Green Cargo
Green and Sustainability-Linked Financing Framework Second Opinion

24 April 2023

Executive Summary

Green Cargo is a state-owned company that is the largest rail freight operator in Sweden. In 2022, it transported 20 million tonnes of goods 11.2 billion net tonne-kilometres and served 2,300 destinations in Europe. Headquartered in Solna, it reported net sales of SEK 4.5 billion, a 60% Swedish rail freight market share, and around 1,800 employees in 2022. Its freight comes from sectors such as forestry, steel, metals and mining, chemicals, energy, construction, automotive, consumer goods, and grocery retail.

This is a second opinion on Green Cargo's green and sustainability-linked financing framework. Section 1 includes our assessment of Green Cargo's overall sustainability governance, including that of its green financing process. Section 2 contains our assessment of the green financing framework's use of proceeds. Section 3 covers our assessment of the sustainability-linked financing framework, including the company's revenues and planned investments.

We give Green Cargo a governance score of **Good.** Green Cargo has relevant environmental strategies in the context of Sweden's ambitious national climate targets, clear oversight of sustainability topics, stronger supply chain management practices, some consideration of environmental risks in business processes, and good awareness and management of social issues as well as sustainability reporting practices. Areas for potential further improvement include providing emissions disclosure by Scope, setting its own absolute emissions reduction targets, developing quantitative sustainability requirements for suppliers, using climate scenario analysis in its planning and risk management processes, and reporting in alignment with the recommendations of the Taskforce on Climate-Related Financial Disclosures (TCFD).

Green financing framework assessment

Under the green financing framework, Green Cargo plans to finance or refinance new electric locomotives and electric locomotive maintenance as well as new wagons, carriers and equipment and eco-driving and driver assistance tools that can support rail freight energy efficiency improvements. Updates since Green Cargo's framework published in October 2019 include the additions of new carriers and wagon equipment that support longer, heavier, and higher volume trains as well as driver assistance tools.

We rate the framework **CICERO Dark Green.** This is because Green Cargo plans to primarily finance electric locomotives and their maintenance, which is shaded Dark Green since electrified rail powered by renewables is well-aligned with a low carbon future. Efficiency measures such as new wagons, carriers, and equipment and eco-driving and driver assistance tools are also good steps towards a low carbon future, but still apply to both electric and diesel trains.

GOVERNANCE ASSESSMENT
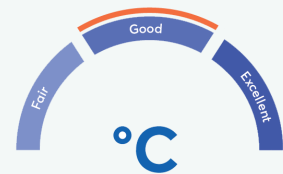
GREEN FINANCING SHADES OF GREEN

GREEN BOND AND LOAN PRINCIPLES
Based on this review, this framework is found aligned with the principles.

SUSTAINABILITY LINKED BOND AND LOAN PRINCIPLES
Based on this review, this Framework is found aligned with the principles.

Strengths

It is a strength that Green Cargo's investments will support rail freight powered by renewable electricity, which is a key pathway for freight transport sector decarbonization. Shifting to lower emissions electrified rail freight from higher emissions road or air freight is reflected in robust science-based benchmarks such as the IEA net zero scenario.[1]

We are encouraged by Green Cargo's approach to locomotive and wagon end of life emphasizing reuse and recycling. This conserves resources, reduces climate emissions and waste, and is well-aligned with a waste management hierarchy.

Pitfalls

It is a pitfall that some financed energy efficiency measures will be used in diesel trains. While lock in risks are low because the wagons, carriers, and equipment that are expected to be the main financing focus of this sub-category can be used with both electric and diesel trains, they will still be associated with ongoing climate emissions.

It is also a pitfall that financed locomotives, wagons, and carriers could potentially be used to transport cargo with harmful climate and environmental impacts. Framework exclusions do not preclude Green Cargo from using financed locomotives or wagons to transport cargo not aligned with a sustainable future such as fossil fuels or products associated with significant local pollution and biodiversity loss from mining.

Sustainability-linked framework assessment

Green Cargo aims to reduce its rail transport Scope 1 and 2 greenhouse gas emissions intensity and improve the energy efficiency of its electric rail traffic. Strengths, weaknesses and pitfalls of the framework are discussed below, and Table 1 at the end of this executive summary provides a snapshot of our assessment of the KPIs and SPTs.

Strengths

It is a strength that in its KPI 1 and 2 calculations, Green Cargo will use actual rather than estimated data on tonne-kilometres, energy, and fuel and will not include any offsets, credits, or avoided emissions. This approach provides a more accurate and comparable measure of its emissions intensity and energy efficiency.

Even as Green Cargo's business is currently well-aligned with a low-carbon future, SPT 1 and SPT 2 demonstrate continued complementary ambition on climate and energy. It is positive Green Cargo seeks further emissions and efficiency improvements beyond already strong baselines and intends to use both SPTs pending lender approval.

Pitfalls

KPI 1 and KPI 2 methodologies do not fully capture the climate benefits of modal shift to electrified rail freight. KPI 1 and KPI 2 performance may become worse if Green Cargo successfully attracts more container cargo that will likely have lighter, less dense goods. We encourage Green Cargo to provide contextual reporting on this dynamic.
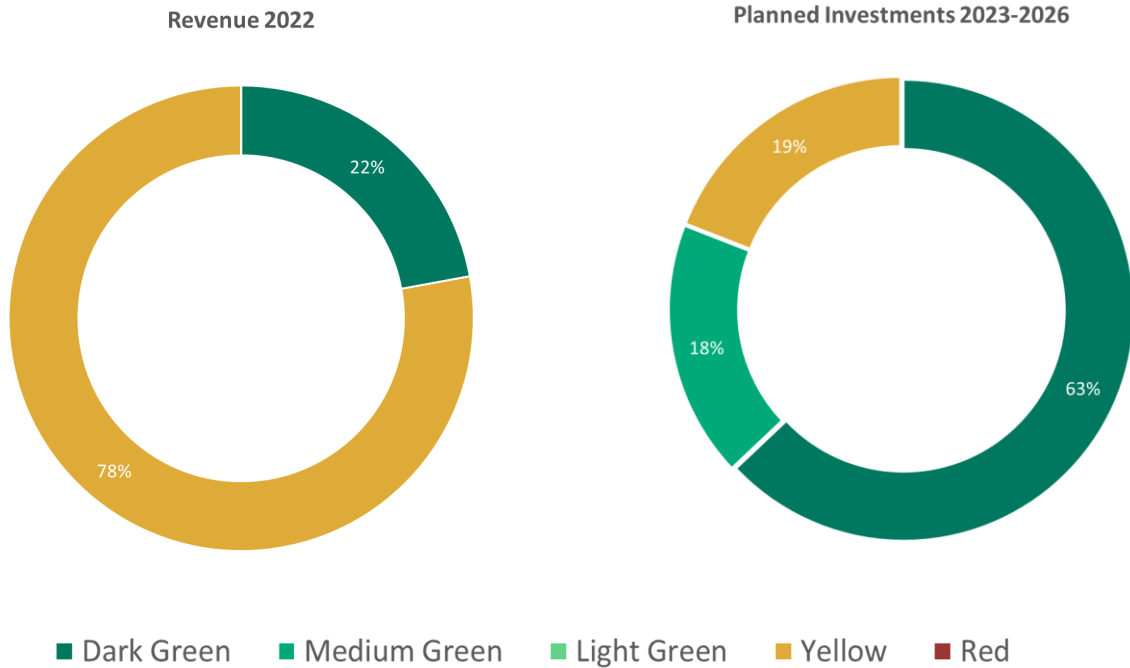
KPI 1 accounting methodologies may not fully capture climate impacts. KPI 1 excludes Scope 3 emissions and 3% of Scope 1 and 2 emissions and may overestimate the benefits of renewable energy purchasing via guarantees of origin.

KPI 2 is less material than KPI 1. Although energy efficiency is beneficial, achieving KPI 2 is unlikely to significantly impact climate emissions. We therefore encourage Green Cargo to always use KPI 1 together with KPI 2 as planned.

SPT 1 implementation challenges include lock in risks, land use change emissions risks, and reliance on policy decisions. Diesel engines, hybrid locomotives, and hydrogen from natural gas can create lock in risks, biofuels can create land use emissions risks, and whether additional rail infrastructure is electrified will depend on policy mandates and resources.

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[1] See Rail subsector report and Net Zero by 2050 from IEA

Shading of Green Cargo's revenues and planned investments

Revenue 2022

22%

78%

Planned Investments 2023-2026

19%

18%

63%

■ Dark Green ■ Medium Green ■ Light Green ■ Yellow ■ Red

Of Green Cargo's 2022 revenues of SEK 4.56 billion, 22% were assigned a Dark Green shade, while 78% were allocated a Yellow shade. The shadings assigned weigh (1) the cross-cutting climate benefits of transport by renewable electric rail against (2) the climate and environmental risks associated with specific categories of cargo. Be aware that there may be Green elements within each Yellow category of revenues, but it is not always possible to specify these further without additional information about the cargo. Dark Green was assigned to 22% of revenues to recognize the climate benefits of transport by renewable electric rail for cargo that is expected to have some climate and environmental benefits, such as certified forestry products and recycled metals. A Yellow shade was assigned to 78% of revenues from electric rail cargo with some climate and environmental risks or unknown contents, rail services and fossil fuel rail and truck transport that could have emissions and lock in risks from use of diesel, as well as state subsidiaries where we do not have enough information to assign a different shade. Cargo with more substantial climate and environmental risks includes emissions-intensive products such as cement, steel and chemicals, products with mining impacts such as stone and non-recycled metals, fossil fuels such as diesel and petrol, products with high deforestation risk like woodchips and biofuels without known sustainability safeguards, automotive components that could be for internal combustion engine vehicles, electric appliances with materials sourcing and end of life risks, food products with unknown agricultural practices, and container cargo with unknown contents.

Of Green Cargo's SEK 2.1 billion planned investments over the next 36 months, 81% received a Shade of Green, while the remaining 19% were shaded Yellow. A Dark Green shading was assigned to 63% of planned investments, including new electric locomotives as well as electric locomotive components and maintenance with emissions and efficiency benefits that are well-aligned with a low carbon future. Medium Green was assigned to 18% of Green Cargo's planned investments in new wagons as well as wagon maintenance and equipment, which allow for heavier loads and greater volumes that improve train energy efficiency. A Yellow shade was allocated to 19% of Green Cargo's planned investments in IT, real estate, radio equipment, and sand refilling infrastructure, which do not explicitly contribute to or hinder the transition to a low carbon future, as well as maintenance of diesel locomotives and engines, which avoid a Red shading despite association with fossil fuel emissions and lock in risk by facilitating near zero emissions electric rail transport in 97% of Green Cargo's freight by providing coverage where tracks are not yet electrified.

Table 1. Summary of KPI and SPT assessment

Assessment of KPIs	KPI 1: Rail transport Scope 1 and 2 GHG emissions intensity (g CO_2e/tonne-km)	KPI 2: Energy efficiency of electric rail traffic (kWh/tonne-km)
Materiality	KPI 1 is material in terms of addressing Green Cargo's climate risks and impacts with caveats around its measurement of intensity rather than absolute emissions and incomplete emissions coverage	KPI 2 is material in terms of addressing Green Cargo's climate risks and impacts with caveats around exclusion of non-renewable energy use, and as such should always be used in combination with KPI 1 as planned
Strategic significance	KPI 1 is of strategic significance	KPI 2 is of strategic significance
Methodology	KPI 1 methodology is robust and transparent with caveats around its potential to be influenced by cargo density trends and the use of market-based Scope 2 emissions accounting	KPI 2 methodology is robust and transparent with caveats around its potential to be influenced by cargo density trends
Assessment of SPTs	**SPT 1: Reduce rail transport Scope 1 and 2 GHG emissions intensity to 1.50 g CO_2e/tonne-km by 2030 from a 2022 baseline of 2.28**	**SPT 2: Improve energy efficiency of electric rail traffic to 0.030 kWh/tonne-km by 2030 from a 2022 baseline of 0.036**
Own past performance	Ambition is lower than past performance based on the historical data available with caveats around cargo density trends	Ambition exceeds own past performance
Peers	Ambition is lower than European state-owned rail freight operator peers with some exceptions, with caveats around peers' much higher baselines	Ambition is difficult to compare with European state-owned rail freight operator peers with absolute energy targets, but higher than peers without energy targets
Science-based scenarios or international targets	Ambition is likely aligned with 2°C scenarios, with caveats around tonne-kilometre growth rates and emissions coverage	Ambition is not possible to assess

CICERO Shades of Green has not reviewed the degree to which the variation in the financial characteristics is commensurate and meaningful. Investors are encouraged to review the term sheets in detail and conduct their own assessment of the financial characteristics of the SLBs.

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1 Green Cargo's environmental management

Company Description

Green Cargo is the largest rail freight operator in Sweden. It is a limited liability company wholly owned by the Swedish state and administered by the Department of State-Owned Enterprises at the Ministry of Enterprise and Innovation. Headquartered in Solna, Green Cargo serves around 300 destinations in Norway, Sweden, and Denmark and, with partners, 2,000 in the rest of Europe.

In 2022, the company transported 20 million tonnes of goods for a total of 11.2 billion net tonne-kilometres.[2] That year, the company had an approximately 60% share of rail freight in Sweden, net sales of SEK 4.5 billion, and around 1,800 employees. Its freight includes cargo from sectors such as forestry and paper, steel, metals and mining, chemicals, energy, construction and engineering, automotive, consumer goods, and grocery retail.

Green Cargo is updating its original green financing framework published in October 2019, as well as publishing a new sustainability-linked financing framework. As of Q4 2022, the outstanding amount of green financing under that framework was EUR 25 million.

Governance Assessment

Green Cargo's climate and environmental strategy includes relevant emissions intensity and energy efficiency goals based on its materiality analysis and clear implementation steps to achieve them. As a state-owned company, it also operates in the context of Sweden's ambitious national climate targets to achieve net zero by 2045. At the same time, while Green Cargo reports on its climate emissions, it does not yet provide a full breakdown by Scopes 1, 2, and 3. It has not developed an absolute emissions reduction goal for its own operations and value chain and does not have a robust climate adaptation and resilience approach beyond extreme weather preparedness.

Green Cargo has developed clear reporting structures for environmental and social issues, including final responsibility for oversight of these topics by its CEO. We are encouraged that sustainability performance is considered in senior management performance reviews, though not incentive structures.

Since the previous framework, Green Cargo has strengthened its supply chain management by developing a code of conduct with qualitative requirements, a management system including some auditing, and regular collaboration with strategic suppliers. We are encouraged by these developments while seeing opportunities for further improvement in areas such as establishing quantitative supplier requirements or goals and considering lifecycle impacts in supplier selection processes.

Green Cargo has taken steps to include climate and environmental risks in business processes, including through its ISO 14001 certification, distribution of responsibility for these issues across relevant departments, and consideration of climate and energy targets in decision making processes. At the same time, the company does not currently use climate scenario analysis in its planning and risk management processes or fully consider climate transition risks in customer selection or climate adaptation in project evaluation.

Green Cargo demonstrates good awareness of social issues and has taken steps to mitigate potential concerns. It has included social risks in its materiality analysis, developed internal and supplier codes of conduct covering

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[2] The issuer defines tonne-kilometre as the same as net tonne-kilometre, which is one tonne of goods transported a distance of one kilometre. Accordingly, ten tonnes of goods transported 100 kilometres corresponds to 1,000 net tonne-kilometres.

social issues and referencing national and international standards, established targets related to safety and gender equality, and undertaken health and safety as well as code of conduct trainings.

It is positive that Green Cargo reports on sustainability performance, targets and policies, and future plans in alignment with Global Reporting Initiative (GRI) guidance. However, it does not currently report based on the recommendations of the Taskforce on Climate-Related Financial Disclosures (TCFD).

In terms of green financing project selection, Green Cargo has established clear processes with environmental competence and veto power, as well as qualitative consideration of broader sustainability issues. However, more ambitious selection criteria, such as lifecycle analysis, are not currently included. Green Cargo has committed to annual public reporting on its green finance allocation and impacts including relevant disclosures and metrics and third-party verification, which is positive.
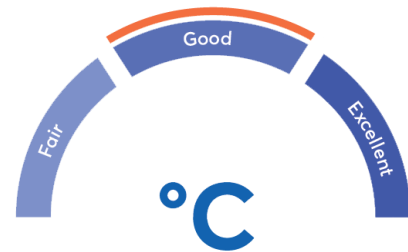
The overall assessment of Green Cargo's governance structure and processes gives it a rating of **Good**.

Sector Risk Exposure

Physical climate risks. For the Nordics, the most severe physical impacts will likely be increased flooding and more frequent storms and extreme weather. Developing rail infrastructure with climate resilience in mind is critical, as well as evaluating and mitigating the physical climate risks of existing infrastructure, considering that climate change poses a direct risk of damage to assets and may cause service disruptions.

Transition risks. Due to the profound changes needed to limit global warming to well-below 2°C, transition risk affects all sectors. The Swedish government expects its state-owned companies to be at the forefront of sustainability and climate issues. Consequently, Green Cargo is exposed to stricter policies as Sweden strengthens its national climate and environmental ambitions. Sweden is targeting climate neutrality by 2045, which includes the transition towards sustainable transport. The remaining use of some diesel trains and embodied emissions of infrastructure and railway equipment are a notable transition risks for companies like Green Cargo. Rail freight companies may also face transition risks from their customers' exposure to stricter climate policies, reduced access to capital, or consumer behaviour changes. Clients in higher emitting sectors such as mining, chemicals, and construction are particularly at risk.

Environmental risks. While railway services have significant environmental benefits, the construction of supportive infrastructure may cause air, water, and noise pollution, deforestation, and destruction of wetlands. Linear infrastructure that companies like Green Cargo require to operate may also impact wildlife due to habitat fragmentation, disruption of movement, and collision risks. Rail accidents may cause spills of materials that can impact environmental quality. The supply chains for infrastructure construction and rail equipment, as well as the value chains of the freight transported, can also create local pollution and biodiversity impacts.

Social risks. A key social risk for companies like Green Cargo is worker and community health and safety during rail operations. Human rights and workers' rights should also be protected across value chains and operations.

Environmental strategies and policies

As part of its Måltavlan, or sustainability scorecard, Green Cargo discloses its Scopes 1 and 2 emissions intensity in g CO_2e per tonne-kilometre. It follows the Greenhouse Gas Protocol guidance using market-based Scope 2 emissions calculations. Green Cargo notes that its Scopes 1 and 2 emissions are primarily from its diesel locomotives, which it plans to phase out by 2030 through electrification and use of biofuels.

By 2030, Green Cargo targets an emissions intensity of 1.5 g CO_2e per tonne-kilometre from a 2022 baseline of 2.28. This would continue the company's downward trend in this metric since 2020 levels of 2.57. Green Cargo attributes this progress to higher volumes and train utilization rates post-pandemic and use of customized terminal trains that reduced diesel use. To achieve further improvements, the company plans to improve traffic planning efficiency, pursue a fleet strategy that will allow for heavier, longer trains that are more efficient, and offer fossil-free fuel alternatives to customers, such as EU Renewable Energy Directive-compliant biofuels.

The company reports its absolute emissions, which were 27,596 tonnes CO_2e in 2022, representing a declining trend from 2018. It does not currently provide a breakdown by Scopes 1, 2, and 3; this is planned for 2023 reporting. According to Green Cargo, the main source of its Scope 3 emissions that represent 14% of its total carbon footprint is third party truck transport suppliers, who still largely rely on fossil fuels. The company is in dialogue with truck suppliers to encourage them to transition to electric vehicles when it is economically feasible. Green Cargo does not have an absolute emissions reduction target.

As a state-owned company, Green Cargo operates in the context of Sweden's national goal of achieving net zero climate emissions by 2045, with a sub-target of reducing domestic transportation emissions by 70% by 2030 compared to a 2010 baseline.[3] To achieve these national targets, Sweden's long-term climate strategy and Green Cargo's business strategy encourage a modal shift to rail freight to avoid where possible more emissions-intensive cargo transport options such as air or road freight.[4] This prioritization of modal shift from freight to rail is reflected in climate emissions reduction pathways, such as the IEA Net Zero by 2050 scenario.[5] Therefore, Green Cargo anticipates that its absolute emissions may increase in order to achieve broader national and global climate targets.

As of 2022, over 97% of Green Cargo's freight on a tonne-kilometre basis was transported by its electric trains, while its diesel trains and road freight accounted for less than 2% each. The company does not operate its own road freight vehicles but does partner with road transport suppliers, such as by encouraging them to become Fair Transport[6] certified, and monitors and reports on these Scope 3 emissions.

According to Green Cargo, around 99% of the company's energy consumption is from its railway traffic. The Swedish Transport Administration purchases and distributes electricity to all Swedish rail operators, including Green Cargo, and uses guarantees of origin (GoO) for renewable energy procurement. Green Cargo plans to begin reporting on its absolute energy use in its 2023 sustainability reporting. Its main energy target is to achieve 0.030 kWh electricity use per tonne-kilometre for its electric rail operation from a 2022 baseline of 0.036. Current performance is a slight improvement from 2018 and 2019 levels of 0.037.

Since the previous framework, Green Cargo has developed internal and supplier codes of conduct covering business ethics, human rights, climate and the environment, non-discrimination, workers' rights, and health and safety. These policies draw on Sweden's 2017 state ownership policy, the United Nations Global Compact (UNGC), and other UN, OECD, and International Labour Organization (ILO) standards. Green Cargo has

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[3] See Sweden's climate policy framework
[4] See Sweden's long-term strategy for reducing greenhouse gas emissions
[5] See Net Zero by 2050
[6] See Fair Transport

implemented internal training on its code of conduct and continues to maintain whistle-blower mechanisms to allow reporting of any potential violations.

Based on its supplier code of conduct, Green Cargo now sets qualitative sustainability requirements for its suppliers, performs screenings and audits to verify compliance, and follows up to ensure corrective measures are taken on any deviations. The company has also initiated a collaboration model for more frequent and systematic engagement with strategic suppliers.

In terms of physical climate risk management, Green Cargo works with infrastructure managers, regulators and other players in the rail sector to improve preparedness for and prevention of disturbances due to extreme weather. It does not currently report based on the guidance of the Taskforce on Climate-Related Financial Disclosures (TCFD) or use climate scenario analysis in its planning and risk management processes.

Green Cargo is ISO 14001 certified, and it reports in alignment with Global Reporting Initiative (GRI) guidance.

2 Green Cargo's Green Financing Framework

Description of Green Cargo's green financing framework

Based on this review, this framework is found to be aligned with the Green Bond Principles and the Green Loan Principles. For details on the issuer's framework, please refer to the sustainable finance framework dated 2023.

Use of proceeds

For a description of the framework's use of proceeds criteria, and an assessment of the categories' environmental impacts and risks, please refer to Shading of eligible projects under Green Cargo's green financing framework below.

Selection

Green Cargo has established an Investment Council to assess projects and assets for eligibility under the framework as well as discuss broader effects on the environment, safety, and other social aspects. Chaired by the CEO, other members of the council include the CFO, the Director of Sustainability and Communications, Legal Counsel, Head of Purchasing, Head of Treasury, and the Controller. The Director of Sustainability and Communications has veto power over decisions on what investments meet framework criteria, while the Green Cargo board of directors make final investment decisions or delegate that responsibility to the CEO.

Management of proceeds

Green finance proceeds are tracked by the issuer using a register of eligible and selected investments corresponding to financing raised and outstanding. The register is maintained and monitored by Green Cargo's treasury department and overseen by its controller. If green debt exceeds the value of eligible assets and projects, funds will be allocated to bank accounts or managed in accordance with Green Cargo's normal short-term liquidity management. None of these funds will be invested in fossil fuel-related assets or other investments excluded under the framework.

Reporting

Green Cargo's treasury department will publish an annual green financing investor report covering allocation and impact on its website as long as it has green financing outstanding. Reporting will be on a portfolio basis using an aggregated approach, aligning on a best-effort basis with the ICMA Handbook – Harmonized Framework for Impact Reporting issued in 2021. In some cases, Green Cargo may report green finance allocation and impacts directly and non-publicly to lenders and counterparts; green assets will not be financed by multiple green instruments at the same time. Green Cargo's third-party auditor will verify allocation and impact reporting.

Allocation reporting will cover green instruments outstanding, amounts invested, share of new financing vs. refinancing, and the balance of any unallocated proceeds. Impact reporting will include descriptions of eligible green assets, a breakdown by green project category, and environmental impact metrics. For fossil-free transport solutions, this will include grams CO_2e/tonne-kilometre and tonnes CO_2e avoided annually relative to diesel trains or alternative transportation. Energy efficient transportation solution metrics will be kWh/tonne-kilometre for electric rail traffic. Where possible, Green Cargo will use primary data, but provide estimates if needed and disclose methodologies and assumptions.

Previous green financing reporting under Green Cargo's October 2019 framework included allocation amounts by project category on a quarterly basis, whether funds were committed vs. used in a revolving credit facility (RCF) dedicated to green financing, and impact indicators including grams CO_2e/tonne-kilometre and kWh/tonne-

kilometre for electric rail traffic. No third-party review was undertaken for reporting related to the green loans previously issued.

Shading of eligible projects under Green Cargo's green financing framework

The eligible projects under Green Cargo's sustainable finance framework are shaded based on their environmental impacts and risks, based on the "Shades of Green" methodology.

- Net proceeds will be used for both financing or refinancing eligible investments and projects in Sweden, Norway, or Denmark. Green Cargo expects around 80% of proceeds to go to new financing and 20% to refinancing. Green Cargo will only allocate funds to tangible assets without age restriction as well as OPEX with a lookback period of three years.
- Green Cargo expects to allocate green financing primarily to new locomotives, followed by new wagons. Under the previous October 2019 framework, 100% of net proceeds were allocated to new electric locomotives.
- Exclusions include projects for which the purpose is fossil energy production, nuclear energy generation, weapons and defence, and potentially environmentally harmful resource extraction (such as rare-earth elements or fossil fuels). According to Green Cargo, these exclusions do not cover the possible transport of related materials such as fossil fuels, weapons, or rare earth elements by financed locomotives or wagons.

Category	Eligible project types	Green Shading and considerations
Fossil-free transportation solutions °C	New electric locomotives; to create more efficient logistics solutions and increased energy efficiency. Investments in, and maintenance of existing electric locomotives.	**Dark Green** ✓ Modal shift to electrified rail freight is an important contribution to a low carbon future and plays a role in achieving the IEA Net Zero Scenario.[7] On average in the EU-27, the greenhouse gas emissions intensity for rail freight is around 1/5 of road freight transport and 1/50 of air freight.[8] The difference may be even greater in countries with highly electrified rail networks such as Sweden. It is also positive that Green Cargo sources renewable electricity. ✓ New electric locomotives create opportunities for more energy efficient logistics solutions, especially in heavier transport arrangements. Increasing traction to allow for longer and heavier trains improves efficiency because overall, less energy is spent compared to driving a greater number of lighter trains. ✓ Electric locomotive fleets like Green Cargo's require maintenance investments. We are encouraged that careful consideration is given to reuse and recycling of locomotives and their parts, such as electronics and steel. Scrapping processes are undertaken in Sweden,

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[7] See Rail subsector report from IEA
[8] See Rail and waterborne — best for low-carbon motorised transport from EEA

		which has a robust regulatory framework to manage potential local pollution and social risks.
		✓ Note that new electric locomotives will not necessarily replace diesel locomotives on a 1:1 basis, as the latter are still needed where track is not electrified.
		✓ While there are currently no specific sustainability criteria used in locomotive sourcing (or wagon sourcing mentioned in the category below), Green Cargo informs us it will develop a procurement approach going forward. While these embodied emissions are relatively small according to the issuer, we encourage Green Cargo to mitigate them where possible.
Energy-efficient transportation solutions °C	New wagons, carriers and wagon equipment; increasing the weight and/or volume per train meter and reducing noise and wear on wheels. Eco-driving and automatic driver assistance; to achieve increased energy efficiency.	**Medium Green** ✓ Wagons, carriers, and equipment that can load more weight or volume per train meter have positive energy efficiency benefits. ✓ Eco-driving and automatic driver assistance can also reduce energy use. According to Green Cargo, these approaches that consider train weight, breaking rate, and topography can reduce electricity use by around 15-20%. Green Cargo informs us it provides training modules for its drivers in eco-driving and is exploring automatic driver assistance system options. ✓ Be aware that the wagons, carriers, and equipment as well as eco-driving and automatic driver assistance will be used with both electric and diesel locomotives, the latter of which are associated with fossil fuel use and climate emissions. However, lock in risks are low because wagons, carriers, and equipment and driving tools can be used with both diesel and electric locomotives. Diesel trains are primarily used for shunting and where the railway is not electrified and account for around 2% of Green Cargo's transport. ✓ It is positive that according to Green Cargo, at end of life, wagon, carrier, and equipment steel is scrapped, melted down, and reused. The issuer informs us that this process is undertaken in Sweden, which has a robust regulatory framework to manage potential local pollution and social risks. ✓ According to the issuer, Green Cargo's wagons are not specific to any particular type of cargo; wagons specialized for cargo that may have greater climate and environmental risks or benefits are rented or belong to customers and are not included under the framework.

Table 1. Eligible project categories

# 3 Green Cargo's Sustainability-Linked Financing Framework

According to CICERO Shades of Green's methodology for sustainability-linked financing frameworks, a Shade of Green should be allocated to the issuer's revenue and planned investment streams. The shadings provide additional context around the issuer's business model and strategy and reflect alignment of the underlying activities towards a low carbon and climate resilient future, while taking into account governance issues. (See "Terms and methodology" for further details).

In this section we also assess the KPIs and SPTs in Green Cargo's sustainability-linked financing framework, in accordance with the Sustainability-Linked Bond Principles (SLBP) and Sustainability-Linked Loan Principles (SLLP). According to the SLBP and SLLP, the KPIs should be relevant, core and material to the issuer's overall business, and of high strategic significance to the issuer's current and/ or future operations. The SLBP and SLLP further recommend that three benchmarking approaches are considered during the target-setting exercise, which inform our assessment of the SPTs. We also include some comments on methodology choices including benchmarks and baselines, as well as comments on financial characteristics, reporting and verification.

Green Cargo's revenues

Of Green Cargo's 2022 revenues of SEK 4.56 billion, 22% were assigned a Green shade, while 78% were allocated a Yellow shade.

Revenue 2022
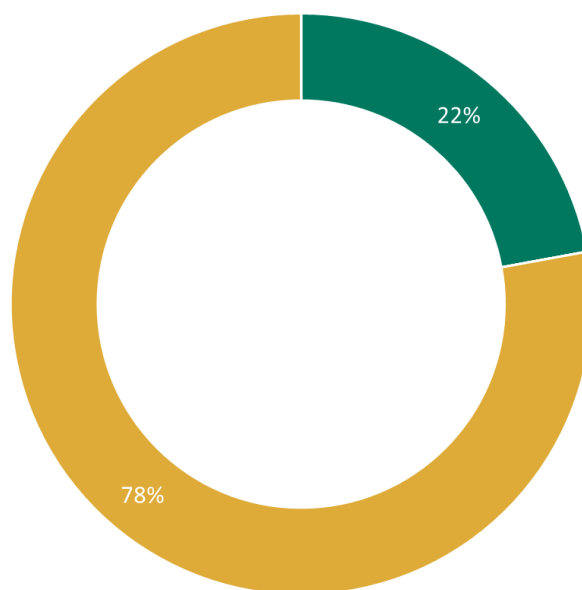
■ Dark Green ■ Medium Green ■ Light Green ■ Yellow ■ Red

Our analysis is based on a breakdown by cargo descriptions provided by Green Cargo. The shading is determined by the climate benefits of Green Cargo's electrified rail as a Dark Green solution and the end use of the cargo and climate risks in its production where relevant. While in practice most rail freight will be transported by both electric rail and diesel rail where track is not electrified, we have prorated revenue data on a tonne-kilometre basis to account for the around 2% of Green Cargo's transport by diesel train. Be aware that there may be different shades including Green elements within each category of revenues, but it is not always possible to specify these further without additional information about the cargo. Note that Green Cargo does not currently screen its freight for climate risks and may face legal restrictions against doing so due to potential anti-competitive effects from its high market share and state ownership structure. It also does not typically know the contents of intermodal containers that it transports.

Dark Green is assigned to 22% of revenues from a prorated share of cargo transported by electric rail that is expected to have some climate or environmental benefits. This includes paper, pulp, and timber are certified under FSC or PEFC criteria for more sustainable forestry practices as well as recycled copper and steel scrap that avoid additional resource extraction and associated climate emissions.

A **Yellow** shade is assigned to 78% of revenues from (1) a prorated share of cargo transported by electric rail that is expected to have some climate and environmental risks or where contents are unknown, (2) truck transport or a prorated share of diesel rail transport, and (3) revenues for which there is not enough information.

Despite the benefits of transport by low carbon electrified rail, this first Yellow category reflects a conservative approach, recognizing the likelihood that these cargoes directly result from or will contribute to activities with varying degrees of climate emissions and environmental risks:

- Construction products including cement, lime, and stone. Cement production is emissions intensive, while stone is associated with mining risks.
- Automotive components and vehicles where fuel type is unknown. While electric or hybrid cars could receive a Green shading, without further information, these may be internal combustion engines with associated fossil fuel emissions risks.
- Railway materials including steel tracks, cement slippers, and stone. Steel and cement production are emissions intensive, while stone is associated with mining risks.
- Chemical products including diesel, petrol, and glue. Fossil fuel products such as diesel and petrol are associated with high emissions during combustion, and other chemicals are often emissions intensive to manufacture.
- Woodchips and biofuels where sustainability sourcing is unknown. Without sufficient safeguards, biofuels have high direct and indirect land use change emissions and biodiversity risks.
- Steel and non-recycled metal products such as copper. These require emissions-intensive processes as well as mining of initial materials, which can have local environmental impacts.
- Electrical appliances such as washing machines and refrigerators with embodied emissions in materials and end of life concerns.
- Non-perishable food where production sustainability is unknown. Absent confirmation of sustainable agricultural practices, food products can be linked to climate emissions, biodiversity loss, and local pollution risks.
- Container cargo where contents are unknown and could be anything from food to cars, waste, or clothes. Without additional information, we cannot assign a Green shading.

In the second category, a Yellow shading has been assigned to revenues from rail services provided to other rail companies, a prorated share of diesel rail transport, and fossil fuel truck transport of unknown container cargo. Rail services such as shunting or renting locomotives may include diesel locomotives and transport by diesel rail and truck involves fossil fuel use, creating associated emissions and lock in risks. Around 5% of truck transport

uses solely HVO biofuel compliant with EU Renewable Energy Directive standards, which provide sufficient safeguards against direct and indirect land use change emission risks from biofuel feedstock sourcing to make this a Medium Green transport solution. However, because cargo contents are unknown, and without additional information, we cannot assign a Green shading.

There is insufficient information about state subsidiary revenues, part of the third Yellow category, to assign a different shade.

Green Cargo's planned investments
Of Green Cargo's SEK 2.1 billion planned investments over the next 36 months, 81% received a Shade of Green, while the remaining 19% were shaded Yellow.

Planned Investments 2023-2026

Legend: ■ Dark Green ■ Medium Green ■ Light Green ■ Yellow ■ Red
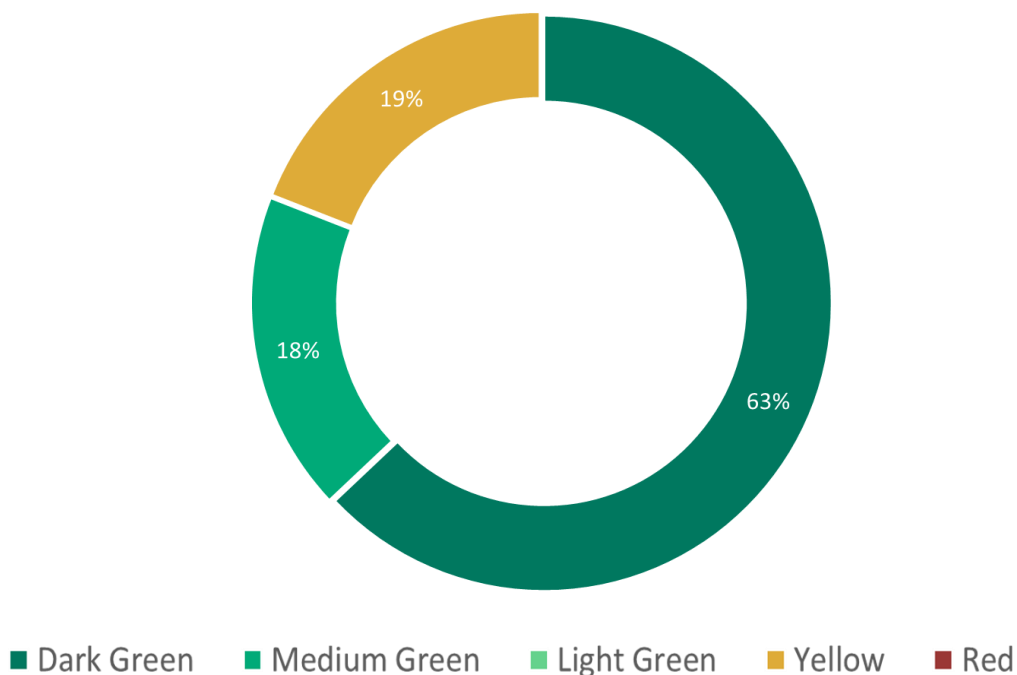
The 81% of Green Cargo's planned investments that received a Shade of Green are well-aligned with its green financing framework described in detail above. See "Shading of eligible projects under Green Cargo's green financing framework" for complete shading considerations.

A **Dark Green** shade was assigned to 63% of Green Cargo's planned investments in new electric locomotives as well as electric locomotive components and maintenance. New electric locomotives are expected to have energy efficiency benefits by allowing for longer and heavier trains in addition to continued climate benefits from electrified freight transport powered by renewables, making these investments well-aligned with a low carbon future.

Medium Green was assigned to 18% of Green Cargo's planned investments in new wagons as well as wagon maintenance and equipment. These are good steps towards a low carbon future as they are expected to allow for heavier loads and greater volumes that improve train energy efficiency.

A **Yellow** shade was allocated to 19% of Green Cargo's planned investments in IT, real estate, radio equipment, sand refilling infrastructure, and maintenance of diesel locomotives and engines. IT with no sustainability focus, real estate with no green building characteristics, radio equipment updates, and sand refilling for breaking and traction do not explicitly contribute to or hinder the transition to a low carbon future. While diesel locomotives facilitate near zero emissions electric rail transport in 97% of Green Cargo's freight by providing coverage where tracks are not yet electrified, they are associated with continued fossil fuel use and have associated emissions and lock in risks.

Description of sustainability-linked financing framework

Based on this review, this framework is found to be aligned with the Sustainability-Linked Bond Principles and Sustainability-Linked Loan Principles. For full details on the issuer's framework, please refer to the sustainability-linked financing framework dated 2023.

Selection of key performance indicators (KPIs)

Summary information about Green Cargo's KPIs is provided below:
- ✓ KPI 1: Rail transport Scope 1 and 2 GHG emissions intensity ($g\,CO_2e$/tonne-km)
- ✓ KPI 2: Energy efficiency of electric rail traffic (kWh/tonne-km)

Calibration of sustainability performance targets (SPTs)

Green Cargo has identified the following SPTs:
- ✓ SPT 1: Reduce rail transport Scope 1 and 2 GHG emissions intensity to 1.50 $g\,CO_2e$/tonne-km by 2030 from a 2022 baseline of 2.28.
- ✓ SPT 2: Improve energy efficiency of electric rail traffic to 0.030 kWh/tonne-km by 2030 from a 2022 baseline of 0.036.

According to Green Cargo, it does not have a specific level of investment or plan for when reductions will occur between 2022 and 2030 but expects stepwise rather than linear declines as initiatives are implemented. It expects achieving these goals to become increasingly difficult given high current performance levels. The issuer informs us that Green Cargo will develop annual sub-targets, but these will be agreed to with each lender rather than included in the framework. According to Green Cargo, 2022 is a representative baseline in that its net tonne-kilometres have been relatively steady over the past few years even during the pandemic because freight operators experienced less significant declines in customers than passenger rail.

For a discussion of the SPTs' ambition level and Green Cargo's strategy to achieve them, please refer to Assessment of SPT 1 and Assessment of SPT 2 below.

Financial Characteristics

Green Cargo plans to always use both of Green Cargo's KPIs/SPTs in sustainability-linked financing instruments issued under the framework as long as this is approved by lenders. The issuer informs us that if both KPIs/SPTs are included as intended, they will be weighted equally. This will be specified in financial instrument documentation. The framework notes a target observation date (TOD), end of year 2030, on which the company's performance on the KPIs will be compared against the SPTs. Should the company fail to report, verify, and achieve the specified SPTs, a trigger event will occur, leading to the introduction of a financial effect via the adjustment mechanism. This may be variation of the loan margin, coupon step-ups, or an increased redemption price of bonds and will be specified in financial instrument documentation. According to the issuer, the size of the penalty will follow standards for loans in the Nordic market or be aligned with the SLBP and market expectations at the time of issuance. If any recalculations or adjustments are needed, Green Cargo will work with SPO providers to review

and auditors to confirm updates if required. The issuer has not defined what percentage change to the baselines would trigger a recalculation.

CICERO Shades of Green has not reviewed to what degree the variation in the financial characteristics of the sustainability-linked financing framework is commensurate and meaningful. Investors are encouraged to review the terms sheets in detail and conduct their own assessment of the financial characteristics.

Reporting

Green Cargo's treasury department will report on KPI performance relative to the SPTs annually in its sustainability report or in a separate progress report published on its website. Green Cargo will secure limited assurance of KPI performance from auditors. Green Cargo informs us that it is most likely to issue loans under the framework, and therefore there would not be public information on annual targets set for these loans, but if bonds are issued, public disclosures on target performance and any penalties would be provided. Green Cargo may additionally report directly and non-publicly to lenders or counterparts in cases where sustainability-linked finance instruments other than bonds are outstanding.

Reporting will include details on calculation methodologies and baselines, information about potential recalculations of baselines, any relevant updates to the company's sustainability strategy or governance, and a list of sustainability-linked finance instruments outstanding. Where possible, the reporting will incorporate explanations of the main factors contributing to KPI performance, illustrations of the positive sustainability impacts of performance improvements, and updates on new or proposed regulations relevant to the KPIs and SPTs.

Verification

Green Cargo will undertake annual third-party verification of the performance level of each KPI relative to the SPTs. External reviewers such as auditors or environmental consultants will have relevant expertise.

Assessment of KPI 1: Rail transport Scope 1 and 2 GHG emissions intensity (g CO_2e/tonne-km)

Aspect	CICERO Shades of Green Comments
Materiality	**KPI 1 is material in terms of addressing Green Cargo's climate risks and impacts with caveats around its measurement of intensity rather than absolute emissions and incomplete emissions coverage** ✓ Reducing Green Cargo's emissions intensity is relevant to limiting both the company's climate transition risk exposure and contributions. At the same time, an intensity measurement does not capture ultimate climate impacts in terms of whether absolute emissions are increasing or decreasing. While we recognize that Green Cargo aims to support modal shift to rail freight to reduce societal emissions overall in ways that may increase its near-term absolute emissions and is therefore focused on intensity measures, we encourage the company to continue to report on absolute emissions as well for a more complete picture of climate risks and impacts. ✓ KPI 1 numerator measurements will cover around 83.4% of Green Cargo's total greenhouse gas emissions based on 2022 footprint data. This is because it only covers Scope 1 and 2 emissions from rail transport (97% of total Scope 1 and Scope 2) and excludes all Scope 3 emissions, primarily from diesel truck transport (14%

of total emissions). The KPI could be strengthened by covering all Green Cargo's greenhouse gas emissions.

✓ It is positive that climate impact is a priority in Green Cargo's own materiality assessment, which included internal assessments and external stakeholder input, as well as a top issue identified for the rail freight sector in external standards such as ENCORE and SASB.

Strategic Significance	**KPI 1 is of strategic significance** ✓ Reducing climate emissions intensity is aligned with Green Cargo's business and sustainability strategy to be customers' sustainable logistics partner that creates climate-smart transportation solutions while achieving Sweden's national climate goals. ✓ A focus on this KPI will likely influence Green Cargo's actions and investment decisions to reduce emissions in its rail transport, such as choosing more efficient diesel or hybrid locomotives, transitioning to lower emissions fuels, reducing unnecessary trips where track is not electrified, and working with the Swedish Transportation Administration to electrify additional areas.
Methodology	**KPI 1 methodology is robust and transparent with caveats around its potential to be influenced by cargo density trends and the use of market-based Scope 2 emissions accounting** ✓ Green Cargo's KPI 1 numerator measurement of Scopes 1 and 2 greenhouse gas emissions from rail transport in tonnes CO_2e is clearly defined and based on the GHGP, which is a robust external standard. It is positive that KPI 1 measurements cover all Green Cargo's rail operations and geographies, use actual rather than estimated data on tonne-kilometres, energy, and fuel for greater accuracy, and will not include any offsets, credits, or avoided emissions. ✓ The intensity approach used in KPI 1 does not capture whether absolute climate emissions for Green Cargo or the Swedish freight transport sector may be increasing or decreasing. This is especially challenging in the context of Green Cargo's goal to encourage a modal shift to lower emissions rail freight from higher emission air or road alternatives. If Green Cargo achieves this aim, it will transport more of what are likely to be lighter and less dense goods. If so, KPI 1 emissions intensity will rise and indicate worse performance despite what might be an overall climate benefit. It is a pitfall that KPI 1 performance cannot capture this dynamic, and investors will not necessarily be able to evaluate ultimate climate impacts or benefits. Where possible, we encourage Green Cargo to provide contextual reporting on societal freight transportation trends and how any changes in its cargo weight that may be the result of modal shift are impacting KPI 1 performance. ✓ Green Cargo has selected a market-based rather than location-based Scope 2 emissions calculation approach. Market-based approaches give credit for renewable energy purchasing through mechanisms such as guarantees of origin that do not necessarily ensure additional renewable energy capacity and reduced emissions.[9]

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[9] See Renewable_energy_certificates_threaten_the_integrity_of_corporate_science-based_targets

Guarantees of origin are therefore less preferred from a climate perspective compared on-site renewable energy generation or power purchase agreements (PPA) that help new renewable energy production projects secure access to finance. We encourage Green Cargo to provide location-based as well as market-based Scope 2 disclosures for transparency and work with the Swedish Transportation Administration ensure any renewable energy purchasing is high quality to achieve intended climate benefits of achieving SPT 1.

Assessment of SPT 1: Reduce rail transport Scope 1 and 2 GHG emissions intensity to 1.50 g CO_2e/tonne-km by 2030

Benchmark	CICERO Shades of Green Comments
Own performance	**Ambition is lower than past performance based on the historical data available with caveats around cargo density trends** ✓ Green Cargo reported greater declines in KPI 1 in 2021 and 2022 compared to the average annual linear reduction associated with achieving SPT 1 between 2022 and 2030. ✓ KPI 1 declined by 5.8% on a year-over-year basis in both 2020-2021 and 2021-2022, dropping from 2.57 g CO_2e/tonne-km in 2020 to 2.28 in 2022. Green Cargo attributes this to more efficient planning that avoided unnecessary diesel train use. ✓ If Green Cargo achieved SPT 1, KPI 1 would decline by 4.3% on an average annual linear reduction basis, or a reduction of 34.2% in total between 2022-2030. The issuer informs us it expects reductions to be stepwise rather than linear as specific initiatives are implemented through 2030. ✓ According to Green Cargo, KPI 1 reductions to achieve SPT 1 will be more difficult to achieve going forward due to the rise of intermodal container shipping with less dense cargo, which impacts the tonne-kilometre denominator of KPI 1. If this is the case, SPT 1 may be more ambitious than historical performance, but this is not guaranteed. We encourage Green Cargo to provide transparency about this effect in its sustainability-linked financing reporting.
Peers	**Ambition is lower than European state-owned rail freight operator peers with some exceptions, with caveats around peers' much higher baselines** ✓ With some exceptions and places where direct comparison is not possible, other European national rail freight operators have set or committed to climate targets that we consider more ambitious because they are more comprehensive in terms of covering absolute emissions rather than emissions intensity, some or all Scope 1, 2, and 3 emissions, and/or multiple time horizons. ✓ At the same time, note that Green Cargo's 2022 baseline of 2.28 g CO_2e/tonne-km is far lower compared to peers' most recently reported performance due to its high degree of renewable electrification, making it more difficult for the issuer to achieve as steep reductions going forward. In 2021, peers' rail freight emissions

intensities (in g CO_2e/tonne-km) were 17.2 for Germany's Deutsche Bahn (DB),[10] 14 for Switzerland's SBB,[11] 5 for France's SNCF,[12] and 2.9 for Austria's ÖBB.[13] While company-specific data is not available, in the UK where Network Rail operates, rail freight emissions intensity was 26.5 g CO_2e/tonne-km in 2021.[14]

✓ DB, SBB, Network Rail, and SNCF all have near term (2030) climate targets verified by the Science Based Targets initiative (SBTi).[15] DB and SNCF's science-based targets (SBTs) follow a 2°C pathway, while SBB and Network Rail have more ambitious 1.5°C targets. DB's near term target is intensity based, while SBB, Network Rail, and SNCF have absolute emissions reductions targets. All four of the companies' climate targets have at least some coverage of Scope 3 emissions as well as Scopes 1 and 2. DB and Network Rail have also committed to net zero by 2050 SBTs, indicating high long-term ambition. We consider these more ambitious than SPT 1 based on varying combinations of use of absolute emissions rather than intensity measures, inclusion of at least some Scope 3 emissions, and longer-term net zero commitments.

✓ ÖBB has a goal of climate neutrality by 2030 in its Scope 1 and 2 emissions excluding buildings and achieving complete climate neutrality across its full Scopes 1, 2, and 3 emissions by 2050.[16] Because its near-term targets are absolute rather than intensity based and it has complementary absolute emissions reductions targets covering its full emissions, we consider these targets more ambitious than SPT 1.

✓ Spain's Renfe seeks to reduce emissions by 9.9 million tonnes CO_2e by 2030.[17] It is unclear whether this is an absolute goal or referring to avoided emissions, and changes in Green Cargo's absolute emissions with SPT 1 are unknown, making comparisons challenging.

✓ Italy's Merictalia[18] and Luxemburg's CFL[19] do not have clear climate targets, making them less ambitious than Green Cargo.

Science-based scenarios or international targets

Ambition is likely aligned with 2°C scenarios, with caveats around tonne-kilometre growth rates and emissions coverage

✓ Although SPT 1 does not cover 100% of Green Cargo's emissions, the Scope 1 and 2 emissions reductions it entails are likely enough to be aligned with 2°C climate scenarios even if its freight tonne-kilometre growth rate triples.

✓ Because Green Cargo's electric rail freight using renewable power is already well-aligned with a low carbon future and science-based pathways, we consider it a Dark Green business[20]. In some cases, absolute emissions from these Dark Green companies may need to increase in the near term to achieve longer term societal climate goals. In the case of Green Cargo, this involves facilitating a shift from

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[10] This DB figure covers Scopes 1, 2, and 3 rather than only Scopes 1 and 2 as in Green Cargo's SPT 1. See Greenhouse_gas_intensity
[11] See Environmentally_responsible_mobility
[12] See SNCF_Group_Annual_Financial_Report
[13] See ÖBB_Sustainability_Report_2021
[14] See Rail_Emissions
[15] See Companies_Taking_Action
[16] See ÖBB_Climate_Protection_Strategy_2030
[17] See Sustainable_Business
[18] See Sustainability
[19] See Ethics_and_Responsibility
[20] Note that this is before factoring in the climate risk associated with its cargo. See "Green Cargo's revenues".

higher emissions road and air freight to lower emissions electric rail freight to reduce total freight emissions. Longer term, Dark Green companies like Green Cargo will also need to achieve net zero emissions.

✓ Green Cargo's current performance of 97% renewable electrification already exceeds the IEA net zero scenario, which requires 67% rail electrification by 2030 and 90% by 2050.[21] Similarly, its current use of less than 2% diesel rail freight and plans to phase this out by 2030 is more ambitious than the IEA net zero scenario, which requires a reduction to 24% diesel energy use by 2030.[22]

✓ According to Green Cargo, the SPT 1 threshold of 1.50 g CO2e/tonne-km is ultra-low. The company did not reference any external climate scenarios when developing SPT 1 and has not made specific projections for how its absolute emissions are likely to change if it achieves SPT 1.

✓ We are also unable to identify any science-based benchmarks for rail emissions intensity to assess the ambitiousness of an SPT 1 performance of 1.50 g CO2e/tonne-km by 2030.

✓ However, we have projected the growth in Green Cargo's absolute emissions in 2030 if it achieves SPT 1 based on Green Cargo current tonne-kilometre freight levels. We then conducted a sensitivity analysis of these projections using different tonne-kilometre growth rate assumptions. Using this approach, if Green Cargo achieves SPT 1, it will likely reduce emissions enough to align with non-sector-specific Intergovernmental Panel on Climate Change (IPCC) 2°C scenarios that require a 21% reduction in emissions between 2019-2030.[23] This is the case even if Green Cargo's rail freight tonne-kilometre annual growth rate triples to around 3% compared to Swedish historical levels between 2003-2022 of around 1%.[24] If Green Cargo's rail freight tonne-kilometre annual growth rate exceeds this threshold, it will no longer be likely aligned with IPCC 2°C scenarios.

✓ Using this same projection and sensitivity analysis approach, it is unlikely that SPT 1 aligns with IPCC 1.5°C scenarios that require 43% reduction in emissions 2019-2030[25] or IEA's net zero scenario for rail that requires a 42% reduction in emissions between 2020-2030.[26] To meet these trajectories while achieving SPT 1, we estimate that Green Cargo's tonne-kilometre growth rate would need to become negative, representing a decline in freight transport, which is unlikely.

✓ As noted above, KPI 1 and SPT 1 cover 84.3% of Green Cargo's total emissions but exclude 3% of Scope 1 and 2 and all Scope 3 emissions. Over time, these operations and value chain emissions will also need to be managed to be fully aligned with Paris Agreement goals.

✓ Be aware of potential lock in risks associated with some strategies to achieve SPT 1, including replacing old diesel engines with more efficient ones in existing diesel

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[21] See Net Zero by 2050, Rail subsector report
[22] See Rail subsector report
[23] See Climate Change 2022: Mitigation of Climate Change
[24] See Järnvägstransporter
[25] See Climate Change 2022: Mitigation of Climate Change
[26] See Rail

locomotives, purchasing hybrid locomotives and improving efficiency in diesel train planning and deployment.

Initiatives and Strategy to Achieve SPT 1

To achieve SPT 1, Green Cargo informs us it plans to:

- Invest in more efficient diesel engines and hybrid locomotives where track is not electrified and improve planning to avoid unnecessary diesel train use. Green Cargo informs us that around 30% diesel consumption reductions are expected from newer diesel engines, with higher improvements possible for hybrids. New locomotives will likely have a lifetime of around 40 years. While greater efficiency in diesel engines, hybrid locomotives and diesel locomotive planning may positively contribute to reducing climate emissions in the near term, be aware of longer-term lock in risks of continued fossil fuel use and associated climate emissions if Green Cargo does not phase out fossil fuels and transition to electrification or lower carbon drop-in fuels such as biofuels.

- Transition from diesel to biofuel or hydrogen in internal combustion engine trains. Any biofuels purchased will be compliant with the EU Renewable Energy Directive and can be substituted for diesel without any engine modifications. Hydrogen sourcing has not yet been determined. Consider the direct and indirect land-use emissions risks from biofuels, particularly those derived from food and feed-based feedstocks. While the EU Renewable Energy Directive provides some safeguards against these risks, they are difficult to eliminate from biofuel supply chains entirely. Prioritization of waste-based feedstocks, additional sustainability sourcing criteria, and lifecycle assessments of biofuel sourcing could strengthen the climate benefits of this approach. The climate emissions lifecycle benefits of hydrogen depend on methods of production, with green hydrogen produced from renewable electricity being the most beneficial compared to natural gas methods that have lock in risks. We encourage Green Cargo to prioritize green hydrogen in any future procurement. Be aware that hydrogen leakage during storage and transport may indirectly contribute to climate change.[27]

- Influence in collaboration with the Swedish Transportation Administration to electrify harbour sites to limit use of diesel trains at those locations. Electrification with renewable power is well-aligned with a low carbon future. Be aware of climate impacts associated with infrastructure construction, including embodied emission of materials and emissions from equipment use.

Green Cargo has not quantified how different investments will contribute to achieving SPT 1. We encourage Green Cargo to undertake this assessment.

Summary of key factors beyond the issuers' direct control that may affect the achievement of SPT 1

Green Cargo identifies two main factors beyond its direct control that may impact its ability to achieve SPT 1. First, societal decarbonization efforts may involve modal shift away from more emissions-intensive modes of transport such as road or air freight. In this scenario, Green Cargo would not have direct control over the kinds of goods it may transport, and this cargo would likely be lighter in weight than its current portfolio, potentially increasing emissions intensity.

Second, Green Cargo notes that most of its Scopes 1 and 2 emissions come from diesel locomotives that are still needed to facilitate intermodal logistics. Some Swedish rail tracks are not electrified, requiring continued non-electric train use. To mitigate these risks, Green Cargo is in dialogue with the Swedish Transport Administration to encourage further electrification of railway tracks to reduce the need for diesel locomotives, and three projects are already planned to be completed between 2023-2027.

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[27] See Climate benefit of a future hydrogen economy

We agree with Green Cargo's assessment of these factors, while encouraging it to pursue the mitigation measures it has identified. In its framework, Green Cargo also mentions that encouraging modal shift to rail will require more short-haul road transport between rail freight terminals and customers, also potentially increasing emissions intensity. Although this is a potential pitfall for KPI 1 materiality, we do not expect these emissions to impact KPI 1/SPT 1, which only includes Scopes 1 and 2 emissions from rail transport.

Additional factors that may be beyond Green Cargo's direct control include:

- Whether there will be sufficient supplies of cost-effective, sustainable biofuels or green hydrogen as a substitute for diesel. There is significant competition for these fuels from difficult to decarbonize sectors such as air, road freight, and sea transportation and heavy industry. Furthermore, there are many competing demands for the renewable electricity needed in large amounts to produce green hydrogen as well as growing physical climate risks to biofuel production, such as droughts, fires, and other extreme weather. All of these factors threaten the cost-competitiveness of these alternative fuels, raising questions as to whether Green Cargo's customers will accept potentially higher associated freight transport costs.
- Whether the Swedish Transportation Administration will have the mandate and resources to electrify additional rail freight infrastructure. This will depend on political and regulatory decisions on whether to prioritize and fund these projects.
- Whether Green Cargo will be able to secure sufficient financing for investments such as new more efficient diesel and hybrid locomotives.

Assessment of KPI 2: Energy efficiency of electric rail traffic (kWh/tonne-km electric rail traffic)

Aspect	CICERO Shades of Green Comments
Materiality	**KPI 2 is material in terms of addressing Green Cargo's climate risks and impacts with caveats around exclusion of non-renewable energy use, and as such should always be used in combination with KPI 1 as planned** ✓ Improving Green Cargo's energy efficiency is relevant to the company's energy transition risk exposure and contributions. Because Green Cargo requires large amounts of renewable electricity in its rail operations, if it can improve its efficiency and reduce overall energy consumption, it can help ensure other sectors of the economy that must be electrified to achieve a low carbon future, such as road transport and buildings, have access to sufficient renewable electricity supplies. ✓ At the same time, based on 2022 data, KPI 2 numerator measurements will only cover around 84% of Green Cargo's total energy use that is not associated with significant climate emissions. This is because it only covers renewable electricity use from electric rail and excludes the 16% of its other energy consumption with stronger links to emissions, such as by diesel trains, as well as smaller sources such as offices. As such, improving performance on KPI 2 may have limited emissions reduction potential. Further, this measurement also does not include energy use by Green Cargo's third-party suppliers with strong Scope 3 emissions links, such as the truck drivers for short-haul transports from rail terminals to consumer distribution centres that typically run on diesel. KPI 2 could be strengthened by covering additional aspects of Green Cargo's energy use more closely linked with its climate emissions.

✓ Note that KPI 2 is an intensity measurement that does not capture whether absolute energy use is increasing or decreasing. While this is less critical for a Dark Green business such as renewable electricity powered rail, we encourage the company to report absolute energy use as well for a more complete picture of climate risks and impacts. The issuer informs us it plans to do so in future sustainability reporting, possibly as soon as in its 2023 disclosures.

✓ It is positive that climate impact is a priority in Green Cargo's own materiality assessment, which included internal assessments and external stakeholder input.

Strategic Significance	**KPI 2 is of strategic significance** ✓ Improving energy efficiency is aligned with Green Cargo's business and sustainability strategy to be customers' sustainable logistics partner that creates climate-smart transportation solutions while achieving Sweden's national climate goals. ✓ A focus on this KPI will likely influence Green Cargo's actions and investment decisions to improve efficiency in its rail transport, such as purchasing new electric locomotives and wagons that allow for increased capacity and tractive power for longer, heavier, higher volume trains as well as eco-driving and driver assistance training and tools.
Methodology	**KPI 2 methodology is robust and transparent with caveats around its potential to be influenced by cargo density trends** ✓ Green Cargo's KPI 2 measurement of energy use from electric rail transport in kWh per tonne-kilometre is clearly defined. It is positive that KPI 2 measurements cover all of Green Cargo's electric rail operations and geographies and use actual rather than estimated kWh and tonne-kilometre data for greater accuracy. ✓ The intensity approach used in KPI 2 does not capture whether Green Cargo's absolute energy use may be increasing or decreasing. As described in the context of climate emissions above, this is especially challenging given Green Cargo's goal to encourage modal shift to lower emissions rail freight. If Green Cargo achieves this aim, it will transport more of what are likely to be lighter and less dense goods. If so, KPI 2 energy efficiency will indicate worse performance despite what might be no change in energy-related performance. It is a pitfall that KPI 2 performance cannot capture this dynamic, and investors will not necessarily be able to evaluate ultimate energy and climate impacts or benefits. We encourage Green Cargo to report on its absolute energy use in its annual sustainability reporting as a complementary metric. The issuer informs us it plans to do so, possibly as soon as in its 2023 reporting. Where possible, we also encourage Green Cargo to provide an assessment of how any changes in its cargo weight that are the result of modal shift are impacting KPI 2 performance.

Assessment of SPT 2: Improve energy efficiency of electric rail traffic to 0.030 kWh/tonne-km by 2030

Benchmark	CICERO Shades of Green Comments
Own performance	**Ambition exceeds own past performance** ✓ If Green Cargo achieves SPT 2, it will need to reduce KPI 2 by 2.1% on an average annual linear reduction basis between 2022 and 2030, while it made no improvement in KPI 2 in three out of the past four reporting years. ✓ KPI 2 declined 2.7% on a year-over-year basis between 2019-2020, but otherwise remained constant at 0.037 kWh/tonne-km electric rail traffic in 2018 and 2019 and 0.036 in 2021 and 2022. ✓ If Green Cargo achieved SPT 2, KPI 2 would decline by 16.7% in total between 2022-2030. The issuer informs us it expects reductions to be stepwise rather than linear as specific initiatives are implemented through 2030. ✓ According to Green Cargo, KPI 2 reductions to achieve SPT 2 will be more difficult to achieve going forward due to the rise of intermodal container shipping with less dense cargo, which impacts the tonne-kilometre denominator of the KPI. If this is the case, this trend may contribute to SPT 2 being more ambitious than Green Cargo's historical performance, but this is not guaranteed. We encourage Green Cargo to provide transparency about this effect in its sustainability-linked financing reporting.
Peers	**Ambition is difficult to compare with European state-owned rail freight operator peers with absolute energy targets, but higher than peers without energy targets** ✓ Green Cargo's peers in the European rail freight sector who are nationally owned either have absolute energy use reduction goals, which we cannot fully compare, or do not have quantitative energy goals, which we consider less ambitious. ✓ SNCF has a goal of reducing energy consumption by 10% by 2024.[28] Switzerland's SBB has set a target of saving 20% of its forecasted annual energy consumption for 2025, or 600 GWh.[29] Austria's ÖBB has a goal of saving 180 GWh of energy by 2024 through energy efficiency measures.[30] Because it is unclear how Green Cargo's absolute energy use will change if it achieves SPT 2, we cannot make a full comparison with these targets. ✓ While the UK's Network Rail has a goal to reduce its non-traction (i.e., not related to hauling freight) energy use by 18% by the end of 2024, we consider this less material than traction-related energy use and therefore less ambitious than SPT 2.[31]

[28] See Promoting Sustainability
[29] See Energy Efficiency
[30] See ÖBB Climate Protection Strategy 2030
[31] See Our ambition for a low-emission railway

✓ Germany's DB,[32] Spain's Renfe,[33] Italy's Merictalia,[34] and Luxemburg's CFL[35] do not appear to have quantitative energy efficiency goals. These peers are therefore less ambitious than Green Cargo on this topic.

Science-based scenarios or international targets	**Ambition is not possible to assess**
	✓ We are unable to conclude on SPT 2 alignment with 1.5°C or well-below 2°C scenarios.
	✓ Green Cargo did not reference any external climate and energy scenarios when developing SPT 2 and has not made specific projections for how its absolute energy use is likely to change if it achieves SPT 2.
	✓ Sweden's national target is to improve national energy intensity by 2030.[36] Given Sweden's already achieved reductions between 2005-2018,[37] its national energy intensity needs to decline by 28.9% between 2018-2030.[38] In comparison. SPT 2 entails a 17% reduction from 2022 to 2030. We note that national energy intensity is calculated using GDP as the denominator and is not comparable with KPI 2, that Green Cargo's baseline is 2022, and that the rail sector is likely a very small contributor to Swedish national energy use, but believe the comparison provides some context given that tonne-km can be considered a proxy for Green Cargo's contribution to GDP.

Initiatives and Strategy to Achieve SPT 2

To achieve SPT 2, Green Cargo plans to:

- Purchase new electric locomotives and wagons that allow for increased capacity as well as increased tractive power. New electric locomotives and wagons create opportunities for more energy efficient logistics solutions, especially in longer, heavier, and higher volume transport arrangements. Increasing traction to allow for longer and heavier trains improves efficiency because overall, less energy is spent compared to driving more and lighter trains.
- Train conductors in eco-driving practices including driver assistance programs. Eco-driving and driver assistance can reduce energy use by adapting to train weight, breaking rate, and topography. According to Green Cargo, these approaches can reduce electricity use by around 15-20%, which is positive.

These strategies are well-aligned with its green financing framework described in detail above. See "Shading of eligible projects under Green Cargo's green financing framework" for additional climate and environmental considerations associated with these approaches.

Green Cargo has not quantified how different investments will contribute to achieving SPT 2. We encourage Green Cargo to undertake this assessment.

Summary of key factors beyond the issuers' direct control that may affect the achievement of SPT 2

Green Cargo notes a main factor beyond its direct control that may impact its ability to achieve SPT 2 similar to the first affecting SPT 1. This is its support for societal modal shift to less emissions-intensive rail leading to

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[32] See Our Targets
[33] See Sustainable Transport
[34] See Sustainability
[35] See Rapport Annuel Du Groupe CFL
[36] See Sweden's long-term strategy for reducing greenhouse gas emissions
[37] Most recent available data is for 2018. See Sweden: Energy Country Profile
[38] Assuming a linear trajectory.

transporting lighter goods, which could potentially decrease energy efficiency and is challenging to mitigate. In a changing climate, the issuer informs us that colder winters or hotter summers could also increase Green Cargo's energy use.

We agree with Green Cargo's assessment. An additional factor that may impact its achievement of SPT 2 beyond its direct control, while highly unlikely, is the company's ability to secure financing for new locomotives, wagons, and eco-driving and driving assistance programs.

4 Terms and methodology

This note provides CICERO Shades of Green's second opinion of the client's framework dated 2023. This second opinion remains relevant to all sustainability linked bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Shades of Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

This assessment is based on a review of documentation of the client's policies and processes, as well as information provided to us by the client during meetings, teleconferences and email correspondence. In our review we have relied on the correctness and completeness of the information made available to us by the company.

Shades of Green methodology

CICERO Shades of Green second opinions are graded dark green, medium green or light green, reflecting a broad, qualitative review of the climate and environmental risks and ambitions. The shading methodology aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The shades are intended to communicate the following:

	Shading	Examples
°C	**Dark Green** is allocated to projects and solutions that correspond to the long-term vision of a low-carbon and climate resilient future.	Solar power plants
°C	**Medium Green** is allocated to projects and solutions that represent significant steps towards the long-term vision but are not quite there yet.	Energy efficient buildings
°C	**Light Green** is allocated to transition activities that do not lock in emissions. These projects reduce emissions or have other environmental benefits in the near term rather than representing low carbon and climate resilient long-term solutions.	Hybrid road vehicles

The "Shades of Green" methodology considers the strengths, weaknesses and pitfalls of the project categories and their criteria. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects; weaknesses are typically areas that are unclear or too general. Pitfalls are also raised, including potential macro-level impacts of investment projects.

Assessment of alignment with Green Bond Principles

CICERO Shades of Green assesses alignment with the International Capital Markets' Association's (ICMA) Green Bond Principles. We review whether the framework is in line with the four core components of the GBP (use of proceeds, selection, management of proceeds and reporting). We assess whether project categories have clear environmental benefits with defined eligibility criteria. The Green Bonds Principles (GBP) state that the "overall environmental profile" of a project should be assessed. The selection process is a key governance factor to consider in CICERO Shads of Green's assessment. CICERO Shades of Green typically looks at how climate and environmental considerations are considered when evaluating whether projects can qualify for green finance

funding. The broader the project categories, the more importance CICERO Shades of Green places on the selection process. CICERO Shades of Green assesses whether net proceeds or an equivalent amount are tracked by the issuer in an appropriate manner and provides transparency on the intended types of temporary placement for unallocated proceeds. Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs.

Assessment of Sustainability-Linked Bond and Sustainability-Linked Loan Frameworks

The structure of Sustainability Linked Bonds (SLBs) and Sustainability Linked Loans (SLLs) linking financial returns with environmental performance can provide security around environmental impacts. However, SLBs and SLLs can vary widely in terms of robustness depending on what KPIs are selected and how they are measured. We provide transparency on 1) the relevance, materiality and reliability of selected KPIs, 2) the rationale and level of ambition of the proposed Sustainability Performance Targets, 3) the relevance of selected benchmarks and baselines, as well as transparency on how well the strategy outlined to achieve them fits with a low carbon and climate resilient future. By considering these factors, we provide context to consider the ambition level of the SLB and SLL. Please note that CICERO Shades of Green does not evaluate any financial aspects of transaction, including to what degree the variation in the financial characteristics of an SLB and SLL is commensurate and meaningful.

Incorporated into the sustainability-linked finance assessment is our company climate risk assessment approach. We allocate a shade of green, yellow or red (see figure below) to revenues or portfolio value which reflect alignment of the underlying activities to a low carbon and climate resilient future and taking into account governance issues.

Shading		Examples	
°C	**Dark Green** is allocated to projects and solutions that correspond to the long-term vision of a low-carbon and climate resilient future.		Solar power plants
°C	**Medium Green** is allocated to projects and solutions that represent significant steps towards the long-term vision but are not quite there yet.		Energy efficient buildings
°C	**Light Green** is allocated to transition activities that do not lock in emissions. These projects reduce emissions or have other environmental benefits in the near term rather than representing low carbon and climate resilient long-term solutions.		Hybrid road vehicles
°C	**Yellow** is allocated to projects and solutions that do not explicitly contribute to the transition to a low carbon and climate resilient future. This category also includes activities with too little information to assess.		Healthcare services
°C	**Red** is allocated to projects and solutions that have no role to play in a low-carbon and climate resilient future. These are the heaviest emitting assets, with the most potential for lock in of emissions and highest risk of stranded assets.		New oil exploration

Assessment of Governance

In addition to shading from dark green to red, CICERO Shades of Green also includes a governance score to show the robustness of the company's sustainability governance structure. When assessing the governance of the company with a combined framework, CICERO Shades of Green looks at eight elements: 1) strategy, policies and governance structure; 2) lifecycle considerations including supply chain policies and environmental considerations towards customers; 3) the integration of climate considerations into their business and the handling of resilience issues; 4) the awareness of social risks and the management of these; 5) reporting; 6) the selection process used to

identify and approve eligible projects under the framework; 7) the management of proceeds; and 8) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

Appendix 1:
Referenced Documents List

Document Number	Document Name	Description
1	Green Cargo Sustainable Finance Framework	Dated 2023
2	Green Cargo Års- Och Hållbarhetsredovisning 2022	Annual and sustainability report for 2022
3	Green Cargo Annual Report Including Sustainability Report	Covering 2021
4	Green Cargo Green Finance Framework Report	As of Q4 2022
5	Sustainable logistics	Green Cargo website
6	Green Cargos interna uppförandekod	Green Cargo's internal code of conduct
7	Green Cargo's Code of Conduct for Suppliers	Green Cargo's supplier requirements

Appendix 2:
About CICERO Shades of Green

CICERO Shades of Green, now a part of S&P Global, provides independent, research-based second party opinions (SPOs) of green financing frameworks as well as climate risk and impact reporting reviews of companies. At the heart of all our SPOs is the multi-award-winning Shades of Green methodology, which assigns shadings to investments and activities to reflect the extent to which they contribute to the transition to a low carbon and climate resilient future.

CICERO Shades of Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Shades of Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Shades of Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

Environmental Finance Bond Awards 2022 Winner — External assessment provider of the year

★ **2020** External Assessment Provider Of The Year, Environmental Finance Green Bond Awards

★ **2020** Largest External Review Provider In Number Of Deals, Climate Bonds Initiative Awards

★ **2019** External Assessment Provider Of The Year, Environmental Finance Green Bond Awards

★ **2019** Largest Green Bond SPO Provider, Climate Bonds Initiative Awards

★ **2018** External Assessment Provider Of The Year, Environmental Finance Green Bond Awards

★ **2018** Largest External Reviewer, Climate Bonds Initiative Awards

★ **2017** Best External Assessment Provider, Environmental Finance Green Bond Awards

★ **2016** Most Second Opinions, Climate Bonds Initiative Awards