°CICERO Shades of Green

Volvo Car AB
Green Financing Second Opinion

September 22, 2020

Volvo Car AB and its consolidated subsidiaries ("Volvo Cars") is a global automotive company headquartered in Gothenburg, Sweden. In 2019, Volvo Cars sold 705,000 cars in about 100 countries. 14% of Volvo Cars' sales were plug-in hybrid vehicles in H1 2020, and it will launch its first battery electric vehilce, the XC40 BEV, later in 2020.

Volvo Cars only includes Clean Transportation as a category in its Green Financing Framework which focuses exclusively on the design, development and production of battery electric vehicles (BEVs) and components that are unique to BEVs and cannot be used for hybrid vehicles. This includes licensing fees for production lines and equity injections into its non-consolidated subsidiary, Polestar, according to the issuer. Volvo Cars is currently investigating various ways to provide easy access to charging infrastructure as the expansion of charging infrastructure and deployment of electric vehicles go hand in hand.

As of 2025, Volvo Cars is aiming for 50% of its sales to be from pure electric vehicles, with the rest being hybrids. The company intends to launch a fully battery electric vehicle each year over the coming years. According to the European Federation for Transport and Environment, electric cars in Europe emit, on average, almost 3 times less CO_2 than equivalent petrol/diesel cars. In the worst case scenario, an electric car with a battery produced in China and driven in Poland, still emits 22% less CO_2. According to the issuer, Volvo Cars has internal life-cycle emission targets for all new vehicles and is actively engaging its suppliers on upstream emissions.

Under this framework, Volvo Cars excludes investments in new and improved production of hybrid vehicles and conventional vehicles as well as investments into fossil fuel equipment within production facilities. The issuer has a carbon reduction plan approved by the Science-Based Target initiative (SBTi) and aims for global climate neutral production by 2025 as well as climate neutrality across the entire value chain by 2040. Currently, vehicle production still includes fossil based energy production as well as some equipment, such as fork lifts and auxiliary engines. It is a strength that Volvo Cars screens and discloses climate risks according to TCFD and that the issuer works actively with its suppliers to reduce its upstream emissions**.** In addition, Volvo Cars validates its achievements and targets through third parties. However, while Volvo Cars manages unallocated proceeds according to its liquidity policy, they can be invested without additional screenings for sustainability.

Based on an assessment of the framework's alignment with the Green Bond and Green Loan Principles, the project categories and Volvo Cars' governance, Volvo Cars' Green Financing Framework receives an overall **CICERO Dark Green** shading and a governance score of **Excellent**. Volvo Cars could improve its framework, e.g., by requiring increased efforts on establishing charging infrastructure and utilizing zero-emission production equipment where possible.

SHADES OF GREEN

Based on our review, we rate the Volvo Cars' Green Financing Framework **CICERO Dark Green.**

Included in the overall shading is an assessment of the governance structure of the green financing framework. CICERO Shades of Green finds the governance procedures in Volvo Cars' framework to be **Excellent**

GREEN BOND and GREEN LOAN PRINCIPLES

Based on this review, this Framework is found in alignment with the principles.

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1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated September 2020**.** 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 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.

Expressing concerns with 'shades of green'

CICERO 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:

CICERO Shades of Green	Examples
Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated.	Wind energy projects with a strong governance structure that integrates environmental concerns
Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered.	Bridging technologies such as plug-in hybrid buses
Light green is allocated to projects and solutions that are climate friendly but do not represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions, but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them.	Efficiency investments for fossil fuel technologies where clean alternatives are not available
Brown is allocated to projects and solutions that are in opposition to the long-term vision of a low carbon and climate resilient future.	New infrastructure for coal

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 financing are carefully considered and reflected in the overall shading. CICERO Green considers four factors in its review of the client's governance processes: 1) the policies and goals of relevance to the green financing 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.

2 Brief description of Volvo Cars' Green Financing Framework and related policies

Volvo Car AB and its consolidated subsidiaries ("Volvo Cars") is a global automotive company headquartered in Gothenburg, Sweden. Founded in 1927, Volvo Cars has been under the direct ownership of Geely Sweden Holdings AB and ultimately by Zheijang Geely Holding Group Co ltd since 2010. In 2019, Volvo Cars sold 705,000 cars in about 100 countries. The company's main car production plants are located in Gothenburg (Sweden), Ghent (Belgium), South Carolina (US), Chengdu, Luqiao and Daqing (China), while engines are manufactured in Skövde (Sweden) and Zhangjiakou (China) and body components in Olofström (Sweden). In 2019, Volvo Cars sold the majority of its cars in Europe (48%) followed by China (23%), the US (15%) and other markets (14%).

Volvo Cars also includes related car subscription, and mobility businesses care services. In addition, Volvo Cars owns the non-consolidated strategic affiliates Polestar by 50% and Lynk & Co by 30%.

Environmental Strategies and Policies

According to Volvo Cars, action to reduce carbon emissions has the highest priority in Volvo Cars' sustainability strategy. Volvo Cars will start delivering its first zero-emission vehicle in 2020. The company, due to its company strategy focusing on hybrid vehicles, sold a share of 14% plug-in hybrids in H1 2020 (compared to 7% in 2019). According to the company, they aim for 20% of their total sales to be from plug-in hybrids by the end of 2020. All of Volvo Cars' models already have a plug-in hybrid option. Focusing on electrification, Volvo Cars will stop further development of diesel engines. Volvo Cars is on track to meet the 2020/21 EU fleet CO_2 emission targets without purchasing additional credits.

For 2019, Volvo Cars reports total absolute emissions of 38.2MtCO_2e (Scope 1, 2 and 3). 0.25% come from Volvo Cars' Scope 1 emissions, 0.5% from Scope 2 emissions, 33.3% from upstream Scope 3 emissions (purchased goods and services, transportation and distribution, waste generated, business travel, employee commuting) and the remaining 66% from downstream Scope 3 emissions (transportation and distribution, use of vehicles and end of life treatment). Volvo Cars total absolute emissions increased by 2.3% between 2018 and 2019 mainly due to increased sales volumes, where the effect of electrification has not yet made its full impact. The total CO2 emissions of Volvo Cars production sites were 197,000tCO_2e in 2019. Due to the low availability of renewable energy in some Asian plants, more than 50% of these emissions occur in Asia. It has also meant that Volvo Cars' vehicles produced in Asia have approximately a ten times larger carbon footprint per vehicle compared to vehicles produced in Europe. All of Volvo Cars' European plants have been supplied by renewable electricity since 2008. The energy efficiency programmes in place have, however, resulted in a 12% reduction in emissions in Asia compared to 2018 and manufacturing emissions per produced car has reduced by 45% since 2015 in Europe and Asia combined. In 2019, average lifecycle CO_2 emissions per produced vehicle amounted to 54,1tCO2 with 65% stemming from tailpipe emissions and 30% stemming from raw materials and suppliers, which represents a 3% reduction compared to 2018.

Volvo Cars aims to be a climate neutral company by 2040. This means reaching net zero emissions, where greenhouse gas emissions across their entire value chain (including the supply chain and tailpipe emissions) will be reduced to as close to zero as possible and, according to the company, any unavoidable emissions will be addressed through various forms of offsetting that support the global transition to renewable energy. Volvo Cars will focus all efforts on reducing emissions that they control, including through energy efficiency and use of

renewable energy. They will also influence suppliers to adopt the same approach. Between 2018 and 2025, Volvo Cars aims to reduce the total lifecycle CO2 emissions per car by 40%. This target includes a 50% reduction target for tailpipe emissions, a 25% reduction in supply chain emissions and a 25% reduction in operational emissions (all per car). These efforts include the targets of climate neutral manufacturing operations by 2025 and a 7% logistics emissions reduction per vehicle by 2025. Globally, Volvo Cars' plants are powered by 58% climate-neutral energy (incl. nuclear energy), with 86% climate-neutral electricity. In general, Volvo Cars has the ambition to validate the company's ambition through third parties. The company will be transparent about the CO_2 footprint of all produced vehicles (starting with the new XC40 BEV). According to the issuer, Volvo Cars has internal life-cycle emission targets for all new vehicles. As of 2025, Volvo Cars targets 50% of sales to be pure electric launching a fully battery electric vehicle every year and the other 50% hybrid technology. Volvo Cars' carbon reduction plan has been approved by the Science-Based Target initiative (SBTi).

Volvo Cars also aims to be a circular business by 2040 with an intermediate target of using 25% recycled and bio based plastics, 40% recycled aluminum and 25% recycled steel in cars from 2025 yielding a 2.5MtCO_2 reduction annually compared to 2018. Currently, 94% of Volvo Cars' production scrap globally is being recycled. In addition, 15% reduction in water consumption per produced unit is targeted. According to the company, all Volvo Cars are designed to be recovered to more than 95% and material recycled to more than 85%.

Volvo Cars was a founding member of the UN Global Compact in 2000. The company is reporting according to the GRI guidelines. Volvo Cars has experienced physical climate events such as hurricanes, storms and flooding that has caused damage and plant closures. Volvo Cars has provided a TCFD status report and currently aims at including relevant disclosures in its 2020 Annual Report. Volvo Cars became a member of the CDP in 2020 and is introducing data collection via the CDP climate questionnaire for their top 100 strategic suppliers based on emission intensive product categories.

Use of proceeds

An amount at least equivalent to the net proceeds from the issuance of the Green Financing Instrument, will be used to finance or refinance, in whole or in part, new or existing, projects, assets or activities within the Green Bond Principles category Clean transportation. Volvo Cars will be financing exclusively the research and development as well as the production of zero-emission battery electric vehicles. This includes licensing fees for production platforms and for the first issuance, according to the issuer, equity investments in its non-consolidated subsidiary Polestar. While Polestar exclusively focuses on electric vehicles and shares electrification technology with Volvo Cars, Volvo Cars remains the owner and Polestar is a licensee of the technology. According to the issuer, double counting is excluded. The company has informed us that the majority of the inaugural issuance will go to refinancing of projects.

Volvo Cars excludes from financing any costs, investments and expenditures related to Hybrid Electric Vehicles (HEV) and Plug-In Hybrid Vehicles (PHEV) as well as conventional vehicles. In addition, Volvo Cars excludes any investments in fossil fuel equipment (e.g., energy generation, heating sources, fossil fuel manufacturing equipment etc.).

Selection

The selection process is a key governance factor to consider in CICERO Green's assessment. CICERO 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 Green places on the governance process.

Volvo Cars has established a cross-departmental Green Financing Committee (the "GFC") comprised of members of the Global Sustainability Team as well as other function teams and departments. The role of the GFC is to review and validate the selection of the eligible green projects as well as the monitoring of the eligible green project pool during the life of the green financing instruments. The GFC will also screen projects for potential ESG controversies, lock-in and rebound effects. According to the issuer, sustainability related controversies are assessed within the existing risk management processes within Volvo Cars. The GFC will meet on a semi-annual basis and as and when the situation requires to identify and coordinate the final selection. This will be performed in consensus by the Group Treasurer, Group Controller and the Head of Global Sustainability.

Management of proceeds

CICERO Green finds the management of proceeds of Volvo Cars to be in accordance with the Green Bond Principles and Green Loan Principles. The net proceeds from Green Financing Instruments will be deposited in Volvo Cars general account and an amount equivalent to the net proceeds will be earmarked for allocation to the eligible green project portfolio, in accordance with the Framework. The Eligible Green Projects consist of recent and new projects with expenditures incurred within a three-year look-back period before their inclusion in portfolio. Volvo Cars will use its best efforts to substitute any projects that the GFC deems no longer meet the Eligibility Criteria, as soon as practical once an appropriate substitution option has been identified. The balance of unallocated net proceeds will be earmarked and invested in cash and/or cash equivalent and/or other liquid marketable instruments, 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 companies.

Reporting

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society.

Volvo Cars will publish a Green Financing Instrument report within one year from the date of issuance of each Green Financing Instrument and annually thereafter until full allocation of the proceeds. The company intends to provide information on an aggregate level. The Green Financing Instrument report will appear as a standalone document published on the website or as part of Volvo Cars' sustainability report which is integrated with the Annual Report.

The reporting will consist of allocation and impact reporting. The allocation reporting will include the aggregated amount of allocation of the net proceeds to the Eligible Green Projects at category level, the proportion of net proceeds used for financing versus refinancing and, the balance of any unallocated proceeds invested in cash and/or cash equivalents.

Volvo Cars will also report on relevant environmental impact metrics where feasible. In addition, Volvo Cars will disclose the measurement methodology for quantitative indicators. Volvo Cars expects to report the absolute number of zero emission vehicles sold, their percentage share of the fleet, as well as the absolute CO_2 emissions avoided and the percentage reduction in CO_2 tailpipe emissions per vehicle. The company aims to align with the "Green Bond – Working towards a Harmonized Framework for Impact Reporting" (April 2020)[1] on a best effort

[1] https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Handbook-Harmonized-Framework-for-Impact-Reporting-220520.pdf

basis. Volvo Cars will obtain an annual assurance for its allocation reporting as well as an external review of its impact reporting.

3 Assessment of Volvo Cars' Green Financing Framework and policies

The framework and procedures for Volvo Cars' green financing investments are assessed and their strengths and weaknesses are discussed in this section. 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 in this section to note areas where Volvo Cars should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, and consideration of environmental ambitions and governance structure reflected in Volvo Cars' Green Financing Framework, we rate the framework **CICERO Dark Green.**

Eligible projects under the Volvo Cars' Green Financing Framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green financing aim to provide investors with certainty that their investments deliver environmental returns as well as financial returns. The Green Bonds Principles (GBP) and Green Loan Principles (GLP) state that the overall environmental profile of a project should be assessed and that the selection process should be well defined.

Category	Eligible project types	Green Shading and some concerns
Clean Transportation	Investments and expenditures (incl. acquisition costs, research & development and licensing cost) for the design, development and manufacturing of Zero Emission Vehicles that is Battery Electric Vehicles (BEV): • 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.	**Dark Green** ✓ Electric vehicles and other zero emission transport solutions are part of a 2050 solution. ✓ According to the issuer, only projects that are unique to zero-emission vehicles (e.g., battery packs) are eligible and any costs, investments and expenditures related to Hybrid Electric Vehicles (HEV), Plug-In Hybrid Vehicles (PHEV) or conventional combustion vehicles are excluded. ✓ Current production includes some fossil fuel equipment (e.g., fork lifts, auxiliary generators and other logistics equipment), but the company informed us that this is excluded from financing under this framework. ✓ All potential new facilities will be screened for climate risks according to TCFD and 100% renewable energy is the preferred option for any new facilities, but as its availability varies regionally for the foreseeable future the issuer

	commits to use climate neutral energy by 2025. Therefore, parts of Volvo Cars production can be powered by non-renewable energy until then. ✓ The production of batteries and sourcing of raw materials can have substantial climate and environmental impact. Volvo Cars is aware of these risks and, according to the company, Volvo Cars is working with battery suppliers to ensure that CO_2 emissions are a top priority for them and has a target of 100% renewable energy for Tier 1 suppliers incl. battery suppliers. ✓ According to the issuer, investments are expected to go largely to new and existing production facilities for electric vehicles incl. licensing costs. According to the issuer, investments are expected to be made mainly in Sweden and China, but also in other EU countries and the US.

Table 1. Eligible project categories

Background

Global transport emissions grew by only 0.6% in 2018 (compared to 1.6% annually over the past decade), as efficiency improvements and electrification helped limit the growth in energy demand. To meet the 2°C target goals, however, direct transport emissions must peak around 2020 and then fall by more than 10% by 2030.[2] The largest amount of carbon savings come from switching from inefficient modes of transport (e.g., private cars) to mass transit.[3]

For projects aimed at like-for-like replacement of transport infrastructure, the improvements in environmental performance depend on the fuel type and efficiency. In order to assess the environmental impacts of electric cars the emission factor for the electricity grid should be considered. While electric modes of transportation are preferable both when it comes to reducing carbon emissions and local pollution compared to internal combustion engine vehicles, we should nevertheless be aware of the indirect greenhouse gas emissions stemming from the production and use of electric cars and strive to keep increasing their efficiency.[4]

In regions where the electricity grid is highly based on low carbon sources such as in the Nordic countries and/or where there are ambitious policies in place to make the grid greener (such as in the EU), electric cars clearly represent environmental benefits compared to fossil fuel cars in the longer term. The charging infrastructure for electric cars needs to be developed in parallel to greening the grid.

In 2019, battery electric vehicles and plug-in hybrid vehicles achieved a global market share of worldwide car sales of 2.6%. In total, the battery electric car stock amounted to 4.79 million globally. More than 50% of which

[2] http://www.iea.org/tcep/transport/
[3] https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter8.pdf
[4] https://www.sciencedirect.com/science/article/pii/S030626192030533X

are in China. Europe accounted for approximately 20% and the US for approximately 18% of these vehicles. At least 20 countries achieve electric vehicle market shares of above 1%.[5]

Volvo Cars sells its cars in China (23%), US (15%) and to a large extent in Europe (48%). In the EU, road transport contributes approximately 21% of total EU emissions of CO_2 with cars and light commercial vehicles being responsible for the majority of road transport emissions (15% of total EU emissions)[6]. One goal of the EU commission is to increase the share of zero-emission vehicles in the fleet. According to the European Federation for Transport and Environment[7], 1.3 million electric vehicles were sold in Europe by the end of 2019, which is estimated to increase to 44 million in 2030. The current limit for average emissions of vehicles sold in the EU is set at 130 grams of CO_2 emitted per kilometer.[8] In addition, the EU allows for manufacturer-specific emission limits depending on average mass of produced cars. E.g., Volvo Cars' cars reached an EU fleet average of 132gCO2/km in 2019. The EU limit will be reduced to 95 gCO_2/km by the year 2021, which corresponds to a manufacturer-specific emissions limit of 110 gCO_2/km for Volvo Cars. Volvo Cars expects to reach this target. In addition, the EU allows for so-called "super credits" to reward low-emission vehicle production by, e.g., counting one electric vehicle as 1.67 vehicles in the average fleet emissions in 2021. Volvo Cars is on track to meet 2020/21 EU fleet CO_2 emission targets without purchasing credits. If the average CO_2 emissions of a manufacturer's fleet exceed its target in a given year, the manufacturer has to pay an excess emissions premium for each car registered. Since 2019, the penalty is EUR 95 for each g/km of target exceedance. In addition, the EU has set a 37.5% (passenger cars) reduction target for 2030 compared to 2021 absolute fleet emission levels.[9]

In 2019, 3% of new passenger cars in the EU were electric.[10] Demand for new electric cars in the EU increased by 66.2% compared to 2018. For the US in 2018, 1.2% all cars sold were electric which represents an increase of 63.3%.[11] In 2019, in terms of absolute electric vehicles sold globally, the American company Tesla sold most, followed by the Chinese companies BYD, BAIC, SAIC and German companies BMW and Volkswagen.[12] BMW's electric share of all of its passenger cars delivered globally, therefore, amounted to approximately 5.1%[13] and Volkswagen's share was 1.3%[14]. Volvo Cars' brand Polestar already sells fully electric vehicles. Volvo Cars will begin delivery to customers of its first all-electric car, the XC40 Recharge P8 in the second half of 2020.

According to the European Federation for Transport and Environment [7], electric cars outperform diesel and gasoline cars in all scenarios in the EU in a life-cycle perspective. According to this briefing, a medium-sized car purchased in 2020, with its battery produced with clean electricity and operated in Sweden has an LCA impact of approximately 11tCO_2 (47g/km) and with the battery produced in China approximately 22tCO_2 (99g/km); in the best case more than 90% of its life-cycle emissions associated with the production. According to Volvo Cars, the first life cycle analysis of one of its vehicles will be communicated later this year, for the XC40 BEV. Volvo Cars will disclose the carbon footprint of all new models as well as the LCA methodology. With a tool launched together

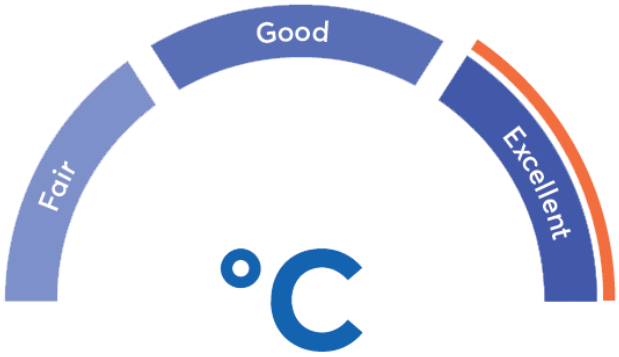
[5] https://www.iea.org/reports/global-ev-outlook-2020
[6] https://ec.europa.eu/clima/policies/transport/vehicles_en
[7] https://www.transportenvironment.org/sites/te/files/T%26E%E2%80%99s%20EV%20life%20cycle%20analysis%20LCA.pdf
[8] https://ec.europa.eu/clima/policies/transport/vehicles/cars_en
[9] https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en
[10] https://www.acea.be/press-releases/article/fuel-types-of-new-cars-petrol-11.9-diesel-3.7-electric-81.3-in-fourth-quart
[11] https://evadoption.com/ev-market-share/ev-market-share-state/
[12] https://de.statista.com/statistik/daten/studie/561568/umfrage/die-groessten-hersteller-von-elektroautos-nach-absatz/
[13] https://www.press.bmwgroup.com/global/article/detail/T0306824EN/bmw-group-annual-report-2019?language=en
[14] https://www.volkswagen-newsroom.com/en/press-releases/volkswagen-passenger-cars-brings-2019-to-a-successful-close-5720

with the briefing[15], the European Federation for Transport and Environment concludes that in a life-cycle perspective, a fully electric car is approximately 56% better than an average petrol car and 54% better than an average diesel car. They outline a best and a worst case scenario: *"In the worst case scenario, an electric car with a battery produced in China and driven in Poland still emits 22% less CO2 than diesel and 28% less than petrol. And in the best case scenario, an electric car with a battery produced in Sweden and driven in Sweden can emit 80% less CO2 than diesel and 81% less than petrol."* [15] In addition, they estimate that electric cars will reduce vehicles' CO_2 emissions four-fold by 2030 due to the shift of the European grid toward renewable energy.

Governance Assessment

Four aspects are studied when assessing the Volvo Cars' governance procedures: 1) the policies and goals of relevance to the green financing framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) 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.

Volvo Cars has a strong focus on zero-emission vehicles, which is underpinned by its aim for 50% of sales to be from pure electric vehicles by 2025, with the rest to be from hybrid vehicles. Volvo Cars also intends to launch one fully electric vehicle per year. In addition, the company aims at climate neutrality by 2040 across the entire value chain. It is a strength that the company conducts life cycle assessments, considers rebound and lock-in effects and that the projects are selected by a Green Financing Committee that decides in consensus. In addition, the company screens for climate risks and screens and discloses climate risks according to TCFD. Unallocated proceeds can be invested without additional screenings for sustainability. Volvo Cars will provide impact reporting such as the absolute number and share of electric vehicles sold and absolute CO_2 tailpipe emissions avoided. In addition to the external validations the company will obtain for its overall company sustainability targets, Volvo Cars will also obtain external review of its impact reporting. The overall assessment of Volvo Cars' governance structure and processes gives it a rating of **Excellent**.



Strengths

It is a strength that Volvo Cars focuses strongly on zero-emission vehicles. By 2025, Volvo Cars is aiming for 50% of its sales to be from pure electric vehicles, with remaining sales coming from hybrid vehicles. Volvo Cars plans to launch one fully battery electric vehicle every year. This is currently one of the most ambitious plans in the car manufacturing industry to transition from a combustion based fleet to an electrified fleet. Recent studies, e.g., by Cox *et al.* (2020)[16], confirm that "electrification of passenger vehicle powertrains is an effective way of reducing greenhouse gas emissions without incurring significant cost penalties; on the contrary, it may even provide minor cost benefits in the future." While this of course depends on the de-facto electricity mix in the grid,

[15] https://www.transportenvironment.org/what-we-do/electric-cars/how-clean-are-electric-cars
[16] Cox, B., Beltran A.M., van Vuuren, D.P. and Mutel, C.L. (2020). 'Life cycle environmental and cost comparison of current and future passenger cars under different energy scenarios'. *Applied Energy*, 269. Available at: https://www.sciencedirect.com/science/article/pii/S030626192030533X

Cox *et al*. conclude that electric drivetrains provide climate benefits in a life-cycle perspective for grids with up to 500 gCO_2/kWh. The European Federation for Transport and Environment estimates that the average EU electric car emits almost 3 times less CO_2 than equivalent petrol or diesel cars and that electric cars provide a better CO_2 footprint in all scenarios in Europe.[15]

It is a strength that Volvo Cars is actively engaging its suppliers on upstream emissions. Approximately 70% of batteries' life-cycle emissions result from the material supply chains[16]. Volvo Cars became a member of the CDP (formerly the Carbon Disclosure Project) in 2020 and is introducing data collection via the CDP climate questionnaire for their top 100 strategic suppliers based on emission intensive product categories. The result will be embedded in supplier dialogues and in future supplier selections. The issuer informed us that they will follow the supplier emission levels and their related activities on a yearly basis. Volvo Cars target to reduce emissions from the supply chain by 25 per cent between 2018 and 2025 and requires direct material suppliers to be ISO14001-certified. CICERO Shades of Green encourages Volvo Cars to establish emission based selection criteria and criteria regarding renewable energy consumption in the battery production.

In general, Volvo Cars has the ambition to validate the company's achievements and targets through third parties. It is a strength that Volvo Cars involves external parties in validating its progress.

It constitutes a strength that Volvo Cars screens all potential new facilities for climate risks according to TCFD. The company has provided a TCFD status report and currently aims at including respective disclosures in its 2020 Annual Report. Considering that Volvo Cars has experienced physical climate events such as hurricanes, storms and flooding that have caused damage and plant closures before, we are encouraged that in addition to transition risks such as consumer behavior change and emissions regulations, physical climate risks will be disclosed as well.

Weaknesses

We find no material weaknesses in Volvo Cars' Green Financing Framework.

Pitfalls

While it is a clear strength that Volvo Cars exclusively focuses on financing the production and development of zero-emission vehicles. The production includes some fossil fuel equipment (e.g., fork lifts, auxiliary generators and other logistics equipment), but the company informed us that this is excluded from financing under this framework. CICERO Shades of Green encourages Volvo Cars to focus on zero-emission equipment for zero-emission vehicle production.

While Volvo Cars aims to produce batteries in regions where the vehicles are produced as well as vehicles in the regions where the vehicles are sold, Volvo Cars partly produces electric vehicles in China some of which are subsequently shipped to other markets globally. Similarly, batteries are produced in Poland and China, but could be used in either regions. This constitutes a pitfall of increased Scope 3 emissions through transport of vehicles and technology as well as increased emissions through more emission intensive production in China.

It should be noted that for personal vehicle solutions smaller cars with a longer lifetime provide larger climate benefits. Cox et al. concluded that "vehicles with smaller batteries and longer lifetime distance travelled have the best relative performance".[16] In 2019 63% of Volvos sold were comparably larger Sport Utility Vehicles (SUVs). While the XC40 will be a comparably larger vehicle as well, CICERO Shades of Green encourages the issuer to consider vehicles' overall climate impact through vehicle weight, battery size, power and energy consumption.

CICERO Shades of Green recognizes individual modes of zero-emission transportation as Dark Green and part of a 2050 solution. However, the largest amount of carbon savings come from switching from inefficient modes of transport (e.g., private cars) to mass transit.[3] Volvo Cars is actively involved in development and deployment of car sharing solutions and CICERO Shades of Green encourages Volvo Cars to continue its efforts mass transport solutions as a primary solution and individual modes of transport as secondary.

It is a pitfall that substantial increase in electric vehicle production could lead to increased pressure on rare earth material sourcing and other environmental impacts that might occur especially in regions with environmental regulation that is less strict than in the EU. Volvo Cars is aware of this challenge and is taking active measures to address these issues developing, e.g., blockchain technology to ensure traceability and carbon accounting. CICERO Shades of Green encourages Volvo Cars to transparently report on key issues Volvo Cars encounters in order to support a global approach toward avoidance of negative environmental and social impacts of material sourcing.

All Volvo Cars are designed to be recovered to more than 95% and material recycled to more than 85%. We encourage Volvo Cars to continue its ambitions towards circular economy solutions especially when incorporating circular systems for battery technology and all of the produced vehicles.

The framework allows for equity injections into its non-consolidated strategic affiliate Polestar. While Polestar exclusively focuses on electric vehicles and shares electrification technology with Volvo Cars, this bears the pitfall of indirectly financing general corporate purpose expenditures. Volvo Cars informed us that double counting is excluded: For technologies that are shared, only cost solely borne by Volvo Cars are Eligible in our framework.

While charging infrastructure currently is not part of this framework Volvo Cars informed us that the company is currently investigating various ways to provide easy access to charging. This could include partnering with different public charging suppliers, facilitate charging at our retailers and potentially invest in a proprietary charging network. CICERO Shades of Green encourages a focus on charging infrastructure as expansion of charging infrastructure and deployment of electric vehicles goes hand in hand.

Appendix 1:
Referenced Documents List

Document Number	Document Name	Description
1	Volvo Cars Green Financing Framework, September 2020	
2	TCFD Reporting and Sustainability Risk Management	TCFD status report
3	Volvo Cars Sustainability Strategy	Document outlining Volvo Cars' sustainability Strategy
4	Volvo Cars Annual Report 2019	
5	Volvo Cars Corporate Sustainability Targets	Document summarizing Volvo Cars' sustainability targets
6	Volvo Cars Carbon Offsetting Position Paper	Document describing Volvo Cars' offsetting position
7	Our Code – How we act	Volvo Cars' Code of Conduct
8	Code of Conduct for business partners	Volvo Cars' vision of responsible business behavior and business principles for the company's business partners
9	Supply Chain Sustainability Management	Volvo Cars' policy regarding supply chain management.
10	Climate Action Position Paper	Volvo Cars' ambition regarding climate action
11	Procurement Position on Metal and Mineral Sourcing	Volvo Cars' metal and mineral sourcing policy
12	Charging Infrastructure Position Paper	Volvo Cars' position on charging infrastructure

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Appendix 2:
About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO 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 Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD).