



Ericsson

Green Finance Second Opinion

1 December 2022

Executive Summary

Ericsson is a networking and telecommunications company headquartered in Stockholm, Sweden. Ericsson provides mobile connectivity solutions to telecom operators and enterprise customers, including infrastructure, software, and services solutions. In 2021, the company had revenues of SEK 232 billion, and employed more than 100,000 employees with a presence in over 180 countries.

Proceeds raised under this framework are expected to finance projects in the energy efficiency project category. Such investments include capital expenditures and R&D investments in modernizations and upgrades of existing 4G, 5G, and 6G solutions, and also in supporting technologies. Such investments must improve energy efficiency by at least 35% compared to the previous generation. According to Ericsson, it has seen promising results from its field trials and case studies, where improved energy savings of more than 40% can be realised when upgrading previous generation radios with its latest solutions.¹ Such energy consumption improvements are primarily based on increased silicon efficiency, multiple radio frequency bands, and software enhancements.

We rate the framework **CICERO Medium Green** and give it a governance score of **Excellent**. The Medium Green shade reflects that investments in the energy efficiency project category should, given a focus on modernizing and upgrading existing networks, contribute to reduced energy consumption and reduced risk of increased emissions from mobile networks. Crucially, these investments must be analysed ‘Breaking the Energy Curve’ approach, which goes beyond hardware improvements and business-as-usual upgrades in seeking efficiency gains,² and Ericsson’s generally excellent corporate level climate and environmental targets and policies. Investors should at the same time note uncertainties regarding the broad direct and indirect impacts and potential rebound risks associated with increased connectivity performance offered by 5G networks, as well as life cycle impacts of network upgrades.

Strengths

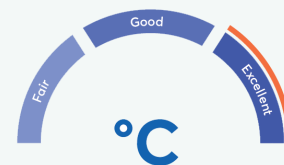
Digital solutions are expected to be an important enabling technology for climate mitigation and adaptation strategies, increasing the need for energy-efficient mobile networks and connectivity. To reduce the risk of increased energy use and emissions from mobile networks, investments in R&D for efficient next-generation data transmission technologies are needed, alongside continued efforts to decarbonise the electricity supply, as mobile networks will continue to consume a significant amount of electricity. Accordingly, it is a strength that Ericsson

SHADES OF GREEN



°CICERO
Medium Green

GOVERNANCE ASSESSMENT



GREEN BOND AND LOAN PRINCIPLES

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

¹ [Ericsson and Vodafone halve network energy consumption in breakthrough 5G trial | Ericsson \(ericsson.com\)](#)

² [Breaking the Energy Curve | Ericsson \(ericsson.com\)](#)



is seeking to invest further in such R&D activities, as well as other related efforts as parts of its 'Breaking the Energy Curve' approach.³

Through its strategy, reporting, and policies, Ericsson demonstrates that it has solid procedures to assess climate impact and risks. Ericsson has over twenty years of experience with climate impact and life cycle assessments for its products and solutions and conducts research in various areas of climate and environmental impacts through its research division (Ericsson Research). Incorporation of lifecycle considerations in the eligibility criteria or selection process would significantly strengthen the framework. Moreover, Ericsson reports on climate risks following the recommendations by the TCFD based on two climate scenarios, the net-zero 2050 and a current policies scenario developed by the NGFS.⁴

Pitfalls

Per the eligibility criteria, reduced energy consumption is measured compared to previous configuration, however proceeds can be used to upgrade or modernize the *same* generation of technology, for example upgrading an existing 5G network with newer 5G components. In such cases, there is no minimum requirement for reduced energy consumption compared to the technology that is in fact being replaced. Ericsson should ensure it favours investments that maximise energy consumption reductions in its selection process, while reporting on case specific energy savings is crucial in such cases.

Rebound risks may be introduced with the improved bandwidth capacity offered by 5G solutions. Rebound effects drive higher consumption levels of services as efficiency and costs improve, ultimately increasing absolute emissions. It should be noted that assessing such direct and indirect rebound effects is challenging, especially in next-generation mobile networks that offer improved throughput and quality of service. However, current research has not found sufficient evidence proving that 5G will contribute to a net reduction in energy use. Hence, the risk of rebound effects is present, which could exceed the energy-saving potential of 5G.

Embodied carbon emissions from the raw material extraction and production processes in mobile network equipment manufacturing are considerable. Research shows embodied emissions could be a predominant emission factor and is likely to take a larger share as the operation of networks is to larger extent using renewable electricity. Ericsson informs that it is continuously working to lower its equipment's absolute carbon footprint. Such embodied carbon emissions should be considered when upgrading mobile networks, particularly in cases where fully functional mobile network systems are replaced due to incremental network performance benefits offered by best-in-class systems.

³ Ibid.

⁴ [Network for Greening the Financial System \(NGFS\)](#)



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1 Ericsson’s environmental management and green finance framework

Company description

Telefonaktiebolaget LM Ericsson (“**Ericsson**” or the “**issuer/company**”) is a networking and telecommunications company headquartered in Stockholm, Sweden, and listed on the Nasdaq stock exchanges in Stockholm and New York. In 2021, the company had revenues of SEK 232 billion and employed more than 100,000 employees with a presence in over 180 countries.⁵ Ericsson is a provider of mobile connectivity solutions and manufactures and sells infrastructure, software, and services solutions to telecom operators and enterprise customers. Ericsson has been granted over 60,000 patents, including patents for its 5G equipment, internet protocol (IP) network equipment, and cloud-based software solutions.

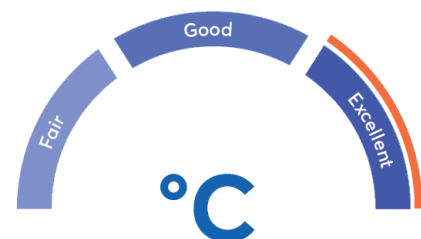
Governance assessment

Ericsson has quantified climate and environmental targets. It has established policies covering its supply chain and business partners, including requirements for manufacturing, transportation, energy consumption, materials, and water and waste management. The issuer works systematically to improve its product and services’ overall carbon footprint, as well as working towards decarbonising its supply chain, and facilitating material recovery through recycling and refurbishment.

Ericsson has committed to a net-zero emission target by 2040, including scope 1, 2 and 3, and by 2030 aims to achieve net zero emissions from its own scope 1 and 2 activities, plus the additional scope 3 emissions associated with business travel and employee commuting (including teleworking). The issuer has extensive emissions reporting mechanisms in place and has over 20 years of experience in applying life cycle assessments to identify ‘impact hotspots’ and how to reduce the carbon footprint of its products and solutions. Moreover, Ericsson’s 2022 SBTi verified target of improving energy efficiency by 35% for its radio systems (2016 baseline), has been achieved. It is unclear whether Ericsson will introduce a new target for reduced energy consumption for its systems. CICERO Shades of Green considers it crucial that Ericsson updates and continues to work towards similar ambitious targets at its product portfolio level. Ericsson reports on climate and environmental risks facing its business activities by following the TCFD recommendations, which are reported using two climate scenarios based on a net-zero 2050 and a current policies scenario developed by the NGFS.⁶

Decisions in the selection process are made by consensus, and environmental competence is well represented. The issuer is targeting investments that support improving the overall energy efficiency of its mobile network product and solutions, though consideration of lifecycle impacts would strengthen the framework.

The reporting structure is well defined and includes relevant metrics for allocation and impact reporting. Given the variety of projects that can be financed, we encourage Ericsson to report on case specific energy savings as far as is possible.



⁵ [Annual report 2021 | Ericsson \(ericsson.com\)](#)

⁶ [NGFS - Scenarios](#)



The overall assessment of Ericsson's 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. Specifically, extreme weather events and water stress may impact Ericsson's supply chain and upstream activities. Water is a crucial input factor for producing electronic components, and draughts, heat waves, and wildfires could cause water shortages, impacting production capacity.

Transition risks. Due to the profound changes needed to limit global warming to well below 2°C, transition risk affects all sectors. Ericsson is exposed to transition risks from stricter energy efficiency requirements and notes in its TCFD analysis that the risk of rising energy prices impacting telecom operators will require further energy efficiency improvements.

Environmental risks. As with climate change, nature and biodiversity loss can create physical risks due to the loss of critical ecosystem services, which can contribute to operational and supply chain disruptions. Telecom hardware and networking manufacturers are exposed to environmental risks through their supply chain and customers. Potential risks associated with water consumption, extraction of minerals, and production and management of chemicals and substances needed to produce telecom and networking equipment are crucial input factors that relate to environmental risks.

Environmental strategies and policies

Ericsson publishes an annual sustainability report prepared in accordance with the Global Reporting Initiative standard (GRI). In addition to annual reporting, Ericsson publishes data relevant to its established targets and associated key performance indicators on its websites.⁷ The company reports emissions for scopes 1, 2, and 3. In 2021, scope 1 and 2 emissions totalled 96 kilotons. Scope 3 emissions were 34,637 kilotons of CO₂, where 32,000 kilotons stemmed from the use of sold products, accounting for ~92% of all emissions, and purchased goods & services from its supplier accounted for ~7% in 2021.

⁷ [ESG resource hub | Ericsson \(ericsson.com\)](#)

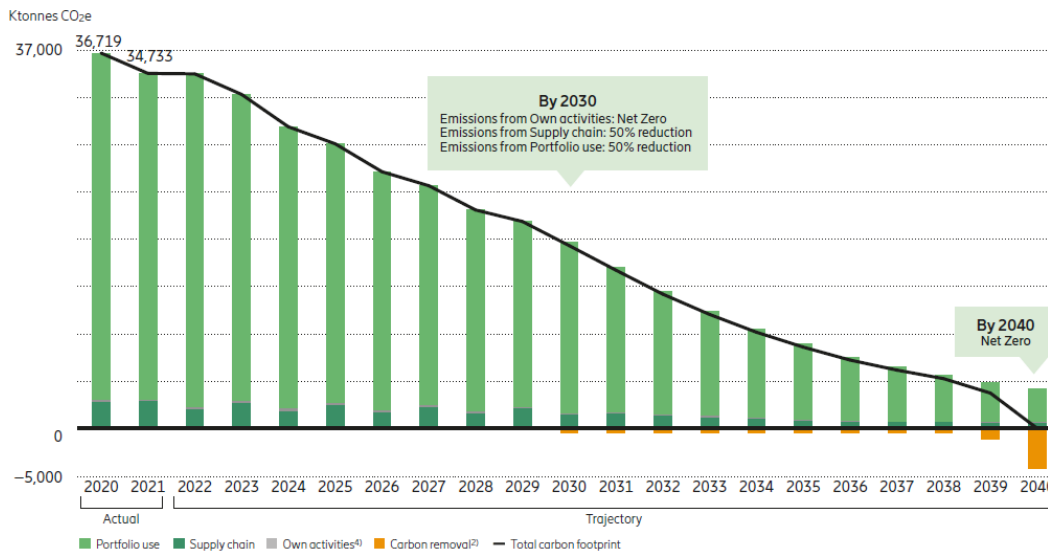


Figure 1: Ericsson net zero trajectory. Source: Ericsson 2021 annual report

The company has set both short and long-term targets for reducing emissions. By 2040, Ericsson aims to be fully net zero across its complete value chain, including emissions from its supply chain and end-use of products, as shown in figure 1. By 2030, it aims to achieve net zero emissions from its own scope 1-2 activities, plus the additional scope 3 emissions associated with business travel and employee commuting (including teleworking). Further, Ericsson aims to halve all up and downstream scope 3 emissions from its end use of product and supply chain emissions. To reach its 2030 ambitions, Ericsson aims to be fully powered by renewable energy by 2030, including power purchase agreements (PPA) and other instruments such as renewable energy certificates (REC). For its supply chain, Ericsson is engaging with 350 of its highest emitting and strategic suppliers, which according to Ericsson are, along with their supply chains, responsible for 90% of Ericsson’s supply chain emissions. The engagement seeks to require the 350 suppliers to set Paris Accord aligned climate targets and commit to reporting on the progress against these targets. Ericsson aims to have completed its engagement with such suppliers by 2025. Ericsson informs that it seeks to influence its suppliers through such engagements, and that it has not yet terminated any supplier relationships due to lack of climate and environmental targets.

Furthermore, Ericsson is focused on improving its products’ energy efficiency and has developed a network-wide approach termed “Breaking the Energy Curve”.⁸ Ericsson believes this approach will enable its products and solutions to support exponential data traffic growth without increasing energy consumption. Associated targets and KPIs linked to this approach have been determined, and its 2022 target to improve its legacy radio systems portfolio energy efficiency by 35% was verified by the Science Based Targets initiative (SBTi) in 2017. According to Ericsson, the target level was surpassed one year ahead of schedule.

Ericsson reports climate risks following the TCFD recommendations, where Ericsson utilises two scenarios developed by the NGFS,⁹ the net zero 2050 scenario and the current policies scenario. In 2021, Ericsson’s TCFD reporting deemed water stress to be one of its most significant physical climate risks. Specifically, risks stemming from water-intensive manufacturing processes of hardware and semiconductors from its suppliers in Asia, which at increased risk of lacking water supplies due to water stress, could cause supply shortages for Ericsson. In addition to TCFD reporting, Ericsson regularly conducts a materiality analysis to identify the most important issues to its stakeholders and map out potential impacts, including climate and environmental factors. Ericsson reports to the CDP regarding climate change but has yet to report on water security.¹⁰

⁸ [Breaking the Energy Curve | Ericsson \(ericsson.com\)](https://www.ericsson.com/en/breaking-the-energy-curve)

⁹ [Scenario portal | Network for Greening the Financial System \(ngfs.net\)](https://www.ngfs.net/en/scenario-portal)

¹⁰ [Ericsson CDP response | CDP \(cdp.net\)](https://www.cdp.net/en/1500/transparency/ericsson)



Ericsson has implemented several policies relevant to sustainability, including an overarching sustainability policy, requirements on material and substance declarations from its suppliers, business partner environmental requirements for suppliers, and other relevant policies and statements.¹¹ For its suppliers and business partners, Ericsson may request its business partners to inform Ericsson about the emission reduction targets and progress against such targets if deemed material to the suppliers business activities. Ericsson may also require certain suppliers to inform Ericsson of its water use and waste management practices.

In 2005, Ericsson established a “take-back” program to minimise waste and increase the reuse of its equipment. The take-back program is available in 180 countries. It gives Ericsson’s customers the option to return used equipment directly to Ericsson, where Ericsson will be responsible for refurbishment or recycling of such products. Ericsson also strives to refurbish equipment that is still viable for reuse and sell such refurbished spare parts and appliances back to the marketplace, providing equipment with a second life.

In 2022, Ericsson incorporated ESG criteria, including scope 1-2, and some scope 3 (business travel and commuting/teleworking) emission reduction targets, into its long-term variable compensation program covering the executive management team and 160 senior leadership roles.

Green finance framework

Based on this review, this framework is found to be aligned with the Green Bond Principles. For details on the issuer’s framework, please refer to the green finance framework dated October 2022.

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

Ericsson has established a sustainability finance committee (SFC). The SFC is represented by members from the treasury, group finance, technology, and the sustainability unit. The committee is responsible for evaluating and ensuring proposed assets satisfy the framework’s eligibility criteria, Ericsson’s overall strategies and policies for social and environmental sustainability, and other relevant long-term sustainability goals. Ericsson informs that climate and environmental subject matter expertise is represented through the sustainability unit.

In addition, the SFC is responsible for replacing any investments that no longer meet the eligibility criteria,¹² and updating the framework to reflect any changes in corporate strategy, technology, and overall market developments concerning the EU taxonomy classification and the upcoming EU green bond standard. The SFC is set to meet on a regular basis at least once a year, and all decisions made are made in consensus.

Management of proceeds

Ericsson will credit an equal amount to any proceeds raised under the framework to an earmarked account. The earmarked account will support Ericsson’s financing of eligible assets. As long as green bonds are outstanding and the earmarked account has a positive balance, Ericsson may deduct funds from the account and add to the lending pool in an amount up to all disbursements from that pool made in respect of eligible assets. The earmarked account will ensure monitoring and tracking of the eligible assets, and Ericsson’s treasury team will be responsible for allocating proceeds. Unallocated proceeds will be held as cash or invested in government bonds, or AAA-rated mortgage bonds issued by Swedish institutions.

¹¹ [Policies and statements | Ericsson \(ericsson.com\)](#)

¹² [Following divestment, liquidation, concerns regarding alignment of underlying activity with eligibility criteria etc.](#)



For any reason, if an eligible asset ceases to comply with the requirements set out in the framework, the asset will be removed from the earmarked pool. Unallocated proceeds will be placed in the liquidity reserves and managed as such.

Reporting

Ericsson will provide an annual sustainability finance investor report, including quantitative impact indicators and relevant data and information where feasible. Reported information may be provided on an aggregated basis, as confidentiality agreements and other considerations limit the amount of detail that can be made available in the report. The report will include allocation and impact reporting, and Ericsson informs that the allocation report will be verified by a third-party.

The allocation report will consist of:

- A description of eligible assets
- Type of green securities utilised and outstanding amounts
- Split between new financing and re-financing
- A list of eligible assets and the amounts allocated as well as the disbursed amounts per category, including loan and lease contracts and geographical distribution.

The impact report aims to disclose the environmental impact of the assets financed under the framework based on the share of financing for each asset. Impact reporting may, to some extent, be aggregated due to the number of projects financed under the framework, and therefore data covered, and calculations provided will be on a best-effort basis. Ericsson informs that the methodologies for the selected impact indicators will be disclosed as part of the impact report.

The impact report may be based on the listed metrics below.

Category	Examples of impact indicators
Energy Efficiency	<ul style="list-style-type: none">▪ Data transferred per kWh and geographical area▪ Reduced energy consumption of a typical new site by x%▪ Achieve x% energy saving in portfolio x compared with portfolio y▪ Absolute energy saving (case specific)▪ Energy consumption per subscription
Renewable Energy	<ul style="list-style-type: none">▪ kWh installed capacity▪ CO₂e emissions avoided by installed renewable energy sources

Table 1: Example of impact indicators to be used in impact reporting





2 Assessment of Ericsson’s green finance framework

The eligible projects under Ericsson’s green finance framework are shaded based on their environmental impacts and risks, based on the “Shades of Green” methodology.

Shading of eligible projects under Ericsson’s green finance framework

- Ericsson informs that all proceeds from first issuance will be allocated to the energy efficiency project category.
- Ericsson informs that it seeks to primarily finance new projects, but that it may also refinance existing eligible assets.
- Proceeds shall not be allocated where the intentional use poses a risk to environmentally or socially harmful activities, such as extraction or production of fossil energy.

Category	Eligible project types	Green Shading and considerations
Energy Efficiency  	Financing of capital expenditures, R&D and customer finance loan and lease contracts of modernizations and upgrade of existing 4G, 5G and 6G as well as supporting technologies that lead to a reduced energy consumption of at least 35% compared to previous generation.	Light Green to Medium Green <ul style="list-style-type: none"> ✓ Digital solutions are expected to be an important enabling technology for climate mitigation and adaptation strategies, increasing the need for energy-efficient mobile networks and connectivity. ✓ Investments in the energy efficiency project category should contribute to reduced energy consumption and reduced risk of increased emissions from mobile networks, particularly in the context of Ericsson’s ‘Breaking the Energy Curve’ approach which goes beyond hardware improvements in seeking efficiency gains. Investments must lead to overall reduced energy consumption of at least 35% against the previous generation of networks. According to Ericsson, it has seen promising results from its field trials and case studies. Ericsson has demonstrated improved energy savings by up to 43% when upgrading previous generation radios with its latest, most energy-efficient ones. Such energy consumption improvements are primarily based on increased silicon efficiency, multiple frequency bands, and software enhancements. ✓ Ericsson has confirmed that proceeds will not finance greenfield sites or expansions of existing networks.



- ✓ Per the eligibility criteria, reduced energy consumption is measured compared to previous generation, however proceeds can be used to upgrade or modernize the *same* generation of technology, for example upgrading an existing 5G network with newer 5G components. In such cases, there is no minimum requirement for improved energy efficiency compared to the technology that is in fact being replaced.
 - ✓ The target in the eligibility criteria does not consider lifecycle impacts. Research shows that embodied carbon emissions could be a predominant emission factor and is likely to take a larger share as the operation of networks is to larger extent using renewable electricity. Ericsson informs that it has over 20 years of experience with life cycle assessments and has invested to reduce emissions stemming from manufacture of silicon and other key components.
 - ✓ Rebound risks may be introduced with the improved bandwidth capacity offered by 5G solutions, which could drive higher consumption levels as efficiency and costs improve, ultimately increasing absolute emissions.
 - ✓ According to Ericsson, the 4G equipment eligible under this framework has built-in 5G capabilities, which can be unlocked with software upgrades. CICERO Shades of Green considers this positive, as it would prevent the premature replacement of 4G deployed equipment when 5G capability is needed due to changes in market demand or regulatory changes that could open for the 5G systems .
 - ✓ According to Ericsson, it finances loan and lease contracts to communications service providers (CSP). Such lease and loan contracts would only be provided to CSPs purchasing the latest 4G/5G equipment. Further, Ericsson informs that it does not have a complete view of the CSP customer base and how they use Ericsson's equipment, which could introduce environmental and climate risks from a deployment and end-use perspective.
 - ✓ According to Ericsson, certain CSPs may power parts of its mobile network infrastructure using diesel-based power generators, particularly in remote locations. Moreover, diesel generators are commonly used as back-up power in case of outages.
-



Renewable Energy Financing of renewable energy investments and related infrastructure. **Dark Green**



Renewable energy production technology and solutions from solar, wind, water and geothermal power with zero operational Greenhouse gas emissions and related infrastructure such as connections, electric substations and foundations.

- ✓Ericsson informs that it does not have explicit plans to allocate proceeds to renewable energy projects. However, potential projects may include solar panel or wind investments. This is to support Ericsson’s Net Zero in own activities target that includes the need for Ericsson to source 100% renewable energy by 2030 (62% in 2021).
- ✓Renewable energy – including solar, wind, hydropower, and geothermal is key to a low carbon transition.

Table 2: Eligible project categories



More on 5G infrastructure

Mobile networks such as 5th generation mobile network (5G) wirelessly connect portable user devices such as cell phones to a wider communication network. 5G enables high bandwidth, low-latency connections needed for high-quality real-time connections and other high bandwidth streaming applications. Energy efficiency has been an important consideration throughout the development, standardisation, and implementation of 5G. 5G is still in its early stages of deployment from a global perspective, with a total of 11.5 million deployments and 206 operators.¹³ Ericsson estimates that 4th generation (4G) networks had a global coverage ratio of 85% in 2021, whereas 5G had a 25% coverage ratio. Further, Ericsson forecasts that 5G networks will have a 75% coverage ratio of the world's population by 2027, reaching 4.4 bn end-users.¹⁴

From a network perspective, direct energy use impacts of 5G networks are typically considered, where 90% of the direct energy usage of network operators are accounted for via electricity drawn from the grid to service networks. When considering the energy efficiency improvements of 5G compared to the previous 4G, the cumulative CO2 emissions savings could be as much as 0.5 billion tonnes of CO2,¹⁵ slightly less than the 2021 carbon footprint of international aviation. The key savings will come from improvements in radio access networks (RANs) and core networks, where estimates show that the amount of energy required to transmit data is only 2%¹⁶ for a 5G cell network compared to the previous generation of 3G/4G networks. It should be noted that large parts of these studies are based on industry reports, and do not always disclose the underlying data, assumptions, and methods used to determine stated results. Furthermore, it is important to understand the difference between improving the overall energy efficiencies for mobile networks, and the general enablement role 5G could play in energy savings across various industries and high bandwidth applications, such as smart grids, Internet of Things (IoT), and autonomous automotive application which are made possible by low-latency high bandwidth connections.

On the other hand, potentially significant embodied emissions associated with mobile networks and the rebound effects are also important to consider.¹⁷ The raw materials acquisition, manufacture and disposal of mobile networks, including the energy use associated with the material processing and manufacturing processes, are key considerations when looking at the environmental benefits of 5G solutions. Research shows embodied emissions could be a predominant emission factor and is likely to take a larger share as the operation of networks is to larger extent using renewable electricity. Rebound risks are also introduced with the improved bandwidth capacity offered by 5G solutions, where rebound effects drive higher consumption levels of services as efficiency and costs improve, ultimately increasing absolute emissions. Research shows that the behavioural consumption patterns that can lead to rebound effects are underexplored for the broader domain of information communication technologies. It is challenging to assess such indirect effects systematically,¹⁸ however, current research has not found sufficient evidence proving that 5G will contribute to a net reduction in energy use.¹⁹ Hence, risks of direct and indirect rebound effects are present, which could exceed the energy-saving potential of 5G. Ericsson research has explored rebound effects in the broader ICT ecosystem. It concludes that it is essential to set a clear starting point to examine the effects at a sector, solution, and product level.²⁰

¹³ [5G coverage map | OOKLA \(speedtest.net\)](#)

¹⁴ [Ericsson mobility report June 2022 | Ericsson \(ericsson.com\)](#)

¹⁵ [Curtailling carbon emissions – can 5G help? | STL Partners \(stlpartners.com\)](#)

¹⁶ [Ibid. Best case scenario](#)

¹⁷ [The energy use implications of 5G: Reviewing whole network operational energy, embodied energy, and indirect effects | Williams et al. 2022](#)

¹⁸ [Assessing Indirect Environmental Effects of Information and Communication Technology \(ICT\): A Systematic Literature Review | Bieser et al. 2018](#)

¹⁹ [Ibid. Williams et al. 2022](#)

²⁰ [Unpacking the multifaceted climate impact of ICT: Rebound and other effects | Ericsson research. 2022](#)



Research indicates that 5G has not substantially reduced emissions in other sectors, which may be explained by several phenomena such as indirect rebound effects, as mentioned above.²¹

To reduce the risk of rising energy use and emissions, investments in R&D for efficient next-generation data transmission technologies are needed, alongside continued efforts to decarbonise the electricity supply, as mobile networks will continue to consume a significant amount of electricity.

²¹ [5G: Future opportunities and challenges | Titu-Marius et al. 2020](#)









3 Terms and methodology

This note provides CICERO Shades of Green’s second opinion of the client’s framework dated October 2022. 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	Ericsson Green Finance Framework	Ericsson's green finance framework, dated October 2022.
2	2021 Annual report	Ericsson's integrated annual report for fiscal year 2021
3	Business Partner Environmental Requirement	Ericsson's policy for its business partners on environmental concerns, dated 2019
4	Requirements on material declarations	Ericsson's policy for requirements on material content from its sub-suppliers, dated 2019
5	Sustainability policy	Ericsson's sustainability policy, dated 2020
6	Ericsson Mobility Report (2022)	Annual report summarising trends within mobile networks and connectivity, dated June 2022.
7	Breaking the energy curve (2020)	Ericsson publication summarising research findings supporting the case for improving absolute energy efficiency whilst increasing throughput for 5G solutions.
8	Ericsson technology review magazine – spotlight on sustainable networks, 2022	Magazine publication by Ericsson, dated September 2022.



Appendix 2: About CICERO Shades of Green

CICERO Shades of 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 Shades of Green.

CICERO Shades of Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Shades of Green is internationally recognised 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 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 Shades of 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, the International Institute for Sustainable Development (IISD) and the School for Environment and Sustainability (SEAS) at the University of Michigan.

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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