



General Motors

**2022 TCFD Report
Task Force on Climate-related Financial Disclosures**

everybody in.

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Introduction

Climate change is among the biggest challenges facing society today, as it poses a threat to our economy, our health, the environment and our way of life. That is why we have been transforming our business in line with our vision of an all-electric, more sustainable future.

This Task Force on Climate-related Financial Disclosures (TCFD) Report details our approach and performance across the TCFD framework, spanning Strategy, Governance, Risk Management, and Metrics and Targets.

It outlines how climate change may impact General Motors Company's (GM's) activities and sets out our approach to mitigating potential climate-related risks. Our understanding of the opportunities and challenges associated with climate change is constantly evolving and our plans to make our business more resilient in the long term continue to adapt accordingly.

This report incorporates a TCFD Index and supplements our [2022 Sustainability Report](#).

This report covers certain sustainability metrics and data for GM as of and during the year ended December 31, 2022, as applicable, unless otherwise stated. In instances where select information is provided from an earlier period or early 2023, that is noted in the report. The report is limited to GM's automotive operations conducted through certain of its consolidated subsidiaries. Unless otherwise stated, data related to GM Financial, our automotive financing services provider, and Cruise, our autonomous ride hail subsidiary, is not included in the report. In some instances, data has been included for operations in which GM's interest is through joint ventures (JVs), including our automotive China JVs. In these instances, the inclusion of that data is noted. Dollar amounts presented within this report are stated in U.S. dollars. Certain amounts may not add due to rounding. The information included in this report is current at the time of publication (July 28, 2023).

Cautionary Note on Forward-Looking Statements

This report may include "forward-looking statements" within the meaning of the U.S. federal securities laws. Forward-looking statements are any statements other than statements of historical fact and represent our current judgment about possible future events. In making these statements, we rely upon assumptions and analysis based on our experience and perception of historical trends, current conditions and expected future developments, as well as other factors we consider appropriate under the circumstances. We believe these judgments are reasonable, but these statements are not guarantees of any future events or financial results, and our actual results may differ materially due to a variety of important factors, many of which are described in our most recent Annual Report on Form 10-K and our other filings with the U.S. Securities and Exchange Commission. We caution readers not to place undue reliance on forward-looking statements. Forward-looking statements speak only as of the date they are made, and we undertake no obligation to update publicly or otherwise revise any forward-looking statements, whether as a result of new information, future events, or other factors that affect the subject of these statements, except where we are expressly required to do so by law.

(Cover image) Preproduction model shown throughout. Actual production model will vary. Blazer EV SS shown available spring 2024.



Strategy

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evolving.

Increasing the Resiliency of Our Business

We are taking steps to increase the resilience of our business and our supply chain and exploring ways to reduce emissions in our products and operations.

Our facilities also depend on consistent water availability and quality, both of which are threatened by the effects of climate change. We are investigating and implementing water-conservation projects, both in water-scarce locations and those where future availability concerns are forecasted.

Recognizing the urgency of the climate crisis, GM has joined the movement of companies aligning their business with the most ambitious aim of the Paris Agreement. This calls for the rise in global temperatures to be limited to well below 2°C above preindustrial levels, with an ambition to limit that increase to 1.5°C. As outlined in our Climate Transition Plan, we have set a goal to achieve carbon neutrality in global products and operations by 2040.

Our sustainability strategy continues to evolve, informed by a range of climate-related environmental, social and regulatory risks and opportunities. To mitigate the impacts of climate change across our value chain and meet the goals we have set, our strategy focuses on the following areas.



“Our journey to a more sustainable, electric future has never been more important than it is today. We know climate change is an urgent priority, and we are advancing toward our bold goal to be carbon neutral in our global products and operations by 2040 so that we can be a part of the solution.”

Kristen Siemen

Vice President Sustainable Workplaces & Chief Sustainability Officer



(Left) Preproduction model shown. Actual production model may vary. Model Year 2024 Chevrolet Equinox EV available fall 2023.

Climate Transition Plan

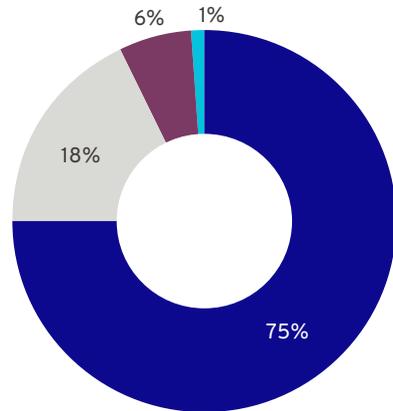
Our goal is to achieve carbon neutrality in global products and operations by 2040.

Where We Are Now

Our increased sourcing of renewable energy and our growing electric vehicle (EV) portfolio, including those powered by our Ultium battery, both contributed to an overall reduction in our total greenhouse gas (GHG) emissions compared to our 2018 baseline.

GM is aligning with the goals of the Paris Agreement and the Business Ambition Pledge for 1.5°C, an urgent call to action from a global coalition of United Nations agencies, businesses and industry leaders.

Our Global 2022 Footprint



- Scope 3—Use of Sold Products
- Scope 3—Purchased Goods and Services
- Scope 3—Other
- Scopes 1 and 2

See more detailed performance in our [Data Center](#).

All emissions-related data was calculated in reference to the [Greenhouse Gas Protocol methodology](#).

We have engaged an independent third party to verify a selection of the GHG emissions and certain sustainability data for our global automotive operations presented in this report. The verification statements and applicable data assertions can be found in the [2022 Sustainability Supplement](#).

Our Targets

To help us achieve carbon neutrality in global products and operations by 2040, we are committed to achieving the following

milestones and Science Based Targets initiative (SBTi)-approved targets. We are on track to meet our emissions reduction goals.

Scope 3—Use of Sold Products

By 2025:
Plan to rapidly scale our annual capacity to 1 million EVs for North America in 2025



By 2035:
Reduce Scope 3 GHG emissions from the use of sold products of light-duty vehicles by 51% per vehicle kilometer by 2035 against a 2018 baseline*



By 2035:
Eliminate tailpipe emissions from new U.S. light-duty vehicles by 2035



Scopes 1 & 2

By 2025:
Source 100% renewable energy at our U.S. sites



By 2035:
Source 100% renewable energy globally



By 2035:
Reduce energy intensity in our operations by 35% by 2035 against a 2010 baseline



By 2035:
Reduce Scope 1 and 2 operations emissions by 72% by 2035 against a 2018 baseline*



* SBTi-approved target

Climate Transition Plan

How We Will Get There

Scope 3 emissions make up the vast majority of the GHG emissions we are seeking to address, and are where we focus many of our initiatives and programs.

Our Initiatives and Programs

Scope 3—Use of Sold Products

- Increasing our portfolio of EVs
- Anticipating total capital spending and investments in battery cell manufacturing joint ventures of approximately \$11–\$12 billion for 2023 and \$11–13 billion per year for 2024 and 2025, primarily to accelerate our transformation plan
- Operating Factory ZERO, GM’s first fully dedicated EV assembly plant, in Detroit-Hamtramck
- Investing in home, workplace and public charging infrastructure in the United States and Canada
- Collaborating with Tesla to integrate the North American Charging Standard (NACS) in our EVs, beginning in 2025
- Investing in hydrogen fuel cell technology to reduce the carbon emissions of medium- and heavy-duty vehicles
- Engaging in climate partnerships:
 - Breakthrough Energy Catalyst: Public-private partnership working to commercialize green hydrogen, long-term energy storage and sustainable aviation fuel
 - TPG Rise Climate: Helping the research community, investors and climate innovation accelerators develop clean energy, decarbonized transport and agricultural technologies
- Addressing the barriers to EV ownership and adoption through customer education and engagement, including our interactive EV Live experience and a network of highly trained EV Specialists at our dealerships

(Right) Preproduction model shown. Actual production model may vary. 2024 Chevrolet Equinox EV 2RS limited availability starting fall 2023. Full lineup available starting spring 2024.



Climate Transition Plan

How We Will Get There

Scope 3—Purchased Goods and Services

- Inviting Tier I suppliers to sign the GM Environmental, Social and Governance (ESG) Partnership Pledge and enhance emissions tracking
- Encouraging global Tier I suppliers to set carbon reduction goals using the GM Supplier Sustainability Goals Framework
- Monitoring participating global Tier I and Tier II suppliers' sustainability performance through CDP and EcoVadis
- Contractually securing all battery raw materials to support our goal of having 1 million units of EV capacity in North America in 2025
- Joining the First Movers Coalition through commitments to procure low-carbon steel, aluminum, concrete and cement, signaling a firm market demand for a net-zero transition

Transition Plan Governance

We believe the goals, targets and activities described in this section meet the definition of a "Climate Transition Plan," as specifically defined by the Task Force on Climate-related Financial Disclosures (TCFD) and the CDP, and we are referring to them as such only for the purposes of this report.

We have developed our Climate Transition Plan in line with our vision of a world with zero emissions. We will revisit this plan annually, while targets are reviewed with the Board by representatives of relevant teams at least semiannually.

To read more about governance of our Climate Transition Plan and climate risk, please see the [Governance section](#) of this report.

Scopes 1 & 2

- Reducing energy consumption by improving energy efficiency
- Successfully sourcing 100% of our electricity for our U.S. sites from renewable sources by 2025¹
- Increasing our use of renewable power for electricity globally
- Exploring opportunities for carbon removals to mitigate emissions that cannot be reduced absolutely, in line with SBTi guidelines

Policy Advocacy

As a part of leading toward an ambitious transformation, we engage with policymakers to advocate for legislative and regulatory action that will support our climate goals.

To read more about GM's policy advocacy, please see the [Public Policy Engagements](#) section of this report and our [2022 Sustainability Advocacy Report](#).

To read more about how we are mitigating our climate-related risks and planning to achieve our climate-related opportunities, please see the [Managing Climate-Related Risks](#) section of this report.

¹ Based on estimated forecasted global renewable energy sourced through currently executed agreements, subject to change depending on actual future electric usage in operations and actual future renewable generation.



Electrification

Reflecting many years of investment in research and development, design, manufacturing, supply chain leadership and customer experience, we continue to expand our portfolio across several segments, including affordable and accessible EVs, luxury models and software-defined vehicles.

The majority of automotive original equipment manufacturer (OEM) GHG emissions are from Scope 3 Category 11—Use of Sold Products. We develop targets, programs and initiatives to address this part of our footprint and align with evolving regulation and customer demand related to vehicle emissions.

Our main strategy for addressing these emissions is to eventually replace traditional internal combustion engine (ICE) vehicles with EVs, which have a significantly lower emissions intensity than equivalent ICE models. We are aiming to produce 400,000 EVs in North America by mid-2024, which will help lower the emissions intensity from the use of sold products significantly. Many of these vehicles, including the all-electric GMC HUMMER EV SUV and Pickup, Cadillac LYRIQ and CELESTIQ, and upcoming Chevrolet Silverado EV WT, Chevrolet Equinox EV and Chevrolet Blazer EV, will feature our Ultium architecture and battery platform.

Previously, we have focused our attention on developing the Ultium platform. We are now into the next phase of our strategy, which will see rapid growth in EV volume through 2025. This will provide the scale needed to bring down costs. In the third phase, we expect to see even more volume and margin growth.

As part of our mission to make EV ownership accessible to all, we launched EV Live in the United States. This immersive, virtual experience allows anyone—GM employees, dealers, retail, fleet and commercial customers, utilities and third-party collaborators—to connect with an EV Specialist from any internet-connected mobile or desktop device. In addition, Explore EV offers our vehicle brand app users additional information about the benefits of EV ownership.

To learn more, see the Advancing Electrification and Autonomy section of our [2022 Sustainability Report](#).

Energy

To reduce our Scope 1 and 2 emissions, our strategy to manage energy in our operations focuses on:

- Improving energy efficiency: Reducing overall energy use by lowering intensity levels and operational loads at our facilities
- Sourcing renewable energy: Supporting the growth of renewable power through direct investments, on-site generation, green tariffs and power purchase agreements
- Addressing intermittency: Mitigating against gaps in supplies of renewable energy for electricity transmission
- Policy advocacy: Advocating for policies that support a resilient, carbon-free energy system, drive down renewable energy costs and increase availability of renewable energy assets

To learn more, see the Our Energy Strategy section of our [2022 Sustainability Report](#).



Supply Chain

GM is working diligently to further integrate environmental sustainability into all aspects of our supply chain functions. We collaborate with our key suppliers, encouraging them to set ambitious emissions reduction targets of their own, source more sustainable materials and increase the transparency of their performance.

We have participated in the CDP supply chain survey since 2013. All our direct material strategic suppliers are invited to complete the CDP Climate Change and Water Security surveys, in addition to a subset of indirect suppliers and our top strategic logistics suppliers. To learn more about our CDP responses, please see the Integrating Sustainability Into Our Supply Chain section of our [2022 Sustainability Report](#).

In 2022, we continued to invite Tier I suppliers to sign GM's ESG Partnership Pledge. This pledge holistically embraces sustainability and asks our suppliers to:

- Commit to carbon neutrality for their Scope 1 and Scope 2 emissions relevant to products or services they provide us (see timeline on next page)
- Achieve or exceed a minimum EcoVadis score of 50 by 2025 in the areas of Labor and Human Rights, Ethics and Sustainable Procurement

By the end of 2022, 68% of our direct suppliers, by budgeted annual purchase value, had committed to the Pledge.



Working with our suppliers, we conduct energy treasure hunts to drive energy- and water-reduction efforts at Tier I and Tier II supplier facilities. The program’s success is embedded in its collaborative framework, identifying potential energy reduction and financial savings opportunities at suppliers’ manufacturing facilities. Each project uses an iteratively developed tool for data collection and assessment. These treasure hunts collectively provided recommendations to save approximately 14,000 MWh of energy and 41,000 cubic meters of water, as well as eliminating 4,600 metric tons of CO2 emissions.²

A cross-enterprise Global Purchasing and Supply Chain (GPSC) Sustainability Team supports this engagement effort with a focus on reducing Scope 3 emissions. This includes:

- Emissions disclosure: Increasing visibility and supplier engagement in carbon footprint reduction through tracking of CDP engagement by select Tier I suppliers
- Sustainable logistics: Increasing shipping container packing density, route efficiency monitoring, supplier emissions reduction and alternative fuels

Timeline to Achieve Carbon Neutrality Goal by Supplier Category³



To learn more, see the Integrating Sustainability Into Our Supply Chain section of our [2022 Sustainability Report](#).

Communities

The changes driving the transition to an all-electric future represent a seismic shift in our industry. As we accelerate that future, we must listen and learn. We understand that climate change does not impact every community equally, and that sustainable technology alone is not enough for everyone to benefit from an all-electric future.

Our Climate Action Framework is rooted in four key areas:

- The future of work: Developing skills for our electric future by investing in training and reskilling, such as through our Technical Learning University and its Electrical Apprentice Program
- Access to EVs: Planning to offer a wide range of EVs across segments and price points
- Infrastructure: Committing to accessible charging solutions that can help meet customers where they are and understanding the need to help address charging deserts and other scenarios that can hinder EV ownership
- Climate: Funding organizations that are helping to close the climate gaps at the community level as well as educating key GM stakeholders

To learn more, see the Climate Action Framework section of our [2022 Sustainability Report](#).

² Supplier self-reported data.

³ Applies to products and services provided to GM.

Governance

Responsibility for overseeing and managing climate-related risks and opportunities rests at the highest level of our organization, which is overseen by our Board and its six standing committees.

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Board Oversight

The Board is committed to sound corporate governance policies and practices that are designed and routinely assessed to enable GM to operate its business responsibly, sustain our success and build long-term shareholder value. The Board also works with management to integrate environmental, social and governance (ESG) principles into the company’s business strategy. This includes agenda items and discussions related to ESG topics at Board and committee meetings.

Expertise on ESG-related issues, including climate, is among the qualifications considered when recommending incumbent, replacement or additional directors to the Board.

Since 2021, the Board has undertaken an annual ESG self-evaluation, designed to ensure that the Board possesses the requisite skills and expertise to oversee the company’s ESG opportunities, priorities and risks. Following this evaluation in 2022, the Board determined that it has strong ESG expertise and possesses a broad range of skills, qualifications and attributes that will support the company’s sustainability commitments.

As an example, one of our directors has developed environmental expertise as a member of the board of Conservation International. In that capacity, he leverages his scientific training to advocate for natural climate solutions. GM benefits from his experience in this area as it seeks to create a world with zero emissions.

The Board has overall responsibility for risk oversight and focuses on the most significant risks facing GM. It discharges these responsibilities, in part, through delegation to its committees.

Governance and Corporate Responsibility Committee (GCRC)

The GCRC oversees ESG initiatives, strategies and policies that have a material impact on the company. The GCRC deploys an ESG scorecard to track progress against GM’s public global sustainability targets and conducts annual reviews of ESG topics such as public policy, corporate philanthropy and other sustainability initiatives (including human rights and responsible sourcing).

In consultation with the Audit Committee, the GCRC also approves the company’s annual Sustainability Report and associated disclosures.

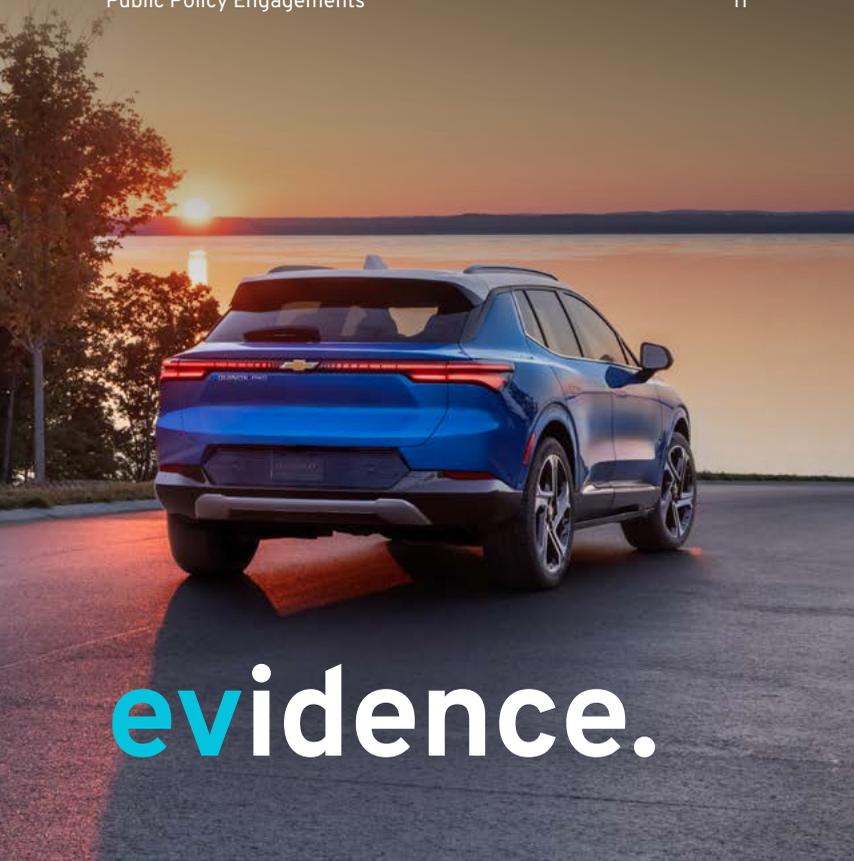
Recent committee activity includes the continued oversight of sustainability strategy through monitoring progress on 10 key sustainability targets, revising GM’s Human Rights Policy to further align it with guidelines in the International Labour Organization’s Core Conventions, and reviewing various public policy issues referenced in our [2022 Sustainability Advocacy Report](#).

Audit Committee (AC)

The AC oversees risks related to financial reporting, internal disclosure controls (including with respect to ESG issues, reporting and disclosures) and auditing matters; and legal, regulatory and compliance programs.

In addition, the committee reviews and approves the annual Sustainability Report.

(Left) Preproduction model shown. Actual production model may vary. 2024 Chevrolet Equinox EV 2RS limited availability starting fall 2023. Full lineup available starting spring 2024.



Executive Compensation Committee (ECC)

The Executive Compensation Committee (ECC) regularly reviews and discusses plan performance at each meeting. In 2022, the committee performed an in-depth review and analysis of our long-term incentive plan and adjusted performance measures to further align with our EV strategy, adding EV performance measures that reward performance for General Motors North America (GMNA) EV Volume, GMNA EV Launch Timing and GMNA EV Launch Quality.

The ECC:

- Makes an annual determination as to whether the company's ESG and sustainability goals and milestones are effectively integrated into our compensation programs
- Oversees design and implementation of an executive compensation program that drives alignment with shareholder interests, encourages management to make decisions that drive long-term value creation, does not reward excessive risk-taking, and attracts, motivates and retains the talent required to accelerate GM's transition to EVs
- Responds to shareholder feedback relative to the alignment of executive compensation with strong performance, including with respect to sustainability goals

Finance Committee (FC)

The FC reviews changes to our shareholder composition, including the impact of ESG-oriented investors. Recently, the committee reviewed and approved the successful issuance of GM's inaugural green bond and supported plans to increase capital expenditures to support our growth strategy through new and continued investment in EVs, autonomous vehicles (AVs), in-vehicle software and other new business opportunities.

Risk and Cybersecurity Committee (RCC)

The RCC oversees risks related to the company's key strategic, enterprise and cybersecurity risks, including climate change, workplace and product safety, and privacy.

As part of our enterprise risk framework, the RCC considers the potential impacts of climate change. This includes regular reviews of our enterprise risk trends, potential emerging risks and management's action plans. Recently, the committee evaluated annual risk assessment results, highlighting the most significant risks to our growth strategy and key strategic initiatives.

Please see GM's [2023 Proxy Statement](#) (page 34) for further information about Board oversight on ESG measures.

Management Oversight

The company's risk governance is facilitated through a top-down and bottom-up communication structure, with our CEO serving as our chief risk officer. Management of enterprise risks and opportunities, ultimately resides with the CEO, who leads our Senior Leadership Team (SLT). The SLT appoints members to our Risk Advisory Council, an executive-level body with delegates from each business unit, to discuss and monitor the most significant business and emerging risks in a cross-functional setting. They are tasked with championing risk management practices and integrating them into their functional or regional business units. We contemplate climate-related risks in our enterprise risk framework and continuously monitor changes to our overall risk landscape.



GM's SLT establishes and executes the company's ESG strategy. This cross-functional group of senior leaders drives GM's ESG initiatives throughout the company, from global product development, portfolio planning, manufacturing and supply chain to human resources (including diversity, equity and inclusion (DEI) and other workforce matters), legal, compliance, social and community impact projects. The SLT is supported in this work by a number of cross-functional groups across the business.

Office of Sustainability

The Office of Sustainability is a cross-functional group that uses a "team of teams" approach to guide sustainability initiatives across the company. It is chaired by the vice president of sustainable workplaces & chief sustainability officer (CSO). The CSO reports to the executive vice president of global manufacturing and sustainability, the enterprise-wide leader for sustainability initiatives who develops and coordinates sustainability strategy and efforts across the company. The Office of Sustainability:

- Monitors the execution of public commitments related to sustainability goals such as carbon neutrality and the Science-Based Targets initiative (SBTi)
- Reviews and approves certain social and environmental sustainability strategies, including human rights and sustainable materials strategies

ESG Disclosure Committee

The ESG Disclosure Committee is a cross-functional group that oversees GM's ESG disclosures. It is chaired by our vice president of global business solutions and chief accounting officer, vice president of sustainable workplaces & CSO, and assistant corporate secretary and lead counsel—corporate governance, finance and securities.

CO2 Governance Committee

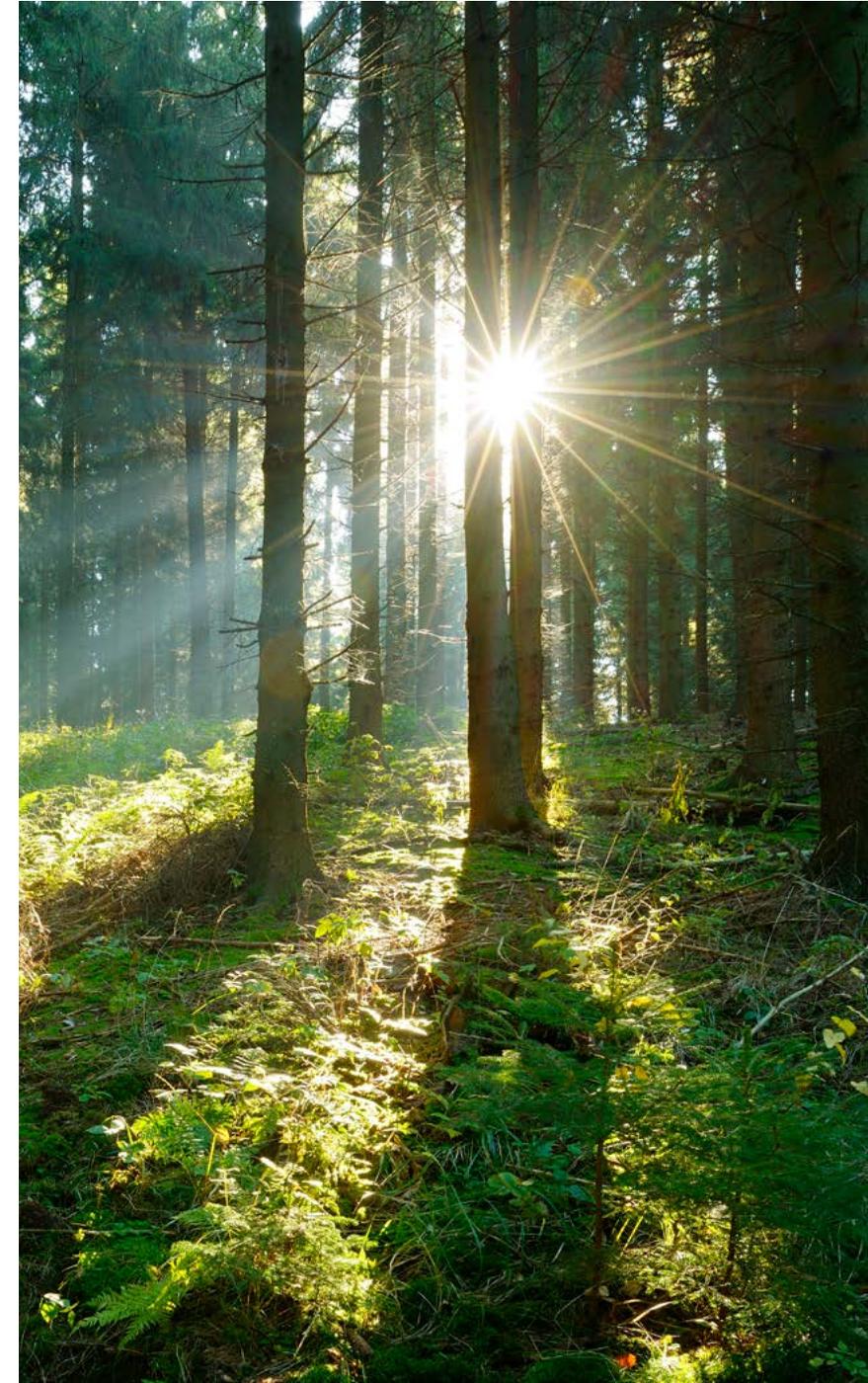
We are focused on reducing CO2 emissions from the use of sold products, primarily by transitioning our portfolio to all-electric vehicles. GM tracks projected fleet-wide CO2 emissions on a regional basis to ensure compliance to increasingly stringent regulations in all our markets. Our CO2 governance process includes senior-level representation from all relevant functions, including product development, planning, sales and marketing, finance, public policy and legal.

Manufacturing Leadership Team (MLT)

The scale of our manufacturing operations presents significant opportunities for emissions reduction. Every month, our progress toward science-based targets for Scope 1, 2 and 3 emissions, as well as other key climate-related indicators such as water and waste, is reviewed and tracked against internal targets by the MLT. The MLT also reviews progress on projects and initiatives that are designed to support our targets.

Local Management

At the manufacturing plant level, management is responsible for tracking energy consumption, analyzing opportunities for energy conservation and monitoring potential climate-related impacts, including catastrophic risks or losses from natural events that may occur at their site. Similar evaluation at the operational level occurs when considering new sites and suppliers.



Public Policy Engagements

Our global commitment to advancing an all-electric, zero-emissions future is unwavering. GM has consistently and publicly advocated for policies that support the adoption of EVs and help to address climate change.

We continue to work closely with governments worldwide to implement complementary policies and nonmonetary incentives, and build out infrastructure, low-carbon electricity and the overall manufacturing footprint necessary for the success of our all-electric vision and carbon-neutral goals.

GM's Global Public Policy (GPP) organization leverages the expertise of the GM team, industry subject matter experts, coalitions and industry trade associations. We carefully consider public policy challenges and opportunities and develop informed policy positions to effectively advocate for legislative and regulatory action that will support decarbonizing on-road transportation and the grid.

GM welcomes the new clean energy tax credits—in particular, the consumer EV purchase incentives for new, used and commercial EVs, and the production tax credits to support domestic critical mineral processing and EV battery production as well as grants to support transition of auto-manufacturing facilities to EV production. The new clean energy tax credits will support continued investments associated with our EV transformation. In addition, the credits will enable us to strategically increase our footprint domestically and with free-trade agreement partners. In turn, this creates jobs, accelerates scale and EV adoption, and allows us to more quickly deliver affordable EVs and infrastructure to support their enjoyment.

In September 2022, GM and the Environmental Defense Fund (EDF) announced a set of principles that seek to accelerate a zero-emissions, all-electric future for passenger vehicles in the United States. The recommendations were developed to support the critical next generation of national tailpipe emission standards, scheduled to begin in 2027. We encourage the Environmental Protection Agency (EPA) to finalize standards aimed at ensuring that at least 50% of new vehicles sold by 2030 are EVs, so that the nation can achieve a 60% reduction in greenhouse gas (GHG) emissions from new vehicles in Model Year 2030, compared to 2021.

To learn more about our approach to public policy, please see our [2022 Sustainability Report](#) and our [2022 Sustainability Advocacy Report](#).



Advocacy Associations and Memberships

Our efforts to decarbonize on-road transportation are guided by GM's business objectives and policy commitments, including climate stewardship, and will be an essential part of helping the United States and other countries achieve their Paris Agreement commitments.

Select Industry Associations and Memberships Engaged on Climate Policy

- Alliance for Automotive Innovation (AAI, Auto Innovators)
- American Automotive Policy Council (AAPC)
- Business Roundtable (BRT)
- Clean Energy Buyers Association (CEBA)
- Electric Drive Transportation Association (EDTA)
- National Association of Manufacturers (NAM)
- Truck and Engine Manufacturers Association (EMA)
- U.S. Chamber of Commerce
- Veloz

Please see our [2022 Sustainability Advocacy Report](#) for more details on public policy, advocacy engagement and our partnerships.

Risk Management

At GM, we conduct risk assessments and factor climate-related risks and opportunities into our business strategies. We will continue to refine our approach as our understanding evolves.

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everywhere.

Identifying and Assessing Climate-Related Risks

We are subject to risks associated with climate change, including the impacts of increased severe weather events on our operations and infrastructure, increased regulation of greenhouse gas (GHG) emissions and changing consumer preferences. Increasing expectations on companies to address climate change may result in increased costs, reduced product demand and reduced profits. Climate change regulations at the international, federal, state or local level could require us to further limit emissions associated with customer use of our products, change our manufacturing processes or product portfolio, or undertake other activities that may require us to incur additional expense, which may be material.

Part of our strategy to address these risks includes our transition to electric vehicles (EVs), which itself presents additional risks, including reduced demand for and profits from our internal combustion engine (ICE) vehicles, which we plan to use to fund our growth strategy and EV transition.

Our Strategic Risk Management (SRM) function facilitates an enterprise risk assessment. This is conducted at least annually and is supplemented with a series of inputs throughout the year. This includes, but is not limited to, external benchmarking and insights, senior leader input through interviews and surveys, and various workshop results, such as SWOT analysis, to understand where our most critical risks and opportunities exist. Environmental, social and governance (ESG)-related risks, including climate change, are considered as part of our risk assessment process.

We evaluate risks and opportunities based on both quantitative and qualitative criteria. We would begin to consider whether something may be substantive from a financial perspective when the potential impact on consolidated net income is greater than \$100 million. We consider additional factors when making our ultimate assessment of whether a risk or opportunity is substantive that are more qualitative in nature. This qualitative evaluation includes consideration of other relevant facts and circumstances, such as strategic significance, potential impact on reputation and probability of occurrence, among others.

Risk owners are assigned to assess identified risks, and are tasked with evaluating probability of occurrence and potential financial, strategic and reputational impact. We then determine whether our current response is appropriate, given our appetite for the risk, or if further mitigation is required.⁴

The Task Force on Climate-related Financial Disclosures (TCFD) groups transition risks into four categories:

- Policy and legal risk
- Technology risk
- Market risk
- Reputational risk

GM considers each of these risk categories when assessing climate-related risk.

In 2021, our Global Sustainability Strategies Team worked with a third-party consultant to host a series of workshops with leaders from key functions of the business to develop and validate a process for identifying and analyzing climate-related risks. We discussed dozens of potential risks and opportunities to determine those most applicable to our business, and then qualitatively prioritized them. The results were shared with the Office of Sustainability.

In early 2023, we continued our work with the third-party consultant and re-engaged key internal stakeholders to conduct a qualitative climate risk assessment, discussing climate-related risks and opportunities, as well as our preparedness to mitigate the risks and leverage the opportunities.

⁴ Risks identified in this report as having a “substantive” impact will vary from risk to risk based on quantitative and qualitative criteria. The use of “significant,” “substantive,” “material” or “materiality” in this report and our other sustainability reporting is not related to or intended to convey matters or facts that could be deemed “material” to a reasonable investor as referred to under U.S. securities laws or similar requirements of other jurisdictions.

Climate Risk Assessment: Methodology

GM's qualitative climate risk assessment considered two potential climate pathways and builds on previous work to identify, prioritize and mitigate climate risks.

Extreme weather and climate-related events may continue to become more frequent and intense. Understanding the different emissions pathways enables us to plan for a range of possible climate responses and associated impacts.

This assessment involved engaging with stakeholders who:

- Assessed and summarized potential strategic and reputational impacts for each risk and opportunity, conducted desktop reviews and trends for each risk, and provided insights on current and future risk mitigation strategies
- Convened interactive workshops to discuss the qualitative analysis of climate-related risks and opportunities, time horizon, impact and probability, and to provide perspectives on how each risk and opportunity could potentially impact GM's planning, operations and strategy
- Attended one-on-one conversations with the core project team to explore GM's resiliency to the identified risks and discuss current and future mitigation measures



Under a “business as usual,” high-carbon pathway (RCP 8.5),⁵ global carbon emissions could potentially continue to rise at the current rate with global temperature rises as likely as not to exceed 4°C. Under such a scenario, businesses may experience climate change impacts including:

- More intense storms and monsoons, heatwaves and droughts
- Widespread supply chain disruption due to severe weather events
- Crop failures and biodiversity loss
- Loss of land due to sea level rises of up to one meter
- More acidic oceans
- Atmospheric CO2 concentrations three to four times higher than preindustrial levels
- Demographic shifts as people move to more habitable areas

Alternatively, under a lower-carbon pathway (RCP 2.6, 2°C or lower),⁵ aggressive mitigation efforts will halve emissions by 2050. The assumption is that we may expect:

- Major shifts in policy and regulations, such as the introduction of carbon pricing mechanisms
- Significant shifts away from fossil fuels
- Cheaper, cleaner forms of energy
- Atmospheric CO2 concentrations falling by the end of the century
- Widespread adoption of EVs

Climate impacts will be largely constrained but not avoided, and the risk of “tipping points” and irreversible change will be reduced. This approach may require “negative emissions” (removing CO2 from the air) before 2100.

Managing Climate-Related Risks

Our chief sustainability officer (CSO) leads our efforts in integrating the analysis of GM’s most critical climate-related risks and opportunities. This includes working with a cross-functional group of leaders to monitor for significant changes in our climate-related risk and opportunity landscape. The CSO/risk owner works with the SRM Team to define key risk indicators (KRIs). Enterprise-level risks are thoroughly reviewed by members of the Senior Leadership Team (SLT) and the Risk and Cybersecurity Committee (RCC) of the Board of Directors.

The process for assessing the relative significance of all identified risks, including climate-related risks, is as follows:

- All enterprise risks are assessed on potential impact and probability, and management determines the appropriate response required given that assessment. Our chief executive officer, chief financial officer and General Counsel hold risk reviews of a subset of these risks throughout the year. Our RCC is regularly updated on changes to management’s risk responses as any of our enterprise risk trends increase throughout the year.
- Each SLT member is involved in an annual risk assessment of their business unit to determine their main risks. These are actively managed and regularly reviewed with the business unit’s leadership team.

The Board has overall responsibility for overseeing the risks facing the company, including climate change. The Board implements its risk oversight function both as a whole and through its Board committees. Each of these committees oversees management practices for categories of risks relevant to its functions.

We have a comprehensive enterprise risk framework that is regularly updated and reviewed, at least annually, by management and the RCC of our Board. Our climate risk assessment aligns climate-related risks and opportunities to GM’s enterprise risk framework and processes.

To help make the most of low-carbon opportunities and drive energy efficiency, we are evaluating the use of an internal cost of carbon.

To read more about the role that the Board’s committees and senior management play in risk management, please see the [Board Oversight](#) and [Management Oversight](#) sections in this report.



⁵ Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathways (RCP 8.5 and RCP 2.6) Source: [TCFD Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities](#).

Climate-Related Risks and Opportunities

Through the qualitative climate risk assessment process, we categorized and identified risks as physical risks and transition risks. Physical risks result from extreme weather events and increasing average global mean temperatures, while transition risks result from the global transition to a low-carbon and climate-resilient economy.

On the right, we outline key climate-related risks and opportunities with the potential to impact our business over the short, medium and long term.

Definition of Time Horizons

- Short term (zero to three years): GM defines short term for risks and opportunities as a period covering up to three years and including annual budgets for capital expenditures (CAPEX) and operating expenses (OPEX). This covers, for example, successfully sourcing 100% of our electricity for our U.S. sites from renewable sources by 2025.
- Medium term (three to five years): GM’s medium-term plan for risks and opportunities includes three to five years of budgets for resources and funds. For example, this includes our anticipated total capital spending and investments in battery cell manufacturing joint ventures of approximately \$11–\$12 billion for 2023 and \$11–13 billion per year for 2024 and 2025.
- Long term (greater than five years): Long term is open-ended and is based on the type of risk or opportunity. For example, our Science Based Targets initiative (SBTi)-approved targets for operations and sold products have a target year of 2035 and our goal to achieve carbon neutrality in global products and operations extends to 2040.

Risk/Opportunity		Time Horizon	Description
Physical Risks			
Increased climate events disrupting GM production		Medium	Increased climate events disrupting GM production
Increased climate events impacting GM suppliers		Medium	Increased climate events impacting the production, logistics and procurement of products and raw materials from suppliers
Transition Risks			
Reduced availability of raw materials		Long	Reduced availability of raw materials impacting costs of vehicle production
Lack of EV infrastructure		Medium	Lack of EV charging infrastructure impacting consumer demand for EVs
Costs related to lower emissions technology		Short	Costs related to lower emissions and battery technology impacting profitability of producing EVs compared to ICE vehicles
Unsuccessful investment in new technologies		Long	Unsuccessful investment in new technologies relative to peers impacting company sales and market share
Opportunities			
Investor interest in sustainability		Short	Increased capital availability due to investor interest in sustainability, giving companies a competitive advantage against peers
New EV products and services		Long	Shift in consumer preferences toward EVs, creating sales and new customer opportunities, including software subscription services

Physical Risks

Physical risks are related to how the changing climate, and extreme weather events such as storms, floods and droughts, can potentially disrupt production, impact our supply chain, reduce revenue and increase costs. The way we manage these risks—both acute risks and chronic, longer-term risks—depends on the location of our operations and the risks identified for each region.

Operations

We reduce physical risks throughout our operations through sound environmental management and by prioritizing compliance. We measure and manage natural resources used at all manufacturing locations, engineering centers, parts distribution centers and proving ground sites around the world. Our facilities vary in function, geography, size and natural environment, which gives rise to varying concerns such as resource scarcity, different regulatory requirements and varying levels of environmental quality. These GM-owned and -operated facilities have location-specific operating plans that all function under GM's [Global Environmental Policy](#), which provides guidelines to help us minimize the impact of our activities, products and services on the environment.

To learn more about our approach to environmental management, please see our [2022 Sustainability Report](#).

Supply Chain

Our Global Purchasing Supply Chain (GPSC) organization manages the risk of increased flooding and extreme weather events, which can impact the production, logistics and procurement of products and materials from suppliers. Securing consistent, resilient and sustainable supply chains for key materials is a strategic priority. The GPSC Team monitors real-time conditions and data from multiple sources to identify climate-related events around the world and map them against our suppliers. In the event of anticipated or actual disruption, alerts are quickly sent to the relevant teams and contingency plans are implemented.

Raw material costs and supply variability are monitored closely by purchasing teams and senior leaders from across the business. We are prioritizing the development of a more resilient and sustainable supply chain of raw materials to manufacture our battery chemistry, which requires cobalt and battery-grade nickel and lithium, as well as other minerals. We are proactively and aggressively pursuing responsibly sourced materials and exploring where investment and partnerships can reduce the cost of advanced technologies. To support an all-electric future, we have made critical investments to contractually secure all battery raw materials to support our goal of 1 million units of EV capacity in North America in 2025.

We also acknowledge the economic and climate benefits of the incentives provided by the clean energy provisions of the Inflation Reduction Act, namely the on-shoring and ally-shoring of the EV supply chain.

In the sections that follow, the details under Risk Trends, Primary Drivers, Implications for the Automotive Sector and Climate Risk Assessment are based on an analysis report produced by a third party and should not be considered predictions or forecasts by GM.



Physical Risks

Risk: Increased climate events disrupting GM production

Risk

Description

Time Horizon: Medium (three to five years)

Increased intensity, frequency or duration of storms, droughts and other severe weather events as a result of climate change may disrupt our production and the production, logistics, cost and procurement of products from our suppliers, and timely delivery of vehicles to customers, and could negatively impact working conditions at our plants and those of our suppliers. Any of the foregoing could have a material adverse effect on our financial condition and results of operations.

In some cases, certain GM facilities produce products, systems, components and parts that disproportionately contribute to a greater degree to our profitability than others, and create significant interdependencies among manufacturing facilities around the world. Should these or other facilities become unavailable, either temporarily or permanently, the inability to manufacture at the affected facility may in the future result in harm to our reputation, increased costs, lower revenues and the loss of customers. We may not be able to easily shift production to other facilities or to make up for lost production. Any new facility needed to replace an inoperable manufacturing facility would need to comply with necessary regulatory requirements, need to satisfy our specialized manufacturing requirements and require specialized equipment.

Assessment

Risk Trends

Each region faces a unique set of climate-related risks that are expected to increase in frequency and intensity. GM production facilities in the United States could be threatened by flooding and severe storm events, as well as the long-term impacts of heat and drought. For example, freezing temperatures and grid failures caused by Winter Storm Uri resulted in a temporary disruption to production and increased electricity costs at the GM Arlington Assembly plant in February 2021, and Winter Storm Elliot threatened to impact GM's Midwest sites in December 2022. Facilities in Mexico could primarily be threatened by the compounding effects of hotter and drier climate conditions leading to extreme heat, drought and wildfire impacts. Facilities in China could face the risk of extreme flooding events driven by heavy precipitation, riverine flooding and coastal threats.⁶

Primary Drivers

- Increasing frequency and intensity of severe weather events (e.g., flooding, wildfires, severe storms, cyclones)
- Long-term changes in climate conditions (e.g., sea level rise, temperature and precipitation patterns)
- Increasing exposure to hazardous weather events in locations with key production facilities

Implications for the Automotive Sector

Increasing climate disasters may threaten the viability of production in certain regions, especially in already high-risk locations.

Climate Risk Assessment

High-Carbon Pathway

Severe climate change due to unmitigated GHG emissions may have significant socioeconomic implications such as increased poverty and socioeconomic destabilization, threatening quality of life, health outcomes and gross domestic product. Severe weather events may occur with increasing frequency and intensity in previously unaffected locations, while impacts at high-risk locations could become unmanageable. Critical infrastructure could be regularly disrupted or damaged, leading to production stoppages, increased downtime and loss of assets or inventory, while increasing utility and maintenance costs could affect profitability. Changing climate conditions could also lead to increasing utility costs and additional maintenance burdens, reducing the lifetime of assets and increasing overall operational costs.

Low-Carbon Pathway

Climate change could continue to disrupt livelihoods across the world, but economies are expected to recover as the worst physical impacts of climate change may have been avoided. Most health and safety impacts would remain at manageable levels while critical transportation, electric, telecommunications and production facilities are expected to only be disrupted occasionally by extreme weather events.

⁶ Source: IPCC Sixth Assessment Report (AR6), WG1: The Physical Science Basis (2021); Aon Weather, Climate, and Catastrophe Insight (2023); NOAA National Centers for Environmental Information: Heat, drought and floods: 2022's extreme weather and climate impact—Washington Post (2023); Flooding in Central China Kills 21, Forces Thousands Evacuated—Bloomberg (2021); China reports 'most severe' heatwave and third driest summer on record—The Guardian (2022); Northern Mexico has a historic water shortage. These maps explain why.—Washington Post (2022); Wettest 24 hours in nearly a century for Dallas-Fort Worth—Yale Climate Connections (2022).

Physical Risks

Risk: Increased climate events disrupting GM production

Response

Our Approach



Our Global Energy Strategy Team works on proactive and reactive strategies to mitigate the impact of grid interruptions. This includes developing a robust Utility Restoration Plan for when facilities are impacted. When an event occurs, this plan supports sites in restoring power as quickly as possible by leveraging GM's relationships with utilities companies. These relationships are also used to support GM suppliers impacted by utility outages.

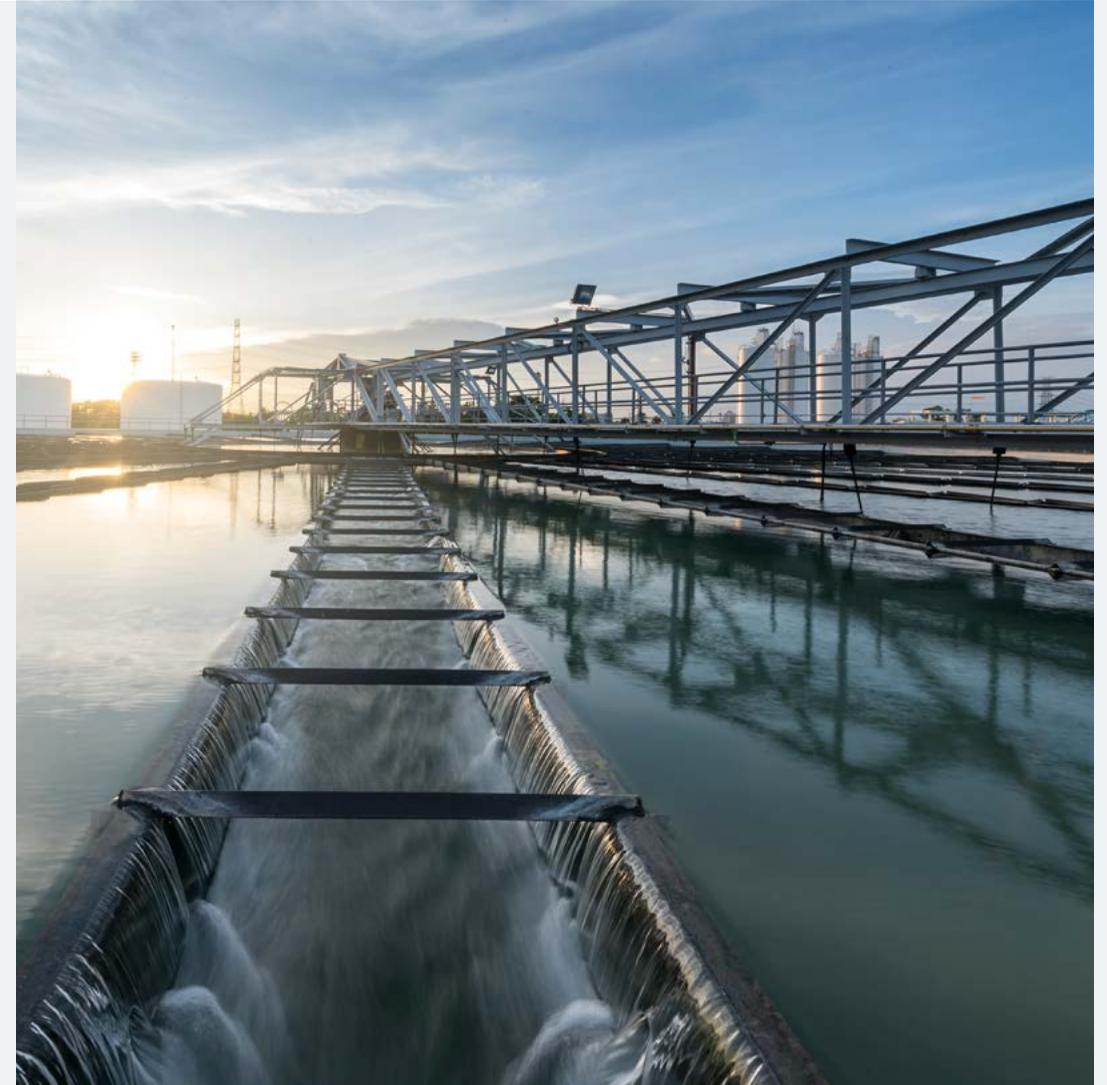
Grid interruptions and their effect on facility operations are tracked and analyzed for trends by specific sites and utilities. Site utility managers and the Global Energy Strategy Team are evaluating tools and technologies to help mitigate risk to critical equipment and to reduce production downtime for sites that are susceptible to frequent outages.

Water is managed locally, with each facility setting its own annual improvement targets in line with the level of water stress in the area. Innovative approaches have allowed facilities to continue production without disruptions, even in water-stressed areas such as Mexico and China. We have integrated water management into our annual business planning processes and remain dedicated to achieving our 2035 goal to reduce the water intensity of our operations by 35% compared to a 2010 baseline. And in 2021, we signed the CEO Water Mandate—a UN Global Compact initiative—joining other global business leaders in addressing key challenges around water security. We are mapping our water progress and achievements against the mandate's six core target areas: direct operations, supply chain and watershed management, collective action, public policy, community education and transparency.

We continue to strive for efficiency and use of renewable energy to transition toward a low-carbon pathway, and we make capital investments for maintenance and upgrades to our facilities to build resilience into our operational infrastructure.

As an example, when a tornado categorized by the National Weather Service as EF-3 hit our GM Bowling Green Assembly plant in December 2021, production was delayed as the teams worked to restore tooling, equipment and the facility to standard. Collaboration with other GM facilities allowed plant leaders to form a recovery plan to resume operations in a timely manner. Among other actions, high-resolution imagery via drone was used to quickly assess damage and prepare a plan of action for repairs, and materials and resources were redirected from other GM locations to the plant.

As the risk of tornado damage in Bowling Green is higher than average,⁷ our Bowling Green Assembly plant could be threatened by future tornadoes. The potential financial impact of a future tornado to this facility would depend on the extent of repair, support, collaboration and other efforts required based on damage incurred, and would be approached with an objective of resuming production safely and without disruption to the customer experience. Such costs would be case specific and could exceed \$100 million, including estimates for repair costs, loss of sales, vehicle damages, logistics, and time and resources from other plants. Steps we have taken to enhance infrastructure resilience include our 2021 roof repair of approximately \$50 million at our Bowling Green Assembly plant, which includes upgrades such as specialized roofing designed to mitigate wind impact.



⁷ Source: <http://www.usa.com/bowling-green-ky-natural-disasters-extremes.htm>

Physical Risks

Risk: Increased climate events potentially impacting suppliers

Risk

Description

Time Horizon: Medium (three to five years)

Increased intensity, frequency or duration of storms, droughts and other severe weather events as a result of climate change may disrupt our production, the production, logistics, cost and procurement of products from our suppliers, and the timely delivery of vehicles to customers, and could negatively impact working conditions at our plants and those of our suppliers. Any of the foregoing could have a material adverse effect on our financial condition and results of operations.

We purchase a wide variety of raw materials, systems, components, parts, supplies, energy, freight, transportation and other services from numerous suppliers to manufacture our products. In some instances, we purchase systems, components, parts and supplies from a single source, which may increase risk of supply disruptions. The raw materials primarily include steel, aluminum, resins, copper, lead, precious metals and raw materials used in EVs.

Assessment

Risk Trends

Potential features of a high-carbon future, such as hot temperature extremes, heavy precipitation events and severe drought events may become more frequent, with the most severe events expected to increase in intensity. Some of the key raw materials for EVs, such as lithium, cobalt, copper and nickel, are especially vulnerable to water-stress impacts, since droughts and flooding affect exploration, processing, operations, transport and other important production and supply chain processes.

Furthermore, many of the world's largest copper and lithium mines are located in areas of high, or extremely high, water stress, including the southern United States, Mexico, the western coast of South America, southern Africa and China.

Climate and weather hazards that led to supply chain disruption in 2022 include Hurricane Ian in the Caribbean, droughts in the central United States, Europe and China, and flooding in Australia, Pakistan and China.⁸

Primary Drivers

- Increasing frequency and intensity of severe weather events (e.g., flooding, wildfires, severe storms and cyclones)
- Long-term changes in the climate and environment (e.g., sea level rise, temperature and precipitation patterns)
- Changing exposure to climate risks at key supplier locations, especially at raw material production sites, exacerbating existing mineral supply risks

Implications for the Automotive Sector

Increasing climate disasters may affect the flow of goods and services through logistical delays and the disruption of entire supply chains.

Climate Risk Assessment

High-Carbon Pathway

The increase in extreme weather events may intensify disruptions to key production facilities, leading to additional facility shutdowns and production delays, while extreme temperatures could also lead to equipment failures and power outages, delaying the production of critical materials. Increasing water stress and temperatures may impact production costs of critical minerals including lithium, as production processes are water-intensive, as well as higher maintenance and utility costs. Climate-related disruptions to supply chains may intensify, leading to downstream production delays and shutdowns of transportation networks. For example, rising sea levels and coastal flooding may threaten the viability of ports, while intense droughts may see water levels in shipping lanes fall too low for cargo ships.

Low-Carbon Pathway

Extreme weather events may continue to occur. However, disruption to supply chains, in the form of production shutdowns, damage to facilities and increased production costs, are expected to be reduced and more localized in nature.

⁸ Source: Aon

Physical Risks

Risk: Increased climate events potentially impacting suppliers

Response

Our Approach



Supply chain visibility is key to proactively identifying and mitigating sustainability risks and impacts. Our in-house supply chain visibility tool integrates GM plants, Tier I, II and III suppliers, and logistics nodes to map geographic locations and relationships across our global supply chain. We work with suppliers to prepare for climate-related risks, an approach that includes establishing disaster plans.

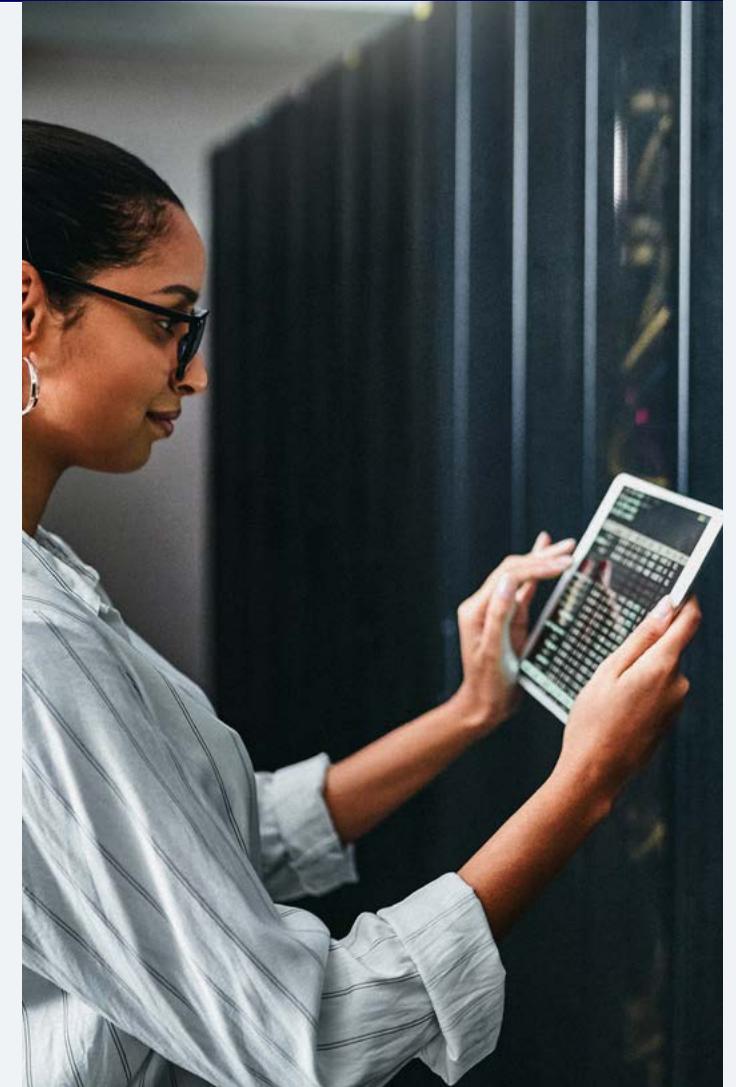
Supply Chain Monitoring



Our Risk and Resiliency Team constantly monitors climate-related hazards and geopolitical issues around the world, sets up local supply agreements to guarantee supply of needed products, and monitors the availability of water in drilling and mining sites. We also rely on relationships with our utility companies to help restore grid access during outages to support our supplier operations.

Our approach also involves supporting key suppliers with risk mitigation and management where appropriate, embedding disaster preparedness, climate resilience and business continuity requirements in request for quotes (RFQs) for new suppliers, and securing redundant energy supplies and strong utility relationships.

Learn more about our approach to raw materials in the [“Reduced availability of raw materials impacting the cost of vehicle production” transition risk](#) in the next section of this report.



Transition Risks

GM is moving toward an all-electric future, but there are transition risks associated with the social and economic shift toward a lower-carbon economy. These include policy, legal and regulatory risks such as carbon disclosure requirements; technological risks such as developing EVs and charging infrastructure; market risks such as the supply of raw materials; and reputational risks such as changing consumer preferences.

In the sections that follow, the details under Risk Trends, Primary Drivers, Implications for the Automotive Sector and Climate Risk Assessment are based on an analysis report produced by a third party and should not be considered predictions or forecasts by GM.



Risk: Reduced availability of raw materials impacting the cost of vehicle production

Risk

Description

Time Horizon: Long (greater than five years)

Any increase in the cost, or reduced availability, of critical materials for our EV propulsion systems, including lithium, nickel, cobalt and certain rare earth metals, could lead to higher production costs for our EVs and could impede our ability to successfully deliver on our EV strategy.

Further, increasing global demand for, and uncertain supply of, such materials could disrupt our or our suppliers' ability to obtain such materials in a timely manner and/or could lead to increased costs. Geopolitical risk, fluctuations in supply and demand, fluctuations in interest rates, any weakening of the U.S. dollar, and other economic and political factors have created and may continue to create pricing pressure for commodities, raw materials and other inputs. These inflationary pressures could, in turn, negatively impact our profitability because we may not be able to pass all of those costs on to our customers or require our suppliers to absorb such costs.

Assessment

Risk Trends

Lithium prices reached an all-time high in November 2022, representing a 200% year-over-year increase, affected by significantly increased demand for EV batteries.⁹ Geographically concentrated production could mean high climate stress, which could increase the risk of supply disruptions. For example, water stress may impact the supply of lithium in the United States and Australia, copper in the United States, Mexico and Chile, and nickel in South Africa and Australia.

In recent years, cobalt has been prone to significant price spikes, driven by significant demand for EV battery production and reliance on suppliers in the Democratic Republic of Congo for the majority of production.⁹

In March 2022, the price of nickel spiked 250% in a single day. Price fluctuations are being driven by a significant increase in demand for EV battery materials, with the potential for delays and cost overruns in production affecting supply.¹⁰

Primary Drivers

- Increased demand for key minerals to support the transition to EVs and clean energy
- Constraints on resources available for mining and refinement capabilities
- Current mineral supply risks that may be exacerbated by climate change

Implications for the Automotive Sector

High prices and uncertain availability of commodities, raw materials or other inputs used by us and our suppliers.

⁹ Commodity financial trends sourced from [Trading Economics](#).

¹⁰ Nickel financial trends sourced from [Bloomberg](#).

Transition Risks

Risk: Reduced availability of raw materials impacting the cost of vehicle production

Assessment

Climate Risk Assessment



High-Carbon Pathway

A slower transition to EVs could keep raw material costs generally lower, but more pronounced physical climate impacts may cause more frequent supply disruptions and associated price spikes. By 2040, demand for lithium and cobalt could be notably higher than in 2020, while copper and nickel demand may see modest growth.¹¹ Supply is expected to mostly maintain pace with demand.

Low-Carbon Pathway

Faster adoption of EVs and clean energy could drive demand for key minerals, increasing costs and difficulties in procuring raw materials. In the next few decades, the demand for lithium and cobalt, copper and nickel would be likely to increase significantly compared to 2020.

Response

Our Approach



Within GM, teams dedicated to risk and resiliency, critical minerals and battery materials manage supply chain-related risks. We work with Tier I suppliers to help identify supply risks and develop contingency plans, and new vendors must meet risk management requirements before doing business with us. We also collect data to better understand risks deeper into our supply chain. GM's Risk and Resiliency Team actively forms risk mitigation plans and we share information about raw material-related risks with key stakeholders.

To mitigate risk factors related to raw materials procurement, we require our suppliers to follow the standards set out by the Initiative for Responsible Mining Assurance, a framework that provides a list of expectations for responsible mines, based on four elements:

- Business integrity: Legal compliance, human rights, transparency, etc.
- Planning for positive legacies: Community support, managing environmental and social impact
- Social responsibility: Labor issues, health and safety, security, etc.
- Environmental responsibility: Waste and water management, air quality, GHG emissions, etc.

Please see the Sourcing Strategic Raw Materials section of our [2022 Sustainability Report](#) for more detail.

Our transition to EVs requires building a more resilient, scalable and sustainable North America-focused supply chain. We have recently announced critical investments to contractually secure all battery raw materials to support our goal of 1 million units of EV capacity in North America in 2025.



¹¹ Commodity financial trends sourced from [Trading Economics](#).

Transition Risks

Risk: Lack of EV charging infrastructure impacting consumer demand for EVs

Risk

Description



Time Horizon: Medium (three to five years)

Consumer adoption of EVs will be critical to the success of our strategy and could be impacted by numerous factors. These include the proliferation of charging infrastructure, in particular with respect to public EV charging stations, and the success of the company's charging infrastructure programs, strategic joint ventures and other relationships. They also include failure by governments and other third parties to make the investments necessary to make infrastructure improvements, such as greater availability of cleaner energy grids and EV charging stations. If we are unable to successfully deliver on our EV strategy, it could materially and adversely affect our results of operations, financial condition and growth prospects, and could negatively impact our brand and reputation.

Assessment

Risk Trends



The United States could expect a 376% increase in EV uptake by 2030.¹² Existing government commitments¹³ are expected to cover charging needs in a high-carbon future and around 60% of needs in a low-carbon future. And according to the International Energy Agency Global EV Outlook 2022, government commitments in China are already in place to meet the projected growth of demand in the country.

Primary Drivers



- Increasing number of EVs on the road creating increasing demand for charging infrastructure
- Regulations¹³ in large markets targeting an increase in supply of charging infrastructure

Implications for the Automotive Sector



Lack of sufficient charging infrastructure would constrain consumer demand, impacting automakers' EV strategies.

Climate Risk Assessment



High-Carbon Pathway

Slow EV growth and current charging infrastructure commitments may meet near-term demand, with ICE vehicles representing 80% of 2030 sales shares.¹⁴ In both the United States and China, existing commitments are expected to be sufficient to meet near-term demand. Significant automaker investments in charging infrastructure may not be needed.

Low-Carbon Pathway

Strong EV growth will demand heavy investment, or customer demand may be negatively impacted. Both public and private investors, including automakers, will be needed, and widescale deployment of charging infrastructure may cause the price of materials to increase. According to the International Energy Agency Global EV Outlook 2022, any new facility needed to replace an inoperable manufacturing facility would need to comply with necessary regulatory requirements, need to satisfy our specialized manufacturing requirements and require specialized equipment. Existing national commitments are sufficient to meet around 60% of this demand in the United States, while in China, sufficient commitments have already been made.

¹² Source: <https://www.iea.org/data-and-statistics/charts/global-ev-sales-by-scenario-2020-2030>

¹³ Source: [White House: NEVI-Environment-FHWA](#)

¹⁴ Source: [IEA Global EV Outlook 2022](#)

Transition Risks

Risk: Lack of EV charging infrastructure impacting consumer demand for EVs

Response

Our Approach



In line with our commitment to a zero-emissions future, we are working to create one of the largest integrated charging ecosystems. Ultium Charge 360 is our holistic approach to charging in the United States and Canada, which provides broad charging access and simplifies the charging experience for EV drivers at home, in the community or on the highway.

Through Ultium Charge 360 we have integrations with 12 charging networks, products and services to help bring a unified charging experience to GM EV customers.

GM has announced plans, through strategic collaborations, to install more than 5,000 DC fast chargers in the United States, and up to 40,000 Level 2 chargers throughout the United States and Canada, in addition to providing access to the nearly 13,000 existing DC fast chargers in North America today and growing.

Through GM's metropolitan fast-charging program, GM and EVgo will install 3,250 DC fast chargers in 50+ major metro areas for EV drivers who live in multi-unit homes, rentals or are otherwise unable to charge at home or work.

Through our highway fast-charging program, GM, Pilot Company and EVgo will install 2,000 DC fast chargers at up to 500 Pilot and Flying J travel centers to enable long-distance travel and road trips. We anticipate having about 200 chargers available for use by the end of 2023.

In 2023, GM announced a collaboration with Tesla to integrate the North American Charging Standard (NACS) in our EVs beginning in 2025. Additionally, the collaboration will expand access to charging for GM EV drivers at 12,000 Tesla Superchargers and growing, throughout North America, beginning in 2024. This agreement complements GM's ongoing investments in charging, reinforcing the company's focus on expanding charging access across home, workplace and public spaces and builds on the more than 134,000 chargers available to GM EV drivers today through the company's Ultium Charge 360 initiative and mobile apps.

These initiatives, combined with this new collaboration with Tesla, will offer GM customers access to one of the largest integrated networks of high-power charging stations in North America.

In addition to establishing key relationships with EV charging station operators, our approach also includes educating and advocating the government for the deployment of public charging infrastructure and for policies that support process streamlining and better electricity rates.

In the next three years, GM plans to move aggressively toward EV leadership as EV adoption is expected to approach 20% of U.S. industry sales in 2025. We are planning to rapidly scale our annual capacity to 1 million EVs for North America by 2025. Additionally, we previously announced our expectation to grow EV revenue to \$50 billion or more by 2025.

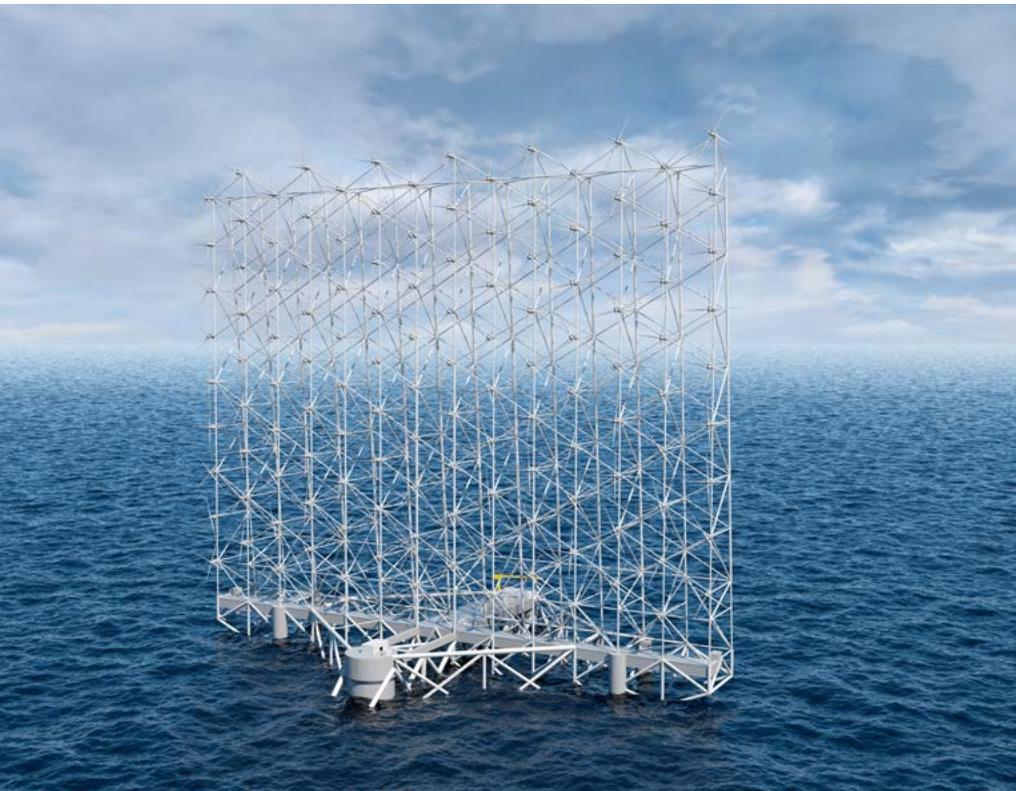
Please see the Ultium Charge 360 section of our [2022 Sustainability Report](#) for more detail.



Climate-Related Opportunities

Efforts to mitigate and adapt to climate change also produce opportunities through resource and process efficiency, the use of renewable energy, the development of new products and services, access to new markets, and suppliers becoming more resilient to the effects of climate change. These can result in lower costs, diversification and an improved competitive position.

In the following opportunity, the details under Description, Opportunity Trends, Primary Drivers, Implications for the Automotive Sector and Climate Opportunity Assessment are based on an analysis report produced by a third party and should not be considered predictions or forecasts by GM.



Opportunity: Increased capital availability due to investor interest in sustainability

Opportunity

Description

Time Horizon: Short (zero to three years)

Companies with high ESG scores, generally experience lower costs of capital compared to companies with low ESG scores.

Assessment

Opportunity Trends

Companies with high scores from ESG rating agencies generally experience lower costs of capital, compared to companies with poor ESG scores, due to being less susceptible to systematic market risks through better management of resources, human capital and company-specific operational risks.

Another factor to consider is investor interest in ESG issues. GM's top four investors, which own 22.5% of the company's shares between them, all support TCFD and other ESG frameworks and alliances. BlackRock and other institutional investors have threatened to vote against management and board directors when companies are not making sufficient progress on sustainability-related disclosures and performance.

Primary Drivers

- Trends in the cost of capital to define the expected returns on an investment
- Investor response to company action on sustainability

Implications for the Automotive Sector

Opportunities to raise capital related to low-carbon transport will expand.

Climate-Related Opportunities

Opportunity: Increased capital availability due to investor interest in sustainability

Assessment

Climate Opportunity Assessment

High-Carbon Pathway

It is expected that declining or steady ESG performance and disclosures may lead to higher costs of capital and a lack of investor interest due to comparatively higher risk. In this scenario, automotive companies could be omitted from sustainability funds due to ESG underperformance and potential investor divestment if automakers do not consider physical climate risks. Companies would experience higher capital, equity and debt costs.

Low-Carbon Pathway

It is expected that aggressive mitigation and improving ESG performance and disclosures will lead to inclusion in sustainable funds, which will hold stocks with larger market capitalization and outperform traditional peer funds.

Response

Our Approach

In 2022, we created a [Sustainable Finance Framework](#) to further align our financing activities with our sustainability strategy and commitments. Under this Framework, we issued \$2.25 billion of investment-grade green bonds, our first capital markets activity that specifically supports our EV strategy. The net proceeds from our inaugural green bond, issued in August 2022, have been allocated exclusively to clean transportation, specifically two eligible projects in the GM Green-Clean Transportation category: capital expenditures toward two assembly plants, the Factory ZERO Assembly Center in Detroit-Hamtramck, Michigan and Orion Assembly, in Orion Township, Michigan. Both facilities once produced gasoline-powered vehicles and will be dedicated to building EVs. There are many factors that may affect the cost to obtain capital. As an example, the issuance costs for our August 2022 green bonds were \$14 million. Proceeds from future issuances under the framework may be used to fund projects supporting clean transportation or socioeconomic advancement and empowerment.

Learn more in the [Advancing Electrification and Autonomy](#) section of our [2022 Sustainability Report](#). GM's first [Sustainable Finance Report](#) was published in the first half of 2023.



Climate-Related Opportunities

Opportunity: Shift in consumer preferences toward EVs, creating sales and new customer opportunities

Opportunity

In the following opportunity, the details under Opportunity Trends, Primary Drivers, Implications for the Automotive Sector and Climate Opportunity Assessment are based on an analysis report produced by a third party and should not be considered predictions or forecasts by GM.

Description



Time Horizon: Long (greater than five years)

We have an opportunity to grow our vehicle and financing revenue by continuing to capitalize on the strength of our established vehicle franchises and customer base, and scaling our EV production through this decade. We also have the potential of growing our revenue through our software-enabled services and subscriptions, including OnStar, our advanced driver assistance systems (ADAS), including Super Cruise, and future offerings, such as our next-generation ADAS, Ultra Cruise and Ultifi, our end-to-end software platform. Additionally, we are incubating several new businesses with a startup mindset that we believe will enable us to attract new customers and generate revenues in new areas.

¹⁵ Source: <https://www.lazard.com/research-insights/2022-global-automotive-supplier-study/>

¹⁶ Source: [Cox Automotive](#)

¹⁷ Source: [IEA Global EV Outlook 2022](#)

Assessment

Opportunity Trends



Market opportunities for ICE vehicles typically flow from vehicle hardware and design. For EVs, computing is the key component, creating market opportunities for central software processors able to manage the battery, run electric motors and provide over-the-air vehicle upgrades.

Investment banks have identified several new markets with high margin potential, which include software-driven ADAS, connectivity and infotainment systems, as well as powertrain technologies related to charging, thermal management and battery cells. EV software and drivetrain is projected to account for 40% of the global automotive component market in 2030, up from 17% in 2019.¹⁵

Additionally, for technologies such as autonomous vehicles (AVs), EVs may be better equipped to handle the advanced sensing and computing hardware, since the battery is a more stable power source, able to support higher-powered AV components.

Primary Drivers



- EV market increases
- EV value opportunities stem from nontraditional automotive opportunities like software

Implications for the Automotive Sector



New markets with high margin potential will emerge, including software-driven systems and powertrain technologies.

Climate Opportunity Assessment



High-Carbon Pathway

A relatively unchanged EV and ICE vehicle market split may halt growth opportunities in software and battery technologies. Customer interest in software-based services is currently below 50%,¹⁶ while ICE vehicles represent 80% of sales shares,¹⁷ generating continued demand for ICE vehicle-related technology and lower potential revenue for EVs.

Low-Carbon Pathway

A scenario with aggressive mitigation could see a growing EV market, which supports a shift away from traditional market opportunities. For example, customer interest in software subscription-based services may grow, with behavioral insights enabling real-time designed experiences to be delivered over the air. In this scenario, a significant portion of margins in the industry could derive from EV-related systems such as software and powertrains.

Climate-Related Opportunities

Opportunity: Shift in consumer preferences toward EVs creating sales and new customer opportunities

Response

Our Approach



We are planning to rapidly scale our annual capacity to 1 million EVs for North America in 2025. A key element in our EV strategy is Ultium, our dedicated EV propulsion architecture. This platform is flexible and will be leveraged across multiple brands and vehicle sizes, styles and drive configurations, allowing for quick response to customer preferences and a shorter design and development lead time compared to our ICE vehicles. We plan to leverage the versatility and flexibility of Ultium to expand our EV portfolio over a wide variety of segments and price points. Additionally, we previously announced our expectation to grow EV revenue to \$50 billion or more by 2025.

GM is working to accelerate EV adoption by delivering a range of EV models across categories and through investments in the EV ecosystem, including home, workplace and public charging, energy management and education. We are also focusing on bidirectional and V2X technologies, including vehicle to home (V2H) and vehicle to grid (V2G) to help minimize energy costs and capitalize on new streams of revenue.

Ultifi is our end-to-end software platform that will provide customers with software-defined features, apps and services over the air, starting in 2023. Ultifi and the apps it enables will empower customers to update their ownership experiences with desirable features such as services and subscriptions, vehicle performance, Super Cruise and, when launched, Ultra Cruise, safety and security features, climate and comfort options, personal themes and EV ownership experience elements. We see the opportunity for Ultifi to help open up \$20-\$25 billion in annual software and service revenue by 2030, including OnStar.

To transform delivery and logistics, we also launched BrightDrop, a wholly owned subsidiary currently operating in the United States and Canada that primarily serves two markets: last-mile package deliveries and online grocery deliveries. We previously announced an investment of approximately \$800 million (\$1 billion CAD) at the CAMI Assembly plant in Ontario, which has subsequently commenced production of the BrightDrop Zevo 600 and BrightDrop Zevo 400.



Metrics and Targets

To help us mitigate our contributions to climate change, we have set a number of climate-related targets. We also track and disclose our performance using energy efficiency, CO2 emissions and the percentage of renewable electricity as our key metrics.

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evaluate.

Climate-Related Targets

The Office of Sustainability leaders are charged with innovating and advocating for the acceleration of our vision of zero crashes, zero emissions and zero congestion. In this role, they provide thought leadership to the entire organization on sustainability-related matters, including strategy. Leaders also ensure that sustainability is integrated into business functions and processes, often convening cross-functional experts to identify opportunities and solve challenges that can be implemented at the operational level.

To manage and measure progress over the next decade and beyond, GM is working toward a comprehensive set of goals. To read more about GM's Climate-Related Targets, please see our [Climate Transition Plan](#).

(Below) Preproduction model shown. Actual production model may vary. Model Year 2024 Chevrolet Equinox EV available fall 2023.





Climate-Related Metrics

Well-to-Wheel CO2 Emissions per Light-Duty Vehicle¹⁸ (gCO2e/km)

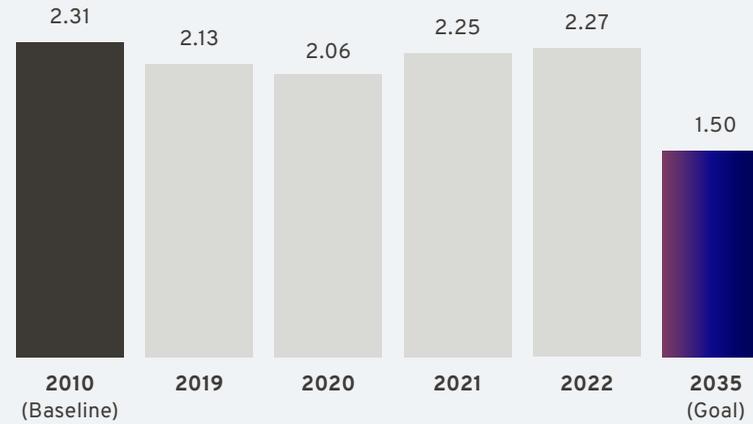
	2018	2019	2020	2021	2022
United States	287	293	280	301	290
China	220	208	206	206	194
Brazil	200	198	195	201	200
Total Weighted Average	245	243	240	246	233

Estimated Avoided Emissions (Metric Tons CO2e per Functional Unit) Compared to Reference Product/Service or Baseline Scenario

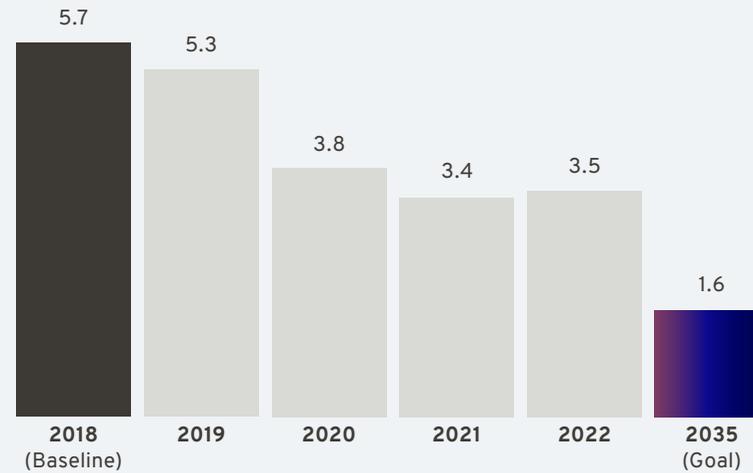
2021: **14.9M** | 2022: **16.7M**

Our [Data Center](#) provides a comprehensive summary of the environmental metrics related to our products and operations.

Energy Intensity¹⁹ (MWh/Vehicle) Energy Used in GM's Operations

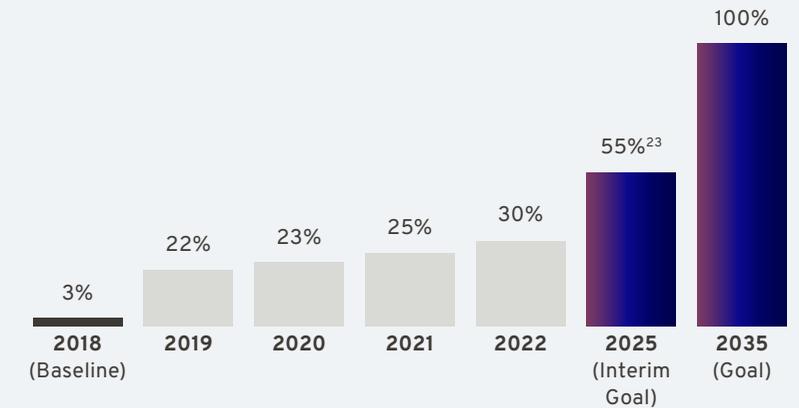


Absolute Scope 1 & 2 Emissions^{20, 21, 22} (Million Metric Tons CO2e)

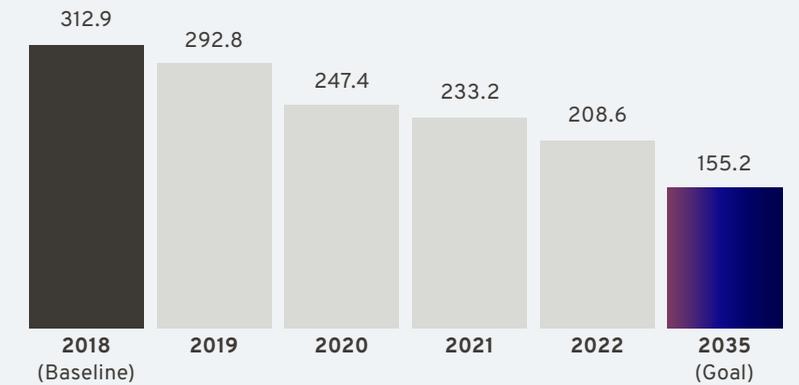


²¹ GM's Scope 1 emissions are generated from the use of fossil fuels, mostly natural gas for process and building heat.
²² GM's Scope 2 emissions are mostly from electricity used in our operations for process and building with some purchased steam and delivered heat by third parties.

Renewable Energy as a Percentage of Global Electricity Use



Absolute Scope 3 Emissions²⁴ (Million Metric Tons CO2e) Category 11: Use of Sold Products



²³ Based on estimated forecasted global renewable energy sourced through currently executed agreements, subject to change depending on actual future electric usage in operations and actual future renewable generation.
²⁴ GM's Scope 3 emissions are calculated in reference to the GHG Protocol for all 15 categories. Category 11: Use of Sold Products is calculated using the well-to-wheel method, consistent with Science Based Target (SBT) requirements.

¹⁸ Data aligns with Science Based Targets initiative (SBTi) for Scope 3: Use of Sold Products. The SBTi standards require well-to-wheel (from fuel production to vehicle driving) for vehicle CO2 intensity (gCO2e/km) calculations.
¹⁹ This is based on the production of 6,075,449 light-duty vehicles and includes all of our energy sources. The boundary for this is within the scope of our organization.
²⁰ Baseline year 2018 and includes all facilities under GM operational control. Calculation includes CO2, CH4 and N2O. Reporting is based on the GHG Protocol, and the source of emissions factors is regulatory or IPCC Good Practice Guidelines.

Task Force on Climate-related Financial Disclosures (TCFD) Index

Disclosure Focus Area	Disclosure	Response and Location
Governance		
Disclose the organization's governance around climate-related risks and opportunities.	a) Describe the board's oversight of climate-related risks and opportunities.	GM 2022 TCFD Report > Governance > Board Oversight CDP Climate Change 2023: C1.1
	b) Describe management's role in assessing and managing climate-related risks and opportunities.	GM 2022 TCFD Report > Governance > Management Oversight CDP Climate Change 2023: C1.2
Strategy		
Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.	GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities CDP Climate Change 2023: C2.1, C2.2, C2.3, C2.4
	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.	GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Physical Risks, Transition Risks and Climate-Related Opportunities CDP Climate Change 2023: C3.1, C3.2, C3.3, C3.4
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan GM 2022 TCFD Report > Risk Management > Climate Risk Assessment: Methodology GM 2022 TCFD Report > Risk Management > Managing Climate-Related Risks GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Physical Risks, Transition Risks and Climate-Related Opportunities CDP Climate Change 2023: C3.1, C3.2, C3.3, C3.4, C12.3b



Disclosure Focus Area	Disclosure	Response and Location
Risk Management		
Disclose how the organization identifies, assesses and manages climate-related risks.	a) Describe the organization's processes for identifying and assessing climate-related risks.	GM 2022 TCFD Report > Risk Management > Identifying and Assessing Climate-Related Risks CDP Climate Change 2023: C2.2
	b) Describe the organization's processes for managing climate-related risks.	GM 2022 TCFD Report > Risk Management > Managing Climate-Related Risks CDP Climate Change 2023: C1.2, C2.1, C2.2, C2.3
	c) Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	GM 2022 TCFD Report > Risk Management > Managing Climate-Related Risks CDP Climate Change 2023: C2.2
Metrics and Targets		
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan GM 2022 TCFD Report > Metrics and Targets GM 2022 Sustainability Supplement > Data Center > Environmental > Global Emissions, Global EV Portfolio, Global Sales Volume of Alternative Drive Train Vehicles, Advanced Powertrain Technologies (Percent of Total U.S. Volume), Sales-Weighted Average Passenger Fleet Fuel Economy by Region (gCO2/km), and Global Energy CDP Climate Change 2023: C4.1, C4.2, C5, C6, C7, C8, C9
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and the related risks.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan GM 2022 TCFD Report > Metrics and Targets > Climate-Related Metrics CDP Climate Change 2023: C6.1, C6.2, C6.3, C6.4, C6.5
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan GM 2022 TCFD Report > Metrics and Targets > Climate-Related Targets CDP Climate Change 2023: C4.1, C4.2



Disclosure Focus Area	Disclosure	Response and Location
Cross-Industry, Climate-Related Metrics		
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.	GHG Emissions: Absolute Scope 1, Scope 2 and Scope 3; emissions intensity.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan GM 2022 TCFD Report > Metrics and Targets > Climate-Related Metrics GM 2022 Sustainability Supplement > Data Center > Environmental > Global Emissions and Sales-Weighted Average Passenger Fleet Fuel Economy by Region (gCO2/km) CDP Climate Change 2023: C6.1, C6.2, C6.3, C6.4, C6.5
	Transition Risks: Amount and extent of assets or business activities vulnerable to transition risks.	GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Transition Risks CDP Climate Change 2023: C2.3
	Physical Risks: Amount and extent of assets or business activities vulnerable to physical risks.	GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Physical Risks CDP Climate Change 2023: C2.3
	Climate-Related Opportunities: Proportion of revenue, assets or other business activities aligned with climate-related opportunities.	GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Climate-Related Opportunities CDP Climate Change 2023: C2.4
	Capital Deployment: Amount of capital expenditure, financing or investment deployed toward climate-related risks and opportunities.	GM 2022 TCFD Report > Strategy > Increasing the Resiliency of Our Business > Climate Transition Plan, Electrification and Communities GM 2022 TCFD Report > Risk Management > Climate-Related Risks and Opportunities > Transition Risks and Climate-Related Opportunities CDP Climate Change 2023: C-TO9.6a
	Internal Carbon Prices: Price on each ton of GHG emissions used internally by an organization.	GM 2022 TCFD Report > Risk Management > Managing Climate-Related Risks CDP Climate Change 2023: C11.3
	Remuneration: Proportion of executive management remuneration linked to climate considerations.	GM 2022 TCFD Report > Governance > Board Oversight > Executive Compensation Committee (ECC) GM 2023 Proxy Statement: p58, 65-69



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