Dow Annual Report 2023

Form 10-K (NYSE:DOW)

Published: February 1st, 2023

Dow (DOW) Historical Annual Reports 2019-2022

Year	Report	Size
2022	Dow (DOW) 10-K Annual Report - Feb 4th, 2022	178kb
2021	Dow (DOW) 10-K Annual Report - Feb 5th, 2021	149kb
2020	Dow (DOW) 10-K Annual Report - Feb 7th, 2020	293kb
2019	Dow (DOW) 10-K Annual Report - Feb 11th, 2019	115kb

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended **December 31, 2022**
or
☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from __________to__________

Commission File Number	Exact Name of Registrant as Specified in its Charter, Principal Office Address and Telephone Number	State of Incorporation or Organization	I.R.S. Employer Identification No.
001-38646	**Dow Inc.** 2211 H.H. Dow Way, Midland, MI 48674 989 636-1000	Delaware	30-1128146
001-03433	**The Dow Chemical Company** 2211 H.H. Dow Way, Midland, MI 48674 989 636-1000	Delaware	38-1285128

Securities registered pursuant to Section 12(b) of the Act:

Registrant	Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Dow Inc.	Common Stock, par value $0.01 per share	DOW	New York Stock Exchange
The Dow Chemical Company	0.500% Notes due March 15, 2027	DOW/27	New York Stock Exchange
The Dow Chemical Company	1.125% Notes due March 15, 2032	DOW/32	New York Stock Exchange
The Dow Chemical Company	1.875% Notes due March 15, 2040	DOW/40	New York Stock Exchange
The Dow Chemical Company	4.625% Notes due October 1, 2044	DOW/44	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Dow Inc.	☑ Yes	☐ No
The Dow Chemical Company	☑ Yes	☐ No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Dow Inc.	☐ Yes	☑ No
The Dow Chemical Company	☐ Yes	☑ No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Dow Inc.	☑ Yes	☐ No
The Dow Chemical Company	☑ Yes	☐ No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Dow Inc.	☑ Yes	☐ No
The Dow Chemical Company	☑ Yes	☐ No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Dow Inc.	Large accelerated filer	☑	Accelerated filer	¨	Non-accelerated filer	¨	Smaller reporting company	¨	Emerging growth company	¨
The Dow Chemical Company	Large accelerated filer	¨	Accelerated filer	¨	Non-accelerated filer	☑	Smaller reporting company	¨	Emerging growth company	¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Dow Inc.	☐
The Dow Chemical Company	☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

Dow Inc.	☑
The Dow Chemical Company	☑

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act).

Dow Inc.	☐ Yes	☑ No
The Dow Chemical Company	☐ Yes	☑ No

As of June 30, 2022, the aggregate market value of the common stock of Dow Inc. held by non-affiliates of Dow Inc. was approximately $ 37.0 billion based on the last reported closing price of $51.61 per share as reported on the New York Stock Exchange.

Dow Inc. had 704,879,920 shares of common stock, $ 0.01 par value, outstanding at December 31, 2022. The Dow Chemical Company had 100 shares of common stock, $0.01 par value, outstanding at December 31, 2022, all of which were held by the registrant’s parent, Dow Inc.

The Dow Chemical Company meets the conditions set forth in General Instruction I(1)(a) and (b) for Form 10-K and therefore is filing this form in the reduced disclosure format.

DOCUMENTS INCORPORATED BY REFERENCE

Dow Inc.: Portions of Dow Inc.'s Proxy Statement for the 2023 Annual Meeting of Stockholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of Dow Inc.'s fiscal year ended December 31, 2022.

The Dow Chemical Company: None.

Dow Inc. and Subsidiaries
The Dow Chemical Company and Subsidiaries

ANNUAL REPORT ON FORM 10-K
For the fiscal year ended December 31, 2022

TABLE OF CONTENTS

This Annual Report on Form 10-K is a combined report being filed by Dow Inc. and The Dow Chemical Company and its consolidated subsidiaries (“TDCC” and together with Dow Inc., “Dow” or the "Company"). This Annual Report on Form 10-K reflects the results of Dow and its consolidated subsidiaries. As a result of the parent/subsidiary relationship between Dow Inc. and TDCC, and considering that the financial statements and disclosures of each company are substantially similar, the companies are filing a combined report for this Annual Report on Form 10-K. The information reflected in this report is equally applicable to both Dow Inc. and TDCC, except where otherwise noted. Each of Dow Inc. and TDCC is filing information in this report on its own behalf and neither company makes any representation to the information relating to the other company.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

Certain statements in this report are “forward-looking statements” within the meaning of the federal securities laws, including Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Such statements often address expected future business and financial performance, financial condition, and other matters, and often contain words or phrases such as “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “opportunity,” “outlook,” “plan,” “project,” “seek,” “should,” “strategy,” "target," “will,” “will be,” “will continue,” “will likely result,” “would” and similar expressions, and variations or negatives of these words or phrases.

Forward-looking statements are based on current assumptions and expectations of future events that are subject to risks, uncertainties and other factors that are beyond Dow’s control, which may cause actual results to differ materially from those projected, anticipated or implied in the forward-looking statements and speak only as of the date the statements were made. These factors include, but are not limited to: sales of Dow’s products; Dow’s expenses, future revenues and profitability; the continuing global and regional economic impacts of the coronavirus disease 2019 (“COVID-19”) pandemic and other public health-related risks and events on Dow’s business; any sanctions, export restrictions, supply chain disruptions or increased economic uncertainty related to the ongoing conflict between Russia and Ukraine; capital requirements and need for and availability of financing; unexpected barriers in the development of technology, including with respect to Dow's contemplated capital and operating projects; Dow's ability to realize its commitment to carbon neutrality on the contemplated timeframe; size of the markets for Dow’s products and services and ability to compete in such markets; failure to develop and market new products and optimally manage product life cycles; the rate and degree of market acceptance of Dow’s products; significant litigation and environmental matters and related contingencies and unexpected expenses; the success of competing technologies that are or may become available; the ability to protect Dow’s intellectual property in the United States and abroad; developments related to contemplated restructuring activities and proposed divestitures or acquisitions such as workforce reduction, manufacturing facility and/or asset closure and related exit and disposal activities, and the benefits and costs associated with each of the foregoing; fluctuations in energy and raw material prices; management of process safety and product stewardship; changes in relationships with Dow’s significant customers and suppliers; changes in consumer preferences and demand; changes in laws and regulations, political conditions or industry development; global economic and capital markets conditions, such as inflation, market uncertainty, interest and currency exchange rates, and equity and commodity prices; business or supply disruptions; security threats, such as acts of sabotage, terrorism or war, including the ongoing conflict between Russia and Ukraine; weather events and natural disasters; disruptions in Dow’s information technology networks and systems; and risks related to Dow’s separation from DowDuPont Inc. such as Dow’s obligation to indemnify DuPont de Nemours, Inc. and/or Corteva, Inc. for certain liabilities.

Where, in any forward-looking statement, an expectation or belief as to future results or events is expressed, such expectation or belief is based on the current plans and expectations of management and expressed in good faith and believed to have a reasonable basis, but there can be no assurance that the expectation or belief will result or be achieved or accomplished. A detailed discussion of principal risks and uncertainties which may cause actual results and events to differ materially from such forward-looking statements is included in the section of this Annual Report on Form 10-K titled “Risk Factors.” These are not the only risks and uncertainties that Dow faces. There may be other risks and uncertainties that Dow is unable to identify at this time or that Dow does not currently expect to have a material impact on its business. If any of those risks or uncertainties develops into an actual event, it could have a material adverse effect on Dow’s business. Dow Inc. and TDCC assume no obligation to update or revise publicly any forward-looking statements whether because of new information, future events, or otherwise, except as required by securities and other applicable laws.

PART I

ITEM 1. BUSINESS

THE COMPANY

Dow Inc. was incorporated on August 30, 2018, under Delaware law, to serve as a holding company for The Dow Chemical Company and its consolidated subsidiaries ("TDCC" and together with Dow Inc., "Dow" or the "Company"). Dow Inc. operates all of its businesses through TDCC, a wholly owned subsidiary, which was incorporated in 1947 under Delaware law and is the successor to a Michigan corporation, of the same name, organized in 1897. The Company's principal executive offices are located at 2211 H.H. Dow Way, Midland, Michigan 48674.

Available Information

The Company's Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, are available free of charge at *www.dow.com/investors*, as soon as reasonably practicable after the reports are electronically filed or furnished with the U.S. Securities and Exchange Commission ("SEC"). The SEC maintains a website that contains these reports as well as proxy statements and other information regarding issuers that file electronically. The SEC's website is *www.sec.gov*. Dow's website and its content are not deemed incorporated by reference into this report.

ABOUT DOW

Dow combines global breadth; asset integration and scale; focused innovation and materials science expertise; leading business positions; and environmental, social and governance ("ESG") leadership to achieve profitable growth and deliver a sustainable future. The Company's ambition is to become the most innovative, customer-centric, inclusive and sustainable materials science company in the world. Dow's portfolio of plastics, industrial intermediates, coatings and silicones businesses delivers a broad range of differentiated, science-based products and solutions for its customers in high-growth market segments, such as packaging, infrastructure, mobility and consumer applications. Dow operates 104 manufacturing sites in 31 countries and employs approximately 37,800 people.

BUSINESS SEGMENTS AND PRODUCTS

The Company conducts its worldwide operations through six global businesses which are organized into the following operating segments: Packaging & Specialty Plastics, Industrial Intermediates & Infrastructure and Performance Materials & Coatings. Corporate contains the reconciliation between the totals for the operating segments and the Company's totals. The Company did not aggregate any operating segments when determining its reportable segments. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations and Note 25 to the Consolidated Financial Statements for additional information concerning the Company's operating segments.

PACKAGING & SPECIALTY PLASTICS

The Packaging & Specialty Plastics operating segment consists of two highly integrated global businesses: Hydrocarbons & Energy and Packaging and Specialty Plastics. The segment employs the industry's broadest polyolefin product portfolio, supported by the Company's proprietary catalyst and manufacturing process technologies. These differentiators, plus collaboration at the customer's design table, enable the segment to deliver more reliable, durable, higher-performing solutions designed for recyclability and enhanced plastics circularity and sustainability. The segment serves customers, brand owners and ultimately consumers in key markets including food and specialty packaging; industrial and consumer packaging; health and hygiene; caps, closures and pipe applications; consumer durables; mobility and transportation; and infrastructure.

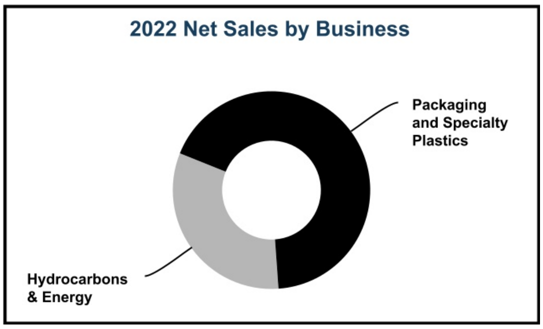
The Company's unique advantages compared with its competitors include: extensive low-cost feedstock positions around the world; unparalleled scale, global footprint and market reach; world-class manufacturing sites in every geographic region; deep customer and brand owner understanding; portfolio of higher-value functional polymers, such as polyolefin elastomers, semiconductive and jacketing compound solutions and wire and cable insulation; and market-driven application development and technical support.

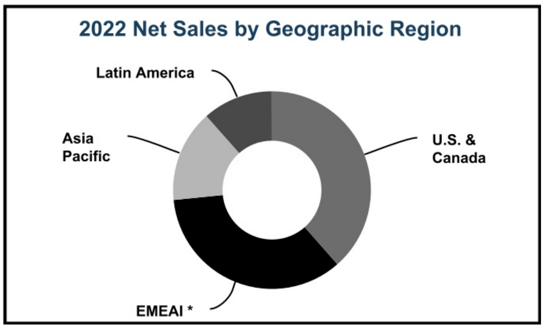
The segment remains agile by participating in the entire ethylene-to-polyethylene chain integration, enabling the Company to manage market swings with industry-leading feedstock and derivative flexibility, and therefore optimize returns while reducing long-term earnings volatility. The Company's unrivaled value chain ownership is further strengthened by its Pack Studio locations in every geographic region, which help customers and brand owners deliver faster and more efficient packaging product commercialization through a global network of laboratories, technical experts and testing equipment.

Hydrocarbons & Energy
Hydrocarbons & Energy is a leading global producer of ethylene, a key chemical building block that the Company consumes primarily within the Packaging & Specialty Plastics segment. Ethylene is transferred to downstream derivative businesses at market-based prices, which are generally equivalent to prevailing market prices for large volume purchases. In addition to ethylene, the business is a leading producer of propylene and aromatics products that are used to manufacture materials consumers use every day. The business also produces and procures the power and feedstocks used by the Company's manufacturing sites.

Packaging and Specialty Plastics
Packaging and Specialty Plastics serves growing, high-value sectors using world-class technology, broad existing product lines, and a rich product pipeline that creates competitive advantages for the entire packaging value chain. The business is a recognized leader in the production, marketing and innovation of polyethylene. The business is also a leader in other ethylene derivatives, such as polyolefin elastomers, ethylene vinyl acetate and ethylene propylene diene monomer ("EPDM") rubber serving mobility and transportation, consumer, wire and cable and construction end-markets. Market growth is expected to be driven by major shifts in population demographics; improving socioeconomic status in emerging geographic regions; consumer and brand owner demand for increased functionality including sustainable offerings through lower-carbon and circular solutions; global efforts to reduce food waste; growth in telecommunications networks; global development of electrical transmission and distribution infrastructure; and renewable energy applications such as wind power and solar (photovoltaic).

Details on Packaging & Specialty Plastics' 2022 net sales, by business and geographic region, are as follows:





* Europe, Middle East, Africa and India ("EMEAI")

Products
Major applications/market segments and products are listed below by business:

Business	*Applications/Market Segments*	*Major Products*	*Key Raw Materials*	*Key Competitors*
Hydrocarbons & Energy	Purchaser of feedstocks; production of cost competitive hydrocarbon monomers utilized by Dow's derivative businesses; and energy, principally for use in Dow's global operations	Ethylene, propylene, benzene, butadiene, octene, aromatics co-products, power, steam, other utilities	Butane, condensate, ethane, naphtha, natural gas, propane	Chevron Phillips Chemical, ExxonMobil, INEOS, LyondellBasell, SABIC, Shell, Sinopec
Packaging and Specialty Plastics	Adhesives; automotive; caps, closures and pipe applications; construction; cosmetics; electrical transmission and distribution; food and supply chain packaging; footwear; health and hygiene; housewares; industrial specialty applications using polyolefin elastomers, ethylene copolymers, and EPDM; irrigation pipe; mobility; photovoltaic encapsulants; sporting goods; telecommunications infrastructure; toys and infant products	Acrylics, bio-based plasticizers, copolymer, elastomers, ethylene copolymer resins, EPDM, ethylene vinyl acetate ("EVA"), methacrylic acid copolymer resins, polyethylene ("PE"), high-density polyethylene ("HDPE"), low-density polyethylene ("LDPE"), linear low-density polyethylene ("LLDPE"), polyolefin plastomers, resin additives and modifiers, semiconductive and jacketing compound solutions and wire and cable insulation	Aliphatic solvent, butene, ethylene, hexene, octene, propylene	Borealis, ExxonMobil, INEOS, Lanxess, LyondellBasell, Nova, SABIC

Joint Ventures:
This segment includes a portion of the Company's share of the results of the following joint ventures:

- EQUATE Petrochemical Company K.S.C.C. (“EQUATE”) - a Kuwait-based company that manufactures ethylene, polyethylene and ethylene glycol, and manufactures and markets monoethylene glycol, diethylene glycol and polyethylene terephthalate resins; owned 42.5 percent by the Company.
- The Kuwait Olefins Company K.S.C.C. (“TKOC”) - a Kuwait-based company that manufactures ethylene and ethylene glycol; owned 42.5 percent by the Company.
- Map Ta Phut Olefins Company Limited (“Map Ta Phut”) - a Thailand-based company that manufactures propylene and ethylene; the Company has an effective ownership of 32.77 percent (of which 20.27 percent is owned directly by the Company and aligned with the Industrial Intermediates & Infrastructure segment and 12.5 percent is owned indirectly through the Company’s equity interest in Siam Polyethylene Company Limited, an entity that is part of The SCG-Dow Group and aligned with the Packaging & Specialty Plastics segment).
- Sadara Chemical Company ("Sadara") - a Saudi Arabian company that manufactures chlorine, ethylene, propylene and aromatics for internal consumption and manufactures and sells polyethylene, ethylene oxide and propylene oxide derivative products, and isocyanates; owned 35 percent by the Company. The Company is responsible for marketing a majority of Sadara products outside of the Middle East zone through the Company’s established sales channels. As part of this arrangement, the Company purchases and sells Sadara products for a marketing fee. In 2021, Dow and the Saudi Arabian Oil Company agreed to and began transitioning the marketing rights and responsibilities for Sadara’s finished products to levels more consistent with each partner’s equity ownership, which is being implemented through 2026. This transition will not impact equity earnings but is expected to reduce the Company's sales of Sadara products over the five year period.

This segment also includes the Company's share of the results of the following joint ventures:

- The Kuwait Styrene Company K.S.C.C. - a Kuwait-based company that manufactures styrene monomer; owned 42.5 percent by the Company.
- The SCG-Dow Group - a group of Thailand-based companies (consisting of Siam Polyethylene Company Limited; Siam Polystyrene Company Limited; Siam Styrene Monomer Company Limited; and Siam Synthetic Latex Company Limited) that manufactures polyethylene, polystyrene, styrene, latex and specialty elastomers; owned 50 percent by the Company.

Current and Future Investments
The Company has announced investments that are being progressed over the next several years and are expected to enhance competitiveness. These include:

- Construction of a world-scale polyethylene unit on the U.S. Gulf Coast based on Dow's proprietary process technologies, to meet consumer-driven demand in specialty packaging, health and hygiene, and industrial and consumer packaging applications.
- Construction of the world's first net-zero carbon emissions (with respect to Scope 1 and 2 carbon dioxide ("CO_2") emissions, including technology advancements) ethylene and derivatives complex in Alberta, Canada.
- Plans to construct a clean hydrogen plant where by-products from core production processes would be converted into hydrogen and CO_2. The CO_2 would be captured and stored until alternative technologies develop. Dow will also look for ways to enable usage of the CO_2 in its processes rather than storing it. The hydrogen plant would allow Dow's Terneuzen manufacturing site to reduce CO_2 emissions by approximately 1.4 million metric tons per year.
- Dow previously signed several renewable and cleaner power agreements which are expected to reduce Scope 2 emissions by more than 600,000 metric tons of CO_2 equivalent per year.
- Ongoing collaboration with Mura Technology ("Mura") to help solve the global plastics waste issue and advance circularity via circular feedstocks, which are converted into recycled plastics. Mura plans to construct a new facility at Dow's Böhlen site in Germany, the latest in a series of planned facilities across the U.S. and Europe to rapidly scale advanced recycling of plastics, and the first expected to be based at a Dow site. This project is targeted for a final investment decision by the end of 2023. This would position Dow to become the largest consumer of circular feedstock for polyethylene production globally.

The Company's ambition includes becoming the most sustainable materials science company, with a strategy to advance the well-being of humanity by helping lead the transition to a sustainable planet and society. This includes lowering energy and greenhouse gas emissions and further enabling a shift to a circular economy for plastics by focusing on resource efficiency and integrating recycled content and renewable feedstocks into its production processes. As part of that strategy, Dow announced the following in 2022:

- In the fourth quarter of 2022, Dow commissioned the retrofit of its first UNIFINITY ™ Fluidized Catalytic Dehydrogenation ("FCDh") technology for cost-advantaged, on-purpose propylene manufacturing and continues to successfully cross all critical startup milestones and make strong progress toward production of on-spec propylene at scale. The FCDh unit, located at one of Dow's mixed-feed crackers in Plaquemine, Louisiana, will ultimately enable production of approximately 150,000 metric tons of additional on-purpose propylene at full run-rate. The breakthrough propylene manufacturing technology, which Dow will license through Univation Technologies, LLC, a wholly owned subsidiary of the Company, can reduce capital outlay by up to 25 percent while lowering energy usage and greenhouse gas emissions by up to 20 percent. This project was originally announced in 2019.
- Acceleration of the Company's sustainability targets set in 2020 by expanding its stop the waste target to a transform the waste target. By 2030, Dow will transform plastic waste and other forms of alternative feedstock to commercialize 3 million metric tons of circular and renewable plastics solutions annually.
- Launched a new collaboration with Waste Management ("WM") to improve residential recycling for hard-to-recycle plastic films by allowing consumers in select markets to recycle these materials directly in their curbside recycling. Once operating at full capacity, this program is expected to help WM divert more than 120,000 metric tons of plastics film from landfills annually. Dow will support this initiative by incorporating recycled content into its product solutions, in line with the Company's goals.
- Signed an agreement with French recycling company Valoregen to contribute to building the largest single hybrid recycling site in France, to be owned and operated by Valoregen. The project, which is expected to be operational and delivering recycled materials in the first half of 2023, will mark an important step in bringing together mechanical recycling (which processes certain plastic waste into secondary products) and newer, advanced recycling processes (which breaks down mixed, hard-to-recycle plastics into their original naphtha-like liquid form to manufacture new virgin-like polymers). Dow will be the main recipient of Valoregen's post-consumer resins, which it will use to develop new plastic products marketed under Dow's REVOLOOP™ product range. It will also support the development of Valoregen's recycling technology capabilities.

- Invested in Plastogaz SA, a technology start-up and proprietor of an advanced recycling technology, which will help to simplify the process of converting plastic waste to feedstock and provide another carbon-efficient option to keep plastic waste out of landfills and the environment. Dow will bring global reach and materials science expertise to further develop technologies with companies, like Plastogaz, who are developing circular feedstock for plastics.
- Invested in Mr. Green Africa, the first recycling company in Africa to be a Certified B Corporation, to enable further diversion of plastic waste from informal dumpsites and the environment, drive positive change in local communities, address inadequacies in existing waste management systems and close the loop on plastics waste across Africa. The investment marks the first of its kind from Dow on the continent and expects to enable approximately 90,000 metric tons of plastic waste to be recovered over four years and recycled into new packaging applications.
- Signed a letter of intent with X-energy, a nuclear energy innovation company which will help Dow advance its carbon emissions reduction goals through the development and deployment of X-energy's advanced small modular nuclear technology in the United States.
- Signed a definitive agreement to take a minority stake in the Hanseatic Energy Hub GmbH ("HEH") and is working with HEH's current members to advance Germany's capabilities to import supplies of liquified natural gas, bio-liquified natural gas and synthetic natural gas through the construction of an import terminal. The HEH consortium is planning to build, own, and operate an import terminal for liquified gases on Dow's Stade, Germany industrial park. The zero-carbon emission terminal will be co-located with Dow's facilities in Stade. Dow is making land available for the construction of the terminal as well as infrastructure services, off-gas heat, site services and mutual harbor use rights.

INDUSTRIAL INTERMEDIATES & INFRASTRUCTURE

The Industrial Intermediates & Infrastructure operating segment consists of two customer-centric global businesses - Industrial Solutions and Polyurethanes & Construction Chemicals - that develop important intermediate chemicals that are essential to manufacturing processes, as well as downstream, customized materials and formulations that use advanced development technologies. These businesses primarily produce and market ethylene oxide and propylene oxide derivatives that are aligned to market segments as diverse as appliances, coatings, furniture and bedding, construction, mobility and automotive, electronics, surfactants for cleaning and sanitization, infrastructure and oil and gas. The businesses' global scale and reach, world-class technology, research and development capabilities and materials science expertise enable the Company to be a premier solutions provider offering customers value-added sustainable solutions to enhance comfort, energy efficiency, product effectiveness and durability across a wide range of home comfort and appliance, building and construction, mobility and transportation, and adhesive and lubricant applications, among others.

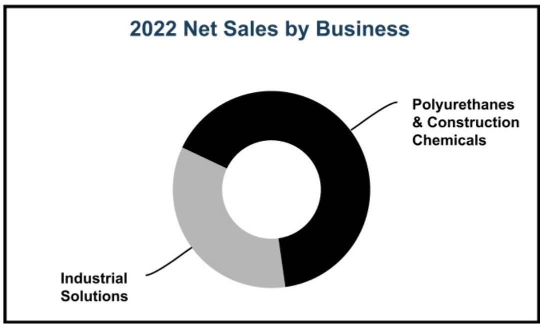
Industrial Solutions

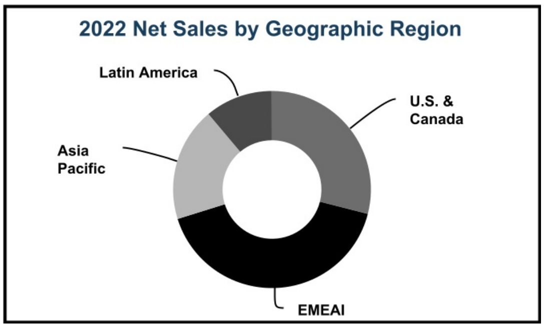
Industrial Solutions provides a broad portfolio of solutions that enable and improve the manufacture of consumer and industrial goods and services. The business' solutions minimize friction and heat in mechanical processes; manage the oil and water interface; deliver ingredients for maximum effectiveness; facilitate dissolvability; enable product identification; decarbonize oil and gas products; reduce energy and water use in textiles; and provide the foundational building blocks for the development of chemical technologies. The business supports manufacturers across a large variety of end-markets, notably coatings, detergents and cleaners, crop protection, pharmaceuticals, electronics, oil and gas, inks and textiles. The business is a leading producer of purified ethylene oxide, ethylene amines and ethanol amines.

Polyurethanes & Construction Chemicals

Polyurethanes & Construction Chemicals consists of three businesses: Polyurethanes, Chlor-Alkali & Vinyl ("CAV") and Construction Chemicals. The Polyurethanes business is the world's largest producer of propylene oxide, propylene glycol and polyether polyols, and a leading producer of aromatic isocyanates and fully formulated polyurethane systems for rigid, semi-rigid and flexible foams, as well as coatings, adhesives, sealants, elastomers and composites that serve energy efficiency, consumer comfort, industrial and enhanced mobility market sectors. The CAV business provides chlorine and caustic soda supply and markets caustic soda, a valuable co-product of the chlor-alkali manufacturing process, and ethylene dichloride and vinyl chloride monomer. The CAV business' assets are predominantly in Western Europe and Latin America and largely produce materials for internal consumption. The Construction Chemicals business provides cellulose ethers, redispersible latex powders, and acrylic emulsions used as key building blocks for differentiated building and construction materials across many market segments and applications ranging from roofing and flooring to gypsum-, cement-, concrete- and dispersion-based building materials. Both Polyurethanes and Construction Chemicals deliver sustainable products aligned toward green building markets yielding reduced environmental impacts and lower product intensity compared to traditional offerings.

Details on Industrial Intermediates & Infrastructures' 2022 net sales, by business and geographic region, are as follows:





Products
Major applications/market segments and products are listed below by business:

Business	*Applications/Market Segments*	*Major Products*	*Key Raw Materials*	*Key Competitors*
Industrial Solutions	Broad range of products for specialty applications, including pharmaceuticals, agriculture crop protection offerings, aircraft deicing, solvents for coatings, heat transfer fluids for concentrated solar power, construction, solvents for electronics processing, food preservation, fuel markers, industrial and institutional cleaning, infrastructure applications, lubricant additives, paper, transportation and utilities; products for energy markets including exploration, production, transmission, refining, mining and gas processing to optimize supply, improve efficiencies and manage emissions	Butyl glycol ethers, VERSENE™ Chelants, UCAR™ Deicing Fluids, ethanolamines, ethylene oxide ("EO"), ethyleneamines, UCON™ Fluids, DOWANOL™ glycol ethers, DOWTHERM™ Heat Transfer Fluids, higher glycols, isopropanolamines, low-VOC solvents, methoxypolyethylene glycol, methyl isobutyl, polyalkylene glycol, CARBOWAX™, SENTRY™, Polyethylene Glycol, TERGITOL™, TRITON™ and ECOFAST™ Pure Surfactants, demulsifiers, drilling and completion fluids, heat transfer fluids, rheology modifiers, scale inhibitors, shale inhibitors, specialty amine solvents, surfactants, water clarifiers, frothing separating agents	Ammonia, butene, ethylene, phenol, propylene	BASF, Eastman, Hexion, Huntsman, INEOS, LyondellBasell, SABIC, Sasol, Shell
Polyurethanes & Construction Chemicals	Aircraft deicing fluids; alumina, pulp and paper; appliances; automotive; bedding; building and construction; flooring; footwear; heat transfer fluids; hydraulic fluids; infrastructure; mobility; packaging; textiles and transportation; construction; caulks and sealants; cement-based tile adhesives; concrete solutions; elastomeric roof coatings; industrial non-wovens; plasters and renders; roof tiles and siding; sport grounds and tape joint compounds	Aniline, caustic soda, ethylene dichloride ("EDC"), methylene diphenyl diisocyanate ("MDI"), polyether polyols, propylene glycol ("PG"), propylene oxide ("PO"), polyurethane systems, toluene diisocyanate ("TDI"), vinyl chloride monomer ("VCM"), AQUASET™ Acrylic Thermosetting Resins, DOW™ Latex Powder, RHOPLEX™ and PRIMAL™ Acrylic Emulsion Polymers, WALOCEL™ Cellulose Ethers	Aniline, benzene, carbon monoxide, caustic soda, cell effluent, cellulose, chlorine, electric power, ethylene, hydrogen peroxide, propylene, styrene	Arkema, Ashland, BASF, Covestro, Eastman, Huntsman, Wanhua

Joint Ventures
This segment includes a portion of the Company's share of the results of EQUATE, TKOC, Map Ta Phut and Sadara.

Current and Future Investments
The Company expects to make investments over the next several years to enhance competitiveness in its Polyurethanes & Construction Chemicals and Industrial Solutions businesses. The investments will include alkoxylation capacity expansions and finishing capabilities; investments to support growth in polyurethane systems; and efficiency improvements around the world.

In 2022, the Company benefited from the completion of a debottlenecking project along the U.S. Gulf Coast to increase aniline production by 60,000 tons per year, which drove the integrated margins higher for the portfolio. Also, in the past year, the Company further progressed and scaled key projects aligned to longer-term sustainability goals, including the first industrial-scale production unit aligned to the RENUVA™ Mattress Recycling Program. This project represents a fully circular investment across the value chain highlighting Dow's materials science solutions to critical challenges facing the industry.

In 2022, ACCUTRACE™ Plus Fuel Marker was selected by the European Commission as the new European Union common fiscal marker to support fuel fraud prevention. The adoption of ACCUTRACE™ Plus Fuel Marker as the new Euromarker was supported by extensive independent technical and safety assessments of the latest fuel marking technologies conducted by the Joint Research Centre and the Scientific Committee on Health, Environmental and Emerging Risks. The marker maintains a unique fingerprint in fuel, which alerts authorities to its intended use and enhances supply chain governance and product identification.

In 2022, the Company progressed the following:

- Construction of an integrated MDI distillation and prepolymers facility at its site in Freeport, Texas. This investment supports increasing demand for downstream polyurethane systems products and advances Dow's leading positions in attractive applications in construction, consumer, and industrial markets that are growing above gross domestic product. The new Freeport MDI facility will replace Dow's current U.S. & Canada capacity in La Porte, Texas, and will also be capable of supplying an additional 30 percent of product to Dow's customers. In coordination with the start-up of the new MDI facility expected in 2023, Dow will shut down its polyurethane assets at the La Porte site.
- Expanded production of propylene glycol capacity at its existing joint venture facility in Map Ta Phut, Thailand by 80,000 tons per year – bringing total capacity to 250,000 tons per year. The additional capacity will support customer growth across Asia Pacific and India and is expected to come online in 2024.
- Expansion of alkoxylation capacity in the United States and Europe. These investments build on previously announced capacity expansions, increasing the Company's global alkoxylation capacity by 70 percent versus the 2020 baseline, collectively. The additional capacity is needed to support increasing demand across a wide range of fast-growing end-markets where the Company is delivering 10 percent to 15 percent annual growth rates, from home and personal care to industrial and institutional cleaning solutions and pharmaceuticals. The investments are backed by supply agreements with customers, including leading consumer brands, and are expected to come online in 2024 and 2025, respectively.
- Dow and Orion Chemicals Orgaform together with Eco-mobilier, H&S Anlagentechnik and The Vita Group have inaugurated a pioneering mattress recycling plant as part of the RENUVA™ program. This is a major step forward for the recovery and recycling of polyurethane foam and a significant advancement to close the loop for end-of-life mattresses. At full capacity, the plant will process up to 200,000 mattresses per year to address growing mattress waste.

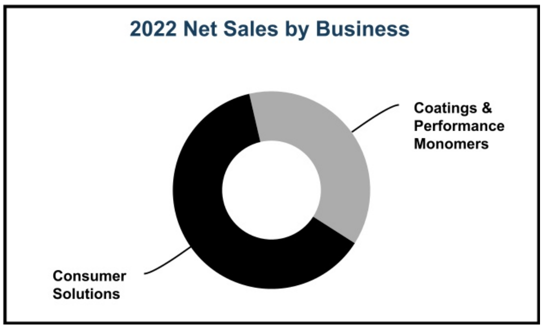
PERFORMANCE MATERIALS & COATINGS

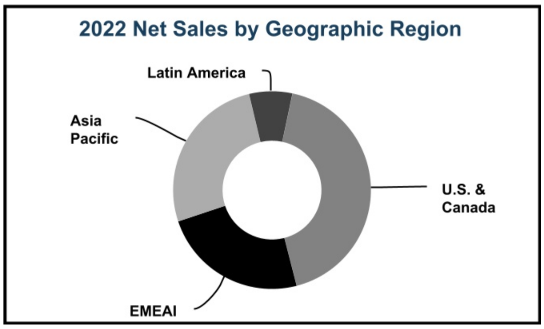
The Performance Materials & Coatings operating segment includes industry-leading franchises that deliver a wide array of solutions into consumer, infrastructure and mobility end-markets. The segment consists of two global businesses: Coatings & Performance Monomers and Consumer Solutions. These businesses primarily utilize the Company's acrylics-, cellulosics- and silicone-based technology platforms to serve the needs of the architectural and industrial coatings; home care and personal care; consumer and electronics; mobility and transportation; industrial and chemical processing; and building and infrastructure end-markets. Both businesses employ materials science capabilities, global reach and unique products and technology combining chemistry platforms to deliver differentiated, market-driven and sustainable innovations to customers.

Coatings & Performance Monomers
Coatings & Performance Monomers consists of two businesses: Coating Materials and Performance Monomers. The Coating Materials business makes critical ingredients and additives that help advance the performance of paints and coatings. The business offers innovative and sustainable products to accelerate paint and coatings performance across diverse market segments, including architectural paints and coatings, as well as industrial coatings applications used in maintenance and protective industries, wood, metal packaging, traffic markings, thermal paper and leather. These products enhance coatings by improving hiding and coverage characteristics, enhancing durability against nature and the elements, lowering or eliminating volatile organic compounds (“VOC”) content, reducing maintenance and improving ease of application. The Performance Monomers business manufactures acrylics-based building blocks needed for the production of coatings, textiles, adhesives and home and personal care products.

Consumer Solutions
Consumer Solutions consists of two businesses: Performance Silicones & Specialty Materials and Silicone Feedstocks & Intermediates. The Performance Silicones & Specialty Materials business delivers an unmatched portfolio of performance-enhancing materials to meet the diverse needs of customers in fast-growing markets, including building and infrastructure; consumer and electronics; industrial and chemical processing; mobility and transportation; home care; and personal care. It focuses resources on delivering valuable differentiation via market-driven innovations and sustainable solutions, which address lower-carbon footprint and circularity goals while enabling continued growth. The Silicone Feedstocks & Intermediates business focuses on maximizing productivity and optimizing margins by leveraging Dow’s scale and global reach. It is charged with producing silicon metal, siloxanes and intermediates, which are key materials to manufacture differentiated downstream silicone products.

Details on Performance Materials & Coatings' 2022 net sales, by business and geographic region, are as follows:





Products
Major applications/market segments and products are listed below by business:

Business	***Applications/Market Segments***	***Major Products***	***Key Raw Materials***	***Key Competitors***
Coatings & Performance Monomers	Acrylic binders for architectural paints and coatings, industrial coatings and paper; adhesives; dispersants; impact modifiers; inks and paints; opacifiers and surfactants for both architectural and industrial applications; plastics additives; processing aids; protective and functional coatings; rheology modifiers	ACOUSTICRYL™ Liquid-Applied Sound Damping Technology; acrylates; ACRYSOL™ Rheology Modifiers; AVANSE™ Acrylic Binders; EVOQUE™ Pre-Composite Polymer; foam cell promoters; FORMASHIELD™ Acrylic Binder; high-quality impact modifiers; MAINCOTE™ Acrylic Epoxy Hybrid; methacrylates; processing aids; RHOPLEX™ Acrylic Resin; TAMOL™ Dispersants; FASTRACK™ Road Marking Resins; vinyl acetate monomers; weatherable acrylic capstock compounds for thermoplastic and thermosetting materials	Acetic acid, acetone, acrylic acid, ammonia, butanol, butyl acrylate, methanol, methyl methacrylate, propylene, styrene	Arkema, BASF, Celanese, Evonik, LyondellBasell, Wacker Chemie
Consumer Solutions	Personal care and home care; mobility and transportation; building and infrastructure; consumer and electronics; industrial and chemical processing	Adhesives and sealants; antifoams and surfactants; coatings and controlled release; coupling agents and crosslinkers; fluids, emulsions and dispersions; formulating and processing aids; granulation and binders; oils; polymers and emollients; opacifiers; reagents; resins, gels and powders; rheology modifiers; rubber; solubility enhancers; aerospace composites; surfactants and solvents; encapsulants for solar photovoltaic applications; ACUSOL™ PRIME 1 Polymer; AMPLIFY™ Si PE 1000 Polymer System; bio-based, readily biodegradable SunSpheres™ BIO SPF Booster; DOWSIL™ Silicone Products; SILASTIC™ Silicone Elastomers; SYL-OFF™ Silicone Release Coatings	Hydrochloric acid, methanol, platinum, silica, silicon metal	Elkem, Momentive, Shin-Etsu, Wacker Chemie

Current and Future Investments
In 2022, several key growth capital projects around the globe were brought online to meet customer needs in fast-growing markets. These include:

- Silicone elastomers capacity in U.S. & Canada for the world's first recyclable silicone self-sealing tire solution, which meets self-sealing tire manufacturers' demands for high performance and sustainability, while providing drivers and passengers with a lighter-weight, safer, and more durable solution.
- Incremental capacity expansion in U.S. & Canada for silicone sealants supporting greater design flexibility and enabling safe, sustainable, and durable building and infrastructure.
- Debottlenecking silicone key intermediates and enhancing capacity of engineered materials in Asia Pacific to accelerate growth in advanced automotive and consumer electronics.
- New silicone gum blends capacity in Latin America to meet the growing demand for sustainable silicone solutions in the personal care industry.

The Company continues to make incremental investments in lower-capital, higher-return projects in the silicones and coatings franchises to further enhance competitiveness. The investments aim to expand manufacturing capacity and increase product mix offerings of silicone intermediates and high-performance silicones to accelerate the downstream business growth. By leveraging global scale and a broad innovation portfolio, the Company is well-positioned to deliver differentiated solutions and sustainable materials in key end-markets, including building and infrastructure, electronics, industrial, mobility, and home and personal care.

CORPORATE

Corporate includes certain enterprise and governance activities (including insurance operations, environmental operations, etc.); non-business aligned joint ventures; non-business aligned litigation expenses; and discontinued or non-aligned businesses.

RAW MATERIALS

The Company operates in an integrated manufacturing environment. Basic raw materials are processed through many stages to produce a number of products that are sold as finished goods at various points in those processes. The major raw material stream that feeds the production of the Company's finished goods is hydrocarbon-based raw materials. The Company purchases hydrocarbon-based raw materials including ethane, propane, butane, naphtha and condensate as feedstocks. These raw materials are used in the production of both saleable products and energy. The Company also purchases and sells certain monomers, primarily ethylene and propylene, to balance internal production and internal consumption. The Company purchases natural gas, primarily to generate electricity, and purchases electric power to supplement internal generation. In addition, the Company produces a portion of its electricity needs in Louisiana and Texas; Alberta, Canada; The Netherlands; and Germany.

The Company's primary source of these raw materials are natural gas liquids ("NGLs"), which are derived from natural gas and crude oil production, and naphtha, which is produced during the processing and refining of crude oil. Given recent advancements in shale gas, shale oil and conventional drilling techniques, the Company expects these raw materials to be in abundant supply. The Company's suppliers of these raw materials include regional, international and national oil and gas companies.

The Company purchases raw materials on both short- and long-term contracts. The Company had adequate supplies of raw materials in 2022 and expects to continue to have adequate supplies of raw materials in 2023.

INDUSTRY SEGMENTS AND GEOGRAPHIC REGION RESULTS

See Note 25 to the Consolidated Financial Statements for information regarding net sales, Operating EBIT and total assets by segment, as well as net sales and long-lived assets by geographic region.

SIGNIFICANT CUSTOMERS AND PRODUCTS

All products and services are marketed primarily through the Company’s sales force, although in some instances more emphasis is placed on sales through distributors. In 2022, no significant portion of the Company's sales was dependent upon a single customer.

PATENTS, LICENSES AND TRADEMARKS

The Company continually applies for and obtains U.S. and foreign patents and has a substantial number of pending patent applications throughout the world. At December 31, 2022, the Company owned approximately 3,700 active U.S. patents and 22,600 active foreign patents as follows:

Remaining Life of Patents Owned at Dec 31, 2022	*United States*	*Rest of World*
Within 5 years	600	3,200
6 to 10 years	1,100	7,000
11 to 15 years	1,500	10,800
16 to 20 years	500	1,600
Total	3,700	22,600

The Company’s primary purpose in obtaining patents is to protect the results of its research for use in operations and licensing. The Company is party to a substantial number of patent licenses, including intellectual property cross-license agreements and other technology agreements, and also has a substantial number of trademarks and trademark registrations in the United States and in other countries, including the “Dow in Diamond” trademark. Although the Company considers that its patents, licenses and trademarks in the aggregate constitute a valuable asset, it does not regard its business as being materially dependent on any single or group of related patents, licenses or trademarks.

PRINCIPAL PARTLY OWNED COMPANIES

The Company's principal nonconsolidated affiliates at December 31, 2022, including direct and indirect ownership interest for each, are listed below:

Principal Nonconsolidated Affiliate	*Country*	*Ownership Interest*	*Business Description*
EQUATE Petrochemical Company K.S.C.C.	Kuwait	42.50 %	Manufactures ethylene, polyethylene and ethylene glycol, and manufactures and markets monoethylene glycol, diethylene glycol and polyethylene terephthalate resins
The Kuwait Olefins Company K.S.C.C.	Kuwait	42.50 %	Manufactures ethylene and ethylene glycol
The Kuwait Styrene Company K.S.C.C.	Kuwait	42.50 %	Manufactures styrene monomer
Map Ta Phut Olefins Company Limited [1]	Thailand	32.77 %	Manufactures propylene and ethylene
Sadara Chemical Company [2]	Saudi Arabia	35.00 %	Manufactures chlorine, ethylene, propylene and aromatics for internal consumption and manufactures and sells polyethylene, ethylene oxide and propylene oxide derivative products, and isocyanates
The SCG-Dow Group:			
Siam Polyethylene Company Limited	Thailand	50.00 %	Manufactures polyethylene
Siam Polystyrene Company Limited	Thailand	50.00 %	Manufactures polystyrene
Siam Styrene Monomer Company Limited	Thailand	50.00 %	Manufactures styrene
Siam Synthetic Latex Company Limited	Thailand	50.00 %	Manufactures latex and specialty elastomers

1. The Company's effective ownership of Map Ta Phut is 32.77 percent, of which the Company directly owns 20.27 percent and indirectly owns 12.5 percent through its equity interest in Siam Polyethylene Company Limited.
2. The Company is responsible for marketing the majority of Sadara products outside of the Middle East zone through the Company's established sales channels. Under this arrangement, the Company purchases and sells Sadara products for a marketing fee. In March 2021, Dow and the Saudi Arabian Oil Company agreed to transition the marketing rights and responsibilities for Sadara's finished products to levels more consistent with each partner's equity ownership. This transition began in July 2021 and is being implemented through 2026.

See Note 11 to the Consolidated Financial Statements for additional information regarding nonconsolidated affiliates.

SUSTAINABILITY STRATEGY

Dow is working to deliver a sustainable future by collaborating and innovating to expand its ability to make a positive impact on society and the planet. As a leading materials science company, Dow has the responsibility and opportunity to act and lead the industry in areas where Dow's science and innovation can make a difference. This means Dow is reducing its environmental footprint, developing and implementing circular economy solutions, and creating new materials that are more sustainable. Dow's sustainability strategy focuses on three areas, which address some of the most pressing challenges facing the planet and offer the most opportunity for Dow to use its science and global scale to make a positive impact.

Climate Protection – Dow is committed to protecting the planet by combating climate change, including contributing to a lower-carbon future, both in its operations and value chains. Dow's comprehensive strategy includes actions to optimize the Company's manufacturing facilities and processes for sustainability, increase clean energy in Dow's purchased power mix, collaborate with the Company's supply chain to address upstream carbon emissions, invest in transformative next-generation solutions for climate protection, and develop low carbon products, technologies and services.

Circular Economy – Dow is taking a leading role in driving a more circular economy by designing for circularity, transforming plastic waste and alternative feedstock into circular and renewable solutions, building new business models for circular materials, and partnering in an industrial ecosystem to end plastic waste.

Safer Materials – Dow is innovating new materials that offer a more favorable health and environmental profile over their life cycles compared to incumbent solutions. Dow believes that creating safer materials is a continuous journey and is possible through innovation, design and more predictive, enabling technologies. Dow's innovations must meet the needs of customers and society, and Dow is committed to continue to evolve its approach to safer materials in line with these expectations.

Climate Protection, Circular Economy and Safer Materials are critical to Dow's license to operate and represent areas where Dow is using its science, scale and global relationships across value chains to create shared opportunity for Dow and society. To accelerate the Company's sustainability commitments, Dow has implemented and continues to expand on its multi-decade targets intended to put the Company on a path to achieve carbon neutrality and eliminate plastic waste, which include the following:

- By 2030, Dow will reduce its net annual Scope 1 and 2 carbon emissions by 5 million metric tons compared with its 2020 baseline, representing a 15 percent reduction from 2020 and a 30 percent reduction since 2005.
- By 2050, Dow intends to be carbon neutral (Scope 1+2+3 plus product benefits).
- By 2030, Dow will transform plastic waste and other forms of alternative feedstock to commercialize 3 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. Dow expects the waste required to produce this target will surpass and replace its original 1 million metric tons stop the waste goal.

The Company's progress in achieving these targets is reviewed regularly by management and with the Environment, Health, Safety & Technology Committee of the Dow Inc. Board of Directors ("Board").

Additional discussion of matters pertaining to the environment, including actions related to the Company's sustainability strategy, is included in Part I, Item 1A. Risk Factors; Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations; and Notes 1 and 15 to the Consolidated Financial Statements. In addition, detailed information on the Company's performance regarding environmental matters and goals, including the Company's annual ESG Report, is accessible through the Science & Sustainability webpage at *www.dow.com/sustainability.* Dow's website and its content are not deemed incorporated by reference into this report.

HUMAN CAPITAL

Dow's ambition – to be the most innovative, customer-centric, inclusive and sustainable materials science company in the world - starts with people. Dow employees create innovative and sustainable materials science solutions to advance the world. Every answer starts with asking the right questions. This is why the diverse, dedicated Dow team collaborates with customers and other stakeholders to find solutions to the world's toughest challenges. The Company's values of Respect for People, Integrity and Protecting Our Planet are fundamental beliefs that are ingrained in each action taken, can never be compromised and are the foundation of the Company's Code of Conduct.

The Company is dedicated to employee health and safety and is invested in fostering a culture of inclusion and continuous learning while supporting its employees through its Total Rewards plans and programs to ensure all Dow employees are respected, valued and encouraged to make their fullest contribution.

Safety, Employee Health and Well-Being

A commitment to safety and employee health is ingrained in Dow's culture and central to how the Dow team works. Dow uses a comprehensive, integrated operating discipline management system that includes policies, requirements, best practices and procedures associated with health and safety. In 2022, the Company achieved an Occupational Safety and Health Administration Total Recordable Injury and Illness Rate of 0.16, based upon the number of incidents per 200,000 work hours for employees and contractors globally. This measure, along with a consistent set of globally applied, as well as locally defined, leading indicators of safety performance, are cornerstones of Dow's worker protection program. The Company maintains a robust, globally tracked near-miss program for situations that did not result in an injury, but could have been high consequence had circumstances been slightly different. This data is reviewed regularly by management and the Environment, Health, Safety & Technology Committee of the Board, is visible to all employees and is built into digital dashboards that include actual injury information for every Dow location around the world.

As part of the Company's total worker health strategy, employees have access to occupational health services at no cost through on-site, Company-managed clinics at its manufacturing locations or an offsite provider overseen by Dow Occupational Health. In addition to access for occupational health needs, the Company also has a comprehensive well-being strategy, which is framed across four dimensions – physical, mental, community and financial well-being – for an approach that is holistic, global, employee centered and outcome-driven. Key ambitions across the four dimensions focus on elements such as workplace stress, psychological safety, resiliency, workload, healthy eating and activities, and social community and inclusion opportunities.

Dow maintains active Crisis Management Teams at the corporate level and in each region where the Company operates to ensure appropriate plans are in place in the event of natural disasters or other emergencies.

Inclusion, Diversity & Equity

At Dow, inclusion, diversity and equity ("ID&E") is a business imperative evidenced by inclusion serving as a core pillar of the Company's ambition statement. A strategic and intentional focus on ID&E not only enhances the employee experience and satisfaction, but it also supports innovation, customer experience and understanding of the communities the Company serves. In 2022, Dow advanced to #15 in the DiversityInc Top 50 Companies for Diversity and for the second year in a row was named to the *Fortune* 100 Best Companies to Work For® list. These are significant accomplishments that represent only two of the many awards the Company received related to its efforts in ID&E.

Dow's strategic ID&E efforts are directed by its Chief Inclusion Officer and Office of Inclusion, which supports implementation throughout Dow's businesses, functions and regions. Three Inclusion Councils drive the ID&E strategy from the top of the Company down and across the enterprise:

- The President's Inclusion Council defines and supports Dow's ID&E strategy from the top.
- A Senior Leaders' Inclusion Council influences change through senior and mid-level business, geographic and functional leaders.
- A Joint Inclusion Council collaborates to drive maximum employee engagement through Employee Resource Group ("ERG") leadership.

Dow's 10 ERGs are representative of the Company's diverse workforce and help foster an inclusive workplace. Dow's ERGs are organized around historically underrepresented groups including women, people of color, LGBTQ+ individuals, people with disabilities and veterans, as well as groups both for professionals who are new to the Company and those who are 50 years or older. Senior leaders serve as executive sponsors for each ERG. In addition, Dow has a Paid Time Off Policy which provides employees time off to volunteer and engage in ERG activities. In 2022, 57 percent of Dow's workforce and 98 percent of Dow people leaders participated in at least one ERG.

Inclusion and diversity metrics, including ERG participation, global representation of women and U.S. ethnic minority representation in the United States, are published internally on a quarterly basis, are embedded in the same scorecard where Dow's financial and safety results are measured and are directly connected to leaders' annual performance and compensation. This data is reviewed regularly by management and with the Compensation and Leadership Development Committee of the Board.

Global pay disparity studies have been conducted at Dow for over 20 years to assess fair treatment between genders and between U.S. ethnic minorities and non-minorities and to ensure Dow's pay practices are being implemented as intended. As part of Dow's ID&E efforts, the Company will continue to conduct annual pay gap studies and actively engage with an external partner to further develop and continue to apply best practices.

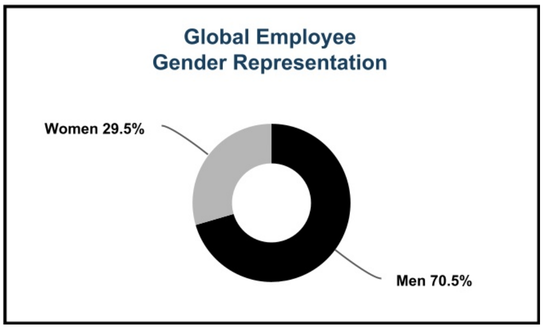
Total Rewards

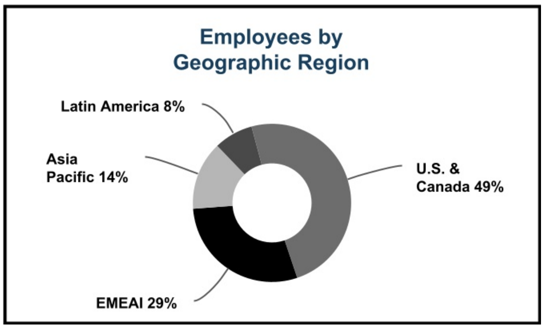
To achieve Dow's ambition to be the most innovative, customer-centric, inclusive and sustainable materials science company in the world, the Company invests in its people, who are at the heart of the Company, through its Total Rewards plans and programs. The Total Rewards plans and programs are structured to attract, retain and motivate Dow's employees. Dow's Total Rewards are designed to support all aspects of its employees – their compensation, future, health, life and career. The Company is committed to aligning its strategy and culture with the needs of its employees and optimizing the investment Dow makes in Total Rewards.

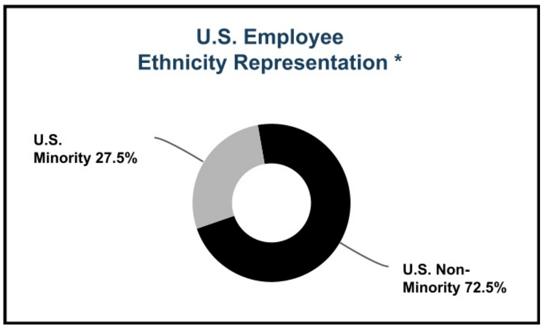
As a global company with a diverse team, Dow aims to ensure employees have access to resources that allow them to meet their unique needs. That is why Dow has established three guiding principles that define its Total Rewards strategy: 1) ensuring programs are market competitive, while leading peer companies in equitable and inclusive offerings; 2) providing employees with offerings that align with their preferences; and 3) offering programs that promote fulfilling career and life experiences. Dow adapts its programs for geography-specific requirements, as well as cultural standards and expectations.

Employee Engagement, Learning and Development
Throughout an employee's career, the Company supports development through a blend of learning approaches including in-person and virtual trainings, digital learning platforms, on-the-job training and a series of leadership development programs. Annually, all employees have the opportunity to provide feedback on employee experience and offer insights into how to improve Dow's working culture through a global employee opinion survey. A key component of the survey is an opportunity for employees to provide feedback on the effectiveness of their direct leader. In 2022, 72 percent of employees responded to the annual survey. The feedback received through this annual survey and additional quarterly checkpoint surveys is used to drive actions to improve the overall Dow experience for employees across the Company, as well as to support continuous improvement in leader effectiveness.

At December 31, 2022, the Company permanently employed approximately 37,800 people on a full-time basis.







* U.S. Minority includes employees who self-identify as Hispanic or Latino, Black or African American, Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, or two or more races. Employees who self-identify as White are considered U.S. Non-Minority.

Additional information regarding Dow's human capital measures can be found in the Company's annual ESG Report, as well as Dow's U.S. Equal Employment Opportunity Report (EEO-1), accessible through the Inclusion and Diversity webpage at *www.dow.com/diversity*. Dow's website and its content are not deemed incorporated by reference into this report.

OTHER ACTIVITIES
The Company engages in property and casualty insurance and reinsurance primarily through its Liana Limited subsidiaries.

EXECUTIVE OFFICERS OF THE REGISTRANT

Set forth below is information related to the Company's executive officers as of February 1, 2023:

Name, Age	*Present Position with Registrant*	*Year Elected as Executive Officer of Dow Inc.*	*Other Business Experience since January 1, 2018*
Lisa Bryant, 47	Chief Human Resources Officer	2022	Dow Inc.: Chief Human Resources Officer since November 2022. TDCC: Chief Human Resources Officer since November 2022; Senior Global Human Resources Director for Finance, Legal, Public Affairs, and Government Affairs from May 2020 to November 2022; North America Human Resources Director from February 2019 to May 2020; Global Human Resources Director for Marketing & Sales from April 2017 to February 2019; Global Human Resources Director for Coatings, Monomers & Plastics Additives from March 2015 to February 2019.
Karen S. Carter, 52	President, Packaging & Specialty Plastics	2019	Dow Inc.: President, Packaging & Specialty Plastics since November 2022; Chief Human Resources Officer and Chief Inclusion Officer from April 2019 to November 2022. TDCC: President, Packaging & Specialty Plastics since November 2022; Chief Human Resources Officer from October 2018 to November 2022; Chief Inclusion Officer from July 2017 to November 2022.
Ronald C. Edmonds, 65	Controller and Vice President of Controllers and Tax	2019	Dow Inc.: Controller and Vice President of Controllers and Tax since April 2019. TDCC: Controller and Vice President since November 2009; Vice President of Tax since January 2016.
Jim Fitterling, 61	Chairman and Chief Executive Officer	2018	Dow Inc.: Chairman since April 2020; Chief Executive Officer since August 2018. TDCC: Chairman since April 2020; Chief Executive Officer since July 2018; President and Chief Operating Officer from February 2016 to July 2018.
Mauro Gregorio, 60	President, Performance Materials & Coatings	2020	Dow Inc.: President, Performance Materials & Coatings since February 2020; Business President, Performance Materials & Coatings from April 2019 to February 2020. TDCC: President, Performance Materials & Coatings since February 2020; Business President, Consumer Solutions from January 2016 to February 2020.
Jane M. Palmieri, 53	President, Industrial Intermediates & Infrastructure	2020	Dow Inc.: President, Industrial Intermediates & Infrastructure since February 2020; Business President, Polyurethanes and Chlor-Alkali & Vinyl from April 2019 to February 2020. TDCC: President, Industrial Intermediates & Infrastructure since February 2020; Business President, Polyurethanes and Chlor-Alkali & Vinyl from April 2018 to February 2020; Business President, Polyurethanes and Chlor-Alkali from October 2016 to April 2018; Business President, Building and Construction from June 2013 to April 2018.
John M. Sampson, 62	Senior Vice President, Operations, Manufacturing & Engineering	2021	Dow Inc.: Senior Vice President, Operations, Manufacturing & Engineering since October 2020. Olin Corporation: Executive Vice President, Business Operations from April 2019 to September 2020; Vice President, Business Operations from October 2015 to April 2019.
A. N. Sreeram, 55	Senior Vice President of Research & Development and Chief Technology Officer	2019	Dow Inc.: Senior Vice President of Research & Development and Chief Technology Officer since April 2019. TDCC: Chief Technology Officer since October 2015; Senior Vice President of Research & Development since August 2013.
Howard Ungerleider, 54	President and Chief Financial Officer	2018	Dow Inc.: President and Chief Financial Officer since August 2018. TDCC: Chief Financial Officer since October 2014; President since July 2018; Vice Chairman from October 2015 to July 2018.
Amy E. Wilson, 52	General Counsel and Corporate Secretary	2018	Dow Inc.: General Counsel and Corporate Secretary since April 2019; Secretary from August 2018 to April 2019. TDCC: General Counsel since October 2018; Corporate Secretary since February 2015; Associate General Counsel from April 2017 to September 2018; Director of the Office of the Corporate Secretary from August 2013 to October 2018.

ITEM 1A. RISK FACTORS

The factors described below represent the Company's principal risks.

CLIMATE CHANGE - RELATED RISKS

Climate Change: Climate change-related risks and uncertainties, legal or regulatory responses to climate change and failure to meet the Company’s climate change commitments could negatively impact the Company’s results of operations, financial condition and/or reputation.
The Company is subject to increasing climate-related risks and uncertainties, many of which are outside of its control. Climate change may result in more frequent severe weather events, potential changes in precipitation patterns and extreme variability in weather patterns, which can disrupt the operations of the Company as well as those of its customers, partners and vendors.

The transition to lower greenhouse gas emissions technology, the effects of carbon pricing and changes in public sentiment, regulations, taxes, public mandates or requirements and increases in climate-related lawsuits, insurance premiums and implementation of more robust disaster recovery and business continuity plans could increase costs to maintain or resume the Company’s operations or achieve its sustainability commitments in the expected timeframes, which would negatively impact the Company’s results of operations.

In 2020, the Company announced commitments to reduce its net annual greenhouse gas emissions by an additional 5 million metric tons, or 15 percent compared with its 2020 baseline, by 2030 (the 2020 baseline represents a 15 percent reduction in greenhouse gas emissions since 2005) and its intention to be carbon neutral by 2050 (Scope 1+2+3, as defined by the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, plus product benefits). Execution and achievement of these commitments within the currently projected costs and expected timeframes are also subject to risks and uncertainties which include, but are not limited to: advancement, availability, development and affordability of technology necessary to achieve these commitments; unforeseen design, operational and technological difficulties; availability of necessary materials and components; adapting products to customer preferences and customer acceptance of sustainable supply chain solutions; changes in public sentiment and political leadership; the Company’s ability to comply with changing regulations, taxes, mandates or requirements related to greenhouse gas emissions or other climate-related matters; and the pace of regional and global recovery from the pandemic caused by coronavirus disease 2019 ("COVID-19"). Given the focus on sustainable investing, if the Company fails to meet its climate change commitments within the committed timeframe and adopt policies and practices to enhance sustainability, the Company’s reputation and its customer and other stakeholder relationships could be negatively impacted and it may be more difficult for the Company to compete effectively or gain access to financing on acceptable terms when needed, which would have an adverse effect on the Company’s results of operations.

PANDEMIC - RELATED RISKS

Public Health Crisis: A public health crisis or global outbreak of disease could have a negative effect on the Company's manufacturing operations, supply chain and workforce, creating business disruptions that could have a substantial negative impact on the Company’s results of operations, financial condition and cash flows.
A public health crisis, including a pandemic similar in nature to COVID-19, could impact all geographic regions where Dow products are produced and sold. The global, regional and local spread of a public health crisis could result, and in the past has resulted in significant global mitigation measures, including government-directed quarantines, social distancing and shelter-in-place mandates, travel restrictions and/or bans, mask and vaccination mandates, restrictions on large gatherings and restricted access to certain corporate facilities and manufacturing sites. Business disruptions and market volatility resulting from a public health crisis could have a substantial negative impact on the Company’s results of operations, financial condition and cash flows. The adverse impact of a pandemic could include, and in the past has included without limitation, fluctuations in the Company’s stock price due to market volatility; a decrease in demand for certain Company products; price declines; reduced profitability; supply chain disruptions impeding the Company’s ability to ship and/or receive product; temporary idling or permanent closure of select manufacturing facilities and/or manufacturing assets; asset impairment charges; interruptions or limitations to manufacturing operations imposed by local, state or federal governments; reduced market liquidity and increased borrowing costs; workforce absenteeism and distraction; labor shortages; customer credit concerns; increased cyber security risk and data accessibility disruptions due to remote working arrangements; workforce reductions and fluctuations in foreign currency markets. Additional risks may include, but are not limited to: shortages of key raw materials; potential impairment in the carrying value of goodwill; additional asset impairment charges; increased obligations related to the Company’s pension and other postretirement benefit

plans; and tax valuation allowance; and may also have the effect of heightening many of the other risks described in this "Risk Factors" section.

MACROECONOMIC RISKS

Financial Commitments and Credit Markets: Market conditions could reduce the Company's flexibility to respond to changing business conditions or fund capital needs.
Adverse economic conditions could reduce the Company's flexibility to respond to changing business and economic conditions or to fund capital expenditures or working capital needs. The economic environment could result in a contraction in the availability of credit in the marketplace and reduce sources of liquidity for the Company. This could result in higher borrowing costs.

Global Economic Considerations: The Company operates in a global, competitive environment which gives rise to operating and market risk exposure.
The Company sells its broad range of products and services in a competitive, global environment, and competes worldwide for sales on the basis of product quality, price, technology and customer service. Increased levels of competition could result in lower prices or lower sales volume, which could have a negative impact on the Company's results of operations. Sales of the Company's products are also subject to extensive federal, state, local and foreign laws and regulations; trade agreements; import and export controls; taxes; and duties and tariffs. The imposition of additional regulations, controls, taxes and duties and tariffs or changes to bilateral and regional trade agreements could result in lower sales volume, which could negatively impact the Company's results of operations.

Economic conditions around the world, and in certain industries in which the Company does business, also impact sales price and volume. As a result, market uncertainty or an economic downturn driven by inflationary pressures; political tensions; war, including the ongoing conflict between Russia and Ukraine and the related sanctions and export restrictions; terrorism; epidemics; pandemics; or political instability in the geographic regions or industries in which the Company sells its products could reduce demand for these products and result in decreased sales volume, which could have a negative impact on the Company's results of operations.

In February 2022, Russia invaded Ukraine resulting in the United States, Canada, the European Union and other countries imposing economic sanctions on Russia. Dow suspended all purchases of feedstocks and energy from Russia and has significantly reduced its operations and product offerings in the country. Dow has also stopped all investments in Russia and is only supplying limited essential goods to Russia. These actions have not had and are not expected to have a material impact on the Company's financial condition or results of operations. However, the fluidity and continuation of the conflict may result in additional economic sanctions and other impacts which could have a negative impact on the Company's financial condition, results of operations and cash flows. These include decreased sales; supply chain and logistics disruptions; volatility in foreign exchange rates and interest rates; inflationary pressures on and availability of raw materials and energy, most notably in Europe; and heightened cybersecurity threats.

In addition, volatility and disruption of financial markets could limit customers' ability to obtain adequate financing to maintain operations, which could result in a decrease in sales volume and have a negative impact on the Company's results of operations. The Company's global business operations also give rise to market risk exposure related to changes in inflation, foreign currency exchange rates (especially in highly inflationary economies such as Argentina), interest rates, commodity prices and other market factors such as equity prices. To manage such risks, the Company enters into hedging transactions, where deemed appropriate, pursuant to established guidelines and policies. If the Company fails to effectively manage such risks, it could have a negative impact on its results of operations.

Pension and Other Postretirement Benefits: Increased obligations and expenses related to the Company's defined benefit pension plans and other postretirement benefit plans could negatively impact its financial condition and results of operations.
The Company has defined benefit pension plans and other postretirement benefit plans (the "plans") in the United States and a number of other countries. The assets of the Company's funded plans are primarily invested in fixed income securities, equity securities of U.S. and foreign issuers and alternative investments, including investments in real estate, private equity and absolute return strategies. Changes in the market value of plan assets, investment returns, discount rates, mortality rates, regulations and the rate of increase in compensation levels may affect the funded status of the Company's plans and could cause volatility in the net periodic benefit cost, future funding requirements of the plans and the funded status of the plans. A significant increase in the Company's obligations or future funding requirements could have a negative impact on the Company's results of operations and cash flows for a particular period and on the Company's financial condition.

Supply/Demand Balance: Earnings generated by the Company's products vary based in part on the balance of supply relative to demand within the industry.
The balance of supply relative to demand within the industry may be significantly impacted by the addition of new capacity, especially for basic commodities where capacity is generally added in large increments as world-scale facilities are built. This may disrupt industry balances and result in downward pressure on prices due to the increase in supply, which could negatively impact the Company's results of operations.

LEGAL AND REGULATORY RISKS

Environmental Compliance: The costs of complying with evolving regulatory requirements could negatively impact the Company's financial results. Actual or alleged violations of environmental laws or permit requirements could result in restrictions or prohibitions on plant operations, substantial civil or criminal sanctions, as well as the assessment of strict liability and/or joint and several liability.
The Company is subject to extensive federal, state, local and foreign laws, regulations, rules and ordinances relating to pollution, protection of the environment, climate change, greenhouse gas emissions, and the generation, storage, handling, transportation, treatment, disposal and remediation of hazardous substances and waste materials. In addition, the Company may have costs related to environmental remediation and restoration obligations associated with past and current sites as well as related to its past or current waste disposal practices or other hazardous materials handling. Although management will estimate and accrue liabilities for these obligations, it is reasonably possible that the Company's ultimate cost with respect to these matters could be significantly higher, which could negatively impact the Company's financial condition and results of operations. Costs and capital expenditures relating to environmental, health or safety matters are subject to evolving regulatory requirements and depend on the timing of the promulgation and enforcement of specific standards which impose the requirements. Moreover, changes in environmental regulations could inhibit or interrupt the Company's operations, or require modifications to its facilities. Accordingly, environmental, health or safety regulatory matters could result in significant unanticipated costs or liabilities. For additional information, see Part II, Item 7. Other Matters, Environmental Matters in Management's Discussion and Analysis of Financial Condition and Results of Operations.

Health and Safety: Increased concerns regarding the safe use of chemicals and plastics in commerce and their potential impact on the environment has resulted in more restrictive regulations and could lead to new regulations.
Concerns regarding the safe use of chemicals and plastics in commerce and their potential impact on health and the environment reflect a growing trend in societal demands for increasing levels of product safety and environmental protection. These concerns could manifest themselves in stockholder proposals, preferred purchasing, delays or failures in obtaining or retaining regulatory approvals, delayed product launches, lack of market acceptance and continued pressure for more stringent regulatory intervention and litigation. These concerns could also influence public perceptions, the viability or continued sales of certain of the Company's products, its reputation and the cost to comply with regulations. In addition, terrorist attacks and natural disasters have increased concerns about the security and safety of chemical production and distribution. These concerns could have a negative impact on the Company's results of operations.

Local, state, federal and foreign governments continue to propose new regulations related to the security of chemical plant locations and the transportation of hazardous chemicals, which could result in higher operating costs.

Litigation: The Company is party to a number of claims and lawsuits arising out of the normal course of business with respect to product liability, patent infringement, employment matters, governmental tax and regulation disputes, contract and commercial litigation, and other actions.
Certain of the claims and lawsuits facing the Company purport to be class actions and seek damages in very large amounts. All such claims are contested. With the exception of the possible effect of the asbestos-related liability of Union Carbide Corporation ("Union Carbide") as described below, it is the opinion of the Company's management that the possibility is remote that the aggregate of all such claims and lawsuits will have a material adverse impact on the Company's consolidated financial statements.

Union Carbide is and has been involved in a large number of asbestos-related suits filed primarily in state courts during the past four decades. At December 31, 2022, Union Carbide's total asbestos-related liability, including future defense and processing costs, was $947 million ($1,016 million at December 31, 2021).

Plastic Waste: Increased concerns regarding plastic waste in the environment, consumers selectively reducing their consumption of plastic products, a lack of plastic waste collection and recycling infrastructure, or new or more restrictive regulations and rules related to plastic waste could reduce demand for the Company's plastic products and could negatively impact the Company's financial results.
Local, state, federal and foreign governments have been increasingly proposing regulations to address the global plastic waste challenge, including, but not limited to, extended producer responsibility fees, a Global Plastics Treaty and bans on non-essential items. These regulations on plastic waste drive demand toward plastic solutions that are recyclable, reusable, made with recycled content and/or renewable raw materials. In addition, without proper waste collection and recycling infrastructure at scale, plastics have faced increased public scrutiny due to negative coverage of plastic waste in the environment, including the world's oceans and rivers. As Dow is one of the world's largest producers of plastics, increased pressure on the use of plastics, despite positive carbon benefits and essential functions such as food preservation and medical uses, could cause reduced demand for the Company's polyethylene products which could negatively impact the Company's financial condition, results of operations and cash flows.

OPERATIONAL AND STRATEGIC RISKS

Company Strategy: Implementing certain elements of the Company's strategy could negatively impact its financial results.
The Company currently has manufacturing operations, sales and marketing activities, and joint ventures in emerging geographic regions. Activities in these geographic regions are accompanied by uncertainty and risks including: navigating different government regulatory environments; relationships with new, local partners; project funding commitments and guarantees; expropriation, military actions, war, terrorism and political instability; sabotage; uninsurable risks; suppliers not performing as expected resulting in increased risk of extended project timelines; and determining raw material supply and other details regarding product movement. In addition, disruptions to supply chains, distribution chains and/or public and private infrastructure, including those caused by industry capacity constraints, material availability, global logistics delays and constraints arising from, among other things, the transportation capacity of ocean shipping containers and labor availability constraints, could materially and adversely impact the Company's business operations. If the manufacturing operations, supply chains, sales and marketing activities, and/or implementation of these projects is not successful, it could adversely affect the Company's financial condition, cash flows and results of operations.

Cyber Threat: The risk of loss of the Company's trade secrets, know-how or other sensitive business information or disruption of operations could negatively impact the Company's financial results.
Cyber-attacks or security breaches could compromise confidential, business critical information, cause a disruption in the Company's operations or harm the Company's reputation. The Company has attractive information assets, including trade secrets, know-how and other sensitive, business critical information. While the Company has a comprehensive cyber-security program that is continuously reviewed, maintained and upgraded, a significant cyber-attack could result in the loss of critical business information and/or could negatively impact operations, which could have a negative impact on the Company's financial results.

Goodwill: An impairment of goodwill could negatively impact the Company’s financial results.
At least annually, the Company assesses goodwill for impairment. If testing indicates that goodwill is impaired, the carrying value is written down based on fair value with a charge against earnings. Where the Company utilizes a discounted cash flow methodology in determining fair value, continued weak demand for a specific product line or business could result in an impairment. Accordingly, any determination requiring the write-off of a significant portion of goodwill could negatively impact the Company's results of operations. See Note 12 to the Consolidated Financial Statements for additional information regarding the Company's goodwill impairment testing.

Operational Event: A significant operational event could negatively impact the Company's results of operations.
As a diversified chemical manufacturing company, the Company's operations, the transportation of products, cyber-attacks, pandemics and other public health-related events or severe weather conditions and other natural phenomena (such as freezing, drought, hurricanes, earthquakes, tsunamis, floods, etc.) could result in an unplanned event that could be significant in scale and could negatively impact operations, neighbors or the public at large, which could have a negative impact on the Company's results of operations.
Major hurricanes and other weather-related events have caused significant disruption in the Company's operations on the U.S. Gulf Coast, logistics across the region, and the supply of certain raw materials, which had an adverse impact on volume and cost for some of its products. Due to the Company's substantial presence on the U.S. Gulf Coast, similar severe weather conditions or other natural phenomena in the future could negatively impact the Company's results of operations.

Raw Materials: Availability of purchased feedstock and energy, and the volatility of these costs, impact Dow’s operating costs and add variability to earnings.
Purchased feedstock and energy costs account for a substantial portion of the Company’s total production costs and operating expenses. The Company purchases hydrocarbon raw materials including ethane, propane, butane, naphtha and condensate as feedstocks and also purchases certain monomers, primarily ethylene and propylene, to supplement internal production, as well as other raw materials. The Company also purchases natural gas, primarily to generate electricity, and purchases electric power to supplement internal generation.

Feedstock and energy costs generally follow price trends in crude oil and natural gas, which are sometimes volatile. While the Company uses its feedstock flexibility and financial and physical hedging programs to help mitigate feedstock cost increases, the Company is not always able to immediately raise selling prices. Ultimately, the ability to pass on underlying cost increases is dependent on market conditions. Conversely, when feedstock and energy costs decline, selling prices generally decline as well. As a result, volatility in these costs could impact the Company’s results of operations.

While the Company expects abundant and cost-advantaged supplies of natural gas liquids ("NGLs") in the United States to persist for the foreseeable future, if NGLs become significantly less advantaged than crude oil-based feedstocks, it could have a negative impact on the Company’s results of operations and future investments. Also, if the Company’s key suppliers of feedstock and energy are unable to provide the raw materials required for production, it could have a negative impact on the Company’s results of operations.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

The Company's corporate headquarters are located in Midland, Michigan. The Company's manufacturing, processing, marketing and research and development facilities, as well as regional purchasing offices and distribution centers are located throughout the world. The Company has investments in property, plant and equipment related to global manufacturing operations. Collectively, the Company operates 104 manufacturing sites in 31 countries. The following table includes the major manufacturing sites by operating segment, including consolidated variable interest entities:

Major Manufacturing Sites by Segment *Location*	*Packaging & Specialty Plastics*	*Industrial Intermediates & Infrastructure*	*Performance Materials & Coatings*
Bahia Blanca, Argentina	X		
Candeias, Brazil	X	X	
Canada:			
Fort Saskatchewan, Alberta	X		
Prentiss, Alberta	X		
Zhangjiagang, China	X	X	X
Germany:			
Boehlen	X	X	
Leuna	X		
Schkopau	X	X	
Stade		X	
Terneuzen, The Netherlands	X	X	
Tarragona, Spain	X	X	
Map Ta Phut, Thailand		X	X
Barry, United Kingdom			X
United States:			
Carrollton, Kentucky			X
Hahnville, Louisiana	X	X	X
Plaquemine, Louisiana	X	X	
Midland, Michigan			X
Deer Park, Texas		X	X
Freeport, Texas	X	X	X
Orange, Texas	X		
Seadrift, Texas	X	X	
Texas City, Texas		X	X

Including the major manufacturing sites, the Company has manufacturing sites and holdings in all geographic regions as follows:

Manufacturing Sites by Region	
Asia Pacific	18 manufacturing sites in 10 countries
EMEAI [1]	37 manufacturing sites in 15 countries
Latin America	15 manufacturing sites in 4 countries
U.S. & Canada	34 manufacturing sites in 2 countries

1. Europe, Middle East, Africa and India.

Properties of the Company include facilities which, in the opinion of management, are suitable and adequate for their use and will have sufficient capacity for the Company’s current needs and expected near-term growth. All of the Company’s plants are owned or leased, subject to certain easements of other persons which, in the opinion of management, do not substantially interfere with the continued use of such properties or materially affect their value. No title examination of the properties has been made for the purpose of this report. Additional information with respect to the Company's property, plant and equipment and leases is contained in Notes 10, 14 and 16 to the Consolidated Financial Statements.

ITEM 3. LEGAL PROCEEDINGS

Asbestos-Related Matters of Union Carbide Corporation
Union Carbide Corporation ("Union Carbide"), a wholly owned subsidiary of the Company, is and has been involved in a large number of asbestos-related suits filed primarily in state courts during the past four decades. These suits principally allege personal injury resulting from exposure to asbestos-containing products and frequently seek both actual and punitive damages. The alleged claims primarily relate to products that Union Carbide sold in the past, alleged exposure to asbestos-containing products located on Union Carbide's premises, and Union Carbide's responsibility for asbestos suits filed against a former Union Carbide subsidiary, Amchem Products, Inc.

For additional information, see Part II, Item 7. Other Matters, Asbestos-Related Matters of Union Carbide Corporation in Management's Discussion and Analysis of Financial Condition and Results of Operations, and Notes 1 and 15 to the Consolidated Financial Statements.

Environmental Proceedings
On May 17, 2021, the Company received a civil complaint from the State of Texas ("State") on behalf of the Texas Commission on Environmental Quality. The complaint, filed in the 250th District Court of Travis County, Texas, alleges environmental violations at the Company's Freeport, Texas, site involving 12 discrete air emissions events. The State is seeking monetary relief of no more than $1 million and injunctive relief to prevent recurrence. On August 31, 2021, the State informed the Company that it would be including additional air emissions events in the complaint, which may impact the monetary relief sought by the State. Discussions between the Company and the Texas Office of the Attorney General are ongoing.

On February 3, 2022, the U.S. Environmental Protection Agency ("EPA") proposed a draft administrative order to resolve alleged violations at the Rohm and Haas Chemicals facility in Kankakee, Illinois, relating to a storage tank at the site that does not have certain control equipment specified by EPA Clean Air Act regulations. This issue was self-disclosed by the facility to the Illinois Environmental Protection Agency in 2015. Negotiations with the agencies are ongoing.

On December 16, 2022, the U.S. Department of Justice filed a complaint and proposed consent decree on behalf of the EPA relating to environmental contamination at the Lower Passaic River Study Area Superfund Site in New Jersey. The proposed consent decree includes a requirement that 85 settling defendants, including the Company's Essex Chemical Corporation subsidiary ("Essex"), make a collective payment of $150 million for the EPA's past and anticipated future response costs, with Essex's share of the group settlement costs being $1.15 million. The proposed consent decree was submitted for notice and a public comment period on December 23, 2022, with public comments due by March 23, 2023.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Dow Inc. is the direct parent company of The Dow Chemical Company and its consolidated subsidiaries, ("TDCC" and together with Dow Inc., "Dow" or the "Company"), owning all of the outstanding common shares of TDCC. The principal market for Dow Inc.'s common stock is the New York Stock Exchange, traded under the symbol “DOW.”

Dow Inc. has paid dividends on a quarterly basis and expects to continue to do so, subject to approval by the Dow Inc. Board of Directors ("Board"). Additional dividend information can be found in Note 17 to the Consolidated Financial Statements and Liquidity and Capital Resources in Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations.

At December 31, 2022, there were 68,825 stockholders of record.

See Part III, Item 11. Executive Compensation for information relating to shares authorized for issuance under Dow Inc.'s equity compensation plans.

The Company grants stock-based compensation to employees and non-employee directors under stock incentive plans, in the form of stock options, stock appreciation rights, performance stock units and restricted stock units. See Note 20 to the Consolidated Financial Statements for additional information.

Issuer Purchases of Equity Securities
The following table provides information regarding purchases of Dow Inc. common stock by the Company during the three months ended December 31, 2022. The Company makes such purchases only during open windows subject to its insider trading policy.

Issuer Purchases of Equity Securities				
Period	*Total number of shares purchased*	*Average price paid per share*	*Total number of shares purchased as part of the Company's publicly announced share repurchase program*	*Approximate dollar value of shares that may yet be purchased under the Company's publicly announced share repurchase program* [1] *(In millions)*
October 2022	—	$ —	—	$ 2,175
November 2022	—	$ —	—	$ 2,175
December 2022	2,452,985	$ 50.96	2,452,985	$ 2,050
Fourth quarter 2022	2,452,985	$ 50.96	2,452,985	$ 2,050

1. On April 1, 2019, the Dow Inc. Board ratified the share repurchase program originally approved on March 15, 2019, authorizing up to $3.0 billion for the repurchase of the Company's common stock, with no expiration date. The Company completed the April 1, 2019 share repurchase program in the second quarter of 2022. On April 13, 2022, the Dow Inc. Board approved a new share repurchase program authorizing up to $3.0 billion for the repurchase of the Company's common stock, with no expiration date.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

On April 1, 2019, DowDuPont Inc. (“DowDuPont” and effective June 3, 2019, n/k/a DuPont de Nemours, Inc. or "DuPont") completed the separation of its materials science business and Dow Inc. became the direct parent company of The Dow Chemical Company and its consolidated subsidiaries (“TDCC” and together with Dow Inc., “Dow” or the “Company”), owning all of the outstanding common shares of TDCC. As a result of the parent/subsidiary relationship between Dow Inc. and TDCC, and considering that the financial statements and disclosures of each company are substantially similar, the companies are filing a combined report for this Annual Report on Form 10-K. The information reflected in this report is equally applicable to both Dow Inc. and TDCC, except where otherwise noted.

In connection with the separation from DowDuPont, the Company entered into various manufacturing, supply and service related agreements with DuPont and Corteva, Inc. ("Corteva").

Except as otherwise indicated by the context, the term "Union Carbide" means Union Carbide Corporation and the term "Dow Silicones" means Dow Silicones Corporation, both wholly owned subsidiaries of the Company.

STATEMENT ON RUSSIA AND UKRAINE CONFLICT

In February 2022, Russia invaded Ukraine resulting in the United States, Canada, the European Union and other countries imposing economic sanctions on Russia. Dow continues to monitor and evaluate the broader economic impact, including sanctions imposed, the potential for additional sanctions and any responses from Russia that could directly affect the Company’s supply chain, business partners or customers. At the time of this filing, the conflict between Russia and Ukraine has not had and is not expected to have a material impact on the Company's financial condition or results of operations.

In the first quarter of 2022, the Company recorded pretax asset related charges of $186 million due to the Russia and Ukraine conflict and the expectation that certain assets will not be recoverable. The Company's remaining net asset exposure is not significant.

In the fourth quarter of 2022, the Company reversed certain asset related charges pertaining to the collectability of accounts receivables and inventory due to the Company's ability to recover a portion of the value of these assets. The pretax gain recorded by the Company in the fourth quarter of 2022 was $68 million.

STATEMENT ON CURRENCY EXCHANGE RATES

The Company's global business operations give rise to market risk exposure related to changes in foreign currency exchange rates and international capital flows that may be affected by extensive regulations and controls, especially in developing or highly inflationary countries such as Argentina. The Company continues to monitor these situations and take appropriate actions as necessary to manage the financial impact pursuant to established guidelines and policies. If the Company is unable to manage certain exposures in a cost-effective manner it could have a significant negative impact on its future results of operations and cash flows. A detailed discussion of these and other principal risks and uncertainties, which may negatively impact the future results of the Company, are included in Part I, Item 1A. Risk Factors.

Table of Contents

ABOUT DOW

Dow combines global breadth; asset integration and scale; focused innovation and materials science expertise; leading business positions; and environmental, social and governance ("ESG") leadership to achieve profitable growth and deliver a sustainable future. The Company's ambition is to become the most innovative, customer-centric, inclusive and sustainable materials science company in the world. Dow's portfolio of plastics, industrial intermediates, coatings and silicones businesses delivers a broad range of differentiated, science-based products and solutions for its customers in high-growth market segments, such as packaging, infrastructure, mobility and consumer applications. Dow operates 104 manufacturing sites in 31 countries and employs approximately 37,800 people.

In 2022, the Company had annual sales of $57 billion, of which 37 percent of the Company's sales were to customers in the U.S. & Canada; 35 percent were in Europe, Middle East, Africa and India ("EMEAI"); while the remaining 28 percent were to customers in Asia Pacific and Latin America.

In 2022, the Company and its consolidated subsidiaries did not operate in countries subject to U.S. economic sanctions and export controls as imposed by the U.S. State Department or in countries designated by the U.S. State Department as state sponsors of terrorism, including Cuba, Iran, the Democratic People's Republic of Korea (North Korea), Sudan and Syria. The Company has policies and procedures in place designed to ensure that it and its consolidated subsidiaries remain in compliance with applicable U.S. laws and regulations.

OVERVIEW

The following is a summary of the results for the Company for the year ended December 31, 2022:

The Company reported net sales in 2022 of $57 billion, up 4 percent from $55 billion in 2021, with increases across all geographic regions, except EMEAI, and operating segments, except Industrial Intermediates & Infrastructure, driven by an increase in local price of 11 percent, which was partially offset by a volume decrease of 3 percent and an unfavorable currency impact of 4 percent.

Local price increased 11 percent compared with 2021, with increases in all operating segments and geographic regions, primarily reflecting price gains due to tight supply and demand dynamics in the first half of the year. Local price increased in Packaging & Specialty Plastics (up 7 percent), Industrial Intermediates & Infrastructure (up 11 percent) and Performance Materials & Coatings (up 21 percent).

Volume decreased 3 percent compared with 2021, with decreases in Industrial Intermediates & Infrastructure (down 7 percent) and Performance Materials & Coatings (down 6 percent). Volume was flat in Packaging & Specialty Plastics. Volume decreased in EMEAI (down 10 percent), partially offset by increases in the U.S. & Canada (up 1 percent) and Latin America (up 1 percent). Volume was flat in Asia Pacific.

Currency had an unfavorable impact of 4 percent on net sales compared with 2021, driven by EMEAI (down 9 percent) and Asia Pacific (down 3 percent).

Restructuring and asset related charges - net were $118 million in 2022, compared with $6 million in 2021, reflecting actions taken related to the Russia and Ukraine conflict in the current year.

Equity in earnings of nonconsolidated affiliates was $268 million in 2022, compared with $975 million in 2021, with lower equity earnings at all principal joint ventures, primarily driven by margin compression at Sadara Chemical Company ("Sadara") and the Kuwait joint ventures.

Sundry income (expense) - net for Dow Inc. and TDCC was income of $727 million and $714 million, respectively, in 2022, compared with expense of $35 million and $79 million, respectively, in 2021. Sundry income (expense) - net increased primarily due to the successful and final resolution and recognition of a long-running patent infringement award.

Net income available for Dow Inc. and TDCC common stockholder(s) was $4,582 million and $4,583 million, respectively, in 2022, compared with $6,311 million and $6,274 million, respectively, in 2021. Earnings per share for Dow Inc. was $6.28 per share in 2022, compared with $8.38 per share in 2021.

In 2022, the Company redeemed $750 million aggregate principal amount of 3.625 percent notes due May 2026.

In 2022, Dow Inc. declared and paid dividends to common stockholders of $2.80 per share ($2,006 million).

In 2022, Dow Inc. repurchased $2,325 million of the Company's common stock.

Other notable events and highlights from the year ended December 31, 2022 include:

- On January 31, 2022, the Company announced that Mary Draves, vice president of Environment, Health and Safety ("EH&S") and chief sustainability officer, announced her decision to retire in April 2022 after 32 years of service.
- On March 22, 2022, the Company announced that Jack Broodo, President of Dow Feedstocks and Energy, would retire at the end of July 2022 after 40 years of service with Dow.
- On March 30, 2022, Dow announced global capacity expansion in response to growing demand for mobility technologies.
- On April 7, 2022, the European Commission selected Dow ACCUTRACE™ Plus Fuel Marker as the new common fiscal marker for tax rebated fuels in the European Union.
- On April 13, 2022, the Dow Inc. Board of Directors ("Board") approved a new share repurchase program authorizing up to $3 billion for the repurchase of the Company's common stock, with no expiration date.
- Effective April 14, 2022, following the Company's Annual Meeting of Stockholders, Jerri DeVard, former Executive Vice President and Chief Customer Officer of Office Depot, Inc., was elected to the Dow Inc. Board.
- On May 31, 2022, Moody's Investors Service announced a credit rating upgrade for TDCC from Baa2 to Baa1, affirmed its P-2 rating and maintained a stable outlook. On June 8, 2022, Standard & Poor’s affirmed TDCC’s BBB and A-2 rating, and revised its outlook to positive from stable. On June 16, 2022, Fitch Ratings affirmed TDCC’s BBB+ and F2 rating, and revised its outlook to positive from stable. These credit agencies' decisions were made as part of their annual review process and reflect the Company's supportive financial policies and strong operating performance.
- On September 7, 2022, Great Place to Work® and Fortune magazine honored Dow as one of the 2022 Best Workplaces in Manufacturing & Production™. Dow ranked fourth in the large organization category, and this was the second consecutive year the Company was named to this prestigious list.
- On October 17, 2022 Dow Inc. announced it will accelerate the sustainability targets the Company set in 2020 by expanding its stop the waste target to a transform the waste target. By 2030, Dow will transform plastic waste and other forms of alternative feedstock to commercialize 3 million metric tons of circular and renewable plastics solutions annually.
- On October 26, 2022, Dow announced its launch of the world’s first recyclable silicone self-sealing tire solution.

- On November 1, 2022, the Company announced that Diego Donoso, President of Packaging & Specialty Plastics, announced his decision to retire in the first quarter of 2023, after over 30 years of service.
- On November 1, 2022, the Company announced that Karen S. Carter, Chief Human Resources Officer and Chief Inclusion Officer for Dow, was named President of Packaging & Specialty Plastics.
- On November 8, 2022, the Company announced that Lisa Bryant was named Chief Human Resources Officer. Effective December 15, 2022, the Board elected Lisa Bryant as an Executive Officer of the Company.
- Dow was named to FORTUNE's World's Most Admired Companies list for 2022.
- Dow was named to the JUST 100 list for the third consecutive year. Dow earned the top spot in the Chemicals sector overall and received the number one position in the Workers and Stakeholders & Governance categories versus industry peers.
- Dow was named to Bloomberg’s 2022 Gender-Equality Index for the second consecutive year.
- Dow was named by the Human Rights Campaign ("HRC") Foundation to its 2022 list of “Best Places to Work for LGBTQ+ Equality.” This marks the Company’s seventeenth consecutive year receiving a perfect score on HRC’s Corporate Equality Index.
- Dow received the 2022 Artificial Intelligence Excellence Award for its Predictive Intelligence capability.
- Dow received eight 2022 Edison Awards™, (two gold, four silver and two bronze) once again earning more awards than any other organization.
- Dow was named the 2022 Organization of the Year by the Society of Asian Scientists and Engineers for its contributions to science and engineering and its commitment to ensuring that inclusion, diversity and equity are a business imperative.
- Dow advanced to 15th place on the 2022 DiversityInc Top 50 Companies for Diversity list making it the fifth consecutive year on the list. Dow was also included on six of DiversityInc's Specialty Lists including: Top Companies for Executive Diversity Councils, Top Companies for People with Disabilities, Top Companies for Black Executives, Top Companies for Latino Executives, Top Companies for Employee Resource Groups and Top Companies for Environmental, Social and Governance.
- Dow was named a 2022 honoree of The Civic 50 by Points of Light, the world's largest organization committed to inspiring, equipping, and engaging people to take action to change their communities and the world.
- For the sixth consecutive year, Dow received a top score on the Disability Equality Index®, placing the Company among the “Best Places to Work for Disability Inclusion” for 2022.
- Dow was honored with a Leading Disability Employer Seal by the National Organization on Disability, marking the sixth consecutive year Dow has received the recognition.
- Dow was honored with a 2022 CIO 100 award for the Company's Digital Manufacturing Acceleration program.
- Dow received six *R&D 100 Awards* from *R&D Magazine* for innovative technologies including: DOWSIL™ ICL-1000 Data Center Immersion Cooling Fluid, DURATRACK™ R-100 and AEH-100 Resins for Green Bike Lanes, ELVALOY™ RET MF 1177 Polymeric PCR Asphalt Paving Compatibilizer, Sustainable Collation Shrink Film enabled by REVOLOOP™, MaizeCare™ Clarity Polymer, and MAINCOTE™ HG-300 Emulsion.
- Dow was named one of the "2022 PEOPLE Companies that Care®" for the third consecutive year.
- Dow received four 2022 BIG™ Innovation Awards from the Business Intelligence Group.
- Dow was awarded 5-Stars in the areas of Employment and Governance in the 2022 Hispanic Association on Corporate Responsibility Corporate Inclusion Index™.
- Dow’s MaizeCare™ Clarity Polymer, a bio-based and biodegradable polymer with film-forming properties for crystal clear formulations, was recognized with an R&D 100 Award and a BIG™ Sustainability Product of the Year in the 2022 Sustainability Awards program.
- Dow's DOWSIL™ TC-6015 Thermally Conductive Encapsulant, an advanced, proven, silicone-based solution that provides exceptional thermal management for power electronics applications, won two prestigious 2022 innovation awards: one from the Business Intelligence Group (BIG™) in the Manufacturing category; and a Silver Edison Awards™ in the Industrial Technology category.

- In 2022, CDP (formerly Carbon Disclosure Project, an international non-profit specialized in environmental reporting) confirmed Dow's climate change score of A-.

In addition to the highlights above, the following events occurred subsequent to December 31, 2022:

- Dow has been named to the JUST 100 list, placing 55th overall, an 11-point improvement from last year, and securing the top spot for Communities in the Chemicals sector.
- On January 25, 2023, the Dow Inc. Board approved restructuring actions ("2023 Restructuring Program") to achieve the Company's structural cost improvement initiatives in response to the continued economic impact from the global recessionary environment and to enhance its agility and long-term competitiveness across the economic cycle. This program includes a global workforce cost reduction, decreasing turnaround spending, actions to rationalize the Company's manufacturing assets, which includes asset write-down and write-off charges and related contract termination fees.

RESULTS OF OPERATIONS

For comparison of results of operations for the fiscal years ended December 31, 2021 and 2020, see Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 4, 2022.

Net Sales

The following tables summarize net sales and sales variance by operating segment and geographic region from the prior year:

Summary of Sales Results In millions	*2022*	*2021*
Net sales	$ 56,902	$ 54,968

Sales Variances by Operating Segment and Geographic Region	*2022*				*2021*			
Percentage change from prior year	*Local Price & Product Mix*	*Currency*	*Volume*	*Total*	*Local Price & Product Mix*	*Currency*	*Volume*	*Total*
Packaging & Specialty Plastics	7 %	(3) %	— %	4 %	50 %	2 %	2 %	54 %
Industrial Intermediates & Infrastructure	11	(5)	(7)	(1)	40	2	(2)	40
Performance Materials & Coatings	21	(4)	(6)	11	19	2	1	22
Total	11 %	(4) %	(3) %	4 %	40 %	2 %	1 %	43 %
Total, excluding the Hydrocarbons & Energy business	10 %	(4) %	(5) %	1 %	37 %	2 %	(2) %	37 %
U.S. & Canada	6 %	— %	1 %	7 %	42 %	— %	2 %	44 %
EMEAI	18	(9)	(10)	(1)	45	4	3	52
Asia Pacific	6	(3)	—	3	25	2	(4)	23
Latin America	6	—	1	7	48	—	(3)	45
Total	11 %	(4) %	(3) %	4 %	40 %	2 %	1 %	43 %

2022 Versus 2021

The Company reported net sales of $56.9 billion in 2022, up 4 percent from $55.0 billion in 2021, with local price up 11 percent, an unfavorable currency impact of 4 percent and volume down 3 percent. Net sales increased in all operating segments except Industrial Intermediates & Infrastructure and across all geographic regions except EMEAI. Local price increased in all operating segments and across all geographic regions, primarily driven by tight supply and demand dynamics and increasing raw material prices, partially offset by slower macroeconomic growth in the second half of the year. Local price increased in Packaging & Specialty Plastics (up 7 percent), Industrial Intermediates & Infrastructure (up 11 percent) and Performance Materials & Coatings (up 21 percent). Volume decreased 3 percent, driven by EMEAI (down 10 percent), which was partially offset by the U.S. & Canada and Latin America (both up 1 percent), while volume was flat in Asia Pacific. Volume was flat in Packaging & Specialty Plastics and decreased in Industrial Intermediates & Infrastructure (down 7 percent) and Performance Materials & Coatings (down 6 percent). Currency unfavorably impacted net sales by 4 percent driven by EMEAI (down 9 percent) and Asia Pacific (down 3 percent). Excluding the Hydrocarbons & Energy business, sales increased 1 percent.

Cost of Sales

Cost of sales ("COS") was $48.3 billion in 2022, compared with $44.2 billion in 2021. COS increased in 2022 primarily due to higher feedstocks, energy, other raw material costs, and logistics costs, partially offset by insurance recoveries related to certain weather-related events in the prior year. COS as a percentage of net sales was 84.9 percent in 2022 compared with 80.4 percent in 2021.

Research and Development Expenses

Research and development ("R&D") expenses were $851 million in 2022, compared with $857 million in 2021. R&D expenses in 2022 decreased compared with 2021 primarily due to lower performance-based compensation costs and a decrease in fringe benefit expenses which reflected stock market declines compared with 2021.

Selling, General and Administrative Expenses

Selling, general and administrative ("SG&A") expenses were $1,675 million in 2022, compared with $1,645 million in 2021. SG&A expenses in 2022 increased primarily due to higher bad debt reserves which offset lower performance-based compensation costs and a decrease in fringe benefit expenses which reflected stock market declines compared with 2021.

Amortization of Intangibles

Amortization of intangibles was $336 million in 2022, compared with $388 million in 2021. Amortization of intangibles decreased primarily due to certain intangible assets becoming fully amortized. See Note 12 to the Consolidated Financial Statements for additional information on intangible assets.

Restructuring and Asset Related Charges - Net

2022 Asset Related Charges

In 2022, the Company recorded pretax asset related charges of $118 million due to the Russia and Ukraine conflict and the expectation that certain assets will not be recoverable. These charges included the write-down of inventory, the recording of bad debt reserves and the impairment of other assets. Asset related charges by segment in 2022 were as follows: $8 million in Packaging & Specialty Plastics, $73 million in Industrial Intermediates & Infrastructure, $6 million in Performance Materials & Coatings and $31 million in Corporate. See Note 5 to the Consolidated Financial Statements for additional information on restructuring and asset related charges.

Equity in Earnings (Losses) of Nonconsolidated Affiliates

The Company's share of equity in earnings of nonconsolidated affiliates was $268 million in 2022, compared with $975 million in 2021, with lower equity earnings at all principal joint ventures, primarily driven by margin compression at Sadara and the Kuwait joint ventures.

Sundry Income (Expense) - Net

Sundry income (expense) – net includes a variety of income and expense items such as foreign currency exchange gains and losses, dividends from investments, gains and losses on sales of investments and assets, non-operating pension and other postretirement benefit plan credits or costs, losses on early extinguishment of debt and certain litigation matters.

TDCC

Sundry income (expense) - net for 2022 was income of $714 million, compared with expense of $79 million in 2021.

In 2022, sundry income (expense) - net included a $321 million gain related to the successful and final resolution and recognition of a long-running patent infringement award (related to Packaging & Specialty Plastics), a $60 million gain related to an adjustment to the Dow Silicones breast implant liability (related to Corporate), non-operating pension and postretirement benefit plan credits and gains on the sales of assets and investments. These were partially offset by foreign currency exchange losses and an $8 million loss on the early extinguishment of debt (related to Corporate). See Notes 6, 14, 15, 19 and 25 to the Consolidated Financial Statements for additional information.

In 2021, sundry income (expense) - net included a $574 million loss on the early extinguishment of debt (related to Corporate and included in "Other net loss" in the consolidated statements of cash flows), and foreign currency exchange losses. These were partially offset by non-operating pension and postretirement benefit plan credits, gains on the sale of assets and investments, a $54 million gain related to an arbitration award (related to Industrial Intermediates & Infrastructure), and a $16 million gain related to post-closing adjustments on the previous divestiture of a bio-ethanol manufacturing facility in Brazil (related to Packaging & Specialty Plastics). See Notes 6, 14, 15, 19 and 25 to the Consolidated Financial Statements for additional information.

Dow Inc.
Sundry income (expense) - net for 2022 was income of $727 million, compared with expense of $35 million in 2021.

In 2022, in addition to the amounts previously discussed above for TDCC, sundry income (expense) - net included a $4 million net gain associated with agreements entered into with DuPont and Corteva as part of the separation and distribution (related to Corporate).

In 2021, in addition to the amounts previously discussed above for TDCC, sundry income (expense) - net included $30 million in gains associated with the agreements entered into with DuPont and Corteva as part of the separation and distribution (related to Corporate).

Interest Expense and Amortization of Debt Discount
Interest expense and amortization of debt discount was $662 million in 2022, compared with $731 million in 2021. Interest expense and amortization of debt discount decreased in 2022 primarily due to the liability management actions taken in 2021. See Liquidity and Capital Resources in Management's Discussion and Analysis of Financial Condition and Results of Operations and Note 14 to the Consolidated Financial Statements for additional information related to debt financing activity.

Provision for Income Taxes
The Company's effective tax rate fluctuates based on, among other factors, where income is earned, the level of income relative to tax attributes and the level of equity earnings, since most earnings from the Company's equity method investments are taxed at the joint venture level. The underlying factors affecting the Company's overall tax rate are summarized in Note 7 to the Consolidated Financial Statements.

The provision for income taxes was $1,450 million in 2022, compared with $1,740 million in 2021, resulting in effective tax rates of 23.8 percent and 21.4 percent, respectively. The provision for income taxes in 2022 was lower than 2021 primarily due to a decrease in pretax income, changes to geographic mix of earnings and a reduction in uncertain tax positions recognized. The tax rate for 2022 in comparison to 2021 was impacted primarily by the level of equity earnings.

Net Income Attributable to Noncontrolling Interests
Net income attributable to noncontrolling interests was $58 million in 2022, compared with $94 million in 2021. See Notes 18 and 23 to the Consolidated Financial Statements for additional information.

Net Income Available for the Common Stockholder(s)
Dow Inc.
Net income available for Dow Inc. common stockholders was $4,582 million in 2022, compared with $6,311 million in 2021. Earnings per share of Dow Inc. was $6.28 per share in 2022, compared with $8.38 per share in 2021. See Note 8 to the Consolidated Financial Statements for details on Dow Inc.'s earnings per share calculations.

TDCC
Net income available for TDCC common stockholder was $4,583 million in 2022, compared with $6,274 million in 2021. TDCC's common shares are owned solely by Dow Inc.

SEGMENT RESULTS

The Company conducts its worldwide operations through six global businesses which are organized into the following operating segments: Packaging & Specialty Plastics, Industrial Intermediates & Infrastructure and Performance Materials & Coatings. Corporate contains the reconciliation between the totals for the operating segments and the Company's totals. The Company did not aggregate any operating segments when determining its reportable segments. The Company reports geographic information for the following regions: U.S. & Canada, EMEAI, Asia Pacific and Latin America. The Company transfers ethylene to its downstream derivative businesses at market prices. See Part I, Item 1. Business for further discussion of the Company's segments.

The Company’s measure of profit/loss for segment reporting purposes is Operating EBIT as this is the manner in which the Company's chief operating decision maker ("CODM") assesses performance and allocates resources. The Company defines Operating EBIT as earnings (i.e., "Income before income taxes") before interest, excluding the impact of significant items. Operating EBIT by segment includes all operating items relating to the businesses; items that principally apply to Dow as a whole are assigned to Corporate. See Note 25 to the Consolidated Financial Statements for reconciliations of these measures.

For comparison of segment results for the fiscal years ended December 31, 2021 and 2020, see Part II, Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 4, 2022.

PACKAGING & SPECIALTY PLASTICS

Packaging & Specialty Plastics In millions	*2022*	*2021*
Net sales	$ 29,260	$ 28,128
Operating EBIT	$ 4,110	$ 6,638
Equity earnings	$ 359	$ 490

Packaging & Specialty Plastics Percentage change from prior year	*2022*	*2021*
Change in Net Sales from Prior Period due to:		
Local price & product mix	7 %	50 %
Currency	(3)	2
Volume	—	2
Total	4 %	54 %

2022 Versus 2021

Packaging & Specialty Plastics net sales were $29,260 million in 2022, up 4 percent from net sales of $28,128 million in 2021. Local price was up 7 percent, currency had an unfavorable impact of 3 percent, primarily in EMEAI and Asia Pacific, and volume was flat. Local price increased in both businesses, primarily in EMEAI, and driven by gains in functional polymers and olefins which more than offset lower polyethylene prices. Local price increased in Hydrocarbons & Energy as prices for co-products are generally correlated to Brent crude oil prices, which on average increased 40 percent compared with 2021. Local price increased in Packaging and Specialty Plastics in EMEAI and Asia Pacific, notably in infrastructure material and flexible packaging applications, more than offsetting decreases in the U.S. & Canada and Latin America. Volume increased in Hydrocarbons & Energy across all geographic regions. Volume decreased in Packaging and Specialty Plastics, primarily in EMEAI and the U.S. & Canada, as supply constraints and lower demand more than offset improved demand in Latin America and Asia Pacific.

Operating EBIT was $4,110 million in 2022, down $2,528 million from Operating EBIT of $6,638 million in 2021. Operating EBIT decreased primarily due to compression in integrated margins due to higher raw materials and energy costs and decreased equity earnings at the EQUATE and Sadara joint ventures.

INDUSTRIAL INTERMEDIATES & INFRASTRUCTURE

Industrial Intermediates & Infrastructure In millions	*2022*	*2021*
Net sales	$ 16,606	$ 16,851
Operating EBIT	$ 1,418	$ 2,282
Equity earnings (losses)	$ (91)	$ 471

Industrial Intermediates & Infrastructure Percentage change from prior year	*2022*	*2021*
Change in Net Sales from Prior Period due to:		
Local price & product mix	11 %	40 %
Currency	(5)	2
Volume	(7)	(2)
Total	(1)%	40 %

2022 Versus 2021

Industrial Intermediates & Infrastructure net sales were $16,606 million in 2022, down 1 percent from $16,851 million in 2021, with local price up 11 percent, an unfavorable currency impact of 5 percent and volume down 7 percent. Local price increased in both businesses and across all geographic regions, except Asia Pacific, primarily driven by strong supply and demand dynamics in the first half of the year and rising energy prices. Currency unfavorably impacted sales in both businesses, primarily in EMEAI and Asia Pacific. Volume in Polyurethanes & Construction Chemicals decreased in all geographic regions. The volume decrease in Polyurethanes & Construction Chemicals was largely driven by inflationary pressure on demand for consumer durables, industrial and building and construction applications. Volume in Industrial Solutions increased in all geographic regions, except Latin America and was driven by strong demand for pharmaceutical, energy and agricultural applications, as well as improved supply availability, as the prior year was impacted by Winter Storm Uri.

Operating EBIT was $1,418 million in 2022, down $864 million from Operating EBIT of $2,282 million in 2021. Operating EBIT decreased primarily due to lower equity earnings from the Sadara, EQUATE and Map ta Phut joint ventures and inflationary pressure on demand.

PERFORMANCE MATERIALS & COATINGS

Performance Materials & Coatings In millions	*2022*	*2021*
Net sales	$ 10,764	$ 9,672
Operating EBIT	$ 1,328	$ 866
Equity earnings	$ 10	$ 7

Performance Materials & Coatings Percentage change from prior year	*2022*	*2021*
Change in Net Sales from Prior Period due to:		
Local price & product mix	21 %	19 %
Currency	(4)	2
Volume	(6)	1
Total	11 %	22 %

2022 Versus 2021
Performance Materials & Coatings net sales were $10,764 million in 2022, up 11 percent from net sales of $9,672 million in 2021, with local price up 21 percent, an unfavorable currency impact of 4 percent, and volume down 6 percent. Local price increased in both businesses and across all geographic regions. Consumer Solutions local price increased in both upstream siloxanes and downstream silicones due to favorable supply and demand dynamics and higher raw material costs, partially offset by price declines in upstream siloxanes late in the year on increased industry supply. Local price increased in Coatings & Performance Monomers due to favorable supply and demand dynamics and higher raw material costs, partially offset by price declines late in the year as demand softened. Volume decreased in both businesses due to lower demand. Consumer Solutions volume decreased in all geographic regions except Asia Pacific, which was flat. Coatings & Performance Monomers volume decreased in all geographic regions except the U.S. & Canada, which was flat. The unfavorable currency impact was driven by EMEAI and Asia Pacific.

Operating EBIT was $1,328 million in 2022, up $462 million from Operating EBIT of $866 million in 2021. Operating EBIT increased primarily due to price gains in Consumer Solutions.

CORPORATE

Corporate In millions	*2022*	*2021*
Net sales	$ 272	$ 317
Operating EBIT	$ (266)	$ (253)
Equity earnings (losses)	$ (10)	$ 7

2022 Versus 2021
Net sales for Corporate, which primarily relate to the Company's insurance operations, were $272 million in 2022, down from net sales of $317 million in 2021.

Operating EBIT was a loss of $266 million in 2022, compared with a loss of $253 million in 2021. Operating EBIT decreased primarily due to the Company's insurance operations, increased environmental costs and equity losses.

OUTLOOK

Operating Segments & End-Market Expectations

In 2023, Dow remains focused on managing near-term dynamics while continuing to position the company for long-term value creation. The Company recognizes initial positive signs from moderating inflation growth in the U.S., improving outlook for energy in Europe, and re-opening in China. However, Dow will continue to take prudent, proactive actions by implementing a playbook of interventions focused on optimizing labor and purchased service costs, reducing turnaround spending, and enhancing productivity, which is collectively expected to deliver $1 billion in cost savings in 2023. Going forward, Dow will continue to maintain its disciplined and balanced approach to capital allocation and focus on cash flow generation, while executing its strategic priorities for long-term sustainable and profitable growth.

In Packaging & Specialty Plastics, improved reliability and ongoing logistics improvements are expected to allow the Company to satisfy areas of resilient demand, notably in flexible food and specialty packaging, as well as higher-value functional polymers. Local prices are expected to continue to be impacted by high energy costs and inflation. The Company's feedstock flexibility and advantaged regional footprint will put the segment in a position to navigate energy market dynamics throughout the year. In-region presence and superior derivative flexibility will allow the segment to continue to optimize price and volume mix.

In Industrial Intermediates & Infrastructure, demand growth is expected in consumer and energy end-markets. Market fundamentals will remain pressured for propylene oxide, polyols, isocyanates and derivatives systems, driven by lower-than-average growth in GDP, elevated raw material and energy costs and the impact of inflation on demand. Increased industry supply of propylene oxide and polyols is expected to impact margins. Recent and soon-to-be-completed investments in alkoxylation capacity are expected to service areas of resilient consumer demand in home care and pharmaceuticals.

In Performance Materials & Coatings, demand for performance silicones is expected to be in excess of GDP as the result of prioritization of key end-markets, most notably in mobility and electronics. Local prices are expected to be impacted by inflation, energy costs in Europe and increased industry supply of siloxanes. Coatings and acrylic monomers are expected to have improved supply availability from the prior year, especially for architectural coatings applications, while prices will be impacted by inflation and energy costs.

Other factors impacting operating segment profitability include an expected decrease in planned maintenance turnaround spending of approximately $300 million compared with 2022.

Projected Uses of Cash

Items that may impact the consolidated statements of cash flows in 2023 include:

- Cash contributions to pension plans are expected to be approximately $150 million.
- Capital expenditures are expected to be approximately $2.2 billion.
- Cash dividends from equity companies are expected to be approximately $350 million.
- Cash outflows related to the Company's 2023 Restructuring Program, including restructuring implementation costs, are expected to be approximately $400 million.

LIQUIDITY AND CAPITAL RESOURCES

The Company had cash and cash equivalents of $3,886 million at December 31, 2022 and $2,988 million at December 31, 2021, of which $1,789 million at December 31, 2022 and $1,745 million at December 31, 2021, was held by subsidiaries in foreign countries, including U.S. territories. For each of its foreign subsidiaries, the Company makes an assertion regarding the amount of earnings intended for permanent reinvestment, with the balance available to be repatriated to the United States.

The cash held by foreign subsidiaries for permanent reinvestment is generally used to finance the subsidiaries' operational activities and future foreign investments. Dow has the ability to repatriate additional funds to the U.S., which could result in an adjustment to the tax liability for foreign withholding taxes, foreign and/or U.S. state income taxes and the impact of foreign currency movements. At December 31, 2022, management believed that sufficient liquidity was available in the United States. The Company has and expects to continue repatriating certain funds from its non-U.S. subsidiaries that are not needed to finance local operations; however, these particular repatriation activities have not and are not expected to result in a significant incremental tax liability to the Company.

For comparison of cash flows for the fiscal years ended December 31, 2021 and 2020, see Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 4, 2022.

The Company's cash flows from operating, investing and financing activities, as reflected in the consolidated statements of cash flows, are summarized in the following table:

Cash Flow Summary	*Dow Inc.*		*TDCC*	
In millions	*2022*	*2021*	*2022*	*2021*
Cash provided by (used for):				
Operating activities - continuing operations	$ 7,486	$ 7,069	$ 7,519	$ 7,200
Operating activities - discontinued operations	(11)	(60)	—	—
Operating activities	7,475	7,009	7,519	7,200
Investing activities	(2,970)	(2,914)	(2,970)	(2,914)
Financing activities	(3,361)	(6,071)	(3,405)	(6,262)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(237)	(99)	(237)	(99)
Summary				
Increase (decrease) in cash, cash equivalents and restricted cash	907	(2,075)	907	(2,075)
Cash, cash equivalents and restricted cash at beginning of year	3,033	5,108	3,033	5,108
Cash, cash equivalents and restricted cash at end of year	$ 3,940	$ 3,033	$ 3,940	$ 3,033
Less: Restricted cash and cash equivalents, included in "Other current assets"	54	45	54	45
Cash and cash equivalents at end of year	$ 3,886	$ 2,988	$ 3,886	$ 2,988

Cash Flows from Operating Activities
Cash provided by operating activities from continuing operations in 2022 was primarily driven by the Company's cash earnings, dividends from equity method investments and cash provided by working capital, which were partially offset by performance-based compensation payments and pension contributions. Cash provided by operating activities from continuing operations in 2021 was primarily driven by the Company's cash earnings and dividends from equity method investments, which were partially offset by cash used for working capital requirements, pension contributions and performance-based compensation payments.

Net Working Capital and Current Ratio at Dec 31	*Dow Inc.*		*TDCC*	
In millions	*2022*	*2021*	*2022*	*2021*
Current assets	$ 20,477	$ 20,848	$ 20,511	$ 20,837
Current liabilities	11,331	13,226	11,247	13,046
Net working capital	$ 9,146	$ 7,622	$ 9,264	$ 7,791
Current ratio	1.81:1	1.58:1	1.82:1	1.60:1

Working Capital Metrics	*Twelve Months Ended*	
	Dec 31, 2022	*Dec 31, 2021*
Days sales outstanding in trade receivables	40	40
Days sales in inventory	54	54
Days payables outstanding	60	57

Cash used for operating activities from discontinued operations was related to cash payments and receipts the Company had with DuPont and Corteva that related to certain agreements and matters related to the separation from DowDuPont.

Cash Flows from Investing Activities
Cash used for investing activities in 2022 was primarily for capital expenditures and purchases of investments, which were partially offset by proceeds from sales and maturities of investments. Cash used for investing activities in 2021 was primarily for capital expenditures and purchases of investments and previously leased assets, which were partially offset by proceeds from sales and maturities of investments.

The Company's capital expenditures were $1,823 million in 2022 and $1,501 million in 2021. Capital spending was higher in 2022 as the Company continued the post-pandemic recovery and ramp up of investments in its higher return, lower risk and quick payback incremental growth projects. The Company expects capital spending in 2023 to be approximately $2.2 billion.

Capital spending in recent years has included the addition of a furnace to the Company's ethylene production facility in Alberta, Canada, which commenced operations in 2021; the retrofit of one of the Company's Louisiana steam crackers with Dow's proprietary fluidized catalytic dehydrogenation ("FCDh") technology to produce on-purpose propylene and the addition of a new specialty alkoxylation reactor in Plaquemine, Louisiana, which were both completed in 2022; the addition of an integrated methylene diphenyl diisocyanate ("MDI") distillation and prepolymers facility at its site in Freeport, Texas, which is expected to be completed in 2023; and construction of a world-scale polyethylene unit on the U.S. Gulf Coast.

Cash Flows from Financing Activities
Cash used for financing activities in 2022 included payments on long-term debt, which was more than offset by proceeds from issuance of long-term debt. In addition, Dow Inc. included cash outflows for dividends paid to stockholders and purchases of treasury stock. TDCC included cash outflows for dividends paid to Dow Inc. Cash used for financing activities in 2021 included payments on long-term debt and transaction financing, debt issuance and other costs, which were partially offset by proceeds from issuance of common stock. In addition, Dow Inc. included cash outflows for dividends paid to stockholders and purchases of treasury stock. TDCC included cash outflows for dividends paid to Dow Inc. See Notes 14 and 17 to the Consolidated Financial Statements for additional information related to the issuance and retirement of debt and the Company's share repurchases and dividends.

Non-GAAP Cash Flow Measures

Free Cash Flow
Dow defines Free Cash Flow as "Cash provided by operating activities - continuing operations," less capital expenditures. Under this definition, Free Cash Flow represents the cash generated by Dow from operations after investing in its asset base. Free Cash Flow, combined with cash balances and other sources of liquidity, represents the cash available to fund obligations and provide returns to shareholders. Free Cash Flow is an integral financial measure used in the Company's financial planning process.

Operating EBITDA
Dow defines Operating EBITDA as earnings (i.e., "Income before income taxes") before interest, depreciation and amortization, excluding the impact of significant items.

Cash Flow Conversion (Operating EBITDA to Cash Flow From Operations)
Dow defines Cash Flow Conversion (Operating EBITDA to cash flow from operations) as "Cash provided by operating activities - continuing operations," divided by Operating EBITDA. Management believes Cash Flow Conversion is an important financial metric as it helps the Company determine how efficiently it is converting its earnings into cash flow.

These financial measures are not recognized in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") and should not be viewed as alternatives to U.S. GAAP financial measures of performance. All companies do not calculate non-GAAP financial measures in the same manner and, accordingly, Dow's definitions may not be consistent with the methodologies used by other companies.

Reconciliation of Non-GAAP Cash Flow Measures	*Dow Inc.*	
In millions	*2022*	*2021*
Cash provided by operating activities - continuing operations (GAAP)	$ 7,486	$ 7,069
Capital expenditures	(1,823)	(1,501)
Free Cash Flow (non-GAAP) [1]	$ 5,663	$ 5,568

1. Free Cash Flow for the year ended December 31, 2021 reflects a $1 billion elective pension contribution.

Reconciliation of Cash Flow Conversion (Operating EBITDA to Cash Flow From Operations)	*Dow Inc.*	
In millions	*2022*	*2021*
Net income (GAAP)	$ 4,640	$ 6,405
+ Provision for income taxes	1,450	1,740
Income before income taxes	$ 6,090	$ 8,145
- Interest income	173	55
+ Interest expense and amortization of debt discount	662	731
- Significant items [1]	(11)	(712)
Operating EBIT (non-GAAP)	$ 6,590	$ 9,533
+ Depreciation and amortization	2,758	2,842
Operating EBITDA (non-GAAP)	$ 9,348	$ 12,375
Cash provided by operating activities - continuing operations (GAAP)	$ 7,486	$ 7,069
Cash Flow Conversion (Operating EBITDA to cash flow from operations) (non-GAAP) [2]	80.1 %	57.1 %

1. The year ended December 31, 2022 includes costs associated with implementing the Company's Digital Acceleration program and 2020 Restructuring Program, asset related charges due to the Russia and Ukraine conflict, a gain related to a legal matter with Nova, a gain related to an adjustment of the Dow Silicones breast implant liability, a loss on the early extinguishment of debt and activity related to the separation from DowDuPont. The year ended December 31, 2021 includes costs associated with implementing the Company's Digital Acceleration program and 2020 Restructuring Program, implementation costs and asset related charges - net, a loss on early extinguishment of debt, a gain on a previous divestiture, litigation related charges, awards and adjustments and activity related to the separation from DowDuPont. See Note 25 to the Consolidated Financial Statements for additional information.
2. Cash flow conversion for the year ended December 31, 2021 reflects a $1 billion elective pension contribution.

Liquidity & Financial Flexibility

The Company's primary source of incremental liquidity is cash flows from operating activities. The generation of cash from operations and the Company's ability to access capital markets is expected to meet the Company's cash requirements for working capital, capital expenditures, debt maturities, contributions to pension plans, dividend distributions to stockholders, share repurchases and other needs. In addition to cash from operating activities, the Company's current liquidity sources also include TDCC's U.S. and Euromarket commercial paper programs, committed and uncommitted credit facilities, committed accounts receivable facilities, a medium-term notes program, a U.S. retail note program ("InterNotes®") and other debt markets.

The Company continues to maintain a strong financial position with all of its committed credit facilities undrawn and fully available at December 31, 2022. Cash and committed and available forms of liquidity were $13.7 billion at December 31, 2022, an increase of $1.1 billion from December 31, 2021. The Company also has no substantive long-term debt maturities due until 2027. Additional details on sources of liquidity are as follows:

Commercial Paper

TDCC issues promissory notes under its U.S. and Euromarket commercial paper programs. TDCC had $299 million of commercial paper outstanding at December 31, 2022 (zero in 2021). TDCC maintains access to the commercial paper market at competitive rates. Amounts outstanding under TDCC's commercial paper programs during the period may be greater or less than the amount reported at the end of the period. Subsequent to December 31, 2022, TDCC issued approximately $311 million of commercial paper.

Committed Credit Facilities
The Company also has the ability to access liquidity through TDCC's committed and available credit facilities. At December 31, 2022, TDCC had total committed and available credit facilities of $8.4 billion. See Note 14 to the Consolidated Financial Statements for additional information on committed and available credit facilities.

Committed Accounts Receivable Facilities
In addition to the above committed credit facilities, the Company maintains an accounts receivable facility in the U.S. where eligible trade accounts receivable, up to $900 million, may be sold at any point in time. The Company also maintains a committed accounts receivable facility in Europe where eligible trade accounts receivable, up to €500 million, may be sold at any point in time. In 2022, the Company sold $391 million of receivables under the U.S. and Europe committed accounts receivable facilities. See Note 13 to the Consolidated Financial Statements for additional information.

Uncommitted Credit Facilities
The Company has entered into various uncommitted bilateral credit arrangements as a potential source of excess liquidity. These lines can be used to support short-term liquidity needs and for general purposes, including letters of credit. The Company had no drawdowns outstanding at December 31, 2022.

Letters of Credit
TDCC utilizes letters of credit to support commitments made in the ordinary course of business. While the terms and amounts of letters of credit change, TDCC generally has approximately $600 million of outstanding letters of credit at any given time.

Company-Owned Life Insurance
The Company has investments in company-owned life insurance ("COLI") policies, which are recorded at their cash surrender value as of each balance sheet date. The Company has the ability to monetize its investment in its COLI policies as an additional source of liquidity. The Company had no outstanding monetization of its existing COLI policies' surrender value at December 31, 2022.

Early Settlement of Letters of Credit
The Company utilizes, from time-to-time, letters of credit discounting programs to manage and expedite the settlement of letters of credit in certain regions. These letters of credit are associated with accounts receivable and the Company retains no interest in the transferred letters of credit or receivables once sold.

Shelf Registration - U.S.
On June 13, 2022, Dow Inc. and TDCC filed a shelf registration statement with the U.S. Securities and Exchange Commission. The shelf indicates that Dow Inc. may offer common stock; preferred stock; depositary shares; debt securities; guarantees; warrants to purchase common stock, preferred stock and debt securities; and stock purchase contracts and stock purchase units, with pricing and availability of any such offerings depending on market conditions. The shelf also indicates that TDCC may offer debt securities, guarantees and warrants to purchase debt securities, with pricing and availability of any such offerings depending on market conditions. In 2022, TDCC filed a prospectus supplement under this shelf registration to register an undetermined amount of securities for issuance under InterNotes®. Also, in 2022, TDCC filed a prospectus supplement under this shelf registration to register an undetermined amount of securities for issuance under a medium-term notes program.

Debt
As the Company continues to maintain its strong balance sheet and financial flexibility, management is focused on net debt (a non-GAAP financial measure), as the Company believes this is the best representation of its financial leverage at this point in time. As shown in the following table, net debt is equal to total gross debt minus "Cash and cash equivalents" and "Marketable securities."

Total Debt at Dec 31	*Dow Inc.*		*TDCC*	
In millions	*2022*	*2021*	*2022*	*2021*
Notes payable	$ 362	$ 161	$ 362	$ 161
Long-term debt due within one year	362	231	362	231
Long-term debt	14,698	14,280	14,698	14,280
Gross debt	$ 15,422	$ 14,672	$ 15,422	$ 14,672
- Cash and cash equivalents	3,886	2,988	3,886	2,988
- Marketable securities [1]	939	245	939	245
Net debt	$ 10,597	$ 11,439	$ 10,597	$ 11,439
Total equity	$ 21,247	$ 18,739	$ 21,489	$ 19,029
Gross debt as a percentage of total capitalization	42.1 %	43.9 %	41.8 %	43.5 %
Net debt as a percentage of total capitalization	33.3 %	37.9 %	33.0 %	37.5 %

1. Included in "Other current assets" in the consolidated balance sheets.

In the second quarter of 2022, the Company redeemed $750 million aggregate principal amount of 3.625 percent notes due May 2026.

In the fourth quarter of 2022, the Company issued $1.5 billion of senior unsecured notes. The offering included $600 million aggregate principal amount of 6.30 percent notes due 2033 and $900 million aggregate principal amount of 6.90 percent notes due 2053.

In 2022, the Company issued an aggregate principal amount of $167 million of InterNotes®. Additionally, the Company repaid $121 million of long-term debt at maturity and approximately $3 million of long-term debt was repaid by consolidated variable interest entities.

The Company may at any time repurchase certain debt securities in the open market or in privately negotiated transactions subject to: the applicable terms under which any such debt securities were issued, certain internal approvals of the Company, and applicable laws and regulations of the relevant jurisdiction in which any such potential transactions might take place. This in no way obligates the Company to make any such repurchases nor should it be considered an offer to do so.

TDCC’s public debt instruments and primary, private credit agreements contain, among other provisions, certain customary restrictive covenant and default provisions. TDCC’s most significant debt covenant with regard to its financial position is the obligation to maintain the ratio of its consolidated indebtedness to consolidated capitalization at no greater than 0.70 to 1.00 at any time the aggregate outstanding amount of loans under the Five Year Competitive Advance and Revolving Credit Facility Agreement ("Revolving Credit Agreement") equals or exceeds $500 million. The ratio of TDCC’s consolidated indebtedness as defined in the Revolving Credit Agreement was 0.40 to 1.00 at December 31, 2022. Management believes TDCC was in compliance with all of its covenants and default provisions at December 31, 2022. The Revolving Credit Agreement was extended in November 2022 and matures in November 2027.

Dow Inc. is obligated, substantially concurrently with the issuance of any guarantee in respect of outstanding or committed indebtedness under the Revolving Credit Agreement, to enter into a supplemental indenture with TDCC and the trustee under TDCC’s existing 2008 base indenture governing certain notes issued by TDCC. Under such supplemental indenture, Dow Inc. will guarantee all outstanding debt securities and all amounts due under such existing base indenture and will become subject to certain covenants and events of default under the existing base indenture.

In addition, the Revolving Credit Agreement includes an event of default which would be triggered in the event Dow Inc. incurs or guarantees third party indebtedness for borrowed money in excess of $250 million or engages in any material activity or directly owns any material assets, in each case, subject to certain conditions and exceptions. Dow Inc. may, at its option, cure the event of default by delivering an unconditional and irrevocable guarantee to the administrative agent within thirty days of the event or events giving rise to such event of default.

No such events have occurred or have been triggered at the time of the filing of this Annual Report on Form 10-K. See Note 14 to the Consolidated Financial Statements for information related to TDCC's notes payable and long-term debt activity and information on TDCC's debt covenants and default provisions.

While taking into consideration the current economic environment, management expects that the Company will continue to have sufficient liquidity and financial flexibility to meet all of its business obligations.

Credit Ratings
TDCC's credit ratings at January 31, 2023 were as follows:

Credit Ratings	*Long-Term Rating*	*Short-Term Rating*	*Outlook*
Fitch Ratings	BBB+	F2	Positive
Moody's Investors Service	Baa1	P-2	Stable
Standard & Poor's	BBB	A-2	Positive

On May 31, 2022, Moody's Investors Service announced a credit rating upgrade for TDCC from Baa2 to Baa1, affirmed its P-2 rating and maintained a stable outlook. On June 8, 2022, Standard & Poor's affirmed TDCC's BBB and A-2 rating, and revised its outlook to positive from stable. On June 16, 2022, Fitch Ratings affirmed TDCC's BBB+ and F2 rating, and revised its outlook to positive from stable. These credit agencies' decisions were made as part of their annual review process and reflect the Company's supportive financial policies and strong operating performance.

Dividends
Dow Inc.
Dow Inc. has paid dividends on a quarterly basis and expects to continue to do so, subject to approval by the Dow Inc. Board. The dividends declared by the Dow Inc. Board align to the Company's strategy announced in 2018 of returning approximately 45 percent of operating net income[1] to the shareholders through the dividend and total shareholder remuneration of approximately 65 percent, when including share repurchases, over the economic cycle. The following tables provide information on dividends declared and paid to common stockholders:

Dividends Paid for the Years Ended Dec 31 In millions, except per share amounts	*2022*	*2021*
Dividends paid, per common share	$ 2.80	$ 2.80
Dividends paid to common stockholders	$ 2,006	$ 2,073

Dow Inc. Cash Dividends Declared and Paid			
Declaration Date	*Record Date*	*Payment Date*	*Amount (per share)*
February 10, 2022	February 28, 2022	March 11, 2022	$ 0.70
April 13, 2022	May 31, 2022	June 10, 2022	$ 0.70
August 10, 2022	August 31, 2022	September 9, 2022	$ 0.70
October 13, 2022	November 30, 2022	December 9, 2022	$ 0.70

1. Operating net income is a non-GAAP measure that Dow defines as "Net income (loss) available for Dow Inc. common stockholders," excluding the impact of significant items.

TDCC
TDCC has committed to fund Dow Inc.'s dividends paid to common stockholders and share repurchases, as approved by the Dow Inc. Board from time to time, as well as certain governance expenses. Funding is accomplished through intercompany loans. TDCC's Board reviews and determines a dividend distribution to Dow Inc. to settle the intercompany loans. For the year ended December 31, 2022, TDCC declared and paid dividends to Dow Inc. of $4,375 million ($3,264 million for the year ended December 31, 2021). At December 31, 2022, TDCC's intercompany loan balance with Dow Inc. was insignificant. See Note 24 to the Consolidated Financial Statements for additional information.

Share Repurchase Program
On April 1, 2019, the Dow Inc. Board ratified the share repurchase program originally approved on March 15, 2019, authorizing up to $3 billion for the repurchase of the Company's common stock, with no expiration date. The Company completed the April 1, 2019 share repurchase program in the second quarter of 2022. On April 13, 2022, the Dow Inc. Board approved a new share repurchase program authorizing up to $3 billion for the repurchase of the Company's common stock, with no expiration date. In 2022, the Company repurchased $2,325 million of its common stock. At December 31, 2022, $2 billion of the new share repurchase program authorization remained available for repurchases. As previously announced, the Company intends to repurchase shares to cover dilution over the cycle. The Company may from time to time expand its share repurchases beyond dilution, based on a number of factors including macroeconomic conditions, free cash flow generation, and the Dow share price. Any share repurchases, when coupled with the Company's dividends, are intended to implement the long-term strategy of targeting shareholder remuneration of approximately 65 percent over the economic cycle.

Pension Plans
The Company has both funded and unfunded defined benefit pension plans that cover employees in the United States and a number of other countries. In 2022 and 2021, the Company contributed $235 million and $1,219 million to its pension plans, respectively, including contributions to fund benefit payments for its unfunded pension plans. In the first quarter of 2021, the Company elected to contribute $1 billion to its U.S. tax-qualified pension plans, which is included in the 2021 contribution amount above. This contribution was based on the Company's funding policy, which is to contribute to defined benefit pension plans when pension laws and/or economics either require or encourage funding. The Company expects to contribute approximately $150 million to its pension plans in 2023.

On March 4, 2021, the Company announced changes to the design of its U.S. tax-qualified and non-qualified pension plans (collectively, the "U.S. Plans") and, effective December 31, 2023, the Company will freeze the pensionable compensation and credited service amounts used to calculate pension benefits for employees who participate in the U.S. Plans. See Note 19 to the Consolidated Financial Statements for additional information concerning the Company’s pension plans.

Restructuring
The 2020 Restructuring Program was substantially complete at December 31, 2021, with the exception of certain cash expenditures expected into 2023, consisting of severance and related benefit costs and costs associated with exit and disposal activities, including contract cancellation penalties and environmental remediation. Restructuring implementation costs totaled $40 million in 2022.

The Company expects to incur additional costs in the future related to its restructuring activities, which will be recognized as incurred. The Company also expects to incur additional employee-related costs, including involuntary termination benefits related to its other optimization activities. These costs cannot be reasonably estimated at this time. See Note 5 to the Consolidated Financial Statements for additional information on the Company's restructuring activities.

Digital Acceleration
In 2021, Dow announced plans to further advance and expand its digitalization efforts to deliver long-term value creation, by accelerating investment in three key areas: expanding digital tools to accelerate materials science innovation; further enhancing the e-commerce buying and fulfillment experience for Dow's customers; and adopting real-time digital manufacturing insights, operational data intelligence and demand sensing to enhance the productivity and reliability of Dow’s operations. The Company expects more than $300 million in incremental annual run rate Operating EBITDA generation by the end of 2023 related to digital acceleration, with an additional one-time $100 million in structural working capital efficiency gains, driven in part by enhanced planning from digital tools.

Digital acceleration pre-tax expenses totaled $230 million in 2022. The Digital Acceleration program was completed at the end of 2022.

Contractual Obligations
The following table summarizes the Company's contractual obligations, commercial commitments and expected cash requirements for interest at December 31, 2022. Additional information related to these obligations can be found in Notes 14, 15, 16 and 19 to the Consolidated Financial Statements.

Contractual Obligations at Dec 31, 2022	*Payments Due In*				
In millions	*2023*	*2024-2025*	*2026-2027*	*2028 and beyond*	*Total*
Dow Inc.					
Long-term debt obligations [1]	$ 362	$ 515	$ 1,287	$ 13,178	$ 15,342
Expected cash requirements for interest [2]	715	1,351	1,298	8,671	12,035
Pension and other postretirement benefits	222	429	439	2,550	3,640
Operating leases [3]	333	452	289	470	1,544
Purchase obligations [4]	3,235	4,285	2,236	3,019	12,775
Other noncurrent obligations [5]	—	825	586	1,386	2,797
Total	$ 4,867	$ 7,857	$ 6,135	$ 29,274	$ 48,133
TDCC					
Long-term debt obligations [1]	$ 362	$ 515	$ 1,287	$ 13,178	$ 15,342
Expected cash requirements for interest [2]	715	1,351	1,298	8,671	12,035
Pension and other postretirement benefits	222	429	439	2,550	3,640
Operating leases [3]	333	452	289	470	1,544
Purchase obligations [4]	3,235	4,285	2,236	3,019	12,775
Other noncurrent obligations [5]	—	719	583	1,355	2,657
Total	$ 4,867	$ 7,751	$ 6,132	$ 29,243	$ 47,993

1. Excludes unamortized debt discount and issuance costs of $282 million. Includes finance lease obligations of $790 million.
2. Cash requirements for interest on long-term debt was calculated using current interest rates at December 31, 2022, and includes $6 million of various floating rate notes.
3. Includes imputed interest of $260 million.
4. Includes outstanding purchase orders and other commitments greater than $1 million obtained through a survey conducted within the Company.
5. Includes liabilities related to asbestos litigation, environmental remediation, legal matters and other noncurrent liabilities. In addition to these items, Dow Inc. includes liabilities related to noncurrent obligations with DuPont and Corteva. The table excludes uncertain tax positions due to uncertainties in the timing of the effective settlement of tax positions with the respective taxing authorities and deferred tax liabilities as it is impractical to determine whether there will be a cash impact related to these liabilities. The table also excludes deferred revenue as it does not represent future cash requirements arising from contractual payment obligations.

The Company expects to meet its contractual obligations through its normal sources of liquidity and believes it has the financial resources to satisfy these contractual obligations.

Off-Balance Sheet Arrangements
Off-balance sheet arrangements are obligations the Company has with nonconsolidated entities related to transactions, agreements or other contractual arrangements. The Company holds variable interests in joint ventures accounted for under the equity method of accounting. The Company is not the primary beneficiary of these joint ventures and therefore is not required to consolidate these entities (see Note 23 to the Consolidated Financial Statements). In addition, see Note 13 to the Consolidated Financial Statements for information regarding the transfer of financial assets.

Guarantees arise during the ordinary course of business from relationships with customers, committed accounts receivable facilities and nonconsolidated affiliates when the Company undertakes an obligation to guarantee the performance of others if specific triggering events occur. Additional information related to guarantees can be found in the "Guarantees" section of Note 15 to the Consolidated Financial Statements.

Fair Value Measurements
See Note 19 to the Consolidated Financial Statements for information related to fair value measurements of pension and other postretirement benefit plan assets; see Note 21 for information related to other-than-temporary impairments; and, see Note 22 for additional information concerning fair value measurements.

OTHER MATTERS

Recent Accounting Guidance
See Note 2 to the Consolidated Financial Statements for a summary of recent accounting guidance.

Critical Accounting Estimates
The preparation of financial statements and related disclosures in accordance with U.S. GAAP requires management to make judgments, assumptions and estimates that affect the amounts reported in the consolidated financial statements and accompanying notes. Note 1 to the Consolidated Financial Statements describes the significant accounting policies and methods used in the preparation of the consolidated financial statements. Following are the Company's accounting policies impacted by judgments, assumptions and estimates:

Asbestos-Related Matters of Union Carbide Corporation
Union Carbide is and has been involved in a large number of asbestos-related suits filed primarily in state courts during the past four decades. These suits principally allege personal injury resulting from exposure to asbestos-containing products and frequently seek both actual and punitive damages. The alleged claims primarily relate to products that Union Carbide sold in the past, alleged exposure to asbestos-containing products located on Union Carbide's premises, and Union Carbide's responsibility for asbestos suits filed against a former Union Carbide subsidiary, Amchem Products, Inc. ("Amchem"). Each year, Ankura Consulting Group, LLC ("Ankura") performs a review for Union Carbide based upon historical asbestos claims, resolution and asbestos-related defense and processing costs, through the terminal year of 2049. Union Carbide compares current asbestos claim and resolution activity, including asbestos-related defense and processing costs, to the results of the most recent Ankura study at each balance sheet date to determine whether the asbestos-related liability continues to be appropriate.

For additional information, see Part I, Item 3. Legal Proceedings; Asbestos-Related Matters of Union Carbide Corporation in Management's Discussion and Analysis of Financial Condition and Results of Operations; and Notes 1 and 15 to the Consolidated Financial Statements.

Environmental Matters
The Company determines the costs of environmental remediation of its facilities and formerly owned facilities based on evaluations of current law and existing technologies. Inherent uncertainties exist in such evaluations primarily due to unknown environmental conditions, changing governmental regulations and legal standards regarding liability, and emerging remediation technologies. The recorded liabilities are adjusted periodically as remediation efforts progress, or as additional technical or legal information becomes available. At December 31, 2022, the Company had accrued obligations of $1,192 million for probable environmental remediation and restoration costs, including $244 million for the remediation of Superfund sites. This is management's best estimate of the costs for remediation and restoration with respect to environmental matters for which the Company has accrued liabilities, although it is reasonably possible that the ultimate cost with respect to these particular matters could range up to approximately two times that amount. For further discussion, see Environmental Matters in Management's Discussion and Analysis of Financial Condition and Results of Operations and Notes 1 and 15 to the Consolidated Financial Statements.

Pension and Other Postretirement Benefits
The amounts recognized in the consolidated financial statements related to pension and other postretirement benefits are determined from actuarial valuations. Inherent in these valuations are assumptions including expected return on plan assets, discount rates at which the liabilities could have been settled at December 31, 2022, rate of increase in future compensation levels, mortality rates and health care cost trend rates. These assumptions are updated annually and are disclosed in Note 19 to the Consolidated Financial Statements. In accordance with U.S. GAAP, actual results that differ from the assumptions are accumulated and amortized over future periods and, therefore, affect expense recognized and obligations recorded in future periods. The U.S. pension plans represent 73 percent of the Company's pension plan assets and 72 percent of the pension obligations.

The Company uses the spot rate approach to determine the discount rate utilized to measure the service cost and interest cost components of net periodic pension and other postretirement benefit costs for the U.S. and other selected countries. Under the spot rate approach, the Company calculates service cost and interest cost by applying individual spot rates from the Willis Towers Watson RATE:Link yield curve (based on high-quality corporate bond yields) for each selected country to the separate expected cash flow components of service cost and interest cost; service cost and interest cost for all other plans (including all plans prior to adoption) are determined on the basis of the single equivalent discount rates derived in determining those plan obligations.

The following information relates to the U.S. plans only; a similar approach is used for the Company’s non-U.S. plans.

The Company determines the expected long-term rate of return on assets by performing a detailed analysis of historical and expected returns based on the strategic asset allocation approved by the Company's Investment Committee and the underlying return fundamentals of each asset class. The Company’s historical experience with the pension fund asset performance is also considered. The expected return of each asset class is derived from a forecasted future return confirmed by historical experience. The expected long-term rate of return is an assumption and not what is expected to be earned in any one particular year. The weighted-average long-term rate of return assumption used for determining net periodic pension expense for 2022 was 7.95 percent. The weighted-average assumption to be used for determining 2023 net periodic pension expense is 7.46 percent. Future actual pension expense will depend on future investment performance, changes in future discount rates and various other factors related to the population of participants in the Company’s pension plans.

The discount rates utilized to measure the pension and other postretirement obligations of the U.S. plans are based on the yield on high-quality corporate fixed income investments at the measurement date. Future expected actuarially determined cash flows for the Company’s U.S. plans are individually discounted at the spot rates under the Willis Towers Watson U.S. RATE:Link 60-90 corporate yield curve (based on 60th to 90th percentile high-quality corporate bond yields) to arrive at the plan’s obligations as of the measurement date. The weighted average discount rate utilized to measure pension obligations increased to 5.64 percent at December 31, 2022, from 3.04 percent at December 31, 2021.

At December 31, 2022, the U.S. tax-qualified plans were underfunded on a projected benefit obligation basis by $545 million. The underfunded amount decreased $2,040 million compared with December 31, 2021. The decrease in the underfunded amount in 2022 was primarily due to the market-related impact of higher discount rates partially offset by unfavorable returns on plan assets.

The assumption for the long-term rate for compensation levels for the U.S. tax-qualified plans was unchanged. The Company uses a generational mortality table to determine the duration of its pension and other postretirement obligations.

The following discussion relates to the Company’s significant pension plans.

The Company bases the determination of pension expense on a market-related valuation of plan assets that reduces year-to-year volatility. This market-related valuation recognizes investment gains or losses over a five-year period from the year in which they occur. Investment gains or losses for this purpose represent the difference between the expected return calculated using the market-related value of plan assets and the actual return based on the market value of plan assets. Since the market-related value of plan assets recognizes gains or losses over a five-year period, the future value will be impacted when previously deferred gains or losses are recorded. Over the life of the plans, both gains and losses have been recognized and amortized. At December 31, 2022, net losses of $3,123 million remain to be recognized in the calculation of the market-related value of plan assets. These net losses will result in increases in future pension expense as they are recognized in the market-related value of assets.

The net decrease in the market-related value of assets due to the recognition of prior losses is presented in the following table:

Net Decrease in Market-Related Asset Value Due to Recognition of Prior Losses In millions	
2023	$ 339
2024	729
2025	950
2026	1,105
Total	$ 3,123

The Company expects pension net periodic benefit cost ("NPBC") to decrease in 2023 by approximately $115 million, resulting in an NPBC credit. The decrease is driven primarily by discount rate increases, resulting in a reduction in the amortization of actuarial losses, partially offset by higher interest cost.

A 25 basis point increase or decrease in the long-term return on assets assumption would change the Company's NPBC credit for 2023 by $58 million. A 25 basis point increase in the discount rate assumption would decrease the Company's NPBC credit for 2023 by $4 million. A 25 basis point decrease in the discount rate assumption would decrease the Company's NPBC credit for 2023 by $23 million.

Income Taxes

Deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities, applying enacted tax rates expected to be in effect for the year in which the differences are expected to reverse. Based on the evaluation of available evidence, both positive and negative, the Company recognizes future tax benefits, such as net operating loss carryforwards and tax credit carryforwards, to the extent that realizing these benefits is considered to be more likely than not.

At December 31, 2022, the Company had a net deferred tax liability balance of $150 million, after valuation allowances of $1,269 million.

In evaluating the ability to realize the deferred tax assets, the Company relies on, in order of increasing subjectivity, taxable income in prior carryback years, the future reversals of existing taxable temporary differences, tax planning strategies and forecasted taxable income using historical and projected future operating results.

The Company files tax returns in multiple jurisdictions and is subject to examination by taxing authorities throughout the world. Tax authorities have the ability to review and challenge matters that could be subject to differing interpretation of applicable tax laws and regulations as they relate to the amount, character, timing or inclusion of revenue and expenses or the sustainability of tax attributes. The ultimate resolution of such uncertainties could last several years. When an uncertain tax position is identified, the Company considers and interprets complex tax laws and regulations in order to determine the need for recognizing a provision in its financial statements. Significant judgment is required in determining the timing and measurement of uncertain tax positions. The Company utilizes internal and external expertise in interpreting tax laws to support the Company's tax positions. The Company recognizes the financial statement effects of an uncertain income tax position when it is more likely than not, based on technical merits, that the position will be sustained upon examination. At December 31, 2022, the Company had uncertain tax positions for both domestic and foreign issues of $520 million and $498 million for interest and penalties.

Environmental Matters

Environmental Policies

Dow is committed to world-class environmental, health and safety ("EH&S") performance, as demonstrated by industry-leading results, a long-standing commitment to Responsible Care®, a strong commitment to achieve the Company's 2025 Sustainability Goals and Dow's drive to deliver against new targets on climate protection and a circular economy. These goals and targets set the standard for sustainability in the chemical industry, focusing on improvements in the Company's local corporate citizenship and product stewardship, and by actively pursuing methods to reduce the Company's environmental impact.

To meet the Company's public commitments, as well as the stringent laws and government regulations related to environmental protection and remediation to which its global operations are subject, the Company has well-defined policies, requirements and management systems. The Company's EH&S Management System ("EMS") defines the "who, what, when and how" needed for the businesses to implement the Company's policies and requirements and meet performance objectives, leadership expectations and public commitments. The EMS is integrated into a company-wide management system for EH&S, Operations, Quality and Human Resources.

The Company believes third-party verification and transparent public reporting are cornerstones of world-class EH&S performance and building public trust. Numerous Dow sites in Europe, Latin America, Asia Pacific and the U.S. & Canada have received third-party verification of the Company's compliance with Responsible Care® and with outside specifications such as ISO-14001. The Company continues to be a global champion of Responsible Care® and has worked to broaden the application and impact of Responsible Care® around the world through engagement with suppliers, customers and joint venture partners.

Dow manages environmental data for reporting with a waste, water and emissions inventory system. All manufacturing sites globally record their emissions and water use in the system. The data is reviewed at the facility level and then by global coordinators before being aggregated for ESG reporting.

Dow's EH&S policies help to ensure the Company achieves its annual health and safety performance targets and the Company seeks to continuously improve on these targets through process and personal safety project implementations. Improvement in these areas, as well as environmental compliance, remains a top management priority, as the Company continues to implement its 2025 Sustainability Goals and progressive, multi-decade sustainability targets that include advancing a circular economy and climate protection. Progress is reviewed regularly by management and with the Environment, Health, Safety & Technology Committee of the Board.

Detailed information on Dow's performance regarding environmental matters and goals is accessible through the Company's Science & Sustainability webpage at *www.dow.com/sustainability*. Dow's website and its content are not deemed incorporated by reference into this report.

Chemical Security

Public and political attention continues to be placed on the protection of critical infrastructure, including the chemical industry, from security threats. Sabotage, terrorism, war, natural disasters and cyber incidents have increased global concerns about the security and safety of chemical production and distribution. Many, including the Company and the American Chemistry Council, have called for uniform risk-based and performance-based national standards for securing the U.S. chemical industry. The Company is subject to U.S. regulations with established risk-based and performance-based standards that must be met at U.S. Coast Guard-regulated and Chemical Facility Anti-Terrorism Standards-regulated facilities promulgated by the U.S. Department of Homeland Security. The Company is also subject to the requirements of the Rail Transportation Security Rule issued by the U.S. Transportation Security Administration. The Company continues to support uniform risk-based national standards for securing the chemical industry.

Since 1988, the Company has maintained a comprehensive, multi-level security plan that focuses on security, emergency planning, preparedness and response. This plan, which has been activated in response to significant world and national events, is reviewed on an annual basis. The Company continues to improve its security plans, placing emphasis on the safety of Dow communities and people by being prepared to meet risks at any level and to address both internal and external identifiable risks. The security plan includes regular vulnerability assessments, security audits, mitigation efforts and physical security upgrades designed to reduce vulnerability. The Company's security plans are also designed to avert interruptions of normal business operations that could materially and adversely affect the Company's results of operations, financial condition and cash flows.

The Company played a key role in the development and implementation of the American Chemistry Council's Responsible Care® Security Code ("Security Code"), which requires that all aspects of security – including facility, transportation and cyberspace – be assessed and gaps addressed. Through the global implementation of the Security Code, the Company has permanently heightened the level of security – not just in the United States, but worldwide. The Company employs several hundred employees and contractors in its Emergency Services and Security department worldwide. In 2019, the Company established its Global Security Operations Center ("GSOC") to provide 24-hour/day, 365-day/year real-time monitoring of global risks to Dow assets and people. The GSOC employs state-of-the-art social media monitoring, threat reporting and geo-fencing capabilities to analyze global risks and report those risks, facilitating decision-making and actions to prevent Dow crises.

Through the implementation of the Security Code, including voluntary security enhancements and upgrades, the Company is well-positioned to comply with U.S. chemical facility regulations and other regulatory security frameworks. The Company participates with the American Chemistry Council to periodically review and update the Security Code.

The Company continues to work collaboratively across the supply chain on Responsible Care®, supply chain design, emergency preparedness, shipment visibility and transportation of hazardous materials. The Company cooperated with public and private entities to lead the implementation of advanced tank car design, and track and trace technologies. Further, the Company’s Distribution Risk Review process addresses potential threats in all modes of transportation across the Company’s supply chain. To reduce vulnerabilities, the Company maintains security measures that meet or exceed regulatory and industry security standards in all areas in which they operate.

The Company's initiatives relative to chemical security, emergency preparedness and response, Community Awareness and Emergency Response and crisis management are implemented consistently at all Dow sites on a global basis. Each Dow site has established outreach programs designed to engage community stakeholders with objectives centered around awareness of Dow operations, products, and efforts to protect worker and community health and the environment. These programs also educate community members on emergency planning and response, emissions and waste, future site plans to reduce waste and emissions, and process safety systems. Finally, these outreach efforts establish an opportunity for Dow site leaders to hear about community stakeholder expectations and address questions and concerns about safety, health, environmental or other issues. The Company participates with chemical associations globally and participates as an active member of the Global Congress on Chemical Security and Emerging Threats and in positions of leadership in the U.S. Chemical Sector Coordinating Council.

Climate Protection
Addressing climate-related risks and opportunities is part of Dow’s overall climate strategy. This 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. In 2020, Dow announced commitments to reduce its net annual Scope 1 and 2 carbon emissions by an additional 5 million metric tons by 2030 versus its 2020 baseline, a 15 percent reduction and a 30 percent reduction since 2005 as Dow had reduced its carbon emissions 15 percent between 2005 and 2020. Additionally, Dow announced its intention to be carbon neutral by 2050 (Scope 1+2+3, as defined by the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, plus product benefits). Reflecting Dow's focus to make meaningful progress in the near term, Dow intends to reduce its carbon emissions by approximately 2 million metric tons from 2022 to 2025 while growing underlying earnings. Dow is also committed to advancing water stewardship within the Company's operations and to working collaboratively to enhance water management at the watershed level. As part of this commitment, Dow has set a global target to reduce freshwater intake intensity by 20 percent at its key water-stressed sites by 2025.

Despite these commitments, climate change-related risks and uncertainties, legal or regulatory responses to climate change, and failure to meet climate change commitments could negatively impact Dow’s operations, financial condition and/or reputation. Climate-related risks include both physical and transition risks.

Physical Risks
Climate-related physical risks include more frequent severe weather events, potential changes in precipitation patterns, water scarcity and extreme variability in weather patterns, which can disrupt the operations of the Company as well as those of its customers, partners and vendors. In 2021, Dow partnered with S&P Global Trucost (Trucost) to assess the Company’s exposure to climate-related physical risks based on the geographic location of manufacturing operations. The risks assessed included water stress, heat waves, cold waves, droughts, hurricanes, wildfires and flooding. The analysis included an assessment of the physical risks using a baseline year of 2020 with time periods ranging to 2050, and scenarios of low, moderate and high climate change. Based on the Trucost methodology, which scores the exposure of sites to physical risks relative to global conditions, Dow was assessed at moderate exposure in 2050 under all scenarios, with a weighted average that is slightly lower than the average of the materials industry (as defined by Trucost). Dow will use this information to inform decision-making at sites with respect to managing climate-related physical risks.

Transition Risks
Climate-related transition risks include the availability, development and affordability of lower greenhouse gas emissions technology, the effects of carbon pricing and changes in public sentiment, regulations, taxes, public mandates or requirements.

Climate Opportunities and Actions
There are also significant climate opportunities for Dow, including the ability to be a leader in the development of lower emissions technology, such as Dow's 2021 announcement to build a net-zero (Scope 1 & 2 emissions) ethylene and derivatives complex in Alberta, Canada. Additional opportunity actions to achieve carbon neutrality include expanding access to clean power, developing lower carbon emissions manufacturing technology, such as Dow's proprietary FCDh technology, and collaborating with Shell to develop electrified cracking technology powered by clean energy. Dow's technology and materials science leadership also provide a significant opportunity to deploy materials to help reduce emissions for customers and industries that will allow Dow to capture value from increasing demand for low-carbon and sustainable products. These are just some examples of critical steps on Dow's path to carbon neutrality by 2050 while enabling business growth.

The potential impacts of climate-related risks and opportunities are part of Dow's climate strategy and factored into the Company's business and financial planning. When assessing the magnitude of impact, Dow evaluates elements such as changes to 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, impact to the price at which products can be sold, impact of potential lost sales or, in the case of opportunities, improvements in production, increased revenues, cost efficiencies and market share gained. In addition, there could be impacts that need to be considered that cannot be financially quantified (e.g., reputational impact of certain risks and opportunities).

Dow is taking specific actions to mitigate identified climate-related physical and transition risks, while also advancing opportunities in several key areas. These include:

- **Optimizing Manufacturing Facilities and Processes for Sustainability:** Dow is investing approximately $1 billion in annual capital spending allocation 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 & 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. In 2021, Dow implemented energy efficiency and emissions reduction projects, reducing energy consumption by 1.232 million kilojoules per year and amounting to 611,500 metric tons of carbon dioxide ("CO_2") reduction. In 2021, Dow's Terneuzen site outlined a roadmap to support the Dutch Climate Agreement and enable a reduction of 1.7 million metric tons of CO_2 annually by 2030 versus a 2020 baseline. These projects are part of Dow's roadmap that will enable the Company to decarbonize its manufacturing while meeting growing demand for its products and includes replacing end-of-life assets with high-efficiency, low-carbon assets. Dow is also working to reduce water use and the potential impact of water stress. One example is the Company's commitment to 100 percent water circularity by 2025 at Dow's site in Terneuzen, The Netherlands.
- **Increasing Clean Energy in Purchased Power Mix:** Dow continues to invest in cost-efficient clean energy, including wind, solar and hydropower, across operations. In 2021, Dow expanded access to renewable power to more than 900 megawatts, so that more than 25 percent of purchased electricity comes from renewable sources. Dow is a leading user of renewable energy in the chemical industry and in the top 20 among global corporations according to BloombergNEF. Dow is also collaborating with X-energy with the intent to deploy carbon-free small modular nuclear technology options at one of the Company's U.S. sites by approximately 2030.
- **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, Dow is collaborating with Shell on technology to electrically heat steam cracker furnaces. Combining electrical cracking with clean electricity sources would reduce the CO_2 footprint of the production process to near zero emissions. Dow also developed its proprietary FCDh technology, which can be used to make cracking a less carbon intensive process, and has installed the technology in a mixed-feed cracker in Louisiana to produce on-purpose propylene, reducing energy use and emissions by up to 20 percent. Dow is leveraging the learnings from the FCDh development to also advance ethane dehydrogenation technology for ethylene and propylene production, which has the potential to reduce emissions by 40 to 50 percent.

- **Collaborating With the Supply Chain to Tackle 'Upstream' Carbon Emissions:** Dow is working closely with its suppliers to set emissions reduction targets and to embed ESG performance as a metric in supplier selection, contracting, and relationship management. Approximately 70 percent 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. Reducing Scope 3 emissions is a tremendous challenge for all companies. Dow recognizes the significant opportunity it has to work 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. Dow was recently recognized as a Global Supplier Engagement Leader by CDP, placing among the top 8 percent of companies that disclose their data to CDP. CDP's Supplier Engagement Rating system independently evaluates supplier engagement practices with the aim of accelerating action to reduce emissions in global supply chains.
- **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, light weighting, fuel transition, circularity, increased operational efficiency, resource reductions and reduced emissions. Examples include Dow's MobilityScience™ platform, which is focused on developing cutting-edge material innovations that will enable the next generation of electric and autonomous vehicles to achieve longer range, greater comfort, enhanced safety, and a lower carbon footprint. Dow's ENDURANCE™ compounds for cable systems support next-generation, longer-life, and lower-carbon emissions infrastructure, including on- and off-shore windfarms. Dow's Novel ENDURANCE™ HFDD 4201 enables significantly lower-carbon emissions (approximately 80 percent), and material and energy savings during cable production. Additionally, in September 2022, Dow introduced DOWSIL™ Immersion Cooling Technology, a next-generation solution for cooling hyperscale cloud enterprise data centers with optimized efficiency and sustainability. DOWSIL™ ICL-1000 Fluid, the first product in this new technology family, is estimated to absorb heat about one thousand times more efficiently than air-cooled systems, resulting in up to a 95 percent reduction in energy use for server cooling and up to a 50 percent reduction in overall data center power consumption. This product can also be recycled to increase its circularity.

Advancing a Circular Economy
Dow's vision for turning the tide on plastic waste is centered on solving challenges: from designing for recyclability at the beginning of a product's life to increasing Dow's capacity to use plastic waste as feedstock and other alternative feedstock, enabling plastic waste to be blended with virgin plastic as recycled resins, and building and partnering in industrial ecosystems to close the loop. The issue is complex, and through partnerships, Dow is working across the value chain to improve access to collection, recycling, and processing infrastructure and to create new circular business models. Improving circularity of plastics through recycling and reuse is critical to a world that is also targeting carbon emissions reduction. The lower-carbon benefits of polyethylene-based packaging serve as a key driver and source of value, as well as the lifecycle perspective of plastic versus other available materials. Moving to circular products includes increasing the share of plastics production from circular feedstocks. In 2020, Dow announced "stop the waste" and "close the loop" targets to address plastic waste and, in 2022, Dow committed to accelerating the circular ecosystem by turning waste and alternative feedstock into raw materials that help deliver 3 million metric tons per year of circular and renewable solutions by 2030 with a new "transform the waste" sustainability target.

Meeting this expanded "transform the waste" target will require investments in technologies and infrastructure and strategic partnerships. 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. Dow expects the waste required to produce this expanded target to surpass and replace the original 1 million metric ton stop the waste goal. Dow is also catalyzing a circular economy for plastics through global partnerships with non-governmental organizations and investors, such as the Alliance to End Plastic Waste, The Recycling Partnership, Circulate Capital and Closed Loop Partners. Additionally, Dow is accelerating its progress through several recently announced circular and mechanical offtake agreements and projects that will help contribute to achieving the new target, including:

- Agreements with Mura Technology to construct multiple world-scale advanced recycling facilities in the U.S. and Europe, collectively adding as much as 600 kilotons of annual capacity.
- An investment to build the largest single hybrid recycling site in France, managed by Valoregen, which will secure a source of post-consumer resins (“PCR”) for Dow.
- Mechanical recycling collaboration with Boomera LAR in Brazil.
- An investment in Mr. Green Africa and an agreement to co-develop more traceable, fair, and high-quality PCR that can be used in the production of new flexible plastic packaging.
- A memorandum of understanding with Lucro Plastecycle to develop and launch polyethylene film solutions using PCR plastics in India.
- The launch of a bold new collaboration with WM to improve consumer recycling for hard-to-recycle plastic films throughout the U.S. by allowing consumers to recycle these materials directly in their curbside recycling. Once operating at full capacity, this collaboration is expected to divert more than 120,000 metric tons of plastic film from landfills annually.

Dow is also working directly with its customers, brand owners and the value chain to help customers redesign and create packaging solutions that are both high-performance and recyclable or made with circular polymers. Dow continuously invests in application development, packaging redesign and infrastructure improvements to deliver on the Company's circularity goals.

As one of the world’s largest producers of plastic, Dow wants to put an end to plastic waste. Eliminating plastic waste is about more than just recycling and reusing. It is about creating innovative solutions that are sustainable and continuing to invest in an industrial ecosystem for the circular economy.

Environmental Remediation
For comparison of environmental remediation-related matters for the fiscal years ended December 31, 2021 and 2020, see Part II, Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 4, 2022.

The Company accrues the costs of remediation of its facilities and formerly owned facilities based on current law and regulatory requirements. The nature of such remediation can include management of soil and groundwater contamination. The accounting policies adopted to properly reflect the monetary impacts of environmental matters are discussed in Note 1 to the Consolidated Financial Statements. To assess the impact on the financial statements, environmental experts review currently available facts to evaluate the probability and scope of potential liabilities. Inherent uncertainties exist in such evaluations primarily due to unknown environmental conditions, changing governmental regulations and legal standards regarding liability, and the ability to apply remediation technologies. These liabilities are adjusted periodically as remediation efforts progress or as additional technical or legal information becomes available. The Company had an accrued liability of $948 million at December 31, 2022, related to the remediation of current or former Dow-owned sites. At December 31, 2021, the liability related to remediation was $983 million.

In addition to current and former Dow-owned sites, under the federal Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") and equivalent state laws (hereafter referred to collectively as "Superfund Law"), the Company is liable for remediation of other hazardous waste sites where the Company allegedly disposed of, or arranged for the treatment or disposal of, hazardous substances. Because Superfund Law imposes joint and several liability upon each party at a site, the Company has evaluated its potential liability in light of the number of other companies that have also been named potentially responsible parties (“PRPs”) at each site, the estimated apportionment of costs among all PRPs, and the financial ability and commitment of each to pay its expected share. The Company’s remaining liability for the remediation of Superfund sites was $244 million at December 31, 2022 ($237 million at December 31, 2021). The Company has not recorded any third-party recovery related to these sites as a receivable.

Information regarding environmental sites is provided below:

Environmental Sites	*Dow-owned Sites* [1]		*Superfund Sites* [2]	
	2022	*2021*	*2022*	*2021*
Number of sites at Jan 1	171	185	134	132
Sites added during year	—	2	2	5
Sites closed during year	—	(16)	(6)	(3)
Number of sites at Dec 31	171	171	130	134

1. Dow-owned sites are sites currently or formerly owned by the Company. In the United States, remediation obligations are imposed by the Resource Conservation and Recovery Act or analogous state law. At December 31, 2022, 24 of these sites (24 sites at December 31, 2021) were formerly owned by Dowell Schlumberger, Inc., a group of companies in which the Company previously owned a 50 percent interest. The Company sold its interest in Dowell Schlumberger in 1992.
2. Superfund sites are sites, including sites not owned by the Company, where remediation obligations are imposed by Superfund Law.

Additional information is provided below for the Company's Midland, Michigan, manufacturing site and Midland off-site locations (collectively, the "Midland sites"), as well as a Superfund site in Wood-Ridge, New Jersey, the locations for which the Company has the largest potential environmental liabilities.

In the early days of operations at the Midland manufacturing site, wastes were usually disposed of on-site, resulting in soil and groundwater contamination, which has been contained and managed on-site under a series of Resource Conservation and Recovery Act permits and regulatory agreements. The Hazardous Waste Operating License for the Midland manufacturing site, issued in 2003, and renewed and replaced in September 2015, also included provisions for the Company to conduct an investigation to determine the nature and extent of off-site contamination from historic Midland manufacturing site operations. In January 2010, the Company, the U.S. Environmental Protection Agency ("EPA") and the State of Michigan ("State") entered into an Administrative Order on Consent that requires the Company to conduct a remedial investigation, a feasibility study and a remedial design for the Tittabawassee River, the Saginaw River and the Saginaw Bay, and pay the oversight costs of the EPA and the State under the authority of CERCLA. See Note 15 to the Consolidated Financial Statements for further information relating to Midland off-site environmental matters.

Rohm and Haas, a wholly owned subsidiary of the Company, is a PRP at the Wood-Ridge, New Jersey Ventron/Velsicol Superfund Site, and the adjacent Berry's Creek Study Area ("BCSA") (collectively, the "Wood-Ridge sites"). Rohm and Haas is a successor in interest to a company that owned and operated a mercury processing facility, where wastewater and waste handling resulted in contamination of soils and adjacent creek sediments. In 2018, the Berry's Creek Study Area Potentially Responsible Party Group ("PRP Group"), consisting of over 100 PRPs, completed a Remedial Investigation/Feasibility Study for the BCSA. During that time, the EPA concluded that an "iterative or adaptive approach" was appropriate for cleaning up the BCSA. Thus, each phase of remediation will be followed by a period of monitoring to assess its effectiveness and determine if there is a need for more work. In September 2018, the EPA signed a Record of Decision ("ROD 1") which describes the initial phase of the EPA's plan to clean-up the BCSA. ROD 1 will remediate waterways and major tributaries in the most contaminated part of the BCSA. The PRP Group has signed agreements with the EPA to design the selected remedy. Although there is currently much uncertainty as to what will ultimately be required to remediate the BCSA and Rohm and Haas's share of these costs has yet to be determined, the range of activities that are required in the interim Record of Decision is known in general terms.

At December 31, 2022, the Company had accrued liabilities totaling $339 million ($358 million at December 31, 2021) for environmental remediation at the Midland and Wood-Ridge sites. In 2022, the Company spent $37 million ($38 million in 2021) for environmental remediation at the Midland and Wood-Ridge sites.

In total, the Company's accrued liability for probable environmental remediation and restoration costs was $1,192 million at December 31, 2022, compared with $1,220 million at December 31, 2021. This is management's best estimate of the costs for remediation and restoration with respect to environmental matters for which the Company has accrued liabilities, although it is reasonably possible that the ultimate cost with respect to these particular matters could range up to approximately two times that amount. Consequently, it is reasonably possible that environmental remediation and restoration costs in excess of amounts accrued could have a material impact on the Company's results of operations, financial condition and cash flows. It is the opinion of the Company's management, however, that the possibility is remote that costs in excess of the range disclosed will have a material impact on the Company's results of operations, financial condition and cash flows.

The amounts charged to income on a pretax basis related to environmental remediation totaled $176 million in 2022 and $158 million in 2021. The amounts charged to income on a pretax basis related to operating the Company's current pollution abatement facilities, excluding internal recharges, totaled $773 million in 2022 and $761 million in 2021. Capital expenditures for environmental protection were $137 million in 2022 and $65 million in 2021.

Asbestos-Related Matters of Union Carbide Corporation

Union Carbide is and has been involved in a large number of asbestos-related suits filed primarily in state courts during the past four decades. These suits principally allege personal injury resulting from exposure to asbestos-containing products and frequently seek both actual and punitive damages. The alleged claims primarily relate to products that Union Carbide sold in the past, alleged exposure to asbestos-containing products located on Union Carbide's premises, and Union Carbide's responsibility for asbestos suits filed against a former Union Carbide subsidiary, Amchem. In many cases, plaintiffs are unable to demonstrate that they have suffered any compensable loss as a result of such exposure, or that injuries incurred in fact resulted from exposure to Union Carbide's products.

For comparison of asbestos-related matters of Union Carbide Corporation for the fiscal years ended December 31, 2021 and 2020, see Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations of the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 4, 2022.

The table below provides information regarding asbestos-related claims pending against Union Carbide and Amchem based on criteria developed by Union Carbide and its external consultants:

Asbestos-Related Claim Activity	*2022*	*2021*
Claims unresolved at Jan 1	8,747	9,126
Claims filed	4,664	4,233
Claims settled, dismissed or otherwise resolved	(6,538)	(4,612)
Claims unresolved at Dec 31	6,873	8,747
Claimants with claims against both Union Carbide and Amchem	(1,530)	(2,139)
Individual claimants at Dec 31	5,343	6,608

Plaintiffs' lawyers often sue numerous defendants in individual lawsuits or on behalf of numerous claimants. As a result, the damages alleged are not expressly identified as to Union Carbide, Amchem or any other particular defendant, even when specific damages are alleged with respect to a specific disease or injury. In fact, there are no asbestos personal injury cases in which only Union Carbide and/or Amchem are the sole named defendants. For these reasons and based upon Union Carbide's litigation and settlement experience, Union Carbide does not consider the damages alleged against Union Carbide and Amchem to be a meaningful factor in its determination of any potential asbestos-related liability.

For additional information see Part I, Item 3. Legal Proceedings and Asbestos-Related Matters of Union Carbide Corporation in Note 15 to the Consolidated Financial Statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

The Company's business operations give rise to market risk exposure due to changes in foreign exchange rates, interest rates, commodity prices and other market factors such as equity prices. To manage such risks effectively, the Company enters into hedging transactions, pursuant to established guidelines and policies that enable it to mitigate the adverse effects of financial market risk. Derivatives used for this purpose are designated as hedges per the accounting guidance related to derivatives and hedging activities, where appropriate. A secondary objective is to add value by creating additional non-specific exposure within established limits and policies; derivatives used for this purpose are not designated as hedges. The potential impact of creating such additional exposures is not material to the Company's results.

The global nature of the Company's business requires active participation in the foreign exchange markets. The Company has assets, liabilities and cash flows in currencies other than the U.S. dollar. The primary objective of the Company's foreign currency risk management is to optimize the U.S. dollar value of net assets and cash flows. To achieve this objective, the Company hedges on a net exposure basis using foreign currency forward contracts, over-the-counter option contracts, cross-currency swaps and nonderivative instruments in foreign currencies. Exposures primarily relate to assets, liabilities and bonds denominated in foreign currencies, as well as economic exposure, which is derived from the risk that currency fluctuations could affect the dollar value of future cash flows related to operating activities. The largest exposures are denominated in European currencies, the Chinese yuan, the Japanese yen, the Thai baht and the Argentinian peso, although exposures also exist in other currencies in Asia Pacific, Canada, Latin America, the Middle East, Africa and India.

The main objective of interest rate risk management is to reduce the total funding cost to the Company and to alter the interest rate exposure to the desired risk profile. To achieve this objective, the Company hedges using interest rate swaps, "swaptions," and exchange-traded instruments. The Company's primary exposure is to the U.S. dollar yield curve.

The Company has a portfolio of equity securities derived primarily from the investment activities of its insurance subsidiaries. This exposure is managed in a manner consistent with the Company's market risk policies and procedures.

Inherent in the Company's business is exposure to price changes for several commodities. Some exposures can be hedged effectively through liquid tradable financial instruments. Natural gas and crude oil, along with feedstocks for ethylene and propylene production, constitute the main commodity exposures. Over-the-counter and exchange traded instruments are used to hedge these risks, when feasible.

The Company uses value-at-risk ("VAR"), stress testing and scenario analysis for risk measurement and control purposes. VAR estimates the maximum potential loss in fair market values, given a certain move in prices over a certain period of time, using specified confidence levels. The VAR methodology used by the Company is a variance/covariance model. This model uses a 97.5 percent confidence level and includes at least one year of historical data.

The 2022 and 2021 year-end and average daily VAR for the aggregate of all positions are shown below. These amounts are immaterial relative to the total equity of the Company.

Total Daily VAR by Exposure Type at Dec 31	*2022*		*2021*	
In millions	*Year-end*	*Average*	*Year-end*	*Average*
Commodities	$ 72	$ 56	$ 26	$ 17
Equity securities	10	9	7	11
Foreign exchange	7	18	24	15
Interest rate	252	230	143	112
Composite	$ 341	$ 313	$ 200	$ 155

The Company's daily VAR for the aggregate of all positions increased from a composite VAR of $200 million at December 31, 2021 to a composite VAR of $341 million at December 31, 2022. The interest rate VAR increased due to an increase in interest rate volatility. The equity securities VAR increased due to an increase in equity volatility and an increase in equity exposure. The foreign exchange VAR decreased due to a decrease in managed exposures. The commodities VAR increased due to an increase in managed exposures and an increase in commodity volatility. See Note 21 to the Consolidated Financial Statements for further disclosure regarding market risk.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Dow Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Dow Inc. and subsidiaries (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of income, comprehensive income, equity, and cash flows, for each of the three years in the period ended December 31, 2022, and the related notes and the schedule listed in the Index at Item 15(a)(2) (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established *in Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 1, 2023, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Uncertain Tax Positions — Refer to Notes 1 and 7 to the financial statements

Critical Audit Matter Description

The Company has a complex legal structure involving numerous domestic and foreign locations with constantly changing tax laws, regulations, and legal interpretations. The Company's management is required to interpret and apply these tax laws and regulations in determining the amount of its income tax liability and provision. When an uncertain tax position is identified by management, the Company must evaluate if it is more likely than not, based on the technical merits, that the uncertain tax position will be sustained upon examination. The Company recognizes a benefit for tax positions using the highest cumulative tax benefit that is more likely than not to be realized. The Company establishes a liability for unrecognized tax benefits that do not meet this threshold.

The evaluation of each uncertain tax position requires management to apply specialized skill, knowledge, and significant judgment related to the identified position. The Company's liability for unrecognized tax benefits and related accrued interest and penalties as of December 31, 2022 was $520 million and $498 million, respectively.

Because of the complexity of tax laws, regulations and legal interpretations relevant to numerous taxing jurisdictions in which the Company operates, auditing uncertain tax positions and the determination of whether the more likely than not threshold was met requires a high degree of auditor judgment and increased extent of effort, including the involvement of our income tax specialists.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to uncertain tax positions included the following, among others:

- We tested the effectiveness of internal controls over income taxes, including those over identifying uncertain tax positions and measuring liabilities.
- We evaluated, with the assistance of our income tax specialists, the Company's uncertain tax positions by performing the following:
  - Obtaining Company and third-party opinions or memoranda regarding the uncertain tax positions.
  - Identifying key judgements underlying the Company's position and evaluating whether the conclusions are consistent with our interpretation of the relevant laws and regulations.
  - Evaluating the Company's method of measuring its liability for unrecognized tax benefits, including underlying data and assumptions.
  - Evaluating the basis for certain intercompany transactions, such as transfer pricing, by comparison to economic studies performed by management and third-party data.
  - Evaluating matters raised by taxing authorities in former and ongoing tax audits.
  - Assessing changes and interpretation of applicable tax law.

/s/ DELOITTE & TOUCHE LLP
Midland, Michigan
February 1, 2023

We have served as the Company's auditor since 1905.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholder and the Board of Directors of The Dow Chemical Company

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of The Dow Chemical Company and subsidiaries (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of income, comprehensive income, equity, and cash flows, for each of the three years in the period ended December 31, 2022, and the related notes and the schedule listed in the Index at Item 15(a)(2) (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established *in Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 1, 2023, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Uncertain Tax Positions — Refer to Notes 1 and 7 to the financial statements

Critical Audit Matter Description

The Company has a complex legal structure involving numerous domestic and foreign locations with constantly changing tax laws, regulations, and legal interpretations. The Company’s management is required to interpret and apply these tax laws and regulations in determining the amount of its income tax liability and provision. When an uncertain tax position is identified by management, the Company must evaluate if it is more likely than not, based on the technical merits, that the uncertain tax position will be sustained upon examination. The Company recognizes a benefit for tax positions using the highest cumulative tax benefit that is more likely than not to be realized. The Company establishes a liability for unrecognized tax benefits that do not meet this threshold. The evaluation of each uncertain tax position requires management to apply specialized skill, knowledge, and significant judgment related to the identified position. The Company’s liability for unrecognized tax benefits and related accrued interest and penalties as of December 31, 2022 was $520 million and $498 million, respectively.

Because of the complexity of tax laws, regulations and legal interpretations relevant to numerous taxing jurisdictions in which the Company operates, auditing uncertain tax positions and the determination of whether the more likely than not threshold was met requires a high degree of auditor judgment and increased extent of effort, including the involvement of our income tax specialists.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to uncertain tax positions included the following, among others:

- We tested the effectiveness of internal controls over income taxes, including those over identifying uncertain tax positions and measuring liabilities.
- We evaluated, with the assistance of our income tax specialists, the Company’s uncertain tax positions by performing the following:
  - Obtaining Company and third-party opinions or memoranda regarding the uncertain tax positions.
  - Identifying key judgements underlying the Company’s position and evaluating whether the conclusions are consistent with our interpretation of the relevant laws and regulations.
  - Evaluating the Company’s method of measuring its liability for unrecognized tax benefits, including underlying data and assumptions.
  - Evaluating the basis for certain intercompany transactions, such as transfer pricing, by comparison to economic studies performed by management and third-party data.
  - Evaluating matters raised by taxing authorities in former and ongoing tax audits.
  - Assessing changes and interpretation of applicable tax law.

/s/ DELOITTE & TOUCHE LLP

Midland, Michigan
February 1, 2023

We have served as the Company's auditor since 1905.

Dow Inc. and Subsidiaries

Consolidated Statements of Income

(In millions, except per share amounts) For the years ended Dec 31,	2022	2021	2020
Net sales	$ 56,902	$ 54,968	$ 38,542
Cost of sales	48,338	44,191	33,346
Research and development expenses	851	857	768
Selling, general and administrative expenses	1,675	1,645	1,471
Amortization of intangibles	336	388	401
Restructuring and asset related charges - net	118	6	708
Integration and separation costs	—	—	239
Equity in earnings (losses) of nonconsolidated affiliates	268	975	(18)
Sundry income (expense) - net	727	(35)	1,269
Interest income	173	55	38
Interest expense and amortization of debt discount	662	731	827
Income before income taxes	6,090	8,145	2,071
Provision for income taxes	1,450	1,740	777
Net income	4,640	6,405	1,294
Net income attributable to noncontrolling interests	58	94	69
Net income available for Dow Inc. common stockholders	$ 4,582	$ 6,311	$ 1,225

Per common share data:			
Earnings per common share - basic	$ 6.32	$ 8.44	$ 1.64
Earnings per common share - diluted	$ 6.28	$ 8.38	$ 1.64

Weighted-average common shares outstanding - basic	721.0	743.6	740.5
Weighted-average common shares outstanding - diluted	725.6	749.0	742.3

See Notes to the Consolidated Financial Statements.

Dow Inc. and Subsidiaries

Consolidated Statements of Comprehensive Income

(In millions) For the years ended Dec 31,	2022	2021	2020
Net income	$ 4,640	$ 6,405	$ 1,294
Other comprehensive income (loss), net of tax			
Unrealized gains (losses) on investments	(312)	(45)	40
Cumulative translation adjustments	(579)	(425)	205
Pension and other postretirement benefit plans	2,457	2,225	(778)
Derivative instruments	272	123	(76)
Total other comprehensive income (loss)	1,838	1,878	(609)
Comprehensive income	6,478	8,283	685
Comprehensive income attributable to noncontrolling interests, net of tax	58	94	69
Comprehensive income attributable to Dow Inc.	$ 6,420	$ 8,189	$ 616

See Notes to the Consolidated Financial Statements.

Dow Inc. and Subsidiaries

Consolidated Balance Sheets

(In millions, except share amounts) At Dec 31,	*2022*	*2021*
Assets		
Current Assets		
Cash and cash equivalents	$ 3,886	$ 2,988
Accounts and notes receivable:		
Trade (net of allowance for doubtful receivables - 2022: $110; 2021: $54)	5,611	6,841
Other	2,144	2,713
Inventories	6,988	7,372
Other current assets	1,848	934
Total current assets	20,477	20,848
Investments		
Investment in nonconsolidated affiliates	1,589	2,045
Other investments (investments carried at fair value - 2022: $1,757; 2021: $2,079)	2,793	3,193
Noncurrent receivables	666	478
Total investments	5,048	5,716
Property		
Property	58,055	57,604
Less: Accumulated depreciation	37,613	37,049
Net property	20,442	20,555
Other Assets		
Goodwill	8,644	8,764
Other intangible assets (net of accumulated amortization - 2022: $5,022; 2021: $4,725)	2,442	2,881
Operating lease right-of-use assets	1,227	1,412
Deferred income tax assets	960	1,358
Deferred charges and other assets	1,363	1,456
Total other assets	14,636	15,871
Total Assets	$ 60,603	$ 62,990
Liabilities and Equity		
Current Liabilities		
Notes payable	$ 362	$ 161
Long-term debt due within one year	362	231
Accounts payable:		
Trade	4,940	5,577
Other	2,276	2,839
Operating lease liabilities - current	287	314
Income taxes payable	334	623
Accrued and other current liabilities	2,770	3,481
Total current liabilities	11,331	13,226
Long-Term Debt	14,698	14,280
Other Noncurrent Liabilities		
Deferred income tax liabilities	1,110	506
Pension and other postretirement benefits - noncurrent	3,808	7,557
Asbestos-related liabilities - noncurrent	857	931
Operating lease liabilities - noncurrent	997	1,149
Other noncurrent obligations	6,555	6,602
Total other noncurrent liabilities	13,327	16,745
Stockholders' Equity		
Common stock (authorized 5,000,000,000 shares of $0.01 par value each; issued 2022: 771,678,525 shares; 2021: 764,226,882 shares)	8	8
Additional paid-in capital	8,540	8,151
Retained earnings	23,180	20,623
Accumulated other comprehensive loss	(7,139)	(8,977)
Unearned ESOP shares	—	(15)
Treasury stock at cost (2022: 66,798,605 shares; 2021: 29,011,573 shares)	(3,871)	(1,625)
Dow Inc.'s stockholders' equity	20,718	18,165
Noncontrolling interests	529	574
Total equity	21,247	18,739
Total Liabilities and Equity	$ 60,603	$ 62,990

See Notes to the Consolidated Financial Statements.

Dow Inc. and Subsidiaries

Consolidated Statements of Cash Flows

(In millions) For the years ended Dec 31,	2022	2021	2020
Operating Activities			
Net income	$ 4,640	$ 6,405	$ 1,294
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	2,758	2,842	2,874
Provision for deferred income tax	79	278	258
Earnings of nonconsolidated affiliates less than (in excess of) dividends received	696	(651)	443
Net periodic pension benefit cost	23	39	266
Pension contributions	(235)	(1,219)	(299)
Net gain on sales of assets, businesses and investments	(19)	(105)	(802)
Restructuring and asset related charges - net	118	6	708
Other net loss	212	921	318
Changes in assets and liabilities, net of effects of acquired and divested companies:			
Accounts and notes receivable	1,187	(2,132)	171
Inventories	347	(1,768)	515
Accounts payable	(1,255)	2,458	(84)
Other assets and liabilities, net	(1,065)	(5)	590
Cash provided by operating activities - continuing operations	7,486	7,069	6,252
Cash used for operating activities - discontinued operations	(11)	(60)	(26)
Cash provided by operating activities	7,475	7,009	6,226
Investing Activities			
Capital expenditures	(1,823)	(1,501)	(1,252)
Investment in gas field developments	(190)	(92)	(5)
Purchases of previously leased assets	(7)	(694)	(5)
Proceeds from sales of property and businesses, net of cash divested	32	68	929
Acquisitions of property and businesses, net of cash acquired	(228)	(129)	(130)
Investments in and loans to nonconsolidated affiliates	(148)	—	(333)
Distributions and loan repayments from nonconsolidated affiliates	52	51	7
Proceeds from sales of ownership interests in nonconsolidated affiliates	11	—	—
Purchases of investments	(1,366)	(1,366)	(1,203)
Proceeds from sales and maturities of investments	747	759	1,122
Other investing activities, net	(50)	(10)	29
Cash used for investing activities	(2,970)	(2,914)	(841)
Financing Activities			
Changes in short-term notes payable	253	(48)	(431)
Proceeds from issuance of short-term debt greater than three months	—	144	163
Payments on short-term debt greater than three months	(14)	(130)	(163)
Proceeds from issuance of long-term debt	1,667	109	4,672
Payments on long-term debt	(1,006)	(2,771)	(4,653)
Purchases of treasury stock	(2,325)	(1,000)	(125)
Proceeds from issuance of stock	212	320	108
Transaction financing, debt issuance and other costs	(24)	(537)	(175)
Employee taxes paid for share-based payment arrangements	(35)	(12)	(27)
Distributions to noncontrolling interests	(83)	(73)	(62)
Dividends paid to stockholders	(2,006)	(2,073)	(2,071)
Cash used for financing activities	(3,361)	(6,071)	(2,764)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(237)	(99)	107
Summary			
Increase (decrease) in cash, cash equivalents and restricted cash	907	(2,075)	2,728
Cash, cash equivalents and restricted cash at beginning of year	3,033	5,108	2,380
Cash, cash equivalents and restricted cash at end of year	$ 3,940	$ 3,033	$ 5,108
Less: Restricted cash and cash equivalents, included in "Other current assets"	54	45	4
Cash and cash equivalents at end of year	$ 3,886	$ 2,988	$ 5,104

See Notes to the Consolidated Financial Statements.

Dow Inc. and Subsidiaries

Consolidated Statements of Equity

(In millions, except per share amounts) For the years ended Dec 31,	*2022*	*2021*	*2020*
Common Stock			
Balance at beginning and end of year	$ 8	$ 8	$ 8
Additional Paid-in Capital			
Balance at beginning of year	8,151	7,595	7,325
Common stock issued / sold	212	320	108
Stock-based compensation and allocation of ESOP shares	258	236	162
Treasury stock issuances - compensation and benefit plans	(79)	—	—
Other	(2)	—	—
Balance at end of year	8,540	8,151	7,595
Retained Earnings			
Balance at beginning of year	20,623	16,361	17,045
Net income available for Dow Inc.'s common stockholders	4,582	6,311	1,225
Dividends to stockholders	(2,006)	(2,073)	(2,071)
Common control transaction	—	46	177
Other	(19)	(22)	(15)
Balance at end of year	23,180	20,623	16,361
Accumulated Other Comprehensive Loss			
Balance at beginning of year	(8,977)	(10,855)	(10,246)
Other comprehensive income (loss)	1,838	1,878	(609)
Balance at end of year	(7,139)	(8,977)	(10,855)
Unearned ESOP Shares			
Balance at beginning of year	(15)	(49)	(91)
Allocation of ESOP shares	15	34	42
Balance at end of year	—	(15)	(49)
Treasury Stock			
Balance at beginning of year	(1,625)	(625)	(500)
Treasury stock purchases	(2,325)	(1,000)	(125)
Treasury stock issuances - compensation and benefit plans	79	—	—
Balance at end of year	(3,871)	(1,625)	(625)
Dow Inc.'s stockholders' equity	20,718	18,165	12,435
Noncontrolling Interests	529	574	570
Total Equity	$ 21,247	$ 18,739	$ 13,005

Dividends declared per share of common stock	$ 2.80	$ 2.80	$ 2.80

See Notes to the Consolidated Financial Statements.

The Dow Chemical Company and Subsidiaries

Consolidated Statements of Income

(In millions) For the years ended Dec 31,	2022	2021	2020
Net sales	$ 56,902	$ 54,968	$ 38,542
Cost of sales	48,332	44,187	33,343
Research and development expenses	851	857	768
Selling, general and administrative expenses	1,675	1,645	1,471
Amortization of intangibles	336	388	401
Restructuring and asset related charges - net	118	6	708
Integration and separation costs	—	—	239
Equity in earnings (losses) of nonconsolidated affiliates	268	975	(18)
Sundry income (expense) - net	714	(79)	1,274
Interest income	181	56	40
Interest expense and amortization of debt discount	662	731	827
Income before income taxes	6,091	8,106	2,081
Provision for income taxes	1,450	1,738	777
Net income	4,641	6,368	1,304
Net income attributable to noncontrolling interests	58	94	69
Net income available for The Dow Chemical Company common stockholder	$ 4,583	$ 6,274	$ 1,235

See Notes to the Consolidated Financial Statements.

The Dow Chemical Company and Subsidiaries

Consolidated Statements of Comprehensive Income

(In millions) For the years ended Dec 31,	2022	2021	2020
Net income	$ 4,641	$ 6,368	$ 1,304
Other comprehensive income (loss), net of tax			
Unrealized gains (losses) on investments	(312)	(45)	40
Cumulative translation adjustments	(579)	(425)	205
Pension and other postretirement benefit plans	2,457	2,225	(778)
Derivative instruments	272	123	(76)
Total other comprehensive income (loss)	1,838	1,878	(609)
Comprehensive income	6,479	8,246	695
Comprehensive income attributable to noncontrolling interests, net of tax	58	94	69
Comprehensive income attributable to The Dow Chemical Company	$ 6,421	$ 8,152	$ 626

See Notes to the Consolidated Financial Statements.

The Dow Chemical Company and Subsidiaries

Consolidated Balance Sheets

(In millions, except share amounts) At Dec 31,	2022	2021
Assets		
Current Assets		
Cash and cash equivalents	$ 3,886	$ 2,988
Accounts and notes receivable:		
Trade (net of allowance for doubtful receivables - 2022: $110; 2021: $54)	5,611	6,841
Other	2,211	2,712
Inventories	6,988	7,372
Other current assets	1,815	924
Total current assets	20,511	20,837
Investments		
Investment in nonconsolidated affiliates	1,589	2,045
Other investments (investments carried at fair value - 2022: $1,757; 2021: $2,079)	2,793	3,193
Noncurrent receivables	650	452
Total investments	5,032	5,690
Property		
Property	58,055	57,604
Less: Accumulated depreciation	37,613	37,049
Net property	20,442	20,555
Other Assets		
Goodwill	8,644	8,764
Other intangible assets (net of accumulated amortization - 2022: $5,022; 2021: $4,725)	2,442	2,881
Operating lease right-of-use assets	1,227	1,412
Deferred income tax assets	960	1,358
Deferred charges and other assets	1,363	1,455
Total other assets	14,636	15,870
Total Assets	$ 60,621	$ 62,952
Liabilities and Equity		
Current Liabilities		
Notes payable	$ 362	$ 161
Long-term debt due within one year	362	231
Accounts payable:		
Trade	4,940	5,577
Other	2,349	2,841
Operating lease liabilities - current	287	314
Income taxes payable	334	623
Accrued and other current liabilities	2,613	3,299
Total current liabilities	11,247	13,046
Long-Term Debt	14,698	14,280
Other Noncurrent Liabilities		
Deferred income tax liabilities	1,110	506
Pension and other postretirement benefits - noncurrent	3,808	7,557
Asbestos-related liabilities - noncurrent	857	931
Operating lease liabilities - noncurrent	997	1,149
Other noncurrent obligations	6,415	6,454
Total other noncurrent liabilities	13,187	16,597
Stockholder's Equity		
Common stock (authorized and issued 100 shares of $0.01 par value each)	—	—
Additional paid-in capital	8,627	8,159
Retained earnings	19,472	19,288
Accumulated other comprehensive loss	(7,139)	(8,977)
Unearned ESOP shares	—	(15)
The Dow Chemical Company’s stockholder's equity	20,960	18,455
Noncontrolling interests	529	574
Total equity	21,489	19,029
Total Liabilities and Equity	$ 60,621	$ 62,952

See Notes to the Consolidated Financial Statements.

The Dow Chemical Company and Subsidiaries

Consolidated Statements of Cash Flows

(In millions) For the years ended Dec 31,	2022	2021	2020
Operating Activities			
Net income	$ 4,641	$ 6,368	$ 1,304
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	2,758	2,842	2,874
Provision for deferred income tax	80	278	258
Earnings of nonconsolidated affiliates less than (in excess of) dividends received	696	(651)	443
Net periodic pension benefit cost	23	39	266
Pension contributions	(235)	(1,219)	(299)
Net gain on sales of assets, businesses and investments	(19)	(105)	(802)
Restructuring and asset related charges - net	118	6	708
Other net loss	221	927	320
Changes in assets and liabilities, net of effects of acquired and divested companies:			
Accounts and notes receivable	1,187	(2,132)	171
Inventories	347	(1,768)	515
Accounts payable	(1,255)	2,458	(84)
Other assets and liabilities, net	(1,043)	157	589
Cash provided by operating activities	7,519	7,200	6,263
Investing Activities			
Capital expenditures	(1,823)	(1,501)	(1,252)
Investment in gas field developments	(190)	(92)	(5)
Purchases of previously leased assets	(7)	(694)	(5)
Proceeds from sales of property and businesses, net of cash divested	32	68	929
Acquisitions of property and businesses, net of cash acquired	(228)	(129)	(130)
Investments in and loans to nonconsolidated affiliates	(148)	—	(333)
Distributions and loan repayments from nonconsolidated affiliates	52	51	7
Proceeds from sales of ownership interests in nonconsolidated affiliates	11	—	—
Purchases of investments	(1,366)	(1,366)	(1,203)
Proceeds from sales and maturities of investments	747	759	1,122
Other investing activities, net	(50)	(10)	29
Cash used for investing activities	(2,970)	(2,914)	(841)
Financing Activities			
Changes in short-term notes payable	253	(48)	(431)
Proceeds from issuance of short-term debt greater than three months	—	144	163
Payments on short-term debt greater than three months	(14)	(130)	(163)
Proceeds from issuance of long-term debt	1,667	109	4,672
Payments on long-term debt	(1,006)	(2,771)	(4,653)
Proceeds from issuance of stock	212	320	108
Transaction financing, debt issuance and other costs	(24)	(537)	(175)
Employee taxes paid for share-based payment arrangements	(35)	(12)	(27)
Distributions to noncontrolling interests	(83)	(73)	(62)
Dividends paid to Dow Inc.	(4,375)	(3,264)	(2,233)
Cash used for financing activities	(3,405)	(6,262)	(2,801)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(237)	(99)	107
Summary			
Increase (decrease) in cash, cash equivalents and restricted cash	907	(2,075)	2,728
Cash, cash equivalents and restricted cash at beginning of year	3,033	5,108	2,380
Cash, cash equivalents and restricted cash at end of year	$ 3,940	$ 3,033	$ 5,108
Less: Restricted cash and cash equivalents, included in "Other current assets"	54	45	4
Cash and cash equivalents at end of year	$ 3,886	$ 2,988	$ 5,104

See Notes to the Consolidated Financial Statements.

The Dow Chemical Company and Subsidiaries

Consolidated Statements of Equity

(In millions, except per share amounts) For the years ended Dec 31,	2022	2021	2020
Common Stock			
Balance at beginning and end of year	$ —	$ —	$ —
Additional Paid-in Capital			
Balance at beginning of year	8,159	7,603	7,333
Issuance of parent company stock - Dow Inc.	212	320	108
Stock-based compensation and allocation of ESOP shares	258	236	162
Other	(2)	—	—
Balance at end of year	8,627	8,159	7,603
Retained Earnings			
Balance at beginning of year	19,288	16,300	17,313
Net income available for The Dow Chemical Company's common stockholder	4,583	6,274	1,235
Dividends to Dow Inc.	(4,375)	(3,264)	(2,233)
Other	(24)	(22)	(15)
Balance at end of year	19,472	19,288	16,300
Accumulated Other Comprehensive Loss			
Balance at beginning of year	(8,977)	(10,855)	(10,246)
Other comprehensive income (loss)	1,838	1,878	(609)
Balance at end of year	(7,139)	(8,977)	(10,855)
Unearned ESOP Shares			
Balance at beginning of year	(15)	(49)	(91)
Allocation of ESOP shares	15	34	42
Balance at end of year	—	(15)	(49)
The Dow Chemical Company's stockholder's equity	20,960	18,455	12,999
Noncontrolling Interests	529	574	570
Total Equity	$ 21,489	$ 19,029	$ 13,569

See Notes to the Consolidated Financial Statements.

Table of Contents

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Principles of Consolidation and Basis of Presentation

The accompanying consolidated financial statements of Dow Inc. and TDCC were prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") and include the assets, liabilities, revenues and expenses of all majority-owned subsidiaries over which Dow exercises control and, when applicable, entities for which Dow has a controlling financial interest or is the primary beneficiary. Intercompany transactions and balances are eliminated in consolidation. Investments in nonconsolidated affiliates (20-50 percent owned companies or less than 20 percent owned companies over which significant influence is exercised) are primarily accounted for using the equity method.

Dow Inc. owns all of the outstanding common shares of TDCC. As a result of the parent/subsidiary relationship between Dow Inc. and TDCC, and considering that the financial statements and disclosures of each company are substantially similar, the companies are filing a combined report for this Annual Report on Form 10-K. The information reflected in the report is equally applicable to both Dow Inc. and TDCC, except where otherwise noted. Transactions between TDCC and Dow Inc. are treated as related party transactions for TDCC. See Note 24 for additional information.

The Company conducts its worldwide operations through six global businesses which are organized into the following operating segments: Packaging & Specialty Plastics, Industrial Intermediates & Infrastructure and Performance Materials & Coatings. Corporate contains the reconciliation between the totals for the operating segments and the Company's totals. See Note 25 for additional information.

Except as otherwise indicated by the context, the term "Union Carbide" means Union Carbide Corporation and the term "Dow Silicones" means Dow Silicones Corporation, both wholly owned subsidiaries of the Company.

Use of Estimates in Financial Statement Preparation
The preparation of financial statements in accordance with U.S. GAAP requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. The Company's consolidated financial statements include amounts that are based on management's best estimates and judgments. Actual results could differ from those estimates.

Significant Accounting Policies
Asbestos-Related Matters
Accruals for asbestos-related matters, including defense and processing costs, are recorded based on an analysis of claim and resolution activity, defense spending, and pending and future claims. These accruals are assessed at each balance sheet date to determine if the asbestos-related liability remains appropriate. Accruals for asbestos-related matters are included in the consolidated balance sheets in "Accrued and other current liabilities" and "Asbestos-related liabilities - noncurrent." See Note 15 for additional information.

Legal Costs
The Company expenses legal costs as incurred, with the exception of defense and processing costs associated with asbestos-related matters.

Foreign Currency Translation
The local currency has been primarily used as the functional currency throughout the world. Translation gains and losses of those operations that use local currency as the functional currency are included in the consolidated balance sheets in "Accumulated other comprehensive loss" ("AOCL"). For certain subsidiaries, the U.S. dollar is used as the functional currency. This occurs when the subsidiary operates in an economic environment where the products produced and sold are tied to U.S. dollar-denominated markets, or when the foreign subsidiary operates in a hyper-inflationary environment. Where the U.S. dollar is used as the functional currency, foreign currency translation gains and losses are reflected in income.

Environmental Matters
Accruals for environmental matters are recorded when it is probable that a liability has been incurred and the amount of the liability can be reasonably estimated based on current law and existing technologies. These accruals are adjusted periodically as assessment and remediation efforts progress or as additional technical or legal information becomes available. Accruals for environmental liabilities are included in the consolidated balance sheets in "Accrued and other current liabilities" and "Other noncurrent obligations" at undiscounted amounts. Accruals for related insurance or other third-party recoveries for environmental liabilities are recorded when it is probable that a recovery will be realized and are included in the consolidated balance sheets in "Accounts and notes receivable - Other" or "Noncurrent receivables."

Environmental costs are capitalized if the costs extend the life of the property, increase its capacity and/or mitigate or prevent contamination from future operations. Environmental costs are also capitalized in recognition of legal asset retirement obligations resulting from the acquisition, construction and/or normal operation of a long-lived asset. Costs related to environmental contamination treatment and cleanup are charged to expense. Estimated future incremental operations, maintenance and management costs directly related to remediation are accrued when such costs are probable and reasonably estimable.

Cash and Cash Equivalents
Cash and cash equivalents include time deposits and investments with maturities of three months or less at the time of purchase.

Financial Instruments
The Company calculates the fair value of financial instruments using quoted market prices when available. When quoted market prices are not available for financial instruments, the Company uses standard pricing models with market-based inputs that take into account the present value of estimated future cash flows.

The Company utilizes derivatives to manage exposures to foreign currency exchange rates, commodity prices and interest rate risk. The fair values of all derivatives are recognized as assets or liabilities at the balance sheet date.

Changes in the fair values of these instruments are reported in income or AOCL, depending on the use of the derivative and whether the Company has elected hedge accounting treatment.

Gains and losses on derivatives that are designated and qualify as cash flow hedging instruments are recorded in AOCL until the underlying transactions are recognized in income. Gains and losses on derivative and non-derivative instruments used as hedges of the Company's net investment in foreign operations are recorded in AOCL as part of the cumulative translation adjustment.

Gains and losses on derivatives designated and qualifying as fair value hedging instruments, as well as the offsetting losses and gains on the hedged items, are reported in income in the same accounting period. Derivatives not designated as hedging instruments are marked-to-market at the end of each accounting period with the results included in income.

Inventories
Inventories are stated at the lower of cost or net realizable value. The method of determining cost for each subsidiary varies among last-in, first-out ("LIFO"); first-in, first-out ("FIFO"); and average cost, and is used consistently from year to year. At December 31, 2022, approximately 27 percent, 64 percent and 9 percent of the Company's inventories were accounted for under the LIFO, FIFO and average cost methods, respectively. At December 31, 2021, approximately 27 percent, 65 percent and 8 percent of the Company's inventories were accounted for under the LIFO, FIFO and average cost methods, respectively.

The Company routinely exchanges and swaps raw materials and finished goods with other companies to reduce delivery time, freight and other transportation costs. These transactions are treated as non-monetary exchanges and are valued at cost.

Property
Land, buildings and equipment are carried at cost less accumulated depreciation or amortization. Property under finance lease agreements is carried at the present value of lease payments over the lease term less accumulated amortization. Depreciation is based on the estimated service lives of depreciable assets and is calculated using the straight-line method. Fully depreciated assets are retained in property and accumulated depreciation accounts until they are removed from service. In the case of disposals, assets and related accumulated depreciation are removed from the accounts, and the net amounts, less proceeds from disposal, are included in income.

Impairment and Disposal of Long-Lived Assets
The Company evaluates long-lived assets (property, finite-lived intangible assets and right-of-use assets) for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. When undiscounted future cash flows are not expected to be sufficient to recover an asset's carrying amount, the asset is written down to its fair value based on bids received from third parties or a discounted cash flow analysis based on market participant assumptions.

Long-lived assets to be disposed of by sale, if material, are classified as held for sale and reported at the lower of carrying amount or fair value less cost to sell, and depreciation/amortization is ceased. Long-lived assets to be disposed of other than by sale are classified as held and used until they are disposed of and reported at the lower of carrying amount or fair value, and depreciation/amortization is recognized over the remaining useful life of the assets.

Goodwill and Other Intangible Assets
The Company records goodwill when the purchase price of a business combination exceeds the estimated fair value of net identified tangible and intangible assets acquired. Goodwill is tested for impairment at the reporting unit level annually in the fourth quarter, or more frequently when events or changes in circumstances indicate that the fair value of a reporting unit has more likely than not declined below its carrying value. When testing goodwill for impairment, the Company may first assess qualitative factors. If an initial qualitative assessment identifies that it is more likely than not that the fair value of a reporting unit is less than its carrying value, additional quantitative testing is performed. The Company may also elect to skip the qualitative testing and proceed directly to the quantitative testing. If the quantitative testing indicates that goodwill is impaired, an impairment charge is recognized based on the difference between the reporting unit's carrying value and its fair value. The Company primarily utilizes a discounted cash flow methodology to calculate the fair value of its reporting units.

Finite-lived intangible assets such as developed technology, customer-related, trademarks, tradenames and software, are amortized over their estimated useful lives, generally on a straight-line basis for periods ranging primarily from 3 to 20 years.

Asset Retirement Obligations
The Company records asset retirement obligations as incurred and reasonably estimable, including obligations for which the timing and/or method of settlement are conditional on a future event that may or may not be within the control of the Company. The fair values of obligations are recorded as liabilities on a discounted basis and are accreted over time for the change in present value. Costs associated with the liabilities are capitalized and amortized over the estimated remaining useful life of the asset, generally for periods of 10 years or less.

Investments
Investments in debt securities, primarily held by the Company's insurance operations, are classified as trading, available-for-sale or held-to-maturity. Investments classified as trading are reported at fair value with unrealized gains and losses related to mark-to-market adjustments included in income. Those classified as available-for-sale are reported at fair value with unrealized gains and losses recorded in AOCL. Those classified as held-to-maturity are recorded at amortized cost. The cost of investments sold is determined by FIFO or specific identification.

Investments in equity securities with a readily determinable fair value are reported at fair value with unrealized gains and losses related to mark-to-market adjustments included in income. Equity securities without a readily determinable fair value are accounted for at cost, adjusted for impairments and observable price changes in orderly transactions.

The Company routinely reviews its investments for declines in fair value below the cost basis. When events or changes in circumstances indicate the carrying value of an asset may not be recoverable, the security is written down, establishing a new cost basis.

Leases
The Company determines whether a contract contains a lease at contract inception. A contract contains a lease if there is an identified asset and the Company has the right to control the asset.

Operating lease right-of-use (“ROU”) assets represent the Company's right to use an underlying asset for the lease term, and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Operating lease ROU assets and lease liabilities are recognized at commencement date based on the present value of lease payments over the lease term. The Company uses the incremental borrowing rate in determining the present value of lease payments, unless the implicit rate is readily determinable. If lease terms include options to extend or terminate the lease, the ROU asset and lease liability are measured based on the reasonably certain decision. Leases with a term of 12 months or less at the commencement date are not recognized on the balance sheet and are expensed as incurred.

The Company has lease agreements with lease and non-lease components, which are accounted for as a single lease component for nearly all classes of leased assets for which the Company is the lessee. Additionally, for certain equipment leases, the portfolio approach is applied to account for the operating lease ROU assets and lease liabilities. In the consolidated statements of income, lease expense for operating lease payments is recognized on a straight-line basis over the lease term. For finance leases, interest expense is recognized on the lease liability and the ROU asset is amortized over the lease term.

Some leasing arrangements require variable payments that are dependent upon usage or output, or may vary for other reasons, such as insurance or tax payments. Variable lease payments are recognized as incurred and are not presented as part of the ROU asset or lease liability. See Note 16 for additional information.

Revenue
The Company recognizes revenue when its customer obtains control of promised goods or services in an amount that reflects the consideration which the Company expects to receive in exchange for those goods or services. To determine revenue recognition, the Company performs the following five steps: (1) identify the contract(s) with a customer, (2) identify the performance obligations in the contract, (3) determine the transaction price, (4) allocate the transaction price to the performance obligations in the contract and (5) recognize revenue when (or as) the entity satisfies a performance obligation. See Note 3 for additional information.

Revenue related to the Company's insurance operations includes third-party insurance premiums, which are earned over the terms of the related insurance policies and reinsurance contracts.

Severance Costs
The Company routinely reviews its operations around the world in an effort to ensure competitiveness across its businesses and geographic regions. When the reviews result in a workforce reduction related to the shutdown of facilities or other optimization activities, severance benefits are provided to employees primarily under the Company's ongoing benefit arrangements. These severance costs are accrued once management commits to a plan of termination and it becomes probable that employees will be entitled to benefits at amounts that can be reasonably estimated.

Income Taxes
The Company accounts for income taxes using the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the future tax consequences of temporary differences between the carrying amounts and tax bases of assets and liabilities using enacted tax rates. The effect of a change in tax rates on deferred tax assets or liabilities is recognized in income in the period that includes the enactment date. The Company uses the portfolio approach for releasing income tax effects from AOCL.

The Company recognizes the financial statement effects of an uncertain income tax position when it is more likely than not, based on the technical merits, that the position will be sustained upon examination. The Company accrues for other tax contingencies when it is probable that a liability to a taxing authority has been incurred and the amount of the contingency can be reasonably estimated. The current portion of uncertain income tax positions is included in "Income taxes payable" and the long-term portion is included in "Other noncurrent obligations" in the consolidated balance sheets.

Provision is made for taxes on undistributed earnings of foreign subsidiaries and related companies to the extent that such earnings are not deemed to be permanently invested.

Earnings per Common Share
The calculation of earnings per common share is based on the weighted-average number of the Company's common shares outstanding for the applicable period. The calculation of diluted earnings per common share reflects the effect of all potential common shares that were outstanding during the respective periods, unless the effect of doing so is antidilutive.

TDCC Dividends
TDCC is a wholly owned subsidiary of Dow Inc. and TDCC's Board of Directors determines whether or not there will be a dividend distribution to Dow Inc. See Notes 17 and 24 for additional information.

NOTE 2 – RECENT ACCOUNTING GUIDANCE

Recently Adopted Accounting Guidance
In the first quarter of 2021, the Company adopted Accounting Standards Update ("ASU") 2019-12, "Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes." The amendments simplify the accounting for income taxes by removing certain exceptions to the general principles of Topic 740, "Income Taxes" and improve consistent application by clarifying and amending existing guidance. The adoption of this guidance did not have a material impact on the Company's consolidated financial statements.

Accounting Guidance Issued But Not Adopted at December 31, 2022
In September 2022, the Financial Accounting Standards Board issued ASU 2022-04, "Liabilities — Supplier Finance Programs (Subtopic 405-50): Disclosure of Supplier Finance Program Obligations," which requires disclosures intended to enhance the transparency of supplier finance programs. The amendments in this ASU require buyers in a supplier finance program to disclose sufficient information about the program to allow a user of financial statements to understand the program's nature, activity during the period, changes from period to period, and potential magnitude. The amendments are effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years, except for the disclosure of rollforward information, which is effective for fiscal years beginning after December 15, 2023. Early adoption is permitted. The amendments should be applied retrospectively to each period in which a balance sheet is presented, except for disclosure of rollforward information, which should be applied prospectively. The ASU only requires disclosures related to the Company's supplier finance
programs and does not affect the recognition, measurement or financial statement presentation of supplier finance program obligations. The Company expects to adopt the new disclosure requirements in the first quarter of 2023, with the exception of the annual requirement to disclose rollforward information, which the Company expects to early adopt and present prospectively beginning in the 2023 annual financial statements.

NOTE 3 – REVENUE

The majority of the Company's revenue is derived from product sales. In 2022, 99 percent of the Company's revenue related to product sales (99 percent in 2021 and 2020). The remaining sales were primarily related to the Company's insurance operations and licensing of patents and technologies.

Disaggregation of Revenue
Dow disaggregates its revenue from contracts with customers by operating segment and business, as the Company believes it best depicts the nature, amount, timing and uncertainty of its revenue and cash flows. See details in the tables below:

Net Trade Sales by Segment and Business In millions	*2022*	*2021*	*2020*
Hydrocarbons & Energy	$ 9,414	$ 8,149	$ 4,271
Packaging and Specialty Plastics	19,846	19,979	14,030
Packaging & Specialty Plastics	$ 29,260	$ 28,128	$ 18,301
Industrial Solutions	$ 5,682	$ 5,139	$ 3,929
Polyurethanes & Construction Chemicals	10,907	11,700	8,080
Others	17	12	12
Industrial Intermediates & Infrastructure	$ 16,606	$ 16,851	$ 12,021
Coatings & Performance Monomers	$ 4,051	$ 4,050	$ 3,258
Consumer Solutions	6,713	5,622	4,693
Performance Materials & Coatings	$ 10,764	$ 9,672	$ 7,951
Corporate	$ 272	$ 317	$ 269
Total	$ 56,902	$ 54,968	$ 38,542

Net Trade Sales by Geographic Region In millions	2022	2021	2020
U.S. & Canada	$ 20,945	$ 19,613	$ 13,582
EMEAI [1]	19,631	19,746	12,969
Asia Pacific	10,344	10,043	8,165
Latin America	5,982	5,566	3,826
Total	$ 56,902	$ 54,968	$ 38,542

1. Europe, Middle East, Africa and India.

Product Sales

Product sales consist of sales of the Company's products to manufacturers and distributors. The Company considers order confirmations or purchase orders, which in some cases are governed by master supply agreements, to be contracts with a customer. Product sale contracts are generally short-term contracts where the time between order confirmation and satisfaction of all performance obligations is less than one year. However, the Company has some long-term contracts which can span multiple years.

Revenues from product sales are recognized when the customer obtains control of the product, which occurs at a point in time, usually upon shipment, with payment terms typically in the range of 30 to 60 days after invoicing, depending on business and geographic region. When the Company performs shipping and handling activities after the transfer of control to the customer (e.g., when control transfers prior to shipment), these are considered fulfillment activities, and accordingly, the costs are accrued when the related revenue is recognized. Taxes collected from customers relating to product sales and remitted to governmental authorities are excluded from revenues. The

Company elected to use the practical expedient to expense cash and non-cash sales incentives, as the amortization period for the costs to obtain the contract would have been one year or less.

Certain long-term contracts include a series of distinct goods that are delivered continuously to the customer through a pipeline (e.g., feedstocks). For these types of product sales, the Company invoices the customer in an amount that directly corresponds with the value to the customer of the Company's performance to date. As a result, the Company recognizes revenue based on the amount billable to the customer in accordance with the right to invoice practical expedient.

The transaction price includes estimates for reductions in revenue from customer rebates and right of returns on product sales. These amounts are estimated based upon the most likely amount of consideration to which the customer will be entitled. All estimates are based on historical experience, anticipated performance and the Company's best judgment at the time to the extent it is probable that a significant reversal of revenue recognized will not occur. All estimates for variable consideration are reassessed periodically. The Company elected the practical expedient to not adjust the amount of consideration for the effects of a significant financing component for all instances in which the period between payment and transfer of the goods will be one year or less.

For contracts with multiple performance obligations, the Company allocates the transaction price to each performance obligation based on the relative standalone selling price. The standalone selling price is the observable price which depicts the price as if sold to a similar customer in similar circumstances.

Patents, Trademarks and Licenses
The Company enters into licensing arrangements in which it licenses certain rights of its patents and technology to customers. Revenue from the majority of the Company's licenses for patents and technology is derived from sales-based royalties. The Company estimates the amount of sales-based royalties it expects to be entitled to based on historical sales to the customer. For the remaining revenue from licensing arrangements, payments are typically received from the Company's licensees based on billing schedules established in each contract. Revenue is recognized when the performance obligation is satisfied.

Remaining Performance Obligations
Remaining performance obligations represent the transaction price allocated to unsatisfied or partially unsatisfied performance obligations. At December 31, 2022, the Company had unfulfilled performance obligations of $840 million ($829 million at December 31, 2021) related to the licensing of technology and expects revenue to be recognized for the remaining performance obligations over the next six years.

The remaining performance obligations are for product sales that have expected durations of one year or less, product sales of materials delivered through a pipeline for which the Company has elected the right to invoice practical expedient, or variable consideration attributable to royalties for licenses of patents and technology. The Company has received advance payments from customers related to long-term supply agreements that are deferred and recognized over the life of the contract, with remaining contract terms that range up to 18 years. The Company will have rights to future consideration for revenue recognized when product is delivered to the customer. These payments are included in "Accrued and other current liabilities" and "Other noncurrent obligations" in the consolidated balance sheets.

Contract Assets and Liabilities
The Company receives payments from customers based upon contractual billing schedules. Accounts receivable are recorded when the right to consideration becomes unconditional. Contract assets include amounts related to the Company's contractual right to consideration for completed performance obligations not yet invoiced. Contract liabilities include payments received in advance of performance under the contract and are recognized in revenue when the performance obligations are met. "Contract liabilities - current" primarily reflects deferred revenue from prepayments from customers for product to be delivered in 12 months or less and royalty payments that are deferred and will be recognized in 12 months or less. "Contract liabilities - noncurrent" includes advance payments that the Company has received from customers related to long-term supply agreements and royalty payments that are deferred and recognized over the life of the contract.

Revenue recognized in 2022 from amounts included in contract liabilities at the beginning of the period was approximately $ 250 million (approximately $295 million in 2021 and $ 145 million in 2020). In 2022, the amount of contract assets reclassified to receivables as a result of the right to the transaction consideration becoming unconditional was approximately $15 million (approximately $35 million in 2021). Asset impairment charges related to contract assets in 2022 were insignificant (no impairment charges in 2021 or 2020).

The following table summarizes the contract assets and liabilities at December 31, 2022 and 2021:

Contract Assets and Liabilities at Dec 31 In millions	*Balance Sheet Classification*	*2022*	*2021*
Accounts and notes receivable - trade	Accounts and notes receivable - trade	$ 5,611	$ 6,841
Contract assets - current	Other current assets	$ 48	$ 34
Contract assets - noncurrent	Deferred charges and other assets	$ 16	$ 26
Contract liabilities - current [1]	Accrued and other current liabilities	$ 275	$ 209
Contract liabilities - noncurrent [2]	Other noncurrent obligations	$ 1,725	$ 1,925

1. The increase from December 31, 2021 to December 31, 2022 was due to the reclassification of deferred royalty payments from noncurrent to current.
2. The decrease from December 31, 2021 to December 31, 2022 was due to the recognition of revenue on long-term product supply agreements and the reclassification of deferred royalty payments from noncurrent to current.

NOTE 4 – DIVESTITURES

Divestiture of Rail Infrastructure Operations and Assets

On September 30, 2020, TDCC sold its rail infrastructure operations and assets, including existing agreements to provide rail services to unrelated third parties, at six sites in the U.S. & Canada to an affiliate of Watco Companies, L.L.C. for cash proceeds of $303 million, net of costs to sell and other adjustments and subject to customary post-closing adjustments. These assets are located at TDCC’s sites in Plaquemine and St. Charles, Louisiana; Freeport and Seadrift, Texas; and Fort Saskatchewan and Prentiss, Alberta, Canada. Divested operations included property with a net book value of $68 million and goodwill of $2 million ($16 million related to Packaging & Specialty Plastics and $ 54 million related to Corporate). TDCC retained ownership of the sites and underlying real property where the divested operations are located. TDCC and the buyer entered into mutual long-term service agreements designed to ensure the continuation of rail services for TDCC's existing operations at each site. The rail-service agreements include variable fees that have an initial term of 25 years. TDCC recognized a pretax gain of $233 million on the sale ($48 million related to Packaging & Specialty Plastics and $185 million related to Corporate), included in "Sundry income (expense) - net" in the consolidated statements of income.

The Company evaluated the divestiture of the rail infrastructure operations and assets and determined it did not represent a strategic shift that had a major effect on the Company’s operations and financial results and did not qualify as an individually significant component of the Company. As a result, the divestiture is not reported as discontinued operations.

Divestiture of Marine and Terminal Operations and Assets

On December 1, 2020, TDCC sold certain U.S. Gulf Coast marine and terminal operations and assets, including existing agreements to provide marine and terminal services to unrelated third parties, at three U.S. sites to an affiliate of Royal Vopak for cash proceeds of $600 million, net of costs to sell and other adjustments and subject to customary post-closing adjustments. These assets are located at TDCC's sites in Plaquemine and St. Charles, Louisiana, and Freeport, Texas. Divested operations included property with a net book value of $93 million and goodwill of $8 million ($7 million related to Packaging & Specialty Plastics, $17 million related to Industrial Intermediates & Infrastructure and $ 77 million related to Corporate). TDCC retained ownership of the sites and the underlying real property where the divested operations are located. TDCC and the buyer entered into mutual long-term service agreements designed to ensure the continuation of marine and terminal services for TDCC's existing operations at each site. The marine and terminal service agreements include fixed and variable fees that have initial terms of up to 25 years. In the fourth quarter of 2020, TDCC recognized a pretax gain of $499 million on the sale ($17 million related to Packaging & Specialty Plastics, $ 61 million related to Industrial Intermediates & Infrastructure and $421 million related to Corporate), included in "Sundry income (expense) - net" in the consolidated statements of income.

The Company evaluated the divestiture of the marine and terminal operations and assets and determined it did not represent a strategic shift that had a major effect on the Company’s operations and financial results and did not qualify as an individually significant component of the Company. As a result, the divestiture is not reported as discontinued operations.

NOTE 5 – RESTRUCTURING AND ASSET RELATED CHARGES - NET

The "Restructuring and asset related charges - net" line in the consolidated statements of income is used to record charges for restructuring programs and other asset related charges, which includes other asset impairments.

Restructuring Programs

2020 Restructuring Program

On September 29, 2020, the Dow Inc. Board approved restructuring actions to achieve the Company's structural cost improvement initiatives in response to the continued economic impact from the coronavirus disease 2019 ("COVID-19") pandemic. The restructuring program was designed to reduce structural costs and enable the Company to further enhance competitiveness while the COVID-19 economic recovery gained traction. This program included a global workforce cost reduction of approximately 6 percent and actions to rationalize the Company's manufacturing assets, which included asset write-down and write-off charges, related contract termination fees and environmental remediation costs ("2020 Restructuring Program"). Severance benefits are provided to employees primarily under Dow's ongoing benefit arrangements and are accrued against the Corporate segment once management commits to a plan of termination. The actions related to the 2020 Restructuring Program were substantially complete by the end of 2021, with the exception of certain cash payments that will continue into 2023.

In the third quarter of 2020, the Company recorded pretax restructuring charges of $ 575 million, consisting of severance and related benefit costs of $ 297 million, asset write-downs and write-offs of $197 million and costs associated with exit and disposal activities of $ 81 million. In the fourth quarter of 2020, the Company recorded net favorable pretax restructuring credits of $1 million related to asset write-downs and write-offs and $ 1 million related to costs associated with exit and disposal activities (related to Performance Materials & Coatings and Corporate). The adjustment to costs associated with exit and disposal activities included curtailment costs associated with a defined benefit pension plan. See Note 19 for additional information. In 2021, the Company recorded pretax restructuring charges of $12 million for asset write-downs and write-offs and $ 10 million for costs associated with exit and disposal activities. In addition, the Company reduced pretax restructuring charges by $10 million for severance and related benefit costs.

The following table summarizes the activities related to the 2020 Restructuring Program:

2020 Restructuring Program In millions	*Severance and Related Benefit Costs*	*Asset Write-downs and Write-offs*	*Costs Associated with Exit and Disposal Activities*	*Total*
Packaging & Specialty Plastics	$ —	$ 11	$ —	$ 11
Industrial Intermediates & Infrastructure	—	22	—	22
Performance Materials & Coatings	—	116	61	177
Corporate	297	47	19	363
Total restructuring charges	$ 297	$ 196	$ 80	$ 573
Charges against the reserve	—	(196)	(5)	(201)
Cash payments	(8)	—	—	(8)
Reserve balance at Dec 31, 2020	$ 289	$ —	$ 75	$ 364
Packaging & Specialty Plastics	$ —	$ —	$ 8	$ 8
Industrial Intermediates & Infrastructure	—	1	—	1
Performance Materials & Coatings	—	8	2	10
Corporate	(10)	3	—	(7)
Total restructuring charges	$ (10)	$ 12	$ 10	$ 12
Charges against the reserve	—	(12)	—	(12)
Cash payments	(175)	—	(21)	(196)
Reserve balance at Dec 31, 2021	$ 104	$ —	$ 64	$ 168
Cash payments	(88)	—	(11)	(99)
Reserve balance at Dec 31, 2022	$ 16	$ —	$ 53	$ 69

At December 31, 2022, $22 million ($112 million at December 31, 2021) of the reserve balance was included in "Accrued and other current liabilities" and $47 million ($56 million at December 31, 2021) was included in "Other noncurrent obligations" in the consolidated balance sheets.

The Company recorded pretax restructuring charges of $585 million inception-to-date under the 2020 Restructuring Program, consisting of severance and related benefit costs of $287 million, asset write-downs and write-offs of $ 208 million and costs associated with exit and disposal activities of $ 90 million.

Asset Write-downs and Write-offs
The 2020 Restructuring Program included charges related to the write-down and write-off of assets totaling $ 196 million in 2020. Details regarding the asset write-downs and write-offs are as follows:

- Packaging & Specialty Plastics recorded a charge of $ 11 million to rationalize its production capacity by shutting down a small-scale production unit.
- Industrial Intermediates & Infrastructure recorded a charge of $ 22 million to rationalize its asset footprint by shutting down certain amines and solvents facilities in the United States and Europe as well as select, small-scale downstream polyurethanes manufacturing facilities.
- Performance Materials & Coatings recorded a charge of $ 116 million for shutting down manufacturing assets, primarily related to small-scale coatings reactors, and also rationalized its upstream asset footprint in Europe and the U.S. & Canada by adjusting the supply of siloxane and silicon metal to balance to regional needs.
- Corporate recorded a charge of $47 million related to the write-down of leased, non-manufacturing facilities and the write-down of miscellaneous assets.

The 2020 Restructuring Program included charges related to the write-down and write-off of assets totaling $ 12 million in 2021, which included additional write-down and write-off of assets related to the actions listed above, impacting Industrial Intermediates & Infrastructure ($1 million) and Performance Materials & Coatings ($8 million), and the write-down of an additional non-manufacturing facility impacting Corporate ($ 3 million).

Shut down related activities for impacted facilities were substantially complete by the end of 2021.

Costs Associated with Exit and Disposal Activities
The 2020 Restructuring Program included charges of $80 million for costs associated with exit and disposal activities in 2020, which included $ 19 million for contract termination fees related to the asset actions listed above, impacting Performance Materials & Coatings ($9 million) and Corporate ($10 million), as well as $56 million for environmental remediation, impacting Performance Materials & Coatings ($ 52 million) and Corporate ($4 million) and $5 million related to curtailment costs associated with a defined benefit pension plan, impacting Corporate.

The 2020 Restructuring Program included charges of $10 million for costs associated with exit and disposal activities in 2021, which included contract termination fees and environmental remediation, impacting Packaging & Specialty Plastics ($8 million) and Performance Materials & Coatings ($ 2 million).

The Company expects to incur additional costs in the future related to its restructuring activities. Future costs are expected to include demolition costs related to closed facilities and restructuring implementation costs. These costs will be recognized as incurred. The Company also expects to incur additional employee-related costs, including involuntary termination benefits, related to its other optimization activities. These costs cannot be reasonably estimated at this time.

Asset Related Charges
2022 Charges
In 2022, the Company recorded pretax asset related charges of $ 118 million due to the Russia and Ukraine conflict and the expectation that certain assets would not be recoverable. These charges included the write-down of inventory, the recording of bad debt reserves and the impairment of other assets. Asset related charges by segment in 2022 were as follows: $8 million in Packaging & Specialty Plastics, $73 million in Industrial Intermediates & Infrastructure, $6 million in Performance Materials & Coatings and $31 million in Corporate.

2020 Charges
In 2020, the Company recognized pretax impairment charges of $ 49 million, including additional pretax impairment charges for capital additions made to a bio-ethanol manufacturing facility in Santa Vitoria, Minas Gerais, Brazil ("Santa Vitoria"), which was impaired in 2017 and divested in 2020, as well as charges for miscellaneous write-offs and write-downs of non-manufacturing assets and the write-down of certain corporate leased equipment. The impairment charges related to Packaging & Specialty Plastics ($19 million), Performance Materials & Coatings ($ 15 million) and Corporate ($ 15 million). See Note 22 for additional information.

Subsequent Event
On January 25, 2023, the Dow Inc. Board approved restructuring actions to achieve the Company's structural cost improvement initiatives in response to the continued economic impact from the global recessionary environment and to enhance its agility and long-term competitiveness across the economic cycle. This program includes a global workforce cost reduction, decreasing turnaround spending, actions to rationalize the Company's manufacturing assets, which includes asset write-down and write-off charges and related contract termination fees.

The Company will record a charge in the first quarter of 2023 for costs associated with these activities. In total, these costs are expected to be in the range of $550 million to $725 million and will consist of severance and related benefit costs ranging from $ 330 million to $425 million in connection with a global workforce reduction of approximately 2,000 roles; costs associated with exit and disposal activities ranging from $ 20 million to $50 million; and asset write-downs and write-offs ranging from $200 million to $250 million.

Future cash payments related to severance costs, contract termination fees and environmental remediation costs are anticipated to be approximately $450 million to $550 million and will be paid out primarily over the next two years.

NOTE 6 – SUPPLEMENTARY INFORMATION

Sundry Income (Expense) – Net	*Dow Inc.*			*TDCC*		
In millions	*2022*	*2021*	*2020*	*2022*	*2021*	*2020*
Non-operating pension and other postretirement benefit plan net credits [1]	$ 358	$ 332	$ 103	$ 358	$ 332	$ 103
Foreign exchange losses [2]	(117)	(8)	(62)	(126)	(13)	(65)
Loss on early extinguishment of debt [3]	(8)	(574)	(149)	(8)	(574)	(149)
Gain on sales of other assets and investments	78	105	48	78	105	48
Indemnification and other transaction related costs [4]	4	30	(21)	—	(2)	(11)
Luxi arbitration award [5]	—	54	—	—	54	—
Gain (loss) on divestitures and asset sale [6]	—	16	(15)	—	16	(15)
Gain on divestiture of rail infrastructure operations and assets [7]	—	—	233	—	—	233
Gain on divestiture of marine and terminal operations and assets [7]	—	—	499	—	—	499
Gain related to Nova legal matter [5]	321	—	544	321	—	544
Dow Silicones breast implant liability adjustment [5]	60	—	5	60	—	5
Other - net	31	10	84	31	3	82
Total sundry income (expense) – net	$ 727	$ (35)	$ 1,269	$ 714	$ (79)	$ 1,274

1. See Note 19 for additional information.
2. Foreign exchange losses in 2022 relate primarily to exposures in the Argentinian peso.
3. See Note 14 for additional information.
4. Primarily related to charges associated with agreements entered into with DuPont and Corteva as part of the separation and distribution.
5. See Note 15 for additional information.
6. The year ended December 31, 2021 includes post-closing adjustments on a previous divestiture, related to Packaging & Specialty Plastics. The year ended December 31, 2020 primarily relates to a loss on the divestiture of a bio-ethanol manufacturing facility in Brazil, related to Packaging & Specialty Plastics.
7. See Note 4 for additional information.

Accrued and Other Current Liabilities
"Accrued and other current liabilities" were $2,770 million and $2,613 million at December 31, 2022 and $3,481 million and $3,299 million at December 31, 2021, for Dow Inc. and TDCC, respectively. Accrued payroll, which is a component of "Accrued and other current liabilities" and includes liabilities related to payroll, performance-based compensation and severance, was $650 million at December 31, 2022 and $1,030 million at December 31, 2021. No other components of "Accrued and other current liabilities" were more than 5 percent of total current liabilities.

Supplemental Cash Flow Information
The following table shows cash paid for interest and income taxes for the years ended December 31, 2022, 2021 and 2020:

Supplemental Cash Flow Information In millions	*2022*	*2021*	*2020*
Cash paid during year for:			
Interest	$ 675	$ 801	$ 842
Income taxes	$ 793	$ 731	$ 518

NOTE 7 – INCOME TAXES

The financial statements for Dow Inc. and TDCC are substantially similar, including the reporting of current and deferred tax expense (benefit), provision for income taxes, and deferred tax asset and liability balances. As a result, the following income tax discussion pertains to Dow Inc. only.

Geographic Allocation of Income and Provision for Income Taxes In millions	*2022*	*2021*	*2020*
Income (loss) before income taxes			
Domestic	$ 2,383	$ 1,523	$ (681)
Foreign	3,707	6,622	2,752
Income before income taxes	$ 6,090	$ 8,145	$ 2,071
Current tax expense (benefit)			
Federal	$ 434	$ (46)	$ (176)
State and local	82	48	4
Foreign	855	1,460	691
Total current tax expense	$ 1,371	$ 1,462	$ 519
Deferred tax expense			
Federal	$ 63	$ 130	$ 184
State and local	1	26	19
Foreign	15	122	55
Total deferred tax expense	$ 79	$ 278	$ 258
Provision for income taxes	$ 1,450	$ 1,740	$ 777
Net income	$ 4,640	$ 6,405	$ 1,294

Reconciliation to U.S. Statutory Rate	2022	2021	2020
Statutory U.S. federal income tax rate	21.0 %	21.0 %	21.0 %
Equity earnings effect	(1.2)	(2.2)	0.2
Foreign income taxed at rates other than the statutory U.S. federal income tax rate	(1.4)	(1.3)	(2.3)
U.S. tax effect of foreign earnings and dividends	1.2	1.7	3.9
Unrecognized tax benefits	1.3	4.7	7.3
Divestitures [1]	—	—	(5.1)
Changes in valuation allowances	(2.8)	2.6	12.6
Federal tax accrual adjustment [2]	0.6	(5.3)	0.3
State and local income taxes	2.8	0.2	0.3
Other - net	2.3	—	(0.7)
Effective tax rate	23.8 %	21.4 %	37.5 %

1. The 2020 impact relates to the divestiture of a bio-ethanol manufacturing facility in Brazil. See Note 5 for additional information.
2. The 2021 impact represents a capital loss incurred on an internal restructuring fully offset by a valuation allowance reported in "Changes in valuation allowances" line item.

Deferred Tax Balances at Dec 31	2022		2021	
In millions	Assets	Liabilities	Assets	Liabilities
Property	$ 505	$ 3,001	$ 484	$ 3,150
Tax loss and credit carryforwards	1,472	—	1,784	—
Postretirement benefit obligations	749	239	1,753	303
Other accruals and reserves	1,497	279	1,487	191
Intangibles	36	415	108	556
Inventory	129	278	33	203
Investments	116	41	31	26
Other – net	999	131	1,093	101
Subtotal	$ 5,503	$ 4,384	$ 6,773	$ 4,530
Valuation allowances	(1,269)	—	(1,391)	—
Total	$ 4,234	$ 4,384	$ 5,382	$ 4,530

Operating Loss and Tax Credit Carryforwards at Dec 31	2022	2021
In millions	Assets	Assets
Operating loss carryforwards		
Expire within 5 years	$ 158	$ 240
Expire after 5 years or indefinite expiration	752	817
Total operating loss carryforwards	$ 910	$ 1,057
Tax credit carryforwards		
Expire within 5 years	$ 77	$ 227
Expire after 5 years or indefinite expiration	96	103
Total tax credit carryforwards	$ 173	$ 330
Capital loss carryforwards		
Expire within 5 years	$ 389	$ 397
Total tax loss and tax credit carryforwards	$ 1,472	$ 1,784

Undistributed earnings of foreign subsidiaries and related companies that are deemed to be permanently invested amounted to $ 6,013 million at December 31, 2022 and $7,769 million at December 31, 2021. Undistributed earnings are subject to certain taxes upon repatriation, primarily where foreign withholding taxes apply. It is not practicable to calculate the unrecognized deferred tax liability on undistributed earnings.

The following table provides a reconciliation of the Company's unrecognized tax benefits:

Total Gross Unrecognized Tax Benefits In millions	*2022*	*2021*	*2020*
Total unrecognized tax benefits at Jan 1	$ 580	$ 373	$ 319
Decreases related to positions taken on items from prior years	(47)	(3)	(1)
Increases related to positions taken on items from prior years	53	187	52
Increases related to positions taken in the current year	46	44	18
Settlement of uncertain tax positions with tax authorities	(111)	(18)	(14)
Decreases due to expiration of statutes of limitations	—	(1)	(1)
Foreign exchange gain	(1)	(2)	—
Total unrecognized tax benefits at Dec 31	$ 520	$ 580	$ 373
Total unrecognized tax benefits that, if recognized, would impact the effective tax rate	$ 520	$ 501	$ 285
Total amount of interest and penalties expense (benefit) recognized in "Provision for income taxes"	$ (27)	$ 359	$ 84
Total accrual for interest and penalties recognized in the consolidated balance sheets	$ 498	$ 502	$ 144

The 2022 impacts primarily relate to the settlement of uncertain tax positions in multiple foreign jurisdictions. The 2021 impacts primarily relate to an increase in uncertain tax positions due to controversy in multiple jurisdictions related to various prior year cross-border matters.

The Company files tax returns in multiple jurisdictions. These returns are subject to examination and possible challenge by the tax authorities. Open years contain matters that could be subject to differing interpretations of applicable tax laws and regulations as they relate to the amount, character, timing or inclusion of revenue and expenses or the sustainability of income tax credits for a given audit cycle. The ultimate resolution of such uncertainties is not expected to have a material impact on the Company's results of operations. The earliest open tax years are 2004 for state income taxes and 2007 for federal income taxes in the United States and 2011 in foreign jurisdictions.

NOTE 8 - EARNINGS PER SHARE CALCULATIONS

The following tables provide earnings per share calculations of Dow Inc. for the years ended December 31, 2022, 2021 and 2020. In accordance with the accounting guidance for earnings per share, earnings per share of TDCC is not presented as this information is not required in financial statements of wholly owned subsidiaries.

Net Income for Earnings Per Share Calculations In millions	*2022*	*2021*	*2020*
Net income	$ 4,640	$ 6,405	$ 1,294
Net income attributable to noncontrolling interests	58	94	69
Net income attributable to participating securities [1]	24	32	9
Net income attributable to common stockholders	$ 4,558	$ 6,279	$ 1,216

1. Restricted stock units are considered participating securities due to the Company's practice of paying dividend equivalents on unvested shares.

Earnings Per Share - Basic and Diluted Dollars per share	*2022*	*2021*	*2020*
Earnings per common share - basic	$ 6.32	$ 8.44	$ 1.64
Earnings per common share - diluted	$ 6.28	$ 8.38	$ 1.64

Share Count Information Shares in millions	*2022*	*2021*	*2020*
Weighted-average common shares outstanding - basic	721.0	743.6	740.5
Plus dilutive effect of equity compensation plans	4.6	5.4	1.8
Weighted-average common shares outstanding - diluted	725.6	749.0	742.3
Stock options and restricted stock units excluded from EPS calculations [1]	7.6	5.8	14.2

1. These outstanding options to purchase shares of common stock and restricted stock units were excluded from the calculation of diluted earnings per share because the effect of including them would have been antidilutive.

NOTE 9 – INVENTORIES

The following table provides a breakdown of inventories:

Inventories at Dec 31 In millions	*2022*	*2021*
Finished goods	$ 4,150	$ 4,554
Work in process	1,476	1,615
Raw materials	954	822
Supplies	892	866
Total	$ 7,472	$ 7,857
Adjustment of inventories to the LIFO basis	(484)	(485)
Total inventories	$ 6,988	$ 7,372

Inventories valued on the LIFO basis represented 27 percent of the total inventories at December 31, 2022 and December 31, 2021.

NOTE 10 – PROPERTY

The following table provides a breakdown of property:

Property at Dec 31 In millions	*Estimated Useful Lives (Years)*	*2022*	*2021*
Land and land improvements	0-25	$ 2,129	$ 2,045
Buildings	5-50	5,045	5,108
Machinery and equipment	3-25	42,131	42,627
Other property	3-50	6,622	6,286
Construction in progress	—	2,128	1,538
Total property		$ 58,055	$ 57,604

In millions	*2022*	*2021*	*2020*
Depreciation expense	$ 1,958	$ 2,063	$ 2,092
Capitalized interest	$ 63	$ 59	$ 64

NOTE 11 – NONCONSOLIDATED AFFILIATES

The Company's investments in companies accounted for using the equity method ("nonconsolidated affiliates"), by classification in the consolidated balance sheets, and dividends received from nonconsolidated affiliates are shown in the following tables:

Investments in Nonconsolidated Affiliates at Dec 31 In millions	*2022*[1]	*2021*[1]
Investment in nonconsolidated affiliates	$ 1,589	$ 2,045
Other noncurrent obligations	(144)	—
Net investment in nonconsolidated affiliates	$ 1,445	$ 2,045

1. The carrying amount of the Company's investments in nonconsolidated affiliates at December 31, 2022 and 2021 was $55 million less than its share of the investees' net assets, exclusive of additional differences relating to Sadara, EQUATE Petrochemical Company K.S.C.C. ("EQUATE") and AgroFresh Solutions Inc. ("AFSI"), which are discussed separately in the disclosures that follow.

Dividends Received from Nonconsolidated Affiliates In millions	*2022*	*2021*	*2020*
Dividends from nonconsolidated affiliates [1]	$ 964	$ 324	$ 425

1. Included in "Earnings of nonconsolidated affiliates less than (in excess of) dividends received" in the consolidated statements of cash flows.

Except for AFSI, the nonconsolidated affiliates in which the Company has investments are privately held companies; therefore, quoted market prices are not available.

Sadara
In 2011, the Company and Saudi Arabian Oil Company formed Sadara - a joint venture between the two companies that subsequently constructed and now operates a world-scale, fully integrated chemicals complex in Jubail Industrial City, Kingdom of Saudi Arabia. The Company has a 35 percent equity interest in this joint venture and has been, and continues to be, responsible for marketing the majority of Sadara's products through the Company's established sales channels. In 2021, Dow and the Saudi Arabian Oil Company agreed to and began transitioning the marketing rights and responsibilities for Sadara's finished products to levels more consistent with each partner's equity ownership, which is being implemented through 2026. This transition will not impact equity earnings, but is expected to reduce the Company's sales of Sadara products over the five year period.

The Company's investment in Sadara was $1,464 million less than Dow's proportionate share of the carrying value of the underlying net assets held by Sadara at December 31, 2022 ($1,541 million less at December 31, 2021). This basis difference, which resulted from the 2019 impairment of the investment, is primarily attributed to the long-lived assets of Sadara and is being amortized over the remaining useful lives of the assets. At December 31, 2022, the Company had an investment balance in Sadara of $322 million ($416 million at December 31, 2021) included in "Investment in nonconsolidated affiliates" in the Company's consolidated balance sheets. See Note 15 for additional information related to guarantees.

In 2020, the Company loaned $333 million to Sadara that was accounted for as in substance common stock and classified as "Investment in nonconsolidated affiliates" in the Company's consolidated balance sheets. At December 31, 2022 and 2021, the Company's note receivable with Sadara was zero.

EQUATE
At December 31, 2022, the Company had a negative investment balance in EQUATE of $ 144 million classified as "Other noncurrent obligations" ($115 million at December 31, 2021 included in "Investment in nonconsolidated affiliates") in the consolidated balance sheets. The Company's investment in EQUATE was $447 million less than the Company's proportionate share of EQUATE's underlying net assets at December 31, 2022 ($ 458 million less at December 31, 2021), which represents the difference between the fair values of certain MEGlobal assets acquired by EQUATE and the Company's related valuation on a U.S. GAAP basis. A basis difference of $126 million at December 31, 2022 ($140 million at December 31, 2021) is being amortized over the remaining useful lives of the assets and the remainder is considered a permanent difference.

AFSI
At December 31, 2022 and 2021, the Company had an investment balance in AFSI of zero. At December 31, 2022, the Company's investment in AFSI was $72 million less than the Company's proportionate share of AFSI's underlying net assets ($ 96 million less at December 31, 2021). This amount primarily relates to an other-than-temporary decline in the Company's investment in AFSI. At December 31, 2022 and 2021, the Company held a 40 percent ownership interest in AFSI.

Transactions with Nonconsolidated Affiliates
The Company has service agreements with certain nonconsolidated affiliates, including contracts to manage the operations of manufacturing sites and the construction of new facilities; licensing and technology agreements; and marketing, sales, purchase, lease and sublease agreements.

The Company sells excess ethylene glycol produced at manufacturing facilities in the United States and Europe to MEGlobal, a subsidiary of EQUATE. The Company also sells ethylene to MEGlobal as a raw material for its ethylene glycol plants in Canada. Sales of these products to MEGlobal represented 1 percent of total net sales in 2022, 2021 and 2020. Sales of ethylene to MEGlobal are reflected in the Packaging & Specialty Plastics segment and represented 2 percent of the segment's sales in 2022, 2021 and 2020. Sales of ethylene glycol to MEGlobal are reflected in the Industrial Intermediates & Infrastructure segment and represented 1 percent of the segment's sales in 2022, 2021 and 2020.

The Company is responsible for marketing the majority of Sadara products outside of the Middle East zone through the Company’s established sales channels. Under this arrangement, the Company purchases and sells Sadara products for a marketing fee. Purchases of Sadara products represented 7 percent of "Cost of sales" in 2022 (9 percent in 2021 and 8 percent in 2020).

The Company purchases products from The SCG-Dow Group, primarily for marketing and distribution in Asia Pacific. Purchases of products from The SCG-Dow Group represented 3 percent of "Cost of sales" in 2022, 2021 and 2020.

Sales to and purchases from other nonconsolidated affiliates were not material to the consolidated financial statements.

Balances due to or due from nonconsolidated affiliates at December 31, 2022 and 2021 were as follows:

Balances Due To or Due From Nonconsolidated Affiliates at Dec 31 In millions	*2022*	*2021*
Accounts and notes receivable - Other	$ 307	$ 357
Accounts payable - Other	$ 1,083	$ 1,611

Principal Nonconsolidated Affiliates

The Company had an ownership interest in 37 nonconsolidated affiliates at December 31, 2022 (37 at December 31, 2021). The Company's principal nonconsolidated affiliates and its ownership interest (direct and indirect) for each at December 31, 2022, 2021 and 2020 are as follows:

Principal Nonconsolidated Affiliates at Dec 31		*Ownership Interest*		
	Country	*2022*	*2021*	*2020*
EQUATE Petrochemical Company K.S.C.C.	Kuwait	42.5 %	42.5 %	42.5 %
The Kuwait Olefins Company K.S.C.C.	Kuwait	42.5 %	42.5 %	42.5 %
The Kuwait Styrene Company K.S.C.C.	Kuwait	42.5 %	42.5 %	42.5 %
Map Ta Phut Olefins Company Limited [1]	Thailand	32.77 %	32.77 %	32.77 %
Sadara Chemical Company	Saudi Arabia	35 %	35 %	35 %
The SCG-Dow Group:				
Siam Polyethylene Company Limited	Thailand	50 %	50 %	50 %
Siam Polystyrene Company Limited	Thailand	50 %	50 %	50 %
Siam Styrene Monomer Company Limited	Thailand	50 %	50 %	50 %
Siam Synthetic Latex Company Limited	Thailand	50 %	50 %	50 %

1. The Company's effective ownership of Map Ta Phut Olefins Company Limited ("Map Ta Phut") is 32.77 percent, of which the Company directly owns 20.27 percent and indirectly owns 12.5 percent through its equity interest in Siam Polyethylene Company Limited.

The Company's investment in and equity earnings from its principal nonconsolidated affiliates are as follows:

Investment in Principal Nonconsolidated Affiliates at Dec 31 In millions	*2022*	*2021*
Investment in nonconsolidated affiliates	$ 1,116	$ 1,621
Other noncurrent obligations	(144)	—
Net investment in principal nonconsolidated affiliates	$ 972	$ 1,621

Equity in Earnings (Losses) of Principal Nonconsolidated Affiliates In millions	*2022*	*2021*	*2020*
Equity in earnings (losses) of principal nonconsolidated affiliates	$ 192	$ 918	$ (16)

The summarized financial information that follows represents the combined accounts (at 100 percent) of the principal nonconsolidated affiliates.

Summarized Balance Sheet Information at Dec 31 In millions	*2022*	*2021*
Current assets	$ 6,241	$ 8,158
Noncurrent assets	22,526	23,681
Total assets	$ 28,767	$ 31,839
Current liabilities	$ 3,754	$ 3,990
Noncurrent liabilities	18,999	20,039
Total liabilities	$ 22,753	$ 24,029
Noncontrolling interests	$ 223	$ 174

Summarized Income Statement Information [1] In millions	*2022*	*2021*	*2020*
Sales	$ 14,026	$ 14,969	$ 9,470
Gross profit	$ 1,246	$ 3,219	$ 619
Income (loss), net of tax	$ (91)	$ 2,013	$ (461)

1. The results in this table include purchase and sale activity between certain principal nonconsolidated affiliates and the Company, as previously discussed in the "Transactions with Nonconsolidated Affiliates" section.

NOTE 12 – GOODWILL AND OTHER INTANGIBLE ASSETS

The following table shows changes in the carrying amounts of goodwill by reportable segment for the years ended December 31, 2022 and 2021:

Goodwill In millions	*Packaging & Specialty Plastics*	*Industrial Intermediates & Infrastructure*	*Performance Materials & Coatings*	*Total*
Balance at Jan 1, 2021	$ 5,115	$ 1,100	$ 2,693	$ 8,908
Foreign currency impact	(10)	(4)	(130)	(144)
Balance at Dec 31, 2021	$ 5,105	$ 1,096	$ 2,563	$ 8,764
Foreign currency impact	(5)	(3)	(112)	(120)
Balance at Dec 31, 2022	$ 5,100	$ 1,093	$ 2,451	$ 8,644

At December 31, 2022, goodwill was carried by all reporting units except Coatings & Performance Monomers.

Goodwill Impairments

The carrying amounts of goodwill at December 31, 2022 and 2021 were net of accumulated impairments of $ 309 million in Industrial Intermediates & Infrastructure and $2,530 million in Performance Materials & Coatings.

Goodwill Impairment Testing

The Company performs an impairment test of goodwill annually in the fourth quarter. In 2022, the Company performed qualitative testing for all reporting units that carried goodwill. Based on the results of the qualitative testing, the Company did not perform quantitative testing on any reporting units in 2022 and 2021. Quantitative testing was performed for one reporting unit in 2020. The qualitative testing on the reporting units indicated that it was not more likely than not that fair value was less than the carrying value for the reporting units. The quantitative testing conducted in 2020 concluded that no goodwill impairments existed.

Other Intangible Assets

The following table provides information regarding the Company's other intangible assets:

Other Intangible Assets at Dec 31	*2022*			*2021*		
In millions	*Gross Carrying Amount*	*Accum Amort*	*Net*	*Gross Carrying Amount*	*Accum Amort*	*Net*
Intangible assets:						
Developed technology [1]	$ 2,651	$ (2,025)	$ 626	$ 2,654	$ (1,871)	$ 783
Software	1,358	(962)	396	1,396	(945)	451
Trademarks/tradenames	352	(345)	7	352	(344)	8
Customer-related	3,103	(1,690)	1,413	3,204	(1,565)	1,639
Total other intangible assets	$ 7,464	$ (5,022)	$ 2,442	$ 7,606	$ (4,725)	$ 2,881

1. Includes $17 million gross carrying amount in 2022 and 2021 for in-process research and development that has not yet commercialized.

The following table provides information regarding amortization expense related to intangible assets:

Amortization Expense In millions	*2022*	*2021*	*2020*
Other intangible assets, excluding software	$ 336	$ 388	$ 401
Software, included in "Cost of sales"	$ 80	$ 90	$ 96

Total estimated amortization expense for the next five fiscal years, including amounts expected to be capitalized, is as follows:

Estimated Amortization Expense for Next Five Years In millions		
2023	$	387
2024	$	368
2025	$	278
2026	$	203
2027	$	170

NOTE 13 – TRANSFERS OF FINANCIAL ASSETS

Accounts Receivable Programs

The Company maintains committed accounts receivable facilities with various financial institutions, including in the United States (“U.S. Program”) and in Europe (“Europe Program” and together with the U.S. Program, "the Programs"), which are both set to expire in November 2025. Under the terms of the Programs, the Company may sell certain eligible trade accounts receivable at any point in time, up to $900 million for the U.S. Program and up to € 500 million for the Europe Program. Under the terms of the Programs, the Company continues to service the receivables from the customer, but retains no interest in the receivables, and remits payment to the financial institutions. The Company also provides a guarantee to the financial institutions for the creditworthiness and collection of the receivables in satisfaction of the facility. See Note 15 for additional information related to guarantees. In 2022, the Company sold $391 million (zero in 2021) of receivables under the Programs.

NOTE 14 – NOTES PAYABLE, LONG-TERM DEBT AND AVAILABLE CREDIT FACILITIES

Notes Payable at Dec 31 In millions	*2022*	*2021*
Commercial paper	$ 299	$ —
Notes payable to banks and other lenders	63	161
Total notes payable	$ 362	$ 161
Year-end average interest rates	6.55 %	5.78 %

Long-Term Debt at Dec 31 In millions	*2022 Average Rate*	*2022*	*2021 Average Rate*	*2021*
Promissory notes and debentures:				
Final maturity 2022	— %	$ —	8.64 %	$ 121
Final maturity 2023	7.63 %	250	7.63 %	250
Final maturity 2025	5.63 %	333	5.63 %	333
Final maturity 2026	— %	—	3.63 %	750
Final maturity 2028 and thereafter [1]	5.36 %	10,864	5.15 %	9,363
Other facilities:				
Foreign currency notes and loans, various rates and maturities	1.16 %	2,562	1.17 %	2,730
InterNotes®, varying maturities through 2052	3.87 %	543	3.37 %	392
Finance lease obligations [2]		790		869
Unamortized debt discount and issuance costs		(282)		(297)
Long-term debt due within one year [3]		(362)		(231)
Long-term debt		$ 14,698		$ 14,280

1. Cost includes net fair value hedge adjustment gains of $46 million at December 31, 2022 ($47 million at December 31, 2021). See Note 21 for additional information.
2. See Note 16 for additional information.
3. Presented net of current portion of unamortized debt issuance costs.

Maturities of Long-Term Debt for Next Five Years at Dec 31, 2022 In millions	
2023	$ 362
2024	$ 127
2025	$ 388
2026	$ 78
2027	$ 1,209

2022 Activity

In the second quarter of 2022, the Company redeemed $ 750 million aggregate principal amount of 3.625 percent notes due May 2026. As a result of the redemption, the Company recognized a pretax loss on the early extinguishment of debt of $8 million, included in "Sundry income (expense) - net" in the consolidated statements of income and related to Corporate.

In the fourth quarter of 2022, the Company issued $ 1.5 billion of senior unsecured notes. The offering included $ 600 million aggregate principal amount of 6.30 percent notes due 2033 and $ 900 million aggregate principal amount of 6.90 percent notes due 2053.

In 2022, the Company issued an aggregate principal amount of $ 167 million of InterNotes®. Additionally, the Company repaid $ 121 million of long-term debt at maturity and approximately $3 million of long-term debt was repaid by consolidated variable interest entities.

2021 Activity

In the second quarter of 2021, the Company redeemed $208 million aggregate principal amount of 3.15 percent notes due May 2024 and $811 million aggregate principal amount of 3.50 percent notes due October 2024. As a result of the redemptions, the Company recognized a pretax loss of $101 million on the early extinguishment of debt, included in "Sundry income (expense) - net" in the consolidated statements of income and related to Corporate.

In the third quarter of 2021, the Company completed cash tender offers for certain debt securities. In total, $1,042 million aggregate principal amount was tendered and retired. As a result, the Company recognized a pretax loss of $472 million on the early extinguishment of debt, included in "Sundry income (expense) – net" in the consolidated statements of income and related to Corporate. In addition, the Company voluntarily repaid $81 million of long-term debt due within one year.

In 2021, the Company issued an aggregate principal amount of $109 million of InterNotes®, and redeemed an aggregate principal amount of $31 million at maturity. In addition, the Company voluntarily repaid an aggregate principal amount of $213 million of InterNotes® with various maturities. As a result, the Company recognized a pretax loss of $1 million on the early extinguishment of debt, included in "Sundry income (expense) - net" in the consolidated statements of income and related to Corporate. Additionally, the Company repaid $259 million of long-term debt at maturity and approximately $25 million of long-term debt was repaid by consolidated variable interest entities.

2020 Activity

In February 2020, the Company issued €2.25 billion aggregate principal amount of notes (“Euro Notes”). The Euro Notes included €1.0 billion aggregate principal amount of 0.50 percent notes due 2027, €750 million aggregate principal amount of 1.125 percent notes due 2032 and €500 million aggregate principal amount of 1.875 percent notes due 2040. The Euro Notes have a weighted average coupon rate of approximately 1.0 percent. With the net proceeds from the issuance of the Euro Notes, Dow Silicones voluntarily repaid $750 million of principal under a certain third party credit agreement ("Term Loan Facility"). In addition, the Company redeemed $1.25 billion of 3.0 percent notes issued by the Company with maturity in 2022. As a result, the Company recognized a pretax loss of $85 million on the early extinguishment of debt, included in “Sundry income (expense) – net” in the consolidated statements of income and related to Corporate.

In the first quarter of 2020, the Company withdrew $800 million under various uncommitted bilateral credit arrangements, which were subsequently repaid in the second quarter of 2020.

In August 2020, the Company issued $2.0 billion aggregate principal amount of notes. The notes included $850 million aggregate principal amount of 2.1 percent notes due 2030 and $1.15 billion aggregate principal amount of 3.6 percent notes due 2050 (together, the "Notes"). With the net proceeds from the issuance of the Notes, Dow Silicones voluntarily repaid the remaining $1.25 billion outstanding principal balance under the Term Loan Facility. In September 2020, the Company also used $556 million of aggregate proceeds from the Notes to fund cash tender offers for certain of its debt securities and certain debt securities of Union Carbide. In total, $493 million aggregate principal amount was tendered and retired. These actions resulted in a pretax loss of $62 million on the early extinguishment of debt included in "Sundry income (expense) – net" in the consolidated statements of income and related to Corporate.

In 2020, the Company also issued an aggregate principal amount of $190 million of InterNotes® and redeemed an aggregate principal amount of $180 million at maturity. In addition, the Company voluntarily repaid an aggregate principal amount of $400 million of InterNotes® with various maturities. As a result, the Company recognized a pretax loss on the early extinguishment of debt of $2 million, included in “Sundry income (expense) – net” in the consolidated statements of income and related to Corporate. Additionally, the Company repaid $134 million of long-term debt at maturity and approximately $29 million of long-term debt was repaid by consolidated variable interest entities.

Available Credit Facilities
The following table summarizes the Company's credit facilities:

Committed and Available Credit Facilities at Dec 31, 2022				
In millions	*Committed Credit*	*Credit Available*	*Maturity Date*	*Interest*
Five Year Competitive Advance and Revolving Credit Facility	$ 5,000	$ 5,000	November 2027	Floating rate
Bilateral Revolving Credit Facility	300	300	September 2023	Floating rate
Bilateral Revolving Credit Facility [1]	500	500	November 2024	Floating rate
Bilateral Revolving Credit Facility	100	100	March 2025	Floating rate
Bilateral Revolving Credit Facility	100	100	March 2025	Floating rate
Bilateral Revolving Credit Facility	100	100	March 2025	Floating rate
Bilateral Revolving Credit Facility	200	200	September 2025	Floating rate
Bilateral Revolving Credit Facility	250	250	September 2025	Floating rate
Bilateral Revolving Credit Facility	300	300	November 2025	Floating rate
Bilateral Revolving Credit Facility	100	100	March 2026	Floating rate
Bilateral Revolving Credit Facility	150	150	November 2026	Floating rate
Bilateral Revolving Credit Facility	200	200	November 2026	Floating rate
Bilateral Revolving Credit Facility	250	250	March 2027	Floating rate
Bilateral Revolving Credit Facility	100	100	May 2027	Floating rate
Bilateral Revolving Credit Facility	350	350	June 2027	Floating rate
Bilateral Revolving Credit Facility	200	200	September 2027	Floating rate
Bilateral Revolving Credit Facility	100	100	October 2027	Floating rate
Bilateral Revolving Credit Facility	100	100	November 2027	Floating rate
Total Committed and Available Credit Facilities	$ 8,400	$ 8,400		

1. Assumes the option to extend the bilateral revolving credit facility will be exercised.

Letters of Credit
The Company utilizes letters of credit to support commitments made in the ordinary course of business. While the terms and amounts of letters of credit change, the Company generally has approximately $600 million of outstanding letters of credit at any given time.

Debt Covenants and Default Provisions
TDCC's outstanding long-term debt has been issued primarily under indentures which contain, among other provisions, certain customary restrictive covenants with which TDCC must comply while the underlying notes are outstanding. Failure of TDCC to comply with any of its covenants, could result in a default under the applicable indenture and allow the note holders to accelerate the due date of the outstanding principal and accrued interest on the underlying notes.

TDCC's indenture covenants include obligations to not allow liens on principal U.S. manufacturing facilities, enter into sale and lease-back transactions with respect to principal U.S. manufacturing facilities, merge or consolidate with any other corporation, or sell, lease or convey, directly or indirectly, all or substantially all of TDCC's assets. The outstanding debt also contains customary default provisions. TDCC remains in compliance with these covenants.

TDCC's primary, private credit agreements also contain certain customary restrictive covenant and default provisions in addition to the covenants set forth above with respect to TDCC's debt. Significant other restrictive covenants and default provisions related to these agreements include:

(a) the obligation to maintain the ratio of TDCC's consolidated indebtedness to consolidated capitalization at no greater than 0.70 to 1.00 at any time the aggregate outstanding amount of loans under the Five Year Competitive Advance and Revolving Credit Facility Agreement ("Revolving Credit Agreement") dated November 23, 2021, equals or exceeds $500 million,

(b) a default if TDCC or an applicable subsidiary fails to make any payment, including principal, premium or interest, under the applicable agreement on other indebtedness of, or guaranteed by, TDCC or such applicable subsidiary in an aggregate amount of $100 million or more when due, or any other default or other event under the applicable agreement with respect to such indebtedness occurs which permits or results in the acceleration of $400 million or more in the aggregate of principal, and

(c) a default if TDCC or any applicable subsidiary fails to discharge or stay within 60 days after the entry of a final judgment against TDCC or such applicable subsidiary of more than $400 million.

Failure of TDCC to comply with any of the covenants or default provisions could result in a default under the applicable credit agreement which would allow the lenders to not fund future loan requests and to accelerate the due date of the outstanding principal and accrued interest on any outstanding indebtedness.

Dow Inc. is obligated, substantially concurrently with the issuance of any guarantee in respect of outstanding or committed indebtedness under TDCC's Revolving Credit Agreement, to enter into a supplemental indenture with TDCC and the trustee under TDCC's existing 2008 base indenture governing certain notes issued by TDCC. Under such supplemental indenture, Dow Inc. will guarantee all outstanding debt securities and all amounts due under such existing base indenture and will become subject to certain covenants and events of default under the existing base indenture.

In addition, the Revolving Credit Agreement includes an event of default which would be triggered in the event Dow Inc. incurs or guarantees third party indebtedness for borrowed money in excess of $250 million or engages in any material activity or directly owns any material assets, in each case, subject to certain conditions and exceptions. Dow Inc. may, at its option, cure the event of default by delivering an unconditional and irrevocable guarantee to the administrative agent within thirty days of the event or events giving rise to such event of default.

No such events have occurred or have been triggered at the time of the filing of this Annual Report on Form 10-K.

NOTE 15 – COMMITMENTS AND CONTINGENCIES

Environmental Matters

Introduction

Accruals for environmental matters are recorded when it is probable that a liability has been incurred and the amount of the liability can be reasonably estimated based on current law and existing technologies. At December 31, 2022, the Company had accrued obligations of $1,192 million for probable environmental remediation and restoration costs ($1,220 million at December 31, 2021), including $244 million for the remediation of Superfund sites ($237 million at December 31, 2021). This is management's best estimate of the costs for remediation and restoration with respect to environmental matters for which the Company has accrued liabilities, although it is reasonably possible that the ultimate cost with respect to these particular matters could range up to approximately two times that amount. Consequently, it is reasonably possible that environmental remediation and restoration costs in excess of amounts accrued could have a material impact on the Company's results of operations, financial condition and cash flows. It is the opinion of the Company's management, however, that the possibility is remote that costs in excess of the range disclosed will have a material impact on the Company's results of operations, financial condition or cash flows. Inherent uncertainties exist in these estimates primarily due to unknown conditions, changing governmental regulations and legal standards regarding liability, and emerging remediation technologies for handling site remediation and restoration. As new or additional information becomes available and/or certain spending trends become known, management will evaluate such information in determination of the current estimate of the environmental liability.

As part of the Company's 2020 Restructuring Program, in the third quarter of 2020, the Company recorded a pretax charge related to environmental remediation matters. This charge resulted from the Company's evaluation of the costs required to manage remediation activities at sites Dow will permanently shut down as part of its 2020 Restructuring Program. In addition, the Company recorded indemnification assets of $50 million related to Dow Silicones' environmental matters. The Company recognized a pretax charge, net of indemnifications, of $56 million, included in "Restructuring and asset related charges - net" in the consolidated statements of income and related to Performance Materials & Coatings ($52 million) and Corporate ($4 million). See Note 5 for additional information.

The following table summarizes the activity in the Company's accrued obligations for environmental matters for the years ended December 31, 2022 and 2021:

Accrued Obligations for Environmental Matters In millions	*2022*	*2021*
Balance at Jan 1	$ 1,220	$ 1,244
Accrual adjustment	184	159
Payments against reserve	(204)	(162)
Foreign currency impact	(8)	(21)
Balance at Dec 31	$ 1,192	$ 1,220

The amounts charged to income on a pretax basis related to environmental remediation totaled $ 176 million in 2022, $158 million in 2021 and $234 million in 2020. Capital expenditures for environmental protection were $ 137 million in 2022, $65 million in 2021 and $80 million in 2020.

Midland Off-Site Environmental Matters
On June 12, 2003, the Michigan Department of Environmental Quality ("MDEQ") issued a Hazardous Waste Operating License (the "License") to the Company's Midland, Michigan, manufacturing site (the "Midland Site"), which was renewed and replaced by the MDEQ on September 25, 2015, and included provisions requiring the Company to conduct an investigation to determine the nature and extent of off-site contamination in the City of Midland soils, the Tittabawassee River and Saginaw River sediment and floodplain soils, and the Saginaw Bay, and, if necessary, undertake remedial action. In 2016, final regulatory approval was received from the MDEQ for the City of Midland and the Company is continuing the long term monitoring requirements of the Remedial Action Plan.

Tittabawassee and Saginaw Rivers, Saginaw Bay
The Company, the U.S. Environmental Protection Agency ("EPA") and the State of Michigan ("State") entered into an administrative order on consent ("AOC"), effective January 21, 2010, that requires the Company to conduct a remedial investigation, a feasibility study and a remedial design for the Tittabawassee River, the Saginaw River and the Saginaw Bay, and pay the oversight costs of the EPA and the State under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act. These actions, to be conducted under the lead oversight of the EPA, will build upon the investigative work completed under the State Resource Conservation Recovery Act program from 2005 through 2009.

The Tittabawassee River, beginning at the Midland Site and extending down to the first six miles of the Saginaw River, are designated as the first Operable Unit for purposes of conducting the remedial investigation, feasibility study and remedial design work. This work will be performed in a largely upriver to downriver sequence for eight geographic segments of the Tittabawassee and upper Saginaw Rivers. In the first quarter of 2012, the EPA requested the Company address the Tittabawassee River floodplain ("Floodplain") as an additional segment. In January 2015, the Company and the EPA entered into an order to address remediation of the Floodplain. The remedial work is expected to continue as river levels allow. The remainder of the Saginaw River and the Saginaw Bay are designated as a second Operable Unit and the work associated with that unit may also be geographically segmented. The AOC does not obligate the Company to perform removal or remedial action; that action can only be required by a separate order. The Company and the EPA have been negotiating orders separate from the AOC that obligate the Company to perform remedial actions under the scope of work of the AOC. The Company and the EPA have entered into six separate orders to perform limited remedial actions in seven of the eight geographic segments in the first Operable Unit, including the Floodplain. Dow has received from the EPA a Notice of Completion of Work for three of these six orders and the Company continues the long-term monitoring requirements. Dow also has entered into a separate order to perform a limited remedial action for certain properties located within the second Operable Unit. In 2022, the Company implemented the limited remedial action in the second Operable Unit.

Alternative Dispute Resolution Process
The Company, the EPA, the U.S. Department of Justice and the natural resource damage trustees (which include the Michigan Office of the Attorney General, the Michigan Department of Environment, Great Lakes and Energy, the Michigan Department of Natural Resources, the U.S. Fish and Wildlife Service, the U.S. Bureau of Indian Affairs and the Saginaw-Chippewa Indian Tribe of Michigan) have been engaged in negotiations to seek to resolve potential governmental claims against the Company for natural resource damages related to

historical off-site contamination associated with the City of Midland, the Tittabawassee and Saginaw Rivers and the Saginaw Bay. The Company and the governmental parties started meeting in the fall of 2005 and entered into a Confidentiality Agreement in December 2005.

On July 20, 2020, the U.S. District Court for the Eastern District of Michigan ("District Court") entered a final consent decree in Civil Action No. 1:19-cv-13292 between the Company and federal, state and tribal trustees to resolve allegations of natural resource damages arising from the historic operations of the Company's Midland Site. The consent decree required the Company to pay a $15 million cash settlement to be used for long-term maintenance and trustee-selected remediation projects with an additional $7 million to specified local projects managed by third parties. These funds were paid in December 2020. The consent decree further requires the Company to complete 13 additional environmental restoration projects which are valued by the trustees at approximately $77 million, to be conducted over the next several years. In 2022, the first environmental restoration project was opened to the public. The Company continues to work with the trustees on the remaining projects.

At December 31, 2022, the accrual for these off-site matters was $ 92 million (included in the total accrued obligation of $ 1,192 million). At December 31, 2021, the Company had an accrual for these off-site matters of $104 million (included in the total accrued obligation of $ 1,220 million).

Environmental Matters Summary
It is the opinion of the Company's management that the possibility is remote that costs in excess of those disclosed will have a material impact on the Company's results of operations, financial condition or cash flows.

Litigation
Asbestos-Related Matters of Union Carbide Corporation
Introduction
Union Carbide is and has been involved in a large number of asbestos-related suits filed primarily in state courts during the past four decades. These suits principally allege personal injury resulting from exposure to asbestos-containing products and frequently seek both actual and punitive damages. The alleged claims primarily relate to products that Union Carbide sold in the past, alleged exposure to asbestos-containing products located on Union Carbide's premises and Union Carbide's responsibility for asbestos suits filed against a former Union Carbide subsidiary, Amchem Products, Inc. ("Amchem"). In many cases, plaintiffs are unable to demonstrate that they have suffered any compensable loss as a result of such exposure, or that injuries incurred in fact resulted from exposure to Union Carbide's products. Union Carbide expects more asbestos-related suits to be filed against Union Carbide and Amchem in the future, and will aggressively defend or reasonably resolve, as appropriate, both pending and future claims.

Estimating the Asbestos-Related Liability
Union Carbide has engaged Ankura Consulting Group, LLC ("Ankura") to perform periodic studies to estimate the undiscounted cost of disposing of pending and future claims against Union Carbide and Amchem through the terminal year of 2049, including a reasonable forecast of future defense and processing costs. Each October, Union Carbide requests Ankura to review its historical asbestos claim and resolution activity through the third quarter of the current year, including asbestos-related defense and processing costs, to determine the appropriateness of updating the most recent study. At each balance sheet date, Union Carbide also compares current asbestos claim and resolution activity, including asbestos-related defense and processing costs, to the results of the most recent Ankura study to determine whether the accrual continues to be appropriate.

In December 2020, Ankura completed a study of Union Carbide's historical asbestos claim and resolution activity through September 30, 2020, including asbestos-related defense and processing costs, and provided estimates for the undiscounted cost of disposing of pending and future claims against Union Carbide and Amchem through the terminal year of 2049. Based on the study and Union Carbide's internal review process, it was determined that no adjustment to the accrual was required.

In December 2021, Ankura stated that an update of its December 2020 study would not provide a more likely estimate of future events than the estimate reflected in the study and, therefore, the estimate in the study remained applicable. Based on Union Carbide's internal review process and Ankura's response, Union Carbide determined that no change to the accrual was required. At December 31, 2021, the asbestos-related liability for pending and future claims against Union Carbide and Amchem, including future asbestos-related defense and processing costs, was $1,016 million, and approximately 25 percent of the recorded liability related to pending claims and approximately 75 percent related to future claims.

In December 2022, Ankura completed a study of Union Carbide's historical asbestos claim and resolution activity through September 30, 2022, including asbestos-related defense and processing costs, and provided estimates for the undiscounted cost of disposing of pending and future claims against Union Carbide and Amchem through the terminal year of 2049. Based on the study and Union Carbide's internal review process, it was determined that no adjustment to the accrual was required. At December 31, 2022, the asbestos-related liability for pending and future claims against Union Carbide and Amchem, including future asbestos-related defense and processing costs, was $947 million, and approximately 23 percent of the recorded liability related to pending claims and approximately 77 percent related to future claims.

Summary
The Company's management believes the amounts recorded by Union Carbide for the asbestos-related liability, including defense and processing costs, reflect reasonable and probable estimates of the liability based upon current, known facts. However, future events, such as the number of new claims to be filed and/or received each year, the average cost of defending and disposing of each such claim, as well as the numerous uncertainties surrounding asbestos litigation in the United States over a significant period of time, could cause the actual costs for Union Carbide to be higher or lower than those projected or those recorded. Any such events could result in an increase or decrease in the recorded liability.

Because of the uncertainties described above, Union Carbide cannot estimate the full range of the cost of resolving pending and future asbestos-related claims facing Union Carbide and Amchem. As a result, it is reasonably possible that an additional cost of disposing of Union Carbide's asbestos-related claims, including future defense and processing costs, could have a material impact on the Company's results of operations and cash flows for a particular period and on the consolidated financial position.

Dow Silicones Chapter 11 Related Matters
In 1995, Dow Silicones, then a 50:50 joint venture between the Company and Corning Incorporated ("Corning"), voluntarily filed for protection under Chapter 11 of the U.S. Bankruptcy Code in order to resolve Dow Silicones' breast implant liabilities and related matters (the "Chapter 11 Proceeding"). Dow Silicones emerged from the Chapter 11 Proceeding on June 1, 2004 (the "Effective Date") and is implementing the Joint Plan of Reorganization (the "Plan"). The Plan provides funding for the resolution of breast implant and other product liability litigation covered by the Chapter 11 Proceeding. As of June 1, 2016, Dow Silicones is a wholly owned subsidiary of the Company. Under the Plan, a product liability settlement program administered by an independent claims office and funded by Dow Silicones (the "Settlement Facility") was created to resolve breast implant and other product liability claims. Product liability claimants rejecting the settlement program in favor of pursuing litigation must bring suit against a litigation facility (the "Litigation Facility") that is also funded by Dow Silicones. At December 31, 2022, Dow Silicones and its insurers have made life-to-date payments of $1,846 million to the Settlement Facility and Litigation Facility and Dow Silicones is currently making additional payments to fund the Settlement Facility.

In accordance with ASC Topic 450 "Accounting for Contingencies," the Company records a liability for breast implant and other product liability claims ("Implant Liability"), which reflects the estimated impact of the settlement of pending claims. The claim filing deadline passed in June 2019. All claims have been received and are being processed. In the fourth quarter of 2022, with the assistance of a third party consultant, Dow Silicones updated its Implant Liability estimate to reflect the reduced uncertainty of the Company's liability for unpaid claims, the decrease in claims filing activity and the passage of time. Accordingly, Dow Silicones decreased its Implant Liability by $60 million, which was included in "Sundry income (expense) - net" in the consolidated statements of income and related to Corporate. Based on the new estimate related to claims filed at and before the claim filing deadline, Dow Silicones estimates that it will be obligated to contribute an additional $16 million to the Settlement Facility at December 31, 2022 ($ 130 million at December 31, 2021) which was included in "Accrued and other current liabilities" and "Other noncurrent obligations" in the consolidated balance sheets.

Dow Silicones believes the recorded liability reflects the best estimate of the remaining funding obligations under the Plan and is not aware of circumstances based on current, known facts that would significantly change the Implant Liability estimate.

Other Litigation Matters
In addition to the specific matters described above, the Company is party to a number of other claims and lawsuits arising out of the normal course of business with respect to product liability, patent infringement, employment matters, governmental tax and regulation disputes, contract and commercial litigation, and other actions. Certain of these actions purport to be class actions and seek damages in very large amounts. All such claims are being contested. The Company has an active risk management program consisting of numerous insurance policies secured from many carriers at various times. These policies may provide coverage that could be utilized to minimize the financial impact, if any, of certain contingencies described above. It is the opinion of the Company's management that the possibility is remote that the aggregate of all such other claims and lawsuits will have a material adverse impact on the results of operations, financial condition and cash flows of the Company.

Indemnifications with Corning
In connection with the June 1, 2016 ownership restructure of Dow Silicones, the Company is indemnified by Corning for at least 50 percent of future losses associated with certain pre-closing liabilities, including the Implant Liability and certain environmental matters described in the preceding sections, subject to certain conditions and limits. The maximum amount of indemnified losses which may be recovered are subject to a cap that declines over time. Indemnified losses are capped at $1 billion between May 31, 2018 and May 31, 2023, and no recoveries are permitted on claims initially submitted after May 31, 2023. The Company had indemnification assets of $98 million at December 31, 2022 ($95 million at December 31, 2021), which was included in "Other current assets" and "Noncurrent receivables" in the consolidated balance sheets.

Gain Contingency - Dow v. Nova Chemicals Corporation Patent Infringement Matter
In December 2010, Dow filed suit in the Federal Court in Ontario, Canada ("Federal Court") alleging that Nova Chemicals Corporation ("Nova") was infringing the Company's Canadian polyethylene patent 2,106,705 (the "'705 Patent"). Nova counterclaimed on the grounds of invalidity and non-infringement. In accordance with Canadian practice, the suit was bifurcated into a merits phase, followed by a damages phase. Following trial in the merits phase, in May 2014 the Federal Court ruled that the Company's '705 Patent was valid and infringed by Nova. Nova appealed to the Canadian Federal Court of Appeal, which affirmed the Federal Court decision in August 2016. Nova then sought leave to appeal its loss to the Supreme Court of Canada ("Canadian Supreme Court"), which dismissed Nova's petition in April 2017. As a result, Nova exhausted all appeal rights on the merits, and it was undisputed that Nova owed the Company the profits it earned from its infringing sales as determined in the trial for the damages phase.

In April 2017, the Federal Court issued a Public Judgment in the damages phase, which detailed its conclusions on how to calculate the profits to be awarded to the Company. In June 2017, the Federal Court ordered Nova to pay $645 million Canadian dollars (equivalent to $495 million U.S. dollars) to the Company, plus pre- and post-judgment interest, for which the Company received payment of $501 million from Nova in July 2017. Although Nova was appealing portions of the damages judgment, certain portions of it were indisputable and could be retained by the Company regardless of the outcome of any further appeals by Nova. As a result of these actions and in accordance with ASC Topic 450-30 "Gain Contingencies," the Company recorded a $160 million pretax gain in the second quarter of 2017.

On September 15, 2020, the Canadian Federal Court of Appeal dismissed Nova's appeal of the damages judgment, thus affirming the trial court's decision in its entirety. In November 2020, Nova filed an application for leave to appeal this decision to the Canadian Supreme Court. In November 2022, the Canadian Supreme Court dismissed Nova's appeal, thereby exhausting all of Nova's appeal rights for the damages judgment. As a result, the Company recorded a pretax gain of $341 million in the fourth quarter of 2022 for the previously disputed portion of the damages judgment, of which $321 million was included in "Sundry income (expense) - net," related to Packaging & Specialty Plastics, and $20 million was included in "Selling, general and administrative expenses" in the consolidated statements of income. At December 31, 2021, the Company had $341 million included in "Accrued and other current liabilities" related to the previously disputed portion of the damages judgment (zero at December 31, 2022).

Gain Contingency - Dow v. Nova Chemicals Corporation Ethylene Asset Matter

On September 18, 2019, the Court of the Queen's Bench in Alberta, Canada, signed a judgment ordering Nova to pay the Company $ 1.43 billion Canadian dollars (equivalent to approximately $1.08 billion U.S. dollars) by October 11, 2019, for damages the Company incurred through 2012 related to the companies' jointly-owned ethylene asset in Joffre, Alberta, Canada. The Court of the Queen's Bench in Alberta, Canada, which initially ruled in June 2018, found that Nova failed to operate the ethylene asset at full capacity for more than ten years, and furthermore, that Nova violated several contractual agreements related to the Company receiving its share of the asset's ethylene production. These actions deprived the Company of millions of pounds of ethylene. Nova appealed the judgment, however, certain portions of it are no longer in dispute and can be retained by the Company regardless of the outcome of any further appeals by Nova. As a result and in accordance with ASC Topic 450-30 "Gain Contingencies," the Company recorded a $186 million pretax gain in the third quarter of 2019. In October 2019, Nova paid $ 1.08 billion Canadian dollars (equivalent to approximately $ 0.8 billion U.S. dollars) directly to the Company, and remitted $347 million Canadian dollars to the Canada Revenue Agency ("CRA") for the tax account of one of the Company's subsidiaries. The Company sought a refund of the entire amount remitted to CRA. On March 31, 2020, the Company received the full refund from CRA, equivalent to $259 million U.S. dollars.

In preparation for the June 2020 appellate hearing on the case, Nova provided the Court of the Queen's Bench in Alberta, Canada, an updated schedule of the financial impact of the issues on appeal, which explained that even if Nova prevails on all appeal issues, the Company would still be entitled to retain an amount in excess of the gain recognized in 2019. As a result, the Company recorded an $18 million pretax gain in the second quarter of 2020, of which $12 million was included in "Selling, general and administrative expenses" and $ 6 million was included in "Sundry income (expense) - net" in the consolidated statements of income and related to Packaging & Specialty Plastics. On September 16, 2020, the Court of Appeal of Alberta issued its decision, affirming the trial court's liability finding, upholding the majority of Dow's damages and requiring the trial court to recalculate a portion of damages. In the fourth quarter of 2020, Nova chose not to petition the Canadian Supreme Court to review the appellate court decision, making additional portions of the ruling in Dow's favor final and no longer subject to dispute. As a result, the Company recorded a $552 million pretax gain in the fourth quarter of 2020, of which $538 million was included in "Sundry income (expense) - net" and $ 14 million was included in "Selling, general and administrative expenses" in the consolidated statements of income and related to Packaging & Specialty Plastics. At December 31, 2022, $323 million ($323 million at December 31, 2021) was included in "Other noncurrent obligations" in the Company's consolidated balance sheets related to the disputed portion of the damages judgment. Dow continues to seek an award of additional damages for the period from 2013 through 2018 to account for the ethylene shortfall during those years. The damages hearing began in the trial court in November 2021 that would resolve the impact of the appellate ruling and quantify Dow's damages for the 2013-2018 period. Dow has also filed a new lawsuit in the same Alberta, Canada court to account for damages due to lost ethylene after June 2018.

Luxi Chemical Group Breach of Contract Matter

In November 2017, an arbitration panel of the Stockholm Chamber of Commerce held that Luxi Chemical Group Co., Ltd. ("Luxi"), based in Shandong Province, China, violated a secrecy and non-use agreement related to the Dow and Johnson Matthey Davy Technologies Limited ("JM") LP OXO ^{SM} Process by using Dow and JM protected information in the design, construction, and operation of its butanol and 2-ethylhexanol plants, awarding damages, fees and costs, plus interest, to both Dow and JM. In September 2021, Luxi paid the arbitration award and interest assessment and, as a result, Dow recorded a pretax gain of $54 million included in "Sundry income (expense) – net" in the consolidated statements of income and related to Industrial Intermediates & Infrastructure.

Brazilian Tax Credits

In March 2017, the Federal Supreme Court of Brazil ("Brazil Supreme Court") ruled in a leading case that a Brazilian value-added tax ("ICMS") should not be included in the base used to calculate a taxpayer's federal contribution on total revenue known as PIS/COFINS (the "2017 Decision"). Previously, three of the Company's Brazilian subsidiaries filed lawsuits challenging the inclusion of ICMS in their calculation of PIS/COFINS, seeking recovery of excess taxes paid. In response to the 2017 Decision, the Brazilian tax authority filed an appeal seeking clarification of the amount of ICMS tax to exclude from the calculation of PIS/COFINS. In May 2021, the Brazil Supreme Court ruled in a leading case related to the amount of ICMS tax to exclude from the calculation of PIS/COFINS, which resolved two of the lawsuits filed by the Company and, in May 2022, a court decision related to the remaining lawsuit, ruling in favor of the Company's Brazilian subsidiary, became final and unappealable. As a result, the Company recorded pretax gains of $112 million in 2022 and $67 million in 2021 for certain excess PIS/COFINS paid from 2009 to 2019, plus applicable interest, which the Company expects to apply to future required federal tax payments, and the reversal of related liabilities. The pretax gains were recorded in "Cost of sales" in the consolidated statements of income. At December 31, 2022, related tax credits available and expected to be applied to future required federal tax payments totaled $126 million ($52 million at December 31, 2021).

Purchase Commitments
The Company has outstanding purchase commitments and various commitments for take-or-pay or throughput agreements. The Company was not aware of any purchase commitments that were negotiated as part of a financing arrangement for the facilities that will provide the contracted goods or services or for the costs related to those goods or services at December 31, 2022 and 2021.

Guarantees
The following table provides a summary of the final expiration, maximum future payments and recorded liability reflected in the consolidated balance sheets for guarantees:

Guarantees	*Dec 31, 2022*			*Dec 31, 2021*		
In millions	*Final Expiration*	*Maximum Future Payments* [1]	*Recorded Liability*	*Final Expiration*	*Maximum Future Payments*	*Recorded Liability*
Guarantees	2038	$ 1,236	$ 200	2038	$ 1,273	$ 220

1. In addition, TDCC has provided guarantees, in proportion to the Company's 35 percent ownership interest, of all future interest payments that will become due on Sadara's project financing debt during the grace period, which Dow's share is estimated to be $393 million at December 31, 2022 ($446 million at December 31, 2021). Based on Sadara's current forecasted cash flows, the Company does not expect to be required to perform under the guarantees.

Guarantees arise during the ordinary course of business from relationships with customers, committed accounts receivable facilities and nonconsolidated affiliates when the Company undertakes an obligation to guarantee the performance of others (via delivery of cash or other assets) if specified triggering events occur. With guarantees, such as commercial or financial contracts, non-performance by the guaranteed party triggers the obligation of the Company to make payments to the beneficiary of the guarantee. The majority of the Company's guarantees relate to debt of nonconsolidated affiliates, which have expiration dates ranging from less than one year to 16 years. The Company's current expectation is that future payment or performance related to the non-performance of others is considered remote.

TDCC has entered into guarantee agreements related to Sadara, a nonconsolidated affiliate. Sadara reached an agreement with its lenders to re-profile its outstanding project financing debt in the first quarter of 2021. In conjunction with the debt re-profiling, TDCC entered into a guarantee of up to approximately $1.3 billion of Sadara's debt, proportionate to the Company's 35 percent ownership interest. The debt re-profiling includes a grace period until June 2026, during which Sadara is obligated to make interest-only payments which are guaranteed by TDCC in proportion to the Company's 35 percent ownership interest. As part of the debt re-profiling, Sadara established a $500 million revolving credit facility guaranteed by Dow, which would be used to fund Dow's pro-rata share of any potential shortfall during the grace period. Based on Sadara's forecasted cash flows and no significant scheduled debt repayments until 2026, the Company does not expect Sadara to draw on the facility. See Note 11 for additional information.

Asset Retirement Obligations
The Company has 104 manufacturing sites in 31 countries. Most of these sites contain numerous individual manufacturing operations, particularly at the Company's larger sites. Asset retirement obligations are recorded as incurred and reasonably estimable, including obligations for which the timing and/or method of settlement are conditional on a future event that may or may not be within the control of the Company. The retirement of assets may involve such efforts as remediation and treatment of asbestos, contractually required demolition, and other related activities, depending on the nature and location of the assets; and retirement obligations are typically realized only upon demolition of those facilities. In identifying asset retirement obligations, the Company considers identification of legally enforceable obligations, changes in existing law, estimates of potential settlement dates and the calculation of an appropriate discount rate to be used in calculating the fair value of the obligations. The Company has a well-established global process to identify, approve and track the demolition of retired or to-be-retired facilities; and no assets are retired from service until this process has been followed. The Company typically forecasts demolition projects based on the usefulness of the assets; environmental, health and safety concerns; and other similar considerations. Under this process, as demolition projects are identified and approved, reasonable estimates are determined for the time frames during which any related asset retirement obligations are expected to be settled. For those assets where a range of potential settlement dates may be reasonably estimated, obligations

are recorded. The Company routinely reviews all changes to items under consideration for demolition to determine if an adjustment to the value of the asset retirement obligation is required.

The Company has recognized asset retirement obligations for the following activities: demolition and remediation activities at manufacturing sites primarily in Europe, the United States, Canada, Japan, the United Arab Emirates and Brazil; and capping activities at landfill sites in the United States, Brazil and Canada. The Company has also recognized conditional asset retirement obligations related to asbestos encapsulation as a result of planned demolition and remediation activities at manufacturing and administrative sites primarily in the United States, Europe, Japan and Argentina. The aggregate carrying amount of conditional asset retirement obligations recognized by the Company (included in the asset retirement obligations balance shown below) was $11 million at December 31, 2022 ($ 13 million at December 31, 2021).

The following table shows changes in the aggregate carrying amount of the Company's asset retirement obligations for the years ended December 31, 2022 and 2021:

Asset Retirement Obligations In millions	*2022*	*2021*
Balance at Jan 1	$ 118	$ 112
Additional accruals	14	13
Liabilities settled	(8)	(7)
Accretion expense	2	1
Revisions in estimated cash flows	(9)	(1)
Other	2	—
Balance at Dec 31	$ 119	$ 118

The discount rate used to calculate the Company's asset retirement obligations at December 31, 2022, was 5.53 percent (1.13 percent at December 31, 2021). These obligations are included in the consolidated balance sheets as "Accrued and other current liabilities" and "Other noncurrent obligations."

The Company has not recognized conditional asset retirement obligations for which a fair value cannot be reasonably estimated in its consolidated financial statements. Assets that have not been submitted/reviewed for potential demolition activities are considered to have continued usefulness and are generally still operating normally. Therefore, without a plan to demolish the assets or the expectation of a plan, such as shortening the useful life of assets for depreciation purposes in accordance with the accounting guidance related to property, plant and equipment, the Company is unable to reasonably forecast a time frame to use for present value calculations. As such, the Company has not recognized obligations for individual plants/buildings at its manufacturing sites where estimates of potential settlement dates cannot be reasonably made. In addition, the Company has not recognized conditional asset retirement obligations for the capping of its approximately 35 underground storage wells and 129 underground brine mining and other wells at Company-owned sites when there are no plans or expectations of plans to exit the sites. It is the opinion of the Company's management that the possibility is remote that such conditional asset retirement obligations, when estimable, will have a material impact on the Company's consolidated financial statements based on current costs.

NOTE 16 - LEASES

Operating lease ROU assets are included in "Operating lease right-of-use assets" while finance lease ROU assets are included in "Net property" in the consolidated balance sheets. With respect to lease liabilities, operating lease liabilities are included in "Operating lease liabilities - current" and "Operating lease liabilities - noncurrent," and finance lease liabilities are included in "Long-term debt due within one year" and "Long-Term Debt" in the consolidated balance sheets.

Dow routinely leases sales and administrative offices, power plants, production facilities, warehouses and tanks for product storage, aircraft, motor vehicles, railcars, computers, office machines and equipment. Some leases contain renewal provisions, purchase options and escalation clauses and the terms for these leased assets vary depending on the lease agreement. These leased assets have remaining lease terms of up to 53 years. See Note 1 for additional information on leases.

The components of lease cost for operating and finance leases for the years ended December 31, 2022, 2021 and 2020 were as follows:

Lease Cost In millions	*2022*	*2021*	*2020*
Operating lease cost	$ 397	$ 494	$ 484
Finance lease cost			
Amortization of right-of-use assets - finance	105	76	58
Interest on lease liabilities - finance	32	27	25
Total finance lease cost	137	103	83
Short-term lease cost	255	238	213
Variable lease cost	611	381	199
Sublease income	(10)	(6)	(5)
Total lease cost	$ 1,390	$ 1,210	$ 974

The following table provides supplemental cash flow and other information related to leases:

Other Lease Information In millions	*2022*	*2021*	*2020*
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash flows for operating leases	$ 393	$ 497	$ 482
Operating cash flows for finance leases	$ 32	$ 27	$ 25
Financing cash flows for finance leases	$ 114	$ 74	$ 58
Right-of-use assets obtained in exchange for lease obligations:			
Operating leases [1]	$ 151	$ (25)	$ 185
Finance leases [1]	$ 62	$ 512	$ 178

1. In 2021, $193 million of leased assets were reclassified from Operating leases to Finance leases due to an amendment that extended the term of the agreement.

The following table summarizes the lease-related assets and liabilities recorded in the consolidated balance sheets at December 31, 2022 and 2021.

Lease Position In millions	*Balance Sheet Classification*	*Dec 31, 2022*	*Dec 31, 2021*
Assets			
Operating lease assets	Operating lease right-of-use assets	$ 1,227	$ 1,412
Finance lease assets	Property	1,167	1,158
Finance lease amortization	Accumulated depreciation	(441)	(368)
Total lease assets		$ 1,953	$ 2,202
Liabilities			
Current			
Operating	Operating lease liabilities - current	$ 287	$ 314
Finance	Long-term debt due within one year	109	106
Noncurrent			
Operating	Operating lease liabilities - noncurrent	997	1,149
Finance	Long-Term Debt	681	763
Total lease liabilities		$ 2,074	$ 2,332

In 2021, the Company executed buy-outs of certain leased assets for $ 687 million. The lease buyouts reduced “Operating lease right-of-use assets” by $166 million and reduced “Operating lease liabilities - current” and “Operating lease liabilities - noncurrent” by $ 44 million and $158 million, respectively. The Company recognized a pretax loss related to the lease buy-outs of $37 million included in “Sundry income (expense) - net” in the consolidated statements of income. The lease buy-outs are included in “Purchases of previously leased assets” in the consolidated statements of cash flows.

Additionally, in 2021, the Company amended an agreement to extend leases of certain assets. The amendment and related remeasurement resulted in a reclassification of $73 million from “Operating lease liabilities – noncurrent” to “Long-Term Debt” and $ 34 million from “Operating lease liabilities - current” to “Long-term debt due within one year." In addition to the reclassifications, the amendment increased “Long-Term Debt” by $ 152 million and decreased “Long-term debt due within one year" by $2 million.

The weighted-average remaining lease term and discount rate for leases recorded in the consolidated balance sheets at December 31, 2022 and 2021 are provided below:

Lease Term and Discount Rate	*Dec 31, 2022*	*Dec 31, 2021*
Weighted-average remaining lease term		
Operating leases	7.6 years	7.9 years
Finance leases	11.0 years	11.8 years
Weighted-average discount rate		
Operating leases	4.49 %	3.72 %
Finance leases	4.29 %	4.17 %

The following table provides the maturities of lease liabilities at December 31, 2022:

Maturities of Lease Liabilities In millions	*Operating Leases*	*Finance Leases*
2023	$ 333	$ 138
2024	253	153
2025	199	78
2026	160	70
2027	129	64
2028 and thereafter	470	487
Total future undiscounted lease payments	$ 1,544	$ 990
Less: Imputed interest	260	200
Total present value of lease liabilities	$ 1,284	$ 790

At December 31, 2022, Dow had additional leases of approximately $ 142 million, primarily for equipment, which had not yet commenced. These leases are expected to commence in 2023 and 2025, with lease terms of up to 16 years.

Dow provides guarantees related to certain leased assets, specifying the residual value that will be available to the lessor at lease termination through the sale of the assets to the lessee or third parties. The following table provides a summary of the final expiration, maximum future payments and recorded liability reflected in the consolidated balance sheets for residual value guarantees at December 31, 2022 and 2021. The lease agreements do not contain any material restrictive covenants.

Lease Guarantees	*Dec 31, 2022*			*Dec 31, 2021*		
In millions	*Final Expiration*	*Maximum Future Payments*	*Recorded Liability*	*Final Expiration*	*Maximum Future Payments*	*Recorded Liability*
Residual value guarantees	2031	$ 258	$ —	2031	$ 280	$ —

NOTE 17 – STOCKHOLDERS' EQUITY

Common Stock

On April 1, 2019, Dow Inc. became an independent, publicly traded company. The principal market for Dow Inc.'s common stock is the New York Stock Exchange, traded under the symbol "DOW." Dow Inc. is the direct parent company of The Dow Chemical Company and its consolidated subsidiaries, ("TDCC" and together with Dow Inc., "Dow" or the "Company"), owning all of the outstanding common shares of TDCC.

The Company may issue shares of Dow Inc. common stock out of treasury stock or as new shares of common stock for options exercised and for the release of restricted stock units ("RSUs"), performance stock units ("PSUs"), the Employee Stock Purchase Plan ("ESPP") and the Employees' Savings Plan (the "Savings Plan"). Common stock shares issued to employees and non-employee directors was approximately 7.5 million in 2022 (8.2 million in 2021 and 4.8 million in 2020). See Note 20 for additional information on the Company's equity awards.

Retained Earnings

Dow Inc.

There are no significant restrictions limiting Dow Inc.'s ability to pay dividends. Dow Inc. declared dividends of $ 2.80 per share in 2022, 2021 and 2020.

Undistributed earnings of nonconsolidated affiliates included in retained earnings were $ 669 million at December 31, 2022 and $ 1,155 million at December 31, 2021.

TDCC

TDCC's Board determines whether or not there will be a dividend distribution to Dow Inc. TDCC declared and paid dividends to Dow Inc. of $ 4,375 million in 2022, $3,264 million in 2021 and $2,233 million in 2020.

Employee Stock Ownership Plan

The Dow Employee Stock Ownership Plan (the "ESOP") allocated the remaining shares in 2022 and no shares remain unallocated at December 31, 2022. Unallocated shares at December 31, 2021 and 2020 were excluded from the Company's earnings per share calculation.

Compensation expense for allocated shares is recorded at the fair value of the shares on the date of allocation. Compensation expense reflected in income before income taxes for ESOP shares allocated was $31 million in 2022, $77 million in 2021 and $72 million in 2020. At December 31, 2022, all remaining unallocated ESOP shares were allocated to plan participants.

Treasury Stock

On April 1, 2019, the Dow Inc. Board ratified the share repurchase program originally approved on March 15, 2019, authorizing up to $ 3.0 billion for the repurchase of the Company's common stock, with no expiration date. The Company completed the April 1, 2019 share repurchase program in the second quarter of 2022. On April 13, 2022, the Dow Inc. Board approved a new share repurchase program authorizing up to $3.0 billion for the repurchase of the Company's common stock, with no expiration date. In 2022, the Company repurchased $2,325 million of its common stock ($1,000 million in 2021 and $125 million in 2020). At December 31, 2022, $2.0 billion of the share repurchase program authorization remained available for repurchases.

The Company began issuing treasury shares to satisfy its obligations to make matching contributions to plan participants under The Dow Employees' Savings Plan in the first quarter of 2022. The Company issued 1.5 million treasury shares under its compensation and benefit plans in 2022.

Compensation expense for issued shares is recorded at the fair value of the shares on the date of issuance. Compensation expense reflected in income before income taxes for treasury shares issued was $94 million in 2022.

The following table provides a reconciliation of Dow Inc. common stock activity for the years ended December 31, 2022, 2021 and 2020:

Shares of Dow Inc. Common Stock	*Issued*	*Held in Treasury*
Balance at Jan 1, 2020	751,228,644	9,729,834
Issued [1]	4,764,554	—
Repurchased	—	3,073,469
Balance at Jan 1, 2021	755,993,198	12,803,303
Issued [1]	8,233,684	—
Repurchased	—	16,208,270
Balance at Jan 1, 2022	764,226,882	29,011,573
Issued [1]	7,451,643	(1,499,610)
Repurchased	—	39,286,642
Balance at Dec 31, 2022	771,678,525	66,798,605

1. Shares issued to employees and non-employee directors under the Company's equity compensation plans.

Accumulated Other Comprehensive Loss

The changes in each component of AOCL for the years ended December 31, 2022, 2021 and 2020 were as follows:

Accumulated Other Comprehensive Loss In millions	*2022*	*2021*	*2020*
Unrealized Gains (Losses) on Investments			
Beginning balance	$ 59	$ 104	$ 64
Unrealized gains (losses) on investments	(326)	(21)	104
Tax (expense) benefit	13	5	(23)
Net unrealized gains (losses) on investments	(313)	(16)	81
(Gains) losses reclassified from AOCL to net income [1]	2	(38)	(54)
Tax expense (benefit) [2]	(1)	9	13
Net (gains) losses reclassified from AOCL to net income	1	(29)	(41)
Other comprehensive income (loss), net of tax	(312)	(45)	40
Ending balance	$ (253)	$ 59	$ 104
Cumulative Translation Adjustment			
Beginning balance	$ (1,355)	$ (930)	$ (1,135)
Gains (losses) on foreign currency translation	(557)	(375)	227
Tax (expense) benefit	24	(40)	25
Net gains (losses) on foreign currency translation	(533)	(415)	252
(Gains) losses reclassified from AOCL to net income [3]	(46)	(10)	(47)
Other comprehensive income (loss), net of tax	(579)	(425)	205
Ending balance	$ (1,934)	$ (1,355)	$ (930)
Pension and Other Postretirement Benefits			
Beginning balance	$ (7,334)	$ (9,559)	$ (8,781)
Gains (losses) arising during the period	2,611	2,094	(1,769)
Tax (expense) benefit	(630)	(464)	411
Net gains (losses) arising during the period	1,981	1,630	(1,358)
Amortization of net loss and prior service credits reclassified from AOCL to net income [4]	622	776	753
Tax expense (benefit) [2]	(146)	(181)	(173)
Net loss and prior service credits reclassified from AOCL to net income	476	595	580
Other comprehensive income (loss), net of tax	2,457	2,225	(778)
Ending balance	$ (4,877)	$ (7,334)	$ (9,559)
Derivative Instruments			
Beginning balance	$ (347)	$ (470)	$ (394)
Gains (losses) on derivative instruments	638	155	(96)
Tax (expense) benefit	(87)	3	(1)
Net gains (losses) on derivative instruments	551	158	(97)
(Gains) losses reclassified from AOCL to net income [5]	(313)	(38)	30
Tax expense (benefit) [2]	34	3	(9)
Net (gains) losses reclassified from AOCL to net income	(279)	(35)	21
Other comprehensive income (loss), net of tax	272	123	(76)
Ending balance	$ (75)	$ (347)	$ (470)
Total AOCL ending balance	$ (7,139)	$ (8,977)	$ (10,855)

1. Reclassified to "Net sales" and "Sundry income (expense) - net."
2. Reclassified to "Provision for income taxes."
3. Reclassified to "Sundry income (expense) - net."
4. These AOCL components are included in the computation of net periodic benefit cost of the Company's defined benefit pension and other postretirement benefit plans. See Note 19 for additional information.
5. Reclassified to "Cost of sales," "Sundry income (expense) - net" and "Interest expense and amortization of debt discount."

NOTE 18 – NONCONTROLLING INTERESTS

Ownership interests in the Company's subsidiaries held by parties other than the Company are presented separately from the Company's equity in the consolidated balance sheets as "Noncontrolling interests." The amount of consolidated net income attributable to the Company and the noncontrolling interests are both presented on the face of the consolidated statements of income.

The following table summarizes the activity for equity attributable to noncontrolling interests for the years ended December 31, 2022, 2021 and 2020:

Noncontrolling Interests In millions	*2022*	*2021*	*2020*
Balance at Jan 1	$ 574	$ 570	$ 553
Net income attributable to noncontrolling interests [1]	58	94	69
Distributions to noncontrolling interests [2]	(76)	(66)	(55)
Deconsolidation of noncontrolling interests [3]	—	—	(7)
Cumulative translation adjustments	(28)	(25)	9
Other	1	1	1
Balance at Dec 31	$ 529	$ 574	$ 570

1. 2022 includes the portion of asset related charges attributable to noncontrolling interests related to a joint venture in Russia. See Note 4 for additional information.
2. Distributions to noncontrolling interests are net of $7 million in 2022, 2021 and 2020 in dividends paid to a joint venture, which were reclassified to "Equity in earnings (losses) of nonconsolidated affiliates" in the consolidated statements of income.
3. Related to the divestiture of the Company's interest in a cogeneration facility in Brazil in the third quarter of 2020.

NOTE 19 – PENSION PLANS AND OTHER POSTRETIREMENT BENEFITS

Defined Benefit Pension Plans

The Company has both funded and unfunded defined benefit pension plans that cover employees in the United States and a number of other countries. The U.S. tax-qualified plan covering the parent company is the largest plan. Benefits for employees hired before January 1, 2008, are based on length of service and the employee’s three highest consecutive years of compensation. Employees hired after January 1, 2008, earn benefits that are based on a set percentage of annual pay, plus interest.

On March 4, 2021, the Company announced changes to its U.S. tax-qualified and non-qualified pension plans. Effective December 31, 2023 ("Effective Date"), the Company will freeze the pensionable compensation and credited service amounts used to calculate pension benefits for employees who participate in its U.S. tax-qualified and non-qualified retirement programs (collectively, the "U.S. Plans"). As a result, at the Effective Date and subject to any bargaining obligations required by law, active participants of the U.S. Plans will not accrue additional benefits for future service and compensation. In connection with these plan amendments, the Company remeasured its U.S. Plans effective February 28, 2021, which resulted in a pretax actuarial gain of $1,268 million, included in other comprehensive income and inclusive of a $ 345 million reduction in the projected benefit obligation resulting from the plan amendments, and a pretax curtailment gain of $19 million, recognized in the first quarter of 2021.

The Company's funding policy is to contribute to the plans when pension laws and/or economics either require or encourage funding. Total global pension contributions were $235 million in 2022, which includes contributions necessary to fund benefit payments for the Company's unfunded pension plans. The Company expects to contribute approximately $150 million to its pension plans in 2023.

The weighted-average assumptions used to determine pension plan obligations and net periodic benefit costs for all plans are summarized in the table below:

Weighted-Average Assumptions for All Pension Plans	*Benefit Obligations at Dec 31*		*Net Periodic Benefit Costs for the Year Ended*		
	2022	*2021*	*2022*	*2021*	*2020*
Discount rate	5.18 %	2.57 %	2.57 %	2.40 %	2.81 %
Interest crediting rate for applicable benefits	4.19 %	3.57 %	3.57 %	3.55 %	3.51 %
Rate of compensation increase	4.05 %	3.94 %	3.94 %	3.91 %	3.92 %
Expected return on plan assets			6.68 %	6.86 %	7.00 %

The weighted-average assumptions used to determine pension plan obligations and net periodic benefit costs for U.S. plans are summarized in the table below:

Weighted-Average Assumptions for U.S. Pension Plans	*Benefit Obligations at Dec 31*		*Net Periodic Benefit Costs for the Year Ended*		
	2022	*2021*	*2022*	*2021*	*2020*
Discount rate	5.64 %	3.04 %	3.04 %	3.03 %	3.41 %
Interest crediting rate for applicable benefits	4.50 %	4.50 %	4.50 %	4.50 %	4.50 %
Rate of compensation increase	4.25 %	4.25 %	4.25 %	4.25 %	4.25 %
Expected return on plan assets			7.95 %	7.96 %	7.95 %

Other Postretirement Benefit Plans
The Company provides certain health care and life insurance benefits to retired employees and survivors. The Company's plans outside of the United States are not significant; therefore, this discussion relates to the U.S. plans only. The plans provide health care benefits, including hospital, physicians' services, drug and major medical expense coverage, and life insurance benefits. In general, for employees hired before January 1, 1993, the plans provide benefits supplemental to Medicare when retirees are eligible for these benefits. The Company and the retiree share the cost of these benefits, with the Company portion increasing as the retiree has increased years of credited service, although there is a cap on the Company portion. The Company has the ability to change these benefits at any time. Employees hired after January 1, 2008, are not covered under the plans.

The Company funds most of the cost of these health care and life insurance benefits as incurred. In 2022, the Company did not make any contributions to its other postretirement benefit plan trusts. The trusts did not hold assets at December 31, 2022. The Company does not expect to contribute assets to its other postretirement benefit plan trusts in 2023.

The weighted-average assumptions used to determine other postretirement benefit plan obligations and net periodic benefit costs for the U.S. plans are provided below:

Weighted-Average Assumptions for U.S. Other Postretirement Benefits Plans	*Benefit Obligations at Dec 31*		*Net Periodic Benefit Costs for the Year Ended*		
	2022	*2021*	*2022*	*2021*	*2020*
Discount rate	5.57 %	2.85 %	2.85 %	2.38 %	3.19 %
Health care cost trend rate assumed for next year	6.79 %	6.50 %	6.50 %	6.75 %	6.25 %
Rate to which the cost trend rate is assumed to decline (the ultimate health care cost trend rate)	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Year that the rate reaches the ultimate health care cost trend rate	2033	2028	2028	2028	2025

Assumptions
The Company determines the expected long-term rate of return on plan assets by performing a detailed analysis of key economic and market factors driving historical returns for each asset class and formulating a projected return based on factors in the current environment. Factors considered include, but are not limited to, inflation, real economic growth, interest rate yield, interest rate spreads and other valuation measures and market metrics. The expected long-term rate of return for each asset class is then weighted based on the strategic asset allocation approved by the governing body for each plan. The Company's historical experience with the pension fund asset performance is also considered.

The Company uses the spot rate approach to determine the discount rate utilized to measure the service cost and interest cost components of net periodic pension and other postretirement benefit costs for the U.S. and other selected countries. Under the spot rate approach, the Company calculates service cost and interest cost by applying individual spot rates from the Willis Towers Watson RATE:Link yield curve (based on high-quality corporate bond yields) for each selected country to the separate expected cash flow components of service cost and interest cost. Service cost and interest cost for all other plans are determined on the basis of the single equivalent discount rates derived in determining those plan obligations.

The discount rates utilized to measure the pension and other postretirement obligations of the U.S. plans are based on the yield on high-quality corporate fixed income investments at the measurement date. Future expected actuarially determined cash flows for the Company's U.S. plans are individually discounted at the spot rates under the Willis Towers Watson U.S. RATE:Link 60-90 corporate yield curve (based on 60th to 90th percentile high-quality corporate bond yields) to arrive at the plan's obligations as of the measurement date.

The Company's mortality assumption used for the US plans is a benefit-weighted version of the Society of Actuaries' RP-2014 base table with future rates of mortality improvement based on a modified version of the assumptions used in the Social Security Administration's 2021 trustees report.

Summarized information on the Company's pension and other postretirement benefit plans is as follows:

Change in Projected Benefit Obligations, Plan Assets and Funded Status of All Significant Plans	*Defined Benefit Pension Plans*		*Other Postretirement Benefit Plans*	
In millions	*2022*	*2021*	*2022*	*2021*
Change in projected benefit obligations:				
Benefit obligations at beginning of year	$ 32,977	$ 35,309	$ 1,251	$ 1,464
Service cost	392	387	6	7
Interest cost	680	594	26	23
Plan participants' contributions	12	10	—	—
Actuarial changes in assumptions and experience	(8,433)	(820)	(318)	(98)
Benefits paid	(1,539)	(1,582)	(67)	(141)
Plan amendments	(25)	2	—	—
Acquisitions/divestitures/other [1]	(602)	8	—	—
Effect of foreign exchange rates	(600)	(545)	(5)	(4)
Termination benefits/curtailments/settlements [2]	(1)	(386)	—	—
Benefit obligations at end of year	$ 22,861	$ 32,977	$ 893	$ 1,251
Change in plan assets:				
Fair value of plan assets at beginning of year	$ 28,167	$ 26,406	$ —	$ —
Actual return on plan assets	(4,556)	2,501	—	—
Employer contributions	235	1,219	—	—
Plan participants' contributions	12	10	—	—
Benefits paid	(1,539)	(1,582)	—	—
Other [3]	(592)	10	—	—
Effect of foreign exchange rates	(496)	(397)	—	—
Fair value of plan assets at end of year	$ 21,231	$ 28,167	$ —	$ —
Funded status:				
U.S. plans with plan assets	$ (545)	$ (2,585)	$ —	$ —
Non-U.S. plans with plan assets	(473)	(1,467)	—	—
All other plans	(612)	(758)	(893)	(1,251)
Funded status at end of year	$ (1,630)	$ (4,810)	$ (893)	$ (1,251)
Amounts recognized in the consolidated balance sheets at Dec 31:				
Deferred charges and other assets	$ 1,035	$ 1,173	$ —	$ —
Accrued and other current liabilities	(66)	(58)	(88)	(99)
Pension and other postretirement benefits - noncurrent	(2,599)	(5,925)	(805)	(1,152)
Net amount recognized	$ (1,630)	$ (4,810)	$ (893)	$ (1,251)
Pretax amounts recognized in accumulated other comprehensive loss at Dec 31:				
Net loss (gain)	$ 7,045	$ 9,934	$ (523)	$ (221)
Prior service credit	(116)	(112)	—	—
Pretax balance in accumulated other comprehensive loss at end of year	$ 6,929	$ 9,822	$ (523)	$ (221)

1. The 2022 impact primarily relates to the transfer of benefit obligations in the U.S. through the purchase of annuity contracts from an insurance company.
2. The 2021 impact primarily relates to the freeze of pensionable compensation and credited service amounts for employees that participate in the U.S. Plans.
3. The 2022 impact relates to the purchase of an annuity contract associated with the transfer of benefit obligations to an insurance company.

A significant component of the overall decrease in the Company's benefit obligation for the year ended December 31, 2022 was due to the change in weighted-average discount rates, which increased from 2.57 percent at December 31, 2021 to 5.18 percent at December 31, 2022. A significant component of the overall decrease in the Company's benefit obligation for the year ended December 31, 2021 was due to the change in weighted-average discount rates, which increased from 2.20 percent at December 31, 2020 to 2.57 percent at December 31, 2021.

The accumulated benefit obligation for all significant pension plans was $ 22.6 billion and $32.5 billion at December 31, 2022 and 2021, respectively.

Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets at Dec 31 In millions	*2022*	*2021*
Accumulated benefit obligations	$ 18,300	$ 27,052
Fair value of plan assets	$ 15,723	$ 21,385

Pension Plans with Projected Benefit Obligations in Excess of Plan Assets at Dec 31 In millions	*2022*	*2021*
Projected benefit obligations	$ 18,388	$ 27,367
Fair value of plan assets	$ 15,723	$ 21,385

Net Periodic Benefit Costs for All Significant Plans for the Year Ended Dec 31	*Defined Benefit Pension Plans*			*Other Postretirement Benefit Plans*		
In millions	*2022*	*2021*	*2020*	*2022*	*2021*	*2020*
Net Periodic Benefit Costs:						
Service cost	$ 392	$ 387	$ 399	$ 6	$ 7	$ 7
Interest cost	680	594	767	26	23	40
Expected return on plan assets	(1,686)	(1,724)	(1,658)	—	—	—
Amortization of prior service credit	(21)	(22)	(19)	—	—	—
Amortization of unrecognized (gain) loss	658	822	773	(15)	(6)	(10)
Curtailment/settlement/other [1]	—	(18)	9	—	—	—
Net periodic benefit costs	$ 23	$ 39	$ 271	$ 17	$ 24	$ 37
Changes in plan assets and benefit obligations recognized in other comprehensive (income) loss:						
Net (gain) loss	$ (2,231)	$ (1,980)	$ 1,753	$ (317)	$ (98)	$ 8
Prior service cost (credit)	(25)	2	8	—	—	—
Amortization of prior service credit	21	22	19	—	—	—
Amortization of unrecognized gain (loss)	(658)	(822)	(773)	15	6	10
Curtailment and settlement gain (loss) [1]	—	18	(9)	—	—	—
Total recognized in other comprehensive (income) loss	$ (2,893)	$ (2,760)	$ 998	$ (302)	$ (92)	$ 18
Total recognized in net periodic benefit cost and other comprehensive (income) loss	$ (2,870)	$ (2,721)	$ 1,269	$ (285)	$ (68)	$ 55

1. The 2021 impact primarily relates to the freeze of pensionable compensation and credited service amounts for employees that participate in the U.S. Plans. The 2020 impact relates to pension plan curtailments of a European plan resulting from the 2020 Restructuring Program and the settlement of certain plan obligations of a U.S. non-qualified pension plan resulting from lump-sum payments.

Except for plan curtailment costs related to the 2020 Restructuring Program, which are included in "Restructuring and asset related charges - net" in the consolidated statements of income, non-service cost components of net periodic benefit cost are included in "Sundry income (expense) - net" in the consolidated statements of income. See Notes 5 and 6 for additional information.

Estimated Future Benefit Payments

The estimated future benefit payments, reflecting expected future service, as appropriate, are presented in the following table:

Estimated Future Benefit Payments at Dec 31, 2022 In millions	*Defined Benefit Pension Plans*	*Other Postretirement Benefit Plans*
2023	$ 1,597	$ 90
2024	1,474	85
2025	1,496	82
2026	1,515	82
2027	1,531	80
2028-2032	7,783	350
Total	$ 15,396	$ 769

Plan Assets

Plan assets consist primarily of equity and fixed income securities of U.S. and foreign issuers, and include alternative investments, such as real estate, private equity and absolute return strategies. Plan assets totaled $21.2 billion at December 31, 2022 and $ 28.2 billion at December 31, 2021 and included no directly held common stock of Dow Inc.

The Company's investment strategy for plan assets is to manage the assets in relation to the liability in order to pay retirement benefits to plan participants over the life of the plans. This is accomplished by identifying and managing the exposure to various market risks, diversifying investments across various asset classes and earning an acceptable long-term rate of return consistent with an acceptable amount of risk, while considering the liquidity needs of the plans.

The plans are permitted to use derivative instruments for investment purposes, as well as for hedging the underlying asset and liability exposure and rebalancing the asset allocation. The plans use value-at-risk, stress testing, scenario analysis and Monte Carlo simulations to monitor and manage both the risk within the portfolios and the surplus risk of the plans.

Equity securities primarily include investments in large- and small-cap companies located in both developed and emerging markets around the world. Fixed income securities include investment and non-investment grade corporate bonds of companies diversified across industries, U.S. treasuries, non-U.S. developed market securities, U.S. agency mortgage-backed securities, emerging market securities and fixed income related funds. Alternative investments primarily include investments in real estate, private equity and absolute return strategies. Other significant investment types include various insurance contracts and interest rate, equity, commodity and foreign exchange derivative investments and hedges.

The Company mitigates the credit risk of investments by establishing guidelines with investment managers that limit investment in any single issue or issuer to an amount that is not material to the portfolio being managed. These guidelines are monitored for compliance both by the Company and external managers. Credit risk related to derivative activity is mitigated by utilizing multiple counterparties, collateral support agreements and centralized clearing, where appropriate. A short-term investment money market fund is utilized as the sweep vehicle for the U.S. plans, which from time to time can represent a significant investment.

The weighted-average target allocation for plan assets of the Company's pension plans is summarized as follows:

Target Allocation for Plan Assets at Dec 31, 2022	
Asset Category	*Target Allocation*
Equity securities	25 %
Fixed income securities	43
Alternative investments	29
Other investments	3
Total	100 %

Fair value calculations may not be indicative of net realizable value or reflective of future fair values. Furthermore, although the Company believes its valuation methods are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

For pension plan assets classified as Level 1 measurements (measured using quoted prices in active markets), total fair value is either the price of the most recent trade at the time of the market close or the official close price, as defined by the exchange on which the asset is most actively traded on the last trading day of the period, multiplied by the number of units held without consideration of transaction costs.

For pension plan assets classified as Level 2 measurements, where the security is frequently traded in less active markets, fair value is based on the closing price at the end of the period; where the security is less frequently traded, fair value is based on the price a dealer would pay for the security or similar securities, adjusted for any terms specific to that asset or liability. Market inputs are obtained from well-established and recognized vendors of market data and subjected to tolerance and quality checks. For derivative assets and liabilities, standard industry models are used to calculate the fair value of the various financial instruments based on significant observable market inputs, such as foreign exchange rates, commodity prices, swap rates, interest rates and implied volatilities obtained from various market sources. For other pension plan assets for which observable inputs are used, fair value is derived through the use of fair value models, such as a discounted cash flow model or other standard pricing models.

For pension plan assets classified as Level 3 measurements, total fair value is based on significant unobservable inputs including assumptions where there is little, if any, market activity for the investment.

Certain pension plan assets are held in funds where fair value is based on an estimated net asset value per share (or its equivalent) as of the most recently available fund financial statements which are received on a monthly or quarterly basis. These valuations are reviewed for reasonableness based on applicable sector, benchmark and company performance. Adjustments to valuations are made where appropriate to arrive at an estimated net asset value per share at the measurement date. These funds are not classified within the fair value hierarchy.

The following table summarizes the bases used to measure the Company’s pension plan assets at fair value for the years ended December 31, 2022 and 2021:

Basis of Fair Value Measurements	*Dec 31, 2022*				*Dec 31, 2021*			
In millions	*Total*	*Level 1*	*Level 2*	*Level 3*	*Total*	*Level 1*	*Level 2*	*Level 3*
Cash and cash equivalents	$ 1,240	$ 989	$ 251	$ —	$ 1,463	$ 1,353	$ 110	$ —
Equity securities:								
U.S. equity securities	$ 1,855	$ 1,845	$ 7	$ 3	$ 4,117	$ 4,097	$ 18	$ 2
Non - U.S. equity securities	2,120	1,924	193	3	4,559	3,935	620	4
Total equity securities	$ 3,975	$ 3,769	$ 200	$ 6	$ 8,676	$ 8,032	$ 638	$ 6
Fixed income securities:								
Debt - government-issued	$ 3,885	$ 57	$ 3,827	$ 1	$ 4,838	$ 242	$ 4,596	$ —
Debt - corporate-issued	4,231	441	3,790	—	4,949	1,095	3,854	—
Debt - asset-backed	128	44	84	—	117	—	116	1
Total fixed income securities	$ 8,244	$ 542	$ 7,701	$ 1	$ 9,904	$ 1,337	$ 8,566	$ 1
Alternative investments:								
Private markets	$ 5	$ —	$ —	$ 5	$ 5	$ —	$ —	$ 5
Real estate	48	48	—	—	67	67	—	—
Derivatives - asset position	348	5	343	—	399	2	397	—
Derivatives - liability position	(479)	(6)	(473)	—	(324)	(2)	(322)	—
Total alternative investments	$ (78)	$ 47	$ (130)	$ 5	$ 147	$ 67	$ 75	$ 5
Other investments	$ 1,103	$ 16	$ 1,087	$ —	$ 1,068	$ 7	$ 1,061	$ —
Subtotal	$ 14,484	$ 5,363	$ 9,109	$ 12	$ 21,258	$ 10,796	$ 10,450	$ 12
Investments measured at net asset value:								
Hedge funds	$ 964				$ 1,312			
Private markets	3,873				3,857			
Real estate	1,956				1,793			
Total investments measured at net asset value	$ 6,793				$ 6,962			
Items to reconcile to fair value of plan assets:								
Pension trust receivables [1]	$ 31				$ 62			
Pension trust payables [2]	(77)				(115)			
Total	$ 21,231				$ 28,167			

1. Primarily receivables for investment securities sold.
2. Primarily payables for investment securities purchased.

The following table summarizes the changes in the fair value of Level 3 pension plan assets for the years ended December 31, 2022 and 2021:

Fair Value Measurement of Level 3 Pension Plan Assets In millions	*Equity Securities*	*Fixed Income Securities*	*Alternative Investments*	*Other Investments*	*Total*
Balance at Jan 1, 2021	$ 10	$ 2	$ 13	$ 2	$ 27
Actual return on assets:					
Relating to assets held at Dec 31, 2021	1	—	(11)	—	(10)
Purchases, sales and settlements, net	(5)	(1)	3	(2)	(5)
Balance at Dec 31, 2021	$ 6	$ 1	$ 5	$ —	$ 12
Actual return on assets:					
Relating to assets held at Dec 31, 2022	(6)	—	(6)	—	(12)
Purchases, sales and settlements, net	—	—	6	—	6
Transfers into Level 3, net	6	—	—	—	6
Balance at Dec 31, 2022	$ 6	$ 1	$ 5	$ —	$ 12

Defined Contribution Plans

U.S. employees may participate in defined contribution plans by contributing a portion of their compensation, which is partially matched by the Company. Defined contribution plans also cover employees in some subsidiaries in other countries, including Brazil, The Netherlands, Canada, Korea, Spain and the United Kingdom. Expense recognized for all defined contribution plans was $150 million in 2022, $165 million in 2021 and $156 million in 2020.

On March 4, 2021, the Company announced changes to its U.S. tax-qualified and non-qualified defined contribution plans. Effective January 1, 2022, contributions to U.S. tax-qualified and non-qualified defined contribution plans were harmonized across the Company's U.S. eligible employee population. The new matching contribution allows all eligible U.S. employees to receive matching contributions of up to 5 percent of their eligible compensation. In addition, beginning on January 1, 2024, all eligible U.S. employees will receive an automatic non-elective contribution of 4 percent of eligible compensation to their respective defined contribution plans.

NOTE 20 – STOCK-BASED COMPENSATION

The Company provides stock-based compensation in the form of the Employee Stock Purchase Plan, which grants eligible employees the right to purchase shares of the Company's common stock at a discounted price. The Company also grants stock-based compensation to employees and non-employee directors under stock incentive plans, in the form of stock options, stock appreciation rights, PSUs and RSUs.

The total stock-based compensation expense included in the consolidated statements of income was $ 211 million, $276 million and $171 million in 2022, 2021 and 2020, respectively. The income tax benefits related to stock-based compensation arrangements were $47 million, $62 million and $39 million in 2022, 2021 and 2020, respectively.

Accounting for Stock-Based Compensation

The Company grants stock-based compensation awards that vest over a specified period or upon employees meeting certain performance and/or retirement eligibility criteria. The fair value of equity instruments issued to employees is measured on the grant date. The fair value of liability instruments (granted to executive employees subject to stock ownership requirements, that provide the recipient the option to elect to receive a cash payment equal to the value of the stock award on the date of delivery) is measured at the end of each quarter. The fair value of equity and liability instruments is expensed over the vesting period or, in the case of retirement, from the grant date to the date on which retirement eligibility provisions have been met and additional service is no longer required. The Company estimates expected forfeitures based on historical activity.

The Company uses the Black-Scholes option valuation model to estimate the fair value of stock options. The weighted-average assumptions used to calculate total stock-based compensation are included in the following table:

Weighted-Average Assumptions	2022	2021	2020
Dividend yield	4.59 %	4.86 %	5.80 %
Expected volatility	30.20 %	33.40 %	26.70 %
Risk-free interest rate	2.00 %	0.68 %	1.49 %
Expected life of stock options granted during period (years)	6.25	6.25	6.10

The dividend yield assumption was equal to the dividend yield on the grant date, which reflected the Company's quarterly dividend payments of $ 0.70 per share in 2022, 2021 and 2020 on Dow Inc. common stock. The expected volatility assumptions for the 2022, 2021 and 2020 stock options were based on an equal weighting of the historical daily volatility for the expected term of the awards and current implied volatility from exchange-traded options. The expected volatility assumption for the market portion of the 2022, 2021 and 2020 PSU awards were based on historical daily volatility for the term of the award. The risk-free interest rate was based on the U.S. Treasury strip rates over the expected life of the 2022, 2021 and 2020 options. The expected life of stock options granted was based on an analysis of historical exercise patterns.

Stock Incentive Plan

The Company has historically granted equity awards under various plans (the "Prior Plans"). On February 9, 2012, the TDCC Board authorized The Dow Chemical Company 2012 Stock Incentive Plan (the "2012 Plan"), which was approved by stockholders at TDCC's annual meeting on May 10, 2012 ("2012 Plan Effective Date") and became effective on that date. On February 13, 2014, the TDCC Board adopted The Dow Chemical Company Amended and Restated 2012 Stock Incentive Plan (the "2012 Restated Plan"). The 2012 Restated Plan was approved by stockholders at TDCC's annual meeting on May 15, 2014, and became effective on that date. The Prior Plans were superseded by the 2012 Plan and the 2012 Restated Plan (collectively, the "2012 Plan"). Under the 2012 Plan, the Company granted options, RSUs, PSUs, restricted stock, stock appreciation rights and stock units to employees and non-employee directors, subject to an aggregate limit and annual individual limits. The terms of the grants were fixed at the grant date. TDCC's stock based compensation programs were assumed by DowDuPont and continued in place with the ability to grant and issue DowDuPont common stock until separation.

On April 1, 2019 ("Original Effective Date"), in connection with the separation, the Company adopted the 2019 Stock Incentive Plan (the "2019 Plan"). Under the 2019 Plan, the Company may grant stock options, RSUs, PSUs, stock appreciation rights and stock units to employees and non-employee directors until the tenth anniversary of the Original Effective Date, subject to an aggregate limit and annual individual limits. The terms of the grants are fixed at the grant date. At December 31, 2022, there were approximately 53 million shares of common stock available for grant under the 2019 Plan.

Stock Options
The Company grants stock options to certain employees, subject to certain annual and individual limits, with terms of the grants fixed at the grant date. The exercise price of each stock option equals the market price of the common stock on the grant date. Options vest from one year to three years and have a maximum term of ten years. The following table summarizes stock option activity for 2022:

Stock Options Shares in thousands	*2022* Shares	Exercise Price [1]
Outstanding at Jan 1, 2022	16,280	$ 50.56
Granted	1,199	$ 60.95
Exercised	(2,968)	$ 38.50
Forfeited/Expired	(86)	$ 61.20
Outstanding at Dec 31, 2022	14,425	$ 53.84
Remaining contractual life in years		4.65
Aggregate intrinsic value in millions	$ 38	
Exercisable at Dec 31, 2022	11,727	$ 53.19
Remaining contractual life in years		3.81
Aggregate intrinsic value in millions	$ 36	

1. Weighted-average per share.

Additional Information about Stock Options In millions, except per share amounts	*2022*	*2021*	*2020*
Weighted-average fair value per share of options granted	$ 11.08	$ 10.37	$ 5.89
Total compensation expense for stock option plans	$ 13	$ 14	$ 22
Related tax benefit	$ 3	$ 3	$ 5
Total amount of cash received from the exercise of options	$ 109	$ 217	$ 108
Total intrinsic value of options exercised [1]	$ 73	$ 121	$ 41
Related tax benefit	$ 16	$ 27	$ 9

1. Difference between the market price at exercise and the price paid by the employee to exercise the options.

Total unrecognized compensation cost related to unvested stock option awards of $ 4 million at December 31, 2022, is expected to be recognized over a weighted-average period of 1.47 years.

Restricted Stock Units
The Company grants RSUs to certain employees and non-employee directors. The grants vest after a designated period of time, generally three years for employees and two years for non-employee directors. The following table shows changes in nonvested RSUs:

RSU Awards Shares in thousands	*2022* Shares	Grant Date Fair Value [1]
Nonvested at Jan 1, 2022	3,543	$ 53.67
Granted	2,080	$ 58.60
Vested	(1,676)	$ 56.30
Canceled	(122)	$ 55.80
Nonvested at Dec 31, 2022	3,825	$ 55.13

1. Weighted-average per share.

Additional Information about RSUs In millions, except per share amounts	2022	2021	2020
Weighted-average fair value per share of RSUs granted	$ 58.60	$ 57.96	$ 47.66
Total fair value of RSUs vested [1]	$ 102	$ 33	$ 106
Related tax benefit	$ 23	$ 7	$ 24
Total compensation expense for RSU awards	$ 99	$ 95	$ 93
Related tax benefit	$ 22	$ 21	$ 21

1. Includes the fair value of shares vested in prior years and delivered in the reporting year.

In 2022, the Company did not settle any RSUs in cash (zero RSUs settled in cash in 2021 and 85,000 RSUs settled in cash for $4 million in 2020). Total unrecognized compensation cost related to RSU awards of $86 million at December 31, 2022 is expected to be recognized over a weighted-average period of 2.09 years. At December 31, 2022, approximately 1.8 million RSUs with a grant date weighted-average fair value per share of $ 54.32 had previously vested, but were not issued. These shares are scheduled to be issued to employees within six months to three years or to non-employee directors upon retirement.

Performance Stock Units

The Company grants PSUs to certain employees. The grants vest when the Company attains specified performance targets, such as return on capital, cumulative cash from operations, environmental, social and governance metrics, and relative total shareholder return, over a predetermined period, generally one year to three years. Performance and payouts are determined independently for each metric. Compensation expense related to PSU awards is recognized over the lesser of the service or performance period. Changes in the fair value of liability instruments are recognized as compensation expense each quarter.

The following table shows the PSU awards granted:

PSU Awards Shares in thousands			
Year	Performance Period	Target Shares Granted [1]	Grant Date Fair Value [2]
2022	Jan 1, 2022 – Dec 31, 2024	1,157	$ 65.83
2021	Jan 1, 2021 – Dec 31, 2023	1,223	$ 61.48
2020	Jan 1, 2020 – Dec 31, 2022	1,426	$ 48.35

1. At the end of the performance period, the actual number of shares issued can range from zero to 200 percent of target shares granted for the 2022 and 2021 awards and can range from zero to 100 percent of the target shares granted for the 2020 award.
2. Weighted-average per share.

The following table shows changes in nonvested PSUs:

PSUs	2022	
Shares in thousands	Shares	Grant Date Fair Value [1]
Nonvested at Jan 1, 2022	3,639	$ 55.36
Granted	1,157	$ 65.83
Vested [2]	(1,079)	$ 57.58
Canceled	(77)	$ 59.73
Nonvested at Dec 31, 2022	3,640	$ 57.93

1. Weighted-average per share.
2. Includes 226,240 shares that were not delivered at vesting due to the final performance of program.

Additional Information about PSUs In millions, except share amounts	2022	2021	2020
Total fair value of PSUs vested and delivered [1]	$ 51	$ —	$ —
Related tax benefit	$ 11	$ —	$ —
Total compensation expense for PSU awards	$ 70	$ 138	$ 56
Related tax benefit	$ 16	$ 31	$ 13
Shares of PSUs settled in cash (in thousands) [2]	162	—	—
Total cash paid to settle PSUs [3]	$ 10	$ —	$ —

1. Includes the fair value of shares vested in prior years and delivered in the reporting year.
2. PSU awards vested in prior years and delivered in the reporting year.
3. Cash paid to certain executive employees for PSU awards vested in prior periods and delivered in the reporting year, equal to the value of the stock award on the date of delivery.

Total unrecognized compensation cost related to PSU awards of $ 37 million at December 31, 2022, is expected to be recognized over a weighted-average period of 1.45 years.

Employee Stock Purchase Plan
The Dow Inc. Board unanimously approved the Dow Inc. 2021 Employee Stock Purchase Plan (the "2021 ESPP"), which was approved by the Company's stockholders at the 2021 Annual Meeting of Stockholders held on April 15, 2021. Under the 2022 ESPP offering, most employees were eligible to purchase shares of common stock of Dow Inc. valued at up to 10 percent of their annual total base salary or wages. The number of shares purchased was determined using the amount contributed by the employee divided by the plan price. The plan price of the stock was equal to 85 percent of the fair market value (closing price) of the common stock at April 1, 2022 (beginning) or October 7, 2022 (ending) of the offering period, whichever was lower.

In 2022, employees subscribed to the right to purchase approximately 2.7 million shares at a weighted-average price of $37.75 per share. The plan price was fixed upon the close of the offering period. The shares were delivered to employees in the fourth quarter of 2022.

In 2021, employees subscribed to the right to purchase approximately 2.3 million shares at a weighted-average price of $ 45.11 per share. The plan price was fixed upon the close of the offering period. The shares were delivered to employees in the fourth quarter of 2021.

Additional Information about Employee Stock Purchase Plan In millions, except per share amounts	2022	2021
Weighted-average fair value per share of purchase rights granted	$ 14.28	$ 16.26
Total compensation expense for ESPP	$ 29	$ 30
Related tax benefit	$ 7	$ 7
Total amount of cash received from the exercise of purchase rights	$ 103	$ 103
Total intrinsic value of purchase rights exercised [1]	$ 18	$ 18
Related tax benefit	$ 4	$ 4

1. Difference between the market price at exercise and the price paid by the employee to exercise the purchase rights.

NOTE 21 – FINANCIAL INSTRUMENTS

The following table summarizes the fair value of financial instruments at December 31, 2022 and 2021:

Fair Value of Financial Instruments at Dec 31 In millions	2022 Cost	2022 Gain	2022 Loss	2022 Fair Value	2021 Cost	2021 Gain	2021 Loss	2021 Fair Value
Cash equivalents:								
Held-to-maturity securities [1]	$ 872	$ —	$ —	$ 872	$ 317	$ —	$ —	$ 317
Money market funds	355	—	—	355	489	—	—	489
Total cash equivalents	$ 1,227	$ —	$ —	$ 1,227	$ 806	$ —	$ —	$ 806
Marketable securities [2]	$ 927	$ 12	$ —	$ 939	$ 237	$ 8	$ —	$ 245
Other investments:								
Debt securities:								
Government debt [3]	$ 754	$ 1	$ (133)	$ 622	$ 746	$ 17	$ (28)	$ 735
Corporate bonds	1,274	10	(159)	1,125	1,251	93	(20)	1,324
Total debt securities	$ 2,028	$ 11	$ (292)	$ 1,747	$ 1,997	$ 110	$ (48)	$ 2,059
Equity securities [4]	5	5	—	10	7	13	—	20
Total other investments	$ 2,033	$ 16	$ (292)	$ 1,757	$ 2,004	$ 123	$ (48)	$ 2,079
Total cash equivalents, marketable securities and other investments	$ 4,187	$ 28	$ (292)	$ 3,923	$ 3,047	$ 131	$ (48)	$ 3,130
Long-term debt including debt due within one year [5]	$ (15,060)	$ 1,683	$ (498)	$ (13,875)	$ (14,511)	$ 27	$ (2,641)	$ (17,125)
Derivatives relating to:								
Interest rates [6]	$ —	$ 105	$ —	$ 105	$ —	$ 1	$ (140)	$ (139)
Foreign currency	—	115	(30)	85	—	46	(18)	28
Commodities [6]	—	72	(61)	11	—	142	(92)	50
Total derivatives	$ —	$ 292	$ (91)	$ 201	$ —	$ 189	$ (250)	$ (61)

1. The Company's held-to-maturity securities primarily included treasury bills and time deposits.
2. The Company's investments in marketable securities are included in "Other current assets" in the consolidated balance sheets.
3. U.S. Treasury obligations, U.S. agency obligations, U.S. agency mortgage-backed securities and other municipalities' obligations.
4. Equity securities with a readily determinable fair value.
5. Cost includes fair value hedge adjustment gains of $46 million at December 31, 2022 and $47 million at December 31, 2021 on $2,279 million of debt at December 31, 2022 and December 31, 2021.
6. Presented net of cash collateral where master netting arrangements allow.

Cost approximates fair value for all other financial instruments.

Debt Securities

The Company's investments in debt securities are primarily classified as available-for-sale. The following table provides the investing results from available-for-sale securities for the years ended December 31, 2022, 2021 and 2020.

Investing Results In millions	2022	2021	2020
Proceeds from sales of available-for-sale securities	$ 543	$ 424	$ 837
Gross realized gains	$ 43	$ 50	$ 94
Gross realized losses	$ 45	$ 12	$ 40

The following table summarizes the contractual maturities of the Company's investments in debt securities:

Contractual Maturities of Debt Securities at Dec 31, 2022 [1] In millions	*Cost*	*Fair Value*
Within one year	$ 71	$ 68
One to five years	855	773
Six to ten years	594	503
After ten years	508	403
Total	$ 2,028	$ 1,747

1. Includes marketable securities with maturities of less than one year.

Portfolio managers regularly review the Company's holdings to determine if any investments in debt securities are other-than-temporarily impaired. The analysis includes reviewing the amount of the impairment, as well as the length of time it has been impaired.

The credit rating of the issuer, current credit rating trends, the trends of the issuer's overall sector, the ability of the issuer to pay expected cash flows and the length of time the security has been in a loss position are considered in determining whether unrealized losses represent an other-than-temporary impairment. The Company did not have any credit-related losses in 2022, 2021 or 2020.

The following table provides the fair value and gross unrealized losses of the Company's investments in debt securities that were deemed to be temporarily impaired at December 31, 2022 and 2021, aggregated by investment category:

Temporarily Impaired Debt Securities at Dec 31	*Less than 12 months*		*12 months or more*		*Total*	
In millions	*Fair Value*	*Unrealized Losses*	*Fair Value*	*Unrealized Losses*	*Fair Value*	*Unrealized Losses*
2022						
Government debt [1]	$ 273	$ (37)	$ 333	$ (96)	$ 606	$ (133)
Corporate bonds	818	(110)	158	(49)	976	(159)
Total temporarily impaired debt securities	$ 1,091	$ (147)	$ 491	$ (145)	$ 1,582	$ (292)
2021						
Government debt [1]	$ 295	$ (13)	$ 151	$ (15)	$ 446	$ (28)
Corporate bonds	355	(17)	16	(3)	371	(20)
Total temporarily impaired debt securities	$ 650	$ (30)	$ 167	$ (18)	$ 817	$ (48)

1. U.S. Treasury obligations, U.S. agency obligations, U.S. agency mortgage-backed securities and other municipalities' obligations.

Equity Securities
There were no material adjustments to the carrying value of the not readily determinable investments for impairment or observable price changes for the year ended December 31, 2022. The net unrealized loss recognized in earnings on equity securities totaled $8 million for the year ended December 31, 2022 ($13 million net unrealized loss for the year ended December 31, 2021).

Investments in Equity Securities In millions	*Dec 31, 2022*	*Dec 31, 2021*
Readily determinable fair value	$ 10	$ 20
Not readily determinable fair value	$ 186	$ 209

Risk Management

The Company's business operations give rise to market risk exposure due to changes in foreign exchange rates, interest rates, commodity prices and other market factors such as equity prices. To manage such risks effectively, the Company enters into hedging transactions, pursuant to established guidelines and policies that enable it to mitigate the adverse effects of financial market risk. Derivatives used for this purpose are designated as hedges per the accounting guidance related to derivatives and hedging activities, where appropriate. A secondary objective is to add value by creating additional non-specific exposure within established limits and policies; derivatives used for this purpose are not designated as hedges. The potential impact of creating such additional exposure is not material to the Company's results. Accounting guidance requires companies to recognize all derivative instruments as either assets or liabilities at fair value.

The Company's risk management program for interest rate, foreign currency and commodity risks is based on fundamental, mathematical and technical models that take into account the implicit cost of hedging. Risks created by derivative instruments and the mark-to-market valuations of positions are strictly monitored at all times, using value-at-risk and stress tests. Counterparty credit risk arising from these contracts is not significant because the Company minimizes counterparty concentration, deals primarily with major financial institutions of solid credit quality, and the majority of its hedging transactions mature in less than three months. In addition, the Company minimizes concentrations of credit risk through its global orientation by transacting with large, internationally diversified financial counterparties. It is the Company's policy to not have credit risk-related contingent features in its derivative instruments. No significant concentration of counterparty credit risk existed at December 31, 2022. The Company does not anticipate losses from credit risk, and the net cash requirements arising from counterparty risk associated with risk management activities are not expected to be material in 2023.

The Company revises its strategies as market conditions dictate and management reviews its overall financial strategies and the impacts from using derivatives in its risk management program with the Company's senior leadership who also reviews these strategies with the Dow Inc. Board and/or relevant committees thereof.

Derivative Instruments

The notional amounts of the Company's derivative instruments at December 31, 2022 and 2021, were as follows:

Notional Amounts [1] In millions	*Dec 31, 2022*	*Dec 31, 2021*
Derivatives designated as hedging instruments		
Interest rate contracts	$ 1,500	$ 3,000
Foreign currency contracts	$ 2,408	$ 5,300
Derivatives not designated as hedging instruments		
Interest rate contracts	$ 3	$ 36
Foreign currency contracts	$ 8,837	$ 8,234

1. Notional amounts represent the absolute value of open derivative positions at the end of the period. Multi-leg option positions are reflected at the maximum notional position at expiration.

The notional amounts of the Company's commodity derivatives at December 31, 2022 and 2021, were as follows:

Commodity Notionals [1]	*Dec 31, 2022*	*Dec 31, 2021*	*Notional Volume Unit*
Derivatives designated as hedging instruments			
Hydrocarbon derivatives	19.2	9.7	million barrels of oil equivalent
Derivatives not designated as hedging instruments			
Hydrocarbon derivatives	—	0.1	million barrels of oil equivalent
Power derivatives	—	3.3	thousands of megawatt hours

1. Notional amounts represent the net volume of open derivative positions outstanding at the end of the period.

Maturity Dates of Derivatives Designated as Hedging Instruments	Year
Interest rate contracts	2023
Foreign currency contracts	2023
Commodity contracts	2026

Interest Rate Risk Management
The main objective of interest rate risk management is to reduce the total funding cost to the Company and to alter the interest rate exposure to the desired risk profile. To achieve this objective, the Company hedges using interest rate swaps, “swaptions,” and exchange-traded instruments.

Foreign Currency Risk Management
The global nature of the Company's business requires active participation in the foreign exchange markets. The Company has assets, liabilities and cash flows in currencies other than the U.S. dollar. The primary objective of the Company's foreign currency risk management is to optimize the U.S. dollar value of net assets and cash flows. To achieve this objective, the Company hedges on a net exposure basis using foreign currency forward contracts, over-the-counter option contracts, cross-currency swaps and nonderivative instruments in foreign currencies. Exposures primarily relate to assets, liabilities and bonds denominated in foreign currencies, as well as economic exposure, which is derived from the risk that currency fluctuations could affect the dollar value of future cash flows related to operating activities.

Commodity Risk Management
The Company has exposure to the prices of commodities in its procurement of certain raw materials. The primary purpose of commodity hedging activities is to manage the price volatility associated with these forecasted inventory purchases.

Derivatives Not Designated in Hedging Relationships
Foreign Currency Contracts
The Company also uses foreign exchange forward contracts, options and cross-currency swaps that are not designated as hedging instruments primarily to manage foreign currency exposure.

Commodity Contracts
The Company utilizes futures, options and swap instruments that are effective as economic hedges of commodity price exposures, but do not meet hedge accounting criteria for derivatives and hedging, to reduce exposure to commodity price fluctuations on purchases of raw materials and inventory.

Interest Rate Contracts
The Company uses swap instruments that are not designated as hedging instruments to manage interest rate exposures. The Company uses interest rate swaps, "swaptions," and exchange-traded instruments to accomplish this objective.

Accounting for Derivative Instruments and Hedging Activities
Cash Flow Hedges
For derivatives that are designated and qualify as cash flow hedging instruments, the gain or loss on the derivative is recorded in AOCL; it is reclassified to income in the same period or periods that the hedged transaction affects income. The unrealized amounts in AOCL fluctuate based on changes in the fair value of open contracts at the end of each reporting period. The Company anticipates volatility in AOCL and net income from its cash flow hedges. The amount of volatility varies with the level of derivative activities and market conditions during any period.

The portion of the mark-to-market effects of the foreign currency contracts is recorded in AOCL; it is reclassified to income in the same period or periods that the underlying item affects income.

Commodity swaps, futures and option contracts with maturities of not more than 60 months are utilized and designated as cash flow hedges of forecasted commodity purchases. The designated portion of the mark-to-market effect of the cash flow hedge instrument is recorded in AOCL; it is reclassified to income in the same period or periods that the underlying commodity purchase affects income.

Fair Value Hedges
For interest rate instruments that are designated and qualify as fair value hedges, the gain or loss on the derivative as well as the offsetting loss or gain on the hedge item attributable to the hedged risk are recognized in current period income and reflected as “Interest expense and amortization of debt discount” in the consolidated statements of income, except for amounts excluded from the assessment of effectiveness that are recognized in earnings through an amortization approach.

Net Foreign Investment Hedges
The Company designates derivatives that qualify as effective net foreign investment hedges, the results of which are presented in the effect of derivative instruments table. The Company also utilizes non-derivative instruments as net foreign investment hedges. The Company had outstanding foreign-currency denominated debt designated as a hedge of net foreign investment of $152 million at December 31, 2022 ($ 174 million at December 31, 2021).

The following tables provide the fair value and balance sheet classification of derivative instruments at December 31, 2022 and 2021:

Fair Value of Derivative Instruments		*Dec 31, 2022*		
In millions	*Balance Sheet Classification*	*Gross*	*Counterparty and Cash Collateral Netting* [1]	*Net Amounts Included in Consolidated Balance Sheets*
Asset derivatives				
Derivatives designated as hedging instruments				
Interest rate contracts	Other current assets	$ 351	$ (246)	$ 105
Foreign currency contracts	Other current assets	58	(39)	19
Commodity contracts	Other current assets	199	(148)	51
Total		$ 608	$ (433)	$ 175
Derivatives not designated as hedging instruments				
Foreign currency contracts	Other current assets	$ 146	$ (50)	$ 96
Commodity contracts	Other current assets	22	(1)	21
Total		$ 168	$ (51)	$ 117
Total asset derivatives		$ 776	$ (484)	$ 292
Liability derivatives				
Derivatives designated as hedging instruments				
Interest rate contracts	Accrued and other current liabilities	$ 246	$ (246)	$ —
Foreign currency contracts	Accrued and other current liabilities	58	(39)	19
Commodity contracts	Accrued and other current liabilities	258	(198)	60
Total		$ 562	$ (483)	$ 79
Derivatives not designated as hedging instruments				
Foreign currency contracts	Accrued and other current liabilities	$ 61	$ (50)	$ 11
Commodity contracts	Accrued and other current liabilities	12	(11)	1
Total		$ 73	$ (61)	$ 12
Total liability derivatives		$ 635	$ (544)	$ 91

1. Counterparty and cash collateral amounts represent the estimated net settlement amount when applying netting and set-off rights included in master netting arrangements between the Company and its counterparties and the payable or receivable for cash collateral held or placed with the same counterparty.

Fair Value of Derivative Instruments		Dec 31, 2021		
In millions	*Balance Sheet Classification*	*Gross*	*Counterparty and Cash Collateral Netting* [1]	*Net Amounts Included in Consolidated Balance Sheets*
Asset derivatives				
Derivatives designated as hedging instruments				
Interest rate contracts	Other current assets	$ 14	$ (14)	$ —
Interest rate contracts	Deferred charges and other assets	130	(130)	—
Foreign currency contracts	Other current assets	24	(13)	11
Foreign currency contracts	Deferred charges and other assets	117	(89)	28
Commodity contracts	Other current assets	305	(173)	132
Commodity contracts	Deferred charges and other assets	9	(2)	7
Total		$ 599	$ (421)	$ 178
Derivatives not designated as hedging instruments				
Interest rate contracts	Other current assets	$ 1	$ —	$ 1
Foreign currency contracts	Other current assets	23	(16)	7
Foreign currency contracts	Deferred charges and other assets	1	(1)	—
Commodity contracts	Other current assets	8	(5)	3
Total		$ 33	$ (22)	$ 11
Total asset derivatives		$ 632	$ (443)	$ 189
Liability derivatives				
Derivatives designated as hedging instruments				
Interest rate contracts	Accrued and other current liabilities	$ 33	$ (14)	$ 19
Interest rate contracts	Other noncurrent obligations	192	(130)	62
Foreign currency contracts	Accrued and other current liabilities	15	(13)	2
Foreign currency contracts	Other noncurrent obligations	90	(89)	1
Commodity contracts	Accrued and other current liabilities	267	(192)	75
Commodity contracts	Other noncurrent obligations	2	(2)	—
Total		$ 599	$ (440)	$ 159
Derivatives not designated as hedging instruments				
Interest rate contracts	Accrued and other current liabilities	$ 59	$ —	$ 59
Foreign currency contracts	Accrued and other current liabilities	31	(16)	15
Foreign currency contracts	Other noncurrent obligations	1	(1)	—
Commodity contracts	Accrued and other current liabilities	25	(8)	17
Total		$ 116	$ (25)	$ 91
Total liability derivatives		$ 715	$ (465)	$ 250

1. Counterparty and cash collateral amounts represent the estimated net settlement amount when applying netting and set-off rights included in master netting arrangements between the Company and its counterparties and the payable or receivable for cash collateral held or placed with the same counterparty.

Assets and liabilities related to forward contracts, interest rate swaps, currency swaps, options and other conditional or exchange contracts executed with the same counterparty under a master netting arrangement are netted. Collateral accounts are netted with corresponding assets or liabilities, when applicable. The Company posted cash collateral of $80 million at December 31, 2022 ($ 71 million at December 31, 2021). Cash collateral of $ 2 million was posted by counterparties with the Company at December 31, 2022 (zero at December 31, 2021).

The following table summarizes the gain (loss) of derivative instruments in the consolidated statements of income and comprehensive income for the years ended December 31, 2022, 2021 and 2020:

Effect of Derivative Instruments	*Amount of gain (loss) recognized in OCI* [1]			*Amount of gain (loss) recognized in income* [2]			
In millions	*2022*	*2021*	*2020*	*2022*	*2021*	*2020*	*Income Statement Classification*
Derivatives designated as hedging instruments:							
Fair value hedges:							
Interest rate contracts	$ —	$ —	$ —	$ —	$ (25)	$ 69	Interest expense and amortization of debt discount [3]
Excluded components [4]	—	2	7	—	—	—	Interest expense and amortization of debt discount
Cash flow hedges:							
Interest rate contracts	239	(62)	—	(10)	(9)	(2)	Interest expense and amortization of debt discount
Foreign currency contracts	5	13	(20)	13	(15)	3	Cost of sales
Commodity contracts	166	133	(8)	310	62	(31)	Cost of sales
Net foreign investment hedges:							
Foreign currency contracts	34	31	(38)	—	—	—	
Excluded components [4]	59	54	27	44	11	20	Sundry income (expense) - net
Total derivatives designated as hedging instruments	$ 503	$ 171	$ (32)	$ 357	$ 24	$ 59	
Derivatives not designated as hedging instruments:							
Interest rate contracts	$ —	$ —	$ —	$ (1)	$ (8)	$ (16)	Interest expense and amortization of debt discount
Foreign currency contracts	—	—	—	(249)	(253)	28	Sundry income (expense) - net
Commodity contracts	—	—	—	48	(46)	11	Cost of sales
Total derivatives not designated as hedging instruments	$ —	$ —	$ —	$ (202)	$ (307)	$ 23	
Total derivatives	$ 503	$ 171	$ (32)	$ 155	$ (283)	$ 82	

1. OCI is defined as other comprehensive income (loss).
2. Pretax amounts.
3. Gain (loss) recognized in income of derivatives is offset by gain (loss) recognized in income of the hedged item.
4. The excluded components are related to the time value of the derivatives designated as hedges.

The following table provides the net after-tax gain (loss) expected to be reclassified from AOCL to income within the next 12 months:

Expected Reclassifications from AOCL within the next 12 months	*Dec 31, 2022*
Cash flow hedges:	
Interest rate contracts	$ (7)
Commodity contracts	$ (48)
Foreign currency contracts	$ 2
Net foreign investment hedges:	
Excluded components	$ —

NOTE 22 – FAIR VALUE MEASUREMENTS

Fair Value Measurements on a Recurring Basis

The following table summarizes the bases used to measure certain assets and liabilities at fair value on a recurring basis:

Basis of Fair Value Measurements on a Recurring Basis	*Dec 31, 2022*				*Dec 31, 2021*			
In millions	*Level 1*	*Level 2*	*Level 3*	*Total*	*Level 1*	*Level 2*	*Level 3*	*Total*
Assets at fair value:								
Cash equivalents:								
Held-to-maturity securities [1]	$ —	$ 872	$ —	$ 872	$ —	$ 317	$ —	$ 317
Money market funds	—	355	—	355	—	489	—	489
Marketable securities [2]	—	939	—	939	—	245	—	245
Equity securities [3]	10	—	—	10	20	—	—	20
Nonconsolidated affiliates [4]	—	—	7	7	—	—	—	—
Debt securities: [3]								
Government debt [5]	—	622	—	622	—	735	—	735
Corporate bonds	35	1,090	—	1,125	44	1,280	—	1,324
Derivatives relating to: [6]								
Interest rates	—	351	—	351	—	145	—	145
Foreign currency	—	204	—	204	—	165	—	165
Commodities	63	158	—	221	15	307	—	322
Total assets at fair value	$ 108	$ 4,591	$ 7	$ 4,706	$ 79	$ 3,683	$ —	$ 3,762
Liabilities at fair value:								
Long-term debt including debt due within one year [7]	$ —	$ 13,875	$ —	$ 13,875	$ —	$ 17,125	$ —	$ 17,125
Guarantee liability [8]	—	—	199	199	—	—	220	220
Derivatives relating to: [6]								
Interest rates	—	246	—	246	—	284	—	284
Foreign currency	—	119	—	119	—	137	—	137
Commodities	103	167	—	270	37	257	—	294
Total liabilities at fair value	$ 103	$ 14,407	$ 199	$ 14,709	$ 37	$ 17,803	$ 220	$ 18,060

1. The Company's held-to-maturity securities primarily included treasury bills and time deposits.
2. The Company's investments in marketable securities are included in "Other current assets" in the consolidated balance sheets.
3. The Company's investments in debt securities, which are primarily available-for-sale, and equity securities are included in "Other investments" in the consolidated balance sheets.
4. Estimated asset for an investment in a limited liability company included in "Investment in nonconsolidated affiliates" in the consolidated balance sheets.
5. U.S. Treasury obligations, U.S. agency obligations, U.S. agency mortgage-backed securities and other municipalities' obligations.
6. See Note 21 for the classification of derivatives in the consolidated balance sheets.
7. See Note 21 for information on fair value measurements of long-term debt.
8. Estimated liability for TDCC's guarantee of Sadara's debt which is included in "Other noncurrent obligations" in the consolidated balance sheets. See Note 15 for additional information.

For assets and liabilities classified as Level 1 measurements (measured using quoted prices in active markets), total fair value is either the price of the most recent trade at the time of the market close or the official close price, as defined by the exchange on which the asset is most actively traded on the last trading day of the period, multiplied by the number of units held without consideration of transaction costs.

For assets and liabilities classified as Level 2 measurements, where the security is frequently traded in less active markets, fair value is based on the closing price at the end of the period; where the security is less frequently traded, fair value is based on the price a dealer would pay for the security or similar securities, adjusted for any terms specific to that asset or liability, or by using observable market data points of similar, more liquid securities to imply the price. Market inputs are obtained from well-established and recognized vendors of market data and subjected to tolerance and quality checks.

For derivative assets and liabilities, standard industry models are used to calculate the fair value of the various financial instruments based on significant observable market inputs, such as foreign exchange rates, commodity prices, swap rates, interest rates and implied volatilities obtained from various market sources. Market inputs are obtained from well-established and recognized vendors of market data and subjected to tolerance/quality checks.

For all other assets and liabilities for which observable inputs are used, fair value is derived through the use of fair value models, such as a discounted cash flow model or other standard pricing models. See Note 21 for further information on the types of instruments used by the Company for risk management.

There were no transfers between Levels 1 and 2 in the years ended December 31, 2022 and 2021.

For assets classified as Level 3 measurements, fair value is based on significant unobservable inputs including assumptions where there is little, if any, market activity. The level 3 asset value represents the fair value of an investment in a limited liability company, accounted for as an investment in nonconsolidated affiliates. There was no unfunded commitment on the investment at December 31, 2022.

For liabilities classified as Level 3 measurements, the fair value is based on significant unobservable inputs including assumptions where there is little, if any, market activity. The fair value of the Company's accrued liability related to the guarantee of Sadara's debt is in proportion to the Company's 35 percent ownership interest in Sadara. The estimated fair value of the guarantee was calculated using a "with" and "without" method. The fair value of the debt was calculated "with" the guarantee less the fair value of the debt "without" the guarantee. The "with" and "without" values were calculated using a discounted cash flow method based on contractual cash flows as well as projected prepayments made on the debt by Sadara. See Note 15 for further information on guarantees classified as Level 3 measurements. The following table summarizes the changes in fair value measurements using Level 3 inputs for the years ended December 31, 2022 and 2021:

Fair Value Measurements Using Level 3 Inputs for Accrued Liability of Sadara Guarantee at Dec 31, In millions	*2022*	*2021*
Balance at Jan 1	$ (220)	$ —
Recognition of liability [1]	—	(235)
Gain included in earnings [2]	21	15
Balance at Dec 31	$ (199)	$ (220)

1. Included in "Other noncurrent obligations" in the consolidated balance sheets.
2. Included in "Equity in earnings (losses) of nonconsolidated affiliates" in the consolidated income statements.

For equity securities calculated at net asset value per share (or its equivalent), the Company had $ 92 million in private equity and $ 20 million in real estate at December 31, 2022 ($106 million in private equity and $ 22 million in real estate at December 31, 2021). There are no redemption restrictions and the unfunded commitments on these investments were $54 million at December 31, 2022 ($ 59 million at December 31, 2021).

Fair Value Measurements on a Nonrecurring Basis
The following table summarizes the bases used to measure certain assets at fair value on a nonrecurring basis in the consolidated balance sheets:

Basis of Fair Value Measurements on a Nonrecurring Basis at Dec 31 In millions	*(Level 3)*	*Total Losses*
2020		
Assets at fair value:		
Long-lived assets and other assets	$ 121	$ (245)

2022 Fair Value Measurements on a Nonrecurring Basis
The Company's fair value measurements on a nonrecurring basis were insignificant in 2022.

2021 Fair Value Measurements on a Nonrecurring Basis
The Company's fair value measurements on a nonrecurring basis were insignificant in 2021.

2020 Fair Value Measurements on a Nonrecurring Basis
As part of the 2020 Restructuring Program, the Company has or will shut down and write off several small manufacturing facilities and miscellaneous assets around the world. The assets associated with this plan were written down to zero. In addition, impairments of leased, non-manufacturing facilities, which were classified as Level 3 measurements, resulted in a write-down of right-of-use assets to a fair value of $110 million using unobservable inputs. The impairment charges related to the 2020 Restructuring Program, totaling $196 million, were included in "Restructuring and asset related charges - net" in the consolidated statements of income and related to Packaging & Specialty Plastics ($11 million), Industrial Intermediates & Infrastructure ($22 million), Performance Materials & Coatings ($ 116 million) and Corporate ($ 47 million).

In 2020, the Company recognized impairment charges of $ 30 million related to the write-down of a non-manufacturing asset and certain corporate leased equipment and the write-off of a capital project. The assets, classified as Level 3 measurements, were valued at $11 million using unobservable inputs. The impairment charges were included in "Restructuring and asset related charges - net" in the consolidated statements of income and related to Performance Materials & Coatings ($15 million) and Corporate ($ 15 million).

In 2020, the Company recognized an additional pretax impairment charge of $ 19 million related to capital additions made to a bio-ethanol manufacturing facility in Santa Vitoria, Minas Gerais, Brazil, which was impaired in 2017. The assets were written down to zero in 2020. The impairment charge was included in “Restructuring and asset related charges - net” in the consolidated statements of income and related to Packaging & Specialty Plastics. On September 29, 2020, the Company divested the bio-ethanol manufacturing facility.

See Note 5 for additional information on the Company's restructuring activities.

NOTE 23 – VARIABLE INTEREST ENTITIES

Consolidated Variable Interest Entities ("VIEs")
The Company holds a variable interest in the following joint ventures or entities for which it is the primary beneficiary:

Asia Pacific Joint Ventures
The Company has variable interests in two joint ventures that own and operate manufacturing and logistics facilities, which produce chemicals and provide services in Asia Pacific. The Company's variable interests in these joint ventures relate to arrangements between the joint ventures and the Company, involving the majority of the output on take-or-pay terms with pricing ensuring a guaranteed return to the joint ventures.

Ethylene Storage Joint Venture
The Company has variable interests in a joint venture that provides ethylene storage in Alberta, Canada. The Company's variable interests relate to arrangements involving a majority of the joint venture's storage capacity on take-or-pay terms with pricing ensuring a guaranteed return to the joint venture; and favorably priced leases provided to the joint venture. The Company provides the joint venture with operation and maintenance services and utilities.

Assets and Liabilities of Consolidated VIEs
The Company's consolidated financial statements include the assets, liabilities and results of operations of VIEs for which the Company is the primary beneficiary. The other equity holders’ interests are reflected in "Net income attributable to noncontrolling interests" in the consolidated statements of income and "Noncontrolling interests" in the consolidated balance sheets.

The following table summarizes the carrying amounts of these entities' assets and liabilities included in the Company's consolidated balance sheets at December 31, 2022 and 2021:

Assets and Liabilities of Consolidated VIEs at Dec 31 In millions	2022	2021
Cash and cash equivalents	$ 17	$ 40
Other current assets	36	40
Net property	157	184
Other noncurrent assets	17	15
Total assets [1]	$ 227	$ 279
Current liabilities	$ 30	$ 37
Long-term debt	—	3
Other noncurrent obligations	12	13
Total liabilities [2]	$ 42	$ 53

1. All assets were restricted at December 31, 2022 and 2021.
2. All liabilities were nonrecourse at December 31, 2022 and 2021.

Amounts presented in the consolidated balance sheets and the table above as restricted assets or nonrecourse obligations relating to consolidated VIEs at December 31, 2022 and 2021 are adjusted for intercompany eliminations.

Nonconsolidated VIEs
The Company holds a variable interest in the following entities for which the Company is not the primary beneficiary:

Silicon Joint Ventures
The Company holds minority voting interests in certain joint ventures that produce silicon inputs for the Company. These joint ventures operate under supply agreements that sell inventory to the equity owners using pricing mechanisms that guarantee a return, therefore shielding the joint ventures from the obligation to absorb expected losses. As a result of the pricing mechanisms of these agreements, these entities are determined to be VIEs. The Company is not the primary beneficiary, as it does not hold the power to direct the activities that most significantly impact the economic performance of these entities; therefore, the entities are accounted for under the equity method of accounting. The Company's maximum exposure to loss as a result of its involvement with these variable interest entities is determined to be the carrying value of the investment in these entities. At December 31, 2022, the Company's investment in these joint ventures was $113 million ($110 million at December 31, 2021), classified as "Investment in nonconsolidated affiliates" in the consolidated balance sheets, representing the Company's maximum exposure to loss.

NOTE 24 – RELATED PARTY TRANSACTIONS

TDCC has committed to fund Dow Inc.'s dividends paid to common stockholders and share repurchases, as approved by the Dow Inc. Board from time to time, as well as certain governance expenses. Funding is accomplished through intercompany loans. TDCC's Board reviews and determines a dividend distribution to Dow Inc. to settle the intercompany loans. The following table summarizes cash dividends TDCC declared and paid to Dow Inc. for the years ended 2022, 2021 and 2020.

TDCC Cash Dividends Declared and Paid In millions	2022	2021	2020
Cash dividends declared and paid	$ 4,375	$ 3,264	$ 2,233

At December 31, 2022 and 2021, TDCC's intercompany loan balance with Dow Inc. was insignificant.

NOTE 25 – SEGMENTS AND GEOGRAPHIC REGIONS

Sales are attributed to geographic region based on customer location; long-lived assets are attributed to geographic region based on asset location.

Geographic Region Information In millions	*United States*	*EMEAI*	*Rest of World*	*Total*
2022				
Sales to external customers	$ 19,336	$ 19,631	$ 17,935	$ 56,902
Long-lived assets	$ 14,638	$ 2,578	$ 3,226	$ 20,442
2021				
Sales to external customers	$ 18,083	$ 19,746	$ 17,139	$ 54,968
Long-lived assets	$ 14,425	$ 2,703	$ 3,427	$ 20,555
2020				
Sales to external customers	$ 12,547	$ 12,969	$ 13,026	$ 38,542
Long-lived assets	$ 13,833	$ 2,813	$ 3,593	$ 20,239

See Part I, Item 1. Business for further discussion of the Company's segments.

Dow's measure of profit/loss for segment reporting purposes is Operating EBIT as this is the manner in which the Company's chief operating decision maker ("CODM") assesses performance and allocates resources. The Company defines Operating EBIT as earnings (i.e., "Income before income taxes") before interest, excluding the impact of significant items. Operating EBIT by segment includes all operating items relating to the businesses; items that principally apply to Dow as a whole are assigned to Corporate.

Segment Information In millions	*Pack. & Spec. Plastics*	*Ind. Interm. & Infrast.*	*Perf. Materials & Coatings*	*Corp.*	*Total*
2022					
Net sales	$ 29,260	$ 16,606	$ 10,764	$ 272	$ 56,902
Restructuring and asset related charges - net [1]	8	73	6	31	118
Equity in earnings (losses) of nonconsolidated affiliates	359	(91)	10	(10)	268
Operating EBIT [2]	4,110	1,418	1,328	(266)	6,590
Depreciation and amortization	1,396	550	789	23	2,758
Total assets	30,017	12,883	13,028	4,675	60,603
Investments in nonconsolidated affiliates	846	454	115	174	1,589
Capital expenditures	1,069	385	369	—	1,823
2021					
Net sales	$ 28,128	$ 16,851	$ 9,672	$ 317	$ 54,968
Restructuring and asset related charges (credits) - net [1]	8	1	10	(13)	6
Equity in earnings of nonconsolidated affiliates	490	471	7	7	975
Operating EBIT [2]	6,638	2,282	866	(253)	9,533
Depreciation and amortization	1,358	612	842	30	2,842
Total assets	30,556	13,750	13,810	4,874	62,990
Investments in nonconsolidated affiliates	1,230	670	111	34	2,045
Capital expenditures	808	359	334	—	1,501
2020					
Net sales	$ 18,301	$ 12,021	$ 7,951	$ 269	$ 38,542
Restructuring and asset related charges - net [1]	30	22	192	464	708
Equity in earnings (losses) of nonconsolidated affiliates	173	(166)	6	(31)	(18)
Operating EBIT [2]	2,325	355	314	(279)	2,715
Depreciation and amortization	1,372	605	870	27	2,874
Total assets	30,069	12,220	13,915	5,266	61,470
Investments in nonconsolidated affiliates	661	531	108	27	1,327
Capital expenditures	678	268	306	—	1,252

1. See Note 5 for information regarding the Company's restructuring programs and other asset related charges.
2. Operating EBIT for TDCC in 2022, 2021 and 2020 is substantially the same as that of Dow Inc. and therefore is not disclosed separately in the table above. A reconciliation of "Net income" to Operating EBIT is provided in the following table.

Reconciliation of "Net income" to Operating EBIT In millions	*2022*	*2021*	*2020*
Net income	$ 4,640	$ 6,405	$ 1,294
+ Provision for income taxes	1,450	1,740	777
Income before income taxes	$ 6,090	$ 8,145	$ 2,071
- Interest income	173	55	38
+ Interest expense and amortization of debt discount	662	731	827
- Significant items	(11)	(712)	145
Operating EBIT	$ 6,590	$ 9,533	$ 2,715

The following tables summarize the pretax impact of significant items by segment that are excluded from Operating EBIT:

Significant Items by Segment for 2022 In millions	*Pack. & Spec. Plastics*	*Ind. Interm. & Infrast.*	*Perf. Materials & Coatings*	*Corp.*	*Total*
Digitalization program costs [1]	$ —	$ —	$ —	$ (230)	$ (230)
Restructuring, implementation costs and asset related charges - net [2]	—	—	—	(40)	(40)
Russia / Ukraine conflict charges [3]	(8)	(73)	(6)	(31)	(118)
Loss on early extinguishment of debt [4]	—	—	—	(8)	(8)
Litigation related charges, awards and adjustments [5]	321	—	—	60	381
Indemnification and other transaction related costs [6]	—	—	—	4	4
Total	$ 313	$ (73)	$ (6)	$ (245)	$ (11)

1. Includes costs associated with implementing the Company's Digital Acceleration program.
2. Includes costs associated with implementing the Company's 2020 Restructuring Program.
3. Asset related charges due to the Russia and Ukraine conflict. See Note 5 for additional information.
4. The Company redeemed outstanding long-term debt resulting in a loss on early extinguishment. See Note 14 for additional information.
5. Includes a gain associated with a legal matter with Nova Chemicals Corporation and a gain related to an adjustment of the Dow Silicones breast implant liability. See Note 15 for additional information.
6. Primarily related to charges associated with agreements entered into with DuPont and Corteva as part of the separation and distribution which, among other matters, provides for cross-indemnities and allocations of obligations and liabilities for periods prior to, at and after the completion of the separation.

Significant Items by Segment for 2021 In millions	*Pack. & Spec. Plastics*	*Ind. Interm. & Infrast.*	*Perf. Materials & Coatings*	*Corp.*	*Total*
Digitalization program costs [1]	$ —	$ —	$ —	$ (169)	$ (169)
Restructuring, implementation costs and asset related charges - net [2]	(8)	(1)	(10)	(50)	(69)
Loss on early extinguishment of debt [3]	—	—	—	(574)	(574)
Net gain on divestitures and asset sale [4]	16	—	—	—	16
Litigation related charges, awards and adjustments [5]	—	54	—	—	54
Indemnification and other transaction related costs [6]	—	—	—	30	30
Total	$ 8	$ 53	$ (10)	$ (763)	$ (712)

1. Includes costs associated with implementing the Company's Digital Acceleration program.
2. Includes costs associated with implementing the Company's 2020 Restructuring Program, and asset-related charges, which include other asset impairments. See Note 5 for additional information.
3. The Company redeemed outstanding long-term debt resulting in a loss on early extinguishment. See Note 14 for additional information.
4. Includes post-closing adjustments on a previous divestiture.
5. Related to an arbitration award received from Luxi Chemical Group Co., Ltd. See Note 15 for additional information.
6. Primarily related to charges associated with agreements entered into with DuPont and Corteva as part of the separation and distribution which, among other matters, provides for cross-indemnities and allocations of obligations and liabilities for periods prior to, at and after the completion of the separation.

Significant Items by Segment for 2020 In millions	*Pack. & Spec. Plastics*	*Ind. Interm. & Infrast.*	*Perf. Materials & Coatings*	*Corp.*	*Total*
Integration and separation costs [1]	$ —	$ —	$ —	$ (239)	$ (239)
Restructuring, implementation costs and asset related charges - net [2]	(30)	(22)	(192)	(474)	(718)
Warranty accrual adjustment of exited business [3]	—	—	—	11	11
Net gain on divestitures and asset sale [4]	52	61	—	604	717
Litigation related charges, awards and adjustments [5]	544	—	—	—	544
Loss on early extinguishment of debt [6]	—	—	—	(149)	(149)
Indemnification and other transaction related costs [7]	—	—	—	(21)	(21)
Total	$ 566	$ 39	$ (192)	$ (268)	$ 145

1. Costs related to business separation activities.
2. Includes costs associated with implementing the Company's 2020 Restructuring Program, and asset-related charges, which include other asset impairments. See Note 5 for additional information.
3. Includes an adjustment to the warranty accrual of an exited business.
4. Primarily related to a gain on the sale of rail infrastructure in the U.S. and Canada and a gain on the sale of marine and terminal operations and assets in the U.S. See Notes 4 and 6 for additional information.
5. Includes recognition of gains associated with a legal matter with Nova. See Note 15 for additional information.
6. The Company redeemed outstanding long-term debt resulting in a loss on early extinguishment. See Note 14 for additional information.
7. Primarily related to charges associated with agreements entered into with DuPont and Corteva as part of the separation and distribution which, among other matters, provides for cross-indemnities and allocations of obligations and liabilities for periods prior to, at and after the completion of the separation.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

As of the end of the period covered by this Annual Report on Form 10-K, Dow Inc. and The Dow Chemical Company (the "Companies") carried out an evaluation, under the supervision and with the participation of the Companies' Disclosure Committee and the Companies' management, including the Chief Executive Officer and the Chief Financial Officer, of the effectiveness of the design and operation of the Companies' disclosure controls and procedures pursuant to paragraph (b) of Exchange Act Rules 13a-15 and 15d-15. Based upon that evaluation, the Chief Executive Officer and the Chief Financial Officer concluded that the Companies' disclosure controls and procedures were effective.

Changes in Internal Control Over Financial Reporting

There were no changes in the Companies' internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Exchange Act Rules 13a-15 and 15d-15 that was conducted during the quarter ended December 31, 2022, that have materially affected, or are reasonably likely to materially affect, the Companies' internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. The Companies' internal control framework and processes are designed to provide reasonable assurance to management and the Board of Directors regarding the reliability of financial reporting and the preparation of the Companies' consolidated financial statements in accordance with accounting principles generally accepted in the United States of America.

The Companies' internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Companies;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Companies are being made only in accordance with authorizations of management and Directors of the Companies; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Companies' assets that could have a material effect on the consolidated financial statements.

Because of its inherent limitations, any system of internal control over financial reporting can provide only reasonable assurance and may not prevent or detect misstatements.

Management assessed the effectiveness of the Companies' internal control over financial reporting and concluded that, as of December 31, 2022, such internal control is effective. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control—Integrated Framework (2013).*

The Companies' independent auditors, Deloitte & Touche LLP, with direct access to the Board of Directors through the Audit Committee of Dow Inc., have audited the consolidated financial statements prepared by the Companies. Their reports on the consolidated financial statements are included in Part II, Item 8. Financial Statements and Supplementary Data. Deloitte & Touche LLP's reports on the Companies' internal control over financial reporting are referenced therein and included herein.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Dow Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Dow Inc. and subsidiaries (the "Company") as of December 31, 2022, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated financial statements as of and for the year ended December 31, 2022, of the Company and the financial statement schedule listed in the Index at Item 15(a)2 and our report dated February 1, 2023, expressed an unqualified opinion on those financial statements and financial statement schedule.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying *Management's Report on Internal Control over Financial Reporting*. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/S/ DELOITTE & TOUCHE LLP

Midland, Michigan
February 1, 2023

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholder and the Board of Directors of The Dow Chemical Company

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of The Dow Chemical Company and subsidiaries (the "Company") as of December 31, 2022, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated financial statements as of and for the year ended December 31, 2022, of the Company and the financial statement schedule listed in the Index at Item 15(a)2 and our report dated February 1, 2023, expressed an unqualified opinion on those financial statements and financial statement schedule.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying *Management's Report on Internal Control over Financial Reporting*. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/S/ DELOITTE & TOUCHE LLP

Midland, Michigan
February 1, 2023

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information relating to Directors, certain executive officers and certain corporate governance matters (including identification of members of the Audit Committee of the Board and financial expert(s)) is contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and is incorporated herein by reference. See also the information regarding executive officers of the registrant set forth in Part I, Item 1. Business under the caption "Executive Officers of the Registrant" in reliance on General Instruction G to Form 10-K.

This information is omitted for The Dow Chemical Company pursuant to General Instruction I of Form 10-K.

ITEM 11. EXECUTIVE COMPENSATION

Information relating to executive compensation and the Company's equity compensation plans is contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and is incorporated herein by reference.

This information is omitted for The Dow Chemical Company pursuant to General Instruction I of Form 10-K.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information with respect to beneficial ownership of Dow Inc. common stock by each Director and all Directors and executive officers of the Company as a group is contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and is incorporated herein by reference.

Information relating to any person who beneficially owns in excess of 5 percent of the total outstanding shares of Dow Inc. common stock is contained in the definitive Proxy Statement for the 2023 Annual Meeting of the Stockholders of Dow Inc. and is incorporated herein by reference.

Information with respect to compensation plans under which equity securities are authorized for issuance is contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and is incorporated herein by reference.

This information is omitted for The Dow Chemical Company pursuant to General Instruction I of Form 10-K.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Reportable relationships and related transactions, if any, as well as information relating to director independence are contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and are incorporated herein by reference.

This information is omitted for The Dow Chemical Company pursuant to General Instruction I of Form 10-K.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Independent Registered Public Accountants

Information with respect to fees and services related to the Company's independent auditors, Deloitte & Touche LLP ("Deloitte"), and the disclosure of the Audit Committee's pre-approval policies and procedures are contained in the definitive Proxy Statement for the 2023 Annual Meeting of Stockholders of Dow Inc. and are incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this report:

(1) The Company's 2022 Consolidated Financial Statements and the Report of Independent Registered Public Accounting Firm (PCAOB ID: 34) are included in Part II, Item 8. Financial Statements and Supplementary Data.

(2) Financial Statement Schedules – The following Financial Statement Schedule should be read in conjunction with the Consolidated Financial Statements and Report of Independent Registered Public Accounting Firm included in Part II, Item 8. Financial Statements and Supplementary Data:

Schedule II Valuation and Qualifying Accounts

Schedules other than the one listed above are omitted due to the absence of conditions under which they are required or because the information called for is included in the Consolidated Financial Statements or the Notes to the Consolidated Financial Statements.

(3) The following exhibits are filed with or incorporated by reference into this Annual Report on Form 10-K:

Exhibit No.	*Description of Exhibit*
2.1	Separation and Distribution Agreement, effective as of April 1, 2019, by and among Dow Inc., DuPont de Nemours, Inc. (formerly known as DowDuPont Inc.), and Corteva, Inc. (incorporated by reference to Exhibit 2.1 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).
2.2	Amended and Restated Shareholders' Agreement, effective as of March 25, 2021, between Excellent Performance Chemicals Company and Dow Saudi Arabia Holding B.V. (portions of this exhibit have been omitted because it is both (i) not material and (ii) the type of information that The Dow Chemical Company treats as private or confidential) (incorporated by reference to Exhibit 99.1 to Dow Inc. and The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on April 23, 2021).
2.3	Transaction Agreement, dated as of December 10, 2015, among The Dow Chemical Company, Corning Incorporated, Dow Corning Corporation and HS Upstate Inc. (incorporated by reference to Exhibit 2.1 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on December 11, 2015).
2.3.1	Tax Matters Agreement, dated as of December 10, 2015, among The Dow Chemical Company, Corning Incorporated, Dow Corning Corporation and HS Upstate Inc. (incorporated by reference to Exhibit 2.2 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on December 11, 2015).
3.1	Amended and Restated Certificate of Incorporation of Dow Inc. (incorporated by reference to Exhibit 3.1 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).
3.2	Amended and Restated Bylaws of Dow Inc. (incorporated by reference to Exhibit 3.2 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).
3.3	Amended and Restated Certificate of Incorporation of The Dow Chemical Company (incorporated by reference to Exhibit 3.1 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on September 1, 2017).
3.4	Amended and Restated Bylaws of The Dow Chemical Company (incorporated by reference to Exhibit 3.2 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on September 1, 2017).

4.1 Indenture, dated as of April 1, 1992 (the "1992 Indenture"), between The Dow Chemical Company and the First National Bank of Chicago, as trustee (incorporated by reference to Exhibit 4.1 to The Dow Chemical Company's Registration Statement on Form S-3, File No. 333-88617, filed with the SEC on October 8, 1999 (the "S-3 Registration Statement")).

4.1.1 Supplemental Indenture, dated as of January 1, 1994, between The Dow Chemical Company and The First National Bank of Chicago, as trustee, to the 1992 Indenture (incorporated by reference to Exhibit 4.2 to the S-3 Registration Statement).

4.1.2 Second Supplemental Indenture, dated as of October 1, 1999, between The Dow Chemical Company and Bank One Trust Company, N.A. (formerly The First National Bank of Chicago), as trustee, to the 1992 Indenture (incorporated by reference to Exhibit 4.3 to the S-3 Registration Statement).

4.1.3 Third Supplemental Indenture, dated as of May 15, 2001, between The Dow Chemical Company and Bank One Trust Company, N.A. (formerly The First National Bank of Chicago), as trustee, to the 1992 Indenture (incorporated by reference to Exhibit 4.4 to The Dow Chemical Company's Registration Statement on Form S-4, File No. 333-67368 filed with the SEC on August 13, 2001).

4.2 Indenture, dated May 1, 2008 (the "2008 Indenture"), between The Dow Chemical Company and The Bank of New York Trust Company, N.A., as trustee, (incorporated by reference to Exhibit 4.1 to Post-Effective Amendment No. 1 to The Dow Chemical Company's Registration Statement on Form S-3, File No. 333-140859, filed with the SEC on May 6, 2008).

4.2.1 First Supplemental Indenture, dated November 30, 2018, between The Dow Chemical Company, Dow Inc. (formerly known as Dow Holdings Inc.), and The Bank of New York Mellon Trust Company, N.A., as trustee, to the 2008 Indenture (incorporated by reference to Exhibit 4.1 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on December 3, 2018).

4.2.2 Second Supplemental Indenture, dated May 20, 2019, between The Dow Chemical Company, Dow Inc. and The Bank of New York Mellon Trust Company, N.A., as trustee, to the 2008 Indenture (incorporated by reference to Exhibit 4.1 to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on May 20, 2019).

4.3 Indenture, dated July 26, 2019 (the "2019 Indenture"), between The Dow Chemical Company and The Bank of New York Trust Company, N.A., as trustee (incorporated by reference to Exhibit 4.3 to Dow Inc. and The Dow Chemical Company's Annual Report on Form 10-K filed with the SEC on February 7, 2020).

4.4 Dow Inc. agrees to provide the SEC, on request, copies of all other such indentures and instruments that define the rights of holders of long-term debt of Dow Inc. and its consolidated subsidiaries, including The Dow Chemical Company, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K.

4.5 Description of Securities registered under Section 12 of the Securities Exchange Act of 1934 (incorporated by reference to Exhibit 4.5 to Dow Inc. and The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on January 31, 2023).

10.1 Tax Matters Agreement, effective as of April 1, 2019, by and among Dow Inc., DuPont de Nemours, Inc. (formerly known as DowDuPont Inc.), and Corteva Inc. (incorporated by reference to Exhibit 10.1 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).

10.2 Employee Matters Agreement, effective as of April 1, 2019, by and among Dow Inc., DuPont de Nemours, Inc. (formerly known as DowDuPont Inc.), and Corteva, Inc. (incorporated by reference to Exhibit 10.2 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).

10.3 Intellectual Property Cross-License Agreement, effective as of April 1, 2019, by and among Dow Inc. and DuPont de Nemours, Inc. (formerly known as DowDuPont Inc.) (incorporated by reference to Exhibit 10.3 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).

10.4 Intellectual Property Cross-License Agreement, dated as of April 1, 2019, by and among Dow Inc. and Corteva, Inc. (incorporated by reference to Exhibit 10.4 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 2, 2019).

10.5 Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.1 Form of Performance Stock Unit Award Agreement under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.1 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.2 Form of Restricted Stock Award Agreement under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.2 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.3 Form of Restricted Stock Unit Award Agreement under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.3 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.4 Form of Stock Appreciation Right Award Agreement under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.4 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.5 Form of Stock Option Award Agreement under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.5 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.6 Form of Restricted Stock Unit Award Agreement (Director) under the Dow Inc. 2019 Stock Incentive Plan effective as of April 1, 2019 (incorporated by reference to Exhibit 4.4.6 to Dow Inc.'s Registration Statement on Form S-3 filed with the SEC on April 1, 2019).

10.5.7 An Amendment to the Dow Inc. 2019 Stock Incentive Plan effective as of April 15, 2021 (incorporated by reference to Exhibit 10.5.7 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 16, 2021).

10.6 The Dow Chemical Company Executives' Supplemental Retirement Plan - Restricted and Cadre Benefits, as restated and effective September 1, 2017 (incorporated by reference to Exhibit 10(a)(iv) to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on November 3, 2017).

10.6.1 An Amendment to The Dow Chemical Company Executives' Supplemental Retirement Plan - Restricted and Cadre Benefits, effective January 1, 2018 (incorporated by reference to Exhibit 10.1.2 to The Dow Chemical Company's Annual Report on Form 10-K for the year ended December 31, 2018).

10.7 The Dow Chemical Company Executives' Supplemental Retirement Plan - Supplemental Benefits, as restated and effective September 1, 2017 (incorporated by reference to Exhibit 10(a)(v) to The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on November 3, 2017).

10.8 The Dow Chemical Company Elective Deferral Plan (Pre-2005), restated and effective as of April 1, 2019 (incorporated by reference to Exhibit 10.8 to Dow Inc. and The Dow Chemical Company's Quarterly Report on Form 10-Q filed with the SEC on May 3, 2019).

10.9 The Dow Chemical Company Elective Deferral Plan (Post 2004), restated and effective as of January 1, 2022 (incorporated by reference to Exhibit 10.9.1 to Dow Inc. and The Dow Chemical Company's Current Report on Form 8-K filed with the SEC on February 3, 2022).

10.10 Dow Inc. Voluntary Deferred Compensation Plan for Non-Employee Directors, restated and effective as of April 1, 2019 (incorporated by reference to Exhibit 10.10 to Dow Inc. and The Dow Chemical Company's Quarterly Report on Form 10-Q filed with the SEC on May 3, 2019).

10.11 Dow Inc. 2021 Employee Stock Purchase Plan effective as of April 15, 2021 (incorporated by reference to Exhibit 10.11 to Dow Inc.'s Current Report on Form 8-K filed with the SEC on April 16, 2021).

21* Subsidiaries of Dow Inc.

23.1.1* Consent of Independent Registered Public Accounting Firm for Dow Inc.

23.1.2* Consent of Independent Registered Public Accounting Firm for The Dow Chemical Company.

23.2* Ankura Consulting Group, LLC's Consent.

31.1* Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

31.2* Certification Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

32.1* Certification Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

32.2* Certification Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

101.INS The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.

101.SCH Inline XBRL Taxonomy Extension Schema Document.

101.CAL Inline XBRL Taxonomy Extension Calculation Linkbase Document.

101.DEF Inline XBRL Taxonomy Extension Definition Linkbase Document.

101.LAB Inline XBRL Taxonomy Extension Label Linkbase Document.

101.PRE Inline XBRL Taxonomy Extension Presentation Linkbase Document.

104 Cover Page Interactive Data File. The cover page interactive data file does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.

*Filed herewith

A copy of any exhibit can be obtained via the Internet through the Investor Relations section of the Company's website (*www.dow.com/investors*), or the Company will provide a copy of any exhibit upon receipt of a written request for the particular exhibit or exhibits desired. All requests should be addressed to the Controller and Vice President of Controllers and Tax of the Company at the address of the Company’s principal executive offices. The referenced website and its content are not deemed incorporated by reference into this report.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

Dow Inc. and Subsidiaries
The Dow Chemical Company and Subsidiaries

Valuation and Qualifying Accounts

Schedule II

(In millions) For the years ended Dec 31,	2022	2021	2020
Accounts Receivable - Allowance for Doubtful Receivables			
Balance at beginning of year	$ 54	$ 51	$ 45
Additions charged to expenses	61	16	22
Deductions from reserves [1]	(5)	(13)	(16)
Balance at end of year	$ 110	$ 54	$ 51
Inventory - Obsolescence Reserve			
Balance at beginning of year	$ 14	$ 23	$ 35
Additions charged to expenses	50	3	2
Deductions from reserves [2]	(7)	(12)	(14)
Balance at end of year	$ 57	$ 14	$ 23
Reserves for Other Investments and Noncurrent Receivables			
Balance at beginning of year	$ 2,033	$ 2,093	$ 2,215
Additions charged to expenses	17	19	7
Deductions from reserves [3]	(100)	(79)	(129)
Balance at end of year	$ 1,950	$ 2,033	$ 2,093
Deferred Tax Assets - Valuation Allowance			
Balance at beginning of year	$ 1,391	$ 1,302	$ 1,262
Additions charged to expenses	120	201	313
Deductions from reserves	(242)	(112)	(273)
Balance at end of year	$ 1,269	$ 1,391	$ 1,302

1. Deductions included write-offs, recoveries, currency translation adjustments and other miscellaneous items.
2. Deductions included disposals and currency translation adjustments.
3. Deductions from reserves for "Reserves for Other Investments and Noncurrent Receivables" included $77 million in 2022, 2021 and 2020 related to the Company's investment in Sadara. See Note 11 to the Consolidated Financial Statements for additional information.

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized, on February 1, 2023.

DOW INC.
THE DOW CHEMICAL COMPANY

/s/ RONALD C. EDMONDS
Ronald C. Edmonds, Controller and Vice President of Controllers and Tax
(Authorized Signatory and Principal Accounting Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report on Form 10-K has been signed below on February 1, 2023 by the following persons on behalf of the registrant and in the capacities indicated.

/s/ SAMUEL R. ALLEN
Samuel R. Allen, Director, Dow Inc.

/s/ GAURDIE E. BANISTER JR.
Gaurdie E. Banister Jr., Director, Dow Inc.

/s/ WESLEY G. BUSH
Wesley G. Bush, Director, Dow Inc.

/s/ RICHARD K. DAVIS
Richard K. Davis, Lead Director, Dow Inc.

/s/ JERRI DEVARD
Jerri DeVard, Director, Dow Inc.

/s/ DEBRA L. DIAL
Debra L. Dial, Director, Dow Inc.

/s/ RONALD C. EDMONDS
Ronald C. Edmonds, Controller and Vice President of Controllers and Tax, Dow Inc.
and TDCC (Authorized Signatory and Principal Accounting Officer)

/s/ JEFF M. FETTIG
Jeff M. Fettig, Director, Dow Inc.

/s/ JIM FITTERLING
Jim Fitterling, Director, Chairman and Chief Executive Officer, Dow Inc. and TDCC (Principal Executive Officer)

/s/ JACQUELINE C. HINMAN
Jacqueline C. Hinman, Director, Dow Inc.

/s/ LUIS ALBERTO MORENO MEJIA
Luis Alberto Moreno Mejia, Director, Dow Inc.

/s/ HOWARD UNGERLEIDER
Howard Ungerleider, President and Chief Financial Officer, Dow Inc. and TDCC;
Director, TDCC (Principal Financial Officer)

/s/ JILL S. WYANT
Jill S. Wyant, Director, Dow Inc.

/s/ DANIEL W. YOHANNES
Daniel W. Yohannes, Director, Dow Inc.

Trademark Listing

The following trademarks or service marks of The Dow Chemical Company and certain affiliated companies of Dow appear in this report: ACCUTRACE, ACOUSTICRYL, ACRYSOL, ACUSOL, AMPLIFY, AQUASET, AVANSE, CARBOWAX, DOW, DOWANOL, DOWSIL, DOWTHERM, DURATRACK, ECOFAST, ELITE, ELVALOY, ENDURANCE, EVOQUE, FASTRACK, FORMASHIELD, LP OXO, MAINCOTE, MAIZECARE, MOBILITYSCIENCE, NORDEL, PRIMAL, RENUVA, REVOLOOP, RHOPLEX, SENTRY, SILASTIC, SUNSPHERES, SYL-OFF, TAMOL, TERGITOL, TRITON, UCAR, UCON, UNIFINITY, VERSENE, WALOCEL

The following registered service mark of American Chemistry Council in the United States appears in this report:
Responsible Care®

The following trademark of the Business Intelligence Group appears in this report: BIG™

The following registered trademark of Disability:IN appears in this report: Disability Equality Index®

The following trademark of Edison Awards appears in this report: Edison Awards™

The following trademarks and registered trademarks of Great Place to Work® Institute, Inc. appears in this report: Great Place to Work®, Fortune 100 Best Companies to Work For®, PEOPLE Companies that Care®, Best Workplaces in Manufacturing & Production™

The following trademark of HACR Hispanic Association on Corporate Responsibility appears in this report:
HACR Corporate Inclusion Index™

The following registered trademark of InspereX Holdings LLC appears in this report: InterNotes®

® ™ Trademark of The Dow Chemical Company ("TDCC") or an affiliated company, except as otherwise specified.