



# **Carbon Disclosure Project 2016**



# 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. Communications .....	14
<b>Risks and Opportunities</b> .....	<b>15</b>
5. Climate Change Risks .....	16
6. Climate Change Opportunities .....	19
<b>Emissions</b> .....	<b>25</b>
7. Emissions Methodology .....	26
8. Emissions Data .....	28
9. Scope 1 Emissions Breakdown .....	31
10. Scope 2 Emissions Breakdown .....	31
11. Energy .....	32
12. Emissions Performance .....	34
13. Emissions Trading .....	35
14. Scope 3 Emissions .....	36
<b>Sign Off</b> .....	<b>39</b>
15. Sign Off .....	40



# Introduction

# Introduction

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**CN is a world-class transportation leader 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. We offer fully integrated rail and other transportation services, including intermodal, trucking, freight forwarding, warehousing and distribution.**

**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. A true backbone of the economy, CN handles over C\$250 billion worth of goods annually and carries more than 300 million tons of cargo, serving exporters, importers, retailers, farmers and manufacturers.**

As a leader in the North American rail transportation industry, we recognize the important responsibility we have to run a safe and efficient business. An integral part of our success depends on our ability to mitigate the impact of, and adapt our business to, changing climatic conditions. With approximately 84% of our GHG 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 36%. Today, we lead the North American rail industry in terms of efficiency and operating margins, consuming 15% less fuel per gross ton-mile than the industry average.

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 2015 we reduced our rail locomotive GHG emissions intensity (tCO<sub>2</sub>e/GTM) by 19% since 2005. We are also on track to meet our science-based target to reduce our GHG emission intensity (tCO<sub>2</sub>e/GTM), which includes fuel consumption from locomotives, shipping vessels, trucks, and operating equipment, and buildings and yard energy consumption, by 22% by 2020, 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 over land – on average, trains are approximately four times more fuel-efficient than trucks. To leverage these benefits, we work with many of our customers, providing them with a GHG calculator, based on our industry leading modal shift quantification protocol that allows them 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 2015, we invested approximately C\$1.53 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 initiatives, we engage our network of 25,000 employees through our EcoConnexions program, giving them practical knowledge and tools to reduce our carbon footprint, while adapting to a changing climate.

As we prepare for the future, our connections with our customers, communities and outstanding team of railroaders are enabling us to provide value that distinguishes us from our competitors by delivering a sustainable and profitable business that drives economic prosperity in a low-carbon environment.

*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/en/delivering-responsibly](http://www.cn.ca/en/delivering-responsibly)*



**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, Mr. Normand Pellerin, has direct responsibility for climate change within the Company. He reports directly to the Vice-President, Safety and Sustainability, Mr. Sam Berrada, who in turn reports to the Executive Vice-President and Chief Operating Officer, Mr. Mike Cory. 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	Monetary reward	Other: Energy Performance	CN's President and Chief Executive Officer (CEO) has integrated sustainability, which includes CN's emission and energy performance, into his Employee Performance Scorecard. Achievement of sustainability performance is tied to the CEO's executive annual bonus compensation structure.
Chief Operating Officer	Monetary reward	Emissions reduction target Energy reduction target	The Executive Vice-President and Chief Operating Officer has included into his Employee Performance Scorecard (EPS) the energy efficiency strategy and the year-over-year rail fuel efficiency target of 1.5%, which aligns with our GHG emission intensity (tCO <sub>2</sub> e/GTM) reduction target of 22% by 2020, based on 2005 levels.
Management group	Monetary reward	Emissions reduction target 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%. The Facility management team performance is tied to the year-over-year target of reducing our overall energy spend by 5%.  Both these targets align with our overall science based target to reduce our GHG emission intensity (tCO <sub>2</sub> e/GTM) (which includes fuel consumption from locomotives, shipping vessels, trucks, and operating equipment, and buildings and yard energy consumption) by 22% by 2020, based on 2005 levels. 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)	Emissions reduction project Emissions 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 processes.  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 includes 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 enterprise-wide risk management (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 strategy is influenced (the internal process for collecting and reporting information to influence the strategy)**

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 (e.g. need for adaptation, regulatory changes, opportunities to develop green process)**

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 GHG calculator and modal shift quantification protocol.

#### **Most important components of the short-term strategy influenced by climate change (short-term can mean current)**

Fuel and emission efficiency of our rail locomotive operations has continued to be the most important part of our short-term (2015-2018) strategy influenced by climate change. With 84% 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 by being 15% more fuel-efficient per gross-ton-mile than the industry average.

For example, as part of our strategy we are now targeting approximately C\$600 million on equipment capital expenditures in 2016, including adding 90 new high-horsepower locomotives. We are also now ensuring that our new locomotive acquisitions include fuel efficiency technologies, such as CN's Real Time Business Intelligence (RTBI) locomotive telemetry system, Trip Optimizer, and Automatic Engine Start/Stop devices. These advancements will enable us to meet our 2016 1.5% fuel efficiency improvement target, and our science-based GHG intensity (tCO<sub>2</sub>e/GTM) reduction target of 22% by 2020, based on 2005 levels.

#### **Most important components of the 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 capacity, resilience and fluidity across our rail 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, mud slides and culvert washouts. We are now building an even more robust network. For example, in 2015 we spent C\$1.75 billion to improve track infrastructure and have planned C\$1.5 billion for track infrastructure in 2016, which includes proactive inspections, maintenance, readiness plans, and emergency planning. These advantages will enable us to run a climate resilient network, improve fluidity and greatly help us recover from weather-related operational challenges.



# Management

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## 2. Strategy

### Business Strategy (continued)

#### How this approach is gaining a strategic advantage over competitors

Integrating climate change considerations into our business strategy is helping us gain a strategic advantage as follows:

- Industry-leading fuel and carbon efficiencies. For example, CN is 15% more fuel-efficient than the industry average. In 2015, we achieved fuel savings of 2.1% representing approximately C\$24 million of savings in fuel operating costs.
- Growth of our intermodal business, leveraging the environmental benefits of rail for long-haul freight. In 2015, our intermodal business grew by 5%.
- Strong reputation on climate strategy and fuel efficiency. In 2015, we were named to the DJSI North America for the seventh consecutive year and were the only North American railroad to be listed on the DJSI World for the fourth year in a row. We scored 99% on our climate strategy.

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

The most substantial business decisions made during 2015 that were influenced by climate change included:

- Investing C\$555 million for equipment capital expenditure, including 90 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\$1.53 billion to ensure the safety and integrity of our rail infrastructure, including approximately C\$30 million to respond to extreme weather events.
- 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	Support	We engage with various Canadian federal and 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.	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 describe 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 cleaner, greener, efficient, and environmentally-responsible transportation solutions.

2.3d  
Public disclosure of research organizations we fund

Yes, we publicly disclose a list of all the research organizations we fund.

# Management

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## 2. Strategy

### Engagement with Policy Makers (continued)

2.3e  
Details of other  
engagement activities  
we undertake.

**Description:**

We play an active role in advancing research in the area of climate change. An 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.

2.3f  
Processes to ensure all  
direct and indirect activities  
that influence 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.

**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.

# Management

## 3. Targets and Initiatives

### Targets

#### 3.1 - 3.1b Our targets

ID	Scope	% of emissions in Scope	% reduction from base year	Metric	Base year	Normalized base year emissions covered by target	Target year	Is this a science-based target?	Comments
001	1 and 2 (location-based)	98%	22%	tCO <sub>2</sub> e per gross ton mile	2005	15.38 tCO <sub>2</sub> e/GTM	2020	Yes. (see comment)	This target relates to emission reductions from the use of our locomotives, shipping vessels, trucks and operating equipment, as well as reductions in energy consumption at our buildings and yards.  NOTE: CN's target was set following the CSO methodology (one of the seven approved by the CDP and SBTI). As of the submission deadline CN was still awaiting approval of our target by the SBTI.

#### 3.1c Change in absolute emissions our intensity target reflects

ID	Direction of change anticipated in absolute Scope 1 + 2 emissions at target completion	% change anticipated in absolute Scope 1 + 2 emissions	Direction of change anticipated in absolute Scope 3 emissions at target completion	% change anticipated in absolute Scope 3 emissions	Comments
001	Increase	1%	N/A	N/A	Our intensity target is expected to bring our absolute emissions to 1% above 2005 levels by 2020.

#### 3.1e Our progress compared to our targets

ID	% complete (time)	% complete (emissions or renewable energy)	Comments
001	67%	80%	In 2015 we achieved an emission intensity reduction of 18% from fuel consumption related to locomotives, shipping vessels, trucks, operating equipment, and energy consumption at our buildings and yards (tCO <sub>2</sub> e/GTM) based on 2005 levels.

# Management

## 3. Targets and Initiatives

### Emission Reduction Initiatives

#### 3.2 - 3.2a

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

Level of aggregation	Description of product	Low-carbon products or avoided emissions	Taxonomy, project or methodology used to classify products as low-carbon or to calculate avoided emissions	% revenue from low-carbon products	R&D in low-carbon products in the reporting year	Comments
Product	The rail freight service we provide, representing 94% of our business, enables our customers to move goods over land in the most efficient and environmentally friendly way. On average, trains are approximately four times more fuel-efficient than trucks. They also reduce highway congestion, lower GHG emissions and reduce air pollution.	Low-carbon products	Low-Carbon Investment (LCI) Registry Taxonomy	94%	Less than or equal to 10%	We continue to invest in greener and cleaner technologies and more efficient practices, to strengthen our low-carbon rail freight service, enabling our customers to reduce GHG emissions.
Product	Our intermodal freight shipping service combines the resources of different transportation modes, such as trucking and rail. Intermodal helps our customers reduce emissions by shifting their truck freight to rail.	Avoided emissions	Other – see comment	23%	Less than or equal to 10%	Moving freight by rail instead of truck lowers GHG emissions by 75%. To leverage these benefits, we work with many of our customers, providing them with a GHG calculator, based on our industry leading modal shift quantification protocol, which allows them to determine their carbon savings from switching heavy long-haul freight from truck to rail.

# 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*	5	302,292
Not to be implemented	0	0

Activity type	Description of activity	Estimated annual CO <sub>2</sub> e savings (tCO <sub>2</sub> e)	Scope	Voluntary/Mandatory	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period	Estimated lifetime of the initiative	Comments
Transportation: fleet	We continued implementation of four projects in 2015 related to our rail locomotive emissions and energy efficiency strategy, which represent 84% 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 CN's RTBI locomotive telemetry system.	295,302	Scope 1	Voluntary	24,000,000	555,000,000	21-25 years	> 30 years	These emission savings relate to Scope 1 emissions covering our rail locomotives. These projects will help us achieve our science-based emission intensity reduction target of 22% in 2020, based on 2005 levels.
Energy efficiency: building services	We invest in energy efficiency projects at our buildings and yards, including HVAC, lighting and air compressor upgrades.	6,990	Scope 2	Voluntary	1,000,000	8,000,000	4-10 years	11-15 years	We continue to work to reduce Scope 2 emissions from electricity consumption at our buildings and yards. This includes investing in a C\$5 million dollar EcoFund to support energy and emission reduction projects.

# 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 2015 we invested C\$555 million for equipment capital expenditures, including 90 new high-horsepower locomotives. In 2016, we have targeted C\$600 million on equipment capital expenditures, including another 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 CN's Real Time Business Intelligence (RTBI) locomotive telemetry system, horsepower to tonne 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.
Dedicated budget for energy efficiency	Energy efficiency is part of our science-based target to reduce our GHG emission intensity by 22% by 2020, based on 2005 levels. 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 through 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.
Internal incentives/ recognition programs	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.

# Management

## 4. Communications

### 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 document	Comment
In mainstream reports (including an integrated report) but have not used the CDSB framework	Complete	Pages 124 to 127	<a href="http://www.cn.ca/en/investors/financial-information/investor-fact-books">http://www.cn.ca/en/investors/financial-information/investor-fact-books</a>	2015 Investor Fact Book
In mainstream reports (including an integrated report) but have not used the CDSB framework	Complete	Pages 12, 13 and 53	<a href="http://www.cn.ca/en/investors/financial-information/annual-reports">http://www.cn.ca/en/investors/financial-information/annual-reports</a>	2015 Annual Report
In Voluntary Communications (complete)	Complete	Pages 17-24 and 64, Emissions and energy efficiency	<a href="http://www.cn.ca/en/delivering-responsibly">http://www.cn.ca/en/delivering-responsibly</a>	2014 Sustainability Report
Voluntary Communication	Complete	Delivering Responsibly Section	<a href="https://www.cn.ca/en/delivering-responsibly">https://www.cn.ca/en/delivering-responsibly</a>	Website Information – <a href="http://www.cn.ca/en/delivering-responsibly">http://www.cn.ca/en/delivering-responsibly</a>

Please note that the 2015 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

ID	Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-REG	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), who, in recent years, have adopted even more stringent locomotive Tier 4 emission standards. These include additional requirements that mandate the application of idle emission controls locomotive engines.</p> <p>In Canada, a Memorandum of Understanding (2011-2015) was signed in 2013 between the Railway Association of Canada and Transport Canada concerning GHGs and critical air contaminants. The GHG emission intensity target for our sector is 6% reduction by 2015 from 2010.</p> <p>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>	<p>Increased operational cost</p> <p>Increased capital cost</p>	3 to 6 years	Direct	Very likely	Medium-high	<p>Non-compliance with locomotive emissions 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.</p> <p>In 2015, we did not experience any non-compliance issues resulting in locomotive shutdowns. The financial implications are minimal (C\$0 in 2015) 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.</p>	<p>To meet emission standards, we purchase tier-compliant engines as part of our strategy to acquire, retire and upgrade locomotives.</p> <p>For example, in 2015, we added 90 new high-horsepower locomotives to our fleet, and expect to take delivery of 90 new high-horsepower locomotives in 2016.</p> <p>We have installed various fuel efficiency technologies on our current locomotive fleet, including CN's Real Time Business Intelligence (RTBI) locomotive telemetry system, Trip Optimizer, and Automatic Engine Start/Stop devices. These advancements will enable us to meet our 2016 1.5% fuel efficiency improvement target, and our 22% science-based GHG emission intensity reduction target by 2020, based on 2005 levels.</p>	<p>The costs associated with the locomotive acquisitions, upgrades and fuel-efficient operations change annually.</p> <p>For example, in 2015, we spent C\$555 million for equipment capital expenditures, including 90 new high-horsepower locomotives. In 2016, we have targeted C\$600 million on equipment capital expenditures, including adding another 90 high-horsepower locomotives to meet requirements.</p>
02 -REG	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.</p> <p>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.</p> <p>Emission limits could further increase legal costs related to defending and resolving legal claims and other litigation related to climate change.</p>	Reduced revenue	3 to 6 years	Indirect	About as likely as not	Medium-high	<p>In the event that GHG regulations impacted CN's coal customers, to the extent that all thermal coal shipments to utilities in North America ceased, it would reduce CN's rail freight revenues by approximately 3% which in 2015 was approximately C\$372 million.</p> <p>In the future, we would expect a similar figure with similar business conditions.</p>	<p>To manage this risk we continue to maintain a diversified and balanced portfolio of goods. For example, in 2015, no individual commodity group accounted for more than 23% of total revenues.</p> <p>We also continued to grow our intermodal business, positioning the positive environmental benefits of long haul rail shipments for our customers. For example, in 2015, the revenue from intermodal business increased by 5%, of which a small percentage was due to modal shift from truck to rail. Our intermodal business has continued solid growth since 2005, and is the largest single business unit with 2015 revenues of approximately C\$2.9 billion.</p>	<p>There are no costs associated with maintaining a diversified and balanced portfolio. A balanced portfolio is a function of our franchise.</p> <p>Investments in the intermodal business are part of the overall 2015 C\$2.7 billion spend on our capital program.</p> <p>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.</p>

# Risks and Opportunities

## 5. Climate Change Risks

### Climate Change – Physical Risks

5.1b  
Risks driven by change in physical climate parameters

ID	Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-PHY	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.</p> <p>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.</p> <p>Temperature extremes can also expose CN to operational and financial risks from episodes of flooding, landslides in unstable mountainous regions, and mud slides. In addition, flooding from spring melt can be damaging to rail bed support structures and cause overflows onto tracks. Landslides and mud slides can be especially damaging to our rail tracks.</p> <p>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.</p> <p>In 2015, 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 heavy early rains through much of the U.S. Midwest and Gulf regions leading to flooding in some areas and forcing the closure of a bridge in Louisiana.</p>	<p>Increased operational cost</p> <p>Increased capital cost</p>	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.</p> <p>In 2015, the financial impact of extreme weather events on our business was approximately C\$30 million.</p> <p>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 the redesign of fuelling station locations as well as 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 the Company assets from wear and tear that could be attributable to changes in climate.</p> <p>For example, in 2015, CN invested approximately C\$1.53 billion into its track infrastructure.</p> <p>Between C\$50-100 million of our operating expenditures are directed towards proactive inspections, maintenance, readiness plans, emergency response planning, and network infrastructure upgrades.</p>

# Risks and Opportunities

## 5. Climate Change Risks

### Climate Change – Other Risks

5.1c  
Risks driven by other  
climate-related  
developments

ID	Risk driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-OTH	Other drivers	<p>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.</p> <p>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.</p> <p>As such, CN has implemented a fuel surcharge program with a view to reducing the company's financial exposure to fuel price volatility.</p>	Increased operational costs	1 to 3 years	Direct	About as likely as not	Medium-high	<p>CN's reliance on fossil fuel could expose our customers to fuel price volatility and increases, adversely impacting business demand.</p> <p>Our fuel surcharge program quantifies these price increases. In 2015, due to the decrease in fuel price combined with weaker freight volumes, our fuel surcharge revenues decreased by C\$575 million, which benefitted our customers.</p>	<p>Our fuel surcharge program has been implemented with a view to offsetting the impact of rising fuel prices.</p> <p>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.</p> <p>For example, we are investing in compressed natural gas (CNG) shunt tractors (instead of diesel) for intermodal operations at Taschereau yard and Brampton Intermodal Terminal. As of the end of 2015, CN has put 17 of these CNG shunt tractors into operation, and plans to add another 12 CNG shunt tractors by the end of 2016.</p>	As of the end of 2015, CN had invested approximately C\$4 million to replace diesel shunt tractors with CNG shunt tractors.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities

6.1 - 6.1a  
Opportunities driven by changes in regulation

ID	Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-REG	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.</p> <p>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.</p> <p>These efforts combined with our Precision Railroading operating practices, have contributed to our leadership on fuel efficiency in the North American rail industry.</p> <p>For example, in 2015, we consumed 15% less fuel per gross-ton-mile than the industry average.</p>	Reduced operational cost	Up to 1 year	Direct	Virtually certain	Medium-high	<p>By updating and acquiring new locomotives within our rail locomotive fleet, and through enhanced locomotive handling procedures, we achieved fuel savings of 2.1% in 2015, representing approximately C\$24 million of savings in fuel operating costs</p> <p>A similar figure would be expected with similar business conditions for the future.</p>	<p>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.</p> <p>For example, in 2015, we added 90 new high-horsepower locomotives to our fleet, and expect to take delivery of another 90 new high-horsepower locomotives in 2016.</p>	<p>The costs associated with our locomotive renewal strategy differ annually.</p> <p>For example, in 2015 we spent C\$555 million for equipment capital expenditures, which included our new high-horsepower locomotives. In 2016, we are targeting approximately C\$600 million for equipment capital expenditures, including another 90 new high-horsepower locomotives.</p>

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities (continued)

ID	Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
02-REG	Cap and Trade Schemes	<p>Various cap and trade mechanisms continue to evolve in Canada and the U.S. presenting important opportunities to position carbon reduction projects that enable companies to meet their compliance objectives.</p> <p>For CN, the movement towards a carbon market presents opportunities given the environmental benefits that rail offers for long haul shipments of freight over other modes of transport.</p> <p>CN has developed a GHG calculator that provides a method for customers to calculate the GHG emission reductions that occur from shifting baseline truck freight traffic to rail.</p>	Increased demand for existing products/ services	Up to 1 year	Direct	Virtually certain	Medium-high	<p>Modal shift provides an opportunity for CN to grow revenue from customers looking for greater fuel efficiencies from shifting freight from truck to rail.</p> <p>For example, in 2015, CN customers that could avoid carbon emissions from shifting truck to rail represented approximately 59% of revenue ton miles, which covers approximately 68% of our freight revenues.</p> <p>Over time, this number could continue to increase as we grow our market share from truck to rail freight.</p>	<p>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.</p> <p>For example, through our EcoConnexions Partnership program, CN customers pledge to work to reduce their carbon emissions and increase energy efficiency. This includes leveraging modal shift from truck to rail as a carbon emission reduction strategy.</p> <p>We also continue to engage with governments and our customers to position the environmental benefits of rail and promote government subsidies that encourage customers to switch freight from truck to rail.</p>	<p>Investments in the intermodal business are part of the overall 2015 C\$2.7 billion spend on our capital program. For example, we are planning to build a C\$250 million intermodal and logistics hub in Milton, Ontario, (targeted to be open for operation at the end of 2019) which will help us efficiently handle growing intermodal traffic.</p> <p>The costs associated with communicating with our customers, and exploring opportunities to position CN's modal shift protocol is included in the marketing and sustainability functional budgets.</p> <p>The costs associated with internal resource time, advertising, and consultants are estimated to be approximately C\$500,000.</p>

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities (continued)

ID	Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
03-REG	Indirect Exposure through customer and supplier requirements	<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.</p> <p>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	<p>The financial implication of exposure to customer requirements can vary depending on the level of direct engagement.</p> <p>For example, in 2015, customers interested in our sustainability practices represented more than C\$1.4 billion of our revenues.</p> <p>These customers had directly requested information from us on our carbon footprint and management practices.</p> <p>Over time, this number could continue to increase as more of our customers demand low-carbon freight options.</p>	<p>In order to optimize this opportunity we are proactively engaging with our customers to position the carbon benefits of our services.</p> <p>For example, in 2015, we continued to engage large customers on carbon-related impacts, including requests to complete the CDP supply chain questionnaire.</p> <p>We are also providing our customers with a web-based GHG calculator to measure the GHGs from rail, marine and truck transportation; the first of its kind in the industry. In 2015, we had over 1500 requests for GHG emission calculations using our web calculator, an increase of 36% vs 2014.</p> <p>Our 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.</p>	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.

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Regulatory Opportunities (continued)

ID	Opportunity driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
04-REG	Government policies supporting rail freight	<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.</p> <p>For example, the Quebec government PEET and PETMAF programs have enabled CN to further accelerate its uptake of fuel-efficient rail technologies such as: CN's Real Time Business Intelligence (RTBI) locomotive telemetry system, Trip Optimizer, and the automatic engine Start/Stop devices.</p>	Reduced operational cost	Up to 1 year	Direct	Virtually certain	Medium	<p>The government subsidies related to new locomotives and new fuel-efficient locomotive technologies support CN to gain fuel efficiency savings of approximately 2.1% representing approximately C\$24 million of savings in annual fuel operating costs, which was in part due to the Quebec government PEET and PETMAF programs.</p> <p>Over time, this number could continue to increase as governments continue to incentivize the uptake of more fuel-efficient and low-carbon technologies.</p>	<p>In order to maximize the opportunity, we submitted applications to the Quebec Government for funding for new fuel-efficient locomotives and the installation of fuel handling technologies.</p> <p>For example, in 2012 and 2014, we obtained funding related to new locomotive acquisitions, as well as installations of automatic engine Start/Stop devices. In 2015, we received funding for other fuel-efficient technologies, including CN's RTBI locomotive telemetry system and Trip Optimizer.</p> <p>These installations will be ongoing. CN will continue to monitor funding opportunities as details of provincial and federal clean tech grant programs become available.</p>	<p>The upfront investment associated with the first grant application was approximately C\$8.2 million, and C\$4.2 million for the second grant application.</p> <p>In 2015, we spent approximately C\$100,000 in administrative costs as part of the government subsidy agreement.</p> <p>These costs were further subsidized by the government.</p>



## Risks and Opportunities

### 6. Climate Change Opportunities

#### Climate Change – Physical Opportunities

6.1b  
Opportunities driven by  
changes in physical climate  
parameters

ID	Risk Driver	Description	Potential impact	Time frame	Direct/ indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-PHY	Other physical climate change opportunities	<p>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.</p> <p>Over the past few years, CN has started to see growth in the cleaner energy markets with respect to wood pellets, biodiesel and ethanol.</p> <p>Revenues from cleaner energy markets are growing gradually, and we continue to engage with our customers to strengthen CN's position within this market.</p>	New products/ business services	3 to 6 years	Direct	About as likely as not	Medium	<p>Alternative energy and clean technology markets are continuing to increase.</p> <p>For example, in 2015, revenues for our Petroleum &amp; Chemicals segment increased by 4% vs. 2014, partially due to higher shipments of natural gas liquids.</p> <p>Shipments of biodiesel also continued to be strong in 2015 and we are expecting growth in 2016 due to increasing North American demand for renewable fuels.</p> <p>Over the next few years, we expect further growth in clean energy markets as global demand continues to increase.</p>	<p>Revenue growth from alternative energy and clean technology markets has the potential of presenting a long-term growth opportunity for CN.</p> <p>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.</p>	<p>The costs associated with communicating with our customers, and exploring opportunities to position CN's service is included in the marketing and sustainability functional budgets.</p> <p>The total costs associated with internal resource time, advertising, and consultants are estimated to be approximately C\$500,000.</p>

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Other Opportunities

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

ID	Risk Driver	Description	Potential impact	Time frame	Direct/indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
01-OTH	Reputation	Environmental responsibility, particularly carbon management, is becoming a top issue on corporate agendas. 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. More and more of CN customers request information 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 demonstrate the economic and environmental advantages of rail over other modes of transport, as well as work with customers 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, Corporate Knights 50 Best Corporate Citizens, and the Global Challenges Index.	Increased demand for existing products/services	Up to 1 year	Direct	Virtually certain	Medium	<p>The sustainability recognitions we receive position the Company positively with customers who have sustainability commitments and are interested in understanding our sustainability practices.</p> <p>For example, in 2015, customers interested in our sustainability practices represented more than C\$1.4 billion of our revenues.</p> <p>These customers had directly requested information from us on our carbon footprint and management practices.</p> <p>A similar figure would be expected with similar business conditions in the future.</p>	<p>In order to position our carbon efficient transportation services, we continue to actively engage with our stakeholders.</p> <p>For example, in 2015, we continued to engage with various customers on carbon-related impacts, including responses to specific customer requests to complete the CDP supply chain questionnaire.</p> <p>We are also providing our customers with a web GHG calculator to measure the GHGs from rail, marine and truck transportation; the first of its kind in the industry. In 2015, we had over 1500 requests for GHG emission calculations using our web calculator, an increase of 36% vs 2014.</p> <p>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.</p> <p>In 2015, we continued to be recognized for our sustainability efforts. For example, we were listed on the Corporate Knights 50 Best Corporate Citizens, Jantzi Social Index, FTSE4Good Index, Global Challenges Index, and the Dow Jones Sustainability Index.</p>	<p>The cost associated with this opportunity is integrated into CN sustainability budgets, including internal resources, advertising, marketing, and external resources.</p> <p>The costs associated with this opportunity is estimated at C\$250,000.</p>
02-OTH	Other - Alternative Fuels	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.	Increased demand for existing products/services	> 6 years	Direct	About as likely as not	Medium	<p>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.</p>	<p>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, we are investing in compressed natural gas (CNG) shunt tractors (instead of diesel) for intermodal operations at Taschereau yard and Brampton Intermodal Terminal. As of the end of 2015, CN has put 17 of these CNG shunt tractors into operation, and plans to add another 12 CNG shunt tractors by the end of 2016.</p>	<p>As of the end of 2015, CN had invested approximately C\$4 million to replace diesel shunt tractors with CNG shunt tractors.</p>



**Emissions**

# Emissions

## 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	5,052,334
Scope 2 (location-based)	2005	222,469
Scope 2 (market-based)	N/A	N/A

### Methodology

7.2  
Protocol used to calculate Scope 1 and 2 emissions

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

7.3  
Source for global warming potentials used

Gas	Reference
CO <sub>2</sub>	IPCC 2013 Fifth Assessment Report
CH <sub>4</sub>	IPCC 2013 Fifth Assessment Report
N <sub>2</sub> O	IPCC 2013 Fifth Assessment Report
Electricity Canada	Environment Canada National Inventory Report (1990-2014)
Electricity USA	Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities (eGrid2012)

# Emissions

## 7. Emissions Methodology

### 7.4 Emissions factors applied and their origin

Fuel/material/energy	Emission factor	Unit	Reference
Diesel (locomotive)	2690	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.15	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	1.0	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Diesel other	2690	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.110	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.151	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Gasoline	2316	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.52	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.2	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Propane	1515	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.024	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.108	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Furnace oil	3156	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.12	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.064	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Stove oil	2753	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.006	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.031	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Kerosene	2560	Carbon dioxide	Environment Canada, National Inventory Report (1990 - 2014)
	0.006	Methane	Environment Canada, National Inventory Report (1990 - 2014)
	0.031	Nitrous oxide	Environment Canada, National Inventory Report (1990 - 2014)
Natural gas	1957.8	CO <sub>2</sub> e g/m <sup>3</sup>	Environment Canada, National Inventory Report (1990 - 2014)
Electricity Canada	Based on provincial emission factors	CO <sub>2</sub> e g/kwh	Environment Canada, National Inventory Report (1990 - 2014)
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 2012)

# Emissions

## 8. Emissions Data

### Boundary

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

Operational control

### Scope 1 and 2 Emissions Data

8.2  
Gross global Scope 1 emissions

5,526,925 metric tonnes CO<sub>2</sub>e

8.3  
Gross global Scope 2 emissions – location-based

194,448 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 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

## 8. Emissions Data

### Data Accuracy

**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
Scope 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 measurements revealed a 1.5% variance. The 1.5% variance is mostly a result of the fuel evaporation losses at the dispenser fuel tanks.
Scope 2	Less than or equal to 2%	Extrapolations Published emission 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 Hydr-Quebec 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 the generic GHG emission factors as provided through the Canadian GHG National Inventory and the U.S. Environmental Protection Agency eGRID data and not the utility factors.

### External Verification or Assurance

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

Third party verification or assurance process in place

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

Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Annual	Complete	Limited	Done	7	ISAE 3410	87%

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

Third party verification or assurance complete

# Emissions

## 8. Emissions Data

### External Verification or Assurance (continued)

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

Location-based or market-based figure	Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Location-based	Annual	Complete	Limited	Done	7	ISAE 3410	100%

**8.8**  
Data points verified as part of third party verification work other than reported in CC8.6, CC8.7 and CC14.2

Additional data points verified	Comment
Year-on-year change in emissions (Scope 1)	The year-over-year changes in our Scope 1, Scope 2 and Scope 3 emissions have been verified by a third party.
Year-on-year change in emissions (Scope 2)	
Year-on-year change in emissions (Scope 3)	

**8.9**  
Carbon dioxide emissions from the combustion of biologically sequestered carbon

7,115 tCO<sub>2</sub>e



## Emissions

### 9. Scope 1 Emissions Breakdown

#### 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	3,917,842
U.S.	1,609,083

#### 9.2 - 9.2d

Our total gross global Scope 1 emissions by activity

Activity	Scope 1 metric tonnes CO <sub>2</sub> e
Locomotives	4,815,828
Intermodal trucks	137,119
Shipping vessel fleet	234,566
On Company Service fleet	97,782
Miscellaneous fuel consumption	212,478
Intermodal equipment	29,152

### 10. Scope 2 Emissions Breakdown

#### 10.1 - 10.1a

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

Country/region	Scope 2, location based (metric tonnes CO <sub>2</sub> e)	Scope 2, market-based (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 in market-based approach (MWh)
Canada	61,810	N/A	364,212	173,800
U.S.	132,638	N/A	230,148	N/A

# Emissions

## 11. Energy

11.1  
Percentage of total  
operational spend on energy

More than 15% but less than 20%

11.2  
Heat, steam and cooling  
consumed during  
reporting year

Energy type	MWh
Heat	0
Cooling	0
Steam	0

11.3  
Amount of fuel in MWh  
consumed (for energy  
purposes) during the  
reporting year

20,100,244

11.3a  
Fuel type breakdown

Fuels	MWh
Diesel (locomotives)	17,117,737
Diesel (others)	2,010,373
Propane	120,676
Gasoline	258,624
Furnace oil	6,516
Stove oil	2,278
Kerosene	1,052
Natural gas	582,988

# Emissions

## 11. Energy

**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	173,800	Grid connected low-carbon electricity, generated from hydro power sources in Canada from the following provinces: Quebec, Manitoba and British Columbia.

**11.5**  
Electricity produced and consumed

Total electricity consumed	Consumed electricity that is purchased	Total electricity produced	Total renewable electricity produced (MWh)	Consumed renewable electricity that is produced by company (MWh)	Comment
594,360	594,360	0	0	0	As a freight railway company, we do not produce electricity.

# Emissions

## 12. Emissions Performance

### Emission History

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

**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	Please explain and include calculation
Emission reduction activities	5.1%	Decreased	The carbon emissions from locomotives decreased due to continued implementation of projects in 2015 related to our rail locomotive emissions and energy efficiency strategy, which represent 84% 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 CN's RTBI locomotive telemetry system. In addition, we achieved emissions savings from energy efficiency projects implemented at our key yards. This includes lighting and HVAC upgrades, as well as upgrades to air compressors. We calculated a reduction of approximately 302,292 tCO <sub>2</sub> e from emission reduction activities related to locomotive fuel efficiency and energy efficiency in our buildings and yards. Our total Scope 1 and Scope 2 emissions in 2014 were 5,888,221 and in 2015, were 5,721,373. Based on the carbon reductions, we calculated a 5.1% reduction in emissions $(302,292/5,888,221) * 100 = 5.1\%$ decrease.
Change in output	2.3%	Increased	While overall, business volumes decreased in 2015 vs 2014, some areas of the business experienced growth (intermodal, automotive, and forest products), partially offsetting declines in other areas. CN also experienced increases related to miscellaneous fuel and energy consumption in some yards. We calculated an increase of approximately 135,444 tCO <sub>2</sub> e from changes in output. Our total Scope 1 and Scope 2 emissions in 2014 were 5,888,221 and in 2015, were 5,721,373. Based on the changes in output, we calculated a 2.3% increase in emissions $(135,444/5,888,221) * 100 = 2.3\%$ increase.

**12.1b**  
Emissions performance calculations in CC12.1 and CC12.1a

Our calculations are based on a location-based Scope 2 figure.

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

Intensity figure	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator: unit total revenue	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
0.000454	Metric tonnes of CO <sub>2</sub> e	12,611,000,000	Location-based	6.5%	Decrease	We reduced our emission intensity against revenue due to emission reduction activities relating to locomotive fuel efficiency as well as energy reduction projects at our key yards.

**12.3**  
Gross combined emissions in metric tonnes of CO<sub>2</sub>e per gross ton mile

Intensity figure	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator	Metric denominator: unit total	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
12.94	Metric tonnes of CO <sub>2</sub> e	Other – Gross ton miles	442,084	Location-based	1.4%	Decrease	We reduced our emission intensity against gross ton miles due to emission reduction activities relating to locomotive fuel efficiency as well as energy reduction projects at our key yards.

## Emissions

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### 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.

13.2  
Origination of projects  
based on carbon credits

We have not originated any projects based on carbon credits or purchased any within the reporting period.

# Emissions

## 14. Scope 3 Emissions

### 14.1 Sources of Scope 3 emissions

Sources of Scope 3 emissions	Evaluation status	Metric tonnes of CO <sub>2</sub> e	Emissions calculation methodology	Percentage of emissions calculated using primary data	Explanation
Purchased goods and services	Relevant, calculated	400,000	Emissions were estimated using the WRI GHG Protocol Scope 3 Evaluator Tool.		CN is in the process of reviewing annual spend from purchased goods and services and developing a more robust Scope 3 inventory. The emissions number provided is a rough approximation for Scope 3 inventory screening purposes and is therefore not included in CN's GHG inventory at this time.
Capital goods	Relevant, calculated	600,000	Emissions were estimated using the WRI GHG Protocol Scope 3 Evaluator Tool.		CN is in the process of reviewing annual spend from capital goods and developing a more robust Scope 3 inventory. The emissions number provided is a rough approximation for Scope 3 inventory screening purposes and is therefore not included in CN's GHG inventory at this time.
Fuel- and energy-related activities (not included in Scope 1 or 2)	Relevant, calculated	1,529,267	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	N/A	N/A		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	Relevant, calculated	12,000	Emissions were estimated using the WRI GHG Protocol Scope 3 Evaluator Tool		CN is in the process of reviewing annual spend from waste and developing a more robust Scope 3 inventory. The emissions number provided is a rough approximation for Scope 3 inventory screening purposes and is therefore not included in CN's GHG inventory at this time.
Business travel	Not relevant, but calculated	36,923	Compilation from corporate travel service providers		Business travel includes corporate road and air travel. Business travel is not considered significant when compared to fuel production.
Employee commuting	Not relevant	N/A	N/A		Employee travel to and from work using road transport. The Scope 3 emissions are not considered significant when compared to fuel production.
Upstream leased assets	Not relevant	N/A	N/A		We lease rail cars and some rail equipment. These Scope 3 emissions are not considered significant when compared to fuel production.
Investments	Not relevant	N/A	N/A		Investments of pensions are conducted through the pension committee. These Scope 3 emissions are not considered significant when compared to fuel production.
Downstream transportation and distribution	Not relevant	N/A	N/A		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	N/A	N/A		As a transport and logistics company, we do not process a sold product.
Use of sold products	Not relevant	N/A	N/A		We do not process a sold product that is then used by third parties. We offer a transportation and logistics service.
End-of-life treatment of sold products	Not relevant	N/A	N/A		We do not process a sold product where the end-of-life treatment of sold products is relevant.
Downstream leased assets	Not relevant	N/A	N/A		We do not lease assets downstream.
Franchises	Not relevant	N/A	N/A		We do not own any franchises.
Other (upstream)					
Other (downstream)					

# Emissions

## 14. Scope 3 Emissions

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

Third-party verification or assurance complete.

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

Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/Section reference	Relevant standard	Proportion of reported Scope 3 emissions verified (%)
Annual	Complete	Limited	Done	7 and 8	ISAE 3410	98%

**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	Emissions reduction activities	18.8	Decrease	In 2015 we continued to encourage employees to limit business travel, leveraging conference calls, webex meetings and video conferencing technologies to reduce emissions.
Fuel production	Emissions reduction activities	3.3	Decrease	In 2015, our emissions related to fuel production decreased as a result of increased locomotive fuel efficiency (less fuel consumed) as well as a decrease in 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 surveys, and through 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.

# Emissions

## 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 (direct and indirect)	Comment
68	85%	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	<p>We are engaging with our suppliers to gain insights into the policies and practices related to sustainability, including carbon management strategies. We also work with them collaboratively to promote sustainable products, including low-carbon impact products.</p> <p>For example, we are working with intermodal equipment suppliers to convert our diesel-powered shunt tractors to units that are powered by compressed natural gas. We work with our suppliers to measure cost benefits as well as reductions in carbon emissions</p>





**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
Luc Jobin	Chief Executive Officer	Chief Executive Officer (CEO)