Nokia’s journey to net-zero

Climate transition plan
June 2025

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Introduction to Nokia's climate ambition and approach

Introduction

Nokia believes that digital and connectivity solutions have a pivotal role in the climate transition, and Nokia is taking a leadership role in its value chain to address this.

Nokia is committed to achieving net-zero emissions by 2040, with targets approved by the Science Based Targets initiative (SBTi) in January 2025.

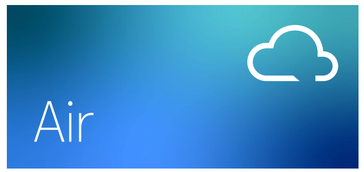
In this document, Nokia outlines the critical levers to reaching net-zero by 2040. Recognizing the complexities of this challenge, Nokia remains optimistic and continues to prioritize climate actions – focusing on energy efficiency and sustainable practices – in its operations and mitigation strategies.

This document also highlights Nokia's long journey toward a more sustainable future, a path that it has pursued even prior to its net-zero commitments.

Nokia's journey towards achieving net-zero emissions is underpinned by a comprehensive environmental sustainability strategy. The following pages provide an in-depth description of this approach.

Nokia's approach to environmental sustainability

Focus areas and impacts



- **Greenhouse gas (GHG) emissions**
- **Climate change**
- **Air pollution**

- **Land use**
- **Land use changes**
- **Species loss**
- **Ecosystem collapse**

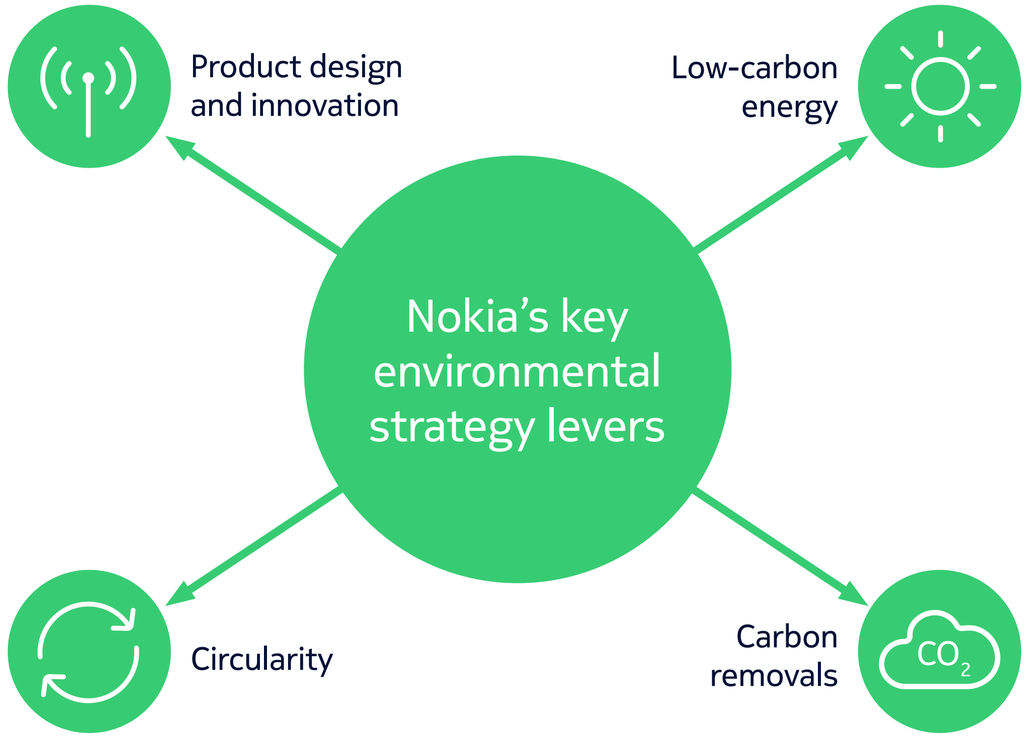
- **Resource depletion: water, minerals and fossil fuels**

Nokia's environmental strategy drives low-carbon[1], circular, and resource-efficient actions across operations and the value chain—integrating climate, biodiversity, and geodiversity efforts to reduce nature impact holistically.

Nokia emphasizes its responsibility toward minimizing negative impacts and maximizing positive ones.

Key measures to drive environmental sustainability include:

- **Product design and innovation:** Leading in energy efficiency across silicon, software and systems.
- **Low-carbon energy:** Committing to using 100% renewable energy across Nokia's facilities by 2025, in accordance with the RE100 framework.
- **Circularity:** Targeting 95% circularity by 2030 for operational waste as well as increasing the share of recycled materials in products.
- **Carbon removals:** Collaborating with partners to support credible carbon removal solutions.



[1] Carbon (CO_2) in the context of this document means carbon dioxide and other equivalent GHGs (CO_2eq).

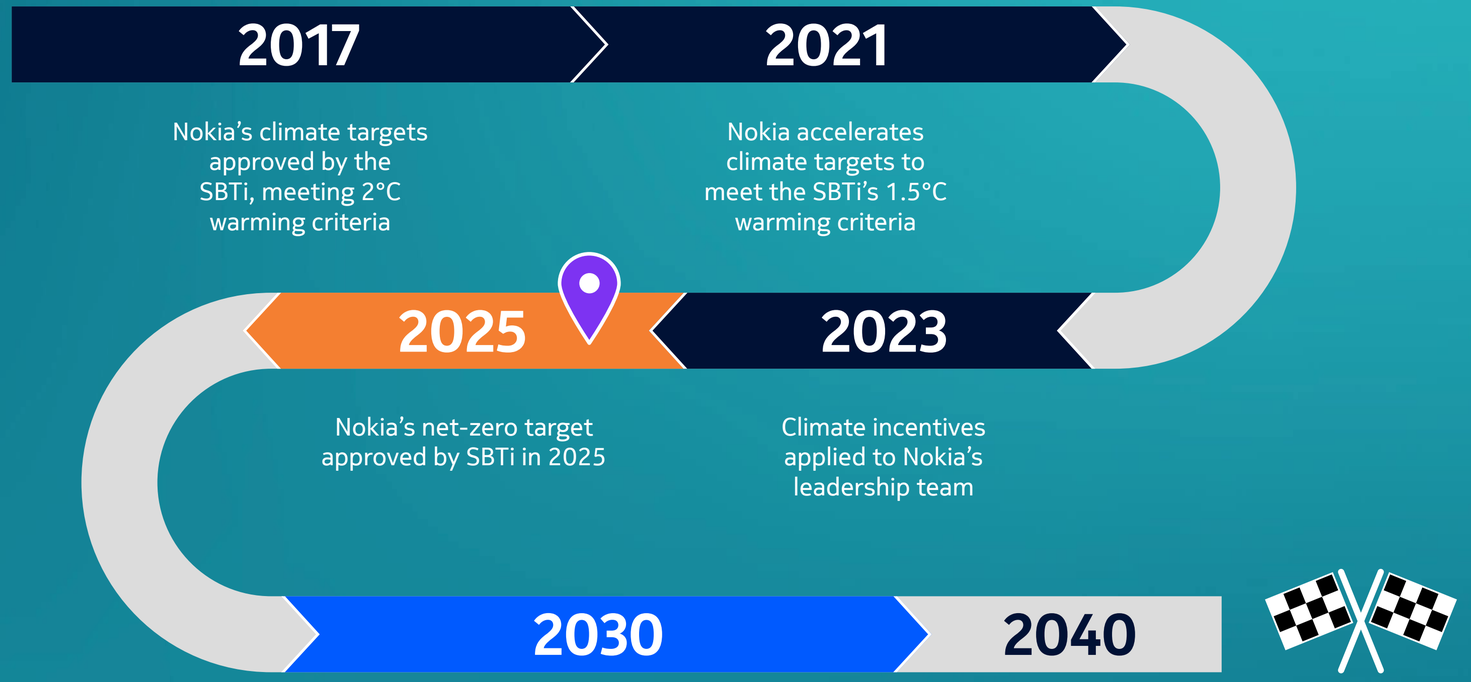
Nokia has committed to reaching **net-zero GHG emissions** by **2040**

Nokia's net-zero target was approved by the SBTi in January 2025.

This ambition **means a reduction of at least 90% of GHG emissions** to as close to zero as possible, with a maximum of up to 10% remaining hard-to-abate emissions being neutralized through carbon removals.

Nokia was the first telecoms vendor to have its 2030 science-based targets validated by the SBTi in 2017 and was among the **first 100 companies** across all sectors to do so.

Nokia's net-zero journey since 2017



[2] Against a baseline year of 2019.

Key climate targets and progress

Net-zero

0%

By 2040

SBTi-approved net-zero GHG emissions by 2040

Baseline 2019

Total emissions reduction

50%

by 2030

Total GHG emission reductions of 50% from a baseline of 2019 (Absolute Scope 1, 2 and 3)

2024

36%

Renewable energy

100%

by 2025

100% of purchased energy from renewable sources across Nokia's facilities globally

2024

87%

Final assembly suppliers' emission reduction

0%

by 2030

Final assembly suppliers' emission reduction decrease to zero emissions by 2030 for their Nokia-related manufacturing

2024

56%

Circularity rate

95%

by 2030

95% waste circularity rate in own offices, labs, final assembly, installations and take-back

2024

81%

Own facilities GHG emissions reduction

85%

by 2025

85% reduction in GHG emissions from Nokia's own facilities

2024

78%

2

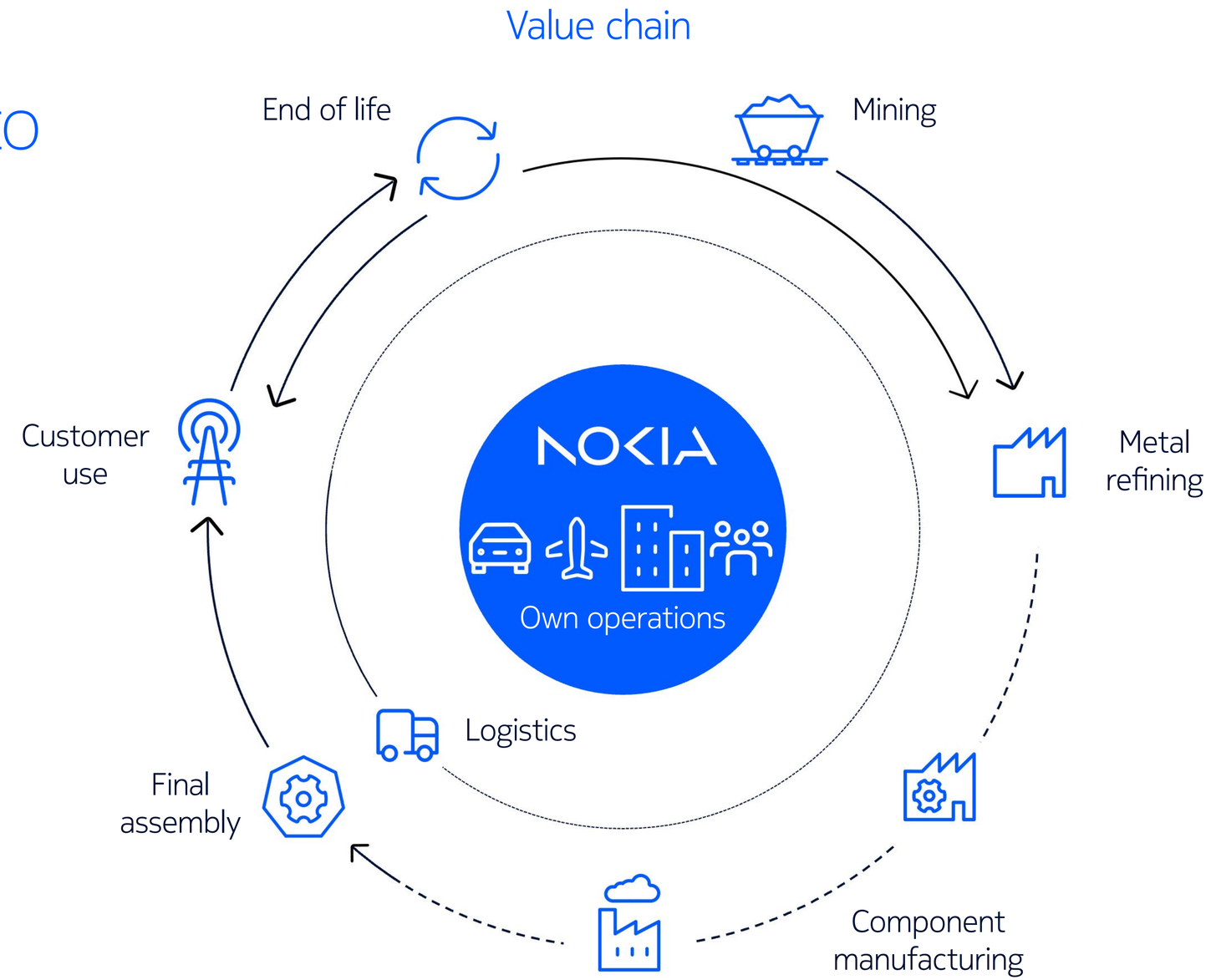
Net-zero commitments, targets and trajectory

Nokia's net-zero commitments apply to its entire value chain

This climate transition plan is structured into three critical areas, representing activity across the value chain:

1. **Own operations** covering energy use in facilities and fleets, contributing to Scope 1 and 2 emissions.
2. **Upstream activities** involving purchased goods, logistics and business travel, which fall under Scope 3 emissions Category 1, 4 and 6. Understanding embodied emissions of purchased goods and services includes the extraction and refining of materials.
3. **Downstream activities** related to the customers' use phase of products, contributing to Scope 3 Category 11 emissions, as well as material recycling.

- Moreover, **decarbonizing the electricity grid** is crucial to reducing GHG emissions, and is a necessity to achieve net-zero. **Governance, monitoring and reporting** are also key requirements to achieve net-zero.



Key milestones to reaching Nokia's net-zero target

2025

Facilities and fleets
Scope 1 and 2
- Achieve 100% renewable energy (RE100)

Purchased goods and services
(Scope 3 Category 1)
- Engage key suppliers to plan and track decarbonization, circular products and services

Use phase
(Scope 3 Category 11)
- Engage with customers to ensure broad uptake of renewables and work with reporting standards

Logistics
(Scope 3 Category 4)
- Optimize logistics methods to minimize emissions

Governance, monitoring and reporting:
- Run carbon dioxide removal pilot

2030

Facilities and fleets
Scope 1 and 2
- Achieve 100% electrification of car fleet

Purchased goods and services
(Scope 3 Category 1)
- Achieve 100% decarbonization for final assembly suppliers, 50% for other suppliers

Use phase
(Scope 3 Category 11)
- Develop Nokia's product portfolio for energy efficiency gains

Logistics
(Scope 3 Category 4)
- Develop biofuel blend agreements for logistics

2040

Facilities and fleets
Scope 1 and 2
- Neutralize residual emissions

Purchased goods and services
(Scope 3 Category 1)
- Usage of circular and low-carbon materials in product design

Use phase
(Scope 3 Category 11)
- Develop decarbonized site energy solutions
- Secure investments in long-term product and solution research and disruption

Governance, monitoring and reporting:
- Neutralize residual emissions

2025 2030 2040

Breakdown of Nokia's carbon footprint

Carbon footprint split by type of emission

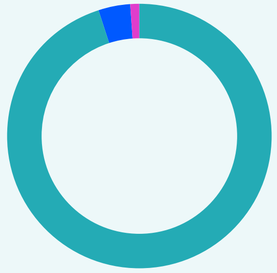
Nokia's actions and progress as of the end of 2024 are shown below and can also be found in the **Nokia 2024 Sustainability Statement**.

Nokia value chain GHG emissions reported according to the Greenhouse Gas Protocol. Reported unit is CO_2eq (metric tons of carbon dioxide equivalent). All these emissions are under Nokia's science-based net-zero target.

Emission source	Metric tons CO_2	% of total	
Energy use in facilities and by fleet	90,498	0%	Nokia's Scope 1 and 2 market-based emissions
Use of sold products	24,736,044	95%	Nokia's Scope 3 emissions
Purchased goods and services	962,134	4%	
Upstream transportation and distribution	160,178	1%	
Capital goods	33,207	0%	
Business travel	29,547	0%	
Total Scope 1, 2 and 3 emissions	**26,011,608**	**100%**	

Nokia's carbon footprint (Scope 1, 2 and 3)

Energy use in facilities and by fleet	0%
Use of sold products	95%
Purchased goods and services	4%
Upstream transportation and distribution	1%
Capital goods	0%
Business travel	0%

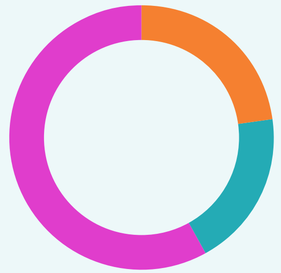


- In 2024, total GHG emissions amounted to 26,011,608 tons CO_2. This marks a 28% decrease compared to the previous year and a 36% reduction relative to the baseline year of 2019.
- The primary contributor to this reduction was a decrease in Scope 3 Category 11, which pertains to the use of sold products, where GHG emissions fell by 28% in comparison to 2023 and by 30% versus the baseline year of 2019.

Emission Source	Metric tons CO_2	% of total	
Facilities, direct emissions	21,236	23%	Nokia's Scope 1 emissions
Car fleet	17,211	19%	
Facilities, indirect emissions from purchased energy, market-based	52,051	58%	Nokia's Scope 2 emissions
Total Scope 1 and 2 emissions	**90,498**	**100%**	

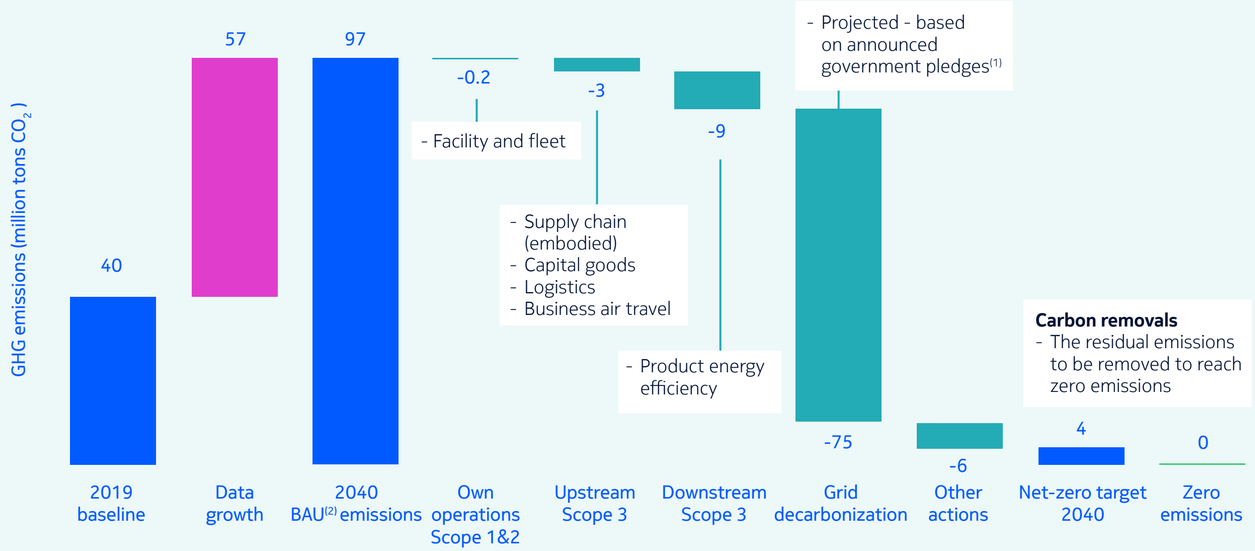
Nokia's carbon footprint (Scope 1 and 2)

Facilities, direct emissions	23%
Car fleet	19%
Facilities, indirect emissions from purchased energy, market-based	58%



Nokia's trajectory to reaching net-zero

Nokia's projected emissions from 2019 to 2040 in million tons CO_2.



(1) International Energy Agency World Energy Outlook (IE1 WEO) 2023 projections and global average emission factor scenario.
(2) BAU = (Business-as-usual)
Note: Data is presented in rounded numbers.

Forward-looking statement.

Detailed explanation of projected emissions reduction journey:

- Using 2019 as the reference year, this graphic illustrates anticipated business growth, taking into account data, sales and product developments, while also considering energy consumption for future data transfers to estimate emissions based on projections from the global energy grid.
- The emissions forecast for 2040, under a business-as-usual scenario (BAU) , indicates an increase from 40 million to 97 million tons of CO_2 if no reduction measures are implemented.
- Negative values represent initiatives aimed at decreasing these estimates, which are divided into operations, downstream and upstream efforts, and grid decarbonization.
- There is a shortfall of 6 million tons of CO_2, highlighting the necessity for additional actions and innovations in products and technology, in conjunction with decarbonization in the energy sector.
- The net-zero framework stipulates that a maximum of 10% of emissions can be offset through carbon removal (equating to 4 million tons), while a reduction of 90% is mandatory.

3

Actions to decarbonize in selected scopes

Approaching decarbonization by targeting own operations, value chain and key external factors

Own operations

Scope 1

Facilities

Car fleet

Scope 2

Purchased energy

Value chain

Scope 3

Upstream activities

Purchased goods and services
Category 1

Logistics
Category 4

Business travel
Category 6

Downstream activities

Use of sold products
Category 11

Mobile Networks

Network Infrastructure

Cloud and Network Services

Bridging the gap

Grid decarbonization

Carbon removals

CO_2

The net-zero pathway is supported by robust governance, monitoring and reporting actions.

Decarbonizing Nokia's own operations

Scope 1

Facilities **Car fleet**

Scope 2

Purchased energy

Key milestones:

76%

By 2024, achieved reduction of Scope 1&2 emissions since the baseline year of 2019

90%

Target reduction of Scope 1&2 market-based emissions by 2030 vs. the baseline year of 2019

100%

Target renewable energy use in Nokia facilities by 2025

Nokia's own facilities Scope 1

By 2024, Nokia achieved an 85% reduction of its facilities' GHG emissions compared to 2019.

Nokia has completed initiatives in reducing emissions from its own facilities through continuous energy efficiency improvements throughout its sites. This encompasses careful site selection, intentional workplace design, housekeeping practices (e.g. maintaining optimal temperature settings), upgrades to technical infrastructure (including cooling and electrical systems) and transitioning to LED lighting.

A pilot project for carbon removal and storage is ongoing in 2025. This initiative aims to achieve complete decarbonization of Nokia's real estate operations in Finland, where the company's headquarters are situated. By the end of 2025, Nokia aims to realize an 85% reduction in GHG emissions from its facilities relative to the levels recorded in 2019.

The short-term objectives and action strategies for 2030 involve progressively phasing out fossil fuel use through targeted site redevelopment, transitioning from fossil fuel heating to electrification, and implementing heat recovery systems in laboratories.

The long-term goal is to eradicate residual emissions from Nokia's facilities by exploring carbon removal and storage options for emissions that are not easily mitigated. Nokia is investigating the potential of smart building technologies to improve energy efficiency and reduce waste. Additionally, it is undertaking a thorough long-term assessment of its real estate carbon footprint to identify further enhancement opportunities. As a possible next step, Nokia is also exploring the option of Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM) certifications for its facilities.

Nokia's car fleet Scope 1

Nokia aims for complete decarbonization of its car fleet.

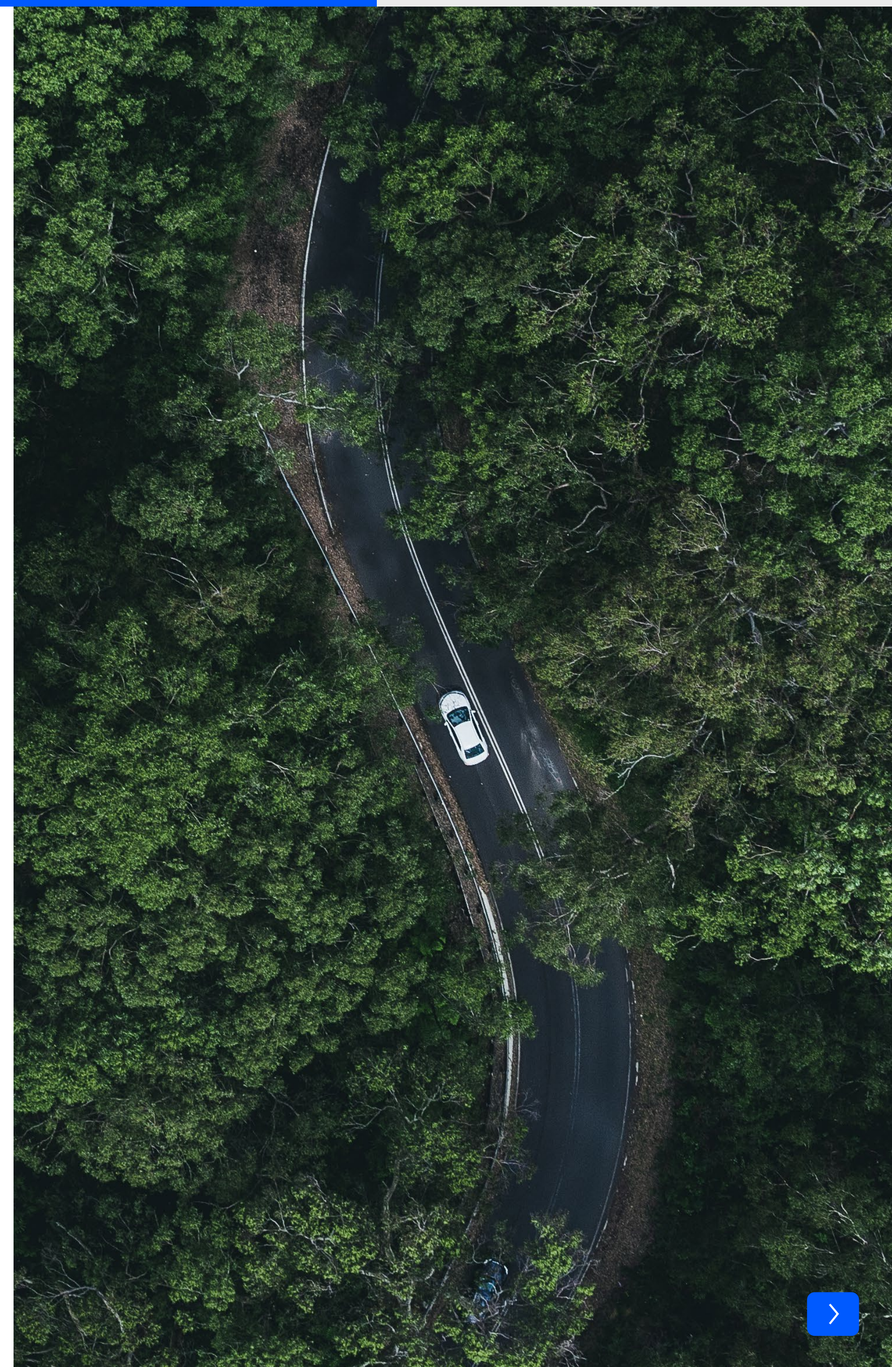
By end of 2024 Nokia has made notable progress in reducing CO_2 emissions from its car fleet, cutting down from 19,334 metric tons in 2023 to 17,211 metric tons - an 11% improvement despite a 4% rise in mileage. The company has electrified 85% of its new vehicles, exceeding the market average, and 95% of future orders are for electrified models. In 2024, Nokia introduced a global Fleet Standard Operating Procedure, encouraged more electric vehicle (EV) options from suppliers, and initiated car allowances to lower emissions.

Environmental criteria are now part of car original equipment manufacturer (OEM) tenders, with EcoVadis scores factoring into evaluations, and OEMs offering free charger installations at homes will receive preference.

In Finland, Nokia's Green Company Car Policy, implemented in 2008, has been running for over 15 years. Average CO_2 emissions of new Nokia company cars have decreased by 86%, from 178 g/km in 2007 to 25 g/km in 2024, exceeding the market average reduction of 50% during the same period.

Looking towards 2030, Nokia plans to enhance its sustainability initiatives through Mobility-as-a-Service solutions, including various mobility options and partnerships with ride-hailing services.

For Nokia's long-term 2040 goals, it envisions a comprehensive shift toward sustainable mobility. In parallel with the prioritization of battery electric vehicle (BEV) adoption and vehicle connectivity to improve efficient driving, Nokia aims to move toward a Mobility-as-a-Service vision. It will explore innovative solutions like the adoption of a mobility pass enabling access to multiple transportation/commuting options, gamification of CO_2 achievements, and global employee commuting surveys to drive further progress. Nokia also aims to achieve net-zero in the full supply chain for fleet and mobility.



Purchased energy Scope 2

In 2024, 87% of the energy consumed in Nokia's facilities came from renewable sources, and renewable district heating has been secured for Nokia's factory located in Oulu, Finland.

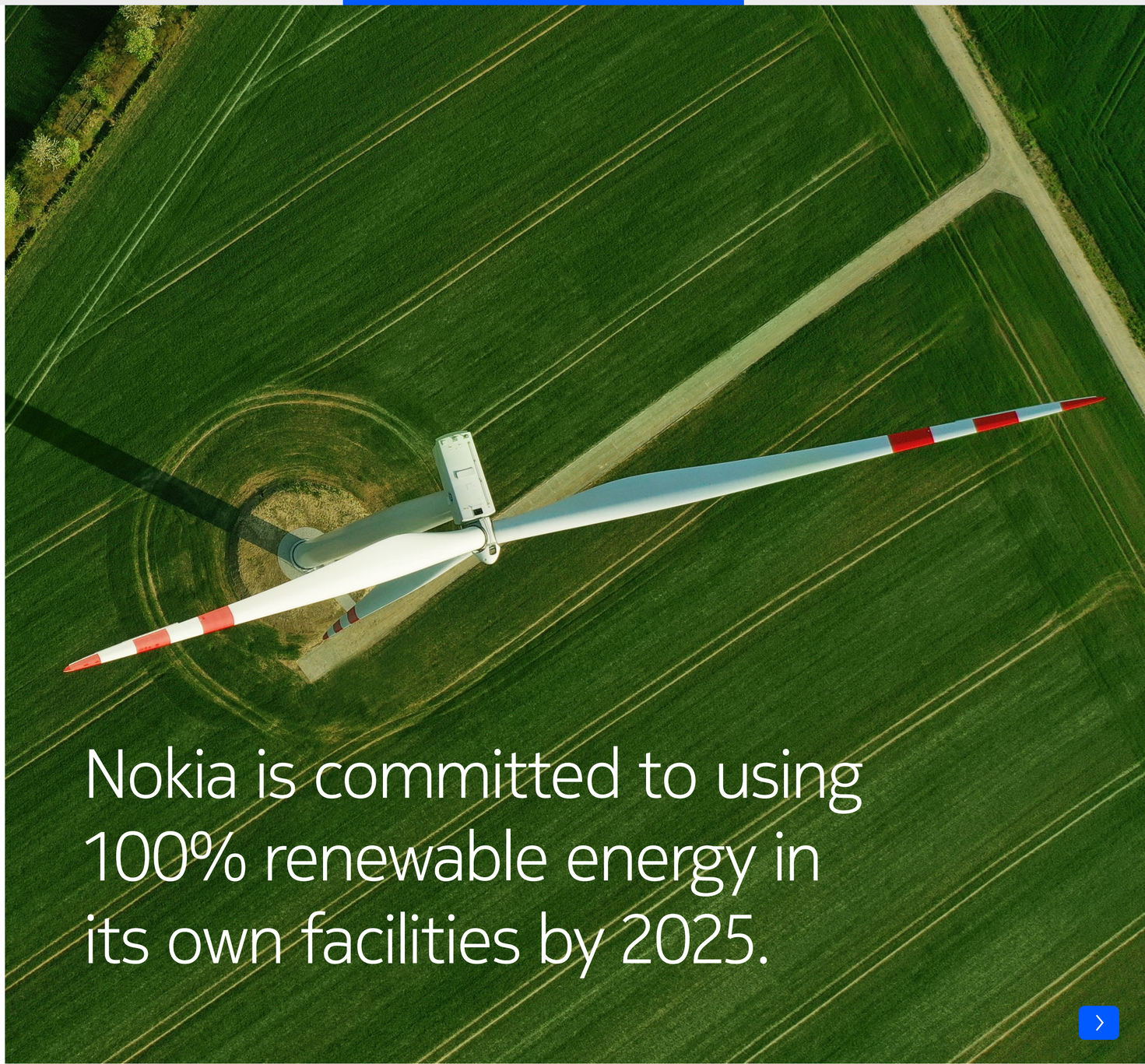
Nokia has installed solar panels on various buildings and is actively seeking additional renewable energy solutions.

Nokia is committed to reaching 100% renewable energy (RE100)[3] by 2025.

Long-term strategies for 2040 include continuous investigation into methods to further reduce emissions beyond existing targets and staying informed about technological advancements that can further decrease difficult-to-reduce emissions.

Nokia is partnering with energy providers and technology companies to develop innovative strategies focused on emission reductions.

Nokia also plans to increase its long-term reliance on renewable energy by exploring options such as wind and geothermal energy.



[3] RE100 is a global corporate renewable energy initiative led by the Climate Group and CDP, with the goal of accelerating the transition to zero-carbon electricity grids by bringing together businesses committed to using 100% renewable electricity in their operations.

Value chain emissions Upstream, Scope 3

Purchased goods and services
Category 1

Logistics
Category 4

Business travel
Category 6

- Nokia is committed to reducing the **embodied upstream emissions** of its products **(Scope 3, Categories 1 and 2)**, by offering circular solutions, using recycled materials, and designing for efficiency while working with suppliers to help decarbonize their operations.
- **Upstream Scope 3 emissions also include logistics and business air travel (Scope 3, Categories 4 and 6).** Here Nokia plans to enhance transportation efficiency, implement decarbonized fuels in logistics, and decrease dependence on air freight.

Purchased goods and services Upstream emissions, Scope 3 Category 1

Over a decade of achievements in supply chain decarbonization activities

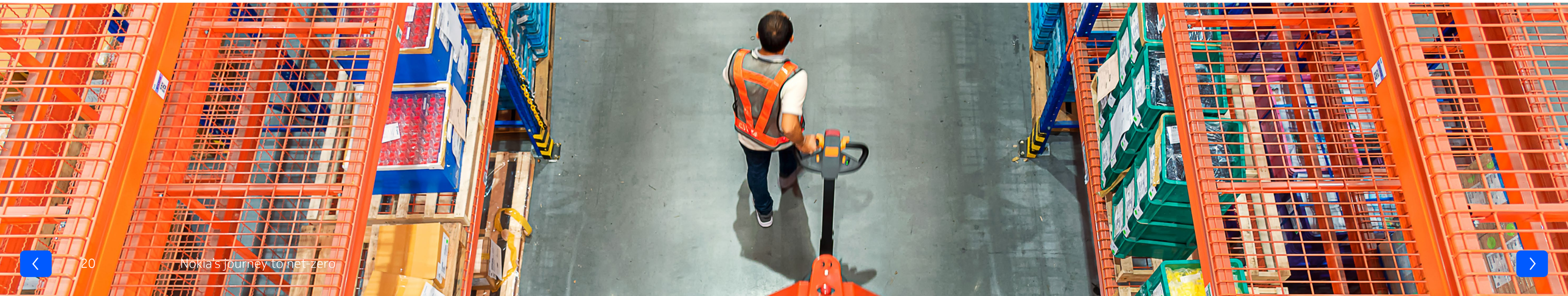
The timeline of Nokia's efforts towards achieving decarbonization of embodied emissions **begins as early as 2009** with the initiation of the EcoVadis program, aimed at assessing and improving the sustainability practices of suppliers. This was followed in 2011 by the commencement of CDP data collection, focusing on suppliers' Scope 1 and 2 emissions, which laid the foundation for more comprehensive environmental reporting.

In 2019, Nokia implemented specific targets and programs for final assembly suppliers, setting clear expectations for reducing emissions and enhancing sustainability. 2022 saw the launch of Nokia's recycled content program and reporting, further emphasizing its dedication to circular economy principles and reducing product embodied emissions.

Building on these efforts, 2023 marked the establishment of targets and programs for integrated circuit (IC) and printed wiring board (PWB) suppliers, ensuring that key hot spot areas of Nokia's products are produced with a focus on reducing environmental impact. These hotspots have the greatest impact towards production emission reduction.

In 2024 Nokia expanded its CDP reporting to include supplier Scope 3 emissions, addressing the embodied emissions associated with the entire supply chain, including material extraction, and reinforcing its commitment to achieving net-zero.

Nokia also engages directly with its logistics providers to develop comprehensive plans for achieving emission reduction targets. This includes regular communication with larger suppliers, particularly those in high-emission sectors, and recognizing outstanding sustainability efforts through Nokia's Supplier Diamond Awards.



Purchased goods and services Upstream emissions, Scope 3 Category 1

Next steps in supply chain decarbonization

Nokia aims for its final assembly suppliers to achieve zero emissions by 2030 for the part of their manufacturing related to Nokia, while other suppliers should reduce emissions by 50% from 2019 levels. Nokia collaborates with suppliers to create tailored strategies (see focus areas below) – including follow-ups and detailed roadmaps – to meet these targets.

Future efforts will focus on high-impact hotspot areas identified through a life cycle analysis (LCA) (see Life Cycle Analysis below), targeting components with the most significant climate impact. Nokia will also gather data from a broader supplier network via the CDP platform, enhancing data quality and engagement achieved over the past decade.

Nokia, together with its suppliers, has identified the following key focus areas to reduce product suppliers' embodied emissions.

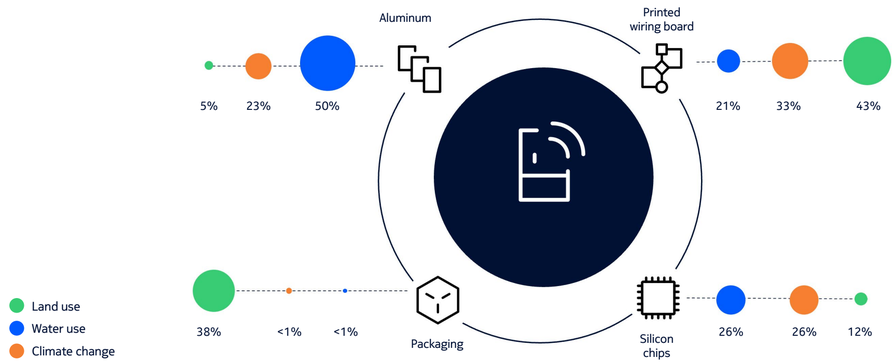
Mechanical part suppliers
Nokia is working with mechanical part suppliers to transition from virgin to recycled materials for aluminum, copper and steel.

ICs/semiconductor suppliers and PWB suppliers
Nokia is working with suppliers to set roadmaps for their decarbonization in this energy-intensive sector.

Final assembly suppliers
Nokia has been creating roadmaps to achieve zero emissions for Scope 1 and 2 by 2030 with final assembly suppliers over the past five years. Nokia's final assembly suppliers should reach zero emissions by 2030 from a 2019 baseline year. This target is for the final assembly suppliers' production of Nokia products.

Life Cycle Analysis

Identifying hotspot areas for product climate impact, water and land use



Logistics
Upstream emissions, Scope 3 Category 4

Nokia aims for a 73% reduction in GHG emissions from logistics operations by 2030.

Nokia is committed to reducing its logistics and transportation emissions and has already taken a number of steps to achieve this goal. Nokia has strategically partnered with leading Logistics Service Providers (LSPs) such as Ceva Logistics, Kühne + Nagel (K+N), DHL, DSV, and Expeditors to advance its sustainability objectives.

One key initiative is the use of sustainable aviation fuel (SAF), which is recognized as a highly effective way to decrease air freight emissions. Nokia is working with logistics partners to promote the use of SAF and establish the necessary criteria for its application. In 2024, Nokia procured sustainable aviation fuel (SAF) effectively offsetting 1% of its total airfreight emissions.

Another important strategy is optimizing transportation modes. Nokia is partnering with logistics providers to explore alternative transport options such as sea freight and multimodal options to reduce reliance on air freight. This has resulted in a significant decrease in air freight shipments over the past two years, partly due to regionalization efforts that bring operations closer to customers. In the Middle East and Africa (MEA) region, multimodal transportation solutions has covered 25% of business operations.

Nokia is also focused on improving space utilization and reducing packaging waste. Packaging reuse is an example of waste reduction in transportation, where annual savings are around 2,000 tons of packaging materials.

To further encourage sustainability among its logistics partners, Nokia promotes climate-related information disclosure through the CDP Supply Chain Climate program. This allows Nokia to monitor and manage emissions from its partners and drive continuous improvements in sustainability performance.

Near- and long-term next steps:

Nokia plans to increase its use of sustainable aviation fuel (SAF) blends and encourage its logistics partners to adopt this eco-friendly fuel. Besides using sustainable fuels, Nokia continues to significantly reduce the volume of goods shipped by airfreight. An important transportation mode for sustainability is rail, and Nokia will explore this option further with its logistics service providers.

Nokia will work closely with its logistics providers to develop and implement sustainability roadmaps, ensuring a shared commitment to environmental responsibility. It encourages its logistics partners to provide greater transparency by sharing climate-related data, fostering a culture of accountability within the supply chain.

Business travel
Upstream emissions, Scope 3 Category 6

Nokia is working toward reducing its business travel emissions as part of its overall Scope 3 emission reduction target.

Nokia has made significant strides in promoting sustainable travel from 2019 to 2024, reducing CO_2 emissions from business air travel by 57% while increasing virtual meetings by 103%. It has established comprehensive environmental, social and governance (ESG) criteria for selecting hotels and airlines, focusing on sustainability commitments and CO_2 emissions.

Key future actions in business travel emissions reductions

- Implementing CO_2 travel budgets via the "Green Credit" system for each business unit.
- Enhancing online booking tools to improve CO_2 visibility and promote lower-emission options and providing quarterly CO_2 travel reports to business leaders.
- Expanding the Train-over-Air Policy to more regions.
- Increasing the use of electric or hybrid rental vehicles by 50%.
- Running employee awareness campaigns to encourage smarter travel choices.

By 2040

Nokia envisions innovative and sustainable business travel, incorporating electric and hydrogen vehicles, electric vertical take-off and landing (eVTOL) aircraft, and a hyperloop transportation system. It aims to use artificial intelligence (AI) for itinerary optimization and its virtual reality (VR) technologies for virtual experiences, alongside blockchain for transparency in sustainability efforts and dynamic carbon pricing to promote low-emission travel.

Value chain emissions Downstream Scope 3 Category 11

30%

decrease achieved in Scope 3 Category 11 GHG emissions since 2019

- Enhancing product energy efficiency is crucial in the reduction of GHG emissions during use phase. Nokia prioritizes product design and innovation to improve energy efficiency, addressing the lion's share of 95% of emissions coming from customer networks.
- Customers focus on minimizing energy use and reducing emissions for competitiveness, and this drives Nokia's innovative initiatives.

Nokia's three business groups offer a diverse portfolio of telecommunications products, services and solutions, with each one tackling emissions in its own unique manner

Mobile Networks

Nokia Mobile Networks provides end-to-end mobile network solutions, including radio access network (RAN) equipment, microwave radio links, network management systems, and network planning and optimization tools.

Network Infrastructure

Nokia Network Infrastructure delivers network infrastructure solutions for high-capacity, reliable and fast data transmission, including IP routing, optical networking equipment, and fixed access solutions.

Cloud and Network Services

Nokia Cloud and Network Services offers cloud-based network services, Network-as-a-Service business models, and software- and services-led value creation.

Mobile Networks Downstream, Scope 3 Category 11

Activities accomplished

By the end of 2024 Mobile Networks (MN) achieved a remarkable 31% improvement in product energy efficiency compared to 2019.

This progress was driven by a series of innovative solutions, including an Extreme Deep Sleep mode for mMIMO radios with the potential of reducing power consumption up to 95%, traffic-aware energy-saving software for Wavence microwave radio backhaul products, and the launch of the MantaRay Energy Saving Modules enabled by AI and machine learning (ML).

MN also addresses energy consumption through digital services, like Digital Design for Energy Efficiency slashing radio network's energy consumption by up to 15%, without compromising network performance, and with energy-efficient Zero foot-print site solution delivering up to 30% total site-level energy savings. Read more at Zero-emission mobile networks | Nokia.com

MN's efforts have been recognized by the industry, with Global Data naming Nokia MN a leader in 5G RAN Energy Efficiency features in 2024.

Action plans for the near future (2030)

MN is setting its sights on a sustainable future, with a clear roadmap for 2030. Building upon its portfolio of base stations, site solutions, backhaul solutions and energy efficiency software, the group is committed to further innovation and optimization.

The journey toward 2030 will be marked by a focus on solutions powered by AI and ML. The group will enhance automation through these technologies, expanding AI/ML-powered services to help clients minimize energy usage.

MN is planning to develop its life cycle analysis (LCA) methodology further, to ensure a more comprehensive and accurate assessment of environmental impact. This includes enhancing the precision of Scope 3 Category 11 reporting, and shifting from a global CO_2 factor to a blended CO_2 factor. The impact of activated energy efficiency features within configurations will be carefully considered.

Long-term targets for 2040:

Nokia's long-term path to achieving net-zero by 2040 involves implementing the planned portfolio enhancements of its Mobile Networks (MN) business group in accordance with its overall net-zero roadmap.

MN is taking steps to lessen reliance on fossil fuels and support a more reliable energy grid as the production of renewable energy rises. Similarly, MN is encouraging its customers to aim for 100% use of carbon-free energy.

Network Infrastructure Downstream, Scope 3 Category 11

Activities accomplished

By the end of 2024, the Network Infrastructure (NI) business group made notable advancements in helping customers reduce their carbon footprint through innovations in its portfolio. After the introduction of FP5 chipset setting a new benchmark for energy efficiency in IP routing with a 75 % reduction in energy consumption over previous generations. Nokia routers offer high density 800G support from day one providing an additional 25 percent to 43 percent energy savings over 400G and extends system longevity.

For Optical Networks Nokia has launched PSE-6s enabling more sustainable networks with better power efficiency, with its super-coherent optics using 40% less power.

The group has also been shipping its fixed access product family based on Nokia's Quillion chipset, with 50% less power needed in fiber installations than previous generations, helping operators to meet their emissions goals.

Action plans for the near future (2030)

NI is focused on enhancing sustainability efforts and collaborating with customers to upgrade legacy networks with more energy-efficient technologies. Nokia is launching Broadband Easy platform that leverages advanced AI to optimized cost deployments and TCO enabling broadband providers to extend coverage to unconnected and underserved communities.

Nokia fiber portfolio is evolving with next-generation passive optical network (PON) technologies to increase bandwidth while reusing existing infrastructure.

Nokia is expanding its data center portfolio with a 'fit for purpose' approach to meet networking imperatives for wide area and data center applications with more efficient solution.

NI actively engages with industry groups and the Standards Global Forum to promote innovative optical networks with a focus on energy consumption.

In the long-term

Nokia's Network Infrastructure (NI) business group is aiming for a significant transition to advanced sustainable technologies in the long-term. Through continuous investment in innovation and collaboration with Nokia Bell Labs, NI is focusing on achieving efficient performance in IP and optical networks. For example, Nokia Bell Labs researchers are exploring ways to approach the Shannon Limit by improving forward error correction through enhanced interaction between redundancy and probabilistic shaping at receivers.

Cloud and Network Services Downstream, Scope 3 Category 11

Activities accomplished

Nokia Cloud and Network Services (CNS) has introduced the Private Wireless Sustainability Calculator, allowing businesses to assess their environmental and social impacts while discovering avenues for positive change.

Moreover, CNS has made significant strides in energy efficiency within cloud-native core products, achieving up to a 40% reduction in energy use in its customers' networks through the application of advanced ML analytics, along with leveraging partnerships, for example with Intel. In addition, Nokia's AI-based software solution Autonomous Network Energy Efficiency (AA EE), as part of its Autonomous Network portfolio, has helped streamline energy consumption for service providers.

Action plans for the near future (2030)

CNS is dedicated to advancing the digital transformation of industrial enterprises, improving operational efficiency and aiding sustainability objectives. Through strategic collaborations, CNS intends to enhance hardware efficiency and optimize energy consumption with the use of sophisticated AI data solutions. As such, the AN EE solution will be expanded by including more domains for an end-to-end sustainability application suite.

Long-term actions for 2040

The long-term initiatives of Nokia's Cloud and Networks Services (CNS) business group aim to facilitate extensive automation via autonomous networks. The goal is to transition from reactive to cognitive and environmentally friendly operations within cloud networks, thereby advancing industrial digitalization and the evolution of telecommunications networks toward a more sustainable and resilient future.

Other decarbonization levers

Other decarbonization levers: energy sector decarbonization and carbon removal strategies

Crucial role of grid decarbonization in achieving net-zero by 2040

This process refers to the reduction of GHG emissions associated with energy generation. It primarily focuses on transitioning from fossil fuels, such as coal and natural gas, to renewable energy sources like wind, solar and hydro, along with nuclear energy.

Nokia is actively partnering with various stakeholders to promote grid decarbonization and provide digital solutions to support renewable energy production and the modernization of the energy grid. Nokia also collaborates with its value chain to facilitate the transition to renewable energy as countries strive to decarbonize their energy systems.

This initiative serves as a key mechanism for decarbonization aimed at minimizing operational emissions (Scope 2), supplier emissions (Scope 3 Category 1) and emissions associated with product use (Scope 3 Category 11).

To model the advancements in grid decarbonization as part of its net-zero strategy, Nokia relies on scenarios from the International Energy Agency (IEA) and reports annual emissions in its Sustainability Statement.

Carbon removals

Nokia's primary focus is on minimizing emissions as much as possible before tackling the remaining emissions through carbon removal strategies.

"Carbon dioxide removals (CDRs) refer to the processes that extract CO_2 from the atmosphere via methods such as the growth of organic matter or through chemical reactions, ensuring the secure storage of the gas in various forms, including underground geological formations or the ocean." This definition is derived from McKinsey, and Nokia is adopting this framework.

As part of its commitment to achieving net-zero, Nokia intends to initiate its first collection of diverse CDR projects by 2025. These CDRs will assist Nokia in compensating emissions that are challenging to mitigate through other levers. The pilot will focus on facility emissions.

Nokia's core principle regarding carbon removals is in alignment with the Oxford Category V principles, which focus on aspects of permanency, verifiability, quality and additionality.

4

Net-zero governance, disclaimers and dependencies

Net-zero governance at Nokia 1/2

Executive oversight provides essential tracking of net-zero progress against targets

The fundamental governance framework consists of:

- **Board of Directors and Committees.** Sets the direction and holds oversight for Nokia's net-zero path, approving emission targets and sustainability incentives. The Audit Committee and Personnel Committee ensure reporting integrity and align rewards with environmental goals.
- **Group Leadership Team (GLT).** Provides oversight of the ESG strategy, ensuring that the alignment of strategic and operational sustainability initiatives are driving progress toward environmental targets.
- **Sustainability Council and ESG Executive Committee.** Oversees and monitors the business alignment and execution of sustainability initiatives across Nokia, evaluating targets and performance metrics.

Supporting processes include:

- **Incentive schemes.** Establish performance indicators, ensuring they are in line with both financial and sustainability objectives, including emission reductions.
- **Target-setting process.** Defines ESG targets informed by business requirements and stakeholder feedback, ensuring coherence with internal groups and functions.

Net-zero governance at Nokia 2/2

Next-level governance framework integrates deeper accountability and assurance into the business

Accountability

- **Defined roles:** Clear role assignments for net-zero initiatives are required at all levels, involving everyone from the Board of Directors to product teams.
- **Empowerment and independence:** Business groups are encouraged to develop their own net-zero plans, while the Board and CEO hold final responsibility.
- **Oversight at mid-level:** Nokia's Sustainability Council oversees accountability between business groups and Corporate Sustainability function for better decision making.
- **Performance incentives:** Net-zero goals will be included in performance reviews and long-term incentives (LTIs) to strengthen commitment to climate initiatives.

Assurance

- **Progress reporting:** Detailed indicators of net-zero progress, in addition to total GHG emissions, for better monitoring.
- **Updates:** Frequent updates by the Sustainability Council for effective progress tracking.
- **Data management:** Focus on automating data to improve reporting efficiency, with a standard operating procedure (SOP) for non-automated data to ensure consistency.

Dependencies and key uncertainties

Critical enablers to success on Nokia's journey to net-zero.

Decarbonizing the global energy grid

To lower Nokia's emissions, it is vital to transition to a decarbonized global energy grid, which is shaped by multiple stakeholders. Emerging technologies may not provide the anticipated emission reductions. This major dependency applies to the entire value chain, and is a success enabler for suppliers and customers alike.

Customer demand and preferences

An increasing number of customers are seeking to minimize their energy consumption and emissions, prompting Nokia to develop more and more energy efficient products. Collaborating closely with customers is crucial in the optimization of energy use and the discovery of decarbonization opportunities.

Advancements in technology

Ongoing research and development in energy-efficient technologies, particularly for 5G-Advanced and 6G networks, is essential for achieving Nokia's goals. The adoption of low-emission technologies, such as network virtualization and AI-driven energy management, is imperative for both Nokia as well as its customers to reach net-zero.

Engaging suppliers

Nokia's dependency on supplier engagement and transparency in reducing emissions is significant.

Harmonized collaboration with both logistics providers and customers is necessary to reduce emissions from transportation. By optimizing order consolidation and frequency, Nokia can transport the same volume using fewer vehicles, thereby minimizing environmental impact.

Capital investment capability

Adequate funding, planning and investment in sustainability initiatives are critical to meeting net-zero targets. Budget limitations or economic downturns could postpone or diminish investments in sustainability efforts.

Regulatory landscape

Inconsistent or unpredictable climate regulations might impose compliance challenges or impede progress. Transparent collaboration and dialogue with regulatory institutions is key.

Achieving net-zero hinges on the availability of reliable clean energy sources. This dependency is valid for the entire value chain.

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About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs, which is celebrating 100 years of innovation.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.