



# **Carbon Disclosure Project 2014**



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*The information provided in this report is strictly confidential and intended solely for the use of the individual or entity to whom it is addressed.*



# Introduction

# Introduction

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**As a leader in the North American rail transportation industry, CN recognizes its environmental responsibility to reduce greenhouse gas emissions. Climate change, particularly global warming, poses a threat to natural ecosystems, which in turn has the potential to impact our operations, those of our customers and the economies where we operate.**

**We believe that an integral part of our success depends on our ability to mitigate the impact of and adapt our business to changing climatic conditions. This is why we have focused our emissions and energy efficiency strategy on: reducing our carbon footprint; providing sustainable solutions to customers; enhancing our stakeholder outreach activities; growing the business through cleaner energy markets; and investing in an efficient and reliable rail infrastructure.**

In addressing climate change, we believe that rail can be an integral part of the solution. 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. Rail also relieves traffic congestion and stress from our strained public infrastructure.

With approximately 85% of our GHG emissions generated from rail operations, emission reduction in this area remains a priority. Over the past fifteen years, CN's GHG emissions have been reduced significantly by the unique way we operate the railroad through precision railroading, the purchase of fuel-efficient locomotives and numerous other programs that advance railroad fuel efficiency. Today, CN continues to lead the North American rail industry in fuel efficiency, consuming close to 15% less fuel per gross-ton-mile overall than the industry average.

In 2013, we reduced our locomotive GHG emission intensity (tCO<sub>2</sub>e/GTM) by 14.4% since 2005. We are now well on our way to meet our target to reduce locomotive GHG emission intensity by 15% by 2015, based on 2005 levels. This target aligns with our annual year-over-year fuel efficiency target of 1.5% until 2015. We are also making sizeable reductions in the emissions of our other fleets, buildings and yard operations. This includes increasing operational and building efficiencies; investing in green technology systems; and reducing waste at our facilities and on our network.

Being cognizant of the service disruptions that can result from weather events, the protection of our network operations remains a top priority. We invest more than C\$2 billion annually to keep our network safe and fluid, which includes the maintenance of our track infrastructure and the execution of seasonal readiness plans, natural hazard warning systems, and other weather-related emergency preparedness protocols.

We continue to drive improvements in our customer service by not only providing a great fuel-efficient transportation service, but also a GHG carbon calculator that customers can use to determine their carbon savings from switching freight from truck to rail, based on our modal shift quantification protocol. We engage with suppliers to support research into next-generation locomotives and alternative fuel options, including natural gas.

At the heart of all these achievements is our EcoConnexions initiative, which continues to engage our network of 23,000 employees to reduce energy consumption. The launch of the EcoConnexions program has been instrumental in giving employees the tools and techniques to change energy habits, and consider energy options when making decisions.

We remain committed to continuing to innovate throughout the entire value chain, creating ecosystems of collaboration to drive a more efficient end-to-end supply chain.

An abstract graphic featuring a network of circles and lines. A central white circle is connected by grey lines to three other circles: one at the top, one at the bottom, and one to the right. The circles have varying shades of grey and white. The word "Management" is written in red text to the right of the central circle.

**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 quarterly and annual 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, Michael Farkouh, who in turn reports to the Executive Vice-President and Chief Operating Officer, Jim Vena. Together, the team report regularly to the 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
Corporate executive team	Monetary reward	<p>CN's executive team have included sustainability and climate change objectives and targets as part of their Employee Performance Scorecards (EPS). For example:</p> <ul style="list-style-type: none"> <li>CN's President and Chief Executive Officer, Claude Mongeau, has integrated sustainability into his EPS.</li> <li>The Executive Vice President and Chief Operating Officer has included into his EPS the energy efficiency strategy and the year-over-year fuel efficiency target of 1.5%. This target aligns with the carbon intensity reduction target of 15% by 2015, based on 2005 levels.</li> </ul> <p>Achievement of the respective performance indicators are tied to the executive annual compensation and bonus reward structure.</p>
Management group	Monetary reward	<p>Various management employees are responsible for executing our emissions and energy efficiency strategy. The performance indicators are included within their respective EPS scorecards. For example:</p> <ul style="list-style-type: none"> <li>The fuel management team performance is tied to our annual year-over-year fuel efficiency target of 1.5%, which aligns with the carbon intensity reduction target of 15% by 2015, based on 2005 levels.</li> <li>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.</li> </ul> <p>The achievement of the above performance indicators are linked to employee recognition as well as the individual's annual compensation and bonus reward.</p>
All employees	Recognition (non-monetary)	Fuel efficiency, emission and energy reduction initiatives are recognized through CN's President's Awards for Excellence within the sustainability category.
Other	Recognition (non-monetary)	Employees are recognized for their efforts through the CN EcoConnexions program awards and 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	√ 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.	√ 3 to 6 years	Climate change risks and opportunities are integrated into our multi-disciplinary enterprise-wide risk management (ERM) process. Based on this review, various climate-related risks and opportunities are considered, including 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 is communicated to the corporate comptroller for inclusion into the enterprise risk management process. At the company level, we considered the climate-related reputational risks from a lack of disclosure on our carbon strategy and management to a broad range of stakeholders, including our investors, customers and governments. We have also considered the impact of extreme weather events on our business operations and operating fuel costs, as well as locomotive regulatory requirements and changing policies on renewable fuels, alternative fuels, and fuel efficient technologies.

#### 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 considered natural disasters and network disruptions due to severe weather conditions that could impact specific buildings and yards on our network. The environment function reviews the changing regulations related to climate change that could impact our business within specific provinces and states in North America.

**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 evaluate the impacts in terms of the economic, environmental and social implications, 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. Where a priority rating of high is assigned to a risk and opportunity, the Company conducts a more strategic review at the executive level to assess the costs and benefits associated with proposed strategic climate change programs to ensure alignment with CN's business goals. Once approved, 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

The business strategy is influenced by various factors, including climate-related information. To inform the business strategy, climate-related information is compiled through a number of sources, including the enterprise risk management exercise, our Sustainability Action Plan, annual environmental regulatory reviews, growth market trends, geotechnical studies, customer surveys, stakeholder requests, fuel efficiency improvement performance reports, and the results of employee engagement programs and customer requests.

The information is compiled from relevant functions within the Company by the Sustainability department. Once analyzed, key performance information is communicated to the Executive team, which is used to inform the company-wide business strategy. The business strategic priorities, plans and targets relating to emissions and energy are formalized and updated annually in our internal Sustainability Action Plan.

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

The climate change aspects that most influenced our business strategy include regulatory risks related to changing locomotive emission standards, severe and extreme changing weather events impacting network infrastructure and track operating efficiency, and increasing building energy costs. Climate change opportunities also influenced the business strategy, including changing customer requests for low-carbon service offerings, favourable government subsidies that promote cleaner technologies, clean energy markets, alternative fuel options and reputational value.

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

Extreme weather patterns, fuel costs and our customer-centric focus continue to influence our short-term (2013-2015) strategy. To ensure we reduce our carbon footprint, we are continuing our short-term annual 1.5% fuel efficiency target, which is part of our business strategy. We also have a formal GHG emission intensity reduction target of 15% (tCO<sub>2</sub>e / Gross Ton Mile (GTM)) by 2015, based on 2005 levels.

To operationalize on this strategy, we continue to improve our precision railroading operational efficiency, conduct employee training, use real-time data and invest in new fuel-efficient locomotives and upgrades to existing locomotives, and other processes and technologies. We have also extended our efficiency strategy to our non-rail fleets and to improving the efficiency of our buildings and yard operations.

Our employees are integral to our ability to reduce energy consumption. The EcoConnexions program has been instrumental in giving employees the tools and techniques to change energy habits, and consider low-carbon energy options when making decisions.

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

Locomotive emission standards, customer requests for low-carbon services, favourable government subsidies and reputation influence our long-term strategies (2015-2020) related to innovation, top-line growth and structured stakeholder engagement. Through our investments in innovation we continue to advance next-generation technologies and alternative fuel options, enabling us to gain even greater fuel efficiency ratios and succeed in a future low-carbon economy. As part of our top-line growth strategy, we are tracking sustainable energy product markets, including wind towers, biodiesel and wood pellets.

Our structured stakeholder engagement strategy is enhancing our customer service proposition by increasing awareness of government incentive programs for low-carbon transport efficiencies, while advancing our modal shift quantification protocol to enable our customers to gain carbon credits from switching freight from truck to rail. This modal shift protocol is part of CN's long-term strategy to positively position CN within the context of a future carbon market regulatory regime.



## 2. Strategy

### Business Strategy (continued)

#### Gaining a strategic advantage over competitors

The integration of climate-related aspects into our business strategy is enabling us to gain a competitive advantage by:

- Building customer loyalty and satisfaction from a carbon efficient and productive rail service in North America. In 2013, CN continued to lead the North American rail industry in fuel efficiency, consuming close to 15% less fuel per gross-ton-mile overall than the industry average. Our operating efficiency resulted in a 14.4% reduction in rail GHG emissions per gross-ton-mile in 2013, based on 2005 levels. With approximately 85% of our GHG emissions generated from rail operations, emission reduction in this area will be an ongoing priority.
- Increasing cost efficiencies from carbon and energy management within our other fleets, buildings and yard operations. This includes increasing operational and building efficiencies; investing in virtualization technologies, investing in energy-efficient data centres; and reducing, recycling and reusing waste at our facilities and on our network.
- Enhanced reputation from our achievements in energy and carbon efficiencies. CN has distinguished itself as a sustainability leader. CN was named to the North American (NA) Dow Jones Sustainability Index (DJSI) for the fourth consecutive year in 2013 – we scored 98% on our climate strategy and were the only NA railroad company to be listed on the DJSI World Index, with leadership status.

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

The most substantial business decisions made during 2013 that have been influenced by climate change aspects include:

- Our equipment capital expenditure of approximately C\$200 million, which included the acquisition of 37 previously-owned high-horsepower locomotives and 44 new AC traction locomotives. These investments are enabling us to meet climate-related regulatory requirements for more efficient and tier-compliant locomotives.
- An investment of approximately C\$1.1 billion to ensure the safety and reliability of our rail infrastructures, including approximately C\$50 million to respond to extreme weather events.
- Continuing to explore the use of liquefied natural gas as a fuel for locomotives, which will enable us to reduce our overall carbon footprint.
- Investing in our energy management data systems and improvements at our buildings and yards.
- Engaging employees on energy reduction projects through the EcoConnexions initiative, which enhances our reputation and ability to attract employees.

# 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 have been actively engaging with various Canadian provincial governments (British Columbia, Alberta, Saskatchewan, and the Western Climate Initiative) on their cap and trade regulatory regimes to position rail freight as a viable low-carbon transportation solution. Collaborations with governments included positioning our Modal Shift Protocol.	We believe that involvement in such sessions with leading policymakers 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 US 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 solutions.

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 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 within 25 communities in Canada. CN had originally set aside C\$150,000 to fund this community tree planting program. Given the overwhelming response, the funding was increased to just over C\$500,000. The program aligns with CN's environmental stewardship and 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 providing a valuable ecosystem in Canada.

**Ducks Unlimited Canada** – CN has continued its three-year partnership with Ducks Unlimited Canada to support the conservation and restoration of wetlands, through an C\$850,000 sponsorship. CN developed its CN EcoConnexions environmental stewardship and 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 financial support to advance the organization's mission to create greater awareness and provide solutions towards climate change. TCRPC is an organization that promotes awareness and education on climate change.

# Management

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## 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 Concordia University's 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, C\$100,000 annually 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 Concordia 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 External Communications 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.

## Management

### 3. Targets and Initiatives

#### Targets

##### 3.1 - 3.1b

Our intensity target.

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Base year emissions (tCO <sub>2</sub> e)	Target year	Comments
001	1	85%	15%	tCO <sub>2</sub> e / Gross ton mile	2005	13.38	2015	This target will be achieved through improved efficiency in our rail locomotive fleet.

##### 3.1c

Change in absolute emissions our 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	Comments
001	Increase	15.2%	N/A	N/A	As we grow as a business, our absolute emissions are expected to increase.

##### 3.1d

Our progress compared to our target.

ID	% complete (time)	% complete (emissions)	Comments
001	80%	96%	We achieved an emission intensity reduction of 14.4% from rail locomotive fuel consumption (tCO <sub>2</sub> e / GTM) based on 2005. We are on track to meet our target of 15% reduction by 2015.

# 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.

#### How emissions are / were avoided

Emissions are avoided by our customers shifting freight from truck to rail. Based on industry standards, rail emits 4-5 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 GHGs by as much as 7.6 million to 10.2 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 2013 truck emissions from the equivalent 2013 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 (CO<sub>2</sub> – 1, Methane – 21, and Nitrous oxide – 310).

#### Assumptions

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

- a) Based on industry standards, rail emits 4-5 times less greenhouse gas emissions than heavy trucks. In Canada, the estimate is 6 times and in the US the estimate is 3 times. We therefore took a range of rail generating between 4-5 times less GHGs than heavy trucks. We used this range to calculate the equivalent truck emissions.
- b) Tonnes of CO<sub>2</sub>e per gallon of diesel fuel is 0.0114
- c) Based on 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, especially now that Quebec has 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  
Emissions reduction  
initiatives active within the  
reporting year.

Stage of development	Number of projects	Total estimated annual CO <sub>2</sub> e savings
Under investigation	0	0
To be implemented	0	0
Implementation commenced	0	0
Implemented	9	32,590
Not to be implemented	0	0

Activity type	Description of activity	Estimated annual CO <sub>2</sub> e savings	Annual monetary savings (unit currency – as specified in CC0.4)	Investment required (unit currency)	Payback period	Estimated lifetime of the initiative, years	Comment
Transportation: fleet	<p>In 2013, we made equipment capital expenditures of C\$200 million for the acquisition of new locomotives, intermodal equipment and vehicles, as well as locomotive and car refurbishments. We also invested in fuel management system enhancements and the installation of new locomotive technologies. These expenditures will enable us to reduce our greenhouse gas (GHG) emissions relating to Scope 1 GHG emissions, which represent more than 85% of our overall footprint.</p> <p>The projects were implemented on a voluntary basis. The greenhouse gas savings will enable us to achieve our emission intensity reduction target of 15% tCO<sub>2</sub>e per GTM in 2015, based on 2005.</p>	32,590 tonnes	C\$10,000,000	C\$200,000,000	20 years	>25 years	N/A

# Management

## 3. Targets and Initiatives

### Emission Reduction Initiatives (continued)

3.3c  
Methods used to drive  
investment in emissions  
reduction activities.

Method	Comment
Compliance with regulatory requirements / standards	With the expiration of our MOU with Environment Canada and pending the Canadian Locomotive Emission Standards, CN continues to follow through on its commitment to acquire, retire and upgrade locomotives so as to improve air quality, enhance fuel efficiency and reduce 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 2013, as part of our capital expenditure allocation to improve the quality of our fleet and grow the business, we took delivery of 44 new and 37 second-hand 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 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 launch of the EcoConnexions program, we set up an Eco-Fund to provide the necessary resources to enable the execution of carbon and energy efficiency projects.
Dedicated budget for energy efficiency	We identified processes and equipment where the biggest reductions were possible by reviewing our Energy Management System data. 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. Through this analysis we have selected projects and allocated a budget for approval.
Dedicated budget for other emission reduction activities	We have established a dedicated budget for various other emission and energy reduction activities as identified in our Sustainability Action Plan. On an annual basis, various department heads and groups, including Intermodal, Supply Management, Great Lakes Shipping, and our Facilities team, submit their business case investment needs to meet the corporate fuel efficiency and carbon reduction objectives. Based on these analyses, we allocate our dedicated sustainability budget on projects that bring the biggest efficiency or reduction benefits.
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 differ according to employee level 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 responses to climate change and GHG emissions performance.

Publication	Page / section reference	Identify the attachment
In annual reports (complete)	Pages 11 and 49	2013 Annual Report
In voluntary communications (complete)	Pages 19-25, Emissions and Energy Efficiency	2012 Sustainability Report
In voluntary communications (complete)	Pages 22-31, Delivering Responsibly	2013 Investor Fact Book
Voluntary communication	Delivering Responsibly section	Website at <a href="http://www.cn.ca/en/delivering-responsibly">www.cn.ca/en/delivering-responsibly</a>



An abstract graphic featuring four circles of varying shades of gray and white, connected by a network of gray lines. The circles are arranged in a roughly square pattern, with lines connecting them in a web-like structure. The central text is positioned in the middle of the composition.

# **Risks and Opportunities**

# Risks and Opportunities

## 5. Climate Change Risk

### 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 US, CN's locomotive emissions are regulated by the US Environmental Protection Agency (EPA), which sets emission standards for newly manufactured and remanufactured 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. We are now anticipating Canadian Locomotive Emission Standards similar to those established under the US EPA. The more stringent emission standards could expose CN to additional costs and affect the pace at which we acquire, retire and upgrade locomotives. Furthermore, the more stringent requirements are not yet technologically feasible and will require continued collaboration with our manufacturers to ensure that the next generation locomotives are compliant.</p>	<p>✓ Increased operational cost</p> <p>✓ Increased capital cost</p>	3-6 years	Direct	Very likely	Medium-high	<p>Non-compliance with locomotive emissions standards could expose the Company to a loss of business related to locomotive shutdowns and could hamper possible revenue growth.</p> <p>In 2013, 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 a similar figure 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.</p> <p>To meet the more stringent Tier 4 standards, we are working with manufacturers to develop new engine technologies that lower fuel consumption and emissions. We also continue to partner with GE and Sustainable Development Technology of Canada in the advancement of the next generation of locomotives.</p>	<p>In 2013, we added 37 previously-owned high-horsepower locomotives and 44 new tier-compliant AC traction locomotives to our fleet. We will target approximately C\$315 million in 2014 for the acquisition of locomotives, intermodal equipment, and vehicle, locomotive and car refurbishments to meet requirements. CN expects to take delivery of 60 new high-horsepower locomotives in 2014. We also continued our investment of C\$1 million over three years into next generation locomotives.</p>
02-REG	Other regulatory drivers	<p><b>Proposed Canadian Federal Climate Change Legislation</b></p> <p>Climate change legislation and regulation 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>	<p>✓ Reduced revenue</p>	3-6 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 they would be unable to supply coal, it would reduce CN's revenues by approximately 6%, which in 2013 was approximately C\$575 million. The potential loss of revenue from thermal coal would be C\$132 million or 1.3% of total revenues.</p> <p>In the future, we would expect a similar figure with similar business conditions.</p>	<p>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 product 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. In 2013, no individual commodity group accounted for more than 23% of total revenues.</p>	<p>There are no costs associated with maintaining a diversified and balanced portfolio. A balanced portfolio is a function of our franchise.</p>

# Risks and Opportunities

## 5. Climate Change Risk

### 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	Changes 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. 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. Temperature extremes can also impact our sites and networks located within the US Tornado Belt, Midwest and New Orleans area, making us vulnerable to increases in tornado occurrences and intensity.</p> <p>In 2013, CN's network was exposed to abnormally cold winters throughout Canada and the US hampering operations and fuel efficiency. We also experienced extreme weather events through the prairies, significant snow drift over our rail cars, floods, and culvert washouts.</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 2013, the financial impact of extreme weather events on our business was approximately C\$50 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 the redesign of fuelling station locations as well as providing the necessary back-up IT systems. Our field forces have ready access to a 24-hour SmartRAD weather warning service.</p> <p><b>Non-rail Modes of Transport</b> – CN is well-placed to address reduced vessel traffic volumes that may occur as a result of extreme drought conditions given our ability to provide both locomotive and truck freight transport alternative services.</p>	<p>In 2013, CN invested approximately C\$1.1 billion into its track infrastructure.</p> <p>Between C\$50 and 100 million of our operating expenditures are directed towards proactive inspections, maintenance, readiness plans, emergency response planning, and network infrastructure upgrades. In 2013, in response to extreme weather events, we expended C\$100 million into capacity enhancements to handle traffic congestion to relieve bottlenecks during extreme weather events.</p>

## Risks and Opportunities

### 5. Climate Change Risk

#### 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 of offsetting the impact of rising fuel prices.</p>	√ Increased operational cost	Unknown	Direct	About as likely as not	Medium to 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 2013, the revenue increase from fuel surcharge price was approximately C\$35 million, over 2012. These prices could continue to increase in the coming years.</p>	<p>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 biodiesel fuels.</p> <p>In late 2013, CN successfully completed a test program using liquefied natural gas in two locomotives. The test program enabled us to enhance our understanding of the use of liquefied natural gas as an alternative to diesel. Testing with LNG will continue in 2014. CN will convert several high-horsepower mainline locomotives to liquefied natural gas and develop special tender cars for the train to carry the LNG.</p>	<p>The next-generation locomotive investments are within the range of approximately C\$1 million.</p> <p>The liquefied natural gas alternative fuel testing program is being led by CN and involves manufacturers and fuel suppliers. Funding for the program has been secured by the manufacturers of the high-pressure direct injection technology - for approximately C\$1 million per year over 3 years.</p>

## 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 US EPA locomotive emission standards, and in anticipation of the Canadian emission standards, opportunities exist to realize long-term carbon efficiencies and significant fuel savings through our locomotive fleet management strategy.</p> <p>As a result of this opportunity, 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. These efforts combined with our precision railroading operating practices, have contributed to our leadership on fuel efficiency in the North American rail industry. In 2013, we consumed close to 15% less fuel per gross-ton-mile overall than the industry average.</p>	√ Reduced operational cost	Up to 1 year	Direct	Virtually certain	High-medium	By proactively 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 to 1.5% representing approximately C\$20 million of savings in fuel operating costs. A similar figure would be expected with similar business conditions for the future.	<p>To meet our obligations under both emission standards and other fuel efficiency voluntary agreements, we have implemented various initiatives. This has included the implementation of fuel efficiency measures, such as improved train handling, the inherent improvements in diesel engine thermal efficiency, and reduced "parasitic" losses in the locomotive auxiliaries.</p> <p>We have also invested significantly in the acquisition of and upgrade to more fuel efficient locomotives.</p>	<p>The costs associated with the locomotive acquisitions, upgrades and fuel efficient operations differ annually. For example, in 2014, we are targeting approximately C\$315 million for the acquisition of locomotives, intermodal equipment and vehicles as well as locomotive and car refurbishments. We also expect to take delivery of 60 new high-horsepower locomotives in 2014.</p> <p>These initiatives enable us to meet our compliance objectives, while minimizing GHG emissions and increasing fuel efficiency.</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><b>Western Climate Initiative (WCI) Regional Cap and Trade Scheme</b></p> <p>The cap and trade schemes developing in Canada and the US 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 US (State of California) have started to put in place regulatory frameworks to position their provinces to comply with GHG reduction obligations.</p> <p>For CN, the movement towards a carbon market presents important opportunities given the environmental benefits that rail presents for shipping 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	High-medium	<p>The modal shift protocol provides an opportunity for CN to grow revenue from customers looking for greater fuel efficiencies by shifting freight from truck to rail. Already, CN customers that can avoid carbon emissions from shifting truck to rail represent approximately 55% of revenue ton miles, which covers approximately 70% of our revenues.</p> <p>Over time, this number could continue to increase as we grow our market share from truck to rail freight.</p>	Over the past year, CN continued to actively engage with its customers to improve the carbon footprint of our customer's shipments and increase our revenues from modal shift.	<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 include 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.</p>	√ Increased demand for existing products / services	Up to 1 year	Direct	Very likely	High-medium	<p>We estimate that the potential to demonstrate the low-carbon impact to our customers could directly impact approximately 10% of revenues. This estimate reflects those customers that have made public commitments to sustainability or are directly requesting information from us relating to the carbon impact of freight. 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 on a number of fronts:</p> <p><b>CDP Supply Chain Questionnaire</b> – We are providing CDP responses to specific customer requests to complete the CDP Supply Chain questionnaire.</p> <p><b>GHG Calculator and Modal Shift Protocol</b> – We have developed and enhanced our GHG calculator to enable customers to measure the GHGs from rail, marine and truck transportation; the first of its kind in the industry.</p> <p><b>Ongoing Customer Engagement</b> – Further, with the development of a modal shift rail freight protocol, ongoing strategic partnerships and engagement with customers, as well as our own operational efficiency, we have 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	<b>Favourable Government Policies</b> 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 technologies. For example, the Quebec government assistance has 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.	√ Reduced operational cost	Current	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 to 1.5% representing approximately C\$20 million of savings in fuel operating costs. 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, CN obtained approval from the Quebec government that it would support funding into new locomotive acquisitions as well as installation of fuel efficient technologies, covering Wi-Tronix, Trip Optimizer and Automatic Engine Start Stop devices. The technologies are currently underway. The first phase of installation began in 2011 and is expected to continue until 2014.	The upfront cost associated with our investments was approximately C\$6 million. These costs will be further subsidized by the government.



## Risks and Opportunities

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### 6. *Climate Change Opportunities*

#### Climate Change – Physical Opportunities

6.1b and 6.1e  
Opportunities driven by  
changes in physical climate  
parameters.

##### **Statement that no substantive opportunity has been identified**

In light of our diversified portfolio of business from a variety of commodity groups and the seasonal variability of weather patterns in North America, we do not expect changing physical parameters related to warming temperatures to have a substantive impact on the business in terms of operations, revenues and expenditures.

When assessing the possible opportunity related to changes in physical climate parameters, we examined the impacts on revenues from our commodity markets as well as the impacts on operating costs. In terms of our commodity markets, we determined that an opportunity presented by warming temperatures within the prairie regions of Canada, lengthening growing seasons and increasing crop production in northern regions, are generally offset by other commodity markets that do not benefit from such temperature changes. As such, the financial implications of this opportunity are estimated to be neutral to the business. We have also found that the opportunities presented by a decrease in fuel consumption and energy demands during warmer winters offset the warmer summers that require increased energy for cooling within our yards and office building operations.

Overall, we do not consider the Company to be exposed to opportunities driven by changes in physical climate parameters to have the potential to generate a substantive change in our business operations, revenues or expenditures.

# 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	<p>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.</p> <p>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 and the Corporate Knights Best 50.</p>	√ Increased demand for existing products / services	Current	Direct	Virtually certain	Medium	<p>The sustainability recognitions we receive position us positively with customers who have sustainability commitments and are interested in understanding our sustainability practices.</p> <p>In 2013, the financial implication of this opportunity was estimated at approximately 10% of our revenues, representing customers with strong sustainability commitments or who have requested information on our carbon footprint. A similar figure would be expected with similar business conditions in the future.</p>	<p>Over the past year, we continued to be recognized by the Corporate Knights rating scheme, Jantzi Social Index, the FTSE4Good Index, Global Challenges Index, and the Dow Jones Sustainability Index. In order to continue to build CN's reputation, we have put in place a number of programs as follows: active participation in the development of a modal shift rail freight protocol, ongoing strategic partnerships and engagements with stakeholders (suppliers, customers, and governments), operational efficiency focus, and communications with investors on our sustainability performance, including our carbon and energy management strategies. Through these programs, we have significantly improved our visibility and reputation as a leader in fuel efficiency and sustainability.</p>	<p>The cost associated with this opportunity is integrated into CN sustainability budgets, including internal resources, advertising, marketing, and external resources. The costs associated with this opportunity is estimated at C\$250,000.</p>

# Risks and Opportunities

## 6. Climate Change Opportunities

### Climate Change – Other Opportunities (continued)

ID	Risk driver	Description	Potential impact	Time frame	Direct / indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
02-OTH	Other	<p>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. Exploring alternative fuels and technologies that may provide added advantages of even greater fuel efficiency and reduced carbon emissions for CN and its customers. This opportunity is having a direct effect on CN. We have already initiated a number of projects to explore alternative fuel options.</p> <p>In 2012, CN began working with its suppliers to test two 3000 horsepower diesel-electric locomotives fuelled principally by liquefied natural gas on revenue services in northern Alberta. The 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. CN has also committed investments into next-generation locomotive technologies, which include considerations of alternative fuel options.</p>	√ Increased demand for existing products / services	10 years or more	Direct	About as likely as not	Medium	Reducing our reliance on fossil fuels through rail technologies that can support alternative fuels could reduce CN's 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>In order to tap into the opportunities related to alternative fuels, CN is working with manufacturers and research centres to support the development of cleaner fuel alternatives, including natural gas and biodiesel fuels. In late 2013, CN successfully completed a test program using liquefied natural gas in two locomotives to enhance our understanding of using liquefied natural gas as an alternative to diesel.</p> <p>Testing with LNG will continue in 2014. CN will convert several high-horsepower mainline locomotives to liquefied natural gas and develop special tender cars to carry the LNG.</p>	The next-generation locomotive investments is estimated at approximately C\$1 million.
03-OTH	Other	As the issue of climate change and the need for renewable energy sources reaches a critical point, CN is well positioned to find growth opportunities in cleaner technology markets. In many jurisdictions across North America, policy and financial incentives are being introduced to encourage the development of clean technology. 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 position CN even more within this market.	√ New products / business services	Current	Direct	About as likely as not	Medium	Clean technology markets are continuing to increase. For instance, revenue increases from wood pellets in 2013 increased by approximately 22% since 2011. Today, CN is the largest rail mover of exported industrial wood pellets in the world. We also saw a 6% increase in alternative fuel carloads, particularly biodiesel, from the previous year. Over the next few years, we expect further growth in the movement of clean technology markets due to increasing demands.	Revenue growth from clean technology markets has the potential of presenting a considerable long-term growth initiative for CN, particularly relating to alternative fuels and wood pellets. To manage this opportunity we continue to engage with our customers to 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 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.

An abstract graphic featuring four circles of varying shades of gray and white, connected by thick gray lines. The circles are arranged in a loose, interconnected pattern. The top-left circle is white with a gray border. The top-right circle is dark gray with a light gray border. The bottom-left circle is dark gray with a light gray border. The bottom-right circle is partially visible, showing a light gray border. The word "Emissions" is written in a bold, red, sans-serif font, positioned to the right of the top-left circle.

**Emissions**

## Emissions

### 7. Emissions Methodology

#### Base Year

##### 7.1

Base year and base year emissions (Scopes 1 and 2).

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

#### Methodology

##### 7.3

Source for global warming potentials used.

Gas	Reference
CO <sub>2</sub>	IPCC 2006 Second Assessment Report
CH <sub>4</sub>	IPCC 2006 Second Assessment Report
N <sub>2</sub> O	IPCC 2006 Second Assessment Report
Electricity Canada	Environment Canada National Inventory Report
Electricity USA	Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities

# Emissions

## 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
	0.15	Methane	Environment Canada
	1.1	Nitrous oxide	Environment Canada
Diesel other	74100	Carbon dioxide	IPCC 2006, Volume 2 Energy
	3.9	Methane	IPCC 2006, Volume 2 Energy
	3.9	Nitrous oxide	IPCC 2006, Volume 2 Energy
Gasoline	69300	Carbon dioxide	IPCC 2006, Volume 2 Energy
	25	Methane	IPCC 2006, Volume 2 Energy
	8	Nitrous oxide	IPCC 2006, Volume 2 Energy
Propane	63100	Carbon dioxide	IPCC 2006, Volume 2 Energy
	62	Methane	IPCC 2006, Volume 2 Energy
	0.2	Nitrous oxide	IPCC 2006, Volume 2 Energy
Furnace Oil	74100	Carbon dioxide	IPCC 2006, Volume 2 Energy
	10	Methane	IPCC 2006, Volume 2 Energy
	0.6	Nitrous oxide	IPCC 2006, Volume 2 Energy
Stove Oil	74100	Carbon dioxide	IPCC 2006, Volume 2 Energy
	10	Methane	IPCC 2006, Volume 2 Energy
	0.6	Nitrous oxide	IPCC 2006, Volume 2 Energy
Kerosene	71900	Carbon dioxide	IPCC 2006, Volume 2 Energy
	10	Methane	IPCC 2006, Volume 2 Energy
	0.6	Nitrous oxide	IPCC 2006, Volume 2 Energy
Natural Gas	Based on province	CO <sub>2</sub> e	Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities
Electricity Canada	Based on provincial emission factors	CO <sub>2</sub> e	Canada - Environment Canada
Electricity USA	Based on state emission factors	CO <sub>2</sub> e	Energy Information Administration State Average CO <sub>2</sub> emission coefficients for Electric Utilities

# Emissions

## 8. Emissions Data

### 8.1

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

### Boundary

Operational control

### 8.2

Gross global Scope 1 emissions.

### Scope 1 and 2 Emissions Data

5,220,949 metric tonnes CO<sub>2</sub>e

### 8.3

Gross global Scope 2 emissions.

183,378 metric tonnes CO<sub>2</sub>e

### 8.4 - 8.4a

Sources (e.g., facilities, specific GHGs, activities, geographies, etc.) 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, which include some of the fuel consumption from our intermodal equipment. 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.

### Data Accuracy

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 measurements revealed a 1.5% variance. The 1.5% variance is mostly a result of the fuel evaporation losses at the dispenser fuel tanks.  The discrepancies related to fuel consumption measurements from fuel dispenser metering systems are not always being captured. Furthermore, metering systems do not exist throughout our entire fuelling systems, thereby forcing the Company to rely on a combination of certified mass balance and metering measurements. The Company has initiated a precision fuel management program, which will expand our fuel metering system to cover all our fuel tanks.
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 onto our SAP system provide costs only. This data includes administrative costs as well as consumption data, which impacts the level of accuracy in our data consumption numbers. Furthermore, in order to calculate the MWh consumption numbers, the Company has applied generic cost per MWh factors, as provided by the Hydro-Québec Analysis and the US 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 US Environmental Protection Agency eGRID data and not the utility factors. We will be working over the next years to obtain detailed utility invoicing to effectively capture electricity consumption and emission factors.

Emissions

8. Emissions Data

8.6  
Verification/assurance  
status for our Scope 1  
emissions.

External Verification or Assurance

Verification complete.

Type of verification or assurance	Attach the document	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.

Verification complete.

Type of verification or assurance	Attach the document	Page/Section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Limited assurance			ISAE 3410	15%

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



# Emissions

## 9. Scope 1 Emissions Breakdown

### 9.1 - 9.1a

We have Scope 1 emission sources in Canada and the US.

Country / region	Scope 1 metric tonnes CO <sub>2</sub> e
Canada	3,633,314
US	1,587,663

### 9.2

Our total gross global Scope 1 emissions by activity.

Activity	Scope 1 metric tonnes CO <sub>2</sub> e
Locomotives	4,595,424
Intermodal trucks	109,578
Shipping vessel fleet	207,138
On Company Service fleet	106,976
Miscellaneous fuel consumption	178,008
Intermodal equipment	23,853

## 10. Scope 2 Emissions Breakdown

### 10.1 - 10.1a

We have Scope 2 emission sources in Canada and the US.

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	59,808	293,787	166,326
US	123,570	201,033	0

Note: Low-carbon electricity has been estimated from Quebec, Manitoba, and B.C.

# Emissions

## 11. Energy

### 11.1

Percentage of total operational spend on energy.

More than 20% but less than 25%

### 11.2

Fuel, electricity, heat, steam and cooling consumed.

Energy type	MWh
Fuel	18,881,897
Electricity	494,820
Heat	0
Steam	0
Cooling	0

### 11.3

Fuel type breakdown.

Fuels	MWh
Diesel (locomotives)	16,257,988
Diesel (others)	1,707,937
Gasoline	310,648
Propane	91,089
Furnace oil	8,449
Stove oil	3,764
Kerosene	1,159
Natural gas	500,863

### 11.4

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

Basis for applying a low carbon emission factor	MWh	Comments
Other	166,326	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.

# Emissions

## 12. Emission Performance

### Emission History

#### 12.1 and 12.1a

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

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

Reason	Emission value (percentage)	Direction of change	Comment
Emission reduction	7.1%	Decrease	The carbon emissions from other sources of diesel consumption (includes the on company service (OCS) fleet, shipping fleet, trucking fleet, and intermodal equipment). The reductions were the result of a broad range of emission reduction activities including, installing fuel efficient engines, use of aerodynamic designs for our trucks, fuel efficient shipping vessel fleet engines, and fuel efficient power sources for our OCS fleet.
Changes in output	3.86%	Increase	The carbon emissions associated with our locomotive fuel consumption increased as a result of the growth of our business. These emissions represent approximately 85% of our carbon footprint.

#### 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
0.000564	Metric tonnes of CO <sub>2</sub> e	Unit total revenue	3.8%	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	% from previous year	Direction of change from previous year	Explanation
228	Metric tonnes of CO <sub>2</sub> e	FTE employee	2.1	Increase	We increase our carbon emissions due to a growth in business, despite an increase in FTE.

#### 12.4

Metric appropriate to our business.

Intensity figure	Metric numerator	Metric denominator	% from previous year	Direction of change from previous year	Explanation
11.45	Metric tonnes of CO <sub>2</sub> e	Gross Ton Miles (millions)	0.7%	Decrease	We decreased our carbon emissions from our locomotive fuel emissions per GTM due to emission reduction activities related to increased fuel efficiency and behavioural practices.

## Emissions

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### 13. *Emission Trading*

#### 13.1

Participation in emission  
trade schemes.

We do not participate in any emission trade schemes.

# 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, not yet calculated	N/A	N/A		We procure goods and services, including building furniture, materials and equipment, chemicals, packaging and paper products.
Capital goods	Relevant, not yet calculated	N/A	N/A		Relevant assets include our locomotives, rail cars, rails, and buildings.
Fuel-and-energy-related activities (not included in Scopes 1 and 2)	Relevant, calculated	1,452,146	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	Relevant, not yet calculated	N/A	N/A		Transportation and distribution includes ground (rail or truck) or vessel transport of the goods and services we procure.
Waste generated in operations	Not relevant	N/A	N/A		We generate waste from our operations, including scrap metal, rail ties, and packaging. Waste GHG emissions are not considered to be a material part of our Scope 3 emissions.
Business travel	Not relevant, but calculated	39,908	Compilation from corporate travel service providers	0.05	Business travel includes corporate road and air travel. Business travel is not considered to be a material part of our Scope 3 emissions.
Employee commuting	Not relevant	N/A	N/A		Employee travel to and from work using road transport.
Upstream leased assets	Relevant, not yet calculated	N/A	N/A		We lease rail cars and some rail equipment.
Investments	Relevant, not yet calculated	N/A	N/A		Investments of pensions are conducted through the pension committee.
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.

Verification complete.

#### 14.2a

Details of verification/assurance for Scope 3 emissions.

Type of verification or assurance	Attach the document	Page/Section reference	Relevant standard	Proportion of reported 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	Emission value percentage	Direction of change	Comment
Business travel	Business output	13.8%	Increase	In 2013, we increased business travel 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.

#### Method of engagement

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

#### Strategy for prioritizing engagements

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.

*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, BC, 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)*