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

Dow Disclosures – TCFD Disclosure Report

Category Governance: Disclose the organization's governance around climate-related risks and opportunities

Describe the board's oversight of climate-related risks and opportunities.

Enterprise risk management is a strategic priority within the Company and responsibility for managing risk rests with management while the Committees and the Board provide oversight. The Board oversees, reviews and approves at least annually the enterprise risk management process implemented by management to identify, assess, manage and mitigate risk. Each Committee maintains additional responsibility for oversight of specific risk areas relevant to their respective charters.

The Board is also responsible for overseeing the Company's strategy development and planning process, including annual review of the corporate plan as well as overseeing the environmental, social and governance priorities of the Company, such as climate-related risks and opportunities and its path to net zero, ensuring transparency and accountability. Each Committee is responsible for oversight of specific strategic and environmental, social and governance areas relevant to their respective charters.

Enterprise Risk Management Process

The enterprise risk management process is a companywide, cross-functional assessment that identifies, assesses, manages and mitigates risks on an annual basis utilizing a broad range of data, both internal and external to Dow, including, but not limited to, strategic alignment; interrelation of risks; macroeconomic, industry, sustainability, geopolitical and regulatory trends; operations and safety; financial performance, including investor and rating agency perspectives; regulatory and compliance actions; market dynamics; and, top risks highlighted by external sources such as the WEF. Risks are then reviewed and categorized based on the potential impact and likelihood of a significant event occurring within the next five years. A member of the leadership team is accountable for each identified risk and, if needed, involves internal subject matter experts. Key risks that have specified mitigation actions are reviewed more regularly in leadership team meetings.

Key risks, including short- and intermediate-term risks, and emerging risks are also regularly evaluated at meetings of the Committees and Board, including climate-related risks. Risks may be reassessed from time to time based on factors such as changes in the external and macroeconomic environment, concerns identified by management or the Board, or through detection in Dow's internal work processes.

Enterprise risks are evaluated quarterly with the controller's team and disclosure counsel to determine if additional risk factors should be included in the Company's periodic reports such as the Annual Report on Form 10-K~ and subsequent Quarterly Reports on Form 10-Q~ ("Periodic Reports"). Principal risks that may negatively impact the future results of the Company are reviewed at least quarterly with the Audit Committee and full Board if necessary and a detailed discussion is included in the section titled "Risk Factors" in the Periodic Reports. In addition, the Board believes that having an independent Lead Director enhances the Board's independent oversight of the Company's risk mitigation efforts by enabling consultation between the Board chair and independent Lead Director on time-sensitive risks.

Committee Responsibilities and Oversight of Risk Management

	AUDIT COMMITTEE	COMPENSATION & LEADERSHIP DEVELOPMENT COMMITTEE	CORPORATE GOVERNANCE COMMITTEE	ENVIRONMENT, HEALTH, SAFETY & TECHNOLOGY COMMITTEE
Areas of Responsibility	• External reporting, risk management, internal controls, compliance with legal and regulatory requirements, and environmental, social and governance reporting frameworks	• ID&E, work environment and culture, remuneration and incentives to drive accountability and progress on the Company's financial and environmental, social and governance performance	• Corporate governance principles, board composition and performance, governance best practices, compliance with legal and regulatory requirements, and environmental, social and governance reporting frameworks	• Environmental performance, health, safety, community, corporate citizenship, social responsibility, public policy, sustainability, climate, science and technology
Areas of Risk Management	• Risk management approach and process; management and effectiveness of accounting, auditing, external reporting, ethics, compliance and internal controls, and cybersecurity	• Executive compensation and benefits policies, practices and disclosures, leadership succession planning and talent management, work environment and culture	• Director independence, Board refreshment and succession planning, overall Board effectiveness, potential conflicts of interest and other governance, reporting and compliance matters	• Environment, health and safety policies and operations, emerging regulatory developments, sustainability, climate, reporting and compliance matters

Although each Committee is responsible for overseeing the management of certain responsibilities and risks as delegated to such Committees by the full Board, the full Board is updated throughout the year and at every Board meeting by the Committees, management and senior leaders. This enables the Board and the Committees to coordinate oversight and the relationships among the various priorities and risks of the Company, including those related to climate.

For additional information, see the Board Committees section starting on page 25 of the 2023 Proxy Statement↗ and the Committee charters posted on the Company's website at Corporate Governance | Dow Investor Relations↗.

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Describe management's role in assessing and managing climate-related risks and opportunities.

To manage the implementation of Dow's Climate Strategy, Dow has established a Climate Program Management Office (Climate PMO). The team is led by the Climate Steering Team (CST), which sets strategy and oversees the activities related to assessing and managing carbon-related risks and opportunities. The CST consists of executive business and functional leaders who report to either the CEO or CFO. The CST is facilitated by the Global Climate Transition Director, who also facilitates the Climate PMO.

The Climate PMO is composed of business and functional leaders from across the Company. The Climate PMO has a series of sub-teams responsible for assessing and managing carbon-related risks and opportunities, including reducing Scope 1, 2 and 3 emissions; improving metrics tracking and reporting; developing products, technologies and business models to address customers' climate-related needs; and developing and executing actions to deliver committed targets. Each sub-team is sponsored by two or more members of the CST, who are accountable for the team's success.

The Climate PMO is tasked with setting goals and targets, prioritizing actions, monitoring progress of sub-teams and ensuring alignment of cross-team objectives. Both the CST and Climate PMO meet at least every six weeks and report to the Executive Leadership Team (ELT) at a minimum of once per quarter. Climate PMO sub-teams meet more frequently as required to drive actions and progress toward project targets.

See also GRI 2-13 Delegation of responsibility for managing impacts, TCFD Category Strategy and TCFD Category Risk Management for additional information on management's role in managing climate-related risks and opportunities.

Category Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning

Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.

The table on the next page provides some of Dow's climate-related risks and opportunities, examples of potential impacts, value chain stage, time horizon and magnitude of impact that each risk or opportunity could have on the Company.

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		Risk/ Opportunity Type	Description/Driver	Examples of Potential Financial Impacts	Value Chain Stage(s) Covered	Time Horizon (term)	Magnitude of Impact
Risks	Physical	**Acute**	Increasing frequency of severe weather events	Reduced revenue from production interruptions	• Upstream • Direct operations	• Short term	Medium
		Chronic	Long-term changes in precipitation patterns leading to water scarcity	Increased capital cost to mitigate potential scarcity events (e.g., increased reservoir capacity)	• Direct operations	• Medium term • Long term	Medium
	Transitional	**Technology**	Affordability of lower-emissions technology	Increased operating costs for emissions reduction technologies, such as carbon capture and sequestration, compared with baseline	• Upstream • Direct operations	• Short term • Medium term • Long term	Medium
	Emerging	**Policy**	Increased concerns regarding plastic waste in the environment	Reduction in demand for plastics produced from non-renewable feedstocks	• Downstream • Direct operations	• Short term • Medium term	Low
Opportunities		**Technology**	Ability to access clean tech grants and subsidies	Reduced capital and/or operating cost of new technologies	• Direct operations	• Short term • Medium term • Long term	High
		Resource Efficiency	Use of more efficient product and distribution processes	Reduced operating cost as a result of efficiency gains	• Direct operations	• Short term • Medium term	Medium
		Products & Services	Dow products can enable the transition to a low-carbon economy	Increased revenues through access to new and emerging markets	• Downstream	• Short term • Medium term • Long term	High
			Development of circular materials and technologies	Increased revenue from circular product offerings	• Downstream • Direct operations	• Short term • Medium term	High
						Short (0-5 years) Medium (5-10 years) Long (>10 years)	**Risk of a material financial impact over 10 or more years**

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Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.

Evaluation of climate-related risks and opportunities continues to be a catalyst for the development of Dow's Decarbonize and Grow strategy (its climate transition plan) and its 2025 water-intensity goal.

Dow's science-based strategy includes a phased approach to decarbonize while meeting growing demand for Dow's products and contributing to a low-carbon future through continued investment in new products, technologies and processes. Dow's Decarbonize and Grow strategy involves specific actions to mitigate identified climate-related physical and transition risks, while also advancing opportunities in several key areas. These include:

- Effective water management: In Seadrift, Texas, Dow upgraded to the state-of-the-art Steamizer® XP™ flare tip to maximize smokeless performance efficiencies and reduce the impact of flaring, demonstrating 50% less steam use. Dow's Kankakee, Illinois, site is reusing effluent from a reverse osmosis unit, resulting in 30% reduction of annual wastewater generation and 14% reduction in water consumption. Dow's water body risk assessment led to the funding of long-term affordable access to safe water to families in Querétaro, Mexico, in partnership with Water.org.
- Optimizing manufacturing facilities and processes for sustainability: Dow is investing approximately $1 billion in annual capital across the economic cycle to decarbonize assets, in a phased approach, while growing capacity. This investment plan includes large, industry-leading projects, such as the announced net-zero carbon emissions (Scope 1 and Scope 2 emissions) site in Alberta, Canada, as well as emissions-reduction investments in existing facilities and replacement of end-of-life carbon-intensive assets with state-of-the-art, carbon-efficient and sustainable technologies. Also see Optimizing Our Manufacturing Facilities and Processes for Sustainability for more information.
- Increasing clean energy in purchased power mix: Dow continues to invest in cost-efficient clean energy, including wind, solar, biomass and hydropower, across its operations.
- Developing next-generation, low-carbon manufacturing technologies: Dow is investing in longer-term, future-focused manufacturing technologies that will be critical in the decarbonization of the Company's manufacturing. For example, in 2022, Dow announced the signing of a letter of intent with X-energy, a nuclear energy innovation company, to develop and deploy X-energy's advanced small modular nuclear technology at a Dow location in the U.S. Gulf Coast. This project is receiving additional support under the Department of Energy's Advanced Reactor Demonstration Program.
- Collaborating with the supply chain to tackle "upstream" carbon emissions: Approximately two-thirds of Dow's emissions footprint fall into the Scope 3 categories and more than half of those come from the raw materials, transportation and other services purchased as a company. Dow has significantly advanced its Scope 3 strategy by improving emissions accounting, advancing transparency along the value chain, and working closely with key suppliers to set and meet emissions reduction targets. In addition, Dow is embedding sustainability performance as a metric in supplier selection, contracting and relationship management, placing topics like carbon emissions as a key element of its supply chain management strategy. Dow recognizes the significant opportunity it has to collaborate with suppliers to reduce those emissions, just as Dow's customers are looking to the Company to reduce emissions for the Dow products they buy. For more information, see GRI 3-3 Management approach – Sustainable Procurement.
- Developing low-carbon products, technologies and services: Dow products are essential to a low-carbon future, and the Company wants the world's best brands to look to Dow to help them achieve their goals and make their products more sustainable. Dow is helping its customers achieve their climate goals by providing products that facilitate energy efficiency, lightweighting, fuel transition, circularity, increased operational efficiency, resource reductions and reduced emissions. For example, Dow's MobilityScience™ platform is enabling the growth of electric vehicles today and also developing cutting-edge material innovations that will enable the next generation of electric and autonomous vehicles to achieve longer range, greater comfort and enhanced safety.
- By 2030, Dow will transform plastic waste and other forms of alternative feedstock to commercialize three million metric tons of circular and renewable solutions annually. To do this, Dow will expand its efforts to stop the waste by building industrial ecosystems to collect, reuse or recycle waste and expand its portfolio to meet rapidly growing demand. For example, in 2022 Dow expanded its partnership with Mura Technology to construct multiple world-scale advanced recycling facilities in the United States and Europe, which will collectively add as much as 600 kilotons of annual advanced recycling capacity. This has additional carbon benefits, with advanced recycling processes expected to save approximately 1.5 tons of carbon dioxide per ton of plastic recycled, compared to incineration and reducing reliance on fossil-based feedstocks. For additional information, please see GRI 3-3 Management approach – Circular Economy. Additionally, Dow expects final investment decision on its Alberta investment by year-end 2023, which will create the world's first cracker and polyethylene (PE) complex with three million metric tons of PE capacity with net-zero Scope 1 and Scope 2 CO_2 emissions by ~2027-2030. Together, Dow's combined circular, renewable, and Scope 1 and Scope 2 zero-CO_2 emissions capacity will comprise >50% of its global PE capacity by 2030. Additionally, see Dow's Actions and Investments to Achieve a More Circular Economy (page 108) in 2023 Proxy Statement↗.

Capital Spending

The Company considers sustainability in all capital project decisions, ensuring projects align with the Company's long-term Sustainability Strategy, which focuses on decarbonization and growth, circularity advancement, safety of products and operations, and improved reliability of operations. Dow has also committed to allocate an average of $1 billion in annual capital, over the economic cycle, to decarbonize its assets, in a phased approach, while growing capacity.

The Company's capital expenditures include projects that support decarbonization and climate change adaptation and mitigation efforts as part of our climate transition plan. In 2022, Dow's capital expenditures were $1,823 million, which primarily reflected ongoing investment and/or completion of higher return, lower risk and quick payback incremental growth projects. Approximately $580 million of the Company's capital expenditures were aligned to projects with direct environmental sustainability drivers, of which approximately $522 million is climate-aligned capital spending that includes:

- Replacement of the Company's obsolete steam and power assets in Louisiana, resulting in lower Scope 1 GHG emissions.
- Retrofit of one of the Company's Louisiana steam facilities with Dow's proprietary FCDh technology to produce on-purpose propylene, which was completed in 2022 and will reduce energy use and greenhouse gas emissions by up to 20% compared with conventional propane dehydrogenation units.
- Addition of an integrated methylene diphenyl diisocyanate (MDI) distillation and prepolymers facility in Freeport, Texas, which is expected to be completed in 2023 and will generate lower GHG emissions and reduce freshwater intake and wastewater generation.
- Preliminary spending related to the Company's first net-zero carbon emissions manufacturing facility in Alberta, Canada.

The Company expects that projects with environmental sustainability drivers will continue to increase and are anticipated to reach more than 60% of the Company's annual capital spending by 2025, driven primarily by the Company's Decarbonize and Grow projects.

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As noted with these examples, the potential impacts of climate-related risks and opportunities are part of Dow's climate strategy and factored into Dow's business and financial planning. For complete details on Dow's energy and emissions strategies, including its plans to transition to low-carbon technology, see GRI 3-3 Management approach – Energy & Emissions Management and GRI 305-5 Reduction of Greenhouse Gas (GHG) emissions.

Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

To ensure its processes and plans are resilient, Dow uses climate-related scenarios to assess physical and transition risks. As Dow is a large consumer of energy, transition scenarios that focus on trends in energy consumption are particularly relevant to Dow. The scenarios selected were intended to span a range of potential energy futures in terms of global primary energy consumption and types. Dow selected these scenarios to cover a range of assumptions with regard to policy development and to build resiliency for a variety of outcomes in its strategy. Most recently, Dow has utilized two boundary scenarios to assess its strategy and exposure to transition risk: one where its global ambition aligns with the IEA Sustainable Development Scenario (SDS) of decarbonizing the economy, and another that aligns with the Regional Rivalry Shared Socioeconomic Pathway 3.0, which explores a more uneven path to decarbonization. The scenarios highlight varying outcomes. For example, in the SDS, Dow's cost of regulatory compliance is higher than in Regional Rivalry, but its opportunities for the development of low-emissions goods and services and low-carbon technologies are also much greater.

Scenario Descriptions, 2050 Snapshot	Sustainable Development[1]	Regional Rivalry[2]
Description	Coordinated path to decarbonization	Uneven path to decarbonization
Market trends	Increased demand for solutions that mitigate climate change	Slower, regionally driven demand for solutions that mitigate climate change; greater market for climate adaptation products
Temperature rise	<2°C	2.1°C
Carbon price (USD/metric ton)	135	30
Renewable energy (% of total primary energy)	47	17

1 IEA Sustainable Development Scenario

2 Regional Rivalry Shared Socioeconomic Pathway 3.0, RCP6.0

Dow's strategy is resilient to a range of potential outcomes. Dow's phased approach to decarbonizing its assets while growing its business will enable Dow to reduce Scope 1 and 2 GHG emissions in line with a well-below 2°C world, as is envisioned by the SDS, while mitigating the affordability risk that presents itself should there be a slower global adoption of the regulatory frameworks needed to address climate change, as is the potential under the Regional Rivalry scenario. For Dow's downstream businesses, all scenarios present opportunities to develop solutions related to climate change – whether these are focused on the mitigation of climate change or the products that address climate adaptation.

For additional information on climate risk resilience, see GRI 3-3 Management approach – Climate & Operational Resilience.

Dow Disclosures – TCFD Disclosure Report

Category Risk Management: Disclose the processes used by the organization to identify, assess and manage climate-related risks

Describe the organization's processes for identifying and assessing climate-related risks.

Climate-related risks, including both physical and transition risks, are assessed with input from internal and external sources including corporate, business, function and geographic leaders; subject matter experts; investors; and other stakeholders. The evaluation of climate-related risks and opportunities is integrated into an annual companywide risk management process, known as enterprise risk management (ERM). ERM identifies significant or major risks to the Company and develops action plans to modify or mitigate risks. For more information, see Enterprise Risk Management within the TCFD Governance Describe the board's oversight of climate-related risks and opportunities section.

Every few years, Dow also utilizes a robust scenario analysis to assess the long-term materiality and impact of climate-related risks and opportunities. Scenario analysis is used to challenge business-as-usual assumptions and strengthen the resiliency of the Company's Decarbonize and Grow strategy. Scenarios are used to evaluate both physical and transition risk and are particularly useful in evaluating the potential and impact of emerging risks.

Under the ERM process, Dow assesses risks based on the potential impact (magnitude of impact) and likelihood of a significant event occurring within the next five years (time horizon). Dow's periodic climate scenario analysis considers a longer time frame (currently to 2050) for magnitude of impact. When assessing whether a climate-related risk or opportunity is substantive, Dow evaluates impacts related to factors such as the cost of raw materials, impact on operating cost (e.g., energy costs, costs of complying with regulation), cost of investment in new technology to reduce emissions or water use, impact to the price at which products can be sold, impact as a result of potential lost sales, or in the case of opportunities, market share gained, etc. In addition, there could be impacts that need to be considered that are not yet able to be quantified in a concrete manner (for example, reputational impact of certain risks is more difficult to quantify) but could still be important for discussion due to a variety of factors. Whether or not a risk or opportunity is determined to be substantive is also dependent on other factors such as where in the value chain the impact may be felt and the duration of impact.

To evaluate physical risks, Dow partnered with S&P Global Trucost (Trucost) to assess the Company's exposure to physical risks based on the geographic location of its manufacturing operations. The risks assessed included water stress, flood, heat waves, cold waves, hurricanes, wildfires and sea level rise. The analysis included an assessment of the physical risks using a baseline year of 2020 with time periods for medium (year 2030) and long term (year 2050) using the Intergovernmental Panel on Climate Change (IPCC) representative concentration pathways (RCP): RCP 2.6, RCP 4.5 and RCP 8.5. These pathways represent varying degrees of global atmospheric GHG concentrations (low, medium and high, respectively), and thus different expectations on global temperature rise. Results will be incorporated into Dow's long-term assessments of Dow's manufacturing sites, which is a key input into Dow's capital approval process.

Water stress is identified to be the largest contributor of the climate-related physical risks. Dow's water-related risk assessment identified six of its manufacturing sites as key water-stressed sites. These sites are designated based on several factors: their location in a water-stressed watershed; water quality; competition among users of the same watershed; local experience at the site; long-term projections; and importance of the site to Dow's production capabilities. Results are incorporated into Dow's long-term assessments of its manufacturing sites, which is a key input into Dow's capital approval process. Also see GRI 3-3 Management approach – Water Stewardship and GRI 303: Water and Effluents 2018 for identification, assessment and risk management approach for water.

Describe the organization's processes for managing climate-related risks.

Management of climate risk is assigned to Dow's CST, which is accountable for developing and implementing plans to mitigate risk and for tracking actions and progress against those plans. With oversight and accountability by the CST, specific carbon-related risks are managed by Dow's Climate PMO. The PMO partners with subject matter experts to develop and implement strategies to mitigate or eliminate climate-related risks. The team develops specific action plans and ensures owners are assigned to drive forward progress in order to reduce Dow's risk exposure. Risk mitigation status updates are provided to executive leaders on a regular basis and discussions include risk time horizons or magnitude of impact to confirm that the strategy remains solid.

For additional detail of the teams involved in climate risk management, see TCFD Governance Management's role in climate risk management.

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Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.

Dow's ERM process is responsible for identifying significant or major risks to the Company and develops action plans to modify or mitigate risks, including climate-related risks. On an annual basis, the ERM process aggregates risks from a broad range of inputs, both internal and external to Dow. Climate-related risks, including both physical and transition risks, are assessed with input from internal and external sources including corporate, business, function and geographic leaders; subject matter experts; investors; and other stakeholders. Climate-related risks considered in the ERM process include, but are not limited to: increase in the severity of weather-related events; potential changes in precipitation patterns; changes in sea level; water scarcity; existing and emerging regulations, taxes, and other requirements related to GHG emissions, carbon management, water availability and water quality; local, country, regional, and global GHG emission reduction mandates and water regulations; changes in public sentiment and political leadership; the effects of carbon pricing and emissions trading systems; adapting products to customer preferences and customer acceptance of these solutions; and, advancement, availability, development and affordability of next-generation technologies necessary to meet the Company's carbon and water reduction commitments. Climate risk is an enterprise-wide risk and it is reviewed and categorized in a heat map, with all enterprise risks, based on the potential impact and likelihood of a significant event occurring within the next five years. Climate risk is assigned to Dow's CST, which is accountable for monitoring current and future climate-related risks and developing and implementing mitigation plans.

The results of the annual ERM process are also reviewed with Dow's Executive Leadership Team – a diverse, cross-functional team representing all of Dow's businesses, functions and geographic regions. Key risks that have specified mitigation actions are reviewed more regularly in leadership team meetings. In addition, risks can be re-evaluated based on several factors including changes in the external and macroeconomic environment, new regulations or emerging trends, concerns identified by senior leaders or Dow's Board, or through detection in Dow's internal work processes. The Audit Committee has oversight of the ERM process and reviews it annually. Specific risks are also reviewed with the Environment, Health, Safety & Technology Committee; Compensation and Leadership Development Committee; Corporate Governance Committee and/or the full Board.

While the annual ERM process categorizes risks based on a short-to-medium term outlook of five years, Dow's senior management routinely assesses the long-term impact of climate-related risks and develops proactive strategies to respond to climate risks and opportunities. The longer-term aspects of climate risks and opportunities are incorporated into the enterprise strategy and are also reviewed with the full Board on a regular basis.

Category Metrics: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities

Describe the organization's processes for identifying and assessing climate-related risks.

Dow employs multiple metrics to monitor its performance and progress toward managing climate and sustainability risks and opportunities. These metrics involve disclosing Scope 1, 2 and 3 GHG emissions, along with supplementary metrics related to energy intensity, renewable power and energy, freshwater intake intensity and the alignment of Dow's innovation and product portfolios to its sustainability objectives. Where appropriate, Dow reports on its progress in meeting established targets for these metrics.

Scope 1, 2 and 3 GHG Emissions

GHG Emissions	Baseline year	Baseline value	2022	2021	2020	Target year
Scope 1	2020	28.79	27.29	28.39	28.79	2030[1]
Scope 2 - Market[2]	2020	6.22	4.19	5.80	6.22	2030[1]
Scope 3	NA[3]	NA[3]	80.55	82.08[4]	85.90[4]	NA[3]

1 Reduce net annual carbon emissions by 5 million metric tons versus Dow's 2020 baseline (Scopes 1 and 2).

2 Emissions factors were updated at applicable sites to reflect the Scope 2 GHG Protocol hierarchy of using utility/supplier or residual mix factors when available under the market-based method, instead of location-based factors that are more generic.

3 Dow is actively working to set a Scope 3 target/baseline while also working to enhance its processes and value chain engagement to ensure transparent reporting and identification of emission reduction opportunities.

4 Restated based on significant advancements in Dow's Scope 3 accounting techniques and data management. See GRI 305-3 Other indirect (Scope 3) for more information.

Overall, Scope 1 emissions decreased in 2022 compared with 2021 primarily due to reduced operating rates as a result of macro-economic conditions and major facility planned outages. In addition, reductions were also supported by energy reduction projects. Dow's Scope 2 emissions were also reduced in 2022 as a result of Dow's efforts to source cleaner sources of energy to support its sites. For more information, see GRI 302-4 Reduction of energy consumption and GRI 305-5 Reduction of GHG emissions.

Significant changes in Scope 3 emissions in 2022 compared with 2021 are due to increases in quantities of purchased feedstocks as well as changes to underlying activity data, emissions factors and Scope 3 models. Dow expects its Scope 3 emissions methodology and values to continue to evolve as Dow enhances and further standardizes its approach and refines its estimates with more specific and primary data. Dow is actively working to set a Scope 3 target/baseline while also working to enhance its processes and value chain engagement to ensure transparent reporting and identification of emission reduction opportunities. For more information on Dow's Scope 3 progress, see 305-3 Other indirect (Scope 3) GHG emissions.

For more information on Dow's GHG emissions calculation methodologies and use of standards, see GRI 305-1 Direct (Scope 1) GHG emissions, GRI 305-2 Energy indirect (Scope 2) GHG emissions, GRI 305-3 Other (Scope 3) GHG emissions and the GHG Protocol Disclosure Report.

Energy Intensity

See also GRI 302-1 Energy consumption within the organization and GRI 302-3 Energy intensity.

Energy intensity is calculated using total energy consumption (GRI 302-1 Energy consumption within the organization) divided by production volume, which includes byproducts and co-products. In 2022, Dow took disciplined action to adjust production rates and reduce cost due to the deterioration of economic conditions in the second half of the year, particularly in Europe. This caused an increase in energy intensity compared with 2021 as production units are designed to operate most efficiently at higher asset utilization rates.

Description (GJ/metric ton of production)	**2022**	**2021**	**2020**
Energy Intensity (Scope 1 & Scope 2)	11.43	10.85	11.86

Water Intensity

The freshwater intake intensity at six key water-stressed sites (KWSS) is aligned with the physical risk of climate change and changing weather patterns. The changing patterns in supply of water, caused by events such as extended droughts, have led to low river levels posing challenges for some manufacturing sites (e.g., ability to ship products). Dow has developed a methodology to evaluate water risk at Dow sites. Dow has also engaged in developing optimization tools to understand the relationship between water and its climate adaptation strategy. This metric was adopted in recognition of the criticality of fresh water as a shared resource and to ensure that water does not become a constraint on community prosperity.

Dow's six KWSS, which all comply with ISO 14001-2015 standards, include: Freeport, Texas (Brazos River); Seadrift, Texas (Guadalupe River); Bahia Blanca, Argentina (purchased fresh water); Terneuzen, the Netherlands (Rivers Rhine and Meuse); Böhlen, Germany (River Weisse Elster and Lake Witznitz); and Tarragona, Spain (purchased freshwater supply source from Ebro River diversion).

The freshwater intake intensity metric is calculated by taking the sum of KWSS fresh water withdrawn directly from the environment divided by the sum of the production volume. Dow has set a target to reduce freshwater intake intensity at KWSS by 20% from its 2015 baseline before the end of 2025.

Description (lb. of water per lb. of production)	**Baseline year**	**Baseline Value**	**2022**	**2021**	**2020**	**Target year**	**Target Value**
Water Intensity for KWSSs	2015	6.6	6.1	3.7[1]	6.2[1]	2025	5.3

1 For comparability, historical values updated to reflect identified data corrections which are immaterial to the INtersections report as a whole.

Dow's freshwater intake intensity increased in 2022 due to two primary factors. First, three of Dow's KWSS experienced drought conditions in 2022 (Freeport, Texas; Seadrift, Texas; and Terneuzen, the Netherlands). Reduced water quality associated with low water availability requires cooling towers to consume higher amounts of water with more frequent blowdowns to maintain equipment operating with diminished water quality. Additionally, four of Dow's KWSS operated at lower production rates as a result of macro-economic conditions. Because certain processes such as cooling systems operate at the same rate regardless of reduced production rate, water intensity increases.

Renewable Power and Energy Metrics (%)

A key element of Dow's climate action plan to reduce Scope 2 emissions is to increase access to renewable power to support its sites. Tracking renewable power as a percentage of power purchased is a metric that can indicate progress against this pillar of Dow's plan. In 2015, Dow set a target to contract 750 MW of renewable power capacity by 2025, a target that has been achieved reaching more than 1,000 MW of renewable power in 2022. Though Dow expects variation in this amount year over year, it expects achievement of its target to be maintained.

As Dow also operates combined heat and power plants to support its sites, Dow is providing the percentage of renewable power it purchases as a portion of the total power consumed. Lastly, Dow provides the metric on renewable energy (renewable power and steam it purchases) as a percentage of energy consumed, which includes fuel purchases to run its operations and self-generate power and steam, consumption of process off-gas for energy-related activities, purchased electricity and purchased steam.

Description	2022	2021	2020
% renewable power, of power purchased	41%	27%	25%
% renewable power, of power consumed	17%	15%	14%
% renewable energy, of energy consumed	3%	2%	2%

R&D Portfolio alignment to sustainability

On an annual basis, R&D project leaders, who are the subject matter experts and trained in sustainability fundamentals, assess the alignment of their projects to Dow's sustainability goals. Responses are approved by leadership and, for continuing projects, compared with the previous year's response. More mature projects are expected to have more rigorous assessments, which can include formal LCAs. A multi-generational plan is being executed to increase accuracy and transparency, with 2022 being the third year.

Description	2022[2]	2021[2]	2020[1]
% R&D portfolio alignment to sustainability	>87%	>85%	>80%

1 Innovation projects are aligned to Dow's sustainability focus areas and provide a sustainability benefit over incumbent approaches.

2 Innovation projects are aligned to Dow's sustainability focus areas: Climate Protection, Circular Economy and Safer Materials.

Revenues from sustainability-aligned markets

Dow enables several sustainability-aligned applications by providing the key building blocks for food preservation, health and well-being, energy efficiency, renewable energy generation, green buildings, recycling and mobility, among others. Significant growth and value of these applications are enabled by sustainability commitments of brand owners, consumers and governments. Participation in some of these markets may also provide access to significant policy incentives. Dow's businesses are required to use an external set of definitions from FTSE Russell Green Revenues Classification System and the United Nations Sustainable Development Goals (U.N. SDGs) to analyze the markets served. Corresponding revenues from sustainability-aligned markets are included in the aggregated ratio, supplied in the table.

Description	2022[2]	2021	2020
Revenue from products that enable sustainability-driven markets[1]	47%	43%	
Revenue from products that address world challenges			48%

1 Dow moved to reporting of revenue from sustainability-aligned markets in 2021.

2 In 2022, Dow introduced more granular mapping of sustainability-aligned markets using the definitions from FTSE Russell Green Revenues Classification System and in alignment to U.N. SDGs.

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