



Volvo Car AB Green Financing Second Opinion

24 May 2023

Executive Summary

Volvo Car AB and its consolidated subsidiaries (“Volvo Cars”) is a global automotive company, headquartered in Gothenburg, Sweden. In 2022, Volvo Cars sold around 615,000 vehicles in over 100 countries, of which around 11% were fully electric.

Under its framework, Volvo Cars will finance or refinance the research and development and production of electric vehicles. In the near term, Volvo Cars expects to allocate the largest proportion of proceeds to research and development. Investments in related components, such as battery manufacturing and recycling, are eligible, though expected to initially be small. Electric transport solutions are vital to transition to a low-carbon and climate resilient future. Nonetheless, they entail substantial lifecycle emissions (e.g. relating to raw material sourcing and battery production, as well as vehicle charging which depend on the electricity mix in the grid and factors such as vehicle size, weight, and power). It should also be noted that the largest amount of carbon savings for the transportation sector come from switching from individual modes of transport (e.g. private cars) to mass transit, while the retirement of older internal combustion engines vehicles from circulation is also crucial.

We rate the framework **CICERO Dark Green** and give it a governance score of **Excellent**. The Dark Green shading reflects the eligibility criteria’s exclusive focus on electric vehicles, given the importance of electric transport in a 2050 future, and Volvo Cars’ climate governance, including its efforts in respect of operational and battery supply chain emissions and circular practices.

Strengths

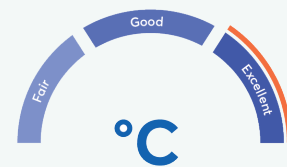
Volvo Cars has clear targets to reduce the emissions in its core business’ value chain, including a long-term goal of becoming a climate neutral company by 2040. Volvo Cars’ ambitious plan to become a fully electric car company by 2030 is ahead of science-based decarbonization pathways set for the global sector. Lifecycle considerations are important, even in the context of transitioning to electric vehicles. Volvo Cars, for example, calculates that a battery electric XC40 model has higher emissions from materials production and refining than the internal combustion engine equivalent, though it will generate around half the lifecycle emissions (if charged using wind power produced electricity and assuming a 200,000 kilometer drive range).¹ Certain emissions reduction targets extend to suppliers (e.g. aiming to have tier 1 suppliers fully powered by climate neutral energy by 2025), while Volvo Cars commits to report on the lifecycle emissions of all new electric models. While Volvo Cars acknowledges that some offsetting will be needed to achieve its 2040 target, no offsetting will be used to reach its 2025 target (whether offsets can be used to achieve the 2030 targets is not yet decided).

SHADES OF GREEN



°CICERO
Dark Green

GOVERNANCE ASSESSMENT



GREEN BOND AND LOAN PRINCIPLES

Based on this review, this framework is found aligned with the principles.

¹ [Volvo Cars - Battery electric XC40 Recharge and XC40 ICE Carbon Footprint Report](#)



Volvo Cars seeks to increase the circularity of its core business to reduce upstream emissions. Importantly, Volvo Cars has quantifiable targets in place in respect of this: it aims to be a ‘circular business’ and from 2025 to use 25% recycled and bio-based plastics, 40% recycled aluminum, and 25% recycled steel in its new vehicles.

Volvo Cars shows a strong awareness of physical climate risks. It screens its production sites and suppliers for physical risks, conducts risk and vulnerability assessments in relation to the identified risks, and prepares adaptation solution plans. Volvo Cars utilizes IPCC climate scenarios for 2030, 2050, and 2100 time-horizons.

Pitfalls

In respect of manufacturing, proceeds could finance capital expenditure investments that serve the production of both electric and internal combustion engine vehicles. For example, Volvo Cars can finance general investments in production lines which produce both electric and internal combustion engine vehicles or tools necessary to produce both types of vehicles. In such instances, Volvo Cars states it will pro-rate investments so that proceeds under the framework reflect only the share of electric vehicles served by the relevant investments. Crucially, Volvo Cars states the shares of investments directly attributable to electric vehicles will be substantial, and that, in any event, it will prioritize investments in factories where only electric vehicles are produced or which otherwise relate wholly to electric vehicles (e.g. production line modifications to allow for electric vehicle production). This risk must also be viewed in the light of Volvo Cars’ expectation that, in the near term, a larger proportion of proceeds will be allocated to research and development than manufacturing.

Proceeds can be used to partly finance acquisitions in companies whose operations do not fully align with the eligibility criteria. Volvo Cars includes various mitigants in this respect: i) acquisition costs can only relate to the costs of tangible and intangible assets, ii) it will pro-rate acquisition costs, so that proceeds are only used for the proportion aligned with the eligibility criteria, and iii) it will aim that this aligned proportion reflects its EU Taxonomy reporting (under which, in 2022, 78% of revenue and 85% CAPEX was EU Taxonomy eligible). Nonetheless, as there is no requirement for acquired companies’ businesses to fully align with the framework, there is risk, particularly given the sector, that these could have partial exposure to fossil-fuel linked activities. However, considering Volvo Cars’ 2030 all-electric production goal, the risk should diminish over time.

Electric vehicles come with significant climate, environmental, and social risks. Climate risks arise from, among other things, increased demand for raw materials and their sourcing from areas highly exposed to physical climate risk, and the high lifecycle emissions associated with battery manufacturing.² Other environmental risks arise from biodiversity impacts from mining. Social risks are also prevalent, stemming from deep supply chains, often in less well-regulated jurisdictions. Volvo Cars looks to mitigate such risks through, for example, its supply chain emissions target and battery audit programs, whereby it evaluates direct and indirect suppliers according to criteria established by the OECD Due Diligence Guidance and other ESG factors (in 2022, it carried out a total of 16 audits in its battery materials supply chain). Moreover, since 2021, Volvo Cars utilizes blockchain technology to track the origins of cobalt, lithium, nickel, and mica used in its batteries. Though it does not currently source battery raw materials directly, this technology enables it to assess the environmental and social risks associated with its battery suppliers and to monitor mining conditions more effectively through the Better Mining Initiative.

Under the framework, Volvo Cars does not commit to report on the environmental impact metrics related to the share of allocated proceeds, instead using the annual corporate performance on selected environmental indicators as a proxy. According to Volvo Cars, it adopts this approach because the estimated environmental benefit of the allocated proceeds will be realised over several years and will be dependent on levels of future battery electric vehicles manufacturing and sales volumes.

²According to recent studies, emissions from the production of lithium-ion batteries range from 61-106 kgCO₂e/kWh: [IVL - Lithium-Ion Vehicle Battery Production - 2019](#)



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1 Volvo Cars' environmental management and green financing framework

Company description

Volvo Car AB and its consolidated subsidiaries ("Volvo Cars") is a global automotive company, headquartered in Gothenburg, Sweden. Listed on the Nasdaq Stockholm stock exchange, its main owner is Geely Sweden Holdings AB. In 2022, Volvo Cars sold around 615,000 vehicles in over 100 countries. Of these, around 11% were fully electric vehicles, an increase from 4% in 2021.

This is an update of Volvo Cars' framework dated September 2020. As of March 2023, the amount of outstanding debt under that framework totals around EUR 1.2 billion.

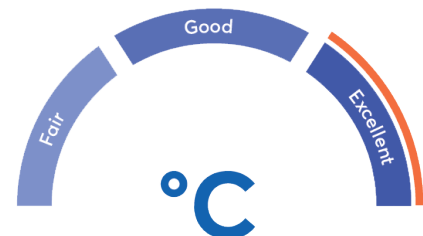
Governance assessment

Volvo Cars has a long-term goal of becoming a climate neutral company by 2040. In 2022, Volvo Cars average lifecycle emissions were of 46.8 tCO₂ per vehicle. This target is complemented by Volvo Cars' holistic use of lifecycle analyses and assessments, which also inform its vehicle production investment decisions. Volvo Cars demonstrates good approaches to physical risks - performing analyses of its manufacturing operations and supply chain exposure - and risks in its supply chain, for example via audits in its battery supply chain, though its strategy to minimize pollution and biodiversity impacts across its supply chain is more nascent.

Volvo Cars' project selection process is robust. Its evaluation process includes assessments of 'potential controversies' such as lock-in effects and rebound effects. This is an important commitment, given the potential dual use of proceeds for capital expenditure to produce both electric and internal combustion engine vehicles (see Pitfalls, above).

Volvo Cars has a track record of green finance reporting and will continue to report on allocation and impact. It could improve its reporting commitments, however, by reporting on the environmental benefits relating specifically to the proceeds under the framework rather than using annual corporate level metrics.

The overall assessment of Volvo Cars' governance structure and processes gives it a rating of **Excellent**.





Sector risk exposure

Physical climate risks. Science shows that extreme weather events are becoming more frequent and intense, that incremental climatic changes are highly likely to happen, and that their impacts are expected to grow more severe over the coming years and decades. The impacts of physical risks are uncertain in probability, magnitude, and timing. Physical climate change may impact Volvo Car's production facilities (for example via extreme weather events or water-stress) and shipments/logistics. Volvo Cars' global supply chain will also be at increased risk, for example disruption to raw material supply.

Transition risks. The number, scope, and ambition of regulatory requirements regarding greenhouse gas emissions are expected to increase significantly in the future for the automotive sector. In particular, there are risks around banning the sale of new internal combustion engine vehicles and their use in urban areas, stricter vehicle fuel efficiency regulations and emissions standards, as well as regulations that apply to production facilities in the supply chain. The market size and demand for critical minerals and rare earth metals are projected to grow almost sevenfold between 2020 and 2030. This could pressure an already tightly pressed supply chain of raw materials, consequently reducing available supply and increasing prices, although advances in battery recycling may offset this somewhat. As technology improves and uptake increases, an overall gradual decline in government subsidies for electric vehicles is also expected. Electric vehicles rely on the concurrent development of charging infrastructure. While Volvo Cars can influence the proliferation of this infrastructure to some extent, this also relies heavily on other stakeholders.

Environmental risks. Volvo Cars has a large and complex global supply chain. Local environmental impacts such as air and noise pollution, wastewater discharge, ground pollution and other negative impacts, including biodiversity loss from the sourcing of natural resources may occur. While mining is crucial to facilitating the large-scale implementation of zero emission technologies, it involves significant risks to the local environment. Such risks include air pollution and wastewater pollution.

Social risks. Electric vehicles rely to a large extent on the sourcing of scarce resources, which brings social risk, especially in less well-regulated jurisdictions. A global presence and deep supply chain can also lead to human rights and labor risks. Despite the drop in the likelihood of accidents, and the corresponding improvements in vehicle safety, over the past decades, damage from vehicular accidents remains a key risk for automotive companies.

Environmental strategies and policies

Volvo Cars no longer manufactures internal combustion engines as of 2022 (though they can still be supplied by a third party and assembled by Volvo Cars), while it aims for 50% of its global sales to be fully electric vehicles by 2025, and to only manufacture fully electric vehicles by 2030.

Volvo Cars aims to be climate neutral by 2040 and has set interim climate targets for 2025. By 2025, it aims to reduce the lifecycle carbon emissions per vehicle by 40% (2018 baseline). This target is broken down into three, per-vehicle sub-targets: i) 25% reduction in operational emissions, ii) 50% reduction in tailpipe emissions, and iii) 25% reduction in supply chain emissions. In 2022, Volvo Cars lifecycle emissions per car were 15% below the 2018 baseline, with an average lifecycle emissions of 46.8 tons CO₂ per vehicle. By 2030, compared to 2019 baselines, Volvo Cars targets i) 60% reduction in Scope 1 and 2 emissions, and ii) 52% reduction in Scope 3



emissions from use of sold products per vehicle kilometer. These 2030 targets have been verified by the Science-Based Target initiative (SBTi). While Volvo Cars acknowledges that some offsetting will be needed to achieve its 2040 target, no offsetting will be used to reach its 2025 target (whether offsets can be used to achieve the 2030 targets is not yet decided).

In 2022, total reported emissions across Scope 1, 2 and 3 were 38 Mt CO₂, down from 39 Mt CO₂ in 2021 (3% decrease). Scope 1 and 2 emissions were 0.11 Mt CO₂ in 2022, down from 0.12 Mt CO₂ in 2021, which nevertheless did not translate into an operational CO₂ emission reduction per vehicle. The bulk of such emissions came from manufacturing operations: from the use of fossil fuel equipment or carbon intensive electricity. Volvo Cars aims at having climate neutral operations by 2025 (manufacturing and non-manufacturing). This is dependent on the availability of climate neutral heating and electricity sourcing, which currently is not available to all its manufacturing facilities. In 2022, its manufacturing facilities were run on 66% climate neutral energy (including 94% climate neutral electricity). For this, Volvo Cars utilizes guarantees of origins and other certifications - note that guarantees of origin and other certifications do not influence the emissions from electricity delivered - as well as solar panels and wind turbines at facilities which in 2022 accounted for 8% of electricity consumption.

In 2022, Scope 3 emissions were around 13 Mt CO₂ for upstream emissions (mostly from purchased aluminum, steel, and lithium-ion batteries) and 25 Mt CO₂ for downstream emissions (mostly from the combustion of fuel during sold vehicle use). The respective figures in 2021 were 12.3 Mt CO₂ and 26.7 Mt CO₂. In respect of progress towards its 2025 sub-targets, this means that, compared to the 2018 baseline, there has been a reduction of 31.5% per vehicle for tailpipe emissions and an increase of 20% per vehicle for supply chain emissions. In terms of tailpipe emissions, the reduction was achieved by the launch of Volvo Cars' third fully electric vehicle, which translated into the higher percentage of electrified vehicles sold globally. Meanwhile, the increase in supply chain emissions stemmed from the increased weight and materials used in new fully electric and plug-in hybrid vehicles. Volvo Cars is seeking to limit such emissions by increasing its use of recycled materials. In addition, all of Volvo Cars' directly contracted suppliers, including carbon intensive aluminum, steel, and battery suppliers, are requested to show a roadmap as to how they will reach 100% climate neutral energy by 2025. Volvo Cars also expects for further reductions on its supply chain emissions through the internalization of part of its battery supply (via NOVO Energy AB) and aims to be a circular business (with an intermediate target of using 25% recycled and bio-based plastics, 40% recycled aluminum and 25% recycled steel in new cars from 2025).

Volvo Cars considers physical climate risk within its risk management process, and it has identified storm and flood events are among the most relevant natural hazards that could affect its operations. Long-term physical risk exposure is considered using scenario analysis, which encompass extreme weather vulnerability assessments for its own production and its supply chain and includes monitoring of the supply chain. For example, it monitors small-scale mining sites (for battery sourcing) vulnerability to flooding and other weather events. Additionally, in 2021, Volvo Cars began measuring water stress exposure at the site level, with 22% of its production volume in 2022 coming from plants in a high water-stressed area.

Volvo Cars publishes an annual sustainability report, prepared in accordance with the GRI. It also reports in accordance with the TCFD recommendations and to the CDP in respect of climate change and water security. Long-term variable cash remuneration for Volvo Cars' executives includes the achievement of its CO₂ fleet targets as a factor.

Green financing framework

Based on this review, this framework is found to be aligned with the Green Bond Principles and Green Loan Principles. For details on the issuer's framework, please refer to the green financing framework dated May 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 section 2.

Selection

Volvo Cars has established a cross-departmental sustainable finance committee (SFC) to determine the eligibility of each project. The SFC is comprised of members of its global sustainability department, as well as other function teams and departments (as deemed necessary). Decisions are made by consensus. The SFC meets on a semi-annual basis, or when required.

The role of the SFC is to review and validate the selection of the eligible green projects based on the framework's eligibility criteria. In assessing projects, Volvo Cars will consider the substantial contribution, do no significant harm, and minimum safeguard criteria of the EU Taxonomy and, where feasible, will prioritize projects considered to align with the EU Taxonomy. The SFC will also screen projects for potential ESG controversies, such as lock-in and rebound effects, and will make use of Volvo Cars' approach to lifecycle analyses, physical risk assessments, and approaches to battery supply chain screening and audit.

Management of proceeds

The net proceeds from green financing instruments will be deposited in Volvo Cars' general account and an amount equal to the net proceeds will be earmarked for allocation to the eligible green project portfolio. The tracked proceeds will be adjusted on a semi-annual basis to match allocations to eligible projects during the time each green financing instrument is outstanding.

Eligible green projects consist of new projects, as well as projects which expenditures were incurred within a two-year look-back period from the date of each issuance. On a best effort basis, proceeds will be fully allocated at the earliest convenience and within two years from the date of each issuance.

Unallocated proceeds will be earmarked and invested in cash and/or cash equivalents and/or other liquid marketable instruments, not including green or conventional debt repayment, as per Volvo Cars' cash management policy. Volvo Cars informed us that this currently only considers credit metrics and does not consider sustainability criteria, e.g., with regards to fossil fuel related assets.

Reporting

Volvo Cars has included a 'green financing report' section in its annual and sustainability report for its green financing since 2020. It will continue to do so and/or publish a standalone document or presentation, available on its website. Volvo Cars commits to such reporting until full allocation of all green financing instrument proceeds.

The allocation reporting will include, for each individual issuance, the proportion of net proceeds allocated to each project type (research and development, manufacturing and other), financing versus refinancing, and the balance of any unallocated proceeds invested in cash and/or cash equivalents and/or other liquid marketable instruments earmarked for the eligible green projects.

Volvo Cars will also continue to report on relevant environmental impact metrics. Reporting will continue to include one or several of the key performance indicators listed in the framework on a historical (achieved performance) basis. In addition, Volvo Cars will disclose the measurement methodology for quantitative indicators. Volvo Cars aims to align with ICMA's "Handbook - Harmonized Framework for Impact Reporting" (June 2022) on a best effort.³ In its previous green financing reporting, Volvo Cars has not reported the

³ ICMA - Harmonized Framework (2022)



environmental benefit related to the share of allocated proceeds under its framework. Rather, it has used its annual corporate performance on the selected indicators for the impact report. This will continue to be the case going forward.

Volvo Cars will continue to obtain an annual assurance for its allocation and impact reporting. In respect of allocation, this will confirm that an amount equal to the net proceeds has been allocated in compliance with the framework's eligibility criteria, and, in respect of impacts, that the metrics disclosed comply with the commitments set out in the framework.



2 Assessment of Volvo Cars' green financing framework

The eligible projects under Volvo Cars' green financing framework are shaded based on their environmental impacts and risks, based on the "Shades of Green" methodology.

Shading of eligible projects under Volvo Car's green financing framework

- Volvo Cars will allocate proceeds to new and existing projects. For existing projects, proceeds will refinance investments or expenditures that took place within two years prior to the issuance of a new green financing instrument. Volvo Cars expects most proceeds to be used for financing and for this to increase over time.
- In the near term, Volvo Cars expects to allocate the largest proportion of proceeds to research and development. The remainder, relating to manufacturing, will mostly include allocation to existing and new car production plants, with small shares for related components such as battery manufacturing and recycling facilities. As electric vehicle production increases, a greater share of proceeds is expected to be allocated to manufacturing.
- Proceeds will not be allocated, in whole or part, to financing, nor refinancing, assets related to combustion-engine vehicles, hybrid electric vehicles, nor plug-in hybrid vehicles (PHEV). This exclusion must be considered in light of Volvo Cars' confirmation that proceeds could be used for capital expenditure investments in joint infrastructure or equipment. Volvo Cars' states it will pro-rate such investments so that proceeds under the framework reflect only the share of fully electric vehicles served by the relevant investments, and that such investments would substantially, but not solely, serve electric vehicles (see below). Given that Volvo Cars should substantially increase the share of electric vehicle produced as a percentage of total out, in line with its 2030 all-electric production goal, we expect investments in joint infrastructure or equipment issue to decrease accordingly.
- Investments via joint ventures are not expected, according to Volvo Cars.
- As of March 2023, the amount of Volvo Cars outstanding green debt totaled around EUR 1.2 billion, with over 80% of the proceeds allocated. Around two thirds of the allocations were directed towards the research & development of electric powertrains and related new platform technology (both financing and refinancing). The remainder was allocated for the financing and refinancing of investments and expenditures related to Volvo Cars' manufacturing facilities for fully electric cars, as well as an equity injection in Polestar.



Category	Eligible project types	Green Shading and considerations
Clean Transportation	<p>Investments and expenditures (incl. acquisition⁴ costs, research & development) for the design, development and manufacturing of Zero Emission Vehicles that is BEV</p> <ul style="list-style-type: none"> • Research & Development dedicated to Zero Emission Vehicles, (including powertrains) and technology which include testing, development of facilities, tooling and manufacturing of Zero Emission Vehicles • Manufacturing Facilities, including new facilities and upgrading or modifying of current manufacturing facilities to produce Zero Emission Vehicles or related components such as EV Batteries and powertrains, as well as remanufacturing and/or recycling of batteries. <p>The corresponding EU Taxonomy Economic Activities are:</p> <p>3.3 Manufacture of low carbon technologies for transport</p> <p>3.4 Manufacture of batteries</p>	<p>Medium Green to Dark Green</p> <ul style="list-style-type: none"> ✓ Volvo Cars’ framework focuses on research and development and manufacturing of electric vehicles. Electric transport solutions are part of the 2050 solution, though entail substantial lifecycle emissions (e.g. relating to raw material sourcing and battery production, and which depend on the electricity mix in the grid and factors such as vehicle size, weight, and power). In a 2050 perspective, the largest amount of carbon savings come from switching from individual modes of transport (e.g. private cars) to mass transit, while the retirement of older internal combustion engines vehicles from circulation is also crucial. ✓ Volvo Cars has confirmed that proceeds can be used for capital expenditure investments in infrastructure or equipment which do not solely serve electric vehicles, for example production lines that produce all types of vehicles or tools necessary to produce both. In such instances, Volvo Cars states it will pro-rate investments so that proceeds under the framework reflect only the share of electric vehicles served by the relevant investments. ✓ Crucially, Volvo Cars states the shares of investments directly attributable to electric vehicles will be substantial, and that, in any event, it will prioritize investments in factories where only electric vehicles are produced or which otherwise relate wholly to electric vehicles (e.g. production line modifications to allow for electric vehicle production). It is Volvo Cars’ responsibility to provide transparency on such investments. ✓ Such investments risks must also be viewed in the light of Volvo Cars’ expectation that, in the near term, a larger proportion of proceeds will be allocated to research and development than manufacturing, the importance of electric vehicles in the transition, the benefits of using existing infrastructure, and its target to only manufacture electric vehicles by 2030. ✓ Battery manufacturing can be financed under the framework, though Volvo Cars expects this to amount to a small share in the coming years. The manufacture of batteries for

⁴ Eligible acquisition costs can only relate to the costs of tangible and intangible assets. The intention is to be in line with the annual EU Taxonomy reporting of Volvo Cars.



7.4 Installation, maintenance and repair of charging stations for electric vehicles in buildings

electric vehicles comes with significant climate, environmental, and social risks. Any production of batteries would be subject to Volvo Cars' target to have climate neutral operations by 2025, while it looks to mitigate supply chain risks through, for example, its supply chain emissions target and battery audit programs.

- ✓ Battery recycling can be financed under the framework. Given the limited availability of Volvo Cars batteries for recycling, Volvo Cars is at the early stages of developing its battery recycling facilities and investments under the framework are therefore expected to be small. Batteries are collected from various sources including Volvo Cars' retailers, third party workshops and dismantlers in addition to Volvo Cars Battery Centers. Battery recycling will play an increasingly important role in a 2050 future, though is currently energy intensive and can use materials with high embodied emissions such as chemicals. Any battery recycling done by Volvo Cars' partners is subject to its requirement for Tier 1 suppliers to use climate neutral energy by 2025.
- ✓ Current production includes some fossil fuel equipment (e.g. fork lifts, auxiliary generators and other logistics equipment), but Volvo Cars informed us that this is excluded under the framework.
- ✓ Proceeds can be used for acquisitions in companies whose operations do not fully align with the eligibility criteria. Volvo Cars includes various mitigants in this respect: i) acquisition costs can only relate to the costs of tangible and intangible assets, ii) it will pro-rate acquisition costs, so that proceeds are only used for the proportion aligned with the eligibility criteria, and iii) it will aim that this aligned proportion reflects its EU Taxonomy reporting (under which, in 2022, 78% of revenue and 85% CAPEX was EU Taxonomy eligible). Nonetheless, as there is no requirement for acquired companies' businesses to fully align with the framework, there is risk, especially as they are likely active in the automotive sector, that these could have partial exposure to fossil-fuel linked activities. However, considering Volvo Cars' 2030 all-electric production goal, the risk should diminish over time.

Table 1. Eligible project categories









3 Terms and methodology

This note provides CICERO Shades of Green’s second opinion of the client’s framework dated May 2023. This second opinion remains relevant to all green 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.

The second opinion is based on a review of the framework and documentation of the client’s policies and processes, as well as information gathered during meetings, teleconferences and email correspondence.

‘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
 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
 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
 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.

Sound governance and transparency processes facilitate delivery of the client’s climate and environmental ambitions laid out in the framework. Hence, key governance aspects that can influence the implementation of the green bond are carefully considered and reflected in the overall shading. CICERO Shades of Green considers four factors in its review of the client’s governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: 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.



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.



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Volvo Cars Green Financing Framework (May 2023)	
2	Volvo Cars Annual and Sustainability Report (2022) and Battery electric XC40 Recharge and XC40 ICE Carbon Footprint Report	
3	Volvo Cars Interim Report Fourth Quarter and Full Year (2022)	
4	Volvo Cars Carbon Offsetting Position Paper	
5	Climate Action Position Paper	
6	Procurement Position on Metal and Mineral Sourcing	
7	Code of Conduct For Business Partners	
8	Supply Chain Sustainability Management	
9	CDP Water Security and Climate Change (2022)	



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

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- ★ **2021 Largest External Reviewer**, Climate Bonds Initiative Awards
 - ★ **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