2020 Annual Report

How We Performed in 2020

FINANCIAL PERFORMANCE

$317 Million – Net Earnings Attributable to Common Stockholders

$1.35 Billion – Adjusted EBITDA[1]

$1.23 Billion – Net Cash Provided by Operating Activities

$748 Million – Free Cash Flow[2]

OPERATIONAL PERFORMANCE

0.14 – Year-end rolling recordable average incident rate*

10.4 million tons – Gross ammonia production*

20.3 million tons – Sales volume*

**company record*

ENVIRONMENTAL PERFORMANCE

1.90 - Emissions intensity (tonnes of Scope 1 CO_2e/tonnes of gross ammonia)

41.73 - Energy intensity (gigajoules/tonnes of gross ammonia)

59,621 - Water consumption (megaliters)

For more information about our environmental, social and governance (ESG) agenda, please visit sustainability.cfindustries.com.

About CF Industries

At CF Industries, our mission is to provide clean energy to feed and fuel the world sustainably. With 3,000 employees focused on safe and reliable operations, environmental stewardship, and disciplined capital and corporate management, we are on a path to decarbonize our ammonia production network – the world's largest – to enable green and blue hydrogen and nitrogen products for energy, fertilizer, emissions abatement and other industrial activities. Our 9 manufacturing complexes in the United States, Canada, and the United Kingdom, an unparalleled storage, transportation and distribution network in North America, and logistics capabilities enabling a global reach underpin our strategy to leverage our unique capabilities to accelerate the world's transition to clean energy. For additional information, please visit www.cfindustries.com.

[1] EBITDA is defined as net earnings attributable to common stockholders plus interest expense — net, income taxes and depreciation and amortization. See reconciliations of EBITDA and adjusted EBITDA to the most directly comparable GAAP measures under "Reconciliation of Non-GAAP Financial Measures".
[2] Free cash flow is defined as net cash from operating activities less capital expenditures and distributions to noncontrolling interests. See reconciliation of free cash flow to the most directly comparable GAAP measure under "Reconciliation of Non-GAAP Financial Measures".

Letter to Shareholders

Fellow CF Industries Shareholders:

Your company delivered strong results in 2020 that reflect outstanding execution by the CF Industries team across all aspects of our business. In a year filled with unprecedented challenges, we operated safely, ran our network extremely well, delivered strong financial results despite a difficult pricing environment, and rolled out a new strategic direction linked with meaningful ESG commitments.

CF Industries continued our longstanding commitment to our communities during the pandemic, donating personal protective equipment and supporting local food banks with nearly $600,000 in donations.

I want to highlight a few of our more significant accomplishments in 2020. We achieved our lowest year-end recordable incident rate ever, ending the year with only four recordable injuries and zero lost time injuries across our network. As is typically the case, safe operations are also more productive. We produced a company record 10.4 million tons of gross ammonia, and set records for shipping and sales at over 20 million product tons for the first time.

This level of performance would be considered outstanding in any year. But setting these records in the midst of a global pandemic is an amazing accomplishment and a testament to the focus and commitment of our employees.

Throughout the COVID-19 pandemic, our team has adapted how we work in order to protect the health and well-being of employees and all those who enter our locations. We are proud of our collective efforts during this unprecedented time and are pleased to report that we have not experienced a single known transmission of the virus at any of our locations, nor have we experienced disruptions to our business from the pandemic.

For the full year of 2020, our net earnings attributable to common stockholders were $317 million, EBITDA[1] was $1.32 billion and adjusted EBITDA was $1.35 billion. We continue to efficiently convert EBITDA into free cash flow. Net cash from operating activities was $1.23 billion and free cash flow was approximately $750 million. Our free cash flow to adjusted EBITDA conversion of 55 percent[3] was the highest rate among our peers.

[3] Represents LTM free cash flow divided by LTM adjusted EBITDA (or EBITDA excluding special items); see "Reconciliation of Non-GAAP Financial Measures" for the calculation of free cash flow and for the reconciliation of FY2020 adjusted EBITDA

CREATING LONG-TERM SHAREHOLDER VALUE

At our core, CF Industries is a producer of ammonia. For decades, we have used the Haber-Bosch process to fix atmospheric nitrogen with hydrogen from natural gas to produce anhydrous ammonia. Up to this point, we have made a business of selling ammonia, and other derivative fertilizer products such as urea and UAN, for the nitrogen value of the molecule.

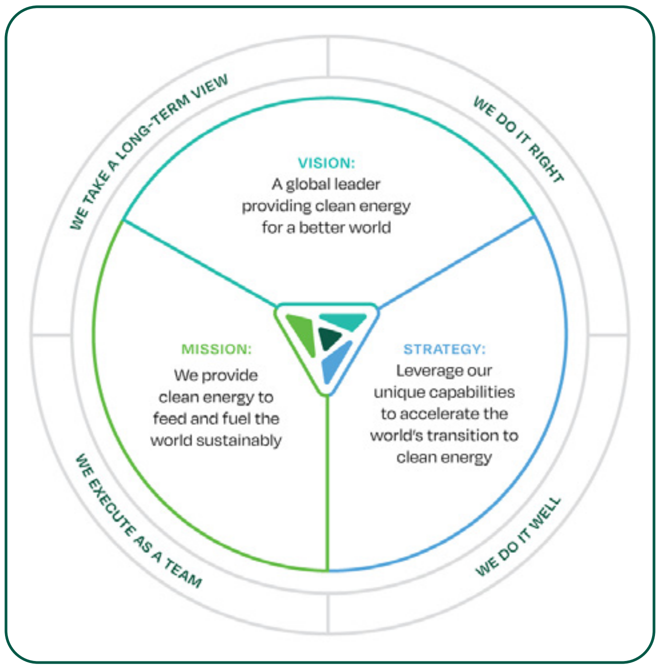
Humankind's ability to produce nitrogen fertilizer has had an undeniably positive effect on the world. Along with advancements in seed technology and farming practices, the growing use of nitrogen fertilizer and other nutrients dramatically increased food production in the second half of the 1900s and lifted countless people out of hunger. At the same time, because fertilizer increases yield, it allows more food to be grown on fewer acres. This reduces the amount of land cleared for agriculture, preserving carbon sequestering forests and important wildlife ecosystems.

We have leveraged our unique asset base and capabilities to efficiently and cost-effectively produce and sell nitrogen fertilizer, enabling the Company to generate substantial free cash flow. Over the last four years, we have substantially strengthened our balance sheet, retiring $1.85 billion in debt, with an additional $250 million repaid in March 2021. We also have used $1.3 billion for share repurchases and growth initiatives as well as returned approximately $1.1 billion to shareholders through dividends.

Despite our high level of financial performance, substantial free cash generation and significant capital deployment, our total shareholder return has lagged our expectations.

As we considered the apparent disconnect between our operational and financial performance with that of our share price, we believed a key aspect of our business was constraining share price appreciation: our carbon footprint. Although our plants are some of the most efficient in the global industry, the production process of ammonia is energy intensive and therefore results in significant carbon emissions, a fact that is increasingly viewed unfavorably by the investment community.

It became obvious that we had to significantly reduce our carbon footprint. At the same time, we saw an incredible opportunity to help the broader economy decarbonize as well.



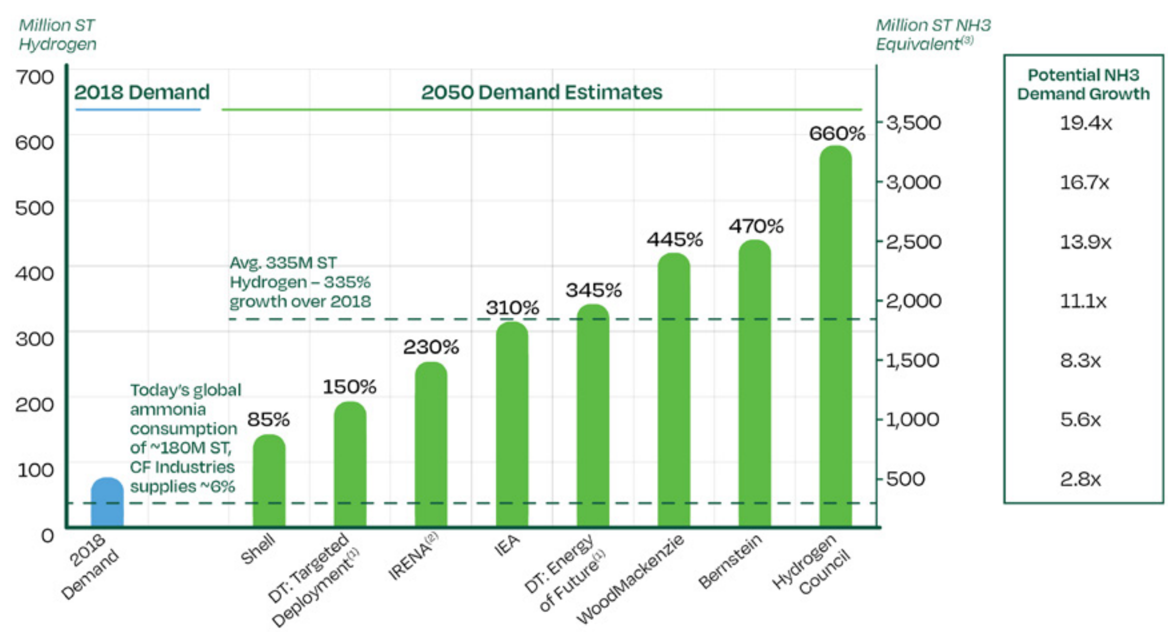
COMMITMENT TO THE CLEAN ENERGY ECONOMY

The global focus on climate change and greenhouse gas emissions has created a push to decarbonize economies. To achieve global climate goals and reduce GHG emissions, the world needs to dramatically increase and scale clean energy technology. Hydrogen, which can be produced with zero carbon emissions through the electrolysis of water, has emerged as a leading candidate for a scalable clean energy source.

The key to unlocking hydrogen as a clean fuel is the ability to store and transport it for use – which is a challenge many renewable energy sources face. This is what makes ammonia the key enabler for a clean energy future. Ammonia is a highly efficient and stable mechanism for the storage and transport of hydrogen. Ammonia's energy density allows for more economic transport of energy compared to liquid hydrogen, gaseous hydrogen and especially lithium batteries. Additionally, a global ammonia transportation and storage infrastructure already exists at over 120 seaports.

As a result, given the expected demand growth for hydrogen as a clean energy source, we believe that demand for green and net-zero-carbon (blue) ammonia as a storage and transport medium for hydrogen, as well as a clean fuel in its own right, will grow dramatically. In fact, if only a portion of the expected growth in hydrogen demand is supported by zero-carbon ammonia, ammonia demand will increase significantly over the current annual global ammonia capacity of 180 million tons.

POTENTIAL LONG-TERM DEMAND FOR HYDROGEN



Source: IEA, Wood Mackenzie, Bernstein: Hydrogen Highway 2020: Ready for Prime Time Deloitte: Australian and Global Hydrogen Demand Growth Scenario Analysis, prepared for COAG Energy Council – National Hydrogen Strategy Taskforce, November 2019

(1) Deloitte (DT) Scenarios: Energy of the Future –Hydrogen demand where all aspects of industry development are favorable for Hydrogen; Targeted Deployment – Countries adopt a targeted approach which aims to maximize economic value in the development of Hydrogen; (2) IRENA is the International Renewable Energy Agency; (3) Each ST of ammonia contains 17.65% hydrogen by mass. 5.67 ST of ammonia are required for each ST of hydrogen

Therefore, the ability to produce green and blue ammonia at scale opens up a significant market opportunity in the coming years as countries and industries shift to the use of clean fuels.

Our strategy is to leverage our unique assets and capabilities to accelerate the world's transition to clean energy. Our existing scale and commitment to produce green and zero-carbon ammonia establishes us as a clear leader in providing clean fuels for a sustainable world.

- We are the world's largest manufacturer of ammonia, producing approximately 10 million tons of ammonia per year at nine manufacturing complexes. This means we already produce nearly 2 million tons of hydrogen on average annually as a chemical component of ammonia.
- We are the safest and most efficient operators in our industry, with deep technical expertise, enabling superior capacity utilization compared to our peers.
- And we have the world's largest and most integrated ammonia production and distribution network, with the ability to serve demand on all continents.

We are committed to decarbonize our network and aggressively scale our ability to produce green and blue ammonia, positioning CF Industries at the forefront of clean hydrogen and ammonia supply. In addition to decarbonizing our own ammonia production, we will be providing the world with a carbon-free source of energy that can be substituted for fossil fuels, creating a multiplicative benefit for the planet. We also expect demand for these products to increase as the agriculture industry decarbonizes. As we execute our strategy and help develop the market for green and blue ammonia, we expect to deliver significant long-term value for all our stakeholders.

INITIATIVES UNDERWAY IN SUPPORT OF OUR STRATEGY

GREEN AMMONIA MANUFACTURING
Initial investment in green ammonia electrolysis project at Donaldsonville Nitrogen Complex

AMMONIA FOR HYDROGEN STORAGE & TRANSPORT
Partnering with companies developing end-market applications/demand

CO_2 SEQUESTRATION
Developing numerous carbon capture and sequestration (CCS) projects near CF Industries production facilities

AMMONIA AS A FUEL
In discussions for supplying ammonia as marine fuel and for global power generation

CO_2 ABATEMENT
Evaluating certified CO_2 abatement projects within the existing network

CLEAN ENERGY AS PART OF OUR BROADER COMMITMENT TO SOCIETY

Our business strategy is also aligned with our commitment to have a positive impact across the many issues important to our broad group of stakeholders.

We communicate our performance in these areas and others through our annual ESG reporting. Our annual Sustainability Report is now available, as are our submissions under the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB) framework and, for the first time, the Task Force on Climate-related Financial Disclosures (TCFD).

The Company has made substantial progress in 2020 on our approach to ESG-related matters. Most notably, the Company announced a set of comprehensive ESG goals covering critical environmental, societal, and workforce imperatives. These include a dramatic reduction in carbon emissions across our global network with a commitment to achieve net-zero carbon emissions by 2050, and an intermediate goal of 25% reduction in emission intensity by 2030.

We also have made specific goals related to inclusion and diversity. We view our commitment to inclusion and diversity as analogous to our commitment to a safe workplace – we make it a priority simply because it is the right thing to do and it makes us a better company. Just as we want everyone to go home in the same condition at the end of the day as when they arrived, we want everyone to feel welcomed and valued as a part of our team.

Since 2019, your senior leadership team had been working on updating the underlying principles of the Company's Core Values: We Do It Right, We Do It Well, We Execute as a Team and We Take a Long-term View. One of the most notable set of updates to the underlying principles was a more explicit expression across the Core Values of our longstanding commitment to inclusion and diversity at our Company. The goals we established in 2020 related to inclusion and diversity will build on this work in the years ahead.

Our complete list of ESG goals can be found at www.cfindustries.com as well as in our 2020 Sustainability Report.

Given the critical importance of these efforts to the company, shareholders and stakeholders, the Board of Directors has begun aligning executive compensation directly to ESG objectives. It has also established a new committee, the Environmental Sustainability and Community Committee, to oversee all aspects of the progress toward net-zero carbon emissions and the company's active involvement in the communities in which it operates.

We encourage you to spend time across all our annual reporting documents to understand the scope of our impact on and contributions to society. We look forward to our ongoing discussions on the positive impact CF Industries has had on the world, and how we are approaching emerging issues important to stakeholders.

THE CLEAN ENERGY FUTURE

We are extremely proud of our performance in 2020 and see tremendous potential for 2021 and beyond. Nitrogen industry dynamics for producers in North America are the most favorable we have seen in nearly a decade. With rapidly developing demand for the hydrogen content of ammonia in clean energy applications, we believe the global ammonia market will soon need to incentivize new greenfield ammonia projects to meet this demand.

Longer-term, we are uniquely positioned to execute our strategy and fulfill our mission to provide clean energy to feed and fuel the world sustainably. Our commitment to decarbonize the world's largest ammonia production network positions CF Industries at the forefront of clean hydrogen and ammonia supply. As we do this, we will build on our Company's substantial legacy, continuing to help the world meet its greatest challenges: to feed a growing population while decarbonizing the global economy.

Thank you for your confidence in CF Industries. We look forward to working with you and earning your continued support in the years ahead.

Tony Will
President and Chief Executive Officer

Board of Directors

JAVED AHMED
Retired Chief Executive Officer, Tate & Lyle PLC

ROBERT C. ARZBAECHER
Retired Chairman, President and Chief Executive Officer, Actuant Corporation

WILLIAM DAVISSON*
Retired Chief Executive Officer, GROWMARK, Inc.

JOHN W. EAVES
Executive Chairman, Arch Resources, Inc.

STEPHEN A. FURBACHER
Chairman of the Board, CF Industries Holdings, Inc.
Retired President and Chief Operating Officer, Dynegy Inc.

STEPHEN J. HAGGE
Retired President and Chief Executive Officer, AptarGroup, Inc.

ANNE P. NOONAN
President and Chief Executive Officer, Summit Materials

MICHAEL J. TOELLE
Owner, T&T Farms

THERESA E. WAGLER
Executive Vice President and Chief Financial Officer, Steel Dynamics, Inc.

CELSO L. WHITE
Former Global Supply Chain Officer, Molson Coors Brewing Company

W. ANTHONY WILL
President and Chief Executive Officer, CF Industries Holdings, Inc.

**William Davisson is retiring from the Board of Directors in 2021*

Senior Management

DOUGLAS C. BARNARD
Senior Vice President, General Counsel and Secretary

CHRISTOPHER D. BOHN
Senior Vice President and Chief Financial Officer

LINDA M. DEMPSEY
Vice President, Public Affairs

BERT A. FROST
Senior Vice President, Sales, Market Development and Supply Chain

DAVID P. HOPKINS*
Managing Director, CF Fertilisers UK

ASHRAF K. MALIK
Senior Vice President, Manufacturing and Distribution

SUSAN L. MENZEL
Senior Vice President, Human Resources

W. ANTHONY WILL
President and Chief Executive Officer

**David P. Hopkins is retiring from CF Industries on April 30, 2021*

Reconciliation of Non-GAAP Financial Measures

The company reports its financial results in accordance with U.S. generally accepted accounting principles (GAAP). Management believes that EBITDA, adjusted EBITDA, free cash flow, and free cash flow yield, which are non-GAAP financial measures, provide additional meaningful information regarding the company's performance and financial strength. Non-GAAP financial measures should be viewed in addition to, and not as an alternative for, the company's reported results prepared in accordance with GAAP. In addition, because not all companies use identical calculations, EBITDA, adjusted EBITDA, free cash flow, and free cash flow yield included in this annual report may not be comparable to similarly titled measures of other companies. Reconciliations of EBITDA, adjusted EBITDA, free cash flow, and free cash flow yield to the most directly comparable GAAP measures are provided below.

EBITDA is defined as net earnings attributable to common stockholders plus interest expense — net, income taxes and depreciation and amortization. Other adjustments include the elimination of loan fee amortization that is included in both interest and amortization, and the portion of depreciation that is included in noncontrolling interests.

The company has presented EBITDA because management uses the measure to track performance and believes that it is frequently used by securities analysts, investors and other interested parties in the evaluation of companies in the industry.

Adjusted EBITDA is defined as EBITDA adjusted with the selected items included in EBITDA as summarized in the table below. The company has presented adjusted EBITDA because management uses adjusted EBITDA, and believes it is useful to investors, as a supplemental financial measure in the comparison of year-over-year performance.

Free cash flow is defined as net cash provided by operating activities, as stated in the consolidated statements of cash flows, reduced by capital expenditures and distributions to noncontrolling interests. Free cash flow to adjusted EBITDA conversion is defined as free cash flow divided by adjusted EBITDA. The company has presented free cash flow, free cash flow to adjusted EBITDA conversion, and free cash flow yield because management uses these measures and believes they are useful to investors, as indications of the strength of the company and its ability to generate cash and to evaluate the company's cash generation ability relative to its industry competitors. It should not be inferred that the entire free cash flow amount is available for discretionary expenditures.

NON-GAAP: RECONCILIATION OF NET EARNINGS TO EBITDA AND ADJUSTED EBITDA

IN MILLIONS	Q4 2020	Q4 2019	FY 2020	FY 2019
Net earnings	$119	$94	$432	$646
Less: Net earnings attributable to noncontrolling interest	(32)	(39)	(115)	(153)
Net earnings attributable to common stockholders	87	55	317	493
Interest expense – net	38	47	161	217
Income tax (benefit) provision	(2)	13	31	126
Depreciation and amortization	230	212	892	875
Less other adjustments:				
Depreciation and amortization in noncontrolling interest	(18)	(19)	(80)	(82)
Loan fee amortization[1]	(1)	(2)	(5)	(9)
EBITDA	$334	$306	$1,316	$1,620
Unrealized net mark-to-market loss (gain) on natural gas derivatives	6	11	(6)	14
COVID impact: Special COVID-19 bonus for operational workforce	-	-	19	-
COVID impact: Turnaround deferral[2]	-	-	7	-
(Gain) loss on foreign currency transactions, including intercompany loans	(2)	(13)	5	(1)
Engineering cost write-off[3]	-	-	9	-
Loss on sale of surplus land	-	-	2	-
Gain on sale of Pine Bend facility	-	-	-	(45)
Property insurance proceeds[4]	-	-	(2)	(15)
PLNL withholding tax charge[5]	-	-	-	16
Loss on debt extinguishment	-	21	-	21
Total adjustments	4	19	34	(10)
Adjusted EBITDA	$338	$325	$1,350	$1,610

(1) Loan fee amortization is included in both interest expense—net and depreciation and amortization

(2) Represents expense incurred due to the deferral of certain plant turnaround activities as a result of the COVID-19 pandemic

(3) Represents costs written off upon the cancellation of a project at one of our nitrogen complexes

(4) Represents proceeds related to a property insurance claim at one of our nitrogen complexes

(5) Represents a charge in the year ended December 31, 2019 on the books of Point Lisas Nitrogen Limited (PLNL), the Company's Trinidad joint venture, for a tax withholding matter; amount reflects our 50 percent equity interest in PLNL

NON-GAAP: RECONCILIATION OF LTM CASH FROM OPERATIONS TO FREE CASH FLOW AND FREE CASH FLOW YIELD

IN MILLIONS, EXCEPT PERCENTAGES AND RATIOS	CF	YARA	MOSAIC	NUTRIEN	OCI
Cash provided by operating activities[1]	$1,231	$2,047	$1,583	$3,323	$393
Capital expenditures	(309)	(739)	(1,171)	(1,423)	(264)
Noncontrolling interests	(174)	-	-	-	(26)
Principal amount of lease payments[2]	-	(122)	-	(274)	(42)
Free cash flow[3]	$748	$1,186	$412	$1,626	$61
Free cash flow yield[4]	7.7%	9.1%	3.5%	5.0%	1.3%
Free cash flow to adjusted EBITDA conversion[5]	55.4%	54.9%	26.4%	44.3%	7.3%

(1) LTM cash provided by operating activities (cash from operations) for CF Industries, Yara International, Mosaic, and Nutrien is the 12-month period ending December 31, 2020 and OCI N.V. is the 12-month period ending September 30, 2020

(2) The accounting for leases for companies whose financial statements are prepared in accordance with International Financial Reporting Standards (IFRS) has changed due to the application of 'IFRS 16 Leases'. As a result, the principal amount of lease payments, which are classified as financing activities under IFRS 16, have been included in the calculation of free cash flow to allow for a comparison to prior periods, which may not have been restated, and to financial statements prepared under US GAAP

(3) Represents cash provided by operating activities less capital expenditures less distributions to noncontrolling interests less principal amount of lease payments classified as financing activities under IFRS calculated from the December 31, 2020 consolidated statements of cash flows for CF Industries, Yara International, Mosaic, and Nutrien and the September 30, 2020 and December 31, 2019 consolidated statements of cash flows for OCI N.V.

(4) Represents LTM free cash flow at the end of each respective period divided by market value of equity (market cap) as of February 16, 2021

(5) Represents LTM free cash flow divided by LTM adjusted EBITDA

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2020

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 001-32597

CF INDUSTRIES HOLDINGS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**20-2697511**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
4 Parkway North, Suite 400	**60015**
Deerfield, Illinois	(Zip Code)
(Address of principal executive offices)	

(847) 405-2400

(Registrant’s telephone number, including area code)

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

Title of each class	Trading symbol(s)	Name of each exchange on which registered
common stock, par value $0.01 per share	CF	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. 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. 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. 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). 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.

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. ☐

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. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the registrant’s common stock held by non-affiliates as of June 30, 2020 (the last business day of the registrant’s most recently completed second fiscal quarter), computed by reference to the closing sale price of the registrant’s common stock, was $5,984,082,631.

214,159,740 shares of the registrant’s common stock, par value $0.01 per share, were outstanding as of January 29, 2021.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for its 2021 annual meeting of stockholders (Proxy Statement) are incorporated by reference into Part III of this Annual Report on Form 10-K. The Proxy Statement will be filed with the Securities and Exchange Commission, pursuant to Regulation 14A, not later than 120 days after the end of the 2020 fiscal year, or, if the registrant does not file the Proxy Statement within such 120-day period, the registrant will amend this Annual Report on Form 10-K to include the information required under Part III hereof not later than the end of such 120-day period.

CF INDUSTRIES HOLDINGS, INC.

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PART I

ITEM 1. BUSINESS.

Our Company

All references to "CF Holdings," "we," "us," "our" and "the Company," refer to CF Industries Holdings, Inc. and its subsidiaries, except where the context makes clear that the reference is only to CF Industries Holdings, Inc. itself and not its subsidiaries. All references to "CF Industries" refer to CF Industries, Inc., a 100% owned subsidiary of CF Industries Holdings, Inc. Notes referenced throughout this document refer to consolidated financial statement note disclosures that are found in Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements.

We are a leading global manufacturer of hydrogen and nitrogen products for clean energy, fertilizer, emissions abatement, and other industrial applications. We operate nitrogen manufacturing complexes in the United States, Canada and the United Kingdom, which are among the most cost-advantaged, efficient and flexible in the world, and an extensive storage, transportation and distribution network in North America. Our 3,000 employees focus on safe and reliable operations, environmental stewardship and disciplined capital and corporate management, driving our strategy to leverage our unique capabilities to accelerate the world's transition to clean energy. Our principal customers are cooperatives, independent fertilizer distributors, traders, wholesalers and industrial users. Our core product is anhydrous ammonia (ammonia), which contains 82% nitrogen and 18% hydrogen. Our nitrogen products that are upgraded from ammonia are granular urea, urea ammonium nitrate solution (UAN) and ammonium nitrate (AN). Our other nitrogen products include diesel exhaust fluid (DEF), urea liquor, nitric acid and aqua ammonia, which are sold primarily to our industrial customers, and compound fertilizer products (NPKs), which are solid granular fertilizer products for which the nutrient content is a combination of nitrogen, phosphorus and potassium.

Our principal assets as of December 31, 2020 include:

- five U.S. nitrogen manufacturing facilities, located in Donaldsonville, Louisiana (the largest nitrogen complex in the world); Port Neal, Iowa; Yazoo City, Mississippi; Verdigris, Oklahoma; and Woodward, Oklahoma. These facilities are wholly owned directly or indirectly by CF Industries Nitrogen, LLC (CFN), of which we own approximately 89% and CHS Inc. (CHS) owns the remainder;
- two Canadian nitrogen manufacturing facilities, located in Medicine Hat, Alberta (the largest nitrogen complex in Canada) and Courtright, Ontario;
- two United Kingdom nitrogen manufacturing facilities, located in Billingham and Ince;
- an extensive system of terminals and associated transportation equipment located primarily in the Midwestern United States; and
- a 50% interest in Point Lisas Nitrogen Limited (PLNL), an ammonia production joint venture located in the Republic of Trinidad and Tobago that we account for under the equity method.

We have a strategic venture with CHS under which CHS owns an equity interest in CFN, a subsidiary of CF Holdings, which represents approximately 11% of the membership interests of CFN. We own the remaining membership interests. CHS also receives deliveries pursuant to a supply agreement under which CHS has the right to purchase annually from CFN up to approximately 1.1 million tons of granular urea and 580,000 tons of UAN at market prices. As a result of its minority equity interest in CFN, CHS is entitled to semi-annual cash distributions from CFN. We are also entitled to semi-annual cash distributions from CFN. See Note 17—Noncontrolling Interests for additional information on our strategic venture with CHS.

For the years ended December 31, 2020, 2019 and 2018, we sold 20.3 million, 19.5 million and 19.3 million product tons generating net sales of $4.12 billion, $4.59 billion and $4.43 billion, respectively.

Our principal executive offices are located outside of Chicago, Illinois, at 4 Parkway North, Suite 400, Deerfield, Illinois 60015, and our telephone number is 847-405-2400. Our Internet website address is *www.cfindustries.com.* Information made available on our website does not constitute part of this Annual Report on Form 10-K.

We make available free of charge on or through our Internet website, *www.cfindustries.com*, all of our reports on Forms 10-K, 10-Q and 8-K and all amendments to those reports as soon as reasonably practicable after such material is filed electronically with, or furnished to, the Securities and Exchange Commission (SEC). Copies of our Corporate Governance Guidelines, Code of Corporate Conduct and charters for the Audit Committee, Compensation and Management Development Committee, Corporate Governance and Nominating Committee, and Environmental Sustainability and Community Committee of our Board of Directors (the Board) are also available on our Internet website. We will provide electronic or paper copies of these documents free of charge upon request. The SEC also maintains a website at *www.sec.gov* that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC.

Our Commitment to a Clean Energy Economy

In October 2020, we announced that we are taking significant steps to support a global hydrogen and clean fuel economy, through the production of green and low-carbon ammonia. Since ammonia is one of the most efficient ways to transport and store hydrogen and is also a fuel in its own right, we believe that the Company, as the world's largest producer of ammonia, with an unparalleled manufacturing and distribution network and deep technical expertise, is uniquely positioned to fulfill anticipated demand for hydrogen and ammonia from green and low-carbon sources. Our strategy is to leverage our unique capabilities to accelerate the world's transition to clean energy. Our approach will focus on green ammonia production, which refers to ammonia produced through a carbon-free process, and low-carbon ammonia, which relates to ammonia produced by conventional processes but with CO_2 removed through carbon capture and sequestration (CCS) and other certified carbon abatement projects. We have announced an initial green ammonia project at our flagship Donaldsonville nitrogen complex to produce approximately 20,000 tons per year of green ammonia. Additionally, we are developing CCS and other carbon abatement projects across our production facilities that will enable us to produce low-carbon ammonia.

Company History

We were founded in 1946 as Central Farmers Fertilizer Company, and were owned by a group of regional agriculture cooperatives for the first 59 years of our existence. Central Farmers became CF Industries in 1970.

Originally established as a fertilizer brokerage company, we expanded owning and operating fertilizer manufacturing and distribution facilities in the early 1950s with a principal objective of assured supply for our owners. At various times in our history, we manufactured and/or distributed nitrogen, phosphate and potash fertilizers.

We operated as a traditional manufacturing and supply cooperative until 2002, when we adopted a new business model that established financial performance as our principal objective, rather than assured supply to our owners. A critical aspect of the new business model was to establish a more economically driven approach to the marketplace.

In August 2005, we completed our initial public offering (IPO) of common stock, which is listed on the New York Stock Exchange. In connection with the IPO, we consummated a reorganization transaction whereby we ceased to be a cooperative and our pre-IPO owners' equity interests in CF Industries were canceled in exchange for all of the proceeds of the offering and shares of our common stock. At the time of the IPO, our assets consisted of one wholly owned nitrogen manufacturing facility in Louisiana, United States; a joint venture nitrogen manufacturing facility in Alberta, Canada, of which we owned 66 percent; a phosphate mining and manufacturing operation in Florida, United States; and distribution facilities throughout North America.

In April 2010, we acquired Terra Industries Inc. (Terra), a leading North American producer and marketer of nitrogen fertilizer products for a purchase price of $4.6 billion, which was paid in cash and shares of our common stock. As a result of the Terra acquisition, we acquired five nitrogen fertilizer manufacturing facilities, an approximately 75.3% interest in TNCLP and certain joint venture interests.

In March 2014, we exited our phosphate mining and manufacturing business, which was located in Florida, through a sale to The Mosaic Company for approximately $1.4 billion in cash. As a result, our company became focused solely on nitrogen manufacturing and distribution.

In July 2015, we acquired the remaining 50% equity interest in CF Fertilisers UK Group Limited (formerly known as GrowHow UK Group Limited) (CF Fertilisers UK) not previously owned by us for total consideration of $570 million, and CF Fertilisers UK became wholly owned by us. This transaction added CF Fertilisers UK's nitrogen manufacturing complexes in Ince, United Kingdom and Billingham, United Kingdom to our consolidated manufacturing capacity.

In February 2016, our strategic venture with CHS commenced, at which time CHS made a capital contribution of $2.8 billion to CFN in exchange for membership interests in CFN, which represented approximately 11% of the total membership interests of CFN.

In late 2015 and 2016, we completed certain capacity expansion projects at Donaldsonville, Louisiana and Port Neal, Iowa. These projects, originally announced in 2012, included the construction of new ammonia, urea, and UAN plants at our Donaldsonville, Louisiana complex and new ammonia and urea plants at our Port Neal, Iowa complex. These plants increased our overall production capacity by approximately 25%, improved our product mix flexibility at Donaldsonville, and improved our ability to serve upper-Midwest urea customers from our Port Neal location. The total capital cost of the capacity expansion projects was $5.2 billion.

Prior to April 2, 2018, Terra Nitrogen, Limited Partnership, which owns and operates our nitrogen manufacturing facility in Verdigris, Oklahoma, was a subsidiary of Terra Nitrogen Company, L.P. (TNCLP). TNCLP was a publicly traded limited partnership of which we were the sole general partner and the majority limited partner, and in which we owned an approximate 75.3% interest.

In 2018, we announced that, in accordance with the terms of TNCLP's First Amended and Restated Agreement of Limited Partnership (as amended by Amendment No. 1 to the First Amended and Restated Agreement of Limited Partnership, the TNCLP Agreement of Limited Partnership), Terra Nitrogen GP Inc. (TNGP), the sole general partner of TNCLP and an indirect wholly owned subsidiary of CF Holdings, elected to exercise its right to purchase all of the 4,612,562 publicly traded common units of TNCLP (the TNCLP Public Units). On April, 2, 2018, TNGP completed its purchase of the TNCLP Public Units (the Purchase) for an aggregate cash purchase price of $388 million. We funded the Purchase with cash on hand. Upon completion of the Purchase, CF Holdings owned, through its subsidiaries, 100 percent of the general and limited partnership interests of TNCLP.

Product Tons and Nutrient Tons

Unless otherwise stated, we measure our production and sales volume in this Annual Report on Form 10-K in product tons, which represents the weight of the product measured in short tons (one short ton is equal to 2,000 pounds). References to UAN product tons assume a 32% nitrogen content basis for production volume.

We also provide certain supplementary volume information measured in nutrient tons. Nutrient tons represent the weight of the product's nitrogen content, which varies by product. Ammonia represents 82% nitrogen content, granular urea represents 46% nitrogen content, UAN represents between 28% and 32% nitrogen content and AN represents between 29% and 35% nitrogen content.

Reportable Segments

Our reportable segments consist of the following segments: ammonia, granular urea, UAN, AN and Other. These segments are differentiated by products. We use gross margin to evaluate segment performance and allocate resources. Total other operating costs and expenses (consisting of selling, general and administrative expenses and other operating—net) and non-operating expenses (interest and income taxes), are centrally managed and are not included in the measurement of segment profitability reviewed by management. See Note 21—Segment Disclosures for additional information.

Our Products

Our primary nitrogen products are ammonia, granular urea, UAN and AN. Our historical sales of nitrogen products are shown in the following table. Net sales do not reflect amounts used internally, such as ammonia, in the manufacture of other products.

	2020		2019		2018	
	Sales Volume (tons)	Net Sales	Sales Volume (tons)	Net Sales	Sales Volume (tons)	Net Sales
	(tons in thousands; dollars in millions)					
Products						
Ammonia	3,767	$ 1,020	3,516	$ 1,113	3,135	$ 1,028
Granular urea	5,148	1,248	4,849	1,342	4,898	1,322
UAN	6,843	1,063	6,807	1,270	7,042	1,234
AN	2,216	455	2,109	506	2,002	460
Other[(1)]	2,322	338	2,257	359	2,252	385
Total	20,296	$ 4,124	19,538	$ 4,590	19,329	$ 4,429

(1) Other segment products include DEF, urea liquor, nitric acid, aqua ammonia and NPKs.

Gross margin was $801 million, $1,174 million and $917 million for the years ended December 31, 2020, 2019 and 2018, respectively.

We own and operate seven nitrogen manufacturing facilities in North America, including five nitrogen manufacturing facilities in the United States, and two in Canada. As of December 31, 2020, the combined production capacity of these seven facilities represented approximately 37%, 42%, 44% and 19% of North American ammonia, granular urea, UAN and AN production capacity, respectively. Each of our nitrogen manufacturing facilities in North America has on-site storage to provide flexibility to manage the flow of outbound shipments without impacting production. We also operate two United Kingdom nitrogen manufacturing facilities that produce ammonia, AN and NPKs and serve primarily the British agricultural and industrial markets.

The following table shows the production capacities as of December 31, 2020 at each of our nitrogen manufacturing facilities:

	Average Annual Capacity[(1)]					
	Gross Ammonia[(2)]	Net Ammonia[(2)]	UAN[(3)]	Urea[(4)]	AN[(5)]	Other[(6)]
	(tons in thousands)					
Donaldsonville, Louisiana[(7)]	4,335	1,390	3,255	2,635	—	445
Medicine Hat, Alberta	1,230	770	—	810	—	—
Port Neal, Iowa	1,230	110	800	1,350	—	110
Verdigris, Oklahoma[(8)]	1,210	430	1,955	—	—	—
Woodward, Oklahoma	480	130	810	—	—	115
Yazoo City, Mississippi[(8)(9)]	570	—	160	—	1,035	125
Courtright, Ontario[(8)(10)]	500	265	345	—	—	400
Ince, U.K.[(11)]	380	15	—	—	575	415
Billingham, U.K.[(8)]	595	230	—	—	625	410
	10,530	3,340	7,325	4,795	2,235	2,020
Unconsolidated Affiliate						
Point Lisas, Trinidad[(12)]	360	360	—	—	—	—
Total	10,890	3,700	7,325	4,795	2,235	2,020

(1) Average annual capacity includes allowance for normal outages and planned maintenance shutdowns.

(2) Gross ammonia capacity includes ammonia used to produce upgraded products. Net ammonia capacity is gross ammonia capacity less ammonia used to produce upgraded products based on the product mix shown in the table.

(3) Measured in tons of UAN containing 32% nitrogen by weight.

(4) Reflects granular urea capacity from the Donaldsonville, Medicine Hat, and Port Neal facilities. Urea liquor and DEF production capacities are included in Other.

(5) AN includes prilled products (Amtrate and industrial-grade AN, or IGAN) and AN solution produced for sale.

(6) Includes product tons of: urea liquor and DEF from the Donaldsonville, Port Neal, Woodward, Yazoo City, and Courtright facilities; nitric acid from the Courtright, Yazoo City, Billingham, and Ince facilities; and NPKs from the Ince facility. Production of DEF can be increased by reducing urea and/or UAN production.

(7) The Donaldsonville facility capacities present an estimated production mix. This facility is capable of producing between 2.4 million and 3.3 million tons of granular urea and between 1.2 million and 4.3 million tons of UAN annually. The facility is also capable of producing up to 1.2 million product tons of 32.5% DEF.

(8) Reduction of UAN or AN production at the Yazoo City, Courtright, Verdigris, and Billingham facilities can allow more merchant nitric acid to be made available for sale.

(9) The Yazoo City facility's production capacity depends on product mix. With the facility maximizing the production of AN products, 160,000 tons of UAN can be produced. UAN production can be increased to 450,000 tons by reducing the production of AN to 900,000 tons.

(10) Production of urea liquor and DEF at the Courtright facility can be increased by reducing UAN production.

(11) The Ince facility can increase production of NPKs and nitric acid by reducing AN production.

(12) Represents our 50% interest in the capacity of PLNL.

The following table summarizes our production volume for the last three years:

	December 31,		
	2020	2019	2018
		(tons in thousands)	
Ammonia[(1)]	10,353	10,246	9,805
Granular urea	5,001	4,941	4,837
UAN (32%)	6,677	6,768	6,903
AN	2,115	2,128	1,731

(1) Gross ammonia production, including amounts subsequently upgraded on-site into granular urea, UAN or AN.

Donaldsonville, Louisiana

The Donaldsonville facility is the world's largest and most flexible nitrogen complex. It has six ammonia plants, five urea plants, four nitric acid plants, three UAN plants, and one DEF plant. The complex, which is located on the Mississippi River, includes deep-water docking facilities, access to an ammonia pipeline, and truck and railroad loading capabilities. The complex has on-site storage for 140,000 tons of ammonia, 201,000 tons of UAN (measured on a 32% nitrogen content basis) and 130,000 tons of granular urea.

Medicine Hat, Alberta, Canada

The Medicine Hat facility, located in southeast Alberta, is the largest nitrogen complex in Canada. It has two ammonia plants and one urea plant. The complex has on-site storage for 60,000 tons of ammonia and 60,000 tons of granular urea.

Port Neal, Iowa

The Port Neal facility is located approximately 12 miles south of Sioux City, Iowa, on the Missouri River. The facility consists of two ammonia plants, three urea plants, two nitric acid plants and one UAN plant. The location has on-site storage for 85,000 tons of ammonia, 130,000 tons of granular urea, and 100,000 tons of 32% UAN.

Verdigris, Oklahoma

The Verdigris facility is located northeast of Tulsa, Oklahoma, near the Verdigris River. It is the second largest UAN production facility in North America. The facility comprises two ammonia plants, two nitric acid plants, two UAN plants and a port terminal. We lease the port terminal from the Tulsa-Rogers County Port Authority. The complex has on-site storage for 60,000 tons of ammonia and 100,000 tons of 32% UAN.

Woodward, Oklahoma

The Woodward facility is located in rural northwest Oklahoma and consists of one ammonia plant, two nitric acid plants, two urea plants and two UAN plants. The facility has on-site storage for 36,000 tons of ammonia and 84,000 tons of 32% UAN.

Yazoo City, Mississippi

The Yazoo City facility is located in central Mississippi and includes one ammonia plant, four nitric acid plants, one AN plant, two urea plants, one UAN plant and a dinitrogen tetroxide production and storage facility. The site has on-site storage for 50,000 tons of ammonia, 48,000 tons of 32% UAN and 11,000 tons of AN and related products.

Courtright, Ontario, Canada

The Courtright facility is located south of Sarnia, Ontario near the St. Clair River. The facility consists of an ammonia plant, a UAN plant, a nitric acid plant and a urea plant. The location has on-site storage for 64,000 tons of ammonia and 16,000 tons of 32% UAN.

Ince, United Kingdom

The Ince facility is located in northwestern England and consists of one ammonia plant, three nitric acid plants, one AN plant and three NPK plants. The location has on-site storage for 11,000 tons of ammonia, 95,000 tons of AN, and 40,000 tons of NPKs.

Billingham, United Kingdom

The Billingham facility, located in the Teesside chemical area in northeastern England, is geographically split among three primary locations: the main site, which contains an ammonia plant, three nitric acid plants and a carbon dioxide plant; the Portrack site, approximately two miles away, which contains an AN fertilizer plant; and the North Tees site, approximately seven miles away, which contains an ammonia storage area. These locations collectively have on-site storage for 40,000 tons of ammonia and 128,000 tons of AN.

Point Lisas, Trinidad

The Point Lisas Nitrogen facility in the Republic of Trinidad and Tobago is owned jointly through a 50/50 venture with Koch Fertilizer LLC. This facility has the capacity to produce 720,000 tons of ammonia annually from natural gas supplied under a contract with The National Gas Company of Trinidad and Tobago Limited (NGC).

Nitrogen Fertilizer Raw Materials

Natural gas is the principal raw material and primary fuel source used in the ammonia production process at our nitrogen manufacturing facilities. In 2020, natural gas accounted for approximately one-third of our total production costs for nitrogen products. Our nitrogen manufacturing facilities have access to abundant, competitively-priced natural gas through a reliable network of pipelines that are connected to major natural gas trading hubs near the facilities. Our facilities utilize the following natural gas hubs: Henry Hub in Louisiana; SONAT in Louisiana; TETCO ELA in Louisiana; ONEOK in Oklahoma; AECO in Alberta; Ventura in Iowa; Demarcation in Kansas; Welcome in Minnesota; Dawn in Ontario; Parkway in Ontario; and the National Balancing Point (NBP) in the United Kingdom.

In 2020, our nitrogen manufacturing facilities consumed, in the aggregate, approximately 365 million MMBtus of natural gas. We employ a combination of daily spot and term purchases from a variety of quality suppliers to maintain a reliable, competitively-priced supply of natural gas. We also use certain financial instruments to hedge natural gas prices. See Note 15—Derivative Financial Instruments for additional information about our natural gas hedging activities.

Nitrogen Fertilizer Distribution

The safe, efficient and economical distribution of nitrogen products is critical for successful operations. Our nitrogen production facilities have access to multiple transportation modes by which we ship products to terminals, warehouses and customers. Each of our production facilities has a unique distribution pattern based on its production capacity and location.

Our North American nitrogen production facilities can ship products via truck and rail to customers and to our storage facilities in the U.S. and Canada, with access to our leased railcar fleet of approximately 5,000 tank and hopper cars, as well as railcars provided by rail carriers. Our United Kingdom nitrogen production facilities mainly ship products via truck.

The North American waterway system is also used extensively to ship products from our Donaldsonville, Verdigris and Yazoo City facilities. To ship ammonia and UAN, we employ a fleet of ten tow boats and twenty-eight river barges, which are primarily leased. We also utilize contract marine services to move urea fertilizer. We can also export nitrogen fertilizer products via seagoing vessels from our Donaldsonville, Yazoo City, Billingham and Ince manufacturing facilities.

The Donaldsonville facility is connected to the 2,000-mile long Nustar pipeline through which we have the ability to transport ammonia to ten terminals and shipping points in the Midwestern U.S. corn belt.

Storage Facilities and Other Properties

As of December 31, 2020, we owned or leased space at 63 in-market storage terminals and warehouses located in a 21-state region of the United States, Canada and the United Kingdom. Including storage at our production facilities, we have an aggregate storage capacity for approximately 3.2 million tons of product. Our storage capabilities are summarized in the following table:

	Ammonia		Granular Urea		UAN[1]		AN	
	Number of Facilities	Capacity (000 Tons)	Number of Facilities	Capacity (000 Tons)	Number of Facilities	Capacity (000 Tons)	Number of Facilities	Capacity (000 Tons)
Plants	9	546	3	320	6	549	3	234
Terminal and Warehouse Locations								
Owned	22	780	—	—	9	244	—	—
Leased[2]	6	124	2	32	24	391	—	—
Total In-Market	28	904	2	32	33	635	—	—
Total Storage Capacity		1,450		352		1,184		234

(1) Capacity is expressed as the equivalent volume of UAN measured on a 32% nitrogen content basis.
(2) Our lease agreements are typically for periods of one to five years.

Customers

The principal customers for our nitrogen products are cooperatives, independent fertilizer distributors, traders, wholesalers and industrial users. Sales are generated by our internal marketing and sales force. CHS was our largest customer in 2020 and accounted for approximately 13% of our consolidated net sales. We have a strategic venture with CHS under which CHS has a minority equity interest in CFN. See Note 17—Noncontrolling Interests for additional information on our strategic venture with CHS.

Competition

Our markets are global and intensely competitive, based primarily on delivered price and, to a lesser extent, on customer service and product quality. During the peak demand periods, product availability and delivery time also play a role in the buying decisions of customers.

Our primary North American-based competitors include Nutrien Ltd., Koch Fertilizer LLC and Iowa Fertilizer Company. There is also significant competition from products sourced from other regions of the world, including some with lower natural gas or other feedstock costs. Because ammonia, urea and UAN are widely-traded fertilizer products and there are limited barriers to entry, we experience competition from foreign-sourced products continuously.

Our primary United Kingdom competition comes from imported products supplied by companies including Yara International, Origin Fertilisers, Ameropa, CHS and Helm. Urea and UAN are not produced in the United Kingdom, but along with AN are widely-traded fertilizer products with limited barriers to entry.

Seasonality

The fertilizer business is seasonal. The degree of seasonality of our business can change significantly from year to year due to weather conditions in the agricultural industry and other factors. The strongest demand for our products in North America occurs during the spring planting season, with a second period of strong demand following the fall harvest. In contrast, we and other fertilizer producers generally manufacture and distribute products throughout the year. As a result, we and/or our customers generally build inventories during the low demand periods of the year to ensure timely product availability during the peak sales seasons. Seasonality is greatest for ammonia due to the short application season and the limited ability of our customers and their customers to store significant quantities of this product. The seasonality of fertilizer demand generally results in our sales volumes and net sales being the highest during the spring and our working capital requirements being the highest just prior to the start of the spring planting season. Our quarterly financial results can vary significantly from one year to the next due to weather-related shifts in planting schedules and purchasing patterns.

Environmental, Health and Safety

We are subject to numerous environmental, health and safety laws and regulations in the United States, Canada, the United Kingdom, the European Union and the Republic of Trinidad and Tobago, including laws and regulations relating to the generation and handling of hazardous substances and wastes; the cleanup of hazardous substance releases; the discharge of regulated substances to air or water; and the demolition of existing plant sites upon permanent closure. In the United States, these laws include the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Toxic Substances Control Act (TSCA), the Occupational Safety and Health Act (OSHA) and various other federal, state and local statutes. Violations of environmental, health and safety laws can result in substantial penalties, court orders to install pollution-control equipment, civil and criminal sanctions, permit revocations and facility shutdowns. In addition, environmental, health and safety laws and regulations may impose joint and several liability, without regard to fault, for cleanup costs on potentially responsible parties who have released or disposed of hazardous substances into the environment. We may be subject to more stringent enforcement of existing or new environmental, health and safety laws in the future.

Environmental, Health and Safety Expenditures

Our environmental, health and safety capital expenditures in 2020 totaled approximately $40 million. We estimate that we will have approximately $45 million of capital expenditures for environmental, health and safety in 2021. In addition, to support safe and reliable operations at our continuous process manufacturing facilities, we conduct scheduled inspections, replacements and overhauls of our plant machinery and equipment, which are referred to as turnarounds. A further description of turnaround activities is included in Note 6—Property, Plant and Equipment—Net to our consolidated financial statements included in Item 8 of this report. Environmental, health and safety laws and regulations are complex, change frequently and have tended to become more stringent over time. We expect that continued government and public emphasis on environmental issues will result in increased future expenditures for environmental controls at our manufacturing and distribution facilities. Such expenditures could have a material adverse effect on our business, financial condition, results of operations and cash flows. Additionally, future environmental, health and safety laws and regulations or reinterpretation of current laws and regulations may require us to make substantial expenditures. Our costs to comply with, or any liabilities under, these laws and regulations could have a material adverse effect on our business, financial condition, results of operations and cash flows.

CERCLA/Remediation Matters

From time to time, we receive notices from governmental agencies or third parties alleging that we are a potentially responsible party at certain cleanup sites under CERCLA or other environmental cleanup laws. In 2011, we received a notice from the Idaho Department of Environmental Quality (IDEQ) that alleged that we were a potentially responsible party for the cleanup of a former phosphate mine site we owned in the late 1950s and early 1960s located in Georgetown Canyon, Idaho. The current owner of the property and a former mining contractor received similar notices for the site. Based on a Consent Order entered into with IDEQ and the U.S. Forest Service in 2014, we and the current property owner are currently conducting a remedial investigation and feasibility study of the site. In 2015, we and several other parties received a notice that the U.S. Department of the Interior and other trustees intend to undertake a natural resource damage assessment for 17 former phosphate mines in southeast Idaho, one of which is the former Georgetown Canyon mine. See Note 20—Contingencies for additional information.

Regulation of Greenhouse Gases

We are subject to regulations in the United Kingdom, the European Union, Canada and the United States concerning greenhouse gas (GHG) emissions.

The United Kingdom has adopted GHG emissions regulations, including regulations to implement the European Union Greenhouse Gas Emission Trading System (EU ETS). Our U.K. manufacturing plants are required to report GHG emissions annually to the United Kingdom Environment Agency pursuant to their site Environmental Permits and Climate Change Agreement, which specify energy efficiency targets. Failure to meet efficiency targets may require these plants to purchase CO_2 emissions allowances. The steam boilers at each of our U.K. sites have also been subject to the EU ETS, and have been required to hold or obtain emissions allowances to offset GHG emissions. Notwithstanding the exit of the United Kingdom from the European Union (Brexit) on January 31, 2020, facilities in the United Kingdom remained subject to the EU ETS through the end of 2020. Beginning on January 1, 2021, our U.K. manufacturing plants became subject to the UK Emissions Trading Scheme (UK ETS). At least initially, the UK ETS is expected to be similar to the EU ETS, although the U.K. government has stated that it intends to establish an emissions cap that is lower than what it would have been had the United Kingdom remained subject to the EU ETS. No agreement has been reached as to whether the UK ETS will establish a linkage with the EU ETS or other national emission trading systems.

In Canada, we are required to conduct an annual review of our operations with respect to compliance with Environment Canada's National Pollutant Release Inventory and Ontario's Mandatory Monitoring and Reporting Regulation and the GHG Reporting Regulation. In 2018, the federal Greenhouse Pollution Pricing Act came into effect, pursuant to which Environment and Climate Change Canada (ECCC) will implement the Output-Based Performance Standard (OBPS), which is intended to function as a backstop to provincial greenhouse gas emissions regulations. In June 2019, the ECCC finalized the emission limits for carbon dioxide equivalent (CO_2e) emissions from nitrogen fertilizer products. These emission limits are based on 95% of the average emissions intensity for the production of such products from all Canadian nitrogen fertilizer plants, reflecting that such products are deemed to be energy-intensive and trade-exposed and thus subject to a less stringent emissions reduction requirement. In the provinces and territories where the OBPS applies, a facility whose carbon emissions exceed the applicable limits is required to offset emissions by obtaining and retiring surplus emission credits, obtaining qualifying emissions offsets, or paying a fee, which for calendar year 2019 was CAD $20 per ton of excess carbon dioxide equivalent, and which fee increases by CAD $10 per ton for each succeeding year through 2022. In December 2020, the Canadian federal government announced that it intended to increase the price of excess emissions of CO_2e by CAD $15 per ton for each year beginning in 2023, with the price of excess CO_2e emissions reaching CAD $170 per ton by 2030. Ontario, Saskatchewan and Alberta are challenging whether the federal government has jurisdiction to impose a federal carbon price on the provinces and territories. The Saskatchewan Court of Appeal (in May 2019) and the Ontario Court of Appeal (in June 2019) each held that the Greenhouse Pollution Pricing Act (GPPA) was validly enacted under the Canadian constitution, while the Alberta Court of Appeal ruled in February 2020 that the GPPA was unconstitutional. Oral argument on the appeal of these decisions was heard by the Supreme Court of Canada in September 2020.

In January 2017, Ontario launched its own GHG cap and trade program and beginning January 1, 2018, Ontario's cap and trade program was linked with the cap and trade programs in Quebec and California. Our Courtright Nitrogen Complex was subject to the Ontario cap and trade program. However, the Ontario government rescinded the cap and trade program in June 2018. Because Ontario no longer had a GHG regulatory regime, the federal government imposed the OBPS in the province beginning in 2019. In July 2019, the new Ontario government enacted a new GHG regulation, called the Emissions-Performance Standards program (EPS), that sets CO_2e emissions limits for nitrogen products based on a production weighted sectoral average. For facilities whose carbon emissions exceed the applicable limits, compliance options included the purchase of emissions performance units for a fee of CAD $20 per ton of excess CO_2e for calendar year 2019, which fee rises by CAD $10 per ton each year through 2022. Except for registration and recordkeeping provisions, the EPS has not yet gone into effect in Ontario and facilities in Ontario are subject to the federal OBPS. However, in September 2020, ECCC announced that the Ontario EPS met the federal government's minimum stringency benchmark requirements, and the federal carbon pricing system will no longer apply in Ontario at a date to be set in consultation between ECCC and the Ontario government.

Beginning in 2018, our Medicine Hat Nitrogen Complex became subject to the Carbon Competitiveness Incentive Regulation (CCIR). This regulation establishes product-specific benchmarks based on the most efficient GHG-emitting facilities in a sector. A facility with emissions that exceeded the applicable benchmark was required to take action to reduce its GHG emissions intensity, purchase emissions offsets or performance credits, or make contributions to Alberta's climate fund. In 2019, the Alberta government passed the Technology Innovation and Emission Reduction Implementation Act (TIER), which replaced the CCIR and went into effect on January 1, 2020. The TIER requires large emitting facilities (other than electricity producers, which are subject to a different standard) to comply with the least stringent of a "facility-specific" benchmark of 90% of historical GHG emissions intensity from a three-year baseline, which intensity limit will be reduced by 1% a year beginning in 2021, or a benchmark reflecting the emissions intensity of the top 10% of facilities for a given sector. The compliance options under the TIER are similar to the compliance options under the CCIR, including initially establishing the price for payments into its carbon fund at CAD $30 per excess ton of emissions (the same effective price as set in the CCIR). The federal government had determined that Alberta's CCIR meets its stringency requirements and did not impose the OBPS in 2019. In December 2019, the federal government determined that the TIER also met the stringency requirements of the OBPS with respect to its regulation of large industrial emitters for 2020. The Alberta government has announced that it will increase the levy for excess emissions of CO_2e from CAD $30 per ton in 2020 by CAD $10 per year, up to CAD $50 per ton in 2022, to match the price of carbon established in the OBPS.

In the United States, GHG regulation is evolving at state, regional and federal levels, although some of the more significant developments to date, including EPA's efforts to regulate greenhouse gas emissions from fossil fuel-fired power plants, do not directly impose obligations on our facilities. The EPA issued a mandatory GHG reporting rule that required all of our U.S. manufacturing facilities to commence monitoring GHG emissions beginning on January 1, 2010 and reporting the previous year's emissions annually starting in 2011. In addition, if we seek to modify or expand any of our major facilities and as a result, are required to obtain a Prevention of Significant Deterioration (PSD) construction permit applicable to such facilities, we could be subject to pollution control requirements applicable to GHGs in addition to requirements applicable to conventional air pollutants. Such requirements may result in increased costs or delays in completing such projects. Other than the states' implementation of this permitting requirement, none of the states where our U.S. production facilities are located-Iowa, Louisiana, Mississippi and Oklahoma-has proposed control regulations limiting GHG emissions.

On December 12, 2015, 195 countries adopted by consensus a new international agreement known as the Paris Agreement. The Paris Agreement was accepted by the United States and ratified by Canada and the United Kingdom and went into effect in November 2016. The Paris Agreement is intended to provide a framework pursuant to which the parties to the agreement will attempt to hold the increase in global average temperatures to below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Each signatory is required to develop its own national plan to attain this objective. Increasing concern over the impacts of climate change is driving the signatories to establish even more ambitious GHG reduction targets. In December 2020, the United Kingdom announced a target to reduce GHG emission 68% from 1990 levels by 2030. The EU has announced a new target to reduce its GHG emission 55% below 1990 levels by 2030. On November 4, 2019, the United States submitted formal notice of its withdrawal from the Paris Agreement, which became effective on November 4, 2020, but on January 20, 2021, President Biden announced that the United States has rejoined the Paris Agreement. This will require the United States to submit its own national plan for reducing GHG emissions. Executive Orders issued by the Biden Administration, including in particular an executive order issued on January 27, 2021 focusing on climate change, evidence the Administration's intent to undertake numerous initiatives in an effort to reduce GHG emissions, including promoting renewable energy development, limiting or prohibiting new oil and gas leases on federal lands, and in general, making climate change considerations a critical component of federal policy.

New Source Performance Standards for Nitric Acid Plants

We operate 14 nitric acid plants in the United States. On August 14, 2012, the EPA issued a final regulation revising air emission standards applicable to newly constructed, reconstructed or modified nitric acid plants. The regulations will apply to these plants if and when we undertake activities or operations that are considered modifications, including physical changes that would allow us to increase our production capacity at these plants. The regulations include certain provisions that could make it difficult for us to meet the limits on emissions of nitrogen oxides (NOx) notwithstanding pollution controls we may add to our plants, and accordingly, the regulations could impact our ability to expand production at our existing plants. The EPA regulation did not include a limitation on emissions of nitrous oxide (a greenhouse gas).

Regulatory Permits and Approvals

We hold numerous environmental and other governmental permits and approvals authorizing operations at each of our facilities. A decision by a government agency to deny or delay issuing a new or renewed regulatory material permit or approval, or to revoke or substantially modify an existing material permit or approval, could have a material adverse effect on our ability to continue operations at the affected facility. Any future expansion of our existing operations is also predicated upon securing the necessary environmental or other permits or approvals. More stringent environmental standards may impact our ability to obtain such permits.

Human Capital Resources

Our long-term success depends on our people. We are dedicated to creating a workplace where employees are proud to work and grow and everyone feels empowered to do their best work. We do this by investing in extensive recruitment, training and professional development opportunities for our employees and fostering diversity and inclusion in our culture.

Employee Population. We employed approximately 3,000 employees at December 31, 2020, of which 66% were located in the United States, 20% in the United Kingdom, and 14% in Canada. As of December 31, 2020, 16% of our employees have worked for the Company more than 20 years, 16% of our employees have worked for the Company between 11 and 20 years, 27% of our employees have worked for the Company between 6 and 10 years, and 41% of our employees have worked at the Company for less than 6 years. Full-time employees represented approximately 99% of our workforce as of December 31, 2020 and approximately 15% were covered by a collective bargaining agreement. We supplement our workforce with contractors with specialized skill sets during periods of peak activity, such as during turnarounds and maintenance events.

Culture, Inclusion and Diversity. Our core values and their underlying principles reflect our commitment to a diverse and inclusive culture, treating one another with respect. During 2020, all of our employees engaged in training to learn to recognize and address the effects of unconscious bias by challenging assumptions; encouraging diversity of experience, opinion, and expression; and supporting a workplace culture that actively strives to be more inclusive. As of December 31, 2020, approximately 14% of our global workforce was female and 15% of the Company's employees in managerial roles were female. Minorities represented approximately 14% of the Company's U.S. workforce and 12% of our U.S. employees in managerial roles. In order to continue to improve the inclusiveness and diversity of our company and culture, our recently announced comprehensive ESG goals include goals to increase the representation of females and persons of color in senior leadership roles and to implement a program designed to increase the hiring and promotion of minority and female candidates.

Workforce Health and Safety. Operating in a safe and responsible manner is a core value and an integral part of what sets the Company apart. We believe that focusing on leading indicators - such as the behavioral safety practices we have incorporated into our annual incentive plan - to drive and measure activities that prevent and control safety incidents, results in our industry-leading safety record. As of December 31, 2020, our 12-month rolling average recordable incident rate (RIR) was 0.14 incidents per 200,000 work hours, and our total recordable injury count was four. For the year ended December 31, 2020, our days away, restricted or transferred (DART) incident rate was 0.03 injuries per 200,000 work hours, and our lost time incident rate was 0.00.

Response to COVID-19 Pandemic. During fiscal 2020, in response to the COVID-19 pandemic, we implemented safety precautions to protect the health and well-being of all of our employees, including the manufacturing workforce who operate our nitrogen manufacturing complexes and distribution facilities. See Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Overview of CF Holdings—Market Conditions and Current Developments—COVID-19 Pandemic, for a further discussion of the pandemic and the actions we have taken.

Talent Development. A core aspect of our culture is our commitment to identifying and developing talent to help employees accelerate growth and achieve their career goals. We invest in extensive assessment, training and professional development opportunities for our employees through a robust set of formal and informal programs, including targeted job movements, key experiences, and training, with an emphasis on creating a culture of inclusion. Leadership is the quality that drives our values and sets us apart. To help foster leadership, we have developed a set of leadership competencies that provide a common language for how to demonstrate leadership at every level of the organization. We view training and development programs as being a key part of succession planning, allowing us to grow a stronger company today and in the future.

ITEM 1A. RISK FACTORS.

In addition to the other information contained in this Annual Report on Form 10-K, you should carefully consider the factors discussed below before deciding to invest in any of our securities. These risks and uncertainties, individually or in combination, could materially and adversely affect our business, financial condition, results of operations and cash flows.

Market Risks

Our business is cyclical, resulting in periods of industry oversupply during which our business, financial condition, results of operations and cash flows tend to be negatively affected.

Historically, selling prices for our products have fluctuated in response to periodic changes in supply and demand conditions. Demand for nitrogen is affected by planted acreage, crop selection and fertilizer application rates, driven by population growth, gross domestic product growth, changes in dietary habits and non-food use of crops, such as production of ethanol and other biofuels among other things. Demand also includes industrial uses of nitrogen, for example chemical manufacturing and emissions reductants such as diesel exhaust fluid (DEF). Supply is affected by available capacity and operating rates, raw material costs and availability, energy prices, government policies and global trade.

Periods of strong demand, high capacity utilization and increasing operating margins tend to stimulate global investment in production capacity. In recent years, fertilizer producers, including CF Holdings, have built new production facilities or expanded capacity of existing production assets, or announced plans to do so. The construction of new nitrogen fertilizer manufacturing capacity in the industry, plus improvements to increase output from the existing production assets, increase nitrogen supply availability and affect the balance of supply and demand. In certain years, global nitrogen fertilizer capacity has increased faster than global nitrogen fertilizer demand, creating a surplus of global nitrogen fertilizer capacity, which led to lower nitrogen fertilizer selling prices in 2016 and 2017. For example, in the two-year period ended December 31, 2017, additional production capacity came on line and, at the same time, the average selling price for our products declined 34%, from $314 per ton in 2015 to $207 per ton in 2017.

Additional production capacity is expected to come on line over the next 12 months outside of North America. We cannot predict the impact of this additional capacity. Also, global or local economic and financial conditions or changes in such conditions, or other factors may cause acceleration of other announced and/or ongoing projects.

Price fluctuations for our products result from changes in supply and demand. Significant price fluctuations we experience could be symptoms of an oversupplied market in transition as new capacity ramps up, and production slows down or shuts down in high cost regions. Similarly, lower energy prices can spur increases in production in high cost regions, which would result in increased supply and pressure on selling prices. Additionally, trade flows adjust as imports into different regions of the world also impact the local supply and demand balances. If imports increase into an oversupplied region, lower prices in that region could result.

During periods of industry oversupply, our financial condition, results of operations and cash flows tend to be affected negatively as the price at which we sell our products typically declines, resulting in possible reduced profit margins, write-downs in the value of our inventory and temporary or permanent curtailments of production. In 2016 and 2017, our financial performance, credit ratings and the trading price for our common stock were negatively impacted by the lower selling prices resulting from the global oversupply of nitrogen fertilizer; while in 2018 and 2019, we experienced increases in the average selling price for our products. In 2020, the average selling price for our products decreased 14% to $203 per ton compared to $235 per ton in 2019. The period of time that these oversupply conditions can persist and the degree to which they will impact our business, financial condition, results of operations and cash flows are uncertain.

Our nitrogen products are global commodities, and we face intense global competition from other producers.

We are subject to intense price competition from our competitors. Most fertilizers and related nitrogen products that we produce, such as industrial grade ammonium nitrate and DEF, are global commodities, with little or no product differentiation, and customers make their purchasing decisions principally on the basis of delivered price and, to a lesser extent, customer service and product quality. As a consequence, conditions in the international market for nitrogen products significantly influence our operating results.

We compete with many producers, including state-owned and government-subsidized entities. Some of our competitors have greater total resources and are less dependent on earnings from fertilizer sales, which make them less vulnerable to industry downturns and better positioned to pursue new expansion and development opportunities. Furthermore, certain governments, in some cases as owners of some of our competitors, may be willing to accept lower prices and profitability on their products or subsidize production or consumption in order to support domestic employment or other political or social goals. Our competitive position could suffer to the extent we are not able to expand our own resources, either through investments in new or existing operations or through acquisitions, joint ventures or partnerships.

China, the world's largest producer and consumer of nitrogen fertilizers, currently has significant capacity surplus and many high-cost plants. As a result, the domestic nitrogen industry in China is operating at less than full capacity. If Chinese government policy, devaluation of the Chinese renminbi, the relaxation of Chinese environmental standards or decreases in Chinese producers' underlying costs such as the price of Chinese coal encourage increased production capacity utilization, any resulting export volume could adversely affect the balance between global supply and demand and may put downward pressure on global fertilizer prices, which could materially adversely affect our business, financial condition, results of operations and cash flows.

Our competitors in Russia continue to benefit from non-market pricing of natural gas, allowing continued exports from the region, and have significant nitrogen fertilizer export capacity. The 2016 revocations of U.S. antidumping measures on solid urea and fertilizer grade ammonium nitrate from Russia have allowed for increases in imports from that country into the United States in recent years.

We also face competition from other fertilizer producers in the Middle East, Europe, Latin America and Africa, who, depending on market conditions, fluctuating input prices, geographic location and freight economics, may take actions at times with respect to price or selling volumes that adversely affect our business, financial condition, results of operations and cash flows.

In addition, the international market for nitrogen products is influenced by such factors as currency exchange rates, including the relative value of the U.S. dollar and its impact upon the cost of importing of nitrogen products into the United States, foreign agricultural policies, the existence of, or changes in, import or foreign currency exchange barriers in certain foreign markets and the laws and policies of the markets in which we operate, including the imposition of new duties, tariffs or quotas, that affect foreign trade and investment. For example, the imposition of duties, tariffs or quotas in a region can directly impact product pricing in that region, which can lead to changes in global trade flows and impact the global supply and demand balance and pricing. Market participants customarily move product between regions of the world, or adjust trade flows, in response to these factors. North America, where we manufacture and sell most of our products, is one of the largest and most liquid nitrogen trading regions in the world. As a result, other manufacturers, traders and other market participants can move nitrogen products to North America when there is uncertainty associated with the supply and demand balance in other regions or when duties, tariffs or quotas impact prices or trade flows in other regions. As a result, duties, tariffs and quotas can lead to uncertainty in the global marketplace and impact the supply and demand balance in many regions, which could adversely affect our business, financial condition, results of operations and cash flows. On October 9, 2019, the European Commission (the Commission) imposed definitive anti-dumping duties on imports to the European Union of UAN manufactured in Russia, the Republic of Trinidad and Tobago and the United States. For imports of UAN manufactured in the United States, the fixed duty rate is €29.48 per metric ton (or €26.74 per ton). The duties will remain in place for an initial five-year period, after which the measures may be renewed by the Commission. The long term impact of this duty on the international market for nitrogen products is uncertain.

A decline in agricultural production or limitations on the use of our products for agricultural purposes could materially adversely affect the demand for our products.

Conditions in the United States, Europe, India, Brazil, China and other global agricultural areas significantly impact our operating results. Agricultural planted areas and production can be affected by a number of factors, including weather patterns and field conditions, current and projected grain inventories and prices, crop disease and/or livestock disease, demand for agricultural products and governmental policies regarding production of or trade in agricultural products. These factors are outside of our control.

Governmental policies, including farm and biofuel subsidies, commodity support programs and tariffs, as well as the prices of fertilizer products, may also directly or indirectly influence the number of acres planted, the mix of crops planted and the use of fertilizers for particular agricultural applications. Ethanol production in the United States contributes significantly to corn demand, representing approximately 35% of total U.S. corn demand, due in part to federal legislation mandating use of renewable fuels. An increase in ethanol production has led to an increase in the amount of corn grown in the United States and to increased fertilizer usage on both corn and other crops that have also benefited from improved farm economics. While the current Renewable Fuel Standard encourages continued high levels of corn-based ethanol production, various interested parties have called to eliminate or reduce the renewable fuel mandate, or to eliminate or reduce corn-based ethanol as part of the renewable fuel mandate. Other factors that drive the ethanol market include the prices of ethanol, gasoline and corn. Lower gasoline prices and fewer aggregate miles, driven by increased automobile fuel efficiency or the continued expansion of electric vehicles, may put pressure on ethanol prices that could result in reduced profitability and lower production for the ethanol industry. This could have an adverse effect on corn-based ethanol production, planted corn acreage and fertilizer demand.

Developments in crop technology, such as nitrogen fixation, the conversion of atmospheric nitrogen into compounds that plants can assimilate, or nitrogen-efficient varieties, or developments in alternatives to traditional animal feed or alternative proteins, could also reduce the use of chemical fertilizers and adversely affect the demand for our products. Widespread adoption of emerging application technologies or alternative farming techniques could disrupt traditional application practices, affecting the volume or types of products used and timing of applications. In addition, from time to time various foreign government and U.S. state legislatures have considered limitations on the use and application of chemical fertilizers due to concerns about the impact of these products on the environment. For example, the United Kingdom is currently consulting with stakeholders and reviewing proposals to limit emissions from solid urea fertilizers, including a potential ban on urea fertilizers. While CF Fertilisers UK Limited does not sell solid urea fertilizer in the United Kingdom, other jurisdictions may consider limits on fertilizer use, such as the European Union, which announced its Farm to Fork and Biodiversity Strategies. Any reduction in the demand for chemical fertilizer products, including as a result of technological developments and/or limitations on the use and application of chemical fertilizers, could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Our business is dependent on natural gas, the prices of which are subject to volatility.

Nitrogen from the atmosphere and hydrogen from natural gas, coal and other carbon energy feedstocks, or from the electrolysis of water, are the fundamental building blocks of nitrogen fertilizers. Energy feedstock costs comprise a significant portion of the total production cost of nitrogen products and, relative to the industry’s marginal producers that set the global price of nitrogen, generally determine profitability for nitrogen producers. Our manufacturing processes utilize natural gas as the principal raw material used in our production of nitrogen fertilizers. We use natural gas both as a chemical feedstock and as a fuel to produce ammonia, granular urea, urea ammonium nitrate solution (UAN), ammonium nitrate (AN) and other nitrogen products.

Most of our nitrogen fertilizer manufacturing facilities are located in the United States and Canada. As a result, North American natural gas comprises a significant portion of the total production cost of our products. In recent years, the cost of North American natural gas for the production of nitrogen fertilizers has been significantly lower than the energy costs of the industry’s marginal nitrogen producers. Changes in the supply of and demand for natural gas can lead to extended periods of higher natural gas prices. If high natural gas prices were to persist in North America and significantly erode our favorable energy cost differentials relative to the marginal nitrogen producers, it could have a material adverse effect on our business, financial condition, results of operations and cash flows.

The price of natural gas in North America has been volatile in recent years. During 2020, the daily closing price at the Henry Hub, the most heavily-traded natural gas pricing point in North America, reached a low of $1.34 per MMBtu on September 22, 2020 and three consecutive days in October and a high of $3.08 per MMBtu on October 27, 2020. During the three-year period ended December 31, 2020, the daily closing price at the Henry Hub reached a low of $1.34 per MMBtu on September 22, 2020 and three consecutive days in October 2020 and a high of $6.88 per MMBtu on January 4, 2018.

We also have manufacturing facilities located in the United Kingdom. These facilities are subject to fluctuations associated with the price of natural gas in Europe, which has also been volatile in recent years. The major natural gas trading point for the United Kingdom is the National Balancing Point (NBP). During 2020, the daily closing price at NBP reached a low of $1.04 per MMBtu on May 22, 2020 and a high of $7.71 per MMBtu on December 30, 2020. During the three-year period ended December 31, 2020, the daily closing price at NBP reached a low of $1.04 per MMBtu on May 22, 2020 and a high of $31.74 per MMBtu on March 2, 2018.

The price of natural gas in North America and worldwide has been volatile in recent years and has declined on average due in part to the development of significant natural gas reserves, including shale gas, and the rapid improvement in shale gas extraction techniques, such as hydraulic fracturing and horizontal drilling. Future production of natural gas from shale formations could be reduced by regulatory changes that restrict drilling or hydraulic fracturing or increase its cost or by reduction in oil exploration and development prompted by lower oil prices resulting in production of less associated gas.

Certain of our operating facilities are located near natural gas hubs that have experienced increased natural gas development and have favorable basis differences as compared to other North American hubs. Favorable basis differences in certain regions may dissipate over time due to increases in natural gas pipeline or storage capacity in those regions. Additionally, basis differentials may become materially unfavorable due to a lack of inbound gas pipeline or storage capacity in other regions during periods of unusually high demand. Increased demand for natural gas, particularly in the Gulf Coast Region, due to increased industrial demand and increased natural gas exports, could result in increased natural gas prices. If such reduced production, increased demand or changes in basis were to occur, or if other developments adversely impact the supply and demand balance for natural gas in North America or elsewhere, natural gas prices could rise, which could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Adverse weather conditions may decrease demand for our fertilizer products, increase the cost of natural gas or materially disrupt our operations.

Weather conditions that delay or disrupt field work during the planting, growing, harvesting or application periods may cause agricultural customers to use different forms of nitrogen fertilizer, which may adversely affect demand for the forms that we sell or may impede farmers from applying our fertilizers until the following application period, resulting in lower seasonal demand for our products.

Adverse weather conditions during or following harvest may delay or eliminate opportunities to apply fertilizer in the fall. Weather can also have an adverse effect on crop yields, which could lower the income of growers and impair their ability to purchase fertilizer from our customers. Adverse weather conditions could also impact transportation of fertilizer, which could disrupt our ability to deliver our products to customers on a timely basis. Our quarterly financial results can vary significantly from one year to the next due to weather-related shifts in fertilizer applications, planting schedules and purchasing patterns. Over the longer-term, changes in weather patterns may shift the periods of demand for products and even the regions to which our products are distributed, which could require us to evolve our distribution system.

In addition, we use the North American waterway system extensively to ship products from some of our manufacturing facilities to our distribution facilities and our customers, and we also export nitrogen fertilizer products via seagoing vessels from deep-water docking facilities at certain of our manufacturing sites. Therefore, persistent significant changes in river or ocean water levels (either up or down, such as a result of flooding or drought for example), may require changes to our operating and distribution activities and/or significant capital improvements to our facilities.

Weather conditions or, in certain cases, weather forecasts, also can disrupt our operations and can affect the price of natural gas, the principal raw material used to make our nitrogen fertilizer products. Colder and/or longer than normal winters and warmer than normal summers increase the demand for natural gas for power generation and for residential and industrial use, which can increase the cost and/or decrease the availability of natural gas. In addition, adverse weather events can not only cause loss of power at our facilities disrupting our operations, but also can impact the supply of natural gas and utilities and cause prices to rise.

Our operating results fluctuate due to seasonality. Our inability to predict future seasonal fertilizer demand accurately could result in our having excess inventory, potentially at costs in excess of market value.

The fertilizer business is seasonal. The degree of seasonality of our business can change significantly from year to year due to conditions in the agricultural industry and other factors. The strongest demand for our products in North America occurs during the spring planting season, with a second period of strong demand following the fall harvest. In contrast, we and other fertilizer producers generally manufacture and distribute products throughout the year. As a result, we and/or our customers generally build inventories during the low demand periods of the year to ensure timely product availability during the peak sales seasons. Seasonality is greatest for ammonia due to the short application seasons and the limited ability of our customers and their customers to store significant quantities of this product. The seasonality of fertilizer demand generally results in our sales volumes and net sales being the highest during the spring and our working capital requirements being the highest just prior to the start of the spring planting season.

If seasonal demand is less than we expect, we may be left with excess inventory that will have to be stored (in which case our results of operations would be negatively affected by any related increased storage costs) or liquidated (in which case the selling price could be below our production, procurement and storage costs). The risks associated with excess inventory and product shortages are exacerbated by the volatility of nitrogen fertilizer prices and the relatively brief periods during which farmers can apply nitrogen fertilizers. If prices for our products rapidly decrease, we may be subject to inventory write-downs, adversely affecting our operating results.

A change in the volume of products that our customers purchase on a forward basis, or the percentage of our sales volume that is sold to our customers on a forward basis, could increase our exposure to fluctuations in our profit margins and materially adversely affect our business, financial condition, results of operations and cash flows.

We offer our customers the opportunity to purchase products from us on a forward basis at prices and delivery dates we propose. Under our forward sales programs, customers generally make an initial cash down payment at the time of order and pay the remaining portion of the contract sales value in advance of the shipment date. Forward sales improve our liquidity by reducing our working capital needs due to the cash payments received from customers in advance of shipment of the product and allow us to improve our production scheduling and planning and the utilization of our manufacturing and distribution assets.

Any cash payments received in advance from customers in connection with forward sales are reflected on our consolidated balance sheets as a current liability until the related orders are shipped, which can take up to several months.

We believe the ability to purchase products on a forward basis is most appealing to our customers during periods of generally increasing prices for nitrogen fertilizers. Our customers may be less willing or even unwilling to purchase products on a forward basis during periods of generally decreasing or stable prices or during periods of relatively high fertilizer prices due to the expectation of lower prices in the future or limited capital resources. In periods of rising fertilizer prices, selling our nitrogen fertilizers on a forward basis may result in lower profit margins than if we had not sold fertilizer on a forward basis. Conversely, in periods of declining fertilizer prices, selling our nitrogen fertilizers on a forward basis may result in higher profit margins than if we had not sold fertilizer on a forward basis. In addition, fixing the selling prices of our products, often months in advance of their ultimate delivery to customers, typically causes our reported selling prices and margins to differ from spot market prices and margins available at the time of shipment.

Operational Risks

Our operations are dependent upon raw materials provided by third parties, and any delay or interruption in the delivery of raw materials may adversely affect our business.

We use natural gas and other raw materials in the manufacture of nitrogen products. We purchase the natural gas and other raw materials from third party suppliers. Our natural gas is transported by pipeline to our facilities by third party transportation providers or through the use of facilities owned by third parties. Delays or interruptions in the delivery of natural gas or other raw materials may be caused by, among other things, severe weather or natural disasters, unscheduled downtime, labor difficulties, insolvency of our suppliers or their inability to meet existing contractual arrangements, deliberate sabotage and terrorist incidents, or mechanical failures. In addition, the transport of natural gas by pipeline is subject to additional risks, including delays or interruptions caused by capacity constraints, leaks or ruptures. Any delay or interruption in the delivery of natural gas or other raw materials, even for a limited period, could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Our transportation and distribution activities rely on third party providers and are subject to environmental, safety and regulatory oversight. This exposes us to risks and uncertainties beyond our control that may adversely affect our operations and exposes us to additional liability.

We rely on natural gas pipelines to transport raw materials to our manufacturing facilities. In addition, we rely on railroad, barge, truck, vessel and pipeline companies to coordinate and deliver finished products to our distribution system and to ship finished products to our customers. We also lease rail cars in order to ship raw materials and finished products. These transportation operations, equipment and services are subject to various hazards, including adverse operating conditions on the inland waterway system, extreme weather conditions, system failures, work stoppages, shutdowns, delays, accidents such as spills and derailments, vessel groundings and other accidents and operating hazards. Additionally, due to the aging infrastructure of certain rail lines, bridges, roadways, pipelines, river locks, and equipment that our third party service providers utilize, we may experience delays in both the receipt of raw materials or the shipment of finished product while repairs, maintenance or replacement activities are conducted. Also, certain third party service providers, such as railroads, have experienced periodic service delays or shutdowns due to capacity constraints in their systems, operational and maintenance difficulties, blockades, weather or safety-related embargoes and delays, and other events, which could impact the shipping of our products and cause disruption in our supply chain.

These transportation operations, equipment and services are also subject to environmental, safety, and regulatory oversight. Due to concerns related to accidents, discharges or other releases of hazardous substances, terrorism or the potential use of fertilizers as explosives, governmental entities could implement new or more stringent regulatory requirements affecting the transportation of raw materials or finished products.

If shipping of our products is delayed or we are unable to obtain raw materials as a result of these transportation companies’ failure to operate properly, or if new and more stringent regulatory requirements were implemented affecting transportation operations or equipment, or if there were significant increases in the cost of these services or equipment, our revenues and cost of operations could be adversely affected. In addition, increases in our transportation costs, or changes in such costs relative to transportation costs incurred by our competitors, could have a material adverse effect on our business, financial condition, results of operations and cash flows.

In the United States and Canada, the railroad industry continues various efforts to limit the railroads' potential liability stemming from the transportation of Toxic Inhalation Hazard materials, such as the anhydrous ammonia we transport to and from our manufacturing and distribution facilities. For example, various railroads shift liability to shippers by contract, purport to shift liability to shippers by tariff, or otherwise seek to require shippers to indemnify and defend the railroads from and against liabilities (including in negligence, strict liability, or statutory liability) that may arise from certain acts or omissions of the railroads, third parties who may have insufficient resources, or the Company, unknown causes or acts of god. These initiatives could materially and adversely affect our operating expenses and potentially our ability to transport anhydrous ammonia and increase our liability for releases of our anhydrous ammonia while in the care, custody and control of the railroads, third parties or us, for which our insurance may be insufficient or unavailable. New or more stringent regulatory requirements also could be implemented affecting the equipment used to ship our raw materials or finished products. Restrictions on service, increases in transportation costs, or changes in such costs relative to transportation costs incurred by our competitors, and any railroad industry initiatives that may impact our ability to transport our products, could have a material adverse effect on our business, financial condition, results of operations and cash flows.

We are subject to risks relating to our information technology systems, and any technology disruption or cybersecurity incident could negatively affect our operations.

We rely on internal and third-party information technology and computer control systems in many aspects of our business, including internal and external communications, the management of our accounting, financial and supply chain functions and plant operations. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to transaction errors, processing inefficiencies, the loss of customers, business disruptions, or the loss of or damage to our confidential business information due to a security breach. In addition, our information technology systems may be damaged, disrupted or shut down due to attacks by computer hackers, computer viruses, employee error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events, and in any such circumstances our system redundancy and other disaster recovery planning may be ineffective or inadequate. Security breaches of our systems (or the systems of our customers, suppliers or other business partners) could result in the misappropriation, destruction or unauthorized disclosure of confidential information or personal data belonging to us or to our employees, business partners, customers or suppliers, and may subject us to legal liability.

As with most large systems, our information technology systems have in the past been, and in the future likely will be, subject to computer viruses, malicious codes, unauthorized access and other cyber attacks, and we expect the sophistication and frequency of such attacks to continue to increase. To date, we are not aware of any significant impact on our operations or financial results from such attempts; however, unauthorized access could disrupt our business operations, result in the loss of assets, and have a material adverse effect on our business, financial condition, or results of operations. Any of the attacks, breaches or other disruptions or damage described above could: interrupt our operations at one or more sites; delay production and shipments; result in the theft of our and our customers' intellectual property and trade secrets; damage customer and business partner relationships and our reputation; result in legal claims and proceedings, liability and penalties under privacy or other laws, or increased costs for security and remediation; or raise concerns regarding our accounting for transactions. Each of these consequences could adversely affect our business, reputation and our financial statements.

Our business involves the use, storage, and transmission of information about our employees, customers, and suppliers. The protection of such information, as well as our proprietary information, is critical to us. The regulatory environment surrounding information security and privacy is increasingly demanding, with the frequent imposition of new and constantly changing requirements. We have established policies and procedures to help protect the security and privacy of this information. Breaches of our security measures or the accidental loss, inadvertent disclosure, or unapproved dissemination of proprietary information or sensitive or confidential data about us or our employees, customers or suppliers, including the potential loss or disclosure of such information or data as a result of fraud, trickery, or other forms of deception, could expose us or our employees, customers, suppliers or other individuals affected to a risk of loss or misuse of this information, which could ultimately result in litigation and potential legal and financial liability. These events could also damage our reputation or otherwise harm our business.

We are reliant on a limited number of key facilities.

Our nitrogen fertilizer operations are located at nine separate nitrogen complexes, the largest of which is the Donaldsonville complex, which represented approximately 40% of our ammonia production capacity as of December 31, 2020. The suspension of operations at any of these complexes could adversely affect our ability to produce our products and fulfill our commitments, and could have a material adverse effect on our business, financial condition, results of operations and cash flows. Operational disruptions could occur for many reasons, including natural disasters, weather, unplanned maintenance and other manufacturing problems, disease, strikes or other labor unrest or transportation interruptions. For example, our

Donaldsonville complex is located in an area of the United States that experiences a relatively high level of hurricane or high wind activity and several of our complexes are located in areas that experience severe weather. Such storms, depending on their severity and location, have the potential not only to damage our facilities and disrupt our operations, but also to affect adversely the shipping and distribution of our products. Moreover, our facilities may be subject to failure of equipment that may be difficult to replace or have long delivery lead times, due in part to a limited number of suppliers, and could result in operational disruptions.

Acts of terrorism and regulations to combat terrorism could negatively affect our business.

Like other companies with major industrial facilities, we may be targets of terrorist activities. Many of our plants and facilities store significant quantities of ammonia and other materials that can be dangerous if mishandled. Any damage to infrastructure facilities, such as electric generation, transmission and distribution facilities, or injury to employees, who could be direct targets or indirect casualties of an act of terrorism, may affect our operations. Any disruption of our ability to produce or distribute our products could result in a significant decrease in revenues and significant additional costs to replace, repair or insure our assets, which could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Due to concerns related to terrorism or the potential use of certain fertilizers as explosives, we are subject to various security laws and regulations. In the United States, these security laws include the Maritime Transportation Security Act of 2002 and the Chemical Facilities Anti-Terrorism Standards regulation. In addition, President Obama issued in 2013 Executive Order 13650 Improving Chemical Facility Safety and Security to improve chemical facility safety in coordination with owners and operators. Governmental entities could implement new or impose more stringent regulations affecting the security of our plants, terminals and warehouses or the transportation and use of fertilizers. These regulations could result in higher operating costs or limitations on the sale of our products and could result in significant unanticipated costs, lower revenues and reduced profit margins. We manufacture and sell certain nitrogen products that can be used as explosives. It is possible that governmental entities in the United States or elsewhere could impose additional limitations on the use, sale or distribution of nitrogen products, thereby limiting our ability to manufacture or sell those products, or that illicit use of our products could result in liability for us.

We are subject to risks associated with international operations.

Our international business operations are subject to numerous risks and uncertainties, including difficulties and costs associated with complying with a wide variety of complex laws, treaties and regulations; unexpected changes in regulatory environments; currency fluctuations; tax rates that may exceed those in the United States; earnings that may be subject to withholding requirements; and the imposition of tariffs, exchange controls or other restrictions.

Changes in governmental trade policies can lead to the imposition of new taxes, levies, duties, tariffs or quotas affecting agricultural commodities, fertilizer or industrial products. These can alter costs, trade flows, access to supplies or demand, and regional balances for our products.

Our principal reporting currency is the U.S. dollar and our business operations and investments outside the United States increase our risk related to fluctuations in foreign currency exchange rates. The main currencies to which we are exposed, besides the U.S. dollar, are the Canadian dollar, the British pound and the euro. These exposures may change over time as business practices evolve and economic conditions change. We may selectively reduce some foreign currency exchange rate risk by, among other things, requiring contracted purchases of our products to be settled in, or indexed to, the U.S. dollar or a currency freely convertible into U.S. dollars, or hedging through foreign currency derivatives. These efforts, however, may not be effective and could have a material adverse effect on our business, financial condition, results of operations and cash flows.

We are subject to anti-corruption laws and regulations and economic sanctions programs in various jurisdictions, including the U.S. Foreign Corrupt Practices Act of 1977, the United Kingdom Bribery Act of 2010, the Canadian Corruption of Foreign Public Officials Act, and economic sanctions programs administered by the United Nations, the European Union and the Office of Foreign Assets Control of the U.S. Department of the Treasury, and regulations set forth under the Comprehensive Iran Accountability Divestment Act. As a result of doing business internationally, we are exposed to a risk of violating anti-corruption laws and sanctions regulations applicable in those countries where we, our partners or agents operate. Violations of anti-corruption and sanctions laws and regulations are punishable by civil penalties, including fines, denial of export privileges, injunctions, asset seizures, debarment from government contracts (and termination of existing contracts) and revocations or restrictions of licenses, as well as criminal fines and imprisonment. The violation of applicable laws by our employees, consultants, agents or partners could subject us to penalties and could have a material adverse effect on our business, financial condition, results of operations and cash flows.

We are subject to antitrust and competition laws in various countries throughout the world. We cannot predict how these laws or their interpretation, administration and enforcement will change over time. Changes in antitrust laws globally, or in their interpretation, administration or enforcement, may limit our existing or future operations and growth.

Financial Risks

Our operations and the production and handling of our products involve significant risks and hazards. We are not fully insured against all potential hazards and risks incident to our business. Therefore, our insurance coverage may not adequately cover our losses.

Our operations are subject to hazards inherent in the manufacture, transportation, storage and distribution of chemical products, including ammonia, which is highly toxic and corrosive. These hazards include: explosions; fires; severe weather and natural disasters; train derailments, collisions, vessel groundings and other transportation and maritime incidents; leaks and ruptures involving storage tanks, pipelines and rail cars; spills, discharges and releases of toxic or hazardous substances or gases; deliberate sabotage and terrorist incidents; mechanical failures; unscheduled plant downtime; labor difficulties and other risks. Some of these hazards can cause bodily injury and loss of life, severe damage to or destruction of property and equipment and environmental damage, and may result in suspension of operations for an extended period of time and/or the imposition of civil or criminal penalties and liabilities.

We maintain property, business interruption, casualty and liability insurance policies, but we are not fully insured against all potential hazards and risks incident to our business. If we were to incur significant liability for which we were not fully insured, it could have a material adverse effect on our business, financial condition, results of operations and cash flows. We are subject to various self-insured retentions, deductibles and limits under these insurance policies. The policies also contain exclusions and conditions that could have a material adverse impact on our ability to receive indemnification thereunder. Our policies are generally renewed annually. As a result of market conditions, our premiums, self-insured retentions and deductibles for certain insurance policies can increase substantially and, in some instances, certain insurance may become unavailable or available only for reduced amounts of coverage. In addition, significantly increased costs could lead us to decide to reduce, or possibly eliminate, coverage. There can be no assurance that we will be able to buy and maintain insurance with adequate limits and reasonable pricing terms and conditions.

In April 2013, there was a fire and explosion at the West Fertilizer Co. fertilizer storage and distribution facility in West, Texas. According to published reports, 15 people were killed and approximately 200 people were injured in the incident, and the fire and explosion damaged or destroyed a number of homes and buildings around the facility. Various subsidiaries of CF Industries Holdings, Inc. (the CF Entities) were named as defendants along with other companies in lawsuits filed in 2013, 2014 and 2015 in the District Court of McLennan County, Texas by the City of West, individual residents of the County and other parties seeking recovery for damages allegedly sustained as a result of the explosion. The cases were consolidated for discovery and pretrial proceedings in the District Court of McLennan County under the caption "In re: West Explosion Cases." The two-year statute of limitations expired on April 17, 2015. As of that date, over 400 plaintiffs had filed claims, including at least 9 entities, 325 individuals, and 80 insurance companies. Plaintiffs allege various theories of negligence, strict liability, and breach of warranty under Texas law. Although we do not own or operate the facility or directly sell our products to West Fertilizer Co., products that the CF Entities manufactured and sold to others were delivered to the facility and may have been stored at the West facility at the time of the incident. The Court granted in part and denied in part the CF Entities' Motions for Summary Judgment in August 2015. Over three hundred cases have been resolved pursuant to confidential settlements that have been or we expect will be fully funded by insurance. The remaining cases are in various stages of discovery and pre-trial proceedings. The next group of cases is expected to be set for trial after the Court resumes scheduling civil jury trials currently on hold because of the outbreak of coronavirus disease 2019 (COVID-19) pandemic. We believe we have strong legal and factual defenses and intend to continue defending the CF Entities vigorously in the pending lawsuits. The increased focus on the risks associated with fertilizers as a result of the incident could impact the regulatory environment and requirements applicable to fertilizer manufacturing and storage facilities.

Our substantial indebtedness could adversely affect our cash flow, prevent us from fulfilling our obligations and impair our ability to pursue or achieve other business objectives.

As of December 31, 2020, we had approximately $4.0 billion of total funded indebtedness, consisting primarily of secured and unsecured senior notes with varying maturity dates between 2021 and 2044, or approximately 40% of our total capitalization, and an additional $750 million of senior secured borrowing availability (reflecting no outstanding borrowings and no outstanding letters of credit) for general corporate purposes under our senior secured revolving credit agreement (as amended, the Revolving Credit Agreement). Our substantial debt service obligations will have an impact on our earnings and cash flow for so long as the indebtedness is outstanding.

Our substantial indebtedness could, as a result of our debt service obligations or through the operation of the financial and other restrictive covenants to which we are subject under the agreements and instruments governing that indebtedness and otherwise, have important consequences. For example, it could:

- make it more difficult for us to pay or refinance our debts as they become due during adverse economic and industry conditions because any related decrease in revenues could cause us not to have sufficient cash flows from operations to make our scheduled debt payments;
- cause us to be less able to take advantage of significant business opportunities, such as acquisition opportunities, and to react to changes in market or industry conditions;
- cause us to use a portion of our cash flow from operations for debt service, reducing the availability of cash to fund working capital and capital expenditures, and other business activities;
- cause us to be more vulnerable to general adverse economic and industry conditions;
- expose us to the risk of increased interest rates because certain of our borrowings, including borrowings under our Revolving Credit Agreement, could be at variable rates of interest;
- make us more leveraged than some of our competitors, which could place us at a competitive disadvantage;
- restrict our ability to dispose of assets or otherwise restrict our use of funds from the disposal of assets;
- restrict our ability to pay dividends on our common stock or utilize excess cash to repurchase shares of our common stock;
- limit our ability to borrow additional monies in the future to fund working capital, capital expenditures and other general corporate purposes; and
- result in a downgrade in the credit rating of our indebtedness which could increase the cost of further borrowings.

We expect to consider options to refinance our outstanding indebtedness from time to time. Our ability to obtain any financing, whether through the issuance of new debt securities or otherwise, and the terms of any such financing are dependent on, among other things, our financial condition, financial market conditions within our industry and generally, credit ratings and numerous other factors, including factors beyond our control. Consequently, in the event that we need to access the credit markets, including to refinance our debt, there can be no assurance that we will be able to obtain financing on acceptable terms or within an acceptable timeframe, if at all. An inability to obtain financing with acceptable terms when needed could have a material adverse effect on our business, financial condition, results of operations and cash flows.

The terms of our existing indebtedness allow us to incur significant additional debt in the future. If we incur additional indebtedness, the risks that we face as a result of our leverage could intensify. If our financial condition or operating results deteriorate, our relations with our creditors, including the holders of our outstanding debt securities, the lenders under our Revolving Credit Agreement and our suppliers, may be materially and adversely affected.

A failure to satisfy the financial maintenance covenants under our Revolving Credit Agreement or a breach of the covenants under any of the agreements governing our indebtedness could limit the borrowing availability under our Revolving Credit Agreement or result in an event of default under such agreements.

Our ability to comply with the covenants in the agreements and instruments governing our indebtedness, including the consolidated interest coverage ratio and consolidated net leverage ratio maintenance covenants contained in our Revolving Credit Agreement, will depend upon our future performance and various other factors, such as market prices for our nitrogen products, natural gas prices and other business, competitive and regulatory factors, many of which are beyond our control. We may not be able to maintain compliance with all of these covenants. In that event, we may not be able to access the borrowing availability under our Revolving Credit Agreement and we would need to seek an amendment to our debt agreements or would need to refinance our indebtedness. There can be no assurance that we can obtain future amendments or waivers of our debt agreements and instruments, or refinance our debt, and, even if we were able to do so, such relief might only last for a limited period, potentially necessitating additional amendments, waivers or refinancings. Any noncompliance by us with the covenants under our debt agreements and instruments could result in an event of default under those debt agreements and instruments. An event of default under an agreement or instrument governing any of our indebtedness may allow our creditors to accelerate the related debt and may result in the acceleration of any other debt to which a cross-acceleration or cross-default provision applies. If our lenders or holders of our debt securities accelerate the repayment of borrowings, we may be forced to liquidate certain assets to repay all or part of our indebtedness, which could materially and adversely impair our business operations. An event of default under our Revolving Credit Agreement would permit the lenders thereunder to terminate all commitments to extend further credit under our Revolving Credit Agreement. Furthermore, our Revolving Credit Agreement and senior secured notes provide for liens on specified collateral to secure our obligations thereunder, and if we were unable to repay amounts due and payable under our Revolving Credit Agreement or the senior secured notes, our Revolving Credit Agreement lenders or holders of the senior secured notes, as applicable, could proceed against the collateral granted to them, which could have a material adverse effect on our business, financial condition and results of operations. In the event our creditors accelerate the repayment of our indebtedness, we cannot assure that we would have sufficient assets to make such repayment.

Potential future downgrades of our credit ratings could adversely affect our access to capital, cause vendors to change their credit terms for doing business with us, and could otherwise have a material adverse effect on us.

As of February 16, 2021, our corporate credit rating by S&P Global Ratings is BB+ with a stable outlook; our corporate credit rating by Moody's Investor Services, Inc. is Ba1 with a stable outlook; and our corporate credit rating with Fitch Ratings, Inc. is BB+ with a stable outlook.

These ratings and our current credit condition affect, among other things, our ability to access new capital, especially debt, as well as the payment terms that vendors are willing to provide us. Negative changes in these ratings may result in more stringent covenants and higher interest rates under the terms of any new debt, and could cause vendors to shorten our payment terms, require us to pay in advance for materials or services, or provide letters of credit, security, or other credit enhancements in order to do business with us.

Tax matters, including changes in tax laws or rates, adverse determinations by taxing authorities and imposition of new taxes could adversely affect our results of operations and financial condition.

We are subject to taxes in (i) the United States, where most of our operations are located, and (ii) numerous foreign jurisdictions where our subsidiaries are organized or conduct business. Tax rates in the various jurisdictions in which we operate may be subject to significant change. Our future effective tax rate could also be affected by changes in our mix of earnings from countries with differing statutory tax rates and tax systems, changes in valuation of deferred tax assets and liabilities or changes in tax laws or their interpretation.

We are also subject to regular reviews, examinations and audits by the Internal Revenue Service (IRS) and other taxing authorities in jurisdictions where we conduct business. Although we believe our tax estimates are reasonable, if a taxing authority disagrees with the positions we have taken, we could face additional tax liabilities, including interest and penalties. There can be no assurance that payment of such additional amounts upon final adjudication of any disputes will not have a material impact on our results of operations and financial condition.

We have used the cash we generate outside the United States primarily to fund development of our business in non-U.S. jurisdictions. If the funds generated by our U.S. business are not sufficient to meet our need for cash in the United States, we may need to repatriate a portion of our future international earnings to the United States. Under the tax laws of the foreign countries in which we operate, those international earnings could be subject to withholding taxes when repatriated; therefore, the repatriation of those earnings could result in an increase in our worldwide effective tax rate and an increase in our use of cash to pay these taxes.

We also need to comply with other new, evolving or revised tax laws and regulations. The enactment of, or increases in, tariffs or value added taxes, or other changes in the application of existing taxes, in markets in which we are currently active, or may be active in the future, or on specific products that we sell or with which our products compete, could have an adverse effect on our results of operations and financial condition.

The United States and other countries in which we operate are in the process of implementing the Organization for Economic Co-operation and Development's (OECD) Base Erosion and Profit Shifting Project (BEPS). BEPS is intended to improve tax disclosure and transparency and eliminate structures and activities that could be perceived by a particular country as resulting in tax avoidance. The OECD is currently developing a framework in order to assist member countries in adopting BEPS related legislation. Each country is permitted to introduce its own legislation to implement BEPS legislation. As a number of our business operations do business across country lines, we are subject to BEPS. The implementation of BEPS could result in tax changes and may adversely affect our provision for income taxes, results of operations and cash flows. In some cases, BEPS legislation could result in double taxation in a portion of our profits without an appropriate mechanism to recover the incremental tax amount in another jurisdiction.

Our business is subject to risks involving derivatives and the risk that our hedging activities might not prevent losses.

We may utilize natural gas derivatives to hedge our financial exposure to the price volatility of natural gas, the principal raw material used in the production of nitrogen-based products. We have used natural gas futures, swaps and option contracts traded in over-the-counter markets or on exchanges. We have also used fixed-price, physical purchase and sales contracts to hedge our exposure to natural gas price volatility. In order to manage our exposure to changes in foreign currency exchange rates, we may from time to time use foreign currency derivatives (primarily forward exchange contracts).

Our use of derivatives can result in volatility in reported earnings due to the unrealized mark-to-market adjustments that occur from changes in the value of the derivatives that do not qualify for, or to which we do not apply, hedge accounting. To the extent that our derivative positions lose value, we may be required to post collateral with our counterparties, adversely affecting our liquidity.

Hedging arrangements are imperfect and unhedged risks will always exist. In addition, our hedging activities may themselves give rise to various risks that could adversely affect us. For example, we are exposed to counterparty credit risk when our derivatives are in a net asset position. The counterparties to our derivatives are multi-national commercial banks, major financial institutions or large energy companies.

Our liquidity could be negatively impacted by a counterparty default on settlement of one or more of our derivative financial instruments or by the triggering of any cross default provisions or credit support requirements against us. Additionally, the International Swaps and Derivative Association master netting arrangements for most of our derivative instruments contain credit-risk-related contingent features, such as cross default provisions and credit support requirements. In the event of certain defaults or a credit ratings downgrade, our counterparty may request early termination and net settlement of certain derivative trades or may require us to collateralize derivatives in a net liability position.

At other times we may not utilize derivatives or derivative strategies to hedge certain risks or to reduce the financial exposure of price volatility. As a result, we may not prevent certain material adverse impacts that could have been mitigated through the use of derivative strategies.

Environmental and Regulatory Risks

We are subject to numerous environmental, health and safety laws, regulations and permitting requirements, as well as potential environmental liabilities, which may require us to make substantial expenditures.

We are subject to numerous environmental, health and safety laws and regulations in the United States, Canada, the United Kingdom, the European Union, the Republic of Trinidad and Tobago and other locations, including laws and regulations relating to the generation and handling of hazardous substances and wastes; the cleanup of hazardous substance releases; the discharge of regulated substances to air or water; and the demolition of existing plant sites upon permanent closure. In the United States, these laws include the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Toxic Substances Control Act and various other federal, state, provincial, local and international laws.

As a producer of nitrogen fertilizer products working with hazardous substances, our business faces risks of spills, discharges or other releases of those substances into the environment. Certain environmental laws, including CERCLA, impose joint and several liability, without regard to fault, for cleanup costs on persons who have disposed of or released hazardous substances into the environment. Given the nature of our business, we have incurred, are incurring currently, and are likely to incur periodically in the future, liabilities under CERCLA and other environmental cleanup laws at our current facilities or facilities previously owned by us or other acquired businesses, adjacent or nearby third-party facilities or offsite disposal locations. The costs associated with future cleanup activities that we may be required to conduct or finance may be material. Additionally, we may become liable to third parties for damages, including personal injury and property damage, resulting from the disposal or release of hazardous substances into the environment.

Violations of environmental, health and safety laws can result in substantial penalties, court orders to install pollution-control equipment, civil and criminal sanctions, permit revocations and facility shutdowns. Environmental, health and safety laws change regularly and have tended to become more stringent over time. As a result, we have not always been and may not always be in compliance with all environmental, health and safety laws and regulations. We may be subject to more stringent enforcement of existing or new environmental, health and safety laws in the future. Additionally, future environmental, health and safety laws and regulations or reinterpretation of current laws and regulations may require us to make substantial expenditures. Our costs to comply with, or any liabilities under, these laws and regulations could have a material adverse effect on our business, financial condition, results of operations and cash flows.

From time to time, our production, distribution or storage of anhydrous ammonia has resulted in accidental releases that have temporarily disrupted our operations and/or resulted in liability for administrative penalties and/or claims for personal injury. To date, our costs to resolve these liabilities have not been material. However, we could incur significant costs if our liability coverage is not sufficient to pay for all or a large part of any judgments against us, or if our insurance carrier refuses coverage for these losses.

We hold numerous environmental and other governmental permits and approvals authorizing operations at each of our facilities. Expansion or modification of our operations is predicated upon securing necessary environmental or other permits or approvals. A decision by a government agency to deny or delay issuing a new or renewed regulatory material permit or approval, or to revoke or substantially modify an existing permit or approval, or a determination that we have violated a law or permit as a result of a governmental inspection of our facilities could have a material adverse effect on our ability to continue operations at our facilities and on our business, financial condition, results of operations and cash flows.

Future regulatory or legislative restrictions on greenhouse gas (GHG) emissions in the jurisdictions in which we operate could materially adversely affect our business, financial condition, results of operations and cash flows.

We are subject to GHG regulations in the United Kingdom, Canada and the United States. In the United States, our existing facilities currently are only subject to GHG emissions reporting obligations, although new facilities that we build, or existing facilities that we modify in the future, could be subject to GHG emissions standards included in their air permits. Our facilities in the United Kingdom have been subject to the European Union Emissions Trading System (EU ETS), which generally required us to hold or obtain emissions allowances to offset GHG emissions from those aspects of our operations that are subject to regulation under this program. Notwithstanding the exit of the United Kingdom from the European Union (Brexit) on January 31, 2020, facilities in the United Kingdom remained subject to the EU ETS through the end of 2020. Beginning on January 1, 2021, our U.K. manufacturing plants became subject to the UK Emissions Trading Scheme (UK ETS). At least initially, the UK ETS is expected to be similar to the EU ETS, although the UK government has stated that it intends to establish an emissions cap that is lower than what it would have been had the United Kingdom remained subject to the EU ETS. No agreement has been reached as to whether the UK ETS will establish a linkage with the EU ETS or other national emission trading systems. Our Medicine Hat Nitrogen Complex, in Alberta, Canada, and our Courtright Nitrogen Complex, in Ontario, Canada, are subject to provincial or federal laws that impose a price on excess GHG emissions. Each of these laws establishes carbon dioxide equivalent (CO_2e) emissions standards applicable to our facilities in terms of emissions per unit of production, with the provincial laws and the federal law using different formulas for establishing these intensity limits and changes in these limits over time. If CO_2e emissions exceed the applicable limits, the excess emissions must be offset, either through obtaining qualifying emission credits or offsets or by making a payment for each ton of excess emissions. The Canadian federal government has announced that it intends to increase the price of excess emissions of CO_2e from CAD $40 per ton in 2021 and CAD $50 per ton in 2022, by CAD $15 per ton each year beginning in 2023, with the price of excess CO_2e emissions reaching CAD $170 per ton by 2030.

On December 12, 2015, 195 countries adopted by consensus a new international agreement known as the Paris Agreement. The Paris Agreement was accepted by the United States and ratified by Canada and the United Kingdom and went into effect in November 2016. The Paris Agreement is intended to provide a framework pursuant to which the parties to the agreement will attempt to hold the increase in global average temperatures to below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5ºC above pre-industrial levels. Each signatory is required to develop its own national plan to attain this objective. Increasing concern over the impacts of climate change is driving the signatories to establish ever more ambitious GHG reduction targets. In December 2020, the United Kingdom announced a target to reduce GHG emission 68% from 1990 levels by 2030. The EU has announced a new target to reduce its GHG emission 55% below 1990 levels by 2030. On November 4, 2019, the United States submitted formal notice of its withdrawal from the Paris Agreement, which became effective on November 4, 2020, but on January 20, 2021, President Biden announced that the United States has rejoined the Paris Agreement. This will require the United States to submit its own national plan for reducing GHG emissions. Executive Orders issued by the Biden administration, including in particular an executive order issued on January 27, 2021 focusing on climate change, evidence the Administration's intent to undertake numerous initiatives in an effort to reduce GHG emissions, including promoting renewable energy development, limiting or prohibiting new oil and gas leases on federal lands, and in general, making climate change considerations a critical component of federal policy.

More stringent GHG regulations, if they are enacted, are likely to have a significant impact on us, because our production facilities emit GHGs such as carbon dioxide and nitrous oxide and because natural gas, a fossil fuel, is a primary raw material used in our nitrogen production process. Regulation of GHGs may require us to make changes in our operating activities that would increase our operating costs, reduce our efficiency, limit our output, require us to make capital improvements to our facilities, increase our costs for or limit the availability of energy, raw materials or transportation, or otherwise materially adversely affect our business, financial condition, results of operations and cash flows. In addition, to the extent that GHG restrictions are not imposed in countries where our competitors operate or are less stringent than regulations that may be imposed in the United States, Canada or the United Kingdom, our competitors may have cost or other competitive advantages over us.

Strategic Risks

The market for green and low-carbon ammonia may be slow to develop, may not develop to the size expected or may not develop at all. Moreover, we may not be successful in the development and implementation of our green and low-carbon ammonia projects in a timely or economic manner, or at all, due to a number of factors, many of which are beyond our control.

The market for green and low-carbon ammonia is developing and evolving, may not develop to the size or at the rate we expect, and is dependent in part on the developing market for green and low-carbon hydrogen. These markets are heavily influenced by federal, state and local government laws, regulations and policies concerning carbon emissions and clean energy in the United States and abroad.

We believe the demand for green and low-carbon ammonia will take several years to fully develop and mature and we cannot be certain that this market or the market for green and low-carbon hydrogen will grow to the size or at the rate we expect. Hydrogen currently only accounts for less than 1% of the world's energy needs.

The recognition and acceptance of green and low-carbon ammonia as a transport and storage mechanism for green and low-carbon hydrogen, the use of green and low-carbon ammonia as a fuel in its own right and the development and growth of end market demand and applications for green and low-carbon hydrogen and green and low-carbon ammonia are uncertain and dependent on a number of factors outside of our control. These factors include, among others, the extent to which and rate at which cost competitive global renewable energy capacity increases, the pricing of alternative sources of energy, the realization of technological improvements required to increase the efficiency and lower the costs of production of green and low-carbon ammonia, the regulatory environment, the rate and extent of infrastructure investment and developments, the availability of tax benefits and other incentives and our ability to provide green and low-carbon ammonia offerings cost-effectively. If a sustainable market fails to develop or develops more slowly than we anticipate, we may decide not to implement, or may not be successful in implementing, one or more elements of our multi-year strategic plan and commitment to a clean fuel economy.

Our clean energy strategy also depends on the realization of certain technical improvements required to increase the efficiency and lower the costs of production of green and low-carbon ammonia. Over time, as we seek to convert additional existing production facilities and further expand our green ammonia and low-carbon ammonia production capacity, we may face operational difficulties and execution risks related to the design, development and construction. If our assumptions about the engineering and process characteristics necessary to successfully build the facility capacity that we are contemplating and to scale up to larger production quantities prove to be incorrect, we may be unable to produce substantial quantities of green or low-carbon ammonia, and the cost to construct or convert such green and low-carbon ammonia facilities, or the production costs associated with the operation of such facilities, may be higher than we project.

We may not be successful in the expansion of our business.

We routinely consider possible expansions of our business, both within the United States and elsewhere. Major investments in our business, including as a result of acquisitions, partnerships, joint ventures, business combination transactions or other major investments, such as our green and low-carbon ammonia projects, require significant managerial resources, the diversion of which from our other activities or opportunities may impair the existing operations of our business. We may be unable to identify or successfully compete for certain acquisition targets, which may hinder or prevent us from acquiring a target or completing other transactions. The risks of any expansion of our business through investments, acquisitions, partnerships, joint ventures or business combination transactions are increased due to the significant capital and other resources that we may have to commit to any such expansion, which may not be recoverable if the expansion initiative to which they were devoted is ultimately not implemented. In addition, these efforts may require capital resources that could otherwise be used for the improvement and expansion of our existing business. As a result of these and other factors, including general economic risk, we may not be able to realize our projected returns from any future acquisitions, partnerships, joint ventures, business combination transactions or other major investments. Among the risks associated with the pursuit and consummation of acquisitions, partnerships, joint ventures or other major investments or business combinations are those involving:

- difficulties in integrating the parties' operations, systems, technologies, products and personnel;
- incurrence of significant transaction-related expenses;
- potential integration or restructuring costs;

- potential impairment charges related to the goodwill, intangible assets or other assets to which any such transaction relates, in the event that the economic benefits of such transaction prove to be less than anticipated;
- other unanticipated costs associated with such transactions;
- our ability to achieve operating and financial efficiencies, synergies and cost savings;
- our ability to obtain the desired financial or strategic benefits from any such transaction;
- the parties’ ability to retain key business relationships, including relationships with employees, customers, partners and suppliers;
- potential loss of key personnel;
- entry into markets or involvement with products with which we have limited current or prior experience or in which competitors may have stronger positions;
- assumption of contingent liabilities, including litigation;
- exposure to unanticipated liabilities;
- differences in the parties’ internal control environments, which may require significant time and resources to resolve in conformity with applicable legal and accounting standards;
- increased scope, geographic diversity and complexity of our operations;
- the tax effects of any such transaction; and
- the potential for costly and time-consuming litigation, including stockholder lawsuits.

In addition, major capital projects may be dependent on the availability and performance of engineering firms, construction firms, equipment suppliers, transportation providers and other vendors necessary to design and implement those projects on a timely basis and on acceptable terms. Major investments such as capital improvements at our facilities are subject to a number of risks, any of which could prevent us from completing capital projects in a timely or economic manner or at all, including, without limitation, cost overruns, non-performance of third parties, the inability to obtain necessary permits or other permitting matters, adverse weather, defects in materials and workmanship, labor and raw material shortages, transportation constraints, engineering and construction change orders, errors in design, construction or start-up, and other unforeseen difficulties.

International acquisitions, partnerships, joint ventures, investments or business combinations and other international expansions of our business involve additional risks and uncertainties, including, but not limited to:

- the impact of particular economic, tax, currency, political, legal and regulatory risks associated with specific countries;
- challenges caused by distance and by language and cultural differences;
- difficulties and costs of complying with a wide variety of complex laws, treaties and regulations;
- unexpected changes in regulatory environments;
- political and economic instability, including the possibility for civil unrest;
- nationalization of properties by foreign governments;
- tax rates that may exceed those in the United States, and earnings that may be subject to withholding requirements;
- the imposition of tariffs, exchange controls or other restrictions; and
- the impact of currency exchange rate fluctuations.

If we finance acquisitions, partnerships, joint ventures, business combination transactions or other major investments by issuing equity or convertible or other debt securities or loans, our existing stockholders may be diluted or we could face constraints under the terms of, and as a result of the repayment and debt-service obligations under, the additional indebtedness. A business combination transaction between us and another company could result in our stockholders receiving cash or shares of another entity on terms that such stockholders may not consider desirable. Moreover, the regulatory approvals associated with a business combination may result in divestitures or other changes to our business, the effects of which are difficult to predict.

We are subject to risk associated with our strategic venture with CHS Inc. (CHS).

We may not realize the full benefits from our strategic venture with CHS that are expected. The realization of the expected benefits of the CHS strategic venture depends on our ability to operate and manage the strategic venture successfully, and on the market prices of the nitrogen fertilizer products that are the subject of our supply agreement with CHS over the life of the agreement, among other factors. Additionally, any challenges related to the CHS strategic venture could harm our relationships with CHS or our other customers.

COVID-19 Pandemic Risk

Our business and operations may be adversely affected by the COVID-19 pandemic.

The outbreak and pandemic of the coronavirus disease 2019 (COVID-19) could have a material and adverse effect on our business, financial condition, results of operations or cash flows. The rapid spread of COVID-19 has resulted in governmental authorities implementing numerous measures to try to contain the virus, such as travel bans and restrictions, quarantines, shelter in place orders and shutdowns. Even though our business operations are designated as part of the critical infrastructure by the United States, United Kingdom and Canadian governments and the governments of the states and provinces in which we operate, these measures have impacted and may further impact all or portions of our workforce and operations. If significant portions of our workforce are unable to work effectively, including because of illness, quarantines, government actions, facility closures or other restrictions, we may be unable to meet customer demand or perform fully under our contracts.

In addition, our customers, suppliers and third party service providers, including transportation providers, have been, or may be in the future, affected by COVID-19, including by the impact of measures taken by federal and local governments to slow the spread of the virus. Any negative impacts on our customers, suppliers and third party service providers could negatively impact our business, financial condition, results of operations or cash flows. For example, global demand for nitrogen for industrial use has been negatively affected by the pandemic, and we expect this to continue as long as economic activity remains low due to the impacts of the pandemic. Restrictions on or disruptions of transportation, port closures or increased border controls or closures, or other impacts on domestic and global supply chains or distribution channels, could increase our costs, limit our ability to meet customer demand or otherwise have a material adverse effect on our business, financial condition, results of operations or cash flows.

The COVID-19 pandemic has reduced and may further reduce the demand for energy, including crude oil, as well as natural gas and coal, which are nitrogen feedstocks. Reduced demand for nitrogen feedstocks has reduced and could further reduce the cost of nitrogen production outside of North America, increasing global nitrogen supply and reducing the market prices of our products. Lower demand for crude oil could also reduce the supply and therefore increase the cost of natural gas, which is the principal raw material used in our production of nitrogen fertilizers. In addition, lower crude oil prices, and a reduced demand for gasoline resulting from actions to slow the spread of COVID-19, have reduced ethanol production and therefore negatively impacted the demand for corn, which is a significant factor driving customer demand for our nitrogen fertilizers. The pandemic has also disrupted traditional food supply chains, which may have a material impact on livestock and food demand, including the demand for corn. Each of these consequences could have a material adverse effect on our business, financial condition, results of operations or cash flows.

While the COVID-19 pandemic did not have a material adverse effect on our reported results for the year ended December 31, 2020, we are unable to predict the ultimate impact it may have on our business, financial condition, results of operations or cash flows. The extent to which our operations may be impacted by COVID-19 will depend on future developments, which are highly uncertain and cannot be accurately predicted, including the further spread of the virus, the duration of the COVID-19 outbreak and the type and duration of actions that may be taken by various governmental authorities in response to the outbreak. The pandemic significantly increased global market uncertainty and caused an economic slowdown, which resulted in a global recession. Persistent weakness in economic activity caused by a deterioration of global market and economic conditions could materially adversely affect our business, financial condition, results of operations or cash flows.

FORWARD LOOKING STATEMENTS

From time to time, in this Annual Report on Form 10-K as well as in other written reports and oral statements, we make forward-looking statements that are not statements of historical fact and may involve a number of risks and uncertainties. These statements relate to analyses and other information that are based on forecasts of future results and estimates of amounts not yet determinable. These statements may also relate to our prospects, future developments and business strategies. We have used the words “anticipate,” “believe,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “project,” “will” or “would” and similar terms and phrases, including references to assumptions, to identify forward-looking statements in this document. These forward-looking statements are made based on currently available competitive, financial and economic data, our current expectations, estimates, forecasts and projections about the industries and markets in which we operate and management’s beliefs and assumptions concerning future events affecting us. These statements are not guarantees of future performance and are subject to risks, uncertainties and factors relating to our operations and business environment, all of which are difficult to predict and many of which are beyond our control. Therefore, our actual results may differ materially from what is expressed in or implied by any forward-looking statements. We want to caution you not to place undue reliance on any forward-looking statements. We do not undertake any responsibility to release publicly any revisions to these forward-looking statements to take into account events or circumstances that occur after the date of this document. Additionally, we do not undertake any responsibility to provide updates regarding the occurrence of any unanticipated events which may cause actual results to differ from those expressed or implied by the forward-looking statements contained in this document.

Important factors that could cause actual results to differ materially from our expectations are disclosed under “Risk Factors” and elsewhere in this Annual Report on Form 10-K. Such factors include, among others:

- the cyclical nature of our business and the impact of global supply and demand on our selling prices;
- the global commodity nature of our nitrogen products, the conditions in the international market for nitrogen products, and the intense global competition from other producers;
- conditions in the United States, Europe and other agricultural areas;
- the volatility of natural gas prices in North America and Europe;
- weather conditions;
- the seasonality of the fertilizer business;
- the impact of changing market conditions on our forward sales programs;
- difficulties in securing the supply and delivery of raw materials, increases in their costs or delays or interruptions in their delivery;
- reliance on third party providers of transportation services and equipment;
- risks associated with cyber security;
- our reliance on a limited number of key facilities;
- acts of terrorism and regulations to combat terrorism;
- risks associated with international operations;
- the significant risks and hazards involved in producing and handling our products against which we may not be fully insured;
- our ability to manage our indebtedness and any additional indebtedness that may be incurred;
- our ability to maintain compliance with covenants under our revolving credit agreement and the agreements governing our indebtedness;
- downgrades of our credit ratings;
- risks associated with changes in tax laws and disagreements with taxing authorities;
- risks involving derivatives and the effectiveness of our risk measurement and hedging activities;
- potential liabilities and expenditures related to environmental, health and safety laws and regulations and permitting requirements;
- regulatory restrictions and requirements related to greenhouse gas emissions;
- the development and growth of the market for green and low-carbon ammonia and the risks and uncertainties relating to the development and implementation of our green and low-carbon ammonia projects;
- risks associated with expansions of our business, including unanticipated adverse consequences and the significant resources that could be required;
- risks associated with the operation or management of the CHS strategic venture, risks and uncertainties relating to the market prices of the fertilizer products that are the subject of our supply agreement with CHS over the life of the supply agreement, and the risk that any challenges related to the CHS strategic venture will harm our other business relationships; and
- the impact of the novel coronavirus disease 2019 (COVID-19) pandemic, including measures taken by governmental authorities to slow the spread of the virus, on our business and operations.

ITEM 1B. UNRESOLVED STAFF COMMENTS.

None.

ITEM 2. PROPERTIES.

Information regarding our facilities and properties is included in Item 1. Business—Reportable Segments and Item 1. Business—Storage Facilities and Other Properties.

Certain of our distribution and storage facilities in the United States are subject to mortgages securing obligations under the Revolving Credit Agreement and our senior secured notes. For additional information, see Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—Debt.

ITEM 3. LEGAL PROCEEDINGS.

Litigation

West Fertilizer Co.

On April 17, 2013, there was a fire and explosion at the West Fertilizer Co. fertilizer storage and distribution facility in West, Texas. According to published reports, 15 people were killed and approximately 200 people were injured in the incident, and the fire and explosion damaged or destroyed a number of homes and buildings around the facility. Various subsidiaries of CF Industries Holdings, Inc. (the CF Entities) were named as defendants along with other companies in lawsuits filed in 2013, 2014 and 2015 in the District Court of McLennan County, Texas by the City of West, individual residents of the County and other parties seeking recovery for damages allegedly sustained as a result of the explosion. The cases were consolidated for discovery and pretrial proceedings in the District Court of McLennan County under the caption "In re: West Explosion Cases." The two-year statute of limitations expired on April 17, 2015. As of that date, over 400 plaintiffs had filed claims, including at least 9 entities, 325 individuals, and 80 insurance companies. Plaintiffs allege various theories of negligence, strict liability, and breach of warranty under Texas law. Although we do not own or operate the facility or directly sell our products to West Fertilizer Co., products that the CF Entities manufactured and sold to others were delivered to the facility and may have been stored at the West facility at the time of the incident.

The Court granted in part and denied in part the CF Entities' Motions for Summary Judgment in August 2015. Over three hundred cases have been resolved pursuant to confidential settlements that have been or we expect will be fully funded by insurance. The remaining cases are in various stages of discovery and pre-trial proceedings. The next group of cases is expected to be set for trial after the Court resumes scheduling civil jury trials currently on hold because of the coronavirus disease 2019 (COVID-19) pandemic. We believe we have strong legal and factual defenses and intend to continue defending the CF Entities vigorously in the pending lawsuits. The Company cannot provide a range of reasonably possible loss due to the uncertain nature of this litigation, including uncertainties around the potential allocation of responsibility by a jury to other defendants or responsible third parties. The recognition of a potential loss in the future in the West Fertilizer Co. litigation could negatively affect our results in the period of recognition. However, based upon currently available information, including available insurance coverage, we do not believe that this litigation will have a material adverse effect on our consolidated financial position, results of operations or cash flows.

Environmental

For information on pending proceedings relating to environmental remediation matters, see Item 1. Business—Environmental, Health and Safety—CERCLA/Remediation Matters and Note 20—Contingencies to our consolidated financial statements included in Item 8 of this report.

ITEM 4. MINE SAFETY DISCLOSURES.

Not applicable.

PART II

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

Our common stock is traded on the New York Stock Exchange under the symbol "CF." As of February 16, 2021, there were 682 stockholders of record.

The following table sets forth share repurchases, on a trade date basis, for each of the three months of the quarter ended December 31, 2020:

	Issuer Purchases of Equity Securities			
Period	**Total number of shares (or units) purchased[1]**	**Average price paid per share (or unit)**	**Total number of shares (or units) purchased as part of publicly announced plans or programs[2]**	**Maximum number (or approximate dollar value) of shares (or units) that may yet be purchased under the plans or programs (in thousands)[2]**
October 1, 2020 - October 31, 2020	5,059	$ 31.33	—	$ 563,407
November 1, 2020 - November 30, 2020	—	—	—	563,407
December 1, 2020 - December 31, 2020	70,392	39.54	—	563,407
Total	75,451	$ 38.99	—	

(1) Represents shares withheld to pay employee tax obligations upon the lapse of restrictions on restricted stock units and the exercise of nonqualified stock options.

(2) On February 13, 2019, our Board of Directors authorized management to repurchase CF Holdings common stock for a total expenditure of up to $1 billion through December 31, 2021. This share repurchase program is discussed in Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—Share Repurchase Program and in Note 18—Stockholders' Equity, in the notes to the consolidated financial statements included in Item 8. Financial Statements and Supplementary Data.

ITEM 6. [RESERVED]

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

You should read the following discussion and analysis in conjunction with the consolidated financial statements and related notes included in Item 8. Financial Statements and Supplementary Data. All references to "CF Holdings," "we," "us," "our" and "the Company" refer to CF Industries Holdings, Inc. and its subsidiaries, except where the context makes clear that the reference is only to CF Industries Holdings, Inc. itself and not its subsidiaries. All references to "CF Industries" refer to CF Industries, Inc., a 100% owned subsidiary of CF Industries Holdings, Inc. References to tons refer to short tons. Notes referenced in this discussion and analysis refer to the notes to consolidated financial statements that are found in Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements. For a discussion and analysis of the year ended December 31, 2019 compared to December 31, 2018, you should read Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2019 Annual Report on Form 10-K filed with the Securities and Exchange Commission (SEC) on February 24, 2020. The following is an outline of the discussion and analysis included herein:

- *Overview of CF Holdings*
  - *Our Company*
  - *Our Commitment to a Clean Energy Economy*
  - *Industry Factors*
  - *Market Conditions and Current Developments*
  - *Financial Executive Summary*
  - *Items Affecting Comparability of Results*
- *Consolidated Results of Operations*
- *Operating Results by Business Segment*
- *Liquidity and Capital Resources*
- *Critical Accounting Estimates*
- *Recent Accounting Pronouncements*
- *Subsequent Event*

Overview of CF Holdings

Our Company

We are a leading global manufacturer of hydrogen and nitrogen products for clean energy, fertilizer, emissions abatement, and other industrial applications. We operate nitrogen manufacturing complexes in the United States, Canada and the United Kingdom, which are among the most cost-advantaged, efficient and flexible in the world, and an extensive storage, transportation and distribution network in North America. Our 3,000 employees focus on safe and reliable operations, environmental stewardship and disciplined capital and corporate management, driving our strategy to leverage our unique capabilities to accelerate the world's transition to clean energy. Our principal customers are cooperatives, independent fertilizer distributors, traders, wholesalers and industrial users. Our core product is anhydrous ammonia (ammonia), which contains 82% nitrogen and 18% hydrogen. Our nitrogen products that are upgraded from ammonia are granular urea, urea ammonium nitrate solution (UAN) and ammonium nitrate (AN). Our other nitrogen products include diesel exhaust fluid (DEF), urea liquor, nitric acid and aqua ammonia, which are sold primarily to our industrial customers, and compound fertilizer products (NPKs), which are solid granular fertilizer products for which the nutrient content is a combination of nitrogen, phosphorus and potassium.

Our principal assets as of December 31, 2020 include:

- five U.S. nitrogen manufacturing facilities, located in Donaldsonville, Louisiana (the largest nitrogen complex in the world); Port Neal, Iowa; Yazoo City, Mississippi; Verdigris, Oklahoma; and Woodward, Oklahoma. These facilities are wholly owned directly or indirectly by CF Industries Nitrogen, LLC (CFN), of which we own approximately 89% and CHS Inc. (CHS) owns the remainder. See Note 17—Noncontrolling Interests for additional information on our strategic venture with CHS;
- two Canadian nitrogen manufacturing facilities, located in Medicine Hat, Alberta (the largest nitrogen complex in Canada) and Courtright, Ontario;
- two United Kingdom nitrogen manufacturing facilities, located in Billingham and Ince;

- an extensive system of terminals and associated transportation equipment located primarily in the Midwestern United States; and
- a 50% interest in Point Lisas Nitrogen Limited (PLNL), an ammonia production joint venture located in the Republic of Trinidad and Tobago that we account for under the equity method.

Our Commitment to a Clean Energy Economy

In October 2020, we announced that we are taking significant steps to support a global hydrogen and clean fuel economy, through the production of green and low-carbon ammonia. Since ammonia is one of the most efficient ways to transport and store hydrogen and is also a fuel in its own right, we believe that the Company, as the world's largest producer of ammonia, with an unparalleled manufacturing and distribution network and deep technical expertise, is uniquely positioned to fulfill anticipated demand for hydrogen and ammonia from green and low-carbon sources. Our strategy is to leverage our unique capabilities to accelerate the world's transition to clean energy. Our approach will focus on green ammonia production, which refers to ammonia produced through a carbon-free process, and low-carbon ammonia, which relates to ammonia produced by conventional processes but with CO_2 removed through carbon capture and sequestration (CCS) and other certified carbon abatement projects. We have announced an initial green ammonia project at our flagship Donaldsonville nitrogen complex to produce approximately 20,000 tons per year of green ammonia. Additionally, we are developing CCS and other carbon abatement projects across our production facilities that will enable us to produce low-carbon ammonia.

Industry Factors

We operate in a highly competitive, global industry. Our operating results are influenced by a broad range of factors, including those outlined below.

Global Supply and Demand Factors

Our products are globally traded commodities and are subject to price competition. The customers for our products make their purchasing decisions principally on the basis of delivered price and, to a lesser extent, on customer service and product quality. The selling prices of our products fluctuate in response to global market conditions, changes in supply and demand and cost factors.

Historically, global fertilizer demand has been driven primarily by population growth, gross domestic product growth, changes in dietary habits, planted acreage, and application rates, among other things. We expect these key variables to continue to have major impacts on long-term fertilizer demand for the foreseeable future. Short-term fertilizer demand growth may depend on global economic conditions, farm sector income, weather patterns, the level of global grain stocks relative to consumption, fertilizer application rates, and governmental regulations, including fertilizer subsidies or requirements mandating increased use of bio-fuels or industrial nitrogen products. Other geopolitical factors like temporary disruptions in fertilizer trade related to government intervention or changes in the buying/selling patterns of key exporting/consuming countries such as China, India, Russia and Brazil, among others, often play a major role in shaping near-term market fundamentals. The economics of nitrogen-based fertilizer manufacturing play a key role in decisions to increase or reduce production capacity. Supply of fertilizers is generally driven by available capacity and operating rates, raw material costs and availability, government policies and global trade. Raw materials are dependent on energy sources such as natural gas or coal; therefore, supply costs are affected by the supply of and demand for these commodities.

Global Trade in Fertilizer

In addition to the relationship between global supply and demand, profitability within a particular geographic region is determined by the supply/demand balance within that region. Regional supply and demand can be influenced significantly by factors affecting trade within regions. Some of these factors include the relative cost to produce and deliver product, relative currency values, the availability of credit and governmental trade policies, including the imposition of duties, tariffs or quotas, that affect foreign trade or investment. The development of additional natural gas reserves in North America over the last decade has decreased natural gas costs relative to the rest of the world, making North American nitrogen fertilizer producers more competitive. Changes in currency values may also alter our cost competitiveness relative to producers in other regions of the world.

Imports account for a significant portion of the nitrogen fertilizer consumed in North America. Producers of nitrogen-based fertilizers located in the Middle East, the Republic of Trinidad and Tobago, North Africa and Russia have been major exporters to North America in recent years. As a result, the North American nitrogen fertilizer market is dependent on imports to balance supply and demand.

Farmers' Economics

The demand for fertilizer is affected by the aggregate crop planting decisions and fertilizer application rate decisions of individual farmers. Individual farmers make planting decisions based largely on prospective profitability of a harvest, while the specific varieties and amounts of fertilizer they apply depend on factors like their current liquidity, soil conditions, weather patterns, crop prices, fertilizer products used and timing of applications, expected yields and the types of crops planted.

Market Conditions and Current Developments

COVID-19 Pandemic

In March 2020, the World Health Organization characterized the outbreak of coronavirus disease 2019 (COVID-19) as a pandemic. Since that time, efforts to slow the spread of COVID-19 have intensified. A number of countries, as well as certain states and cities within the United States, have continued to enact temporary closures of businesses, to issue shelter in place or quarantine orders, and to take other restrictive measures in response to the pandemic.

Due to the use of fertilizer products in crop production to support the global food supply chain, our business operations were designated as part of the critical infrastructure by the United States and as essential businesses in the United Kingdom and Canada, with corresponding designations for those states and provinces in which we operate that issued restrictive orders. As a result, our manufacturing complexes continued to operate during 2020 and have continued to operate through the date of this report. Our production of ammonia, the basic building block for our products, was 10.4 million tons in 2020 compared to 10.2 million tons in 2019. Through the date of this filing, we have continued to ship products by all modes of transportation to our customers, and we have not experienced any significant delays in marine, rail or truck transportation services due to the pandemic.

In 2020, we did not experience a meaningful impact in customer demand as a result of the COVID-19 pandemic. Our total volume of products shipped in 2020 of 20.3 million tons was 4% higher compared to 19.5 million tons in 2019.

In response to the pandemic, we instituted safety precautions early in 2020 to protect the health and well-being of all of our employees, including the manufacturing workforce who operate our nitrogen complexes and distribution facilities. These safety measures included installing thermal temperature checks at each of our sites for all personnel, including contractors, who arrive at our sites, adjusting schedules to support social distancing, including changes to loading and shipping procedures, maintaining a close contact log for employees, self-quarantine logs, requiring face coverings on site, restricting visitor access, and implementing enhanced cleaning protocols and travel restrictions for employees. We also paid approximately $19 million of bonuses to our operational workforce under a special COVID-19 bonus program, which concluded in June 2020. In addition, since mid-March 2020, the majority of our non-operational personnel at our sites who work in administrative and operational support functions have worked remotely in order to maintain social distancing following governmental guidelines. These administrative and operational support functions have operated effectively during this period, meeting our commitments to our customers and continuing to manage our business without interruption. We have not furloughed any employees or instituted any reductions in pay or benefits or other significant cost containment measures due to the pandemic.

We participate in a global market, which includes a global supply chain and customer base. The long-term effects of the COVID-19 pandemic are unclear and could adversely affect our business in the future. We have operated our business in a remote working environment and could continue to do so for an extended duration, if necessary. However, if the pandemic were to impact a large portion of our workforce in any one location, we might need to idle that facility temporarily or transfer other employees from other network sites, which could have an impact on our business operations, profitability and cash flow. The impact of the COVID-19 pandemic is fluid and continues to evolve. As a result, we cannot predict the extent to which our business, results of operations, financial condition or liquidity may be impacted by the pandemic in the future.

Sales Volume

There was strong demand for fertilizer in 2020 as we shipped 20.3 million tons of product compared to 19.5 million tons in 2019, which increased net sales by $199 million. The increase in total sales volume was due primarily to the impact of increased supply resulting from both higher inventory levels entering 2020 and higher production in 2020. Our sales volumes in 2020 were higher across all of our major products compared to 2019.

Our shipments can shift between quarters due primarily to shifts in weather patterns that impact fertilizer applications. During the fourth quarter of 2020, granular urea sales volume was higher as domestic demand strengthened amid increasing crop prices and overall farm economics improved. Additionally, ammonia sales volume in the fourth quarter of 2020 exceeded the fourth quarter of 2019 as a result of increased demand due to an early fall harvest and ideal weather conditions throughout the Midwestern United States.

Sales volume for our products in 2020, 2019 and 2018 is shown in the table below.

	2020		2019		2018	
	Sales Volume (tons)	Net Sales	Sales Volume (tons)	Net Sales	Sales Volume (tons)	Net Sales
	(tons in thousands; dollars in millions)					
Ammonia	3,767	$ 1,020	3,516	$ 1,113	3,135	$ 1,028
Granular urea	5,148	1,248	4,849	1,342	4,898	1,322
UAN	6,843	1,063	6,807	1,270	7,042	1,234
AN	2,216	455	2,109	506	2,002	460
Other	2,322	338	2,257	359	2,252	385
Total	20,296	$ 4,124	19,538	$ 4,590	19,329	$ 4,429

We expect sales volumes for our products to return to a range of 19-19.5 million product tons in 2021 due to lower year-end inventory than the year before and lower expected production due to a higher number of planned turnarounds than in 2020.

Selling Prices

The selling prices for all of our major products were lower in 2020 than 2019 as global energy prices remained low, driving higher global nitrogen operating rates and the resulting additional global supply availability. The average selling price for our products for 2020 and 2019 was $203 per ton and $235 per ton, respectively. The decrease in average selling prices of 14% in 2020 from 2019 decreased net sales by $665 million.

Natural Gas Prices

Natural gas is the principal raw material used to produce our nitrogen products. We use natural gas both as a chemical feedstock and as a fuel to produce nitrogen products. Natural gas is a significant cost component of manufactured nitrogen products, representing approximately one-third of our production costs.

Most of our nitrogen fertilizer manufacturing facilities are located in the United States and Canada. As a result, the price of natural gas in North America directly impacts a substantial portion of our operating expenses. Due to increases in natural gas production resulting from the rise in production from shale gas formations, natural gas prices in North America have declined over the last decade, but are subject to volatility. Natural gas prices during 2020 were lower on average than 2019, due in part to reduced energy demand as a result of the COVID-19 pandemic, partially offset by reductions in supply. The daily market price at the Henry Hub, the most heavily-traded natural gas pricing point in North America, fluctuated throughout 2020. The average daily market price at the Henry Hub was $1.99 per MMBtu for 2020 compared to $2.51 per MMBtu for 2019, a decrease of 21%. The price of natural gas decreased in the first half of 2020 and increased in the second half of 2020 with the average daily market price rising at the Henry Hub to $2.47 per MMBtu in the fourth quarter of 2020.

We also have manufacturing facilities located in the United Kingdom. These facilities are subject to fluctuations associated with the price of natural gas in Europe. The major natural gas trading point for the United Kingdom is the National Balancing Point (NBP). The price of natural gas in the United Kingdom during 2020 was lower on average compared to 2019 as a result of increased availability of liquefied natural gas in the global market as well as the global economic downturn related to the COVID-19 pandemic. The average daily market price at NBP was $3.20 per MMBtu for 2020 compared to $4.44 per MMBtu for 2019, a decrease of 28%. The daily market price at NBP also fluctuated throughout 2020 as the price decreased in the first half of 2020 and increased in the second half of 2020 with the average daily market price rising at the NBP to $5.29 per MMBtu in the fourth quarter of 2020.

Natural gas costs in cost of sales, including the impact of realized natural gas derivatives, was $2.24 per MMBtu in 2020, an 18% decrease from $2.74 per MMBtu in 2019, which resulted in an increase in gross margin of approximately $195 million.

Financial Executive Summary

We reported net earnings attributable to common stockholders of $317 million in 2020 compared to $493 million in 2019, a decline in net earnings of 36%, or $176 million. The decrease in net earnings was due primarily to lower selling prices as lower global energy costs drove higher global operating rates, leading to increased global nitrogen supply availability. The impact of lower selling prices was partially offset by lower realized natural gas costs and higher sales volume, leading to a net decline in gross margin of $373 million in 2020. Gross margin declined from $1,174 million in 2019 to $801 million in 2020. The following describes the significant factors that impacted gross margin:

- Average selling prices declined 14% in 2020 to $203 per ton, which decreased gross margin by $665 million,
- Realized natural gas costs declined by 18% in 2020 to $2.24 per MMBtu, which increased gross margin by $195 million,
- Sales volume increased 4% to 20.3 million product tons, the highest annual sales volume for the Company. The increase in sales volume increased gross margin by $61 million.

Additionally, net earnings were impacted by lower selling, general and administrative costs, which declined by $33 million due primarily to the impact of lower corporate project activity and travel during the COVID-19 pandemic, and a decline in our annual tax provision of $95 million, driven by lower pre-tax earnings as well as certain favorable discrete tax items, including the impact of the Terra Amended Tax Returns. See discussion under “Items Affecting Comparability—Terra Amended Tax Returns,” below, for further information.

Diluted net earnings per share attributable to common stockholders decreased $0.76 per share, to $1.47 per share in 2020 compared to $2.23 per share in 2019. This decrease is due primarily to lower net earnings, partially offset by a 3% reduction in diluted weighted-average common shares outstanding due to repurchases made under our share repurchase program. On February 13, 2019, our Board of Directors (the Board) authorized the repurchase of up to $1 billion of CF Holdings common stock through December 31, 2021 (the 2019 Share Repurchase Program). In 2019, we repurchased approximately 7.6 million shares under the 2019 Share Repurchase Program for $337 million. In 2020, we repurchased approximately 2.6 million shares under the 2019 Share Repurchase Program for $100 million. No shares were repurchased under the 2019 Share Repurchase Program in the second, third or fourth quarter of 2020. See discussion under “Liquidity and Capital Resources—Share Repurchase Programs,” below, for further information.

Items Affecting Comparability of Results

In addition to the impact of market conditions discussed above, certain items impacted our financial results during the years ended December 31, 2020 and 2019. The following table and related discussion outline these items and how they impacted the comparability of our financial results during these periods. Positive amounts in the table below are costs or expenses incurred, while negative amounts are income recognized in the periods presented. During the years ended December 31, 2020 and 2019, we reported net earnings attributable to common stockholders of $317 million and $493 million, respectively.

	2020		2019	
	Pre-Tax	After-Tax[1]	Pre-Tax	After-Tax[1]
	(in millions)			
Unrealized net mark-to-market (gain) loss on natural gas derivatives[2]	$ (6)	$ (5)	$ 14	$ 10
COVID impacts:				
Special COVID-19 bonus for operational workforce[2]	19	15	—	—
Turnaround deferral[2]	7	6	—	—
Loss (gain) on foreign currency transactions, including intercompany loans[3]	5	4	(1)	(1)
Engineering cost write-off[3]	9	7	—	—
Loss on sale of surplus land[3]	2	1	—	—
Insurance proceeds[3]	(37)	(28)	(37)	(28)
Gain on sale of Pine Bend facility[3]	—	—	(45)	(34)
Losses on debt extinguishment	—	—	21	16
Louisiana incentive tax credit[4]	—	—	—	(30)
Terra amended tax returns—interest income and income tax benefit[5]	(26)	(44)	(5)	(14)
PLNL withholding tax charge[6]	—	—	16	16

(1) The tax impact is calculated utilizing a marginal effective rate of 23.2% in 2020 and 23.3% in 2019.
(2) Included in cost of sales in our consolidated statements of operations.
(3) Included in other operating—net in our consolidated statements of operations.
(4) Included in income tax provision in our consolidated statements of operations.
(5) Included in interest expense, interest income and income tax provision in our consolidated statements of operations.
(6) Included in equity in earnings (loss) of operating affiliate in our consolidated statements of operations.

The following describes the significant items that impacted the comparability of our financial results in 2020 and 2019. Descriptions of items below that refer to amounts in the table above, refer to the pre-tax amounts, except for the discussion under *Income taxes*.

Unrealized net mark-to-market (gain) loss on natural gas derivatives

Natural gas is the largest and most volatile single component of the manufacturing cost for nitrogen-based products. At certain times, we have managed the risk of changes in natural gas prices through the use of derivative financial instruments. The derivatives that we may use for this purpose are primarily natural gas fixed price swaps, basis swaps and options. We use natural gas derivatives as an economic hedge of natural gas price risk, but without the application of hedge accounting. This can result in volatility in reported earnings due to the unrealized mark-to-market adjustments that occur from changes in the value of the derivatives, which is reflected in cost of sales in our consolidated statements of operations. In 2020 and 2019, we recognized an unrealized net mark-to-market (gain) loss on natural gas derivatives of $(6) million and $14 million, respectively.

COVID impacts

In March 2020, a short-term bonus program was initiated to compensate operational employees for continuing their critical tasks at the beginning of the COVID-19 pandemic. The bonus program concluded in June 2020. Approximately $19 million was paid as part of the program and was recognized in cost of sales in our consolidated statement of operations for the year ended December 31, 2020.

In addition, certain plant turnaround activities were deferred because of the COVID-19 pandemic. As a result, we incurred $7 million of expense for the year ended December 31, 2020, which was recognized in cost of sales in our consolidated statement of operations.

Loss (gain) on foreign currency transactions, including intercompany loans

In 2020 and 2019, we recognized a loss (gain) of $5 million and $(1) million, respectively, which consists of foreign currency exchange rate impacts on foreign currency denominated transactions, including the impact of changes in foreign currency exchange rates on intercompany loans that were not permanently invested.

Engineering cost write-off

In June 2020, a project at one of our nitrogen complexes was cancelled and, as a result, $9 million of previously capitalized engineering costs were expensed in the year ended December 31, 2020. The expense is reflected in other operating—net in our consolidated statement of operations.

Loss on sale of surplus land

In 2020, we recognized a loss of $2 million on the sale of surplus land, which is reflected in other operating—net in our consolidated statement of operations.

Insurance proceeds

We recognized income of $37 million in both 2020 and 2019 related to insurance claims at one of our nitrogen complexes. The $37 million of income in 2020 consists of $35 million related to business interruption insurance proceeds and $2 million related to property insurance proceeds. The $37 million of income in 2019 consisted of $22 million related to business interruption insurance proceeds and $15 million related to property insurance proceeds. These proceeds are reflected in other operating—net in our consolidated statements of operations.

Gain on sale of Pine Bend facility

During the first quarter of 2019, we entered into an agreement to sell our Pine Bend dry bulk storage and logistics facility in Minnesota. In April of 2019, we completed the sale, received proceeds of $55 million and recognized a pre-tax gain of $45 million. The gain is reflected in other operating—net in our consolidated statement of operations.

Losses on debt extinguishment

On November 13, 2019, we redeemed in full all of the $500 million outstanding principal amount of the 7.125% senior notes due May 2020 (the 2020 Notes), in accordance with the optional redemption provisions provided in the indenture governing the 2020 Notes. On December 13, 2019, we redeemed $250 million principal amount, representing 50% of the $500 million outstanding principal amount immediately prior to such redemption, of the 3.400% senior secured notes due December 2021 (the 2021 Notes), in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes. As a result of the early redemption of the 2020 Notes and the 2021 Notes, we recognized a loss on debt extinguishment of $21 million, of which $12 million related to the 2020 Notes and $9 million related to the 2021 Notes.

Louisiana incentive tax credit

For 2019, our income tax provision included an incentive tax credit from the State of Louisiana of $30 million, net of federal income tax, related to certain capital projects at our Donaldsonville, Louisiana complex.

Terra amended tax returns

We completed the acquisition of Terra Industries Inc. (Terra) in April 2010. After the acquisition, we determined that the manner in which Terra reported the repatriation of cash from foreign affiliates to its U.S. parent for U.S. and foreign income tax purposes was not appropriate. As a result, in 2012 we amended certain tax returns, including Terra's income and withholding tax returns, back to 1999 (the Amended Tax Returns) and paid additional income and withholding taxes, and related interest and penalties. In early 2013, the Internal Revenue Service (IRS) commenced an examination of the U.S. tax aspects of the Amended Tax Returns. In 2017, we also made a Voluntary Disclosure Filing with the Canadian Revenue Agency (CRA) with respect to the Canadian tax aspects of this matter and paid additional Canadian taxes due.

In early 2019, the IRS completed its examination of the Amended Tax Returns and submitted its audit reports and related refund claims to the Joint Committee on Taxation of the U.S. Congress (the Joint Committee). For purposes of its review, the Joint Committee separated the IRS audit reports into two separate matters: (i) an income tax related matter and (ii) a withholding tax matter. In late 2019, we received notification that the Joint Committee had approved the IRS audit reports and related income tax refunds relating to the income tax related matter. As a result of the approval by the Joint Committee, we recognized in the fourth quarter of 2019 interest income of $5 million ($4 million after tax) and a reduction in income tax expense of $10 million related to the favorable settlement of certain uncertain tax positions. No income tax refunds were received in 2019 related to the Amended Tax Returns.

In 2020, we received notification that the Joint Committee approved the IRS audit report and related withholding tax refunds relating to the withholding tax matter and we received IRS Notices indicating the amount of tax and interest to be refunded and received with respect to the withholding tax matter and the income tax matter. In addition, the CRA settled with us the Voluntary Disclosure matter.

In 2020, as a result of these events, we recognized $26 million of interest-related income and $18 million of income tax benefit, which consisted of the following:

- additional income of $26 million ($23 million, net of tax) representing $16 million of interest income related to the U.S. Federal income tax matter and withholding tax matter and a $10 million reversal of previously accrued interest related to the Canadian tax aspects of this matter,
- a reduction in our liabilities for unrecognized tax benefits of $12 million with a corresponding reduction in income tax expense related to the U.S. Federal withholding tax matter, and
- additional income tax benefit of $9 million related to the U.S. Federal income tax matter and related state amended returns.

In 2020, we received U.S. federal income tax refunds, including interest, of $110 million relating to the Amended Tax Returns, consisting of $68 million related to the income tax matter and $42 million related to the withholding tax matter, which finalized these matters with the IRS. As a result of the finalization of the income tax matter and the withholding tax matter, all U.S. federal tax years commencing before January 1, 2012 are now closed.

In the first quarter of 2021, we received approximately $20 million of withholding tax refunds, including interest, from the CRA, related to the Voluntary Disclosure Filing. These amounts were previously recorded in our consolidated balance sheet as of December 31, 2020.

PLNL withholding tax charge

The Trinidadian tax authority (the Board of Inland Revenue) issued a proposed tax assessment against PLNL, our joint venture in the Republic of Trinidad and Tobago, with respect to tax years 2011 and 2012 in the amount of approximately $12 million. The proposed assessment asserted that PLNL should have withheld tax at a higher rate on dividends paid to its Trinidadian owners. The Board of Inland Revenue also would have assessed statutory interest and penalties on the amount of tax owed when a final assessment was issued for the tax years 2011 and 2012.

During the third quarter of 2019, the Trinidadian government offered a tax amnesty period that provided taxpayers the opportunity to pay any prior year tax obligations and avoid accumulated interest or penalties. During the tax amnesty period, PLNL evaluated the proposed assessment, including considering the outcome of certain recent legal cases involving other taxpayers. As a result of this evaluation, in the third quarter of 2019, PLNL paid withholding tax to the Board of Inland Revenue under the amnesty program for tax years back to 2011, and recognized a charge for $32 million. Our 50% share of PLNL’s tax charge is $16 million, which reduced our equity in earnings of operating affiliate for 2019.

Consolidated Results of Operations

The following table presents our consolidated results of operations and supplemental data:

	Year ended December 31,						
	2020	2019	2018[1]	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$4,124	$4,590	$4,429	$ (466)	(10)%	$ 161	4 %
Cost of sales (COS)	3,323	3,416	3,512	(93)	(3)%	(96)	(3)%
Gross margin	801	1,174	917	(373)	(32)%	257	28 %
Gross margin percentage	19.4 %	25.6 %	20.7 %	(6.2)%		4.9 %	
Selling, general and administrative expenses	206	239	214	(33)	(14)%	25	12 %
Other operating—net	(17)	(73)	(27)	56	77 %	(46)	(170)%
Total other operating costs and expenses	189	166	187	23	14 %	(21)	(11)%
Equity in earnings (loss) of operating affiliate	11	(5)	36	16	N/M	(41)	N/M
Operating earnings	623	1,003	766	(380)	(38)%	237	31 %
Interest expense—net	161	217	228	(56)	(26)%	(11)	(5)%
Loss on debt extinguishment	—	21	—	(21)	(100)%	21	N/M
Other non-operating—net	(1)	(7)	(9)	6	86 %	2	22 %
Earnings before income taxes	463	772	547	(309)	(40)%	225	41 %
Income tax provision	31	126	119	(95)	(75)%	7	6 %
Net earnings	432	646	428	(214)	(33)%	218	51 %
Less: Net earnings attributable to noncontrolling interests	115	153	138	(38)	(25)%	15	11 %
Net earnings attributable to common stockholders	$ 317	$ 493	$ 290	$ (176)	(36)%	$ 203	70 %
Diluted net earnings per share attributable to common stockholders	$ 1.47	$ 2.23	$ 1.24	$ (0.76)	(34)%	$ 0.99	80 %
Diluted weighted-average common shares outstanding	215.2	221.6	233.8	(6.4)	(3)%	(12.2)	(5)%
Dividends declared per common share	$ 1.20	$ 1.20	$ 1.20	$ —	— %	$ —	— %
Natural gas supplemental data (per MMBtu)							
Natural gas costs in COS[2]	$ 2.21	$ 2.75	$ 3.15	$ (0.54)	(20)%	$ (0.40)	(13)%
Realized derivatives loss (gain) in COS[3]	0.03	(0.01)	0.01	0.04	N/M	(0.02)	N/M
Cost of natural gas in COS	$ 2.24	$ 2.74	$ 3.16	$ (0.50)	(18)%	$ (0.42)	(13)%
Average daily market price of natural gas Henry Hub (Louisiana)	$ 1.99	$ 2.51	$ 3.12	$ (0.52)	(21)%	$ (0.61)	(20)%
Average daily market price of natural gas National Balancing Point (UK)	$ 3.20	$ 4.44	$ 8.07	$ (1.24)	(28)%	$ (3.63)	(45)%
Unrealized net mark-to-market (gain) loss on natural gas derivatives	$ (6)	$ 14	$ (13)	$ (20)	N/M	$ 27	N/M
Depreciation and amortization	$ 892	$ 875	$ 888	$ 17	2 %	$ (13)	(1)%
Capital expenditures	$ 309	$ 404	$ 422	$ (95)	(24)%	$ (18)	(4)%
Sales volume by product tons (000s)	20,296	19,538	19,329	758	4 %	209	1 %
Production volume by product tons (000s):							
Ammonia[4]	10,353	10,246	9,805	107	1 %	441	4 %
Granular urea	5,001	4,941	4,837	60	1 %	104	2 %
UAN (32%)	6,677	6,768	6,903	(91)	(1)%	(135)	(2)%
AN	2,115	2,128	1,731	(13)	(1)%	397	23 %

N/M—Not Meaningful

(1) For a discussion and analysis of the year ended December 31, 2018, see Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2019 Annual Report on Form 10-K filed with the SEC on February 24, 2020.

(2) Includes the cost of natural gas and related transportation that is included in cost of sales during the period under the first-in, first-out inventory cost method.

(3) Includes realized gains and losses on natural gas derivatives settled during the period. Excludes unrealized mark-to-market gains and losses on natural gas derivatives.

(4) Gross ammonia production, including amounts subsequently upgraded on-site into granular urea, UAN, or AN.

The following is a discussion and analysis of our consolidated results of operations for the year ended December 31, 2020 compared to the year ended December 31, 2019. For a discussion and analysis of our consolidated results of operations for the year ended December 31, 2019 compared to the year ended December 31, 2018, see Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2019 Annual Report on Form 10-K filed with the SEC on February 24, 2020.

Net Sales

Our net sales are derived primarily from the sale of nitrogen products and are determined by the quantities of nitrogen products we sell and the selling prices we realize. The volumes, mix and selling prices we realize are determined to a great extent by a combination of global and regional supply and demand factors. Net sales also include shipping and handling costs that are billed to our customers. Sales incentives are reported as a reduction in net sales.

Our total net sales decreased $466 million, or 10%, to $4.12 billion in 2020 compared to $4.59 billion in 2019 due to a 14% decrease in average selling prices, which decreased net sales by $665 million, partially offset by a 4% increase in sales volume, which increased net sales by $199 million.

Average selling prices were $203 per ton in 2020 compared to $235 per ton in 2019, a decrease of 14%, due primarily to lower average selling prices across all products, primarily driven by increased global nitrogen supply availability as lower global energy costs drove higher global operating rates. The increase in total sales volume of 4% was due to higher sales volume across all our products as greater supply availability resulting from both higher inventory levels entering 2020 and higher production in 2020.

Cost of Sales

Our cost of sales includes manufacturing costs, purchased product costs, and distribution costs. Manufacturing costs, the most significant element of cost of sales, consist primarily of raw materials, realized and unrealized gains and losses on natural gas derivatives, maintenance, direct labor, depreciation and other plant overhead expenses. Purchased product costs primarily include the cost to purchase nitrogen fertilizers to augment or replace production at our facilities. Distribution costs consist of the cost of freight required to transport finished products from our plants to our distribution facilities, which are recognized in cost of sales when the product is sold to our customers, and storage costs incurred prior to final shipment to customers.

Our cost of sales decreased $93 million, or 3%, to $3.32 billion in 2020 as compared to $3.42 billion in 2019. The decrease in our cost of sales was due primarily to the impact of lower realized natural gas costs, including the impact of realized derivatives, and lower costs related to plant maintenance activity. We recognized an unrealized net mark-to-market gain on natural gas derivatives of $6 million in 2020 compared to an unrealized net mark-to-market loss of $14 million in 2019. These factors were partially offset by an increase in cost of sales due to higher sales volumes, higher distribution costs, and costs related to the special COVID-19 bonus. The special COVID-19 bonus is more fully described in the section above titled "Items Affecting Comparability of Results—COVID impacts." The cost of sales per ton averaged $164 in 2020, a 6% decrease from $175 per ton in 2019. Realized natural gas costs, including the impact of realized derivatives, decreased 18% to $2.24 per MMBtu in 2020 from $2.74 per MMBtu in 2019.

Selling, General and Administrative Expenses

Our selling, general and administrative expenses consist primarily of corporate office expenses such as salaries and other payroll-related costs for our executive, administrative, legal, financial, IT, and sales functions, as well as certain taxes and insurance and other professional service fees, including those for corporate initiatives.

Selling, general and administrative expenses decreased $33 million, or 14%, to $206 million in 2020 from $239 million in 2019. The decrease was due primarily to lower corporate project activity and travel as a result of the COVID-19 pandemic.

Other Operating—Net

Other operating—net includes administrative costs that do not relate directly to our central operations. Costs included in "other operating costs" can include foreign exchange gains and losses, unrealized gains and losses on foreign currency derivatives, costs associated with our closed facilities, amounts recorded for environmental remediation for other areas of our business, litigation expenses and gains and losses on the disposal of fixed assets.

Other operating—net was $17 million of income in 2020 compared to $73 million of income in 2019. The income in 2020 includes insurance proceeds of $37 million. The insurance proceeds were partially offset by $9 million of expense related to the cancellation of a project, and foreign currency transaction losses of $5 million, which includes the impact of changes in foreign currency exchange rates on intercompany loans that were not permanently invested. The income in 2019 was due primarily to the gain recognized on the sale of the Pine Bend facility of $45 million and insurance proceeds of $37 million, partially offset by foreign currency transaction losses. Each of these items is more fully described in the section above titled "Items Affecting Comparability of Results."

Equity in Earnings (Loss) of Operating Affiliate

Equity in earnings (loss) of operating affiliate consists of our 50% ownership interest in PLNL. We include our share of the net earnings from our equity method investment in PLNL as an element of earnings from operations because this investment provides additional production and is integrated with our other supply chain and sales activities. Our share of the net earnings includes the amortization of certain tangible and intangible assets identified as part of the application of purchase accounting at acquisition.

Equity in earnings of operating affiliate was $11 million in 2020 compared to a loss of $5 million in 2019. The loss in 2019 included approximately $16 million related to a withholding tax charge recognized by PLNL regarding a multi-year tax dispute. See "Items Affecting Comparability of Results—PLNL withholding tax charge," above, for additional information.

Interest Expense—Net

Our interest expense—net includes the interest expense on our long-term debt, amortization of the related fees required to execute financing agreements, annual fees pursuant to our revolving credit agreement and interest on tax liabilities. Capitalized interest relating to the construction of major capital projects reduces interest expense as the interest is capitalized and amortized over the estimated useful lives of the related assets. Interest expense—net also includes interest income, which includes amounts earned on our cash, cash equivalents, and investments and any interest earned related to income tax refunds.

Net interest expense decreased by $56 million to $161 million in 2020 from $217 million in 2019. The decrease was due primarily to our redemption of $750 million aggregate principal amount of long-term debt in the fourth quarter of 2019, which is more fully described under "Liquidity and Capital Resources—Senior Notes," below. In addition, the decrease reflects $26 million of income in 2020 related to the finalization of the Terra amended tax returns, which is more fully described under "Liquidity and Capital Resources—Terra Amended Tax Returns," below.

Losses on Debt Extinguishment

On November 13, 2019, we redeemed in full all of the $500 million outstanding principal amount of the 2020 Notes, in accordance with the optional redemption provisions provided in the indenture governing the 2020 Notes. On December 13, 2019, we redeemed $250 million principal amount, representing 50% of the $500 million outstanding principal amount immediately prior to such redemption, of the 2021 Notes, in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes. As a result of the early redemption of the 2020 Notes and the 2021 Notes, we recognized a loss on debt extinguishment of $21 million, of which $12 million related to the 2020 Notes and $9 million related to the 2021 Notes.

Income Tax Provision

Our income tax provision for 2020 was $31 million on pre-tax income of $463 million, or an effective tax rate of 6.7% compared to an income tax provision of $126 million on pre-tax income of $772 million, or an effective tax rate of 16.3% in 2019.

For 2020, our income tax provision includes a $27 million benefit related to the settlement of certain U.S. and foreign income tax audits, which primarily related to the settlement of the audit of the Terra amended tax returns, which is more fully described under "Liquidity and Capital Resources—Terra Amended Tax Returns," below.

For 2019, our income tax provision includes an incentive tax credit from the State of Louisiana of $30 million, net of federal income tax, related to certain capital projects at our Donaldsonville, Louisiana complex, and an income tax benefit of $10 million related to the favorable settlement of certain uncertain tax positions related to the Terra amended tax returns.

Our effective tax rate is impacted by earnings attributable to the noncontrolling interest in CFN, as our consolidated income tax provision does not include a tax provision on the earnings attributable to the noncontrolling interest. Our effective tax rate for 2020 of 6.7%, which is based on pre-tax income of $463 million, would be 2.2 percentage points higher, or 8.9%, if based on pre-tax income exclusive of the earnings attributable to the noncontrolling interest of $115 million. Our effective tax rate for 2019 of 16.3%, which is based on pre-tax income of $772 million, would be 4.0 percentage points higher, or 20.3%, if based on pre-tax income exclusive of the earnings attributable to the noncontrolling interest of $153 million.

Both 2020 and 2019 were impacted by additional discrete tax items. See Note 10—Income Taxes for additional information.

Net Earnings Attributable to Noncontrolling Interest

Net earnings attributable to noncontrolling interest includes the net earnings attributable to the approximately 11% CHS minority equity interest in CFN, a subsidiary of CF Holdings.

Net earnings attributable to noncontrolling interest decreased $38 million, or 25%, to $115 million in 2020 compared to $153 million in 2019 due to lower earnings of CFN driven by lower average selling prices due primarily to increased global nitrogen supply availability.

Diluted Net Earnings Per Share Attributable to Common Stockholders

Net earnings per share attributable to common stockholders decreased $0.76 to $1.47 per diluted share in 2020 from $2.23 per diluted share in 2019. This decrease is due primarily to lower net earnings, partially offset by the impact of a 3% reduction in diluted weighted-average common shares outstanding due to repurchases made under our share repurchase program. See discussion under "Liquidity and Capital Resources—Share Repurchase Program," below, for further information.

Operating Results by Business Segment

Our reportable segment structure reflects how our chief operating decision maker, as defined in the accounting principles generally accepted in the United States (U.S. GAAP), assesses the performance of our reportable segments and makes decisions about resource allocation. These segments are differentiated by products. Our management uses gross margin to evaluate segment performance and allocate resources. Total other operating costs and expenses (consisting of selling, general and administrative expenses and other operating—net) and non-operating expenses (interest and income taxes), are centrally managed and are not included in the measurement of segment profitability reviewed by management.

The following table presents summary operating results by business segment:

	Ammonia	Granular Urea[(1)]	UAN[(1)]	AN[(1)]	Other[(1)]	Consolidated
			(in millions)			
Year ended December 31, 2020						
Net sales	$ 1,020	$ 1,248	$ 1,063	$ 455	$ 338	$ 4,124
Cost of sales	850	847	949	390	287	3,323
Gross margin	$ 170	$ 401	$ 114	$ 65	$ 51	$ 801
Gross margin percentage	16.7 %	32.1 %	10.7 %	14.3 %	15.1 %	19.4 %
Year ended December 31, 2019						
Net sales	$ 1,113	$ 1,342	$ 1,270	$ 506	$ 359	$ 4,590
Cost of sales	878	861	981	399	297	3,416
Gross margin	$ 235	$ 481	$ 289	$ 107	$ 62	$ 1,174
Gross margin percentage	21.1 %	35.8 %	22.8 %	21.1 %	17.3 %	25.6 %
Year ended December 31, 2018						
Net sales	$ 1,028	$ 1,322	$ 1,234	$ 460	$ 385	$ 4,429
Cost of sales	867	889	1,007	414	335	3,512
Gross margin	$ 161	$ 433	$ 227	$ 46	$ 50	$ 917
Gross margin percentage	15.7 %	32.8 %	18.4 %	10.0 %	13.0 %	20.7 %

(1) The cost of ammonia that is upgraded into other products is transferred at cost into the upgraded product results.

The following is a discussion and analysis of our operating results by business segment for the year ended December 31, 2020 compared to the year ended December 31, 2019. For a discussion and analysis of our operating results by business segment for the year ended December 31, 2019 compared to the year ended December 31, 2018, see Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2019 Annual Report on Form 10-K filed with the SEC on February 24, 2020.

Ammonia Segment

Our ammonia segment produces anhydrous ammonia (ammonia), which is our most concentrated nitrogen product. Ammonia contains 82% nitrogen and 18% hydrogen. The results of our ammonia segment consist of sales of ammonia to external customers. In addition, ammonia is the "basic" nitrogen product that we upgrade into other nitrogen products such as granular urea, UAN and AN. We produce ammonia at all of our nitrogen manufacturing complexes.

The following table presents summary operating data for our ammonia segment:

	Year ended December 31,						
	2020	2019	2018	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$ 1,020	$ 1,113	$ 1,028	$ (93)	(8)%	$ 85	8 %
Cost of sales	850	878	867	(28)	(3)%	11	1 %
Gross margin	$ 170	$ 235	$ 161	$ (65)	(28)%	$ 74	46 %
Gross margin percentage	16.7 %	21.1 %	15.7 %	(4.4)%		5.4 %	
Sales volume by product tons (000s)	3,767	3,516	3,135	251	7 %	381	12 %
Sales volume by nutrient tons (000s)[(1)]	3,090	2,884	2,571	206	7 %	313	12 %
Average selling price per product ton	$ 271	$ 317	$ 328	$ (46)	(15)%	$ (11)	(3)%
Average selling price per nutrient ton[(1)]	$ 330	$ 386	$ 400	$ (56)	(15)%	$ (14)	(4)%
Gross margin per product ton	$ 45	$ 67	$ 51	$ (22)	(33)%	$ 16	31 %
Gross margin per nutrient ton[(1)]	$ 55	$ 81	$ 63	$ (26)	(32)%	$ 18	29 %
Depreciation and amortization	$ 176	$ 167	$ 155	$ 9	5 %	$ 12	8 %
Unrealized net mark-to-market (gain) loss on natural gas derivatives	$ (2)	$ 4	$ (4)	$ (6)	N/M	$ 8	N/M

N/M—Not Meaningful

(1) Ammonia represents 82% nitrogen content. Nutrient tons represent the tons of nitrogen within the product tons.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Net Sales. Net sales in our ammonia segment decreased by $93 million, or 8%, to $1.02 billion in 2020 from $1.11 billion in 2019 due primarily to a 15% decrease in average selling prices, partially offset by a 7% increase in sales volume. Average selling prices decreased to $271 per ton in 2020 compared to $317 per ton in 2019. The decrease in average selling prices was due to increased global nitrogen supply availability as lower global energy costs drove higher global operating rates. Sales volume was higher in 2020 due to greater supply availability resulting from increased production and higher inventory levels entering 2020.

Cost of Sales. Cost of sales in our ammonia segment averaged $226 per ton in 2020, a 10% decrease from $250 per ton in 2019, due primarily to the impact of lower realized natural gas costs and lower costs related to plant maintenance activity, partially offset by higher distribution costs.

Gross Margin. Gross margin in our ammonia segment decreased by $65 million to $170 million in 2020 from $235 million in 2019, and our gross margin percentage was 16.7% in 2020 compared to 21.1% in 2019. The decrease in gross margin was due to a 15% decrease in average selling prices, which reduced gross margin by $170 million. This factor was partially offset by a decrease in realized natural gas costs, which increased gross margin by $57 million, a 7% increase in sales volume, which increased gross margin by $29 million, a $13 million net decrease in other manufacturing and distribution costs, and the impact of a $2 million unrealized net mark-to-market gain on natural gas derivatives in 2020 compared to a $4 million loss in 2019.

Granular Urea Segment

Our granular urea segment produces granular urea, which contains 46% nitrogen. Produced from ammonia and carbon dioxide, it has the highest nitrogen content of any of our solid nitrogen fertilizers. Granular urea is produced at our Donaldsonville, Louisiana; Medicine Hat, Alberta; and Port Neal, Iowa nitrogen complexes.

The following table presents summary operating data for our granular urea segment:

	Year ended December 31,						
	2020	2019	2018	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$ 1,248	$ 1,342	$ 1,322	$ (94)	(7)%	$ 20	2 %
Cost of sales	847	861	889	(14)	(2)%	(28)	(3)%
Gross margin	$ 401	$ 481	$ 433	$ (80)	(17)%	$ 48	11 %
Gross margin percentage	32.1 %	35.8 %	32.8 %	(3.7)%		3.0 %	
Sales volume by product tons (000s)	5,148	4,849	4,898	299	6 %	(49)	(1)%
Sales volume by nutrient tons (000s)[1]	2,368	2,231	2,253	137	6 %	(22)	(1)%
Average selling price per product ton	$ 242	$ 277	$ 270	$ (35)	(13)%	$ 7	3 %
Average selling price per nutrient ton[1]	$ 527	$ 602	$ 587	$ (75)	(12)%	$ 15	3 %
Gross margin per product ton	$ 78	$ 99	$ 88	$ (21)	(21)%	$ 11	13 %
Gross margin per nutrient ton[1]	$ 169	$ 216	$ 192	$ (47)	(22)%	$ 24	13 %
Depreciation and amortization	$ 270	$ 264	$ 276	$ 6	2 %	$ (12)	(4)%
Unrealized net mark-to-market (gain) loss on natural gas derivatives	$ (2)	$ 4	$ (4)	$ (6)	N/M	$ 8	N/M

N/M—Not Meaningful

(1) Granular urea represents 46% nitrogen content. Nutrient tons represent the tons of nitrogen within the product tons.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Net Sales. Net sales in our granular urea segment decreased $94 million, or 7%, to $1.25 billion in 2020 compared to $1.34 billion in 2019 due primarily to a 13% decrease in average selling prices, partially offset by a 6% increase in sales volume. Average selling prices decreased to $242 per ton in 2020 compared to $277 per ton in 2019. The decrease was due primarily to increased global nitrogen supply availability as lower global energy costs drove higher global operating rates. Sales volume was higher due primarily to greater supply availability resulting from higher inventory levels entering 2020 and increased production. In addition, North American demand strengthened in the fourth quarter of 2020 amid increasing crop prices and overall improved farm economics.

Cost of Sales. Cost of sales in our granular urea segment averaged $164 per ton in 2020, an 8% decrease from $178 per ton in 2019, due primarily to the impact of lower realized natural gas costs and lower costs related to plant maintenance activity.

Gross Margin. Gross margin in our granular urea segment decreased by $80 million to $401 million in 2020 from $481 million in 2019, and our gross margin percentage was 32.1% in 2020 compared to 35.8% in 2019. The decrease in gross margin was due to a 13% decrease in average selling prices, which decreased gross margin by $166 million. This factor was partially offset by a decrease in realized natural gas costs, which increased gross margin by $40 million, a $23 million net decrease in other manufacturing and distribution costs, a 6% increase in sales volume, which increased gross margin by $17 million, and the impact of a $2 million unrealized net mark-to-market gain on natural gas derivatives in 2020 compared to a $4 million loss in 2019.

UAN Segment

Our UAN segment produces urea ammonium nitrate solution (UAN). UAN, a liquid fertilizer product with a nitrogen content that typically ranges from 28% to 32%, is produced by combining urea and ammonium nitrate. UAN is produced at our nitrogen complexes in Courtright, Ontario; Donaldsonville, Louisiana; Port Neal, Iowa; Verdigris, Oklahoma; Woodward, Oklahoma; and Yazoo City, Mississippi.

The following table presents summary operating data for our UAN segment:

	Year ended December 31,						
	2020	2019	2018	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$ 1,063	$ 1,270	$ 1,234	$ (207)	(16)%	$ 36	3 %
Cost of sales	949	981	1,007	(32)	(3)%	(26)	(3)%
Gross margin	$ 114	$ 289	$ 227	$ (175)	(61)%	$ 62	27 %
Gross margin percentage	10.7 %	22.8 %	18.4 %	(12.1)%		4.4 %	
Sales volume by product tons (000s)	6,843	6,807	7,042	36	1 %	(235)	(3)%
Sales volume by nutrient tons (000s)[1]	2,155	2,144	2,225	11	1 %	(81)	(4)%
Average selling price per product ton	$ 155	$ 187	$ 175	$ (32)	(17)%	$ 12	7 %
Average selling price per nutrient ton[1]	$ 493	$ 592	$ 555	$ (99)	(17)%	$ 37	7 %
Gross margin per product ton	$ 17	$ 42	$ 32	$ (25)	(60)%	$ 10	31 %
Gross margin per nutrient ton[1]	$ 53	$ 135	$ 102	$ (82)	(61)%	$ 33	32 %
Depreciation and amortization	$ 256	$ 251	$ 270	$ 5	2 %	$ (19)	(7)%
Unrealized net mark-to-market (gain) loss on natural gas derivatives	$ (2)	$ 4	$ (4)	$ (6)	N/M	$ 8	N/M

N/M—Not Meaningful

(1) UAN represents between 28% and 32% of nitrogen content, depending on the concentration specified by the customer. Nutrient tons represent the tons of nitrogen within the product tons.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Net Sales. Net sales in our UAN segment decreased $207 million, or 16%, to $1.06 billion in 2020 compared to $1.27 billion in 2019 due primarily to a 17% decrease in average selling prices, partially offset by a 1% increase in sales volume. Average selling prices decreased to $155 per ton in 2020 compared to $187 per ton in 2019 due primarily to increased global nitrogen supply availability as lower global energy costs drove higher global operating rates and increased imports into the United States as trade flows adjusted in response to the European Union anti-dumping duties. Sales volume in our UAN segment was approximately 6.8 million tons in both 2020 and 2019.

Cost of Sales. Cost of sales in our UAN segment averaged $138 per ton in 2020, a 5% decrease from $145 per ton in 2019, due primarily to the impact of lower realized natural gas costs.

Gross Margin. Gross margin in our UAN segment decreased by $175 million to $114 million in 2020 from $289 million in 2019, and our gross margin percentage was 10.7% in 2020 compared to 22.8% in 2019. The decrease in gross margin was due to a 17% decrease in average selling prices, which decreased gross margin by $222 million, and a $27 million net increase in other manufacturing and distribution costs. These factors were partially offset by a decrease in realized natural gas costs, which increased gross margin by $58 million, a 1% increase in sales volume, which increased gross margin by $10 million, and the impact of a $2 million unrealized net mark-to-market gain on natural gas derivatives in 2020 compared to a $4 million loss in 2019.

AN Segment

Our AN segment produces ammonium nitrate (AN). AN, which has a nitrogen content between 29% and 35%, is produced by combining anhydrous ammonia and nitric acid. AN is used as nitrogen fertilizer and is also used by industrial customers for commercial explosives and blasting systems. AN is produced at our nitrogen complexes in Yazoo City, Mississippi and Ince and Billingham, United Kingdom.

The following table presents summary operating data for our AN segment:

	Year ended December 31,						
	2020	2019	2018	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$ 455	$ 506	$ 460	$ (51)	(10)%	$ 46	10 %
Cost of sales	390	399	414	(9)	(2)%	(15)	(4)%
Gross margin	$ 65	$ 107	$ 46	$ (42)	(39)%	$ 61	133 %
Gross margin percentage	14.3 %	21.1 %	10.0 %	(6.8)%		11.1 %	
Sales volume by product tons (000s)	2,216	2,109	2,002	107	5 %	107	5 %
Sales volume by nutrient tons (000s)[(1)]	747	708	676	39	6 %	32	5 %
Average selling price per product ton	$ 205	$ 240	$ 230	$ (35)	(15)%	$ 10	4 %
Average selling price per nutrient ton[(1)]	$ 609	$ 715	$ 680	$ (106)	(15)%	$ 35	5 %
Gross margin per product ton	$ 29	$ 51	$ 23	$ (22)	(43)%	$ 28	122 %
Gross margin per nutrient ton[(1)]	$ 87	$ 151	$ 68	$ (64)	(42)%	$ 83	122 %
Depreciation and amortization	$ 100	$ 88	$ 85	$ 12	14 %	$ 3	4 %
Unrealized net mark-to-market loss on natural gas derivatives	$ —	$ 1	$ —	$ (1)	(100)%	$ 1	N/M

N/M—Not Meaningful

(1) AN represents between 29% and 35% of nitrogen content. Nutrient tons represent the tons of nitrogen within the product tons.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Net Sales. Net sales in our AN segment decreased $51 million, or 10%, to $455 million in 2020 from $506 million in 2019 due primarily to a 15% decrease in average selling prices, partially offset by a 5% increase in sales volume. Average selling prices decreased to $205 per ton in 2020 compared to $240 per ton in 2019 due primarily to increased global nitrogen supply availability as lower global energy costs drove higher global operating rates. Sales volume increased due primarily to greater supply availability as a result of higher inventory levels entering 2020.

Cost of Sales. Cost of sales in our AN segment averaged $176 per ton in 2020, a 7% decrease from $189 per ton in 2019, due primarily to the impact of lower realized natural gas costs and lower costs related to plant maintenance activity.

Gross Margin. Gross margin in our AN segment decreased by $42 million to $65 million in 2020 from $107 million in 2019, and our gross margin percentage was 14.3% in 2020 compared to 21.1% in 2019. The decrease in gross margin was due to a 15% decrease in average selling prices, which decreased gross margin by $77 million. This factor was partially offset by a decrease in realized natural gas costs, which increased gross margin by $26 million, and a 5% increase in sales volume, which increased gross margin by $4 million, a $4 million net decrease in other manufacturing and distribution costs, and the impact of a $1 million unrealized net mark-to-market loss on natural gas derivatives in 2019.

Other Segment

Our Other segment primarily includes the following products:

- Diesel exhaust fluid (DEF) is an aqueous urea solution typically made with 32.5% or 50% high-purity urea and the remainder deionized water.
- Urea liquor is a liquid product that we sell in concentrations of 40%, 50% and 70% urea as a chemical intermediate.
- Nitric acid is a nitrogen-based mineral acid that is used in the production of nitrate-based fertilizers, nylon precursors and other specialty chemicals.
- Compound fertilizer products (NPKs) are solid granular fertilizer products for which the nutrient content is a combination of nitrogen, phosphorus and potassium.

The following table presents summary operating data for our Other segment:

	Year ended December 31,						
	2020	2019	2018	2020 v. 2019		2019 v. 2018	
	(in millions, except as noted)						
Net sales	$ 338	$ 359	$ 385	$ (21)	(6)%	$ (26)	(7)%
Cost of sales	287	297	335	(10)	(3)%	(38)	(11)%
Gross margin	$ 51	$ 62	$ 50	$ (11)	(18)%	$ 12	24 %
Gross margin percentage	15.1 %	17.3 %	13.0 %	(2.2)%		4.3 %	
Sales volume by product tons (000s)	2,322	2,257	2,252	65	3 %	5	— %
Sales volume by nutrient tons (000s)[(1)]	457	444	439	13	3 %	5	1 %
Average selling price per product ton	$ 146	$ 159	$ 171	$ (13)	(8)%	$ (12)	(7)%
Average selling price per nutrient ton[(1)]	$ 740	$ 809	$ 877	$ (69)	(9)%	$ (68)	(8)%
Gross margin per product ton	$ 22	$ 27	$ 22	$ (5)	(19)%	$ 5	23 %
Gross margin per nutrient ton[(1)]	$ 112	$ 140	$ 114	$ (28)	(20)%	$ 26	23 %
Depreciation and amortization	$ 68	$ 72	$ 67	$ (4)	(6)%	$ 5	7 %
Unrealized net mark-to-market loss (gain) on natural gas derivatives	$ —	$ 1	$ (1)	$ (1)	(100)%	$ 2	N/M

N/M—Not Meaningful

(1) Nutrient tons represent the tons of nitrogen within the product tons.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Net Sales. Net sales in our Other segment decreased $21 million, or 6%, to $338 million in 2020 from $359 million in 2019 due to an 8% decrease in average selling prices, partially offset by a 3% increase in sales volume. Average selling prices decreased to $146 per ton in 2020 compared to $159 per ton in 2019. The decrease in average selling prices was due primarily to increased global nitrogen supply availability as lower global energy costs drove higher global operating rates. The increase in sales volume was due primarily to higher DEF and NPK sales volumes, partially offset by lower nitric acid sales volume.

Cost of Sales. Cost of sales in our Other segment averaged $124 per ton in 2020, a 6% decrease from $132 per ton in 2019, due primarily to the impact of lower realized natural gas costs.

Gross Margin. Gross margin in our Other segment decreased by $11 million to $51 million in 2020 from $62 million in 2019, and our gross margin percentage was 15.1% in 2020 compared to 17.3% in 2019. The decrease in gross margin was due to an 8% decrease in average selling prices, which reduced gross margin by $30 million. This factor was partially offset by a decrease in realized natural gas costs, which increased gross margin by $14 million, a $3 million net decrease in other manufacturing and distribution costs, a 3% increase in sales volume including a shift in the mix of products sold within the segment, which increased gross margin by $1 million, and the impact of a $1 million unrealized net mark-to-market loss on natural gas derivatives in 2019.

Liquidity and Capital Resources

Our primary uses of cash are generally for operating costs, working capital, capital expenditures, debt service, investments, taxes, share repurchases and dividends. Our working capital requirements are affected by several factors, including demand for our products, selling prices, raw material costs, freight costs and seasonal factors inherent in the business. In addition, we may from time to time seek to retire or purchase our outstanding debt through cash purchases, in open market or privately negotiated transactions or otherwise. Such repurchases, if any, will depend on prevailing market conditions, our liquidity requirements, contractual restrictions and other factors. The amounts involved may be material.

Generally, our primary source of cash is cash from operations, which includes cash generated by customer advances. We may also from time to time access the capital markets or engage in borrowings under our revolving credit agreement. Our cash from operations could be affected by various risks and uncertainties, including, but not limited to, the effects of the COVID-19 pandemic.

In March 2020, as the impact of the COVID-19 pandemic unfolded in many locations around the world, credit markets began to function less efficiently, causing concern about liquidity in credit markets generally. In response to this and out of an abundance of caution, we borrowed $500 million under our $750 million revolving credit agreement to ensure we maintained ample financial flexibility in light of the uncertainty in the global markets, including the financial credit markets. In April 2020, due to confidence in the functioning of the credit markets and strong nitrogen fertilizer business conditions, we repaid the $500 million of borrowings.

Our cash and cash equivalents balance was $683 million at December 31, 2020, an increase of $396 million from $287 million at December 31, 2019. At December 31, 2020, we were in compliance with all applicable covenant requirements under our revolving credit agreement, senior notes and senior secured notes, and unused borrowing capacity under our revolving credit agreement was $750 million.

On February 17, 2021, we announced that our wholly owned subsidiary CF Industries elected to redeem in full the entire outstanding $250 million principal amount of 3.400% Senior Secured Notes due December 2021 (the 2021 Notes) on March 20, 2021, in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes. Based on market interest rates on February 12, 2021, we estimate that the total amount for the redemption of the 2021 Notes will be approximately $258 million, including accrued interest.

Cash Equivalents

Cash equivalents include highly liquid investments that are readily convertible to known amounts of cash with original maturities of three months or less. Under our short-term investment policy, we may invest our cash balances, either directly or through mutual funds, in several types of investment-grade securities, including notes and bonds issued by governmental entities or corporations. Securities issued by governmental entities include those issued directly by the U.S. and Canadian federal governments; those issued by state, local or other governmental entities; and those guaranteed by entities affiliated with governmental entities.

Share Repurchase Program

On February 13, 2019, the Board authorized the repurchase of up to $1 billion of CF Holdings common stock through December 31, 2021 (the 2019 Share Repurchase Program). Repurchases under the 2019 Share Repurchase Program may be made from time to time in the open market, through privately negotiated transactions, block transactions or otherwise. The manner, timing and amount of repurchases will be determined by our management based on the evaluation of market conditions, stock price, and other factors.

During the year ended December 31, 2019, we repurchased approximately 7.6 million shares of CF Holdings common stock under the 2019 Share Repurchase Program for $337 million. In June and December of 2019, we retired approximately 4.2 million and 3.4 million shares, respectively, that were repurchased under the 2019 Share Repurchase Program in 2019.

During the first quarter of 2020, we repurchased approximately 2.6 million shares of CF Holdings common stock under the 2019 Share Repurchase Program for $100 million and retired those shares in the second quarter of 2020. No shares were repurchased in the second, third or fourth quarter of 2020 under the 2019 Share Repurchase Program. At December 31, 2020, we held 102,843 shares of treasury stock.

The following table summarizes the share repurchases under the 2019 Share Repurchase Program.

	Shares	Amounts
	(in millions)	
Shares repurchased in 2019:		
First quarter	1.5	$ 60
Second quarter	2.7	118
Third quarter	1.5	72
Fourth quarter	1.9	87
Shares repurchased as of December 31, 2019	7.6	337
Shares repurchased in 2020:		
First quarter	2.6	100
Shares repurchased as of December 31, 2020	10.2	$ 437

Capital Spending

We make capital expenditures to sustain our asset base, increase our capacity, improve plant efficiency and comply with various environmental, health and safety requirements. Capital expenditures totaled $309 million in 2020 compared to $404 million in 2019. The decrease in capital expenditures in 2020 was due primarily to actions take to defer certain non-essential capital project activity as a result of the COVID-19 pandemic.

Capital expenditures in 2021 are estimated to be in the range of $450 million, which reflects a return to a normal spending level and includes expenditures for our initial green ammonia project at our Donaldsonville complex. Planned capital expenditures are generally subject to change due to delays in regulatory approvals or permitting, unanticipated increases in cost, changes in scope and completion time, performance of third parties, delays in the receipt of equipment, adverse weather, defects in materials and workmanship, labor or material shortages, transportation constraints, acceleration or delays in the timing of the work and other unforeseen difficulties. All of these factors may also be influenced or exacerbated by the direct or indirect impacts of the COVID-19 pandemic.

Government Policies

The policies or laws of governments around the world can result in the imposition of taxes, duties, tariffs or other restrictions or regulatory requirements on imports and exports of raw materials, finished goods or services from a particular country or region of the world. The policies and laws of governments can also impact the subsidization of natural gas prices, and subsidies or quotas applied to domestic producers or farmers. Due to the critical role that fertilizers play in food production, the construction and operation of fertilizer plants often are influenced by economic, political and social objectives. Additionally, the import or export of fertilizer can be subject to local taxes imposed by governments which can have the effect of either encouraging or discouraging import and export activity. The impact of changes in governmental policies or laws or the political or social objectives of a country could have a material impact on fertilizer demand and selling prices and therefore could impact our liquidity.

Ethanol Industry and the Renewable Fuel Standard

Corn used to produce ethanol accounts for approximately 35% of total U.S. corn demand. U.S. government policy, as expressed in the Renewable Fuel Standard (RFS), is a major determinant for the ethanol market. The RFS establishes minimum volumes of various types of renewable fuels, including ethanol, that must be included in the United States' supply of fuel for transportation. In addition, the U.S. Congress, at various times, has proposed legislation to either modify or eliminate the RFS. While past legislation proposing changes to the RFS has not been enacted into law, there can be no assurance that future legislation will not be enacted into law. Other factors that drive the ethanol market include the prices of ethanol, gasoline and corn. Lower gasoline prices and fewer aggregate miles, driven by increased automobile fuel efficiency or the continued expansion of electric vehicles, may put pressure on ethanol prices that could result in reduced profitability and lower production for the ethanol industry. This could impact the demand for corn and nitrogen fertilizer and, therefore, could impact our liquidity.

Terra Amended Tax Returns

In 2020, we received income tax refunds, including interest, of $110 million relating to the settlement of IRS audits of amended tax returns that we had filed in 2012 related to prior tax years. See discussion under “Items Affecting Comparability—Terra Amended Tax Returns,” above, for further information.

Repatriation of Foreign Earnings and Income Taxes

We have operations in Canada, the United Kingdom and a 50% interest in a joint venture in the Republic of Trinidad and Tobago. Historically, the estimated additional U.S. and foreign income taxes due upon repatriation of the earnings of these foreign operations to the U.S. were recognized in our consolidated financial statements as the earnings were recognized, unless the earnings were considered to be permanently reinvested based upon our then current plans. However, the cash payment of the income tax liabilities associated with repatriation of earnings from foreign operations occurred at the time of the repatriation. As a result, the recognition of income tax expense related to foreign earnings, as applicable, and the payment of taxes resulting from repatriation of those earnings could occur in different periods.

In light of changes made by the Tax Act, commencing with the 2018 tax year, the United States no longer taxes earnings of foreign subsidiaries even when such earnings are earned or repatriated to the United States, unless such earnings are subject to U.S. rules on passive income or certain anti-abuse provisions. Foreign subsidiary earnings may still be subject to withholding taxes when repatriated to the United States.

Cash balances held by our joint venture are maintained at sufficient levels to fund local operations as accumulated earnings are repatriated from the joint venture on a periodic basis.

As of December 31, 2020, approximately $122 million of our consolidated cash and cash equivalents balance of $683 million was held by our Canadian and United Kingdom subsidiaries. Historically, and for the current year, the cash balance held by the Canadian subsidiaries represented accumulated earnings of our foreign operations that were not considered to be permanently reinvested. As of December 31, 2020, we would not expect any additional cash tax cost to repatriate the Canadian and United Kingdom cash balances if we were to repatriate this cash in the future, other than foreign withholding tax.

Net Operating Loss and Capital Loss Carryforwards

As of December 31, 2018, we had net operating loss and capital loss carryforwards (collectively, the Tax Loss Carryforwards) of $271 million. These Tax Loss Carryforwards were available to reduce taxable income and thereby, reduce cash taxes in the United States and other tax jurisdictions in which they could be applied. As a result of the effective usage of certain of these Tax Loss Carryforwards to offset current cash taxes payable, there were no U.S. Federal Tax Loss Carryforwards remaining as of December 31, 2019. As a result, we paid income taxes of approximately $111 million in 2020, net of income tax refunds of approximately $90 million primarily related to the Terra Amended Tax Returns, which are more fully described above under “Items Affecting Comparability—Terra Amended Tax Returns.”

Debt

Revolving Credit Agreement

On December 5, 2019, CF Holdings and CF Industries entered into a senior secured Fourth Amended and Restated Credit Agreement (the Revolving Credit Agreement), which amended and restated our Third Amended and Restated Revolving Credit Agreement, as previously amended (referred to herein, as in effect from time to time, as the Prior Credit Agreement), that was scheduled to mature September 18, 2020. The Revolving Credit Agreement provides for a revolving credit facility of up to $750 million with a maturity of December 5, 2024. The Revolving Credit Agreement includes a letter of credit sub-limit of $125 million. Borrowings under the Revolving Credit Agreement may be used for working capital, capital expenditures, acquisitions, share repurchases and other general corporate purposes.

Borrowings under the Revolving Credit Agreement may be denominated in U.S. dollars, Canadian dollars, euros and British pounds, and bear interest at a per annum rate equal to an applicable eurocurrency rate or base rate plus, in either case, a specified margin. We are required to pay an undrawn commitment fee on the undrawn portion of the commitments under the Revolving Credit Agreement and customary letter of credit fees. The specified margin and the amount of the commitment fee depend on CF Holdings’ credit rating at the time.

CF Industries is the lead borrower under the Revolving Credit Agreement. The borrowers and guarantors under the Revolving Credit Agreement, which are currently comprised of CF Holdings, CF Industries and CF Holdings’ wholly owned subsidiaries CF Industries Enterprises, LLC (CFE), CF Industries Sales, LLC (CFS), CF USA Holdings, LLC (CF USA), and CF Industries Distribution Facilities, LLC (CFIDF), are referred to together herein as the Loan Parties. Subject to specified exceptions, the Revolving Credit Agreement requires that each direct or indirect domestic subsidiary of CF Holdings that guarantees debt for borrowed money of any Loan Party in excess of $150 million become a guarantor under the Revolving Credit Agreement. Subject to specified exceptions, the Revolving Credit Agreement requires a grant of a first priority security interest in substantially all of the assets of the Loan Parties, including a pledge by CF USA of its equity interests in CFN and mortgages over certain material fee-owned domestic real properties, to secure the obligations of the Loan Parties thereunder.

In addition to the obligations under the Revolving Credit Agreement, the Loan Parties also guarantee the obligations under any (i) letter of credit facilities, letter of credit reimbursement agreements, letters of credit, letters of guaranty, surety bonds or similar arrangements, (ii) interest rate or other hedging arrangements and (iii) agreements to provide Automated Clearing House transactions, cash management services or foreign exchange facilities or other cash management arrangements in the ordinary course of business, in each case between CF Holdings or certain of its subsidiaries, on the one hand, and any person that is a lender or the administrative agent under the Revolving Credit Agreement or an affiliate of such person, on the other hand, that are designated by CF Industries as Secured Bilateral LC Facilities, Secured Swap Agreements or Secured Cash Management Agreements (each as defined in the Revolving Credit Agreement), as applicable, pursuant to the terms of the Revolving Credit Agreement. Obligations under Secured Bilateral LC Facilities, Secured Swap Agreements and Secured Cash Management Agreements are secured by the same security interest that secures the obligations under the Revolving Credit Agreement.

At any time that (i) no default or event of default exists under the Revolving Credit Agreement and related documentation and (ii) (a) CF Holdings attains an investment-grade rating as set forth in the Revolving Credit Agreement; (b) CF Industries' senior secured notes due 2021 and senior secured notes due 2026, including all fees, expenses and other amounts due and payable thereunder, have been paid or defeased or (c) CF Industries' senior secured notes due 2021 and senior secured notes due 2026 cease to be secured by the assets of the Loan Parties that secure obligations under the Revolving Credit Agreement, CF Industries will have the right to require that (a) the security interest securing obligations under the Revolving Credit Agreement be terminated and released and (b) each guarantor under the Revolving Credit Agreement other than CF Holdings be released from its obligations under the Revolving Credit Agreement and related documentation.

The Revolving Credit Agreement contains representations and warranties and affirmative and negative covenants customary for a financing of this type. The financial covenants applicable to CF Holdings and its subsidiaries in the Revolving Credit Agreement:

(i) require that the interest coverage ratio (as defined in the Revolving Credit Agreement) be not less than 2.75:1.00 as of the last day of each fiscal quarter and

(ii) require that the total net leverage ratio (as defined in the Revolving Credit Agreement) be not greater than 3.75:1.00 (the Maximum Total Net Leverage Ratio) as of the last day of each fiscal quarter, provided that, if any borrower or subsidiary consummates a material acquisition during any fiscal quarter, CF Industries may elect to increase the Maximum Total Net Leverage Ratio to 4.25:1.00 for the period of four consecutive fiscal quarters commencing with such fiscal quarter (and no further such election may be made unless and until the Maximum Total Net Leverage Ratio is less than or equal to 3.75:1.00 as of the end of two consecutive fiscal quarters after the end of such period).

As of December 31, 2020, we were in compliance with all covenants under the Revolving Credit Agreement.

The Revolving Credit Agreement contains events of default (with notice requirements and cure periods, as applicable) customary for a financing of this type, including, but not limited to, non-payment of principal, interest or fees; inaccuracy of representations and warranties in any material respect; and failure to comply with specified covenants. Upon the occurrence and during the continuance of an event of default under the Revolving Credit Agreement and after any applicable cure period, subject to specified exceptions, the administrative agent may, and at the request of the requisite lenders is required to, accelerate the loans under the Revolving Credit Agreement or terminate the lenders' commitments under the Revolving Credit Agreement.

In March 2020, we borrowed $500 million under the Revolving Credit Agreement to ensure we maintained ample financial flexibility in light of the uncertainty in the global markets, including the financial credit markets, caused by the COVID-19 pandemic. In April 2020, due to confidence in the functioning of the credit markets and strong nitrogen fertilizer business conditions, we repaid the $500 million of borrowings, which returned our unused borrowing capacity under the Revolving Credit Agreement to $750 million.

As of December 31, 2020, we had unused borrowing capacity under the Revolving Credit Agreement of $750 million and no outstanding letters of credit. In addition, there were no borrowings outstanding under the Revolving Credit Agreement as of December 31, 2020 or 2019. Maximum borrowings under the Revolving Credit Agreement during 2020 were $500 million. The weighted-average annual interest rate of borrowings under the Revolving Credit Agreement during 2020 was 2.05%. There were no borrowings under the Prior Credit Agreement or the Revolving Credit Agreement during 2019.

Letters of Credit

In addition to the letters of credit that may be issued under the Revolving Credit Agreement, as described above, we have also entered into a bilateral agreement with capacity to issue letters of credit up to $250 million (reflecting an increase of $105 million in December 2020). As of December 31, 2020, approximately $125 million of letters of credit were outstanding under this agreement.

Senior Notes

Long-term debt presented on our consolidated balance sheets as of December 31, 2020 and 2019 consisted of the following debt securities issued by CF Industries:

	Effective Interest Rate	December 31, 2020		December 31, 2019	
		Principal Outstanding	Carrying Amount [1]	Principal Outstanding	Carrying Amount [1]
		(in millions)			
Public Senior Notes:					
3.450% due June 2023	3.562%	$ 750	$ 748	$ 750	$ 747
5.150% due March 2034	5.279%	750	741	750	740
4.950% due June 2043	5.031%	750	742	750	742
5.375% due March 2044	5.465%	750	741	750	741
Senior Secured Notes:					
3.400% due December 2021	3.782%	250	249	250	248
4.500% due December 2026	4.759%	750	740	750	739
Total long-term debt		$ 4,000	$ 3,961	$ 4,000	$ 3,957
Less: Current maturities of long-term debt		250	249	—	—
Long-term debt, net of current maturities		$ 3,750	$ 3,712	$ 4,000	$ 3,957

(1) Carrying amount is net of unamortized debt discount and deferred debt issuance costs. Total unamortized debt discount was $9 million and $10 million as of December 31, 2020 and 2019, respectively, and total deferred debt issuance costs were $30 million and $33 million as of December 31, 2020 and 2019, respectively.

Public Senior Notes

On November 13, 2019, we redeemed in full all of the $500 million outstanding principal amount of the 7.125% senior notes due May 2020 (the 2020 Notes), in accordance with the optional redemption provisions in the indenture governing the 2020 Notes. The total aggregate redemption price, excluding accrued interest paid on the 2020 Notes in connection with the redemption, was approximately $512 million. As a result, we recognized a loss on debt extinguishment of $12 million, primarily consisting of premiums paid for the early retirement of debt for the 2020 Notes.

Under the indentures (including the applicable supplemental indentures) governing our senior notes due 2023, 2034, 2043 and 2044 identified in the table above (the Public Senior Notes), each series of Public Senior Notes is guaranteed by CF Holdings. From November 21, 2016 to November 13, 2019, the Public Senior Notes were guaranteed not only by CF Holdings, but also by certain 100% owned subsidiaries of CF Holdings. The guarantee of the Public Senior Notes in the case of each of those subsidiaries was subject to automatic release upon specified events, including the release of such subsidiary's guarantee of the 2020 Notes. On November 13, 2019, as a result of the release of all subsidiary guarantees of the 2020 Notes upon the retirement of, and satisfaction and discharge of the indenture governing, the 2020 Notes, all subsidiary guarantees of the Public Senior Notes were automatically released.

Interest on the Public Senior Notes is payable semiannually, and the Public Senior Notes are redeemable at our option, in whole at any time or in part from time to time, at specified make-whole redemption prices.

The indentures governing the Public Senior Notes contain covenants that limit, among other things, the ability of CF Holdings and its subsidiaries, including CF Industries, to incur liens on certain assets to secure debt, to engage in sale and leaseback transactions, to merge or consolidate with other entities and to sell, lease or transfer all or substantially all of the assets of CF Holdings and its subsidiaries to another entity. Each of the indentures governing the Public Senior Notes provides for customary events of default, which include (subject in certain cases to customary grace and cure periods), among others, nonpayment of principal or interest on the applicable Public Senior Notes; failure to comply with other covenants or agreements under the indenture; certain defaults on other indebtedness; the failure of CF Holdings' guarantee of the applicable Public Senior Notes to be enforceable; and specified events of bankruptcy or insolvency. Under each indenture governing the Public Senior Notes, in the case of an event of default arising from one of the specified events of bankruptcy or insolvency, the applicable Public Senior Notes would become due and payable immediately, and, in the case of any other event of default (other than an event of default related to CF Industries' and CF Holdings' reporting obligations), the trustee or the holders of at least 25% in aggregate principal amount of the applicable Public Senior Notes then outstanding may declare all of such Public Senior Notes to be due and payable immediately.

Under each of the indentures governing the Public Senior Notes, specified changes of control involving CF Holdings or CF Industries, when accompanied by a ratings downgrade, as defined with respect to the applicable series of Public Senior Notes, constitute change of control repurchase events. Upon the occurrence of a change of control repurchase event with respect to a series of Public Senior Notes, unless CF Industries has exercised its option to redeem such Public Senior Notes, CF Industries will be required to offer to repurchase them at a price equal to 101% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

Senior Secured Notes

On November 21, 2016, CF Industries issued $500 million aggregate principal amount of 3.400% senior secured notes due 2021 (the 2021 Notes) and $750 million aggregate principal amount of 4.500% senior secured notes due 2026 (the 2026 Notes, and together with the 2021 Notes, the Senior Secured Notes). On December 13, 2019, we redeemed $250 million principal amount of the 2021 Notes in accordance with the optional redemption provisions in the indenture governing the 2021 Notes. The total aggregate redemption price, excluding accrued interest paid on the 2021 Notes redeemed in connection with the redemption, was approximately $257 million. As a result, we recognized a loss on debt extinguishment of $9 million, primarily consisting of premiums paid for the early retirement of debt for the 2021 Notes.

On February 17, 2021, we announced that CF Industries elected to redeem in full the entire outstanding $250 million principal amount of the 2021 Notes on March 20, 2021, in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes.

Interest on the Senior Secured Notes is payable semiannually, and the Senior Secured Notes are redeemable at our option, in whole at any time or in part from time to time, at specified make-whole redemption prices.

Under the terms of the applicable indenture, the Senior Secured Notes of each series are guaranteed on a senior secured basis, jointly and severally, by CF Holdings and each current and future domestic subsidiary of CF Holdings (other than CF Industries) that from time to time is a borrower, or guarantees indebtedness, under the Revolving Credit Agreement. The requirement for any subsidiary of CF Holdings to guarantee the Senior Secured Notes of a series will apply only until, and the subsidiary guarantees of the Senior Secured Notes of a series will be automatically released upon, CF Holdings having an investment grade corporate rating, with a stable or better outlook, from two of three selected ratings agencies and there being no default or event of default under the applicable indenture. The subsidiary guarantors of the Senior Secured Notes currently consist of CFE, CFS, CF USA and CFIDF.

Subject to certain exceptions, the obligations under each series of Senior Secured Notes and each guarantor's related guarantee are secured by a first priority security interest in substantially all of the assets of CF Industries, CF Holdings and the subsidiary guarantors, including a pledge by CF USA of its equity interests in CFN and mortgages over certain material fee-owned domestic real properties (the Collateral). The obligations under the Revolving Credit Agreement, together with certain letter of credit, cash management, hedging and similar obligations and future pari passu secured indebtedness, are secured by the Collateral on a pari passu basis with the Senior Secured Notes. The liens on the Collateral securing the obligations under the Senior Secured Notes of a series and the related guarantees will be automatically released and the covenant under the applicable indenture limiting dispositions of Collateral will no longer apply if CF Holdings has an investment grade corporate rating, with a stable or better outlook, from two of three selected ratings agencies and there is no default or event of default under the applicable indenture.

Under each of the indentures governing the Senior Secured Notes, specified changes of control involving CF Holdings or CF Industries, when accompanied by a ratings downgrade, as defined with respect to the applicable series of Senior Secured Notes, constitute change of control repurchase events. Upon the occurrence of a change of control repurchase event with respect to the 2021 Notes or the 2026 Notes, as applicable, unless CF Industries has exercised its option to redeem such Senior Secured Notes, CF Industries will be required to offer to repurchase them at a price equal to 101% of the principal amount thereof, plus accrued and unpaid interest, if any, to, but not including, the date of repurchase.

The indentures governing the Senior Secured Notes contain covenants that limit, among other things, the ability of CF Holdings and its subsidiaries, including CF Industries, to incur liens on certain assets to secure debt, to engage in sale and leaseback transactions, to sell or transfer Collateral, to merge or consolidate with other entities and to sell, lease or transfer all or substantially all of the assets of CF Holdings and its subsidiaries to another entity. Each of the indentures governing the Senior Secured Notes provides for customary events of default, which include (subject in certain cases to customary grace and cure periods), among others, nonpayment of principal or interest on the applicable Senior Secured Notes; failure to comply with other covenants or agreements under the indenture; certain defaults on other indebtedness; the failure of CF Holdings' or certain subsidiaries' guarantees of the applicable Senior Secured Notes to be enforceable; lack of validity or perfection of any lien securing the obligations under the Senior Secured Notes and the guarantees with respect to Collateral having an aggregate fair market value equal to or greater than a specified amount; and specified events of bankruptcy or insolvency. Under each indenture governing the Senior Secured Notes, in the case of an event of default arising from one of the specified events of bankruptcy or insolvency, the applicable Senior Secured Notes would become due and payable immediately, and, in the case of any other event of default (other than an event of default related to CF Industries' and CF Holdings' reporting obligations), the trustee or the holders of at least 25% in aggregate principal amount of the applicable Senior Secured Notes then outstanding may declare all of such Senior Secured Notes to be due and payable immediately.

Forward Sales and Customer Advances

We offer our customers the opportunity to purchase products from us on a forward basis at prices and on delivery dates we propose. Therefore, our reported nitrogen fertilizer selling prices and margins may differ from market spot prices and margins available at the time of shipment.

Customer advances, which typically represent a portion of the contract's value, are received shortly after the contract is executed, with any remaining unpaid amount generally being collected by the time control transfers to the customer, thereby reducing or eliminating the accounts receivable related to such sales. Any cash payments received in advance from customers in connection with forward sales contracts are reflected on our consolidated balance sheets as a current liability until control transfers and revenue is recognized. As of December 31, 2020 and 2019, we had $130 million and $119 million, respectively, in customer advances on our consolidated balance sheets.

While customer advances are generally a significant source of liquidity, the level of forward sales contracts is affected by many factors including current market conditions and our customers' outlook of future market fundamentals. During periods of declining prices, customers tend to delay purchasing fertilizer in anticipation that prices in the future will be lower than the current prices. If the level of sales under our forward sales programs were to decrease in the future, our cash received from customer advances would likely decrease and our accounts receivable balances would likely increase. Additionally, borrowing under the Revolving Credit Agreement could become necessary. Due to the volatility inherent in our business and changing customer expectations, we cannot estimate the amount of future forward sales activity.

Under our forward sales programs, a customer may delay delivery of an order due to weather conditions or other factors. These delays generally subject the customer to potential charges for storage or may be grounds for termination of the contract by us. Such a delay in scheduled shipment or termination of a forward sales contract due to a customer's inability or unwillingness to perform may negatively impact our reported sales.

Natural Gas

Natural gas is the principal raw material used to produce nitrogen products. We use natural gas both as a chemical feedstock and as a fuel to produce ammonia, granular urea, UAN, AN and other products. Expenditures on natural gas are a significant portion of our production costs, representing approximately one-third of our total production costs in 2020. As a result of these factors, natural gas prices have a significant impact on our operating expenses and can thus affect our liquidity.

We enter into agreements for a portion of our future natural gas supply and related transportation. As of December 31, 2020, our natural gas purchase agreements have terms that range from one to five years and a total minimum commitment of approximately $430 million, and our natural gas transportation agreements have terms that range from one to ten years and a total minimum commitment of approximately $180 million. Our minimum commitments to purchase and transport natural gas are based on prevailing market-based forward prices excluding reductions for plant maintenance and turnaround activities.

Because most of our nitrogen manufacturing facilities are located in the United States and Canada, the price of natural gas in North America directly impacts a substantial portion of our operating expenses. Due to increases in natural gas production resulting from the rise in production from shale gas formations, natural gas prices in North America have declined in the last decade, but are subject to volatility. During 2020, the daily closing price at the Henry Hub, the most heavily-traded natural gas pricing point in North America, reached a low of $1.34 per MMBtu on September 22, 2020 and three consecutive days in October and a high of $3.08 per MMBtu on October 27, 2020. During the three-year period ended December 31, 2020, the daily closing price at the Henry Hub reached a low of $1.34 per MMBtu on September 22, 2020 and three consecutive days in October 2020 and a high of $6.88 per MMBtu on January 4, 2018.

We also have manufacturing facilities located in the United Kingdom. These facilities are subject to fluctuations associated with the price of natural gas in Europe. The major natural gas trading point for the United Kingdom is the National Balancing Point (NBP). During 2020, the daily closing price at NBP reached a low of $1.04 per MMBtu on May 22, 2020 and a high of $7.71 per MMBtu on December 30, 2020. During the three-year period ended December 31, 2020, the daily closing price at NBP reached a low of $1.04 per MMBtu on May 22, 2020, and a high of $31.74 per MMBtu on March 2, 2018.

Natural gas costs in our cost of sales, including the impact of realized natural gas derivatives, decreased 18% to $2.24 per MMBtu in 2020 from $2.74 per MMBtu in 2019.

Derivative Financial Instruments

We may use derivative financial instruments to reduce our exposure to changes in prices for natural gas that will be purchased in the future. Natural gas is the largest and most volatile component of our manufacturing cost for our nitrogen products. From time to time, we may also use derivative financial instruments to reduce our exposure to changes in foreign currency exchange rates. Volatility in reported quarterly earnings can result from the unrealized mark-to-market adjustments in the value of the derivatives. In 2020 and 2019, we recognized an unrealized net mark-to-market (gain) loss on natural gas derivatives of $(6) million and $14 million, respectively, which is reflected in cost of sales in our consolidated statements of operations.

Derivatives expose us to counterparties and the risks associated with their ability to meet the terms of the contracts. For derivatives that are in net asset positions, we are exposed to credit loss from nonperformance by the counterparties. We control our credit risk through the use of multiple counterparties that are multinational commercial banks, other major financial institutions or large energy companies, and the use of International Swaps and Derivatives Association (ISDA) master netting arrangements. The ISDA agreements are master netting arrangements commonly used for over-the-counter derivatives that mitigate exposure to counterparty credit risk, in part, by creating contractual rights of netting and setoff, the specifics of which vary from agreement to agreement.

The ISDA agreements for most of our derivative instruments contain credit-risk-related contingent features, such as cross default provisions and credit support thresholds. In the event of certain defaults or a credit ratings downgrade, our counterparty may request early termination and net settlement of certain derivative trades or may require us to collateralize derivatives in a net liability position. The Revolving Credit Agreement, at any time when it is secured, provides a cross collateral feature for those of our derivatives that are with counterparties that are party to, or affiliates of parties to, the Revolving Credit Agreement so that no separate collateral would be required for those counterparties in connection with such derivatives. In the event the Revolving Credit Agreement becomes unsecured, separate collateral could be required in connection with such derivatives.

As of December 31, 2020 and 2019, the aggregate fair value of the derivative instruments with credit-risk-related contingent features in net liability positions was $6 million and $12 million, respectively, which also approximates the fair value of the maximum amount of additional collateral that would need to be posted or assets needed to settle the obligations if the credit-risk-related contingent features were triggered at the reporting dates. As of December 31, 2020, our open natural gas derivative contracts consisted of natural gas fixed price swaps and basis swaps for 34.1 million MMBtus. As of December 31, 2019, contracts consisted of natural gas fixed price swaps, basis swaps and options for 41.1 million MMBtus. At both December 31, 2020 and 2019, we had no cash collateral on deposit with counterparties for derivative contracts. The credit support documents executed in connection with certain of our ISDA agreements generally provide us and our counterparties the right to set off collateral against amounts owing under the ISDA agreements upon the occurrence of a default or a specified termination event.

Embedded Derivative Liability

Under the terms of our strategic venture with CHS, if our credit rating as determined by two of three specified credit rating agencies is below certain levels, we are required to make a non-refundable yearly payment of $5 million to CHS. Since 2016, our credit ratings have been below certain levels and, as a result, we made an annual payment of $5 million to CHS in the fourth quarter of each year. These payments will continue on a yearly basis until the earlier of the date that our credit rating is upgraded to or above certain levels by two of three specified credit rating agencies or February 1, 2026. As of December 31, 2020 and 2019, the embedded derivative liability was $18 million and $20 million, respectively. See Note 9—Fair Value Measurements for additional information.

Defined Benefit Pension Plans

We contributed $45 million to our pension plans in 2020. We expect to contribute approximately $33 million to our pension plans in 2021. In addition, we expect to contribute a total of approximately $66 million to our U.K. plans in the three-year period ending 2024, as agreed with the plans' trustees.

Distributions on Noncontrolling Interest in CFN

The CFN Board of Managers approved semi-annual distribution payments for the years ended December 31, 2020, 2019 and 2018, in accordance with CFN's limited liability company agreement, as follows:

Approved and paid	Distribution Period	Distribution Amount (in millions)
First quarter of 2021	Six months ended December 31, 2020	$ 64
Third quarter of 2020	Six months ended June 30, 2020	86
First quarter of 2020	Six months ended December 31, 2019	88
Third quarter of 2019	Six months ended June 30, 2019	100
First quarter of 2019	Six months ended December 31, 2018	86
Third quarter of 2018	Six months ended June 30, 2018	79

Cash Flows

Operating Activities

Net cash provided by operating activities in 2020 was $1,231 million as compared to $1,505 million in 2019, a decrease of $274 million. The decrease in cash flow from operations was due primarily to lower net earnings and higher cash taxes paid, partially offset by favorable changes in net working capital. Cash paid for taxes, net of refunds, was $111 million in 2020, compared to a net refund of $41 million in 2019. In 2020, we received income tax refunds, including interest, of $110 million related to the finalization of amended U.S. tax returns, which is further described above under Terra Amended Tax Returns. During 2020, net changes in working capital contributed $12 million to cash flow from operations, while in 2019 net changes in working capital reduced cash flow from operations by $112 million. The increased cash flow from working capital changes was primarily driven by inventories and accounts payable and accrued expenses.

Investing Activities

Net cash used in investing activities was $299 million in 2020 compared to $319 million in 2019. During 2020, capital expenditures totaled $309 million compared to $404 million in 2019. The decrease in capital expenditures in 2020 was due primarily to actions taken to defer certain non-essential capital project activity as a result of the COVID-19 pandemic. Net cash used in investing activities in 2019 included proceeds of $55 million related to the sale of our Pine Bend facility and $15 million related to property insurance proceeds received.

Financing Activities

Net cash used in financing activities was $542 million in 2020 compared to $1,583 million in 2019. The decline in cash used in financing activities was due to cash used to redeem certain senior notes in 2019 and higher share repurchase activity in 2019. In 2019, we paid $769 million in connection with the redemption of the 2020 Notes and the partial redemption of the 2021 Notes. In 2020, we spent $100 million to repurchase shares of common stock compared to $370 million in 2019, which included approximately $33 million related to shares repurchased in late 2018 that were paid for in 2019. Dividends paid on common stock in 2020 and 2019 were $258 million and $265 million, respectively. Distributions to noncontrolling interest totaled $174 million in 2020 as compared to $186 million in 2019.

Critical Accounting Estimates

Our discussion and analysis of our financial condition, results of operations, liquidity and capital resources is based upon our consolidated financial statements, which have been prepared in accordance with U.S. GAAP. U.S. GAAP requires that we select policies and make estimates and judgments that affect the reported amounts of assets, liabilities, revenues, expenses and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates. We base our estimates on historical experience, technological assessment, opinions of appropriate outside experts, and the most recent information available to us. Actual results may differ from these estimates. Changes in estimates that may have a material impact on our results are discussed in the context of the underlying financial statements to which they relate. The following discussion presents information about our most critical accounting estimates.

Income Taxes

We recognize expenses, assets and liabilities for income taxes based on estimates of amounts that ultimately will be determined to be taxable or deductible in tax returns filed in various jurisdictions. U.S. income taxes are provided on that portion of the earnings of foreign subsidiaries that is expected to be remitted to the U.S. and be taxable. The final taxes paid are dependent upon many factors and judgments, including negotiations with taxing authorities in various jurisdictions and resolution of disputes arising from federal, state and international tax audits. The judgments made at any point in time may change from previous conclusions based on the outcome of tax audits, as well as changes to, or further interpretations of, tax laws and regulations. We adjust income tax expense in the period in which these changes occur.

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those differences are projected to be recovered or settled. Realization of deferred tax assets is dependent on our ability to generate sufficient taxable income of an appropriate character in future periods. A valuation allowance is established if it is determined to be more likely than not that a deferred tax asset will not be realized. Significant judgment is applied in evaluating the need for and the magnitude of appropriate valuation allowances against deferred tax assets.

As a large commercial enterprise with international operations, our income tax expense and our effective tax rate may change from period to period due to many factors. The most significant of these factors are changes in tax legislation in the countries in which we operate, changes in the geographic mix of earnings, the tax characteristics of our income, the ability to realize certain foreign tax credits and net operating losses, and the portion of the income of our foreign subsidiaries and foreign joint venture that could be subjected to U.S. taxation. It is reasonably likely that these items will impact income tax expense, net income and liquidity in future periods.

We operate in a number of countries and as a result have a significant amount of cross border transactions. The taxability of cross border transactions has received an increasing level of scrutiny among regulators in countries across the globe, including the countries in which we operate. The tax rules and regulations within the various countries in which we operate are complex and in many cases there is not symmetry between the rules of the various countries. As a result, there are instances where regulators within the countries involved in a cross border transaction may reach different conclusions regarding the taxability of the transaction in their respective jurisdictions based on the same set of facts and circumstances. We work closely with regulators to reach a common understanding and conclusion regarding the taxability of cross border transactions. However, there are instances where reaching a common understanding is not possible or practical.

We recognize the effect of income tax positions only if sustaining those positions is more likely than not. Tax positions that meet the more likely than not recognition threshold but are not highly certain are measured based on the largest amount of benefit that is greater than 50% likely of being realized upon settlement with the taxing authority. As of December 31, 2020, we have recorded a reserve for unrecognized tax benefits, including penalties and interest, of $85 million. This amount represents our best estimate of the potential amounts due based on our interpretations of the rules and the facts and circumstances of the transactions. Differences in interpretation of the tax laws can result in differences in taxes paid which may be higher or lower than our estimates.

Recoverability of Long-Lived Assets, Goodwill and Investments in Unconsolidated Subsidiaries

We review the carrying values of our property, plant and equipment and other long-lived assets, including our finite-lived intangible assets, goodwill and investments in affiliates including joint ventures in accordance with U.S. GAAP in order to assess recoverability. Factors that we must estimate when performing impairment tests include production and sales volumes, selling prices, raw material costs, operating rates, operating expenses, inflation, discount rates, exchange rates, tax rates and capital spending. Significant judgment is involved in estimating each of these factors, which include inherent uncertainties. The factors we use are consistent with those used in our internal planning process. The recoverability of the values associated with our goodwill, long-lived assets and investments in unconsolidated affiliates is dependent upon future operating performance of the specific businesses to which they are attributed. Certain of the operating assumptions are particularly sensitive to the cyclical nature of the fertilizer business. Adverse changes in demand for our products, increases in supply and the availability and costs of key raw materials could significantly affect the results of our review.

The recoverability and impairment tests of long-lived assets are required only when conditions exist that indicate the carrying value may not be recoverable. For goodwill, impairment tests are required at least annually, or more frequently if events or circumstances indicate that it may be impaired. Our investment in an unconsolidated affiliate is reviewed for impairment whenever events or circumstances indicate that its carrying value may not be recoverable. When circumstances indicate that the fair value of our investment in any such affiliate is less than its carrying value, and the reduction in value is other than temporary, the reduction in value would be recognized immediately in earnings.

PLNL is our joint venture investment in the Republic of Trinidad and Tobago and operates an ammonia plant that relies on natural gas supplied, under a Gas Sales Contract (the NGC Contract), by the National Gas Company of Trinidad and Tobago Limited (NGC). The joint venture is accounted for under the equity method. The joint venture experienced past curtailments in the supply of natural gas from NGC, which reduced the ammonia production at PLNL. The NGC Contract had an initial expiration date of September 2018 and was extended on the same terms until September 2023. Any NGC commitment to supply gas beyond 2023 will be based on new agreements. If NGC does not make sufficient quantities of natural gas available to PLNL at prices that permit profitable operations, PLNL may cease operating its facility and we would write off the remaining investment in PLNL. The carrying value of our equity method investment in PLNL at December 31, 2020 is $80 million.

We evaluate goodwill for impairment in the fourth quarter at the reporting unit level. Our evaluation can begin with a qualitative assessment of the factors that could impact the significant inputs used to estimate fair value. If after performing the qualitative assessment, we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill, then no further analysis is necessary. However, if it is unclear based on the results of the qualitative test, we perform a quantitative test, which involves comparing the fair value of a reporting unit with its carrying amount, including goodwill. We use an income-based valuation method, determining the present value of future cash flows, to estimate the fair value of a reporting unit. If the fair value of a reporting unit exceeds its positive carrying amount, goodwill of the reporting unit is considered not impaired, and no further testing is necessary. If the fair value of the reporting unit is less than its carrying amount, goodwill impairment would be recognized equal to the amount of the carrying value in excess of the reporting unit’s fair value, limited to the total amount of goodwill allocated to the reporting unit. We identified no goodwill impairment in 2020, 2019 or 2018. As of December 31, 2020 and 2019, the carrying value of our goodwill was $2.37 billion.

Intangible assets identified in connection with our 2010 acquisition of Terra consist of customer relationships, which are being amortized over a period of 18 years. The intangible assets identified in connection with our 2015 acquisition of CF Fertilisers UK consist of customer relationships and trade names, which are being amortized over a period of approximately 20 years. Our intangible assets are presented in other assets on our consolidated balance sheets. See Note 7—Goodwill and Other Intangible Assets for additional information regarding our goodwill and other intangible assets.

Pension Assets and Liabilities

Pension assets and liabilities are affected by the fair value of plan assets, estimates of the expected return on plan assets, plan design, actuarial estimates and discount rates. Actual changes in the fair value of plan assets and differences between the actual return on plan assets and the expected return on plan assets affect the amount of pension expense ultimately recognized. Key assumptions that affect our projected benefit obligation (PBO) are discount rates and, in addition for our United Kingdom plans, an adjusted retail price index (RPI). Key assumptions affecting pension expense include discount rates, the expected long-term rate of return on assets (EROA) and, in addition for our United Kingdom plans, RPI.

The December 31, 2020 PBO was computed based on a weighted-average discount rate of 2.4% for our North America plans and 1.5% for our United Kingdom plans, which were based on yields for high-quality (AA rated or better) fixed income debt securities that match the timing and amounts of expected benefit payments as of the measurement date of December 31, 2020. Declines in comparable bond yields would increase our PBO. The weighted-average discount rate used to calculate pension expense in 2020 was 3.1% for North America plans and 2.0% for United Kingdom plans. Our net benefit obligation, after deduction of plan assets, could increase or decrease depending on the extent to which returns on pension plan assets are lower or higher than the discount rate. The 4.1% weighted-average EROA used to calculate pension expense in 2020 for our North America plans is based on studies of actual rates of return achieved by equity and non-equity investments, both separately and in combination over historical holding periods. The 3.4% weighted-average EROA used to calculate pension expense in 2020 for our United Kingdom plans is based on expected long-term performance of underlying investments. The EROA for both North America and United Kingdom plans are adjusted for expenses and diversification bonuses, if applicable. For our United Kingdom plans, the 3.0% RPI used to calculate our PBO and the 3.0% RPI used to calculate 2020 pension expense are developed using the Bank of England implied retail price inflation curve, which is based on the difference between yields on fixed interest government bonds and index-linked government bonds.

For North America qualified pension plans, our PBO was $884 million as of December 31, 2020, which was $38 million higher than pension plan assets. For our United Kingdom pension plans, our PBO was $643 million as of December 31, 2020, which was $152 million higher than pension plan assets. The tables below estimate the impact of a 50 basis point increase or decrease in the key assumptions on our December 31, 2020 PBO and 2020 pension expense:

	North America Plans			
	Increase/(Decrease) in December 31, 2020 PBO		Increase/(Decrease) in 2020 Pension Expense	
Assumption	+50 bps	-50 bps	+50 bps	-50 bps
	(in millions)			
Discount Rate	$ (52)	$ 58	$ (2)	$ 2
EROA	N/A	N/A	(4)	4

	United Kingdom Plans			
	Increase/(Decrease) in December 31, 2020 PBO		Increase/(Decrease) in 2020 Pension Expense	
Assumption	+50 bps	-50 bps	+50 bps	-50 bps
	(in millions)			
Discount Rate	$ (49)	$ 53	$ —	$ —
EROA	N/A	N/A	(2)	—
RPI	28	(30)	2	(2)

See Note 11—Pension and Other Postretirement Benefits for further discussion of our pension plans.

Recent Accounting Pronouncements

See Note 3—New Accounting Standards for a discussion of recent accounting pronouncements.

Subsequent Event

In February 2021, the central portion of the United States experienced extreme and unprecedented cold weather. Certain natural gas suppliers declared force majeure events due to natural gas well freeze offs or frozen equipment. This occurred at the same time as large increases in natural gas demand were occurring due to the cold temperatures. Due to these unprecedented factors, several states declared a state of emergency and natural gas was redirected for residential usage. At certain of our manufacturing locations, we were asked to reduce our natural gas consumption and therefore these plants either operated at reduced rates or temporarily suspended operations. We returned excess natural gas to our suppliers and received prevailing market prices, which were in excess of our cost. During this period of time, we have experienced lower production, but have procured product in order to meet customer obligations. Higher maintenance and repair activity may be necessary as the plants are restarted. At the present time, we do not know the net positive or negative impact of these events on our operations; however, we do not expect it to result in a material impact to our business.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

We are exposed to the impact of changes in commodity prices, interest rates and foreign currency exchange rates.

Commodity Prices

Our net sales, cash flows and estimates of future cash flows related to nitrogen-based products are sensitive to changes in selling prices as well as changes in the prices of natural gas and other raw materials unless these costs have been fixed or hedged. A $1.00 per MMBtu change in the price of natural gas would change the cost to produce a ton of ammonia, granular urea, UAN (32%) and AN by approximately $33, $22, $14 and $15, respectively.

Natural gas is the largest and most volatile component of the manufacturing cost for nitrogen-based products. At certain times, we have managed the risk of changes in natural gas prices through the use of derivative financial instruments. The derivative instruments that we may use for this purpose are primarily natural gas fixed price swaps, basis swaps and options. These derivatives settle using primarily a NYMEX futures price index, which represents the basis for fair value at any given time. The contracts represent anticipated natural gas needs for future periods and settlements are scheduled to coincide with anticipated natural gas purchases during those future periods. As of December 31, 2020, we had natural gas fixed price swaps and basis swaps covering certain periods through March 2022.

As of December 31, 2020 and 2019, we had open derivative contracts for 34.1 million MMBtus and 41.1 million MMBtus, respectively. A $1.00 per MMBtu increase in the forward curve prices of natural gas at December 31, 2020 would result in a favorable change in the fair value of these derivative positions of $18 million, and a $1.00 per MMBtu decrease in the forward curve prices of natural gas would change their fair value unfavorably by $18 million.

From time to time we may purchase nitrogen products on the open market to augment or replace production at our facilities.

Interest Rates

As of December 31, 2020, we had six series of senior notes totaling $4.00 billion of principal outstanding with maturity dates of December 1, 2021, June 1, 2023, December 1, 2026, March 15, 2034, June 1, 2043 and March 15, 2044. The senior notes have fixed interest rates. As of December 31, 2020, the carrying value and fair value of our senior notes was approximately $3.96 billion and $4.73 billion, respectively.

Borrowings under the Revolving Credit Agreement bear current market rates of interest and we are subject to interest rate risk on such borrowings. There were no borrowings outstanding under the Revolving Credit Agreement as of December 31, 2020 or 2019. Maximum borrowings under the Revolving Credit Agreement during 2020 were $500 million. The weighted-average annual interest rate of borrowings under the Revolving Credit Agreement during 2020 was 2.05%. There were no borrowings under the Prior Credit Agreement or the Revolving Credit Agreement during 2019.

Foreign Currency Exchange Rates

We are directly exposed to changes in the value of the Canadian dollar, the British pound and the euro. We generally do not maintain any exchange rate derivatives or hedges related to these currencies.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
CF Industries Holdings, Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of CF Industries Holdings, Inc. and subsidiaries (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income, equity, and cash flows for each of the years in the three-year period ended December 31, 2020, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

We also have 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, 2020, 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 24, 2021 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 3 to the consolidated financial statements, the Company changed its method of accounting for Leases as of January 1, 2019 due to the adoption of Accounting Standards Update No. 2016-02, *Leases (Topic 842)*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Evaluation of the measurement of projected benefit obligations

As discussed in Note 11 to the consolidated financial statements, the Company's projected benefit obligation (PBO) associated with its pension plans established in North America and the United Kingdom were $884 million and $643 million as of December 31, 2020, respectively. The Company's PBO represents an actuarially determined estimate of the present value of the future benefit payments attributed to past service under its pension plans to the beneficiaries of those plans. Determining the PBO requires the Company to make assumptions, including the selection of a discount rate for both the North American and United Kingdom plans and an adjusted retail price index (RPI) for the United Kingdom plans. The selected discount rate and RPI are then applied to these future benefit payments in determining the present value of those obligations as of December 31, 2020.

We identified the evaluation of the Company's measurement of the PBO to be a critical audit matter. Specialized skills were needed to evaluate the assumptions regarding the discount rates utilized in the measurement of the PBO for both the North American and United Kingdom plans and the adjusted RPI utilized in the measurement of the PBO for the Company's United Kingdom plans. In addition, a high degree of auditor judgment was required regarding the evaluation of these discount rates and the adjusted RPI, as minor changes to these assumptions could have a significant impact on the PBO.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's pension accounting process, including controls related to the determination of discount rates and adjusted RPI assumptions utilized in determining the Company's PBO for both the North American and United Kingdom pension plans. We involved actuarial professionals with specialized skills and knowledge, who evaluated the Company's PBO by evaluating the Company's actuary reports. Specifically, as it relates to the selected discount rates and adjusted RPI assumptions, the actuarial professionals:

– developed an understanding and assessed the methods used by the Company's actuaries to develop the discount rates and adjusted RPI

– evaluated the relevance and reliability of information used by the Company's actuaries in the development of the discount rates and the adjusted RPI

– evaluated the North American discount rates' period over period change using market trends based on published yield curves and indices

– recalculated the Company's single equivalent discount rate using the PBO cash flows and the Company's actuaries' proprietary yield curve for the North American discount rates

– independently developed a single equivalent discount rate using the PBO cash flows and publicly available yield curves for the North American pension plans, and compared that to the Company's selected discount rates for North America

– developed discount rates using publicly available yield curves for the United Kingdom, adjusted for the assessment of the timing of payments expected to be made to beneficiaries under the Company's pension plans, and compared those to the Company's selected discount rates for the United Kingdom

– developed an inflationary factor using published spot rate projection based on the assessment of the timing of payments expected to be made to beneficiaries under the Company's pension plans within the United Kingdom, and compared that to the Company's adjusted RPI.

(signed) KPMG LLP

We have served as the Company's auditor since 1983.

Chicago, Illinois
February 24, 2021

CF INDUSTRIES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

	Year ended December 31,		
	2020	2019	2018
	(in millions, except per share amounts)		
Net sales	$ 4,124	$ 4,590	$ 4,429
Cost of sales	3,323	3,416	3,512
Gross margin	801	1,174	917
Selling, general and administrative expenses	206	239	214
Other operating—net	(17)	(73)	(27)
Total other operating costs and expenses	189	166	187
Equity in earnings (loss) of operating affiliate	11	(5)	36
Operating earnings	623	1,003	766
Interest expense	179	237	241
Interest income	(18)	(20)	(13)
Loss on debt extinguishment	—	21	—
Other non-operating—net	(1)	(7)	(9)
Earnings before income taxes	463	772	547
Income tax provision	31	126	119
Net earnings	432	646	428
Less: Net earnings attributable to noncontrolling interests	115	153	138
Net earnings attributable to common stockholders	$ 317	$ 493	$ 290
Net earnings per share attributable to common stockholders:			
Basic	$ 1.48	$ 2.24	$ 1.25
Diluted	$ 1.47	$ 2.23	$ 1.24
Weighted-average common shares outstanding:			
Basic	214.9	220.2	232.6
Diluted	215.2	221.6	233.8

See Accompanying Notes to Consolidated Financial Statements.

CF INDUSTRIES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Net earnings	$ 432	$ 646	$ 428
Other comprehensive income (loss):			
Foreign currency translation adjustment—net of taxes	44	62	(105)
Derivatives—net of taxes	(1)	—	—
Defined benefit plans—net of taxes	3	(57)	8
	46	5	(97)
Comprehensive income	478	651	331
Less: Comprehensive income attributable to noncontrolling interests	115	153	138
Comprehensive income attributable to common stockholders	$ 363	$ 498	$ 193

See Accompanying Notes to Consolidated Financial Statements.

CF INDUSTRIES HOLDINGS, INC.

CONSOLIDATED BALANCE SHEETS

	December 31, 2020	December 31, 2019
	(in millions, except share and per share amounts)	
Assets		
Current assets:		
Cash and cash equivalents	$ 683	$ 287
Accounts receivable—net	265	242
Inventories	287	351
Prepaid income taxes	97	71
Other current assets	35	23
Total current assets	1,367	974
Property, plant and equipment—net	7,632	8,170
Investment in affiliate	80	88
Goodwill	2,374	2,365
Operating lease right-of-use assets	259	280
Other assets	311	295
Total assets	$ 12,023	$ 12,172
Liabilities and Equity		
Current liabilities:		
Accounts payable and accrued expenses	$ 424	$ 437
Income taxes payable	—	1
Customer advances	130	119
Current operating lease liabilities	88	90
Current maturities of long-term debt	249	—
Other current liabilities	15	18
Total current liabilities	906	665
Long-term debt	3,712	3,957
Deferred income taxes	1,184	1,246
Operating lease liabilities	174	193
Other liabilities	444	474
Equity:		
Stockholders' equity:		
Preferred stock—$0.01 par value, 50,000,000 shares authorized	—	—
Common stock—$0.01 par value, 500,000,000 shares authorized, 2020—214,057,701 shares issued and 2019—216,023,826 shares issued	2	2
Paid-in capital	1,317	1,303
Retained earnings	1,927	1,958
Treasury stock—at cost, 2020—102,843 shares and 2019—0 shares	(4)	—
Accumulated other comprehensive loss	(320)	(366)
Total stockholders' equity	2,922	2,897
Noncontrolling interest	2,681	2,740
Total equity	5,603	5,637
Total liabilities and equity	$ 12,023	$ 12,172

See Accompanying Notes to Consolidated Financial Statements.

CF INDUSTRIES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF EQUITY

	Common Stockholders							
	$0.01 Par Value Common Stock	Treasury Stock	Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity	Noncontrolling Interests	Total Equity
					(in millions)			
Balance as of December 31, 2017	$ 2	$ —	$ 1,397	$ 2,443	$ (263)	$ 3,579	$ 3,105	$ 6,684
Adoption of ASU No. 2016-01	—	—	—	1	(1)	—	—	—
Adoption of ASU No. 2014-09	—	—	—	(1)	—	(1)	—	(1)
Adoption of ASU No. 2018-02	—	—	—	10	(10)	—	—	—
Net earnings	—	—	—	290	—	290	138	428
Other comprehensive loss	—	—	—	—	(97)	(97)	—	(97)
Purchases of treasury stock	—	(500)	—	—	—	(500)	—	(500)
Issuance of $0.01 par value common stock under employee stock plans	—	(4)	12	—	—	8	—	8
Stock-based compensation expense	—	—	21	—	—	21	—	21
Cash dividends ($1.20 per share)	—	—	—	(280)	—	(280)	—	(280)
Acquisition of noncontrolling interests in TNCLP	—	—	(62)	—	—	(62)	(331)	(393)
Distributions declared to noncontrolling interests	—	—	—	—	—	—	(139)	(139)
Balance as of December 31, 2018	$ 2	$ (504)	$ 1,368	$ 2,463	$ (371)	$ 2,958	$ 2,773	$ 5,731
Net earnings	—	—	—	493	—	493	153	646
Other comprehensive income	—	—	—	—	5	5	—	5
Purchases of treasury stock	—	(337)	—	—	—	(337)	—	(337)
Retirement of treasury stock	—	843	(110)	(733)	—	—	—	—
Acquisition of treasury stock under employee stock plans	—	(4)	—	—	—	(4)	—	(4)
Issuance of $0.01 par value common stock under employee stock plans	—	2	17	—	—	19	—	19
Stock-based compensation expense	—	—	28	—	—	28	—	28
Cash dividends ($1.20 per share)	—	—	—	(265)	—	(265)	—	(265)
Distributions declared to noncontrolling interest	—	—	—	—	—	—	(186)	(186)
Balance as of December 31, 2019	$ 2	$ —	$ 1,303	$ 1,958	$ (366)	$ 2,897	$ 2,740	$ 5,637
Net earnings	—	—	—	317	—	317	115	432
Other comprehensive income	—	—	—	—	46	46	—	46
Purchases of treasury stock	—	(100)	—	—	—	(100)	—	(100)
Retirement of treasury stock	—	107	(17)	(90)	—	—	—	—
Acquisition of treasury stock under employee stock plans	—	(13)	—	—	—	(13)	—	(13)
Issuance of $0.01 par value common stock under employee stock plans	—	2	6	—	—	8	—	8
Stock-based compensation expense	—	—	25	—	—	25	—	25
Cash dividends ($1.20 per share)	—	—	—	(258)	—	(258)	—	(258)
Distributions declared to noncontrolling interest	—	—	—	—	—	—	(174)	(174)
Balance as of December 31, 2020	$ 2	$ (4)	$ 1,317	$ 1,927	$ (320)	$ 2,922	$ 2,681	$ 5,603

See Accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year ended December 31,		
	2020	2019	2018
	(in millions)		
Operating Activities:			
Net earnings	$ 432	$ 646	$ 428
Adjustments to reconcile net earnings to net cash provided by operating activities:			
Depreciation and amortization	892	875	888
Deferred income taxes	(74)	149	78
Stock-based compensation expense	25	28	22
Unrealized net (gain) loss on natural gas derivatives	(6)	14	(13)
Loss on embedded derivative	3	4	1
Loss on debt extinguishment	—	21	—
Loss (gain) on disposal of property, plant and equipment	15	(40)	6
Undistributed (earnings) losses of affiliate—net of taxes	(1)	2	(3)
Changes in:			
Accounts receivable—net	(19)	(6)	68
Inventories	27	(26)	(52)
Accrued and prepaid income taxes	8	22	8
Accounts payable and accrued expenses	(15)	(72)	44
Customer advances	11	(30)	59
Other—net	(67)	(82)	(37)
Net cash provided by operating activities	1,231	1,505	1,497
Investing Activities:			
Additions to property, plant and equipment	(309)	(404)	(422)
Proceeds from sale of property, plant and equipment	2	70	26
Distributions received from unconsolidated affiliate	6	—	10
Insurance proceeds for property, plant and equipment	2	15	10
Other—net	—	—	1
Net cash used in investing activities	(299)	(319)	(375)
Financing Activities:			
Payments of long-term borrowings	—	(769)	—
Proceeds from short-term borrowings	500	—	—
Repayments of short-term borrowings	(500)	—	—
Payment to CHS related to credit provision	(5)	(5)	(5)
Financing fees	—	(3)	1
Purchases of treasury stock	(100)	(370)	(467)
Dividends paid on common stock	(258)	(265)	(280)
Acquisition of noncontrolling interests in TNCLP	—	—	(388)
Distributions to noncontrolling interests	(174)	(186)	(139)
Proceeds from issuances of common stock under employee stock plans	5	19	12
Shares withheld for taxes	(10)	(4)	(4)
Net cash used in financing activities	(542)	(1,583)	(1,270)
Effect of exchange rate changes on cash and cash equivalents	6	2	(5)
Increase (decrease) in cash and cash equivalents	396	(395)	(153)
Cash and cash equivalents at beginning of period	287	682	835
Cash and cash equivalents at end of period	$ 683	$ 287	$ 682

See Accompanying Notes to Consolidated Financial Statements.

1. Background and Basis of Presentation

We are a leading global manufacturer of hydrogen and nitrogen products for clean energy, fertilizer, emissions abatement, and other industrial applications. We operate nitrogen manufacturing complexes in the United States, Canada and the United Kingdom, which are among the most cost-advantaged, efficient and flexible in the world, and an extensive storage, transportation and distribution network in North America. Our 3,000 employees focus on safe and reliable operations, environmental stewardship and disciplined capital and corporate management, driving our strategy to leverage our unique capabilities to accelerate the world's transition to clean energy. Our principal customers are cooperatives, independent fertilizer distributors, traders, wholesalers and industrial users. Our core product is anhydrous ammonia (ammonia), which contains 82% nitrogen and 18% hydrogen. Our nitrogen products that are upgraded from ammonia are granular urea, urea ammonium nitrate solution (UAN) and ammonium nitrate (AN). Our other nitrogen products include diesel exhaust fluid (DEF), urea liquor, nitric acid and aqua ammonia, which are sold primarily to our industrial customers, and compound fertilizer products (NPKs), which are solid granular fertilizer products for which the nutrient content is a combination of nitrogen, phosphorus and potassium.

All references to "CF Holdings," "the Company," "we," "us" and "our" refer to CF Industries Holdings, Inc. and its subsidiaries, except where the context makes clear that the reference is only to CF Industries Holdings, Inc. itself and not its subsidiaries. All references to "CF Industries" refer to CF Industries, Inc., a 100% owned subsidiary of CF Industries Holdings, Inc.

Our principal assets as of December 31, 2020 include:

- five U.S. nitrogen manufacturing facilities located in Donaldsonville, Louisiana; Port Neal, Iowa; Yazoo City, Mississippi; Verdigris, Oklahoma; and Woodward, Oklahoma. These facilities are wholly owned directly or indirectly by CF Industries Nitrogen, LLC (CFN), of which we own approximately 89% and CHS Inc. (CHS) owns the remainder. See Note 17—Noncontrolling Interests for additional information on our strategic venture with CHS;
- two Canadian nitrogen manufacturing facilities, located in Medicine Hat, Alberta and Courtright, Ontario;
- two United Kingdom nitrogen manufacturing facilities, located in Billingham and Ince;
- an extensive system of terminals and associated transportation equipment located primarily in the Midwestern United States; and
- a 50% interest in Point Lisas Nitrogen Limited (PLNL), an ammonia production joint venture located in the Republic of Trinidad and Tobago that we account for under the equity method.

2. Summary of Significant Accounting Policies

Consolidation and Noncontrolling Interests

The consolidated financial statements of CF Holdings include the accounts of CF Industries and all majority-owned subsidiaries. All significant intercompany transactions and balances have been eliminated.

In 2018, we announced that Terra Nitrogen GP Inc. (TNGP), the sole general partner of Terra Nitrogen Company, L.P. (TNCLP) and an indirect wholly owned subsidiary of CF Holdings, elected to exercise its right to purchase all of the 4,612,562 publicly traded common units of TNCLP (the TNCLP Public Units). On April 2, 2018, TNGP completed its purchase of the TNCLP Public Units (the Purchase) for an aggregate cash purchase price of $388 million. Upon completion of the Purchase, we owned, through our subsidiaries, 100% of the general and limited partnership interests of TNCLP. Prior to the purchase of the TNCLP Public Units, we owned approximately 75.3% of TNCLP through general and limited partnership interests and outside investors owned the remaining approximately 24.7% of the limited partnership, and we consolidated TNCLP into our financial statements. The outside investors' limited partnership interests in the partnership were included in noncontrolling interests in our consolidated financial statements prior to our purchase of the TNCLP Public Units.

We own approximately 89% of the membership interests in CFN and consolidate CFN in our financial statements. CHS' minority equity interest in CFN is included in noncontrolling interests in our consolidated financial statements.

See Note 17—Noncontrolling Interests for additional information.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States (U.S. GAAP) requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses for the periods presented. Significant estimates and assumptions are used for, but are not limited to, net realizable value of inventories, environmental remediation liabilities, environmental and litigation contingencies, the cost of customer incentives, useful lives of property and identifiable intangible assets, the evaluation of potential impairments of property, investments, identifiable intangible assets and goodwill, income taxes, allowances for doubtful accounts receivable, the determination of the benefit obligation and annual expense of defined benefit pension and other postretirement plans and the valuation of stock-based compensation awards granted to employees.

Revenue Recognition

We follow a five-step model for revenue recognition. The five steps are: (1) identification of the contract(s) with the customer, (2) identification of the performance obligation(s) in the contract(s), (3) determination of the transaction price, (4) allocation of the transaction price to the performance obligation(s), and (5) recognition of revenue when (or as) each performance obligation is satisfied. Control of our products transfers to our customers when the customer is able to direct the use of, and obtain substantially all of the benefits from, our products, which occurs at the later of when title or risk of loss transfers to the customer. Control generally transfers to the customer at a point in time upon loading of our product onto transportation equipment or delivery to a customer destination. Revenue from forward sales programs is recognized on the same basis as other sales regardless of when the customer advances are received.

In situations where we have agreed to arrange delivery of the product to the customer's intended destination and control of the product transfers upon loading of our product, we have elected to not identify delivery of the product as a performance obligation. We account for freight income associated with the delivery of these products as freight revenue, since this activity fulfills our obligation to transfer the product to the customer. Shipping and handling costs incurred by us are included in cost of sales.

We offer cash incentives to certain customers based on the volume of their purchases over a certain period. Customer incentives are reported as a reduction in net sales.

Cash and Cash Equivalents

Cash and cash equivalents include highly liquid investments that are readily convertible to known amounts of cash with original maturities of three months or less. The carrying value of cash and cash equivalents approximates fair value.

Investments

Short-term investments and noncurrent investments are accounted for primarily as available-for-sale securities reported at fair value. Changes in the fair value of available-for-sale debt securities are recognized in other comprehensive income. Changes in the fair value of available-for-sale equity securities are recognized through earnings. The carrying values of short-term investments approximate fair values because of the short maturities and the highly liquid nature of these investments.

Inventories

Inventories are reported at the lower of cost and net realizable value with cost determined on a first-in, first-out and average cost basis. Inventory includes the cost of materials, production labor and production overhead. Inventory at warehouses and terminals also includes distribution costs to move inventory to the distribution facilities. Net realizable value is reviewed at least quarterly. Fixed production costs related to idle capacity are not included in the cost of inventory but are charged directly to cost of sales in the period incurred.

Investment in Unconsolidated Affiliate

The equity method of accounting is used for our investment in an affiliate that we do not consolidate, but over which we have the ability to exercise significant influence. Our equity method investment for which the results are included in operating earnings consists of our 50% ownership interest in PLNL, which operates an ammonia production facility in the Republic of Trinidad and Tobago. Our share of the net earnings from this investment is reported as an element of earnings from operations because PLNL's operations provide additional production and are integrated with our supply chain and sales activities in the ammonia segment. See Note 8—Equity Method Investment for additional information.

Profits resulting from sales or purchases with equity method investees are eliminated until realized by the investee or investor, respectively. Investments in affiliates are reviewed for impairment whenever events or circumstances indicate that the carrying value may not be recoverable. If circumstances indicate that the fair value of an investment in an affiliate is less than its carrying value, and the reduction in value is other than temporary, the reduction in value would be recognized immediately in earnings.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Depreciation and amortization are computed using the straight-line method and are recorded over the estimated useful life of the property, plant and equipment. Useful lives are as follows:

	Years
Mobile and office equipment	3 to 10
Production facilities and related assets	2 to 30
Land improvements	10 to 30
Buildings	10 to 40

We periodically review the useful lives assigned to our property, plant and equipment and we change the estimates to reflect the results of those reviews.

Scheduled inspections, replacements and overhauls of plant machinery and equipment at our continuous process manufacturing facilities during a full plant shutdown are referred to as plant turnarounds. Plant turnarounds are accounted for under the deferral method, as opposed to the direct expense or built-in overhaul methods. Under the deferral method, expenditures related to turnarounds are capitalized in property, plant and equipment when incurred and amortized to production costs on a straight-line basis over the period benefited, which is until the next scheduled turnaround in up to five years. If the direct expense method were used, all turnaround costs would be expensed as incurred. Internal employee costs and overhead amounts are not considered turnaround costs and are not capitalized. Turnaround costs are classified as investing activities in our consolidated statements of cash flows. See Note 6—Property, Plant and Equipment—Net for additional information.

Recoverability of Long-Lived Assets

We review property, plant and equipment and other long-lived assets in order to assess recoverability based on expected future undiscounted cash flows whenever events or circumstances indicate that the carrying value may not be recoverable. If the sum of the expected future net cash flows is less than the carrying value, an impairment loss would be recognized. The impairment loss is measured as the amount by which the carrying value exceeds the fair value of the asset.

Goodwill and Other Intangible Assets

Goodwill represents the excess of the purchase price of an acquired entity over the amounts assigned to the assets acquired and liabilities assumed. Goodwill is not amortized, but is reviewed for impairment annually or more frequently if certain impairment conditions arise. We perform our annual goodwill impairment review in the fourth quarter of each year at the reporting unit level. Our evaluation can begin with a qualitative assessment of the factors that could impact the significant inputs used to estimate fair value. If after performing the qualitative assessment, we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill, then no further analysis is necessary. However, if the results of the qualitative test are unclear, we perform a quantitative test, which involves comparing the fair value of a reporting unit with its carrying amount, including goodwill. We use an income-based valuation method, determining the present value of future cash flows, to estimate the fair value of a reporting unit. If the fair value of a reporting unit exceeds its positive carrying amount, goodwill of the reporting unit is considered not impaired, and no further analysis is necessary. If the fair value of the reporting unit is less than its carrying amount, goodwill impairment would be recognized equal to the amount of the carrying value in excess of the reporting unit's fair value, limited to the total amount of goodwill allocated to the reporting unit.

Our intangible assets are presented in other assets on our consolidated balance sheets. See Note 7—Goodwill and Other Intangible Assets for additional information regarding our goodwill and other intangible assets.

Leases

Right-of-use (ROU) assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. ROU assets and lease liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. The discount rate used to calculate the present value represents our secured incremental borrowing rate and is calculated based on the treasury yield curve commensurate with the term of each lease, and a spread representative of our secured borrowing costs. Our lease terms may include options to extend or terminate the lease when it is reasonably certain that we will exercise that option.

Leases may be classified as either operating leases or finance leases. We have made an accounting policy election to not include leases with an initial term of 12 months or less on the balance sheet. For finance leases, if any, ROU assets are amortized over the lease term on a straight-line basis and interest expense is recognized using the effective interest method and based on the lease liability at period end. For operating leases, rental payments, including rent holidays, leasehold incentives, and scheduled rent increases are expensed on a straight-line basis. Leasehold improvements are amortized over the shorter of the depreciable lives of the corresponding fixed assets or the lease term including any applicable renewals. For our rail car leases, barge tow charters, and terminal and warehouse storage agreements, we have made an accounting policy election to not separate lease and non-lease components, such as operating costs and maintenance, due to sufficient data not being available. As a result, the non-lease components are included in the ROU assets and lease liabilities on our consolidated balance sheet. See Note 24—Leases for additional information.

Income Taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those differences are projected to be recovered or settled. Realization of deferred tax assets is dependent on our ability to generate sufficient taxable income of an appropriate character in future periods. A valuation allowance is established if it is determined to be more likely than not that a deferred tax asset will not be realized. Significant judgment is applied in evaluating the need for and magnitude of appropriate valuation allowances against deferred tax assets.

We record our tax expense for Global Intangible Low-Taxed Income (GILTI) as an expense in the period in which incurred and as such do not record a deferred tax liability for taxes that may be due in future periods.

Interest and penalties related to unrecognized tax benefits are reported as interest expense and income tax expense, respectively.

See Note 10—Income Taxes for additional information.

Customer Advances

Customer advances represent cash received from customers following acceptance of orders under our forward sales programs. Under such advances, the customer prepays a portion of the value of the sales contract prior to obtaining control of the product, thereby reducing or eliminating accounts receivable from customers. Revenue is recognized when the customer obtains control of the product.

Derivative Financial Instruments

Natural gas is the principal raw material used to produce nitrogen-based products. We manage the risk of changes in natural gas prices primarily through the use of derivative financial instruments. The derivative instruments that we may use are primarily natural gas fixed price swaps, basis swaps and options traded in the over-the-counter (OTC) markets. The derivatives reference primarily a NYMEX futures price index, which represent the basis for fair value at any given time. These derivatives are traded in months forward and settlements are scheduled to coincide with anticipated gas purchases during those future periods. We do not use derivatives for trading purposes and are not a party to any leveraged derivatives.

Derivative financial instruments are accounted for at fair value and recognized as current or noncurrent assets and liabilities on our consolidated balance sheets. We use natural gas derivatives as an economic hedge of natural gas price risk, but without the application of hedge accounting. As a result, changes in fair value of these contracts are recognized in earnings. The fair values of derivative instruments and any related cash collateral are reported on a gross basis rather than on a net basis. Cash flows related to natural gas derivatives are reported as operating activities.

See Note 15—Derivative Financial Instruments for additional information.

Debt Issuance Costs

Costs associated with the issuance of debt are recorded on the balance sheet as a direct deduction from the carrying amount of the related debt liability. Costs associated with entering into revolving credit facilities are recorded as an asset in noncurrent assets. All debt issuance costs are amortized over the term of the related debt using the effective interest rate method. Debt issuance discounts are netted against the related debt and are amortized over the term of the debt using the effective interest method. See Note 12—Financing Agreements for additional information.

Environmental

Environmental expenditures that relate to current operations are expensed or capitalized as appropriate. Expenditures that relate to an existing condition caused by past operations are expensed. Expenditures that increase the capacity or extend the useful life of an asset, improve the safety or efficiency of the operations, or mitigate or prevent future environmental contamination are capitalized. Liabilities are recorded when it is probable that an obligation has been incurred and the costs can be reasonably estimated. Environmental liabilities are not discounted.

Emission Credits

Emission credits may be generated by or granted to the Company through emissions trading systems or other regulatory programs. From time to time, we may also purchase emission credits. We have elected to account for emission credits using the intangible asset model. Under this model, emission credits that are purchased are measured at their cost basis and tested for impairment annually. We do not recognize any internally generated emission credits under the intangible asset model until a monetary transaction occurs, such as a sale of the emission credits. If a facility exceeds regulatory emissions allowance levels and offsetting credits are not held by us, our obligation is recognized as an operating expense and a liability at the fair value of the emissions allowance deficit.

Stock-based Compensation

We grant stock-based compensation awards under our equity and incentive plans. The awards that have been granted to date are nonqualified stock options, restricted stock awards, restricted stock units and performance restricted stock units. The cost of employee services received in exchange for the awards is measured based on the fair value of the award on the grant date and is recognized as expense on a straight-line basis over the period during which the employee is required to provide the services. We have elected to recognize equity award forfeitures as they occur in determining the compensation cost to be recognized in each period. See Note 19—Stock-based Compensation for additional information.

Treasury Stock

We periodically retire treasury shares acquired through repurchases of our common stock and return those shares to the status of authorized but unissued. We account for treasury stock transactions under the cost method. For each reacquisition of common stock, the number of shares and the acquisition price for those shares is added to the treasury stock count and total value. When treasury shares are retired, we allocate the excess of the repurchase price over the par value of shares acquired to both retained earnings and paid-in capital. The portion allocated to paid-in capital is determined by applying the average paid-in capital per share, and the remaining portion is recorded to retained earnings.

Litigation

From time to time, we are subject to ordinary, routine legal proceedings related to the usual conduct of our business. We may also be involved in proceedings regarding public utility and transportation rates, environmental matters, taxes and permits relating to the operations of our various plants and facilities. Accruals for such contingencies are recorded to the extent management concludes their occurrence is probable and the financial impact of an adverse outcome is reasonably estimable. Legal fees are recognized as incurred and are not included in accruals for contingencies. Disclosure for specific legal contingencies is provided if the likelihood of occurrence is at least reasonably possible and the exposure is considered material to the consolidated financial statements.

In making determinations of likely outcomes of litigation matters, many factors are considered. These factors include, but are not limited to, history, scientific and other evidence, and the specifics and status of each matter. If the assessment of various factors changes, the estimates may change. Predicting the outcome of claims and litigation, and estimating related costs and exposure, involves substantial uncertainties that could cause actual costs to vary materially from estimates and accruals.

Foreign Currency Translation

We translate the financial statements of our foreign subsidiaries with non-U.S. dollar functional currencies using period-end exchange rates for assets and liabilities and weighted-average exchange rates for each period for revenues and expenses.

The resulting translation adjustments are recorded as a separate component of accumulated other comprehensive income (loss) within stockholders' equity.

Foreign currency-denominated assets and liabilities are remeasured into U.S. dollars at exchange rates existing at the respective balance sheet dates. Gains and losses resulting from these foreign currency transactions are included in other operating—net on our consolidated statements of operations. Gains and losses resulting from intercompany foreign currency transactions that are of a long-term investment nature, if any, are reported in other comprehensive income.

3. New Accounting Standards

Recently Adopted Pronouncements

On January 1, 2020, we adopted Accounting Standards Update (ASU) No. 2018-15, Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract. This ASU aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. This ASU does not affect the accounting for the service element of a hosting arrangement that is a service contract. We adopted this ASU prospectively. The adoption of this ASU did not have a material impact on our consolidated financial statements; however, it could have an effect on future financial results if significant new software involving a cloud computing agreement is implemented. In this case, a certain portion of the implementation costs would be deferred and expensed over the term of the cloud computing arrangement.

On January 1, 2019, we adopted ASU No. 2016-02, Leases (Topic 842), which supersedes the lease accounting requirements in ASC Topic 840, Leases. This ASU requires lessees to recognize the rights and obligations resulting from virtually all leases (other than leases that meet the definition of a short-term lease) on their balance sheets as right-of-use assets with corresponding lease liabilities. Extensive quantitative and qualitative disclosures, including significant judgments made by management, are required to provide greater insight into the extent of income and expense recognized and expected to be recognized from existing contracts. We elected the optional transition method provided under ASU No. 2018-11, Leases (Topic 842): Targeted Improvements, which provides the option to adopt ASU No. 2016-02 as of the adoption date with a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. The cumulative effect adjustment we recognized in the opening balance of retained earnings as of January 1, 2019 was not material. In addition, we elected the package of practical expedients permitted under the transition guidance within ASU No. 2016-02, which allows us to carry forward the historical lease determination, lease classification, and assessment of initial direct costs. See Note 24—Leases for additional information.

Recently Issued Pronouncement

In December 2019, the Financial Accounting Standards Board issued ASU No. 2019-12, Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes. This ASU adds new guidance to simplify accounting for income taxes, changes the accounting for certain income tax transactions and makes minor improvements to the codification. The amendments are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. We do not expect our adoption of this ASU on January 1, 2021 will have a material effect on our consolidated financial statements.

4. Revenue Recognition

Our performance obligations under a customer contract correspond to each shipment of product that we make to our customer under the contract. As a result, each contract may have more than one performance obligation based on the number of products ordered, the quantity of product to be shipped and the mode of shipment requested by the customer. When we enter into a contract with a customer, we are obligated to provide the product in that contract during a mutually agreed upon time period. Depending on the terms of the contract, either we or the customer arranges delivery of the product to the customer's intended destination. When we arrange delivery of the product and control of the product transfers upon loading, we recognize freight revenue, which was not material for 2020, 2019 or 2018.

Certain of our contracts require us to supply products on a continuous basis to the customer. We recognize revenue on these contracts based on the quantity of products transferred to the customer during the period. For 2020, 2019 and 2018, the total amount of revenue for these contracts was $44 million, $55 million and $85 million, respectively.

From time to time, we will enter the marketplace to purchase product in order to satisfy the obligations of our customer contracts. When we purchase product for this purpose, we are the principal in the transaction and recognize revenue on a gross basis. As discussed in Note 8—Equity Method Investment, we have transactions in the normal course of business with PLNL, reflecting our obligation to purchase 50% of the ammonia produced by PLNL at current market prices. Other than products purchased from PLNL, products purchased in the marketplace in order to satisfy the obligations of our customers were not material during 2020, 2019 or 2018.

Transaction Price

We agree with our customers on the selling price of each transaction. This transaction price is generally based on the product, market conditions, including supply and demand balances, freight arrangements including where control transfers, and customer incentives. In our contracts with customers, we allocate the entire transaction price to the sale of product to the customer, which is the basis for the determination of the relative standalone selling price allocated to each performance obligation. Any sales tax, value added tax, and other tax we collect concurrently with our revenue-producing activities are excluded from revenue. Returns of our product by our customers are permitted only when the product is not to specification. Returns were not material during 2020, 2019 or 2018.

We offer cash incentives to certain customers that do not provide an option to the customer for additional product. Accrual of these incentives involves the use of estimates, including how much product the customer will purchase and whether the customer will achieve a certain level of purchases within the incentive period. The balances of customer incentives accrued at December 31, 2020 and 2019 were not material.

Revenue Disaggregation

We track our revenue by product and by geography. See Note 21—Segment Disclosures for our revenue by reportable segment, which are ammonia, granular urea, UAN, AN and Other. The following table summarizes our revenue by product and by geography (based on destination of our shipment) for 2020, 2019 and 2018:

	Ammonia	Granular Urea	UAN	AN	Other	Total
	(in millions)					
Year ended December 31, 2020						
North America	$ 874	$ 1,183	$ 998	$ 197	$ 235	$ 3,487
Europe and other	146	65	65	258	103	637
Total revenue	$ 1,020	$ 1,248	$ 1,063	$ 455	$ 338	$ 4,124
Year ended December 31, 2019						
North America	$ 948	$ 1,269	$ 1,176	$ 200	$ 256	$ 3,849
Europe and other	165	73	94	306	103	741
Total revenue	$ 1,113	$ 1,342	$ 1,270	$ 506	$ 359	$ 4,590
Year ended December 31, 2018						
North America	$ 883	$ 1,243	$ 1,047	$ 186	$ 261	$ 3,620
Europe and other	145	79	187	274	124	809
Total revenue	$ 1,028	$ 1,322	$ 1,234	$ 460	$ 385	$ 4,429

Accounts Receivable and Customer Advances

Our customers purchase our products through sales on credit or forward sales. Products sold to our customers on credit are recorded as accounts receivable when the customer obtains control of the product. Customers that purchase our products on credit are required to pay in accordance with our customary payment terms, which are generally less than 30 days. For 2020, 2019 and 2018, the amount of customer bad debt expense recognized was immaterial.

For forward sales, the customer prepays a portion of the value of the sales contract prior to obtaining control of the product. These prepayments, when received, are recorded as customer advances and are recognized as revenue when the customer obtains control of the product. Forward sales are customarily offered for periods of less than one year in advance of when the customer obtains control of the product.

As of December 31, 2020 and 2019, we had $130 million and $119 million, respectively, in customer advances on our consolidated balance sheets. The increase in the balance of customer advances was due primarily to an increase in forward contracts amidst an increasing price environment. During 2020, all of our customer advances that were recorded as of December 31, 2019 were recognized as revenue.

We have certain customer contracts with performance obligations where if the customer does not take the required amount of product specified in the contract, then the customer is required to make a payment to us, which may vary based upon the terms and conditions of the applicable contract. As of December 31, 2020, excluding contracts with original durations of less than one year, and based on the minimum product tonnage to be sold and current market price estimates, our remaining performance obligations under these contracts are approximately $867 million. We expect to recognize approximately 31% of these performance obligations as revenue in 2021, approximately 42% as revenue during 2022 and 2023, approximately 23% as revenue during 2024 and 2025, and the remainder thereafter. If these customers do not fulfill their contractual obligations under such contracts, the legally enforceable minimum amount that they would pay to us under these contracts is approximately $212 million as of December 31, 2020. Other than the performance obligations described above, any performance obligations with our customers that were unfulfilled or partially filled at December 31, 2020 will be satisfied in 2021.

All of our contracts require that the period between the payment for goods and the transfer of those goods to the customer occur within normal contractual terms that do not exceed one year; therefore, we have not adjusted the transaction price of any of our contracts to recognize a significant financing component. We have also expensed any incremental costs associated with obtaining a contract that has a duration of less than one year, and there were no costs capitalized during 2020, 2019 or 2018.

5. Net Earnings Per Share

Net earnings per share were computed as follows:

	Year ended December 31,		
	2020	2019	2018
	(in millions, except per share amounts)		
Net earnings attributable to common stockholders	$ 317	$ 493	$ 290
Basic earnings per common share:			
Weighted-average common shares outstanding	214.9	220.2	232.6
Net earnings attributable to common stockholders	$ 1.48	$ 2.24	$ 1.25
Diluted earnings per common share:			
Weighted-average common shares outstanding	214.9	220.2	232.6
Dilutive common shares—stock-based awards	0.3	1.4	1.2
Diluted weighted-average shares outstanding	215.2	221.6	233.8
Net earnings attributable to common stockholders	$ 1.47	$ 2.23	$ 1.24

Dilutive earnings per share is calculated using weighted-average common shares outstanding, including the dilutive effect of stock-based awards as determined under the treasury stock method. In the computation of diluted earnings per common share, potentially dilutive stock-based awards are excluded if the effect of their inclusion is anti-dilutive. Shares for anti-dilutive stock-based awards not included in the computation of diluted earnings per common share were 3.3 million, 1.4 million and 1.5 million for the years ended December 31, 2020, 2019 and 2018, respectively.

6. Property, Plant and Equipment—Net

Property, plant and equipment—net consists of the following:

	December 31,	
	2020	2019
	(in millions)	
Land	$ 68	$ 71
Machinery and equipment	12,539	12,338
Buildings and improvements	895	890
Construction in progress	275	236
Property, plant and equipment[1]	13,777	13,535
Less: Accumulated depreciation and amortization	6,145	5,365
Property, plant and equipment—net	$ 7,632	$ 8,170

(1) As of December 31, 2020 and 2019, we had property, plant and equipment that was accrued but unpaid of approximately $43 million and $42 million, respectively.

Depreciation and amortization related to property, plant and equipment was $876 million, $855 million and $865 million in 2020, 2019 and 2018, respectively.

In 2019, we sold our Pine Bend dry bulk storage and logistics facility in Minnesota, received proceeds of $55 million and recognized a pre-tax gain of $45 million. The gain is reflected in other operating—net in our consolidated statement of operations for the year ended December 31, 2019.

Plant turnarounds—Scheduled inspections, replacements and overhauls of plant machinery and equipment at our continuous process manufacturing facilities during a full plant shutdown are referred to as plant turnarounds. The expenditures related to turnarounds are capitalized in property, plant and equipment when incurred. The following is a summary of capitalized plant turnaround costs:

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Net capitalized turnaround costs at beginning of the year	$ 246	$ 252	$ 208
Additions	84	102	156
Depreciation	(104)	(112)	(111)
Effect of exchange rate changes	—	4	(1)
Net capitalized turnaround costs at end of the year	$ 226	$ 246	$ 252

Scheduled replacements and overhauls of plant machinery and equipment include the dismantling, repair or replacement and installation of various components including piping, valves, motors, turbines, pumps, compressors, heat exchangers and the replacement of catalysts when a full plant shutdown occurs. Scheduled inspections are also conducted during full plant shutdowns, including required safety inspections which entail the disassembly of various components such as steam boilers, pressure vessels and other equipment requiring safety certifications. Internal employee costs and overhead amounts are not considered turnaround costs and are not capitalized.

7. Goodwill and Other Intangible Assets

The following table shows the carrying amount of goodwill by reportable segment as of December 31, 2020 and 2019:

	Ammonia	Granular Urea	UAN	AN	Other	Total
	(in millions)					
Balance as of December 31, 2019	$ 587	$ 828	$ 576	$ 302	$ 72	$ 2,365
Effect of exchange rate changes	—	—	—	8	1	9
Balance as of December 31, 2020	$ 587	$ 828	$ 576	$ 310	$ 73	$ 2,374

All of our identifiable intangible assets have definite lives and are presented in other assets on our consolidated balance sheets at gross carrying amount, net of accumulated amortization, as follows:

	December 31, 2020			December 31, 2019		
	Gross Carrying Amount	Accumulated Amortization	Net	Gross Carrying Amount	Accumulated Amortization	Net
	(in millions)					
Customer relationships	$ 133	$ (52)	$ 81	$ 131	$ (45)	$ 86
Trade names	32	(9)	23	31	(7)	24
Total intangible assets	$ 165	$ (61)	$ 104	$ 162	$ (52)	$ 110

Our intangible assets are being amortized over a weighted-average life of approximately 20 years. Amortization expense of our identifiable intangibles was $8 million, $8 million and $7 million for the years ended December 31, 2020, 2019 and 2018, respectively. The gross carrying amount and accumulated amortization of our intangible assets are also impacted by the effect of exchange rate changes. Total estimated amortization expense for each of the five succeeding fiscal years is as follows:

	Estimated Amortization Expense
	(in millions)
2021	$ 8
2022	8
2023	8
2024	8
2025	8

8. Equity Method Investment

We have a 50% ownership interest in PLNL, which operates an ammonia production facility in the Republic of Trinidad and Tobago. We include our share of the net earnings from this equity method investment as an element of earnings from operations because PLNL provides additional production to our operations and is integrated with our other supply chain and sales activities in the ammonia segment.

As of December 31, 2020, the total carrying value of our equity method investment in PLNL was $80 million, $42 million more than our share of PLNL's book value. The excess is attributable to the purchase accounting impact of our acquisition of the investment in PLNL and reflects the revaluation of property, plant and equipment. The increased basis for property, plant and equipment is being amortized over a remaining period of approximately 12 years. Our equity in earnings of PLNL is different from our ownership interest in income reported by PLNL due to amortization of this basis difference.

We have transactions in the normal course of business with PLNL reflecting our obligation to purchase 50% of the ammonia produced by PLNL at current market prices. Our ammonia purchases from PLNL totaled $57 million, $69 million and $86 million in 2020, 2019 and 2018, respectively.

The Trinidadian tax authority (the Board of Inland Revenue) issued a proposed tax assessment against PLNL with respect to tax years 2011 and 2012 in the amount of approximately $12 million. The proposed assessment asserted that PLNL should have withheld tax at a higher rate on dividends paid to its Trinidadian owners. The Board of Inland Revenue also would have assessed statutory interest and penalties on the amount of tax owed when a final assessment was issued for the tax years 2011 and 2012. As we own a 50% interest in PLNL, our effective share of any assessment that is determined to be a liability of PLNL would be 50%, which would be reflected as a reduction in our equity in earnings of PLNL.

During the third quarter of 2019, the Trinidadian government offered a tax amnesty period that provided taxpayers the opportunity to pay any prior year tax obligations and avoid accumulated interest or penalties. During the tax amnesty period, PLNL evaluated the proposed assessment, including considering the outcome of certain recent legal cases involving other taxpayers. As a result of this evaluation, in the third quarter of 2019, PLNL paid withholding tax to the Board of Inland Revenue under the amnesty program for tax years back to 2011, and recognized a charge for $32 million in the third quarter of 2019. Our 50% share of PLNL's tax charge was $16 million, which reduced our equity in earnings of operating affiliate for 2019.

PLNL operates an ammonia plant that relies on natural gas supplied, under a Gas Sales Contract (the NGC Contract), by The National Gas Company of Trinidad and Tobago Limited (NGC). PLNL experienced past curtailments in the supply of natural gas from NGC, which reduced historical ammonia production at PLNL. The NGC Contract had an initial expiration date of September 2018 and was extended on the same terms until September 2023. Any NGC commitment to supply gas beyond 2023 will be based on new agreements. In May 2018, the NGC and PLNL reached a settlement of an arbitration proceeding regarding PLNL's claims for damages due to natural gas supply curtailments. The net after-tax impact of the settlement reached between NGC and PLNL that was recognized in our consolidated statement of operations for 2018 was an increase in our equity in earnings of operating affiliate of approximately $19 million.

9. Fair Value Measurements

Our cash and cash equivalents and other investments consist of the following:

	December 31, 2020			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in millions)			
Cash	$ 108	$ —	$ —	$ 108
Cash equivalents:				
U.S. and Canadian government obligations	552	—	—	552
Other debt securities	23	—	—	23
Total cash and cash equivalents	$ 683	$ —	$ —	$ 683
Nonqualified employee benefit trusts	16	3	—	19

	December 31, 2019			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in millions)			
Cash	$ 59	$ —	$ —	$ 59
Cash equivalents:				
U.S. and Canadian government obligations	211	—	—	211
Other debt securities	17	—	—	17
Total cash and cash equivalents	$ 287	$ —	$ —	$ 287
Nonqualified employee benefit trusts	17	2	—	19

Under our short-term investment policy, we may invest our cash balances, either directly or through mutual funds, in several types of investment-grade securities, including notes and bonds issued by governmental entities or corporations. Securities issued by governmental entities include those issued directly by the U.S. and Canadian federal governments; those issued by state, local or other governmental entities; and those guaranteed by entities affiliated with governmental entities.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

The following tables present assets and liabilities included in our consolidated balance sheets as of December 31, 2020 and 2019 that are recognized at fair value on a recurring basis, and indicate the fair value hierarchy utilized to determine such fair value:

	December 31, 2020			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash equivalents	$ 575	$ 575	$ —	$ —
Nonqualified employee benefit trusts	19	19	—	—
Derivative assets	1	—	1	—
Derivative liabilities	(7)	—	(7)	—
Embedded derivative liability	(18)	—	(18)	—

	December 31, 2019			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash equivalents	$ 228	$ 228	$ —	$ —
Nonqualified employee benefit trusts	19	19	—	—
Derivative liabilities	(12)	—	(12)	—
Embedded derivative liability	(20)	—	(20)	—

Cash Equivalents

As of December 31, 2020 and 2019, our cash equivalents consisted primarily of U.S. and Canadian government obligations and money market mutual funds that invest in U.S. government obligations and other investment-grade securities.

Nonqualified Employee Benefit Trusts

We maintain trusts associated with certain nonqualified supplemental pension plans. The fair values of the trust assets are based on daily quoted prices in an active market, which represents the net asset values of the shares held in the trusts, and are included on our consolidated balance sheets in other assets. Debt securities are accounted for as available-for-sale securities and changes in fair value are reported in other comprehensive income. Changes in the fair value of available-for-sale equity securities in the trust assets are recognized through earnings.

Derivative Instruments

The derivative instruments that we may use are primarily natural gas fixed price swaps, basis swaps and options traded in the OTC markets with multi-national commercial banks, other major financial institutions or large energy companies. The natural gas derivative contracts represent anticipated natural gas needs for future periods and settlements are scheduled to coincide with anticipated natural gas purchases during those future periods. The natural gas derivative contracts settle using primarily a NYMEX futures price index. To determine the fair value of these instruments, we use quoted market prices from NYMEX and standard pricing models with inputs derived from or corroborated by observable market data such as forward curves supplied by an industry-recognized independent third party. See Note 15—Derivative Financial Instruments for additional information.

Embedded Derivative Liability

Under the terms of our strategic venture with CHS, if our credit rating as determined by two of three specified credit rating agencies is below certain levels, we are required to make a non-refundable yearly payment of $5 million to CHS. Since 2016, our credit ratings have been below certain levels and, as a result, we made an annual payment of $5 million to CHS in the fourth quarter of each year. These payments will continue on a yearly basis until the earlier of the date that our credit rating is upgraded to or above certain levels by two of the three specified credit rating agencies or February 1, 2026. This obligation is recognized on our consolidated balance sheets as an embedded derivative and is included within other current liabilities and other liabilities. As of December 31, 2020 and 2019, the embedded derivative liability was $18 million and $20 million, respectively. Included in other operating—net in our consolidated statements of operations for the years ended December 31, 2020, 2019 and 2018 is a net loss of $3 million, $4 million and $1 million, respectively.

The inputs into the fair value measurement include the probability of future upgrades and downgrades of our credit rating based on historical credit rating movements of other public companies and the discount rates to be applied to potential annual payments based on applicable credit spreads of other public companies at different credit rating levels. Based on these inputs, our fair value measurement is classified as Level 2.

See Note 17—Noncontrolling Interests for additional information regarding our strategic venture with CHS.

Financial Instruments

The carrying amounts and estimated fair value of our financial instruments are as follows:

	December 31, 2020		December 31, 2019	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
	(in millions)			
Long-term debt, including current maturities	$ 3,961	$ 4,731	$ 3,957	$ 4,295

The fair value of our long-term debt was based on quoted prices for identical or similar liabilities in markets that are not active or valuation models in which all significant inputs and value drivers are observable and, as a result, they are classified as Level 2 inputs.

The carrying amounts of cash and cash equivalents, as well as instruments included in other current assets and other current liabilities that meet the definition of financial instruments, approximate fair values because of their short-term maturities.

Assets and Liabilities Measured at Fair Value on a Nonrecurring Basis

We also have assets and liabilities that may be measured at fair value on a nonrecurring basis; that is, the assets and liabilities are not measured at fair value on an ongoing basis, but are subject to fair value adjustments in certain circumstances, such as when there is evidence of impairment, when there is allocation of purchase price in an acquisition or when a new liability is being established that requires fair value measurement. These include long-lived assets, goodwill and other intangible assets and investments in unconsolidated subsidiaries, such as equity method investments, which may be written down to fair value as a result of impairment. The fair value measurements related to each of these rely primarily on Company-specific inputs and the Company's assumptions about the use of the assets. Since certain of the Company's assumptions would involve inputs that are not observable, these fair values would reside within Level 3 of the fair value hierarchy.

We review the carrying value of our goodwill, definite lived intangible assets, and investments in unconsolidated subsidiaries to assess recoverability as part of our annual impairment review in the fourth quarter of each year and more frequently if there is an event that requires reassessment during the year. As part of the assessment process when performing impairment tests, we estimate many factors including future production and sales volumes, selling prices, raw materials costs, operating rates, operating expenses, inflation, discount rates, exchange rates, tax rates and capital spending. The assumptions we make are material estimates that are used in the impairment testing.

10. Income Taxes

Income Tax Provision

The components of earnings before income taxes and the components of our income tax provision are as follows:

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Domestic	$ 421	$ 679	$ 516
Non-U.S.	42	93	31
Earnings before income taxes	$ 463	$ 772	$ 547
Current			
Federal	$ 106	$ 4	$ 5
Foreign	6	21	14
State	(7)	(48)	6
	105	(23)	25
Deferred			
Federal	(76)	112	85
Foreign	4	—	(10)
State	(2)	37	3
	(74)	149	78
Income tax provision before Tax Reform	31	126	103
Tax Reform - Current			
Federal	—	—	19
Foreign	—	—	—
State	—	—	(3)
Income tax provision - Tax Reform	—	—	16
Income tax provision	$ 31	$ 126	$ 119

Terra Amended Tax Returns

We completed the acquisition of Terra Industries Inc. (Terra) in April 2010. After the acquisition, we determined that the manner in which Terra reported the repatriation of cash from foreign affiliates to its U.S. parent for U.S. and foreign income tax purposes was not appropriate. As a result, in 2012 we amended certain tax returns, including Terra's income and withholding tax returns, back to 1999 (the Amended Tax Returns) and paid additional income and withholding taxes, and related interest and penalties. In early 2013, the Internal Revenue Service (IRS) commenced an examination of the U.S. tax aspects of the Amended Tax Returns. In 2017, we also made a Voluntary Disclosure Filing with the Canadian Revenue Agency (CRA) with respect to the Canadian tax aspects of this matter and paid additional Canadian taxes due.

In early 2019, the IRS completed its examination of the Amended Tax Returns and submitted its audit reports and related refund claims to the Joint Committee on Taxation of the U.S. Congress (the Joint Committee). For purposes of its review, the Joint Committee separated the IRS audit reports into two separate matters: (i) an income tax related matter and (ii) a withholding tax matter. In late 2019, we received notification that the Joint Committee had approved the IRS audit reports and related income tax refunds relating to the income tax related matter. As a result of the approval by the Joint Committee, we recognized in the fourth quarter of 2019 the following amounts in our consolidated statement of operations; (i) $5 million of interest income ($4 million, net of tax); and (ii) a reduction in income tax expense of $10 million as a result of the favorable settlement of certain uncertain tax positions. No income tax refunds were received in 2019 related to the Amended Tax Returns.

In 2020, we received notification that the Joint Committee approved the IRS audit report and related withholding tax refunds relating to the withholding tax matter and we received IRS Notices indicating the amount of tax and interest to be refunded and received with respect to the withholding tax matter and the income tax matter. In addition, the CRA settled with us the Voluntary Disclosure matter.

In 2020, as a result of these events, we recognized $26 million of interest-related income and $18 million of income tax benefit, which consisted of the following:

- additional income of $26 million ($23 million, net of tax) representing $16 million of interest income related to the U.S. Federal income tax matter and withholding tax matter and a $10 million reversal of previously accrued interest related to the Canadian tax aspects of this matter,
- a reduction in our liabilities for unrecognized tax benefits of $12 million with a corresponding reduction in income tax expense related to the U.S. Federal withholding tax matter, and
- an additional income tax benefit of $9 million related to the U.S. Federal income tax matter and related state amended returns.

In 2020, we received U.S. Federal income tax refunds, including interest, of $110 million relating to the Amended Tax Returns, consisting of $68 million related to the income tax matter and $42 million related to the withholding tax matter, which finalized these matters with the IRS. As a result of the finalization of the income tax matter and the withholding tax matter, all U.S. federal tax years commencing before January 1, 2012 are now closed.

In the first quarter of 2021, we received approximately $20 million of withholding tax refunds, including interest, from the CRA, related to the Voluntary Disclosure Filing. These amounts were previously recorded in our consolidated balance sheet as of December 31, 2020.

Canada Revenue Agency Notices of Reassessment

In 2016, the Canada Revenue Agency (CRA) issued Notices of Reassessment for tax years 2006 through 2009 to one of our Canadian affiliates asserting a disallowance of certain patronage allocations. The tax assessments totaled CAD $174 million (or approximately $137 million), including provincial taxes but excluding any interest or penalties. We filed a Notice of Objection with respect to the Notices of Reassessment with the CRA and Alberta Tax and Revenue Administration and we posted letters of credit in lieu of paying the additional tax liability assessed. In 2018, the matter was accepted for consideration under the bilateral settlement provisions of the US-Canada Tax Treaty (the Treaty) by the United States and Canadian competent authorities and was subject to a two-year period to reach a settlement. The period was subsequently extended, but it expired in February 2021 and the matter is being referred to binding arbitration under the provisions of the Treaty.

While there is uncertainty about the ultimate timing and outcome of this matter, which may be resolved in binding arbitration, we do not expect that resolution of the matter will result in a material net tax liability, because the Company would be entitled to an offsetting U.S. foreign tax credit for any incremental Canadian tax paid. Upon resolution of the matter, interest would be assessed based upon the amount of tax due. Similarly, the Company would be entitled to receive interest on the offsetting reduction in tax due to the foreign tax credit. Due to uncertainty in how each taxing authority would apply their interest calculation rules, we are not able to predict the net amount of interest that we would pay to or receive from the taxing authorities.

Tax Reform

The Tax Cuts and Jobs Act (the “Tax Act” or “Tax Reform”) was enacted on December 22, 2017. Among other provisions, the Tax Act imposed a transition tax liability on taxpayers with undistributed foreign entity earnings. In 2018, we recorded a $16 million increase to the provisional amount of the transition tax liability. The adjustment to the provisional amount was required to properly reflect the inclusion of amounts subject to the transition tax in tax returns where the amounts were to be reported. The adjustment related to changes in (i) the amount of includible income subject to the transition tax; (ii) the computation of the allowable foreign tax credits against the transition tax liability and (iii) the allocation of certain gains and losses to various foreign tax credit baskets. The adjustment to the provisional amount represented an approximate 3 percentage point increase to our effective tax rate for the year ended December 31, 2018.

The Tax Act also provided a new category of income from foreign operations, Global Intangible Low-Taxed Income (GILTI), that was subject to federal income tax beginning in the year ended December 31, 2018. The U.S. tax on foreign earnings in the effective tax rate table below includes our tax on GILTI, which is primarily related to Canadian earnings.

COVID-19 Tax Legislation

In March 2020, the Coronavirus Aid, Relief, and Economic Security Act (the CARES Act) was signed into law. The CARES Act includes, among other things, a five-year net operating loss (NOL) carryback (including a related technical correction to the 2017 Tax Cuts and Jobs Act) for tax losses incurred in tax years 2018 through 2020, a change in interest deduction limitations for tax years 2019 and 2020, increasing the annual interest limitation from 30% to 50% of adjusted taxable income and increased refundability of corporate alternative minimum tax (AMT) credits. These provisions have limited applicability to the Company.

On December 27, 2020, the Consolidated Appropriations Act, 2021 (the CAA) was signed into law. The CAA extends certain provisions of the CARES Act, provides additional funding for others and contains new relief provisions. The tax provisions within this legislation will not have a significant effect on the Company.

We continue to monitor and assess the impact of tax legislation related to COVID-19 in all tax jurisdictions in which we operate.

Effective Tax Rate

Differences in the expected income tax provision based on statutory rates applied to earnings before income taxes and the income tax provision reflected in the consolidated statements of operations are summarized below.

	Year ended December 31,		
	2020	2019	2018
	(in millions, except percentages)		
Earnings before income taxes	$ 463	$ 772	$ 547
Expected tax provision at U.S. statutory rate of 21%	$ 97	$ 162	$ 115
State income taxes, net of federal	(1)	2	3
Net earnings attributable to noncontrolling interests	(24)	(32)	(29)
Foreign tax rate differential	1	2	—
U.S. tax on foreign earnings	(6)	3	12
Foreign partnership basis difference	(7)	—	—
Valuation allowance	—	—	4
Tax rate change	—	—	(2)
Terra amended tax returns	(24)	(10)	—
Other	(5)	(1)	—
Transition tax liability (Tax Reform)	—	—	16
Income tax provision	$ 31	$ 126	$ 119
Effective tax rate	6.7 %	16.3 %	21.7 %
Income tax provision before Tax Reform[(1)]	$ 31	$ 126	$ 103
Effective tax rate before Tax Reform	6.7 %	16.3 %	18.7 %

(1) Income tax provision before Tax Reform reflects the income tax provision less the Tax Reform impact included in the table above consisting of the transition tax liability.

On April 2, 2018, we acquired the TNCLP Public Units. Our effective tax rate in 2018 was impacted by a $16 million reduction to our deferred tax liability as a result of the change in our effective state income tax rate due to the implementation of legal entity structure changes related to the acquisition. See Note 17—Noncontrolling Interests for additional information.

The foreign tax rate differential is impacted by the inclusion of equity earnings from our equity method investment in PLNL, a foreign operating affiliate, which are included in pre-tax earnings on an after-tax basis. In 2020, the foreign tax rate differential includes $6 million tax expense for the revaluing of deferred taxes due to an enacted rate change in the jurisdiction of a foreign affiliate.

U.S. tax on foreign earnings for the year ended December 31, 2020 is inclusive of the current year tax on global intangible low-tax income (GILTI), benefit from the Section 250 deduction and foreign tax credits, as well as adjustments to prior year amounts for these items recorded upon filing the U.S. federal return in the fourth quarter of 2020.

Our effective tax rate is impacted by earnings attributable to noncontrolling interests in CFN and, prior to April 2, 2018, TNCLP, as our consolidated income tax provision does not include a tax provision on the earnings attributable to the noncontrolling interests. As a result, earnings attributable to the noncontrolling interests of $115 million, $153 million and $138 million in 2020, 2019 and 2018, respectively, which are included in earnings before income taxes, impacted the effective tax rate in all three years. See Note 17—Noncontrolling Interests for additional information.

Deferred Taxes

Deferred tax assets and deferred tax liabilities are as follows:

	December 31,	
	2020	2019
	(in millions)	
Deferred tax assets:		
Net operating loss and capital loss carryforwards	$ 194	$ 108
Retirement and other employee benefits	69	71
State tax credits	69	72
Operating lease liabilities	61	66
Other	23	61
	416	378
Valuation allowance	(157)	(60)
	259	318
Deferred tax liabilities:		
Depreciation and amortization	(204)	(276)
Investments in partnerships	(1,173)	(1,217)
Operating lease right-of-use assets	(60)	(65)
Other	(6)	(6)
	(1,443)	(1,564)
Net deferred tax liability	$ (1,184)	$ (1,246)

We consider the earnings of our United Kingdom subsidiaries to be permanently reinvested. As of December 31, 2020, we would not expect any additional U.S. and foreign income tax that would be due upon repatriation of these accumulated earnings, other than foreign withholding tax, which we have not accrued.

During 2019, as a result of group legal entity reorganizations, foreign net operating loss carryforwards were eliminated, which resulted in a net decrease of $99 million in the net operating loss carryforwards deferred tax asset. We recorded a corresponding reduction in the related valuation allowance of $99 million as these losses were not anticipated to be realized. The valuation allowance activity in the current year is primarily attributable to a capital loss. As a result of an intercompany transaction with a foreign affiliate, we recognized a capital loss which will be carried forward and for which we recorded a deferred tax asset of approximately $90 million. The foreign affiliate operations do not normally generate capital gains and there is no practical plan to do so in the future, therefore, we established a full valuation allowance of approximately $90 million against the deferred tax asset. As of December 31, 2020, our net operating loss and capital loss carryforwards are comprised of state net operating loss carryforwards with expiration dates generally ranging from 2027 to 2037 and foreign capital loss carryforwards, which can be carried forward indefinitely. Our foreign affiliates, including the foreign affiliate described above, have operations that do not normally generate capital gains and have no practical plans to do so in the future. As a result, we have recorded a full valuation allowance against all foreign capital loss carryforwards.

As of December 31, 2020, we have state tax credit carryforwards resulting in a deferred tax asset of $69 million. The state tax credits have expiration dates generally ranging from 2033 to 2040. We have recorded a $27 million valuation allowance on the portion of the state tax credits that are not expected to be realized before they expire based on taxable income projections.

Unrecognized Tax Benefits

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	December 31,	
	2020	2019
	(in millions)	
Unrecognized tax benefits:		
Balance as of January 1	$ 104	$ 126
Additions for tax positions taken during the current year	—	—
Additions for tax positions taken during prior years	—	22
Reductions related to lapsed statutes of limitations	—	—
Reductions related to settlements with tax jurisdictions	(23)	(44)
Balance as of December 31	$ 81	$ 104

Our effective tax rate would be affected by $37 million if these unrecognized tax benefits were to be recognized in the future.

In 2020, as a result of the settlement and finalization of carryover impacts of the Terra Amended Tax Returns on other tax periods, we reduced our liability for unrecognized tax benefits by $19 million and recorded a corresponding deferred income tax liability. In addition, we reduced our liabilities for unrecognized tax benefits by $4 million with a corresponding reduction in income tax provision.

In 2019, we increased the amount of our unrecognized tax benefits by $22 million. The increase primarily related to an addition for state investment tax credits. In addition, we reduced the amount of our unrecognized tax benefits in 2019 by $44 million. This reduction primarily related to the approval by the Joint Committee of the IRS audit report related to the Terra Amended Tax Returns described above.

We file federal, provincial, state and local income tax returns principally in the United States, Canada and the United Kingdom, as well as in certain other foreign jurisdictions. In general, filed tax returns remain subject to examination by United States tax jurisdictions for years 2012 and thereafter, by Canadian tax jurisdictions for years 2006 and thereafter, and by United Kingdom tax jurisdictions for years 2018 and thereafter. Our income tax liability or transition tax expense could be impacted by the finalization of currently on-going U.S. or foreign income tax audits of prior tax years falling before the date of enactment of the Tax Act or audits by the U.S. or foreign taxing authorities, which change the amount of our total income allocable to and taxed in the United States or a foreign country.

Interest expense and penalties of $(29) million, $4 million, and $1 million were recorded for the years ended December 31, 2020, 2019 and 2018, respectively. Amounts recognized in our consolidated balance sheets for accrued interest and penalties related to income taxes of $4 million and $33 million as of December 31, 2020 and 2019, respectively, are included in other liabilities.

11. Pension and Other Postretirement Benefits

We maintain five funded pension plans, consisting of three in North America (one U.S. plan and two Canadian plans) and two in the United Kingdom. One of our Canadian plans is closed to new employees and the two United Kingdom plans are closed to new employees and future accruals. The portion of the U.S. plan that is open to new employees is a cash balance plan, which provides benefits based on years of service and interest credits. We also provide group medical insurance benefits to certain retirees in North America. The specific medical benefits provided to retirees vary by group and location.

Our plan assets, benefit obligations, funded status and amounts recognized on our consolidated balance sheets for our North America and United Kingdom plans as of the December 31 measurement date are as follows:

	Pension Plans				Retiree Medical Plans	
	North America		United Kingdom		North America	
	December 31,		December 31,		December 31,	
	2020	2019	2020	2019	2020	2019
	(in millions)					
Change in plan assets						
Fair value of plan assets as of January 1	$ 790	$ 673	$ 418	$ 383	$ —	$ —
Return on plan assets	96	115	58	19	—	—
Employer contributions	22	38	23	23	4	3
Plan participant contributions	—	—	—	—	1	1
Benefit payments	(66)	(43)	(25)	(23)	(5)	(4)
Foreign currency translation	4	7	17	16	—	—
Fair value of plan assets as of December 31	846	790	491	418	—	—
Change in benefit obligation						
Benefit obligation as of January 1	(839)	(742)	(597)	(524)	(37)	(43)
Service cost	(17)	(14)	—	—	—	—
Interest cost	(25)	(30)	(11)	(15)	(1)	(1)
Benefit payments	66	43	25	23	5	4
Foreign currency translation	(4)	(7)	(20)	(22)	—	—
Plan amendments	—	(4)	—	3	—	—
Plan participant contributions	—	—	—	—	(1)	(1)
Change in assumptions and other	(65)	(85)	(40)	(62)	(1)	4
Benefit obligation as of December 31	(884)	(839)	(643)	(597)	(35)	(37)
Funded status as of December 31	$ (38)	$ (49)	$ (152)	$ (179)	$ (35)	$ (37)

In the table above, the line titled “Plan amendments” for 2019 relates to the impact of updates to certain mortality tables for the U.S. plan and a conversion option for pensions in payment for the U.K. plans.

The line titled “Change in assumptions and other” for our North America pension plans primarily reflects the impact of losses due to the decrease in discount rates for 2020 and 2019.

The line titled “Change in assumptions and other” for our U.K. pension plans primarily reflects losses due to the decrease in discount rates for 2020 and 2019. For 2019, the losses from the decrease in discount rates was partially offset by gains due to the decrease in inflation rate assumptions.

The line titled “Benefit payments” includes $22 million of lump sum payments for our U.S. pension plan in December 2020.

Amounts recognized on the consolidated balance sheets consist of the following:

	Pension Plans				Retiree Medical Plans	
	North America		United Kingdom		North America	
	December 31,		December 31,		December 31,	
	2020	2019	2020	2019	2020	2019
	(in millions)					
Other assets	$ 10	$ 10	$ —	$ —	$ —	$ —
Accrued expenses	—	—	—	—	(3)	(3)
Other liabilities	(48)	(59)	(152)	(179)	(32)	(34)
	$ (38)	$ (49)	$ (152)	$ (179)	$ (35)	$ (37)

Pre-tax amounts recognized in accumulated other comprehensive loss consist of the following:

	Pension Plans				Retiree Medical Plans	
	North America		United Kingdom		North America	
	December 31,		December 31,		December 31,	
	2020	2019	2020	2019	2020	2019
	(in millions)					
Prior service cost	$ 4	$ 5	$ 1	$ 1	$ —	$ —
Net actuarial loss	79	82	129	132	4	2
	$ 83	$ 87	$ 130	$ 133	$ 4	$ 2

Net periodic benefit cost (income) and other amounts recognized in accumulated other comprehensive loss for the years ended December 31 included the following:

	Pension Plans						Retiree Medical Plans		
	North America			United Kingdom			North America		
	2020	2019	2018	2020	2019	2018	2020	2019	2018
	(in millions)								
Service cost	$ 17	$ 14	$ 15	$ —	$ —	$ —	$ —	$ —	$ —
Interest cost	25	30	28	11	15	14	1	1	2
Expected return on plan assets	(30)	(32)	(31)	(14)	(18)	(17)	—	—	—
Amortization of prior service cost (benefit)	1	—	—	—	—	—	—	(1)	(1)
Amortization of actuarial loss (gain)	3	—	3	3	—	—	(1)	(1)	(1)
Net periodic benefit cost (income)	16	12	15	—	(3)	(3)	—	(1)	—
Net actuarial (gain) loss	(1)	3	3	(4)	60	(3)	1	(4)	(8)
Prior service cost (credit)	—	4	—	—	(3)	5	—	—	—
Amortization of prior service (cost) benefit	(1)	—	—	—	—	—	—	1	1
Amortization of actuarial (loss) gain	(3)	—	(3)	(3)	—	—	1	1	1
Total recognized in accumulated other comprehensive loss	(5)	7	—	(7)	57	2	2	(2)	(6)
Total recognized in net periodic benefit cost (income) and accumulated other comprehensive loss	$ 11	$ 19	$ 15	$ (7)	$ 54	$ (1)	$ 2	$ (3)	$ (6)

In the table above, the line titled "Prior service cost (credit)" in 2019 relates to plan amendments for updates to certain mortality tables for the U.S. plan and a conversion option for pensions in payment for the U.K. plans.

Service costs are recognized in cost of sales and selling, general and administrative expenses, and other costs are recognized in other non-operating—net on our consolidated statements of operations.

The accumulated benefit obligation (ABO) in aggregate for the defined benefit pension plans in North America was approximately $834 million and $793 million as of December 31, 2020 and 2019, respectively. The ABO in aggregate for the defined benefit pension plans in the United Kingdom was approximately $643 million and $597 million as of December 31, 2020 and 2019, respectively.

The following table presents aggregated information for those individual defined benefit pension plans that have an ABO in excess of plan assets as of December 31, which excludes two North American defined benefit pension plans that have plan assets in excess of its ABO:

	North America		United Kingdom	
	2020	2019	2020	2019
	(in millions)			
Accumulated benefit obligation	$ (678)	$ (654)	$ (643)	$ (597)
Fair value of plan assets	667	630	491	418

The following table presents aggregated information for those individual defined benefit pension plans that have a projected benefit obligation (PBO) in excess of plan assets as of December 31, which excludes two North American defined benefit pension plans that have plan assets in excess of its PBO:

	North America		United Kingdom	
	2020	2019	2020	2019
	(in millions)			
Projected benefit obligation	$ (715)	$ (689)	$ (643)	$ (597)
Fair value of plan assets	667	630	491	418

Our pension funding policy in North America is to contribute amounts sufficient to meet minimum legal funding requirements plus discretionary amounts that we may deem to be appropriate. Actual contributions may vary from estimated amounts depending on changes in assumptions, actual returns on plan assets, changes in regulatory requirements and funding decisions.

In accordance with United Kingdom pension legislation, our United Kingdom pension funding policy is to contribute amounts sufficient to meet the funding level target agreed between the employer and the trustees of the United Kingdom plans. Actual contributions are usually agreed with the plan trustees in connection with each triennial valuation and may vary following each such review depending on changes in assumptions, actual returns on plan assets, changes in regulatory requirements and funding decisions.

We currently estimate that our consolidated pension funding contributions for 2021 will be approximately $6 million for the North America plans and $27 million for the United Kingdom plans.

The expected future benefit payments for our pension and retiree medical plans are as follows:

	Pension Plans		Retiree Medical Plans
	North America	United Kingdom	North America
	(in millions)		
2021	$ 47	$ 27	$ 3
2022	47	28	3
2023	48	29	2
2024	48	30	2
2025	49	30	2
2026-2030	251	163	9

The following assumptions were used in determining the benefit obligations and expense:

	Pension Plans						Retiree Medical Plans		
	North America			United Kingdom			North America		
	2020	2019	2018	2020	2019	2018	2020	2019	2018
Weighted-average discount rate—obligation	2.4 %	3.1 %	4.1 %	1.5 %	2.0 %	2.9 %	2.2 %	3.0 %	4.1 %
Weighted-average discount rate—expense	3.1 %	4.1 %	3.6 %	2.0 %	2.9 %	2.5 %	3.0 %	4.1 %	3.4 %
Weighted-average cash balance interest crediting rate—obligation	3.0 %	3.0 %	3.0 %	n/a	n/a	n/a	n/a	n/a	n/a
Weighted-average cash balance interest crediting rate—expense	3.0 %	3.0 %	3.0 %	n/a	n/a	n/a	n/a	n/a	n/a
Weighted-average rate of increase in future compensation	4.2 %	4.2 %	4.3 %	n/a	n/a	n/a	n/a	n/a	n/a
Weighted-average expected long-term rate of return on assets—expense	4.1 %	4.6 %	4.5 %	3.4 %	4.4 %	4.2 %	n/a	n/a	n/a
Weighted-average retail price index—obligation	n/a	n/a	n/a	3.0 %	3.0 %	3.3 %	n/a	n/a	n/a
Weighted-average retail price index—expense	n/a	n/a	n/a	3.0 %	3.3 %	3.2 %	n/a	n/a	n/a

n/a—not applicable

The discount rates for all plans are developed by plan using spot rates derived from a hypothetical yield curve of high quality (AA rated or better) fixed income debt securities as of the year-end measurement date to calculate discounted cash flows (the projected benefit obligation) and solving for a single equivalent discount rate that produces the same projected benefit obligation. In determining our benefit obligation, we use the actuarial present value of the vested benefits to which each eligible employee is currently entitled, based on the employee's expected date of separation or retirement.

The cash balance interest crediting rate for the U.S. plan is based on the greater of 10-year Treasuries or 3.0%.

For our North America plans, the expected long-term rate of return on assets is based on analysis of historical rates of return achieved by equity and non-equity investments and current market characteristics, adjusted for estimated plan expenses and weighted by target asset allocation percentages. As of January 1, 2021, our weighted-average expected long-term rate of return on assets is 3.2%, which will be used in determining expense for 2021.

For our United Kingdom plans, the expected long-term rate of return on assets is based on the expected long-term performance of the underlying investments, adjusted for investment managers' fees and estimated plan expenses. As of January 1, 2021, our weighted-average expected long-term rate of return on assets is 3.3%, which will be used in determining expense for 2021.

The retail price index for the United Kingdom plans is developed using the Bank of England implied retail price inflation curve, which is based on the difference between yields on fixed interest government bonds and index-linked government bonds.

For the measurement of the benefit obligation at December 31, 2020 for our primary (U.S.) retiree medical benefit plans, the assumed health care cost trend rates, for pre-65 retirees, start with a 6.3% increase in 2021, followed by a gradual decline in increases to 4.5% for 2030 and thereafter. For post-65 retirees, the assumed health care cost trend rates start with a 7.0% increase in 2021, followed by a gradual decline in increases to 4.5% for 2030 and thereafter. For the measurement of the benefit obligation at December 31, 2019 for our primary (U.S.) retiree medical benefit plans, the assumed health care cost trend rates, for pre-65 retirees, started with a 7.0% increase in 2020, followed by a gradual decline in increases to 4.5% for 2026 and thereafter. For post-65 retirees, the assumed health care cost trend rates started with an 8.3% increase in 2020, followed by a gradual decline in increases to 4.5% for 2026 and thereafter.

The objectives of the investment policies governing the pension plans are to administer the assets of the plans for the benefit of the participants in compliance with all laws and regulations, and to establish an asset mix that provides for diversification and considers the risk of various different asset classes with the purpose of generating favorable investment returns. The investment policies consider circumstances such as participant demographics, time horizon to retirement and liquidity needs, and provide guidelines for asset allocation, planning horizon, general portfolio issues and investment manager evaluation criteria. The investment strategies for the plans, including target asset allocations and investment vehicles, are subject to change within the guidelines of the policies.

The target asset allocation for our U.S. pension plan is 80% non-equity and 20% equity, which has been determined based on analysis of actual historical rates of return and plan needs and circumstances. The equity investments are tailored to exceed the growth of the benefit obligation and are a combination of U.S. and non-U.S. total stock market index mutual funds. The non-equity investments consist primarily of investments in debt securities and money market instruments that are selected based on investment quality and duration to mitigate volatility of the funded status and annual required contributions. The non-equity investments have a duration profile that is similar to the benefit obligation in order to mitigate the impact of interest rate changes on the funded status. This investment strategy is achieved through the use of mutual funds and individual securities.

The target asset allocation for one of the Canadian plans is 70% non-equity and 30% equity, and 100% non-equity for the other Canadian plan. This investment strategy is achieved through the use of a mutual fund for equity investments and individual securities for non-equity investments. The equity investment is a passively managed portfolio that diversifies assets across multiple securities, economic sectors and countries. The non-equity investments consist primarily of investments in debt securities that are selected based on investment quality and duration to mitigate volatility of the funded status and annual required contributions. The non-equity investments have a duration profile that is similar to the benefit obligation in order to mitigate the impact of interest rate changes on the funded status.

The pension assets in the United Kingdom plans are each administered by a Board of Trustees consisting of employer nominated trustees, member nominated trustees and an independent trustee, with a requirement that member nominated trustees represent at least one-third of each Board of Trustees. It is the responsibility of the trustees to ensure prudent management and investment of the assets in the plans. The trustees meet on a quarterly basis to review and discuss fund performance and other administrative matters.

The trustees’ investment objectives are to hold assets that generate returns sufficient to cover prudently each plan’s liability without exposing the plans to unacceptable risk. This is accomplished through the asset allocation strategy of each plan. For both plans, if the asset allocation moves more than plus or minus 5% from the benchmark allocation, the trustees may decide to amend the asset allocation. At a minimum, the trustees review the investment strategy at every triennial actuarial valuation to ensure that the strategy remains consistent with its funding principles. The trustees may review the strategy more frequently if opportunities arise to reduce risk within the investments without jeopardizing the funding position.

Assets of the United Kingdom plans are invested in externally managed pooled funds. The assets are allocated between a growth portfolio and a matching portfolio. The growth portfolio seeks a return premium on investments across multiple asset classes. Growth portfolio funds may include, among others, traditional equities and bonds, growth fixed income, hedged funds, and may use derivatives. The matching portfolio seeks to align asset changes with changes in liability due to interest and discount rate. Matching portfolio funds are composed of corporate bonds, U.K. gilts and liability-driven investment funds and generally invest in fixed income debt securities including government bonds, gilts, gilt repurchase agreements, swaps and investment grade corporate bonds and may use derivatives. The target asset allocation for one of the United Kingdom plans is 55% in the growth portfolio and 45% in the matching portfolio and the other United Kingdom plan is 60% in the growth portfolio (including a legacy holding in an actively managed property fund) and 40% in the matching portfolio.

The fair values of our pension plan assets as of December 31, 2020 and 2019, by major asset class, are as follows:

	North America			
	December 31, 2020			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash and cash equivalents[1]	$ 30	$ 7	$ 23	$ —
Equity mutual funds				
Index equity[2]	134	134	—	—
Pooled equity[3]	30	—	30	—
Fixed income				
U.S. Treasury bonds and notes[4]	37	37	—	—
Corporate bonds and notes[5]	499	—	499	—
Government and agency securities[6]	110	—	110	—
Other[7]	7	—	7	—
Total assets at fair value by fair value levels	$ 847	$ 178	$ 669	$ —
Accruals and payables—net	(1)			
Total assets	$ 846			

	United Kingdom			
	December 31, 2020			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash and cash funds[8]	$ 22	$ 5	$ 17	$ —
Pooled equity funds[9]	118	—	118	—
Pooled diversified funds[10]	55	—	55	—
Debt funds				
Pooled U.K. government fixed and index-linked securities funds[11]	73	—	73	—
Pooled global debt funds[12]	88	—	88	—
Pooled liability-driven investment funds [13]	83	—	83	—
Total assets at fair value by fair value levels	$ 439	$ 5	$ 434	$ —
Funds measured at NAV as a practical expedient[14]	52			
Total assets	$ 491			

	North America			
	December 31, 2019			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash and cash equivalents[1]	$ 21	$ 1	$ 20	$ —
Equity mutual funds				
Index equity[2]	137	137	—	—
Pooled equity[3]	35	—	35	—
Fixed income				
U.S. Treasury bonds and notes[4]	25	25	—	—
Corporate bonds and notes[5]	472	—	472	—
Government and agency securities[6]	93	—	93	—
Other[7]	8	—	8	—
Total assets at fair value by fair value levels	$ 791	$ 163	$ 628	$ —
Accruals and payables—net	(1)			
Total assets	$ 790			

	United Kingdom			
	December 31, 2019			
	Total Fair Value	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(in millions)			
Cash	$ 4	$ 4	$ —	$ —
Pooled target return funds[15]	220	—	220	—
Fixed income				
Pooled U.K. government index-linked securities funds[16]	32	—	32	—
Pooled global fixed income funds[17]	33	—	33	—
Pooled liability-driven investment funds [13]	84	—	84	—
Total assets at fair value by fair value levels	$ 373	$ 4	$ 369	$ —
Pooled property funds measured at NAV as a practical expedient[14]	45			
Total assets	$ 418			

(1) Cash and cash equivalents are primarily repurchase agreements and short-term money market funds.

(2) The index equity funds are mutual funds that utilize a passively managed investment approach designed to track specific equity indices. They are valued at quoted market prices in an active market, which represent the net asset values of the shares held by the plan.

(3) The equity pooled mutual funds consist of pooled funds that invest in common stock and other equity securities that are traded on U.S., Canadian, and foreign markets.

(4) U.S. Treasury bonds and notes are valued based on quoted market prices in an active market.

(5) Corporate bonds and notes, including private placement securities, are valued by institutional bond pricing services, which gather information from market sources and integrate credit information, observed market movements and sector news into their pricing applications and models.

(6) Government and agency securities consist of U.S. municipal bonds and Canadian provincial bonds that are valued by institutional bond pricing services, which gather information on current trading activity, market movements, trends, and specific data on specialty issues.

(7) Other includes primarily mortgage-backed and asset-backed securities, which are valued by institutional pricing services, which gather information from market sources and integrate credit information, observed market movements and sector news into their pricing applications and models.

(8) Cash and cash funds include a cash fund that holds primarily short-dated term money market securities.

(9) Pooled equity funds invest in a broad array of global equity, equity-related securities, a range of diversifiers and may use derivatives for efficient portfolio management. The funds are valued at net asset value (NAV) as determined by the fund managers based on the value of the underlying net assets of the fund.

(10) Pooled diversified funds invest in broad array of asset classes and a range of diversifiers including the use of derivatives. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(11) Pooled U.K. government fixed and index-linked securities funds invest primarily in Sterling denominated fixed income and inflation-linked fixed income securities issued or guaranteed by the U.K. government and may use derivatives for efficient portfolio management. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(12) Pooled global debt funds invest in a broad array of debt securities from corporate and government bonds to emerging markets and high-yield fixed and floating rate securities of varying maturities. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(13) Pooled liability-driven investment funds invest primarily in gilt repurchase agreements, physical United Kingdom government gilts, and derivatives to provide exposure to interest rates, thus hedging this element of risk associated with pension liabilities. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(14) Funds measured at NAV as a practical expedient in 2020 include two funds of funds with return strategies with exposure to varying asset classes and credit strategies, as well as alternative investment strategies not precluding multi-asset credit strategies, global macro strategies, commodities, fixed income, equities and currency, and in 2020 and 2019, pooled property funds that invest primarily in freehold and leasehold property in the United Kingdom. The funds are valued using NAV as determined by the fund managers based on the value of the underlying assets of the fund.

(15) Pooled target return funds invest in a broad array of asset classes and a range of diversifiers including the use of derivatives. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(16) Pooled U.K. government index-linked securities funds invest primarily in United Kingdom government index-linked gilt securities. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

(17) Pooled global fixed income funds invest primarily in government bonds, investment grade corporate bonds, high yield and emerging market bonds and can make use of derivatives. The funds are valued at NAV as determined by the fund managers based on the value of the underlying net assets of the fund.

We have defined contribution plans covering substantially all employees in North America and the United Kingdom. Depending on the specific provisions of each plan, qualified employees receive company contributions based on a percentage of base salary, matching of employee contributions up to specified limits, or a combination of both. In 2020, 2019, and 2018, we recognized expense related to our contributions to the defined contribution plans of $22 million, $20 million, and $18 million, respectively.

In addition to our qualified defined benefit pension plans, we also maintain certain nonqualified supplemental pension plans for highly compensated employees as defined under federal law. The amounts recognized in accrued expenses and other liabilities in our consolidated balance sheets for these plans were $4 million and $16 million, respectively, as of December 31, 2020, and $2 million and $16 million, respectively, as of December 31, 2019. We recognized expense for these plans of $2 million, $1 million, and $1 million in 2020, 2019, and 2018, respectively.

12. Financing Agreements

Revolving Credit Agreement

On December 5, 2019, CF Holdings and CF Industries entered into a senior secured Fourth Amended and Restated Credit Agreement (the Revolving Credit Agreement), which amended and restated our Third Amended and Restated Revolving Credit Agreement, as previously amended (referred to herein, as in effect from time to time, as the Prior Credit Agreement), that was scheduled to mature September 18, 2020. The Revolving Credit Agreement provides for a revolving credit facility of up to $750 million with a maturity of December 5, 2024. The Revolving Credit Agreement includes a letter of credit sub-limit of $125 million. Borrowings under the Revolving Credit Agreement may be used for working capital, capital expenditures, acquisitions, share repurchases and other general corporate purposes.

Borrowings under the Revolving Credit Agreement may be denominated in U.S. dollars, Canadian dollars, euros and British pounds, and bear interest at a per annum rate equal to, at our option, an applicable eurocurrency rate or base rate plus, in either case, a specified margin. We are required to pay an undrawn commitment fee on the undrawn portion of the commitments under the Revolving Credit Agreement and customary letter of credit fees. The specified margin and the amount of the commitment fee depend on CF Holdings' credit rating at the time.

The guarantors under the Revolving Credit Agreement are currently comprised of CF Holdings and CF Holdings' wholly owned subsidiaries CF Industries Enterprises, LLC (CFE), CF Industries Sales, LLC (CFS), CF USA Holdings, LLC (CF USA) and CF Industries Distribution Facilities, LLC (CFIDF).

As of December 31, 2020, we had unused borrowing capacity under the Revolving Credit Agreement of $750 million and no outstanding letters of credit. There were no borrowings outstanding under the Revolving Credit Agreement as of December 31, 2020 or 2019, and there were no borrowings outstanding under the Prior Credit Agreement or the Revolving Credit Agreement during 2019. In March 2020, we borrowed $500 million under the Revolving Credit Agreement to ensure we maintained ample financial flexibility in light of the uncertainty in the global markets caused by the COVID-19 pandemic, which we repaid in April 2020. Maximum borrowings under the Revolving Credit Agreement during the year ended December 31, 2020 were $500 million. The weighted-average annual interest rate of borrowings under the Revolving Credit Agreement during the year ended December 31, 2020 was 2.05%.

The Revolving Credit Agreement contains representations and warranties and affirmative and negative covenants, including financial covenants. As of December 31, 2020, we were in compliance with all covenants under the Revolving Credit Agreement.

Letters of Credit

In addition to the letters of credit that may be issued under the Revolving Credit Agreement, as described above, we have also entered into a bilateral agreement with capacity to issue letters of credit up to $250 million (reflecting an increase of $105 million in December 2020). As of December 31, 2020, approximately $125 million of letters of credit were outstanding under this agreement.

Senior Notes

Long-term debt presented on our consolidated balance sheets as of December 31, 2020 and 2019 consisted of the following debt securities issued by CF Industries:

	Effective Interest Rate	December 31, 2020		December 31, 2019	
		Principal	Carrying Amount(1)	Principal	Carrying Amount(1)
		(in millions)			
Public Senior Notes:					
3.450% due June 2023	3.562%	$ 750	$ 748	$ 750	$ 747
5.150% due March 2034	5.279%	750	741	750	740
4.950% due June 2043	5.031%	750	742	750	742
5.375% due March 2044	5.465%	750	741	750	741
Senior Secured Notes:					
3.400% due December 2021	3.782%	250	249	250	248
4.500% due December 2026	4.759%	750	740	750	739
Total long-term debt		$ 4,000	$ 3,961	$ 4,000	$ 3,957
Less: Current maturities of long-term debt		250	249	—	—
Long-term debt, net of current maturities		$ 3,750	$ 3,712	$ 4,000	$ 3,957

(1) Carrying amount is net of unamortized debt discount and deferred debt issuance costs. Total unamortized debt discount was $9 million and $10 million as of December 31, 2020 and 2019, respectively, and total deferred debt issuance costs were $30 million and $33 million as of December 31, 2020 and 2019, respectively.

Under the indentures (including the applicable supplemental indentures) governing the senior notes due 2023, 2034, 2043 and 2044 identified in the table above (the Public Senior Notes), each series of Public Senior Notes is guaranteed by CF Holdings.

Under the terms of the applicable indenture, the 3.400% senior secured notes due December 2021 (the 2021 Notes) and the 4.500% senior secured notes due December 2026 (the 2026 Notes) identified in the table above (together, the Senior Secured Notes) are guaranteed on a senior secured basis, jointly and severally, by CF Holdings and each current and future domestic subsidiary of CF Holdings (other than CF Industries) that from time to time is a borrower, or guarantees indebtedness, under the Revolving Credit Agreement. The requirement for any subsidiary of CF Holdings to guarantee the Senior Secured Notes of a series will apply only until, and the subsidiary guarantees of the Senior Secured Notes of a series will be automatically released upon, CF Holdings having an investment grade corporate rating, with a stable or better outlook, from two of three selected ratings agencies and there being no default or event of default under the applicable indenture. The subsidiary guarantors of the Senior Secured Notes currently consist of CFE, CFS, CF USA and CFIDF.

Subject to certain exceptions, the obligations under each series of Senior Secured Notes and each guarantor's related guarantee are secured by a first priority security interest in substantially all of the assets of CF Industries, CF Holdings and the subsidiary guarantors, including a pledge by CF USA of its equity interests in CFN and mortgages over certain material fee-owned domestic real properties (the Collateral). The obligations under the Revolving Credit Agreement, together with certain letter of credit, cash management, hedging and similar obligations and future pari passu secured indebtedness, are secured by the Collateral on a pari passu basis with the Senior Secured Notes. The liens on the Collateral securing the obligations under the Senior Secured Notes of a series and the related guarantees will be automatically released and the covenant under the applicable indenture limiting dispositions of Collateral will no longer apply if CF Holdings has an investment grade corporate rating, with a stable or better outlook, from two of three selected ratings agencies and there is no default or event of default under the applicable indenture.

On November 13, 2019, we redeemed in full all of the remaining $500 million outstanding principal amount of the 7.125% senior notes due May 2020 (the 2020 Notes), in accordance with the optional redemption provisions in the indenture governing the 2020 Notes. The total aggregate redemption price paid on the 2020 Notes in connection with the redemption was approximately $512 million, excluding accrued interest. As a result, we recognized a loss on debt extinguishment of $12 million, primarily consisting of premiums paid.

On December 13, 2019, we redeemed $250 million principal amount, representing 50% of the $500 million principal amount outstanding immediately prior to such redemption, of the 2021 Notes in accordance with the optional redemption provisions in the indenture governing the 2021 Notes. The total aggregate redemption price paid in connection with the redemption was approximately $257 million, excluding accrued interest. As a result, we recognized a loss on debt extinguishment of $9 million, primarily consisting of premiums paid.

On February 17, 2021, we announced that CF Industries elected to redeem in full the entire outstanding $250 million principal amount of the 2021 Notes on March 20, 2021, in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes. See Note 25—Subsequent Events for additional information.

Interest on the Public Senior Notes and the Senior Secured Notes is payable semiannually, and the Public Senior Notes and Senior Secured Notes are redeemable at our option, in whole at any time or in part from time to time, at specified make-whole redemption prices.

13. Interest Expense

Details of interest expense are as follows:

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Interest on borrowings[1]	$ 185	$ 223	$ 228
Fees on financing agreements[1]	8	13	13
Interest on tax liabilities[2]	(14)	3	1
Interest capitalized	—	(2)	(1)
Interest expense	$ 179	$ 237	$ 241

(1) See Note 12—Financing Agreements for additional information.
(2) Interest on tax liabilities for the year ended December 31, 2020 includes a reduction in interest accrued on the reserve for unrecognized tax benefits.

14. Other Operating—Net

Details of other operating—net are as follows:

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Insurance proceeds[1]	$ (37)	$ (37)	$ (10)
Loss (gain) on disposal of property, plant and equipment—net[2]	15	(40)	6
Loss (gain) on foreign currency transactions[3]	5	(1)	(5)
Loss on embedded derivative[4]	3	4	1
Other	(3)	1	(19)
Other operating—net	$ (17)	$ (73)	$ (27)

(1) Insurance proceeds in 2020 and 2019 relate to property and business interruption insurance claims at one of our nitrogen complexes.
(2) Loss (gain) on disposal of property, plant and equipment—net in 2020 includes $9 million of engineering costs written off upon the cancellation of a project at one of our nitrogen complexes. In 2019, includes the gain on sale of our Pine Bend facility of $45 million. See Note 6—Property, Plant and Equipment—Net for additional information on the sale of our Pine Bend facility.
(3) Loss (gain) on foreign currency transactions consists of foreign currency exchange rate impacts on foreign currency denominated transactions, including the impact of changes in foreign currency exchange rates on intercompany loans that were not permanently invested.
(4) Loss on embedded derivative consists of unrealized and realized losses related to a provision of our strategic venture with CHS. See Note 9—Fair Value Measurements for additional information.

15. Derivative Financial Instruments

We may use derivative financial instruments to reduce our exposure to changes in prices for natural gas that will be purchased in the future. Natural gas is the largest and most volatile component of our manufacturing cost for nitrogen-based products. From time to time, we may also use derivative financial instruments to reduce our exposure to changes in foreign currency exchange rates. The derivatives that we may use to reduce our exposure to changes in prices for natural gas are primarily natural gas fixed price swaps, basis swaps and options traded in the OTC markets. These natural gas derivatives settle using primarily a NYMEX futures price index, which represents the basis for fair value at any given time. We enter into natural gas derivative contracts with respect to natural gas to be consumed by us in the future, and settlements of those derivative contracts are scheduled to coincide with our anticipated purchases of natural gas used to manufacture nitrogen products during those future periods. We use natural gas derivatives as an economic hedge of natural gas price risk, but without the application of hedge accounting. As a result, changes in fair value of these contracts are recognized in earnings. As of December 31, 2020, we had natural gas fixed price swaps and basis swaps covering certain periods through March 2022.

As of December 31, 2020, our open natural gas derivative contracts consisted of natural gas fixed price swaps and basis swaps for 34.1 million MMBtus. As of December 31, 2019, we had open natural gas derivative contracts for 41.1 million MMBtus of natural gas fixed price swaps, basis swaps and options. For the year ended December 31, 2020, we used derivatives to cover approximately 19% of our natural gas consumption.

The effect of derivatives in our consolidated statements of operations is shown in the table below.

	Gain (loss) recognized in income			
		Year ended December 31,		
	Location	2020	2019	2018
			(in millions)	
Natural gas derivatives				
Unrealized net gains (losses)	Cost of sales	$ 6	$ (14)	$ 13
Realized net (losses) gains	Cost of sales	(13)	4	(2)
Net derivative (losses) gains		$ (7)	$ (10)	$ 11

The fair values of derivatives on our consolidated balance sheets are shown below. As of December 31, 2020 and 2019, none of our derivative instruments were designated as hedging instruments. See Note 9—Fair Value Measurements for additional information on derivative fair values.

	Asset Derivatives			Liability Derivatives		
		December 31,			December 31,	
	Balance Sheet Location	2020	2019	Balance Sheet Location	2020	2019
		(in millions)			(in millions)	
Natural gas derivatives	Other current assets	$ 1	$ —	Other current liabilities	$ (7)	$ (12)

The counterparties to our derivative contracts are multinational commercial banks, major financial institutions and large energy companies. Our derivative contracts are executed with several counterparties under International Swaps and Derivatives Association (ISDA) agreements. The ISDA agreements are master netting arrangements commonly used for OTC derivatives that mitigate exposure to counterparty credit risk, in part, by creating contractual rights of netting and setoff, the specifics of which vary from agreement to agreement. These rights are described further below:

- Settlement netting generally allows us and our counterparties to net, into a single net payable or receivable, ordinary settlement obligations arising between us under the ISDA agreement on the same day, in the same currency, for the same types of derivative instruments, and through the same pairing of offices.
- Close-out netting rights are provided in the event of a default or other termination event (as defined in the ISDA agreements), including bankruptcy. Depending on the cause of early termination, the non-defaulting party may elect to terminate all or some transactions outstanding under the ISDA agreement. The values of all terminated transactions and certain other payments under the ISDA agreement are netted, resulting in a single net close-out amount payable to or by the non-defaulting party.
- Setoff rights are provided by certain of our ISDA agreements and generally allow a non-defaulting party to elect to set off, against the final net close-out payment, other matured and contingent amounts payable between us and our

counterparties under the ISDA agreement or otherwise. Typically, these setoff rights arise upon the early termination of all transactions outstanding under an ISDA agreement following a default or specified termination event.

Most of our ISDA agreements contain credit-risk-related contingent features such as cross default provisions. In the event of certain defaults or termination events, our counterparties may request early termination and net settlement of certain derivative trades or, under certain ISDA agreements, may require us to collateralize derivatives in a net liability position. The Revolving Credit Agreement, at any time when it is secured, provides a cross collateral feature for those of our derivatives that are with counterparties that are party to, or affiliates of parties to, the Revolving Credit Agreement so that no separate collateral would be required for those counterparties in connection with such derivatives. In the event the Revolving Credit Agreement becomes unsecured, separate collateral could be required in connection with such derivatives. As of December 31, 2020 and 2019, the aggregate fair value of the derivative instruments with credit-risk-related contingent features in net liability positions was $6 million and $12 million, respectively, which also approximates the fair value of the maximum amount of additional collateral that may need to be posted or assets that may be needed to settle the obligations if the credit-risk-related contingent features were triggered at the reporting dates. As of December 31, 2020 and 2019, we had no cash collateral on deposit with counterparties for derivative contracts. The credit support documents executed in connection with certain of our ISDA agreements generally provide us and our counterparties the right to set off collateral against amounts owing under the ISDA agreements upon the occurrence of a default or a specified termination event.

The following table presents amounts relevant to offsetting of our derivative assets and liabilities as of December 31, 2020 and 2019:

	Amounts presented in consolidated balance sheets[(1)]	Gross amounts not offset in consolidated balance sheets		Net amount
		Financial instruments	Cash collateral received (pledged)	
		(in millions)		
December 31, 2020				
Total derivative assets	$ 1	$ —	$ —	$ 1
Total derivative liabilities	(7)	—	—	(7)
Net derivative liabilities	$ (6)	$ —	$ —	$ (6)
December 31, 2019				
Total derivative assets	$ —	$ —	$ —	$ —
Total derivative liabilities	(12)	—	—	(12)
Net derivative liabilities	$ (12)	$ —	$ —	$ (12)

(1) We report the fair values of our derivative assets and liabilities on a gross basis on our consolidated balance sheets. As a result, the gross amounts recognized and net amounts presented are the same.

We do not believe the contractually allowed netting, close-out netting or setoff of amounts owed to, or due from, the counterparties to our ISDA agreements would have a material effect on our financial position.

16. Supplemental Balance Sheet Data

Accounts Receivable—Net

Accounts receivable—net consist of the following:

	December 31,	
	2020	2019
	(in millions)	
Trade	$ 256	$ 229
Other	9	13
Accounts receivable—net	$ 265	$ 242

Inventories

Inventories consist of the following:

	December 31,	
	2020	2019
	(in millions)	
Finished goods	$ 246	$ 311
Raw materials, spare parts and supplies	41	40
Total inventories	$ 287	$ 351

Accounts Payable and Accrued Expenses

Accounts payable and accrued expenses consist of the following:

	December 31,	
	2020	2019
	(in millions)	
Accounts payable	$ 85	$ 78
Accrued natural gas costs	106	88
Payroll and employee-related costs	68	81
Accrued interest	32	32
Other	133	158
Total accounts payable and accrued expenses	$ 424	$ 437

Payroll and employee-related costs include accrued salaries and wages, vacation, benefits, incentive plans and payroll taxes.

Accrued interest includes interest payable on our outstanding senior notes. See Note 12—Financing Agreements and Note 13—Interest Expense for additional information.

Other includes accrued utilities, property and other taxes, sales incentives and other credits, accrued litigation settlement costs, accrued maintenance and professional services.

Other Current Liabilities

As of December 31, 2020, other current liabilities of $15 million primarily includes $7 million of unrealized loss on natural gas derivatives and $5 million representing the current portion of the unrealized loss on the embedded derivative liability related to our strategic venture with CHS. As of December 31, 2019, other current liabilities of $18 million primarily includes $12 million of unrealized loss on natural gas derivatives and $5 million representing the current portion of the unrealized loss on the embedded derivative liability related to our strategic venture with CHS.

See Note 9—Fair Value Measurements, Note 15—Derivative Financial Instruments and Note 17—Noncontrolling Interests for additional information.

Other Liabilities

Other liabilities consist of the following:

	December 31, 2020	December 31, 2019
	(in millions)	
Benefit plans and deferred compensation	$ 256	$ 298
Tax-related liabilities	155	147
Unrealized loss on embedded derivative	13	15
Other	20	14
Other liabilities	$ 444	$ 474

Benefit plans and deferred compensation include liabilities for pensions, retiree medical benefits, and the noncurrent portion of incentive plans. See Note 11—Pension and Other Postretirement Benefits for additional information.

17. Noncontrolling Interests

A reconciliation of the beginning and ending balances of noncontrolling interests and distributions payable to the noncontrolling interests on our consolidated balance sheets is provided below.

	Year ended December 31, 2020	2019	2018		
	CFN	CFN	CFN	TNCLP	Total
			(in millions)		
Noncontrolling interests:					
Balance as of January 1	$ 2,740	$ 2,773	$ 2,772	$ 333	$ 3,105
Earnings attributable to noncontrolling interests	115	153	130	8	138
Declaration of distributions payable	(174)	(186)	(129)	(10)	(139)
Purchase of TNCLP Public Units	—	—	—	(331)	(331)
Balance as of December 31	$ 2,681	$ 2,740	$ 2,773	$ —	$ 2,773
Distributions payable to noncontrolling interests:					
Balance as of January 1	$ —	$ —	$ —	$ —	$ —
Declaration of distributions payable	174	186	129	10	139
Distributions to noncontrolling interests	(174)	(186)	(129)	(10)	(139)
Balance as of December 31	$ —	$ —	$ —	$ —	$ —

CF Industries Nitrogen, LLC (CFN)

We have a strategic venture with CHS under which CHS owns an equity interest in CFN, a subsidiary of CF Holdings, which represents approximately 11% of the membership interests of CFN. We own the remaining membership interests. Under the terms of CFN's limited liability company agreement, each member's interest will reflect, over time, the impact of the profitability of CFN, any member contributions made to CFN and withdrawals and distributions received from CFN. For financial reporting purposes, the assets, liabilities and earnings of the strategic venture are consolidated into our financial statements. CHS' interest in the strategic venture is recorded in noncontrolling interests in our consolidated financial statements. CHS also receives deliveries pursuant to a supply agreement under which CHS has the right to purchase annually from CFN up to approximately 1.1 million tons of granular urea and 580,000 tons of UAN at market prices. As a result of its equity interest in CFN, CHS is entitled to semi-annual cash distributions from CFN. We are also entitled to semi-annual cash distributions from CFN. The amounts of distributions from CFN to us and CHS are based generally on the profitability of CFN and determined based on the volume of granular urea and UAN sold by CFN to us and CHS pursuant to supply agreements, less a formula driven amount based primarily on the cost of natural gas used to produce the granular urea and UAN, and adjusted for the allocation of items such as operational efficiencies and overhead amounts. Additionally, under the terms of the strategic venture, we recognized an embedded derivative related to our credit rating. See Note 9—Fair Value Measurements for additional information.

On January 31, 2021, the CFN Board of Managers approved semi-annual distribution payments for the distribution period ended December 31, 2020 in accordance with CFN's limited liability company agreement. On February 1, 2021, CFN distributed $64 million to CHS for the distribution period ended December 31, 2020.

Terra Nitrogen Company, L.P. (TNCLP)

On February 7, 2018, we announced that, in accordance with the terms of TNCLP's First Amended and Restated Agreement of Limited Partnership (as amended by Amendment No. 1 to the First Amended and Restated Agreement of Limited Partnership, the TNCLP Agreement of Limited Partnership), Terra Nitrogen GP Inc. (TNGP), the sole general partner of TNCLP and an indirect wholly owned subsidiary of CF Holdings, elected to exercise its right to purchase all of the 4,612,562 publicly traded common units of TNCLP (the TNCLP Public Units). On April 2, 2018, TNGP completed its purchase of the TNCLP Public Units (the Purchase) for an aggregate cash purchase price of $388 million, at which time we recognized a reduction in paid-in capital of $62 million; a deferred tax liability of $5 million; and the removal of the TNCLP noncontrolling interests, as shown in the table above. Upon completion of the Purchase, CF Holdings owned, through its subsidiaries, 100 percent of the general and limited partnership interests of TNCLP.

Prior to April 2, 2018, TNCLP was a master limited partnership that owned a nitrogen manufacturing facility in Verdigris, Oklahoma. We owned approximately 75.3% of TNCLP through general and limited partnership interests and outside investors owned the remaining approximately 24.7% of the limited partnership interests. For financial reporting purposes, the assets, liabilities and earnings of the partnership were consolidated into our financial statements. The outside investors' limited partnership interests in TNCLP were recorded in noncontrolling interests in our consolidated financial statements. The noncontrolling interest represented the noncontrolling unitholders' interest (prior to the Purchase) in the earnings and equity of TNCLP. Affiliates of CF Industries were required to purchase all of TNCLP's nitrogen products at market prices as defined in the Amendment to the General and Administrative Services and Product Offtake Agreement, dated September 28, 2010.

Prior to April 2, 2018, TNCLP made cash distributions to the general and limited partners based on formulas defined within the TNCLP Agreement of Limited Partnership. Cash available for distribution (Available Cash) was defined in the TNCLP Agreement of Limited Partnership generally as all cash receipts less all cash disbursements, less certain reserves (including reserves for future operating and capital needs) established as the general partner determined in its reasonable discretion to be necessary or appropriate. Changes in working capital affected Available Cash, as increases in the amount of cash invested in working capital items (such as increases in receivables or inventory and decreases in accounts payable) reduced Available Cash, while declines in the amount of cash invested in working capital items increased Available Cash. Cash distributions to the limited partners and general partner varied depending on the extent to which the cumulative distributions exceeded certain target threshold levels set forth in the TNCLP Agreement of Limited Partnership.

18. Stockholders' Equity

Common Stock

Our Board of Directors (the Board) has authorized certain programs to repurchase shares of our common stock. These programs have generally permitted repurchases to be made from time to time in the open market, through privately-negotiated transactions, through block transactions or otherwise. Our management has determined the manner, timing and amount of repurchases under these programs based on the evaluation of market conditions, stock price and other factors.

On August 1, 2018, the Board authorized the repurchase of up to $500 million of CF Holdings common stock through June 30, 2020 (the 2018 Share Repurchase Program). In 2018, we completed the 2018 Share Repurchase Program with the repurchase of 10.9 million shares for $500 million, of which $33 million was accrued and unpaid at December 31, 2018.

On February 13, 2019, the Board authorized the repurchase of up to $1 billion of CF Holdings common stock through December 31, 2021 (the 2019 Share Repurchase Program). In 2019, we repurchased approximately 7.6 million shares under the 2019 Share Repurchase Program for $337 million. In 2020, we repurchased approximately 2.6 million shares under the 2019 Share Repurchase Program for $100 million.

In 2019, we retired 18.6 million shares of repurchased stock. The retired shares were returned to the status of authorized but unissued shares. As part of the retirements, we reduced our treasury stock, paid-in capital and retained earnings balances for 2019 by $843 million, $110 million and $733 million, respectively. We held no shares in treasury of repurchased stock as of December 31, 2019.

In 2020, we retired 2.8 million shares of repurchased stock. The retired shares were returned to the status of authorized but unissued shares. As part of the retirements, we reduced our treasury stock, paid-in capital and retained earnings balances for 2020 by $107 million, $17 million and $90 million, respectively. As of December 31, 2020, we held 102,843 shares in treasury of repurchased stock.

Changes in common shares outstanding are as follows:

	Year ended December 31,		
	2020	2019	2018
Beginning balance	216,023,826	222,818,495	233,287,089
Exercise of stock options	321,465	629,186	462,647
Issuance of restricted stock(1)	552,362	267,165	68,803
Purchase of treasury shares(2)	(2,942,795)	(7,691,020)	(11,000,044)
Ending balance	213,954,858	216,023,826	222,818,495

(1) Includes shares issued from treasury.
(2) Includes shares withheld to pay employee tax obligations upon the vesting of restricted stock or the exercise of stock options.

Preferred Stock

CF Holdings is authorized to issue 50 million shares of $0.01 par value preferred stock. Our Second Amended and Restated Certificate of Incorporation, as amended, authorizes the Board, without any further stockholder action or approval, to issue these shares in one or more classes or series, and (except in the case of our Series A Junior Participating Preferred Stock, 500,000 shares of which are authorized and the terms of which were specified in the original certificate of incorporation of CF Holdings) to fix the rights, preferences and privileges of the shares of each wholly unissued class or series and any of its qualifications, limitations or restrictions. The Series A Junior Participating Preferred Stock had been established in CF Holdings' original certificate of incorporation in connection with our former stockholder rights plan that expired in 2015. No shares of preferred stock have been issued.

Accumulated Other Comprehensive Loss

Changes to accumulated other comprehensive loss and the impact on other comprehensive income (loss) are as follows:

	Foreign Currency Translation Adjustment	Unrealized Gain (Loss) on Securities	Unrealized Gain (Loss) on Derivatives	Defined Benefit Plans	Accumulated Other Comprehensive Loss
			(in millions)		
Balance as of December 31, 2017	$ (145)	$ 1	$ 4	$ (123)	$ (263)
Adoption of ASU 2016-01[1]	—	(1)	—	—	(1)
Adoption of ASU 2018-02[2]	—	—	1	(11)	(10)
Gain arising during the period	—	—	—	3	3
Reclassification to earnings[3]	—	—	—	2	2
Effect of exchange rate changes and deferred taxes	(105)	—	—	3	(102)
Balance as of December 31, 2018	(250)	—	5	(126)	(371)
Loss arising during the period	—	—	—	(62)	(62)
Reclassification to earnings[3]	—	—	—	(2)	(2)
Effect of exchange rate changes and deferred taxes	62	—	—	7	69
Balance as of December 31, 2019	(188)	—	5	(183)	(366)
Gain arising during the period	—	—	—	1	1
Reclassification to earnings[3]	—	—	(1)	6	5
Effect of exchange rate changes and deferred taxes	44	—	—	(4)	40
Balance as of December 31, 2020	$ (144)	$ —	$ 4	$ (180)	$ (320)

(1) On January 1, 2018, we adopted ASU No. 2016-01, Financial Instruments-Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities, which changes the income statement impact of equity investments held by an entity. The amendments require the unrealized gains or losses of equity instruments measured at fair value to be recognized in net earnings. Our adoption of this ASU resulted in an increase to opening retained earnings of $1 million representing the cumulative effect of unrealized gains from equity securities from accumulated other comprehensive loss.

(2) In the fourth quarter of 2018, we adopted ASU No. 2018-02, Income Statement-Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income. This ASU allowed a reclassification from accumulated other comprehensive income (loss) to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act. As a result of our adoption of this ASU, we reclassified $10 million of stranded tax effects previously recognized in accumulated other comprehensive loss to retained earnings during the fourth quarter of 2018.

(3) Reclassifications out of accumulated other comprehensive loss to the consolidated statements of operations were not material.

19. Stock-based Compensation

2014 Equity and Incentive Plan

On May 14, 2014, our shareholders approved the CF Industries Holdings, Inc. 2014 Equity and Incentive Plan (the 2014 Equity and Incentive Plan) which replaced the CF Industries Holdings, Inc. 2009 Equity and Incentive Plan. Under the 2014 Equity and Incentive Plan, we may grant incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, performance awards (payable in cash or stock) and other stock-based awards to our officers, employees, consultants and independent contractors (including non-employee directors). The purpose of the 2014 Equity and Incentive Plan is to provide an incentive that is aligned with the interests of our shareholders.

Share Reserve and Individual Award Limits

The maximum number of shares reserved for the grant of awards under the 2014 Equity and Incentive Plan is the sum of (i) 13.9 million and (ii) the number of shares subject to outstanding awards under our predecessor plans to the extent such awards terminate or expire without delivery of shares. For purposes of determining the number of shares of stock available for grant under the 2014 Equity and Incentive Plan, each option or stock appreciation right is counted against the reserve as one share. Each share of stock granted, other than an option or a stock appreciation right, is counted against the reserve as 1.61 shares. If any outstanding award expires or is settled in cash, any unissued shares subject to the award are again available for grant under the 2014 Equity and Incentive Plan. Shares tendered in payment of the exercise price of an option and shares withheld by the Company or otherwise received by the Company to satisfy tax withholding obligations are not available for future grant under the 2014 Equity and Incentive Plan. As of December 31, 2020, we had 6.0 million shares available for future awards under the 2014 Equity and Incentive Plan. The 2014 Equity and Incentive Plan provides that no more than 5.0 million shares underlying awards of stock options and stock appreciation rights may be granted to a participant in any one calendar year.

Restricted Stock Awards, Restricted Stock Units and Performance Restricted Stock Units

The fair value of a restricted stock award (RSA) or a restricted stock unit (RSU) is equal to the number of shares subject to the award multiplied by the closing market price of our common stock on the date of grant. We estimated the fair value of each performance restricted stock unit (PSU) on the date of grant using a Monte Carlo simulation. Generally, RSUs vest in three equal annual installments following the date of grant. PSUs are granted to key employees and generally vest three years from the date of grant subject to the attainment of applicable performance goals during the performance period. The RSAs awarded to non-management members of the Board vest the earlier of one year from the date of the grant or the date of the next annual stockholder meeting. During the vesting period, the holders of the RSAs are entitled to dividends and voting rights. During the vesting period, the holders of the RSUs are paid dividend equivalents in cash to the extent we pay cash dividends. PSUs accrue dividend equivalents to the extent we pay cash dividends on our common stock during the performance and vesting periods. Upon vesting of the PSUs, holders are paid the cash equivalent of the dividends paid during the performance and vesting periods based on the shares of common stock, if any, delivered in settlement of PSUs. Holders of RSUs and PSUs are not entitled to voting rights unless and until the awards have vested.

A summary of restricted stock activity during the year ended December 31, 2020 is presented below.

	Restricted Stock Awards		Restricted Stock Units		Performance Restricted Stock Units	
	Shares	Weighted-Average Grant-Date Fair Value	Shares	Weighted-Average Grant-Date Fair Value	Shares	Weighted-Average Grant-Date Fair Value
Outstanding as of December 31, 2019	36,567	$ 41.84	693,960	$ 40.14	304,834	$ 44.42
Granted	50,895	27.51	316,154	45.23	210,869	47.93
Restrictions lapsed (vested)(1)	(36,567)	41.84	(372,855)	38.36	(58,460)	48.68
Forfeited	—	—	(23,165)	44.13	(11,745)	45.97
Outstanding as of December 31, 2020	50,895	27.51	614,094	43.70	445,498	45.72

(1) For performance restricted stock units, the shares represent the performance restricted stock units granted in 2017, for which the three-year performance period ended December 31, 2019.

The 2020, 2019 and 2018 weighted-average grant date fair value for RSAs was $27.51, $41.84, and $40.40, for RSUs was $45.23, $41.94, and $43.09, and for PSUs was $47.93, $43.09, and $44.59, respectively.

The actual tax benefit realized from restricted stock vested in each of the years ended December 31, 2020, 2019 and 2018 was $5 million, $3 million and $1 million, respectively. The fair value of restricted stock vested was $22 million, $11 million and $3 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Stock Options

Under the 2014 Equity and Incentive Plan and our predecessor plans, we have granted to plan participants nonqualified stock options to purchase shares of our common stock. The exercise price of these options was equal to the market price of our common stock on the date of grant. The contractual life of each option was ten years and generally one-third of the options vested on each of the first three anniversaries of the date of grant. No stock option awards have been granted to plan participants since 2017.

A summary of stock option activity during the year ended December 31, 2020 is presented below:

	Shares	Weighted-Average Exercise Price
Outstanding as of December 31, 2019	5,059,892	$ 39.88
Exercised	(321,465)	25.95
Forfeited	(6,527)	30.95
Expired	(162,859)	52.86
Outstanding as of December 31, 2020	4,569,041	40.41
Exercisable as of December 31, 2020	4,569,041	40.41

	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value[(1)] (in millions)
Outstanding as of December 31, 2020	4.2	$ 15
Exercisable as of December 31, 2020	4.2	$ 15

(1) The aggregate intrinsic value represents the total pre-tax intrinsic value, based on our closing stock price of $38.71 as of December 31, 2020, which would have been received by the option holders had all option holders exercised their options as of that date.

Selected amounts pertaining to stock option exercises are as follows:

	2020	2019	2018
		(in millions)	
Cash received from stock option exercises	$ 8	$ 18	$ 12
Actual tax benefit realized from stock option exercises	$ 1	$ 3	$ 2
Pre-tax intrinsic value of stock options exercised	$ 4	$ 12	$ 10

Compensation Cost

Compensation cost is recorded primarily in selling, general and administrative expenses. The following table summarizes stock-based compensation costs and related income tax benefits:

	Year ended December 31,		
	2020	2019	2018
		(in millions)	
Stock-based compensation expense	$ 26	$ 28	$ 21
Income tax benefit	(6)	(6)	(4)
Stock-based compensation expense, net of income taxes	$ 20	$ 22	$ 17

As of December 31, 2020, pre-tax unrecognized compensation cost was $14 million for RSAs and RSUs, which will be recognized over a weighted-average period of 1.7 years, and $7 million for PSUs, which will be recognized over a weighted-average period of 1.3 years.

Excess tax benefits realized from the vesting of restricted stock or stock option exercises are recognized as an income tax benefit in our consolidated statements of operations and are required to be reported as an operating cash inflow rather than a reduction of taxes paid. The excess tax benefits realized in 2020, 2019 and 2018 were $3 million, $7 million, and $6 million, respectively.

20. Contingencies

West Fertilizer Co.

On April 17, 2013, there was a fire and explosion at the West Fertilizer Co. fertilizer storage and distribution facility in West, Texas. According to published reports, 15 people were killed and approximately 200 people were injured in the incident, and the fire and explosion damaged or destroyed a number of homes and buildings around the facility. Various subsidiaries of CF Industries Holdings, Inc. (the CF Entities) were named as defendants along with other companies in lawsuits filed in 2013, 2014 and 2015 in the District Court of McLennan County, Texas by the City of West, individual residents of the County and other parties seeking recovery for damages allegedly sustained as a result of the explosion. The cases were consolidated for discovery and pretrial proceedings in the District Court of McLennan County under the caption “In re: West Explosion Cases.” The two-year statute of limitations expired on April 17, 2015. As of that date, over 400 plaintiffs had filed claims, including at least 9 entities, 325 individuals, and 80 insurance companies. Plaintiffs allege various theories of negligence, strict liability, and breach of warranty under Texas law. Although we do not own or operate the facility or directly sell our products to West Fertilizer Co., products that the CF Entities manufactured and sold to others were delivered to the facility and may have been stored at the West facility at the time of the incident.

The Court granted in part and denied in part the CF Entities’ Motions for Summary Judgment in August 2015. Over three hundred cases have been resolved pursuant to confidential settlements that have been or we expect will be fully funded by insurance. The remaining cases are in various stages of discovery and pre-trial proceedings. The next group of cases is expected to be set for trial after the Court resumes scheduling civil jury trials currently on hold because of the coronavirus disease 2019 (COVID-19) pandemic. We believe we have strong legal and factual defenses and intend to continue defending the CF Entities vigorously in the pending lawsuits. The Company cannot provide a range of reasonably possible loss due to the uncertain nature of this litigation, including uncertainties around the potential allocation of responsibility by a jury to other defendants or responsible third parties. The recognition of a potential loss in the future in the West Fertilizer Co. litigation could negatively affect our results in the period of recognition. However, based upon currently available information, including available insurance coverage, we do not believe that this litigation will have a material adverse effect on our consolidated financial position, results of operations or cash flows.

Other Litigation

From time to time, we are subject to ordinary, routine legal proceedings related to the usual conduct of our business, including proceedings regarding public utility and transportation rates, environmental matters, taxes and permits relating to the operations of our various plants and facilities. Based on the information available as of the date of this filing, we believe that the ultimate outcome of these routine matters will not have a material adverse effect on our consolidated financial position, results of operations or cash flows.

Environmental

From time to time, we receive notices from governmental agencies or third parties alleging that we are a potentially responsible party at certain cleanup sites under CERCLA or other environmental cleanup laws. In 2011, we received a notice from the Idaho Department of Environmental Quality (IDEQ) that alleged that we were a potentially responsible party for the cleanup of a former phosphate mine site we owned in the late 1950s and early 1960s located in Georgetown Canyon, Idaho. The current owner of the property and a former mining contractor received similar notices for the site. In 2014, we and the current property owner entered into a Consent Order with IDEQ and the U.S. Forest Service to conduct a remedial investigation and feasibility study of the site. In 2015, we and several other parties received a notice that the U.S. Department of the Interior and other trustees intend to undertake a natural resource damage assessment for 17 former phosphate mines in southeast Idaho, one of which is the former Georgetown Canyon mine. Because the former mine site is still in the remedial investigation/feasibility study stage, we are not able to estimate at this time our potential liability, if any, with respect to the cleanup of the site or a possible claim for natural resource damages. However, based on the results of the site investigation conducted to date, we do not expect the remedial or financial obligations to which we may be subject involving this or other cleanup sites will have a material adverse effect on our consolidated financial position, results of operations or cash flows.

21. Segment Disclosures

Our reportable segments consist of ammonia, granular urea, UAN, AN, and Other. These segments are differentiated by products. Our management uses gross margin to evaluate segment performance and allocate resources. Total other operating costs and expenses (consisting of selling, general and administrative expenses and other operating—net) and non-operating expenses (interest and income taxes) are centrally managed and are not included in the measurement of segment profitability reviewed by management.

Our assets, with the exception of goodwill, are not monitored by or reported to our chief operating decision maker by segment; therefore, we do not present total assets by segment. Goodwill by segment is presented in Note 7—Goodwill and Other Intangible Assets.

Segment data for sales, cost of sales and gross margin for 2020, 2019 and 2018 are presented in the table below.

	Ammonia	Granular Urea[(1)]	UAN[(1)]	AN[(1)]	Other[(1)]	Consolidated
			(in millions)			
Year ended December 31, 2020						
Net sales	$ 1,020	$ 1,248	$ 1,063	$ 455	$ 338	$ 4,124
Cost of sales	850	847	949	390	287	3,323
Gross margin	$ 170	$ 401	$ 114	$ 65	$ 51	801
Total other operating costs and expenses						189
Equity in earnings of operating affiliate						11
Operating earnings						$ 623
Year ended December 31, 2019						
Net sales	$ 1,113	$ 1,342	$ 1,270	$ 506	$ 359	$ 4,590
Cost of sales	878	861	981	399	297	3,416
Gross margin	$ 235	$ 481	$ 289	$ 107	$ 62	1,174
Total other operating costs and expenses						166
Equity in loss of operating affiliate						(5)
Operating earnings						$ 1,003
Year ended December 31, 2018						
Net sales	$ 1,028	$ 1,322	$ 1,234	$ 460	$ 385	$ 4,429
Cost of sales	867	889	1,007	414	335	3,512
Gross margin	$ 161	$ 433	$ 227	$ 46	$ 50	917
Total other operating costs and expenses						187
Equity in earnings of operating affiliate						36
Operating earnings						$ 766

(1) The cost of ammonia that is upgraded into other products is transferred at cost into the upgraded product results.

Depreciation and amortization by segment for 2020, 2019 and 2018 is as follows:

	Ammonia	Granular Urea	UAN	AN	Other	Corporate	Consolidated
				(in millions)			
Depreciation and amortization							
Year ended December 31, 2020	$ 176	$ 270	$ 256	$ 100	$ 68	$ 22	$ 892
Year ended December 31, 2019	167	264	251	88	72	33	875
Year ended December 31, 2018	155	276	270	85	67	35	888

Enterprise-wide data by geographic region is as follows:

	Year ended December 31,		
	2020	2019	2018
	(in millions)		
Sales by geographic region (based on destination of shipments):			
United States	$ 3,036	$ 3,387	$ 3,160
Foreign:			
Canada	397	410	379
North America, excluding U.S. and Canada	54	53	81
United Kingdom	332	413	425
Other foreign	305	327	384
Total foreign	1,088	1,203	1,269
Consolidated	$ 4,124	$ 4,590	$ 4,429

	December 31,		
	2020	2019	2018
	(in millions)		
Property, plant and equipment—net by geographic region:			
United States	$ 6,527	$ 6,991	$ 7,426
Foreign:			
Canada	525	558	544
United Kingdom	580	621	653
Total foreign	1,105	1,179	1,197
Consolidated	$ 7,632	$ 8,170	$ 8,623

Our principal customers are cooperatives, independent fertilizer distributors, traders, wholesalers and industrial users. In 2020, 2019 and 2018, CHS accounted for approximately 13%, 15% and 14% of our consolidated net sales, respectively. See Note 17—Noncontrolling Interests for additional information.

22. Supplemental Cash Flow Information

The following provides additional information relating to cash flow activities:

	Year ended December 31,		
	2020	2019	2018
	(in millions)		
Cash paid during the year for			
Interest—net of interest capitalized	$ 184	$ 228	$ 227
Income taxes—net of refunds	111	(41)	7
Supplemental disclosure of noncash investing and financing activities:			
Change in capitalized expenditures in accounts payable and accrued expenses	$ 1	$ (6)	$ 2
Change in accrued share repurchases	—	(33)	33

23. Asset Retirement Obligations

Asset retirement obligations (AROs) are legal obligations associated with the retirement of long-lived assets that result from the acquisition, construction, development or normal operation of such assets. AROs are initially recognized as incurred when sufficient information exists to estimate fair value. We have AROs at our nitrogen manufacturing complexes and at our distribution and storage facilities that are conditional upon cessation of operations. These AROs include certain decommissioning activities as well as the removal and disposal of certain chemicals, waste materials, structures, equipment, vessels, piping and storage tanks. Also included are reclamation of land and the closure of certain effluent ponds and/or waste storage areas. The most recent estimate of the aggregate cost of these AROs expressed in 2020 dollars is approximately $115 million. We have not recorded a liability for these conditional AROs as of December 31, 2020 because we do not believe there is currently a reasonable basis for estimating a date or range of dates of cessation of operations at our nitrogen manufacturing facilities or our distribution and storage facilities, which is necessary in order to estimate fair value. In reaching this conclusion, we considered the historical performance of each complex or facility and have taken into account factors such as planned maintenance, asset replacements and upgrades of plant and equipment, which if conducted as in the past, can extend the physical lives of our nitrogen manufacturing facilities and our distribution and storage facilities indefinitely. We also considered the possibility of changes in technology, risk of obsolescence, and availability of raw materials in arriving at our conclusion.

24. Leases

We have operating leases for certain property and equipment under various noncancelable agreements, the most significant of which are rail car leases and barge tow charters for the distribution of our products. The rail car leases currently have minimum terms ranging from one to eleven years and the barge tow charter commitments range from one to six years. Our rail car leases and barge tow charters commonly contain provisions for automatic renewal that can extend the lease term unless canceled by either party. We also have operating leases for terminal and warehouse storage for our distribution system, some of which contain minimum throughput requirements. The storage agreements contain minimum terms generally ranging from one to five years and commonly contain provisions for automatic renewal thereafter unless canceled by either party. The renewal provisions for our rail car leases, barge tow charters and terminal and warehouse storage agreements are not reasonably certain to be exercised.

The components of lease costs were as follows:

	Year ended December 31,	
	2020	2019
	(in millions)	
Operating lease cost	$ 107	$ 95
Short-term lease cost	17	26
Variable lease cost	6	4
Total lease cost	$ 130	$ 125

Total rent expense for cancelable and noncancelable operating leases was $121 million for 2018, which was recorded under the previous lease accounting standard, ASC 840.

Supplemental cash flow information related to leases was as follows:

	Year ended December 31,	
	2020	2019
	(in millions)	
Operating cash flows - cash paid for amounts included in the measurement of operating lease liabilities	$ 105	$ 93
Right-of-use (ROU) assets obtained in exchange for operating lease obligations	80	73

Supplemental balance sheet information related to leases was as follows:

	December 31,	
	2020	2019
	(in millions)	
Operating lease ROU assets	$ 259	$ 280
Current operating lease liabilities	$ 88	$ 90
Operating lease liabilities	174	193
Total operating lease liabilities	$ 262	$ 283

	December 31,	
	2020	2019
Operating leases		
Weighted-average remaining lease term	4 years	5 years
Weighted-average discount rate[(1)]	4.7 %	4.9 %

(1) Upon adoption of the new lease accounting standard, discount rates used for existing leases were established at January 1, 2019.

The following table reconciles the undiscounted cash flows for our operating leases to the operating lease liabilities recorded on our consolidated balance sheet as of December 31, 2020.

	Operating lease payments
	(in millions)
2021	$ 90
2022	68
2023	47
2024	39
2025	22
Thereafter	24
Total lease payments	290
Less: imputed interest	(28)
Present value of lease liabilities	262
Less: Current operating lease liabilities	(88)
Operating lease liabilities	$ 174

As of December 31, 2020, we have entered into additional leases that had not yet commenced and therefore have been excluded from total operating lease liabilities as of that date. These leases will commence in fiscal year 2021 with future minimum payments of $6 million and lease terms of five years.

25. Subsequent Events

On February 17, 2021, we announced that our wholly owned subsidiary CF Industries, Inc. elected to redeem in full the entire outstanding $250 million principal amount of the 2021 Notes on March 20, 2021, in accordance with the optional redemption provisions provided in the indenture governing the 2021 Notes. Based on market interest rates on February 12, 2021, we estimate that the total amount for the redemption of the 2021 Notes will be approximately $258 million, including accrued interest. See Note 12—Financing Agreements for additional information.

In February 2021, the central portion of the United States experienced extreme and unprecedented cold weather. Certain natural gas suppliers declared force majeure events due to natural gas well freeze offs or frozen equipment. This occurred at the same time as large increases in natural gas demand were occurring due to the cold temperatures. Due to these unprecedented factors, several states declared a state of emergency and natural gas was redirected for residential usage. At certain of our manufacturing locations, we were asked to reduce our natural gas consumption and therefore these plants either operated at reduced rates or temporarily suspended operations. We returned excess natural gas to our suppliers and received prevailing market prices, which were in excess of our cost. During this period of time, we have experienced lower production, but have procured product in order to meet customer obligations. Higher maintenance and repair activity may be necessary as the plants are restarted. At the present time, we do not know the net positive or negative impact of these events on our operations; however, we do not expect it to result in a material impact to our business.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

ITEM 9A. CONTROLS AND PROCEDURES.

(a) *Disclosure Controls and Procedures.* The Company's management, with the participation of the Company's principal executive officer and principal financial officer, has evaluated the effectiveness of the Company's disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act)) as of the end of the period covered by this report. Based on such evaluation, the Company's principal executive officer and principal financial officer have concluded that, as of the end of such period, the Company's disclosure controls and procedures are effective in (i) ensuring that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and (ii) ensuring that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the Company's management, including the Company's principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

(b) *Management's Report on Internal Control over Financial Reporting.*

Management's Report on Internal Control over Financial Reporting

The Company's management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, for the Company. Under the supervision and with the participation of our senior management, including our principal executive officer and principal financial officer, we assessed the effectiveness of our internal control over financial reporting as of December 31, 2020, using the criteria set forth in the *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013. Based on this assessment, management has concluded that our internal control over financial reporting is effective as of December 31, 2020. KPMG LLP, the independent registered public accounting firm that audited the Company's consolidated financial statements, has issued an attestation report on the Company's internal control over financial reporting as of December 31, 2020, which appears on the following page.

(c) *Changes in Internal Control over Financial Reporting.* There have not been any changes in the Company's internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

CF INDUSTRIES HOLDINGS, INC.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
CF Industries Holdings, Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited CF Industries Holdings, Inc. and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income, equity, and cash flows for each of the years in the three-year period ended December 31, 2020, and the related notes (collectively, the consolidated financial statements), and our report dated February 24, 2021 expressed an unqualified opinion on those consolidated financial statements.

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 of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included 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.

(signed) KPMG LLP

Chicago, Illinois
February 24, 2021

ITEM 9B. OTHER INFORMATION.

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.

Information appearing in the Proxy Statement under the headings "Proposal 1: Election of Directors—Director Nominees"; "Proposal 1: Election of Directors—Director Nominee Biographies"; "Executive Officers"; "Corporate Governance—Committees of the Board—Audit Committee"; and, if required, "Delinquent Section 16(a) Reports" is incorporated herein by reference.

We have adopted a Code of Corporate Conduct that applies to our employees, directors and officers, including our principal executive officer, principal financial officer and principal accounting officer. The Code of Corporate Conduct is posted on our Internet website, *www.cfindustries.com*. We will provide an electronic or paper copy of this document free of charge upon request. We intend to disclose on our Internet website any amendment to any provision of the Code of Corporate Conduct that relates to any element of the definition of "code of ethics" enumerated in Item 406(b) of Regulation S-K under the Exchange Act and any waiver from any such provision granted to our principal executive officer, principal financial officer, principal accounting officer or controller or persons performing similar functions.

ITEM 11. EXECUTIVE COMPENSATION.

During the last completed fiscal year, Stephen J. Hagge, Javed Ahmed, John D. Johnson, Anne P. Noonan, Michael J. Toelle and Celso L. White served as the members of the Compensation and Management Development Committee of the Board.

Information appearing under the following headings of the Proxy Statement is incorporated herein by reference: "Compensation Discussion and Analysis," "Compensation Discussion and Analysis—Other Compensation Governance Practices and Considerations—Compensation and Benefits Risk Analysis," "Compensation and Management Development Committee Report," "Executive Compensation" and "Corporate Governance—Director Compensation."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.

Information appearing under the following headings of the Proxy Statement is incorporated herein by reference: "Common Stock Ownership—Common Stock Ownership of Certain Beneficial Owners" and "Common Stock Ownership—Common Stock Ownership of Directors and Management."

We currently issue stock-based compensation under the 2014 Equity and Incentive Plan. Under the 2014 Equity and Incentive Plan, we may grant incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, performance awards (payable in cash or stock) and other stock or cash-based awards.

Equity Compensation Plan Information as of December 31, 2020

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights[(1)]	Weighted-average exercise price of outstanding options, warrants and rights[(2)]	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in the first column)[(3)]
Equity compensation plans approved by security holders	6,741,928	$ 40.41	6,028,074
Equity compensation plans not approved by security holders	—	—	—
Total	6,741,928	$ 40.41	6,028,074

(1) Includes 4,569,041 shares issuable pursuant to outstanding nonqualified stock options, 614,094 shares issuable pursuant to restricted stock units (RSUs) and 1,558,793 shares issuable pursuant to performance restricted stock units (PSUs) under our 2014 Equity and Incentive Plan and our 2009 Equity Incentive Plan. PSUs are subject to attainment of the applicable performance goals during the three-year performance period and are reflected at their maximum potential payout. The PSUs shown in the table above reflect the full amount awarded to plan participants in 2018, 2019 and 2020. The three-year performance periods for the PSUs awarded in 2018, 2019 and 2020 are in each case composed of three one-year periods with performance goals set annually. Because accounting rules require performance goals to be set before a PSU is determined for accounting purposes to have been granted, the number of PSUs reported as

outstanding as of December 31, 2020 in "Note 19—Stock-based Compensation" reflects all of the 2018 PSUs awarded, but only two-thirds of the 2019 PSUs awarded and one-third of the 2020 PSUs awarded.

(2) RSUs and PSUs are not reflected in the weighted exercise price as these awards do not have an exercise price.

(3) Under the 2014 Equity and Incentive Plan, the number of shares available for issuance will be reduced (i) by one share for each share issued pursuant to options and stock appreciation rights and (ii) by 1.61 shares for each share of stock issued pursuant to RSUs and PSUs.

See Note 19—Stock-based Compensation for additional information on the 2014 Equity and Incentive Plan.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE.

Information appearing in the Proxy Statement under the headings "Corporate Governance—Director Independence" and "Policy Regarding Related Person Transactions" is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

Information appearing in the Proxy Statement under the headings "Proposal 4: Ratification of Selection of Independent Auditor for 2021—Audit and Non-Audit Fees" and "Proposal 4: Ratification of Selection of Independent Auditor for 2021—Pre-Approval of Audit and Non-Audit Services" is incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

(a) Documents filed as part of this report:

(1) All financial statements:

The following financial statements are included in Part II, Item 8. Financial Statements and Supplementary Data:

Financial statement schedules are omitted because they are not applicable or the required information is included in the consolidated financial statements or notes thereto.

(2) Exhibits

A list of exhibits filed with this Annual Report on Form 10-K (or incorporated by reference to exhibits previously filed or furnished) is provided in the Exhibit Index on page 116 of this report.

ITEM 16. FORM 10-K SUMMARY.

None.

CF INDUSTRIES HOLDINGS, INC.

EXHIBIT INDEX

EXHIBIT NO.	DESCRIPTION
2.1	Agreement and Plan of Merger, dated as of July 21, 2005, by and among CF Industries Holdings, Inc., CF Merger Corp. and CF Industries, Inc. (incorporated by reference to Exhibit 2.1 to Amendment No. 3 to CF Industries Holdings, Inc.'s Registration Statement on Form S-1 filed with the SEC on July 26, 2005, File No. 333-124949)
2.2	Agreement and Plan of Merger, dated as of March 12, 2010, by and among CF Industries Holdings, Inc., Composite Merger Corporation and Terra Industries Inc. (incorporated by reference to Exhibit 2.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on March 12, 2010, File No. 001-32597)
2.3	Asset Purchase Agreement, dated October 28, 2013, among CF Industries Holdings, Inc., CF Industries, Inc. and The Mosaic Company (incorporated by reference to Exhibit 2.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 1, 2013, File No. 001-32597)*
2.4	Second Amended and Restated Limited Liability Company Agreement of CF Industries Nitrogen, LLC, dated as of December 18, 2015, by and between CF Industries Sales, LLC and CHS Inc. (incorporated by reference to Exhibit 2.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on December 21, 2015, File No. 001-32597)*,**
2.5	First Amendment to the Second Amended and Restated Limited Liability Company Agreement of CF Industries Nitrogen, LLC, dated as of March 30, 2018, by and among CF Industries Nitrogen, LLC, CF Industries Sales, LLC, CF USA Holdings, LLC and CHS Inc. (incorporated by reference to Exhibit 2.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)*
3.1	Second Amended and Restated Certificate of Incorporation, as amended (incorporated by reference to Exhibit 3.2 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on July 25, 2017, File No. 001-32597)
3.2	Fourth Amended and Restated Bylaws of CF Industries Holdings, Inc., effective October 14, 2015, as amended April 20, 2018 (incorporated by reference to Exhibit 3.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.1	Specimen common stock certificate (incorporated by reference to Exhibit 4.3 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on July 25, 2017, File No. 001-32597)
4.2	Description of common stock of CF Industries Holdings, Inc.
4.3	Indenture, dated as of May 23, 2013, among CF Industries, Inc., CF Industries Holdings, Inc. and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to CF Industries Holding, Inc.'s Current Report on Form 8-K filed with the SEC on May 23, 2013, File No. 001-32597)
4.4	First Supplemental Indenture, dated as of May 23, 2013, among CF Industries, Inc., CF Industries Holdings, Inc. and Wells Fargo Bank, National Association, as trustee, relating to CF Industries, Inc.'s 3.450% Senior Notes due 2023 (includes form of note) (the "2023 Notes Supplement") (incorporated by reference to Exhibit 4.2 to CF Industries Holding, Inc.'s Current Report on Form 8-K filed with the SEC on May 23, 2013, File No. 001-32597)
4.5	First Supplement, dated as of November 21, 2016, relating to the 2023 Notes Supplement (incorporated by reference to Exhibit 4.10 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)
4.6	Second Supplement, dated as of March 29, 2018, relating to the 2023 Notes Supplement (incorporated by reference to Exhibit 4.2 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.7	Third Supplement, dated as of March 22, 2019, relating to the 2023 Notes Supplement (incorporated by reference to Exhibit 4.2 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.8	Second Supplemental Indenture, dated as of May 23, 2013, among CF Industries, Inc., CF Industries Holdings, Inc. and Wells Fargo Bank, National Association, as trustee, relating to CF Industries, Inc.'s 4.950% Senior Notes due 2043 (includes form of note) (the "2043 Notes Supplement") (incorporated by reference to Exhibit 4.3 to CF Industries Holding, Inc.'s Current Report on Form 8-K filed with the SEC on May 23, 2013, File No. 001-32597)

EXHIBIT NO.	DESCRIPTION
4.9	First Supplement, dated as of November 21, 2016, relating to the 2043 Notes Supplement (incorporated by reference to Exhibit 4.12 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)
4.10	Second Supplement, dated as of March 29, 2018, relating to the 2043 Notes Supplement (incorporated by reference to Exhibit 4.3 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.11	Third Supplement, dated as of March 22, 2019, relating to the 2043 Notes Supplement (incorporated by reference to Exhibit 4.3 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.12	Third Supplemental Indenture, dated as of March 11, 2014, among CF Industries, Inc., CF Industries Holdings, Inc. and Wells Fargo Bank, National Association, as trustee, relating to CF Industries, Inc.'s 5.150% Senior Notes due 2034 (includes form of note) (the "2034 Notes Supplement") (incorporated by reference to Exhibit 4.2 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on March 11, 2014, File No. 001-32597)
4.13	First Supplement, dated as of November 21, 2016, relating to the 2034 Notes Supplement (incorporated by reference to Exhibit 4.14 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)
4.14	Second Supplement, dated as of March 29, 2018, relating to the 2034 Notes Supplement (incorporated by reference to Exhibit 4.4 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.15	Third Supplement, dated as of March 22, 2019, relating to the 2034 Notes Supplement (incorporated by reference to Exhibit 4.4 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.16	Fourth Supplemental Indenture, dated as of March 11, 2014, among CF Industries, Inc., CF Industries Holdings, Inc. and Wells Fargo Bank, National Association, as trustee, relating to CF Industries, Inc.'s 5.375% Senior Notes due 2044 (includes form of note) (the "2044 Notes Supplement") (incorporated by reference to Exhibit 4.3 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on March 11, 2014, File No. 001-32597)
4.17	First Supplement, dated as of November 21, 2016, relating to the 2044 Notes Supplement (incorporated by reference to Exhibit 4.16 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)
4.18	Second Supplement, dated as of March 29, 2018, relating to the 2044 Notes Supplement (incorporated by reference to Exhibit 4.5 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.19	Third Supplement, dated as of March 22, 2019, relating to the 2044 Notes Supplement (incorporated by reference to Exhibit 4.5 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.20	Indenture, dated as of November 21, 2016, among CF Industries Holdings, Inc., CF Industries, Inc., the Subsidiary Guarantors (as defined therein) party thereto and Wells Fargo Bank, National Association, as trustee and collateral agent, relating to CF Industries, Inc.'s 3.400% Senior Secured Notes due 2021 (includes form of note) (the "2021 Notes Indenture") (incorporated by reference to Exhibit 4.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 22, 2016, File No. 001-32597)
4.21	First Supplemental Indenture, dated as of March 29, 2018, relating to the 2021 Notes Indenture (incorporated by reference to Exhibit 4.6 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.22	Second Supplemental Indenture, dated as of March 22, 2019, relating to the 2021 Notes Indenture (incorporated by reference to Exhibit 4.6 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.23	Indenture, dated as of November 21, 2016, among CF Industries Holdings, Inc., CF Industries, Inc., the Subsidiary Guarantors (as defined therein) party thereto and Wells Fargo Bank, National Association, as trustee and collateral agent, relating to CF Industries, Inc.'s 4.500% Senior Secured Notes due 2026 (includes form of note) (the "2026 Notes Indenture") (incorporated by reference to Exhibit 4.2 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 22, 2016, File No. 001-32597)

EXHIBIT NO.	DESCRIPTION
4.24	First Supplemental Indenture, dated as of March 29, 2018, relating to the 2026 Notes Indenture (incorporated by reference to Exhibit 4.7 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 3, 2018, File No. 001-32597)
4.25	Second Supplemental Indenture, dated as of March 22, 2019, relating to the 2026 Notes Indenture (incorporated by reference to Exhibit 4.7 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 2, 2019, File No. 001-32597)
4.26	Pledge and Security Agreement, dated as of November 21, 2016, among CF Industries Holdings, Inc., CF Industries, Inc., the other Guarantors (as defined therein) party thereto and Wells Fargo Bank, National Association, as collateral agent under the indenture relating to CF Industries, Inc.'s 3.400% Senior Secured Notes due 2021 (incorporated by reference to Exhibit 4.3 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 22, 2016, File No. 001-32597)
4.27	Pledge and Security Agreement, dated as of November 21, 2016, among CF Industries Holdings, Inc., CF Industries, Inc., the Subsidiary Guarantors (as defined therein) party thereto and Wells Fargo Bank, National Association, as collateral agent under the indenture relating to CF Industries, Inc.'s 4.500% Senior Secured Notes due 2026 (incorporated by reference to Exhibit 4.4 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 22, 2016, File No. 001-32597)
4.28	First Lien/First Lien Intercreditor Agreement, dated as of November 21, 2016, among Morgan Stanley Senior Funding, Inc., as authorized representative of the Credit Agreement Secured Parties, Wells Fargo Bank, National Association, as collateral agent in connection with CF Industries, Inc.'s 3.400% Senior Secured Notes due 2021 and 4.500% Senior Secured Notes due 2026 and each additional Authorized Representative from time to time party thereto for the Other First-Priority Secured Parties of the Series with respect to which it is acting in such capacity (incorporated by reference to Exhibit 4.5 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on November 22, 2016, File No. 001-32597)
10.1	Change in Control Severance Agreement, effective as of April 29, 2005, and amended and restated as of July 24, 2007, by and among CF Industries, Inc., CF Industries Holdings, Inc. and Douglas C. Barnard (incorporated by reference to Exhibit 10.3 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on November 5, 2007, File No. 001-32597)***
10.2	Change in Control Severance Agreement, effective as of September 1, 2009, amended as of October 20, 2010, and amended further and restated as of February 17, 2014, by and between CF Industries Holdings, Inc. and Christopher D. Bohn (incorporated by reference to Exhibit 10.3 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 27, 2014, File No. 001-32597)***
10.3	Change in Control Severance Agreement, effective as of November 21, 2008, by and between CF Industries Holdings, Inc. and Bert A. Frost (incorporated by reference to Exhibit 10.11 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 26, 2009, File No. 001-32597)***
10.4	Change in Control Severance Agreement, effective as of November 19, 2007 and amended and restated as of March 6, 2009, by and between CF Industries Holdings, Inc. and Richard A. Hoker (incorporated by reference to Exhibit (e)(9) to CF Industries Holdings, Inc.'s Solicitation/Recommendation Statement on Schedule 14D-9 filed with the SEC on March 23, 2009, File No. 005-80934)***
10.5	Change in Control Severance Agreement, effective as of October 9, 2017, by and between CF Industries Holdings, Inc. and Susan L. Menzel (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on November 2, 2017, File No. 001-32597)***
10.6	Change in Control Severance Agreement, effective as of April 24, 2007, amended as of July 24, 2007, and amended further and restated as of February 17, 2014, by and between CF Industries Holdings, Inc. and W. Anthony Will (incorporated by reference to Exhibit 99.1 to CF Industries Holding, Inc.'s Current Report on Form 8-K filed with the SEC on February 20, 2014, File No. 001-32597)***
10.7	Change in Control Severance Agreement, effective as of February 2, 2012, and amended and restated as of September 1, 2019, by and between CF Industries Holdings, Inc. and Ashraf K. Malik (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on October 31, 2019, File No. 001-32597)***
10.8	Change in Control Severance Agreement, effective as of February 27, 2020, by and between CF Industries Holdings, Inc. and Linda M. Dempsey (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 7, 2020, File No. 001-32597)***
10.9	Form of Amendment to Change in Control Severance Agreement (incorporated by reference to Exhibit 10.3 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on December 24, 2015, File No. 001-32597)***

EXHIBIT NO.	DESCRIPTION
10.10	Form of Indemnification Agreement with Officers and Directors (incorporated by reference to Exhibit 10.10 to Amendment No. 2 to CF Industries Holdings, Inc.'s Registration Statement on Form S-1 filed with the SEC on July 20, 2005, File No. 333-124949)***
10.11	CF Industries Holdings, Inc. 2009 Equity and Incentive Plan (incorporated by reference to Appendix A to CF Industries Holdings, Inc.'s Definitive Proxy Statement on Schedule 14A filed with the SEC on March 16, 2009, File No. 001-32597)***
10.12	Amendment, dated as of July 21, 2016, to the CF Industries Holdings, Inc. 2009 Equity and Incentive Plan (incorporated by reference to Exhibit 10.3 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***
10.13	CF Industries Holdings, Inc. 2014 Equity and Incentive Plan (incorporated by reference to Appendix C to CF Industries Holdings, Inc.'s Definitive Proxy Statement on Schedule 14A filed with the SEC on April 3, 2014, File No. 001-32597)***
10.14	Amendment, dated as of July 21, 2016, to the CF Industries Holdings, Inc. 2014 Equity and Incentive Plan (incorporated by reference to Exhibit 10.4 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***
10.15	CF Industries Holdings, Inc. Supplemental Benefit and Deferral Plan (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on October 20, 2014, File No. 001-32597)***
10.16	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.6 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 3, 2009, File No. 001-32597)***
10.17	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.17 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 27, 2014, File No. 001-32597)***
10.18	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.2 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on November 6, 2014, File No. 001-32597)***
10.19	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.2 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 7, 2015, File No. 001-32597)***
10.20	Form of Amendment to Non-Qualified Stock Option Award Agreements (incorporated by reference to Exhibit 10.5 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 7, 2015, File No. 001-32597)***
10.21	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.23 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 25, 2016, File No. 001-32597)***
10.22	Form of Non-Qualified Stock Option Award Agreement (incorporated by reference to Exhibit 10.6 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***
10.23	Form of Non-Qualified Stock Option Award Amendment Letter Agreement, dated as of July 19, 2018 (incorporated by reference to Exhibit 10.2 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 2, 2018, File No. 001-32597)***
10.24	Form of Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.7 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***
10.25	Form of Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.32 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)***
10.26	Form of Performance Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.8 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***

EXHIBIT NO.	DESCRIPTION
10.27	Form of Performance Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.40 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 23, 2017, File No. 001-32597)***
10.28	Form of Performance Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on May 4, 2017, File No. 001-32597)***
10.29	Form of Performance Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.43 to CF Industries Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 22, 2019, File No. 001-32597)***
10.30	Form of Non-Employee Director Restricted Stock Award Agreement (incorporated by reference to Exhibit 10.3 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 7, 2014, File No. 001-32597)***
10.31	Form of Equity Award Amendment Letter Agreement, dated as of July 21, 2016 (incorporated by reference to Exhibit 10.5 to CF Industries Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 4, 2016, File No. 001-32597)***
10.32	CF Industries Holdings, Inc. Annual Incentive Plan (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on December 14, 2018, File No. 001-32597)***
10.33	Fourth Amended and Restated Revolving Credit Agreement, dated as of December 5, 2019, among CF Industries Holdings, Inc., the borrowers from time to time party thereto, the lenders from time to time party thereto, Citibank, N.A., as administrative agent, and Morgan Stanley Bank, N.A. and Goldman Sachs Bank USA, as issuing banks (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on December 5, 2019, File No. 001-32597)
10.34	Amended and Restated Pledge and Security Agreement, dated as of December 5, 2019, among CF Industries Holdings, Inc., CF Industries, Inc., the other Grantors (as defined therein) party thereto and Citibank, N.A., as administrative agent
10.35	Second Amended and Restated Guaranty Agreement, dated as of December 5, 2019, by and among CF Industries Holdings, Inc., CF Industries, Inc. and the other Guarantors (as defined therein) party thereto in favor of Citibank, N.A., as administrative agent
10.36	Amended and Restated Nitrogen Fertilizer Purchase Agreement, dated December 18, 2015, by and between CF Industries Nitrogen, LLC and CHS Inc. (incorporated by reference to Exhibit 10.1 to CF Industries Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on December 21, 2015, File No. 001-32597)**
21	Subsidiaries of the registrant
23	Consent of KPMG LLP, independent registered public accounting firm
31.1	Certification of Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101	The following financial information from CF Industries Holdings, Inc.'s Annual Report on Form 10-K for the fiscal year ended December 31, 2020, formatted in Inline XBRL (eXtensible Business Reporting Language): (1) Consolidated Statements of Operations, (2) Consolidated Statements of Comprehensive Income, (3) Consolidated Balance Sheets, (4) Consolidated Statements of Equity, (5) Consolidated Statements of Cash Flows and (6) Notes to Consolidated Financial Statements
104	Cover Page Interactive Data File (included in Exhibit 101)

*	Schedules (or similar attachments) have been omitted pursuant to Item 601(a)(5) of Regulation S-K.

** Portions omitted pursuant to an order granting confidential treatment under Rule 24b-2 of the Securities Exchange Act of 1934, as amended.

*** Management contract or compensatory plan or arrangement required to be filed (and/or incorporated by reference) as an exhibit to this Annual Report on Form 10-K pursuant to Item 15(a)(3) of Form 10-K.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

CF INDUSTRIES HOLDINGS, INC.

Date: February 24, 2021

By: /s/ W. ANTHONY WILL

W. Anthony Will
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title(s)	Date
/s/ W. ANTHONY WILL W. Anthony Will	President and Chief Executive Officer, Director (Principal Executive Officer)	February 24, 2021
/s/ CHRISTOPHER D. BOHN Christopher D. Bohn	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	February 24, 2021
/s/ RICHARD A. HOKER Richard A. Hoker	Vice President and Corporate Controller (Principal Accounting Officer)	February 24, 2021
/s/ STEPHEN A. FURBACHER Stephen A. Furbacher	Chairman of the Board	February 24, 2021
/s/ JAVED AHMED Javed Ahmed	Director	February 24, 2021
/s/ ROBERT C. ARZBAECHER Robert C. Arzbaecher	Director	February 24, 2021
/s/ WILLIAM DAVISSON William Davisson	Director	February 24, 2021
/s/ JOHN W. EAVES John W. Eaves	Director	February 24, 2021
/s/ STEPHEN J. HAGGE Stephen J. Hagge	Director	February 24, 2021
/s/ ANNE P. NOONAN Anne P. Noonan	Director	February 24, 2021
/s/ MICHAEL J. TOELLE Michael J. Toelle	Director	February 24, 2021
/s/ THERESA E. WAGLER Theresa E. Wagler	Director	February 24, 2021
/s/ CELSO L. WHITE Celso L. White	Director	February 24, 2021

Stockholder Information

CORPORATE HEADQUARTERS

CF Industries Holdings, Inc.
4 Parkway North, Suite 400
Deerfield, Illinois 60015-2590
Telephone 847.405.2400

INDEPENDENT AUDITORS

KPMG LLP
Chicago, Illinois 60601

CORPORATE GOVERNANCE

Information on CF Industries Holdings, Inc.'s corporate governance, including its board of directors, management, board committees, code of corporate conduct and corporate governance guidelines, can be found on the investor relations section of the company's website at cfindustries.com.

DIVIDEND POLICY

CF Industries Holdings, Inc. pays quarterly cash dividends on its common stock at a rate of $0.30 per share. The declaration and payment of dividends to holders of common stock is at the discretion of the board of directors and will depend on many factors, including general economic and business conditions, strategic plans, financial results and condition, legal requirements and other factors as the board of directors deems relevant. The company currently does not offer a dividend reinvestment plan.

FORWARD-LOOKING STATEMENTS

All statements in this publication, other than those relating to historical facts, are "forward-looking statements" within the meaning of federal securities laws. The company's safe harbor statement, describing those statements and detailing certain risks and uncertainties involved in those statements, is found in the enclosed annual report on Form 10-K. It is also found in the company's filings, financial news releases and presentations.

INVESTOR INFORMATION

A copy of this annual report, as well as company news releases, SEC filings and other materials of interest to stockholders, can be found on the investor relations section of the company's website at cfindustries.com.

QUARTERLY CONFERENCE CALLS, INVESTOR CONFERENCES AND INVESTOR EMAIL UPDATES

CF Industries Holdings, Inc. conducts quarterly conference calls and updates to discuss the company's performance and prospects. The company's executives also regularly appear at major investor conferences in the U.S. and internationally. These generally are accessible via the company's website at cfindustries.com. At the site, investors also may sign up to receive e-mail alerts to news, upcoming events and corporate filings.

REQUEST FOR ANNUAL REPORT ON FORM 10-K

Investors may download a copy from the company's website at cfindustries.com. Stockholders also may, upon request to investor relations at the corporate headquarters address shown on this page, receive a hard copy of the company's complete audited financial statements free of charge.

STOCKHOLDER QUESTIONS

Stockholders with questions about the company, its operations and performance should contact investor relations at the corporate headquarters address or phone number. Stockholders with questions about their CF Industries stockholder accounts should contact the company's transfer agent and registrar as follows:

CORRESPONDENCE:

Computershare
P.O. Box 30170
College Station, TX 77842-3170

OVERNIGHT CORRESPONDENCE:

Computershare
211 Quality Circle, Suite 210
College Station, TX 77845

SHAREHOLDER WEBSITE:

www.computershare.com/investor

SHAREHOLDER ONLINE INQUIRIES:

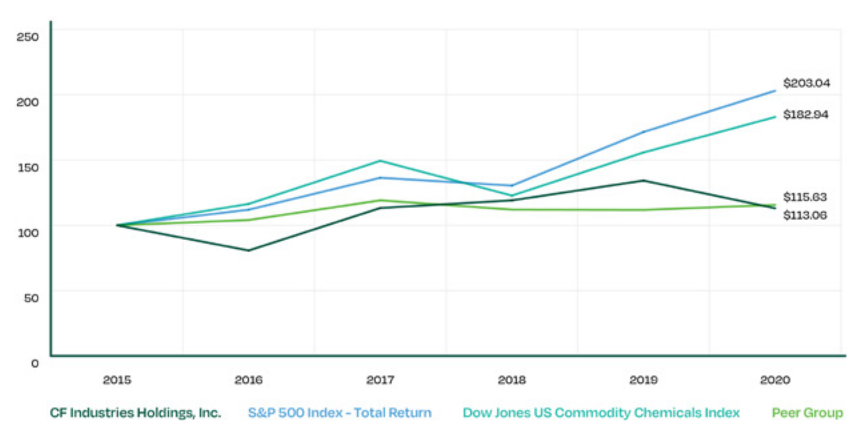
https://www-us.computershare.com/investor/contact

TELEPHONE INQUIRIES:

866.298.4984 — U.S.
201.680.6578 — Outside U.S.

COMPARISON OF 5-YEAR CUMULATIVE TOTAL RETURN

This graph presents a comparison of the cumulative total shareholder return on CF Industries Holdings, Inc. common stock with the cumulative total return of the Dow Jones U.S. Commodity Chemicals Index (DJUSCC), the S&P500 index, and a peer group of publicly traded manufacturers of agricultural chemical fertilizers ("Peer Group"), in each case based on an initial investment of $100 on December 31, 2015 and assuming dividend reinvestment. The Peer Group consists of Agrium Inc. ("Agrium"), The Mosaic Company ("Mosaic"), Potash Corporation of Saskatchewan Inc. ("PotashCorp"), Nutrien Ltd. ("Nutrien"), Incitec Pivot Limited, OCI N.V., CVR Partners LP, LSB Industries, Inc. and Yara International ASA. Agrium and PotashCorp are included in the peer group from December 31, 2015 through December 31, 2017. On January 2, 2018, Agrium and PotashCorp completed a merger of equals transaction to form Nutrien. Nutrien was included in the peer group for the period from January 2, 2018 through December 31, 2020. For Yara International ASA, Incitec Pivot Limited and OCI N.V., cumulative total shareholder return has been calculated using the company's home exchange stock prices converted into U.S. dollars.



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