Welcome to your CDP Climate Change Questionnaire 2023

C0. Introduction

C0.1

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

Norfolk Southern Corporation (NYSE: NSC) is one of the nation's premier transportation companies, moving the goods and materials that drive the U.S. economy. Norfolk Southern connects customers to markets and communities to economic opportunity, with safe, reliable, and cost-effective shipping solutions. The company's service area includes 22 states and the District of Columbia, every major container port in the eastern United States, and a majority of the U.S. population and manufacturing base.

Norfolk Southern's strategic objectives are transforming the way we do business to operate more efficiently and better serve customers, while reducing the railroad's overall environmental footprint. Our multi-pronged strategic approach includes evaluating new technologies and implementing industry best practices to help us drive efficiency and lessen our environmental impacts.

Norfolk Southern's fundamental business is the efficient, reliable, and safe movement of large volumes of freight from origins to destinations across long distances. The value of this service is provided not only by the freight transportation service itself, but also through the measurable positive impact to the environment arising from the inherent efficiencies in moving freight by rail versus other modes of transportation. Moving freight by rail is lower emissions as compared to truck, and customers who choose rail reduce their carbon footprint. Studies show that trains are three to seven times more fuel-efficient and produce on average 75 percent fewer greenhouse gas emissions than trucks.

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 clean-up of hazardous material or petroleum releases. Compliance with such environmental laws is a principal objective of our company. 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 2023 Environmental, Social, and Governance (ESG) Report includes data and content from calendar year 2022 and the first half of 2023. This report was published on our website June 30, 2023. This report and the previously published reports are available to the public at http://www.nscorp.com/content/nscorp/en/about-ns/sustainability.html.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date

January 1, 2022

End date

December 31, 2022

Indicate if you are providing emissions data for past reporting years

No

C0.3

(C0.3) Select the countries/areas in which you operate.

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 chosen approach for consolidating your GHG inventory.

Operational control

C-TO0.7/C-TS0.7

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

Rail

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	6558441084

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) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual or committee	Responsibilities for climate-related issues
Board-level committee	The Norfolk Southern Board of Directors is comprised of the President and CEO and 14 independent directors including the Independent Chair of the Board. The Board of Directors includes the following six committees, each with a chairperson and a written charter specifying the committee's duties: Executive Committee, Audit Committee, Human Capital Management and Compensation Committee, Governance and Nominating Committee, Finance and Risk Management Committee, and Safety Committee. The Board Chair and the chairs of the respective committees establish the agenda for committee meetings. All directors are encouraged to provide input on Board and committee meeting agendas. An example of a climate-related decision made by the Board of Directors was the recent appointments of two company officers with responsibilities for climate-related issues. The positions are: • Executive Vice President and Chief Transformation Officer (CTO). This position oversees a new Transformation Division, which includes NS sustainability issues and initiatives to reduce impacts to the environment. Additionally, the Chief Sustainability Officer reports to the CTO position. This position reports directly to the President and CEO. •Executive Vice President and Chief Legal Officer. This position oversees government relations, corporate governance and legal matters, including issues relative to the environment and climate change. This position reports directly to the President and CEO. These recent Board-appointed positions are part of Norfolk Southern's strategic plan to transform the company for next-generation railroading, which includes forward-thinking sustainability strategies to improve fuel economy and reduce emissions.
Board-level committee	The Governance and Nominating Committee's broad responsibilities impact a wide range of NS decisions, including those related to governance, internal and external relationships, legislative developments, sustainability, and overall performance. The committee is in a critical position to guide decisions and, therefore, the committee charter includes the following elements: reviewing NS policy related to sustainability issues, which includes climate and emerging issues; establishing annual and long-term goals and initiatives; and

	overseeing the ESG Report. As an example of the committee's climate-related decisions, the Board formally revised the G&N Committee's charter document to include the oversight of the sustainability program at NS. The charter states the committee shall review and oversee the corporation's policy relating to sustainability issues, emerging sustainability issues, annual and long-term goals for the corporation's sustainability initiatives, and the corporation's annual ESG Report. This committee ensures that the sustainability initiatives appropriately reflect the expectations of Norfolk Southern's shareholders and reviews the ESG Report to ensure an appropriate level of detail and clarity. Our 2023 ESG Report was published on our website on June 30, 2023 and is available at http://www.norfolksouthern.com/content/dam/nscorp/get-to-know-ns/about-ns/environment/Forging-a-Better-Tomorrow-Report.pdf
Board-level committee	The Finance and Risk Management Committee is a standing committee. The committee provides oversight of NS' Enterprise Risk Management (ERM) process. In consultation with management, the committee: • Recommends to the Board of Directors procedures and processes for the corporation's ERM process, and ensures management and oversight responsibilities for specific, identified areas of risk for the corporation. • Oversees the corporation's ERM process, which addresses sustainability and climate-change risks relating to volatility in energy prices, business interruptions from severe weather, and legislative and regulatory efforts to limit greenhouse gas emissions, as well as financial, legal, and other risk types. • Receives regular presentations and updates on risk-management efforts and approves the work flowing through the ERM process. As an example of a climate-related decision made by the Finance and Risk Management Committee, in 2021, the committee approved the issuance of $500M in green bonds to demonstrate Norfolk Southern's commitment to supporting capital investment-promoting sustainable projects. The committee records and reports with a written record its deliberations and decisions, and regularly reports to the Board of Directors the committee's activities and conclusions with respect to the principal matters it considered.

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 strategy Monitoring progress towards corporate targets Reviewing and guiding the risk management process	Sustainability is discussed during Governance and Nominating Committee meetings. Climate and sustainability-related issues may also be scheduled topics at some additional meetings of the Board of Directors. The Board provides climate-related oversight through reviewing and guiding risk-management policies, reviewing and guiding strategy, and monitoring progress towards corporate targets as it relates to climate change, energy, and environmental policy. Risks are evaluated through a thorough process that considers magnitude of potential risks as well as likelihood of occurrence. This risk-evaluation process helps to inform NS risk-management policies. The Board of Directors provides input on climate-related issues identified through the formal Enterprise Risk Management process, goals outlined in the company's strategic plan developed by the CEO and senior managers, discussions with investors and customers, and feedback from a range of community stakeholders. Norfolk Southern's strategic plan to transform all aspects of the business included establishing and appointing an individual in the position of Executive Vice President and Chief Transformation Officer (CTO) and redefining the Chief Sustainability Officer role which reports to the CTO. The CTO and/or the Chief Sustainability Officer report regularly to the Board on climate-related and other sustainability matters.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues
Row 1	Yes	NS assessed each of its director's professional experience on several subjects and has determined that 4 out of 15 board members, or 27%, possess experience in environmental and safety matters.

C1.2

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

Position or committee

Chief Operating Officer (COO)

Climate-related responsibilities of this position

Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

Quarterly

Please explain

The Chief Operating Officer (COO) leads the operations and builds on the successful implementation of precision scheduled railroading (PSR). For NS, PSR involves lowering operating costs, which includes the climate-related responsibilities of optimizing locomotive efficiency and

reducing energy consumption. This position has oversight and responsibility within their role and reports and communicates to the full Board of Directors on issues, including climate issues related to their purview. This position has the authority, influence, and resources to act on climate-related risks and opportunities in alignment with our corporate strategy. Major capital investments such as locomotive technology to reduce emissions is overseen by the COO. Our engineering department reports to the COO and together they both assess and manage climate-related risks and opportunities such as potential and actual damage to our rail infrastructure from flash flood events.

Position or committee

Other C-Suite Officer, please specify

Chief Transformation Officer

Climate-related responsibilities of this position

Assessing climate-related risks and opportunities

Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

Half-yearly

Please explain

The Chief Transformation Officer (CTO) oversees a new Transformation Division identified as part of our strategic plan. The plan to transform NS for next-generation railroading is built around PSR and NS' five core principles: serve customers, manage assets, control costs, work safely and develop people. These five principles optimize the network and create the most efficient network which in turn reduces emissions and focuses on climate-related issues. This position has oversight and responsibility within their role and reports and communicates to the full Board of Directors on issues, including climate issues related to their purview. This position has the authority, influence, and resources to act on climate-related risks and opportunities in alignment with our corporate strategy.

Position or committee

Chief Sustainability Officer (CSO)

Climate-related responsibilities of this position

Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Other, please specify

The CSO reports to the CTO

Frequency of reporting to the board on climate-related issues via this reporting line

Half-yearly

Please explain

The Chief Sustainability Officer reports to the CTO position. The Chief Sustainability Officer is responsible for advancing the company's strategy to integrate sustainability practices into daily operations to achieve efficiencies, control costs, generate revenue, and reduce impacts. This position is critical to NS' commitment to environmental, social, and governance practices that positively impact the environment, while simultaneously supporting the growth and evolution of the company. This position has oversight and responsibility within their role and reports and communicates to the full Board of Directors on issues, including climate issues related to their purview. This position has the authority, influence, and resources to act on climate-related risks and opportunities in alignment with our corporate strategy.

Position or committee

Other, please specify

Environmental Policy Council

Climate-related responsibilities of this position

Assessing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Other, please specify

Legal – Chief Legal Officer

Frequency of reporting to the board on climate-related issues via this reporting line

Annually

Please explain

The Environmental Policy Council (EPC) is charged with the oversight and monitoring of corporate environmental policy. EPC consists of senior executives from across the corporation and is chaired by the EVP and Chief Legal Officer, or their designee. EPC conducts at least one formal meeting annually and is accessible on an ad-hoc basis. The Environmental Policy Council (EPC) is committed to protecting the quality of the environment; therefore, climate-related issues that impact the environment are within the purview of the committee's responsibilities.
Additionally, the EPC comprises senior management, department heads, and the Chief Sustainability Officer, who operate as leaders of various operational areas and can work together to impact change. The EPC statement of policy includes the following responsibilities:
• Ensuring that environmental training for each job is conducted. Note that this has particular benefit to the positive impact of changes made in locomotive technology to reduce energy use in 2022.
• Managing all wastes, including minimizing waste through inventory management, recycling, reduced consumption of energy, greater use of environmentally preferred materials, and use of non-polluting technologies, procedures, and work practices. Internal auditing is conducted.
• Protecting environmental quality of NS' real estate through sound management of land, water, and other property resources.
• Ensuring continuing improvement, measuring performance, and reporting environmental information.
• Overseeing and monitoring environmental policies and practices that are deemed necessary for NS to facilitate compliance with all applicable environmental laws and regulations, giving due regard to both existing and prospective legal requirements, as well as overseeing NS' corporate sustainability program.
This position has oversight and responsibility within their role and reports and communicates to the full Board of Directors on issues, including

climate issues related to their purview. This position has the authority, influence, and resources to act on climate-related risks and opportunities in alignment with our corporate strategy.

Position or committee

Other, please specify

Sustainability Advisory Council

Climate-related responsibilities of this position

Assessing climate-related risks and opportunities

Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Corporate Sustainability/CSR reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

Annually

Please explain

The Corporate Sustainability Advisory Council includes department leaders across the company and is chaired by the Chief Sustainability Officer. This group meets at least annually and serves both as advisors and ambassadors for our sustainability program. This group established five pillars for our sustainability strategy with each pillar being led by a cross-departmental team which meets 3-4 times each year. This position has oversight and responsibility within their role and reports and communicates to the full Board of Directors on issues, including climate issues related to their purview. This position has the authority, influence, and resources to act on climate-related risks and opportunities in alignment with our corporate strategy.

C1.3

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive

Corporate executive team

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary

Performance indicator(s)

Energy efficiency improvement

Incentive plan(s) this incentive is linked to

Short-Term Incentive Plan

Further details of incentive(s)

NS' 2022 annual monetary incentive is designed to compensate executives based on achievement of annual corporate performance metrics: operating income, weighted at 20 percent, strategic objectives, weighted at 20 percent, and operating ratio, weighted at 60 percent. Both operating income and operating ratio are calculated using operating expenses.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

Fuel expenses are the third-largest expense, so improvements in fuel efficiency can result in significant improvements to our operating income and operating ratio. Since locomotive fuel drives over 90 percent of our Scope 1 and Scope 2 emissions, the annual cash incentive encourages the C-Suite to focus on fuel and operating efficiencies that ultimately result in emissions reduction per ton-mile.

Entitled to incentive

Management group

Type of incentive

Monetary reward

Incentive(s)

Bonus - % of salary

Performance indicator(s)

Energy efficiency improvement

Incentive plan(s) this incentive is linked to

Short-Term Incentive Plan

Further details of incentive(s)

NS' 2022 annual monetary incentive is designed to compensate management based on achievement of annual corporate performance metrics: operating income, weighted at 20 percent, strategic objectives, weighted at 20 percent, and operating ratio, weighted at 60 percent. Both operating income and operating ratio are calculated using operating expenses.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

Fuel expenses are the third-largest expense, so improvements in fuel efficiency can result in significant improvements to our operating income and operating ratio. Since locomotive fuel drives over 90 percent of our Scope 1 and Scope 2 emissions, the annual cash incentive encourages management to focus on fuel and operating efficiencies that ultimately result in emissions reduction per ton-mile.

Entitled to incentive

All employees

Type of incentive

Monetary reward

Incentive(s)

Bonus – set figure

Performance indicator(s)

Implementation of an emissions reduction initiative
Increased engagement with customers on climate-related issues

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

NS also has a "Spot Award Program." The Spot Award is designed to meaningfully and promptly provide a financial reward to members of our team who – through agile, collaborative, and inclusive ways of working – make important contributions to our company. When considering an individual for a Spot Award, the following are considered:
• The award is reserved for superior performance out-side an employee's normal job responsibilities.
• The award recognizes a one-time achievement, e.g., successful completion of a high-impact project or development and implementation of an innovative business solution.
• An award value of $1,000 – $5,000 is suitable for most awards.

• For accomplishments that may not meet the requirement for a Special Contribution Award of $25,000 or greater, but deserve an award greater than $5,000, an enhanced $10,000 Spot Award can be made with CEO approval.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

One climate-related project that has directly impacted our sustainability activities and has featured several Spot Awards has been the development of our new NS Carbon Calculator. Customers are utilizing the NS Carbon Calculator web-tool to estimate emissions savings as they run "what-if" freight mode conversion scenarios. As customers utilize the tool, they will be linked with marketing and sales representatives who can assist them in establishing freight service. In recognition of the work accomplished by several teams on this project, seven individuals received a NS Spot Award for their accomplishments.

Entitled to incentive

All employees

Type of incentive

Non-monetary reward

Incentive(s)

Internal company award

Performance indicator(s)

Energy efficiency improvement

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

The Spirit Award recognizes the exceptional accomplishments of NS employees. Managers are encouraged to use the award as a means to express appreciation to employees for contributions and exemplary talents that drive the five principles behind the NS Way to:

• Serve customers

• Manage assets
• Control costs
• Work safely
• Develop people

Demonstrating the NS Way values is essential in maintaining forward momentum as NS strives to not only meet, but exceed, every industry standard, including those tied to environmental and climate-change goals. The Spirit Award recognizes employees who exceed expectations by acknowledging the importance of the company values and how they play a key role in achieving NS' mission.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

When considering an individual for a Spirit Award, the following are considered:
• The award recognizes individuals or teams for superior performance outside normal job responsibilities, outstanding performance of job responsibilities, or successful completion of a high-impact project.
• The award recognizes individuals or teams for making a significant contribution in the creation, development, or diffusion of innovative solutions to business challenges.
• The award recognizes individuals or teams for collaborative and inclusive ways of working.

One of the recipients that received a Spirit Award was recognized for quickly identifying and correcting a lubricant leak, which prevented possible environmental contamination to a nearby river.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	6	For NS, the short-term planning horizon encompasses the period in which tactical and operational decisions are made based on the assets already in place, which we have determined to be 0 to 6 years.
Medium-term	6	50	NS 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 six years (electronic components) to 50 years (statutory limit of railcars in interline service). Our 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	50	100	While most NS assets are procured and retired within a 7 to 50-year, medium-term horizon, many decisions span a significantly longer period. For instance, in 2016, we completed the retirement and replacement of a railroad bridge in Letchworth State Park in Portageville, NY. The original bridge was 147 years old, and was replaced by a bridge that NS hopes will provide productive service for another 150 years. Numerous other operating properties have been in service for our company and its predecessors for 100 years or more. Hence, our long-term planning horizon extends from 50 years to 100 years or more.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

The Norfolk Southern Enterprise Risk Council utilizes the Enterprise Risk Management (ERM) program to identify and define substantive financial or strategic impacts to operations. Part of the ERM process is categorizing risks as either Tier 1 Risks or Tier 2 Risks.
Risks are evaluated based on both the quantitative and qualitative factors of 1) impact & likelihood; and 2) management preparedness. Impact is defined as “a measure of tangible and intangible effect(s) a risk will have on the organization in the next 12 months,” and is rated by evaluating the financial, operational, and reputational outcomes. Adverse effect on free cash flow and duration of business interruption are used as quantitative indicators of financial and operational impact, respectively. Substantial financial impacts are quantified as costs exceeding $50M. Reputational harm is

considered qualitatively based upon factors such as anticipated level of regulatory scrutiny, scope of media coverage, and impact to brand. Tier 1 Risks are those that NS determines carry “high risk exposures accompanied with management identifying improvement opportunities” or need for additional preparedness. The risks identified in this category, if unaddressed, can lead to a substantive financial or strategic impact on our business. Norfolk Southern's Tier 1 substantive risks include:

1. Regulatory Compliance, which can impact long-term operating costs, revenues, and profitability, could be impacted by expansion of economic or operational regulations imposed on NS and its customers.

2. Catastrophic Incidents could greatly and immediately impact operating costs, particularly in the event of catastrophic loss resulting from a major derailment or other catastrophic event. Extreme weather events and changes in climate patterns can impact the condition of rail infrastructure over time, leading to increased frequency or duration of service interruptions on the NS network.

3. Cybersecurity and IT System Resiliency could affect operating costs, efficiencies, and corporate reputation as a result of any failures to prevent cyber-attacks, safeguard sensitive corporate data, and/or maintain and upgrade critical systems essential to core business functionality.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term

Medium-term
Long-term

Description of process

The Enterprise Risk Management (ERM) program uses a workshop approach to assess which risks and/or opportunities could have a substantive financial or strategic impact. Workshops are held at least annually for risk identification and prioritization. Quarterly engagements with key internal stakeholders are conducted on a quarterly basis. Risks are reported using a heat map developed as a result of discussions during these workshops. The risks identified as carrying “high risk exposures” or a need for additional preparedness, if unaddressed, can lead to a substantive financial or strategic impact on NS' business. Norfolk Southern’s Tier 1 substantive risks are as follows.
1. Regulatory Compliance, which can impact long-term operating costs; revenues and profitability could be impacted by expansion of economic or operational regulations imposed on NS and its customers.
2. Catastrophic Incidents could greatly and immediately impact operating costs, particularly in the event of catastrophic loss resulting from a major derailment or other catastrophic event. Extreme weather events and changes in climate patterns can impact the condition of rail infrastructure over time leading to increased frequency or duration of service interruptions on the NS network.
3. Cybersecurity and IT System Resiliency could affect operating costs, efficiencies, and corporate reputation as a result of any failures to prevent cyber-attacks, safeguard sensitive corporate data, and/or maintain and upgrade critical systems essential to core business functionality.

The following case studies describe the process used to identify, assess, and respond to both physical and transitional risks using the ERM process.

“Service resiliency” has been identified as a Tier 1 Risk. The ERM process defined the service resiliency risk as: “Growth objectives and financial measures, including long-term revenues, earnings per share, and operating ratio could be impacted by an inability to effectively execute our rail service plan and appropriately adjust and respond to unexpected service challenges (e.g., extreme weather, demand spikes, rail breaks, equipment malfunctions).

A second order risk is experiencing a reduction in network velocity that creates new or exacerbates existing service issues by straining assets, resources, and the current cost structure.”

An example case study of the using the ERM process to identify, assess, and respond to a Tier 1 climate-related PHYSICAL risk was the train service interruption caused by historic flooding of the Missouri and Grand Rivers, resulting in submerged or washed-out train track, which

impacted NS train service, product delivery, scheduling, finances, and customer service. The ERM process had identified this as a possibility, assessed potential response options, and pre-planned for the re-routing of train traffic until damaged train track could be repaired. Pre-planned contractors, supplies, and equipment were deployed to repair and normalize train service as quickly as possible. The pre-planning for this physical risk event resulted in restoring train service as quickly as possible, minimizing the financial impacts and customer disruption caused by this event.

An example case study of the using the ERM process to identify, assess, and respond to a Tier 1 climate-related TRANSITIONAL risk is the need to minimize greenhouse gas emissions. Traditionally, diesel fuel is the primary energy source for freight haul by rail, creating most of the NS greenhouse gas emissions. The ERM process identified the transition away from diesel fuel as a Tier 1 Risk to NS freight haul. Various alternatives to using traditional diesel fuel were assessed (e.g., replacing diesel fuel with other energy sources, implementing technology to limit diesel fuel emissions, improving train handling), resulting in responses to limit diesel fuel use and associated greenhouse gas emissions.

Examples include:
• A computer-driven Energy Management System, also referred to as Trip Optimizer and LEADER, which reduces energy use by braking and accelerating the train through pre-programmed topography and rail conditions to most efficiently move the train. This technology acts like a "smart cruise control" for the train.
• Precision scheduled railroading (PSR)is a key initiative to reorganize the workforce; optimize assets, train routes, and train schedules; and incorporate customer needs in a manner that optimizes train performance, thereby reducing energy use, while still meeting the customer demands.
• "Sleeper cars" – a new technology that reduces the amount of energy used during a cold weather layover. Previously, the locomotive needed to stay running through the night to operate properly during the next day's use. The "Sleeper" technology reduces the amount of energy to meet the engine requirement.

The result of these and similar initiatives resulted in a 24 percent reduction in absolute greenhouse gas emissions since year 2015, with a recently accepted Science-based target (SBT) to further reduce NS greenhouse gas emissions intensity by 42 percent between 2019 and 2034.

C2.2a

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	NS considers risks associated with current regulations through both our Law and Government Relations Departments. These departments have an in-depth understanding of the current regulatory landscape and are therefore well-positioned to assess and manage risks as they relate to current regulations. NS, through its Government Relations Department, assesses risks due to current and emerging regulations that may impact our suppliers. We consider the risks associated with current regulations, including U.S carbon markets and taxes, locomotive emission standards, and renewable energy legislation. For example, if one of our suppliers is not able to meet locomotive air emission regulatory requirements, this could impact our operating costs and potentially the ability of NS to operate the necessary number of locomotives to meet the business demand. Because there are only two manufacturers of locomotives, both impacted by the air emission regulations, this is a risk for our company.
Emerging regulation	Relevant, always included	NS reviews and monitors potential financial risks to us from emerging federal and state regulations, as well as emerging carbon-pricing mechanisms, and includes this information in our risk-management process. These risks have the potential to impact our costs for fuel and the commodity mix that we transport. Based on this information, we assess our current and future risk and associated mitigation options as a result of emerging regulations. NS considers risks associated with emerging regulations through our Government Relations Department. The department has an in-depth understanding of the regulatory landscape, including emerging regulations, and is therefore well positioned to assess and manage risks as they relate to new and changing regulations. A specific emerging regulation is pending legislation to manage carbon emissions on the coal, crude, and fracking industries. Our coal, crude, and fracking industry customers may have their businesses negatively impacted by the legislation, resulting in a decrease of their product and, in turn, we could experience a decrease in shipments of their materials and products.
Technology	Relevant, always included	Technology upon which NS relies for its operations is subject to cyber risks and, in turn, can create climate-related risks. For example, increasingly, locomotive technologies are subject to air emissions requirements. We have an initiative to reduce energy emissions with a computer-driven Energy Management System, also referred to as Trip Optimizer and

		LEADER. Because the Trip Optimizer and LEADER systems can be negatively impacted by information technology issues related to cyber-security and IT system resiliency, NS identifies technology as a risk. This has been identified as a Tier 1 Risk by the ERM. This risk to the rail optimization system could ultimately increase our carbon emissions by resulting in a technology interruption of the Trip Optimizer and LEADER systems.
Legal	Relevant, sometimes included	NS' legal services section handles research, advice, supervision, and representation for transactions affecting our corporate real estate holdings, industrial development, telecommunications, facilities, and operations management. Risks associated with the interpretation of federal and state laws like the Clean Water Act (CWA) and Clean Air Act can impact the scope of the railroad's compliance obligations and increase the cost of compliance. A specific risk is the interpretation regarding jurisdictional waters of the U.S. Portions of NS rail right-of-way have lower topography that could potentially be regulated, which would increase both the time and cost to maintain our infrastructure. NS takes a management-system approach to identify legal obligations but assumes some risk as the interpretation of these legal obligations can create a financial impact, resulting in re-allocation of resources from voluntary climate/environmental improvement measures and programs. An example of a legal risk related to the transition to a low-carbon economy is a concern for an increase in regulatory fines and penalties as carbon-emission limits become stricter, requiring increased legal involvement to address these fines and penalties.
Market	Relevant, always included	NS has a wide range of clients, including pharmaceuticals, automotive, electronics, and retailers, just to name a few. During NS' risk-assessment process, consideration is given to climate-related risks in the markets where we operate. One segment of our market is agriculture and forest commodities, which can be impacted by climate. Crops may be impacted by a climate-driven drought or destructive rain, hurricanes, or tornadoes. Forest products could be impacted by the increase in drought, ice storms, and tropical systems. As a result, this could adversely affect our business operations and contribute to lower rail-shipment volumes. Based on this information, we assess our current and future risks and associated mitigation options as a result of potential changes in the market.

Reputation	Relevant, sometimes included	NS's Enterprise Risk Management processes and team structure are defined to detect, monitor, assess, escalate, and mitigate risks in all aspects of our business whether they emanate from regulatory, technology, legal, market, reputation, 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 we determine 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. NS has demonstrated and documented leadership in environmental stewardship, leading and supporting forest and wetland restoration efforts across multiple states and in partnership and with many non-profit organizations. NS' Thoroughbred Code of Ethics and values of integrity and respect require "do what's right" and "get it done" – this includes ensuring that our actions or actions of our partners do not negatively impact the rail-road's reputation in the industry or in our communities. A reputational risk is the risk of changing customer or community perceptions of an organization's contribution to or detraction from the transition to a lower-carbon economy. An example of NS' response to a reputational risk is the application and acceptance of a Science-Based Target (SBT) for reducing our greenhouse gas emissions, demonstrating our commitment and ambition toward a low-carbon economy.
Acute physical	Relevant, sometimes included	Acute physical risks for NS include severe weather events, such as hurricanes, flood waters, winter storms, and tornadoes. These extreme events can submerge, wash out, or destroy miles of train track and, as a result, interrupt operations. For example, NS spent $1,450,000 on Hurricane Ida-related expenses for prevention, repair, and recovery measures. These measures included clearing downed trees from the line of road, clearing drainage systems of debris, replacing washed out aggregate to restored railroad track roadbed, and replacing dam-aged crossing and signal components. In addition to infrastructure re-pairs, round-the-clock track, bridge, drainage system, and signal system inspections were performed to ensure trains could run safely during this inclement weather. NS monitors the risk of flooding by conducting inspections to look for opportunities to do the following: armor the roadbed; raise track in specific areas prone to flooding; install culverts, or pipes, to drain water underneath road or railway in flood-prone areas; and reinforce bridge ends to prevent a potential washout of bridge structures during floods. During Hurricane Ida, NS experienced $47,000 worth of damage that required capitalization.

		If rail lines are out of service due to severe weather, our operations, customer service, and fuel efficiencies are negatively affected.
Chronic physical	Relevant, sometimes included	Weather patterns and extreme variability in air temperatures impact operations and may increase the risk of rail failure. In some cases, the risk is a result of a longer period that can have a cumulative effect. An example of this risk to NS is extreme cold, which can contribute to broken rail and, in turn, may lead to derailments along with interrupting train movements. Extreme heat can also cause rail-alignment issues. Weather-related patrols must be significantly increased during periods of temperature extremes to identify weakened or misaligned rail to prevent business interruptions. These patrols are also inspecting track for signs of undermining due to erosion or increasingly higher water levels in the adjacent areas. In order to proactively address the slow, chronic impact of weather pattern changes, the inspections identify necessary projects to strengthen the rail bed in order to avoid future rail failure and derailment.

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?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your bu siness.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation

Mandates on and regulation of existing products and services

Primary potential financial impact

Increased direct costs

Company-specific description

NS must stay abreast of emerging emissions regulations regarding the equipment we operate in a territory we operate alongside, such as California. California serves as NS' "canary in a coal mine" for emerging regulations that could have material effects on NS' operations. Failing to monitor emerging regulations could present a material risk to our ability to operate profitably and within our current service areas. Meeting current and emerging regulations may have a substantive financial impact on the company if costs exceed $50 million. NS defines viability as the reliability of the manufacturer, operations, maintenance costs, and the equipment's residual value. NS proactively manages the risk of emerging regulations in our Enterprise Risk Management (ERM) business function under the Regulatory Compliance Risk Category and Operational: Asset Availability and Demand Resource Planning. NS manages the impact of emerging regulations through Public Private Partnerships (P3) Fuel Efficiencies/Emissions project on Eco Locomotive & Idle Reduction Efforts, piloting battery powered locomotives under CARB and high bio-fuel blends and renewable diesel, 25% fleet replacement with new locomotive goal in compliance with CARB, Extensive inventories of current locomotive fleet, tier, and age to identify lowest losses if pressed to replace fleet to comply with CARB-like standards. These efforts support NS' progress toward achieving its' SBTi approved well-below 2C scienced based target of 42% reduction of Scope 1-2 according to a 2019 base year by 2034. To evaluate the impact of emerging regulations in more detail, NS performed a scenario analysis using the Network for Greening the Financial Sector (NGFS) Disorderly: Delayed Transition and Hot House World: Nationally Determined Contributions. Considering these two scenarios, NS evaluated the rigor of our existing management methods to mitigate the risk of emerging regulations and concluded that NS is adequately prepared to manage the risk of mandates and regulations on locomotive transportation and the availability of locomotive technology. The extensive biofuel research, Biofuel locomotive testing, and battery electric locomotive testing and P3 projects demonstrate NS's commitment to meeting the emission reductions of the SBT and incorporating collaboration and innovation engagements.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

800,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

NS evaluated the financial implications of emerging regulations using non-compliance penalties per CARB through discussions with experts in CARB compliance. The potential financial implications would be likened to $800 million in penalties annually associated with CARB-like policies for additional operational territories.

Cost of response to risk

200,000,000

Description of response and explanation of cost calculation

NS works with Original Equipment Manufacturers (OEMs) to test alternative fuels for our locomotives that could substantially reduce CO2 emissions. These collaborations improve the OEM knowledge base, improve the NS engine fleet, and meet carbon intensity reduction goals. In addition to alternative fuels, NS is modernizing more than 100 locomotives each year since 2016, with a total of 1,000 expected by 2025. The

average cost of a locomotive modernization is $2 million, multiplied by 100 new locomotives each year, NS' cost to manage this risk is $200 million.

Comment

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?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Opp1

Where in the value chain does the opportunity occur?

Downstream

Opportunity type

Products and services

Primary climate-related opportunity driver

Shift in consumer preferences

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

NS rail transport emits on average 75 percent less greenhouse gas emissions per ton-mile as compared to trucks. Efficiency benefits realized from the NS Precision Scheduled Railroad (PSR) operating model coupled with NS implementation of emission-reducing technologies, such as Trip Optimizer, LEADER, and sleeper stations, reduces NS greenhouse gas emissions. The NS network of interconnected rail lines and intermodal facilities provides shippers the ability to easily access our transportation services for an efficient and environmentally friendly way to haul their freight. We communicate to our customers the climate change and transportation efficiency benefits associated with the movement of goods via train versus truck. As customers pursue less carbon-intensive modes of transporting freight, our rail services provide an opportunity for customers to reduce their climate impact. This shift toward a low-carbon economy can result in increased revenue opportunities for Norfolk Southern. A recent shipper survey indicates that 15 percent of shippers may convert some business from truck to rail because of the increased stakeholder focus on Environmental, Social, and Governance (ESG) considerations.

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

63,260,000

Potential financial impact figure – maximum (currency)

316,300,000

Explanation of financial impact figure

The estimated opportunity for an increase in revenue resulting from a change in NS customer preferences for freight haul is based on a recent shipper survey indicating 15 percent of shippers may convert some business from truck to rail because of the increased stakeholder focus on ESG. Assuming this truck-to-rail revenue increase would fall within the NS Intermodal revenues of approximately $3.163 billion was used to estimate the range of potential revenue increase by assuming a lower and upper bound of 2 and 10 percent increase in Intermodal revenues resulting from increased demand for NS services. 2% of $3.163B is 63.26M and 10% of $3.163B is $316.3M.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

Monitoring legislation and communicating with customers about their preferences is a regular part of NS' marketing efforts. As such, there are no additional costs to realize the opportunity to increase NS Intermodal revenues as a result of increased demand for NS services. NS monitors legislation that could affect our customers' preferences. Additionally, NS marketing teams communicate with customers on a regular basis to learn of the factors that drive their consumption of rail transport and adjust products and services to secure extra business where possible.

As part of the NS strategy to increase flexible freight revenues as customers seek low-carbon transportation options, NS launched its second-generation web-based carbon calculator in March 2022. This tool is located on NS' website and offers potential new customers (possibly moving from truck carriers to NS rail system) the opportunity to compare the truck versus rail carbon footprint for transporting their commodity. The calculator is multi-functional, includes the entire US rail network, and captures the entire cycle of fuel usage: direct fuel burn, yard and local moves, idling, repositioning equipment, intermodal handlings, and drayage. We analyzed over 7 million shipments from 2021 to create a fuel efficiency factor for 30 different commodities plus intermodal, and as a result, found that the range for fuel efficiency by commodity type was much greater than expected. In 2022, we performed a similar analysis of all shipments and updated the fuel efficiency factors as needed.

This calculator focuses on incorporating carbon into the decision framework of shippers. As shippers realize the lower carbon footprint advantages shipping by NS rail as compared to truck, the opportunity to grow NS business revenue in a low-carbon economy becomes more apparent. There are many factors that influence NS bringing in new business. As existing and new customers re-examine their supply chains to lower their contracted transportation emissions, this could benefit NS rail, which is the lower-carbon option for surface transportation.

Comment

There are many factors that influence NS bringing in new business. As existing and new customers re-examine their supply chains to lower their contracted transportation emissions this could benefit rail which is the lower carbon option for surface transportation.

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a climate transition plan that aligns with a 1.5°C world?

Row 1

Climate transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a climate transition plan within two years

Explain why your organization does not have a climate transition plan that aligns with a 1.5°C world and any plans to develop one in the future

NS is in the process of developing a credible transition plan in alignment with a 1.5°C world and inclusive of TCFD transition plan considerations. Our current transition planning effort consists of a well-below 2ºC temperature scenario alignment and was most recently conducted during our SBTi target-setting and approval process. This initial exercise satisfies TCFD guidance for transition plans to be aligned with strategy; to be anchored in quantitative elements, including climate-related metrics and targets; and to articulate actionable, specific initiatives. We are actively developing our governance processes for our transition plan, including approval, oversight, and accountability, and we are working to codify our climate-related capabilities, technologies, transition pathways, scenarios, and financial plans used to directly address our transition risks.

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy
Row 1	Yes, qualitative and quantitative

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios Customized publicly available transition scenario	Company-wide	1.6ºC – 2ºC	NS performed a scenario analysis using the Network for Greening the Financial Sector (NGFS) Disorderly: Delayed Transition and Hot House World: Nationally Determined Contributions (NDCs) to evaluate impacts of emerging regulations. The Delayed Transition scenario assumes high variation in regional policy and delayed policy start. Delayed Transition assumes policy uncertainty leads to higher investment premiums lasting two years, 2030-2031. The assumption is suppliers provide zero-emission locomotives and low-carbon fuels demand will significantly increase. Slow to fast changes in demand for low-emission technology are a higher risk in a delayed transition. NDCs scenario focuses on decarbonizing the energy sector and passenger transportation. Existing mandates stay within a steady state with a push for decarbonization where possible. Considering these two scenarios, NS evaluated existing management methods to mitigate emerging regulation risks and concluded NS is adequately prepared to manage risks of mandates and regulations on locomotive transportation and locomotive technology availability. Extensive biofuel research, biofuel locomotive testing, and battery electric locomotive testing demonstrate NS's commitment to meeting SBT emission reductions and incorporating collaboration/innovation engagements. Assumptions: Delayed Transition scenario assumptions anticipated a shift from low to high carbon price implications between 2030 and 2050, with aggressive policy implementation starting in 2030 reflecting the need to decarbonize. This will result in an increase in demand for biofuel or biofuel

			blends, increasing the NS' operational costs. NDCs scenario assumptions had low carbon price implications with moderate regional policy variation. NDCs focus on passenger transportation and thus do not have a direct impact on NS operations; however, the increase in demand for alternative fuels, low emission fuels, or zero emission transportation will result in a surge price in alternative fuels and battery propulsion locomotives, resulting in higher capital costs. Analytical choices involved short-term (0-2 years), medium-term (2-5 years), and long-term time horizons (5-20 years, focusing on 10-year risks), with a financial impact defined as any activity affecting net revenue.
Physical climate scenarios RCP 8.5	Company-wide		In alignment with our enterprise risk management process, Norfolk Southern performed a physical climate change scenario analysis to explore vulnerabilities and to address our response to climate-related risk. The physical risk scenario analysis focused on almost 450 of our critical assets in short-, medium-, and long-term scenarios. This includes a baseline of 2020 which extends to 2100 at 5-year intervals and looks at a historical baseline view (average of 1986-2005). The analysis was conducted for Representative Concentration Pathways (RCPs) 2.6, 4.5, and 8.5 along eight different climate perils using Jupiter Intelligence ClimateScore Global program. Norfolk Southern reports annually on the climate-related risks and opportunities we face in our publicly available CDP response.
Physical climate scenarios RCP 4.5	Company-wide		In alignment with our enterprise risk management process, Norfolk Southern performed a physical climate change scenario analysis to explore vulnerabilities and to address our response to climate-related risk. The physical risk scenario analysis focused on almost 450 of our critical assets in short-, medium-, and long-term scenarios. This includes a baseline of 2020 which extends to 2100 at 5-year intervals and looks at a historical baseline view (average of 1986-2005). The analysis was conducted for Representative Concentration Pathways (RCPs) 2.6, 4.5, and 8.5 along eight different climate perils using Jupiter Intelligence ClimateScore Global program. Norfolk Southern reports annually on the climate-related risks and opportunities we face in our publicly available CDP response.

Physical climate scenarios RCP 2.6	Company-wide		In alignment with our enterprise risk management process, Norfolk Southern performed a physical climate change scenario analysis to explore vulnerabilities and to address our response to climate-related risk. The physical risk scenario analysis focused on almost 450 of our critical assets in short-, medium-, and long-term scenarios. This includes a baseline of 2020 which extends to 2100 at 5-year intervals and looks at a historical baseline view (average of 1986-2005). The analysis was conducted for Representative Concentration Pathways (RCPs) 2.6, 4.5, and 8.5 along eight different climate perils using Jupiter Intelligence ClimateScore Global program. Norfolk Southern reports annually on the climate-related risks and opportunities we face in our publicly available CDP response.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

- What are the impacts and our vulnerability to the following transition risks:
  - Emerging regulations
  - increase in climate related legal disputes
  - accessibility of decarbonization solutions for NS services and operations
- What are the potential financial implications of emerging regulations?
- How could we enhance our current management methods to decrease our vulnerability to policy, technology, and market risks?
- What variables are needed to support decision-making?
- Who is responsible, accountable, consulted, and informed in the risk prioritization and mitigation process?
- How can we integrate these risks into existing ERM noting proportionality to enterprise-wide risks?
- What forces and developments have the greatest ability to shape future performance?

Results of the climate-related scenario analysis with respect to the focal questions

To evaluate the impact of the risks noted above in more detail, NS performed a scenario analysis using the Network for Greening the Financial Sector (NGFS) Disorderly: Delayed Transition and Hot House World: Nationally Determined Contributions. The Disorderly: Delayed Transition scenario assumes a high variation in regional policy and delayed policy start. Disorderly Delayed Transition assumes that policy uncertainty leads to a higher investment premium that lasts for two years, 2030-2031. The assumption is that suppliers could provide zero-emission locomotives, and there will be a significant increase in demand for low-carbon fuels. Slow to fast changes in demand for low-emission technology are a higher risk in a delayed transition. Hot House World: NDCs scenario focuses on decarbonizing the energy sector and passenger transportation. As a result, existing mandates stay within a steady state with a push for decarbonization where possible. Considering these two scenarios, NS evaluated the rigor of our existing management methods to mitigate the risk of the risks noted above and concluded that NS is adequately prepared to manage the risk of mandates and regulations on locomotive transportation and the availability of locomotive technology. However, NS is not adequately prepared to mitigate the risks in entirety. This exercise helped further define NS' appetite for risk and the proportionality of climate related risks to enterprise-wide risks. In addition, this exercise highlighted NS's need to develop a strategic technology and decarbonization analysis tracked in existing risk listing, complete strategic assessment of locomotives by age and emission tier for future incorporation of financial planning in risk mitigating activities, supply chain resilience, and cap/ex considerations. In addition, this exercise has highlighted the need for NS to invest in a Transition Plan that includes the mitigation measures and recommended activities noted above. An important result / decision from of this scenario analysis is that NS plans to complete a preliminary Transition Plan end of 2024.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	Recognizing the need to address climate-related risks and opportunities as customers seek low-carbon transportation services, the Precision Scheduled Railroading (PSR) operating model was implemented at NS to improve rail transportation services to our customers. The PSR model improves efficiencies in asset utilization, workforce, and train performance. NS achieved significant reductions in fuel consumption and associated greenhouse gas (GHG) emissions. The PSR strategies create year-over-year improvements in operating efficiencies, resulting in annual reductions in GHG emissions.

		Recognizing the potential of these efficiencies, NS applied for and received an approved science-based target (SBT) for reducing GHG emissions into the future. Since railroad transport service is 3-7 times more fuel efficient and emits approximately 75% less GHG emissions than highway transport, NS has made a substantial strategic decision to underscore intermodal freight haul in future planning and partner with trucking customers to use train service for long haul and truck service for local delivery. A typical intermodal freight train can carry the freight of hundreds of trucks therefore taking congestion off roads and reducing carbon emissions. Any carbon restrictive regulation could cause potential customers to shift business to rail, therefore creating advantages for NS.
Supply chain and/or value chain	Yes	Recognizing the need to address climate-related risks and opportunities as customers seek low-carbon transportation services and improvements to supply and/or value chains, NS launched a new long-term operating plan that overhauls the way the railroad runs trains across the network. This results in fewer, heavier trains, reducing circuity and train miles, reducing car handlings, and increasing network velocity – all which contribute to lower carbon emissions per ton-mile. As a result, NS operates with roughly 20 percent fewer locomotives and 21 percent fewer rail cars, significantly reducing GHG emissions. A case study describes the strategy, development, and implementation of our new operating plan. Recognizing the need to address climate-related risks and opportunities as customers seek low-carbon transportation services and improvements to supply and/or value chains, NS' network planning and optimization team developed our plan using modelling and simulation tools to run scenarios and analyze operating data and train flows. Weeks before the plan rollout, the marketing teams met with hundreds of customers to communicate expectations for the transition and explain the supply chain and environmental benefits of the program. Through these efforts, 60,000 carloads of new business were generated by assisting 90 industries build or expand their use of the NS network, removing carbon-emitting heavy trucks from the highway.
Investment in R&D	Yes	Investment in research and development (R&D) is driven by safety, innovation, operating efficiency, and the opportunity to reduce the industry's carbon contributions through the development of new technologies that can reduce GHG emissions from locomotive operations. A strategic investment is the installation of Energy Management (EM) System technologies. NS has been invested in R&D of energy management/fuel conservation systems since 2005. Since that time, NS continues to drive technology

		development in this area. In 2016, NS began installing the latest EM technologies, implementing throttle control on road locomotives. The throttle control installations continue to drive fuel conservation on the NS road fleet with 172 new installations in 2020 and 120 new installations in 2021. The goal is to equip 100% of NS road locomotives in use with an auto-throttle capable EM system. At the end of 2022, over 99% of the road fleet were equipped with EM. Another recent R&D project involved the assembly of a Tier 4 switcher locomotive to be tested in conjunction with Progress Rail. This test will check the feasibility of exhaust after treatment utilizing diesel exhaust fluid (DEF) solution to reduce exhaust emissions in the rail industry. The continuing initiatives to improve locomotive fuel efficiency have resulted in an 8% improvement since 2019 conserving more than 80 million gallons of diesel and avoiding more than 825,000 metric tonnes of CO2 emissions. NS has improved emissions intensity per gross ton miles (GTM) by 5.8 percent in 2022 vs. our 2019 baseline.
Operations	Yes	The most substantial strategic decision in the operations area since 2020 is the continuation, contribution, and continual monitoring of NS' locomotive idle-reduction policies. To further reduce the carbon footprint from railroad operations through reductions in fuel consumption and carbon emissions, NS developed idle-reduction policies and programs to eliminate unnecessary engine idling. For operational reasons, locomotives must sometimes be kept idling to prevent the engine from freezing in cold weather or to maintain proper pressure in air brake lines. To offset that, our road locomotives are outfitted with automatic engine start/stop technology that saves fuel by automatically shutting down an idling engine when conditions allow. In cold weather, the locomotive will shut down automatically when certain engine temperature thresholds are met and then restart as needed to prevent freezing. These practices are governed by Equipment Operation & Handling Rule L-238. NS monitors compliance with L-238 via auditing. Out of 22,223 locomotives audited in 2021, 98.6 percent complied with L-238. A recent update to our fuel conservation rules reduced locomotive idling in 2022 by almost 3,000 hours per day which reduces fuel usage by around 311,000 gallons per month resulting in 3,200 metric tons of avoided emissions.

		In addition, NS has expanded the use of our customized plug-in heater systems, known as “Sleeper” stations, that are installed in rail yards to eliminate engine idling. Locomotives can be shut down and plugged into the “Sleeper,” which heats the engine and keeps the battery system charged. Through innovative public-private partnerships aimed at reducing transportation-related emissions in urban environments, NS has installed “Sleeper” units at rail yards in Atlanta, Chicago, Kansas City, Missouri, and across Ohio. An additional 16 installations were completed at yards in Erie, Buffalo, Chicago, Calumet, and Burns Harbor in 2020.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Assets	NS invested $5.6 million in GreenTrees in 2011, which reforested 10,000 acres of hardwoods and is currently sequestering over 50,000 metric tons of CO2 per year. These generated carbon offsets are verified through the American Carbon Registry. For the vintage year 2020, the verification was completed in 2021. 51,785 tons of carbon offsets were approved by ACR for the 2020 vintage year. Such offsets can be retired against NS emissions, used to provide incentive to customers to convert more shipments to rail, or sold to other companies needing to lower their emissions. We currently have around 290,000 offsets, which represent about 7 percent of our total scope 1 and 2 emissions. Between 2016 and 2030, the trees will generate an estimated 1.12 million carbon credits for Norfolk Southern. The next verification is planned for 2023.

C3.5

(C3.5) In your organization’s financial accounting, do you identify spending/revenue that is aligned with your organization’s climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition
Row 1	No, but we plan to in the next two years

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

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

Well-below 2°C aligned

Year target was set

2020

Target coverage

Company-wide

Scope(s)

Scope 1
Scope 2

Scope 2 accounting method

Location-based

Scope 3 category(ies)

Intensity metric

Other, please specify
Metric tons CO2e per million gross ton-miles (MGTM)

Base year

2019

Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

12.84

Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

0.54

Intensity figure in base year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit o f activity)

Intensity figure in base year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in base year for total Scope 3 (metric tons CO2e per unit of activity)

Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

13.38

% of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

100

% of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

100

% of total base year emissions in Scope 3, Category 1: Purchased goods and services covered by this Scope 3, Category 1: Purchased goods and services intensity figure

% of total base year emissions in Scope 3, Category 2: Capital goods covered by this Scope 3, Category 2: Capital goods intensity figure

% of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) covered by this Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) intensity figure

% of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution covered by this Scope 3, Category 4: Upstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 5: Waste generated in operations covered by this Scope 3, Category 5: Waste generated in operations intensity figure

% of total base year emissions in Scope 3, Category 6: Business travel covered by this Scope 3, Category 6: Business travel intensity figure

% of total base year emissions in Scope 3, Category 7: Employee commuting covered by this Scope 3, Category 7: Employee commuting intensity figure

% of total base year emissions in Scope 3, Category 8: Upstream leased assets covered by this Scope 3, Category 8: Upstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution covered by this Scope 3, Category 9: Downstream transportation and distribution intensity figure

% of total base year emissions in Scope 3, Category 10: Processing of sold products covered by this Scope 3, Category 10: Processing of sold products intensity figure

% of total base year emissions in Scope 3, Category 11: Use of sold products covered by this Scope 3, Category 11: Use of sold products intensity figure

% of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products covered by this Scope 3, Category 12: End-of-life treatment of sold products intensity figure

% of total base year emissions in Scope 3, Category 13: Downstream leased assets covered by this Scope 3, Category 13: Downstream leased assets intensity figure

% of total base year emissions in Scope 3, Category 14: Franchises covered by this Scope 3, Category 14: Franchises intensity figure

% of total base year emissions in Scope 3, Category 15: Investments covered by this Scope 3, Category 15: Investments intensity figure

% of total base year emissions in Scope 3, Other (upstream) covered by this Scope 3, Other (upstream) intensity figure

% of total base year emissions in Scope 3, Other (downstream) covered by this Scope 3, Other (downstream) intensity figure

% of total base year emissions in Scope 3 (in all Scope 3 categories) covered by this total Scope 3 intensity figure

% of total base year emissions in all selected Scopes covered by this intensity figure

100

Target year

2034

Targeted reduction from base year (%)

42

Intensity figure in target year for all selected Scopes (metric tons CO2e per unit of activity) [auto-calculated]

7.7604

% change anticipated in absolute Scope 1+2 emissions

-37.5

% change anticipated in absolute Scope 3 emissions

0

Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

12.16

Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

0.44

Intensity figure in reporting year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

Intensity figure in reporting year for total Scope 3 (metric tons CO2e per unit of activity)

Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

12.61

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

% of target achieved relative to base year [auto-calculated]

13.70204285

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

Norfolk Southern's GHG emissions intensity was 12.61 metric tons of CO2 equivalents per million gross ton miles in 2022 as compared to the base year (2019), which was 13.38 metric tons of CO2 equivalents per million gross ton miles. Norfolk Southern had its SBT validated in 2021

by the Science Based Target initiative, in line with a well-below 2-degree Celsius scenario, committing to reduce GHG emissions intensity (Scope 1 + 2) by 42 percent by 2034.

Plan for achieving target, and progress made to the end of the reporting year

NS plans to achieve our SBTi-approved target in the short-term through increasing our procurement of biodiesel fuel and renewable diesel fuel. We have also extended our locomotive modernization program by another 330 units. Each modernization can improve fuel efficiency up to 25%. We anticipated completing 1,000 units by 2025.

In the medium- and long-term time horizons, we're continuing to research and invest in alternative propulsion methods and technologies that will not only accelerate NS's transition to the low-carbon economy, but also, will help alleviate our climate-related risks.

List the emissions reduction initiatives which contributed most to achieving this target

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to increase low-carbon energy consumption or production

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number

Low 1

Year target was set

2021

Target coverage

Company-wide

Target type: energy carrier

Electricity

Target type: activity

Consumption

Target type: energy source

Renewable energy source(s) only

Base year

2021

Consumption or production of selected energy carrier in base year (MWh)

362,800

% share of low-carbon or renewable energy in base year

3.7

Target year

2030

% share of low-carbon or renewable energy in target year

30

% share of low-carbon or renewable energy in reporting year

4.2

% of target achieved relative to base year [auto-calculated]

1.9011406844

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes. Norfolk Southern has an approved target to reduce scope 1 and 2 GHG emissions 42% per million gross ton-miles (MGTM) by 2034 from a 2019 base year. Purchased electricity is currently around 4% of our annual scope 1 and 2 emissions so increasing our use of renewable energy can assist with meeting our 2034 target.

Is this target part of an overarching initiative?

Science Based Targets initiative

Please explain target coverage and identify any exclusions

This target covers 100% of total electricity consumption.

Plan for achieving target, and progress made to the end of the reporting year

We have a clean energy purchase agreement in the state of Pennsylvania. For 2022 we added two community solar agreements in the state of New York which helped increase our renewable energy consumption from 3.7% to 4.2%. We are exploring other solar opportunities and energy purchase agreements to ultimately meet our target of 30% renewable energy by 2030.

List the actions which contributed most to achieving this target

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 initiatives at each stage of development, and for those in the implementation stages, th e estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	2	487,114
Not to be implemented	0	0

C4.3b

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

Initiative category & Initiative type

Energy efficiency in production processes
Automation

Estimated annual CO2e savings (metric tonnes CO2e)

389,691

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

188,622,000

Investment required (unit currency – as specified in C0.4)

0

Payback period

11-15 years

Estimated lifetime of the initiative

6-10 years

Comment

Norfolk Southern has installed two vendors' version of train energy management hardware and software on our locomotives. Energy Management is a core component of our emissions intensity reduction target as the systems have been EPA-certified for fuel savings of at least 10%. Using the estimated annual CO2e savings and converting this to 37.8M gallons of diesel conserved at approximately $4.99 per gallon (U.S. Energy Information Administration – average 2022 wholesale diesel price), represent $188.6 million in savings for 2022.

Initiative category & Initiative type

Company policy or behavioral change
Resource efficiency

Estimated annual CO2e savings (metric tonnes CO2e)

97,423

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

47,155,500

Investment required (unit currency – as specified in C0.4)

0

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 to reduce consumption/emissions intensity by 42 percent in the period from 2019 through 2034. This equates to 2.5 percent absolute emissions reductions annually. Using the estimated annual CO2e savings and converting this to gallons of diesel (9.45M gallons) conserved at approximately $4.99 per gallon (U.S. Energy Information Administration – average 2022 wholesale diesel price), and assuming that half of our reduction comes through this training and technique, this would represent a total of $47.156 million savings per year.

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 90 percent 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 can provide a sufficient financial return even without a material price on GHG emissions, Norfolk Southern will pursue that investment.
Partnering with governments on technology development	Norfolk Southern partners with local governments to invest in lower-emission 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 lower emission 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?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

Other, please specify

Taxonomy used is based off the avoided emissions, see "Methodology used to calculate avoided emissions" for more information.

Type of product(s) or service(s)

Rail

Other, please specify

Avoided emissions due to rail transportation fuel efficiencies.

Description of product(s) or service(s)

Norfolk Southern is a provider of transportation services, almost entirely by rail. As a rail carrier, our competition includes all of the forms of freight transportation. Rail transport is three to seven times more fuel efficient than truck transport. As a result, rail is often able to help customers avoid carbon emissions through this advantageous emission profile over trucks. It is estimated that our customers annually avoid around 15 million metric tons of emissions by choosing rail instead of truck.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify

Norfolk Southern proprietary methodology

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Gate-to-gate

Functional unit used

U.S. Class 1 Rail companies often use “Revenue Ton-Miles (RTM)” and “Revenue Ton-Mile per gallon of diesel (RTM/gal)” as freight haul efficiency metrics. RTM/gal measures a freight train's ability to transport one U.S. short ton of freight a distance (miles) per gallon of diesel fuel. For this metric, the larger the better. Sometimes this ratio is inverted to "gallons of fuel per RTM". For this metric, less is better since it represents fuel gallons needed to move one freight ton one mile.

Reference product/service or baseline scenario used

The references used were the RTM and RTM/gal metrics for freight hauling if the transport mode was a truck, which is the primary surface transport mode for freight hauling. The types of freight volumes analyzed in this metric were merchandise and intermodal (not coal, due to regulatory restrictions relating to its hauling).

Life cycle stage(s) covered for the reference product/service or baseline scenario

Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

15,000,000

Explain your calculation of avoided emissions, including any assumptions

Our rail emissions estimates are backed by careful data analysis applied to over 14 million shipments over the past two years representing 18 railcar types and 29 commodities plus intermodal. This generates avoided emissions for each shipment independently that are more accurate, within a reasonable tolerance, for each commodity on a lane by lane basis.

Users input data on commodities shipped (group and type), truck shipping volume (trucks/shipment, weight of commodity per truckload), price of

carbon, and shipment frequency. Mileage and emissions results presented on the Norfolk Southern Carbon Calculator are estimates that are for informational purposes only. The spatial boundary of the calculator is both the North American rail network as well as the North American interstate and road network used to transport freight. Truck and rail mileage calculations are derived independently using industry best practices and trip planning software. Rail ton-miles per gallon, repositioning factors and handling factors are based on findings from internal analysis of Norfolk Southern historical shipment data.
Norfolk Southern Carbon Calculator assumptions:
Long haul truck MPG: 6.5 (U.S. Energy Information Administration)
Dray truck MPG: 6.0 (Federal Railroad Administration: Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors)
Long haul truck idling factor: 7% (Oak Ridge National Laboratory: Class-8 Heavy Truck Duty Cycle Project Final Report)
Long haul truck repositioning factor: tanker - 82.8%, non-tanker - 20.5% (American Transportation Research Institute: An Analysis of the Operational Costs of Trucking: 2021 Update)
Dray truck repositioning factor: tanker - 82.8%, non-tanker - 20.5% (American Transportation Research Institute: An Analysis of the Operational Costs of Trucking: 2021 Update)
Global warming potential factors (The Intergovernmental Panel on Climate Change: IPCC AR5)
Average weight per finished vehicle (lbs): 4,287.392 (U.S. Environmental Protection Agency)
Greenhouse gas mobile combustion factors (U.S. Environmental Protection Agency)

More here: http://www.norfolksouthern.com/content/nscorp/en/about-ns/sustainability/carbon-calculator.html

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

86

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

No

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?
Row 1	No

C5.2

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

Scope 1

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

4,784,047

Comment

NS 2019 base year Scope 1 emissions were 4,784,047 metric tons CO2e.

Scope 2 (location-based)

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

201,474

Comment

NS 2019 base year Scope 2 emissions were 201,474 metric tons CO2e.

Scope 2 (market-based)

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

201,474

Comment

NS reported a Scope 2 location-based figure in 2019.

Scope 3 category 1: Purchased goods and services

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
146,465

Comment
NS 2019 base year Scope 3 category 1 emissions were 146,465 MTCO2e.

Scope 3 category 2: Capital goods

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
1,566,764

Comment
NS 2019 base year Scope 3 category 2 emissions were 1,566,764 MTCO2e.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)

1,074,376

Comment

NS 2019 base year Scope 3 category 3 emissions were 1,074,376 MTCO2e.

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

22,998

Comment

NS 2019 base year Scope 3 category 4 emissions were 22,998 MTCO2e.

Scope 3 category 5: Waste generated in operations

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

80,530

Comment

NS 2019 Scope 3 category 5 emissions were 80,530 MTCO2e.

Scope 3 category 6: Business travel

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

8,309

Comment

NS 2019 Scope 3 category 6 emissions were 8,309 MTCO2e.

Scope 3 category 7: Employee commuting

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

112,236

Comment

NS 2019 Scope 3 category 7 emissions were 112,236 MTCO2e.

Scope 3 category 8: Upstream leased assets

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

1,514

Comment

NS 2019 Scope 3 category 8 emissions were 1,514 MTCO2e.

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 10: Processing of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 11: Use of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 12: End of life treatment of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 13: Downstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3 category 15: Investments

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not relevant to our business

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissio ns.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
US EPA Center for Corporate Climate Leadership: Indirect Emissions From Purchased Electricity
US EPA Center for Corporate Climate Leadership: Direct Emissions from Stationary Combustion Sources
US EPA Center for Corporate Climate Leadership: Direct Emissions from Mobile Combustion Sources

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

4,127,658

Comment

Gross scope 1 emissions in 2022 were independently verified.

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 are reporting a Scope 2, market-based figure

Comment

NS calculated Scope 2 location based emissions using the U.S. EPA's eGrid. NS calculated Scope 2 market based emissions using the Green-e residual mix emission factors.

C6.3

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

Reporting year

Scope 2, location-based

150,491

Scope 2, market-based (if applicable)

152,460

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 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 gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

400,830

Emissions calculation methodology

Hybrid method

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

19

Please explain

Purchased goods and services annual spend is managed by the Norfolk Southern Procurement Department.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,289,401

Emissions calculation methodology

Spend-based method

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

0

Please explain

Capital annual spend is managed by the Norfolk Southern.

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

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

956,554

Emissions calculation methodology

Spend-based method

Fuel-based method

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

0

Please explain

Norfolk Southern estimates fuel- and energy-related activities that are not included in Scope 1 and 2 by using the total locomotive diesel fuel and multiplying it by the wheel-to-tank (WTT) emission factor for diesel. This includes emissions associated with the upstream supply chain process, from extraction to delivery of the fuel to NS. Annual spend from diesel fuel purchases is obtained directly from the Norfolk Southern's R-1 Report which is submitted to the U.S. Surface Transportation Board (STB). The NS R-1 Report is used to obtain the annual locomotive fuel use from freight, yard switching, and work trains. These data, representing the single largest source of GHG emissions data, represents one of the most closely tracked metrics by NS.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

177

Emissions calculation methodology

Fuel-based method

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

80

Please explain

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. Norfolk Southern calculated and reported emissions from the transportation and distribution of products purchased, including rails, ties, ballasts, and locomotives, in 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, calculated

Emissions in reporting year (metric tons CO2e)

55,125

Emissions calculation methodology

Waste-type-specific method

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

0

Please explain

Norfolk Southern has collected data related to GHG emissions from waste generated in its operations. Activity data sources for waste generated in operations were the annual total mass of waste (short tons) and the proportion of waste being sent to the landfill, recycled, and incinerated. Emission factors were obtained from the EPA Waste Reduction Model (WARM) Version 15 (Management Practices and Background Documents, November 2020). Only end-of-life process emission factors were used from the WARM documentation. For waste sent to the

landfill, the emission factor associated with mixed municipal solid waste (MSW) material was used. For recycled waste, emissions from material recovery in preparation for recycling were assumed to have been allocated to the recycled material; therefore, the emission factor used for recycled waste was zero metric tonnes of carbon dioxide equivalent (MTCO2e)/short ton. For incinerated waste, the emission factor associated with dimensional lumber was used since only crossties were burned for energy. NS wastes were assumed to be composed of mixed MSW and mixed recyclables.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

14,027

Emissions calculation methodology

Distance-based method

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

85

Please explain

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 providers. Rental car miles were obtained from our main rental agency. NS also included employee reimbursed mileage.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

76,758

Emissions calculation methodology

Average data method

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

0

Please explain

The average commute time per state and average fuel required for round-trip commute per state are gathered from 2016 Census Bureau data. It was assumed that one minute of commute is equivalent to one mile travelled and the overall fuel source is gasoline. The total number of NS employees per state was multiplied by the fuel required for a round-trip commute daily to calculate the gallons of gasoline used per day. The totals were then multiplied by 261 days to account for work days within 2022. Using the emissions factors identified by EPA, the total emissions for CO2e was calculated. Please note that this is a high-end estimate as the figures used for the total number of NS employees per state are W-2 figures that include any employees that received wages or salary during the 2022 year. NS Human Resources maintains the information used to calculated commuting emissions.

Upstream leased assets

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

657

Emissions calculation methodology

Hybrid method

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

100

Please explain

NS leased facilities were identified per state. The electricity consumption of the facilities in each state was estimated by using a factor of 15.9 kWh for each facility's square footage. Using the emissions factors for GHG pollutants obtained from EPA’s eGRID 2020, the total emissions for

CO2e was calculated. A leased facility located in Quebec, Canada was not included in the data since it is out of scope for the eGRID database. Norfolk Southern calculated GHG emissions from upstream leased assets that were not reported in Norfolk Southern's Scope 1 and 2 emissions. 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

Please explain

This category includes emissions that occurred 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

Please explain

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

Please explain

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

Please explain

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 therefore, 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

Please explain

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 Southern.

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

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

Please explain

Based on the definition of “investment” provided in the GHG Protocol’s “Technical Guidance for Calculating Scope 3 Emissions,” this category is not relevant to Norfolk Southern’s operations. This category includes Scope 3 emissions associated with NS’ 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 relevant, explanation provided

Please explain

NS did not evaluate any other upstream data.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

NS did not evaluate any other downstream data.

C6.7

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

Yes

C6.7a

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

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	31,488	NS emissions from biofuels were 31,488 metric tons CO2e in 2022.

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

0.000335673

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

4,278,149

Metric denominator

unit total revenue

Metric denominator: Unit total

12,745,000,000

Scope 2 figure used

Location-based

% change from previous year

13.3

Direction of change

Decreased

Reason(s) for change

Other emissions reduction activities

Please explain

Due to efficiencies through precision scheduled rail-roading, technologies, and training initiatives, along with a greater emphasis on and investment in targeted enterprise-wide emissions reduction initiatives and energy efficiency projects led to a smaller intensity figure in 2022 vs. 2021.

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 just Scope 1

Intensity figure

0.00002311

Metric numerator: emissions in metric tons CO2e

4,127,658

Metric denominator: unit

t.mile

Metric denominator: unit total

178,629,229,000

% change from previous year

-1.22

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

This metric includes Scope 1 emissions from locomotives and excludes Scope 2 emissions. This is the most appropriate indicator of emissions related to NS transport activities. Due to efficiencies through precision scheduled railroading, technologies, and training initiatives, along with a greater emphasis on and investment in targeted enterprise-wide emissions reduction initiatives and energy efficiency projects led to a smaller intensity figure vs. 2021.

ALL

Scopes used for calculation of intensities

Report just Scope 1

Intensity figure

0.00002311

Metric numerator: emissions in metric tons CO2e

178,629,229,000

Metric denominator: unit

t.mile

Metric denominator: unit total

4,127,658

% change from previous year

-1.22

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

This metric includes Scope 1 emissions from locomotives and excludes Scope 2 emissions. This is the most appropriate indicator of emissions related to NS transport activities. Due to efficiencies through precision scheduled railroading, technologies, and training initiatives, along with a greater emphasis on and investment in targeted enterprise-wide emissions reduction initiatives and energy efficiency projects led to a smaller intensity figure vs. 2021.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

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	4,089,403	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	8,393	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	29,862	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

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

Country/area/region	Scope 1 emissions (metric tons CO2e)
United States of America	4,127,658

C7.3

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

By activity

C7.3c

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

Activity	Scope 1 emissions (metric tons CO2e)
Transport services activities	4,127,658

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	Comment
Transport services activities	4,127,658	All NS Scope 1 emissions can be attributed to transport services activities.

C7.5

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

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
United States of America	150,491	152,460

C7.6

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

By facility

C7.6b

(C7.6b) Break down your total gross global Scope 2 emissions by business facility.

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Florida	623	641
Iowa	43	79
New York	1,461	815
Delaware, Maryland, New Jersey, Pennsylvania	23,718	15,465
Michigan	3,376	4,283
Indiana, Ohio, West Virginia	62,853	47,576
Louisiana	383	407
Illinois and Missouri	10,033	18,791
Alabama and Georgia	20,156	25,487
Kentucky, Mississippi, Tennessee	9,354	9,690
North Carolina, South Carolina, Virginia	18,483	19,765

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

No

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
Transport services activities	150,491	152,460	Transport service activities (i.e., freight haul) use diesel-powered locomotives, which do not contribute to Scope 2 emissions. No freight haul activities are powered by electricity.

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 in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	787	Increased	0.5	NS' gross global emissions were impacted by our change in revenue in 2022 vs.2021 with 14.4% growth and that is a core reason why NS' Scope 2 emissions increased, but only by 0.5% vs. 2021 totals NS' increase in year-over-year (Y/Y) renewable energy consumption has been driven largely by our advances in energy efficiency across our facilities. This specifically includes increases in our total renewable energy usage in deregulated markets to approximately 26%, or 12% across our entire network.

				2022 S2 – 2021 S2 = 150,491 – 149,704 MTCO2e % difference = 787/149,704 = 0.5%
Other emissions reduction activities	0	No change	0	As referenced in C4.3b, NS is maintaining ongoing emissions reduction initiatives. These initiatives include improving techniques and training associated with locomotive assignment and handling, which equate to a 2.5% absolute annual emissions reduction (454,650 MTCO2e annually). In addition, NS is installing two vendors' versions of train energy management hardware and software on our locomotives, which also equate to a 2.5% absolute annual emissions reduction (454,650 MTCO2e annually). Since these initiatives were initially reported in 2020 and are still ongoing with no changes to the initiatives, we are also seeing no change (0%) in emissions reductions attributed to these initiatives in 2022.
Divestment				
Acquisitions				
Mergers				
Change in output	18,608	Decreased	0.44	NS' metric for observing changes in business output is Million-Gross-Ton-Miles (MGTM). NS' MGTM figure from 2021 to 2022 decreased in part due to moderating output activity in 2022 as economic conditions began to normalize after the COVID-19 pandemic. The MGTM figure served as a business output normalizer for both 2022 and 2021 Scope 1+2 emissions. The year-over-year(Y/Y) Scope 1 + 2 difference was -1.04%, attributed to the Y/Y MGTM increase demonstrated in the calculation below Y/Y Scope 1 + 2 difference = [(2022 S1+S2) – (2021 S1+S2)] / (2021 S1 + S2) = (4,270,657 – 4,315,512) / 4,315,512 = - 1.04% Change in output difference = [(MGTM 2022) – (MGTM 2021)] / (MGTM 2021) =

				(339,335- 340,795) / 340,795 = - 0.43% Y/Y Scope 1 + 2 difference due to change in output = Y/Y Intensity figure change = (S1+S2/MGTM 2022) - (S1+S2/MGTM 2021) / (S1+S1/MGTM 2021) = -0.44% 4,270,657 * |-0.44%| = 18,608 MTCO2e
Change in methodology				
Change in boundary				
Change in physical operating conditions				
Unidentified				
Other	19,541	Decreased	125.3	NS Scope 1 and 2 emissions from 2021 to 2022 decreased in part due to improved locomotive fuel efficiencies through precision scheduled rail-roading, technologies, and training initiatives, along with a greater emphasis on and investment in targeted enterprise-wide emissions reduction initiatives and energy efficiency projects. This also led to a smaller intensity figure in 2022 vs. 2021. Y/Y Scope 1 + 2 difference = [(2022 S1+S2) – (2021 S1+S2)] / (2021 S1 + S2) = (4,278,149 – 4,315,512) / 4,315,512 = -0.87 % Change in output difference = [(MGTM 2022) – (MGTM 2021)] / (MGTM 2021) = (339,335 - 340,795) / 340,795 = - 0.43% Change in output difference (MTCO2e) = 18,608 MTCO2e Change in S2 emissions (MTCO2e) = 787 MTCO2e Total S1+S2 difference Y/Y = 37,362 MTCO2e Change in emissions due to efficiencies = 37,362 - 18,608 +787 = 19,541 MTCO2e

				Y/Y % change due to efficiencies = |2022 - 2021| / 2021 = [77,183 - (-)19,541] / 77,183 = 125.3%

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 15% but less than or equal to 20%

C8.2

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

	Indicate whether your organization undertook this energy-related activity in the reporting year
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 (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	116,669	31,180,484	31,297,153
Consumption of purchased or acquired electricity		19,983	370,004	370,004
Total energy consumption		136,652	31,550,488	31,687,140

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 heat	Yes
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.

Sustainable biomass

Heating value

HHV

Total fuel MWh consumed by the organization

0

Comment

No sustainable biomass consumed in 2022.

Other biomass

Heating value

HHV

Total fuel MWh consumed by the organization

0

Comment

No other biomass consumed in 2022.

Other renewable fuels (e.g. renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

117,040

Comment

Biodiesel + Ethanol = 116,669 MWH + 370 MWH = 117,040 MWH

Coal

Heating value

HHV

Total fuel MWh consumed by the organization

0

Comment

No coal consumed in 2022.

Oil

Heating value

HHV

Total fuel MWh consumed by the organization

22,351

Comment

Used oil + Kerosene = 552 MWH + 21,799 MWH = 22,351 MWH

Gas

Heating value

HHV

Total fuel MWh consumed by the organization

90,379

Comment

Natural Gas + CNG = 90,305 MWH + 75 MWH = 90,379 MWH

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

31,067,383

Comment

Liquid propane + Jet fuel + Diesel + Gasoline = 39,084 MWH + 11,753 MWH + 31,016,324 MWH + 206,821 MWH = 31,273,982 MWH

Total fuel

Heating value

HHV

Total fuel MWh consumed by the organization

31,503,752

Comment

Total fuel is sum of oil, gas, other renewable, and other non-renewable fuels consumed during the 2022 reporting year.

C8.2e

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

Country/area of low-carbon energy consumption

United States of America

Sourcing method

Unbundled procurement of energy attribute certificates (EACs)

Energy carrier

Electricity

Low-carbon technology type

Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

4,318

Tracking instrument used

No instrument used

Country/area of origin (generation) of the low-carbon energy or energy attribute

United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

For calculations of the Scope 2 market-based figure in response C6.2, NS obtained the Weighted Grid Mix Residual Mix Emission Factor, first determining a weighting factor for each state according to the MWh usage in that state (state MWh/total MWh), next multiplying the weighting factor times the residual mix emission factor for the state, and finally, adding all the weighted amounts to get a single Weighted Grid Mix Emission Factor representative of the entire system. NS purchased 4,318 MWh of EACs in 2022.

Country/area of low-carbon energy consumption

United States of America

Sourcing method

Project-specific contract with an electricity supplier

Energy carrier

Electricity

Low-carbon technology type

Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

15,665

Tracking instrument used

Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute

United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

For calculations of the Scope 2 market-based figure in response C6.2, NS obtained the Weighted Grid Mix Residual Mix Emission Factor, first determining a weighting factor for each state according to the MWh usage in that state (state MWh/total MWh), next multiplying the weighting factor times the residual mix emission factor for the state, and finally, adding all the weighted amounts to get a single Weighted Grid Mix Emission Factor representative of the entire system. NS procured 15,665 MWh of solar electricity through contracted community solar agreements in 2022.

C-TS8.2f

(C-TS8.2f) 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	gCO2e/kWh	0	Grid-sourced electricity does not provide motive power for Norfolk Southern transportation movements. All moves are powered by diesel.

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area

United States of America

Consumption of purchased electricity (MWh)

370,004

Consumption of self-generated electricity (MWh)

0

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

370,004

C-TS8.5

(C-TS8.5) Provide any efficiency metrics that are appropriate for your organization's transport products and/or services.

Activity

Rail

Metric figure

0.0020959

Metric numerator

Other, please specify

Gallons

Metric denominator

Revenue-ton.mile

Metric numerator: Unit total

374,386,481

Metric denominator: Unit total

178,629,229,000

% change from last year

-2.2

Please explain

U.S. Class 1 Rail companies commonly use “Revenue Ton-Mile per gallon of diesel (RTM/gal)” as a freight haul efficiency metric. This measures the ability of a freight train to transport one U.S. short ton of freight a certain distance (miles) per gallon of diesel fuel. For this metric, the larger the better. Sometimes this ratio is inverted to "gallons of fuel per RTM". For this metric, less is better since it represents the gallons of fuel needed to move one ton of freight one mile.

C9. Additional metrics

C9.1

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

Description

Metric value

Metric numerator

Metric denominator (intensity metric only)

% change from previous year

Direction of change

Please explain

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.

Activity

Rail

Metric

Fleet adoption

Technology

Other, please specify

More fuel-efficient locomotives

Metric figure

125

Metric unit

Other, please specify

number of locomotives

Explanation

Norfolk Southern is continuously upgrading our existing fleet. At our Juniata locomotive shop in Altoona, PA, Norfolk Southern regularly rebuilds locomotives into more efficient machines, benefiting both customers and the environment. In 2022, NS and our contractors rebuilt 125 locomotives (100 DC2AC units by Wabtec plus 25 DC2AC by Juniata).

NS is also leveraging our investment in positive train control (PTC) by integrating onboard locomotive energy management, train-handling

systems into the safety-based PTC technology. The merging of these advanced technologies provides us with enhanced operational safety while giving us greater capabilities to improve locomotive fuel economy. NS deployed two types of onboard Energy Management (EM) systems – LEADER and Trip Optimizer. By the end of 2022, NS outfitted approximately 99% of our road fleet with EM technology integrated into PTC. In addition, our entire network is certified to operate trains equipped with Trip Optimizer or LEADER, meaning it has been mapped and is equipped with the required hardware and software that communicates with the train-handling technologies

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	

C-TO9.6a/C-TS9.6a

(C-TO9.6a/C-TS9.6a) Provide details of your organization's investments in low-carbon R&D for transport-related activities over the last three years.

Activity

Rail

Technology area

Other, please specify

Smart Systems

Stage of development in the reporting year

Applied research and development

Average % of total R&D investment over the last 3 years

81

R&D investment figure in the reporting year (unit currency as selected in C0.4) (optional)

5,000,000

Average % of total R&D investment planned over the next 5 years

Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

At NS, locomotive fuel efficiency is a top priority. Norfolk Southern's strategy to reduce locomotive diesel fuel use is multi-pronged and ever-evolving as we evaluate new technologies and industry best practices.

On average, trains are approximately 75% more fuel efficient than trucks. NS builds upon this advantage and further reduces emissions through fuel management systems. In 2020, NS invested approximately $11 million in R&D of these fuel management systems. In 2021, EM was included within the budget of other programs, such as the DC2AC conversion program. In addition, NS' 2021 budget featured $1.1 million that was allocated solely for EM. In 2022, a new enhanced feature for EM was purchased for $5M. NS made improvements in our onboard energy management technologies, resulting in more efficient train handling. NS deployed two types of onboard energy management systems – LEADER and Trip Optimizer. These GPS-based systems identify the proper throttle position and dynamic braking setting to achieve optimal fuel efficiency based on factors such as track topography and train tonnage. The latest models have automated features similar to cruise control in automobiles, enabling the train to operate in an autopilot mode.

NS also utilizes a fuel management system known as Horsepower Per Ton 2.0 (HPT). This operations tool conserves fuel by enabling train crews to match locomotive horsepower with operating requirements, such as train type, tonnage, and topography of track segments.

In addition, NS expanded the use of our customized plug-in heater systems, known as the "Sleeper," that are installed in rail yards to eliminate engine idling. Locomotives can be shut down and plugged into the "Sleeper," which heats the engine and keeps the battery system charged. Through innovative public-private partnerships aimed at reducing transportation-related emissions in urban environments, NS installed "Sleeper"

units at rail yards in Atlanta, Chicago, Kansas City, Missouri, and across Ohio in 2019. An additional 16 installations were completed at yards in Erie, Buffalo, Chicago, Calumet, and Burns Harbor in 2020.

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	Third-party verification or assurance process in place

C10.1a

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

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

2022-GHG-Emissions-Report.pdf

Page/ section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

C10.1b

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

Scope 2 approach

Scope 2 location-based

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

2022-GHG-Emissions-Report.pdf

Page/ section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category

Scope 3: Business travel

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Employee commuting

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Upstream leased assets

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Waste generated in operations

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Upstream transportation and distribution

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

Relevant standard

Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)

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

2022-GHG-Emissions-Report.pdf

Page/section reference

Statement of Greenhouse Gas Emissions, p. 1 of 7
Notes to the Statement of Greenhouse Gas Emissions, p. 2 of 7
Scope 1, 2, and 3 GHG Inventory by Type, p. 6 of 7

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?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Year on year emissions intensity figure	Attestation standards established by AICPA (AT105)	Emissions intensity figures are verified during the third-party verification of the annual GHG Inventory. 2022-GHG-Emissions-Report.pdf [1]

[1] 2022-GHG-Emissions-Report.pdf

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, but we anticipate being regulated in the next three years

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

NS' strategy for complying with systems we anticipate being regulated by includes emissions-reductions strategies, efficiency upgrades, and generation of carbon credits. We anticipate being regulated in the next three years.

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

No, but we 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/clients

C12.1a

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

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Climate change performance is featured in supplier awards scheme

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

% of supplier-related Scope 3 emissions as reported in C6.5

0

Rationale for the coverage of your engagement

Norfolk Southern's Thoroughbred Sustainability Partner Awards launched in 2022 are a new annual opportunity to recognize our customers and suppliers who are leaders in sustainability. All customers and suppliers were welcome to submit an application to be recognized.

Impact of engagement, including measures of success

A total of 15 partners were recognized in three achievement pillars: energy efficiency, innovation, and environmental steward ship. Award winners are acknowledged in the industry for their sustainability leadership and enjoy brand recognition for their commitment to a more sustainable supply chain. Winners are appointed to a team of thought-leaders to collaborate with other industry colleagues to shape the future of sustainability in the supply chain.

A cross-departmental team from Norfolk Southern reviewed applications for their measurable progress during 2021. Winners were selected based on their program's novelty, relevance, and impact. The award recipients collectively demonstrated outstanding achievements toward energy efficiency, innovation, and environmental stewardship. Achievements by the honorees included:

Diverting 17 million pounds of waste from landfills
Avoiding more than 500,000 metric tons of carbon emissions

Eliminating 5.2 million miles of diesel fuel burn annually
Removing millions of pounds of plastic from the ocean and converted to auto parts
Achieving a 30% reduction in fuel consumption, saving 225,000 gallons annually

Comment

The Energy Efficiency Award is intended to recognize corporate programs achieving energy efficiency savings. Submissions should emphasize quantitative savings and results rather than qualitative indicators.
The Innovation Award is intended to recognize technology innovations that have significantly contributed to a more sustainable future.
The Environmental Stewardship Award is intended to recognize outstanding efforts promoting stewardship of the environment.

C12.1b

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

Type of engagement & Details of engagement

Education/information sharing
Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

100

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

The NS Carbon Calculator provides a user-friendly system for estimating emissions savings as customers convert their mode of freight transport from truck to rail. The new system assists NS customers in meeting sustainability goals related to reduce their carbon footprint. By providing estimates for carbon savings when choosing rail, NS can potentially increase the volume of freight shipped on our lines by those customers. With the advancement of recent technology, NS has implemented the ability to capture near real-time fuel data from its fleet of locomotives, correlate the fuel data to train consists, and therefore calculate a fuel burn metric at the train, railcar, customer, and commodity level. This fuel

burn information, coupled with mileage from historical traffic patterns is utilized to establish a repeatable, verifiable process for calculating truck and rail emissions for fuel consumed in freight transportation services.

Impact of engagement, including measures of success

In a multi-year effort, NS is improving the way it engages and communicates with customers. We partner with customers to help them achieve their sustainability goals, and like ourselves much of their recent focus is on reducing emissions. We support our customers in this critical objective through encouraging them to use our next generation carbon calculator. The carbon calculator makes it easier for them to do business with us by incorporating carbon into their freight decision framework with quantifiable benefits from modal shift. When our customers use our carbon calculator, they are also demonstrating to us that they are committing to the transition to a low-carbon economy and are serious about their own sustainability goals. We value that commitment to sustainability, particularly through choosing NS and the freight industry. Customers will utilize a new NS Carbon Calculator web-tool to estimate emissions savings as they run "what-if" freight mode conversion scenarios. As customers utilize the tool, they will be linked with marketing and sales representatives who can assist them in establishing freight service.

The overall impact of engagement the Carbon Calculator has on our climate-related engagement strategy with our customers is all-encompassing: since we have released the Carbon Calculator as a publicly available tool, 100% of our customers now can engage with NS on how rail transport can help them achieve their own sustainability goals, particularly related to lower carbon emissions.

An additional measure of success for this engagement is the change in the number of our customers year-to-year that have committed to SBTi, which validates carbon reduction targets. We believe that if our customers have an established SBTi target, they will be looking to their suppliers for additional ways with help them achieve their targets. Currently, 46 of our top 200 customers by revenue have committed to SBTi. These customers represented approximately 20% of our revenue in 2022. These figures serve as our baseline measure of success for this engagement metric since our Carbon Calculator is new this year.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, suppliers have to meet climate-related requirements, but they are not included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement

Complying with regulatory requirements

Description of this climate related requirement

NS is committed to being a responsible steward of the environment and helping to protect the communities where we operate and source materials. As part of that effort, NS seeks suppliers that demonstrate a commitment to sustainable business practices. To that end, Norfolk Southern has a sourcing sustainability statement. This statement lists six ways that companies can demonstrate sustainable projects and policies, including: 1) documented corporate sustainability strategy, 2) plans and processes to reduce GHG emissions, 3) commitment to increase post-consumer recycled content, 4) documented reduction in landfill-bound waste, 5) documented minimization in packaging materials, and 6) demonstrated commitment to consolidate shipments. The NS sourcing statement says that, "Consideration will be given to suppliers who demonstrate a sustainability focus, including the above initiatives; who work to exceed their sustainability performance expectations; and who demonstrate transparency of their supply chain impacts through documentation, including country of origin." The target suppliers are those with potential impact, including wood tie treaters, rail mills, taxi crew-haul carriers, diesel fuel providers, intermodal facility operators, used cross-tie dispositions, ballast quarries, locomotives, and others. Starting with a 2015 pilot, NS continues to survey key suppliers in its major supply chains on their sustainability efforts.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Supplier self-assessment

Grievance mechanism/Whistleblowing hotline

Response to supplier non-compliance with this climate-related requirement

Retain and engage

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

External engagement activities that could directly or indirectly influence policy, law, or regulation th at may impact the climate

Yes, we engage directly with policy makers

Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may impact the climate

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

Yes

Attach commitment or position statement(s)

In May 2021, Norfolk Southern Corporation's shareholders passed a resolution at our annual shareholder's meeting asking that we evaluate and publish a report describing if, and how, our lobbying activities (direct and through trade associations and other organizations) align with the goals of the Paris Climate Agreement and risks presented by any misalignment.

Following the shareholder vote, we engaged with shareholders and asked for their feedback to best understand what shareholders wanted included in this report. Beyond the explicit requests set forth in the resolution, our shareholders generally communicated that they were looking for an understanding of our efforts in the climate area, transparency as to our activities concerning climate lobbying, and the oversight of such activities. We took these shareholders concerns into account when drafting this attached report. This report is aligned with NS' climate change strategy.

2021NSClimateLobbyingReport.pdf

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan

NS' Government Relations team seeks to educate and inform public officials about issues important to NS' business, and it supports public officials and candidates whose views match those of Norfolk Southern. By doing so, Norfolk Southern furthers public policy goals that are consistent with its business, values, and strategies, and as a result, ensures our engagement activities are consistent with our overall climate change strategy.

The processes NS has in place to ensure this are as follows. To advocate our position, the corporation relies on government relations professionals, assisted as needed by subject matter experts. Norfolk Southern's adopted corporate procedure states that only authorized employees and contract lobbyists may engage in lobbying activities, as defined by the appropriate jurisdiction, on behalf of the corporation. In addition, the procedure requires a corporation employee who has engaged in lobbying on behalf of the corporation to report the time spent on such lobbying, and any associated expenses, immediately following the close of the calendar quarter in which such lobbying occurred. The procedure further requires that persons who engage in lobbying on behalf of the corporation comply with all applicable legal requirements.

NS continues to have ongoing dialogue with regulators and policymakers. As part of its oversight role, the Governance and Nominating Committee of the corporation's Board of Directors reviews, at least annually, the corporation's political contributions, including spending related to trade associations and other tax-exempt organizations.

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?

Specify the policy, law, or regulation on which your organization is engaging with policy makers

Work towards government understanding of railroads' improved fuel efficiency metrics and cautiously impose new requirements that may support the increased efficiency.

Category of policy, law, or regulation that may impact the climate

Low-carbon products and services

Focus area of policy, law, or regulation that may impact the climate

Energy efficiency requirements

Policy, law, or regulation geographic coverage

National

Country/area/region the policy, law, or regulation applies to

United States of America

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

Freight railroads voluntarily invest millions of dollars each year into technologies supporting improved fuel efficiency metrics. Freight railroads remain significantly more fuel efficient than over-the-road trucking options. NS energy efficiency advocacy is coordinated through the Association of American Railroads.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3b

(C12.3b) Provide details of the trade associations your organization is a member of, or engages with, which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association

Other, please specify

Association of American Railroads

Is your organization's position on climate change policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

No, we did not attempt to influence their position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

The overwhelming majority of our nondeductible contributions to trade associations or chamber of commerce in 2022, representing 88% of the total of such contributions, was to the Association of American Railroads. The AAR's mission is to promote a safe and efficient North American rail system, with principal activities in areas such as standards, operations, safety, security, public affairs and public policy. The AAR's full members include the seven Class I freight railroads in the US, Canada and Mexico, as well as Amtrak. The AAR works with elected officials and leaders in Washington DC to advance sound public policy supporting the interests of the freight rail industry. The AAR's climate policy, as outlined in a white paper published by the AAR in 2021, recognizes the impact of climate change and highlights that as the most fuel-efficient way to move freight over land, freight rail is ahead of other surface transportation modes in limiting its carbon footprint. For example, the AAR notes that one train can carry the freight of hundreds of trucks, which reduces highway congestion; moving freight by train instead of by truck reduces GHG emissions by 75% on average; and railroads account for 40% of US freight, but only 1.9% of US transport-related GHGs. As such, the AAR notes the potential reduction in transportation-related GHG emissions associated with moving more freight by rail is substantial. The AAR's policy goals in this arena are designed to encourage policymakers to: remove impediments to transporting freight by rail; promote policies that enable the rail industry to move more goods, more efficiently; and, promote modal equity in the incorporation of new and emerging technologies. The AAR notes that all six Class I freight railroads that are members of the AAR are participating in the Science Based Targets initiative to reduce their GHG emissions. Thus, all the major freight railroads in North America, which are all AAR members, have committed to adopt GHG emission reductions consistent with what the climate science deems necessary to meet the goals of the Paris Climate agreement. Considering the AAR's stated recognition of climate change impacts, and stated policy goal of increasing rail transportation, and the concurrent reduction in GHG emissions, we have concluded that there is no misalignment between the AAR and the emission-reduction goal of the Paris Climate Agreement.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)

707,004

Describe the aim of your organization's funding

Norfolk Southern consulted with the AAR regarding the trade association's position on this issue and concurs with the current position. In general, NS' Government Relations team seeks to educate and inform public officials about issues important to NS' business, and it supports public officials and candidates whose views match those of Norfolk Southern. By doing so, Norfolk Southern furthers public policy goals that are consistent with its business, values, and strategies.

To advocate our position, the corporation relies on government relations professionals, assisted as needed by subject matter experts. Norfolk Southern's adopted corporate procedure states that only authorized employees and contract lobbyists may engage in lobbying activities, as defined by the appropriate jurisdiction, on behalf of the corporation. In addition, the procedure requires a corporation employee who has engaged in lobbying on behalf of the corporation to report the time spent on such lobbying, and any associated expenses, immediately following the close of the calendar quarter in which such lobbying occurred. The procedure further requires that persons who engage in lobbying on behalf of the corporation comply with all applicable legal requirements.

NS continues to have ongoing dialogue with regulators and policymakers. As part of its oversight role, the Governance and Nominating Committee of the corporation's Board of Directors reviews, at least annually, the corporation's political contributions, including spending related to trade associations and other tax-exempt organizations.

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

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 mainstream reports

Status

Complete

Attach the document

2022 Annual Report.pdf

Page/Section reference

Page K15- Climate change risk factors
Page K15 - Risks from severe weather conditions

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Norfolk Southern's 2023 Environmental, Social, and Governance (ESG) Report which incorporates TCFD recommendations was made available to the public June 30, 2023. Attached is last year's 2022 Corporate Responsibility Report.
http://www.nscorp.com/content/nscorp/en/about-ns/sustainability.html

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Publication

In mainstream reports, incorporating the TCFD recommendations

Status

Complete

Attach the document

Forging-a-Better-Tomorrow-Report.pdf

Page/Section reference

Page 2 – Forging a Better Tomorrow
Pages 8-9 – Carbon Emissions & Climate Change
Pages DS-1 - DS-24 – Data Scorecard

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Norfolk Southern's 2023 Environmental, Social, and Governance (ESG) Report which incorporates TCFD recommendations was made available to the public the first week of July 2023. Attached is the 2023 ESG Report. http://www.norfolksouthern.com/content/dam/nscorp/get-to-know-ns/about-ns/environment/Forging-a-Better-Tomorrow-Report.pdf

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment

Row 1	Task Force on Climate-related Financial Disclosures (TCFD) Other, please specify Drawdown Georgia Business Compact: The companies share a goal of net zero carbon emissions in Georgia by 2050. The compact launched in October 2021 and includes a growing list of collaborative partners.	Norfolk Southern measures progress on ESG activities against several third-party reporting frameworks, including TCFD. Our annual ESG report has been prepared in alignment with the TCFD framework. Norfolk Southern was one of the first ten companies to join the Drawdown Georgia Compact. We now have over 70 companies committed to helping Georgia become the first net zero state. Facilitated by the Ray C. Anderson Center for Sustainable Business, the Drawdown Georgia Business Compact is a business-focused collaborative initiative focused on galvanizing climate action in Georgia. The Compact builds on comprehensive solution research and ensures diverse participation across Georgia's economy.

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity
Row 1	Yes, both board-level oversight and executive management-level responsibility	Sustainability is discussed during Governance and Nominating Committee meetings. Climate and sustainability-related issues may also be scheduled topics at some additional meetings of the Board of Directors. One of the climate-related issues that has been presented to the Board has been biodiversity. The Board provides sustainability (and by extension, biodiversity-related) oversight through reviewing and guiding risk-management policies, reviewing and guiding strategy, and reviewing major plans of action as it

		relates to climate change, energy, and environmental policy. Nature-based solutions is a key pillar of our sustainability strategy and includes initiatives which support biodiversity.

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Initiatives endorsed
Row 1	Yes, we have endorsed initiatives only	SDG Other, please specify America's Longleaf Restoration Initiative, SBTi

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment

No and we don't plan to within the next two years

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment

No and we don't plan to within the next two years

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity- sensitive areas in the reporting year?

Not assessed

C15.5

(C15.5) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness

C15.6

(C15.6) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	

C15.7

(C15.7) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Impacts on biodiversity Biodiversity strategy	2023 ESG report attached. See page 13-14, Sustainable Land Use & Biodiversity http://www.norfolksouthern.com/content/dam/nscorp/get-to-know-ns/about-ns/environment/Forging-a-Better-Tomorrow-Report.pdf 1

[1]Forging-a-Better-Tomorrow-Report.pdf

C16. 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.

Norfolk Southern's reporting structure is setup to include Executive Vice President and Chief Transformation Officer who directly reports to the Chief Executive Officer and the Board of Directors as an equal reporting position to the Chief Financial Officer who reports directly to the Chief Executive Officer. The Executive VP and Chief Transformation Officer is the highest member of the C-Suite responsible for climate related issues.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Executive Vice President/Chief Transformation Officer, NS' reporting structure includes the EVP/CTO who directly reports to the CEO and the Board as an equal reporting position to the CFO.	Chief Financial Officer (CFO)

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	12,745,000,000

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.

Requesting member

Ford Motor Company

Scope of emissions

Scope 1

Scope 2 accounting method

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

75,753

Uncertainty (±%)

2

Major sources of emissions

Locomotive diesel emissions

Verified

No

Allocation method

Allocation based on another physical factor

Market value or quantity of goods/services supplied to the requesting member

1,191,408,326

Unit for market value or quantity of goods/services supplied

Other, please specify

Lading Ton-Miles

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Norfolk Southern uses the operational control approach to report Scope 1, 2, and 3 emissions. Approximately 90% of NS's carbon footprint (considering Scope 1 and 2 emissions) is attributed to locomotive diesel fuel consumed in the transportation of freight. The service we provide our customers is the transportation of their freight, therefore the major emission source attributable to our customers is locomotive diesel fuel consumption. Emissions total includes finished vehicles and industrial products.

Requesting member

BMW AG

Scope of emissions

Scope 1

Scope 2 accounting method

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

12,650

Uncertainty (±%)

2

Major sources of emissions

Locomotive diesel emissions

Verified

No

Allocation method

Allocation based on another physical factor

Market value or quantity of goods/services supplied to the requesting member

204,768,897

Unit for market value or quantity of goods/services supplied

Other, please specify

Lading Ton-Miles

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Norfolk Southern uses the operational control approach to report Scope 1, 2, and 3 emissions. Approximately 90% of NS's carbon footprint (considering Scope 1 and 2 emissions) is attributed to locomotive diesel fuel consumed in the transportation of freight. The service we provide our customers is the transportation of their freight, therefore the major emission source attributable to our customers is locomotive diesel fuel consumption.

Requesting member

International Paper Company

Scope of emissions

Scope 1

Scope 2 accounting method

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

33,865

Uncertainty (±%)

2

Major sources of emissions

Locomotive diesel emissions

Verified

No

Allocation method

Allocation based on another physical factor

Market value or quantity of goods/services supplied to the requesting member

1,453,045,516

Unit for market value or quantity of goods/services supplied

Other, please specify

Lading Ton-Miles

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Norfolk Southern uses the operational control approach to report Scope 1, 2, and 3 emissions. Approximately 90% of NS's carbon footprint (considering Scope 1 and 2 emissions) is attributed to locomotive diesel fuel consumed in the transportation of freight. The service we provide our customers is the transportation of their freight, therefore the major emission source attributable to our customers is locomotive diesel fuel consumption.

Requesting member

WestRock Company

Scope of emissions

Scope 1

Scope 2 accounting method

Scope 3 category(ies)

Allocation level

Company wide

Allocation level detail

Emissions in metric tonnes of CO2e

36,636

Uncertainty (±%)

2

Major sources of emissions

Locomotive diesel emissions

Verified

No

Allocation method

Allocation based on another physical factor

Market value or quantity of goods/services supplied to the requesting member

1,492,825,828

Unit for market value or quantity of goods/services supplied

Other, please specify

Lading Ton-Miles

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

Norfolk Southern uses the operational control approach to report Scope 1, 2, and 3 emissions. Approximately 90% of NS's carbon footprint (considering Scope 1 and 2 emissions) is attributed to locomotive diesel fuel consumed in the transportation of freight. The service we provide our customers is the transportation of their freight, therefore the major emission source attributable to our customers is locomotive diesel fuel consumption.

SC1.2

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

Norfolk Southern uses primary allocated emissions data from our customers to calculate our customers' emissions. Norfolk Southern tracks data down to the locomotive and car and is easily able to access primary fuel data for each customer. In the absence of primary data, Norfolk Southern uses a commodity-based fuel efficiency in conjunction with specific and/or extrapolated customer data (Revenue Ton Miles (RTM) shipped) to allocate emissions to that customer. NS uses a measure called Revenue Ton Miles (RTM) to normalize annual GHG emissions and determine GHG emission intensity. A Revenue Ton Mile or Lading Ton Mile is a calculation of Tons of lading x Miles it moves. For example, if you move 20 tons 10 miles you would have 200 Revenue Ton Miles (20 tons * 10 Miles = 200 Revenue Ton Miles). Because NS is able to track revenue ton miles by customer and by commodity type, this information can be used to allocate emissions to a customer based on the Revenue Ton Miles of their shipments. NS uses Emission Factors and Global Warming Potentials from the EPA Center for Corporate Climate Leadership GHG Emission Factors Hub, (www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub) for CO2, N2O, and CH4 to determine total metric tons of CO2- Eq emissions allocated to a specific customer: For example, if a customer shipped 1 million RTM with Norfolk Southern in 2022, then RTM/ (Commodity specific RTM/ gal) = gallons of diesel fuel consumption. By multiplying the emission factors by estimated gallons and converting kilograms or grams to metric tons, emissions for each greenhouse gas are determined for that customer. By multiplying N2O and CH4 emissions by their Global Warming Potential, all greenhouse gases are converted to CO2-equivalents and added for a total metric ton of CO2-equivalents.
Emission Factors used:

CO2 EF = 10.21 kg CO2/gallon diesel
N2O EF = 0.26 g N2O/gallon diesel
CH4 EF = 0.8 g CH4/gallon diesel
GWPs used:
1 MT CO2 = 1
1 MT N2O = 298
1 MT CH4 = 25

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
We face no challenges	Norfolk Southern has developed internal technology for measuring and applying direct fuel burn from locomotives to each railcar and container based on its weight. We can follow each unit as it moves across our network to estimate direct fuel burn. We then add estimates for fuel burn associated with yard and local service, repositioning empties and locomotives, and handling of containers for intermodal service. We have developed a platform with the capability to produce annual emission reports for our customers.

SC1.4

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

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

In 2021, Norfolk Southern developed the capacity to segment our business and determine the different fuel efficiencies of our commodities and used commodity .

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?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

No, I am not providing data

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below

I have read and accept the applicable Terms