and infrastructure enhancements.

ExxonMobil's greenhouse gas emission reduction plans

The Company recently announced plans to further **reduce greenhouse gas emissions** in its operations by 2025, compared to 2016 levels, while aiming for industry-leading greenhouse gas performance across its businesses by 2030. The 2025 plans include a 15 to 20 percent reduction in greenhouse gas intensity of upstream operations. The reductions will be supported by a 40 to 50 percent reduction in methane intensity; and a 35 to 45 percent reduction in flaring intensity. The Company also plans to eliminate routine flaring by 2030 in upstream operations, as defined by the World Bank.

The 2025 emission reduction plans include actions that are expected to reduce absolute greenhouse gas emissions by an estimated 30 percent for the Company's upstream business. Similarly, absolute flaring and methane emissions are expected to decrease by 40 to 50 percent. ExxonMobil's emission reduction plans cover Scope 1 and Scope 2 emissions from assets operated by the Company.

Actions will include deploying industry-leading best practices such as increased leak detection and repair, the application of advanced technologies to improve inspections, and improved facility designs including the phase out of high-bleed pneumatic devices. See **Taking actions to reduce methane emissions** above for more information.

ExxonMobil's emission reduction plans will leverage the continued application of operational efficiencies, ongoing development and deployment of lower-emission technologies, such as carbon capture, and through additional purchases of renewable electricity for its operations.



ExxonMobil is working to find new and better ways to monitor and reduce methane emissions, including in its Permian operations.

Greenhouse gas emissions performance data

ExxonMobil assesses its performance to support continual improvements throughout the organization. Since 2011, performance data include unconventional operations information. In 2014, the Company started reporting data over a 10-year period to demonstrate trends over time as part of a commitment to transparency. The reporting guidelines and indicators of IPIECA, the International Oil and Gas Producers Association and the American Petroleum Institute Oil and Gas Industry Guidance on Voluntary Sustainability Reporting (2015) informed what data are included in the performance table.

	2020*	2019	2018	2017	2016	2015	2014	2013	2012	2011
Managing the risks of climate change ³										
⁴ Greenhouse gas emissions, absolute (net equity, CO ₂ -equivalent emissions), millions of tonnes	112	118	123	122	124	122	124	127	126	128
⁵ Direct (excluding emissions from exported power and heat)	105	110	115	113	116	114	116	119	118	119
⁶ Emissions associated with imported power	7	8	8	8	8	8	8	8	8	9
CO ₂ (excluding emissions from exported power and heat)	107	112	115	115	116	114	116	119	120	124

Methane (CO ₂ -equivalent)	5	6	8	7	7	7	7	7	5	3
Other gases (CO ₂ -equivalent)	<1	<1	<1	<1	1	1	1	1	1	1
Emissions from exported power and heat	3	3	3	3	3	4	8	16	15	15
⁴Greenhouse gas emissions, normalized (net equity, CO₂-equivalent emissions), tonnes per 100 tonnes of throughput or production										
Upstream	24.0	24.8	26.6	25.8	25.8	25.5	24.2	23.2	22.3	20.7
Downstream	20.4	19.1	18.6	18.6	19.4	18.9	19.2	19.7	19.6	20.0
Chemical	53.5	55.0	54.3	54.2	53.9	54.8	54.5	57.9	56.3	57.2
By-region greenhouse gas emissions (net equity, CO₂-equivalent emissions), millions of tonnes										
Africa/Europe/Middle East	34	36	42	43	44	44	43	44	44	45
Americas	64	65	63	63	64	65	66	70	68	66
Asia Pacific	14	17	18	16	16	13	15	13	14	17
By-division greenhouse gas emissions (net equity, CO₂-equivalent emissions), millions of metric tons										
Upstream	50	54	58	58	58	56	57	58	56	54
Downstream	40	41	42	42	45	45	47	49	51	54
Chemical	22	23	23	22	21	21	21	20	19	20
Carbon dioxide – captured for storage, millions of tonnes	7.4	6.8	7.0	6.6	6.3	6.9	6.9	5.9	4.8	5.0
Energy use (billion gigajoules)	1.5	1.5	1.5	1.4	1.5	1.5	1.4	1.4	1.5	1.5
Upstream (gigajoules per tonnes production)	2.5	2.5	2.6	2.5	2.4	2.4	2.3	2.1	2.0	2.0
Refining (gigajoules per tonnes throughput)	3.3	3.0	3.0	2.9	2.9	2.9	2.9	3.0	3.0	3.0
Chemical (gigajoules per tonnes product)	11.7	10.5	10.0	10.5	10.6	10.9	10.7	10.9	12.0	11.4
⁷Hydrocarbon flaring (worldwide activities), million standard cubic feet per day	320	430	410	410	530	560	460	390	380	430
⁸Cogeneration capacity in which ExxonMobil has interest, gigawatts	5.5	5.4	5.4	5.4	5.3	5.5	5.5	5.3	5.2	5.0

* 2020 performance data includes ongoing greenhouse gas emissions mitigation measures as well as impacts associated with COVID-19.

¹ <https://methaneguidingprinciples.org>

² <https://www.iea.org/reports/methane-tracker-2020>

³ ExxonMobil-operated emissions, reductions, and avoidance performance data are based on a combination of measured and estimated emissions data using reasonable efforts and collection methods. Calculations are based on industry standards and best practices, including guidance from the American Petroleum Institute (API) and IPIECA. There is uncertainty associated with the emissions, reductions, and avoidance performance data due to variation in the processes and operations, the availability of sufficient data, quality of those data and methodology used for measurement and estimation. Performance data may include rounding of subcategories. Changes to the performance data may be reported as part of the company's annual publications as new or updated data and/or emission methodologies become available. Emissions, reductions, and avoidance estimates from non-ExxonMobil operated facilities are also included in the equity data and similarly may be updated as part of the company's annual publications. ExxonMobil works with industry, including API and IPIECA, to improve emission factors and methodologies

⁴ The net equity greenhouse gas emissions metric was introduced in 2011 as a replacement for the direct equity greenhouse gas metric. Information has been restated back to 2009 according to the new metric. The net equity greenhouse gas metric includes direct and imported greenhouse gas emissions and excludes emissions from exports (including Hong Kong Power through mid-2014). ExxonMobil reports greenhouse gas emissions on a net equity basis for all business operations, reflecting its percent ownership in an asset.

⁵ The addition of direct emissions and emissions associated with exported power and heat is equivalent to World Resources Institute (WRI) Scope 1.

⁶ These emissions are equivalent to WRI Scope 2.

⁷ Flaring increased in 2019 due to start-up of growth projects in the Upstream and as a result of implementing measures to comply with new regulatory requirements in Downstream and Chemical manufacturing. The 2020 flaring reduction goal was met.

⁸ Cumulative figure.

Energy and Carbon Summary

Scope 3 emissions

ExxonMobil has publicly reported the Company's Scope 1 and Scope 2 greenhouse gas emissions data for many years. The 2025 emission reduction plans are based on Scope 1 and Scope 2 emissions and are projected to be consistent with the goals of the Paris Agreement.

ReportApril 19, 2021

Reporting Scope 1 emissions data (direct greenhouse gas emissions from Company operations) provides useful insight into the efficiency and emission-reduction performance of the Company's operations, portfolio of products, business sectors served and resource type.

Reporting Scope 2 emissions data (indirect greenhouse gas emissions from energy purchased by the Company) highlights the Company's choice of energy sources, primarily purchases of electricity to power its operations.

Noting that stakeholders have expressed growing interest in Scope 3 data, the Company is providing Scope 3 information in the table below and plans to do so on an annual basis. Scope 3 includes the indirect emissions resulting from the consumption and use of the Company's products.

Because Scope 1 and Scope 2 emissions are within the direct control of a company, the criteria for identifying and reporting them is well established, transparent and consistent across industries. Reporting Scope 3 emissions, however, is less certain and less consistent because it includes the indirect emissions resulting from the consumption and use of a company's products occurring outside of its control. Evaluating a company's Scope 3 emissions and comparing them to other companies can be challenging due to inconsistent reporting methodologies, as well as potential duplication, inconsistencies and inaccuracies that may occur when reporting emissions that are the result of activities from assets not owned or controlled by the reporting organization. The International Petroleum Industry Environmental Conservation Association (IPIECA) acknowledges these issues.¹

Furthermore, Scope 3 emissions do not provide meaningful insight into the Company's emission-reduction performance and could be misleading in some respects. For example, increased natural gas sales by ExxonMobil that reduce the amount of coal burned for power generation would result in an overall reduction of global emissions but would increase Scope 3 emissions reported by the Company.

Ultimately, changes in society's energy use coupled with the development and deployment of affordable lower-emission technologies will be required to drive meaningful Scope 3 emissions reductions.

To do its part and support society's ambition of net-zero emissions by 2050, ExxonMobil is committed to continuing to invest in new technologies that can potentially reduce emissions at scale. As highlighted throughout the *Energy & Carbon Summary*, the Company is focusing its competencies on developing breakthrough technology that could reduce emissions from the three sectors that emit 80 percent of all energy-related greenhouse gas emissions: power generation, industrial processes and commercial transportation. The Company is also partnering with governments, academia and industry to research and commercialize biofuels, direct air capture, and lower the cost of carbon capture and storage.

ExxonMobil's focus and commitment to supporting the goals of the Paris Agreement are further detailed in the forward-looking emission-reduction plans described in the **Metrics and Targets section**.

Estimated Scope 3 emissions from the use of ExxonMobil's crude and natural gas production for the year ending Dec. 31, 2020 as provided under IPIECA's Category 11 were 540 million tonnes.

Note: The table below provides ExxonMobil's Scope 3 estimates associated with the use of its natural gas and crude production in alignment with Category 11 of IPIECA's methodology, which contemplates accounting for products at the point of extraction, processing or sales. ExxonMobil's Scope 3 estimates represent three approaches for accounting and are not meant to be aggregated as this would lead to duplicative accounting.

For example, for completeness, the Scope 3 estimates associated with the combustion of the crude processed, produced or sold from ExxonMobil's refineries are provided; however, to avoid duplicative accounting, these Scope 3 estimates are not included in ExxonMobil's Scope 3 Category 11 total since the associated Scope 3 emissions would have been reported by the producer of those crudes.

ExxonMobil 2020 Scope 3 estimates

(Million tonnes CO₂-equivalent)

IPIECA Category 11 Scope 3		Upstream production	Refining throughput	Petroleum product sales
Natural gas production	170	540	600	650
Crude production	370			

Notes: Applied CO₂ Emission Factors were obtained from EPA or derived from API calculations; where applicable emission factors for specific fuel products were applied. Non-fuels products are not combusted by the end-user and therefore are not included in these Scope 3 estimates. IPIECA's Scope 3 methodology includes 15 categories of activities along each product's value chain. Due to lack of third-party data, Scope 3 emissions for categories other than Category 11 could not be estimated.

¹ IPIECA/API, 2016. *Estimating petroleum industry value chain (Scope 3) greenhouse gas emissions - Overview of methodologies*

Energy and Carbon Summary

Frequently asked questions

Report

April 19, 2021

✓ How are ExxonMobil's operations and investments aligned with the Paris Agreement?

ExxonMobil supports the goals of the Paris Agreement,¹ an agreement among national governments to reduce carbon emissions from their economies. The Company's *Outlook for Energy*, which informs its business strategy and investments, projects future energy supply and demand, and aligns in aggregate with the Nationally Determined Contributions (NDCs) submitted by Paris Agreement signatories, which outline each country's plans to reduce its emissions. ExxonMobil's greenhouse gas emission reduction plans announced in 2020 are projected to be on a pathway consistent with the goals of the Paris Agreement.

The Company's strategy focuses on the dual challenge of meeting the growing demand for energy to support economic development around the world while minimizing environmental impacts and the risks of climate change. ExxonMobil believes it has an important role to play in helping reduce climate risks through its commitment to manage operational emissions, produce cleaner, more advanced products, conduct fundamental research into new technology solutions, and engage in climate policy discussions.

Over the past two decades, ExxonMobil has invested more than \$10 billion to research, develop and deploy lower-emission energy solutions. These solutions have resulted in highly efficient operations that have eliminated or avoided approximately 520 million tonnes of greenhouse gas emissions. The Company continues to deploy its competencies in breakthrough technology development to pursue advances in the high-emission sectors where current technologies are insufficient to achieve deep reductions. These sectors – power generation, commercial transportation and industrial – represent about 80 percent of current energy-related CO₂ emissions and are projected to increase with population growth and economic development. Further advances in these areas are critical to reducing emissions and would make a meaningful contribution to achieving the goals of the Paris Agreement.

As governments around the world implement policies to meet their respective emission-reduction goals, demand for more carbon-intensive energy products will be reduced.

However, even under 2°C scenarios, a growing and increasingly prosperous global population will increase energy demand and still require significant investment in new supplies of oil and natural gas. The IEA's Sustainable Development Scenario (SDS) estimates the world will still need 66 million barrels of oil per day in 2040². However, without further investment, the impact of depletion would result in oil production of just 22 million barrels of oil per day in 2040.³ The IEA estimates \$12 trillion of additional oil and natural gas investment is needed to meet the oil and natural gas demand in the SDS.

Noting the Paris Agreement did not contemplate voluntary commitments from individual companies, and that advancing the goals of Paris can occur in a number of ways (including replacing more emission-intensive activities with less intensive activities), ExxonMobil's announced greenhouse gas plans are projected to be consistent with the goals of the Paris Agreement. For example, planned reductions in upstream emissions through 2025 would be consistent with the goals of a 2-degree pathway (which envisions a global emissions reduction of about 10 percent in 2025 versus 2016⁴).

✓ Does ExxonMobil have to reduce its production to align with the Paris Agreement?

The Paris Agreement does not contemplate or require individual companies to decrease production to align with the goal of maintaining global temperature rise to below 2°C. The structure of the agreement recognizes that energy-related emissions are driven by society's demand for energy – not its supply. Improved efficiency, effective government policies and informed consumer choices are more effective measures to address demand.

With respect to energy supply, production reductions by individual companies would have no impact on demand or consumption of energy, and would simply result in production shifting from one producer to another. In addition, shifting of production would not necessarily reduce the amount of greenhouse gases produced and, in some cases, the opposite could be true. The transfer of production from well-run, highly efficient operators to less-efficient producers, for example, could actually increase emissions associated with the production of oil and natural gas, and finished products. Society benefits when the most efficient operators lead energy development efforts.

ExxonMobil has a long history of industry-leading operational performance. For example, the Company's refining operations have consistently ranked in the top quartile for energy efficiency in the key refining industry benchmark survey by Solomon Associates.⁵ In ExxonMobil's chemical business, advanced efficiency technologies and techniques have reduced net equity greenhouse gas emissions intensity by nearly 8 percent between 2013 and 2020.

In addition, as of 2020 the Company reported over a 34 percent reduction in methane emissions in its U.S. unconventional production through a series of industry-leading best practices such as equipment upgrading and enhanced use of technology to improve inspections. ExxonMobil exceeded its goal to reduce company-wide methane emissions by 15 percent and flaring by 25 percent by year-end 2020.

Recently, ExxonMobil announced plans to reduce the intensity of operated upstream greenhouse gas emissions by 15 to 20 percent by 2025, compared to 2016 levels. This will be supported by a 40 to 50 percent decrease in methane intensity, and a 35 to 45 percent decrease in flaring intensity across its global operations, as well as other measures. The Company's upstream operations also plan to align with the World Bank's initiative to eliminate routine flaring by 2030.

The plan is projected to be consistent with the goals of the Paris Agreement and will drive meaningful near-term emission reductions as the Company works toward industry-leading greenhouse gas performance across its business lines.

ExxonMobil's emission reduction plans cover Scope 1 and Scope 2 emissions from assets operated by the Company. The plans will leverage the continued application of operational efficiencies and ongoing development and deployment of lower-emission technologies such as carbon capture and storage.

While the Company's voluntary efforts are important, they capture only a fraction of industry's overall methane emissions, which is why ExxonMobil works with policymakers to improve effectiveness of regulations so that all of industry participates to maximize the benefits to society.

✓ What is ExxonMobil doing to prepare for a lower-carbon future while meeting energy needs of a growing population?

ExxonMobil plays a critical role in providing the energy that supports economic growth and improves the quality of life for people around the world. Major forecasts project energy demand to increase as the global population rises to well over 9 billion by 2040 from 7.5 billion today, and because of growing prosperity and an expanding middle class.⁶

Even under 2°C and net-zero scenarios, meeting this increase in energy demand will require significant investment in new supplies of oil and natural gas, generally consistent with ExxonMobil's investment levels. This is mainly due to the significant natural decline rates associated with oil and natural gas production. At the same time, there is a need to

pursue further emission-reduction efforts and technologies in support of the goals of the Paris Agreement.

The Company supports market-based approaches to reduce emissions, including further cost-effective regulation of methane and an economy-wide price on carbon. ExxonMobil believes market-based policies that place a uniform, predictable cost on carbon will drive emission reductions at the lowest cost to society while supporting technology innovation and deployment.

Technology innovation is critical because the current solution set is insufficient to reduce emissions to targeted levels at an acceptable cost to society. According to the IEA, only six of 46 important technologies and sectors are on track to help society reach the Paris Agreement goals.⁷ Meeting these goals will require large-scale deployment of new technologies in key areas – power generation, commercial transportation and industrial processes – where emissions are most significant and forecast to increase.

Near-term actions the Company is taking to prepare for a lower-carbon future, include:

- Expanding supplies of cleaner-burning natural gas
- Improving energy efficiency in operations
- Operating and investing in carbon capture and storage
- Reducing flaring and methane emissions from operations
- Developing products, such as premium lubricants, light-weight plastics, and special tire liners to help consumers improve efficiency and reduce emissions
- Advocating for effective climate policy to address the risks of climate change at the lowest societal cost.

Longer-term efforts include:

- Progressing advanced biofuels from algae and agricultural waste for commercial transportation and petrochemicals
- Researching breakthroughs to improve commerciality of carbon capture and storage technology for power generation and industrial applications
- Developing new and efficient technologies that reduce emissions in refining and chemical facilities

More information can be found in the **Strategy** section of this *2021 Energy & Carbon Summary*.

✓ How is ExxonMobil supporting society's desire to achieve net-zero emissions and 2°C?

ExxonMobil has supported the Paris Agreement from its adoption. The Company also continues to support U.S. government participation in the framework. ExxonMobil's **Outlook for Energy** aligns in aggregate with the current Nationally Determined Contributions (NDCs) submitted by Paris Agreement signatories, which represent each country's plan to address its greenhouse gas emissions. ExxonMobil bases its business strategy and investments on its work underpinning the *Outlook*, which assumes progress in technologies, infrastructure and government policies to meet the NDCs. New NDCs have been submitted recently and more are expected in 2021.

The IPCC assessed available pathways and found 74 pathways that limit global warming to below 2°C (IPCC Lower 2°C).⁸ In those pathways, global net anthropogenic emissions of CO₂ fell on average more than 20 percent from 2010 levels by 2030, reaching net

zero around 2070.⁹ At the time at which net emissions reach net zero, any remaining emissions would need to be balanced by removing CO₂ from the atmosphere.

A challenge for society is how to transition to a net-zero world, while providing for a growing population with growing energy needs.

The IPCC pathways that lead to net zero and limit warming to less than 2°C show important trends, including increase in renewables (wind and solar), decrease in coal, increase in use of carbon dioxide removal (CDR), increase in carbon capture, and focused efforts to reduce other greenhouse gases and aerosols that cause warming. The IEA's net-zero emissions by 2050 scenario, a net-zero analysis through 2030, also reached similar conclusions on needed CO₂ reductions through deployment of all key technologies.

ExxonMobil continues to help meet global oil and natural gas demand, which is projected to continue even in a rapid net-zero transition, while working to reduce the Company's emissions of greenhouse gases. The Company also plays an important role in helping to improve technology that would be useful in net-zero pathways including biofuels, carbon capture, direct air capture, reduction of methane including advanced measurement and monitoring, and technology to enable low greenhouse gas energy such as hydrogen.

The pathways that lead to net zero involve a transition of all major regions of the world and across all sectors of the economy. ExxonMobil continues to proactively collaborate with governments and organizations to advance policy and technology development in support of net zero. The Company recognizes and continues to support the important work of the UNFCCC to achieve global participation through the Paris Agreement. The Company also works with major trade associations and industry groups including the Oil and Gas Climate Initiative and International Petroleum Industry Environmental Conservation Association to advance emission reduction policies and best practices and to develop and deploy lower emission technology. The oil and natural gas sector along with other sectors and governments all have an important role to play in the energy transition.

✓ Why isn't ExxonMobil investing in existing renewable energy sources like wind and solar?

Although wind and solar will play an important role in the transition to lower-carbon energy sources, new technology advances are required to reduce emissions to levels outlined in 2°C scenarios. ExxonMobil is undertaking research and development where the need is greatest. The Company is focused on areas where it can make a unique and significant contribution, and where it has deep scientific competencies. In this way, ExxonMobil can make the most meaningful and expedient contribution to society's efforts to manage the risks of climate change.

The Company's technology development program focuses on three distinct high-emitting sectors where there are currently limited viable solutions for broad deployment: commercial transportation, power generation and industrial processes. These sectors represent about 80 percent of current energy-related CO₂ emissions and are projected to increase with population growth and economic development.

In transportation, ExxonMobil is making progress in the development of advanced algae and cellulosic liquid biofuels. Because of their energy density, liquid fuel solutions are currently needed for commercial transportation where battery capacity is an issue for heavy loads and long distances.

In power generation and for industrial processes, the Company is working to make carbon capture and storage technology more economic, to potentially enable wider deployment. ExxonMobil currently has about 20 percent of the world's total carbon capture capacity.

In the industrial sector, ExxonMobil is developing new processes for refining and chemical facilities to reduce energy use through advanced separations processes, catalysts and process configurations.

Further progress in these areas is critical to reducing emissions and would make a meaningful contribution to achieving the goals of the Paris Agreement.

It should also be noted that ExxonMobil was one of the top purchasers in 2018 of renewable energy, including wind and solar to support its operations.

✓ Why did ExxonMobil establish a new Low Carbon Solutions business and what products or technologies will be commercialized?

In 2018, ExxonMobil established a Carbon Capture & Storage (CCS) Venture that was recently expanded into the new Low Carbon Solutions business with the goal of commercializing its extensive low-carbon technology portfolio. The new business will initially focus on CCS and hydrogen, two of the critical technologies required for society to achieve the climate goals outlined in the Paris Agreement. The objective is to build on ExxonMobil's decades of CCS operating experience and CCS-related R&D to help facilitate society's transition to a lower carbon future at the lowest possible cost. Over the past two decades, ExxonMobil has invested more than \$10 billion on lower-emission energy solutions, including CCS, with plans to invest at least another \$3 billion through 2025.¹⁰ ExxonMobil's investment in CCS and other low-carbon solutions will be based on opportunity availability and attractiveness.

The establishment of the Low Carbon Solutions business coincides with a growing recognition by governments and investors of the importance of CCS and a developing market for emission-reduction credits, all of which are critical for broad scale commercialization. CCS is also one of the few technologies that could enable some industry sectors to significantly reduce greenhouse gas emissions, including the refining, chemicals, cement and steel sectors.

Today, ExxonMobil is the world's leader in carbon capture, with more than 30 years of experience in CCS technology and is the first company to capture more than 120 million tonnes of CO₂, the equivalent to the annual emissions of more than 25 million cars.¹¹ The company has an equity share in about one-fifth of global CO₂ capture capacity,¹² and has captured approximately 40 percent of all the captured anthropogenic CO₂ in the world since the early 1970s.¹³

ExxonMobil Low Carbon Solutions will also leverage ExxonMobil's significant experience in the production of hydrogen which, when coupled with CCS, is likely to play a critical role across a number of market sectors as the world transitions to a lower-carbon energy system. Other technology focus areas in ExxonMobil's low carbon portfolio will be added in the future as they mature to commercialization.

¹ Reference is made to the first set of NDC submissions made in 2015; new or updated NDCs are anticipated, but not included as part of this analysis as only a few countries have updated their NDCs at this time. Additional NDC submissions are anticipated ahead of the 26th United Nations Climate Change Conference in 2021.

² IEA World Energy Outlook 2020, p. 171.

³ IEA, ExxonMobil analysis.

⁴ ExxonMobil analysis

⁵ Solomon Associates. Solomon Associates fuels and lubes refining data available for even years only.

⁶ BROOKINGS INSTITUTION, There are many definitions of "middle class" - here's ours, Richard V. Reeves and Katherine Guyot Tuesday, September 4, 2018, accessed December 2020.
<https://www.brookings.edu/blog/up-front/2018/09/04/there-are-many-definitions-of-middle-class-heres-ours/>

⁷ IEA, 2020. *Uneven progress on clean energy technologies faces further pressure from the Covid-19 crisis*, 5 June 2020, accessed December 2020.

<https://www.iea.org/news/uneven-progress-on-clean-energy-technologies-faces-further-pressure-from-the-covid-19-crisis>

⁸ IPCC, 2018: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. In Press.

⁹ ExxonMobil analysis of IPCC 74 Lower 2°C scenarios.

¹⁰ Represents currently identified future investment opportunities from 2021 through 2025, consistent with past practice, results, and announced plans.

¹¹ Global CCS Institute 2020 report and ExxonMobil analysis of 2020 facility data. Car equivalency calculated with US EPA GHG equivalency calculator.

¹² Global CCS capacity: Global CCS Institute, *Global Status of CCS 2020*, page 19. ExxonMobil CCS capacity: ExxonMobil estimates.

¹³ Global CCS Institute. Data updated as of April 2020 and based on cumulative anthropogenic carbon dioxide capture volume. Anthropogenic CO₂, for the purposes of this calculation, means CO₂ that without carbon capture and storage would have been emitted to the atmosphere, including, but not limited to: reservoir CO₂ from gas fields; CO₂ emitted during production and CO₂ emitted during combustion. It does not include natural CO₂ produced solely for enhanced oil recovery.



Energy & Carbon Summary

Describes how ExxonMobil is doing its part to address the dual challenge of ensuring the world has the energy it needs while also minimizing climate-change risks.

[Digital Report](#) | [Report PDF](#) | [Executive summary](#) | [Chairman's letter](#) | [Reducing emissions infographic](#)

Our plan to drive meaningful near-term emission reductions

Builds on success of existing efforts to reduce methane emissions and flaring, and is consistent with the goals of the Paris Agreement

[Dec. 2020 release: ExxonMobil announces emission reduction plans →](#)







Delivering real results to address the risks of climate change

With a longstanding commitment to investments in technology and the ingenuity of our people, ExxonMobil is well positioned to continue to provide the energy that is essential to improving lives around the world, while managing the risks of climate change.



Preparing for a lower-carbon energy future and supporting the goals of the 2015 Paris Agreement.



Driving advancements in technology and research to prepare the world for a lower-carbon energy future.



What we've done

2020 emission reductions

15% reduction in methane emissions*

25% reduction in flaring*

*compared to 2016 levels

Since 2000

~520M

tonnes of greenhouse gas emissions eliminated or avoided from operations.

Equivalent of removing 110M passenger vehicles off the road for a year.

Since 2000

>\$10B

invested to research, develop and deploy lower-emission energy solutions

Enabled customer emission reduction

We are delivering products and solutions that enable customers to meet product performance requirements while reducing their emissions and improving energy efficiency across the supply chain.

Products and solutions include:



Natural
gas



Lightweight
materials & packaging



Advanced
fuels & lubricants



R&D Investment

Our sustained investment in R&D plays an important role in positioning ExxonMobil to develop breakthrough solutions in areas such as carbon capture, biofuels, hydrogen, and energy-efficient process technology.

Investments primarily focused on reducing emissions from the three sectors that emit 80 percent of all energy-related greenhouse gas emissions: power generation, industrial, and commercial transportation.

Invested in technology that could capture more than 90 percent of CO₂ and prove up to six times more effective than conventional

technology.

Partnered with governments, academia, and industry to research and commercialize biofuels, direct air capture, and lower the cost of carbon capture and storage to help support society's ambition of net-zero emissions by 2050.

What we're planning to do

We recently announced a plan to further reduce greenhouse gas emissions in our global operations by 2025, while aiming for industry-leading greenhouse gas performance by 2030. This plan represents some of the most aggressive reductions in the industry.

Driving emissions down

The 2025 plan*

15-20%

reduction in greenhouse gas intensity of our Upstream operations

*ExxonMobil's emission reduction plans are compared to 2016 levels and cover Scope 1 and Scope 2 emissions from assets operated by the company.

Supported by

40-50%
reduction in methane intensity

35-45%
reduction in flaring intensity

Expected to deliver

~30%
reduction in absolute greenhouse gas emissions in our Upstream business

40-50%
reduction in absolute flaring and methane emissions

“We respect and **support society’s ambition to achieve net zero emissions by 2050**, and continue to advocate for policies that promote cost-effective, market-based solutions to address the risks of climate change.”



Darren W. Woods
ExxonMobil Chairman and Chief Executive Officer



FAQs

Why is ExxonMobil focusing on intensity in addition to absolute emissions?



Is ExxonMobil making a Net Zero pledge?



What is ExxonMobil’s approach to renewables like wind and solar?



ExxonMobil’s plans to reduce greenhouse gas emissions are projected to be

consistent with the goals of the Paris Agreement.

ExxonMobil's support for the Paris Agreement

In December 2015, after more than two decades of international effort, nations convened in Paris and drafted an agreement that for the first time signaled that both developed and developing nations will strive to undertake action on climate change and report on related progress.

The **Paris Agreement** "aims to strengthen the global response to the threat of climate change ... by: Holding the increase in the global average temperature to well below 2°C above pre-industrial levels."

The company has supported the Paris Agreement from its inception and continues to support U.S. government participation in the framework. ExxonMobil assesses its business strategy and plans against a range of scenarios, including those that meet the objectives of the Paris Agreement, which assume progress in technologies, infrastructure and government policies related to climate change.

The Climate Challenge

Outlook for Energy

 **Reaffirming our commitment to the Paris Agreement**

Climate change Energy Factor

 **Expressing support for the Paris Accord**

Climate change

 **What does pursuing a 2°C pathway mean?**

Outlook for Energy



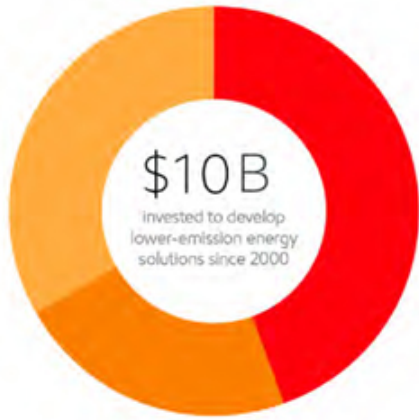


Scope 3 GHG emissions

ExxonMobil is providing Scope 3 greenhouse gas emissions – those emissions associated with consumers’ use of our products – on an annual basis. Reducing these indirect emissions will require changes in society's energy choices and the development and deployment of affordable, lower-emission technologies.

For the full picture of ExxonMobil’s current emissions reporting, please view our [Energy & Carbon Summary](#).

Investing to reduce emissions



> \$4 Billion

invested since 2000 at our Upstream facilities around the world on emission reduction efforts, including energy efficiency and flare mitigation



> \$2 Billion

invested since 2000 in our refining and chemical facilities and enabling research around the world to reduce greenhouse gas emissions



> \$3 Billion

in support of Upstream and Downstream cogeneration facilities since 2001 to more efficiently produce electricity and reduce greenhouse gas emissions



Reducing methane emissions by leveraging terabytes



Effectively managing methane and reducing flaring

ExxonMobil exceeded its goals announced in 2018 to **reduce methane emissions by 15 percent and flaring by 25 percent by 2020**, compared with 2016 levels.

[Learn more about ExxonMobil's steps to curb methane emissions](#)

[Offering a model regulatory framework for industry to reduce emissions](#)

[Reducing flaring in the Permian](#)

[Learn more about](#)

Energy & Carbon Summary

ExxonMobil has a long history of responsibly meeting society's evolving need for energy in a reliable and sustainable manner. With a longstanding commitment to investments in technology and the ingenuity of our people, we are well positioned to continue to provide the energy that is essential to improving lives around the world, while managing the risks of climate change.

[Energy and Carbon Summary](#)

ExxonMobil public engagement on climate policy

There are few challenges more important than meeting the world's growing demand for energy while reducing environmental impacts and the risks of climate change. ExxonMobil supports the 2015 Paris Agreement and believes the company has a constructive role to play in developing solutions.

[Sustainability](#)

Innovating lower-emission energy solutions: R&D

highlights

R&D has been part of ExxonMobil's DNA since our company began more than 135 years ago. Our innovations have helped provide the energy fundamental to modern life – from the clean, efficient fuels that power today's transportation to the natural gas that provides light and heat to homes and businesses.

Energy and innovation

Carbon capture and storage

Carbon capture and storage (CCS) is the process of capturing and injecting CO₂ into underground geological formations for permanent storage.

Carbon capture

Algae and advanced biofuels

Scientists at ExxonMobil are working to transform algae and plant waste into biofuels that could one day be used for transportation. These advanced biofuels offer the possibility of achieving significant greenhouse gas reductions compared to today's transportation fuels.

Energy and innovation

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Energy & Carbon Summary

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Energy is essential. Accessible and affordable supplies of energy support our ability to meet the basic requirements of life, and power society's progress around the world.

Under most third-party scenarios that meet the objectives of the Paris Agreement, oil and natural gas continue to play a significant role for decades in meeting increasing energy demand of a growing and more prosperous global population.

This *Energy & Carbon Summary* describes how we at ExxonMobil will play an important role in meeting society's need for energy and at the same time support efforts to mitigate the risk of climate change, as reflected in the four pillars of our climate strategy: mitigating emissions in our operations, providing products to help customers reduce their emissions, developing and deploying scalable technology solutions, and proactively engaging on climate-related policy.

ExxonMobil strives to deliver superior results while providing products and services that are essential to the health and welfare of billions of people around the world. We are committed to providing reliable and affordable energy to support human progress while advancing effective solutions that address the risks of climate change.

ExxonMobil is working to be part of the solution.

[Read the Executive summary →](#)



Delivering real results to address the risks of climate change

With a longstanding commitment to investments in technology and the ingenuity of our people, ExxonMobil is well positioned to continue to provide the energy that is essential to improving lives around the world, while managing the risks of climate change.



Preparing for a lower-carbon energy future and supporting the goals of the 2015 Paris Agreement.



Driving advancements in technology and research to prepare the world for a lower-carbon energy future.



What we've done

2020 emission reductions

15% reduction in methane emissions*

25% reduction in flaring*

*compared to 2016 levels

Since 2000

~520M

tonnes of greenhouse gas emissions eliminated or avoided from operations.

Equivalent of removing 110M passenger vehicles off the road for a year.

Since 2000

>\$10B

invested to research, develop and deploy lower-emission energy solutions

Enabled customer emission reduction

We are delivering products and solutions that enable customers to meet product performance requirements while reducing their emissions and improving energy efficiency across the supply chain.

Products and solutions include:



Natural
gas



Lightweight
materials & packaging



Advanced
fuels & lubricants



R&D Investment

Our sustained investment in R&D plays an important role in positioning ExxonMobil to develop breakthrough solutions in areas such as carbon capture, biofuels, hydrogen, and energy-efficient process technology.

Investments primarily focused on reducing emissions from the three sectors that emit 80 percent of all energy-related greenhouse gas emissions: power generation, industrial, and commercial transportation.

Invested in technology that could capture more than 90 percent of CO₂ and prove up to six times more effective than conventional technology.

Partnered with governments, academia, and industry to research and commercialize biofuels, direct air capture, and lower the cost of carbon capture and storage to help support society's ambition of net-zero emissions by 2050.

What we're planning to do

We recently announced a plan to further reduce greenhouse gas emissions in our global operations by 2025, while aiming for industry-leading greenhouse gas performance by 2030. This plan represents some of the most aggressive reductions in the industry.

Driving emissions down

The 2025 plan*

15-20%

reduction in greenhouse gas intensity of our Upstream operations

*ExxonMobil's emission reduction plans are compared to 2016 levels and cover Scope 1 and Scope 2 emissions from assets operated by the company.

Supported by

40-50%

reduction in methane intensity

35-45%

reduction in flaring intensity

Expected to deliver

~30%




reduction in absolute greenhouse gas emissions in our Upstream business

40-50%

reduction in absolute flaring and methane emissions

Our efforts

ExxonMobil aspires to position itself as a leader in providing energy while evolving the energy system. Through these four elements, we ensure that processes and programs are implemented to mitigate risks, reduce emissions and improve our energy efficiency.

Governance	
Metrics and targets	
Strategy	
Risk management	

Task Force on Climate-related Financial Disclosures (TCFD)

The ExxonMobil *Energy & Carbon Summary* is aligned with the core elements of the framework developed by the Financial Stability Board's Task Force on Climate-related Financial Disclosures

(TCFD), designed to encourage informed conversations.

[TCFD core elements and our disclosures →](#)

“Few would disagree that one of the most urgent societal challenges we face today is addressing the risks of climate change. How we meet the world’s demand for the energy necessary for economic growth while mitigating the long-term impact on our environment is key to our sustainable future.”



Darren W. Woods
Chairman and Chief Executive Officer



Download the report

Explore the *2021 Energy & Carbon Summary* to discover how we strive to meet the world’s demand for energy while protecting the environment and addressing the risks of climate change.

 **2021 Energy & Carbon Summary**

PDF / 7.70 MB • April 23, 2021

 **Chairman's letter**

PDF / 0.72 MB • Jan. 5, 2021

 **Executive Summary**

PDF / 0.13 MB • April 23, 2021



Reducing emissions infographic

PDF / 1.07 MB • April 23, 2021

Additional information

Scope 3 emissions

[Reporting on Scope 1 and 2; understanding Scope 3 →](#)

Frequently asked questions

[Review our FAQs →](#)

Disclosures

[Providing shareholders with disclosures that impart meaningful insights about our business →](#)

Important Additional Information Regarding Proxy Solicitation

Exxon Mobil Corporation ("ExxonMobil") has filed a definitive proxy statement and form of associated BLUE proxy card with the U.S. Securities and Exchange Commission (the "SEC") in connection with the solicitation of proxies for ExxonMobil's 2021 Annual Meeting (the "Proxy Statement"). ExxonMobil, its directors and certain of its executive officers will be participants in the solicitation of proxies from shareholders in respect of the 2021 Annual Meeting. Information regarding the names of ExxonMobil's directors and executive officers and their respective interests in ExxonMobil by security holdings or otherwise is set forth in the Proxy Statement. To the extent holdings of such participants in ExxonMobil's securities are not reported, or have changed since the amounts described, in the Proxy Statement, such changes have been reflected on Initial Statements of Beneficial Ownership on Form 3 or Statements of Change in Ownership on Form 4 filed with the SEC. Details concerning the nominees of ExxonMobil's Board of Directors for election at the 2021 Annual Meeting are included in the Proxy Statement. BEFORE MAKING ANY VOTING DECISION, INVESTORS AND SHAREHOLDERS OF THE COMPANY ARE URGED TO READ ALL RELEVANT DOCUMENTS FILED WITH OR FURNISHED TO THE SEC, INCLUDING THE COMPANY'S DEFINITIVE PROXY STATEMENT AND ANY SUPPLEMENTS THERETO AND ACCOMPANYING BLUE PROXY CARD, BECAUSE THEY CONTAIN IMPORTANT INFORMATION. Investors and shareholders can obtain a copy of the Proxy Statement and other relevant documents filed by ExxonMobil free of charge from the SEC's website, www.sec.gov. ExxonMobil's shareholders can also obtain, without charge, a copy of the Proxy Statement and other relevant filed documents by directing a request by mail to ExxonMobil Shareholder Services at 5959 Las Colinas Boulevard, Irving, Texas, 75039-2298 or at shareholderrelations@exxonmobil.com or from the investor relations section of ExxonMobil's website, www.exxonmobil.com/investor.

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