

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Norfolk Southern Corporation ("Norfolk Southern" or "NS"), based in Norfolk, Virginia, U.S.A., controls a major freight railroad, Norfolk Southern Railway Company (collectively with its railroad subsidiaries, "NSR"). NSR is a common carrier by rail engaged in the transportation of raw materials, intermediate products and finished goods. NSR operates primarily in the eastern half of the U.S.A. and, via interchange with other rail carriers, provides service to and from the rest of the U.S.A.

As of December 31, 2017, NSR operated approximately 19,500 route miles of track in 22 states and the District of Columbia. The system's lines reach many individual industries, electric generating facilities, mines, distribution centers, transload facilities and other businesses located in smaller communities in its service area. NSR also transports overseas freight through several Atlantic and Gulf Coast ports, provides comprehensive logistics services and offers the most extensive intermodal network in the eastern half of the U.S.A.

The common stock of Norfolk Southern is listed on the New York Stock Exchange ("NYSE") under the symbol NSC.

Norfolk Southern's operations are subject to federal and state environmental laws and regulations concerning, among other things, emissions to the air; discharges to waterways or ground water supplies; handling, storage, transportation, and disposal of water and other

materials; and the cleanup of hazardous material or petroleum releases. Compliance with such environmental laws is a principal objective of Norfolk Southern.

Norfolk Southern also supports and encourages voluntary efforts to conduct its business in accordance with sustainability practices that will help promote corporate success and the health of the environment. The 2017 Sustainability report includes data from calendar year 2016 and is available to the public at www.norfolksouthern.com. The 2018 Sustainability report will be available online in Fall of 2018.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Financial control

C-TO0.7/C-TS0.7

(C-TO0.7/C-TS0.7) For which transport modes will you be providing data?

Rail

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Director on board	NS identifies risks through its Enterprise Risk Management Program (ERMP), including risks associated with climate change. The Finance and Risk Management Committee of the Board of Directors oversees ERMP and receives routine updates on risks. NS's Enterprise Risk Council, headed by management and which reports to the Finance and Risk Management Committee, works with employees to identify, assess and mitigate risks, including those associated with climate change.

C1.1b

(C1.1b) Provide further details on the board’s oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing and guiding risk management policies	NS identifies risks through its Enterprise Risk Management Program (ERMP), including risks associated with climate change. The Finance and Risk Management Committee of the Board of Directors oversees ERMP and receives routine updates on risks. NS's Enterprise Risk Council, headed by management and which reports to the Finance and Risk Management Committee, works with employees to identify, assess and mitigate risks, including those associated with climate change.

C1.2

(C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Sustainability Officer (CSO)	Both assessing and managing climate-related risks and opportunities	Less frequently than annually
Risk committee	Both assessing and managing climate-related risks and opportunities	Less frequently than annually
Other committee, please specify (Environmental Policy Council)	Both assessing and managing climate-related risks and opportunities	Less frequently than annually

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored.

Management implements the Enterprise Risk Management Program through its Enterprise Risk Council. The Council is comprised of executive leadership and the chief risk officer, who coordinate with business leaders across Norfolk Southern to assess and mitigate enterprise risks.

Management provides regular updates on risk management efforts to the Finance and Risk Management committee. At a company level, our Enterprise Risk Management identifies and prioritizes risks and opportunities that impact the enterprise through the Council's interactions with business unit leaders across the company, who are best positioned to assess and manage those risks and opportunities. At an asset level, the same business unit leaders who are integral to the ERMP are tasked by their department heads to address risks and opportunities as they impact their specific department, geography, and assets. Business unit leaders manage asset risks and opportunities within their business units; their analysis of asset-level risks and opportunities feeds into their discussions with the Council about company-level risks.

Our Environmental Policy Council oversees and monitors those environmental policies and practices that are deemed necessary for us to facilitate compliance with all applicable environmental laws and regulations, giving due regard to both existing and prospective legal requirements, as well as oversee our corporate sustainability program. Among other executives, our Chief Sustainability Officer is a member of the Council and provides reports regarding the sustainability program at each meeting.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues.

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Other, please specify (Annual Corporate Performance Metrics)

Comment

Corporate executive team - NS's annual cash incentive is designed to compensate executives based on achievement of annual corporate performance metrics: 50% operating income; 35% operating ratio; and 15% composite service measure. Both operating income and operating ratio are calculated using operating expenses, and fuel consumption is a significant driver of such expenses. When NS improves fuel efficiency, it should result in improvements to its operating income and operating ratio. Improved fuel efficiency also furthers NS's 2015 goal to reduce locomotive fuel consumption by \$80 million by 2020, and NS's 2010 goal to reduce carbon emissions by 10% per revenue-ton-mile.

Who is entitled to benefit from these incentives?

Management group

Types of incentives

Monetary reward

Activity incentivized

Other, please specify (Annual Corporate Performance Metrics)

Comment

Corporate executive team and Management Group - NS's long-term incentive award is designed to promote enhancement of shareholder value and efficient utilization of corporate assets, based on: 50% after-tax return on average invested capital; and 50% total shareholder return. After-tax return on average invested capital is based upon NS's net operating profit after-tax, and so is dependent upon operating expenses, of which fuel is a significant driver. When NS improves fuel efficiency, it should result in improvements to its after-tax return on average invested capital. Improved fuel efficiency also furthers NS's 2015 goal to reduce locomotive fuel consumption by \$80 million by 2020, and NS's 2010 goal to reduce carbon emissions by 10% per revenue-ton-mile.

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Monetary reward

Activity incentivized

Other, please specify (Annual Corporate Performance Metrics)

Comment

NS's annual cash incentive is designed to compensate all non-agreement and certain agreement employees based on achievement of annual corporate performance metrics: 50% operating income; 35% operating ratio; and 15% composite service measure. Both operating income and operating ratio are calculated using operating expenses, and fuel consumption is a significant driver of such expenses. When NS improves fuel efficiency, it should result in improvements to its operating income and operating ratio. Improved fuel efficiency also furthers NS's 2015 goal to reduce locomotive fuel consumption by \$80 million by 2020, and NS's 2010 goal to reduce carbon emissions by 10% per revenue-ton-mile.

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

	From (years)	To (years)	Comment
Short-term	0	6	For Norfolk Southern, the short-term planning horizon encompasses the period in which tactical and operational decisions are made based on the assets already in place.
Medium-term	7	50	Norfolk Southern is a capital-intensive company. Our planning horizons are, in large part, determined by the acquisition and disposition cycles of our key assets. Most operational assets have a lifecycle that ranges from 6 years (electronic components) to 50 years (statutory limit of railcars in interline service). NS' medium-term planning horizon encompasses those years in which the majority of its operational assets, including locomotives, rail, railcars, radios, and operational electronics, will be retired and replaced.
Long-term	51	100	While the majority of Norfolk Southern assets are procured and retired within a 7-to-50 year, medium term horizon, many decisions span a significantly longer period of time. For instance, in 2016 Norfolk Southern completed the retirement and replacement of a railroad bridge in Letchworth State Park in Portageville, NY. The original bridge was 147 years old, and is replaced by a bridge that NS hopes will provide productive service for another 150 years. Numerous other operating properties have been in service for Norfolk Southern and its predecessors for 100 years or more. Hence, NS' long-term planning horizon extends 100 years or more.

C2.2

(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.

Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

C2.2a

(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Every two years	>6 years	Norfolk Southern's Enterprise Risk Management effort is a management-led, multi-disciplinary team that is charged with canvassing all corporate functions and environmental factors to identify potential and actual risks to the company's financial and operational success. Identified potential risks are vetted by internal teams, prioritized, and gauged against the mitigating effects of existing controls and countermeasures. The Enterprise Risk Management leadership reports to the board's Finance and Risk Management Committee as a scheduled part of the agenda no less than yearly, highlighting and discussing the inherent and residual risks identified.

C2.2b

(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.

Norfolk Southern's processes for identifying climate-related risks is embedded in its processes for identifying risks of any type -- commercial or operational, current or future, tangible or reputational. A special challenge posed by climate-related risks is that many of the climate-related risks (e.g. regulatory, physical, or technological) have a variety of negative AND POSITIVE potential outcomes of uncertain probability. As such, many climate-related risks are not prioritized as highly as their more definitive non-climate risks.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Upstream	Relevant, sometimes included	Norfolk Southern's Enterprise Risk Management processes and team structure are defined to detect, monitor, assess, escalate, and mitigate risks in all aspects of Norfolk Southern's business whether they emanate from regulatory, technology, legal, market, reputational, or physical direct effects – or the indirect effects emanating from our upstream or downstream partners. The process considers the inherent dangers in each risk as well as the palliative effects of our mitigating actions. The resultant residual risk is evaluated and prioritized based on its likelihood of occurrence and the magnitude of its impact should it occur. Items that rank highly on NS' priority list are escalated and evaluated again. If NS determines that additional mitigation actions could be productive, the risk is assigned to an internal entity that can best develop the appropriate mitigation. High priority risks are presented to senior management and the board for discussion, advice, and monitoring.
Downstream	Relevant, sometimes included	Norfolk Southern's Enterprise Risk Management processes and team structure are defined to detect, monitor, assess, escalate, and mitigate risks in all aspects of Norfolk Southern's business whether they emanate from regulatory, technology, legal, market, reputational, or physical direct effects – or the indirect effects emanating from our upstream or downstream partners. The process considers the inherent dangers in each risk as well as the palliative effects of our mitigating actions. The resultant residual risk is evaluated and prioritized based on its likelihood of occurrence and the magnitude of its impact should it occur. Items that rank highly on NS' priority list are escalated and evaluated again. If NS determines that additional mitigation actions could be productive, the risk is assigned to an internal entity that can best develop the appropriate mitigation. High priority risks are presented to senior management and the board for discussion, advice, and monitoring.

C2.2d

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

Climate-related risks are surfaced and vetted by the Enterprise Risk Management committee which determines inherent risk, mitigating controls, the resultant residual risk, and the potential for additional management actions to improve Norfolk Southern's expected resilience -- operationally and financially.

To date, most climate-related risks pose an array of potential impacts with conflicting positive and negative effects on the health of the company, often intermingling revenue, expense, and operational efficiency effects.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

No

C2.3b

(C2.3b) Why do you not consider your organization to be exposed to climate-related risks with the potential to have a substantive financial or strategic impact on your business?

	Primary reason	Please explain
Row 1	Other, please specify	Norfolk Southern has a complex relationship with risks traditionally associated with climate change -- often with contradicting effects. To illustrate, consider the potential effects of emissions-related regulation: Regulation on emissions associated with our locomotives has the potential to increase costs and reduce efficiencies of our operations. Simultaneously, balanced regulation would also affect our largest competitor, trucks. Such regulation would actually benefit Norfolk Southern, owing to the lower carbon-intensity of rail transport as compared to truck. At the same time, it is a real risk that regulation would not be balanced. This mixture of outcomes and undefined probability make a deterministic handling process difficult to implement.

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

No

C2.4b

(C2.4b) Why do you not consider your organization to have climate-related opportunities?

	Primary reason	Please explain
Row 1	No instruction from management to seek out opportunities	Norfolk Southern stakeholders send inconsistent or unclear messages regarding expectations for addressing climate-related risks. These conflicts result in few regulatory imperatives, contrasting planning horizons, and differing values placed on aspects of sustainability. Clarity from our stakeholders in these areas would help focus Norfolk Southern's direction.

C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

	Impact	Description
Products and services	We have not identified any risks or opportunities	
Supply chain and/or value chain	We have not identified any risks or opportunities	
Adaptation and mitigation activities	We have not identified any risks or opportunities	
Investment in R&D	We have not identified any risks or opportunities	
Operations	We have not identified any risks or opportunities	
Other, please specify	We have not identified any risks or opportunities	

C2.6

(C2.6) Describe where and how the identified risks and opportunities have factored into your financial planning process.

	Relevance	Description
Revenues	We have not identified any risks or opportunities	
Operating costs	We have not identified any risks or opportunities	
Capital expenditures / capital allocation	We have not identified any risks or opportunities	
Acquisitions and divestments	We have not identified any risks or opportunities	
Access to capital	We have not identified any risks or opportunities	
Assets	We have not identified any risks or opportunities	
Liabilities	We have not identified any risks or opportunities	
Other	We have not identified any risks or opportunities	

C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?

No

C3.1f

(C3.1f) Why are climate-related issues not integrated into your business objectives and strategy?

Our sustainability program is young, but maturing. Climate-related concerns are not yet fully recognized by our corporate culture as a critical element of our business. To elevate awareness and integration, we anticipate developing a corporate sustainability strategic plan that will outline policies and processes for quantitatively and qualitatively assessing the climate-related risks and opportunities of our operations, giving us a structured and systematic approach to integrating climate-related concerns into our business strategies and decision making in the future. Our planning horizon for strategic plan development and integration is approximately 12-24 months.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Intensity target

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number

Int 1

Scope

Scope 2 (location-based)

% emissions in Scope

100

% reduction from baseline year

10

Metric

Other, please specify (Grams of CO2e per Gross Ton Mile.)

Base year

2015

Start year

2016

Normalized baseline year emissions covered by target (metric tons CO2e)

5518738

Target year

2021

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)

Target status

Underway

Please explain

Norfolk Southern's intensity target is a 10% reduction in grams CO2e per Revenue Ton Mile, using 2015 as a reference year with a target completion year of 2021.

% change anticipated in absolute Scope 1+2 emissions

-7.56

% change anticipated in absolute Scope 3 emissions

0

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation		
To be implemented*		
Implementation commenced*	2	4600000
Implemented*		
Not to be implemented		

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Activity type

Energy efficiency: Processes

Description of activity

Other, please specify (Training on Locomotive Handling)

Estimated annual CO2e savings (metric tonnes CO2e)

2300000

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

32900000

Investment required (unit currency – as specified in CC0.4)

Payback period

11-15 years

Estimated lifetime of the initiative

6-10 years

Comment

Norfolk Southern is improving techniques and training associated with locomotive assignment and handling. It is a core component of our emissions intensity reduction target, currently set reduce consumption/emissions by 10% in the period from 2016 through 2021. Using this year's statistics off 451,731,491 gallons of locomotive diesel fuel consumed @ \$1.426 per gallon, and assuming that half of our reduction comes through this training and technique, this would represent a \$32.9 million savings per year. The investment required to achieve this savings is intermingled with several other projects, and is not individually known.

Activity type

Energy efficiency: Processes

Description of activity

Other, please specify (LEADER and Trip Optimizer)

Estimated annual CO2e savings (metric tonnes CO2e)

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

32900000

Investment required (unit currency – as specified in CC0.4)

Payback period

11-15 years

Estimated lifetime of the initiative

6-10 years

Comment

Norfolk Southern is installing two vendors' version of train energy management hardware and software on our locomotives. This software coaches locomotive engineers as to how to handle a train more efficiently and complements our standard training and assignment improvements, mentioned above. Energy Management is a core component of our emissions intensity reduction target, currently set reduce consumption/emissions by 10% in the period from 2016 through 2021. Using this year's statistics off 451,731,491 gallons of locomotive diesel fuel consumed @ \$1.426 per gallon, and assuming that half of our reduction comes through this training and technique, this would represent a \$32.9 million savings per year. The investment required to achieve this savings is intermingled with several other projects, and is not individually known.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Compliance with regulatory requirements/standards	Norfolk Southern's locomotive emissions, which comprise approximately 95% of total Scope 1 and Scope 2 emissions, are governed by EPA "Tier" regulations that limit greenhouse gas, particulate, and other emissions based on locomotive manufacture date. Norfolk Southern complies with all such EPA regulations.
Financial optimization calculations	When investments in sustainability are able to provide a sufficient financial return even without a material price on GHG emissions, Norfolk Southern will pursue that investment.
Other	Norfolk Southern partners with local governments to invest in less emissive technologies when the local entity is willing to contribute capital to compensate for an unfavorable financial investment result. A prime example of this is NS' pursuit of less emissive locomotives through locally sponsored, federally funded CMAQ grants.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Company-wide

Description of product/Group of products

Norfolk Southern is a provider of transportation services, almost entirely by rail. As a rail carrier, our primary form of competition is truck. Rail transport is less carbon-intensive per revenue ton mile than truck transport. As a result, rail is often able to help customers avoid carbon emissions through this advantageous emission profile.

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Route-ton mile emission calculations.)

% revenue from low carbon product(s) in the reporting year

90

Comment

Calculation of % low-carbon service depends heavily on assumptions regarding the ability for freight to be carried via truck, the comparison of effective rail routes vs. truck routes, and other factors. For an illustration of the advantageous emissions profile of rail and intermodal freight transport over truck, refer to Norfolk Southern's "Green Machine" calculator, available at <http://www.nscorp.com/nscorpthml/future/carbon%20footprint0407-2.html>

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

January 1 2015

Base year end

December 31 2015

Base year emissions (metric tons CO2e)

5268211

Comment

Scope 2 (location-based)

Base year start

January 1 2015

Base year end

December 31 2015

Base year emissions (metric tons CO2e)

250526

Comment

Scope 2 (market-based)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

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

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)

4872474

End-year of reporting period

<Not Applicable>

Comment

Does not include CO2 tonnage associated with biofuel.

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We have operations where we are able to access electricity supplier emission factors or residual emissions factors, but are unable to report a Scope 2, market-based figure

Comment

NS made no attempt to obtain Market-based emission factors for Scope 2 data. At 4.5% of total Scope 1 + Scope 2 emissions, the potential variance introduced by using regional factors instead of plant factors was considered to be insignificant.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO₂e?

Row 1

Scope 2, location-based

228814

Scope 2, market-based (if applicable)

<Not Applicable>

End-year of reporting period

<Not Applicable>

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

No

C6.5

(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

5462970.34

Emissions calculation methodology

Readers will note a significant difference between our Scope 3 emissions reported here, and those attested to by our auditor, KPMG. KPMG's scope was intentionally limited to only those aspects of Scope 3 for which we have experience and confidence in our inventory management methods. Those aspects included business-related travel (including air travel, automobile rental, and personal vehicle mileage). For this report, Norfolk Southern has begun the journey to address a broader scope 3 inventory -- specifically our upstream suppliers. Our initial efforts have yielded the inventory shown in our CDP report. However, with clear opportunities for improvement in our (and our suppliers') methods, NS has not sought verification of these additional emissions. Emissions were calculated based on the hybrid method as outlined in the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. Norfolk Southern requested our highest volume suppliers to report data related to GHG emissions associated with Norfolk Southern products and services and provide this data to Norfolk Southern for inclusion on this response. Responses were received from 50 percent of suppliers that were contacted. The data received from the suppliers was used to calculate Norfolk Southern's GHG emissions from purchased goods and services. For data that was not provided by suppliers, an average numerical value was used in estimating GHG emissions. Emissions for purchased goods were calculated using volumes of key purchased goods by type of material applied against applicable emission factors from the IPCC.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

50

Explanation

Last year, Norfolk Southern did not calculate our Scope 3 emissions related to purchased goods and services. To establish a Scope 3 baseline, we focused on potential upstream emissions generated by our highest volume suppliers, specifically those that provide rail, ballast, and ties for maintenance of track within our system network. In future years, as Norfolk Southern's inventory processes mature, we anticipate obtaining a greater percentage of data from suppliers and value chain partners, as well as enlarging our data set to calculate our Scope 3 emissions from purchased goods and services. Diesel fuel is the primary purchased good of NS.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

4229913.16

Emissions calculation methodology

Emissions were calculated based on the hybrid method as outlined in the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. Locomotives are the primary capital goods acquired by Norfolk Southern Railway. Accordingly, GHG emissions and other data was requested from GE, our principal locomotive supplier. The data received from the suppliers was used to calculate Norfolk Southern's GHG emissions from capital goods. For data that was not provided by suppliers, an average numerical value was used in estimating GHG emissions. Emissions for capital goods were calculated using volumes of key purchased goods by type of material applied against applicable emission factors from the IPCC.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

50

Explanation

Last year, Norfolk Southern did not calculate our Scope 3 emissions related to capital goods. This year, we obtained data on locomotives supplied to Norfolk Southern from GE Transportation. GE is Norfolk Southern's primary locomotive supplier. According to the data provided by GE, GE supplied Norfolk Southern with 50 New Locomotives Built in 2017. Of those 50, 34 were Tier 4 Technology and 16 were Tier 4 Credit Units.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

The fuel-and-energy-related activities (not included in Scope 1 or 2) for Norfolk Southern are generated by the company's upstream leased assets. As such, this data has been included in the upstream leased assets category.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

610422.26

Emissions calculation methodology

Emissions were calculated based on the fuel-based method as outlined in the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. Norfolk Southern requested our highest volume suppliers to report data related to transportation of their goods. This data was used to calculate emissions from upstream transportation and distribution by determining the amount of fuel consumed and applying the appropriate emission factor for that fuel.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

75

Explanation

Norfolk Southern calculated and reported emissions from the transportation and distribution of products purchased, including rails, ties, ballasts, and locomotives, in Categories 1 and 2 the reporting year between the company's tier 1 suppliers and its own operations in vehicles not owned or operated by Norfolk Southern.

Waste generated in operations

Evaluation status

Relevant, not yet calculated

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Norfolk Southern has begun the process of collecting data related to GHG emissions from waste generated in its operations; however, at this time, we do not have sufficient data to calculate the Scope 3 emissions from this category. Norfolk Southern is actively working to calculate the volume of materials recycled by our maintenance divisions, and will report this information in subsequent years.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

5354

Emissions calculation methodology

Emissions were calculated based on the distance-based method as outlined in the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. Air travel miles were obtained from our travel service provider American Express and Concur. The miles were inserted into ghg protocol.com's toolkit. All miles were classified as "Air, Short-Haul, Seating Unknown", as precise distance and seating information was not available. Rental car miles were obtained from our main rental agency, Hertz, and inserted into the same gpgprotocol.com toolkit spreadsheet. Also, included employee reimbursed mileage.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

85

Explanation

An insignificant amount of business travel is not arranged through our corporate travel provider, accordingly this activity and related emissions are considered inconsequential and not included in the calculation.

Employee commuting

Evaluation status

Relevant, not yet calculated

Metric tonnes CO₂e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

This year, Norfolk Southern has taken steps towards estimating the commuting-related emissions of our employees. We have begun the process of creating an employee commuting survey that we plan to send to employees in order to gather data on employee commuting habits. Additionally, we plan to use our Atlanta, Georgia office as a pilot office to scope out a methodology for commuting practices and public transit incentives. We are in the process of writing a white paper related to employee commuting.

Upstream leased assets

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

2031.17

Emissions calculation methodology

Emissions were calculated based on the average data method as outlined in the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. Electrical emissions at facilities leased by Norfolk Southern were calculated using the Green House Gas Protocol toolkit spreadsheets. Electrical and natural gas consumption was estimated using industry standard 17.3 KWH per square foot. Facilities were aggregated by region, and the appropriate region's emission factors were selected in the spreadsheet with one exception: Quebec. Norfolk Southern leases a small facility in Quebec, Canada. However, the toolkit spreadsheet does not calculate emissions for Canada. Accordingly, the Quebec office's emissions were calculated using NPCC New England regional factors.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

50

Explanation

Norfolk Southern calculated GHG emissions from upstream leased assets are that were not reported in Norfolk Southern's Scope 1 and 2 inventories. The scope of these assets is office space. All office space lease rates include utilities. Accordingly, no data is available for electricity consumption for the specific leased spaces. The assets in the calculation do include emissions from natural gas for heating the buildings where this data was available. The energy and electrical utility emissions at facilities leased by Norfolk Southern is included in the lease agreements, and is therefore not reported separately.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

This category includes emissions that occur in the reporting year from transportation and distribution of sold products in vehicles not owned or controlled by the reporting company. Norfolk Southern does not distribute sold products. As such, the emissions generated by downstream transportation and distribution are not relevant to Norfolk Southern.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Norfolk Southern is primarily a provider of freight transportation services, not a manufacturer or vendor of products for sale. As such, the emissions generated by processing of sold products are not relevant to Norfolk Southern.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

This category includes emissions from the use of goods and services sold by the reporting company in the reporting year. Norfolk Southern is primarily a provider of freight transportation services, not a manufacturer or vendor of products for sale. As such, the emissions generated by use of sold products are not relevant to Norfolk Southern.

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

This category includes emissions from the waste disposal and treatment of products sold by the reporting company at the end of their life. Norfolk Southern does not sell products, and thus, does not produce emissions from the waste disposal of products. As such, this category of emissions is not relevant to Norfolk Southern's operations as a rail transportation company.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in Scope 1 or Scope 2. Norfolk Southern does not act as a lessor. Therefore, emissions from downstream leased assets are not relevant to Norfolk Sothern.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Norfolk Southern does not currently own franchises. As such, the emissions generated by franchises are not relevant to Norfolk Southern.

Investments

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Based on the definition of "investment" provided in the Guidance for Calculating Scope 3 emissions, this category is not relevant to Norfolk Sothern's operations. This category includes scope 3 emissions associated with NS's investments in the reporting year, not already included in scope 1 or scope 2. This category is applicable to investors and companies that provide financial services. Norfolk Sothern does not provide financial services. As such, the emissions generated by investments are not relevant to Norfolk Southern

Other (upstream)

Evaluation status

Not evaluated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Other (downstream)

Evaluation status

Not evaluated

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

Yes

C6.7a

(C6.7a) Provide the emissions from biologically sequestered carbon relevant to your organization in metric tons CO2.

85476.86

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.00048349

Metric numerator (Gross global combined Scope 1 and 2 emissions)

5101288

Metric denominator

unit total revenue

Metric denominator: Unit total

10551000000

Scope 2 figure used

Location-based

% change from previous year

7.4

Direction of change

Decreased

Reason for change

Emission intensity per dollar of revenue improved (declined) for three primary reasons. First, rate increases were positive, as evidenced by our 2% RPU increase -- indicative of our (non-public) rate increases. From a different perspective, revenues increased by 7% vs. a 5.8% increase in Revenue Ton Miles and a 5% increase in units. Each of these relationships would tend to indicate improved (declined) emission intensity per dollar of revenue. Second, our 5% increase in volumes, combined with a concerted effort to increase train length, has yielded an economy of scale that comes from long trains. This economy of scale has several effects, one of which is better fuel economy per unit, which drives better emissions per unit, mile, and revenue dollar. Third, our Operations team continues to employ training and technology to improve the management of locomotives and handling of trains. Fuel economy, as measured in gallons per thousand gross ton miles, was a record in 2017 -- leading to an improvement in emissions per revenue dollar.

C-TS6.15

(C-TS6.15) What are your primary intensity (activity-based) metrics that are appropriate to your emissions from transport activities in Scope 1, 2, and 3?

Rail

Scopes used for calculation of intensities

Report Scope 1 + 2

Intensity figure

0.000025

Metric numerator: emissions in metric tons CO2e

5101288

Metric denominator: unit

t.mile

Metric denominator: unit total

201500000000

% change from previous year

-8.25

Please explain any exclusions in your coverage of transport emissions in selected category, and reasons for change in emissions intensity.

Norfolk Southern provides transportation services and not other revenue products. Accordingly, all of our emissions are attributed to providing rail service. In 2017, two primary drivers affected our improved emissions intensity: First, our 5% increase in volumes, combined with a concerted effort to increase train length, has yielded an economy of scale that comes from long trains. This economy of scale has several effects, one of which is better fuel economy per unit, which drives better emissions per revenue ton mile. Second, our Operations team continues to employ training and technology to improve the management of locomotives and handling of trains. Fuel economy, as measured in gallons per thousand gross ton miles, was a record in 2017 -- leading to an improvement in emissions per revenue ton mile.

ALL

Scopes used for calculation of intensities

Report Scope 1 + 2

Intensity figure

0.000025

Metric numerator: emissions in metric tons CO2e

5101288

Metric denominator: unit

t.mile

Metric denominator: unit total

201500000000

% change from previous year

-8.25

Please explain any exclusions in your coverage of transport emissions in selected category, and reasons for change in emissions intensity.

Norfolk Southern provides transportation services and not other revenue products. Accordingly, all of our emissions are attributed to providing rail service. In 2017, two primary drivers affected our improved emissions intensity: First, our 5% increase in volumes, combined with a concerted effort to increase train length, has yielded an economy of scale that comes from long trains. This economy of scale has several effects, one of which is better fuel economy per unit, which drives better emissions per revenue ton mile. Second, our Operations team continues to employ training and technology to improve the management of locomotives and handling of trains. Fuel economy, as measured in gallons per thousand gross ton miles, was a record in 2017 -- leading to an improvement in emissions per revenue ton mile.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	4826780	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	10498	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	32310	IPCC Fifth Assessment Report (AR5 – 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	4872474

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

Please select

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions, metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility generation activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	4872474	<Not Applicable>	Norfolk Southern is a transportation services company. All emissions, direct or indirect, are in support of the provision of transportation services.

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	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)
United States of America	228813.68	0	0	0

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

Please select

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization’s total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	228813.68		Norfolk Southern is a transportation services company. All emissions, direct or indirect, are in support of the provision of transportation services.

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change		Norfolk Southern had a minor change in biofuel consumption...nothing material.
Other emissions reduction activities	358212.71	Decreased	6.94	Emission reduction is calculated by multiplying 2017's revenue ton miles (201.5 Billion) by the difference between our 2017 emissions per mile (25.317 grams per RTM) and 2016's emission (27.094 grams per mile)
Divestment		<Not Applicable>		
Acquisitions	0	No change		
Mergers	0	No change		
Change in output	298037	Increased	5.77	In 2017, Norfolk Southern's production of transportation services, as measured in Revenue Ton Miles, increased 5.77%
Change in methodology	0	No change		
Change in boundary	0	No change		
Change in physical operating conditions	0	No change		
Unidentified	0	No change		
Other	0	No change		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 10% but less than or equal to 15%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	No

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	367749.29	19171283	19928068
Consumption of purchased or acquired electricity	<Not Applicable>	0	389035	389035
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	367749.29	19560318	19765991.13

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)

Diesel

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

18838942.68

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Jet Kerosene

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

11025.12

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Biodiesel

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

367749.29

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Residual Fuel Oil

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

453471

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Kerosene

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

10224.73

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Natural Gas

Heating value

Please select

Total fuel MWh consumed by the organization

216555.15

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Liquefied Petroleum Gas (LPG)

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

65604.66

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

Fuels (excluding feedstocks)

Gas Oil

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

28930.9

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

<Not Applicable>

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Biodiesel

Emission factor

0.091

Unit

kg CO2e per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Transport_Tool_v2_6

Comment

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit Includes only the GHG Emissions for Biofuel, which excludes CO2 from Biodiesel combustion.

Diesel

Emission factor

10.241

Unit

kg CO2 per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Transport_Tool_v2_6

Comment

Gas Oil

Emission factor

10.164

Unit

kg CO2e per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Stationary_Combustion_Tool_(Version4-1)

Comment

Jet Kerosene

Emission factor

9.57

Unit

kg CO2e per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Transport_Tool_v2_6.

Comment

Kerosene

Emission factor

9.568

Unit

kg CO2e per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Stationary_Combustion_Tool_(Version4-1)

Comment

Liquefied Petroleum Gas (LPG)

Emission factor

6.106

Unit

kg CO2e per gallon

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Stationary_Combustion_Tool_(Version4-1)

Comment

Natural Gas

Emission factor

0.05343

Unit

lb CO2e per 1000 cubic ft3

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Stationary_Combustion_Tool_(Version4-1)

Comment

Residual Fuel Oil

Emission factor

11.164

Unit

Please select

Emission factor source

Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx GHGprotocol.org toolkit as manifest in Stationary_Combustion_Tool_(Version4-1)

Comment

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor

No purchases or generation of low-carbon electricity, heat, steam or cooling accounted with a low-carbon emission factor

Low-carbon technology type

<Not Applicable>

MWh consumed associated with low-carbon electricity, heat, steam or cooling

<Not Applicable>

Emission factor (in units of metric tons CO₂e per MWh)

<Not Applicable>

Comment

C-TS8.2h

(C-TS8.2h) Provide details on the average emission factor used for all transport movements per mode that directly source energy from the grid.

Category	Emission factor unit	Average emission factor: unit value	Comment
Rail	gCO ₂ /kWh	0	Grid-sourced electricity does not provide motive power for Norfolk Southern Transportation movements. All of our moves are diesel electric.

C-TS8.4

(C-TS8.4) Provide any efficiency metrics that are appropriate for your organization's transport products and/or services.

Activity

Rail

Metric figure

0.002273

Metric numerator

Other, please specify (Gallons)

Metric denominator

Revenue-ton.mile

Metric numerator: Unit total

458179000

Metric denominator: Unit total

20150000000

% change from last year

-6.24

Please explain

Several factors contribute to the 6.24 percent improvement in revenue ton miles per gallon of diesel fuel: 1) Ongoing efforts to improve fuel efficiency through better train handling. 2) Training and technology to reduce incidence of unnecessarily idling locomotives. 3) General increase in business which provides economies of scale to train handling.

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C-TO9.3/C-TS9.3

(C-TO9.3/C-TS9.3) Provide tracking metrics for the implementation of low-carbon transport technology over the reporting year.

C-TO9.6/C-TS9.6

(C-TO9.6/C-TS9.6) What is your investment in research and development (R&D), equipment, products and services and which part of it would you consider a direct investment in the low-carbon transition?

Activity

Rail

Investment start date

January 1 2017

Investment end date

December 31 2018

Investment area

Equipment

Technology area

Control systems

Investment maturity

Large scale commercial deployment

Investment figure

20000000

Low-carbon investment percentage

21-40%

Please explain

Our investment in locomotive energy management systems drive fuel efficiency, reducing the emissions rate on over 95% of our emissions. Our energy management systems are inter-related with other locomotive-based systems. As such, allocating investment dollars specifically to these systems is difficult and subjective. The investment figures relayed here are illustrative.

Activity

Rail

Investment start date

January 1 2017

Investment end date

December 31 2017

Investment area

Equipment

Technology area

Drivetrain

Investment maturity

Large scale commercial deployment

Investment figure

25000000

Low-carbon investment percentage

0-20%

Please explain

Norfolk Southern has begun to modernize locomotives that have reached expected lifespan. Rebuilt locomotives are brought to Tier 3 standards, reducing emissions. Additionally, the rebuilding of a locomotive is less carbon intensive than the purchase of a new one. Norfolk Southern does not publish the precise cost per modernized locomotive. The investment figure provided here is conservative and illustrative.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	No third-party verification or assurance

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.

Scope

Scope 1

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

Norfolk Southern CDP verification from KPMG.pdf

Page/ section reference

KPMG verified 100% of Scope 1 and Scope 2, and NS' Scope 3 emissions related to business travel -- specifically commercial air travel, car rentals, and reimbursed mileage from personal vehicles. For 2017, Norfolk Southern has begun, for the first time, to quantify Scope 3 emissions related to the upstream supply chain. These numbers are significant and included in this report, but were not verified by KPMG.

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

No, we do not verify any other climate-related information reported in our CDP disclosure

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?
No, and we do not anticipate being regulated in the next three years

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?
No

C11.3

(C11.3) Does your organization use an internal price on carbon?
No, and we do not currently anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
Yes, our suppliers
Yes, our customers

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement

Information collection (understanding supplier behavior)

Details of engagement

Collect climate change and carbon information at least annually from suppliers

% of suppliers by number

% total procurement spend (direct and indirect)

% Scope 3 emissions as reported in C6.5

Rationale for the coverage of your engagement

Norfolk Southern seeks suppliers that demonstrate a commitment to sustainable business practices. Starting with a 2015 pilot, NS continues to survey key suppliers in its major supply chains periodically on their sustainability efforts.

Impact of engagement, including measures of success

In 2016, NS awarded its first Supplier Sustainability Award to Progress Rail. The award recognized the locomotive maker for its partnership with NS in developing the Eco locomotive, a new class of low-emission locomotive used in yard and local service. The Eco model, part of an NS' locomotive modernization program, recycles 1980s models and equips them with a new low-emission engine built by Progress Rail's EMD division. NS couples Eco units with engineless "slugs" that add emissions-free pulling power.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement

Collaboration & innovation

Details of engagement

Other – please provide information in column 5

Size of engagement

% Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

Norfolk Southern subsidiaries share the railroad’s commitment to provide efficient, productive, and sustainable freight transportation for customers. Trains are four times more fuel-efficient on average than trucks, reducing GHG emissions by 75 percent per ton-mile of freight. In 2017, Thoroughbred Direct Intermodal Services, a logistics provider, and Triple Crown Services, a multimodal carrier, earned a place on the U.S. Environmental Protection Agency’s first SmartWay High Performer list. The list recognizes shippers, carriers, and logistics service providers for supply chain efficiencies that help their customers reduce transportation-related greenhouse gas emissions and lower shipping costs. TDIS and TCS, who manage door-to-door freight transport services, rely heavily on rail-based solutions to reduce supply-chain emissions.

Impact of engagement, including measures of success

Norfolk Southern subsidiaries share the railroad’s commitment to provide efficient, productive, and sustainable freight transportation for customers. Trains are four times more fuel-efficient on average than trucks, reducing GHG emissions by 75 percent per ton-mile of freight. In 2017, Thoroughbred Direct Intermodal Services, a logistics provider, and Triple Crown Services, a multimodal carrier, earned a place on the U.S. Environmental Protection Agency’s first SmartWay High Performer list. The list recognizes shippers, carriers, and logistics service providers for supply chain efficiencies that help their customers reduce transportation-related greenhouse gas emissions and lower shipping costs. TDIS and TCS, who manage door-to-door freight transport services, rely heavily on rail-based solutions to reduce supply-chain emissions.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

- Direct engagement with policy makers
- Trade associations

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Energy efficiency	Support	NS directly engages policy makers and works through its primary trade association, the American Association of Railroads, to advocate for regulation and legislation that leverages the energy efficiencies inherent in rail transportation. Relevant topics include funding for the national freight network that improves commercial access to rail transportation, which is substantially more efficient than other means of ground transportation. Such improved access benefits the greater environment and communities that ground transportation travels through because it decreases fossil fuels used and emissions output, and it benefits customers and companies whose supply chain we are part of, as it provides them a carbon-efficient means of transporting their freight.	Legislative solutions to minimize GHG should take into consideration the relative outputs of differing forms of transportation and encourage the cleaner and more efficient forms. Because trains are substantially more fuel efficient than trucks when transporting freight (four times more efficient), and because greenhouse gas emissions are directly related to fuel consumption, moving freight by rail instead of truck significantly reduces greenhouse gas emissions attributable to that freight.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

Association of American Railroads

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The Association of American Railroads (AAR) works with elected officials and leaders in Washington, DC to advance sound public policy that supports the interests of the freight rail industry to ensure it will continue to meet America's transportation needs today and tomorrow. America's freight railroads operate the safest, most efficient, cost-effective and environmentally sound freight transportation system in the world. AAR's position: As Congress considers legislation to limit emissions of carbon dioxide and other greenhouse gases, it should take into account the environmental friendliness of freight railroading. Climate legislation offers an opportunity for policymakers to encourage the movement of freight by environmentally-friendly rail and to spur the development of carbon capture and storage technology.

How have you, or are you attempting to, influence the position?

Norfolk Southern consulted with the AAR regarding the trade association's position on this issue and concurs with the current position.

Trade association

American Coalition for Clean Coal Electricity

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The American Coalition for Clean Coal Electricity (ACCCE) represents energy resource providers, utilities, and companies that transport energy commodities. The ACCCE advocates for public policies that advance environmental improvement, economic prosperity and energy security. ACCCE believes that the wise use of coal – one of America's most abundant, domestically produced energy resources – is essential to providing affordable, reliable electricity for millions of U.S. consumers and a growing domestic economy. Further, ACCCE is committed to continued and enhanced U.S. leadership in developing and deploying new, advanced clean coal technologies that protect and improve the environment.

How have you, or are you attempting to, influence the position?

NS's position is consistent with the ACCCE's.

Trade association

US Chamber of Commerce

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The mission of the U.S. Chamber of Commerce's Global Energy Institute is to unify policymakers, regulators, business leaders, and the American public behind a common sense energy strategy to help keep America secure, prosperous, and clean. Through policy development, education, and advocacy, the Institute is building support for meaningful energy action at the local, state, national, and international levels.

How have you, or are you attempting to, influence the position?

NS's position is consistent with the US Chamber of Commerce.

Trade association

National Association of Manufacturers

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association’s position

At a time when the U.S. and global economies are under extreme pressure, policymakers should look very cautiously at new government programs to expand environmental rules or impose entirely new regulatory regimes. The NAM represents the best interests of manufacturers on a variety of environmental issues, including air and water quality regulations, EPA and state environmental justice procedures, sustainability practices, hazardous waste disposal policies, chemical security and management and E-waste programs.

How have you, or are you attempting to, influence the position?

NS's position is consistent with the National Association of Manufacturers.

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

The Enterprise Risk Council is comprised of officers who also oversee the activities of policy-influencing corporate functions, including government relations, corporate communications, and sustainability. This networked management and accountability, with senior management positioned near the top, ensures thoughtful activities that cohere to NS's central strategies.

C12.4

(C12.4) Have you published information about your organization’s response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In voluntary sustainability report

Status

Underway – previous year attached

Attach the document

2017-ns-sustainability-report.pdf

Content elements

- Governance
 - Strategy
 - Risks & opportunities
 - Emissions figures
 - Emission targets
 - Other metrics
-

C14. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Director Corporate Social Responsibility	Environment/Sustainability manager

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

Please select

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
-----------------------	--

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Please select

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

Please select

SC3.1

(SC3.1) Do you want to enroll in the 2018-2019 CDP Action Exchange initiative?

Please select

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2017-2018 Action Exchange initiative?

Please select

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services, if so, what functionality will you be using?

Please select

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

Please select

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Public	Investors Customers	Yes, submit Supply Chain Questions now

Please confirm below

I have read and accept the applicable Terms