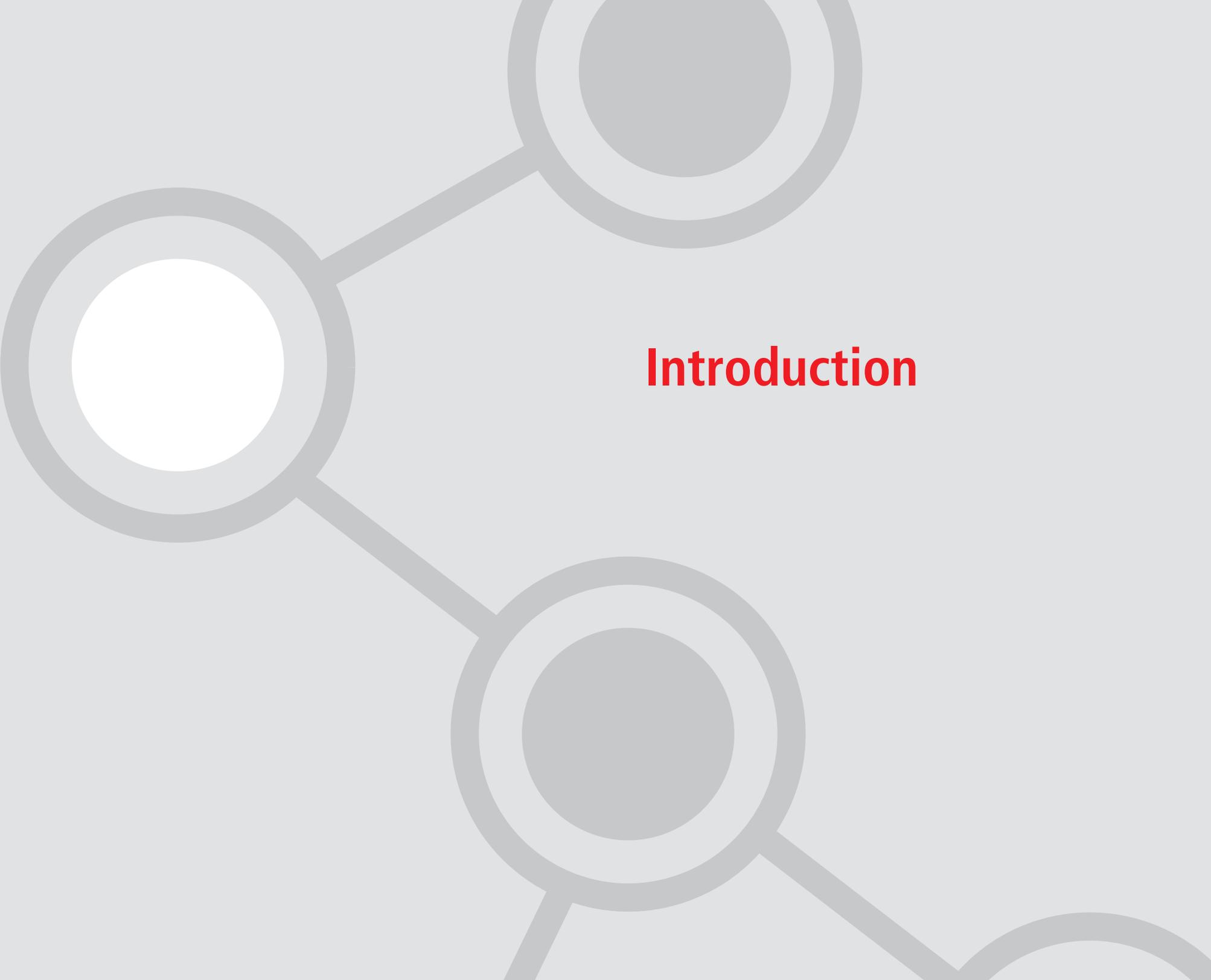


# **Carbon Disclosure Project 2015**



# Table of Contents

<b>Introduction</b> .....	<b>1</b>
<b>Management</b> .....	<b>3</b>
1. Governance .....	4
2. Strategy .....	5
3. Targets and Initiatives .....	10
4. Communication .....	14
<b>Risks and Opportunities</b> .....	<b>15</b>
5. Climate Change Risks .....	16
6. Climate Change Opportunities .....	19
<b>GHG Emissions Accounting, Energy and Fuel Use, and Trading</b> .....	<b>24</b>
7. Emissions Methodology .....	25
8. Emissions Data .....	27
9. Scope 1 Emissions Breakdown (January 1, 2014 - December 31, 2014) .....	29
10. Scope 2 Emissions Breakdown (January 1, 2014 - December 31, 2014) .....	29
11. Energy .....	30
12. Emissions Performance .....	31
13. Emissions Trading .....	32
14. Scope 3 Emissions .....	33
<b>Sign Off</b> .....	<b>36</b>
15. Sign Off .....	37



# Introduction

# Introduction

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**CN is engaged in the rail and related transportation business. Our network of approximately 20,000 route miles of track spans Canada and mid-America, uniquely connecting three coasts: the Atlantic, the Pacific and the Gulf of Mexico. Our 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 commodity and geographic diversity positions the Company to face economic and climate fluctuations and enhances our potential for growth opportunities. Today, CN leads the North American rail industry in terms of efficiency and operating margins, consuming 15% less fuel per gross ton-mile than the industry average.**

As a leader in the North American rail transportation industry, we recognize the important responsibility we have to run a safe and efficient business that is resilient to changing climatic conditions and minimizes our GHG emissions. With approximately 85% of our emissions generated from rail operations, we believe the single best way we can positively impact the environment is by continuously improving our rail fuel efficiency and reducing our carbon footprint. Over the past 20 years, CN has improved its fuel efficiency by 35%.

Our emission reductions take place on several levels, from our asset lean precision railroading initiatives to our Fuel Management Excellence program, which includes fleet acquisitions, new technology applications, and fuel-efficient train handling techniques. As a result of these programs, in 2014 we reduced our locomotive GHG emissions intensity (tCO<sub>2</sub>e/GTM) by 17% since 2005. We have already surpassed our target to reduce locomotive GHG emission intensity by 15% by 2015, based on 2005 levels.

In addition to providing a fuel-efficient transportation service, we believe that rail can be an integral part of the climate change solution offering both environmental and economic advantages. Compared to other transportation modes, rail is the most fuel-efficient method of moving freight - no land transportation mode can outperform rail for the hauling of large volumes of high-density freight over long distances. This is why we are working collaboratively with our customers to help them reduce their carbon impacts. We developed a GHG calculator, based on our industry leading modal shift quantification protocol, that enables our customers to determine their carbon savings from switching freight from truck to rail.

We also continue to invest significantly in building a robust and safe network that is resilient to changing climatic conditions. In 2014, we invested approximately C\$1.25 billion to maintain the safety and integrity of our network, which includes the maintenance of our tracks and yards and the execution of seasonal readiness plans, natural hazard warning systems, and other weather-related emergency preparedness protocols.

In support of all of these achievements, we use our EcoConnexions initiative to engage our network of 25,000 employees, giving them practical knowledge and tools to reduce our carbon footprint, while adapting to a changing climate. As we look ahead, our outstanding team of railroaders are focusing on building for the future with the confidence to deliver value for all our stakeholders by running a safe and efficient business that contributes to a low-carbon future.

*CN - Canadian National Railway Company and its operating railway subsidiaries - spans Canada and mid-America, from the Atlantic and Pacific oceans to the Gulf of Mexico, serving the ports of Vancouver, Prince Rupert, B.C., Montreal, Halifax, New Orleans, and Mobile, Ala., and the key metropolitan areas of Toronto, Buffalo, Chicago, Detroit, Duluth, Minn./Superior, Wis., Green Bay, Wis., Minneapolis/St. Paul, Memphis, and Jackson, Miss., with connections to all points in North America. For more information on CN, visit the Company's website at [www.cn.ca](http://www.cn.ca). Information on delivering responsibly, including climate change is available at: [www.cn.ca](http://www.cn.ca)*



**Management**

# Management

## 1. Governance

**1.1 - 1.1a**  
Highest level of direct responsibility for climate change and position of individual or name of committee with this responsibility

The Environment, Safety and Security (ESS) Committee of the Board of Directors (which is made up of Board members) has the highest level of responsibility for climate change in the Company. The ESS Committee is responsible for providing oversight on strategic climate change issues and reviewing the progress of the Company's carbon strategy, management and performance during its regular meetings.

At the executive level, the Assistant Vice-President of Environment and Sustainability, Normand Pellerin, has direct responsibility for climate change within the Company. He reports directly to the Vice-President, Safety and Sustainability, Sam Berrada, who in turn reports to the Executive Vice-President and Chief Operating Officer, Jim Vena. The team reports regularly to the Executive Leadership Team and Chief Executive Officer on strategic environmental initiatives, including matters related to our emissions and energy efficiency strategy.

The Assistant Vice-President of Environment and Sustainability is responsible for ensuring the effective deployment of our emissions and energy efficiency strategic initiatives, as defined through the sustainability action plan, against set objectives, targets and performance expectations. Reporting to the Assistant Vice-President for Sustainability is a cross-functional sustainability committee with senior representation from CN's departments. The sustainability committee meets quarterly to define and align CN's sustainability and climate change priorities with the business strategy, and monitor and communicate performance as identified in our sustainability action plan.

**1.2 - 1.2a**  
Incentives for management of climate change issues, including attainment of targets

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comments
Chief Executive Officer (CEO)	Monetary reward	Other: Energy Performance	CN's President and Chief Executive Officer (CEO), Claude Mongeau, has integrated sustainability, which includes CN's emission and energy performance into his Employee Performance Scorecard (EPS). Achievement of sustainability performance is tied to the CEO's executive annual bonus compensation structure.
Chief Operating Officer (COO)	Monetary reward	Emission reduction target Energy reduction target	The Executive Vice-President and Chief Operating Officer, Jim Vena, has included into his EPS the energy efficiency strategy and the year-over-year rail fuel efficiency target of 1.5%, which aligns with the carbon intensity reduction target of 15% by 2015, based on 2005 levels.
Management group	Monetary reward	Energy reduction target	Various management employees are responsible for executing our emissions and energy efficiency strategy. The performance indicators are included within their respective EPS objectives. For example: The fuel management team performance is tied to our annual year-over-year fuel efficiency target of 1.5%, which aligns with the rail carbon intensity (tCO <sub>2</sub> e/GTM) reduction target of 15% by 2015, based on 2005 levels.  The Facility Management team's performance is tied to the year-over-year target of reducing our overall energy spend by 10%.  Our Sustainability Management team's performance is tied to the implementation of our emissions and energy efficiency strategy and the execution of our climate change communications. The achievement of the above performance indicators are linked to employee recognition as well as the individual's annual compensation and bonus reward.
All employees	Recognition (non-monetary)	Emission reduction project Emission reduction target Energy reduction project Energy reduction target Efficiency project Efficiency target	Fuel efficiency, emission and energy reduction initiatives can be recognized through CN's President Awards for Excellence within the sustainability category. Employees are also recognized for their efforts through the CN EcoConnexions program and many other internal communications.

# Management

## 2. Strategy

### Risk Management Approach

**2.1 - 2.1a**  
Risk management procedures regarding climate change risks and opportunities

Frequency of monitoring	To whom are results reported?	Geographical areas considered	How far into the future are risks considered?	Comment
Annually	Board or individual/sub-set of the Board or committee appointed by the Board	Given the location of our business, we predominantly focus our risk process on North America covering Canada and the United States. We also consider risks in other regions, including Europe, Asia and South America.	> 6 years	Climate change risks and opportunities are integrated into our multi-disciplinary enterprise-wide risk management (ERM) process. A detailed climate risks and opportunities assessment is conducted annually and the results are integrated into the ERM process. The assessment includes a consideration of regulatory risks, changing weather patterns, customer requests, fuel price volatility, and reputational issues. Significant climate change risks and opportunities are integrated into the ERM process, and further assessed and classified within CN's company-wide risk categories.

**2.1b**  
How risk and opportunity identification processes are applied at both company and asset levels

#### Company level perspective

At the company level, climate change risks and opportunities are assessed annually by the Sustainability Department based on information from our various departmental functions, and in consideration of changing policies, strategic objectives and market trends. The assessment considers a broad range of climate risks and opportunities that could impact the entire Company. Examples of company level risks and opportunities include reputational impacts from more robust carbon disclosure, business continuity and network fluidity from extreme weather events, new cleaner fuel-efficient technologies, changing policies and regulations on emissions, carbon markets and uptake of cleaner fuel alternatives. The assessment results are communicated to our internal audit risk team to be considered for inclusion into the enterprise risk management process.

#### Asset level perspective

At the asset level, the climate change risks and opportunities are assessed departmentally on an annual basis, or more frequently as necessary. The departmental assessments are more specific in nature and relate to the risks and opportunities that could occur from a functional, business unit and regional perspective. For example, the Network Transportation and System Engineering functions consider natural disasters and network disruptions due to severe weather conditions that could impact specific buildings and yards on CN's network. The Sustainability function reviews the changing regulations related to climate change that could impact our business within specific provinces and states in North America. The results of these assessments are also communicated to the risk team to be considered for inclusion in the enterprise risk management process.

**2.1c**  
Prioritizing identified risks and opportunities

The prioritization of climate change risks and opportunities is based on our understanding of the likelihood and severity of the potential impacts on our operations and business. We consider a broad range of impacts, including financial, operational, physical, reputational, and organizational impacts. We evaluate the impacts using qualitative ratings of low, medium and high. Risks and opportunities that result in a medium or higher rating are prioritized.

The high priority risks are then integrated into the ERM process and re-assessed. Climate change information that could be material is presented in the MD&A section of our annual report. Strategic climate change programs are integrated, tracked and monitored through the Sustainability Committee's action plan.

# Management

## 2. Strategy

### Business Strategy

2.2 - 2.2a  
Climate change is  
integrated into our  
business strategy

#### The process by which the business strategy is influenced

Climate-related information is integrated into the strategic planning process on an annual basis. The information is compiled by the Sustainability Committee on a broad range of climate-related topics, including fuel, emission and energy efficiency performance reports, technology renewals and upgrade reports, climate risk and opportunity assessments, GHG regulatory reviews, and stakeholder requests. The information is used to update our sustainability action plan. Strategic climate-related information is also reported to the Executive team to inform the company-wide business strategy. For example, based on this information, our strategic business plan would be updated with objectives and programs related to fuel and energy efficiency, and GHG emissions.

#### Climate change aspects that have influenced the strategy

Both climate risks and opportunities have influenced our strategy. The climate change risks that influenced our strategy include changing locomotive emission standards, severe and extreme weather events impacting network infrastructure and track operating efficiency, and increasing building energy costs. Climate change opportunities that influenced our strategy include changing customer requests for low-carbon fuel-efficient service offerings, favourable government subsidies that promote cleaner technologies, clean energy and carbon market dynamics, alternative fuel options and reputational value.

For example, carbon market trends and customer requests for low-carbon services have continued to provide opportunities to position the benefits of rail freight, enabling us to grow our intermodal business. We are also now providing information to our customers on the carbon footprint of our services, while educating them on the carbon savings from switching freight from truck to rail through our industry leading modal shift quantification protocol and GHG calculator.

#### Short-term strategy influenced by climate change

Fuel and emission efficiency of our rail locomotive operations has continued to be the most important part of our short-term (2014-2017) strategy influenced by climate change. With 85% of our GHG emissions generated from rail operations, we believe that the single best way we can improve productivity performance while positively impacting the environment is by continuously improving our rail fuel efficiency. CN continues to lead the North American rail industry in fuel efficiency, consuming 15% less fuel per gross ton mile overall than the industry average. Given expectations of continued solid freight volumes, we are committed to reducing the rate of increase in our emissions while maintaining our industry-leading productivity performance.

For example, as part of our strategy, we are now targeting approximately C\$500 million on equipment capital expenditures in 2015, including adding 90 new high-horsepower locomotives. We are also now investing in and testing LNG locomotives and various new technology applications and enhanced analytical capabilities, including Wi-Tronix, Trip Optimizer, and Automatic Engine Start/Stop devices. These advancements will enable us to meet our aggressive annual 1.5% fuel efficiency improvement target, and our short-term 15% rail GHG intensity (tCO<sub>2</sub>e/GTM) reduction target by 2015, based on 2005 levels.

#### Long-term strategy influenced by climate change

The most important part of our long-term business strategy (2018-2025) influenced by climate change is our strategic priority to build for the future and increase network capacity, resilience and fluidity across our network. Weather-related operational challenges are an important consideration in this strategy, as we adapt our network to minimize exposure and improve recovery from extreme weather events such as extreme cold, floods, mudslides and culvert washouts. We are now building an even more robust network. For example, in 2014 we spent C\$1.25 billion to improve track infrastructure and have planned C\$1.4 billion for track infrastructure in 2015, which includes proactive inspections, maintenance, readiness plans, and emergency planning. These advantages will enable us to run a climate-resilient network and improve fluidity, while greatly helping us recover from weather-related operational challenges.

# Management

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## 2. Strategy

### Business Strategy (continued)

#### Gaining a strategic advantage over competitors through:

- Industry-leading fuel and carbon efficiencies. For example, CN consumes 15% less fuel per gross ton mile overall than the industry average. In 2014, we achieved fuel savings of 2.5%, representing approximately C\$40 million of savings in fuel operating costs.
- Growth of our intermodal business, leveraging the environmental benefits of rail for long-haul freight. In 2014, our intermodal business grew by 13%.
- Strong reputation on climate strategy and fuel efficiency. In 2014, we were named to the DJSI North America for the sixth consecutive year and were the only North American railroad to be listed on the DJSI World for the third year in a row. We scored 96% on our climate strategy.

#### Most substantial business decisions made during the reporting year influenced by climate change

- Investing C\$375 million for equipment capital expenditure, including 60 new high horsepower locomotives. These investments are enabling us to increase fuel efficiency, reduce GHGs, meet climate-related regulatory requirements for more efficient and tier-compliant locomotives, and support business growth.
- Investing C\$1.25 billion to ensure the safety and reliability of our rail infrastructures, including approximately C\$30 million to respond to extreme weather events.
- Testing liquefied natural gas in our rail operations. We successfully converted two high-horsepower mainline locomotives to natural gas for testing in 2015 on a CN secondary mainline in Alberta. Four special tender cars were also built to carry liquefied natural gas for the trains.
- Investing C\$5 million annually in an EcoFund to support and engage employees on energy reduction projects through the EcoConnexions program.

2.2c - 2.2d  
An internal price of carbon

We do not currently use an internal price of carbon, and we do not anticipate doing so within the next two years.

# Management

## 2. Strategy

### Engagement with Policy Makers

2.3 and 2.3a  
Engagement in activities to influence policy on climate change

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Cap and trade	Neutral	We engage with various Canadian provincial governments (Quebec, Ontario, British Columbia, Alberta, Saskatchewan, and the Western Climate Initiative) on their cap and trade and carbon tax regulatory regimes to position rail freight as a viable low-carbon transportation solution. Collaborations with governments included positioning our Modal Shift Quantification Protocol.	We support provincial and state carbon markets within Canada and the U.S. We believe that involvement with leading policy makers on carbon markets moves the transportation sector forward in identifying practical solutions that contribute to, and support, future policy developments in a manner that will foster low-carbon economic growth, while ensuring significant GHG emission reductions.

2.3b and 2.3c  
Trade association memberships

Trade association	Is your position on climate change consistent with theirs?	Please explain the trade association's position	How have you, or are you attempting to, influence the position?
Railway Association of Canada (RAC)	Consistent	The RAC represents rail businesses within Canada on various issues, including environmental sustainability. The RAC supports and encourages sustainable transportation systems to serve the nation and its regions.	We engage with Environment Canada, through our role as the chair of the Railway Association of Canada. CN believes in working with both Canadian and U.S. governments to identify technically feasible options to meet greater efficiency standards for locomotives.
Association of American Railroads (AAR)	Consistent	The AAR is a standard-setting organization for North America's railroads, focused on improving safety and productivity of rail transportation. It supports affordable, efficient and environmentally responsible transportation.	We engage with the AAR as a member of the organization, and support them in promoting a cleaner, greener, efficient, and environmentally responsible transportation solution.

2.3d - 2.3f  
Involvement with organizations producing public work on climate change

We fund various organizations that produce public work on climate change. The following provides examples of the work and the alignment to CN's strategy on climate change:

**Tree Canada, Arbor Day and Communities in Bloom** – CN's EcoConnexions From the Ground Up program has partnered with Tree Canada and Communities in Bloom to support the public work related to tree planting initiatives. In 2014, we invested C\$500,000 to fund tree plantings within 30 communities across Canada and the U.S. We also partnered with Tree Canada and Arbor Day to complete eight mass reforestation projects, resulting in the planting of 400,000 trees. The program aligns with CN's biodiversity, emission and energy management strategy, enabling tree planting initiatives in a sustainable and environmentally responsible manner, especially in areas in close proximity to rail lines. These trees act as a sink for greenhouse gas emissions, while contributing to sustainable land management, biodiversity and ecosystem health.

**Ducks Unlimited Canada** – CN has continued its three-year partnership with Ducks Unlimited Canada to support the conservation and restoration of wetlands, through an \$850,000 sponsorship. CN developed its biodiversity, emission and energy management strategy to help protect ecosystems that could be impacted by various factors, including climate-related conditions. The partnership financially supports the public work related to rebuilding key existing wetland projects, which act as carbon sinks, while protecting and preserving natural ecosystems.

**The Climate Reality Project Canada (TCRPC)** – CN provides continued support to advance the organization's mission to create greater awareness and provide solutions towards climate change.

# Management

## 2. Strategy

### Engagement with Policy Makers (continued)

2.3g  
Other engagement  
activities

**Description:**

We play an active role in advancing research in the area of climate change. A recent example is our gift to the Concordia University John Molson School of Business to establish the CN Centre for Studies in Sustainable Supply Chain Management.

**Method of engagement:**

We have engaged with the John Molson School of Business through a C\$500,000 gift, with approximately C\$100,000 over a five-year period, to support research to establish the CN Centre for Studies in Sustainable Supply Chain Management.

**Topic of engagement:**

The topic of engagement is related to sustainable supply chain management.

**Nature of engagement:**

Our engagement relates to supporting an educational research centre with a focus on conducting sustainable supply chain management projects, with the objective of disseminating information on new techniques to make supply chains more sustainable.

**Action advocated as part of engagement:**

Through our gift to the University, we are advocating student research at the bachelor, master and doctoral levels into supply chain management that improves the movement of goods to enable supply chain managers to reduce greenhouse gas emissions, waste and energy requirements, while maximizing safety and financial returns.

2.3h  
Ensuring our direct and  
indirect activities  
influencing public policy  
are consistent with our  
overall climate change  
strategy

The direct and indirect activities that could influence public policy are typically reviewed by the Government and Public Affairs department on an annual basis to ensure alignment with the strategic direction of the business, including our climate change strategic focus areas. Public policy decisions that could impact our overall climate strategy are communicated to the Sustainability team to be validated for consistency with our climate strategy. Where inconsistencies are noted, recommendations are proposed to ensure alignment.

2.4 and 2.4a  
Board of Directors support  
for an international  
agreement between  
governments on climate  
change to limit global  
temperature rise to under  
two degrees Celsius

No opinion.

# Management

## 3. Targets and Initiatives

### Targets

3.1 - 3.1b  
Our targets

ID	Scope	% of emissions in scope	% reduction from base year	Base year	Base year emissions (metric tonnes CO <sub>2</sub> e)	Target year	Comment
Abs1	Scope 2	9%	15%	2010	24,640	2015	This target relates to the reduction of electricity consumption at key rail yards where we have made significant investments as part of our energy efficiency strategy.

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Normalized base year emissions	Target year	Comment
Int2	Scope 1	85%	15%	Other: tonnes of CO <sub>2</sub> e per gross ton mile	2005	13.38	2015	This target relates to emission reductions from the use of our locomotives, representing 85% of our overall GHG emissions.

3.1c  
Change in absolute emissions our intensity target reflects

ID	Direction of change anticipated in absolute Scope 1 and 2 emissions at target completion	% change anticipated in absolute Scope 1 and 2 emissions	Direction of change anticipated in absolute Scope 3 emissions at target completion	% change anticipated in absolute Scope 3 emissions	Comment
Int2	Increase	11.7%	No change	0%	As we grow as a business, our absolute emissions are expected to increase. However, we expect our fuel efficiency gains to offset this increase and result in a lower-than-projected rise in emissions.

3.1d  
Our progress compared to our targets

ID	% complete (time)	% complete (emissions)	Comments
Abs1	80%	100%	We achieved an absolute emission reduction (tonnes of CO <sub>2</sub> e) of 19% from electricity consumption at key yards based on 2010 levels, surpassing our absolute target of 15% reduction by 2015.
Int2	90%	100%	We achieved an emission intensity reduction of 16.8% from rail locomotive fuel consumption (tCO <sub>2</sub> e /GTM) based on 2005 levels, surpassing our target of 15% reduction by 2015.

# Management

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## 3. Targets and Initiatives

### Emission Reduction Initiatives

3.2 - 3.2a  
How our service directly enables GHG emissions to be avoided by third parties

#### How emissions are/were avoided

Emissions are avoided by our customers shifting freight from truck to rail. Based on industry standards, rail emits approximately four times less greenhouse gas emissions than heavy trucks.

#### An estimate of the amount of emissions that are/were avoided over time

We estimate that CN can enable its customers to avoid GHG emissions by as much as 8.3 million tonnes of CO<sub>2</sub>e, by shifting freight from truck to rail.

#### The methodology

We calculated the total GHG emissions avoided for customers by subtracting the equivalent 2014 truck emissions from the equivalent 2014 rail emissions. The emission factors were based on the Canadian National Inventory Report emission factors for diesel (CO<sub>2</sub> – 2663, Methane – 0.15, Nitrous Oxide – 1.1), and the global warming potentials were applied from the International Panel on Climate Change, Fifth Assessment (CO<sub>2</sub> – 1, Methane - 34, and Nitrous oxide – 298).

#### Assumptions

We based our avoided-emission calculations on the following assumptions and guidance:

- a) According to recent industry standards, rail emits approximately four times less greenhouse gas emissions than heavy trucks. In Canada, the estimate is at least three times and in the U.S. the estimate is on average four times. We used a factor of four times less GHGs than heavy trucks to calculate the equivalent truck emissions.
- b) Tonnes of CO<sub>2</sub>e per gallon of diesel fuel is 0.0113.
- c) An estimate of approximately 55% of CN freight moved. The remaining estimate of approximately 45% covers coal, grain and fertilizers, iron ore, non-ferrous ore, crude and condensate, and 80% of sulphur. These commodity groups are not truck-competitive.

#### Considerations on generating CERs or ERUs within the framework of CDM or JI

We are currently considering opportunities relating to carbon credits, given that some Canadian provinces have put in place cap and trade regulations, which is expected to facilitate the process.

# Management

## 3. Targets and Initiatives

### Emission Reduction Initiatives (continued)

3.3, 3.3a and 3.3b  
Emission reduction  
initiatives active within the  
reporting year

Stage of development	Number of projects	Total estimated annual CO <sub>2</sub> e savings in metric tonnes CO <sub>2</sub> e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	9	122,719
Not to be implemented	0	0

Activity type	Description of activity	Estimated annual CO <sub>2</sub> e savings (metric tonnes CO <sub>2</sub> e)	Scope	Voluntary/Mandatory	Annual monetary savings (unit currency – as specified in CC0.4)	Investment required (unit currency – as specified in CC0.4)	Payback period	Estimated lifetime of the initiative	Comment
Transportation: fleet	In 2014, we continued the implementation of our energy efficiency strategy along with nine projects related to our rail locomotive emissions, which account for 85% of our greenhouse gas emissions. This includes new locomotive acquisitions, fuel management system enhancements, and the installation of new locomotive technologies such as Trip Optimizer and AESS.	122,719	Scope 1	Voluntary	C\$40,000,000	C\$375,000,000	4-10 years	>30 years	These emissions savings relate to Scope 1 emissions covering our rail locomotives. These projects enable us to achieve our emission intensity reduction target of 15% tCO <sub>2</sub> e/GTM in 2015, based on 2005 levels.

# Management

## 3. Targets and Initiatives

### Emission Reduction Initiatives (continued)

3.3c  
Methods used to drive investment in emission reduction activities

Method	Comments
Compliance with regulatory requirements/standards	Through the U.S. EPA and Environment Canada Locomotive Emission Standards, CN continues to follow through on its commitment to acquire, retire and upgrade locomotives so as to improve air quality, enhance rail fuel efficiency and reduce rail GHG emission intensity. Based on this obligation, we assess our locomotive fleet annually through financial optimization calculations to determine the budget that would be necessary to meet our commitments in the context of our business needs. For example, in 2014 we invested C\$375 million for equipment capital expenditures, including 60 new high-horsepower locomotives. In 2015, we have targeted C\$500 million on equipment capital expenditures, including adding 90 new high-horsepower locomotives.
Dedicated budget for energy efficiency	We invest in the efficiency of our locomotive fleet beyond our regulatory compliance obligations. This includes new rail technologies such as Wi-Tronix, horsepower to tonnage matching, distributed power, Trip Optimizer, Automatic Engine Start/Stop technology, flange lubrication and liquefied natural gas projects.
Employee engagement	Our employees are integral to our ability to reduce energy consumption. Through the EcoConnexions program, we set up an EcoFund to provide the necessary resources to enable the execution of carbon and energy efficiency projects, including education and awareness.
Internal incentives/recognition programs	We established a 15% energy reduction target by 2015, with a baseline of 2010 relating to the consumption of electricity at our key yards. To meet this objective, we identified processes and equipment where the biggest reductions were possible by reviewing our energy management data information. Once identified, we conducted a business analysis to determine the key projects that could support our reduction initiatives. We then assessed the projects based on saving potentials, investment needs and return on investment calculations. Feasible projects are financed through a dedicated energy management budget, facility-specific budgets and subsidies/grants. We have also established a dedicated EcoFund budget of C\$5 million annually for our emission and energy reduction activities as identified in the sustainability action plan. Through our Employee Performance Scorecard, a percentage of the bonus structure is allocated to meeting corporate objectives, including our fuel efficiency objectives. These incentive contributions vary according to employee levels within the organization, and the extent to which the employee contributes to meeting objectives.
Dedicated budget for energy efficiency	We established a 15% energy reduction target by 2015, with a baseline of 2010 relating to the consumption of electricity at our key yards. To meet this objective, we identified processes and equipment where the biggest reductions were possible by reviewing our energy management data information. Once identified, we conducted a business analysis to determine the key projects that could support our reduction initiatives. We then assessed the projects based on saving potentials, investment needs and return on investment calculations. Feasible projects are financed through a dedicated energy management budget, facility-specific budgets and subsidies/grants. We have also established a dedicated EcoFund budget of C\$5 million annually for our emission and energy reduction activities as identified in the sustainability action plan.

## Management

### 4. Communication

#### Climate Change and GHG Emission Performance

4.1  
Information CN has published relating to our response to climate change and GHG emissions performance

Publication	Status	Page/section reference	Attach the document
GHG emissions performance document	Complete	All	<a href="http://www.cn.ca/-/media/Files/Delivering-Responsibly/Environment/2015-cdp8-response-en.pdf">http://www.cn.ca/-/media/Files/Delivering-Responsibly/Environment/2015-cdp8-response-en.pdf</a>
Delivering Responsibly report	Complete	Pages 19-25, Emissions and Energy Efficiency	<a href="http://www.cn.ca/-/media/Files/Delivering-Responsibly/Delivering-Resp-2012-en.pdf">http://www.cn.ca/-/media/Files/Delivering-Responsibly/Delivering-Resp-2012-en.pdf</a>
Delivering Responsibly website	Complete	Delivering Responsibly Section	<a href="http://www.cn.ca/en/delivering-responsibly">http://www.cn.ca/en/delivering-responsibly</a>

Please note that the 2014 carbon data is part of a voluntary communication (GHG emissions performance) that is one of the essential downloads on our website at the following url:  
<http://www.cn.ca/en/delivering-responsibly>.



# **Risks and Opportunities**

# Risks and Opportunities

## 5. Climate Change Risks

### Climate Change – Regulatory Risks

5.1 - 5.1a  
Risks driven by changes in regulations

Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Air pollution limits	<p><b>Proposed Canadian Federal Locomotive Emission Standards</b></p> <p>More stringent locomotive air emission standards can expose the Company to compliance, technological and financial risks. For example, in the U.S., CN's locomotive emissions are regulated by the U.S. Environmental Protection Agency (EPA), which sets emission standards for newly manufactured and re-manufactured off-road engines. In recent years, the EPA adopted even more stringent locomotive Tier 4 emission standards to be met by 2015, with an additional requirement that mandates the application of idle emission controls on newly manufactured and remanufactured engines. In Canada, a Memorandum of Understanding (2011-2015) was signed in 2013 between the Railway Association of Canada and Transport Canada concerning GHGs and Criteria Air Contaminants. The GHG emission intensity target for our sector is a 6% reduction by 2015 from 2010 levels. The more stringent emission standards and GHG targets could expose CN to additional costs and affect the pace at which we acquire, retire and upgrade locomotives.</p>	Increased operational cost	3 to 6 years	Direct	Very likely	Medium-high	Non-compliance with locomotive emission standards and sector-specific GHG reduction targets could expose the Company to a loss of business in the event of locomotive shutdowns and could hamper possible revenue growth. In 2014, we did not experience any non-compliance issues resulting in locomotive shutdowns. The financial implications are minimal and not being felt by CN given that we are proactively ensuring compliance of our fleet. In the future, we would expect similar impacts with similar business conditions.	To meet emission standards, we purchase tier-compliant engines as part of our strategy to acquire, retire and upgrade locomotives. For example, we added 60 new high-horsepower locomotives to our fleet in 2014 and expect to take delivery of 90 new high-horsepower locomotives in 2015. We have installed various new technology applications and enhanced analytical capabilities on our current locomotive fleet, including Wi-Tronix, Trip Optimizer, and Automatic Engine Start/Stop devices. These advancements will enable us to meet our aggressive annual 1.5% fuel efficiency improvement target and our short-term 15% GHG reduction target by 2015, based on 2005 levels. We are also now testing Liquefied Natural Gas locomotives.	The costs associated with the locomotive acquisitions, upgrades and fuel-efficient operations change annually. For example, in 2014, we spent C\$375 million for equipment capital expenditures, including 60 new high-horsepower locomotives. In 2015, we have targeted C\$500 million on equipment capital expenditures, including adding 90 high-horsepower locomotives to meet requirements. The liquefied natural gas alternative fuel testing program involves manufacturers and fuel suppliers. Funding for the program has been secured by the manufacturers - for approximately C\$1 million per year over 3 years.
Other regulatory drivers	<p><b>Proposed Canadian Federal Climate Change Legislation</b></p> <p>Climate change legislation and regulations could affect the markets for, or the volume of, the goods the Company carries thereby resulting in an adverse effect on operations, financial position, results of operation or liquidity. More specifically, restrictions, caps, taxes or other controls on emissions of GHGs could affect CN's utility coal customers due to coal capacity being replaced with natural gas generation and renewable energy. Emission limits could further increase legal costs related to defending and resolving legal claims and other litigation related to climate change.</p>	Other: Reduced Revenue	3 to 6 years	Indirect (Client)	About as likely as not	Medium-high	In the event that GHG regulations impacted CN's coal customers to the extent that they would be unable to supply coal, it would reduce CN's revenues by approximately 3.5%, which in 2014 was approximately C\$440 million. In the future, we would expect a similar figure with similar business conditions.	CN freight revenues are derived from the movement of a diversified and balanced portfolio of goods, including petroleum and chemicals, grain and fertilizers, coal, metals and minerals, forest products, intermodal and automotive. The commodity and geographic diversity better position the Company to face changing GHG regulations. To manage this risk we continue to maintain a diversified and balanced portfolio of goods. For example, in 2014, no individual commodity group accounted for more than 23% of total revenues. We also continued to grow our intermodal business, positioning the positive environmental benefits of long haul rail shipments for our customers. For example, in 2014, the revenue from intermodal business increased by 13%, of which a small percentage was due to modal shift from truck to rail. Our intermodal business is one of the fastest growing business segments and the largest single business unit with 2014 revenues of more than C\$2.7 billion. Increasing this business could offset losses from goods impacted by more stringent GHG regulations.	There are no costs associated with maintaining a diversified and balanced portfolio. A balanced portfolio is a function of our franchise. Investments in the intermodal business are part of the overall 2014 C\$2.3 billion spend on our capital program. In 2017, we are planning to build a C\$250 million intermodal and logistics hub in Milton, Ontario, which will help us efficiently handle growing intermodal traffic.

# Risks and Opportunities

## 5. Climate Change Risks

### Climate Change – Physical Risks

5.1b  
Risks driven by change in physical climate parameters

Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Change in temperature extremes	<p>Extreme temperatures can present a risk to our network infrastructure. Rail misalignments and track buckling are possible from thermal rail expansions. In addition, extreme cold can result in track freezing, leading to greater frequencies of broken rails, frozen switches, and high rates of wheel replacements. Changes in temperature extremes could affect the operation of our network. For example, there have been cases when CN has had to shut down significant portions of the network for a period of time, exposing the Company to operational and financial risks. Temperature extremes can also expose CN to operational and financial risks from episodes of flooding, landslides in unstable mountainous regions, and mudslides. In addition, flooding from spring melt can be damaging to rail bed support structures and cause overflows onto tracks. Landslides and mudslides can be especially damaging to our rail tracks. Temperature extremes can also impact our sites and networks located within the U.S. Tornado Belt, Midwest and New Orleans area, making us vulnerable to increases in tornado occurrences and intensity. In 2014, CN's network was exposed to abnormally cold winters throughout Canada and the U.S. hampering operations and fuel efficiency. Severe winters were experienced in eastern Canada and the U.S. central and southern regions. We also experienced extreme heat conditions in western Canada through the prairies during the summer months in addition to significant snow drift over our rail cars in the winter, and floods and culvert washouts in winter and spring. These washouts were particularly prevalent in northern Saskatchewan during the spring thaw.</p>	Increased operational cost	Up to 1 year	Direct	Virtually certain	High	<p>The financial implications of extreme temperature conditions and changes in precipitation extremes vary depending on the degree of damage. In 2014, the financial impact of extreme weather events on our business was approximately C\$30 million. These trends could continue into the next year and result in similar capital expenditures.</p>	<p><b>Extreme weather readiness plans</b> – Our summer and winter readiness plans include procedures for train speed, train length and weight, inspections, rail replacements, de-stressing, and fire-prevention and response. We also installed weather stations to monitor outside temperatures and humidity.</p> <p><b>Emergency Response Planning Program</b> – Our emergency response planning procedures address extreme weather patterns, including hurricanes. This has resulted in redesigning fuelling station locations and providing the necessary back-up IT systems. Our operating teams have ready access to a 24-hour Smartrad weather warning service.</p>	<p>Year over year, CN expends considerable costs towards the maintenance of its infrastructure to protect company assets from wear and tear that could be attributable to changes in climate. For example, in 2014, CN invested approximately C\$1.25 billion into its track infrastructure. Between C\$50-100 million of our operating expenditures are directed towards proactive inspections, maintenance, readiness plans and emergency response plans to help manage temperature extremes.</p>

# Risks and Opportunities

## 5. Climate Change Risks

### Climate Change – Other Risks

5.1c  
Risks driven by other  
climate-related  
developments

Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Other drivers	CN is susceptible to the volatility of fuel prices due to changes in the economy or supply disruptions, which could result from climate-related events. Fuel shortages could be impacted by climate-related events, which could in turn result in rising fuel prices that could materially adversely affect CN's results of operations, financial position or liquidity. As such, CN has implemented a fuel surcharge program with a view to reducing the Company's financial exposure to fuel price volatility.	Increased operational cost	Unknown	Direct	About as likely as not	Medium-high	CN's reliance on fossil fuel could expose our customers to fuel price volatility and increases, adversely impacting business demand. Our fuel surcharge program quantifies these price increases. In 2014, fuel surcharge revenues increased by C\$72 million due to both price and volume increases. These prices could continue to increase in the coming years.	Our fuel surcharge program has been implemented with a view to offsetting the impact of rising fuel prices. In addition to the fuel surcharge program, we are also committed to exploring renewable alternatives by supporting and monitoring research towards cleaner alternative energy sources, including natural gas, and bio-diesel fuels. For example, in 2014, we successfully converted two high-horsepower mainline locomotives to liquified natural gas. The locomotives will be tested in 2015. We also added 10 compressed natural gas shunt tractors (instead of diesel) at Brampton Intermodal terminal, as well as a new Fast-Fill refuelling station for the CNG yard tractors.	The liquefied natural gas alternative fuel testing program involves manufacturers and fuel suppliers. Funding for the program has been secured by manufacturers for approximately C\$1 million per year over 3 years.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities

6.1 - 6.1a  
Opportunities driven by changes in regulation

Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Voluntary agreements	<p><b>Air Emission Limits</b></p> <p>As part of our obligations under the U.S. EPA locomotive emission standards, and in anticipation of the Canadian Memorandum of Understanding on GHG reduction targets, opportunities exist to realize long-term carbon efficiencies and significant fuel savings through our locomotive fleet renewal strategy. Our strategy to acquire, retire and upgrade locomotives to meet compliance objectives will enable us to not only meet our compliance objectives but also drive even greater fuel and cost saving efficiencies across our business. These efforts combined with our Precision Railroading operating practices, have contributed to our leadership on fuel efficiency in the North American rail industry. For example, in 2014, we consumed 15% less fuel per gross ton mile overall than the industry average.</p>	Reduced operational cost	Up to 1 year	Direct	Virtually certain	Medium-high	By updating and acquiring new locomotives within our rail locomotive fleet, and through enhanced locomotive handling procedures, we have estimated potential annual fuel savings of 1.5%, representing approximately C\$25 million of savings in fuel operating costs. A similar figure would be expected with similar business conditions for the future.	We have increased the pace at which we are upgrading existing locomotives and acquiring new locomotives enabling us to not only meet our compliance objectives but also benefit from even greater fuel efficiencies. For example, in 2014, we added 60 new high-horsepower locomotives to our fleet, and expect to take delivery of 90 new high-horsepower locomotives in 2015. Furthermore, we are proactively working with manufacturers to develop new engine technologies that lower fuel consumption and emissions. We also partner with EMD and Sustainable Development Technology of Canada in the advancement of the next generation of locomotives (LNG).	The costs associated with our locomotive renewal strategy differ annually. For example, in 2014 we spent C\$375 for equipment capital expenditures, which included our new high-horsepower locomotives. In 2015, we are targeting approximately C\$500 million for equipment capital expenditures, including 90 new high-horsepower locomotives.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities (continued)

Opportunity driver	Description	Potential impact	Time frame	Direct / indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Cap-and-Trade schemes	<p><b>Western Climate Initiative (WCI) Regional Cap-and-Trade Scheme</b></p> <p>The cap-and-trade schemes developing in Canada and the U.S. under the Western Climate Initiative are presenting important opportunities to position carbon reduction projects that enable companies to meet their compliance objectives. Canadian member provinces, specifically British Columbia, Ontario and Quebec, and the U.S. (State of California) have started to put in place regulatory frameworks to position their provinces to comply with GHG reduction obligations. For CN, the movement towards a carbon market presents important opportunities given the environmental benefits that rail presents for long haul shipments of freight over other modes of transport. CN has developed a GHG calculator and modal shift protocol that provides a method for customers to calculate the GHG emission reductions that occur from shifting baseline truck freight traffic to rail. Customers who can demonstrate emission reductions through modal shift are eligible to generate “offset credits” to be used to meet their own emission reduction goals, to be traded with other regulated emitters, or be banked for future use. By positioning the protocol for approval throughout North America, CN’s customers benefit from the carbon credits associated with shifting truck freight traffic to rail.</p>	Increased demand for existing products/ services	Up to 1 year	Direct	Virtually certain	Medium-high	The modal shift protocol provides an opportunity for CN to grow revenue from customers looking for greater fuel efficiencies from shifting freight from truck to rail. For example, in 2014, CN customers that could avoid carbon emissions from shifting truck to rail represented approximately 55% of revenue ton miles, which covers approximately 70% of our revenues. Over time, this number could continue to increase as we grow our market share from truck to rail freight.	We continued to invest in the growth of our intermodal business and engaged with existing and potential customers to position the positive environmental benefits of long haul rail shipments for our customers. We also continue to engage with governments and our customers to position the opportunities to gain carbon credits from switching freight from truck to rail through our industry-leading modal shift quantification protocol.	Investments in the intermodal business are part of the overall 2014 C\$2.3 billion spend on our capital program. For example, in 2017 we are planning to build a C\$250 million intermodal and logistics hub in Milton, Ontario, which will help us efficiently handle growing intermodal traffic. The costs associated with our communicating with our customers and exploring opportunities to position CN’s modal shift protocol are included in the marketing and sustainability functional budgets. The costs associated with internal resource time, advertising, and consultants are estimated to be approximately C\$500,000.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities (continued)

Opportunity driver	Description	Potential impact	Time frame	Direct / indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Other regulatory drivers	<p><b>Customer and Supplier Requirements</b></p> <p>There are growing pressures from our customers to manage the carbon impacts throughout their supply chain. Leading multinational and manufacturing companies are already setting environmental pre-selection criteria for their suppliers, which includes requirements to understand the carbon impact of the supply chain. Suppliers that can demonstrate an efficient carbon footprint of the supply chain are well positioned with their customers to maintain and grow existing business. For CN, we have seen increasing requests from our customers on transportation-related carbon footprints, including questions regarding our reduction targets and performance. These requirements are presenting an important opportunity for CN to enhance our reputation and gain market share by demonstrating to our customers and other stakeholders CN's low-carbon rail freight transportation solution. We are also being asked to complete the CDP supply chain questionnaires on behalf of some of our larger customers.</p>	Increased demand for existing products/services	Up to 1 year	Direct	Very likely	Medium-high	The financial implication of exposure to customer requirements can vary depending on the level of direct engagement. For example, in 2014, customers interested in our sustainability practices represented more than C\$500 million of our revenues. These customers had directly requested information from us on our carbon footprint and management practices. Over time, this number could continue to increase as more of our customers demand low-carbon freight options.	In order to optimize this opportunity, we are proactively engaging with our customers to position the carbon benefits of our services. For example, in 2014, we continued to engage large customers on carbon-related impacts, including requests to complete the CDP supply chain questionnaire. We are also providing our customers with a web GHG calculator to measure the GHG emissions from rail, marine and truck transportation—the first of its kind in the industry. In 2014, we had over 1100 requests for GHG emission calculations using our web calculator. Our industry-leading modal shift rail freight protocol, ongoing strategic partnerships and engagement with customers, as well as our own operational efficiency, has significantly improved our visibility and reputation as a leader in fuel efficiency with our customers.	The costs associated with communicating with our customers, and exploring opportunities to position CN's carbon-efficient rail service is included in the marketing and sustainability functional budgets. The costs associated with internal resource time, advertising, and consultants are estimated to be approximately C\$500,000.
Other regulatory drivers	<p><b>Favourable Government Policies</b></p> <p>Opportunities exist from increasing government subsidies for technologies that enable low-carbon transportation and logistics services in their efforts to improve energy efficiency and lower GHGs. This has been the case for North American states and provinces, including Quebec, Ontario, British Columbia, New Brunswick, Illinois, Minnesota, and Wisconsin. These types of government subsidies are presenting CN with important opportunities to accelerate fuel-efficient rail and building technologies. For example, the Quebec government PEET and PETMAF programs have enabled CN to further accelerate its uptake of fuel-efficient rail technologies such as: Wi-Tronix, Trip Optimizer, and the Automatic Engine Start/Stop devices.</p>	Reduced operational costs	Up to 1 year	Direct	Virtually certain	Medium	The government subsidies related to new locomotives and new fuel-efficient locomotive technologies will support CN to gain fuel efficiency savings of approximately 1.5%, representing approximately C\$2.8 million of savings in annual fuel operating costs (based on actual savings from the Quebec Funding program). Over time, this number could continue to increase as governments continue to incentivize the uptake of more fuel-efficient and low-carbon technologies.	In order to maximize the opportunity, we submitted an application to the Quebec Government for funding for new fuel-efficient locomotives and the installation of fuel efficiency technologies. For example, in 2012 and 2014, we obtained funding related to new locomotive acquisitions, as well as installations of Automatic Engine Start/Stop devices. Funding for other fuel efficiency technologies (Wi-Tronix and Trip Optimizer) is expected in 2015. The first phase of installation began in 2011. These installations will be ongoing into 2016. CN will be applying for further funding in 2015 for the acquisition of new locomotives and installation of fuel efficiency technologies.	The upfront cost associated with our investments in the first grant application was approximately C\$8.2 million, and C\$4.2 million for the second grant application. These costs will be further subsidized by the government.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Physical Opportunities

6.1b  
Opportunities driven by changes in physical climate parameters

Opportunity driver	Description	Potential impact	Time frame	Direct / indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Change in temperature extremes	With increasing extreme weather events and possible disruptions in diesel fuel supply, we could begin to see the growth of alternative energy sources and cleaner technology markets. CN is well positioned to grow its business through these markets. Over the past few years, CN has started to see growth in the cleaner energy markets with respect to wood pellets and biodiesel. Revenues from cleaner energy markets are growing gradually, and we continue to engage with our customers to strengthen CN's position within this market.	Other: Increase in revenue	3 to 6 years	Direct	Very likely	Medium-high	Alternative energy and clean technology markets are continuing to increase. For example, between 2013 and 2014, we saw a 45% increase in shipments of biodiesel, and a 22% increase in shipments of wind turbine parts. Over the next few years, we expect further growth in the movement of clean technology markets due to increasing demand.	Revenue growth from alternative energy and clean technology markets has the potential of presenting a long-term growth opportunity for CN. For example, at CN, we are managing this opportunity by continuing to engage with our customers to better position CN's service for new cleaner technology markets.	The costs associated with communicating with our customers and exploring opportunities to position CN's service are included in the marketing and sustainability functional budgets. The total costs associated with internal resource time, advertising, and consultants are estimated to be approximately C\$500,000.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Other Opportunities

6.1c  
Opportunities driven by changes in other climate-related developments

Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Reputation	Environmental responsibility, particularly carbon management, is becoming a top issue on corporate agendas as companies grapple with the complexities associated with creating meaningful eco-efficient operations. As a result, there are growing pressures to not only manage the impacts controlled by the Company but also those it influences through the supply chain network. These pressures could present opportunities to enhance CN's reputation by demonstrating to our customers and other stakeholders the value of rail as a low-carbon freight transportation solution. CN has already started to be affected by this opportunity, as more and more of our customers request information from us on the carbon footprint of their supply chain with respect to Scope 3 emissions from freight transportation. Through these requests, we have been able to capitalize on customer engagements to not only demonstrate the economic and environmental advantages of rail over other modes of transport, but also work together to explore the use of our GHG calculator and modal shift protocol. These collaborations continue to build and enhance our reputation with our customers. We are also being recognized by various stakeholders, including rankings on the Dow Jones Sustainability Index, the Globe and Mail Clean 50, and Maclean's Top 50 Socially Responsible Corporations.	Increased demand for existing products/services	Up to 1 year	Direct	Virtually certain	Medium	The sustainability recognitions we receive position the Company positively with customers who have sustainability commitments and are interested in understanding our sustainability practices. For example, in 2014, customers interested in our sustainability practices represented more than approximately C\$500 million of our revenues. These customers had directly requested information from us on our carbon footprint and management practices. A similar figure would be expected with similar business conditions in the future.	In order to position our carbon-efficient transportation services, we continue to actively engage with our stakeholders. For example, in 2014, we continued to engage with large customers on carbon-related impacts, including responses to specific customer requests to complete the CDP supply chain questionnaire. We are also providing our customers with a web GHG calculator to measure the GHG emissions from rail, marine and truck transportation—the first of its kind in the industry. In 2014, we had over 1100 requests for GHG emission calculations using our web calculator. To better position our fuel efficiency and carbon management programs to a broad range of stakeholders, we have enhanced disclosures in our Annual Report, Sustainability Report, website, as well as through specific targeted investor questionnaires. In 2014, we continued to be recognized for our sustainability efforts. For example, we were listed on the Clean 50, Maclean's Top 50 Socially Responsible Corporations, Corporate Knights rating scheme, Jantzi Social Index, FTSE4Good Index, Global Challenges Index, and the Dow Jones Sustainability Index.	The cost associated with this opportunity is integrated into CN sustainability budgets, including internal resources, advertising, marketing, and external resources. The cost associated with this opportunity is estimated at C\$250,000.
Other drivers	With increasing pressure to reduce our reliance on non-renewable sources of energy, opportunities exist to explore alternative more sustainable fuels and technologies within rail freight transportation. We have already initiated a number of projects to explore alternative fuel options. For instance, we have already begun working with our suppliers to test two 3,000-horsepower diesel-electric locomotives fuelled principally by liquefied natural gas in northern Alberta. This initiative is the beginning of a number of activities to explore the use of liquefied natural gas as a potential alternative to conventional diesel fuel.	Increased demand for existing products/services	>6 years	Direct	About as likely as not	Medium	Reducing our reliance on fossil fuels by investing in rail technologies that support alternative fuels could reduce our operating costs. For example, we estimate that switching to compressed natural gas as an alternative to conventional diesel fuel could result in approximately 64% cost avoidance for our intermodal shunt tractor operations. As we increase our use of compressed natural gas in the future, the estimated cost avoidance could continue to grow.	In order to tap into the opportunities related to alternative fuels, we are working with manufacturers and research centres to support the development of cleaner fuel alternatives, including natural gas. For example, in 2014 we successfully converted two high-horsepower mainline locomotives to liquefied natural gas. Four special tender cars were also built to carry liquefied natural gas for the trains.	The liquefied natural gas alternative fuel testing program involves CN, manufacturers and fuel suppliers. Funding for the program has been secured by manufacturers for approximately C\$1 million per year over 3 years.



**GHG Emissions Accounting,  
Energy and Fuel Use, and Trading**

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 7. Emissions Methodology

### Base Year

7.1  
Base year and Base-year emissions (Scopes 1 and 2)

Scope	Base year	Base-year emissions (metric tonnes CO <sub>2</sub> e)
Scope 1	2005	4,586,971
Scope 2	2010	194,267

7.2  
Protocol used to calculate Scope 1 and 2 emissions

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

### Methodology

7.3  
Source for global warming potentials used

Gas	Reference
CO <sub>2</sub>	IPCC Fifth Assessment Report (AR5 - 100 year)
CH <sub>4</sub>	IPCC Fifth Assessment Report (AR5 - 100 year)
N <sub>2</sub> O	IPCC Fifth Assessment Report (AR5 - 100 year)
Other: Electricity Canada	Other: Environment Canada National Inventory Report (1990-2012)
Other: Electricity USA	Other: Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities (eGrid 9 <sup>th</sup> edition)

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 7. Emissions Methodology

### 7.4 Emissions factors applied and their origin

Fuel/material/energy	Emission factor	Unit	Reference
Diesel (locomotive)	2663	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.15	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	1.1	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Diesel (other)	2663	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.110	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.151	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Gasoline	2289	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.068	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.2	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Propane	1507	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.024	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.108	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Furnace oil	3124	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.12	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.064	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Stove oil	2725	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.06	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.031	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Kerosene	2534	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2012)
	0.006	Methane	Environment Canada, National Inventory Report (1990 - 2012)
	0.031	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2012)
Natural gas	1952.5	CO <sub>2</sub> e g/m <sup>3</sup>	Environment Canada, National Inventory Report (1990 - 2012)
Electricity Canada	Based on provincial emission factors	CO <sub>2</sub> e g/kwh	Environment Canada, National Inventory Report (1990 - 2012)
Electricity USA	Based on state emission factors	CO <sub>2</sub> e g/kwh	Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities (eGrid 9 <sup>th</sup> edition)

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 8. Emissions Data (January 1, 2014 - December 31, 2014)

8.1  
Boundary used for Scope 1 and Scope 2 greenhouse gas inventory

Operational control

8.2  
Gross global Scope 1 emissions

5,665,910 metric tonnes CO<sub>2</sub>e

8.3  
Gross global Scope 2 emissions

210,674 metric tonnes CO<sub>2</sub>e

8.4 - 8.4a  
Sources (e.g., facilities, activities, geographies) of Scope 1 and Scope 2 emissions not included in this disclosure

Source	Relevance of Scope 1 emissions from this source	Relevance of Scope 2 emissions excluded from this source	Explain why the source is excluded
Emissions from intermodal equipment	Emissions are not relevant	No emissions excluded	We estimate that less than 1% of Scope 1 emissions have not been covered. Emissions not included are not considered material. The source information is not yet consolidated and therefore not available for reporting.
Emissions from remote sites	Emissions are not relevant	Emissions are not relevant	We estimate that less than 1% of Scope 2 emissions have not been covered, which relate to electricity consumption invoices. The source information is not yet consolidated and therefore not available for reporting.

8.5  
Level of uncertainty of the total gross global Scope 1 and Scope 2 figures supplied and sources of uncertainty

Scope	Uncertainty range	Main sources of uncertainty	Please expand on the uncertainty in your data
1	Less than or equal to 2%	Metering/Measurement Constraints	We currently apply a combination of both generic mass balance and metering/measurement methodology in the compilation of our locomotive fuel consumption data. A reconciliation between the fuel consumption data from our invoices and the fuel consumption data from mass balance and metering/measurement revealed a 1.5% variance. The 1.5% variance is mostly a result of the fuel evaporation losses at the dispenser fuel tanks.
2	Less than or equal to 2%	Extrapolation Other: Published emissions Factors	<b>Extrapolations made to estimate MWh</b> – At this time, most invoices from utilities that are uploaded into our SAP system provide costs only. This data includes administrative costs as well as consumption costs, which impacts the level of accuracy in our data. Furthermore, in order to calculate the MWh consumption numbers, we have applied generic cost per MWh factors, as provided by the Manitoba Hydro Analysis and the U.S. Energy Information Administration. Data uncertainty could exist where utility cost variances occur based on the time of use of electricity as opposed to the quantity of use of electricity.  <b>Use of generic factors to calculate GHG emissions</b> – Conversions into GHG emissions are based on generic GHG emission factors as provided through the Canadian GHG National Inventory and the U.S. Environmental Protection Agency eGRID data, not utility factors.

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 8. Emissions Data (January 1, 2014 - December 31, 2014)

**8.6**  
Verification/assurance status for our Scope 1 emissions

Third-party assurance complete.

**8.6a**  
Details of verification/assurance for Scope 1 emissions

Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Limited assurance			ISAE 3410	88%

**8.7**  
Verification/assurance status for our Scope 2 emissions

Third-party assurance complete.

**8.7a**  
Details of verification/assurance for Scope 2 emissions

Type of verification or assurance	Attach the statement	Page/Section reference	Relevant standard	Proportion of reported Scope 2 emissions verified (%)
Limited assurance			ISAE 3410	100%

## GHG Emissions Accounting, Energy and Fuel Use, and Trading

### 9. Scope 1 Emissions Breakdown (January 1, 2014 - December 31, 2014)

#### 9.1 - 9.1a

We have Scope 1 emission sources in Canada and the U.S.

Country/region	Scope 1 metric tonnes CO <sub>2</sub> e
Canada	3,990,390
United States of America	1,675,520

#### 9.2 - 9.2d

Our total gross global Scope 1 emissions by activity

Activity	Scope 1 emissions (metric tonnes CO <sub>2</sub> e)
Locomotives	4,995,242
Intermodal trucks	136,245
Shipping vessel fleet	210,912
On Company Service fleet	100,685
Miscellaneous fuel consumption	202,002
Intermodal equipment	20,823

### 10. Scope 2 Emissions Breakdown (January 1, 2014 - December 31, 2014)

#### 10.1 - 10.1a

We have Scope 2 emission sources in Canada and the U.S.

Country/region	Scope 2 metric tonnes CO <sub>2</sub> e	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam, or cooling accounted for in CC8.3 (MWh)
Canada	63,660	313,250	171,480
United States of America	147,014	234,802	0

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 11. Energy

11.1  
Percentage of total operational spend on energy

More than 20% but less than or equal to 25%

11.2  
Fuel, electricity, heat, steam and cooling consumed during reporting year

Energy type	MWh
Fuel	20,544,388
Electricity	548,052
Heat	0
Steam	0
Cooling	0

11.3  
Fuel type breakdown

Fuels	MWh
Diesel (locomotive)	17,738,867
Diesel	1,903,937
Gasoline	260,279
Propane	115,774
Furnace oil	8,929
Stove oil	2,291
Kerosene	1,918
Natural gas	512,393

11.4  
Electricity, heat, steam or cooling accounted at low-carbon emission factor

Basis for applying a low-carbon emission factor	MWh associated with low-carbon electricity, heat, steam or cooling	Comment
Other	171,480	Grid-connected low-carbon electricity, based on provincial emission factors. This energy is from hydro power sources of emissions in Canada from the following provinces: Quebec, Manitoba and British Columbia.

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 12. Emissions Performance

### Emission History

Compared to the previous year, our gross global emissions have increased.

**12.1 and 12.1a**  
Gross global emissions (Scopes 1 and 2 combined) compared to the previous year and reasons for any change

Reason	Emission value (percentage)	Direction of change	Comments
Emission reduction activities	2%	Decrease	Carbon emissions from locomotives decreased due to continued implementation of projects in 2014 related to our rail locomotive emissions and energy efficiency strategy, which represent 85% of our greenhouse gas emissions. This includes new locomotive acquisitions, fuel management system enhancements, and the installation of new locomotive technologies such as Trip Optimizer and AESS. To calculate the reduction, we calculated a reduction of approximately 122,719 t CO <sub>2</sub> e from locomotive carbon reduction activities related to fuel efficiency. Our total Scope 1 and Scope 2 emissions were 5,404,326 tCO <sub>2</sub> e in 2013 and 5,876,584 tCO <sub>2</sub> e in 2014. Based on the locomotive carbon reduction, we calculated a 2% reduction in emissions from locomotives $(122,719 / 5,404,326) * 100 = 2\%$ decrease.
Change in output	11%	Increase	The carbon emissions associated with our locomotive fuel consumption, buildings, and other operating fleets increased as a result of the growth of our business, as well as the extremely cold winter conditions experienced in 2014. We calculated a 622,609 tCO <sub>2</sub> e increase from carbon emissions due to business, which represents an 11% increase $(622,609 tCO_2e / 5,404,326) * 100 = 11.5\%$ increase.

**12.2**  
Gross combined emissions in metric tonnes of CO<sub>2</sub>e per unit currency of total revenue

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change
0.000513	Metric tonnes CO <sub>2</sub> e	Unit total revenue	5.5%	Decrease	We reduced our emission intensity against revenue due to emission reduction activities relating to more fuel-efficient equipment and practices.

**12.3**  
Gross combined emissions in metric tonnes of CO<sub>2</sub>e per full-time employee (FTE)

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change
239	Metric tonnes CO <sub>2</sub> e	FTE employee	4.8%	Increase	We increased our carbon emissions due to growth in business.

**12.4**  
Metric appropriate to our business

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change
11.13	Metric tonnes CO <sub>2</sub> e	Other: Gross ton miles (millions)	2.8%	Decrease	We decreased our carbon emission intensity from locomotive fuel on a GTM basis due to increased fuel efficiency through our Precision Railroad model, the purchase of new, fuel-efficient locomotives, and the use of fuel efficiency technologies (such as Trip Optimizer and AESS).

### 13. *Emissions Trading*

13.1  
Participation in emission  
trading schemes

We do not participate in any emissions trading schemes and we do not currently anticipate doing so in the next two years.

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 14. Scope 3 Emissions

### 14.1 Sources of Scope 3 emissions

Sources of Scope 3 emissions	Evaluation status	Metric tonnes CO <sub>2</sub> e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
Purchased goods and services	Not relevant, explanation provided				We procure goods and services, including building furniture, track maintenance materials and equipment, chemicals and paper products. Given the scope and nature of our business, these emissions are not considered significant when compared to fuel production.
Capital goods	Not relevant, explanation provided				Our assets include locomotives, rail cars, rails, and buildings. When compared to emissions from fuel and energy production, emissions from capital goods are not considered significant.
Fuel- and energy-related activities (not included in Scope 1 or 2)	Relevant, calculated	1,581,423	Used the GHGenius calculation tool	85%	We procure diesel fuel for the operation of our locomotives, as well as other miscellaneous fuels.
Upstream transportation and distribution	Not relevant, explanation provided				Transportation and distribution includes ground (rail or truck) or vessel transport of the goods and services we procure. These Scope 3 emissions are not considered significant when compared to fuel production.
Waste generated in operations	Not relevant, explanation provided				We generate waste from our operations, including scrap metal, rail ties, and packaging. Waste GHG emissions are not considered significant when compared to fuel production.
Business travel	Not relevant, calculated	45,444	Compilation from corporate travel service providers	0.05%	Business travel includes corporate road and air travel. Business travel is not considered significant when compared to fuel production.
Employee commuting	Not relevant, explanation provided				Employee travel to and from work using road transport. These Scope 3 emissions are not considered significant when compared to fuel production.
Upstream leased assets	Not relevant, explanation provided				We lease rail cars and some rail equipment. These Scope 3 emissions are not considered significant when compared to fuel production.
Downstream transportation and distribution	Not relevant, explanation provided				As a transport and logistics company, we are part of the transportation supply chain. Therefore, downstream transportation and distribution does not apply to our business.
Processing of sold products	Not relevant, explanation provided				As a transport and logistics company, we do not process sold products.
Use of sold products	Not relevant, explanation provided				We do not process sold products that are then used by third parties. We offer a transportation and logistics service.
End-of-life treatment of sold products	Not relevant, explanation provided				We do not process sold products where the end-of-life treatment of sold products is relevant.
Downstream leased assets	Not relevant, explanation provided				We do not lease assets downstream.
Franchises	Not relevant, explanation provided				We do not own any franchises.
Investments	Not relevant, explanation provided				Investments of pensions are conducted through the pension committee. These Scope 3 emissions are not considered significant when compared to fuel production.
Other (upstream)					
Other (downstream)					

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

## 14. Scope 3 Emissions

**14.2**  
Verification/assurance status for our Scope 3 emissions

Third-party assurance complete.

**14.2a**  
Details of verification/assurance for Scope 3 emissions

Type of verification or assurance	Attach the statement	Page/Section reference	Relevant standard	Proportion of Scope 3 emissions verified (%)
Limited assurance			ISAE 3410	97%

**14.3 and 14.3a**  
Scope 3 emissions compared to previous year

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comments
Business travel	Business output	13.9%	Increase	In 2014, we increased business travel due to the growth in our business activities.
Fuel- and energy-related activities (not included in Scopes 1 or 2)	Business output	8.9%	Increase	In 2014, our emissions related to fuel production increased due to the growth in our business activities.

**14.4 and 14.4a**  
Engagement with elements of our value chain on GHG emissions and climate change strategies

### Suppliers

#### Method of engagement

We engage with our suppliers through one-on-one meetings, supplier forums, focused questionnaires and railway association forums, including the Railmarketplace Partners.

#### Strategy for prioritizing engagement

We prioritize our suppliers based on a diverse range of criteria, including single source suppliers, suppliers of a critical component, non-substitutable suppliers and the volume of spend on the supplier. These suppliers include equipment manufacturers, such as rail locomotives and technology suppliers, fuel service providers, transportation solution providers, as well as building efficiency technology suppliers.

#### Measures of success

We measure the number of suppliers engaged, and the business and environmental benefits that we have been able to achieve through these engagements.

### Customers

#### Method of engagement

We engage with our customers through one-on-one meetings, customer survey responses, and customer forums.

#### Strategy for prioritizing engagement

We prioritize customers based on the following criteria:

- Customers that have placed formal requests to CN to communicate on our GHG emissions and carbon management strategies.
- Customers that are leading in sustainability initiatives to identify opportunities to communicate our carbon and energy management performance through one-on-one account meetings.

#### Measures of success

We measure the number of customers reached.

# GHG Emissions Accounting, Energy and Fuel Use, and Trading

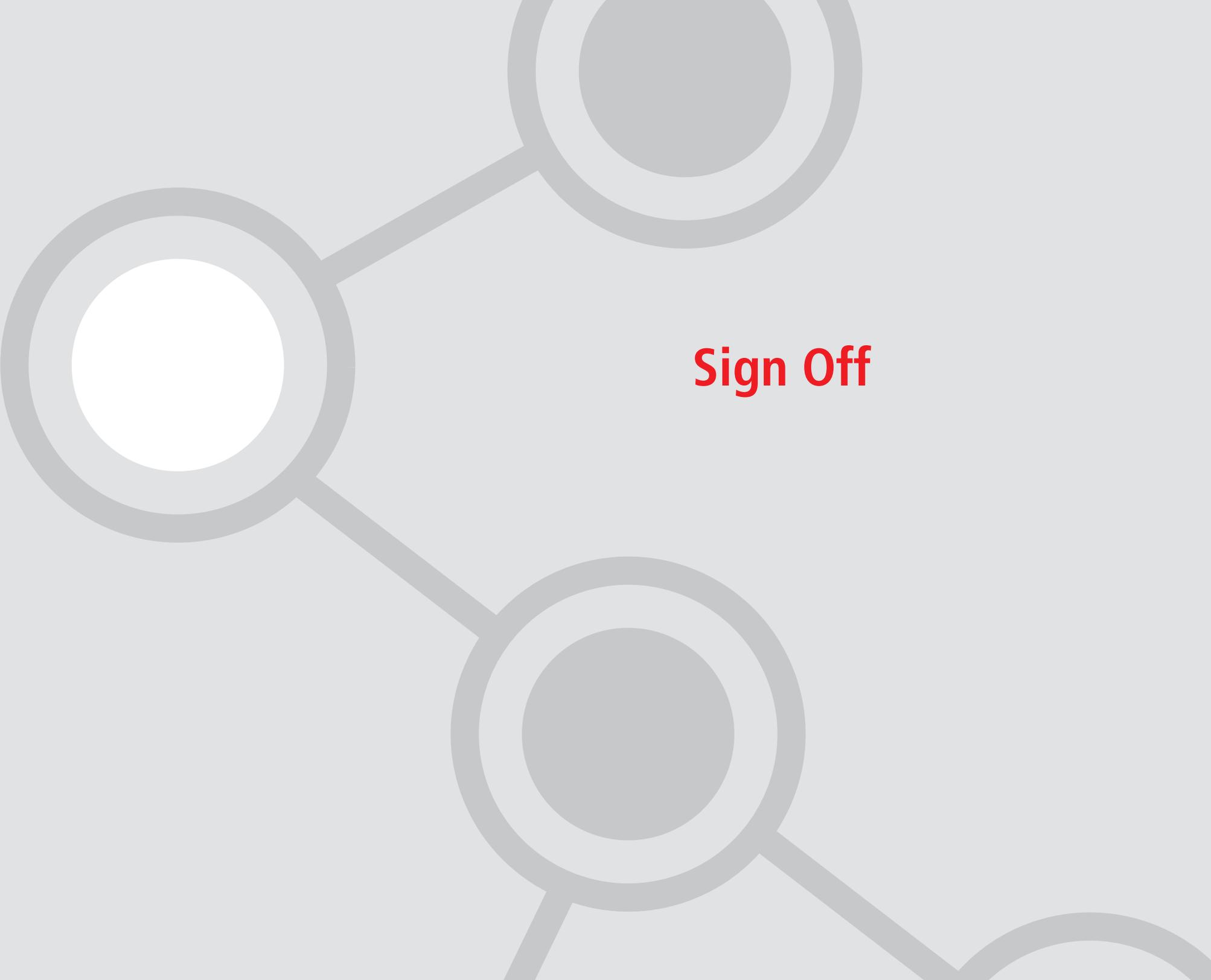
## 14. Scope 3 Emissions

**14.4b**  
Suppliers with whom we are engaging and the proportion of our total spend

Number of suppliers	% of total spend	Comment
69	88%	Our supply management team has engaged our critical suppliers through a questionnaire, one-on-one meetings, supplier forums and railway association meetings.

**14.4c**  
Data on our suppliers' GHG emissions and climate change strategies

How we make use of the data	Details
Stimulating innovation of new products	We are engaging with our suppliers to gain insights into their policies and practices related to sustainability, including carbon management strategies. We also work with suppliers collaboratively to promote sustainable products, including low carbon impact products. For example, we are working with suppliers to convert our vehicles and locomotives to units that are powered by compressed natural gas and liquefied natural gas respectively. We work with our suppliers to measure cost benefits as well as reductions in carbon emissions.



**Sign Off**

## Sign Off

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### 15. Sign Off

15.1  
Sign off for our CDP report

Name	Job title	Corresponding job category
Jim Vena	Chief Operating Officer	Chief Operating Officer (COO)

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