

Selected Railroad Statistics - unaudited

	2022	2021	2020
Financial measures			
Key financial performance indicators ⁽¹⁾			
Total revenues (\$ millions)	17,107	14,477	13,819
Freight revenues (\$ millions)	16,569	13,888	13,218
Operating income (\$ millions)	6,840	5,616	4,777
Adjusted operating income (\$ millions) ⁽²⁾⁽³⁾	6,862	5,622	5,263
Net income (\$ millions) ⁽⁴⁾	5,118	4,899	3,545
Adjusted net income (\$ millions) ⁽²⁾⁽³⁾⁽⁴⁾	5,134	4,225	3,767
Diluted earnings per share (\$) ⁽⁴⁾	7.44	6.90	4.97
Adjusted diluted earnings per share (\$) ⁽²⁾⁽³⁾⁽⁴⁾	7.46	5.95	5.28
Free cash flow (\$ millions) ⁽²⁾⁽⁵⁾	4,259	3,296	3,227
Gross property additions (\$ millions)	2,757	2,897	2,863
Share repurchases (\$ millions)	4,709	1,582	379
Dividends per share (\$)	2.93	2.46	2.30
Financial ratios			
Operating ratio (%) ⁽⁶⁾	60.0	61.2	65.4
Adjusted operating ratio (%) ⁽²⁾⁽³⁾	59.9	61.2	61.9
Adjusted debt-to-adjusted EBITDA (times) ⁽²⁾	1.86	1.82	1.98
Return on invested capital (ROIC) (%) ⁽²⁾⁽⁴⁾⁽⁷⁾	15.8	16.4	12.7
Adjusted ROIC (%) ⁽²⁾⁽⁴⁾⁽⁷⁾	15.9	14.1	13.3
Operational measures ⁽⁸⁾			
Statistical operating data			
Gross ton miles (GTMs) (millions)	463,710	458,401	455,368
Revenue ton miles (RTMs) (millions)	235,788	233,138	230,390
Carloads (thousands)	5,697	5,701	5,595
Route miles (includes Canada and the U.S.)	18,600	19,500	19,500
Employees (end of year)	23,971	22,604	24,381
Employees (average for the year)	23,396	24,084	23,786
Key operating measures			
Freight revenue per RTM (cents)	7.03	5.96	5.74
Freight revenue per carload (\$)	2,908	2,436	2,362
GTMs per average number of employees (thousands)	19,820	19,033	19,144
Operating expenses per GTM (cents)	2.21	1.93	1.99
Labor and fringe benefits expense per GTM (cents)	0.63	0.63	0.60
Diesel fuel consumed (US gallons in millions)	402.2	405.2	407.5
Average fuel price (\$/US gallon)	5.42	3.28	2.42
Fuel efficiency (US gallons of locomotive fuel consumed per 1,000 GTMs)	0.867	0.884	0.895
Train weight (tons)	9,324	9,658	9,501
Train length (feet)	8,160	8,559	8,572
Car velocity (car miles per day)	196	195	185
Through dwell (entire railroad, hours)	7.6	7.9	8.6
Through network train speed (miles per hour)	18.9	19.2	18.5
Locomotive utilization (trailing GTMs per total horsepower)	197	198	196
Safety indicators ⁽⁹⁾			
Injury frequency rate (per 200,000 person hours)	1.10	1.36	1.64
Accident rate (per million train miles)	1.97	1.84	1.87

(1) Amounts expressed in Canadian dollars and prepared in accordance with United States generally accepted accounting principles (GAAP), unless otherwise noted.

(2) These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

(3) See the section entitled Adjusted performance measures in the MD&A for an explanation of these non-GAAP measures.

(4) In the first quarter of 2022, the Company changed its method of calculating market-related values of pension assets for its defined benefit plans using a retrospective approach. Comparative figures have been restated to conform to the change in methodology. See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(5) See the section entitled Liquidity and capital resources – Free cash flow in the MD&A for an explanation of this non-GAAP measure.

(6) Operating ratio is defined as operating expenses as a percentage of revenues.

(7) See the section entitled ROIC and adjusted ROIC in the MD&A for an explanation of these non-GAAP measures.

(8) Statistical operating data, key operating measures and safety indicators are unaudited and based on estimated data available at such time and are subject to change as more complete information becomes available. Definitions of gross ton miles, fuel efficiency, train weight, train length, car velocity, through dwell and through network train speed are included within the Company's Management's Discussion and Analysis. Definitions of all other indicators are provided on CN's website, www.cn.ca/glossary.

(9) Based on Federal Railroad Administration (FRA) reporting criteria.

Contents

Business profile	3
Corporate organization	3
Strategy overview	3
Human capital management	9
Forward-looking statements	12
2022 Financial outlook	12
Financial highlights	13
2022 compared to 2021	13
Operating highlights	14
Non-GAAP measures	15
Adjusted performance measures	15
ROIC and adjusted ROIC	18
Constant currency	19
Revenues	20
Operating expenses	24
Other income and expenses	26
2021 compared to 2020	27
Summary of quarterly financial data	34
Summary of fourth quarter 2022	34
Financial position	35
Liquidity and capital resources	36
Off balance sheet arrangements	44
Outstanding share data	44
Financial instruments	44
Recent accounting pronouncements	46
Critical accounting estimates	47
Business risks	57
Controls and procedures	67

Management's Discussion and Analysis

This Management's Discussion and Analysis (MD&A) dated January 31, 2023, relates to the consolidated financial position and results of operations of Canadian National Railway Company, together with its wholly-owned subsidiaries, collectively "CN" or the "Company," and should be read in conjunction with the Company's 2022 Annual Consolidated Financial Statements and Notes thereto. All financial information reflected herein is expressed in Canadian dollars and prepared in accordance with United States generally accepted accounting principles (GAAP), unless otherwise noted.

CN's common shares are listed on the Toronto and New York stock exchanges. Additional information about CN filed with Canadian securities regulatory authorities and the United States Securities and Exchange Commission (SEC), including the Company's 2022 Annual Information Form and Form 40-F, may be found online on SEDAR at www.sedar.com, on the SEC's website at www.sec.gov through EDGAR, and on the Company's website at www.cn.ca in the Investors section. Printed copies of such documents may be obtained by contacting CN's Corporate Secretary's Office.

Business profile

CN is engaged in the rail and related transportation business. CN's network of 18,600 route miles of track spans Canada and the United States of America (U.S.), connecting Canada's Eastern and Western coasts with the U.S. South. CN's extensive network and efficient connections to all Class I railroads provide CN customers access to Canada, the U.S. and Mexico. Essential to the economy, to the customers, and to the communities it serves, CN safely transports more than 300 million tons of cargo, serving exporters, importers, retailers, farmers and manufacturers. CN and its affiliates have been contributing to community prosperity and sustainable trade since 1919. CN is committed to programs supporting social responsibility and environmental stewardship.

CN's freight revenues are derived from seven commodity groups representing a diversified and balanced portfolio of goods transported between a wide range of origins and destinations. This product and geographic diversity better position the Company to face economic fluctuations and enhances its potential for growth opportunities. For the year ended December 31, 2022, CN's largest commodity group accounted for 29% of total revenues. From a geographic standpoint, 16% of revenues relate to U.S. domestic traffic, 32% transborder traffic, 18% Canadian domestic traffic and 34% overseas traffic. The Company is the originating carrier for over 85%, and the originating and terminating carrier for over 65%, of traffic moving along its network, which allows it both to capitalize on service advantages and build on opportunities to efficiently use assets.

Corporate organization

The Company manages its rail operations in Canada and the U.S. as one business segment. Financial information reported at this level, such as revenues, operating income and cash flow from operations, is used by the Company's corporate management in evaluating financial and operational performance and allocating resources across CN's network. The Company's strategic initiatives are developed and managed centrally by corporate management and are communicated to its regional activity centers (the Western Region, Eastern Region and U.S. Region), whose role is to manage the day-to-day service requirements of their respective territories, control direct costs incurred locally, and execute the strategy and operating plan established by corporate management.

See Note 24 – *Segmented information* to the Company's 2022 Annual Consolidated Financial Statements for additional information on the Company's corporate organization, as well as selected financial information by geographic area.

Strategy overview

CN has long been a nation builder and trade enabler, and is essential to the North American economy. The Company's strengths are many: a three-coast network; geographic, customer and product diversity; and a proven ability to innovate, including running a scheduled railroad.

CN's business strategy is anchored on the Company's vision of *Powering Sustainable Growth for our customers, our people and the communities in which we operate*. CN's strategic plan is anchored on driving operational excellence every day, developing strong customer partnerships, growing geographic and product reach, and continuous innovation. CN's objective is to deliver sustainable, profitable growth by providing superior customer service, growing faster than the economy, pricing ahead of rail inflation, and continuously improving operating efficiency. This strategy rests on CN's strong commitment to *Delivering Responsibly*, moving its customers' goods safely and efficiently, doing so in a manner that seeks to minimize the impact on the environment, attracting and retaining top talent, helping build safer and stronger communities, and adhering to the highest governance standards.

Management's Discussion and Analysis

CN aims to drive consistent shareholder returns and earnings growth by striving for sustainable financial performance, including profitable top-line growth, strong free cash flow generation and return on invested capital well above the Company's cost of capital. CN also returns value to shareholders through dividend payments and share repurchases.

Driving operational excellence every day

CN's goal is to deliver reliable, efficient and cost-effective transportation services for its customers. CN continues to improve its service productivity and safety, with a focus on investments in network fluidity, automation, big data analytics and the digital customer experience. CN's scheduled railroading model focuses on improving every aspect of railroad operations to meet customer commitments efficiently and profitably. This calls for the continuous measurement of results and the use of such information to generate further improvements in the service provided to customers and in the efficiency of operations. By running a disciplined scheduled operation, with a focus on car velocity, CN can lean into its strengths and pursue growth opportunities across its three-coast network.

Developing strong customer partnerships

CN aims to provide the best customer service by anticipating its customers' needs, understanding their growth plans, earning their trust, becoming a truly customer-centric organization and demonstrating agility. CN is developing deeper and stronger customer partnerships, putting its customers, and ultimately their end customers, at the center of its operations.

CN's focus is on end-to-end collaboration to help our customers grow their markets. Supply chain collaboration agreements with ports, terminal operators and customers leverage key performance metrics that drive efficiencies within CN's operations and across the entire supply chain. CN's goal is to ensure a seamless end-to-end customer experience by bringing transparency to the supply chain and adjusting its service performance measures to better reflect its customers' changing requirements.

CN is also leveraging technology in the way it does business, including sharing data through Application Programming Interfaces (APIs) and improving its communications and service performance through the use of mobile reporting and enhanced digital customer interfaces.

Growing geographic and product reach

With its three-coast network that spans North America, CN is helping its customers in connecting North America to the world. To grow its reach for carload customers, CN is expanding its network of transload facilities across North America. In Western Canada, CN is investing in infrastructure and equipment to grow its capacity and increase its share of new industrial production while also responding to shifting demands in commodities. In Eastern Canada and the U.S., CN aims to further densify its network through gateway growth and providing customers with cost-advantageous intermodal routes.

Continuous innovation

CN proactively pursues an ambitious innovation strategy using technology, analytics and automation to increase safety and efficiency as well as deliver a reliable, lower-carbon, seamless service to its customers. As a pioneer of scheduled railroading, CN is well positioned to drive the next wave of change by applying technology and new ways of working to unlock further operational excellence, customer service and employee engagement, including:

- Leveraging a strategic partnership with Google Cloud to deliver new customer experiences and modernize CN's technology infrastructure.
- Using advanced digital technologies, big data, artificial intelligence (AI) and predictive analytics for better planning, efficiency, and safety.
- Improving real-time data and analytical support tools.
- More accurate, consistent and relevant information provided to all stakeholders (e.g., customers, employees, communities).
- Automating manual processes to improve efficiency and safety.
- Protecting the Company's physical assets, digital assets and data to keep its network safe.
- Collaborating on the transition to a lower carbon economy.

Delivering Responsibly

Sustainability is at the heart of how CN is building for the future. *Delivering Responsibly*, the encapsulation of the Company's sustainability strategy and commitments, underpins all of CN's decisions, commitments and investments. The Company is focused on transporting goods safely and efficiently, doing so in a manner that seeks to minimize the impact on the environment, attracting, retaining and engaging top talent, helping to build stronger, safer communities, while adhering to the highest governance standards. CN understands that transparency is essential for stakeholder trust concerning the Company's Environmental, Social and Governance (ESG) commitments. In that regard, CN seeks to align its ESG disclosures with global best practice frameworks, reporting on commitments and performance with focus, clarity and comparability. In 2022, CN announced that it joined the United Nations Global Compact initiative – a voluntary platform for the development, implementation, and disclosure of responsible business practices. CN is also proud of its 2022 accomplishments, including being recognized

Management's Discussion and Analysis

on CDP's prestigious "A List" for the Company's efforts to tackle climate change, and for once again being named to the Dow Jones Sustainability World and North American indices.

Safety is a core value

CN is intensely committed to the health and safety of its employees, the communities and environments in which it operates and the customers it serves. The Company embraces a safety culture based on the fundamental belief that all injuries and accidents are preventable. CN's primary objective is to reduce serious injuries and fatalities to zero. The Company is employing advanced technology and innovative training to help achieve this goal. More specifically, CN is:

- Fostering an engaged workforce that understands and respects *Life Critical Rules*.
- Embedding a mindset whereby employees take ownership for their own safety and the safety of others by *Looking Out for Each Other*.
- Training employees to identify and mitigate exposures.
- Using advanced technologies to proactively mitigate human error and reduce risk.
- Maintaining reliable and safe equipment and infrastructure.
- Investing in employee training, coaching, recognition and engagement initiatives.

See the section entitled *Human capital management - Health and safety* of this MD&A for additional information regarding CN's safety initiatives.

Building the talent and culture to drive CN's continuous performance

CN people have always been the Company's most important differentiator, caring passionately about railroading and bringing optimism, commitment and resilience to daily tasks. CN aims to attract, retain and train the very best talent, with a focus on a diverse, inclusive and winning culture to enhance employee engagement. The Company aspires to have workforce diversity that reflects the communities in which it operates. CN develops its employees with the necessary skills for an increasingly automated and data-driven work environment.

See the section entitled *Human capital management* of this MD&A for additional information regarding CN's human capital initiatives.

Tackling the impact of climate change

The Company's goal is to conduct its operations in a way that seeks to minimize environmental impact, while offering a carbon-efficient and sustainable way to move goods. CN is making a positive contribution in the fight against climate change and playing a key role in the transition to a lower-carbon economy.

With approximately 85% of its direct greenhouse gas (GHG) emissions generated from rail operations, CN believes the best way to reduce its carbon footprint is by continuously improving fuel efficiency. Over the years, this focus has resulted in significant progress in decoupling volume growth from carbon emissions intensity. CN continues to maintain its leadership position among Class I North American railways, consuming approximately 15% less locomotive fuel per gross ton mile than the industry average. CN was also the first North American railway, and among the first 100 companies globally, to announce an approved science-based climate target. CN aims to reduce GHG emissions in line with the Paris Agreement and in 2021, committed to setting a net-zero target by joining the "Business Ambition for 1.5 °C" and the United Nations' "Race to Zero" campaign.

To achieve its decarbonization targets, CN will need to continue to improve the fuel efficiency of its fleets, increase its use of sustainable renewable fuels and test innovative propulsion technologies while working collaboratively to bring low-carbon alternatives to market. Collaboration with suppliers, customers, supply chain partners, innovators and regulators is critical for CN to deliver on its climate commitments and to help drive economic prosperity in a low-carbon environment.

The Company's CDP Report and Task Force on Climate-related Financial Disclosures (TCFD) report are available on CN's website in the *Delivering Responsibly* section.

Community engagement

CN does not operate in isolation. It is tightly integrated with the rest of society, providing vital links spanning eight provinces, 16 states, 110 First Nation and Métis territories, and more than 2,000 towns and cities across its network. As such, CN continues to play an essential role and contributes to economic prosperity through job creation, investments and freight transportation services. However, CN believes it is not just what it does but how it does it that matters for its long-term success. The Company seeks to enhance its reputation through open and proactive engagement to ensure stakeholders and Indigenous communities are aware of its strategy. CN engages externally across a wide spectrum of initiatives and fosters effective two-way communications that ensure a respectful and beneficial exchange.

CN believes the rail industry can enhance safety by working closely with communities. Under CN's structured *Community Engagement* program, the Company engages with municipal officers and their emergency responders to assist them in their emergency response planning. During this frequent outreach, CN discusses:

- Its comprehensive safety programs and performance.

Management's Discussion and Analysis

- The nature, volume and economic importance of dangerous goods it transports through their communities.
- Emergency response planning.
- Training sessions for emergency responders.

The outreach builds on CN's involvement in *Transportation Community Awareness and Emergency Response* (TRANSCAER®), through which the Company has been working for many years to help communities in Canada and the U.S. understand the movement of hazardous materials and what is required in the event of transportation incidents. *All Aboard for Safety* is CN's flagship community education program. Every year, CN employees make hundreds of presentations and talk to thousands of children and adults at schools and community events in Canada and the U.S. about the importance of rail safety and the dangers of walking or playing on or near railway tracks.

As part of CN's year-round outreach effort, the CN Police Service continues to be active in communities across the CN network to promote safe behavior around railroad infrastructure. Activities include conducting enforcement initiatives with external agencies and delivering safety presentations to high-risk groups. During the industry's annual *Rail Safety Week* campaign, CN police officers and other employees, in partnership with Operation Lifesaver®, participate in numerous safety initiatives to raise awareness about preventing accidents and injuries around railway property.

CN believes another way to help build more sustainable communities is to actively contribute millions of dollars each year through its *CN Stronger Communities Fund* to organizations, programs and initiatives that promote diversity and inclusion, innovation and safety, education, environmental protection, and many other causes such as food banks, homeless shelters, domestic violence shelters, healthcare centers, and anti-poverty organizations.

CN is proud of its employees, retirees and their families who volunteer to make their communities better places to live, work and play. The *CN Railroaders in the Community* program recognizes these acts of kindness by providing grants to the community-based not-for-profit organizations employees (current, retired or family) choose to support through their volunteer efforts. CN also encourages employee community involvement through its annual volunteer *CN In Your Community Day*.

Operating within or adjacent to the nearly 200 reserve lands of 110 First Nations and Métis territories, CN is in regular contact with Indigenous communities across its network, identifying and fostering business opportunities, increasing employee awareness, and promoting employment opportunities within these communities. CN's Indigenous Advisory Council (IAC), created in February 2021, is an independent body comprised of Indigenous leaders from across Canada. The IAC's mandate is to provide advice to CN's Board and to the company's Chief Executive Officer (CEO) on relevant issues such as reinforcing diversity and inclusion through policies and procedures that reflect these principles.

Disciplined capital allocation and execution

CN's success depends on a steady stream of capital investments that are aligned with and support its business strategy. These investments cover a wide range of areas, from track infrastructure and rolling stock to information and operating technologies, as well as other equipment and assets that improve the safety, efficiency, capacity and reliability of CN's service offering. Investments in track infrastructure enhance the safety and integrity of the physical plant, increase the capacity and fluidity of the network, promote service excellence, and support growth. New locomotives equipped with distributed power capability increase capacity, fuel productivity and efficiency, and improve service reliability, particularly in cold weather, while improving train handling and safety. Targeted railcar acquisitions aim to tap growth opportunities, complementing the fleet of privately owned railcars that traverse CN's network. CN is also investing in and deploying advanced technologies to automate labor-intensive tasks like track and railcar inspections, as well as to improve the customer experience through 'track and trace' functionality. CN's long-term economic viability depends on the presence of a supportive regulatory and government policy environment that encourages investment and innovation.

The multi-year implementation of CN's strategic plan requires a disciplined, analysis-driven approach to capital investment. Talent, technology and capital need to be fully aligned. The Company's capital investment roadmap includes several core elements:

- Investing in the maintenance of a safe and reliable network.
- Investing in asset infrastructure to increase the capacity of its three-coast network.
- Developing a portfolio approach to technology with business-led investment decisions, delivering value at each stage of implementation.
- Deepening supply chain partnerships with its customers, including road-to-rail conversion.
- Investing in data analytic systems, including AI, to support data-driven decision-making.
- Investing in technologies and capital assets to support decarbonization of its footprint.
- Growing its physical and commercial reach through strategic partnerships and acquisitions.

Management's Discussion and Analysis

2022 Highlights

Financial highlights - 2022 compared to 2021

- Record revenues of \$17,107 million, an increase of \$2,630 million, or 18%.
- Operating expenses of \$10,267 million, an increase of \$1,406 million, or 16%.
- Record operating income of \$6,840 million, an increase of \$1,224 million, or 22%, and record adjusted operating income of \$6,862 million, an increase of \$1,240 million, or 22%. ⁽¹⁾⁽²⁾
- Operating ratio, defined as operating expenses as a percentage of revenues, of 60.0%, an improvement of 1.2 points, and adjusted operating ratio of 59.9%, an improvement of 1.3 points. ⁽¹⁾⁽²⁾
- Net income of \$5,118 million, an increase of \$219 million, or 4%, and record diluted earnings per share of \$7.44, an increase of 8%. ⁽³⁾
- Record adjusted net income of \$5,134 million, an increase of \$909 million, or 22%, and record adjusted diluted earnings per share of \$7.46, an increase of 25%. ⁽¹⁾⁽²⁾⁽³⁾
- The Company generated record free cash flow of \$4,259 million, a 29% increase. ⁽¹⁾⁽⁴⁾
- On a constant currency basis, diluted earnings per share would have been lower by \$0.13. ⁽¹⁾⁽⁵⁾
- ROIC of 15.8%, a decrease of 0.6 points and adjusted ROIC of 15.9%, an increase of 1.8 points. ⁽¹⁾⁽⁶⁾

(1) These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

(2) See the section of this MD&A entitled Adjusted performance measures for an explanation of these non-GAAP measures.

(3) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(4) See the section of this MD&A entitled Liquidity and capital resources – Free cash flow for an explanation of this non-GAAP measure.

(5) See the section of this MD&A entitled Constant Currency for an explanation of this non-GAAP measure.

(6) See the section of this MD&A entitled ROIC and adjusted ROIC for an explanation of these non-GAAP measures.

National bargaining concluded in the U.S.

On December 2, 2022, the round of national bargaining between the nation's freight railroads, including CN, and all 12 rail unions was fully resolved when President Biden signed legislation passed by Congress. The legislation implemented collective bargaining agreement terms for the four unions that had not previously ratified their agreements. These agreement terms are the same terms that previously were ratified and implemented by the other eight rail unions. All U.S. employees in the bargaining round are therefore now covered by new collective bargaining agreement terms based on the recommendations of the Presidential Emergency Board. The new terms increase wages by a compounded 24 percent over the five-year term of the contract, from 2020 through 2024, with a 14.1 percent wage increase effective immediately. The agreements also include five US\$1,000 annual lump sum payments, adjustments to health care premiums, health benefit enhancements, and an additional personal leave day for all employees. This resulted in an incremental wage accrual of \$47 million, or \$35 million after-tax (\$0.05 per diluted share), recorded in the third quarter of 2022 in Labor and fringe benefits within the Consolidated Statements of Income, to reflect the terms of the new agreements.

Leadership changes

On January 25, 2022, CN announced that Tracy Robinson was appointed as CN's President and CEO effective February 28, 2022. On November 28, 2022, the Company announced that Edmond (Ed) Harris assumed the role of Executive Vice-President and Chief Operating Officer, following the departure of Rob Reilly.

Reinvestment in the business

In 2022, CN spent approximately \$2.75 billion in its capital program, of which \$1.60 billion were invested to maintain the safety and integrity of its network, particularly track infrastructure. CN's capital spending also included \$0.75 billion for strategic initiatives to increase capacity, enable growth and improve network resiliency, including line capacity upgrades and information technology initiatives, and \$0.40 billion on equipment, including the acquisition of 500 new grain hopper cars.

Shareholder returns

The Company repurchased 30.2 million of its common shares during the year, returning \$4.7 billion to its shareholders. CN also increased its quarterly dividend per share by 19% to \$0.7325 from \$0.6150 in 2021, effective for the first quarter of 2022, and paid \$2.0 billion in dividends in 2022.

Management's Discussion and Analysis

Future value creation

On January 24, 2023, the Company's Board of Directors approved a new Normal Course Issuer Bid (NCIB) that allows for the repurchase of up to 32.0 million common shares between February 1, 2023 and January 31, 2024. In addition, on that same day, the Company's Board of Directors approved an increase of 8% to the quarterly dividend to common shareholders, from \$0.7325 per share in 2022 to \$0.7900 per share in 2023, effective for the first quarter.

Sustainability recognition

The Company's sustainability practices earned it a place on the Dow Jones Sustainability World and North American Indices, for the 11th and 14th consecutive year, respectively. CN was also recognized for its actions to cut emissions, mitigate climate risks and develop the low carbon economy, earning a spot on the CDP 'A' List for the seventh time, as well as being recognized for the 13th time. CN was one of only three Canadian companies to earn a spot on the prestigious 'A' List in 2022.

COVID-19 pandemic

The COVID-19 pandemic necessitated governments, institutions and communities to take actions that resulted in a partial economic shutdown beginning in March 2020. New variants of the virus led to the re-imposition of restrictive measures across North America and in other parts of the world in late 2021, however, in 2022, many North American jurisdictions relaxed or eliminated pandemic-related restrictions and mandates.

The long-term implications of the COVID-19 pandemic, including the extent of the impact on the business, financial position, results of operations and liquidity of the Company, remain unknown and will depend on future developments, which are highly uncertain and cannot be predicted, including the occurrence, scope and duration of any outbreaks as well as additional actions taken by governmental authorities and other parties in response to the pandemic.

2023 Business outlook and assumptions

The Company assumes negative North American industrial production in 2023. For the 2022/2023 crop year, the grain crop in Canada was above its three-year average (or in line when excluding the significantly lower 2021/2022 crop year) and the U.S. grain crop was in line with its three-year average. The Company assumes that the 2023/2024 grain crops in Canada and the U.S. will be in line with their respective three-year averages (excluding the significantly lower 2021/2022 crop year in Canada).

In 2023, the Company will continue to invest in its capital program to improve the safety, efficiency and integrity of its network. These investments will enable and support the growth of the Company and will be financed with cash generated from operations or with cash from financing activities as required.

The forward-looking statements discussed in this section are subject to risks and uncertainties that could cause actual results or performance to differ materially from those expressed or implied in such statements and are based on certain factors and assumptions which the Company considers reasonable about events, developments, prospects and opportunities that may not materialize or that may be offset entirely or partially by other events and developments. In addition to the assumptions and expectations discussed in this section, reference should be made to the section of this MD&A entitled *Forward-looking statements* for assumptions and risk factors affecting such statements.

Management's Discussion and Analysis

Human capital management

CN's ability to develop the best railroaders in the industry has been a key contributor to the Company's success. CN recognizes that without the right people, no matter how good a service plan or business model a company may have, it will not be able to fully execute. The Company continues to focus on hiring the right people, onboarding them successfully, helping them build positive relationships with their colleagues and supporting all employees to grow and develop, while deepening its commitment to develop talent and plan for the future.

Governance

CN's Senior Vice President and Chief Human Resources Officer has leadership accountability for the Company's workforce policies and programs and reports directly to the CEO. CN's Board and its committees, including the Governance, Sustainability and Safety Committee and Human Resources and Compensation Committee (HRCC) provide oversight of the Company's human capital management strategies, programs, practices and performance. The HRCC is responsible for monitoring executive management's performance assessment, compensation and succession planning as well as ensuring effective talent management through engagement surveys and monitoring union relations and strategy for consistency with CN's strategic direction. The HRCC also has the mandate to review human resources practices and policies by ensuring, amongst other things, that appropriate human resources systems are in place so that the Company can attract, motivate and retain the quality and diversity of personnel required to meet its business objectives. The Company's senior management provides regular briefings on human capital matters to the Board and its Committees to facilitate oversight.

The Board of Directors and management are committed to maintaining and instilling a strong ethical culture at CN, and as such, have developed a solid ethics program based on CN's core values of integrity and respect. Each director, executive officer and management employee must certify annually their compliance with the Code of Business Conduct and employees are required to complete an online training course on the Code of Business Conduct. Integrity training is also part of every new employee's onboarding program. In addition, Anti-Fraud Policy and Guidelines apply to all employees of CN and its wholly owned subsidiaries and set out steps to be taken in response to reported or suspected fraud in all its forms, as well as measures that are taken to identify, prevent and manage fraud-related risks.

Total employees

As at December 31, 2022, CN employed a total of 17,392 employees in Canada (2021 – 16,314), of which 12,841, or 74%, were unionized employees (2021 – 11,878, or 73%) and 6,579 employees in the U.S. (2021 – 6,290) of which 5,571, or 85%, were unionized employees (2021 – 5,289, or 84%). Within Canada, there are 79 bargaining units and in the U.S., there are currently 43 active bargaining units. See the section entitled *Business risks* of this MD&A for additional information regarding labor negotiations.

Health and safety

CN has an uncompromising commitment to the health and safety of its employees, the customers it serves, and the communities and environments in which it operates. The Company's long-term safety improvement is driven by continued investments in infrastructure, rigorous safety processes and exposure reduction efforts, as well as efforts to continue deepening the Company's safety culture. The attainment of annual accident and injury targets is a component of management's annual incentive bonus plan. The Company's injury frequency rate and accident rate, defined according to the criteria of the Federal Railroad Administration (FRA), are provided for the entire company's operations and are publicly disclosed on a quarterly basis. See the section entitled *Selected railroad statistics* for additional information on CN's safety measures.

CN's culture and commitment to safety is supported by its focus on training, leadership, and technology. CN's Safety Management System is the framework for putting safety at the center of its day-to-day operations. This proactive plan is designed to minimize risk, drive continuous improvement in the reduction of injuries and accidents, and engage employees at all levels of the organization.

The *Looking Out For Each Other* peer-to-peer engagement program focuses on raising awareness among all employees of the top causes of incidents and injuries, identifying and reviewing safe work procedures, training employees to be aware of their surroundings and recognize potential at-risk work practices, teaching employees how to provide constructive feedback to their peers and learning from past incidents. The Company's *Life Critical Rules* address the day-to-day activities that have the potential to cause serious harm or even loss of life. They are based on past incidents and are designed to help ensure they do not happen again. CN's safety leadership training program is heavily focused on teaching employees the importance of controlling exposures to risk and on developing the attitudes and behaviors required for a values-driven safety culture.

CN also continues to leverage new technology to drive improved safety performance including installing powerful sensor and AI technology into specially equipped autonomous track inspection cars positioned in existing train service, enabling track inspections at normal track speed. AI technology is also enhancing how CN inspects its railcar fleet. Automated inspection portals feature ultra-high-definition cameras that capture a 360° view of a train as it travels through at track speed. Both these innovations in automation increase inspection frequency and quality and play an important role in preventing incidents. CN has also implemented Electronic Track Authority Verification

Management's Discussion and Analysis

(ETAV), a geospatial navigation aid application that improves safety by leveraging precise location information to warn track maintenance vehicle operators of approaching or exceeding limits of Track Authority (TA).

CN strives for continuous improvement in our environmental, health, safety, and security (EHS&S) performance and is proud to be a long-standing Responsible Care® Partner. Triennially, CN undergoes a Responsible Care® audit conducted by an external audit team to ensure CN's processes, programs and policies meet the rigorous Responsible Care® Management System Specifications, Guiding Principles and Stewardship Codes.

CN works closely with all of its customers and suppliers to ensure adherence to *Life Critical Rules* where applicable, and to encourage a shared commitment to a values-based safety culture.

CN believes that the rail industry can also enhance safety by working more closely with communities. Under CN's structured Community Engagement program, the Company engages with municipal officers and their emergency responders in an effort to assist them in their emergency response planning. The outreach builds on CN's involvement in the TRANSCAER® initiative, through which the Company has been working for many years to help communities in Canada and the U.S. understand the movement of hazardous materials and what is required in the event of transportation incidents.

Pandemic Plan

In response to the COVID-19 pandemic, CN deployed its multi-phase Pandemic Plan in March of 2020 and continues to institute various measures to protect its employees, customers, and the communities in which CN operates:

- CN's medical team and occupational health department, who are members of the Association of American Railroads Health Committee, have played a pivotal role in CN's pandemic planning, taking direction from the World Health Organization, as well as federal, provincial and state authorities, as required, and offering best practices shared amongst North American railroads.
- CN implemented preventative measures to ensure the safety of its employees and by extension, of its customers and communities. As Public Health authorities have relaxed their recommendations, CN has evolved accordingly.
- Between January and June 2022, CN complied with Transport Canada's Ministerial Order mandating COVID vaccination. In June 2022, the government of Canada repealed the mandatory COVID vaccination. CN therefore invited back to work employees who had been put on leave of absence per the Ministerial Order. CN continues to follow all public health recommendations across our network and adjusts as these recommendations evolve.
- Aligned with public health, office-based employees who were able to work from home during the height of the pandemic have been invited back to the office and are now working from the office in a hybrid model where possible. Safety measures are in place and remain aligned with relevant public health authorities' recommendations for all employees, office and field alike.
- Through a dedicated COVID team which includes nurses, CN continues to monitor COVID cases as well as answer any employees questions or concerns.
- CN communicates any relevant updates on the status of the pandemic as it relates to our operations.

Talent management

Attraction and recruitment

CN continues to align its talent strategies to the business objectives, by focusing on acquiring as well as developing the various skills and capabilities required to meet its commitments, address challenges, and ensure a solid bench of talent to mitigate risk. CN recruits and hires talent with a broad range of strengths, perspectives and experiences, while also engaging with partners across our network, including Indigenous and other equity-seeking groups to ensure CN has the representation of populations across our communities. Over the last year, similar to other organizations, CN has had to compete extensively to attract talent, however its refreshed early career strategy, which allows it to partner with university and technical schools across Canada and the U.S., has helped create strong visibility of our jobs and opportunities.

In 2022 and 2021, CN was recognized as one of Canada's Top 100 Employers and Montreal's Top Employers. In addition, CN was also listed as one of Canada's best Diversity Employers.

Training and development

CN offers a variety of training programs, which cover mandatory requirements or are part of an employee's learning journey and development. This ensures that its employees are equipped to perform in their roles and prepare for career advancement opportunities, as required.

The Company offers trainings in technical, business and leadership programs, with either online, e-learning or virtually-led courses, and, when possible or necessary, through in-person sessions. People leaders are supported in building the skills and knowledge needed to successfully perform at each level and this includes a focus on enhancing communication skills, increasing collaboration across teams and creating a strong base of inclusive leadership throughout our workforce. In 2022, CN also launched its online and curated playlists/curricula for more self-guided and self-paced learning to allow for development tools to be available throughout the year and self-directed by the employee. For the Operations group, CN has various entry-level supervisory programs, to onboard front-line management, that focus on providing those

Management's Discussion and Analysis

leaders with a comprehensive understanding of railway operations, sales and customer service, as well as people leadership. The programs last between six to twelve months, with both classroom learning and practical application in the field before they are ready for appointment into front line positions.

Furthermore, CN also supports its employees through a structured performance management process. At the beginning of each year, non-unionized employees set goals for the year that align to its business strategy and objectives. At mid and year-end, there is a formal discussion and review of progress against these goals as well as how they were achieved. CN continues to emphasize the importance of a performance-based culture. In addition, there are also development discussions with key talent to enhance skills, capabilities and experience across the talent pools.

Compensation

CN's approach to compensation continues to be driven by our goal to deliver sustainable value creation, while ensuring that target compensation supports the attraction and retention of talent. Compensation programs are designed to encourage appropriate behaviors and include appropriate risk mitigation mechanisms. In addition, compensation best practices adopted by CN include industry benchmarking and pay positioning as well as pay equity reviews.

CN offers a competitive compensation portfolio that consists of base salary, employee share investment plan, short-term and long-term incentives (applicable to certain employees only), benefits, retirement plans and other non-monetary elements.

Diversity, Equity and Inclusion (DE&I)

At CN, employees are the Company's single greatest asset and the importance of creating a work environment that welcomes the contribution and uniqueness of every employee is recognized. CN is committed to creating a workforce of top talent that reflects the diversity of the population and stakeholders it serves. The Diversity and Inclusion Plan ("Diversity Plan") focuses on developing a more inclusive workplace by increasing the representation of women, people of color, Indigenous peoples, persons with disabilities and veterans. The plan applies at all levels within the organization and includes strategies on sourcing (among others, early career sourcing through internships, co-op and new graduate programs), selection, hiring, training and development of diverse candidates, anchoring CN's commitment to Diversity, Equity and Inclusion.

The Company has embedded diversity in its policy regarding composition of the Board and executive management. The Diversity Policy, which also applies to executive management, states that in fulfilling its oversight role, the HRCC regularly reviews CN's integrated approach to executive and high-potential talent management and succession planning, in order to ensure that CN has diverse candidate pools for potential successors for executive roles.

CN is undertaking various initiatives aimed at better promoting and reinforcing diversity, equity and inclusion which are strongly supported through active involvement by management and the Board. Some examples include:

- executing on a renewed DE&I vision whereby CN aims to reflect the communities in which it operates;
- conducting regular reviews of pay equity and defining a roadmap to address identified gaps;
- refocusing our sponsorships and donations budget to better align with our strategic DE&I vision;
- assessing hiring practices to leverage diversity focused recruitment agencies and requiring diverse candidate slates for all recruitment mandates;
- developing inclusive leaders through targeted training and education, including unconscious bias and inclusive leadership training, as leaders will be critical in creating and sustaining an inclusive environment;
- continuing to support and leverage the Employee Resource Groups (ERGs) that are backed by executive sponsors (currently seven ERGs); and
- having sufficient resources to support our DE&I vision.

CN had set a target that by the end of 2022 it would achieve and thereafter maintain a Board composition in which at least 50% of the independent Board members are to come from diverse groups, including gender parity. Currently, five out of 10, or 50% of independent Board members are women and two, or 20% of independent Board members are from underrepresented groups. CN had also elected to set a gender diversity target for executive management (comprising all Vice-Presidents and more senior positions), whereby at the end of 2022, at least 30% of this group would be women. This aligns to the targets as set out in the Catalyst Accord 2022, to which CN is a signatory. CN made significant progress with respect to the representation of executive women, increasing from 18% at the end of 2021, to attaining the 30% target in early December 2022. Currently 27%, or eight of the 30 executive management roles, are held by women.

Management's Discussion and Analysis

Forward-looking statements

Certain statements included in this MD&A are "forward-looking statements" within the meaning of the *United States Private Securities Litigation Reform Act of 1995* and under Canadian securities laws, including statements based on management's assessment and assumptions and publicly available information with respect to CN. By their nature, forward-looking statements involve risks, uncertainties and assumptions. CN cautions that its assumptions may not materialize and that current economic conditions render such assumptions, although reasonable at the time they were made, subject to greater uncertainty. Forward-looking statements may be identified by the use of terminology such as "believes", "expects", "anticipates", "assumes", "outlook", "plans", "targets" or other similar words.

Forward-looking statements include, but are not limited to, those set forth in the table below, which also presents key assumptions used in determining the forward-looking statements. See also the section of this MD&A entitled *Strategy overview - 2023 Business outlook and assumptions*.

Forward-looking statements	Key assumptions
Statements relating to revenue growth opportunities, including those referring to general economic and business conditions	<ul style="list-style-type: none">• North American and global economic growth• Long-term growth opportunities being less affected by current economic conditions• No material disruption of CN's operations or of the economy's supply chains as a result of pandemics or geopolitical conflicts and tensions
Statements relating to the Company's ability to meet debt repayments and future obligations in the foreseeable future, including income tax payments, and capital spending	<ul style="list-style-type: none">• Adequate credit ratios• Investment-grade credit ratings• Access to capital markets• Adequate cash generated from operations and other sources of financing
Statements relating to pension contributions	<ul style="list-style-type: none">• Adequate cash generated from operations and other sources of financing• Adequate long-term return on investment on pension plan assets• Level of funding as determined by actuarial valuations, particularly influenced by discount rates for funding purposes

Forward-looking statements are not guarantees of future performance and involve risks, uncertainties and other factors which may cause actual results, performance or achievements of CN to be materially different from the outlook or any future results, performance or achievements implied by such statements. Accordingly, readers are advised not to place undue reliance on forward-looking statements. Important risk factors that could affect the forward-looking statements include, but are not limited to, general economic and business conditions, including factors impacting global supply chains such as pandemics and geopolitical conflicts and tensions; industry competition; inflation, currency and interest rate fluctuations; changes in fuel prices; legislative and/or regulatory developments; compliance with environmental laws and regulations; actions by regulators; increases in maintenance and operating costs; security threats; reliance on technology and related cybersecurity risk; trade restrictions or other changes to international trade arrangements; transportation of hazardous materials; various events which could disrupt operations, including illegal blockades of rail networks, and natural events such as severe weather, droughts, fires, floods and earthquakes; climate change; labor negotiations and disruptions; environmental claims; uncertainties of investigations, proceedings or other types of claims and litigation; risks and liabilities arising from derailments; timing and completion of capital programs; and other risks detailed from time to time in reports filed by CN with securities regulators in Canada and the U.S., including its Annual Information Form and Form 40-F. See the section entitled *Business risks* of this MD&A for a description of major risk factors relating to CN.

Forward-looking statements reflect information as of the date on which they are made. CN assumes no obligation to update or revise forward-looking statements to reflect future events, changes in circumstances, or changes in beliefs, unless required by applicable securities laws. In the event CN does update any forward-looking statement, no inference should be made that CN will make additional updates with respect to that statement, related matters, or any other forward-looking statement. Other than in instances where CN specifically provides otherwise, information contained on, or accessible through, our website is not a part of this MD&A.

2022 Financial outlook

During the year, the Company issued and updated its 2022 financial outlook. The 2022 actual results were in line with the Company's last 2022 outlook that was updated on October 25, 2022.

Capital expenditures for the year were \$2.75 billion, approximately 16% of revenues, compared to 17% of revenues per the Company's 2022 outlook, mainly due to higher revenues as a result of higher fuel surcharge revenue and the positive translation impact of a weaker Canadian dollar.

Management's Discussion and Analysis

Financial highlights

The following table lists key measures of the Company's financial performance for the years ended December 31, 2022, 2021 and 2020 and the financial position measures as at December 31, 2022, 2021 and 2020:

<i>In millions, except percentage and per share data</i>	2022	2021	2020	Change	
				2022 vs 2021	2021 vs 2020
Revenues	\$ 17,107	\$ 14,477	\$ 13,819	18%	5%
Operating income	\$ 6,840	\$ 5,616	\$ 4,777	22%	18%
Adjusted operating income ⁽¹⁾⁽²⁾	\$ 6,862	\$ 5,622	\$ 5,263	22%	7%
Net income ⁽³⁾	\$ 5,118	\$ 4,899	\$ 3,545	4%	38%
Adjusted net income ⁽¹⁾⁽²⁾⁽³⁾	\$ 5,134	\$ 4,225	\$ 3,767	22%	12%
Basic earnings per share ⁽³⁾	\$ 7.46	\$ 6.91	\$ 4.98	8%	39%
Diluted earnings per share ⁽³⁾	\$ 7.44	\$ 6.90	\$ 4.97	8%	39%
Adjusted diluted earnings per share ⁽¹⁾⁽²⁾⁽³⁾	\$ 7.46	\$ 5.95	\$ 5.28	25%	13%
Dividends declared per share	\$ 2.93	\$ 2.46	\$ 2.30	19%	7%
Operating ratio ⁽⁴⁾	60.0%	61.2%	65.4%	1.2 -pts	4.2 -pts
Adjusted operating ratio ⁽¹⁾⁽²⁾	59.9%	61.2%	61.9%	1.3 -pts	0.7 -pts
Net cash provided by operating activities	\$ 6,667	\$ 6,971	\$ 6,165	(4%)	13%
Net cash used in investing activities	\$ 2,510	\$ 2,873	\$ 2,946	13%	2%
Free cash flow ⁽¹⁾⁽⁵⁾	\$ 4,259	\$ 3,296	\$ 3,227	29%	2%

<i>In millions, except percentages</i>	As at December 31, 2022	As at December 31, 2021	As at December 31, 2020	Change	
				2022 vs 2021	2021 vs 2020
Financial position					
Total assets	\$ 50,662	\$ 48,538	\$ 44,804	4%	8%
Total long-term financial liabilities ⁽⁶⁾	\$ 25,436	\$ 22,674	\$ 21,879	(12%)	(4%)

(1) These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

(2) See the section of this MD&A entitled Adjusted performance measures for an explanation of these non-GAAP measures.

(3) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(4) Operating ratio is defined as operating expenses as a percentage of revenues.

(5) See the section of this MD&A entitled Liquidity and capital resources – Free cash flow for an explanation of this non-GAAP measure.

(6) Total long-term financial liabilities is the sum of deferred income taxes, other liabilities and deferred credits, pension and other postretirement benefits, long-term debt (excluding the current portion) and operating lease liabilities.

2022 compared to 2021

Revenues for the year ended December 31, 2022 were \$17,107 million compared to \$14,477 million in 2021. The increase of \$2,630 million, or 18%, was mainly attributable to higher fuel surcharge revenue as a result of higher fuel prices, freight rate increases, the positive translation impact of a weaker Canadian dollar, higher Canadian export volumes of coal via west coast ports and higher volumes of U.S. grain; partly offset by lower international container traffic volumes via the port of Vancouver as a result of supply chain congestion and significantly lower export volumes of Canadian grain in the first half of 2022.

Operating expenses for the year ended December 31, 2022 were \$10,267 million compared to \$8,861 million in 2021. The increase of \$1,406 million, or 16%, was mainly as a result of higher fuel prices, the negative translation impact of a weaker Canadian dollar as well the Recovery of the loss on assets held for sale of \$137 million recorded in the first quarter of 2021 resulting from the Company entering into an agreement for the sale of non-core lines; partly offset by Transaction-related costs of \$84 million recorded in the third quarter of 2021 resulting from the terminated CN Merger Agreement with KCS.

Operating income for the year ended December 31, 2022 increased by \$1,224 million, or 22%, to \$6,840 million, when compared to the same period in 2021. The operating ratio was 60.0% in 2022, compared to 61.2% in 2021, a 1.2-point improvement.

Net income for the year ended December 31, 2022 was \$5,118 million, an increase of \$219 million, or 4%, when compared to 2021, and diluted earnings per share increased by 8% to \$7.44. ⁽¹⁾ The increase was mainly driven by higher operating income in 2022, partly offset by a merger termination fee of \$886 million (\$770 million after-tax) received from KCS in 2021.

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

Operating highlights

The following table lists key measures of the Company's operating performance, for the purpose of measuring the efficiency and effectiveness of train operations:

	2022	2021	2020	Change	
				Favorable/(Unfavorable)	2022 vs 2021
Gross ton miles (GTMs) (millions) ⁽¹⁾	463,710	458,401	455,368	1%	1%
Train weight (tons) ⁽²⁾	9,324	9,658	9,501	(3%)	2%
Train length (feet) ⁽³⁾	8,160	8,559	8,572	(5%)	—%
Through network train speed (miles per hour) ⁽⁴⁾	18.9	19.2	18.5	(2%)	4%
Fuel efficiency (US gallons of locomotive fuel consumed per 1,000 GTMs) ⁽⁵⁾	0.867	0.884	0.895	2%	1%
Through dwell (entire railroad, hours) ⁽⁶⁾	7.6	7.9	8.6	4%	8%
Car velocity (car miles per day) ⁽⁷⁾	196	195	185	1%	5%

- (1) GTMs: The workload performed by system trains in hauling freight or equipment. GTMs are calculated by multiplying the trailing weight by the distance the train moved. A larger number is an indicator of more traffic (and thus more revenue) being moved.
- (2) Train weight: An efficiency measurement on how much tonnage each mainline train handles on average as it crosses the network. Calculated as the total of GTMs and divided by total train miles, this measure provides insight on how well each train was maximized in terms of its capacity to move traffic. This operating measure was formerly named Train productivity.
- (3) Train length: An efficiency measurement on average trailing length of each mainline train on the network. Calculated as the total of car foot miles (the sum of car length multiplied by miles travelled for each trailing car) divided by total train miles, this measure provides insight on how well each train was maximized in terms of its capacity to move traffic.
- (4) Through network train speed: A measure of the line-haul movement from origin to destination, including time at terminals. The average speed is calculated by dividing train miles by total hours operated, excluding yard and local trains, passenger trains, maintenance of way trains, and foreign trains. This measure represents the fluidity of trains on the network, with a higher value also indicating a more fluid network.
- (5) Fuel efficiency: This measure represents how efficient the Company is in the generation and utilization of locomotive horsepower in freight train operations, with a lower number indicating improved performance. Fuel efficiency is defined as US gallons of locomotive fuel consumed per 1,000 GTMs. Annual fuel efficiency metrics for 2021 and 2020 have been revised as more complete information became available.
- (6) Through dwell: The average time a car resides within terminal boundaries expressed in hours. The measurement begins with a customer release, received interchange, or train arrival event and ends with a customer placement (actual or constructive), delivered or offered in interchange, or train departure event. This excludes stored, bad ordered, maintenance of way cars, or cars with dwell greater than 10 days. This measure represents the efficiency of handling cars within the terminal, with a lower value indicating higher performance.
- (7) Car velocity: The average miles per day traveled by loaded and empty cars (including all active cars whether private, foreign or CN owned) on company lines. This measure represents the fluidity of cars on the network, calculated by the sum of miles each car traveled divided by the sum of all of the cars' active time, with a higher value indicating a smoother and more fluid operation.

For the year ended December 31, 2022, when compared to 2021, the Company's focus on scheduled railroading has resulted in improvements in car velocity, through dwell and fuel efficiency, as well as a decrease in train length and train weight, despite negative impacts from the harsh winter in the first quarter of 2022. In addition, the Company's fuel initiatives allowed it to achieve a new record for fuel efficiency of 0.867.

For the year ended December 31, 2021, when compared to 2020, operating performance improved across most measures, specifically through network train speed, through dwell and car velocity, despite negative impacts from the polar vortex in February, the forest fires in Western Canada over the summer and the B.C. washouts in the fourth quarter. The Company capitalized on its prior year's strategic investments in its infrastructure and its continued focus on efficiency and network fluidity. In addition, the Company's fuel initiatives allowed it to achieve a record fuel efficiency of 0.884.

Management's Discussion and Analysis

Non-GAAP measures

This MD&A makes reference to non-GAAP measures including adjusted performance measures, constant currency, return on invested capital (ROIC) and adjusted ROIC, free cash flow, and adjusted debt-to-adjusted EBITDA multiple that do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. From management's perspective, these non-GAAP measures are useful measures of performance and provide investors with supplementary information to assess the Company's results of operations and liquidity. These non-GAAP measures should not be considered in isolation or as a substitute for financial measures prepared in accordance with GAAP.

For further details of these non-GAAP measures, including a reconciliation to the most directly comparable GAAP financial measures, refer to the sections of this MD&A entitled *Adjusted performance measures*, *Constant currency*, *ROIC and adjusted ROIC*, and *Liquidity and capital resources*.

Adjusted performance measures

Adjusted net income, adjusted diluted earnings per share, adjusted operating income, adjusted operating expenses and adjusted operating ratio are non-GAAP measures that are used to set performance goals and to measure CN's performance. Management believes that these adjusted performance measures provide additional insight to management and investors into the Company's operations and underlying business trends as well as facilitate period-to-period comparisons, as they exclude certain significant items that are not reflective of CN's underlying business operations and could distort the analysis of trends in business performance. These items may include:

- i. operating expense adjustments: workforce reduction program, depreciation expense on the deployment of replacement system, advisory fees related to shareholder matters, losses and recoveries from assets held for sale, business acquisition-related costs;
- ii. non-operating expense adjustments: business acquisition-related financing fees, merger termination income, gains and losses on disposal of property; and
- iii. the effect of tax law changes and rate enactments.

These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

For the year ended December 31, 2022, the Company's adjusted net income was \$5,134 million, or \$7.46 per diluted share, which excludes advisory fees related to shareholder matters of \$22 million, or \$16 million after-tax (\$0.02 per diluted share) recorded in Casualty and other within the Consolidated Statements of Income.

For the year ended December 31, 2021, the Company reported adjusted net income of \$4,225 million, or \$5.95 per diluted share, which excludes: ⁽¹⁾

- employee termination benefits and severance costs related to a workforce reduction program of \$39 million, or \$29 million after-tax (\$0.04 per diluted share) recorded in the third quarter in Labor and fringe benefits within the Consolidated Statements of Income;
- advisory fees related to shareholder matters of \$20 million, or \$15 million after-tax (\$0.02 per diluted share) of which \$13 million, or \$10 million after-tax (\$0.01 per diluted share) was recorded in the fourth quarter and \$7 million, or \$5 million after-tax (\$0.01 per diluted share) was recorded in the third quarter in Casualty and other within the Consolidated Statements of Income;
- the recovery of \$137 million, or \$102 million after-tax (\$0.14 per diluted share) recorded in the first quarter related to the loss on assets held for sale in the second quarter of 2020, to reflect an agreement for the sale for on-going rail operations, certain non-core rail lines in Wisconsin, Michigan and Ontario to a short line operator;
- transaction-related costs, consisting of an advance to Kansas City Southern (KCS) and a related refund, net of transaction costs, of \$84 million, or \$70 million after-tax (\$0.10 per diluted share), recorded in the third quarter resulting from the terminated CN Merger Agreement with KCS;
- amortization of bridge financing and other fees of \$97 million, or \$84 million after-tax (\$0.11 per diluted share), of which \$65 million, or \$60 million after-tax (\$0.08 per diluted share) was recorded in the third quarter and \$32 million, or \$24 million after-tax (\$0.03 per diluted share) was recorded in the second quarter, resulting from the KCS transaction, recorded in Interest expense within the Consolidated Statements of Income; and
- merger termination fee paid by KCS to CN of \$886 million, or \$770 million after-tax (\$1.08 per diluted share), recorded in the third quarter resulting from KCS' notice of termination of the CN Merger Agreement with KCS.

For the year ended December 31, 2020, the Company reported adjusted net income of \$3,767 million, or \$5.28 per diluted share ⁽¹⁾, which excludes a loss of \$486 million, or \$363 million after-tax (\$0.51 per diluted share) in the second quarter, resulting from the Company's decision to market for sale for on-going rail operations, certain non-core lines in Wisconsin, Michigan and Ontario, and a current income tax recovery of \$141 million (\$0.20 per diluted share) in the first quarter resulting from the enactment of the *Coronavirus Aid, Relief, and Economic Security*

Management's Discussion and Analysis

(CARES) Act, a U.S. tax-and-spending package aimed at providing additional stimulus to address the economic impact of the COVID-19 pandemic.

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Adjusted net income is defined as Net income in accordance with GAAP adjusted for certain significant items. Adjusted diluted earnings per share is defined as adjusted net income divided by the weighted-average diluted shares outstanding. The following table provides a reconciliation of Net income and Earnings per share in accordance with GAAP, as reported for the years ended December 31, 2022, 2021 and 2020, to the non-GAAP adjusted performance measures presented herein:

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>		
	2022	2021	2020
Net income ⁽¹⁾	\$ 5,118	\$ 4,899	\$ 3,545
<i>Adjustments:</i>			
<i>Operating expense adjustments:</i>			
Workforce reduction program	–	39	–
Advisory fees related to shareholder matters	22	20	–
Loss (recovery) on assets held for sale	–	(137)	486
Transaction-related costs	–	84	–
<i>Non-operating expense adjustments:</i>			
Amortization of bridge financing and other fees	–	97	–
Merger termination fee	–	(886)	–
<i>Tax adjustments:</i>			
Tax effect of adjustments ⁽²⁾	(6)	109	(123)
Tax law changes and rate enactments	–	–	(141)
<i>Total adjustments</i>	16	(674)	222
<i>Adjusted net income</i> ⁽¹⁾	\$ 5,134	\$ 4,225	\$ 3,767
Diluted earnings per share ⁽¹⁾	\$ 7.44	\$ 6.90	\$ 4.97
<i>Impact of adjustments, per share</i>	0.02	(0.95)	0.31
<i>Adjusted diluted earnings per share</i> ⁽¹⁾	\$ 7.46	\$ 5.95	\$ 5.28

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(2) The tax impact of adjustments is based on the nature of the item for tax purposes and related tax rates in the applicable jurisdiction.

Management's Discussion and Analysis

Adjusted operating income is defined as Operating income in accordance with GAAP adjusted for certain significant operating expense items. Adjusted operating expenses is defined as Operating expenses in accordance with GAAP adjusted for certain significant operating expense items. Adjusted operating ratio is defined as adjusted operating expenses as a percentage of revenues. The following table provides a reconciliation of Operating income, Operating expenses and operating ratio, as reported for the years ended December 31, 2022, 2021 and 2020, to the non-GAAP adjusted performance measures presented herein:

<i>In millions, except percentages</i>	<i>Year ended December 31,</i>		
	2022	2021	2020
Operating income	\$ 6,840	\$ 5,616	\$ 4,777
<i>Operating expense adjustments:</i>			
Workforce reduction program	—	39	—
Advisory fees related to shareholder matters	22	20	—
Loss (recovery) on assets held for sale	—	(137)	486
Transaction-related costs	—	84	—
<i>Total operating expense adjustments</i>	22	6	486
<i>Adjusted operating income</i>	\$ 6,862	\$ 5,622	\$ 5,263
Operating expenses	10,267	8,861	9,042
<i>Total operating expense adjustments</i>	(22)	(6)	(486)
<i>Adjusted operating expenses</i>	\$ 10,245	\$ 8,855	\$ 8,556
Operating ratio	60.0 %	61.2 %	65.4 %
<i>Impact of adjustments</i>	(0.1)%	— %	(3.5)%
<i>Adjusted operating ratio</i>	59.9 %	61.2 %	61.9 %

Management's Discussion and Analysis

ROIC and adjusted ROIC

ROIC and adjusted ROIC are useful measures for management and investors to evaluate the efficiency of the Company's use of capital funds and allow investors to assess the operating and investment decisions made by management. The Company calculates ROIC as return divided by average invested capital, both of which are non-GAAP measures. Return is defined as Net income plus interest expense after-tax, calculated using the Company's effective tax rate. Average invested capital is defined as the sum of Total shareholders' equity, Long-term debt and Current portion of long-term debt less Cash and cash equivalents, and Restricted cash and cash equivalents, averaged between the beginning and ending balance over the last twelve-month period. The Company calculates adjusted ROIC as adjusted return divided by average invested capital, both of which are non-GAAP measures. Adjusted return is defined as adjusted net income plus interest expense after-tax, calculated using the Company's adjusted effective tax rate. Return, average invested capital, ROIC, adjusted return and adjusted ROIC do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

The following table provides a reconciliation of Net income and adjusted net income to return and adjusted return, respectively, as well as the calculation of average invested capital, which have been used to calculate ROIC and adjusted ROIC:

<i>In millions, except percentage</i>	<i>As at and for the year ended December 31,</i>		
	2022	2021	2020
Net income ⁽¹⁾	\$ 5,118	\$ 4,899	\$ 3,545
Interest expense	548	610	554
Tax on interest expense ⁽²⁾	(133)	(139)	(120)
Return ⁽¹⁾	\$ 5,533	\$ 5,370	\$ 3,979
Average total shareholders' equity	\$ 22,064	\$ 21,198	\$ 18,846
Average long-term debt	13,175	11,987	11,931
Average current portion of long-term debt	783	709	1,420
Less: Average cash, cash equivalents, restricted cash and restricted cash equivalents	(1,088)	(1,221)	(844)
Average invested capital	\$ 34,934	\$ 32,673	\$ 31,353
ROIC ⁽¹⁾	15.8%	16.4%	12.7%
Adjusted net income ⁽¹⁾⁽³⁾	\$ 5,134	\$ 4,225	\$ 3,767
Interest expense	548	610	554
Less: Amortization of bridge financing and other fees ⁽⁴⁾	—	(97)	—
Tax on interest expense less amortization of bridge financing and other fees ⁽⁵⁾	(133)	(123)	(137)
Adjusted return ⁽¹⁾	\$ 5,549	\$ 4,615	\$ 4,184
Average invested capital	\$ 34,934	\$ 32,673	\$ 31,353
Adjusted ROIC ⁽¹⁾	15.9%	14.1%	13.3%

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(2) The effective tax rate, defined as Income tax expense as a percentage of Income before income taxes, used to calculate the tax on Interest expense for 2022 was 24.3% (2021 - 22.8%; 2020 - 21.6%).

(3) This non-GAAP measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. See the section of this MD&A entitled Adjusted performance measures for an explanation of this non-GAAP measure.

(4) Relates to amortization of bridge financing and other fees resulting from the KCS transaction, recorded in Interest expense within the Consolidated Statements of Income.

(5) The adjusted effective tax rate is a non-GAAP measure, defined as Income tax expense, net of tax adjustments as presented in Adjusted performance measures as a percentage of Income before taxes, net of pre-tax adjustments as presented in Adjusted performance measures. This measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to a similar measure presented by other companies. The adjusted effective tax rate used to calculate the adjusted tax on interest expense less amortization of bridge financing and other fees for 2022 was 24.3% (2021 - 24.0%; 2020 - 24.8%).

Management's Discussion and Analysis

Constant currency

Financial results at constant currency allow results to be viewed without the impact of fluctuations in foreign currency exchange rates, thereby facilitating period-to-period comparisons in the analysis of trends in business performance. Measures at constant currency are considered non-GAAP measures and do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. Financial results at constant currency are obtained by translating the current period results denominated in US dollars at the weighted average foreign exchange rates used to translate transactions denominated in US dollars of the comparable period of the prior year.

The average foreign exchange rates were \$1.30 and \$1.25 per US\$1.00, for the years ended December 31, 2022 and 2021, respectively.

On a constant currency basis, the Company's Net income for the year ended December 31, 2022 would have been lower by \$90 million (\$0.13 per diluted share).

The following table provides a reconciliation of the impact of constant currency and related percentage change at constant currency on the financial results, as reported for the year ended December 31, 2022:

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>	2022	Constant currency impact	2021	% Change at constant currency Fav (Unfav)
Revenues					
Petroleum and chemicals	\$	3,229	\$ (74)	\$ 2,816	12%
Metals and minerals		1,911	(57)	1,548	20%
Forest products		2,006	(57)	1,740	12%
Coal		937	(11)	618	50%
Grain and fertilizers		2,783	(56)	2,475	10%
Intermodal		4,906	(58)	4,115	18%
Automotive		797	(24)	576	34%
<i>Total freight revenues</i>		16,569	(337)	13,888	17%
Other revenues		538	(15)	589	(11%)
<i>Total revenues</i>		17,107	(352)	14,477	16%
Operating expenses					
Labor and fringe benefits		2,935	(43)	2,879	—%
Purchased services and material		2,191	(33)	2,082	(4%)
Fuel		2,518	(88)	1,513	(61%)
Depreciation and amortization		1,729	(25)	1,598	(7%)
Equipment rents		338	(10)	336	2%
Casualty and other		556	(15)	506	(7%)
Recovery of loss on assets held for sale		—	—	(137)	(100%)
Transaction-related costs		—	—	84	100%
<i>Total operating expenses</i>		10,267	(214)	8,861	(13%)
<i>Operating income</i>		6,840	(138)	5,616	19%
Interest expense		(548)	18	(610)	13%
Other components of net periodic benefit income ⁽¹⁾		498	—	407	22%
Merger termination fee		—	—	886	(100%)
Other income (loss)		(27)	—	43	(163%)
<i>Income before income taxes</i> ⁽¹⁾		6,763	(120)	6,342	5%
Income tax expense ⁽¹⁾		(1,645)	30	(1,443)	(12%)
Net income ⁽¹⁾	\$	5,118	\$ (90)	\$ 4,899	3%
Diluted earnings per share ⁽¹⁾	\$	7.44	\$ (0.13)	\$ 6.90	6%

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

Revenues

The following table provides the components of total revenues and freight revenues, as well as other key operating measures, for the years ended December 31, 2022 and 2021:

<i>In millions, unless otherwise indicated</i>	<i>Year ended December 31,</i>			<i>% Change</i>	<i>% Change at constant currency⁽¹⁾</i>
	2022	2021			
Freight revenues	\$ 16,569	\$ 13,888		19%	17%
Other revenues	538	589		(9%)	(11%)
Total revenues	\$ 17,107	\$ 14,477		18%	16%
Freight revenues					
Petroleum and chemicals	\$ 3,229	\$ 2,816		15%	12%
Metals and minerals	1,911	1,548		23%	20%
Forest products	2,006	1,740		15%	12%
Coal	937	618		52%	50%
Grain and fertilizers	2,783	2,475		12%	10%
Intermodal	4,906	4,115		19%	18%
Automotive	797	576		38%	34%
Total freight revenues	\$ 16,569	\$ 13,888		19%	17%
Revenue ton miles (RTMs) (<i>millions</i>)	235,788	233,138		1%	1%
Freight revenue/RTM (<i>cents</i>)	7.03	5.96		18%	15%
Carloads (<i>thousands</i>)	5,697	5,701		—%	—%
Freight revenue/carload (\$)	2,908	2,436		19%	17%

(1) This non-GAAP measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. See the section of this MD&A entitled Constant currency for an explanation of this non-GAAP measure.

Revenues for the year ended December 31, 2022 totaled \$17,107 million compared to \$14,477 million in 2021. The increase of \$2,630 million, or 18%, was mainly attributable to higher fuel surcharge revenue as a result of higher fuel prices, freight rate increases, the positive translation impact of a weaker Canadian dollar, higher Canadian export volumes of coal via west coast ports and higher volumes of U.S. grain; partly offset by lower international container traffic volumes via the port of Vancouver as a result of supply chain congestion and significantly lower export volumes of Canadian grain in the first half of 2022.

Fuel surcharge revenues increased by \$1,592 million in 2022, mainly as a result of higher fuel prices.

In 2022, RTMs, measuring the weight and distance of freight transported by the Company, increased by 1% relative to 2021. Freight revenue per RTM increased by 18% in 2022 when compared to 2021, mainly driven by higher fuel surcharge revenue as a result of higher fuel prices, freight rate increases, a decrease in the average length of haul and the positive translation impact of a weaker Canadian dollar.

Petroleum and chemicals

	<i>Year ended December 31,</i>			<i>% Change</i>	<i>% Change at constant currency</i>
	2022	2021			
Revenues (<i>millions</i>)	\$ 3,229	\$ 2,816		15%	12%
RTMs (<i>millions</i>)	46,273	42,436		9%	9%
Revenue/RTM (<i>cents</i>)	6.98	6.64		5%	3%
Carloads (<i>thousands</i>)	636	596		7%	7%

The petroleum and chemicals commodity group comprises a wide range of commodities, including chemicals and plastics, refined petroleum products, natural gas liquids, crude oil and sulfur. The primary markets for these commodities are within North America, and as such, the performance of this commodity group is closely correlated with the North American economy as well as oil and gas production. Most of the Company's petroleum and chemicals shipments originate in Western Canada, a key oil and gas development area and a major center for natural gas feedstock and world-scale petrochemicals and plastics; in eastern Canadian regional plants; and in the Louisiana petrochemical corridor between New Orleans and Baton Rouge.

For the year ended December 31, 2022, revenues for this commodity group increased by \$413 million, or 15%, when compared to 2021, mainly due to higher fuel surcharge revenue, increased volumes of refined petroleum products, natural gas liquids and petroleum crude, freight rate increases and the positive translation impact of a weaker Canadian dollar.

Management's Discussion and Analysis

Revenue per RTM increased by 5% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases and the positive translation impact of a weaker Canadian dollar.

<i>Percentage of commodity group revenues</i>	2022	2021
Refined petroleum products	45 %	44 %
Chemicals and plastics	37 %	40 %
Crude and condensate	13 %	11 %
Sulfur	5 %	5 %

Metals and minerals

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (<i>millions</i>)	\$	1,911	\$ 1,548	23%	20%
RTMs (<i>millions</i>)		27,606	26,743	3%	3%
Revenue/RTM (<i>cents</i>)		6.92	5.79	20%	16%
Carloads (<i>thousands</i>)		956	969	(1%)	(1%)

The metals and minerals commodity group consists primarily of materials related to oil and gas development such as frac sand, drilling pipe and large diameter pipe, steel, iron ore, non-ferrous base metals and ores, raw materials including scrap metal, industrial materials including aggregates, construction materials such as roofing and railway equipment, machinery and dimensional (large) loads. The Company provides unique rail access to base metals, iron ore and frac sand mining as well as aluminum and steel producing regions, which are among the most important in North America. This strong origin franchise, coupled with the Company's access to port facilities and the end markets for these commodities, has made CN a leader in the transportation of metals and minerals products. The key drivers for this market segment are oil and gas development, automotive production, and non-residential construction.

For the year ended December 31, 2022, revenues for this commodity group increased by \$363 million, or 23%, when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases, the positive translation impact of a weaker Canadian dollar, more revenue generating moves of empty customer-owned cars and increased volumes of frac sand.

Revenue per RTM increased by 20% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases, the positive translation impact of a weaker Canadian dollar, and more revenue generating moves of empty customer-owned cars; partly offset by an increase in the average length of haul.

<i>Percentage of commodity group revenues</i>	2022	2021
Metals	29 %	31 %
Minerals	27 %	26 %
Energy materials	24 %	22 %
Iron ore	20 %	21 %

Forest products

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (<i>millions</i>)	\$	2,006	\$ 1,740	15%	12%
RTMs (<i>millions</i>)		25,020	25,948	(4%)	(4%)
Revenue/RTM (<i>cents</i>)		8.02	6.71	20%	16%
Carloads (<i>thousands</i>)		330	339	(3%)	(3%)

The forest products commodity group includes various types of lumber, panels, paper, board and wrapping paper, wood pulp and other fibers such as logs, recycled paper, wood chips, and wood pellets. The Company has extensive rail access to the western and eastern Canadian fiber-producing regions, which are among the largest fiber source areas in North America. In the U.S., the Company is strategically located to serve both the Midwest and southern U.S. corridors with interline connections to other Class I railroads. The key drivers for the various commodities are: for lumber and panels, housing starts and renovation activities primarily in the U.S.; for fibers (mainly wood pulp), the consumption of

Management's Discussion and Analysis

paper, pulpboard and tissue in North American and offshore markets; and for newsprint, advertising lineage, non-print media and overall economic conditions, primarily in the U.S.

For the year ended December 31, 2022, revenues for this commodity group increased by \$266 million, or 15%, when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases and the positive translation impact of a weaker Canadian dollar; partly offset by lower volumes of lumber and woodpulp as a result of continuing supply chain challenges.

Revenue per RTM increased by 20% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases and the positive translation impact of a weaker Canadian dollar.

<i>Percentage of commodity group revenues</i>	2022	2021
Lumber	39 %	40 %
Pulp	28 %	29 %
Paper	17 %	16 %
Panels	16 %	15 %

Coal

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (<i>millions</i>)	\$	937	\$ 618	52%	50%
RTMs (<i>millions</i>)		22,679	18,471	23%	23%
Revenue/RTM (<i>cents</i>)		4.13	3.35	23%	22%
Carloads (<i>thousands</i>)		503	379	33%	33%

The coal commodity group consists of thermal grades of bituminous coal, metallurgical coal and petroleum coke. Canadian thermal and metallurgical coal are largely exported via terminals on the west coast of Canada to offshore markets. In the U.S., thermal coal is transported from mines served in southern Illinois, or from western U.S. mines via interchange with other railroads, to major utilities in the Midwest and Southeast U.S., as well as offshore markets via terminals on the U.S. Gulf Coast. Petroleum coke, a by-product of the oil refining process, is exported to offshore markets via terminals on the west coast of Canada and the U.S. Gulf Coast, as well as shipped to industrial users in domestic markets. The key drivers for this market segment are weather conditions, environmental regulations, global energy, coal and steel supply and demand conditions, and for U.S. domestic utility coal, the price of natural gas.

For the year ended December 31, 2022, revenues for this commodity group increased by \$319 million, or 52%, when compared to 2021, mainly due to higher Canadian export volumes of thermal and metallurgical coal via west coast ports due to the re-opening of two mines in November 2021 and favorable market conditions due to rising energy prices, as well as higher fuel surcharge revenue.

Revenue per RTM increased by 23% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue and a decrease in the average length of haul.

<i>Percentage of commodity group revenues</i>	2022	2021
Canadian coal - export	54 %	45 %
Petroleum coke	20 %	25 %
U.S. coal - export	14 %	16 %
U.S. coal - domestic	12 %	14 %

Grain and fertilizers

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (<i>millions</i>)	\$	2,783	\$ 2,475	12%	10%
RTMs (<i>millions</i>)		55,359	58,733	(6%)	(6%)
Revenue/RTM (<i>cents</i>)		5.03	4.21	19%	17%
Carloads (<i>thousands</i>)		614	628	(2%)	(2%)

The grain and fertilizers commodity group depends primarily on crops grown and fertilizers processed in Western Canada and the U.S. Midwest. The grain segment consists of wheat, oats, barley, flaxseed, rye, peas, lentils, corn, corn meal, ethanol, dried distillers grain, canola seed and

Management's Discussion and Analysis

canola products, soybeans, soybean products, sweeteners and animal fat. Production of grain varies considerably from year to year, affected primarily by weather conditions, seeded and harvested acreage, the mix of grains produced and crop yields. Grain exports are sensitive to the size and quality of the crop produced, international market conditions and foreign government policy. The majority of grain produced in Western Canada and moved by CN is exported via the ports of Vancouver, Prince Rupert and Thunder Bay. These rail movements are subject to government regulation that establishes a maximum revenue entitlement that railways can earn. Although railway companies are free to set freight rates for western grain shipments, total revenue is limited based on a formula that takes into account tonnage, length of haul, and a specified price index. Shipments of grain that are exported to the U.S. are not regulated. Grain grown in the U.S. Midwest is exported as well as transported to domestic processing facilities and feed markets. The Company also serves major producers of potash in Canada, as well as producers of ammonium nitrate, anhydrous ammonia, urea and other fertilizers across Canada and the U.S. The key drivers for fertilizers are input prices, demand, government policies, and international competition.

For the year ended December 31, 2022, revenues for this commodity group increased by \$308 million, or 12%, when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases and increased volumes of U.S. grain and the positive translation impact of a weaker Canadian dollar; partly offset by significantly lower export volumes of Canadian grain in the first half of 2022 compared to record volumes in the prior year and reduced potash shipments.

Revenue per RTM increased by 19% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, freight rate increases, a decrease in the average length of haul and the positive translation impact of a weaker Canadian dollar.

Percentage of commodity group revenues	2022	2021
Canadian grain - regulated	32 %	39 %
U.S. grain - domestic	22 %	19 %
Canadian grain - commercial	13 %	12 %
Fertilizers - potash	13 %	14 %
U.S. grain - exports	11 %	7 %
Fertilizers - other	9 %	9 %

Intermodal

	<i>Year ended December 31,</i>	2022	2021	% Change	% Change at constant currency
Revenues (<i>millions</i>)	\$	4,906	\$ 4,115	19%	18%
RTMs (<i>millions</i>)		56,029	58,412	(4%)	(4%)
Revenue/RTM (<i>cents</i>)		8.76	7.04	24%	23%
Carloads (<i>thousands</i>)		2,450	2,611	(6%)	(6%)

The intermodal commodity group includes rail and trucking services and is comprised of two markets: domestic intermodal and international intermodal. Domestic intermodal transports consumer products and manufactured goods, serving retail, wholesale and logistics provider channels, within domestic Canada, domestic U.S., Mexico and transborder, while international intermodal handles import and export container traffic, serving the major ports of Vancouver, Prince Rupert, Montreal, Halifax, New Orleans and Mobile. CN's network of inland intermodal terminals, located near ports and large urban centers, connects customers to major markets in North America and overseas. Domestic intermodal is driven by consumer markets, with growth generally tied to the economy. International intermodal is driven by North American economic and trade conditions as well as global trade patterns. Revenues for CN owned TransX and H&R businesses are included in this commodity group within the domestic market.

For the year ended December 31, 2022, revenues for this commodity group increased by \$791 million, or 19%, when compared to 2021, mainly due to higher fuel surcharge revenue, an increase in ancillary services including container storage, freight rate increases and the positive translation impact of a weaker Canadian dollar; partly offset by lower international container traffic volumes via the port of Vancouver as a result of supply chain congestion.

Revenue per RTM increased by 24% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, an increase in ancillary services including container storage, freight rate increases and the positive translation impact of a weaker Canadian dollar.

Percentage of commodity group revenues	2022	2021
International	63 %	65 %
Domestic	37 %	35 %

Management's Discussion and Analysis

Automotive

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (millions)	\$	797	\$ 576	38%	34%
RTMs (millions)		2,822	2,395	18%	18%
Revenue/RTM (cents)		28.24	24.05	17%	14%
Carloads (thousands)		208	179	16%	16%

The automotive commodity group moves both domestic finished vehicles and parts throughout North America, providing service to certain vehicle assembly plants in Ontario, Michigan and Mississippi. The Company also serves vehicle distribution facilities in Canada and the U.S., as well as parts production facilities in Michigan and Ontario. The Company serves shippers of finished vehicle imports via the ports of Halifax and Vancouver, and through interchange with other railroads. CN's broad network of auto compounds is used to facilitate distribution of vehicles throughout Canada and the U.S. Midwest. The primary drivers for this market are automotive production and sales in North America, which are driven by the average age of vehicles in North America and the price of fuel.

For the year ended December 31, 2022, revenues for this commodity group increased by \$221 million, or 38%, when compared to 2021, mainly due to higher fuel surcharge revenue, higher volumes of finished vehicles, the positive translation impact of a weaker Canadian dollar and freight rate increases.

Revenue per RTM increased by 17% in 2022 when compared to 2021, mainly due to higher fuel surcharge revenue, the positive translation impact of a weaker Canadian dollar, a decrease in the average length of haul and freight rate increases.

Percentage of commodity group revenues	2022	2021
Finished vehicles	92 %	91 %
Auto parts	8 %	9 %

Other revenues

	Year ended December 31,	2022	2021	% Change	% Change at constant currency
Revenues (millions)	\$	538	\$ 589	(9%)	(11%)

Other revenues are derived from non-rail logistics services that support the Company's rail business including vessels and docks, transloading and distribution, automotive logistics, and freight forwarding and transportation management.

For the year ended December 31, 2022, Other revenues decreased by \$51 million, or 9%, when compared to 2021, mainly due to lower revenues for international freight forwarding as a result of closing down CN Worldwide.

Percentage of other revenues	2022	2021
Vessels and docks	54 %	45 %
Other non-rail services	38 %	47 %
Other revenues	8 %	8 %

Operating expenses

Operating expenses for the year ended December 31, 2022, amounted to \$10,267 million compared to \$8,861 million in 2021. The increase of \$1,406 million, or 16%, was mainly as a result of higher fuel prices, the negative translation impact of a weaker Canadian dollar as well the Recovery of the loss on assets held for sale of \$137 million recorded in the first quarter of 2021 resulting from the Company entering into an agreement for the sale of non-core lines; partly offset by Transaction-related costs of \$84 million recorded in the third quarter of 2021 resulting from the terminated CN Merger Agreement with KCS.

Management's Discussion and Analysis

The following table provides the components of total operating expenses for the years ended December 31, 2022 and 2021:

<i>In millions</i>	<i>Year ended December 31,</i>		<i>2022</i>	<i>2021</i>	<i>% Change</i>	<i>% Change at constant currency⁽¹⁾</i>
Labor and fringe benefits	\$	2,935	\$	2,879	(2%)	—%
Purchased services and material		2,191		2,082	(5%)	(4%)
Fuel		2,518		1,513	(66%)	(61%)
Depreciation and amortization		1,729		1,598	(8%)	(7%)
Equipment rents		338		336	(1%)	2%
Casualty and other		556		506	(10%)	(7%)
Recovery of the loss on assets held for sale		—		(137)	(100%)	(100%)
Transaction-related costs		—		84	100%	100%
Total operating expenses	\$	10,267	\$	8,861	(16%)	(13%)

(1) This non-GAAP measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. See the section of this MD&A entitled Constant currency for an explanation of this non-GAAP measure.

Labor and fringe benefits

Labor and fringe benefits expense includes wages, payroll taxes and employee benefits such as incentive compensation, including stock-based compensation, health and welfare, current service cost for pensions and postretirement benefits. Certain incentive compensation plans are based mainly on financial performance targets and the related expense is recorded in relation to the attainment of such targets.

Labor and fringe benefits expense increased by \$56 million, or 2%, in 2022 when compared to 2021. The increase was mainly due to general wage increases, an incremental wage accrual for the tentative agreements with the U.S. unions and the negative translation impact of a weaker Canadian dollar; partly offset by lower average headcount, lower pension expense and employee termination benefits and severance costs related to a workforce reduction program in the third quarter of 2021.

Purchased services and material

Purchased services and material expense includes the cost of services purchased from outside contractors; materials used in the maintenance of the Company's track, facilities and equipment; transportation and lodging for train crew employees; utility costs; and the net costs of operating facilities jointly used by the Company and other railroads.

Purchased services and material expense increased by \$109 million, or 5%, in 2022 when compared to 2021. The increase was mainly due to higher material costs, the negative translation impact of a weaker Canadian dollar and higher snow clearing and utility costs driven by harsher winter operating conditions; partly offset by lower international freight forwarding expense as a result of closing down CN Worldwide.

Fuel

Fuel expense includes fuel consumed by assets, including locomotives, vessels, vehicles and other equipment as well as federal, provincial and state fuel taxes.

Fuel expense increased by \$1,005 million, or 66%, in 2022 when compared to 2021. The increase was mainly as a result of higher fuel prices and the negative translation impact of a weaker Canadian dollar.

Depreciation and amortization

Depreciation and amortization expense includes the costs associated with the use of properties and intangible assets over their estimated service lives. Depreciation expense is affected by capital additions, railroad property retirements from disposal, sale and/or abandonment and other adjustments including asset impairments.

Depreciation and amortization expense increased by \$131 million, or 8%, in 2022 when compared to 2021. The increase was mainly due to a higher depreciable asset base and the negative translation impact of a weaker Canadian dollar.

Equipment rents

Equipment rents expense includes rental expense for the use of freight cars owned by other railroads (car hire) or private companies and for the lease of freight cars, locomotives and intermodal equipment, net of rental income from other railroads for the use of the Company's freight cars (car hire) and locomotives.

Equipment rents expense increased by \$2 million, or 1%, in 2022 when compared to 2021. The increase was mainly due to the negative translation impact of a weaker Canadian dollar; partly offset by higher locomotive horsepower-hour income.

Management's Discussion and Analysis

Casualty and other

Casualty and other expense includes expenses for personal injuries, environmental, freight and property damage, insurance, bad debt, operating taxes, cloud computing, software and support costs, advisory fees related to shareholder matters as well as travel expenses.

Casualty and other expense increased by \$50 million, or 10% in 2022 when compared to 2021. The increase was mainly due to higher cloud computing costs, travel costs and operating taxes as well as the negative translation impact of a weaker Canadian dollar; partly offset by higher passenger train recoveries.

Recovery of loss on assets held for sale

Recovery of loss on assets held for sale of \$137 million in the first quarter of 2021 resulting from the Company entering into an agreement with a short line operator, for the sale of non-core lines in Wisconsin, Michigan and Ontario representing 850 miles that were classified as assets held for sale plus an additional 50 miles of track and roadway assets. See *Note 6 – Assets held for sale* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Transaction-related costs

For the year ended December 31, 2021, the Company incurred transaction costs related to the terminated CN Merger Agreement of \$84 million, consisting of \$125 million of transaction-related costs; US\$700 million (\$845 million) paid to KCS and reported as an advance to KCS in the second quarter and expensed in the third quarter; and the related refund received of US\$700 million (\$886 million) in the third quarter. See *Note 4 – Acquisition* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Other income and expenses

Interest expense

In 2022, Interest expense was \$548 million compared to \$610 million in 2021. The decrease was mainly due to amortization of bridge financing and other fees of \$97 million recorded in 2021 (see *Note 4 – Acquisition* to the Company's 2022 Annual Consolidated Financial Statements for additional information); partly offset by a higher average level of debt and a negative translation impact of a weaker Canadian dollar.

Other components of net periodic benefit income

In 2022, Other components of net periodic benefit income was \$498 million compared to \$407 million in 2021. ⁽¹⁾ The increase was mainly due to lower amortization of net actuarial loss and higher expected return on assets; partly offset by higher interest cost.

Merger termination fee

In 2021, the Company received a US\$700 million (\$886 million) termination fee resulting from KCS terminating the CN Merger Agreement and entering into a merger agreement with CP. See *Note 4 – Acquisition* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Other income (loss)

In 2022, Other loss was \$27 million compared to Other income of \$43 million in 2021. The unfavorable variance was mainly due to fluctuations in the fair value of an equity investment in autonomous driving technology.

Income tax expense ⁽¹⁾

In 2022, the Company recorded an income tax expense of \$1,645 million compared to an income tax expense of \$1,443 million in 2021.

The effective tax rate for 2022 was 24.3% compared to 22.8% in 2021. The increase in the effective tax rate was mainly attributable to the merger termination fee, transaction-related costs, and bridge financing and other fees resulting from the KCS transaction recorded in the 2021 Consolidated Statements of Income, taxed at a lower inclusion rate.

For 2023, the Company anticipates the estimated annual effective tax rate to be in the range of 24.0% to 25.0%.

⁽¹⁾ See *Note 2 – Change in accounting policy* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

2021 compared to 2020

Revenues for the year ended December 31, 2021 were \$14,477 million compared to \$13,819 million in 2020. The increase of \$658 million, or 5%, was mainly attributable to freight rate increases, higher applicable fuel surcharge rates and an increase in intermodal ancillary services; partly offset by the negative translation impact of a stronger Canadian dollar and lower volumes of Canadian grain in terms of RTMs compared to record volumes in 2020.

Operating expenses for the year ended December 31, 2021 were \$8,861 million compared to \$9,042 million in 2020. The decrease of \$181 million, or 2%, was mainly due to the \$137 million recovery recorded in the first quarter of 2021 related to the \$486 million loss on assets held for sale recorded in the second quarter of 2020, as well as the positive translation impact of a stronger Canadian dollar; partly offset by higher fuel costs due to rising fuel prices, higher incentive compensation and \$84 million of transaction-related costs resulting from the terminated CN Merger Agreement with KCS.

Operating income for the year ended December 31, 2021 increased by \$839 million, or 18%, to \$5,616 million, an all-time record. Adjusted operating income for the year ended December 31, 2021 was \$5,622 million, an increase of \$359 million, or 7%, when compared to 2020. ⁽¹⁾

The operating ratio was 61.2% in 2021, compared to 65.4% in 2020, a 4.2-point improvement. The adjusted operating ratio was 61.2% in 2021 compared to 61.9% in 2020, a 0.7-point improvement. ⁽¹⁾

Net income for the year ended December 31, 2021 was \$4,899 million, an increase of \$1,354 million, or 38%, when compared to 2020, and diluted earnings per share increased by 39% to \$6.90. ⁽²⁾ The increase was mainly driven by a merger termination fee of \$886 million (\$770 million after-tax) received from KCS. Adjusted net income for the year ended December 31, 2021 was \$4,225 million, an increase of \$458 million, or 12%, and adjusted diluted earnings per share increased by 13% to \$5.95, when compared to 2020. ⁽¹⁾⁽²⁾

The Company generated record free cash flow for the year ended December 31, 2021 of \$3,296 million compared to \$3,227 million in 2020, an increase of \$69 million, or 2%. ⁽¹⁾

(1) These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to a similar measures presented by other companies. See the section of this MD&A entitled *Adjusted performance measures for an explanation of these non-GAAP measures*.

(2) See Note 2 – *Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information*.

Assets held for sale

In the first quarter of 2021, CN entered into an agreement with a short line operator, for the sale of non-core lines in Wisconsin, Michigan and Ontario representing 850 miles that were classified as assets held for sale plus an additional 50 miles of track and roadway assets, resulting in a \$137 million recovery (\$102 million after-tax) of the \$486 million loss (\$363 million after-tax) recorded in the second quarter of 2020 to adjust the carrying amount of the track and roadway assets to their then estimated net selling price.

As at December 31, 2021, the carrying amount of assets held for sale of \$260 million was included in Other current assets in the Consolidated Balance Sheets.

In the fourth quarter of 2021, the Surface Transportation Board (STB) approved the Company's agreement with the short line operator without condition and the transaction closed on January 28, 2022 and January 31, 2022 for the U.S. and Canadian assets, respectively. The resulting difference between the net selling price and what was estimated was insignificant.

Management's Discussion and Analysis

Constant currency

Financial results at constant currency allow results to be viewed without the impact of fluctuations in foreign currency exchange rates, thereby facilitating period-to-period comparisons in the analysis of trends in business performance. Measures at constant currency are considered non-GAAP measures and do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. Financial results at constant currency are obtained by translating the current period results denominated in US dollars at the weighted average foreign exchange rates used to translate transactions denominated in US dollars of the comparable period of the prior year.

The average foreign exchange rates were \$1.25 and \$1.34 per US\$1.00, for the years ended December 31, 2021 and 2020, respectively.

On a constant currency basis, the Company's Net income for the year ended December 31, 2021 would have been higher by \$166 million (\$0.23 per diluted share).

The following table provides a reconciliation of the impact of constant currency and related percentage change at constant currency on the financial results, as reported for the year ended December 31, 2021:

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>	2021	Constant currency impact	2020	% Change at constant currency Fav (Unfav)
Revenues					
Petroleum and chemicals	\$	2,816	\$ 128	\$ 2,631	12%
Metals and minerals		1,548	83	1,409	16%
Forest products		1,740	93	1,700	8%
Coal		618	17	527	20%
Grain and fertilizers		2,475	80	2,609	(2%)
Intermodal		4,115	95	3,751	12%
Automotive		576	32	591	3%
<i>Total freight revenues</i>		13,888	528	13,218	9%
Other revenues		589	29	601	3%
<i>Total revenues</i>		14,477	557	13,819	9%
Operating expenses					
Labor and fringe benefits		2,879	65	2,723	(8%)
Purchased services and material		2,082	60	2,152	—%
Fuel		1,513	94	1,152	(39%)
Depreciation and amortization		1,598	44	1,589	(3%)
Equipment rents		336	19	432	18%
Casualty and other		506	27	508	(5%)
Loss (recovery) on assets held for sale		(137)	(12)	486	131%
Transaction-related costs		84	47	—	N/A
<i>Total operating expenses</i>		8,861	344	9,042	(2%)
<i>Operating income</i>		5,616	213	4,777	22%
Interest expense		(610)	(35)	(554)	(16%)
Other components of net periodic benefit income ⁽¹⁾		407	—	292	39%
Merger termination fee		886	39	—	N/A
Other income		43	4	6	683%
<i>Income before income taxes</i> ⁽¹⁾		6,342	221	4,521	45%
Income tax expense ⁽¹⁾		(1,443)	(55)	(976)	(53%)
Net income ⁽¹⁾	\$	4,899	\$ 166	\$ 3,545	43%
Diluted earnings per share ⁽¹⁾	\$	6.90	\$ 0.23	\$ 4.97	43%

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

Revenues

The following table provides the components of total revenues and freight revenues, as well as other key operating measures, for the years ended December 31, 2021 and 2020:

<i>In millions, unless otherwise indicated</i>	<i>Year ended December 31,</i>				<i>% Change</i>	<i>% Change at constant currency⁽¹⁾</i>
	2021	2020				
Freight revenues	\$ 13,888	\$ 13,218			5%	9%
Other revenues	589	601			(2%)	3%
Total revenues	\$ 14,477	\$ 13,819			5%	9%
Freight revenues						
Petroleum and chemicals	\$ 2,816	\$ 2,631			7%	12%
Metals and minerals	1,548	1,409			10%	16%
Forest products	1,740	1,700			2%	8%
Coal	618	527			17%	20%
Grain and fertilizers	2,475	2,609			(5%)	(2%)
Intermodal	4,115	3,751			10%	12%
Automotive	576	591			(3%)	3%
Total freight revenues	\$ 13,888	\$ 13,218			5%	9%
Revenue ton miles (RTMs) (<i>millions</i>)	233,138	230,390			1%	1%
Freight revenue/RTM (<i>cents</i>)	5.96	5.74			4%	8%
Carloads (<i>thousands</i>)	5,701	5,595			2%	2%
Freight revenue/carload (<i>\$</i>)	2,436	2,362			3%	7%

(1) This non-GAAP measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. See the section of this MD&A entitled 2021 compared to 2020 – Constant currency for an explanation of this non-GAAP measure.

Revenues for the year ended December 31, 2021, totaled \$14,477 million compared to \$13,819 million in 2020. The increase of \$658 million, or 5%, was mainly attributable to freight rate increases, higher applicable fuel surcharge rates and an increase in intermodal ancillary services; partly offset by the negative translation impact of a stronger Canadian dollar and lower volumes of Canadian grain in terms of RTMs compared to record volumes in 2020. Fuel surcharge revenues increased by \$301 million in 2021, mainly due to higher applicable fuel surcharge rates.

In 2021, RTMs, measuring the weight and distance of freight transported by the Company, increased by 1% relative to 2020, despite the unfavorable impact of the ongoing supply chain challenges, the polar vortex in February, the forest fires and drought in Western Canada over the summer and the B.C. washouts in the fourth quarter of 2021. Freight revenue per RTM increased by 4% in 2021 when compared to 2020, mainly driven by a decrease in the average length of haul, freight rate increases and higher applicable fuel surcharge rates; partly offset by the negative translation impact of a stronger Canadian dollar.

Petroleum and chemicals

	<i>Year ended December 31,</i>				<i>% Change</i>	<i>% Change at constant currency</i>
	2021	2020				
Revenues (<i>millions</i>)	\$ 2,816	\$ 2,631			7%	12%
RTMs (<i>millions</i>)	42,436	43,556			(3%)	(3%)
Revenue/RTM (<i>cents</i>)	6.64	6.04			10%	15%
Carloads (<i>thousands</i>)	596	597			—%	—%

For the year ended December 31, 2021, revenues for this commodity group increased by \$185 million, or 7%, when compared to 2020, mainly due to freight rate increases, increased volumes of natural gas liquids (principally propane) and higher applicable fuel surcharge rates; partly offset by the negative translation impact of a stronger Canadian dollar and lower volumes of petroleum crude.

Revenue per RTM increased by 10% in 2021 when compared to 2020, mainly due to freight rate increases, including volume commitment amounts under customer contracts and higher applicable fuel surcharge rates; partly offset by negative translation impact of stronger Canadian dollar.

Management's Discussion and Analysis

Metals and minerals

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	1,548	\$ 1,409	10%	16%
RTMs (millions)		26,743	21,561	24%	24%
Revenue/RTM (cents)		5.79	6.53	(11%)	(7%)
Carloads (thousands)		969	935	4%	4%

For the year ended December 31, 2021, revenues for this commodity group increased by \$139 million, or 10%, when compared to 2020, mainly due to increased export volumes of iron ore via the Gulf Coast, higher volumes of frac sand, higher shipments of semi-finished steel products, higher applicable fuel surcharge rates and freight rate increases; partly offset by the negative translation impact of a stronger Canadian dollar.

Revenue per RTM decreased by 11% in 2021 when compared to 2020, mainly due to a significant increase in the average length of haul and the negative translation impact of a stronger Canadian dollar; partly offset by higher applicable fuel surcharge rates and freight rate increases.

Forest products

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	1,740	\$ 1,700	2%	8%
RTMs (millions)		25,948	25,602	1%	1%
Revenue/RTM (cents)		6.71	6.64	1%	6%
Carloads (thousands)		339	342	(1%)	(1%)

For the year ended December 31, 2021, revenues for this commodity group increased by \$40 million, or 2%, when compared to 2020, mainly due to freight rate increases, higher volumes of lumber and panels and higher applicable fuel surcharge rates; partly offset by the negative translation impact of a stronger Canadian dollar and lower volumes of woodpulp.

Revenue per RTM increased by 1% in 2021 when compared to 2020, mainly due to freight rate increases and higher applicable fuel surcharge rates; partly offset by the negative translation impact of a stronger Canadian dollar.

Coal

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	618	\$ 527	17%	20%
RTMs (millions)		18,471	16,173	14%	14%
Revenue/RTM (cents)		3.35	3.26	3%	6%
Carloads (thousands)		379	289	31%	31%

For the year ended December 31, 2021, revenues for this commodity group increased by \$91 million, or 17%, when compared to 2020, mainly due to increased exports of U.S. thermal coal via the Gulf Coast, higher applicable fuel surcharge rates and freight rate increases; partly offset by the negative translation impact of a stronger Canadian dollar.

Revenue per RTM increased by 3% in 2021 when compared to 2020, mainly due to a significant decrease in the average length of haul, higher applicable fuel surcharge rates and freight rate increases; partly offset by the negative translation impact of a stronger Canadian dollar.

Management's Discussion and Analysis

Grain and fertilizers

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	2,475	\$ 2,609	(5%)	(2%)
RTMs (millions)		58,733	61,736	(5%)	(5%)
Revenue/RTM (cents)		4.21	4.23	—%	3%
Carloads (thousands)		628	663	(5%)	(5%)

For the year ended December 31, 2021, revenues for this commodity group decreased by \$134 million, or 5%, when compared to 2020, mainly due to lower export volumes of Canadian grain compared to prior period record volumes and the negative translation impact of a stronger Canadian dollar; partly offset by higher potash volumes, higher export volumes of U.S. grain, freight rate increases and higher applicable fuel surcharge rates.

Revenue per RTM remained flat in 2021 when compared to 2020.

Intermodal

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	4,115	\$ 3,751	10%	12%
RTMs (millions)		58,412	59,165	(1%)	(1%)
Revenue/RTM (cents)		7.04	6.34	11%	14%
Carloads (thousands)		2,611	2,582	1%	1%

For the year ended December 31, 2021, revenues for this commodity group increased by \$364 million, or 10%, when compared to 2020, mainly due to an increase in ancillary services including container storage, more revenue generating moves of empty customer-owned containers, higher applicable fuel surcharge rates, freight rate increases, increased international container traffic via the port of Halifax and increased domestic intermodal wholesale volumes; partly offset by the negative translation impact of a stronger Canadian dollar and decreased international container traffic volumes via the port of Prince Rupert.

Revenue per RTM increased by 11% in 2021 when compared to 2020, mainly due to an increase in ancillary services including container storage, more revenue generating moves of empty customer-owned containers, higher applicable fuel surcharge rates and freight rate increases; partly offset by the negative translation impact of a stronger Canadian dollar.

Automotive

	Year ended December 31,	2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	576	\$ 591	(3%)	3%
RTMs (millions)		2,395	2,597	(8%)	(8%)
Revenue/RTM (cents)		24.05	22.76	6%	12%
Carloads (thousands)		179	187	(4%)	(4%)

For the year ended December 31, 2021, revenues for this commodity group decreased by \$15 million, or 3%, when compared to 2020, mainly due to lower volumes of finished vehicles shipped primarily due to a semiconductor chip shortage impacting the automotive industry production and lower volumes of Vancouver imports and the negative translation impact of a stronger Canadian dollar; partly offset by higher applicable fuel surcharge rates and freight rate increases.

Revenue per RTM increased by 6% in 2021 when compared to 2020, mainly due to a decrease in the average length of haul, higher applicable fuel surcharge rates and freight rate increases; partly offset by the negative translation impact of a stronger Canadian dollar.

Management's Discussion and Analysis

Other revenues

	Year ended December 31,		2021	2020	% Change	% Change at constant currency
Revenues (millions)	\$	589	\$	601	(2%)	3%

For the year ended December 31, 2021, Other revenues decreased by \$12 million, or 2%, when compared to 2020, mainly due to lower revenues for automotive logistics primarily due to a semiconductor chip shortage impacting the automotive industry production and the negative translation impact of a stronger Canadian dollar; partly offset by higher revenues from international freight forwarding and vessels.

Operating expenses

Operating expenses for the year ended December 31, 2021 amounted to \$8,861 million compared to \$9,042 million in 2020. The decrease of \$181 million, or 2%, was mainly driven by the \$137 million recovery recorded in the first quarter of 2021 related to the \$486 million loss on assets held for sale recorded in the second quarter of 2020, as well as the positive translation impact of a stronger Canadian dollar; partly offset by higher fuel costs due to rising fuel prices, higher incentive compensation and \$84 million of transaction-related costs resulting from the terminated CN Merger Agreement with KCS.

The following table provides the components of total operating expenses for the years ended December 31, 2021 and 2020:

In millions	Year ended December 31,		2021	2020	% Change	% Change at constant currency ⁽¹⁾
Labor and fringe benefits	\$	2,879	\$	2,723	(6%)	(8%)
Purchased services and material		2,082		2,152	3%	—%
Fuel		1,513		1,152	(31%)	(39%)
Depreciation and amortization		1,598		1,589	(1%)	(3%)
Equipment rents		336		432	22%	18%
Casualty and other		506		508	—%	(5%)
Loss (recovery) on assets held for sale		(137)		486	128%	131%
Transaction-related costs		84		—	N/A	N/A
Total operating expenses	\$	8,861	\$	9,042	2%	(2%)

(1) This non-GAAP measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies. See the section of this MD&A entitled 2021 compared to 2020 – Constant currency for an explanation of this non-GAAP measure.

Labor and fringe benefits

Labor and fringe benefits expense increased by \$156 million, or 6%, in 2021 when compared to 2020. The increase was mainly due to higher incentive compensation, general wage increases, as well as \$39 million of employee termination benefits and severance costs related to a workforce reduction program in the third quarter; partly offset by the positive translation impact of a stronger Canadian dollar.

Purchased services and material

Purchased services and material expense decreased by \$70 million, or 3%, in 2021 when compared to 2020. The decrease was mainly due to the positive translation impact of a stronger Canadian dollar and lower material costs as a result of cost reduction efforts.

Fuel

Fuel expense increased by \$361 million, or 31%, in 2021 when compared to 2020. The increase was mainly due to higher fuel prices; partly offset by the positive translation impact of a stronger Canadian dollar and fuel efficiency gains resulting in an all-time record fuel efficiency.

Depreciation and amortization

Depreciation and amortization expense increased by \$9 million, or 1%, in 2021 when compared to 2020. The increase was mainly due to a higher depreciable asset base; partly offset by the positive translation impact of a stronger Canadian dollar.

Equipment rents

Equipment rents expense decreased by \$96 million, or 22%, in 2021 when compared to 2020. The decrease was mainly due to lower car hire expense as a result of price incentives on railcars and the positive translation impact of a stronger Canadian dollar.

Management's Discussion and Analysis

Casualty and other

Casualty and other expense remained flat in 2021 when compared to 2020. Lower incident costs and the positive translation impact of a stronger Canadian dollar were offset by an increase in insurance premiums and \$20 million of advisory fees related to shareholder matters.

Loss (recovery) on assets held for sale

In the first quarter of 2021, the Company recovered \$137 million of the \$486 million loss on assets held for sale recorded in the second quarter of 2020, resulting from the Company entering into an agreement for the sale of non-core lines. See *Note 5 – Assets held for sale* to the Company's 2021 Annual Consolidated Financial Statements for additional information.

Transaction-related costs

For the year ended December 31, 2021, the Company incurred transaction costs related to the terminated CN Merger Agreement of \$84 million, consisting of \$125 million of transaction-related costs; US\$700 million (\$845 million) paid to KCS; and the related refund received of US\$700 million (\$886 million) in the third quarter. See *Note 3 – Acquisitions* to the Company's 2021 Annual Consolidated Financial Statements for additional information.

Other income and expenses

Interest expense

In 2021, Interest expense was \$610 million compared to \$554 million in 2020. The increase was mainly due to amortization of bridge financing and other fees of \$97 million; partly offset by a lower average level of debt and a positive translation impact of a stronger Canadian dollar.

Other components of net periodic benefit income

In 2021, Other components of net periodic benefit income was \$407 million compared to \$292 million in 2020. ⁽²⁾ The increase was mainly due to lower interest cost, partly offset by higher amortization of net actuarial loss and lower expected return on plan assets.

Merger termination fee

In 2021, the Company received a US\$700 million (\$886 million) termination fee resulting from KCS terminating the CN Merger Agreement and entering into a merger agreement with CP. See *Note 3 – Acquisitions* to the Company's 2021 Annual Consolidated Financial Statements for additional information.

Other income

In 2021, Other income was \$43 million compared to \$6 million in 2020. The increase was mainly due to fluctuations in the fair value of the equity investment in autonomous driving technology and higher gains on disposal of land.

Income tax expense ⁽¹⁾

In 2021, the Company recorded an income tax expense of \$1,443 million compared to an income tax expense of \$976 million in 2020. Included in the 2020 figure was a current income tax recovery of \$141 million recorded in the first quarter, resulting from the enactment of the CARES Act.

On March 27, 2020, the U.S. government enacted the CARES Act, which included corporate income tax measures allowing U.S. federal net operating losses (NOLs) arising in tax years 2018, 2019, and 2020 to be fully carried back to each of the five tax years preceding the tax year of the NOL. As a result of the CARES Act, the Company reclassified its 2019 deferred income tax asset of \$213 million on the NOL that arose in 2019, to a current income tax receivable and recorded a current income tax recovery of \$141 million in 2020 to reflect an amount recoverable at the higher U.S. federal corporate income tax rate of 35% applicable to pre-2018 tax years.

The effective tax rate for 2021 was 22.8% compared to 21.6% in 2020. Excluding the aforementioned income tax recovery, the adjusted effective tax rate for 2020 was 24.7%. ⁽²⁾ The decrease in the effective tax rate was mainly attributable to the merger termination fee, transaction-related costs, and bridge financing and other fees resulting from the KCS transaction recorded in the Consolidated Statements of Income, taxed at a lower inclusion rate.

(1) See *Note 2 – Change in accounting policy* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(2) The adjusted effective tax rate is a non-GAAP measure, defined as the effective tax rate adjusted to exclude the effect of the 2020 income tax recovery as it is not reflective of CN's underlying business operations. This measure does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to a similar measure presented by other companies.

Management's Discussion and Analysis

Summary of quarterly financial data

In millions, except per share data	2022 Quarters				2021 Quarters			
	Fourth	Third	Second	First	Fourth	Third	Second	First
Revenues	\$ 4,542	\$ 4,513	\$ 4,344	\$ 3,708	\$ 3,753	\$ 3,591	\$ 3,598	\$ 3,535
Operating income ⁽¹⁾	\$ 1,912	\$ 1,932	\$ 1,769	\$ 1,227	\$ 1,566	\$ 1,341	\$ 1,382	\$ 1,327
Dividends per share	\$ 0.7325	\$ 0.7325	\$ 0.7325	\$ 0.7325	\$ 0.6150	\$ 0.6150	\$ 0.6150	\$ 0.6150
Financial measures impacted by change in accounting policy								
Net income ⁽¹⁾⁽²⁾	\$ 1,420	\$ 1,455	\$ 1,325	\$ 918	\$ 1,201	\$ 1,686	\$ 1,036	\$ 976
Net income as previously reported ⁽¹⁾	N/A	N/A	N/A	N/A	\$ 1,199	\$ 1,685	\$ 1,034	\$ 974
Basic earnings per share ⁽²⁾	\$ 2.10	\$ 2.13	\$ 1.92	\$ 1.31	\$ 1.70	\$ 2.38	\$ 1.46	\$ 1.37
Basic earnings per share as previously reported	N/A	N/A	N/A	N/A	\$ 1.70	\$ 2.38	\$ 1.46	\$ 1.37
Diluted earnings per share ⁽¹⁾⁽²⁾	\$ 2.10	\$ 2.13	\$ 1.92	\$ 1.31	\$ 1.70	\$ 2.37	\$ 1.46	\$ 1.37
Diluted earnings per share as previously reported ⁽¹⁾	N/A	N/A	N/A	N/A	\$ 1.69	\$ 2.37	\$ 1.46	\$ 1.37

(1) Certain quarters include items that management believes do not necessarily arise as part of CN's normal day-to-day operations and can distort the analysis of trends in business performance. See the section of this MD&A entitled *Adjusted performance measures* for additional information on these items.

(2) See Note 2 – *Change in accounting policy* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Revenues generated by the Company during the year are influenced by seasonal weather conditions, general economic conditions, cyclical demand for rail transportation and competitive forces in the transportation marketplace (see the section entitled *Business risks* of this MD&A). Operating expenses reflect the impact of freight volumes, seasonal weather conditions, labor costs, fuel prices, and the Company's productivity initiatives. Fluctuations in the Canadian dollar relative to the US dollar have also affected the conversion of the Company's US dollar-denominated revenues and expenses and resulted in fluctuations in Net income in the rolling eight quarters presented above.

Summary of fourth quarter 2022

Revenues for the fourth quarter of 2022 increased by \$789 million, or 21%, to a record \$4,542 million, when compared to the same period in 2021. The increase was mainly attributable to higher fuel surcharge revenue as a result of higher fuel prices, the positive translation impact of a weaker Canadian dollar, freight rate increases and higher volumes of Canadian grain. Fuel surcharge revenues increased by \$382 million in the fourth quarter of 2022, mainly as a result of higher fuel prices. RTMs in the fourth quarter of 2022 increased by 6% when compared to the same period in 2021. Freight revenue per RTM increased by 15% in the fourth quarter of 2022 when compared to the same period in 2021, mainly driven by higher fuel surcharge revenue as a result of higher fuel prices, the positive translation impact of a weaker Canadian dollar and freight rate increases.

Operating expenses for the fourth quarter of 2022 increased by \$443 million, or 20%, to \$2,630 million, when compared to the same period in 2021. The increase was mainly as a result of higher fuel prices and the negative translation impact of a weaker Canadian dollar.

Operating income for the fourth quarter of 2022 increased by \$346 million, or 22%, to \$1,912 million, when compared to the same period in 2021. The operating ratio was 57.9% in the fourth quarter of 2022 compared to 58.3% in the fourth quarter of 2021, a 0.4-point improvement.

Net income for the fourth quarter of 2022 was \$1,420 million, an increase of \$219 million, or 18%, when compared to the same period in 2021, and diluted earnings per share increased by 24% to \$2.10. ⁽¹⁾

(1) See Note 2 – *Change in accounting policy* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

Financial position

The following tables provide an analysis of the Company's balance sheet as at December 31, 2022 as compared to 2021. Assets and liabilities denominated in US dollars have been translated to Canadian dollars using the foreign exchange rate in effect at the balance sheet date. As at December 31, 2022 and 2021, the foreign exchange rates were \$1.3554 and \$1.2637 per US\$1.00, respectively.

<i>In millions</i>	<i>December 31,</i>	2022	2021	Variance	Explanation of variance
Total assets	\$	50,662	\$ 48,538	\$ 2,124	
Cash and cash equivalents and restricted cash and cash equivalents		834	1,341	(507)	Refer to the Consolidated Statements of Cash Flows of the Company's 2022 Annual Consolidated Financial Statements.
Other current assets, excluding cash and cash equivalents and restricted cash and cash equivalents		2,383	2,085	298	Increase primarily due to higher accounts receivable, consistent with the increase in revenues.
Properties		43,537	41,178	2,359	See the section of this MD&A entitled <i>Liquidity and capital resources - Investing activities</i> , increase primarily due to gross property additions of \$2,757 million and the effect of foreign exchange, partly offset by depreciation of \$1,723 million.
Operating lease right-of-use-assets		470	445	25	Increase primarily due to higher lease renewals.
Pension asset		3,033	3,050	(17)	Decrease due to negative actual returns of \$2,823 million, interest cost of \$448 million and current service cost of \$150 million, almost entirely offset by actuarial gains arising from the increase in the year-end discount rate from 3.15% to 5.26% of \$3,383 million and employer contributions of \$21 million.
Intangible assets, goodwill and other		405	439	(34)	Decrease primarily due to the sale of an equity investment with a readily determinable fair value.
Total liabilities and shareholders' equity	\$	50,662	\$ 48,538	\$ 2,124	
Accounts payable and other excluding current portion of operating lease liabilities		2,660	2,504	156	Increase mainly due to timing of payments related to trade payables, as well as payroll related accruals.
Deferred income taxes		9,796	9,303	493	Increase primarily due to a deferred income tax expense of \$404 million recorded in Net income and a foreign exchange loss of \$292 million, partly off offset by a deferred income tax recovery of \$158 million recorded in Other comprehensive income. The deferred income tax expense and recovery were mostly attributable to new temporary differences generated during the year.
Other liabilities and deferred credits		441	427	14	Increase was not significant.
Pension and other postretirement benefits		486	645	(159)	Decrease primarily due to actuarial gains arising from the increase in year-end discount rates of \$205 million, employer contributions of \$26 million, plan amendment gains of \$21 million and benefit payments of \$14 million, partly offset by negative actual returns of \$65 million, interest cost of \$25 million and current service cost of \$9 million.
Total long-term debt, including the current portion		15,429	12,485	2,944	See the section of this MD&A entitled <i>Liquidity and capital resources - Financing activities</i> , increase primarily due to the issuance of US\$1.5 billion of Notes and the effect of foreign exchange.
Operating lease liabilities including the current portion		466	430	36	Increase primarily due to higher lease renewals.
Total shareholders' equity		21,384	22,744	(1,360)	Refer to the Consolidated Statements of Changes in Shareholders' Equity of the Company's 2022 Annual Consolidated Financial Statements.

Management's Discussion and Analysis

Liquidity and capital resources

The Company's principal source of liquidity is cash generated from operations, which is supplemented by borrowings in the money markets and capital markets. To meet its short-term liquidity needs, the Company has access to various financing sources, including unsecured revolving credit facilities, commercial paper programs, and an accounts receivable securitization program. In addition to these sources, the Company can use equipment loans or issue debt securities to meet its longer-term liquidity needs. The strong focus on cash generation from all sources gives the Company increased flexibility in terms of meeting its financing requirements.

The Company's primary short-term and long-term cash requirements are discussed below:

- *Short-term cash requirements:* includes working capital requirements, such as labor and fringe benefits, fuel, income tax instalments, pension contributions, and contractual obligations; interest and principal payments on current debt financing; dividends; and share repurchases.
- *Long-term cash requirements:* includes capital expenditures relating to track infrastructure and other, interest and principal repayments of long-term debt financing, operating and finance lease obligations; business acquisitions and long-term contractual obligations.

The Company sets priorities on its uses of available funds based on short-term operational requirements, expenditures to continue to operate a safe railway and pursue strategic initiatives, while also considering its long-term contractual obligations and returning value to its shareholders; and as part of its financing strategy, the Company regularly reviews its capital structure, cost of capital, and the need for additional debt financing. For a summary of short-term and long-term contractual obligations, including material cash requirements related to such obligations, refer to the table within this section entitled *Contractual obligations*.

The Company has a working capital deficit, which is common in the capital-intensive rail industry, and is not an indication of a lack of liquidity. The Company maintains adequate resources to meet daily cash requirements, and has sufficient financial capacity to manage its day-to-day cash requirements and current obligations. As at December 31, 2022 and 2021, the Company had Cash and cash equivalents of \$328 million and \$838 million, respectively; Restricted cash and cash equivalents of \$506 million and \$503 million, respectively; and a working capital deficit of \$625 million and a working capital surplus \$306 million, respectively. ⁽¹⁾ The cash and cash equivalents pledged as collateral for a minimum term of one month pursuant to the Company's bilateral letter of credit facilities are recorded as Restricted cash and cash equivalents. There are currently no specific requirements relating to working capital other than in the normal course of business as discussed herein.

The Company's U.S. and other foreign subsidiaries maintain sufficient cash to meet their respective operational requirements. If the Company should require more liquidity in Canada than is generated by its domestic operations, the Company could decide to repatriate funds associated with undistributed earnings of its foreign operations, including its U.S. and other foreign subsidiaries. The impact on liquidity resulting from the repatriation of funds held outside Canada would not be significant as such repatriation of funds would not cause significant tax implications to the Company under the tax laws of Canada and the U.S. and other foreign tax jurisdictions, and the tax treaties currently in effect between them.

The Company expects cash from operations and its various sources of financing to be sufficient to meet its ongoing obligations. The Company is not aware of any trends or expected fluctuations in its liquidity that would impact its ongoing operations or financial condition as of the date of this MD&A.

(1) Working capital is a non-GAAP measure which management believes is a useful measure of liquidity. The Company defines working capital as current assets of \$3,217 million (2021 - \$3,426 million) less current liabilities of \$3,842 million (2021 - \$3,120 million). Working capital does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to a similar measure presented by other companies.

Available financing sources

Shelf prospectus and registration statement

On May 4, 2022, the Company filed a new shelf prospectus with Canadian securities regulators and a registration statement with the SEC, pursuant to which CN may issue up to \$6.0 billion of debt securities in the Canadian and U.S. capital markets over a 25-month period following the filing date. This shelf prospectus and registration statement replaced CN's previous shelf prospectus and registration statement that expired on March 11, 2022.

As at December 31, 2022, the remaining capacity of this shelf prospectus and registration statement was \$4.1 billion. Access to the Canadian and U.S. capital markets under the shelf prospectus and registration statement is dependent on market conditions.

The Company's access to long-term funds in the capital markets depends on its credit ratings and market conditions. The Company believes that it continues to have access to the capital markets. If the Company were unable to borrow funds at acceptable rates in the capital markets, the Company could borrow under its credit facilities, draw down on its accounts receivable securitization program, access the pledged cash under its letter of credit facilities, raise cash by disposing of surplus properties or otherwise monetizing assets, reduce discretionary spending or take a combination of these measures to assure that it has adequate funding for its business.

Management's Discussion and Analysis

Revolving credit facilities

On March 31, 2022, the Company's revolving credit facility agreement was amended, to extend the term of the credit facility by one year and transition from the benchmark on US borrowings from London Interbank Offered Rate (LIBOR) to the Secured Overnight Financing Rate (SOFR). The credit facility of \$2.5 billion consists of a \$1.25 billion tranche maturing on March 31, 2025 and a \$1.25 billion tranche maturing on March 31, 2027. The revolving credit facility agreement is structured as a sustainability linked loan whereby its applicable margins are adjusted upon achievement of certain sustainability targets. The credit facility provides for borrowings at various benchmark interest rates, such as the SOFR and the Canadian Dollar Offered Rate (CDOR), plus applicable margins, based on CN's credit ratings and sustainability targets. There is no fallback language for CDOR.

As at December 31, 2022 and 2021, the Company had no outstanding borrowings under this revolving credit facility.

On March 18, 2022, the Company entered into a \$1.0 billion two-year unsecured revolving credit facility agreement with a consortium of lenders. The credit facility is available for working capital and general corporate purposes and provides for borrowings at various benchmark interest rates, such as SOFR and CDOR, plus applicable margins, based on CN's credit ratings. As at December 31, 2022, the Company had no outstanding borrowings under this revolving credit facility.

Equipment loans

The Company has a secured non-revolving term loan credit facility for financing or refinancing the purchase of equipment. The equipment loans made under the non-revolving credit facility have a tenor of 20 years, bear interest at variable rates such as LIBOR and CDOR plus a margin, are repayable in equal quarterly installments, are prepayable at any time without penalty, and are secured by rolling stock.

As at December 31, 2022 and 2021, the Company had outstanding borrowings of US\$542 million (\$734 million) and US\$572 million (\$723 million), respectively, and had no further amount available under this non-revolving term loan facility.

Commercial paper

The Company has a commercial paper program in Canada and in the U.S. Both programs are backstopped by the Company's revolving credit facility. The maximum aggregate principal amount of commercial paper that can be issued is \$2.5 billion, or the US dollar equivalent, on a combined basis. The commercial paper programs, which are subject to market rates in effect at the time of financing, provide the Company with a flexible financing alternative, and can be used for general corporate purposes. The cost of commercial paper and access to the commercial paper market in Canada and the U.S. are dependent on credit ratings and market conditions. If the Company were to lose access to its commercial paper program for an extended period of time, the Company could rely on its revolving credit facilities to meet its short-term liquidity needs.

As at December 31, 2022 and 2021, the Company had total commercial paper borrowings of US\$594 million (\$805 million) and US\$111 million (\$140 million), respectively, presented in Current portion of long-term debt on the Consolidated Balance Sheets.

Accounts receivable securitization program

The Company has an agreement to sell an undivided co-ownership interest in a revolving pool of accounts receivable to unrelated trusts for maximum cash proceeds of \$450 million. On January 19, 2023, the Company extended the term of its agreement by one year to February 1, 2025. The trusts are multi-seller trusts and the Company is not the primary beneficiary. Funding for the acquisition of these assets is customarily through the issuance of asset-backed commercial paper notes by the unrelated trusts.

The Company has retained the responsibility for servicing, administering and collecting the receivables sold. The average servicing period is approximately one month and the interest on borrowings under the Accounts receivable securitization program is renewed based on commercial paper rates then in effect or SOFR or CDOR if the commercial paper market is inaccessible and includes fallback language that allows for the succession of CDOR to an alternative rate consistent with market convention. Subject to customary indemnifications, each trust's recourse is limited to the accounts receivable transferred.

The accounts receivable securitization program provides the Company with readily available short-term financing for general corporate use. In the event the program is terminated before its scheduled maturity, the Company expects to meet its future payment obligations through its various sources of financing including its revolving credit facilities and commercial paper program, and/or access to capital markets.

As at December 31, 2022, and 2021 the Company had no outstanding borrowings under the accounts receivable securitization program.

Bilateral letter of credit facilities

The Company has a series of committed and uncommitted bilateral letter of credit facility agreements. On March 31, 2022, the Company extended the maturity date of certain committed bilateral letter of credit facility agreements to April 28, 2025. The agreements are held with various banks to support the Company's requirements to post letters of credit in the ordinary course of business. Under these agreements, the Company has the option from time to time to pledge collateral in the form of cash or cash equivalents, for a minimum term of one month, equal to at least the face value of the letters of credit issued.

Management's Discussion and Analysis

As at December 31, 2022, the Company had outstanding letters of credit of \$396 million (2021 - \$394 million) under the committed facilities from a total available amount of \$470 million (2021 - \$518 million) and \$100 million (2021 - \$158 million) under the uncommitted facilities.

As at December 31, 2022, included in Restricted cash and cash equivalents was \$397 million (2021 - \$396 million) and \$100 million (2021 - \$100 million) pledged as collateral under the committed and uncommitted bilateral letter of credit facilities, respectively.

Additional information relating to the Company's financing sources is provided in *Note 16 – Debt* to the Company's 2022 Annual Consolidated Financial Statements.

Credit ratings

The Company's ability to access funding in the debt capital markets and the cost and amount of funding available depends in part on its credit ratings. Rating downgrades could limit the Company's access to the capital markets, or increase its borrowing costs.

The following table provides the Company's long-term debt and commercial paper credit ratings as of the date of this MD&A, which remain unchanged from 2021.

	Outlook	Long-term debt rating ⁽¹⁾	Commercial paper rating ⁽¹⁾
DBRS Morningstar	Stable	A	R-1 (low)
Moody's Investors Service	Negative	A2	P-1
Standard & Poor's	Negative	A	A-1

⁽¹⁾ These credit ratings are not recommendations to purchase, hold, or sell the securities referred to above. Ratings may be revised or withdrawn at any time by the credit rating agencies. Each credit rating should be evaluated independently of any other credit rating.

Cash flows

The following table provides the cash flows for the year ended December 31, 2022 and 2021:

<i>In millions</i>	<i>Year ended December 31,</i>		<i>2022</i>		<i>2021</i>	<i>Variance</i>
Net cash provided by operating activities	\$	6,667	\$	6,971	\$	(304)
Net cash used in investing activities		(2,510)		(2,873)		363
Net cash used in financing activities		(4,667)		(3,857)		(810)
Effect of foreign exchange fluctuations on cash, cash equivalents, restricted cash, and restricted cash equivalents		3		–		3
<i>Net increase (decrease) in cash, cash equivalents, restricted cash, and restricted cash equivalents</i>		(507)		241		(748)
Cash, cash equivalents, restricted cash, and restricted cash equivalents, beginning of year		1,341		1,100		241
<i>Cash, cash equivalents, restricted cash, and restricted cash equivalents, end of year</i>	\$	834	\$	1,341	\$	(507)

Free cash flow

Free cash flow is a useful measure of liquidity as it demonstrates the Company's ability to generate cash for debt obligations and for discretionary uses such as payment of dividends, share repurchases and strategic opportunities. The Company defines its free cash flow measure as the difference between net cash provided by operating activities and net cash used in investing activities, adjusted for the impact of (i) business acquisitions and (ii) merger transaction-related payments, cash receipts and cash income taxes, which are items that are not indicative of operating trends. Free cash flow does not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

Management's Discussion and Analysis

The following table provides a reconciliation of Net cash provided by operating activities in accordance with GAAP, as reported for the years ended December 31, 2022, 2021 and 2020, to the non-GAAP free cash flow presented herein:

<i>In millions</i>	<i>Year ended December 31,</i>		<i>2021</i>	<i>2020</i>
Net cash provided by operating activities	\$	6,667	\$ 6,971	\$ 6,165
Net cash used in investing activities		(2,510)	(2,873)	(2,946)
<i>Net cash provided before financing activities</i>		4,157	4,098	3,219
<i>Adjustments:</i>				
Cash income taxes for merger transaction-related payments and cash receipts ⁽¹⁾		102	—	—
Transaction-related costs ⁽²⁾		—	125	—
Advance for acquisition ⁽³⁾		—	845	—
Refund of advance for acquisition ⁽³⁾		—	(886)	—
Merger termination fee ⁽³⁾		—	(886)	—
Acquisition, net of cash acquired ⁽⁴⁾		—	—	8
<i>Total adjustments</i>	\$	102	\$ (802)	\$ 8
<i>Free cash flow</i>	\$	4,259	\$ 3,296	\$ 3,227

(1) Relates to income tax payments of \$102 million for KCS merger transaction-related payments and cash receipts. See Note 4 – Acquisition to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(2) Relates to transaction-related costs of \$125 million paid. See Note 4 – Acquisition to the Company's 2022 Annual Consolidated Financial Statements for additional information.

(3) See Note 4 – Acquisition to the Company's 2022 Annual Consolidated Financial Statements, for additional information.

(4) Relates to cash paid on the closing of the acquisition of H&R Transport Limited (H&R), related to funds initially withheld for the indemnification of claims.

Operating activities

Net cash provided by operating activities decreased by \$304 million in 2022 when compared to 2021, mainly due to higher income tax payments partly offset by higher net income.

Pension contributions

The Company's contributions to its various defined benefit pension plans are made in accordance with the applicable legislation in Canada and the U.S. and such contributions follow minimum and maximum thresholds as determined by actuarial valuations. Pension contributions for the years ended December 31, 2022 and 2021 were \$70 million and \$127 million, respectively. The 2021 contributions are mainly attributable to the Company's main pension plan, the CN Pension Plan, for the current service cost as determined by the actuarial valuation as at December 31, 2020. For 2022, given the fully funded status of the CN Pension Plan as determined by the latest actuarial valuation for funding purposes as at December 31, 2021, the Company was prohibited from making contributions once the actuarial valuation report was filed in April 2022.

Based on the anticipated results of the Company's next actuarial valuations for funding purposes, the CN Pension Plan is expected to remain fully funded and at a level such that the Company would continue to be prohibited from making contributions to the CN Pension Plan in 2023. As such, the Company expects to make total cash contributions of approximately \$55 million for all pension plans in 2023.

See the section of this MD&A entitled *Critical accounting estimates – Pensions and other postretirement benefits* for additional information pertaining to the funding of the Company's pension plans. Additional information relating to the pension plans is provided in Note 18 – *Pensions and other postretirement benefits* to the Company's 2022 Annual Consolidated Financial Statements.

Income tax payments

The Company is required to make scheduled instalment payments as prescribed by the tax authorities. In Canada, the Company's domestic jurisdiction, tax instalments in a given year are generally based on the prior year's taxable income whereas in the U.S., the Company's predominant foreign jurisdiction, they are based on forecasted taxable income of the current year.

In 2022, net income tax payments were \$1,288 million (2021 - \$759 million). The increase was mostly due to higher required instalment payments in Canada and in the U.S. mainly caused by higher pre-tax income and the merger termination fee recorded in 2021.

For 2023, the Company's net income tax payments are expected to be approximately \$1.5 billion. The increase is mostly due to higher required instalment payments caused by higher expected pre-tax income.

Investing activities

Net cash used in investing activities decreased by \$363 million in 2022 when compared to 2021, mainly due to proceeds received from the assets held for sale and lower property additions.

Management's Discussion and Analysis

Property additions

The following table provides the property additions for the years ended December 31, 2022 and 2021:

<i>In millions</i>	<i>Year ended December 31,</i>		2022	2021
Track and roadway ⁽¹⁾	\$	1,841	\$	1,972
Rolling stock		390		403
Buildings		96		81
Information technology		293		291
Other		137		150
<i>Gross property additions</i>		2,757		2,897
<i>Less: Finance leases</i>		7		6
<i>Property additions</i>	\$	2,750	\$	2,891

(1) In 2022, approximately 80% (2021 - 78%) of the Track and roadway property additions were incurred to renew basic infrastructure. Costs relating to normal repairs and maintenance of Track and roadway properties are expensed as incurred, and amounted to approximately 10% of the Company's total operating expenses in 2022 (2021 - 11%).

2023 Capital expenditure program

In 2023, the Company will continue to invest in its capital program to improve the safety, efficiency and integrity of its network. These investments will enable and support the growth of the Company and will be financed with cash generated from operations or with cash from financing activities as required.

Financing activities

Net cash used in financing activities increased by \$810 million in 2022 when compared to 2021, primarily driven by higher repurchases of common shares; partly offset by higher issuance of long-term debt and higher issuance of commercial paper.

Debt financing activities

Debt financing activities in 2022 included the following:

- On November 15, 2022, repayment of US\$250 million (\$332 million) 2.25% Notes due 2022 upon maturity;
- On August 5, 2022, issuance of US\$800 million (\$1,028 million) 3.85% Notes due 2032 and US\$700 million (\$900 million) 4.40% Notes due 2052, in the U.S. capital markets, which resulted in total net proceeds of \$1,901 million. In conjunction with this debt issuance, CN settled a notional US\$675 million (\$868 million) of treasury locks, resulting in a cumulative loss of \$2 million. This loss was recorded in Accumulated other comprehensive loss and is being amortized over the term of the corresponding debt and recognized as an adjustment to interest expense on the Consolidated Statements of Income (see Note 23 – *Financial instruments* to the Company's 2022 Annual Consolidated Financial Statements for additional information);
- Repayment of equipment loans of \$40 million;
- Net issuance of commercial paper of \$563 million; and
- Repayment of finance leases of \$7 million.

Debt financing activities in 2021 included the following:

- On September 15, 2021, early redemption of US\$400 million (\$506 million) 2.85% Notes due 2021;
- On March 31, 2021, issuance of US\$310 million (\$389 million) equipment loan under the non-revolving credit facility;
- On January 18, 2021, early redemption of \$250 million 2.75% Notes due 2021;
- Repayment of equipment loans of \$33 million;
- Net issuance of commercial paper of \$66 million; and
- Repayment of finance leases of \$68 million.

Cash obtained from the issuance of debt was used for general corporate purposes, including the redemption and refinancing of outstanding indebtedness and share repurchases. Additional information relating to the Company's outstanding debt securities is provided in Note 16 – *Debt* to the Company's 2022 Annual Consolidated Financial Statements.

Management's Discussion and Analysis

Repurchase of common shares

The Company may repurchase its common shares pursuant to a NCIB at prevailing market prices plus brokerage fees, or such other prices as may be permitted by the Toronto Stock Exchange (TSX). The Company repurchased 29.4 million common shares under its NCIB effective between February 1, 2022 and January 31, 2023, which allowed for the repurchase of up to 42.0 million common shares.

The Company suspended its share repurchase program at the end of March 2020 due to the economic circumstances resulting from the COVID-19 pandemic. The Company resumed its share repurchases in February 2021 and suspended the share repurchases at the end of April 2021 in connection with the CN Merger Agreement with KCS. Following the termination of the CN Merger Agreement, the Company resumed share repurchases at the end of September 2021.

Previous NCIBs allowed for the repurchase of up to 14.0 million common shares between February 1, 2021 and January 31, 2022, and up to 16.0 million common shares between February 1, 2020 and January 31, 2021.

The following table provides the information related to the share repurchases for the years ended December 31, 2022, 2021 and 2020:

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>				Total NCIB
	2022	2021	2020		
February 2022 - January 2023 NCIB					
Number of common shares	29.4	N/A	N/A		29.4
Weighted-average price per share ⁽¹⁾	\$ 156.06	N/A	N/A	\$	156.06
Amount of repurchase ⁽¹⁾	\$ 4,591	N/A	N/A	\$	4,591
February 2021 - January 2022 NCIB					
Number of common shares	0.8	10.3	N/A		11.1
Weighted-average price per share ⁽¹⁾	\$ 153.54	\$ 153.69	N/A	\$	153.68
Amount of repurchase ⁽¹⁾	\$ 118	\$ 1,582	N/A	\$	1,700
February 2020 - January 2021 NCIB					
Number of common shares	N/A	—	2.0		2.0
Weighted-average price per share ⁽¹⁾	N/A	\$ —	\$ 113.56	\$	113.56
Amount of repurchase ⁽¹⁾	N/A	\$ —	\$ 226	\$	226
Total for the year					
Number of common shares	30.2	10.3	3.3 ⁽²⁾		
Weighted-average price per share ⁽¹⁾	\$ 156.00	\$ 153.69	\$ 116.97 ⁽²⁾		
Amount of repurchase ⁽¹⁾	\$ 4,709	\$ 1,582	\$ 379 ⁽²⁾		

(1) Includes brokerage fees.

(2) Includes 2020 repurchases from the February 2019 - January 2020 NCIB, which consisted of 1.3 million common shares, a weighted-average price per share of \$122.38 and an amount of repurchase of \$153 million.

On January 24, 2023, the Board of Directors of the Company approved a new NCIB, which allows for the repurchase of up to 32.0 million common shares between February 1, 2023 and January 31, 2024.

On August 16, 2022, the U.S. government enacted the *Inflation Reduction Act* (IRA). The IRA imposes a one percent excise tax on specified repurchases of stock by certain publicly traded corporations, effective for repurchases after December 31, 2022. The amount on which the tax is imposed is reduced by the value of any stock issued by such corporation during the tax year. This provision currently does not impact CN. Future regulations and interpretations are expected to be issued to clarify how the excise tax will be applied in practice and may alter the Company's initial assessment. Payments of this excise tax, if it became applicable, would increase the cost of making repurchases. It would not, however, affect the Company's results of operations as they would be accounted for as direct costs of common share repurchases and recorded within Total shareholders' equity.

On November 3, 2022, the Canadian government announced its intention to introduce a new two percent tax on repurchases of stock by a public corporation, effective for repurchases beginning January 1, 2024. Further details are expected to be provided in March or April of 2023 when the Canadian government tables its 2023 Budget; however it is expected that this proposed tax will be similar to the one percent excise tax provision enacted by the U.S. government on August 16, 2022. The Company continues to monitor the developments of this announcement. If this proposed two percent tax on repurchases of stock is enacted, it is expected to affect the Company. Payments of this excise tax, if it became applicable, would increase the cost of making repurchases. It would not, however, affect the Company's results of operations as they would be accounted for as direct costs of common share repurchases and recorded within Total shareholders' equity.

The Company's NCIB notices may be found online on SEDAR at www.sedar.com and on the SEC's website at www.sec.gov through EDGAR. Printed copies may be obtained by contacting the Corporate Secretary's Office.

Management's Discussion and Analysis

Share Trusts

The Company's Employee Benefit Plan Trusts ("Share Trusts") purchase CN's common shares on the open market, which are used to deliver common shares under the Share Units Plan and the Employee Share Investment Plan (ESIP). Shares purchased by the Share Trusts are retained until the Company instructs the trustee to transfer shares to participants of the Share Units Plan or the ESIP. Additional information relating to Share Trusts is provided in Note 19 – Share capital to the Company's 2022 Annual Consolidated Financial Statements.

The following tables provide the information related to the share purchases and settlements by Share Trusts under the Share Units Plan and the ESIP for the years ended December 31, 2022, 2021 and 2020:

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>		<i>2022</i>		<i>2021</i>		<i>2020</i>	
Share purchases by Share Units Plan Share Trusts								
Number of common shares			0.5		–			–
Weighted-average price per share	\$		170.85	\$	–	\$		–
Amount of purchase	\$		81	\$	–	\$		–
Share purchases by ESIP Share Trusts								
Number of common shares			0.2		0.2			0.1
Weighted-average price per share	\$		155.53	\$	142.90	\$		123.03
Amount of purchase	\$		24	\$	26	\$		14
Total purchases	\$		105	\$	26	\$		14

<i>In millions, except per share data</i>	<i>Year ended December 31,</i>		<i>2022</i>		<i>2021</i>		<i>2020</i>	
Share settlements by Share Units Plan Share Trusts								
Number of common shares			0.2		0.2			0.4
Weighted-average price per share	\$		88.23	\$	88.23	\$		88.23
Amount of settlement	\$		15	\$	20	\$		35
Share settlements by ESIP Share Trusts								
Number of common shares			0.2		0.2			0.2
Weighted-average price per share	\$		141.60	\$	128.40	\$		118.04
Amount of settlements	\$		23	\$	18	\$		27
Total settlements	\$		38	\$	38	\$		62

Dividends paid

During 2022, the Company paid quarterly dividends of \$0.7325 per share amounting to \$2,004 million, compared to \$1,740 million, at the rate of \$0.6150 per share, in 2021. On January 24, 2023, the Company's Board of Directors approved an increase of 8% to the quarterly dividend to common shareholders, from \$0.7325 per share in 2022 to \$0.7900 per share in 2023.

Contractual obligations

In the normal course of business, the Company incurs contractual obligations. The following table sets forth the Company's contractual obligations and related cash requirements for the following items as at December 31, 2022:

<i>In millions</i>	Total	2023	2024	2025	2026	2027	2028 & thereafter
Debt obligations ⁽¹⁾	\$ 15,419	\$ 1,056	\$ 509	\$ 385	\$ 713	\$ 36	\$ 12,720
Interest on debt obligations	11,205	627	617	601	580	568	8,212
Finance lease obligations	11	1	2	2	4	1	1
Operating lease obligations ⁽²⁾	505	140	110	89	56	32	78
Purchase obligations ⁽³⁾	2,300	2,030	143	126	1	–	–
Other long-term liabilities ⁽⁴⁾	553	67	43	43	27	23	350
Total contractual obligations	\$ 29,993	\$ 3,921	\$ 1,424	\$ 1,246	\$ 1,381	\$ 660	\$ 21,361

(1) Presented net of unamortized discounts and debt issuance costs and excludes finance lease obligations.

(2) Includes \$70 million related to renewal options reasonably certain to be exercised and \$39 million of imputed interest.

(3) Includes fixed and variable commitments for information technology services and licenses, railroad cars, locomotives, wheels, rail, engineering services, rail ties as well as other equipment and services. Costs of variable commitments were estimated using forecasted prices and volumes.

(4) Includes expected payments for workers' compensation, postretirement benefits other than pensions, net unrecognized tax benefits, environmental liabilities and pension obligations that have been classified as contractual settlement agreements.

Management's Discussion and Analysis

Adjusted debt-to-adjusted EBITDA multiple

Management believes that the adjusted debt-to-adjusted EBITDA multiple is a useful credit measure because it reflects the Company's ability to service its debt and other long-term obligations. The Company calculates the adjusted debt-to-adjusted EBITDA multiple as adjusted debt divided by the last twelve months of adjusted EBITDA. Adjusted debt is defined as the sum of Long-term debt and Current portion of long-term debt as reported on the Company's Consolidated Balance Sheets as well as Operating lease liabilities, including current portion and pension plans in deficiency recognized on the Company's Consolidated Balance Sheets due to the debt-like nature of their contractual and financial obligations. Adjusted EBITDA is calculated as Net income excluding Interest expense, Income tax expense, Depreciation and amortization, operating lease cost, Other components of net periodic benefit income, Other income (loss), and other significant items that are not reflective of CN's underlying business operations and which could distort the analysis of trends in business performance. Adjusted debt and adjusted EBITDA are non-GAAP measures used to compute the Adjusted debt-to-adjusted EBITDA multiple. These measures do not have any standardized meaning prescribed by GAAP and therefore, may not be comparable to similar measures presented by other companies.

The following table provides a reconciliation of debt and Net income in accordance with GAAP, reported as at and for the years ended December 31, 2022, 2021 and 2020, respectively, to adjusted debt and adjusted EBITDA, which have been used to calculate the non-GAAP adjusted debt-to-adjusted EBITDA multiple:

<i>In millions, unless otherwise indicated</i>	<i>As at and for the year ended December 31,</i>		
	2022	2021	2020
Debt	\$ 15,429	\$ 12,485	\$ 12,906
<i>Adjustments:</i>			
Operating lease liabilities, including current portion ⁽¹⁾	466	430	418
Pension plans in deficiency ⁽²⁾	353	447	553
Adjusted debt	\$ 16,248	\$ 13,362	\$ 13,877
Net income ⁽³⁾	\$ 5,118	\$ 4,899	\$ 3,545
Interest expense	548	610	554
Income tax expense ⁽³⁾	1,645	1,443	976
Depreciation and amortization	1,729	1,598	1,589
Operating lease cost ⁽⁴⁾	142	131	143
Other components of net periodic benefit income ⁽³⁾	(498)	(407)	(292)
Other loss (income)	27	(43)	(6)
<i>Adjustments:</i>			
Workforce reduction program ⁽⁵⁾	—	39	—
Advisory fees related to shareholder matters ⁽⁶⁾	22	20	—
Loss (recovery) on assets held for sale ⁽⁷⁾	—	(137)	486
Transaction-related costs ⁽⁸⁾	—	84	—
Merger termination fee ⁽⁹⁾	—	(886)	—
Adjusted EBITDA	\$ 8,733	\$ 7,351	\$ 6,995
Adjusted debt-to-adjusted EBITDA multiple (times)	1.86	1.82	1.98

- (1) Represents the present value of operating lease payments. See Note 13 – Leases to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (2) Represents the total funded deficit of all defined benefit pension plans with a projected benefit obligation in excess of plan assets. See Note 18 – Pensions and other postretirement benefits to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (3) In the first quarter of 2022, the Company changed its method of calculating market-related values of pension assets for its defined benefit plans using a retrospective approach. Comparative figures have been restated to conform to the change in methodology. See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (4) Represents the operating lease costs recorded in Purchased services and material and Equipment rents within the Consolidated Statements of Income. See Note 13 – Leases to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (5) Relates to employee termination benefits and severance costs related to a workforce reduction program, recorded in Labor and fringe benefits within the Consolidated Statements of Income.
- (6) Relates to advisory fees related to shareholder matters recorded in Casualty and other within the Consolidated Statements of Income.
- (7) Relates to the recovery of \$137 million of the \$486 million loss on assets held for sale recorded in the second quarter of 2020, resulting from the Company entering into an agreement for the sale of non-core lines. See Note 6 – Assets held for sale to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (8) Relates to transaction costs incurred as a result of the terminated CN Merger Agreement of \$84 million, consisting of \$125 million of transaction-related costs, partially offset by \$41 million of income generated as a result of the applicable foreign exchange rates prevailing at the time of payment and related receipt of the US\$700 million advance to KCS. See Note 4 – Acquisition to the Company's 2022 Annual Consolidated Financial Statements for additional information.
- (9) Relates to the termination fee resulting from KCS terminating the CN Merger Agreement and entering into a merger agreement with CP. See Note 4 – Acquisition to the Company's 2022 Annual Consolidated Financial Statements for additional information.

Management's Discussion and Analysis

All forward-looking statements discussed in this section are subject to risks and uncertainties and are based on assumptions about events and developments that may not materialize or that may be offset entirely or partially by other events and developments. See the section of this MD&A entitled *Forward-looking statements* for a discussion of assumptions and risk factors affecting such forward-looking statements.

Off balance sheet arrangements

Guarantees and indemnifications

In the normal course of business, the Company enters into agreements that may involve providing guarantees or indemnifications to third parties and others, which may extend beyond the term of the agreements. These include, but are not limited to, standby letters of credit, surety and other bonds, and indemnifications that are customary for the type of transaction or for the railway business. As at December 31, 2022, the Company has not recorded a liability with respect to guarantees and indemnifications. Additional information relating to guarantees and indemnifications is provided in *Note 22 – Major commitments and contingencies* to the Company's 2022 Annual Consolidated Financial Statements.

Outstanding share data

As at January 31, 2023, the Company had 668.5 million common shares and 3.8 million stock options outstanding.

Financial instruments

Risk management

In the normal course of business, the Company is exposed to various risks from its use of financial instruments. To manage these risks, the Company follows a financial risk management framework, which is monitored and approved by the Company's Audit, Finance and Risk Committee, with a goal of maintaining a strong balance sheet, optimizing earnings per share and free cash flow, financing its operations at an optimal cost of capital and preserving its liquidity. The Company has limited involvement with derivative financial instruments in the management of its risks and does not hold or issue them for trading or speculative purposes.

Credit risk

Credit risk arises from cash and temporary investments, accounts receivable and derivative financial instruments. To manage credit risk associated with cash and temporary investments, the Company places these financial assets with governments, major financial institutions, or other creditworthy counterparties, and performs ongoing reviews of these entities. To manage credit risk associated with accounts receivable, the Company reviews the credit history of each new customer, monitors the financial condition and credit limits of its customers, and keeps the average daily sales outstanding within an acceptable range. The Company works with customers to ensure timely payments, and in certain cases, requires financial security, including letters of credit. CN also obtains credit insurance for certain high risk customers. Although the Company believes there are no significant concentrations of customer credit risk, economic conditions can affect the Company's customers and can result in an increase to the Company's credit risk and exposure to business failures of its customers. A widespread deterioration of customer credit and business failures of customers could have a material adverse effect on the Company's results of operations, financial position or liquidity. The Company considers the risk due to the possible non-performance by its customers to be remote.

The Company has limited involvement with derivative financial instruments, however from time to time, it may enter into derivative financial instruments to manage its exposure to interest rates or foreign currency exchange rates. To manage the counterparty risk associated with the use of derivative financial instruments, the Company enters into contracts with major financial institutions that have been accorded investment grade ratings. Though the Company is exposed to potential credit losses due to non-performance of these counterparties, the Company considers this risk to be remote.

Liquidity risk

Liquidity risk is the risk that sufficient funds will not be available to satisfy financial obligations as they come due. In addition to cash generated from operations, which represents its principal source of liquidity, the Company manages liquidity risk by aligning other external sources of funds which can be obtained upon short notice, such as revolving credit facilities, commercial paper programs, and an accounts receivable securitization program. As well, the Company can issue debt securities in the Canadian and U.S. capital markets under its shelf prospectus and

Management's Discussion and Analysis

registration statement. The Company's access to long-term funds in the debt capital markets depends on its credit ratings and market conditions. The Company believes that its investment grade credit ratings contribute to reasonable access to capital markets. See the section of this MD&A entitled *Liquidity and capital resources* for additional information relating to the Company's available financing sources and its credit ratings.

Foreign currency risk

The Company conducts its business in both Canada and the U.S. and as a result, is affected by currency fluctuations. Changes in the exchange rate between the Canadian dollar and the US dollar affect the Company's revenues and expenses. To manage foreign currency risk, the Company designates US dollar-denominated debt of the parent company as a foreign currency hedge of its net investment in foreign operations. As a result, from the dates of designation, foreign exchange gains and losses on translation of the Company's US dollar-denominated debt are recorded in Accumulated other comprehensive loss, which minimizes volatility of earnings resulting from the conversion of US dollar-denominated debt into the Canadian dollar.

The Company also enters into foreign exchange forward contracts to manage its exposure to foreign currency risk. As at December 31, 2022, the Company had outstanding foreign exchange forward contracts to purchase a notional value of US\$1,311 million (2021 - US\$910 million). These outstanding contracts are at a weighted-average exchange rate of \$1.33 per US\$1.00 (2021 - \$1.27 per US\$1.00) with exchange rates ranging from \$1.29 to \$1.37 per US\$1.00 (2021 - \$1.25 to \$1.28 per US\$1.00). The weighted-average term of the contracts is 157 days (2021 - 251 days) with terms ranging from 29 days to 300 days (2021 - 112 days to 352 days). Changes in the fair value of foreign exchange forward contracts, resulting from changes in foreign exchange rates, are recognized in Other income in the Consolidated Statements of Income as they occur. For the year ended December 31, 2022, the Company recorded a gain of \$129 million (2021 - loss of \$18 million; 2020 - loss of \$3 million), related to foreign exchange forward contracts. These gains and losses were largely offset by the re-measurement of US dollar-denominated monetary assets and liabilities recognized in Other income. As at December 31, 2022, the fair value of outstanding foreign exchange forward contracts included in Other current assets and Accounts payable and other was \$33 million and \$4 million, respectively (2021 - \$nil and \$2 million, respectively).

The estimated annual impact on Net income of a one-cent change in the Canadian dollar relative to the US dollar is approximately \$30 million.

Interest rate risk

The Company is exposed to interest rate risk, which is the risk that the fair value or future cash flows of a financial instrument will vary as a result of changes in market interest rates. Such risk exists in relation to the Company's debt. The Company mainly issues fixed-rate debt, which exposes the Company to variability in the fair value of the debt. The Company also issues debt with variable interest rates, which exposes the Company to variability in interest expense.

To manage interest rate risk, the Company manages its borrowings in line with liquidity needs, maturity schedule, and currency and interest rate profile. In anticipation of future debt issuances, the Company may use derivative instruments such as forward rate agreements. During the year, CN entered into treasury lock agreements to hedge US Treasury benchmark rates related to an expected debt issuance in 2022. The treasury locks were designated as cash flow hedging instruments with cumulative gains or losses recorded in Accumulated other comprehensive loss in derivative instruments. On August 5, 2022, CN settled a notional US\$675 million (\$868 million) of treasury locks in conjunction with the issuances of US\$800 million (\$1,028 million) Notes due 2032 and US\$700 million (\$900 million) Notes due 2052, resulting in a cumulative loss of \$2 million. This loss was recorded in Accumulated other comprehensive loss and is being amortized over the term of the corresponding debt and recognized as an adjustment to interest expense on the Consolidated Statements of Income.

As at December 31, 2022, there were no treasury locks outstanding.

The estimated annual impact on Net income of a one-percent change in the interest rate on floating rate debt is approximately \$15 million.

Commodity price risk

The Company is exposed to commodity price risk related to purchases of fuel and the potential reduction in Net income due to increases in the price of diesel. Fuel prices are impacted by geopolitical events, changes in the economy or supply disruptions. Fuel shortages can occur due to refinery disruptions, production quota restrictions, climate, and labor and political instability.

The Company manages fuel price risk by offsetting the impact of rising fuel prices with the Company's fuel surcharge program. The surcharge applied to customers is determined in the second calendar month prior to the month in which it is applied, and is generally calculated using the average monthly price of On-Highway Diesel, and, to a lesser extent, West-Texas Intermediate crude oil.

While the Company's fuel surcharge program provides effective coverage, residual exposure remains given that fuel price risk cannot be completely managed due to timing and given the volatility in the market. As such, the Company may enter into derivative instruments to manage such risk when considered appropriate.

Management's Discussion and Analysis

Fair value of financial instruments

The financial instruments that the Company measures at fair value on a recurring basis in periods subsequent to initial recognition are categorized into the following levels of the fair value hierarchy based on the degree to which inputs are observable:

- Level 1: Inputs are quoted prices for identical instruments in active markets
- Level 2: Significant inputs (other than quoted prices included in Level 1) are observable
- Level 3: Significant inputs are unobservable

The carrying amounts of Cash and cash equivalents and Restricted cash and cash equivalents approximate fair value. These financial instruments include highly liquid investments purchased three months or less from maturity, for which the fair value is determined by reference to quoted prices in active markets.

The carrying amounts of Accounts receivable, Other current assets and Accounts payable and other approximate fair value due to their short maturity, unless otherwise specified. The fair value of equity investments with readily determinable fair values, included in Intangible assets, goodwill and other, is classified as Level 1 with gains and losses being recorded in Other income within the Consolidated Statements of Income. The fair value of derivative financial instruments, included in Other current assets and Accounts payable and other is classified as Level 2 and is used to manage the Company's exposure to foreign currency risk. The fair value is measured by discounting future cash flows using a discount rate derived from market data for financial instruments subject to similar risks and maturities. The fair value of assets held for sale, included in Other current assets is classified as Level 3. Additional disclosures are provided in *Note 6 - Assets held for sale* to the Company's 2022 Annual Consolidated Financial Statements.

The carrying amount of the Company's debt does not approximate fair value. The fair value is estimated based on quoted market prices for the same or similar debt instruments, as well as discounted cash flows using current interest rates for debt with similar terms, company rating, and remaining maturity. The Company classifies debt as Level 2. As at December 31, 2022, the Company's debt, excluding finance leases, had a carrying amount of \$15,419 million (2021 - \$12,475 million) and a fair value of \$14,137 million (2021 - \$14,424 million). The carrying amount of debt excluding finance leases exceeded the fair value due to an increase in market rates compared to the stated coupon rate.

Recent accounting pronouncements

The following recent Accounting Standards Update (ASU) issued by the Financial Accounting Standards Board (FASB) came into effect during the current year and has been adopted by the Company:

ASU 2021-10 Disclosures by business entities about government assistance (Topic 832)

The ASU will increase the transparency of government assistance including the disclosure of types of assistance, an entity's accounting for the assistance, and the effect of the assistance on an entity's financial statements.

The Company adopted this standard in the fourth quarter of 2022 with an effective date of January 1, 2022. The adoption of this standard has been applied to existing government assistance transactions. See *Note 12 - Properties* to the Company's 2022 Annual Consolidated Financial Statements for additional information.

The following recent ASUs issued by the FASB were issued in 2020, were amended in 2021 as well as in 2022 and have not been adopted by the Company:

ASU 2020-04 and ASU 2022-06 Reference rate reform (Topic 848): Facilitation of the effects of reference rate reform on financial reporting and related amendments

USD London Interbank Offered Rate (LIBOR) and Canadian Dollar Offered Rate (CDOR) are benchmark interest rates referenced in a variety of agreements. The publication of certain LIBOR and CDOR rates were discontinued in January 2022 and May 2021, respectively, and the remaining rates are expected to be discontinued on June 30, 2023 and June 30, 2024, respectively. The recommended alternative reference rates for LIBOR and CDOR are the Secured Overnight Financing Rate (SOFR) and Canadian Overnight Repo Rate Average (CORRA), respectively.

The ASU provides optional expedients and exceptions for applying generally accepted accounting principles to transactions affected by reference rate reform if certain criteria are met. These transactions include contract modifications, hedging relationships, and sale or transfer of debt securities classified as held-to-maturity.

The ASU was effective starting on March 12, 2020, and is available to be adopted on a prospective basis no later than December 31, 2024, following the amendments of ASU 2022-06. The Company has a non-revolving credit facility that references LIBOR and CDOR for which the alternative reference rate is expected to be SOFR and CORRA, respectively. As at December 31, 2022, the Company has equipment loans made under the non-revolving credit facility referencing LIBOR with outstanding borrowings of US\$542 million (see *Note 16 - Debt* to the Company's

Management's Discussion and Analysis

2022 Annual Consolidated Financial Statements for additional information). The equipment loans will be impacted by the discontinuance of the remaining LIBOR rates and the Company has fallback language that allows for the succession of LIBOR to SOFR.

The Company is evaluating the effects that the adoption of the ASU will have on its Consolidated Financial Statements and related disclosures, and whether it will elect to apply any of the optional expedients and exceptions provided in the ASU.

Other recently issued ASUs required to be applied on or after December 31, 2022 have been evaluated by the Company and are not expected to have a significant impact on the Company's Consolidated Financial Statements.

Critical accounting estimates

The preparation of financial statements in accordance with GAAP requires management to make estimates, judgments and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the disclosure of contingent assets and liabilities at the date of the financial statements. On an ongoing basis, management reviews its estimates based upon available information. Actual results could differ from these estimates. The Company's policies for income taxes, capital expenditures, depreciation, pensions and other postretirement benefits, personal injury and other claims and environmental matters, require management's more significant judgments and estimates in the preparation of the Company's consolidated financial statements and, as such, are considered to be critical. The following information should be read in conjunction with the Company's 2022 Annual Consolidated Financial Statements and Notes thereto.

Management discusses the development and selection of the Company's critical accounting policies, including the underlying estimates and assumptions, with the Audit, Finance and Risk Committee of the Company's Board of Directors. The Audit, Finance and Risk Committee has reviewed the Company's related disclosures.

Income taxes

The Company follows the asset and liability method of accounting for income taxes. Under the asset and liability method, the change in the net deferred income tax asset or liability is included in the computation of Net income or Other comprehensive income (loss). Deferred income tax assets and liabilities are measured using enacted income tax rates expected to apply to taxable income in the years in which temporary differences are expected to be recovered or settled. As a result, a projection of taxable income is required for those years, as well as an assumption of the ultimate recovery/settlement period for temporary differences. The projection of future taxable income is based on management's best estimate and may vary from actual taxable income.

On an annual basis, the Company assesses the need to establish a valuation allowance for its deferred income tax assets, and if it is deemed more likely than not that its deferred income tax assets will not be realized, a valuation allowance is recorded. The ultimate realization of deferred income tax assets is dependent upon the generation of sufficient future taxable income, of the necessary character, during the periods in which those temporary differences become deductible. Management considers the scheduled reversals of deferred income tax liabilities, the available carryback and carryforward periods, and projected future taxable income in making this assessment. As at December 31, 2022, in order to fully realize all of the deferred income tax assets, the Company will need to generate future taxable income of approximately \$2.3 billion, and, based upon the level of historical taxable income, projections of future taxable income of the necessary character over the periods in which the deferred income tax assets are deductible, and the reversal of taxable temporary differences, management believes, following an assessment of the current economic environment, it is more likely than not that the Company will realize the benefits of these deductible differences.

In addition, Canadian, or domestic, tax rules and regulations, as well as those relating to foreign jurisdictions, are subject to interpretation and require judgment by the Company that may be challenged by the taxation authorities upon audit of the filed income tax returns. Tax benefits are recognized if it is more likely than not that the tax position will be sustained on examination by the taxation authorities. As at December 31, 2022, the total amount of gross unrecognized tax benefits was \$52 million, before considering tax treaties and other arrangements between taxation authorities. The amount of net unrecognized tax benefits as at December 31, 2022 was \$38 million. If recognized, \$15 million of the net unrecognized tax benefits as at December 31, 2022 would affect the effective tax rate.

The Company believes that it is reasonably possible that \$12 million of the net unrecognized tax benefits as at December 31, 2022 related to Canadian and U.S. federal, state, and provincial income tax matters, each of which are individually insignificant, may be recognized over the next twelve months as a result of settlements and a lapse of the applicable statute of limitations, and will not significantly affect the effective tax rate as they are mainly related to temporary differences.

The Company's deferred income tax assets are mainly composed of temporary differences related to lease liabilities, the pension liability, accruals for personal injury and other claims, net operating losses and tax credit carryforwards, compensation reserves, and other postretirement benefits liability. The Company's deferred income tax liabilities are mainly composed of temporary differences related to properties, the pension asset and operating lease right-of-use assets. These deferred income tax assets and liabilities are recorded at the

Management's Discussion and Analysis

enacted tax rates of the periods in which the related temporary differences are expected to reverse. As a result, fiscal budget changes and/or changes in income tax laws that affect a change in the timing, the amount, and/or the income tax rate at which the temporary difference components will reverse, could materially affect deferred income tax expense as recorded in the Company's results of operations. The reversal of temporary differences is expected at future-enacted income tax rates which could change due to fiscal budget changes and/or changes in income tax laws. As a result, a change in the timing and/or the income tax rate at which the components will reverse, could materially affect deferred income tax expense as recorded in the Company's results of operations. From time to time, the federal, provincial, and state governments enact new corporate income tax rates resulting in either lower or higher tax liabilities. A one-percentage-point change in the Canadian and U.S. statutory federal tax rate would have the effect of changing the deferred income tax expense by \$208 million and \$157 million in 2022, respectively.

For the year ended December 31, 2022, the Company recorded an income tax expense of \$1,645 million, of which \$404 million was a deferred income tax expense.

For the year ended December 31, 2021, the Company recorded an income tax expense of \$1,443 million, of which \$513 million was a deferred income tax expense. ⁽¹⁾ The current income tax expense included a recovery of \$141 million resulting from the enactment of the CARES Act.

For the year ended December 31, 2020, the Company recorded an income tax expense of \$976 million, of which \$481 million was a deferred income tax expense. ⁽¹⁾ The deferred income tax expense included a recovery of \$112 million resulting from the enactment of a lower provincial corporate income tax rate.

The Company's net deferred income tax liability as at December 31, 2022 was \$9,796 million (2021 - \$9,303 million). Additional disclosures are provided in *Note 8 – Income taxes* to the Company's 2022 Annual Consolidated Financial Statements.

⁽¹⁾ See *Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements* for additional information.

Depreciation

Properties are carried at cost less accumulated depreciation including asset impairment write-downs. The Company has a process in place to determine whether or not costs qualify for capitalization, which requires judgment. The cost of properties, including those under finance leases, net of asset impairment write-downs, is depreciated on a straight-line basis over their estimated service lives, measured in years, except for rail and ballast whose services lives are measured in millions of gross tons. The Company follows the group method of depreciation whereby a single composite depreciation rate is applied to the gross investment in a class of similar assets, despite small differences in the service life or salvage value of individual property units within the same asset class. The Company uses approximately 40 different depreciable asset classes.

For all depreciable assets, the depreciation rate is based on the estimated service lives of the assets. Assessing the reasonableness of the estimated service lives of properties requires judgment and is based on currently available information, including periodic depreciation studies conducted by the Company. The Company's U.S. properties are subject to comprehensive depreciation studies as required by the STB and are conducted by external experts. Depreciation studies for Canadian properties are not required by regulation and are conducted internally. Studies are performed on specific asset groups on a periodic basis. Changes in the estimated service lives of the assets and their related composite depreciation rates are implemented prospectively.

The studies consider, among other factors, the analysis of historical retirement data using recognized life analysis techniques, and the forecasting of asset life characteristics. Changes in circumstances, such as technological advances, changes to the Company's business strategy, changes in the Company's capital strategy or changes in regulations can result in the actual service lives differing from the Company's estimates.

A change in the remaining service life of a group of assets, or their estimated net salvage value, will affect the depreciation rate used to amortize the group of assets and thus affect depreciation expense as reported in the Company's results of operations. A change of one year in the composite service life of the Company's fixed asset base would impact annual depreciation expense by approximately \$72 million.

Depreciation studies are a means of ensuring that the assumptions used to estimate the service lives of particular asset groups are still valid and where they are not, they serve as the basis to establish the new depreciation rates to be used on a prospective basis. In 2022, the Company completed depreciation studies for track properties and as a result, the Company changed the estimated service lives for various types of track assets and their related composite depreciation rates. The results of these depreciation studies did not materially affect the Company's annual depreciation expense.

Given the nature of the railroad and the composition of its network which is made up of homogeneous long-lived assets, it is impractical to maintain records of specific properties at their lowest unit of property.

Retirements of assets occur through the replacement of an asset in the normal course of business, the sale of an asset or the abandonment of a section of track. For retirements in the normal course of business, generally the life of the retired asset is within a reasonable range of the expected useful life, as determined in the depreciation studies, and, as such, no gain or loss is recognized under the group method. The asset's cost is removed from the asset account and the difference between its cost and estimated related accumulated depreciation (net

Management's Discussion and Analysis

of salvage proceeds), if any, is recorded as an adjustment to accumulated depreciation and no gain or loss is recognized. The historical cost of the retired asset is estimated by using deflation factors or indices that closely correlate to the properties comprising the asset classes in combination with the estimated age of the retired asset using a first-in, first-out approach, and applying it to the replacement value of the asset.

In each depreciation study, an estimate is made of any excess or deficiency in accumulated depreciation for all corresponding asset classes to ensure that the depreciation rates remain appropriate. The excess or deficiency in accumulated depreciation is amortized over the remaining life of the asset class.

For retirements of depreciable properties that do not occur in the normal course of business, the historical cost, net of salvage proceeds, is recorded as a gain or loss in income. A retirement is considered not to be in the normal course of business if it meets the following criteria: (i) it is unusual, (ii) it is significant in amount, and (iii) it varies significantly from the retirement pattern identified through depreciation studies. A gain or loss is recognized in Other income for the sale of land or disposal of assets that are not part of railroad operations.

For the year ended December 31, 2022, the Company recorded total depreciation expense of \$1,723 million (2021 - \$1,593 million; 2020 - \$1,583 million). As at December 31, 2022, the Company had Properties of \$43,537 million, net of accumulated depreciation of \$16,526 million (2021 - \$41,178 million, net of accumulated depreciation of \$15,093 million). Additional disclosures are provided in Note 12 – Properties to the Company's 2022 Annual Consolidated Financial Statements.

GAAP requires the use of historical cost as the basis of reporting in financial statements. As a result, the cumulative effect of inflation, which has significantly increased asset replacement costs for capital-intensive companies such as CN, is not reflected in operating expenses. Depreciation charges on an inflation-adjusted basis, assuming that all operating assets are replaced at current price levels, would be substantially greater than historically reported amounts.

Pensions

Effective January 1, 2022, CN elected to change its accounting methodology for determining the market-related value of assets for the Company's defined benefit pension plans. The new accounting method changes the calculation of market-related value of pension plan assets used to determine net periodic benefit cost but has no impact on the annual funded status of the plans. The Company's previous methodology calculated market-related value for pensions whereby realized and unrealized gains/losses and appreciation/depreciation in the value of the investments were recognized over a period of five years. The Company's new methodology will apply a corridor approach so that the market-related value does not result in a value that deviates excessively from its fair value. Specifically, the market-related value will not exceed 110% or be less than 90% of the fair value. This change establishes a corridor approach whereby the amount causing the market-related value to be outside of the 10% corridor will be recognized immediately in the market-related value of assets and will not be subject to the five-year period of recognition. There is no change in the recognition approach for investment income.

Pensions and other postretirement benefits

The Company's plans have a measurement date of December 31. The following table provides the Company's pension asset, pension liability and other postretirement benefits liability as at December 31, 2022, and 2021:

<i>In millions</i>	<i>December 31,</i>		<i>2022</i>		<i>2021</i>	
Pension asset		\$	3,033	\$	3,050	
Pension liability		\$	353	\$	447	
Other postretirement benefits liability ⁽¹⁾		\$	147	\$	212	

(1) Includes current portion of \$14 million as at December 31, 2022 (2021 - \$14 million). See Note 15 – Accounts payable and other to the Company's 2022 Annual Consolidated Financial Statements for the related current portion.

The descriptions in the following paragraphs pertaining to pensions relate generally to the Company's main pension plan, the CN Pension Plan, unless otherwise specified.

Amendments to postretirement medical benefits plans in the U.S.

In June 2022, CN approved changes affecting members participating in the Company's postretirement medical benefits plans in the U.S. Beginning in 2023, Medicare-eligible retirees will be covered by a health reimbursement arrangement, which is an employer-funded account that can be used for reimbursement of eligible medical expenses. Non-Medicare eligible retirees will continue to be covered by the existing self-insured program. This change constitutes a plan amendment event resulting in a \$28 million reduction to the affected plans' Accumulated projected benefit obligation, recorded in Other comprehensive income, and is composed of a prior service credit of \$21 million and an actuarial gain of \$7 million, substantially all due to lower expected future benefit payments and to the approximate 130 basis point increase in the end of period discount rates between the prior year end and May 31, 2022, respectively.

Management's Discussion and Analysis

Curtailed event

On October 31, 2021, the CN Board of Directors approved changes affecting non-unionized members participating in the Company's defined benefit pension plans. Effective April 1, 2024, the affected defined benefit pension plans will be amended to cease benefits accruals for non-unionized members, generally known as a delayed hard freeze. Effective April 1, 2024, all non-unionized members will be transferred to the Company's defined contribution pension plans for their future service. This delayed hard freeze constitutes a plan curtailment event recognized on October 31, 2021 resulting in a \$52 million reduction to the Projected benefit obligation, recorded in Other comprehensive income as an actuarial gain, mostly due to reflecting projected future salary increases and service only up to April 1, 2024. The curtailment event also triggered an interim re-measurement of the funded status of the affected defined benefit pension plans resulting in an actuarial gain of \$1,915 million recorded in Other comprehensive income composed of i) an actuarial gain on the Projected benefit obligation of \$1,808 million substantially all due to the 84 basis point increase in the end of period discount rate between December 31, 2020 (2.55%) and October 31, 2021 (3.39%), and ii) an actuarial gain on the Plan assets of \$107 million due to higher actual returns (\$982 million) compared to expected returns (\$875 million) over that same ten-month period. Due to the interim re-measurement, the resulting Net periodic benefit income recorded during the fourth quarter of 2021 increased by \$25 million composed of i) a decrease to Current service cost of \$9 million, and ii) an increase to Other components of net periodic benefit income of \$16 million.

Calculation of net periodic benefit cost (income)

In accounting for pensions and other postretirement benefits, assumptions are required for, among other things, the discount rate, the expected long-term rate of return on plan assets, the rate of compensation increase, health care cost trend rates, mortality rates, employee early retirements, terminations and disability. Changes in these assumptions result in actuarial gains or losses, which are recognized in Other comprehensive income (loss). The Company generally amortizes these gains or losses into net periodic benefit cost (income) over the expected average remaining service life of the employee group covered by the plans only to the extent that the unrecognized net actuarial gains and losses are in excess of the corridor threshold, which is calculated as 10% of the greater of the beginning-of-year balances of the projected benefit obligation or market-related value of plan assets. The Company's net periodic benefit cost (income) for future periods is dependent on demographic experience, economic conditions and investment performance. Recent demographic experience has revealed no material net gains or losses on termination, retirement, disability and mortality. Experience with respect to economic conditions and investment performance is further discussed herein.

For the years ended December 31, 2022, 2021 and 2020, the consolidated net periodic benefit cost (income) for pensions and other postretirement benefits were as follows:

<i>In millions</i>	<i>Year ended December 31,</i>	2022	2021	2020
Net periodic benefit income for pensions ⁽¹⁾	\$	(340)	\$ (210)	\$ (118)
Net periodic benefit cost for other postretirement benefits	\$	1	\$ 2	\$ 3

(1) See Note 2 – Change in accounting policy to the Company's 2022 Annual Consolidated Financial Statements for additional information. Net periodic benefit income for pensions was restated by \$9 million from \$201 million under the prior method to \$210 million for the year ended December 31, 2021 and by \$23 million from \$141 million under the prior method to \$118 million for the year ended December 31, 2020.

As at December 31, 2022 and 2021, the projected pension benefit obligation and accumulated other postretirement benefit obligation were as follows:

<i>In millions</i>	<i>December 31,</i>	2022	2021
Projected pension benefit obligation	\$	13,909	\$ 17,813
Accumulated other postretirement benefit obligation	\$	147	\$ 212

Discount rate assumption

The Company's discount rate assumption, which is set annually at the end of each year, is determined by management with the aid of third-party actuaries. The discount rate is used to measure the single amount that, if invested at the measurement date in a portfolio of high-quality debt instruments with a rating of AA or better, would provide the necessary cash flows to pay for pension benefits as they become due. For the Canadian pension and other postretirement benefit plans, future expected benefit payments are discounted using spot rates based on a derived AA corporate bond yield curve for each maturity year. A year-end discount rate of 5.26% based on bond yields prevailing at December 31, 2022 (2021 - 3.15%) was considered appropriate by the Company.

The Company uses the spot rate approach to measure current service cost and interest cost for all defined benefit pension and other postretirement benefit plans. Under the spot rate approach, individual spot discount rates along the same yield curve used in the determination of the projected benefit obligation are applied to the relevant projected cash flows for current service cost at the relevant maturity. More specifically, current service cost is measured using the cash flows related to benefits expected to be accrued in the following year by active

Management's Discussion and Analysis

members of a plan and interest cost is measured using the projected cash flows making up the projected benefit obligation multiplied by the corresponding spot discount rate at each maturity.

As at December 31, 2022, a 0.25% decrease in the 5.26% discount rate used to determine the projected benefit obligation would have resulted in a decrease of approximately \$345 million to the funded status for pensions and would result in an increase of approximately \$6 million to the 2023 projected net periodic benefit income. A 0.25% increase in the discount rate would have resulted in an increase of approximately \$325 million to the funded status for pensions and would result in a decrease of approximately \$6 million to the 2023 projected net periodic benefit income.

Expected long-term rate of return assumption

The expected long-term rate of return is determined based on expected future performance for each asset class and is weighted based on the investment policy. Consideration is taken of the historical performance, the premium return generated from an actively managed portfolio, as well as current target asset allocations, published market return expectations, economic developments, inflation rates and administrative expenses. Based on these factors, the rate is determined by the Company. For 2022, the Company used a long-term rate of return assumption of 7.00% on the market-related value of plan assets to compute net periodic benefit cost (income). In 2023, the Company will increase the expected long-term rate of return on plan assets by 60 basis points to 7.60% to reflect management's current view of long-term investment returns.

The assets of the Company's various plans are primarily held in separate trust funds ("Trusts") which are diversified by asset type, geography, sector and investment strategy. Each year, the CN Board of Directors reviews and confirms or amends the Statement of Investment Policies and Procedures (SIPP) which includes the plans' long-term target asset allocation ("Policy") and related benchmark indices. This Policy is based on the long-term expectations of the economy and financial market returns and considers the dynamics of the plans' benefit obligations. In 2022, the Policy was amended to implement a target asset allocation change to bonds and mortgages, equities and investment-related liabilities. These changes were taken into account in the determination of the Company's expected long-term rate of return assumption. In 2022, the Policy was: 2% cash and short-term investments, 38% bonds and mortgages, 2% emerging market debt, 3% private debt, 32% equities, 4% real estate, 5% resource and royalties, 4% infrastructure, 2% specialty portfolio, 12% absolute return investments and negative 4% for investment-related liabilities.

Annually, the CN Investment Division ("Investment Manager"), a division of the Company created to invest and administer the assets of the plans, can also implement an investment strategy ("Strategy") which can lead the Plan's actual asset allocation to deviate from the Policy due to changing market risks and opportunities. The Pension and Investment Committee of the Board of Directors ("Committee") regularly compares the actual plan asset allocation to the Policy and Strategy and compares the actual performance of the Company's pension plan assets to the performance of the benchmark indices.

The Committee's approval is required for all major investments in illiquid securities. The SIPP allows for the use of derivative financial instruments to implement strategies, to hedge and to adjust existing or anticipated exposures. The SIPP prohibits investments in securities of the Company or its subsidiaries.

The actual, market-related value and expected rates of return on plan assets for the last five years were as follows:

	2022	2021	2020	2019	2018
Actual	(14.2%)	8.7%	12.5%	12.2%	(2.4%)
Market-related value	2.8%	8.0%	7.1%	6.1%	5.7%
Expected	7.00%	6.79%	7.00%	7.00%	7.00%

The Company's expected long-term rate of return on plan assets reflects management's view of long-term investment returns and the effect of a 1% variation in such rate of return would result in a change to the net periodic benefit cost (income) of approximately \$105 million.

Management's assumption of the expected long-term rate of return is subject to risks and uncertainties that could cause the actual rate of return to differ materially from management's assumption. There can be no assurance that the plan assets will be able to earn the expected long-term rate of return on plan assets.

Net periodic benefit income for pensions for 2023

In 2023, the Company expects net periodic benefit income to be approximately \$390 million for all its defined benefit pension plans, as compared to actual net periodic benefit income of \$340 million for the year ended December 31, 2022.

Management's Discussion and Analysis

Plan asset allocation

Based on the fair value of the assets held as at December 31, 2022, the assets of the Company's various plans are comprised of 3% in cash and short-term investments, 35% in bonds and mortgages, 2% in emerging market debt, 6% in private debt, 30% in equities, 3% in real estate, 7% in resource and royalties, 4% in infrastructure, 2% in specialty portfolio, 15% in absolute return investments, 1% in alternative risk premia investments and negative 8% in investment-related liabilities. See *Note 18 – Pensions and other postretirement benefits* to the Company's 2022 Annual Consolidated Financial Statements for additional information on the fair value measurements of such assets.

A significant portion of the plans' assets are invested in publicly traded equity securities whose return is primarily driven by stock market performance. Debt securities also account for a significant portion of the plans' investments and provide a partial offset to the variation in the pension benefit obligation that is driven by changes in the discount rate. The funded status of the plan fluctuates with market conditions and impacts funding requirements. The Company will continue to make contributions to the pension plans that as a minimum meet pension legislative requirements.

Rate of compensation increase

The rate of compensation increase is determined by the Company based upon its long-term plans for such increases. For 2022, a basic rate of compensation increase of 2.75% was used to determine the projected benefit obligation and the net periodic benefit cost (income).

Mortality

The Canadian Institute of Actuaries (CIA) published in 2014 a report on Canadian Pensioners' Mortality ("Report"). The Report contained Canadian pensioners' mortality tables and improvement scales based on experience studies conducted by the CIA. The CIA's conclusions were taken into account in selecting management's best estimate mortality assumption used to calculate the projected benefit obligation as at December 31, 2022, 2021 and 2020.

Funding of pension plans

The Company's main Canadian defined benefit pension plan, the CN Pension Plan, accounts for 93% of the Company's pension obligation and can produce significant volatility in pension funding requirements, given the pension fund's size, the many factors that drive the plan's funded status, and Canadian statutory pension funding requirements. Adverse changes to the assumptions used to calculate the plan's funding status, particularly the discount rate used for funding purposes, as well as changes to existing federal pension legislation, regulation and guidance could significantly impact the Company's future contributions.

For accounting purposes, the funded status is calculated under generally accepted accounting principles for all pension plans. For funding purposes, the funded status is also calculated under going concern and solvency scenarios as prescribed under pension legislation and subject to guidance issued by the CIA and the Office of the Superintendent of Financial Institutions (OSFI) for all registered Canadian defined benefit pension plans. The Company's funding requirements are determined upon completion of actuarial valuations. Actuarial valuations are generally required on an annual basis for all Canadian defined benefit pension plans, or when deemed appropriate by the OSFI. Actuarial valuations are also required annually for the Company's U.S. qualified defined benefit pension plans.

The Company's most recently filed actuarial valuations for funding purposes for its Canadian registered defined pension plans conducted as at December 31, 2021 indicated a funding excess on a going concern basis of approximately \$4.2 billion and a funding excess on a solvency basis of approximately \$1.1 billion, calculated using the three-year average of the plans' hypothetical wind-up ratio in accordance with the *Pension Benefit Standards Regulations, 1985*. The federal pension legislation requires funding deficits, if any, to be paid over a number of years, as calculated under current pension regulations. Alternatively, a letter of credit can be subscribed to fulfill required solvency deficit payments.

The Company's next actuarial valuations for funding purposes for its Canadian registered defined benefit pension plans required as at December 31, 2022 will be performed in 2023. These actuarial valuations are expected to identify a funding excess on a going concern basis of approximately \$4.4 billion, while on a solvency basis a funding excess of approximately \$1.6 billion is expected.

Based on the anticipated results of these valuations, the CN Pension Plan is expected to remain fully funded and at a level such that the Company would continue to be prohibited from making contributions to the CN Pension Plan. As such, the Company expects to make total cash contributions of approximately \$55 million for all of the Company's pension plans in 2023. The Company expects cash from operations and its other sources of financing to be sufficient to meet its 2023 funding obligations.

Management's Discussion and Analysis

Information disclosed by major pension plan

The following table provides the Company's plan assets by category, projected benefit obligation at end of year, as well as Company and employee contributions by major defined benefit pension plan:

<i>In millions</i>	<i>December 31, 2022</i>	CN Pension Plan	BC Rail Pension Plan	U.S. and other plans	Total			
Plan assets by category								
Cash and short-term investments	\$	513	\$	17	\$	6	\$	536
Bonds		5,211		328		177		5,716
Mortgages		16		—		—		16
Emerging market debt		355		7		1		363
Private debt		992		—		5		997
Public equities		4,468		85		49		4,602
Private equities		683		2		4		689
Real estate		402		—		2		404
Resource and royalties		1,185		7		6		1,198
Infrastructure		716		1		3		720
Absolute return		2,498		48		13		2,559
Alternative risk premia		151		3		1		155
<i>Total investments</i>		17,190		498		267		17,955
Investment-related liabilities ⁽¹⁾		(1,444)		(28)		(7)		(1,479)
Other ⁽²⁾		92		3		18		113
Total plan assets	\$	15,838	\$	473	\$	278	\$	16,589
Projected benefit obligation at end of year	\$	12,887	\$	391	\$	631	\$	13,909
Company contributions in 2022	\$	21	\$	—	\$	26	\$	47
Employee contributions in 2022	\$	60	\$	—	\$	—	\$	60

(1) Investment-related liabilities include securities sold under repurchase agreements.

(2) Other consists of operating assets of \$155 million and liabilities of \$42 million required to administer the Trusts' investment assets and the plans' benefit and funding activities.

Additional disclosures are provided in Note 18 – Pensions and other postretirement benefits to the Company's 2022 Annual Consolidated Financial Statements.

Personal injury and other claims

In the normal course of business, the Company becomes involved in various legal actions seeking compensatory and occasionally punitive damages, including actions brought on behalf of various purported classes of claimants and claims relating to employee and third-party personal injuries, occupational disease and property damage, arising out of harm to individuals or property allegedly caused by, but not limited to, derailments or other accidents.

Canada

Employee injuries are governed by the workers' compensation legislation in each province whereby employees may be awarded either a lump sum or a future stream of payments depending on the nature and severity of the injury. As such, the provision for employee injury claims is discounted. In the provinces where the Company is self-insured, costs related to employee work-related injuries are accounted for based on actuarially developed estimates of the ultimate cost associated with such injuries, including compensation, health care and third-party administration costs. An actuarial study is generally performed at least on a triennial basis. For all other legal actions, the Company maintains, and regularly updates on a case-by-case basis, provisions for such items when the expected loss is both probable and can be reasonably estimated based on currently available information.

In 2022, 2021 and 2020 the Company recorded a decrease of \$11 million, \$11 million and \$13 million, respectively, to its provision for personal injuries in Canada as a result of actuarial valuations for employee injury claims.

Management's Discussion and Analysis

As at December 31, 2022, 2021 and 2020, the Company's provision for personal injury and other claims in Canada was as follows:

<i>In millions</i>	2022	2021	2020
Beginning of year	\$ 182	\$ 206	\$ 207
Accruals and other	16	12	31
Payments	(30)	(36)	(32)
End of year	\$ 168	\$ 182	\$ 206
Current portion - End of year	\$ 27	\$ 50	\$ 68

The assumptions used in estimating the ultimate costs for Canadian employee injury claims include, among other factors, the discount rate, the rate of inflation, wage increases and health care costs. The Company periodically reviews its assumptions to reflect currently available information. Over the past three years, the Company has not had to significantly change any of these assumptions. Changes in any of these assumptions could materially affect Casualty and other expense as reported in the Company's results of operations.

For all other legal claims in Canada, estimates are based on the specifics of the case, trends and judgment.

United States

Personal injury claims by the Company's employees, including claims alleging occupational disease and work-related injuries, are subject to the provisions of the *Federal Employers' Liability Act* (FELA). Employees are compensated under FELA for damages assessed based on a finding of fault through the U.S. jury system or through individual settlements. As such, the provision is undiscounted. With limited exceptions where claims are evaluated on a case-by-case basis, the Company follows an actuarial-based approach and accrues the expected cost for personal injury, including asserted and unasserted occupational disease claims, and property damage claims, based on actuarial estimates of their ultimate cost. An actuarial study is performed annually.

For employee work-related injuries, including asserted occupational disease claims, and third-party claims, including grade crossing, trespasser and property damage claims, the actuarial valuation considers, among other factors, the Company's historical patterns of claims filings and payments. For unasserted occupational disease claims, the actuarial valuation includes the projection of the Company's experience into the future considering the potentially exposed population. The Company adjusts its liability based upon management's assessment and the results of the study. On an ongoing basis, management reviews and compares the assumptions inherent in the latest actuarial valuation with the current claim experience and, if required, adjustments to the liability are recorded.

Due to the inherent uncertainty involved in projecting future events, including events related to occupational diseases, which include but are not limited to, the timing and number of actual claims, the average cost per claim and the legislative and judicial environment, the Company's future payments may differ from current amounts recorded.

In 2022, the Company recorded a decrease of \$9 million to its provision for U.S. personal injury and other claims attributable to non-occupational disease claims, third-party claims and occupational disease claims pursuant to the 2022 actuarial valuation. In 2021 and 2020, actuarial valuations resulted in a decrease of \$20 million and a decrease of \$10 million, respectively. The prior years' adjustments from the actuarial valuations were mainly attributable to non-occupational disease claims, third-party claims and occupational disease claims, reflecting changes in the Company's estimates of unasserted claims and costs related to asserted claims. The Company has an ongoing risk mitigation strategy focused on reducing the frequency and severity of claims through injury prevention and containment; mitigation of claims; and lower settlements of existing claims.

Management's Discussion and Analysis

As at December 31, 2022, 2021 and 2020, the Company's provision for personal injury and other claims in the U.S. was as follows:

<i>In millions</i>	2022	2021	2020
Beginning of year	\$ 125	\$ 141	\$ 145
Accruals and other	33	30	28
Payments	(39)	(45)	(29)
Foreign exchange	9	(1)	(3)
End of year	\$ 128	\$ 125	\$ 141
Current portion - End of year	\$ 18	\$ 25	\$ 41

For the U.S. personal injury and other claims liability, historical claim data is used to formulate assumptions relating to the expected number of claims and average cost per claim for each year. Changes in any one of these assumptions could materially affect Casualty and other expense as reported in the Company's results of operations. A 5% change in the asbestos average claim cost would result in an increase or decrease in the liability recorded of approximately \$1 million and a 1% change in the inflation trend rate for all injury types would result in an increase or decrease in the liability recorded of approximately \$2 million.

Environmental matters

Known existing environmental concerns

The Company is or may be liable for remediation costs at individual sites, in some cases along with other potentially responsible parties, associated with actual or alleged contamination. The ultimate cost of addressing these known contaminated sites cannot be definitively established given that the estimated environmental liability for any given site may vary depending on the nature and extent of the contamination; the nature of anticipated response actions, taking into account the available clean-up techniques; evolving regulatory standards governing environmental liability; and the number of potentially responsible parties and their financial viability. As a result, liabilities are recorded based on the results of a four-phase assessment conducted on a site-by-site basis. A liability is initially recorded when environmental assessments occur, remedial efforts are probable, and when the costs, based on a specific plan of action in terms of the technology to be used and the extent of the corrective action required, can be reasonably estimated. The Company estimates the costs related to a particular site using cost scenarios established by external consultants based on the extent of contamination and expected costs for remedial efforts. In the case of multiple parties, the Company accrues its allocable share of liability taking into account the Company's alleged responsibility, the number of potentially responsible parties and their ability to pay their respective share of the liability. Adjustments to initial estimates are recorded as additional information becomes available.

The Company's provision for specific environmental sites is undiscounted and includes costs for remediation and restoration of sites, as well as monitoring costs. Environmental expenses, which are classified as Casualty and other in the Consolidated Statements of Income, include amounts for newly identified sites or contaminants as well as adjustments to initial estimates. Recoveries of environmental remediation costs from other parties are recorded as assets when their receipt is deemed probable.

As at December 31, 2022, 2021 and 2020, the Company's provision for specific environmental sites was as follows:

<i>In millions</i>	2022	2021	2020
Beginning of year	\$ 56	\$ 59	\$ 57
Accruals and other	27	23	44
Payments	(26)	(26)	(42)
Foreign exchange	2	—	—
End of year	\$ 59	\$ 56	\$ 59
Current portion - End of year	\$ 41	\$ 38	\$ 46

The Company anticipates that the majority of the liability at December 31, 2022 will be paid out over the next five years. Based on the information currently available, the Company considers its provisions to be adequate.

Management's Discussion and Analysis

Unknown existing environmental concerns

While the Company believes that it has identified the costs likely to be incurred for environmental matters based on known information, the discovery of new facts, future changes in laws, the possibility of releases of hazardous materials into the environment and the Company's ongoing efforts to identify potential environmental liabilities that may be associated with its properties may result in the identification of additional environmental liabilities and related costs. The magnitude of such additional liabilities and the costs of complying with future environmental laws and containing or remediating contamination cannot be reasonably estimated due to many factors, including:

- the lack of specific technical information available with respect to many sites;
- the absence of any government authority, third-party orders, or claims with respect to particular sites;
- the potential for new or changed laws and regulations and for development of new remediation technologies and uncertainty regarding the timing of the work with respect to particular sites; and
- the determination of the Company's liability in proportion to other potentially responsible parties and the ability to recover costs from any third parties with respect to particular sites.

Therefore, the likelihood of any such costs being incurred or whether such costs would be material to the Company cannot be determined at this time. There can thus be no assurance that liabilities or costs related to environmental matters will not be incurred in the future, or will not have a material adverse effect on the Company's financial position or results of operations in a particular quarter or fiscal year, or that the Company's liquidity will not be adversely impacted by such liabilities or costs, although management believes, based on current information, that the costs to address environmental matters will not have a material adverse effect on the Company's financial position or liquidity. Costs related to any unknown existing or future contamination will be accrued in the period in which they become probable and reasonably estimable.

Future occurrences

In railroad and related transportation operations, it is possible that derailments or other accidents, including spills and releases of hazardous materials, may occur that could cause harm to human health or to the environment. As a result, the Company may incur costs in the future, which may be material, to address any such harm, compliance with laws and other risks, including costs relating to the performance of clean-ups, payment of environmental penalties and remediation obligations, and damages relating to harm to individuals or property.

Regulatory compliance

The Company may incur significant capital and operating costs associated with environmental regulatory compliance and clean-up requirements, in its railroad operations and relating to its past and present ownership, operation or control of real property. Environmental expenditures that relate to current operations are expensed unless they relate to an improvement to the property. Expenditures that relate to an existing condition caused by past operations and which are not expected to contribute to current or future operations are expensed. Operating expenses related to regulatory compliance activities for environmental matters for the year ended December 31, 2022 amounted to \$31 million (2021 - \$27 million; 2020 - \$25 million). For 2023, the Company expects to incur operating expenses relating to environmental matters in the same range as 2022. In addition, based on the results of its operations and maintenance programs, as well as ongoing environmental audits and other factors, the Company plans for specific capital improvements on an annual basis. Certain of these improvements help ensure facilities, such as fueling stations, waste water and storm water treatment systems, comply with environmental standards and include new construction and the updating of existing systems and/or processes. Other capital expenditures relate to assessing and remediating certain impaired properties. The Company's environmental capital expenditures for the year ended December 31, 2022 amounted to \$19 million (2021 - \$18 million; 2020 - \$20 million). For 2023, the Company expects to incur capital expenditures relating to environmental matters in the same range as 2022.

Management's Discussion and Analysis

Business risks

In the normal course of business, the Company is exposed to various business risks and uncertainties that can have an effect on the Company's results of operations, financial position, or liquidity. While some exposures may be reduced by the Company's risk management strategies, many risks are driven by external factors beyond the Company's control or are of a nature which cannot be eliminated. The key areas of business risks and uncertainties described in this section are not the only ones that can affect the Company. Additional risks and uncertainties not currently known to management or that may currently not be considered material by management, could nevertheless also have an adverse effect on the Company's business.

Competition

The Company faces significant competition, including from rail carriers and other modes of transportation, and is also affected by its customers' flexibility to select among various origins and destinations, including ports, in getting their products to market. Specifically, the Company faces competition from CP, which operates the other major rail system in Canada and services most of the same industrial areas, commodity resources and population centers as the Company; major U.S. railroads and other Canadian and U.S. railroads; long-distance trucking companies, transportation via the St. Lawrence-Great Lakes Seaway and the Mississippi River and transportation via pipelines. In addition, while railroads must build or acquire and maintain their rail systems, motor carriers and barges are able to use public rights-of-way that are built and maintained by public entities without paying fees covering the entire costs of their usage.

Competition is generally based on the quality and the reliability of the service provided, access to markets, as well as price. Factors affecting the competitive position of customers, including exchange rates and energy cost, could materially adversely affect the demand for goods supplied by the sources served by the Company and, therefore, the Company's volumes, revenues and profit margins. Factors affecting the general market conditions for the Company's customers can result in an imbalance of transportation capacity relative to demand. An extended period of supply/demand imbalance could negatively impact market rate levels for all transportation services, and more specifically the Company's ability to maintain or increase rates. This, in turn, could materially and adversely affect the Company's business, results of operations or financial position.

Previous consolidation of rail systems in the U.S. have resulted in larger rail systems that are in a position to compete effectively with the Company in numerous markets.

CP-KCS merger agreement

On February 28, 2022, CN filed a responsive application with the Surface Transportation Board (STB) requesting the STB to condition any approval of a CP-KCS merger on the divestiture of the KCS line from Kansas City, Missouri to Springfield and East St. Louis, Illinois (the "Kansas City Speedway") to CN, pursuant to the STB's statutory authority to order "the divestiture of parallel tracks" as a merger condition. Granting CN control of the line will provide customers with a new competitive option to move goods across a key North American economic corridor. On March 16, 2022, the STB suspended the procedural schedule until further notice in order for Applicants to explain an "apparent inconsistency" in baseline 2019 tonnage data presented by the Applicants. On April 27, 2022, the STB required Applicants to amend their operating plan and required parties to submit amended comments and responsive applications. On May 27, 2022, the STB issued a revised procedural schedule. On June 9, 2022, the Company submitted comments on Applicants' amended operating plan, and the Company submitted an amended operating plan in support of the divestiture of the Kansas City Speedway. On July 1, 2022, the STB accepted the Company's responsive application for consideration and consolidated the Company's divestiture request with the primary application. On July 12, 2022, the Company submitted reply comments, and parties of record submitted reply comments to the Company's proposed divestiture of the Kansas City Speedway. On July 22, 2022, the STB scheduled a three-day hearing for September 28 to 30, 2022. On August 11, 2022, the Company filed its rebuttal in support of its responsive application. The STB held a seven-day hearing between September 28 and October 7, 2022. The Company filed Comments on the Draft Environmental Impact Statement (EIS) for the CP-KCS merger on October 14, 2022. The Company filed its final brief on October 21, 2022. In response to questions from the STB at the hearing, the Company included an alternative trackage rights proposal to divestiture to remedy the competitive harm from parallel tracks between Kansas City and Chicago in the CP-KCS merger. On January 27, 2023, the STB Office of Environmental Analysis issued a Final EIS for the proposed CP-KCS merger, which will be considered in the STB's decision whether to approve the merger. The STB's decision on whether to approve the merger has not yet been issued.

There can be no assurance that the Company will be able to compete effectively against current or future competitors in the transportation industry, or that further consolidation within the transportation industry, including consolidation arising from the CP-KCS merger, if approved, and legislation allowing for more leniency in size and weight for motor carriers will not adversely affect the Company's competitive position. No assurance can be given that competitive pressures in transportation markets will not lead to reduced revenues, profit margins or both.

Management's Discussion and Analysis

Environmental matters

The Company's operations are subject to numerous federal, provincial, state, municipal and local environmental laws and regulations in Canada and the U.S. concerning, among other things, emissions into the air; discharges into waters; the generation, handling, storage, transportation, treatment and disposal of waste, hazardous substances and other materials; decommissioning of underground and aboveground storage tanks; and soil and groundwater contamination. A risk of environmental liability is inherent in railroad and related transportation operations; real estate ownership, operation or control; and other commercial activities of the Company with respect to both current and past operations. As a result, the Company incurs significant operating and capital costs, on an ongoing basis, associated with environmental regulatory compliance and clean-up requirements in its railroad operations and relating to its past and present ownership, operation or control of real property.

While the Company believes that it has identified the costs likely to be incurred for environmental matters in the next several years based on known information, the discovery of new facts, the participation and financial viability of other parties responsible for any such liability, future changes in laws, the possibility of releases of hazardous materials into the environment and the Company's ongoing efforts to identify potential environmental liabilities that may be associated with its properties may result in the identification of additional environmental liabilities and related costs.

In railroad and related transportation operations, it is possible that derailments or other accidents, including spills and releases of hazardous materials, may occur that could cause harm to human health or to the environment. In addition, the Company is also exposed to potential catastrophic liability risk, faced by the railroad industry in general, in connection with the transportation of toxic inhalation hazard materials such as chlorine and anhydrous ammonia, or other dangerous commodities such as crude oil and propane that the Company may be required to transport as a result of its common carrier obligations. Therefore, the Company may incur costs in the future, which may be material, to address any such harm, compliance with laws or other risks, including costs relating to the performance of clean-ups, payment of environmental penalties and remediation obligations, and damages relating to harm to individuals or property.

The environmental liability for any given contaminated site varies depending on the nature and extent of the contamination; the available clean-up techniques; evolving regulatory standards governing environmental liability; and the number of potentially responsible parties and their financial viability. As such, the ultimate cost of addressing known contaminated sites cannot be definitively established. Also, additional contaminated sites yet unknown may be discovered or future operations may result in accidental releases.

While some exposures may be reduced by the Company's risk mitigation strategies (including periodic audits, employee training programs, emergency plans and procedures, and insurance), many environmental risks are driven by external factors beyond the Company's control or are of a nature which cannot be completely eliminated. Therefore, there can be no assurance, notwithstanding the Company's mitigation strategies, that liabilities or costs related to environmental matters will not be incurred in the future or that environmental matters will not have a material adverse effect on the Company's results of operations, financial position or liquidity, or reputation.

Personal injury and other claims

In the normal course of business, the Company becomes involved in various legal actions seeking compensatory and occasionally punitive damages, including actions brought on behalf of various purported classes of claimants and claims relating to employee and third-party personal injuries, occupational disease, and property damage, arising out of harm to individuals or property allegedly caused by, but not limited to, derailments or other accidents. The Company maintains provisions for such items, which it considers to be adequate for all of its outstanding or pending claims and benefits from insurance coverage for occurrences in excess of certain amounts. The final outcome with respect to actions outstanding or pending at December 31, 2022, or with respect to future claims, cannot be predicted with certainty, and therefore there can be no assurance that their resolution will not have a material adverse effect on the Company's results of operations, financial position or liquidity, in a particular quarter or fiscal year.

Labor negotiations

The working conditions of the Company's unionized workforce are governed by collective agreements which are negotiated from time to time. Disputes relating to the renewal of collective agreements could potentially result in strikes, lockouts, slowdown of the business and ultimately loss of business. There can be no assurance that the Company will be able to renew and have its collective agreements ratified without a strike or lockout or that the resolution of these negotiations will not have a material adverse effect on the Company's results or financial position. Future labor agreements could increase labor and fringe benefits and related expenses.

Management's Discussion and Analysis

Canadian workforce

On September 13, 2021, the Company served notice to commence bargaining for the renewal of the collective agreement with the International Brotherhood of Electrical Workers (IBEW) governing approximately 700 signals and communications workers, which expired on December 31, 2021. After six months of bargaining, the IBEW served notice of dispute with the Minister of Labour which commences the conciliation/mediation process under the Canada Labour Code. On June 15, 2022, the IBEW gave a 72-hour notice of its intention to strike and on June 18, 2022 the IBEW commenced their strike. On July 4, 2022, the IBEW agreed to binding arbitration, bringing the strike to an end. On October 7, 2022, the arbitrator rendered a decision dated October 12, 2022 awarding a three percent wage increase per year from 2022 through 2024. This decision finalizes the collective agreement between CN and the IBEW, which expires on December 31, 2024.

On December 1, 2021, CN filed an application with the Canadian Industrial Relations Board (CIRB) pursuant to Section 18.1 of the Canada Labour Code to review the current bargaining unit structure applicable to running trades on its Canadian railway. There are currently 12 bargaining units and 16 collective agreements covering Locomotive Engineers and Conductors. CN believes that this structure is no longer appropriate for labor relations. A consolidated unit of Locomotive Engineers and Conductors governed by one collective agreement will address these issues and would be a more appropriate bargaining unit structure. On March 23, 2022, the Teamsters Canada Rail Conference (TCRC) served notice to commence bargaining for the renewal of the Conductor and Yard Coordinator collective agreement governing approximately 3,000 employees, which expired on July 22, 2022. In April 2022, CN filed a formal request with the CIRB requesting that the expiry date of the collective agreement be extended until the CIRB has rendered a decision on our application to conduct a bargaining unit review. On September 8, 2022, with the assistance of the CIRB as arbitrators, CN and the TCRC reached an agreement to consolidate 15 of the 16 collective bargaining agreements into one single agreement, and the CIRB issued a bargaining unit for the remaining single agreement on September 12, 2022. On September 29, 2022, the CIRB ruled that the sixteenth agreement, represented by Unifor, would be consolidated with the other Transportation agreements into one single agreement, one bargaining unit. Collective bargaining with the TCRC on the single agreement will commence on January 30, 2023.

On December 1, 2022, a tentative agreement was reached between CN and TCRC for Rail Traffic Controllers for the renewal of their collective agreement. This agreement was ratified on December 23, 2022. This is a three-year agreement expiring on December 31, 2025 and impacts approximately 160 employees.

On December 16, 2022, Unifor filed a Notice of Dispute with the Minister of Labour in the ongoing collective bargaining negotiations with CN, which impact the Clerical, Shopcraft and Intermodal groups. On December 30, 2022, the Minister of Labour appointed conciliators. Either party could potentially be in a position of a labor disruption (strike or lock-out) as early as March 21, 2023.

U.S. workforce

As of January 31, 2023, collective agreements covering all non-operating and operating craft employees at Grand Trunk Western Railroad Company (GTW), companies owned by Illinois Central Corporation (ICC), companies owned by Wisconsin Central Ltd. (WC) and Bessemer & Lake Erie Railroad Company (BLE), and all employees at Pittsburgh and Conneaut Dock Company (PCD) were ratified and remain in place. The agreements in place have various moratorium provisions, which preserve the status quo with respect to the given collective agreement during the terms of such moratoriums. Where negotiations are ongoing, the terms and conditions of existing agreements generally continue to apply until new agreements are reached or the processes of the *Railway Labor Act* have been exhausted.

The general approach to labor negotiations by U.S. Class I railroads is to bargain on a collective national basis with the industry, which GTW, ICC, WC and BLE currently participate in, for collective bargaining agreements covering all union-represented employees, with the exception of two employee groups working at PCD covering in total fewer than 35 employees. The national bargaining has concluded in the United States. On December 2, 2022, the round of national bargaining between the nation's freight railroads (including the Company) and all 12 rail unions was fully resolved when President Biden signed legislation passed by Congress. The legislation implemented collective bargaining agreement terms for the four unions that had not previously ratified their agreements. These agreement terms are the same terms that previously were ratified and implemented by the other eight rail unions. All US employees in the bargaining round are therefore now covered by new collective bargaining agreement terms based on the recommendations of Presidential Emergency Board 250. The new terms increase wages by a compounded 24 percent over the five-year term of the contract, from 2020 through 2024, with a 14.1 percent wage increase effective immediately. The agreements also include five US\$1,000 annual lump sum payments, adjustments to health care premiums, health benefit enhancements, and an additional personal leave day for all employees. This resulted in an incremental wage accrual of \$47 million, or \$35 million after-tax (\$0.05 per diluted share), recorded in the third quarter of 2022 in Labor and fringe benefits within the Consolidated Statements of Income, to reflect the terms of the new agreement.

Management's Discussion and Analysis

Regulation

Economic regulation – Canada

The Company's rail operations in Canada are subject to economic regulation by the Canadian Transportation Agency under the *Canada Transportation Act*, which provides rate and service remedies, including final offer arbitration, long-haul interswitching rates and mandatory interswitching. It also regulates the maximum revenue entitlement for the movement of regulated grain, charges for railway ancillary services and noise-related disputes. In addition, various Company business transactions must gain prior regulatory approval, with attendant risks and uncertainties, and the Company is subject to government oversight with respect to rate, service and business practice issues.

No assurance can be given that any current or future regulatory or legislative initiatives by the Canadian federal government and agencies will not materially adversely affect the Company's results of operations or its competitive and financial position.

Economic regulation – U.S.

The Company's U.S. rail operations are subject to economic regulation by the STB. The STB serves as both an adjudicatory and regulatory body and has jurisdiction over certain railroad rate and service issues and rail restructuring transactions such as mergers, line sales, line construction and line abandonments. As such, various Company business transactions must gain prior regulatory approval and aspects of its pricing and service practices may be subject to challenge, with attendant risks and uncertainties. Recent proposals in proceedings undertaken by the STB in a number of significant matters remain pending.

On March 15 and 16, 2022, the STB held a public hearing concerning a proposal by the STB in 2016 to amend its regulations regarding reciprocal switching. In addition to participating in the hearing, the Company, the Association of American Railroads, and other railroads submitted written testimony and post-hearing comments in February and April 2022. The STB members conducted additional meetings with stakeholders.

On April 22, 2022, the STB proposed to revise its existing service emergency rules for rail shippers seeking a directed service order during a service emergency and propose accelerated process for acute service emergencies. Comments were submitted in May and June 2022.

On April 26 and 27, 2022, the STB held a hearing on "Urgent Issues in Freight Rail Service". The STB required four Class I railroads to attend and invited three other Class I railroads, including the Company, to attend. On May 6, 2022, the STB required all Class I railroads to submit additional weekly service data and additional monthly employment data for six months. The STB also required certain Class I railroads to submit service recovery plans, but the Company is not required to do so. On October 28, 2022, the STB extended the data reporting for weekly service data and monthly employment data for another six months for all Class I railroads until May 5, 2023.

On August 8, 2019, the STB issued interim findings and guidance to National Railroad Passenger Corporation (Amtrak) and the Company regarding the terms and conditions for Amtrak's use of the Company's lines. On March 3, 2022, the STB issued a schedule for Amtrak and the Company to submit opening, reply, and rebuttal submissions on the remaining issues in the case. Opening and reply submissions were submitted in May and July 2022, and rebuttal submissions were submitted in August 2022.

On December 19, 2022, the STB issued final decisions in two proceedings relating to small rate disputes (Final Offer Rate Review and Voluntary Arbitration Program). On December 27, 2022, Union Pacific Railroad Company appealed the Final Offer Rate Review rule in the United States Court of Appeals for the Eighth Circuit, and the Association of American Railroads has also subsequently filed an appeal. On December 29, 2022, the Company appealed the Voluntary Arbitration Program rule in the United States Court of Appeals for the Seventh Circuit, and CSX also filed an appeal. On the same date, four railroads, including the Company, asked the STB to stay its deadline for Class I railroads to opt-in to the Voluntary Arbitration Program while any appeal and any petition for reconsideration is decided. On January 24, 2023, the STB denied without prejudice the request for stay and have allowed the railroads to refile a stay request on February 3, 2023. On January 24, 2023, petitions for reconsideration were filed by three other Class I railroads.

No assurance can be given that these and any other current or future regulatory or legislative initiatives by the U.S. federal government and agencies will not materially adversely affect the Company's results of operations or its competitive and financial position.

Economic regulation – International

The Organization for Economic Co-operation and Development (OECD) is in the process of finalizing its Pillar Two guidelines on some key components of global tax reform which includes a global minimum corporate tax rate of 15%. These guidelines are currently being proposed to be effective in 2024 and must now be enacted by the OECD member countries. It is possible that these guidelines, including the global minimum corporate tax rate measure of 15%, could impact the Company's effective tax rate. However, the Company is unable to predict at this time when and how this measure will be enacted into law and its impact on the Company and is currently monitoring developments in this area.

No assurance can be given that these and any other current or future regulatory or legislative initiatives by international organizations and agencies will not materially adversely affect the Company's results of operations or its competitive and financial position.

Management's Discussion and Analysis

Safety regulation – Canada

The Company's rail operations in Canada are subject to safety regulation by the Minister under the *Railway Safety Act* as well as the rail portions of other safety-related statutes, which are administered by Transport Canada. The Company may be required to transport toxic inhalation hazard materials as a result of its common carrier obligations and, as such, is also subject to additional regulatory oversight in Canada. The *Transportation of Dangerous Goods Act*, also administered by Transport Canada, establishes the safety requirements for the transportation of goods classified as dangerous and enables the adoption of regulations for security training and screening of personnel working with dangerous goods, as well as the development of a program to require a transportation security clearance for dangerous goods, the tracking of dangerous goods during transport and the development of an emergency response plan.

On March 10, 2021, the Minister issued two orders respecting railway uncontrolled movements. The first order imposes special interim procedures aimed at reducing the risks of uncontrolled movements. The second order requires the Canadian railway industry to revise existing rules to incorporate design and performance parameters for locomotives with roll-away protection, to develop a precise definition of attended versus unattended equipment as well as incorporate requirements on the use of roll-away protection to reduce the risks of an uncontrolled movement. In accordance with the second order, the Railway Association of Canada filed the requested revisions on March 10, 2022. The Minister approved the revised rules on May 9, 2022 and they came into force on October 1, 2022.

On November 25, 2020, the Minister approved the new Duty and Rest Period Rules for Operating Employees (the "Rules") subject to conditions clarifying some aspects of the Rules. In accordance with the new Rules, CN filed with Transport Canada on November 25, 2021, its Fatigue Management Plan containing an extensive set of prescriptive requirements for processes around scheduling, fitness for duty, deadheading, and other requirements of the new rules. On March 11, 2022, Transport Canada opened pre-consultations on proposed Fatigue Management System Regulations. On November 25, 2022, provisions of the Rules prohibiting employees from commencing a duty period or operating railway equipment if unfit for duty came into force. The other provisions of the Rules applicable to CN will come into effect on May 25, 2023.

On July 9 and 11, 2021, Transport Canada issued orders pursuant to the *Railway Safety Act* in response to wildfires in British Columbia. In addition to requiring the implementation of specific measures aimed at reducing the risk of fires and improving their detection, the Order directed railway companies to complete and implement a Final Extreme Weather Fire Risk Mitigation Plan ("Final Plan") within 60 days following the issuance of these orders. In accordance with this requirement, CN filed its proposed Final Plan on September 9, 2021. On October 14, 2021, the Transportation Safety Board confirmed that its investigation of the Lytton fire had not revealed any evidence to link railway operations to the fire. On June 15, 2022, the Minister approved the Railway Extreme Heat and Fire Risk Mitigation Rules requiring railway companies to reduce speed and conduct additional track inspections when temperatures are high, inspect locomotive exhaust systems more frequently, and implement a fire risk reduction plan.

On November 26, 2021, Transport Canada adopted regulations revising the scope of application of the Grade Crossing Regulations by setting requirements for grade crossings according to a risk-based model. Under this model, existing crossings considered to be low risk are exempted from upgrade requirements. The amendments also extend the compliance deadline for upgrade requirements (previously November 28, 2021) on the basis of the risk-based model. For crossings considered to be high priority, the deadline is extended by one year (until November 28, 2022), and for all other crossings (i.e., crossings that do not meet the threshold criteria for low-risk or high priority) by three years (until November 28, 2024).

On May 31, 2022, the Minister approved revisions to the Rules Respecting Track Safety which will come into force on May 31, 2023. The revisions include requirements to make available to Transport Canada railway track standards and for the confidential treatment of technical sensitive information provided by railway companies. The revisions also provide for the development of a plan for selecting, defining and analyzing key performance indicators; new requirement for crossties and new inspection requirements for Class I track where occupied passenger trains are operated.

On July 25, 2022, the Minister issued an order requesting railway companies to revise the Railway Freight and Passenger Train Brake Inspection and Safety Rules to incorporate enhanced inspection requirements for the performance of air brakes, including in cold temperatures. In accordance with these directions, the Railway Association of Canada filed proposed revisions respecting air brake train tests on November 30, 2022. Revisions respecting test standards must be filed by May 31, 2023.

On September 2, 2022, Transport Canada's Locomotive Voice and Video Recorder (LVVR) Regulations came into force. These regulations prohibit a railway company from operating railway equipment unless it is fitted with prescribed recording instruments and the prescribed information is recorded, collected and preserved. LVVR technology will assist in preventing accidents and facilitate investigations to better understand the circumstances of accidents. Supply chain disruptions have hampered the industry's ability to strictly adhere to the implementation timelines. Transport Canada acknowledges these challenges and encourages the industry to diligently equip their operating railway equipment.

On October 6, 2022, a Task Force appointed by the Minister on January 31, 2022 made recommendations regarding short and long-term actions to alleviate supply chain congestion. No formal action has been announced by the Minister on the basis of this report.

Management's Discussion and Analysis

On November 17, 2022, the Minister tabled Bill C-33 in the House of Commons. The Bill is titled "An Act to amend the Customs Act, the Railway Safety Act, the Transportation of Dangerous Goods Act, 1992, the Marine Transportation Security Act, the Canada Transportation Act and the Canada Marine Act and to make a consequential amendment to another Act". Key amendments are to the *Railway Safety Act* which will provide the Minister the same power for security questions which he currently has to deal with safety issues.

On January 9, 2023, Transport Canada published amendments to the *Transportation Information Regulations* which will require Canadian railways to provide information respecting performance indicators such as transit time and dwell time. This information will be published each week. The amendments will come into force on April 4, 2023.

No assurance can be given that these and any other current or future regulatory or legislative initiatives by the Canadian federal government and agencies will not materially adversely affect the Company's results of operations or its competitive and financial position.

Safety regulation – U.S.

The Company's U.S. rail operations are subject to safety regulation by the FRA under the *Federal Railroad Safety Act* as well as rail portions of other safety statutes, with the transportation of certain hazardous commodities also governed by regulations promulgated by the Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA requires carriers operating in the U.S. to report annually the volume and route-specific data for cars containing these commodities; conduct a safety and security risk analysis for each used route; identify a commercially practicable alternative route for each used route; and select for use the practical route posing the least safety and security risk. In addition, the Transportation Security Administration (TSA) requires rail carriers to provide upon request, within five minutes for a single car and 30 minutes for multiple cars, location and shipping information on cars on their networks containing toxic inhalation hazard materials and certain radioactive or explosive materials; and ensure the secure, attended transfer of all such cars to and from shippers, receivers and other carriers that will move from, to, or through designated high-threat urban areas.

On February 18, 2020, the FRA issued a final rule that requires each Class I railroad and certain shortline railroads to develop a railroad Risk Reduction Program (RRP) in a written plan that will be reviewed and approved by the FRA and will be subject to audit. CN submitted its plan on August 16, 2021. In November 2021, the FRA denied the Class I risk reduction program plans with comments. CN submitted its revised plan on February 7, 2022 and made further revisions in response to comments from the FRA on March 25, 2022. On July 7, 2022, the FRA approved the Company's RRP. On September 8, 2022, the FRA issued a notice of proposed rulemaking regarding whether the FRA should retain or remove a provision in the final RRP rule clarifying that contractors who perform a significant portion of a railroad's operations are considered the railroad's directly affected employees for purposes of the RRP rule. The FRA is seeking comments in response to a petition for reconsideration of the final rule filed by the Association of American Railroads (AAR). Comments were submitted on November 7, 2022.

On March 1, 2021, the FRA implemented an emergency order governing the use of face masks in railroad operations. On April 19, 2022, the FRA announced that it will not enforce its face mask emergency order at this time in light of the court decision concerning the Centers for Disease Control and Prevention (CDC) transportation mask order.

The US government previously announced that it intended to impose vaccine mandates on (1) government contractors and (2) all private sector employers with 100 or more employees. As to government contractors, the Biden Administration issued Executive Order 14042 called "Ensuring Adequate COVID-19 Safety Protocols for Federal Contractors." The Executive Order required federal government contractors and others doing business with federal contractors to require vaccination of their employees. The contractor mandate was originally scheduled to go into effect on January 10, 2022. However, two federal appeals courts have ruled that the contractor mandate exceeded the President's authority. Additionally, two other federal appellate courts covering different states have pending cases in which the mandate is also challenged. The Biden Administration has indicated that it does not plan to enforce the mandate with these adverse rulings in place. For private sector employers, the Occupational Safety and Health Administration (OSHA) issued an emergency temporary standard (ETS) requiring employers with 100 or more employees to mandate vaccination. After a decision by the United States Supreme Court, OSHA withdrew the ETS.

On June 13, 2022, the FRA issued a final rule requiring Class I and other railroads to submit fatigue risk management program plans by July 13, 2023 to the FRA for approval. Railroads have 36 months to implement their plans after the FRA approves the plans.

On July 28, 2022, the FRA proposed a rule requiring two-person crew, except in certain circumstances. The FRA held a public hearing on the proposed rule on December 14, 2022. The Association of American Railroads, the Company, and other railroads submitted comments on December 21, 2022.

No assurance can be given that these and any other current or future regulatory or legislative initiatives by the U.S. federal government and agencies will not materially adversely affect the Company's results of operations or its competitive and financial position.

Management's Discussion and Analysis

Regulation – Vessels

The Company's vessel operations are subject to regulation by the U.S. Coast Guard and the Department of Transportation, Maritime Administration, which regulate the ownership and operation of vessels operating on the Great Lakes and in U.S. coastal waters. In addition, the Environmental Protection Agency has authority to regulate air emissions from these vessels.

Security

The Company is subject to statutory and regulatory directives in the U.S. addressing homeland security concerns. In the U.S., safety matters related to security are overseen by the TSA, which is part of the U.S. Department of Homeland Security (DHS) and PHMSA, which, like the FRA, is part of the U.S. Department of Transportation. Border security falls under the jurisdiction of U.S. Customs and Border Protection (CBP), which is part of the DHS. In Canada, the Company is subject to regulation by the Canada Border Services Agency (CBSA). Matters related to agriculture-related shipments crossing the Canada/U.S. border also fall under the jurisdiction of the U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA) in the U.S. and the Canadian Food Inspection Agency (CFIA) in Canada. More specifically, the Company is subject to:

- border security arrangements, pursuant to an agreement the Company and CP entered into with the CBP and the CBSA;
- the CBP's Customs-Trade Partnership Against Terrorism (C-TPAT) program and designation as a low-risk carrier under CBSA's Customs Self-Assessment (CSA) program;
- regulations imposed by the CBP requiring advance notification by all modes of transportation for all shipments into the U.S. The CBSA is also working on similar requirements for Canada-bound traffic;
- inspection for imported fruits and vegetables grown in Canada and the agricultural quarantine and inspection (AQI) user fee for all traffic entering the U.S. from Canada; and
- gamma ray screening of cargo entering the U.S. from Canada, and potential security and agricultural inspections at the Canada/U.S. border.

The Company has worked with the AAR to develop and put in place an extensive industry-wide security plan to address terrorism and security-driven efforts by state and local governments seeking to restrict the routings of certain hazardous materials. If such state and local routing restrictions were to go into force, they would be likely to add to security concerns by foreclosing the Company's most optimal and secure transportation routes, leading to increased yard handling, longer hauls, and the transfer of traffic to lines less suitable for moving hazardous materials, while also infringing upon the exclusive and uniform federal oversight over railroad security matters.

While the Company will continue to work closely with the CBSA, CBP, and other Canadian and U.S. agencies, as described above, no assurance can be given that these and future decisions by the U.S., Canadian, provincial, state, or local governments on homeland security matters, legislation on security matters enacted by the U.S. Congress or Parliament, or joint decisions by the industry in response to threats to the North American rail network, will not materially adversely affect the Company's results of operations, or its competitive and financial position.

Transportation of hazardous materials

As a result of its common carrier obligations, the Company is legally required to transport toxic inhalation hazard materials regardless of risk or potential exposure or loss. A train accident involving the transport of these commodities could result in significant costs and claims for personal injury, property damage, environmental penalties and remediation in excess of insurance coverage for these risks, which may materially adversely affect the Company's results of operations, or its competitive and financial position.

Pandemic risk

Severe disruptions in regional economies and the world economy can be caused by the outbreak of a contagious illness, such as the COVID-19 pandemic. Such pandemics and efforts to contain them could result in international, national and local border closings, travel restrictions, significant disruptions to business operations, supply chains, customer activity and demand, service cancellations, reductions and other changes, significant challenges in healthcare service preparation and delivery, and quarantines, as well as considerable general concern and uncertainty, all of which could negatively affect the economic environment and may in the future have further impacts, as was the case for the COVID-19 pandemic. It is not possible to predict what measures and restrictions may be imposed by governmental authorities and the period of time during which those measures and restrictions may apply. Economic and supply chain disruptions, including temporary staff shortages resulting from a pandemic, could further materially affect the Company's financial results and operations. A pandemic could also further and significantly impact freight demand and commodity prices in connection with ensuing economic disruption, supply shortages, trade disruption, temporary staff shortages and temporary closures of facilities in geographic locations more importantly impacted by the outbreak. The scope and severity of such disruptions and their impact on the Company's financial results and operations could be material.

Management's Discussion and Analysis

Economic conditions

The Company is susceptible to changes in the economic conditions of the industries and geographic areas that produce and consume the freight it transports or the supplies it requires to operate. In addition, many of the goods and commodities carried by the Company experience cyclical demand. For example, the volatility in domestic and global energy markets could impact the demand for transportation services as well as impact the Company's fuel costs and surcharges. In addition, the volatility in other commodity markets such as coal and iron ore could have an impact on volumes. Many of the bulk commodities the Company transports move offshore and are affected more by global rather than North American economic conditions. Adverse North American and global economic conditions, or economic or industrial restructuring, that affect the producers and consumers of the commodities carried by the Company, including customer insolvency, may have a material adverse effect on the volume of rail shipments and/or revenues from commodities carried by the Company, and thus materially and negatively affect its results of operations, financial position, or liquidity. Moreover, supply chain disruptions in North America and internationally may adversely affect volumes of goods and timelines, and therefore adversely affect CN's operations and financial results.

Pension funding volatility

The Company's funding requirements for its defined benefit pension plans are determined using actuarial valuations. See the section of this MD&A entitled *Critical accounting estimates – Pensions and other postretirement benefits* for information relating to the funding of the Company's defined benefit pension plans. Adverse changes with respect to pension plan returns and the level of interest rates as well as changes to existing federal pension legislation and regulation may significantly impact future pension contributions and have a material adverse effect on the funding status of the plans and the Company's results of operations.

There can be no assurance that the Company's pension expense and funding of its defined benefit pension plans will not increase in the future and thereby negatively impact earnings and/or cash flow.

Reliance on technology and related cybersecurity risk

The Company relies on information technology in all aspects of its business. The Company depends on the proper functioning and availability of its information technology, including communications systems and data processing systems designed to operate safely and effectively and to compete within the transportation industry. The Company's information technology systems are critical in meeting customer expectations, tracking, maintaining, and operating trains and related vehicles, managing employees, and interfacing with customers, suppliers, vendors, and other third parties.

Security threats continue to grow and can come from nation states, organized criminals, hackers and others, and the Company is at heightened risk, due to its position as a critical component of both the Canadian and U.S. infrastructure, and may be impacted by cyber attacks or security incidents, whether accidental or malicious. While the Company has business continuity and disaster recovery plans, other security and mitigation programs in place to protect its operations, as well as information and technology assets, a cybersecurity attack, significant disruption or failure of its information technology and communications systems or those of its vendors or service providers, including system failure, security breach, disruption by malware or other damage could interrupt or delay the Company's operations, result in service interruptions, safety failures, security violations, regulatory compliance failures or other operational difficulties, damage its reputation, cause a loss of customers, vendors, suppliers, agents, or third-party capacity providers and lead to misappropriation of assets, data corruption, unauthorized system and data access or disclosures. The Company may experience security breaches that could remain undetected for an extended period and, therefore, have a greater impact on the services provided. A cyber incident or interruption of information technology systems could expose the Company to a risk of loss, litigation, regulatory oversight, enforcement actions or cause it to incur significant time and expense to remedy such an event, any of which could have a material adverse impact on its operational and financial position.

The Company is investing to meet evolving network and data security expectations and regulations in an effort to mitigate the impact a security incident might have on the Company, including its results of operations, financial position or liquidity. The final outcome of a potential security incident, however, cannot be predicted with certainty. Therefore, there can be no assurance that its resolution will not have a material adverse effect on the Company's reputation, goodwill, results of operations, financial position or liquidity, in any particular quarter or fiscal year.

New regulatory obligations related to cybersecurity and technology risk may impose additional costs and obligations on the Company and may lead to government inquiries or requests for information. This includes, but is not limited to, Security Directives from the DHS and TSA requiring rail operators to take several actions in 2022 and in 2023 to enhance rail cybersecurity.

On October 18, 2022, the TSA issued the second Security Directive titled Rail Cybersecurity Mitigation Actions that applies to Class I railroads effective October 24, 2022. This security directive applies to critical cyber systems, which if compromised could result in an operational disruption, and requires railroads to submit a cybersecurity implementation plan by February 21, 2023 to the TSA for approval and develop a cybersecurity assessment program plan, which must be updated annually.

On November 30, 2022, TSA also issued an Advance Notice of Proposed Rulemaking for enhancing surface cyber risk management to seek input on ways to strengthen cybersecurity and resiliency in the rail sectors.

Management's Discussion and Analysis

Additionally, pursuant to the *Cyber Incident Reporting for Critical Infrastructure Act of 2022*, the DHS Cybersecurity & Infrastructure Security Agency (CISA) is developing mandatory cyber incident reporting requirements for U.S. critical infrastructure which includes the transportation sector and Class I railroads.

There can be no assurance that the plans, programs, and assets the Company has in place to prevent or mitigate the effects of cyber incidents or attacks will be sufficient to prevent or detect such incidents or attacks, or to avoid a material adverse impact on our systems after such incidents or attacks do occur.

Trade restrictions

Global as well as North American trade conditions, including trade barriers on certain commodities, may interfere with the free circulation of goods across Canada and the U.S. or the cost associated therewith.

On November 24, 2021, the U.S. Department of Commerce issued the final results of its second administrative review of anti-dumping and countervailing duty orders regarding softwood lumber products from Canada, by applying a 17.9% combined duty rate, approximately twice the current combined duty rate of 8.99%. Following completion of any legal challenges under the CUSMA or USMCA Chapter 10 or in U.S. courts, these new duty rates will apply retroactively. The Government of Canada has stated that it still believes this is entirely unjustified and will hurt consumers, businesses and workers on both sides of the border. The decision will be challenged while a negotiated solution to this longstanding trade issue is pursued.

It remains too early to assess the potential outcome of other ongoing various trade actions taken by governments and agencies. As such, there can be no assurance that trade actions will not materially adversely affect the volume of rail shipments and/or revenues from commodities carried by the Company, and thus materially and negatively impact earnings and/or cash flow.

Terrorism and international conflicts

Potential terrorist actions can have a direct or indirect impact on the transportation infrastructure, including railway infrastructure in North America, and can interfere with the free flow of goods. Rail lines, facilities and equipment could be directly targeted or become indirect casualties, which could interfere with the free flow of goods. International conflicts can also have an impact on the Company's markets. Government response to such events could adversely affect the Company's operations. Insurance premiums could also increase significantly or coverage could become unavailable.

Customer credit risk

In the normal course of business, the Company monitors the financial condition and credit limits of its customers and reviews the credit history of each new customer. Although the Company believes there are no significant concentrations of credit risk, economic conditions can affect the Company's customers and can result in an increase to the Company's credit risk and exposure to the business failures of its customers. A widespread deterioration of customer credit and/or business failures of customers could have a material adverse effect on the Company's results of operations, financial position or liquidity.

Liquidity

Disruptions in financial markets or deterioration of the Company's credit ratings could hinder the Company's access to external sources of funding to meet its liquidity needs. There can be no assurance that changes in the financial markets will not have a negative effect on the Company's liquidity and its access to capital at acceptable terms and rates.

Supplier concentration

The Company operates in a capital-intensive industry where the complexity of rail equipment limits the number of suppliers available. The supply market could be disrupted if changes in the economy caused any of the Company's suppliers to cease production or to experience capacity or supply shortages. The supply market could become further concentrated and could result in changes to the product or service offerings by suppliers. This could also result in cost increases to the Company and difficulty in obtaining and maintaining the Company's rail equipment and materials. Since the Company also has foreign suppliers, international relations, trade restrictions and global economic and other conditions may potentially interfere with the Company's ability to procure necessary equipment and materials. Widespread business failures of, or restrictions on suppliers, could have a material adverse effect on the Company's results of operations or financial position.

Management's Discussion and Analysis

Availability of qualified personnel

The Company may experience demographic challenges in the employment levels of its workforce. Changes in employee demographics, training requirements and the availability of qualified personnel, particularly locomotive engineers and conductors and information technologists, could negatively impact the Company's ability to meet demand for rail service. The Company monitors employment levels and seeks to ensure that there is an adequate supply of personnel to meet rail service requirements. However, the Company's efforts to attract and retain qualified personnel may be hindered by specific conditions in the job market. No assurance can be given that demographic or other challenges will not materially adversely affect the Company's results of operations or its financial position.

Fuel costs and supply disruptions

The Company is susceptible to the volatility of fuel prices due to changes in the economy or supply disruptions. Rapid rises in fuel prices, such as those experienced in 2022, or fuel supply disruptions can occur due to refinery disruptions, production quota restrictions, climate, as well as labor and political instability such as the ongoing Russia-Ukraine conflict. Increases in fuel prices or supply disruptions may materially adversely affect the Company's results of operations, financial position or liquidity.

Foreign exchange

The Company conducts its business in both Canada and the U.S. and as a result, is affected by currency fluctuations. Changes in the exchange rate between the Canadian dollar and other currencies (including the US dollar) make the goods transported by the Company more or less competitive in the world marketplace and thereby may adversely affect the Company's revenues and expenses.

Interest rates

The Company is exposed to interest rate risk relating to the Company's debt. The Company mainly issues fixed-rate debt, which exposes the Company to variability in the fair value of the debt. The Company also issues debt with variable interest rates, which exposes the Company to variability in interest expense. Adverse changes to market interest rates may significantly impact the fair value or future cash flows of the Company's financial instruments. There can be no assurance that changes in the market interest rates will not have a negative effect on the Company's results of operations or liquidity.

Transportation network disruptions

Due to the integrated nature of the North American freight transportation infrastructure, the Company's operations may be negatively affected by service disruptions of its own network, including illegal blockades, as well as of other transportation links such as ports and other railroads which interchange with the Company. A significant prolonged service disruption of CN's network or one or more of these entities could have an adverse effect on the Company's results of operations, financial position or liquidity. Furthermore, deterioration in the cooperative relationships with the Company's connecting carriers could directly affect the Company's operations.

Severe weather

The Company's success is dependent on its ability to operate its railroad efficiently. Severe weather and natural disasters, such as extreme cold or heat, flooding, droughts, fires, hurricanes and earthquakes, can disrupt operations and service for the railroad, affect the performance of locomotives and rolling stock, as well as disrupt operations for both the Company and its customers. Business interruptions resulting from severe weather could result in increased costs, increased liabilities and lower revenues, which could have a material adverse effect on the Company's results of operations, financial condition or liquidity.

Management's Discussion and Analysis

Climate change

Climate change has the potential physical risks of increasing the frequency of adverse weather events, which can disrupt the Company's operations and damage its infrastructure or properties. It could also affect the markets for, or the volume of, the goods the Company carries or otherwise have a material adverse effect on the Company's results of operations, financial position or liquidity. Government action or inaction to address climate change could also affect CN. The Company is currently subject to climate change and other emissions-related laws and regulations that have been proposed and, in some cases adopted, at the federal, provincial and state levels. While CN is continually focused on efficiency improvements and reducing its carbon footprint, cap and trade systems, carbon taxes, or other controls on emissions of greenhouse gases imposed by various government bodies could increase the Company's capital and operating costs. An escalating price on carbon emissions could materially increase direct costs related to fuel purchases and indirect expenses related to purchased goods, materials, and electricity required to operate our business. Government incentives encouraging the use of alternative sources of energy also could affect certain of our customers and the markets for certain of the commodities we carry in an unpredictable manner that could alter our traffic patterns. The Company may not be able to offset such impacts through, for example, higher freight rates. Climate change legislation and regulation could also affect CN's customers; make it difficult for CN's customers to produce products in a cost-competitive manner due to increased energy costs; and increase legal costs related to defending and resolving legal claims and other litigation related to climate change.

Controls and procedures

The Company's Chief Executive Officer and its Chief Financial Officer, after evaluating the effectiveness of the Company's disclosure controls and procedures (as defined in *Exchange Act* Rules 13a-15(e) and 15d-15(e)) as of December 31, 2022, have concluded that the Company's disclosure controls and procedures were effective.

During the fourth quarter ended December 31, 2022, there were no changes in the Company's internal control over financial reporting (as defined in *Exchange Act* Rules 13a-15(f) and 15d-15(f)) that materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

As of December 31, 2022, management has assessed the effectiveness of the Company's internal control over financial reporting (as defined in *Exchange Act* Rules 13a-15(f) and 15d-15(f)) using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control – Integrated Framework* (2013). Based on this assessment, management has determined that the Company's internal control over financial reporting was effective as of December 31, 2022, and issued Management's Report on Internal Control over Financial Reporting dated January 31, 2023 to that effect.