

People & Planet Report 2019

NOIKIA



We are on a journey to **1.5°C** where we can help build a more sustainable future for all people and the planet. Trust and integrity are the basis of our business. We strive to ensure the technology we provide is not misused to limit freedom of expression or right to privacy. We engage with our supply chain to improve transparency. We believe in an inclusive, diverse world where nobody is left behind. **Join us.**

Letter from the President and CEO

Here, at Nokia's headquarters in Finland, it seems that spring starts earlier and winter ends sooner each year. Yet your perspective on the dangers of climate change will be very different depending on where you are in the world.

The Australian firefighter, who has been battling raging bushfires for months on end. The Kenyan subsistence farmer, who faces another failed crop because of another year without rain. For them, climate change is already a matter of life and death.

Nokia is a global company. That means we have global responsibilities not just to our shareholders, customers and employees, but to the countries we work in, and the world we leave behind to our children and grandchildren.

This really hit home for me recently when reading David Wallace-Wells' excellent book *The Uninhabitable Earth*. In 2008, our neighbours Norway created "Doomsday" – a seed vault that was designed to store every crop on the planet and act as a global food bank in the event of a global catastrophe. But due to an unprecedented heatwave in the North Pole last year, the permafrost, which protects the vault, has started to melt.

The global catastrophe is already happening. The question we need to ask ourselves is: Can we do something about it?

At Nokia, we believe we can and we must.

This report sets out the steps we have taken to become a more sustainable company: increasing the energy efficiency of our products and processes; reducing carbon emissions at all of our sites; helping our customers make their operations more sustainable; and building the technologies of the future that will improve people's lives while protecting the planet and conserving its resources.

Equally, this report looks at what we are doing to better care for people as well as the planet. We are a company whose reputation is built on over 150 years of trustworthiness. That trust is earned by our employees acting ethically and with integrity at all times.

That means conducting business honestly and transparently wherever we find ourselves; promoting human rights and human dignity by ensuring our products do no harm; protecting private data; building on our impressive work to close unexplained pay gaps at Nokia; and creating an inclusive working culture where everyone can fulfill their potential.

This report goes into detail on the ambitious targets we have set ourselves on cutting emissions and playing our part in meeting the 1.5°C global warming goal set by the United Nations – a goal that climate experts agree is critical to avoid catastrophic climate change. The report is also aligned with the United Nations Global Compact.

We believe our work to build a more connected world will create new solutions and new opportunities to work, travel and live more sustainably.

“Technology alone cannot solve the global climate challenge we face. We need both the individual and the collective will to take the right decisions and follow through on our ambitions.”

However, technology alone cannot solve the global climate challenge we face. We need both the individual and the collective will to take the right decisions and follow through on our ambitions. Economic prosperity and ecological harmony is possible. We believe that improving the lives of people and nurturing our planet should go hand in hand.

After reading this report, I hope you will join us on this journey.
Warm regards

Rajeev Suri
Nokia President and CEO



Contents

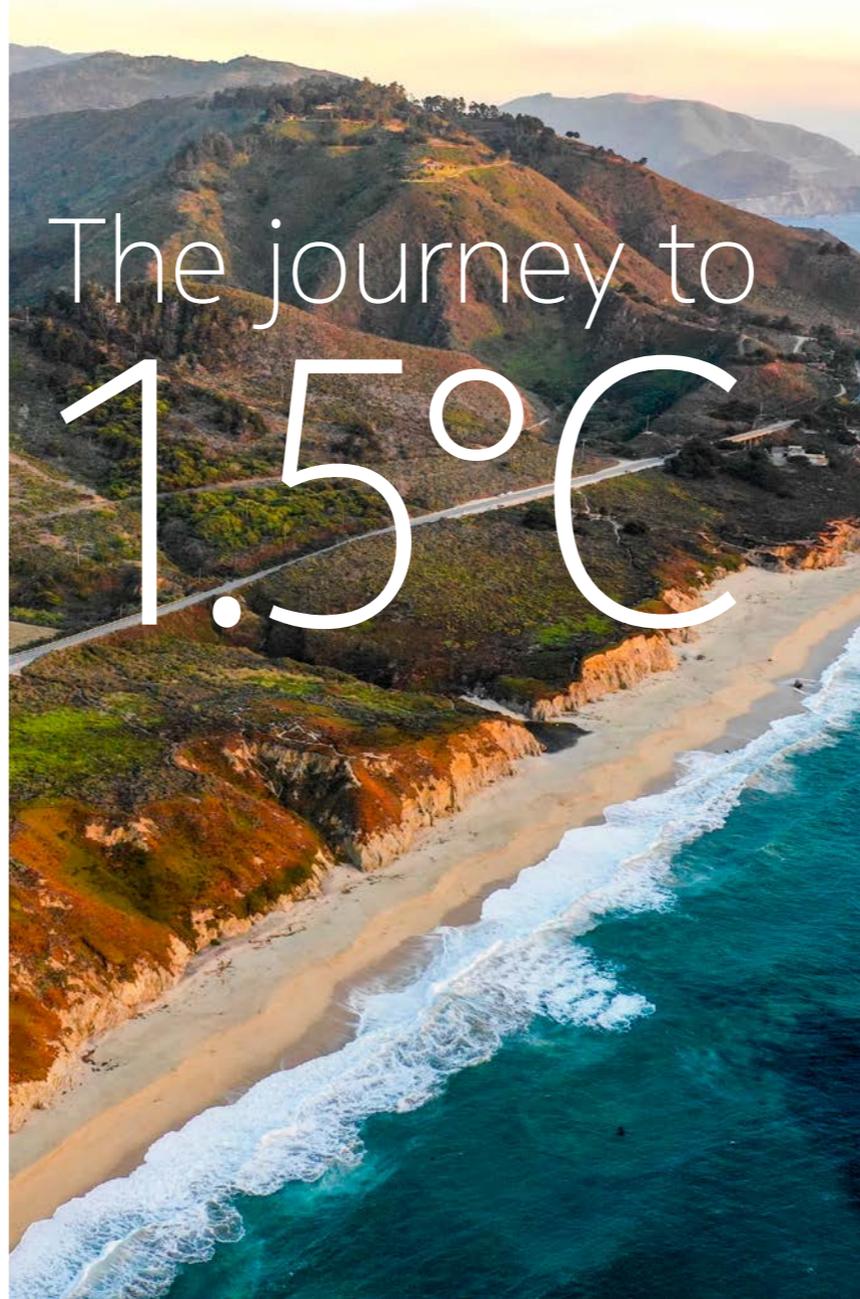
Letter from the President and CEO	3	4.3 Compliance reimagined 2019	44
About this report	5	4.4 Reporting of ethical concerns without fear of retaliation	47
Nokia today	6	4.5 Anti-corruption, Center of Excellence & Third-Party Program	49
1.0 Our approach	8	4.6 Addressing human rights	50
1.1 Sustainability highlights and challenges 2019	9	4.7 Responsible sourcing	54
1.2 Our sustainability priorities and impacts	10	4.8 Materials traceability and conflict minerals	60
1.3 Sustainability scope and key topics	11	4.9 Data privacy and security	61
1.4 The UN Sustainable development goals and our business	13	5.0 Respecting our people	63
1.5 Managing sustainability	14	5.1 Highlights	64
2.0 Improving people's lives with technology	15	5.2 Who we are	65
2.1 Highlights	16	5.3 A great place to work	66
2.2 Our economic impact	17	5.4 People development	68
2.3 Innovation and sustainability	19	5.5 Ensuring decent working conditions and fair employment	71
2.4 Connecting people and things	20	5.6 Inclusion, diversity, and anti-discrimination	74
2.5 Connecting the unconnected	21	5.7 Strengthening our health and safety performance	76
2.6 Efficiency and digitalization	22	6.0 Making change happen together	78
2.7 Making a difference with technology	24	6.1 Highlights	79
3.0 Combatting climate change	25	6.2 Collaborating with NGOs	80
3.1 Highlights	26	6.3 Working with governmental and multilateral organizations	83
3.2 Climate commitment	27	6.4 Collaboration with universities, cities and other industries	85
3.3 Climate – our products and networks	28	7.0 Key data and reporting principles	86
3.4 Sustainable product design and materials	32	7.1 Data reporting principles	87
3.5 Circular practices and products	34	7.2 Environmental data	92
3.6 Our own operations - energy efficiency, emissions, and circularity	36	7.3 Social, ethics and management systems data	99
3.7 Waste in own operations	38	7.4 Supply chain management data	104
3.8 Water	40	7.5 Financial data	105
4.0 Conducting our business with integrity	41	8.0 Independent practitioner's assurance report	106
4.1 Highlights	42	8.1 Independent practitioner's assurance report	107
4.2 Ethical business and corporate governance	43		

About this report

The scope of this report is Nokia Group in 2019, including the Networks segment, Nokia Software, Nokia Technologies and Group Common and Other. The report contains limited information on our undersea cables business, Alcatel Submarine Networks (ASN), and our antenna systems business, Radio Frequency Systems (RFS). Both ASN and RFS are reported in Group Common and Other.

In our reporting, we are committed to expanding our transparency and our coverage. Our report is prepared in accordance with the Global Reporting Initiative GRI Standards, Core-option, and is compliant with the UN Global Compact. Our selected key sustainability indicators have been assured by the independent auditor of Nokia, PricewaterhouseCoopers Oy. This report was published in April 2020 and it is only available in digital format. We have also published supplementary information online at www.nokia.com/about-us/sustainability, including an executive summary of the key achievements in 2019, and the Global Reporting Initiative index.

Sustainability and corporate responsibility topics are also discussed in our official annual reports, including the annual report on Form 20-F that is filed with the US Securities and Exchange Commission. The Board Review of 2019 Annual Accounts includes non-financial information as required by the Finnish Accounting Act implementing the EU Directive on disclosure of non-financial information. Financial and operational information in this report should be read in conjunction with the information provided in our interim reports and annual financial reports, as well as the risk factors and forward-looking statements included in such reports. For more information on our financial results, operations, and reporting structure, please see www.nokia.com/about-us/investors.



Climate action

In September 2019, at the United Nations climate summit, we joined a group of 87 companies in committing to recalibrate our existing science-based climate targets in line with the 1.5°C scenario. [Read more](#)

Improving lives

Since 2016 around 1 633 500 people have already benefitted from our community investment programs globally against our 2025 target of improving the lives of 2 000 000 people. [Read more](#)



Addressing human rights

We successfully completed our first external human rights assessment for the Global Network Initiative (GNI). [Read more](#)



ETHISPHERE®
WORLD'S MOST
ETHICAL
COMPANIES®
2018-2020

Business with integrity

Nokia has been recognized as one of the 2020 World's Most Ethical Companies by Ethisphere, a global leader in defining and advancing the standards of ethical business practices. [Read more](#)



Supply chain transparency

Our supplier audit implementation is aligned with SA8000 methodology and we implemented 332 supply chain audits of which 91 were onsite audits and 241 suppliers were assessed using the EcoVadis sustainability ratings scorecards. [Read more](#)

Nokia today

We create the technology to connect the world. We develop and deliver the industry's only end-to-end portfolio of network equipment, software, services and licensing that is available globally.

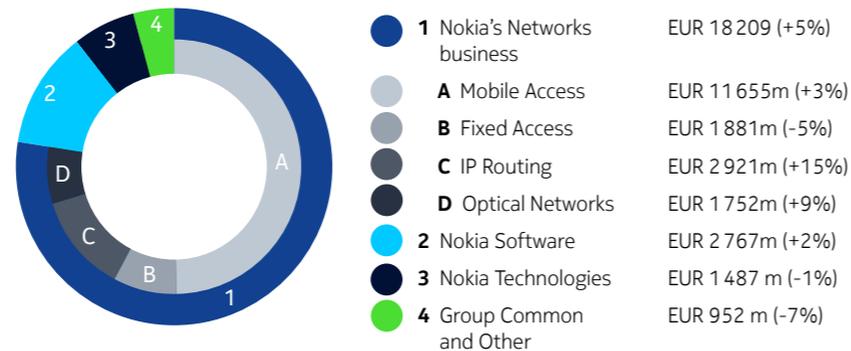
Our customers include communications service providers whose combined networks support 6.4 billion subscriptions, as well as enterprises in the private and public sector that use our network portfolio to increase productivity and enrich lives.

Through our research teams, including the world-renowned Nokia Bell Labs, we are leading the world to adopt end-to-end 5G networks that are more energy efficient, faster, more secure and capable of revolutionizing lives, economies and societies. We adhere to the highest ethical business standards as we create technology with social purpose, quality and integrity.

We have customers in nearly 200 countries. Our technologies transform the way people and things communicate and connect. At the end of 2019, we employed 94 723 people. More than a third worked within our research and development (R&D) in Europe, North America, and Asia.

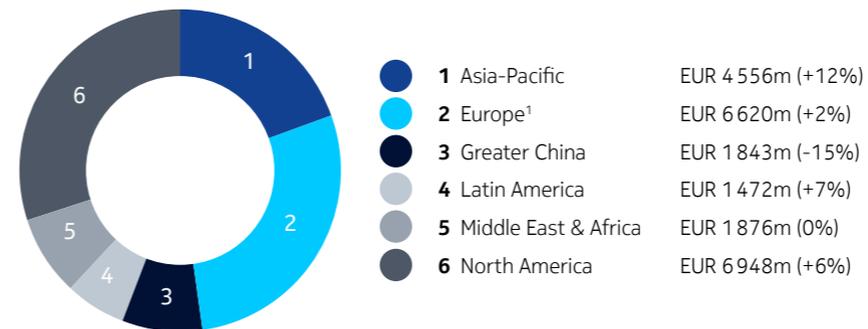
In 2019 we delivered net sales of EUR 23.3 billion and invested EUR 4.4 billion in R&D. We have seven main business groups: Mobile Networks, Global Services, Fixed Networks, IP and Optical Networks, Nokia Software, Nokia Enterprise and Nokia Technologies. Nokia Bell Labs leads the company's research and development. For more information see our financial reporting at www.nokia.com/investors.

Net sales by business 2019



The figures are derived from our consolidated financial statements prepared in accordance with IFRS. Year-on-year change is in parenthesis.

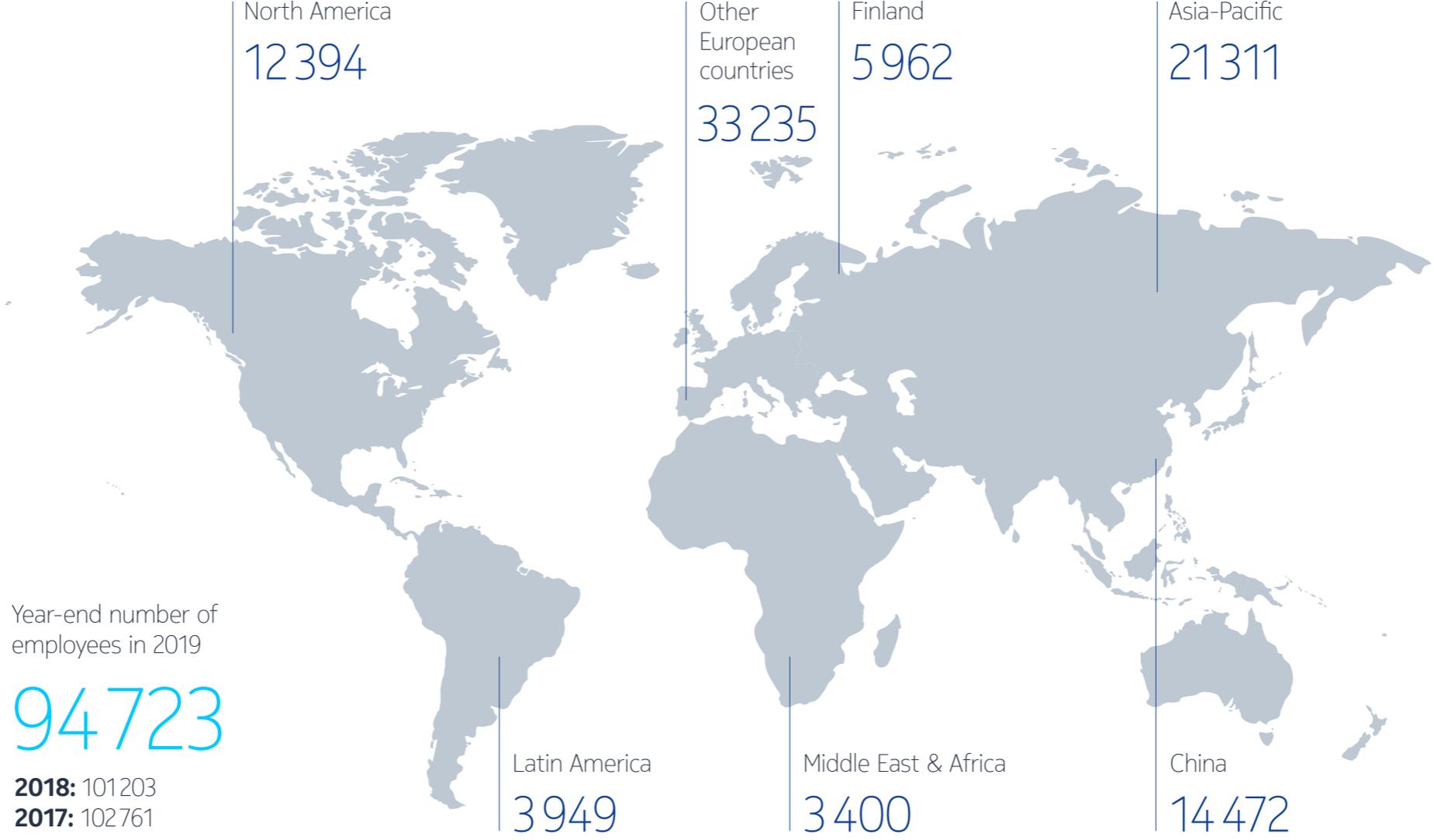
Net sales by region 2019



¹All Nokia Technologies IPR and Licensing net sales are allocated to Finland.

The figures are derived from our consolidated financial statements prepared in accordance with IFRS. Year-on-year change is in parenthesis.

Year-end number of employees by region 2019



Our approach

In 2019 our sustainability vision remained to create the technology to connect the world, in a responsible way. We started a major review of our sustainability strategy and approach in 2019. We looked at the impact, scope, focus areas, and targets. The work is ongoing at the time of this report and final priorities and plans will be communicated once finalized and approved.

People and nature can and must live in harmony.

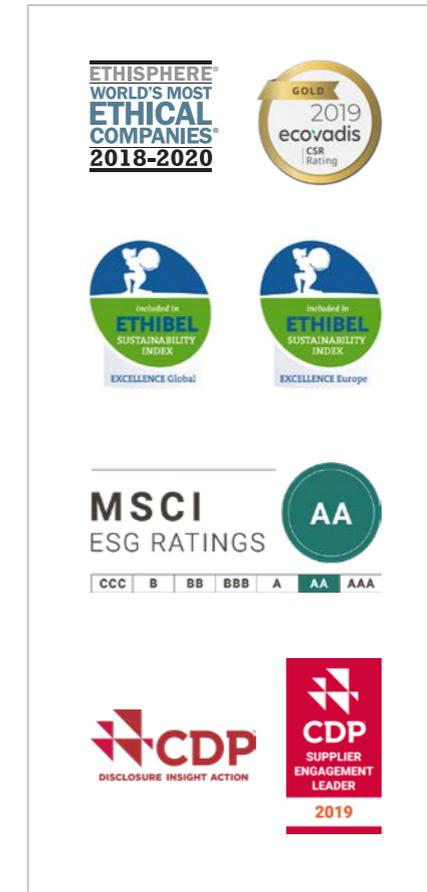
Sustainability highlights and challenges in 2019

What we did well...

- ✓ In 2019, the radio networks we supplied to our customers supported around 6.4 billion subscriptions worldwide.
- ✓ In September 2019, at the United Nations climate summit, we joined a group of 87 companies in committing to recalibrate our existing science-based climate targets in line with the 1.5°C scenario.
- ✓ We delivered zero emission products to over 150 customers globally and the customer base station sites we modernized used on average 46% less energy (43% in 2018) than those where our customers did not modernize.
- ✓ In October 2019, we completed our first external human rights assessment for the Global Network Initiative (GNI). The GNI board found we had made good faith efforts over time to implement the GNI Principles on freedom of expression and privacy.
- ✓ By the end of 2019, we had secured 62 commercial 5G contracts and launched 18 live 5G networks with our customers.
- ✓ As part of our inclusion and diversity work in 2019, we closed the unexplained pay gap identified in our company based on pay equity analysis we conducted with Mercer.
- ✓ In 2019, 96% of our suppliers achieved full visibility to the smelters in our supply chain. 82% of smelters identified as part of our supply chain were validated as conflict-free or were active in the validation process.
- ✓ In May 2019, we launched our Helping Hands volunteering and engagement program for employees. Through our community investment programs, we have cumulatively improved the lives of 1 633 500 people globally since 2016.
- ✓ We were again recognized for our sustainability work by many independent organizations. A full listing can be found on our [website](#).

What we need to do better...

- ✓ In 2019, we deeply regret the seven fatal incidents involving people working on our behalf. One of the incidents involved our own employee and six involved our contractors or subcontractors.
- ✓ In our supply chain management, audit closure continues to be a challenge. We target to close Corporate Responsibility onsite audit findings within six months of audit. In 2019 audit closure within six months was the same as previous year at 52%. We need to improve this.
- ✓ While the total facilities waste decreased by 41% compared to 2018, we did not reach our target of recycling 60% of all facilities waste.
- ✓ Women accounted for 22% of our workforce and 15% of the leadership positions. Despite great efforts, we need to work harder to reach our 2020 goal of increasing women in leadership positions by 25% (baseline 15.5% in 2016).



Our sustainability priorities and impacts

Our core business is connectivity and related activities. Our technology connects people and things, improves lives by providing access to education, information, better healthcare, and greater opportunity, connecting us to our communities and business, and can help enable a safer environment and healthier planet.

At the end of 2019 we began a major review and overhaul of our sustainability strategy, with emphasis on the range of impact, scope, focus areas, and targets. The strategy work is based on a number of factors related to our business and the impact on sustainable development including:

- Global macro trends with an impact on sustainable development. See below and more on our [website](#).
- Our regular engagement with various stakeholders. Read more about [Making change happen together](#).
- Requirements and information requests especially from our customers and investor. See our [Recognitions and Awards](#).
- Our benchmarking of 23 industry peers and the leaders in sustainability
- Our corporate strategy and [Code of Conduct](#)
- Assessments of risks and opportunities through Nokia Enterprise [Risk Management system](#)
- Analysis of the economic, environmental and social value we can create throughout our value chain. Read more [here](#).
- Analysis of UN Sustainable Development Goals and Targets and their relevance to Nokia. Read more on our [website](#).
- International sustainability frameworks such as [SASB](#), [TCFD](#), the [Global Reporting Initiative](#) (GRI) G4 and the [UN Global Compact](#)
- Our long history and experience in sustainability

Our strategy work is still ongoing. Final priorities and roadmaps were pending Board approval when this report was published.

Global macro trends impacting our sustainability approach

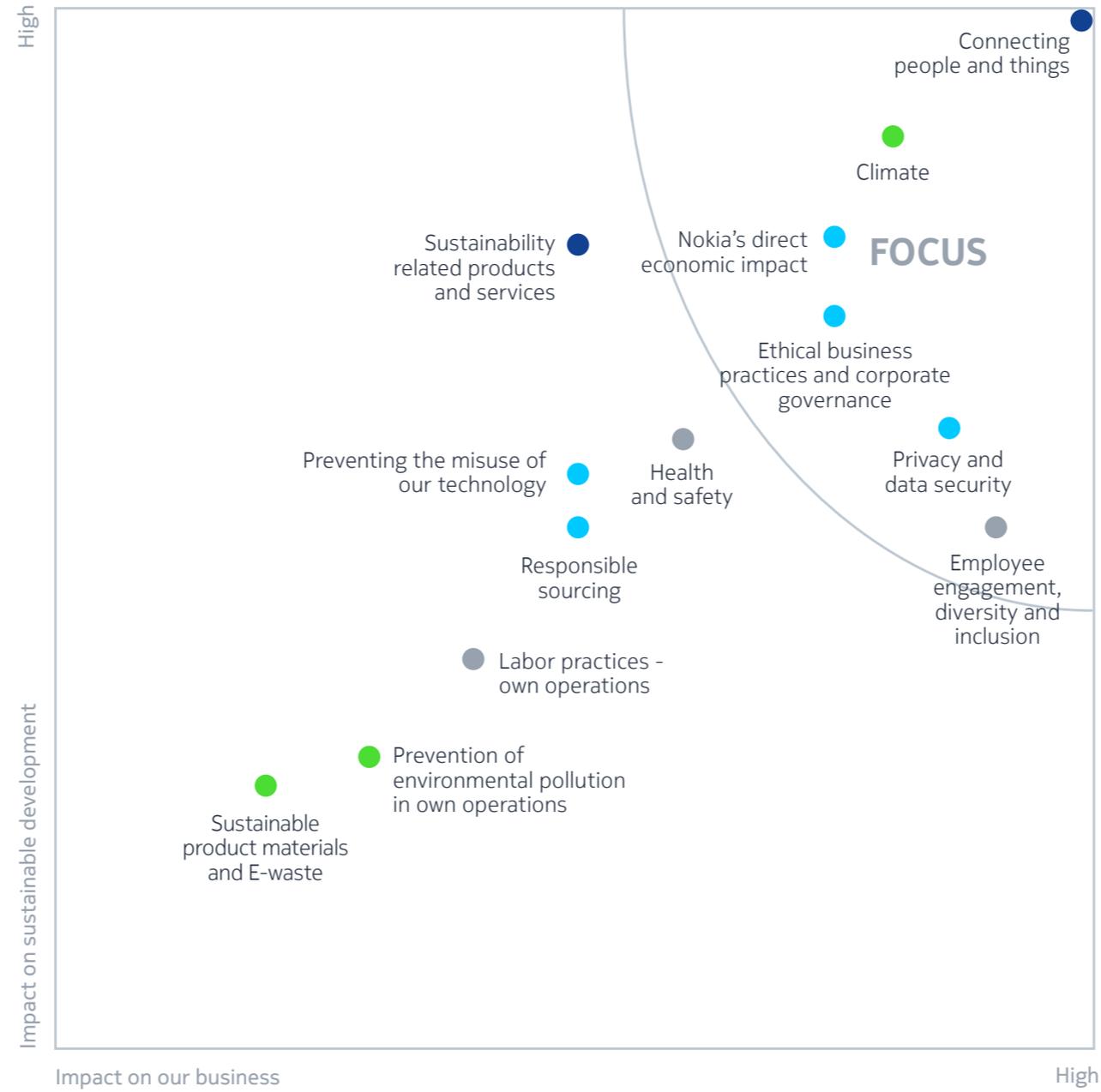
2019 saw some key global trends that continued to impact our sustainability work which included:

- The potential of technology
- Growing concern about the risks of technology
- The role of ethics and transparency
- Climate change and the sustainable use of natural resources
- Geopolitical and societal changes
- Competition for talent

To read more about these trends visit our [website](#).

Sustainability scope and key topics – impact on our business and sustainable development

Based on the analysis described above, we revised and clarified our materiality, reduced the total number of topics included in our sustainability scope from 20 to 13, adjusted the contents of the topics and assessed their importance to our business success and sustainable development.



- Improving lives with technology
- Environment
- Our people
- Integrity

All the topics shown in this diagram are material to our sustainability work. Those in the top right corner of the diagram are most important to our business and sustainable development.

Our targets and performance

We have set a total of 28 external targets for our key sustainability areas. Below is a snapshot of the end of year status for some of the most significant external targets across our sustainability focus areas.

By the end of 2019, of the existing 28 short-term and long-term targets:

- 6 of the 9 short-term targets were achieved and 3 were not achieved.
- 11 of the 19 long-term targets were ongoing and on track, 1 was achieved during 2019, and 7 were on-going and not on track.

For a more detailed overview of all of our public targets please visit the [website](#) and download our executive summary of this report.

Focus area	Targets	Achievement	Status
Improving people's lives with technology	2022 Helping our customers to connect the next billion, measured by number of subscriptions in Nokia radio customers' networks	At the end of 2019 the radio networks we delivered to our customers served around 6.4 billion subscriptions worldwide, compared to around 5.5 billion at the end of 2016.	 Ongoing - on track
Climate	2030 Science Based Target for Scope 3 (use of sold products): GHG emission reduction of 75% compared to the 2014 baseline	Scope 3 emissions included in our Science Based Target were on track to reach the 2030 target.	 Ongoing - on track
	2030 Science Based Target for Scope 1+2: GHG emission reduction of 41%, compared to the 2014 baseline	Scope 1+2 emissions included in our Science Based Target were on track to reach the 2030 target.	 Ongoing - on track
Ethical business practices	2020 Ethical Business training (EBT) completion: 95%	In 2019, the training was completed by 96.7% of our employees.	 Ongoing - on track
Privacy and security	2020 Our aim for 2020 is that Nokia be recognized as an industry leader in security and privacy. This will be assessed through external benchmarking	Our security Capability Maturity Model score for 2019 was 3.1 and ahead our industry peers. Critical information protection and employee engagement targets were met and over 95% of the identified critical and high audit findings were addressed.	 Ongoing - on track
Employee engagement, diversity and inclusion	2020 Sustained focus on CEO-sponsored Nokia Culture Principles	The target was measured by an anonymous employee engagement survey. The result was 78.2% favorable towards the company, as measured by the average of two target questions about overall direction of the company and its culture. Albeit the result was down by 1.3 percentage points compared to 2018, it remains on green.	 Ongoing - on track
	2020 Increasing the % of women in leadership by 25% (baseline 2016)	In 2019, we had 15.0% women in leadership positions, 0.5 percentage points down from the 2016 baseline of 15.5%.	 Ongoing - not on track

The UN Sustainable Development Goals and our business

In 2019, the SDGs and their targets continued to provide a key framework for our sustainability work. Our priorities have been remapped against our most material United Nations Sustainable Development Goals (SDGs) 8, 9 and 13 where we can have the greatest impact, though we continue to believe the technology we provide can positively impact all 17 SDGs.

Improving people's lives with technology



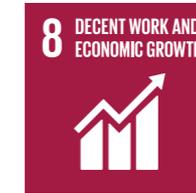
Goal 9: In 2019, the digitalization of industry and enterprises took off while the rollout of 5G began, and we also continued to support public safety, smart cities and critical communications. We connected the unconnected across the world to better education, healthcare and market opportunities. Read more on [pages 15–24](#) and on our [website](#).

Protecting the environment



Goal 13: The call for climate action became the most important sustainability issue during 2019 and we strengthened our response. In September 2019 we committed to recalibrate our science-based targets to align with the 1.5°C scenario. Read more about this and our environmental activities on [pages 25–40](#) and on our [website](#).

Conducting our business with integrity and Respecting our people in everything we do



Goal 8: We were again acknowledged as one of the World's Most Ethical companies by the Ethisphere Institute. During 2019 we also completed two major milestones in our Human Rights work completing both an internal human rights assessment and undergoing the external Global Network Initiative's Human Rights assessment for the first time. See [pages 41–62](#) in this report and our [website](#).

At the end of 2019, we had 94 723 people globally, while our supply chain numbered some 14 000 suppliers. We continued to emphasize diversity and inclusion as well as development and improvement. See [pages 63–77](#) in this report and our [website](#).

Making change happen together



Goal 17: We work with our customers, suppliers, other industries, enterprises, organizations, authorities, and NGOs. Our social and environmental programs in 2019 included improving healthcare and education with UNICEF, as well as working with customers on environmental and supply chain projects.

For more information on how we engaged and collaborated with key stakeholders in 2019 visit [pages 78–85](#) and our [website](#).

Managing sustainability

Sustainability issues are reviewed regularly at all levels of the company. We have built strong governance structures and processes to manage good ethical business practices and corporate responsibility. Our Code of Conduct provides our requirements and guidance for all employees. The Code is supported by policies and management systems related to responsibility issues. Our key corporate responsibility policies are regularly updated and can be found [online](#).

The highest decision-making body in our company after the General Meeting of shareholders is the Board of Directors. In 2019, the Board of Directors reviewed our corporate sustainability status including targets, performance, key trends and priorities. The Board also agreed on renewal of the sustainability strategy and targets and the Corporate Community Investment and University donations budget and adjusted focus areas for the year 2020. The Board also had cybersecurity/information security, ethics & compliance and privacy updates.

The Board of Directors Review of Nokia 2019 Annual Accounts also includes non-financial information which was also reviewed by the Board of Directors' Audit Committee. The Audit Committee also received an annual update on conflict minerals, ethics and compliance, and internal audit and controls reviews. The Board of Directors' Personnel Committee received culture, demography, and diversity updates, and reviewed the results of the Nokia Culture Cohesion Tracker survey in 2019.

The Nokia Group Leadership Team is chaired by the President and CEO. The Leadership Team reviews and approves sustainability related policies, strategy, and the annual sustainability report, and also reviews other sustainability related topics when needed. Nokia governance meetings and committees where Group Leadership Team members participate and where sustainability related topics are frequently reviewed include for example the Compliance meeting, the Security meeting, the Diversity Steering committee, the Sponsorship and Donations Committee, and Human Rights Due Diligence governance council. Our Chief Marketing Officer (CMO) is responsible for sustainability at the executive management level. During the year, sustainability related topics were reviewed during CMO management team monthly meetings. At the operational level, sustainability is managed by the Sustainability team (reporting to CMO), the Ethics and Compliance team and subject matter experts in our business units. The sustainability governance model will be reviewed in 2020 in order to support implementation of the new sustainability strategy. More information about our corporate governance practices is available in our annual reports and on our [website](#).

Risk and opportunity management

The key opportunities and risks are primarily identified against business targets as an integral part of strategy and financial planning, and in daily business operations. Our Enterprise Risk Management covers all types of risks that can affect Nokia including strategic, operational, financial

and hazard risks. The aforementioned governance practices ensure adequate focus on key sustainability topics and related issue management.

The most important risk factors and the principal factors and trends affecting our operations are discussed in our Form 20-F filing for the year 2019 [here](#).

These risk factors include sustainability-related threats such as:

- risks related to product safety, product misuse, environmental accidents, health and privacy and security, including cybersecurity threats
- risk of non-compliance with regulations or our supplier and customer requirements
- violation of ethical standards, including our Code of Conduct
- labor unrest and strikes
- inability to retain, motivate, develop and recruit appropriately skilled employees
- purchasing boycotts and public harm to our brand
- risks related to issues with tariffs and taxation, including tax disputes
- disruptions in our manufacturing, service creation, delivery, logistics or supply chain caused, for instance, by natural disasters, military actions, civil unrest, public health and safety threats (including disease outbreaks), many of which may be fuelled by the adverse effects resulting from climate change.

For more information on Nokia Enterprise Risk Management, please go to our [website](#).

Improving people's lives with technology

We can achieve our greatest impact on the world's sustainability challenges by developing and enhancing solutions and technology that improve lives and provide greater opportunities for people and planet to thrive. The continued development and rollout of 5G, Internet of Things (IoT), Artificial Intelligence and other new technologies together have the potential to socially and economically empower any individual, community, industry or country.

Everything and everyone will be connected, bringing immediacy to all information with new opportunities and challenges for humanity.

Highlights

Connectivity will bring economic, educational, health, environmental and efficiency opportunities to all.

6.4

billion

The number of subscriptions globally served by the radio networks we have delivered to our customers. This is an increase of some 0.3 billion subscriptions over 2018. We are on track to achieve our target to help our customers connect the next billion by 2022 (baseline 2016)

206 900

direct beneficiaries of our community programs in 2019

100

villages in India will be digitalized as part of our Smartpur cooperation with NGO Digital Empowerment Foundation

+1 300

customers

deploying our mission critical networks globally

Our economic impact

As a global company we have significant direct and indirect economic impact on our stakeholders. Direct economic impact includes our purchasing of goods from suppliers, dividends paid to shareholders, wages and benefits paid to our employees, as well as financial expenses paid to creditors, income taxes paid to the public sector, and community investments.

The related key performance indicators are listed in the table. We contribute indirectly to the economy in a variety of ways, though our greatest indirect impact comes as a result of the benefits of technology. Read more below and in the Improving Lives chapter of this report.

Our tax payments

In 2019, we paid a total of EUR 516 million in direct income taxes (EUR 364 million in 2018), of which EUR 179 million was paid in Asia-Pacific and EUR 257 million in Europe, the Middle East, and Africa. The taxes paid in the Americas region were EUR 80 million. Besides paying direct income tax,

we contribute to society in the form of pension contributions, social security contributions, payroll taxes, value added taxes, sales taxes, customs duties, excise taxes, environmental taxes, and other similar duties and fees. As a major taxpayer and collector of indirect taxes and payroll-related taxes, we pay and collect these taxes in accordance with the applicable rules and regulations.

Our tax policy

The foundation of our tax policy is to pay the right amount of tax that is legally due in the correct jurisdiction. Furthermore, we observe all applicable rules and regulations in every country where we operate, and we follow the rules set by the relevant authorities.

We also follow a global transfer pricing policy that is based on the Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations issued by the Organisation for Economic Cooperation and Development (OECD). The guidelines outline the arm's length principle as an internationally accepted valuation standard for intercompany dealings. Based on the policy and guidance given by the OECD, we comply with the arm's length principle in all our intercompany dealings. We also follow the development of local transfer pricing rules and regulations in all territories and adopt localized transfer pricing policies if necessary.

Large multinationals are obliged to disclose country-specific information to the tax authorities (so-called country-by-country reporting within the framework of OECD BEPS action 13). We are compliant with these reporting requirements.

We may also seek advance pricing agreements, for example, agreements between taxpayers and tax authorities, to the extent feasible in order to gain mutual understanding and acceptance on the tax treatment of intercompany arrangements. The benefit of such agreements is to remove uncertainty regarding tax treatment, especially in complex business arrangements.

Nokia conducts business in many countries, and in every one of these countries our policy is to operate in an open and cooperative relationship with the tax authorities. Our tax planning is aligned with our business models, and taxes are considered in business decision-making – but only as one of many elements. Our business and location planning is driven by sound commercial needs. We are subject to income taxes in multiple jurisdictions. Our businesses and investments globally, particularly in emerging markets, are subject to uncertainties, including unfavorable or unpredictable changes in tax laws, taxation treatment, and regulatory proceedings, including tax audits. We are compliant with reporting requirements to disclose country specific information to tax authorities according to the country by country reporting requirements. We will also actively monitor and comply with other regulations in this area.

Indirect economic impact

Our company and its activities also indirectly impact economic development in other ways. We generate business opportunities and employment within our supply chain and enable competence development for our employees. Connectivity is beneficial in many ways and has been shown to increase productivity

This activity supports SDG Target 8.2:



“Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors”

and economic growth. According to the GSMA's The Mobile Economy 2019 report, by 2023 the mobile industry contribution to global GDP will stand at USD 4.8 trillion. Furthermore, the report states that 5G technologies are expected to contribute USD 2.2 trillion to the global economy over the next 15 years, with key sectors such as manufacturing, utilities and professional/financial services benefiting the most from the new technology. Download the report [here](#).

Connectivity helps to connect the unconnected and provide access to information, as well as to financial and commercial services to underserved areas. It enables new ways of doing business, transforms public service delivery, and brings innovation to a wider audience. Our industry also has a major role to play in technology transfer and human capital development globally.

A recent study looking at the enabling effect of mobile communications, carried out by the GSMA (Global Mobile Association) and the Carbon Trust stated that compared to the global carbon footprint of mobile networks themselves, the level of avoided emissions enabled by mobile communications technologies is ten times greater. Read the report [here](#).

Economic impact

			2016	2017	2018	2019
	Stakeholder	Impact (EUR million)	Nokia Group	Nokia Group	Nokia Group	Nokia Group
Direct economic value generated	Customers	Net sales	23 614	23 147	22 563	23 315
Economic value distributed	Suppliers	Total purchases of goods and services	13 544	12 572	14 118	14 989
	Shareholders	Dividends paid	1 501	963	1 081	570
	Employees	Wages and benefits ¹	7 814	7 845	7 834	7 191
	Creditors	Net financial expenses	273	531	233	346
	Public sector	Income expenses paid (+) Income taxes refunded (-)	503	555	364	516
	Communities	Community investments ²	5	7	7	2

Group numbers include both continuing and discontinued operations. Discontinued operations refer to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015.

¹ Includes termination benefits and excludes social security expenses

² Reporting with current methodology started in 2016. 2016 values are including corporate and key regional contributions, 2017 also some local contributions.

Innovation and sustainability

We understand the need to grow further and enable new technology, creativity and innovation. Technology innovation plays a key role in achieving a more sustainable planet and better, healthier lives for all people.

For example, in 2019, we announced that Canadian startup company HaiLa, which offers technologies that can drastically reduce energy consumption for Internet of Things devices, had won the 2019 Nokia Open Innovation Challenge. Read more [here](#).

Nokia Bell Labs leads the research arm in Nokia and conducts disruptive research for the next phase of human existence. Nokia Bell Labs is world-renowned for its profound influence on the evolution of communications and information technologies and consequently how people connect, collaborate, compute and communicate. For more information see www.bell-labs.com. In 2019 we again held our Nokia Bell Labs prize competition to attract the best minds to help solve humanity's problems www.bell-labs.com/prize.

Through our Invent with Nokia platform we are eager to work with external companies and individuals who can bring diverse technology and new ideas to our business. Read more at inventwithnokia.nokia.com.

Innovation will drive the creation of many solutions to today's challenges and opportunities. We sponsor

the Millennium Prize enabling us to promote the value of innovation and technology in creating a better life. This prize is intended to raise awareness of the importance of innovation globally. Read more at taf.fi/millennium-technology-prize.

We also look at environmental innovation. For example, in a trial carried out with Nordkapp, the Finnish Environment Institute SYKE, Telia and Vaisala we showed how 5G, video drones and computer vision can be used to monitor and provide real-time insights into environmental conditions such as the problems with blue-green algae in the Baltic Sea. Imagine if the same technology could be used to monitor and analyze plastic pollution in the sea or be used in other environmental analysis. Read more on our [website](#).

In February 2019 we demonstrated the world's first liquid-cooled 5G base station at the Mobile World Congress in Barcelona, a project that went on to win the Finnish Quality Innovation award.

For information on how we innovate visit www.nokia.com/innovation.

Connecting people and things

We are building extraordinary networks, software and ecosystems. We are continually reimagining technology to meet society's many challenges and opportunities, making communities smarter and more sustainable, transportation safer, and enterprises more agile and efficient.

We look at how our technology impacts people – enabling them to control and manage their wellness, experiences, choices, and lives, and how they explore and experience the world around them. We are focused on the human benefits of technologies.

Digitalization is driving industry in more sustainable ways and further improving individual lives and the planet. Key areas of industry are the digitalization of the energy sector, the digitalization and automation of the transport sector, the facilitation of healthcare anywhere, the digitalization of communications between people and things, and the implementation of digital production and manufacturing that will decentralize and localize manufacturing while making it more efficient.

Technology and sustainable development

The total annual energy bill of global radio networks in 2018 was EUR 81 billion showing a 4% increase from 2017. The arrival of the first commercial 5G networks may have a small negative impact on the total 2019 figures due to the rollout of the first new 5G equipment to existing 2G, 3G and 4G sites. The positive news is that 5G technology has been designed to build towards 100 times more energy efficient than other radio technology used before. This enables us to decouple the huge expected traffic growth from the energy consumption, which means the potential for much more sustainable networks.

We are rolling out 5G with customer networks across all continents. New technology will empower individuals and communities. In fact, technology is already bringing greater, more sustainable efficiencies to enterprises and communities: safer, cleaner cities, and access to digital health; better management of natural resources, and improved data about and analytics of the world around us and its resources. Social and ethical issues related to technology include automation and the changing landscape of jobs and talent acquisition, the role of AI and big data in privacy, the enhanced security of smart cities, and the potential misuse of technology. Technology will help us change the way we consume to enable a more sustainable future and a healthier planet. It is also imperative that the digital divide is not widened and no one is left behind.

This activity supports SDG Targets:



9.c: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the internet in least developed countries by 2020; and

9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.

Connecting the unconnected

In 2019 we had customers in nearly 200 countries, and the rollout of 5G began in earnest around the world. We continued to improve connectivity and coverage in many emerging markets and announced new cooperation in countries and territories such as Algeria, Aruba, Brazil, Egypt, Ethiopia, Kenya, Malaysia, Nigeria, Pakistan, Rwanda, Sudan, the Marianas, Tanzania, Tunisia, Uganda, and Vietnam.

For example, in Brazil we will help bring connectivity to some of the 93% of Brazilian farmers who currently have no wireless access to broadband services on their farms, while in Kenya we will upgrade the fiber network providing higher capacity for expanded broadband service in East Africa. More examples of customer projects can be found on our [website](#).

There are still more than three billion people without broadband internet connectivity, which makes it more challenging to enable their economic welfare and access to basic human rights such as good

healthcare and education. With the advent of 5G we must ensure the digital divide does not widen between those who have access and those who do not. Rural communities and women are often the most affected by lack of connectivity.

Across our regions our employees volunteer as part of our community investment programs to help connect people to better healthcare, improved educational opportunities and access to market opportunities. We work with both global and local community organizations and NGOs to enable people to connect to greater opportunities.

5G and digital lives

5G will touch all aspects of life. We offer the broadest portfolio of solutions in our industry. By the end of 2019 we had 66 5G commercial deals, over 100 5G agreements, and had rolled out 5G networks across all regions. We announced, among others, agreements and collaboration on 5G with AT&T, Sprint, T-Mobile, US Cellular and Verizon in the USA, with NTT DoCoMo, KDDI and Softbank in Japan, KT, SKT and LG Uplus in Korea, Elisa, Telefonica, Telia Company, Vodafone in Europe, Antel in Latin America, and du, Ooredoo, Rain, Saudi Telecom, and Zain in the Middle East and Africa region. For more information on where we are rolling out 5G and its benefits go to networks.nokia.com/5g.

For example, 5G can, in combination with other technologies and smart planning, bring new types of services and greatly improve existing ones to help fight climate change through faster, better and more accurate data. The combination of 5G's

low latency, which provides real-time connectivity and massive amounts of data, with sensors and analytics will enable all sorts of smart services that will greatly improve environmental, health, and public safety. For example:

- **Weather companies** - can significantly improve forecasting accuracy, adopt new climatology models, deliver more granular weather forecasts, and deliver intelligent alerts for extreme weather conditions.
- **Healthcare providers** - can build intelligent patient alerts around environmental data sources. For example, asthma patients or those suffering from extreme allergies can be automatically alerted if a weather event or dust build-up in a certain area is likely to impact their health.
- **Smart cities** - could improve living conditions and security with up-to-date traffic and movement insights.
- **Public safety organizations** - can use environment data to predict and react faster to forest fires, hurricanes and other natural disasters.
- **Insurance companies** - can create more nuanced, accurate risk profiles to price their products and services more effectively. With a range of environmental data, they can better understand risk factors across different geographies, and even different parts of the same city.
- **Smart car developers** - will want real-time data to help optimize routes, predict hazards and avoid danger.
- **UAV, USV and drone designers** - can improve flight path calculations with accurate air pressure and humidity data.

Efficiency and digitalization

The Fourth Industrial Revolution (4IR) will be powered by 5G and will provide the spark that lights a revolution of change, enabling more efficient sustainable industry, a significant response to climate challenges and providing alternative consumption options for individuals and communities. In 2019 we provided solutions to more than 120 new private wireless network customers paving the way to Industry 4.0.

What if transportation and logistics companies could not only greatly improve efficiency and safety, but through digitalization also positively affect their carbon footprint by enabling collection and analysis of environmental data, improve waste management or material use. That's why we are providing solutions to transportation and logistics bodies such as the Ports of Kokkola and Oulu in Finland and Vienna Airport, enabling potential improvements in efficiency, safety, environmental issues and security. The production and use of renewable energy are only set to grow and energy companies need to be ready to better support

this development. For example, we are helping transform Finland's nationwide smart grid to better support renewable energy. Making resource industries safer, more efficient and reducing waste is a positive that can be achieved through digitalization of mining operations as we have done in Peru.

We also live by our own words through the digitalization of our own 5G factory in Oulu, Finland. In July 2019 this project was selected by McKinsey and the World Economic Forum as an Advanced 4th Industrial Revolution (4IR) Lighthouse, reflecting leadership and proven success in adopting and implementing 4IR technologies at scale. Read more [here](#).

In 2019 we also enabled a range of customers in the manufacturing, energy and other industries including automotive and logistics to be more efficient, less wasteful and potentially helping them improve their climate response. Read more [here](#).

Internet of Things (IoT)

Connected devices have an increasing role in our daily lives, from sensor and security systems in smart cities, to control and safety systems in smart homes. Industrial IoT is integral to enabling greater efficiency, security and safety in the utility industry, agriculture, the automotive industry, healthcare and public safety.

We offer our Intelligent Management Platform for All Connected Things (IMPACT) IoT Platform, a horizontal platform covering connectivity management, data

collection, device detection and analytics, and business application development, on top of device and subscription management across all industries.

Imagine being able to provide IoT services for agriculture, industry and even connected vehicles from a single platform. Service providers can do that and more with our IMPACT platform. In 2019 for example, Rakuten in Japan selected our IMPACT platform to help support the rollout of such IoT services across Japan. To further support the global adoption of IoT solutions, we also launched an innovation studio in Germany with AT&T. Read more [here](#).

It is critical that security is an integral part of IoT solutions. In October 2019, we launched NetGuard Adaptive Security Operations to give service providers a highly automated end-to-end system to meet the demands of 5G network connectivity and to address the rising cybersecurity threat posed by internet-connected devices. Read more [here](#).

Artificial Intelligence

AI and Machine Learning make communications networks more efficient and are becoming part of a wide range of new services over 5G and cloud. In 2019 for example we announced the opening of a network of Cognitive Collaboration Hubs. These data science centers will further our cooperation with telco operators and enterprises with an aim to develop innovative, AI-powered use cases, such as to improve road safety through better real time analysis.

Our white paper "What will it take to create an AI-driven telecoms industry?" can be downloaded [here](#).

There are also ethical questions around the use of AI and Machine Learning in organizations which creates trust issues. These issues relate to the potential to discriminate and to misuse, as well as potential negative affects of how people and machines interact. Collective debate is critical in finding a balance that maximizes the benefit of these technologies for society and minimizes or mitigates the risks. To this end we continued our participation in the EU Commission High-Level Expert Group on AI, where we helped create guidelines for trustworthy artificial intelligence.

We have also set up an internal AI Ethics and Governance Advisory Board that aims to support innovation and enable the development of responsible and trustworthy AI by leveraging internal expertise and by offering specialized and multidisciplinary oversight and guidance. It is intended to serve as a forum for debate, where solutions to ethical dilemmas are found, in line with the existing regulatory framework.

Smart cities and public safety

Urban populations are growing and continue to deal with congestion, security, citizen safety, environmental pollution, resource management, infrastructure capacity, and access and supply of services. Cities will need to be digitalized providing more connectivity and accessibility for all citizens.

Digitalization will make cities more efficient and more sustainable by offering better safety and surveillance services, as well as better lighting, parking, waste management and environmental services.

In 2019 we announced cooperation with 32 customers in the public sector and smart cities space. For example, a Nokia Bell Labs-driven industry group is building key enablers for a fast 5G network based on smart light poles, which will form the digital backbone of the smart cities of the future. The LuxTurrim5G ecosystem project has developed the 5G smart pole concept where 5G base stations, a variety of different sensors, video cameras, displays and other devices have been integrated into light poles. Read more [here](#).

We have well over a 1300 reference cases in mission critical networks which can, for example, enable first responders to use applications, such as video, for better information and faster response times and provide improved critical service availability and security features.

For more cases on how digitalization, 5G and other technologies are improving many facets of life and our planet, visit our [website](#). For more information on secure and reliable high-capacity connectivity, visit our [website](#).

Making a difference with technology

Technology can make a real difference by reducing the impact of natural disasters, both before and after the event, and by enabling the transformation and modernization of community health services.

Saving Lives

Nokia Saving Lives (NSL) brings advanced technical solutions to the crisis field for humanitarian purposes. The initiative gathers innovative technology such as Nokia Drone Networks and people together in a way that drives speedy collaboration between humanitarian workers, technology vendors and operators. More information [here](#).

In a world first, we worked with Sendai City in Japan to conduct a trial of a Nokia drone on a private LTE network provided by our Digital Automation Cloud. The aim was to test the potential use of drones during a tsunami or other disasters to help in prevention and mitigation efforts. Read more [here](#).

In healthcare organizations we offer intelligent infrastructure and digital technologies to support better, more targeted patient care while also reducing costs. In May 2019, we began working with GE's Licensing business (GE) to commercialize our latest technologies and intellectual property in markets beyond telecommunications. The initial focus is on



Child receiving Measles-Rubella vaccine at a health facility in Semarang District, Central Java.

looking at the potential of space division multiplexing (SDM) optical technology which could, for example, be used in medical imaging. Read more [here](#).

In 2019 we continued our Smartpur collaboration in India with the NGO Digital Empowerment Foundation. The project aims to create a sustainable ecosystem where community members can leverage digital tools to bring efficiency to daily lives, transparency in governance, economic prosperity for households and ease of access to various government services and information. In 2019, the project scaled up to 100 villages across 7 states in India. Read more [here](#).

Corporate community investments

Our corporate community investment again emphasized the role of technology in improving lives

by connecting the unconnected, empowering women and girls, and saving lives. In 2019, we continued our corporate programs at the global level including connecting schools in Kenya and the mHealth program in Indonesia, as well as local programs around the world. For example, our collaboration with UNICEF on mHealth in Indonesia has been able to reach 83 300 direct beneficiaries and 76 300 000 indirectly since the beginning of the program in 2017. Read more [here](#).

In 2020 we will slightly adjust the focus of our corporate community investment programs to concentrate on three areas: connecting the unconnected, empowering diversity, and defending our climate. Read more on our social programs in [Making Change Happen together](#) section or online [here](#).

Combatting climate change

In 2019 climate change took center stage in the world. We must act – governments, cities, business and individuals. Technology will play a key role in providing solutions to many of the issues associated with climate change through Industry 4.0 underpinned by 5G. 5G and other emerging technologies will enable positive sustainable change in economies, industries and connectivity itself, when processes are planned wisely. We also believe a circular approach is necessary to achieve a carbon neutral society. We aim to play our part and welcome others to join us.

Coastal regions are at the forefront of the damaging effects of climate change.

Highlights

Climate change provides by far the greatest challenge of our time and we are at the beginning of the decisive decade. We must act – governments, cities, businesses and individuals. Digitalization will provide one way to achieve global climate targets, but these tools and solutions require innovative cross-sector collaboration to maximize the impact. We continue to play our part in improving energy efficiency and circularity in order to encourage the ICT sector in managing potential increases in its own emissions.

56 300

product units were reused as part of our circular practices and products program

Over 150

of our customers with zero emission products and solutions delivered globally

5G and drones were successfully trialed for monitoring of blue-green algae in the Baltic Sea

Over 400

of our key suppliers representing around 59% of our total procurement disclosed their climate performance information via CDP survey

1.5°C represents our commitment to recalibrate our science-based targets in line with the latest science concerning global warming

46%

less energy was used on average by the networks we modernized in 2019 compared to those not modernized

We undertook a full study of the plastics inventory across our operations to gain a fuller picture of where we can initially work to reduce and remove single-use plastics

Climate commitment

In 2019, we continued to emphasize environmental sustainability across our own operations and throughout our supply chain.

We again concentrated on reducing power consumption where possible and improving energy and material efficiency across our product portfolio. We also increased our work with other industries and organizations to provide more efficient technology solutions that can lower their emissions and improve resource efficiency through greater automation and digitalization.

We have a global Environmental Management System (EMS) through which we analyze our most significant environmental aspects annually. We take into account current and potential future regulatory and other related requirements, stakeholder interest, the size of the environmental impact, related risks and opportunities, and current and potential changes in our business. Our own operations are certified under the ISO 14001:2015 EMS standard. In 2019 the coverage of employees within the scope of that certification was 85%. Our EMS covers our Networks segment. For more information on our circular approach and our significant environmental aspects, visit our [website](#).

In September 2019, at the United Nations climate summit, we joined an original group of 87 companies

Our carbon footprint (Scope 1+2+3), metric tons CO₂e



Emission source	Metric tons CO ₂ e	(% of total)
Use of sold products	35 310 000	88.9%
Purchased goods and services	3 063 000	7.7%
Energy use in facilities and by fleet	452 200	1.1%
Capital goods	417 000	1.0%
Upstream transportation and distribution	303 600	0.8%
Employee commuting	110 900	0.3%
Business air travel	71 700	0.2%

Percentages counted out of reported, relevant GHG emissions.

and committed to recalibrate our existing science-based targets to be in line with the latest science related to the **1.5°C warming scenario**. Our current science-based targets are set for 2030 (baseline 2014).

Firstly, we aim to reduce by 75% our Scope 3 greenhouse gas emissions caused by the use of our sold products by our customers. Secondly, we also aim to reduce our Scope 1 and 2 emissions from our own operations by 41%. We believe technology can play a significant role in helping industries, communities and individuals reduce their carbon footprint.

In 2019, the science-based targets we set in 2017 for the two-degree climate scenario were both on track. These targets will be reviewed over the coming year in line with the above commitment. This pledge was also reflected in our 2019 work with the Nordic CEOs for a Sustainable Future Initiative and the climate commitment made in Reykjavik, Iceland with the Nordic Prime Ministers in August 2019. Read more [here](#).

Risks and opportunities

The potential effects of climate change are wide ranging, from the natural disasters that could affect our supply chain, operations and customers to the impact on the world economy, rising energy prices and greater regulation. The technology we develop can help others decrease their negative impact by providing more energy efficient products, more efficient use of materials, greater automation, and the digitalization of industries and society that can reduce waste and resource consumption. We continue to minimize our footprint while also maximizing the beneficial handprint of the technology we produce. For examples of how we help others increase efficiency, visit our [website](#).

We have also aligned our climate related disclosures, including risks, opportunities, governance, targets and scenario analysis according to the guidance of the Task Force on Climate-related Financial Disclosures (TCFD) in our CDP report.

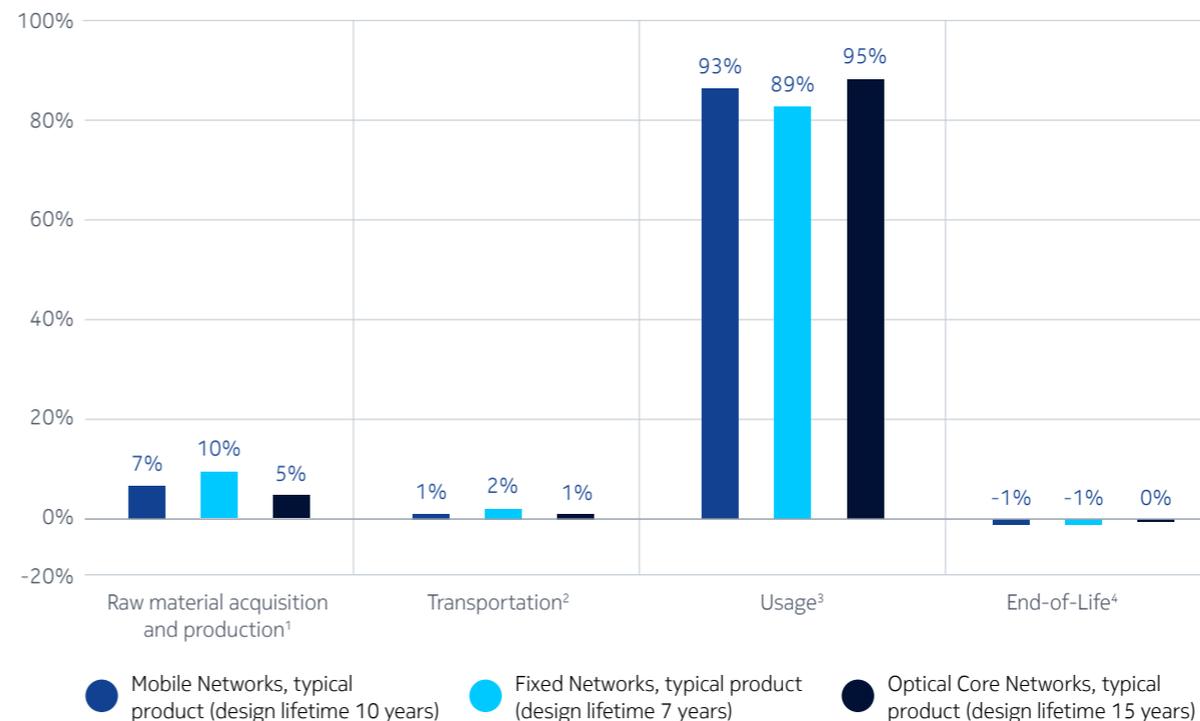
Climate — our products and networks

A technological revolution is needed for telecommunications networks to support the onslaught of virtual reality, the massive scale of devices, as well as the need to analyze the data from these devices.

We believe a new network will emerge, the Future X Network. In less than ten years, it will need to provide digital needs with imperceptible latency, deliver at terascale capacities, provide global-local alliance, have human cognitive operation, and ensure personalized protection.

To accomplish this, researchers are working on projects to disrupt the field by a factor of 10x. That means 10x more capacity, 10x lower latency, 10x better energy consumption, 10x better reliability or 10x performance in some dimension. This individual research is bundled into what we call Future X projects that seek to create innovations across all the major dimensions of the network; from wireline and wireless access into optical transport, IP routing, the control systems, data center architectures, and a common network operating system. Creating such a Future X Network from an environmentally sustainable point of view means, at the very least, minimizing the environmental impact of our products in use. According to life cycle

% of greenhouse gas emissions from different product life cycle stages



¹ Raw material acquisition, production, and associated transportation
² Transportation of the finished product to its point of installation
³ Product use at customer site, starts from installation, ends at de-installation just before the transport to end-of-life treatment
⁴ Starts with the transportation of de-installed goods and ends with the waste treatment, the final disposition of the product after its useful life

Based on product life-cycle assessments of typical configurations. Calculated with constant electricity usage @ 1kW.

assessment, the use phase accounts for the greater part of our carbon footprint caused by our typical products. See the graph on this page.

Future X Network contributions in energy efficiency will help reduce the greater part of our carbon footprint, but we also try to maximize the use of our products and services to bring positive impacts through automation, connectivity, efficiency, resource management, and digitalization. Read more on the [Nokia Bell Labs Future X Network](#).

Nokia science-based targets for Scope 3 emissions reduction

Our Science Based Target (SBT) for Scope 3 emissions covers emissions from customer use of our products. Our target is currently to reduce these emissions by 75% by 2030 compared to the 2014 baseline. The SBT scope is smaller than our total Scope 3 emissions from the use of sold products, and products within the scope of the SBT represent the two most energy consuming segments of our networks business product portfolio. We concentrate on the long-term trend line, as product development takes time and is a step-by-step process. We continue on track with our emissions reduction.

Our science-based targets were originally set in 2017 based on the 2°C climate scenario in alignment with the Paris agreement. These targets will be reviewed over the coming year to be in line with our recent commitment to a 1.5°C scenario. Read more [here](#).

Towards zero emissions

5G is a natively greener technology than 4G and can potentially provide 100 times more traffic with less energy per bit thanks to new standardized features such as Lean Carrier and Massive MIMO. In addition,

Nokia is improving the energy efficiency beyond the features standardized in 3GPP. As an example we are developing energy efficiency software features to minimize the energy consumption of the Massive MIMO products in all traffic conditions.

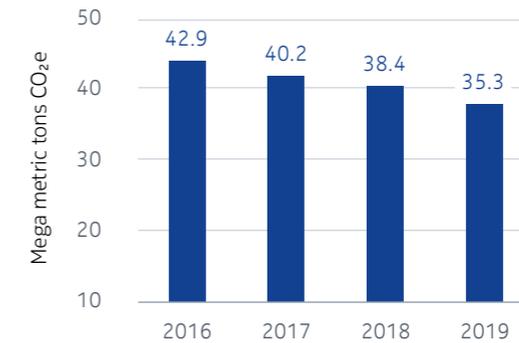
The convergence of Wi-Fi, 5G and LiFi (Light Fidelity), foreseen as a promising technology for the coming years, opens new challenges. Our target in Nokia Bell Labs Research was to propose an energy efficient backhauling system for this emergent market based on mature and low-cost components. This new system is currently studied in close collaboration with the Mobile Networks Business Group where perspectives for Industry 4.0 are also envisaged. One first goal is to demonstrate the support of high bandwidth applications, and the convergence of 5G, Wi-Fi and LiFi in an integrated demonstrator between Nokia Bell Labs and our Mobile Networks Business Group.

More information on zero emissions is available [here](#).

5G Network Energy Efficiency

Through 2019, we have dramatically expanded our radio portfolio called AirScale (4x more references), by introducing a wide range of single-band and multi-band Remote Radio Heads, as well as an AirScale 6-pipe Radio Frequency Module, exhibiting a peak energy efficiency at unit level as high as 34% across various frequency bands. AirScale portfolio deliveries have represented more than 40% of all our Macro base station deliveries over the year. Shipped baseband capacity has increased by over 50% while keeping the energy footprint almost unchanged (+2%).

Scope 3 CO₂e-emissions from customer use of sold products reduced by 8% from 2018



Product use time varies between 6 and 15 years, depending on the products. Energy use calculations are based on product group specific ETSI standards where ever standards have been published. In 2016–2019 data has 100% business group coverage of Nokia's Networks business and estimated at least 90% coverage of product portfolio.

We have further enhanced the energy efficiency of our AirScale radio products by delivering more powerful energy saving software features, such that higher savings can be achieved even in medium-to-busy traffic conditions. Over 150 customers have installed energy efficiency software features to our products. Over 16% of our radio products in the field have one or more energy efficiency software features activated.

Our Single RAN (SRAN) solution typically enables 45% lower energy consumption compared to the traditional way of building separate 2G, 3G and 4G radio networks. The idea behind SRAN is that with a single software and shared common hardware we can build a network that can support any radio technology concurrently. Furthermore, due to sharing of resources between different technologies, we can build much more efficient networks compared to individual networks which have idle resources that consume energy without producing anything. Our SRAN solution is now used in over 21% of all Nokia base station sites globally. We are currently developing 5G support for our SRAN solution, which will help our 5G customers gain the same benefits.

The energy efficiency of mobile networks can be significantly improved by using 5G power-saving features, by small cell deployments and by new 5G architecture and protocols. 5G has a significant potential for reducing energy compared to LTE by using sleep modes at low load – up to 50–60% gains at the base station level when networks operate at

10% average load, and up to 30–40% gains at 20% average load. Read more in our white paper "5G Network Energy Efficiency".

In 2019, we continued to develop and offer our zero emissions radio network solutions, including energy-saving software features and services. We delivered zero emission products to over 150 customers worldwide, and the networks we modernized in 2019 used on average 46% less energy than those that were not modernized, and the total energy savings of these modernizations were 4 times bigger (in MWh) than in 2018. When we launched our AirScale base station in 2016 we promised 60% energy savings, and now we have delivered 69% energy savings through AirScale configurations. This not only reduces energy consumption and carbon footprint, but also brings financial savings for our customers. The typical payback time for base station modernization is two to three years. Read more about 5G radio [here](#).

We are making energy efficiency gains across our portfolio. In the fixed access networks segment, we have enhanced our fiber access node portfolio to include form factors better suited to smaller deployments, which decreases the power consumption per user in low density areas. Our Multi-PON solution is built on our new chipset Quillion which enables much lower power consumption (up to 50%). In copper infrastructure it helps reduce rack space by 50% and power consumption by 10%.

Sensing as a Service - As part of their latest collaboration within the Nokia Center for Advanced Research, Nokia Bell Labs and the University of Helsinki are working on technologies to enable highly precise, intelligent, real-time air quality and environmental sensing over a 5G network. The project, called MegaSense, aims to create the networking and sensing technologies needed to provide comprehensive environmental information to users' devices, cars, homes and offices. The project builds on top academic excellence in atmospheric sciences, computer science, and geo-informatics.

Read more about [Sensing as a Service](#) and about [MegaSense project](#)

Where we still sell our software together with hardware, we are working with leading suppliers that have dedicated energy efficiency programs. For both deployments including the underlying hardware and software-only business we are continuously working on reducing the footprint of our products, to keep emissions and associated cost low for our customers. Once in operation at our customers, Nokia Software's products actively help reduce resource usage and in particular energy usage. We even build software that directly aims to minimize energy usage, like the Self-Optimizing Networks (SON) Energy Optimization package.

In optical networks, the new generation of our Photonic Service Engine (PSE) family of super-coherent digital signal processors, underscores our leading position in the industry and our innovation pedigree. The Nokia PSE-3 is instrumental in improving the energy efficiency of our Photonic Service Switch (PSS) platform. Read more [online](#).

Since 2009 we annually report product energy consumption according to the EU Code of Conduct on Energy Consumption of Broadband Equipment for the products that we place on the European Economic Area (EEA) market.



Sustainable product design and materials

The aim of our Design for Environment approach is to help ensure we create technologies that take into account environmentally sustainable aspects. Life cycle thinking is a key component of this approach. It helps us reduce our environmental impact and improve material and energy efficiency across our own operations, product use-time and take-back, and through to our suppliers.

We employ the ISO 14040 /14044 standards as the bases for the life cycle assessments (LCAs) performed on our products.

When we measure our carbon footprint from our operations through to the complete life cycle of our products – that is, their design, manufacture, distribution, use, and treatment at end of life – we find that our products' energy consumption during use is a priority, as about 89% of our total carbon footprint comes from this part of our business.

We also offer takeback, repair, refurbish and recycle services to maximize the value of the obsolete

equipment. Customers can contact our Asset Recovery services at asset.recovery@nokia.com

Our Design for Environment (DfE) program also helps product and software teams by setting targets and evaluating energy-saving features with each new product introduction. Read more on our [website](#).

In 2019 we initiated work with key suppliers of aluminum parts to assess their use of recycled materials content in feedstock materials with the goal to increase the amount of recycled content in such materials. We also began work on eliminating our products' reliance on certain brominated and chlorinated compounds as well as the work on assessing the use of plastics in our product portfolio. For more information and more on our plastics project see [page 38](#) of this report.

Nokia's DfE for software guidance and best practices help designers to significantly reduce the amount of energy used by network equipment by asking designers to consider how their software code affects equipment energy usage.

Materials and Restricted Substances

Global legislation or regulations ban or restrict several substances considered hazardous to humans and/or the environment. These substances must not be present in our products, components, and materials that are selected during the product design phase. Beyond this, future customer and legal requirements may also influence product development choices made today.

Our products, including original equipment manufacturers' (OEMs) product parts, modules and components must meet the requirements stated in the Nokia Substance List. Suppliers' product documentation must also provide us with a list of any EU REACH candidate substance of very high concern present in a product. Furthermore, products, parts, modules, and components must not contain any substance listed as "To be Avoided" in our Substance List to the extent technically and economically possible.

We globally restrict the use of ozone depleting substances in products and packaging, as well as in supplier processes per the requirements of EU Regulation (EC)1005/2009 on Ozone Depleting Substances, which implements the Montreal Protocol into EU legislation.

We again updated our [Substance List](#) in 2019, with the elimination of four phthalates in accordance with the European Union directive 2011/65/EU (RoHS Recast). The regulation of these phthalates (BBP, DBP, DEHP and DIBP) is in addition to the existing restrictions on lead, cadmium, mercury, chromium (VI), polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs).

We are committed to comply with all applicable substance requirements from environmental laws and regulations such as the EU RoHS Directive (2011/65/EU), WEEE Directive (2012/19/EU) and REACH Regulation ((EC) 1907/2006). For more information on REACH, please see [Nokia's REACH Declaration](#).

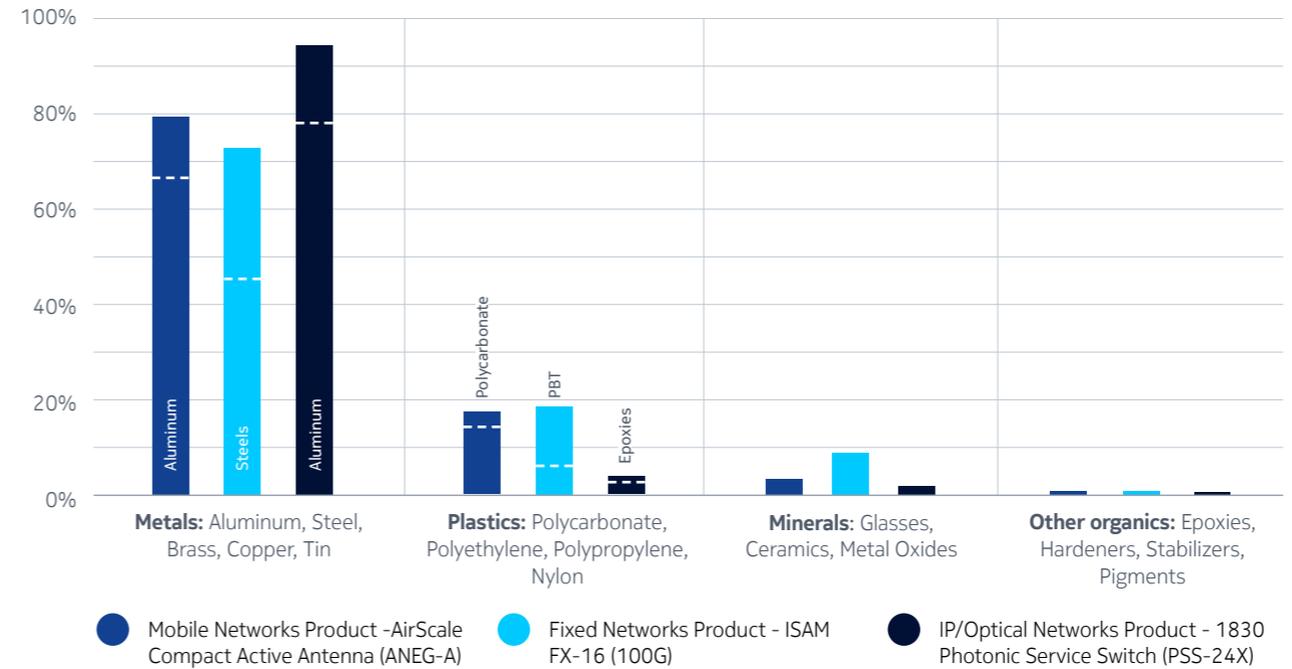
Material Efficiency

Material efficiency includes designing products that use less materials and energy while having increased throughput capacity and functionality. In 2019, Nokia Fixed Networks unveiled its Quillion chipset family — designed to power massive-scale next-generation access networks. It is optimized to support time-critical and low-latency 5G transport, allowing operators to connect more people with higher speeds. Quillion chipset technology will help reduce rack space by 50% and power consumption by 10%, thereby enabling operators to support more customers without increasing the cabinet size. This is critical for providers confined by the capacity and space of a given cabinet or node, and eliminates investment in additional rack space, cabinets or nodes needed to serve more customers or deliver enhanced ultra-broadband services. [Learn more.](#)

Product Materials Breakdown

Our products are comprised predominantly of metals which constitute more than 75% of the total weight in most products. Aluminum is the most significant metal, which is used in sheet metal for cabinets and chassis, and in castings for heat sinks. Alloyed steels are also used for structural parts. Copper and tin are the chief metal constituents in printed wiring boards and cable conductors. Tiny amounts of precious metals such as gold and silver are used in special components such as integrated circuits and as electrical contact finishes on printed wiring boards and connectors. Polymer plastics such as polycarbonate are used for housings in residential-

Product Materials Breakdown



Based on product life cycle assessments of typical configurations. Largest shares of single materials by product stated inside the bars.

type products such as the Nokia WiFi Access Point. Epoxy resins are used for the insulating build-up layers of printed wiring boards. Crystal polymers are used for connector housings. Inorganic materials are chiefly comprised of minerals such as silicate glasses that are woven into reinforcing for epoxy resin-

based printed wiring boards. Minute amounts of other organic materials are employed as hardeners, stabilizers and pigments in components. The total weight percentage of these material types for three Nokia product examples are shown graphically on this page.

Circular practices and products

We have well established circular practices that utilize the full value of our products. As the original equipment manufacturer, we maintain closed loop processes that keep products at their highest value and quality for multiple uses and the longest time possible.

We take back or acquire excess and obsolete products from customers and markets, and then repair, refurbish or remanufacture the units for inclusion in the product supply chain for customer purchase or our own internal use. Products that cannot be reused are recycled to generate raw material for another application or industry. In 2019, we reused 56 300 units (56 000 in 2018) and sent approximately 4 000 metric tons of old telecommunications equipment for materials recovery (4 100 in 2018).

In October 2019 we were invited to present Circular Supply best practices at the inaugural Global Telecom Industry Circular Economy Forum in Nanjing, China, which was organized by our customer Orange with the China Association of Circular Economy. The focus of the forum was to look at the opportunities and new regulations related to circular economy, and to develop a common understanding of the principles



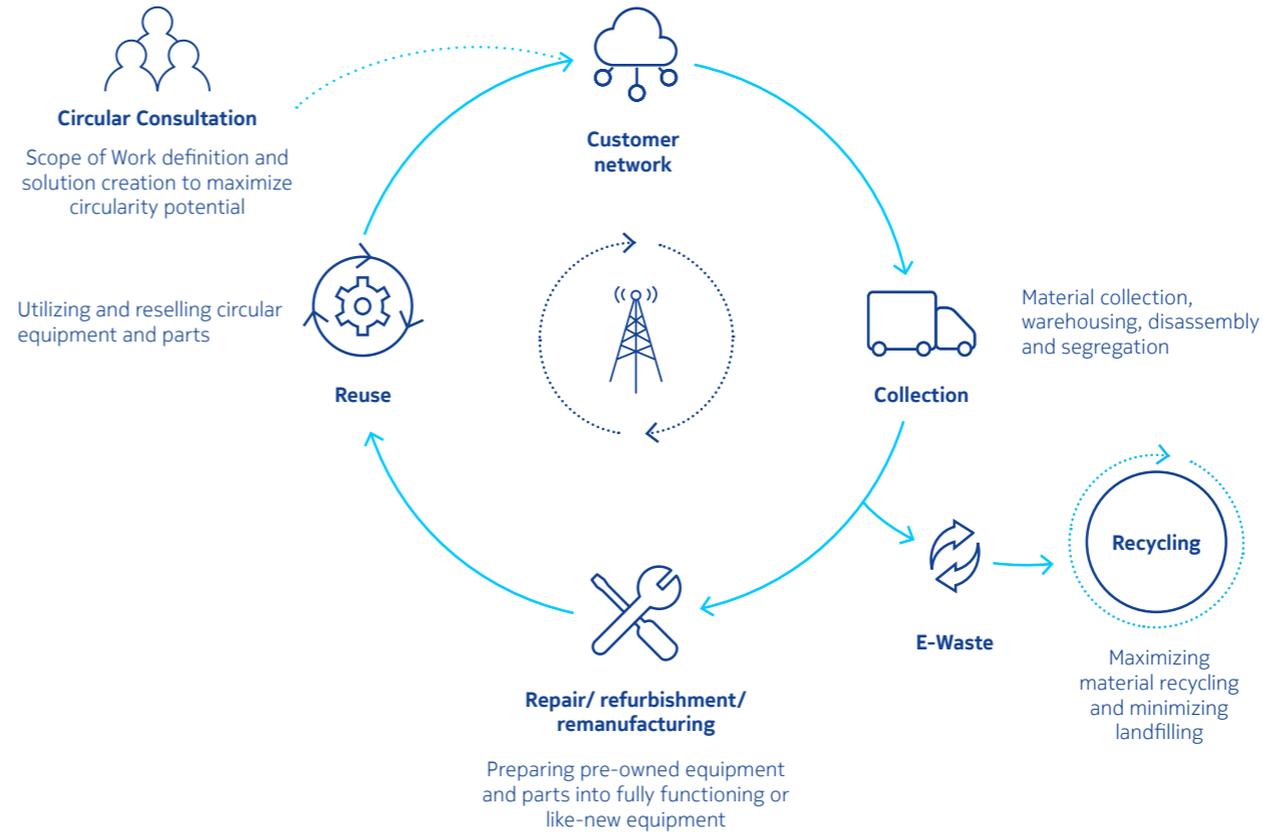
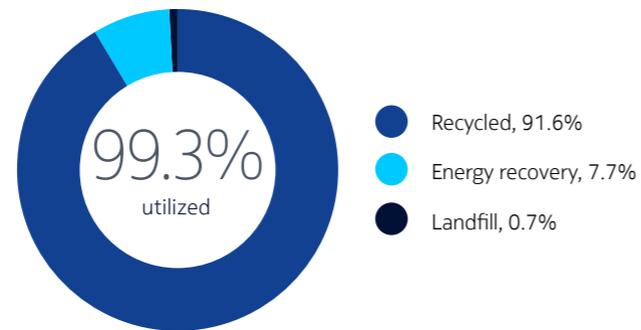
and practices that underpin the responsible use of the planet's resources. We were also recognized in Finland for our circular practices and presented at the Taiwan Mobile circular seminar.

Extended Producer Responsibility (EPR)

Compliance with relevant environmental regulations is an important part of our environmental policy. Extended Producer Responsibility (EPR) regulatory programs strive to decrease the environmental impact of covered products by making the manufacturer responsible for the entire life cycle of the product, especially end-of-life (EOL) management through product takeback.

We continued our work on increasing product value at end of life with the iNEMI organization. Read latest [here](#).

Product take-back



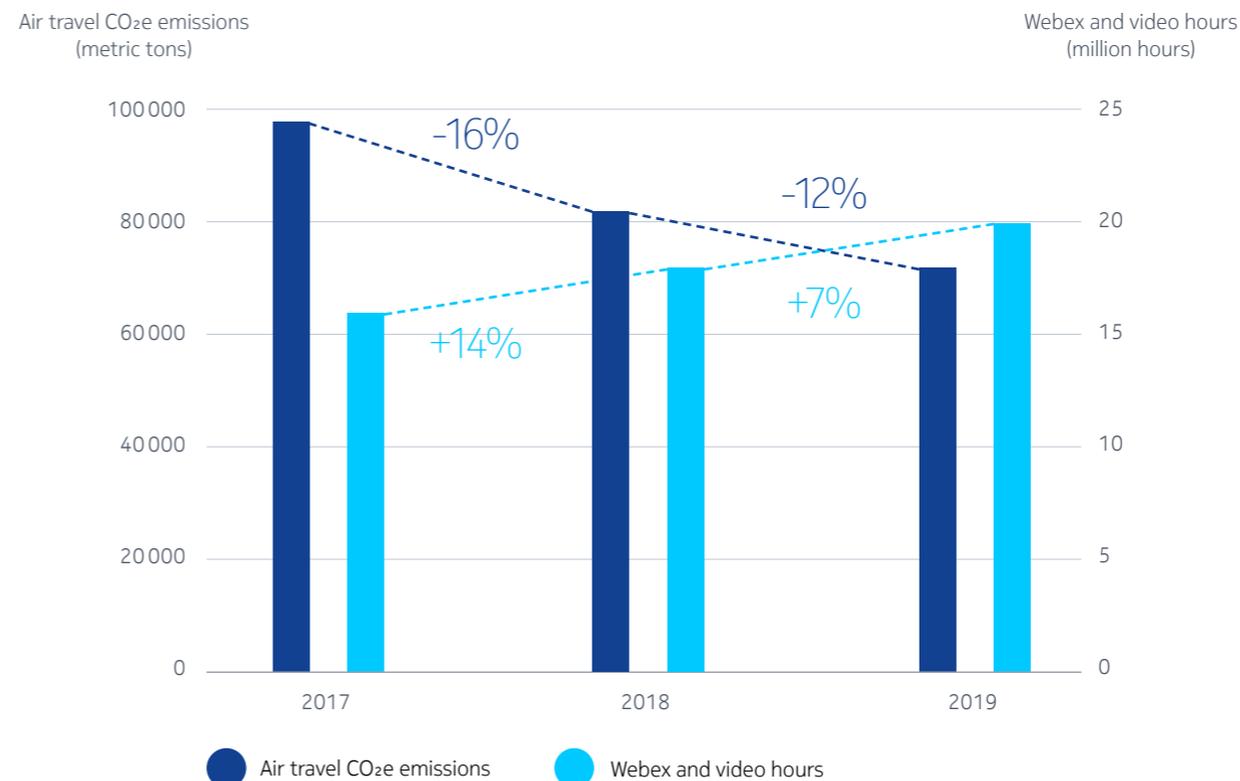
Our own operations – energy efficiency, emissions, and circularity

As defined in our original Science Based Targets (SBT), we have committed to decrease our Scope 1 and 2 emissions, that is emissions from our own operations, by 41% by 2030, compared to the 2014 baseline.

In 2019 our electricity consumption across our facilities decreased by 4% as compared to 2018 and 31% of our total purchased electricity was from renewable sources. These actions reduce our Scope 2 emissions and help us in reaching the long-term climate target. Currently we are well on track.

Our Real Estate team maintained its focus on developing and delivering efficient facilities in line with our overall company goals and SBT targets. In the area of energy efficiency, all the real estate regions made considerable contributions to the overall energy saving of 82 000 MWh representing a 7% reduction on our 2018 consumption. Larger capital investments in several major sites such as Espoo, Finland and Dallas, USA, incorporated energy efficient equipment and controls. The Coolab project in China achieved overall savings of 12 600 MWh and 9 900 tons of CO₂. Building audits as required by the EU Energy Efficiency Directive identified a number of improvement opportunities which are being evaluated.

Virtual meetings increased, business travel emissions decreased



The inclusion of energy efficient equipment in maintenance replacement schedules and refurbishment projects continued to be deployed across our portfolio with projects implemented in all areas including Heating, Ventilation and Air Conditioning (HVAC) controls, all aimed at reducing our energy use.

Real Estate's improved data collection and reporting process have seen an increase in the number of sites reporting their utility and waste data. We supported Earth Hour and through our Switch Off Campaign reinforced the message of energy conservation to all staff within our facilities. We continue to encourage consideration

of sustainability in the selection, development, management and disposal of our facilities.

Employee transportation — our car fleet

In 2019 our global fleet greenhouse gas emissions decreased by 8% compared to 2018.

As a follow-up to the commuting survey in 2018 we have identified our main locations where mobility programs would support employee commuting to the office. Read some interesting examples of local actions taken in 2019 to promote public transportation and bicycle usage on our [website](#).

Our Travel and Fleet Procurement strategy and vision on fleet and mobility was recognized externally at the Fleet Europe Awards 2019. We received the Fleet Manager of the Year and Fleet and Mobility Manager of the Year Awards at the Fleet Summit in Estoril.

Reducing our travel footprint

Business travel includes flights, rail, rental cars, taxis, and public transport. Our reporting is based on the biggest contributor to business travel emissions, air travel, for which we calculate the CO₂e emissions based on the number of miles flown. In 2019, our CO₂e emissions related to business travel were approximately 72 000 metric tons, meaning an estimated 12% decrease compared to 2018. The use of virtual meeting hours increased by an estimated 7% compared to 2018. We also continued to encourage the use of other eco-friendly commuting options.

Product transportation and distribution

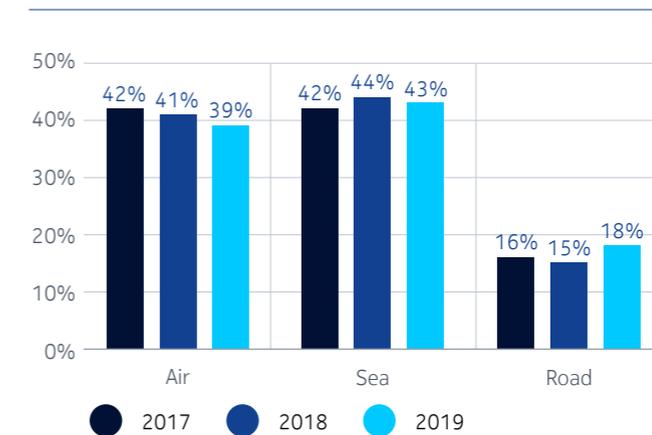
We aim to save space, reduce packaging materials and maximize transport efficiency thus reducing inbound and outbound shipments. Reuse of packaging materials also contributes to reductions in CO₂ emissions from deliveries. In 2019, we reduced the use of new packaging materials by 3 200 metric tons (4 200 in 2018) through the reuse of transportation packaging.

We look at the most efficient transportation options and in 2019, our Scope 3 GHG emissions related to upstream transportation and distribution of our products stood at around 303 600 metric tons CO₂e, a decrease of 21% over the previous year. We also carried out an analysis of the routes/customers that have the greatest impact and are working on specific reduction targets with our business lines.

In 2019 we improved our use of railway transportation, reduced material airfreight to factories through localization initiatives, and prevented defective material reaching Nokia by detecting the defects at the source via remote inspections. For 2020, our focus will be to further positively impact the environmental efficiency of our transportation by identifying the biggest contributors and highlighting the issue.

We also have a marine fleet related to our separately managed undersea cables business, Alcatel Submarine Networks (ASN). The greenhouse gas emissions increased in 2019 by 2% compared to 2018.

Share of transportation modes



Our supply chain – energy efficiency and carbon emissions

For information on our environmental work with our supply chain please refer to the Responsible Sourcing section on [pages 54–59](#) of this report.

Waste in our own operations

We have implemented waste reduction, reuse, and recycling programs across our operations. All electronic waste processing facilities used by our facilities and operations, including Asset Recovery, must undergo a Health, Safety & Environmental (HSE) Liability Assessment.

Our electronic waste can only be shipped to processing facilities that are on an HSE approval list. The requirements for the HSE liability assessment vary based on risk, which is dependent on waste quantity, shipment frequency, waste type/toxicity, waste treatment technology, environmental management systems, location, legal requirements and prior assessments.

Our goal is to maintain the minimum number of approved waste processing facilities needed to meet required services and minimize environmental liability. In 2019, we completed eight HSE liability assessments of e-waste recycling facilities located in Canada, USA, United Kingdom, Finland and Hungary.

In 2019, year on year, the total facilities waste decreased by 41%.

Plastics

Half of all plastic produced and used in the world is designed to be used only once and then thrown away. The issue of plastics escalated globally around the world in 2019.

We initiated a complete plastic inventory study to understand the amount of plastics we use a year and how we use them in our own office operations, for inbound and outbound packaging, and in the products and services we create.

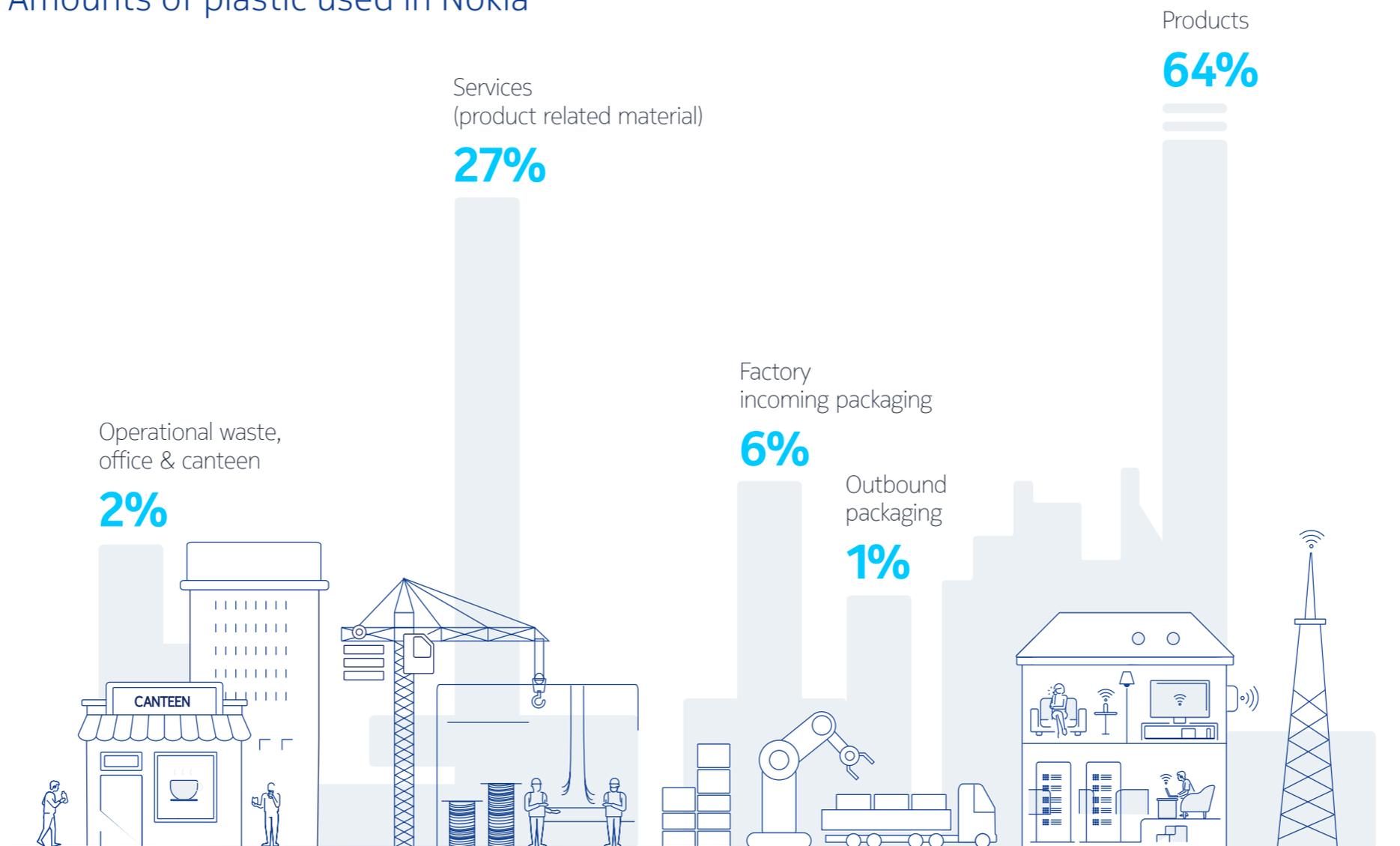
The results from the study showed that we use 10 700 tons of plastics every year. 91% of our plastic is in products but they are not single-use plastics as they are in use over many years. Although most of the parts in our products are metal, we also need plastics for our products to function such as in electronic components and cables. In addition, we currently have plastics in our inbound and outbound packaging, and the operational waste from offices and canteens is also calculated as a part of our plastic use. We had 1.6 kg of plastic waste per employee in the most recent year. Part of this waste is plastic bottles used in the office and the packaging of canteen food.

We cannot escape the fact that we need plastic in our products. Most of the plastic in our products is already recoverable, 92% of the materials are recycled at product end of life and 56 300 product units were reused in 2019. Some of our products are used for as long as 30 years. We have several good practices in place such as product takeback

“Most of the plastic in our products is already recoverable, 92% of the materials are recycled at product end of life and 56 300 product units were reused in 2019.”

recycling service. Also, our packaging is already 85% renewable and only 15% of it is plastics. But we can always do more.

Amounts of plastic used in Nokia



Water

Life cycle assessment (LCA) shows that the predominant amount of water withdrawal results from the generation of electricity used to power our products in our customers' networks. As our products consume electricity during their relatively long design lifetime (10 to 15 years for many of them), our biggest influence on water withdrawal is to reduce power consumption over the product's use time.

Water in our own operations

Where possible we measure the total water use in a building which may include water used for cleaning, catering, toilets and business group operations. However, these activities are not submetered separately. Our greatest water withdrawal in our own operations occurs in sanitary use: flushing toilets and in the cleaning of facilities. Where it is within our control, we focus on those top 20 sites that are located in countries identified as being in the Extreme and High-Risk categories and we will work to influence building owners to make



similar commitments. More information on supplier engagement and water issues can be found on [pages 57–59](#).

In 2019, we used 1 737 000 m³ (1 791 000 m³ in 2018) of water. Water use decreased by 3%

compared to 2018 as water conservation measures were enhanced compared to the previous year. In addition, in 2019 more accurate water data was obtained and less data was estimated. The estimations we use are typically more conservative than measured data.

Conducting our business with integrity

Our business is built on a foundation of trust. Our Code of Conduct (CoC) is our commitment to building and maintaining trust across our business and wherever we operate. It provides clear and simple direction for all our employees and business partners and defines the principles of ethical and compliant business practices, including how we work with suppliers to ensure responsible sourcing and respect for human rights.

Trustworthiness, transparency, risk mitigation and open dialog are keys to conducting our business with integrity.



Highlights

We are defined by our actions, not just words. We aim to act in a trustworthy, ethical and transparent way with our own employees, our suppliers, our partners, our customers and other external parties. Our good reputation is an integral part of why our customers buy from us and why others work with and for us. Our Code of Conduct, processes and procedures ensure we retain that reputation.

228

local Ombuds leaders based in 88 countries by end of 2019

96.7%

of our employees globally completed the mandatory online Ethical Business Training

994

reported concerns were received and processed through our Ethics and Compliance team

332

supply chain audits were implemented, of which 45 were onsite audits on corporate responsibility topics

We greatly strengthened compliance oversight, governance, and engagement by establishing close partnerships between the regulatory excellence experts and business group compliance leads, not only providing legal interpretation and guidance but also ensuring that risk mitigation, training, and awareness are embedded in the business

1st

independent external Human Rights assessment was successfully completed for the Global Network Initiative (GNI)

Ethical business and corporate governance

Our long-standing reputation for acting with unyielding integrity is our most precious asset. Our commitment to upholding the highest principles of business ethics and integrity defines us as a company and distinguishes us from many of our competitors.

Every employee is held accountable and responsible for upholding our ethical values and for conducting business with unwavering standards of integrity.

Code of Conduct

Our Code of Conduct (CoC) is applicable to all our employees, directors, and management. We also require our third-party business partners to follow strict requirements based on our Code of Conduct. Our Code promotes personal integrity and sets forth the key principles and practices of our ethical business approach, protecting our valuable reputation and providing clear guidance to our employees and other stakeholders. Additionally, a Code of Ethics is applicable to the President and CEO, Chief Financial Officer, Deputy Chief Financial Officer, and Corporate Controller.

We require employees to acknowledge the Nokia Code of Conduct, which is cascaded to

our employees as part of our annual mandatory compliance training. The Code is accessible from various resources, including a company mobile app, and online versions in 23 languages. Please see our [Code of Conduct](#).

We are committed to upholding the laws and regulations in all countries where we operate. The CoC includes basic legal guidance and information on key ethical behavior and standards. It includes summaries of the 14 key business policy statements that provide guidance on proper ethical conduct. The 14 policy statements include: Improper Payments/Anti-Corruption, Conflict of Interest, Fair Competition, Privacy, Dealing with Government Officials, Intellectual Property & Confidential Information, Working with Suppliers, Trade Compliance, Insider Trading, Health, Safety & Labor Conditions, Controllership, Fair Employment Practices, Human Rights, Environment, and operational guidance on third-party screening and corporate hospitality. The complete policies and respective Q&As are made available to our employees in the intranet.

Each compliance policy area is the responsibility of one or more subject matter experts. These experts ensure that our policies and procedures remain up to date and in conformity with applicable laws and regulations. They consider new and emerging issues within their fields, and they develop and deliver training and communications on matters within their respective fields.

Leadership engagement, accountability and compliance oversight

Our commitment to integrity applies to every part of our business, at every level. Our Chief Compliance Officer (CCO) presents separately and independently to the full Board of Directors once per year, to the Audit Committee of the Board four times per year, or as needed, and to the Compliance Meeting attendees, which includes Group Leadership members, twice per year. The CCO also regularly meets with the Audit Committee in executive sessions without members of senior management present. Our CCO reports solid line to the Chief Legal Officer (CLO), with dotted line reporting to the Board of Directors.

We have dedicated compliance leaders for each of the company's seven regions, including the Nokia Shanghai Bell (NSB) compliance team. Another compliance team is focused on supporting our business groups. This ensures that compliance risks are identified and managed both horizontally and vertically. Our Legal Team is responsible for driving compliance in their daily operations and those of their assigned client groups.

Compliance reimaged 2019

In 2019 in addition to introducing new programs and processes, we continued to execute the key initiatives supporting our compliance reimaged program, including:

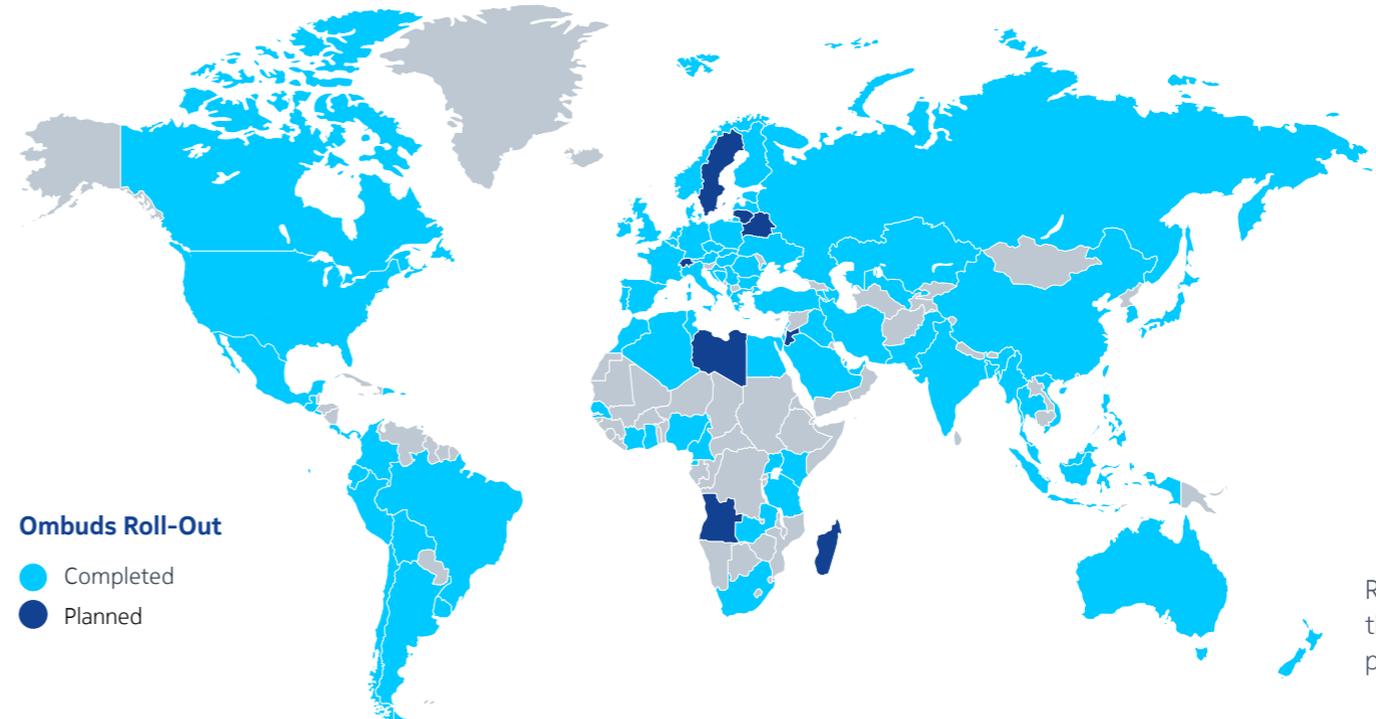
- the Go Local initiative, which targeted compliance at the grassroots level
- a comprehensive 360-degree Compliance Risk Assessment, including soliciting employee feedback through an Employee Compliance Survey
- culture and awareness programs focused on high risk markets via our compliance Spotlight program
- renewal plans based on designing and implementing customized compliance governance in challenging markets
- data analytics and monitoring activities, including Digitalization: enhanced digital and user-friendly solutions to gather, identify, and analyze risk-related data
- Compliance Operating Reviews (CORs) conducted in collaboration with business teams or country heads as the lead facilitators along with active participation from senior leaders in finance, HR, and other gatekeeping functions
- newly formatted and engaging online training and targeted microlearning opportunities

Open reporting – Global Ombuds Program

The Ombuds Program continues to strengthen our company speak-up culture and reinforce our non-retaliation policy. The vast network of local ombuds leaders actively promotes the program and serves as confidential and neutral resources for employees who have compliance questions, concerns and requests for guidance. The Ombuds network is a critical element in preventing, detecting and

Ombuds Update

Status as of 31 Dec 2019



Read about the Ombuds program [here](#).

Ombuds Roll-Out

- Completed
- Planned

Ombuds Landscape

- 228 Local Ombuds Leaders Based in
- 88 countries
- 145 cities
- 200 sites
- ~86% employee coverage

2019 Statistics

- Overall, ~600 questions, concerns and requests for guidance raised
- 65 issues reported to Ethics Helpline
- 30% substantiation rate

2020 Priorities

- Global rollout continuation
- 2020 refresh (Ombuds reaching 2-year tenure)
- Revamp awareness campaign
- Training: 2020 Code of Conduct Investigations Learning Academy
- 2020 Virtual Integrity Day

addressing wrongdoing by expanding the existing channels currently available for raising concerns. In 2019 we:

- continued to deploy our creative and impactful global awareness campaign
- implemented two new on-line trackers to gather real-time updates from Ombuds Leaders regarding local awareness activity and employee engagement. The trackers are linked to the Ombuds Power BI dashboard, which includes other data points (e.g. case statistics) to allow for deeper analysis of the Ombuds Program
- focused on Ombuds training as a key theme this year. An online module was implemented to deliver 24x7 training to newly appointed ombuds and to serve as refresher training (the online module supplements mandatory WebEx training)
- created and deployed an Ombuds Handbook

Compliance risk assessment and mitigation

Evaluating, managing, and eliminating ethics and compliance risks is critical to our success. We have a systematic and structured approach to risk management across our business operations and processes. Key risks and opportunities are identified, analyzed, managed, and monitored as part of overall business performance management with the support of risk management personnel. Risk management covers strategic, operational, financial, and safety risks.

Our risk assessment program is a dynamic process and the program is implemented through three independent and unique mechanisms:

1. Quarterly review of compliance risks within the Enterprise Risk Management (ERM) program
2. Annual company-wide Compliance Risk Assessment to identify potential compliance issues that employees may face and to provide appropriate support to help them deal with compliance risk
3. Country or entity-specific Compliance Controls Framework (CCF Reviews) – essentially an internally-developed, business-owned process of identifying anti-corruption risks and developing responsive mitigation controls. The CCF review is used to enhance engagement by, for example:
 - convening round table discussion with senior management on exceptional compliance risks faced and how to remediate them
 - conducting targeted face-to-face training
 - encouraging open discussion of compliance risks faced and instigating buy-in
 - demonstrating compliance presence and oversight across the globe to ensure all employees worldwide understand our compliance culture and expectations

Identified risks are then addressed through a detailed mitigation plan with assigned ownership and accountability. Each item is tracked for timely completion. Each methodology complements the other and using all three vehicles, spread out at different times during the year, ensures that we have a 360-degree view of our processes and are receiving feedback from multiple touch points.

In 2019, Ethics and Compliance carried out 23 CCF reviews, including 21 country CCF reviews, one region review (Central America & the Caribbean), and one Joint Venture review.

Gauging effectiveness

In addition to these assessments, as part of our Compliance Risk Assessment Program, we continuously engage with employees through anonymous surveys to gauge the effectiveness and understanding of our compliance program. In 2019, our online anonymous Employee Compliance Survey included 19 questions addressing: Tone from the Top, Compliance Program effectiveness, Improper Payments, Conflict of Interest, Data Protection, Confidential Information, Privacy and Trade Compliance:

- 20% of our employees responded
- Results were overall very positive with responses falling in the range of 76% to 96% favorable

Findings from the Survey were integrated into the 2019 Compliance Risk Assessment alongside other inputs (CCF reviews, Compliance Operations Reviews and Internal Audit Reviews results, Compliance investigations, CCT Survey results, etc.)

Employee and other stakeholder inputs are actively and routinely sought to further develop the company's program. We use multiple feedback channels, discussions, and training to drive and enhance the culture of continuous improvement in our compliance program.

On an annual basis, our Internal Audit team collaborates with the compliance team in audits and through other inquiries that assess the effectiveness of our compliance processes and controls. The Internal Audit team is also called in by the E&C organization to assist with financial investigations. The Internal Audit team takes steps to collaboratively mitigate all risks identified during these reviews and investigations.

Similarly, Internal Audit attends the quarterly E&C regional reviews where issues that have been identified through audits are presented and discussed and involves the E&C organization when ethics-related issues are identified in audits.

Compliance training program

The Ethical Business Training (EBT) module is one of four mandatory web-based training courses deployed in 2019. In addition to including a review and acknowledgment of our Code of Conduct and the related 14 policy areas, the EBT also provides a review of key information related to our ethical values and ethics in the workplace. Included in the training are practical examples and information on policies and laws that guide employees through the process of considering potential risks and making ethical decisions. In 2019, 96.7% of our employees completed the EBT module.

In addition to the mandatory annual EBT, we also conducted live training sessions and deployed several targeted web-based trainings on topics such as anti-bribery, competition law, conflict of interest, privacy,

hospitality, and third parties. For example, targeted training sessions on competition law were provided to business stakeholders, and a new short form competition course was developed for deployment in 2020. The competition law training covers key areas, including dealing with competitors and collaboration in tenders, procurement, and implementing our global dawn raid guidelines.

In 2019, we delivered 231 face-to-face sessions, training over 8 900 individuals across the globe, covering business groups, relevant stakeholders, regional groups, including country engagement sessions, and service companies.

Annual training plans are created and are based on defined compliance topics of importance, new and/or updated policies, identified potential risks, and any other key changes to law or regulations that need to be addressed.

Compliance communications program

Compliance communications help employees understand the laws, regulations and policies that apply to their everyday work. In addition to formal training, we annually refresh and deploy both a global and region-specific communication and awareness program to strengthen understanding and to ensure adherence to our Code, policies, and core values.

In 2019 our Ethics & Compliance communications included ten compliance job aids and related talking points to assist managers in discussing compliance topics with their teams; face-to-face

trainings and discussion sessions held by regional and market compliance representatives; and various communications on trending compliance topics, including blogs and posts on trust and integrity.

We hosted a global Integrity Day event. The day was met with great enthusiasm and increased participation. Global engagement of senior leaders, legal and compliance members, and Ombuds representatives resulted in an estimated 10 000 employees in attendance at over 130 sites. The Integrity Day event included the announcement of 22 Compliance Hero award recipients and ten Ombuds award recipients in recognition of their exemplary ethical behavior and outstanding contributions to our compliance culture.

Reporting of ethical concerns without fear of retaliation

It is our priority to ensure all employees are empowered to raise concerns and speak up about potential violations of our Code of Conduct. Retaliation of any kind is not permitted, and we take seriously all allegations regarding any form of reprisal and investigate such concerns thoroughly.

We offer multiple channels to report ethical concerns, including a dedicated email address, an online portal, a mobile app, and country-specific phone numbers. Our Business Ethics Helpline allows for anonymous reporting and is open to employees and external stakeholders. We respond to and investigate all concerns promptly and establish remediation plans as needed.

In 2019, our Ethics & Compliance Office received 994 concerns of which 289 were investigated as alleged violations of our Code of Conduct and 106 allegations were substantiated with “cause found” after investigations. Specifically, two concerns were received as alleged violations of our anti-bribery policies, involving third parties, but neither of these concerns was substantiated. During the year, we implemented corrective actions including 32 dismissals, and 30 written warnings. The total

Ethical business – case examples of reported concerns

Issue raised	Our guidance	Actions taken
Sales employee expensed thousands of US dollars in personal and family entertainment to Nokia and falsified expense reports, while the manager was lax in reviewing the expense claims.	Nokia Code section on Controllershship emphasizes that an employee must not misrepresent financial records, including falsifying expense reports.	The allegations were substantiated, the employee was terminated for cause and the manager was reprimanded.
Employees solicited and received cash, meals and other items of value from vendors in exchange for steering business to the vendors.	Nokia Code section on Working with Suppliers mandates ethical and transparent relationships with its suppliers. We do not solicit or accept things of value when managing supplier relationships.	The allegations were substantiated and all culpable employees were terminated for cause.
Employees engaged in a pattern of harassment, intimidation and unprofessional conduct toward other employees.	Nokia Code section on Fair Employment stresses that respect is fundamental to Nokia’s culture, and discrimination, harassment and retaliation, in any manner, are prohibited.	The allegations were substantiated. Based on their respective roles in the misconduct, one employee was terminated and two were reprimanded.

Above are anonymized illustrative examples of investigations carried out in 2019 by our Business Integrity Group.

number of reported concerns increased by 12% from 2018 which we attribute to increased awareness of reporting channels, growth of the global Ombuds program, and increased line manager engagement in driving open reporting.

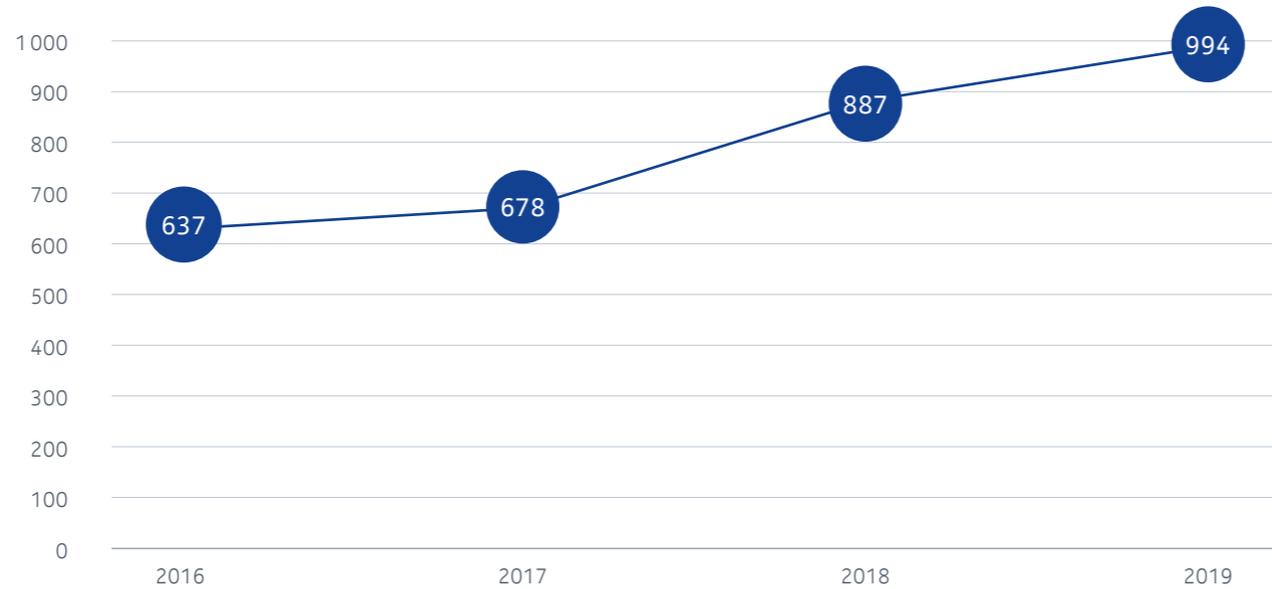
In 2019, there were no significant fines or non-monetary sanctions for non-compliance with laws

and regulations related to anti-corruption, product health or safety and security, environment, data privacy, export control laws or taxation.

Number of investigations by the Ethics & Compliance Office



Number of ethical concerns reported



Number of ethical concerns reported in 2019

Conflict of interest	69
Controllership	88
Dealing with government officials	1
Fair competition	2
Fair employment (all HR related concerns)	416
Guidance	164
Human rights	1
Improper payments	11
Intellectual property & confidential information	54
Privacy	7
Trade compliance	5
Wellbeing, health, safety and environment	27
Working with suppliers	64
Other	85
Total number of concerns reported	994

Anti-Corruption Center of Excellence and Third-Party Program

The Anti-Corruption Center of Excellence (COE) drives awareness through training and communications and employs a multi-faceted, risk-based approach to efficiently manage and monitor the sales third-party risk management process; review, approve, and monitor gifts, entertainment, hospitality, donations, and sponsorships; and screen customers through an enhanced Know Your Customer screening program rolled out in 2019.

We have clear and unequivocal anti-corruption policies. Risks and mitigation measures are reviewed with the company's senior leadership, Board of Directors, and the Audit Committee.

As part of our comprehensive anti-corruption program, the COE employs online tools for screening, approval, and monitoring processes related to

third parties and for gifts, travel, entertainment, sponsorship & donation requests.

We have implemented a global Improper Payments program covering employees and business partners. We work closely with third parties, including commercial third parties and suppliers, to encourage adherence to the same standards of ethical business across all interactions and to help ensure responsible sourcing and globally acceptable labor practices. For example, sales third parties undergo a thorough screening during which they are required to acknowledge our Commercial Third-Party Code of Conduct which is available in eight languages. We also follow a strict no agents rule that prohibits the use of commercial agents in virtually all of our commercial dealings, other than where required by law or in exceptional cases. Our regional and business compliance counsels deliver training and communications to our third parties regarding our expectations on ethical conduct, where necessary.

Competition laws

Our competition law compliance program aims to ensure that we meet our goal of full compliance with applicable competition and anti-trust laws. We are committed to complying with competition laws everywhere we do business. Our Code of Conduct sets out the key elements of our competition law policy and is supplemented by detailed policies and training.

Our Competition Law e-learning, the Competition Law Policy, some specific competition compliance



World's Most Ethical Award

We were honored for three consecutive years, and four times overall, by the Ethisphere Institute as one the World's Most Ethical Companies, in recognition of our strong compliance program, culture, and bold vision for the future.

¹ World's Most Ethical Companies" and "Ethisphere" names and marks are registered trademarks of Ethisphere LLC.

guidelines and materials, and recorded training sessions and presentations are available to our employees through the company intranet. There is a dedicated Fair Competition website for the competition compliance program.

Responsible advertising

Advertising at our company must be built on a clear and accurate messaging framework, as set out in our visual and verbal guidelines, with pragmatic statements, grounded in fact, with real proof points, and reasons to believe in Nokia. The use of false or deceptive messages, ambiguity, or aggressive sales techniques are strictly forbidden and against our Code of Conduct and our brand guidance. Our brand guidance is available on brand.nokia.com.

Addressing human rights

We fundamentally believe that connectivity and the technology we provide are a social good that can support human rights and we acknowledge the responsibility that comes with this. Upholding human rights is a complex issue that covers not only the technology we provide, but our partners, suppliers and our own operations. Therefore, we strive to continuously learn and improve and believe that engaging with the broader stakeholder community to drive dialogue is the best way forward.

In 2019 we updated our Human Rights Policy to reflect our expanded portfolio and it is available on our [website](#). The policy addresses the impact of our products and services on free expression, access to information, exchange of ideas, and economic development. Policies related to other human rights, for example rights related to fair labor practices, modern slavery and human trafficking, and environmental stewardship, are reflected in other company policies. See Human Rights Framework table below.

Our Human Rights Framework

	Nokia employees	Technology Misuse	Nokia supply chain
Human Rights Impact	Labor rights, Health, Safety, Wellbeing, Decent working conditions, Compensation Impact - Materiality - Risk	Freedom of expression and privacy Impact - Materiality - Risk	Labor conditions, freedom of expression, compensation, health and safety, corruption Impact - Materiality - Risk
Potential Risk mitigation	Ensuring decent working conditions Health and wellbeing	Code of conduct Human rights due diligence	Code of conduct for suppliers Audits, assessments and training Health & safety maturity
Grievance mechanisms	Ethics Helpline One in 90 discussions	Ethics Helpline	Ethics Helpline Audits and assessments
Measurement	Cultural cohesion tracker Related targets	Reported and investigated concerns Related targets	Developing health and safety Related targets

The most salient human rights risks related to our company and business involve the potential misuse of the technology we provide. Our rigorous Human Rights Due Diligence (HRDD) process helps mitigate these risks by aiming to ensure that human rights are not infringed upon through the misuse of the technology we provide to our customers.

This process is pre-emptive. Before any sale is made, the process is used to identify the potential risk level to human rights through any potential misuse of our technology. We look at a country's long-term commitment to upholding Human Rights, the intended use of the technology in question and the customer type in order to identify potential risks early in the process and trigger the required HRDD investigation and senior-level approval/denial review where needed. The HRDD triggers are a mandatory part of the sales approval process.

Training, tracking results, communication of findings, checkpoints and triggers for the process are reviewed and where needed improved on an ongoing basis.

We aim to be transparent and active by working with key industry stakeholders including, amongst others, through membership in the Global Network Initiative (GNI). GNI is a unique multi-stakeholder group involving leading ICT companies, investors, academics and civil society groups. We are a Board member of GNI and as part of membership, we agree

to undertake an independent assessment of our Human Rights approach.

In October 2019 we completed our first ever GNI assessment by the independent assessor Foley Hoag LLP. We are honored to report that the GNI Board found Nokia has made good faith efforts over time to implement the GNI Principles on freedom of expression and privacy.

The table on the previous page provides links to information on specifically mentioned human rights topics in relation to the requirements of the French duty of vigilance law. Similar regulatory discussions are ongoing in other countries.

Increasing transparency on the overall narrative

In this year's report we have again included new anonymized case examples from our Human Rights Due Diligence work in 2019 providing insight and examples on the robustness of our HRDD as well as showing "Go," "No go" and "Go with conditions" sales cases. We believe these real case examples support greater transparency and help to drive the dialogue and narrative further, rather than simply reporting numbers of cases. They also serve to emphasize the importance of looking at the use case rather than a simple list of products. Of the HRDD cases investigated in 2019, 71% were resolved as "Go," 6% as "No go" and 21% as "Go with conditions." In addition, 2% of the investigations were still ongoing at the end of 2019.¹

“ We look at a country's long-term commitment to upholding Human Rights, the intended use of the technology in question and the customer type in order to identify potential risks early in the process and trigger the required HRDD investigation and senior-level approval/denial review where needed. The HRDD triggers are a mandatory part of the sales approval process.”

¹ Time period covers 1 April–31 December 2019 due to changes in the HRDD process. From 2020 onwards, the data will cover the whole reporting period.

Human Rights Due Diligence anonymized case examples

	Country	Requestor	Request	HRDD investigation	HRDD decision	Policy Principle
Case example 1	Extreme risk country	A non-governmental private entity	Connectivity for video surveillance including static cameras on private land.	The requested solution was for closed private network connectivity and video surveillance and monitoring of private static industrial sites on private land to monitor key assets of the company. HRDD focused on whether there would be any link to the public network or any possibility of misuse, surveillance or monitoring of public areas outside the client's facilities. The closed network requested to be supplied would be used exclusively by the private enterprise for their internal communication and would not be connected to any networks open to the public. HRDD checked the location of the video surveillance sites and established that there would be no public areas and no habitation near the targeted areas. The connectivity would be limited to the area and supplied video surveillance via this connectivity would therefor only work in this area.	 GO	<p>Nokia will provide communication systems, drones, video transmission capabilities, networking capabilities and other technology to governmental and enterprise customers for purposes such as public safety, transport, energy and smart city enablement.</p> <p>We will not, however, pursue direct business with intelligence agencies or similar institutions involving or relating to active surveillance or interception of communications.</p>
Case example 2	High risk country	Governmental entity	Connectivity for government private entity law enforcement for public safety	The requested solution was for microwave and routing connectivity for a private network for law enforcement personnel in a high risk country to communicate with each other. HRDD focused on whether there would be any connectivity link to the public network or potential for misuse. HRDD confirmed that the connectivity would be for a closed solution for use only by law enforcement to talk to each other. There would be no link to the public network and no surveillance capabilities.	 GO	<p>Nokia will provide communication systems, drones, video transmission capabilities, networking capabilities and other technology to governmental and enterprise customers for purposes such as public safety, transport, energy and smart city enablement.</p> <p>We will not, however, pursue direct business with intelligence agencies or similar institutions involving or relating to active surveillance or interception of communications.</p>

Human Rights Due Diligence anonymized case examples

	Country	Requestor	Request	HRDD investigation	HRDD decision	Policy Principle
Case example 3	High risk country	Local telco Operator	Standard passive 3GPP/ETSI compliant lawful intercept capabilities in the telco network	<p>The requested solution was for passive 3GPP/ETSI compliant lawful intercept capabilities for Voice over LTE as required by law in that country. HRDD checked that the requirements were standard ETSI/3GPP passive with no extra customization. The solution would allow the operator only to react and respond to authority-originated queries. The capabilities would not, by themselves, be sufficient for the delivery of the full lawful interception process.</p> <p>The conditions are that only 3GPP/ETSI standard defined requests would be supported and the operator would not provide any access to non-public product information without further review.</p>	 GO (with conditions)	<p>Nokia will provide passive lawful interception capabilities to customers who have a legal obligation to provide such capabilities. This means we will provide products that meet agreed standards for lawful intercept capabilities as defined by recognized standards bodies such as the 3rd Generation Partner Project (3GPP) and the European Telecoms Standards Institute (ETSI).</p> <p>We will not, however, engage in any activity relating to active lawful interception technologies, such as storing, post-processing or analyzing of intercepted data gathered by the network operator</p>
Case example 4	High risk country	Governmental entity	Video surveillance mounted on vehicles in an area of unrest	<p>The requested solution was for video surveillance mounted on vehicles with the specific intent of recording interactions between two conflicting groups within an area of dispute. The HRDD investigation concentrated on the location of the proposed case, intended customer and actual use case. The decision to decline pursuing this case was made as the intended location was disputed between two conflicting parties and the ability to put any sort of controls around the misuse of the specific technology and any resulting data were extremely limited.</p>	 NO GO	<p>Nokia will seek to prevent the sale of our products and services in cases where we believe there is a significant potential that those products or services could be used to infringe human rights. To assess such situations, we have a senior-level internal review process that focuses on sales in countries that have been deemed by an independent expert as presenting a high human rights risk.</p> <p>We will, in situations where conflict may exist between local law or its interpretation and the generally accepted international human rights standards, strive to resolve that conflict in a manner that best respects human rights.</p>

Responsible sourcing

Our supply chain is a critical part of our own reputation and extended impact. We work with both customers and suppliers to drive transparency, sustainability and good ethical and business practice in our long and often complex supply chain.

We work with our suppliers to remedy, develop and build capability to enable a more sustainable and transparent ecosystem. We engage with our customers to share and drive improvements and knowledge in our common supply chain and collaborate where possible across the ICT industry for greater impact. For example, we continued our collaboration with the Joint Audit Cooperation (JAC) initiative, the association of some of the world's largest telecom operators. We engaged on supply chain efficacy, circular economy practices and health and safety improvements as well as auditing best practice. Read more [online](#).

Sustainability is one of the six pillars of our Supplier Performance Evaluation. In 2019 we had business with around 14 000 suppliers, and 80% of our total supplier spend was distributed across around 450 suppliers.

Our suppliers fall into three broad categories: hardware suppliers for product materials, services suppliers who support the provision of services to our customers, for example, in installation and construction of the networks we sell, and indirect suppliers for everyday goods and services we need to run our business such as IT, software, legal and marketing. Our manufacturing suppliers are mainly based in Asia and services suppliers are based around the world. Our final assembly included our own factories in Finland, India and Poland as well as Flextronics, Foxconn, Jabil and Sanmina supplier sites in Brazil, China, Hungary, Italy, Mexico, Romania, Thailand, Ukraine, USA and Vietnam.

In 2019 our Supplier Requirements were again communicated to our suppliers as part of our supplier contracts, and we expected our suppliers to commit to these as part of their contractual obligations. An overview of those requirements can be found on our [website](#). The requirements cover social, ethical and environmental issues. In 2019 we also thoroughly reviewed our Supplier Requirements and in 2020 intend to adopt the RBA guidelines as the basis of our requirements going forward.

We continue to expect and encourage our tier one suppliers to apply and cascade the same requirements to their own suppliers. Transparency and compliance requirements are firmly applied to all supplier relationships, and gifts or entertainment are neither given nor received beyond nominal value items. We investigate and qualify all suppliers,

Supplier coverage in Nokia's sustainability programs

Program	Coverage
Health & Safety maturity assessment	over 98% of relevant supplier base
CDP supply chain climate change	over 59% of supplier spend
Responsible minerals program	98% of relevant supplier spend
EcoVadis sustainability assessments	56% of supplier spend
Request for Information process (anti-corruption, health & safety and overall sustainability)	100% of supplier spend

We do not measure percentages for onsite audits as they are risk-based

requiring them to comply with all applicable laws and regulations, and show they share the values stated in our Code of Conduct. To learn more about our supplier management and related sustainability visit our responsible sourcing page [online](#).

Our materiality analysis and Enterprise Risk Management help identify potential supply chain risks and we carry out more in-depth analyses to determine all supply chain risks. The outcomes are included in our

category strategies related to nature and size, as well as monitoring and performance related requirements. We review category strategies annually. We also review the supplier location and business context.

We have detailed KPIs and public global targets related to supply chain activities. In 2019, 64 cases out of a total of 994 concerns raised on the ethics helpline were related to our suppliers (58 in 2018). More information on raising concerns can be found on [pages 47–48](#) of this report.

Monitoring, assessment and auditing

In 2019 we again ran regular assessments with our supplier network to help them meet our ethical standards and improve performance as needed. Our general audit covers the full set of supplier requirements, including corporate responsibility requirements, and are often used with new high-risk suppliers or suppliers where there has been significant change in business or location.

We also conduct specific corporate responsibility in-depth audits on our existing suppliers and align with SA8000 methodology in audit implementation. The audits include not only document reviews, interviews with managers and employees, and site visits, but also inspections of facilities, production lines, and warehouses. In addition, we continue to use EcoVadis sustainability assessments and supporting document reviews. We require suppliers to at least achieve a satisfactory score on EcoVadis and should be renewed every two years.

Findings from our in-depth audits

Category of Findings	Instances of non-compliance	Number of potential risk areas identified	Total number of recommendations for improvement
Child labor (proof of age documents missing)	0	0	0
Forced labor (contract agreement issues/ fine/deduction etc.)	1	0	1
Health and safety	210	75	285
Freedom of association and right to collective bargaining	10	3	13
Discrimination	3	2	5
Disciplinary practices	4	4	8
Working hours	29	8	37
Remuneration	40	12	52
Management systems	115	55	170
Environmental management system	64	21	85
Total	476	180	656

The table is based on 45 CR in-depth audits conducted in 2019.

In 2019, 74% (74% in 2018) of suppliers had a satisfactory score on EcoVadis. We implemented 332 (364 in 2018) supply chain audits of which 45 were onsite audits on corporate responsibility topics; 46 were against our full set of supplier requirements and 241 suppliers were assessed using the EcoVadis scorecards. We spent 90 auditor days conducting corporate responsibility in-depth audits (190 in

2018) at 45 supplier sites (75 in 2018). Countries covered by these audits were China, Finland, India, Jordan, Mexico, Pakistan, Thailand and Vietnam and reached a total of around 34 000 supplier employees.

Of the 476 instances of non-compliance, 210 related to health and safety and 64 to environment. As a

Identified non-compliance and actions taken

Category	Non-compliance identified	Actions taken by supplier
Forced labor	Supplier employees did not get a copy of their contract agreement.	Supplier revised the contract agreement regulation so that, upon employment, employee signs the contract agreement and receives a copy of the contract agreement while one set is kept with the employer. Supplier has shared few samples of the signed contract and confirmed that such contract has been signed with all of the employees.
Management systems	Supplier had a service agreement, covering a group of foreign employees, where it stipulated that overtime or weekend work will not be compensated if such work is carried out due to a project requirement.	Supplier amended the contract agreement of the foreign employees, clearly defining regular and overtime work and relevant compensation. Evidence of the amendment and the communication to the foreign employees were shared with Nokia.
Health & Safety, Environmental management	Supplier had no access control to hazardous waste and chemical storage area. There was no eye wash in the chemical usage area or shower station in the hazardous waste and chemical storage area. Personal Protective Equipment (PPE) was not available near the chemical storage area.	Supplier has undertaken several activities, including constructed a fence and a gate to restrict physical access to the chemical storage, created an approval process to bring in/out chemical to/from the storage area, installed a shower station, and started providing PPE in the chemical storage area. Supplier has shared pictures with Nokia as evidence of completing the action plan.
Health & Safety	Supplier had no H&S training in place on either PPE or certified First Aid. There was also no general H&S training for all the employees.	Supplier has revised training procedure by adding PPE training, First Aid training requirement and general H&S training for all employees. Supplier has started maintaining the training record for evidence. Images and scanned documents were shared with Nokia as evidence of completing the action plan.
Remuneration	Supplier had no full and final settlement records available for four former employees whose records were requested to be shown. There was no procedure to deal with the absconding employees. Delay in the final settlement was also observed for one of the former employees included in the data sample.	Supplier established a policy to clear all pending full and final settlement records within 45 days and to communicate with those absconding employees. Example of the final settlement records for a few employees was shared with Nokia as an evidence of implementing the policy and the action plan.
Remuneration	Supplier had a leave policy stipulating the number of employee leave days but the policy did not meet the legal requirements.	Supplier amended the leave policy ensuring compliance with the legal requirements. A new, legally compliant policy was approved and shared with Nokia as an evidence of completing the action plan.
Working hours	Supplier employees were found working excessive overtime.	Supplier has developed the controls for overtime monitoring and alerts as well as accountability. Gradual overtime reduction plan was provided to Nokia with proof records of gradual reduction of overtime as per reduction plan.

This table is based on 45 CR onsite audits conducted in 2019.

result, we made 656 improvement recommendations which are addressed through corrective action plans. Three of the 45 onsite audits were conducted through our customers' **Joint Audit Cooperation (JAC) framework**. See findings and real recommendation examples below.

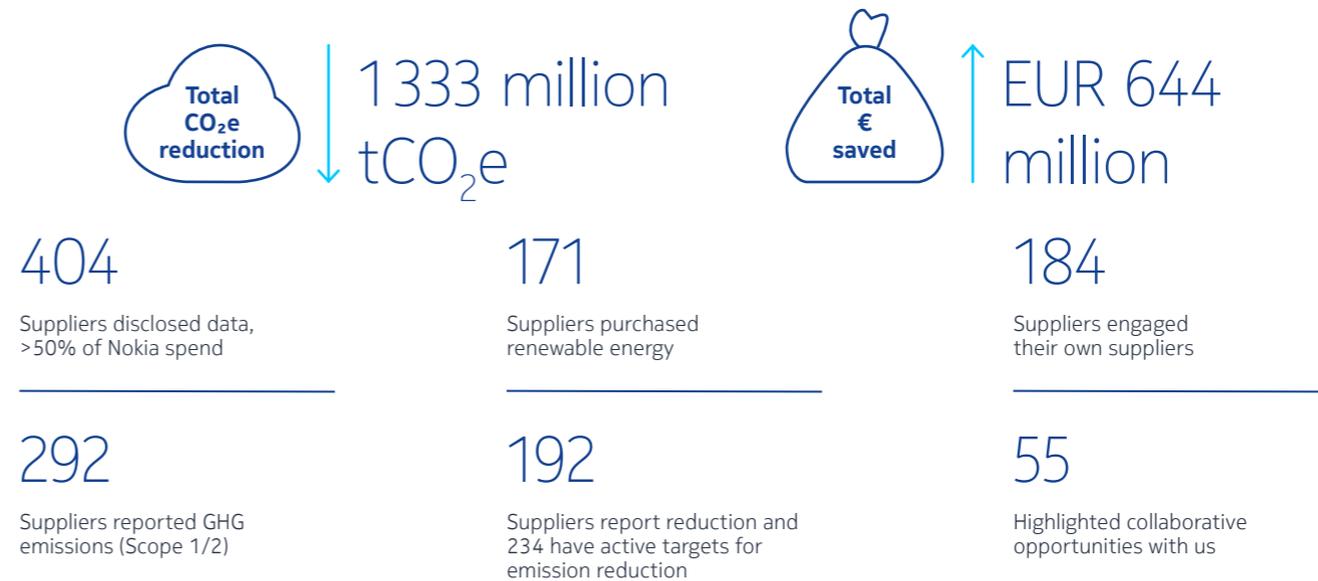
Audit closure continues to be a challenge. We target to close CR onsite audit findings within six months of audit. In 2019, 52% of audits were closed within this time (52% in 2018). We continue to emphasize this as an issue which needs constant vigilance and improvement.

Capability building – driving improvements

In 2019 we ran 6 supplier training workshops in China, India, Jordan, Mexico, Pakistan, and Vietnam and we organized online training on conflict-free sourcing and climate change, as well as arranging face-to-face training workshops to create improvement plans and actions for 98 suppliers. See supplier workshop participation below.

We require all suppliers, except those with very low environmental impact, to have a documented Environmental Management System (EMS) in place. We require and track that key suppliers and those with greater impacts are certified to ISO 14001. We create environmental improvement programs together to drive improvements in our upstream Scope 3 emissions through the CDP Supply Chain Program. We encourage our key suppliers to report their climate impacts and set carbon reduction

Supplier climate disclosure figures



Supplier participation in Nokia sustainability workshops and webinars



targets through CDP and work with them to build improvement programs.

In 2019, 404 of our key suppliers representing around 59% of our total procurement spend, responded to the CDPs request to disclose their climate performance information. 234 of them also provided emission reduction targets (an increase of 47 suppliers from 2018). The total saving from these carbon reduction initiatives was 1333 million metric tons CO₂e and around EUR 644 million during the year.

In early 2020 we were again placed on the CDP Supplier Engagement Leaderboard. Our company was in the top 3% for our supplier engagement activities on climate change.

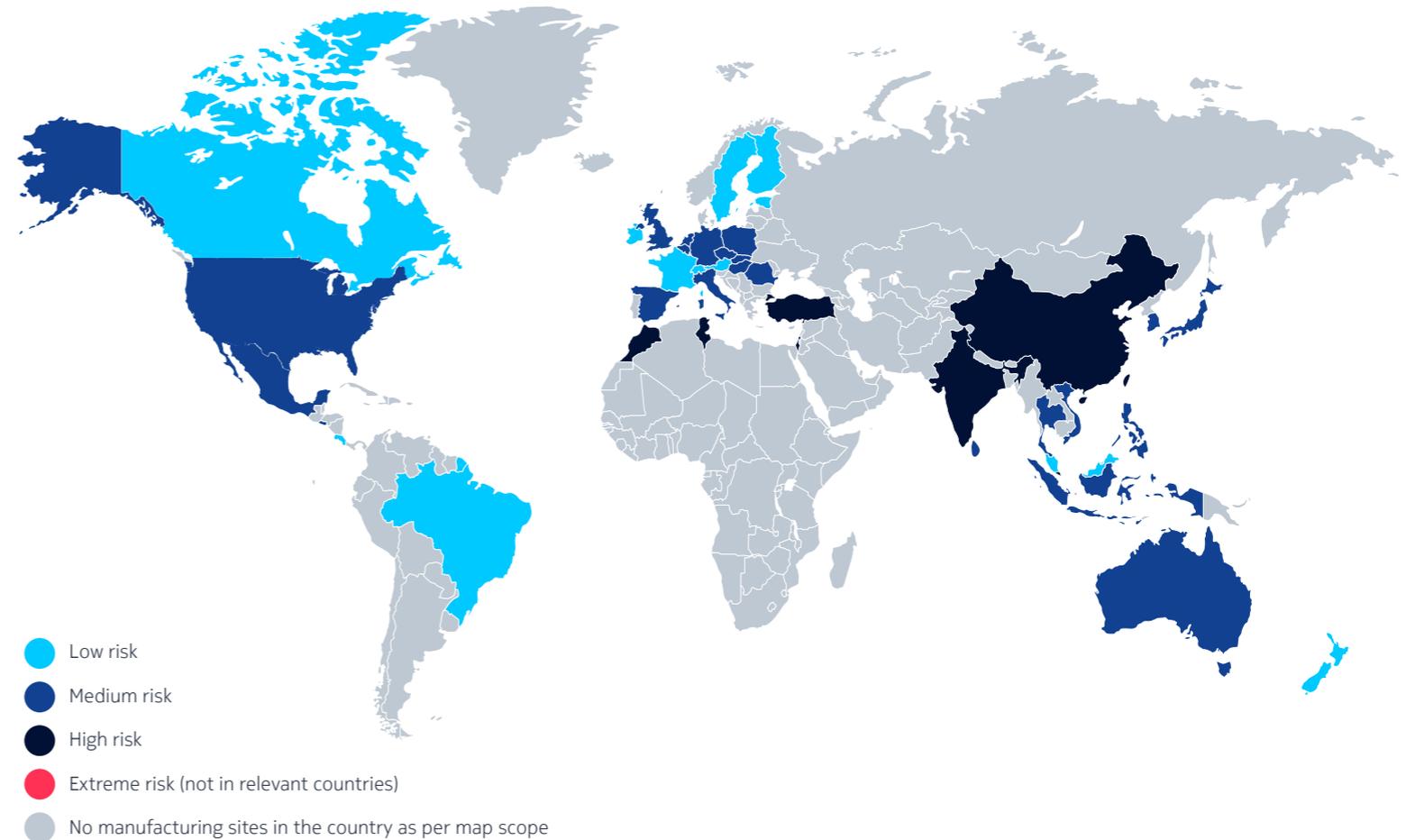
184 suppliers also further engaged their next tier in CO₂ reporting. 141 suppliers calculated an allocation of their emissions for us based on the products and services we purchase from them and 82 suppliers provided emissions intensity data. Using a hybrid methodology for calculation, based on supplier information for Scope 1 and 2 emissions, our emissions with participating suppliers totalled 1.5 million metric tons of CO₂e. By scaling up the allocated emissions to 100% of our suppliers, we estimated our Scope 3 emissions from our supply chain to be approximately 3 million metric tons of CO₂e.

Water – resource management

We earlier identified supplier categories where water may be a material risk and address them

Water risk countries

Water security risk across our manufacturing sites of tier 1 suppliers for our top 50 sales item products.



Water security risk evaluation source Verisk Maplecroft.

through a water assessment program. In 2019, 237 (150 in 2018) our manufacturing suppliers representing 47% of total spend, completed the CDP water assessment. Out of the participating suppliers, 59% had undertaken a water related risk assessment for their direct operations and 26% identified actual water related risks in their operations such as increased water stress, flooding and higher water prices.

54% of the suppliers have a water related policy. 52% of the suppliers reported water consumption information and 50% water discharge information. There were 10 water projects implemented due to Nokia engagement with suppliers in 2019 and 13% of our suppliers reported collaborative engagement opportunities with us. 73% of the suppliers reported active target or goal. 16% of the responding suppliers also engaged with their own supply chain on water risk.

Developing Health & Safety Maturity

Many of our subcontractors work at height, with electricity, and need to drive long distances as part of their work on our behalf. We therefore emphasize the importance of health and safety in our supply chain. Our supplier training provides awareness of potential dangers related to their work and ensures the correct safety equipment is used as required.

At the end of 2019, 97% of high-risk activity suppliers were covered by our onsite health and safety maturity assessments. 99% (89% from 2018) of assessed suppliers met H&S compliant

supplier status. Any supplier not meeting H&S requirements were to be phased out or required thorough improvement where we had no alternative. We had 54 supplier-related fatal, critical or high potential incidents in 2019. As part of consequence management related to those incidents, we issued 33 warning notes to our suppliers and terminated business relationships with six suppliers. 46 of the incidents were designated high-potential where no one was critically or fatally injured.

Combatting modern slavery in the supply chain

We do not tolerate slavery, servitude, trafficking in persons, and forced or compulsory labor in our own operations or in our supply chain. In June 2019 we published our third Modern Slavery statement, with an updated risk map and a full listing of covered businesses. The statement can be found on our corporate website at www.nokia.com/about-us/sustainability/downloads.

In 2019 our audits uncovered one case which included a potential risk of forced labor. This instance involved workers not receiving a copy of their contract agreement. As part of audit follow up the related supplier has been addressed on this case, and the finding was also shared with all local suppliers in a workshop as one of our fundamental requirements.

CR risk map

In 2019 we continued our work to raise awareness of modern slavery and the role of technology in combatting it and all other forms of forced labor

in the supply chain. This work included advocating for greater dialogue on modern slavery and human rights through industry and UN sponsored events.

Materials traceability and conflict minerals

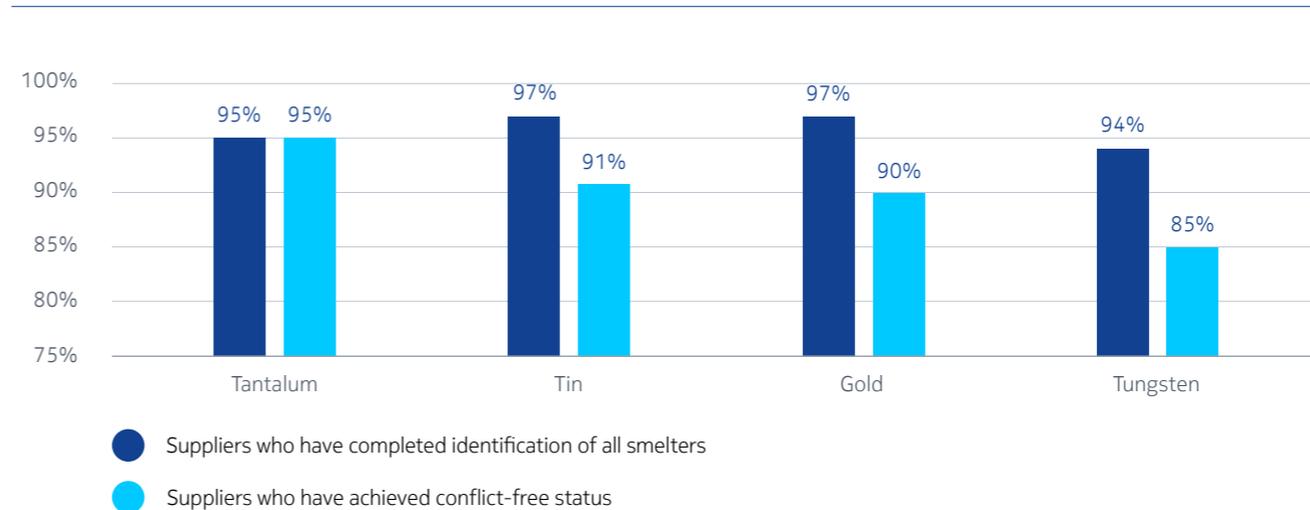
Military conflict, human and labor rights, and environmental impact remain key risks in the mining, extraction and trade of metals industry that provide key minerals in electronic components. Tracing the materials used in our products and ensuring they are conflict-free is key. We aim to contribute to a long-term solution to the issues of conflict minerals that ensures responsible and conflict-free sourcing via legitimate trade that brings sustainable improvements in those countries where the risks are greatest. We demand that our suppliers commit to sourcing these key materials from environmentally and socially responsible sources. In 2019 we also revised our responsible minerals sourcing policy which can be found [here](#).

In 2019 we continued our work with the Responsible Minerals Initiative to improve the traceability of minerals and ensure responsible sourcing. Our due diligence approach is aligned with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals.

We achieved a 96% rate of suppliers establishing a full traceability of 3TG smelters. Any supplier not meeting our objective or with no corrective action plan was recommended for phasing out from our supplier pool. In 2019, we held a workshop in China on responsible minerals sourcing and carried out eight audits covering conflict minerals due diligence.

Under the Responsible Minerals Assurance Program (RMAP) we achieved an 82% validation level for the smelters and refineries in our supply chain that are conflict-free or active in the validation process. A

Share of suppliers who have completed identification of all smelters and have achieved conflict-free status



further 5% of smelters were identified where our due diligence efforts have demonstrated that the smelters can be reasonably considered as conflict-free.

We also undertook mapping of cobalt in our components based on part material declarations. We addressed 41 relevant suppliers about our requirements related to cobalt and engaged them in exercising due diligence over cobalt supply chain by using the industry's cobalt reporting template. We also engaged in cobalt smelter outreach and encouraged them to go through Responsible Minerals Assurance program.

For upstream engagement we have continued our work with the Public-Private Alliance, contributing to the development of in-region programs. In 2019 we joined an industry delegation visit to DRC and Rwanda, where national and regional government and civil society stakeholder meetings were conducted and visits to mines completed. For more information on our responsible minerals due diligence results, please refer to our conflict minerals report available at the end of May 2020 at www.nokia.com/about-us/sustainability/downloads.

Data privacy and security

The protection of customer, employee, or other sensitive data is a critical issue, and has come very much to the forefront during 2019 as we see the first rollouts of 5G-based communications networks. We continue to ensure we have dedicated processes in place that focus on technical protection, processes and people.

Technical protection includes, for example, security incident event monitoring (SIEM) by our security operations center (SOC), access management, anti-malware operations, certificate management, log provisioning, network security services, security incident management, server provisioning, software whitelisting and vulnerability remediation.

Process-related controls comprise of business-driven governance, security as part of global business processes, integrated enterprise risk management, active third-party management and a dedicated security program to respond to our customers' security and privacy requirements. Our internal processes help to enforce the proper handling,



storage, transmission, and destruction of sensitive or confidential information.

Our key programs to protect and identify critical data include critical information protection program, focused assessments, company privacy program, supply chain security program, customer security requirements program, common security controls program, and selected ISO 27001 certifications.

People-related mitigation relies on active security culture management, enabling and supporting employee security work, and employment life cycle

management. To drive this, we have an internal accreditation program with three tiers. Our security culture program also provides other learning channels such as regular company-wide phishing testing, mandatory e-learning for all employees and targeted campaigns.

Security is an ever-growing concern within the telecommunications industry. We are firmly dedicated to protecting next-generation networks from attacks and are seen as a leader in the provision of network security solutions. We hold annual Security Days and

Nokia HackAthons. For more information on the solutions we provide to our customers visit networks.nokia.com/solutions/security.

Our breach management process is followed in the event of a breach or attack. The plan focuses on three key elements: detection and analysis, containment, eradication, and recovery, and post incident activities.

We run a response function that consists of three teams – Incident Response Teams (IRTs), the Major Event Team (MET) and the Crisis Management Team (CMT) – depending on the type of incident or crisis. Each team has well defined tasks, and teams carry out training on an annual basis. Teams consist of subject matter experts from all areas of the company. Regular training and internal and external testing on our breach management capability is provided. The testing includes annual internal table-top exercises, as well as annual external outside-in simulated attacks.

As is the case for all international companies with internet-facing services, we face daily attack attempts. We actively and regularly validate our security throughout the year through:

- external and internal security audits
- group-wide external maturity assessment
- external and internal simulated attacks (red team tests)
- regular group wide phishing testing
- external information security risk rating service
- customer feedback
- external and internal ISO 27001 audits for our key delivery sites

All our employees and external contractors are required to take mandatory Information Security e-learning courses every two years. New hires must take an e-learning course when starting and our security awareness and culture Key Performance Indicators (KPIs) are tracked on a monthly level.

In 2019, we achieved our target to secure our defined critical information ecosystems and closed 95% of the identified critical and high vulnerabilities identified in our assessments and audits. We are well on track to achieve our 2020 target to be recognized as an industry leader in security and privacy.

Getting privacy right

With the growing complexities provided by today's technology and business environment, enabling strategic and consistent management of privacy ensures we are in a position to make the most of the opportunities ahead. With the arrival of 5G and IoT, in a world where everyone and everything are increasingly connected, cloud storage, big data, and other technology advances, getting privacy right is a necessity.

We have established a comprehensive company-wide privacy program that builds privacy into our processes, products and services. We process personal data transparently and fairly, only collecting personal data that is necessary and retaining such data for no longer than it is needed. We fulfil the data subject's rights where required and we do not disclose personal data to law enforcement or other governmental agencies unless required by law.

We also ensure that all personal data is only accessed by persons with a clear need to know. Should a personal data breach occur, the process is in place to manage and mitigate any related risk to data subjects, including mechanisms to communicate with supervisory authorities if required. To drive and maintain privacy awareness, we designed and deliver a program of awareness training targeting high-risk groups. Employee privacy responsibilities are also covered in our Code of Conduct, and we handle all employee and Human Resources data strictly in line with global and local privacy requirements.

Our privacy management model, set out in our Group-wide Privacy Management Policy, is supported by Nokia Executive Leadership. The model provides clear and internationally acknowledged privacy principles as well as a governance framework to implement sound privacy practices across our businesses. Compliance with the General Data Protection Regulation (GDPR) and other privacy laws as well as commitments to customers, are enforced via our privacy principles. We continue to strengthen our framework to meet changing internal and external needs. Thanks to our programmatic approach, we remain in a position of strength to safeguard personal data entrusted to us.

There were no substantiated complaints regarding breaches of customer data in 2019. For the latest information on our security and privacy visit our [website](#).

Respecting our people

Our people are our greatest asset and we aim to build a culture of trust, respect, diversity and opportunity for all. We believe it is essential that we continuously work on creating a company culture that is inclusive and makes use of all the talent to respond to our company business priorities.



Attracting the best talent from diverse backgrounds is key to sustainable business.

Highlights

We foster a culture that supports productivity growth, high performance and the wellbeing of organizations and individual employees. It is a culture that is guided by our vision, brand, and values. It is through our people and culture that we shape technology to serve human needs.

Our Code of Conduct applies to all our employees and our values of **Respect, Challenge, Achievement** and **Renewal** guide the way we develop our common culture.

76 0000

people

actively participated in internal online discussions around the culture of inclusion

56 762

people

participated in webcasts for our annual Global Day of Learning

We took affirmative action to close the unexplained pay gap based on a pay equity analysis we undertook with Mercer and we aim to keep it closed

97%

of suppliers carrying out high risk work were assessed against our Health & Safety Maturity Assessment program

690 000

training hours were provided by us to customers and partners

24%

of total hires were female in 2019 compared to 23% in 2018

Who we are

At the end of 2019, we had 94 723 employees in 118 countries. 3% of employees were based at our headquarters in Espoo, Finland.

We also outsource certain non-core activities and/or use subcontractors to meet customer needs or volume demands. At end of 2019 the number of temporary workers (external temporary labor, ETL) used for example to cover sickness was in the region of 3 400 people. Activities performed by externals, be they ETL or subcontractors, include for example, consultants supporting different tasks in

our business groups and support functions, facility service providers, security guards and IT support. Externals are not covered in any of the employee sections of the report, but instead included in the responsible sourcing section.

During 2019



94 723

employees in the year-end
(101 203 in 2018)



22%

of employees were women
(22% also in 2018).



97%

of employees had permanent contracts (the rest were trainees or had fixed-term contracts)
(96% in 2018).



4 493

employees were hired, leading to 5% rate of new employee hires
(8 849 in 2018).



166

different nationalities worked in Nokia.



11 211

employees left Nokia, leading to a 13% total attrition rate
(9 988 in 2018).

Ten biggest Nokia countries by number of employees

Country	% of employees ¹
India	16%
China	16%
USA	11%
Poland	6%
Finland	6%
France	5%
Germany	4%
Russian Federation	3%
Hungary	2%
Canada	2%

¹ At year-end 2019

A great place to work

We believe it is essential that we continuously work on creating a company culture that is inclusive and makes use of all the talent to respond to our company business priorities.

We foster a culture that supports productivity growth, high performance and the wellbeing of organizations and individual employees. It is a culture that is guided by our vision, brand, and values. It is through our people and culture that we shape technology to serve human needs.

Our culture, which stems from our Finnish roots, is key to why our customers and partners choose to work with us. Integrity is fundamental to how we work and what we provide for our customers. We can stand out as a trusted customer partner who can sustain long-term relationships through a proven ability to foster a level of trust which we work relentlessly to earn and maintain.

Commonly shared cultural principles and a strong focus on Drive, Dare and Care forms the platform we use to shape our core culture. We focus on selected business priorities and the behaviors which drive them best.



Our pursuit of a common culture is always done in accordance with our values

- **Respect:** Acting with uncompromising integrity, we work openly and collaboratively, seeking to earn respect from others.
- **Challenge:** We are never complacent. We ask tough questions and push for higher performance to deliver the right results.
- **Achievement:** We take responsibility and are accountable for driving quality, setting high standards, and striving for continuous improvement.
- **Renewal:** We constantly refine our skills; learning and embracing new ways of doing things and adapting to the world around us.

Engaging and working with our people

A diverse and inclusive workforce has been shown to contribute to the success of a company.

2019 marked a year when Nokia Way manifested itself in initiatives which highlighted the importance of inclusion in how we encounter each other, how we lead, and how we do business. We concentrated on defining the benefits of inclusion for the company, teams and individuals; what inclusive leadership is about; and how to stay resilient in the face of the changes in work-life and business transformation.

On a behavioral level, we concentrated on enhancing employees' and leaders' emotional and social intelligence, listening and sharing skills, and ability to make better everyday decisions. In 2019, the culture

of inclusion inspired more than 76 000 people to actively hold discussions on Yammer, our internal communication channel, 19 000 unique internal article readers, 10 000 culture video viewers and over 3 500 webcast and online event participants.

Change facilitation in the businesses continued with 72 000 people participating in the change map survey, while 1 000 trained change managers facilitated better change leadership.

Culture progression and follow-up

Our cultural progress and evolution are monitored through a company-wide employee survey called the Culture Cohesion Tracker (CCT). The CCT results give us a continued quantitative and qualitative employee feedback loop on a wide variety of employment factors, from ethical behavior and team meeting content to feelings about psychological safety and our corporate commitment to sustainable operations. Above all, the survey targets our employees' engagement in the future direction of our company and our culture.

The CCT was held during October 2019. Results were used to help each of the business groups and regions update and refine their own respective culture roadmaps, for the sake of effective communications about strengths and taking actions on prioritized challenges. For the first time, results were also made available to all employees in an interactive online dashboard, with an intent to provide transparent reporting and enable all employees to make changes in their day-to-day activities.

All 2019 results below continue to be inclusive of the Nokia Shanghai Bell (NSB) joint venture. The most important questions in the CCT are two target questions about our overall company and culture direction, which remained in the green during 2019.

The average % favorability for these two CCT questions is 78.2%, down 1.3 percentage points year on year. The overall CCT result, a combination of all survey content, remained at 84% favorability towards the company between 2018 and 2019, indicating good engagement and solid cohesion.

Cohesion ranges:

- 85> Excellent engagement, strong cohesion
- 73> Good engagement, solid cohesion
- 64> Moderate engagement, fluctuating cohesion
- <64 Concerning engagement, weak cohesion

We continuously develop the way in which we follow up on our progress. We are currently migrating toward the use of a new survey and associated tool called Change Map, which emphasizes team performance.

People development

Given the competitive market we face in finding and retaining skilled employees in our business, it is essential that we continually develop not just our culture, but also our talent management, performance support and career development.

Our performance and talent management approach, called Nokia People Focus, enables the company to have a strategic and integrated framework for company goals, individual performance, talent management, career development, reward, and recognition. Regular manager-employee dialogs (1 in 90 dialogs) focus on five key areas: goals, feedback, wellbeing, development, and coaching.

Our approach to talent development starts with all employees and development of top talent. Personal development is key to retaining and engaging our employees and developing their skills.

End-to-End Employee Experience

In 2019 we continued focusing on employee/user experience to make our people practices available, transparent and applicable by ensuring they are agile and fit for purpose and apply lean service design principles. We conducted interviews with employees, senior leaders and executives to identify



and validate what they value or is not needed. For 2018–2019, we had set three priority areas to improve the user experience: maximize the value of our current offerings, make our user interfaces more convenient and personally significant, and

broaden focus to meet the needs of different user groups. For example, with focused communication and training, we increased awareness and made our service offering more easily accessible, relevant and engaging.

Annual Development Review and performance feedback culture

We encourage managers to recognize performance, celebrate achievement and talk about an employee's potential and career aspirations as well as plan for their development in the coming year. The Annual Development Review process is well understood and positively perceived. It is highly automated and covers all employees.

Through communication and training we have started to draw line managers' attention to the importance of regular, ongoing and transparent performance feedback. Inclusive, developmental and multi-dimensional feedback will continue to be one of our key focus areas in 2020.

Future Talent Growth

In 2019 we focused on talent identification and growth beyond the top 300 leaders. We profiled rising talent and high potential individuals, with a focus on succession opportunities, talent rotation, diversity and preparing Generation Y for senior positions. Criteria for consideration of talent included aptitude as a future top 300, rising stars (high performers, high potentials), fast trackers, key value creators and candidates who are on multiple succession pipelines. Overall, we have increased our efforts in targeted development of executive successors towards specific roles. Robust development plans and pipelines have led to a high executive successor utilization rate.

Leadership development

We continue to invest in our leaders at all levels through our instructor-led programs and online platforms which offer for example branded solutions from Harvard ManageMentor and Spark. A survey we conducted in early 2019 with all 2018 program participants yielded 690 responses representing all levels of leaders and showed content is both relevant and applicable.

Particular focus is placed on developing coaching skills which we believe are enabling skills for leaders to engage with employees. One of our high potential programs was recognised by EFMD for its experiential learning approach where participants meet with other companies to understand the challenges and opportunities around the Fourth Industrial Revolution. Two potential business opportunities are currently being explored as a result. See the article on Nokia's Discovery Journey EFMD Global Focus Iss. 3 Vol. 13 Innovation in Leadership [here](#).

We are 20 years into the 21st century and we see leadership evolving. Situational leadership is still here. Leaders still need to manage and lead. But new 21st century leadership skills and mindsets are becoming necessities: coaching, collaborating, networking, followship, agile thinking and experimenting to name a few. Our programs address these to make sure our leaders are future fit. Our leaders are empowered to enrol in corporate leadership programs which target all levels and types of leaders.

Corporate leadership instructor led development programs in 2019

Target group	Number of participants
Aspiring leaders	352
First line leaders	1008
Leaders of leaders	568
Senior leaders	114
Executives	186
Several levels of leaders*	963
Total	3191*

*25% of the participants were female

In partnership with Harvard Business Publishing we have successfully introduced technology-enabled virtual four to ten-week leadership development journeys. Close to 50% of senior leader learners already participated in an HBP program in 2019.

2019 Leadership Development Figures from Aspiring Leaders to Executives

In 2018 we introduced Harvard ManageMentor and in 2019 we saw 76% growth in visitors, 46% in visits and 53% in lesson completions (YoY) with close to 3000 active users. HMM Spark, introduced in 2019, is already incorporated into several talent programs. Additionally, over 22 000 employees have completed

a wide selection of self-paced leadership online solutions. Major effort was placed on training leaders on gender dynamics in 2019 with 723 workshop participants.

104 face-to-face leadership development programs have been delivered in 23 countries in 2019 and 41 virtual leadership development sessions covering Western, European and Eastern time zones.

Chatbot in Human Resources Digitalization and AI opportunities

In 2019, we continued to scale a range of digitalization and AI activities to improve both the employee experience and HR efficiency. Today, the HR country chatbots serve about 20 000 employees, complemented with a global HR chatbot addressing the whole employee base. Employees can now access HR information anytime, anywhere. In 2020, we will increase the country HR chatbot reach, and make the experience more personalized and integrated.

NokiaEDU

NokiaEDU is the company's learning organization that offers learning solutions to our customers, partners and employees. In 2019, we delivered 2 million training hours to our employees (2.2 million in 2018). Consistent with our digitalization strategy, about 85% of employee training was technology-enabled. Virtual instructor-led training accounted for 27% of employee training, compared to 19% in 2018.

We also provide training to customers and partners, which in 2019 totaled 690 000 training hours

(770 000 in 2018). Our training not only instructs how to operate and maintain our products, but also includes more general technology training on topics such as 5G and Internet of Things. Overall, NokiaEDU learning solutions received a user satisfaction score of 97.6% in 2019 (96.9% in 2018).

Learning Index

The Learning Index is an innovative tool designed to reinforce a culture of learning by enabling employees to monitor their commitment to continuous learning and information sharing. In 2019, we saw a 30% increase in Learning Index points compared to 2018. The Learning Index is now used by 77% of our employees.

Competence Development

We partner with our Business Groups to enhance employee competencies in business-critical areas, including Artificial Intelligence, Machine Learning and more. More than 7 000 R&D engineers are participating in Phase One of Nokia's Workforce Strategy, a comprehensive initiative designed to build a future fit workforce. The program will expand in 2020 to include additional organizations and job roles across the company.

Global Days of Learning (GDOL)

Our Global Days of Learning 2019 reflected our core value of renewal. This year's theme was the company's LEAP initiative, where leaders and subject-matter-experts discussed a variety of topics related to Leadership, Execution, Accountability and Performance. The days gathered 56 762 webcast



participants across all sessions (88% increase over 2018), and 90% stated they would participate in another GDOL.

Ensuring decent working conditions and fair employment

We uphold high standards of ethics and rights in our own internal activities and aim to treat all our employees in a way that satisfies internationally recognized ethical and responsible business practices, customers, investors, partners and the relevant legislation, whether global or local.

A management framework for labor conditions

Our Code of Conduct is the basis for our labor conditions and is underpinned by our Global Human Resources Framework and local employment laws, policies and practices. We adhere to the United Nations Universal Declaration of Human Rights and the United Nations Global Compact. Wherever we operate we meet and often strive to exceed the requirements of labor laws and regulations. We publish information related to policies and guidelines on our intranet.

We are aligned with key elements of the social accountability standard SA8000. Our policies, Standard Operating Procedures (SOPs), and Code of Conduct are implemented to cover our employees and are also applied to our suppliers. The policies cover child labor avoidance, forced labor avoidance,



freedom of association and collective bargaining, non-discrimination, humane treatment, working time, disciplinary practices, compensation and occupational health and safety.

Zero tolerance for child and forced labor

We have a strict policy against using child labor and zero tolerance to all forms of forced, bonded, or imprisoned labor in our own operations and our supply chain. Potential remediation is planned

based on SA8000 recommendations. See more in [Conducting our Business with Integrity](#).

The identity and age of candidates are checked at hiring to ensure that the terms and conditions of employment are in accordance with local legislation as well as with the internationally accepted labor standards. Proof of identity and age are part of minimal vetting standards.

Freedom of association and collective bargaining

We respect the right to collective bargaining and freedom of association. Collective bargaining agreements are local, and in most countries where we have collective bargaining agreements, employees who have chosen not to be members of a union are also covered. Employees can choose freely to join, not join, or leave unions and associations and select their representatives based on local and international practices. We encourage active, open communication and dialogue with employees and/or their representatives.

In countries where local works councils operate, we work with them as needed. We communicate regularly with employees directly as well as in meetings such as the European Works Council (EWC) in Europe. Employees and management prepare and participate in the annual EWC plenary. We offer free elections for employees to choose union representatives. The majority of production employees were represented by an independent trade union or covered by collective bargaining agreements.

Employee representatives are entitled to participate in trainings that are a necessity in order to take care of employee representative duties and to increase their awareness of trade union rights and obligations. Additionally, employee representatives can use company infrastructure during the workday. See more on our [website](#).

Non-discrimination

We do not tolerate discrimination. We prohibit discrimination based on any personal attribute. See more under [Diversity and inclusion](#).

Working time

We do not permit our people to work more than legally allowed. We define regular working hours in accordance with local laws. Young workers from 15 to 18 years old or as specified by local legislation are not permitted to carry out work that may be hazardous, unsafe, or unhealthy, are not allowed to work night shifts, and have a maximum daily working time of eight hours. We provide guidance through the worktime standard operating procedure and guarantee the minimum one day off in every seven days in our production operations.

Disciplinary practices

We appreciate that our employees conform to good conduct and practice, but we also ensure we have appropriate disciplinary processes in place where needed. Our disciplinary SOP helps ensure consistent and fair treatment to all employees. Where local law or collective agreements differ from the SOP, we apply local law or applicable collective agreements. All forms of physical, mental, or verbal abuse, or harassment are unacceptable.

Compensation

We pay at least the minimum wage or the appropriate prevailing wage, whichever is higher, comply with all legal requirements on wages, and

provide any legally or contractually required benefits. Part-time or temporary workers are not excluded from employee benefit plans due to company policy or benefits practice. Pay practices are regularly reviewed to align pay with performance, experience, and skills required for every position.

Our reward programs contribute to our business success by balancing market competitiveness and affordability based on a total reward approach. These are performance driven (both on an individual and company basis), flexible, and fair. The key elements of our compensation structures are annual base salary, incentive/bonus programs, recognition programs and long-term incentives. We have an employee reward and recognition program, Recognize Excellence, which allows employees and managers to recognize individual performance, and acknowledge the contribution of colleagues.

Share in Success

We continued our employee share purchase program called Share in Success. Eligible employees are given one free matching share for every two shares they purchase and continue to hold for 12 months. We aim to include as many employees as possible, subject to local laws and regulations. In 2019, 34% (36% in 2018) of the eligible population in 72 countries chose to participate in the program. In 2020, it is intended the total number of eligible countries will be 75 (out of a total number of 123 countries where we operate).

Recruitment

We have taken active steps towards promoting diversity awareness in the hiring process by rolling out a Diversity in Recruitment video for hiring managers to recognize and remedy bias in the selection process. In 2019 our leadership asked that our recruiters ensure wherever possible that we always have a qualified female or diverse candidate in the final hiring manager interview shortlist.

In December 2019, we stopped asking external candidates about their compensation history except under exceptional circumstances in order to ensure we pay diverse candidates equally, regardless of their pay history. Our approach aims to ensure that we treat all candidates fairly and with respect. Candidates do not pay for recruitment costs. We as recruiter carry all recruitment costs and none of our vendors charge candidates for recruitment costs.

The recruitment of new talent is key to implementing our strategy, supporting youth employment and enhancing our contribution to the communities in which we are present through our traineeship programs. We also encourage and support internal development of our whole global employee population by promoting all non-executive job vacancies internally first, for a period of ten working days, prior to inviting external applications. In 2019, 49% of hires were internal, compared to 51% in 2018.

We take our Glassdoor reputation seriously and are proud to score among the best technology

companies. In 2019 we maintained our strong positioning of 4.2 (scale from 1 to 5) which positions us as an employer of choice on the market. Also, for the second consecutive year, 85% of the review providers indicated they would recommend us to their friends and see our culture and values (4.2) and work/life balance (4.3) as two of our main strengths. Learn more at www.glassdoor.com/nokia.

Gender diversity focused recruitment programs

We are committed to creating a work environment that values diversity and inclusion, respect and renewal, customer focus, and innovation. In 2019, globally, female share of hires stood at 24% out of the total hires, compared to 23% in 2018 and 24% in 2017.

To increase diversity, for example, in the India region, we have introduced various initiatives focused on recruiting diverse talent, both at the lateral and graduate level. We believe that the success of our female employees is key to our success, and we are committed to supporting the professional goals and aspirations of our female colleagues. In 2019, in India, our graduate diversity hiring improved to 54% from 49% (2018).

More information on recruitment and careers can be found at www.nokia.com/careers. Or visit us on LinkedIn, Facebook, Twitter @NokiaCareers.

Providing support during restructuring

The business environment we operate in is challenging: the landscape remains tough and we

are facing continuous price pressure from our competitors as the opportunities of the 5G era unfold. Following the successful integration of Alcatel-Lucent and having achieved the synergy savings target in 2018, we are on the right strategic path – however, in order to reach our goals and maintain best-in-class cost leadership we must move faster and accelerate our strategy execution. To achieve that goal the company has announced a cost savings target of EUR 700 million to be reached by the end of 2020. Delivering against this commitment has required that we reduce the number of employees that we employ. These reductions are never easy. Throughout the process, we have made it a priority to provide support for those employees and to treat them with dignity and respect.

We have put in place extensive measures to limit the impacts of restructuring (including reorganizations leading to headcount reductions), such as:

- Employees affected by restructuring are entitled to severance packages which are often higher than local statutory minimum.
- We support and encourage redeployment activities for impacted employees to find new job opportunities in the company, including retraining as necessary.
- We offer career counseling and job search support outside the company.
- We offer employees continued training opportunities to maintain and develop their skills and competencies to meet the anticipated changes in business, markets, and the technology environment in which we operate.

Inclusion, diversity and anti-discrimination

For our company, inclusion is about creating an environment where all our people feel, and are, valued and accepted. They should feel they can bring their full selves to work each day and they are able to contribute their personal best.

We cultivate a globally diverse workplace culture of respect. We do not tolerate discrimination based on any personal attribute such as race, ethnic origin, color, nationality, disability, religion, age, gender, sexual orientation, gender identity, characteristics, or expression, in all employment practices, including recruitment, promotions, training, and pay levels.

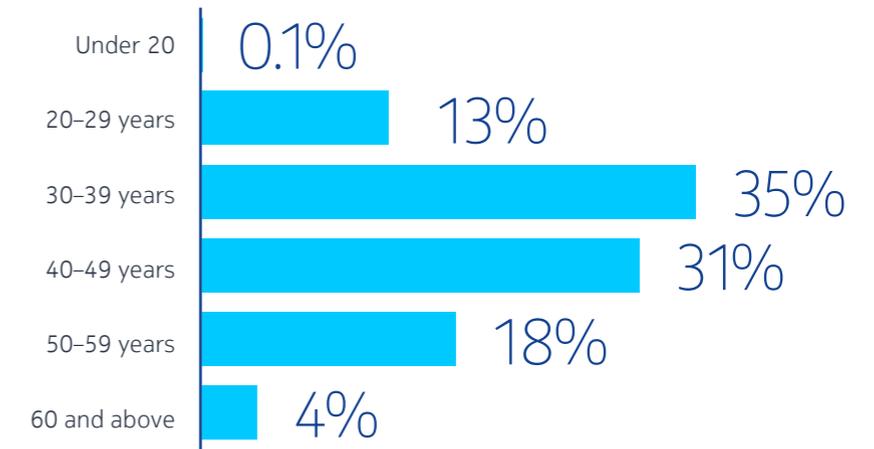
We have a strong focus on developing diverse talent across the organization. This includes pay practices which are regularly reviewed to align pay with performance, experience, and skills required for every position. In 2019, we closed the unexplained pay gap based on pay equity analysis we conducted with Mercer. This analysis found a small but statistically significant unexplained pay gap in the company – a gap that could not be explained by factors that drive pay at Nokia, such as performance, experience, job grade, or location. Read [more](#).

Culture of Inclusion

We believe our inclusiveness is what makes us thrive. In 2019, we launched the mandatory eLearning module, Moving Beyond Bias, for all employees to foster a common understanding about what inclusion and diversity means in Nokia and to counteract bias, and help shift from a fixed mindset. As leaders play a vital role in creating an inclusive environment, we also piloted a training module called Navigating Bias. This program, specifically designed for line managers when making people-related decisions, will be rolled out in 2020. During 2019 we trained 1512 (906 in 2018) managers on inclusive leadership practices.

In July we ran our first inclusion survey for all our employees to get an assessment of employee perceptions of inclusion and exclusion at Nokia. Feedback gathered from 22% of our employees indicated that the majority of employees feel included and agreed that the company's focused initiatives towards inclusion and diversity have further strengthened our company culture. We also found out that when some employees felt excluded, they feel it's because of who they are: women who experience exclusion believe it is gender related; non-binary and other genders tended to feel less included; some respondents felt excluded based on their former legacy company origin. We have analyzed the reasons in detail and developed focused action plans towards improvement.

Average age range of Nokia employees in 2019



Gender Balance

We have a Gender Balance Steering Committee that presents decision proposals to the Group Leadership Team and steers our various gender balance programs. The GLT members actively took part in the high-touch global women leadership programs, acting as mentors or sponsors to the Inspiring Women Leaders participants.

Bloomberg has given us a strong score in its Gender Equality Index (GEI) for 2020 – the second time in a row that we are included in this index. Committed to more equal and inclusive workplaces, we landed at a GEI score of 71.26 compared to an average of 63.41 for the 37 technology companies included in the

overall list of 325 companies. For more information on our diversity and inclusion activities visit our [website](#).

The gender diversity of our Board of Directors consists of a number of individual elements, including gender, generation, nationality, cultural and educational backgrounds, skills, and experience. In 2019, our board represented 40% females and 60% males. In 2019, 15% of our leadership positions were held by women. In total, women accounted for 22% of our workforce. Our target has been to increase the percentage of women in leadership by 25% by 2020 (baseline 2016).

In 2019, we again hosted greenlight for girls (g4g) events to drive the interest of 11- to 15-year-old girls in science, technology, engineering and mathematics (STEM). Around 1 290 girls experienced a day of science at our premises, hosted by 225 employee volunteers. Read more on these and other activities on our [website](#).

Inclusion and diversity are also driven bottom up within the company. We work with 14 employee resource groups who actively support grassroots movements that promote diversity and inclusive behaviors.

StrongHer – employee network that promotes gender balance

StrongHer is an inclusive employee network aiming for a company culture where women have the same opportunities as men and are well represented in all business domains and functions. To achieve real change in the nomination dynamics, and visible increase in gender statistics, StrongHer defined a

common theme for 2019 – Engaging managers for an inclusive workplace.

StrongHer builds and deploys emblematic worldwide programs through its global network of 40+ chapters across five continents. Its focus in 2019 was on the deployment of the StrongHer Charter for Managers to enable Nokia line managers to explicitly walk the talk on gender balance, to publicly commit to take gender inclusive actions, and to become certified champions of the StrongHer values. Read [more](#).

Black economic empowerment

In South Africa we are committed to good governance practices, transparency, and compliance with all Broad-Based Black Economic Empowerment (BBBEE) codes of good practice. We have an obligation to promote Black Economic Empowerment Programs, and also to ensure alignment to our group diversity programs. Hence through our BEE plan, we always commit to achieving specific BEE deliverables and actual target percentages for each deliverable. Read [more](#).

LGBT+ inclusion

Consistent with our support for the United Nations Standards of Conduct for Business (a framework for businesses to prevent discrimination based on sexual orientation and gender identity), we launched our OUT Leader program in June 2019. The goal is both to provide the space for LGBT+ leaders to be safely out, and just as importantly, to showcase role models for LGBT+ employees to highlight their career potential in the company.

We take actions across our organization. For example, in India, our Human Resources team also modified its medical policies to make them more inclusive for LGBT+ employees in 2019. The modifications included allowing an employee cover for same gender partners and providing insurance cover for procedures such as Sex Reassignment Surgery (SRS) and Hormone Replacement Therapy (HRT).

EQUAL! is our LGBT+ Employee Resource Group which provides education and support for our employees who are lesbian, gay, bisexual, transgender and other related groups (LGBT+) or who have family, friends, or colleagues who are LGBT+. We were proud to receive recognitions for our activities around inclusion and diversity. For more information on our LGBT+ activities and recognitions in 2019 visit our [website](#).

Equal opportunities for disabled employees

We aim to ensure equal opportunities for disabled people through programs such as Mission Handicap and @TalentEgal in France where our percentage of disabled employees was 4.5% by end 2019 and our activities in Germany where our current disabled quota is 5%. In late 2019 we also celebrated the International Day of Persons with Disabilities with personal employee stories. The main objective of doing this at Nokia was to give persons with disabilities a voice to share their own stories, make their contributions visible, unlock some biased mindsets and make everyone more comfortable about including people with disabilities into both their discussions and their teams. For more information on our diversity and inclusion programs look [here](#).

Strengthening our health and safety performance

In our networks' businesses, employees and contractors face inherent risks when installing and maintaining equipment and constructing base stations on behalf of our customers. We focus on ensuring that all our employees and contractors are aware of the risks related to their jobs and receive the necessary training and equipment to work safely, whether in the office or on site. We address job-related health and safety (H&S) risks through training, analysis, assessments and consequence management.

Our H&S management system is certified with the internationally recognized OHSAS 18001 standard and has third-party verification by Bureau Veritas. As of year end 2019, coverage of employees within the scope of that certification was around 79% and comprises all activities within all networks business groups, customer operations and supporting corporate functions. Moreover, we began the transition to the ISO 45001 standard in 2019.



Group Leadership representatives review our health and safety performance on a regular basis through a Consequence Management Committee, covering all fatal and high potential incidents and setting strategic direction.

More information on our Health & Safety programs can be found [online](#). We encourage employees and contractors to report near misses and dangerous incidents. Our health, safety and labour conditions policy can be found [here](#).

Health and safety campaigns

On 2 May 2019 we celebrated World Safety Day, and this year we shone a spotlight on our achievements. The theme was Excellence on repeat, which involves taking a different perspective, placing a focus on the positive, and learning from what we do right in Nokia. The aim was to understand what enables us to succeed so that we not only celebrate our achievements, but also share how and why we earned those achievements, so that others may learn from them, and more importantly repeat them, demonstrating our culture and values in everyday life at Nokia. Participants also used the World Safety Day platform to reinforce our company [Life Saving Rules](#).

Addressing key risks through training and assessments

By the end of 2019, 97% (89% in 2018) of suppliers carrying out high risk work had been assessed against our H&S Maturity Assessment program. 99% of the assessed suppliers met compliant

supplier status for Health & Safety. Read more in the responsible sourcing section. In 2019, we also carried out impact assessments on 99% of all high-risk projects. 100% of those projects were found to meet our minimum non-negotiable requirements. Projects were assessed, scored and tracked to identify potential improvements.

We strive to be the industry leader in Health and Safety and were honored to receive the Golden Peacock Award for Occupational Health & Safety at the 20th World Congress on Environment Management and Climate Change in India. We also attained the prestigious bizSAFE Level 3 certification in Singapore, as one result of going above and beyond general requirements for our customers. The topic of Health and Safety is also an important part of our mandatory Ethical Business Training.

Our health and safety performance

In 2019, there was one (zero in 2018) work-related fatal incident resulting in the death of one (zero in 2018) employee. In addition, there were six (one in 2018) work-related fatal incidents resulting in the death of six (one in 2018) contractors or subcontractors. Any such serious incidents while carrying out work for Nokia are unacceptable.

Lost-time incidents of our employees decreased by 64% between 2018–2019, standing at 14 incidents in 2019 (39 in 2018). Reporting of near miss incidents by both employees and contractors

decreased by 20% with 362 incidents reported in 2019 (454 in 2018).

Wellbeing

Internally we continued to focus on wellbeing as a key enabler of performance excellence and business success. Our wellbeing framework has three pillars: Thrive, which creates a working environment at Nokia where people's health and wellbeing is not only maintained but improved; Manage, which embeds wellbeing into all aspects of our people management practices; and Care, which provides timely, professional support for every employee. More on wellbeing and our activities in 2019 can be found [here](#).

We design products that transmit and receive radio frequency (RF) energy. In 2019 we were also a key contributor to the standardization of Electro Magnetic Field (EMF) exposure assessment for 5G base stations. Our updated Nokia RF exposure statement can be found [here](#).

Making change happen together

We achieve the greatest positive impact through collaboration between industry sectors, civil society, customer segments, employees and other stakeholders. We work with customers, suppliers, partners, industries, academia, non-governmental organizations, cities, governments and civil society, who all have an important role to play in making positive change happen.

As the world becomes more urbanized we must all live, work and cooperate with each other to create a sustainable future.

Highlights

Collaboration is key. We achieve the greatest sustainable impact when we work with others who have a vested interest and we create shared value.

Sustainable development is built on each stakeholder taking their responsibility, not only for their own challenges and opportunities but to enable other parties to be more sustainable and thus improve lives.

2 000 000

is the number of lives we target to improve over the period 2016 to 2025 through our key corporate and regional community investment programs

1 290

girls attended our STEM days held on our premises with greenlight for girls

206 900

individuals directly benefited from our community programs in 2019. Since 2016 around 1 633 500 people have benefited from the programs

Helping hands

our new employee volunteering program enabled us to support 45 local community projects around the world with both funding and people out of 264 requests received from our employees

14 959 730

people indirectly benefited from our mobile health collaboration with UNICEF in Indonesia in 2019

Collaborating with NGOs

Our three key pillars of connecting the unconnected, empowering women, and saving lives remained the basis of our community investment programs in 2019.

We support programs which have a long-term impact and create a sustainable future platform in the target communities, while being aligned with the UN Sustainable Development goals.

We continued some global long-term collaborations, but also shifted our focus from a heavily global approach to a more balanced local one, by focusing more on targeting employee engagement for volunteering through our Helping hands initiative, introduced below.

We have recently renewed our corporate community investment priorities, and from 2020 onwards the key pillars are Connecting the Unconnected, Empowering Diversity, and Defending our Climate. These updated pillars were aligned to support the most material sustainability topics in Nokia. We want to support all diverse groups, so while continuing to empower women through our programs, in the future we will also focus on supporting persons with disabilities and other forms of diversity and inclusion. The other new theme, Defending our Climate reflects our strong commitment to combatting climate change, allowing us to collaborate with environmental NGOs as well.



©Finnish Red Cross

In 2019, we continued our long-term programs with UNICEF in Indonesia and Kenya. In Kenya, we teamed up with UNICEF and the Government of Kenya in a multi-partner collaboration to bring internet connectivity and digital learning to disadvantaged Kenyan schools. In Indonesia, we have worked together with UNICEF since 2017 to support the development of high-impact mobile health (mhealth) programs that save lives.

We finalized our five-year program with Save the Children in Myanmar which aimed to improve access to and quality of preschool education for the most marginalized children and enhance advocacy and policy engagement in the national education sector.

We continued the collaboration with greenlight for girls (g4g), who provide STEM based education programs for young girls. We held in total five joint

g4g-Nokia events and joined two larger g4g events, where 255 of our employees together with g4g professionals showed 1290 girls the fun in STEM through interactive workshops. More information on our global programs [online](#).

In April 2019 we launched Helping hands, our employee engagement community volunteering program which allows us to support 45 locally based community programs that are close to the hearts of our employees. The projects cover a total of 30 countries where they mobilize hundreds of our employees. Each project is done in collaboration with a trusted NGO and is aligned with our overall CCI themes. For more information on Helping hands and all our community-based programs in 2019 see our [website](#).

Our Season's Greetings campaign from 2018–2019 saw three employee-voted programs receive funding for work in 2019. The 3 programs were the Red Cross Disaster Relief Fund which supported the victims of Cyclone Idai in Mozambique, Oxfam Refugee Crisis Appeal helping Rohingya people in refugee camps in Bangladesh, and Plan International's Digital Gender Divide program, working in Uganda and Ethiopia to build up young people's work-related skills and capacities. For more on the activities enabled by this funding, visit our [website](#).

Our total CCI impact

Our collaboration with Corporate Citizenship and London Benchmark Group (LBG) on impact measurement and data analysis of our community

investment programs was continued for 2019. Our university donations program was also included again as part of total CCI impact.

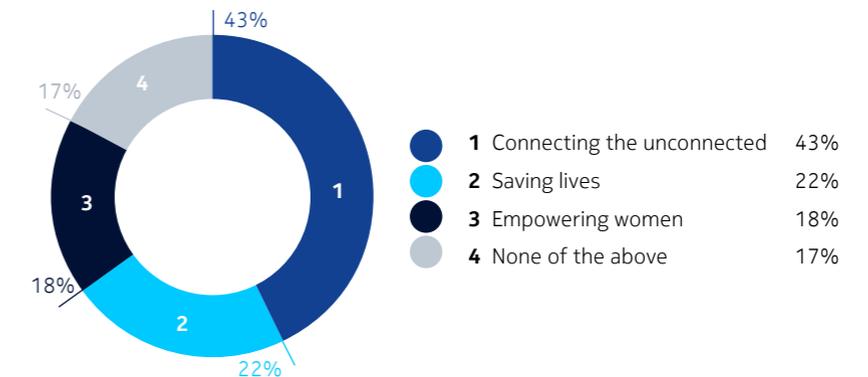
In 2019, we invested EUR 2.3 million in communities around the world, representing a 65% decrease in contributions from 2018. The decrease is largely due to budget reductions in our regional programs and 84% of the contributions were provided as cash, 15% as employee time and a minimal share as in-kind non-cash resources. The key regional (India and China) contributions covered 19% of the total spend, corporate 36%, university donations 32% and the remaining 12% came from local markets.

83% of the global and key regional contributions supported our three themes. Most contributions in 2019 were classified under the Connecting the Unconnected theme. In 2019, our programs supported over 23 500 people to develop new skills or personal effectiveness, improved the quality of life or wellbeing of over 20 000 people, and improved the quality of and access to healthcare for over 21 900 people in developing countries.

Volunteering

Our volunteering guidelines and supplemental standard operating procedure (SOP) provide support to our employees on charitable sponsorships and donations. All employees are allowed two days per year from their paid working time to engage in volunteering work. In 2019, our employees contributed around 9 600 hours of volunteering in paid working time, down from 18 500 in 2018.

83% of Nokia's community investment contributions were aligned to the three thematic priorities



The introduction of Helping hands projects in 2019 has shown a significant increase in the number of NGO partnerships that have volunteering in paid-working time opportunities for our employees. We introduced our Helping hands employee engagement volunteering program on a global level, which will hopefully provide a more systematic approach and some financial support for smaller local community programs. In 2019, Helping hands mobilized approximately 200 employee volunteers, who contributed in total around 1 300 hours of volunteering in paid working time.

For example, as part of our community investment programs in India, we continued Smartpur, our project to digitalize villages, our support for education for out-of-school children in migrant communities, and work with WWF to contribute to the rejuvenation, restoration and further conservation of two wetlands.

In China, among other initiatives, we worked with Junior Achievement (JA) on the final competition of Technology Innovation Relay in Middle Schools of Sichuan Province in our Chengdu R&D Center as the year's culmination of our community work there. Students submitted innovation suggestions based on careful observation and in-depth consideration of practical problems in life and their care for society and the well-being of people. In China, we also continued our collaboration for the 9th year with Zhonggu Charity on the Internet Classroom against Poverty program, where we built internet classrooms and donated second-hand computers to schools in remote, underdeveloped villages. Read [more](#).

Engaging with our communities on the ground

Our Location Development (LD) is the global program that aims for every location to be recognized locally as Employer of Choice and Hub of Innovation. LD covers location specific improvement actions. Locally, volunteers from each internal organization team up to make it happen. The location head is the project leader, and reports forecasted location improvement projects into the location development dashboard. The program focuses on local attractiveness, local best employee experience and engagement, ensuring one Nokia culture across business groups and across functions locally.

Volunteers in our locations around the world carry out innumerable acts of kindness throughout the year, providing the basics for those in critical need: food, clothing, and refurbishing shelters. Many provide next-level aid through education and professional training, helping those to break the cycle of poverty. Our Location Development again actively supported our Corporate Community Investment approach both through Helping hands projects and through other local volunteering activities globally. In 2019 we saw some 360 local humanitarian projects supported by more than 3 700 employees. The reported number of volunteering hours was around 11 000, reaching 29 000 beneficiaries.

“ We have recently renewed our corporate community investment priorities, and from 2020 onwards the key pillars are Connecting the Unconnected, Empowering Diversity, and Defending our Climate.”

Working with governmental and multilateral organizations

We also work with industry partners, policy makers, international and multilateral organizations, civil society and academia, to help transform towards a digital economy and society. Digitalization will play an increasing role in enabling all 17 Sustainable Development Goals.

Our approach to governments

We contribute to policy debates fostering a connected society and the adoption of new technologies around the world. We do not participate in the political or electoral process through direct donations to political groups.

Our guidelines for dealing with government officials always apply, regardless of the employee's role and the purpose or frequency of interaction. They also apply for interactions with employees of state-owned companies and other governmental customers. The basic guidance for interaction with a government official is laid down in our Code of Conduct.

Industry cooperation

We have broad and deep interaction and collaboration with many key industry bodies that are



striving for economic and societal development on the national, regional and global levels, such as World Economic Forum (WEF), GSMA, and Digital Europe. Read more on our [website](#).

Cooperation in standardization

We participate in industry organization activities to develop standards for digitalization and sustainability, especially related to 5G. We collaborate

with other companies and actively participate in many standardization fora on several topics such as energy efficient telecommunications networks, circular product and supply chain, science-based emission reduction target setting for the ICT sector, lawful interception in telecommunication network, and other regulatory aspects.

On reducing energy consumption, we also contribute to the update of the EU Code of Conduct on Energy Consumption of Broadband Equipment. As a new topic in 2019, we joined the standardization work on the ethical use of Artificial Intelligence.

A snapshot of our activities in 2019

World Economic Forum

As member of the WEF Digital Communications Governors Group, our President and CEO Rajeev Suri is driving a 5G and next generation networks project. In November 2019, he was nominated as Vice-Chair of the WEF Digital Communications Steering Committee. In Argentina, we lead the Infrastructure group as part of WEF's Internet for All Initiative together with the Secretary of ICT.

European Round Table of Industrialists

In 2019, Chair of Nokia Board of Directors Risto Siilasmaa hosted an ERT plenary session in Finland. The ERT brings together chief executives and chairpersons from major multinational companies of European parentage covering a wide range of industrial and technological sectors.

United Nations Broadband Commission

As UN Broadband Commissioner, our President and CEO Rajeev Suri actively engaged in the Broadband Commission session in Davos on how to connect the remaining unconnected and advance the UN Sustainable Development Goals through technology.

European Union – African Union Digital Economy Task Force

We took an active membership role in the EU-AU DETF to drive cooperation between both continents in the digital space. Four priority themes included universal access to affordable broadband, better digital skills for all citizens, digitally enabled entrepreneurship, and adoption of eServices.

World Summit on the Information Society and ITU Telecom World 2019

We join important fora of global exchanges on connectivity and sustainability. The World Summit on the Information Society (WSIS) Forum represents the world's largest annual gathering of the ICT for development community. We participated and spoke at the event. In September 2019, we also sponsored the ITU Telecom World event in Budapest, Hungary, and contributed to the discussions there.

European Commission High Level Expert Group on AI

As a participant of the AI HLEG we have helped create guidelines for trustworthy artificial intelligence, providing a European framework for ethical, law-abiding, and robust deployment of

 We have broad and deep interaction and collaboration with many key industry bodies that are striving for developments in the economy and society at national, regional and global level.”

AI solutions. Additionally, our representative was the co-rapporteur in the public sector for a report on investment and policy recommendations for trustworthy AI.

Collaboration with universities, cities and other industries

We work with a broad range of academic institutions in areas such as collaborative research, training programs, innovation events, talent development and continuous learning. Our University Donations Program also provides the opportunity to work with universities to further scientific exploration, develop talent, and share and create knowledge.

We balance our long-term research between the technology and human-focused scientific research. For instance, while developing new technologies for connected robots, we study the intersections of technology and human needs using a multidisciplinary approach.

Through its Distinguished Academic Partner program, Nokia Bell Labs fosters intensive collaboration with the best and brightest minds from the world's top universities and academic organizations to drive a vision of future human needs. We have created a global network of world-leading partners delivering disruptive innovation in technologies such as 5G

technologies, AI, advanced materials and Industrial IoT. As well as delivering breakthrough technologies, this network also provides access to cutting-edge expertise to build our talent pipeline. Some highlights from this program in 2019 include:

- we created a new battery design for the 5G world with our research partners at AMBER, Trinity College Dublin
- within 12 months of its launch, our research center with Cambridge University has become the nucleus of mobile, wearable and ubiquitous systems research in the UK ecosystem
- we implemented a smart lighting pilot in Antwerp with IMEC
- the Secure and Private IOT initiative at CyLab, Carnegie Mellon University is now well established with an exciting research agenda

For more examples of recent outcomes and more information about the program please visit our [website](#).

Our University Donations Program aims to sponsor high quality research in areas that are close to our business interests, such as those relating to Artificial Intelligence (AI) and future 6G, or indirectly, such as with other sectors where ICT and digital communications will play a key role. In 2019, we contributed EUR 730 000 and equipment to 18 universities across the world for innovation projects. See [online](#) for examples of some of the work done under these donation programs. The programs supported by our university donations included

programs in Belgium, Canada, China, Germany, Italy, the UK, and the USA.

Working with cities

We continued our work with cities and communities to drive digitalization and smart development that will provide sustainable living for citizens and sustainable development for businesses. In 2019 we announced cooperation with, for example, cities in Canada, Czech Republic, Israel, Japan, the United Arab Emirates, the United Kingdom and the United States. We provided solutions and platforms, for example, for disaster communications and preparedness, public safety, environmental sensing, and security. Read more information [here](#).

We also enhanced our Smart Home offering and added new products and features to our whole-home WiFi portfolio to enhance the consumer experience. Read more [online](#).

Key data and reporting principles

The sustainability data presented in the following pages covers Nokia Group, covering the calendar year 2019 and where available, trend data since year 2016. Before the data tables we describe the data reporting principles.

Data surrounds us, it is part of who we are and what we do. It helps us make decisions.

Data reporting principles

Scope and boundaries

The sustainability data presented in this report covers Nokia Group, including Networks business, Nokia Software, Nokia Technologies and Group Common and Other. The report contains limited information on our undersea cables business, Alcatel Submarine Networks (ASN), and our antenna systems business, Radio Frequency Systems (RFS). Both ASN and RFS are reported in Group Common and Other. Data covers the calendar year 2019 and where available, trend data since year 2016. Information dating back to 2003 is available on our [website](#).

Newly acquired companies will be included in the reporting scope when they have been legally consolidated and integrated into Nokia systems. Exceptions to the reporting scope for certain indicators are specified in data table notes. When adjustments have been made compared to earlier reports, they are specified in data table notes.

Assurance

Our selected indicators have been assured by an independent auditor of Nokia, PricewaterhouseCoopers Oy. The indicator selection is done based on our materiality analysis, target setting and specific stakeholder needs. Please see more information on Independent Practitioner's Assurance Report on [page 107](#).

Environmental data

We have an internal document Environmental Data Handbook, where we document, for example, data boundaries, data collection methodologies, used

tools, and emission factors. Below we explain key information from the Handbook. All environmental data is presented in rounded numbers. Year-on-year comparison calculations for all environmental data are done with non-rounded values.

Resource utilization

Energy data covers stationary and mobile sources combustion of fuels and consumption of electricity, heat, and cooling in facility operations, as well as combustion of fuels in the marine fleet. Water data covers withdrawal of water from municipal sources in facility operations and the share of recycled water, which is recycled both for sanitary purposes and for irrigation. Waste generation covers hazardous and nonhazardous waste generated in facility operations. In addition, we separately report packaging waste, which is reused in our distribution hubs operated by service providers, and the amount of equipment collected at the end-of-life.

Energy, water, and waste consumption data is typically collected from facility-level responders, obtained from invoices or metered data. For facilities with no data availability, usage of 2019 data is estimated employing annual intensity factors based on kWh/m² (electricity and natural gas), m³/m² (water) and kg/m² (waste), as calculated from the reporting sites, thereby accounting for 100% of Nokia facilities. In 2019, these estimation procedures accounted for less than 5% of electricity and natural gas usage, less than 15% of waste generation and less than 15% of water withdrawal, when compared to total withdrawal, respectively. There are two changes

with environmental reporting methodology in 2019. Subleased areas, covering 6% of the total site area, are not covered in reporting from 2019 onwards. Also intensity factors used for estimating missing facility data were changed in 2019. Previously water and waste estimations were done based on employee headcount, but from 2019 onwards estimations are done based on facility area (m²).

Waste generated at our facilities is handled directly by vendors, by landlord vendors and local authorities. The level of accuracy varies, and we aim to report the most accurate data. Where specific weights are not available, to ensure maximum coverage we employ estimation and extrapolation methods. Utilized waste includes waste that has been either reused, recycled, or the energy from it has been utilized. Non-utilized waste has been either sent to a landfill or incinerated without energy recovery. Composting of biowaste is recorded under recycling. The definitions for what is reported under hazardous and non-hazardous waste have been made on a global level to keep corporate reporting simple. For example, all discarded batteries and electric and electronical waste (WEEE) are reported globally under hazardous waste, although only different sub-categories of WEEE are defined hazardous in different countries. The actual waste treatment is always done according to local legal requirements. Reported waste data is rounded to hundreds of metrics tons. We ensure the total waste amount rounds correctly and summed sub-metrics match the total. This might lead to small rounding exceptions with the sub-metrics.

Our carbon footprint

Our approach to measuring greenhouse gas emissions follows the Greenhouse Gas (GHG) Protocol (www.ghgprotocol.org) developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). We use the following three standards:

- The Greenhouse Gas Protocol, A Corporate accounting and reporting standard
- GHG Protocol, Scope 2 guidance, An Amendment to the GHG Protocol corporate standard
- Corporate value chain (Scope 3), Accounting and reporting standard, Supplement to the GHG Protocol corporate accounting and reporting standard.

The GHG Protocol defines three scopes of CO₂e emissions:

- Scope 1 – direct emissions, from sources owned or controlled by the company.
- Scope 2 – indirect emissions, from the consumption of purchased electricity, heat, and/or steam. As per GHG Protocol Scope 2 Guidance - An amendment to the GHG Protocol Corporate Standard, published in 2015, we report both location-based and market-based Scope 2 emissions from 2014 onwards.
- Scope 3 – indirect emissions, as a consequence of the activities of the company, but from sources not owned or controlled by the company.

Greenhouse gases

We report the emissions as CO₂e as per GHG Protocol's guidance. GHG Protocol is including six

groups of greenhouse gases related to the Kyoto Protocol: Carbon dioxide (CO₂), Hydrofluorocarbons (HFCs), Methane (CH₄), Nitrous oxide (N₂O), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF₆). CO₂ equivalent (CO₂e) is the universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gases, expressed in terms of the GWP of one unit of CO₂.

Operational boundaries and emission calculation

We use the operational control approach for setting organizational boundaries for our GHG emissions inventory. We use emission factors available at the end of the reporting year. From 2018 reporting onwards we follow the GHG Protocol recommendation to use IPCC 5th Assessment Report (AR5) GWP100 values. These values do not include climate-carbon feedbacks. Some emission factor data sources still use GWP100 values from AR4 as a data source of their emission factors. The expectation is that all data sources will start to use AR5 values in the coming years. Where we use emission factors developed by the International Energy Agency, OECD/IEA, the emission calculations have been prepared by Nokia and do not necessarily reflect the views of the International Energy Agency.

Scope 1 emissions

Direct CO₂e emissions from Nokia facilities include GHG emissions resulting from the combustion of oil and gas within Nokia facilities, along with minor direct releases of GHGs associated with refrigerant leakage from facilities' cooling systems. Emissions

are calculated by using emission factors published by United States Environmental Protection Agency (EPA).

Direct CO₂e emissions from our mobile fleet are tracked by obtaining information from country-specific leasing suppliers, which are consolidated into one system. Emissions calculation is based on actual driven mileage and official CO₂ emission value per km of each car make and model. Applicable emission factors are sourced from car manufacturers. As an exception, in the USA emissions are calculated based on driven mileages and actual fuel consumption. In the case that the distance travelled is not available from the leasing supplier, the budgeted annual mileage in the leasing contract is used for calculation. Direct CO₂e emissions from our marine fleet are calculated based on the fuel type and fuel usage of marine vessels. Alcatel Submarine Networks maintains a listing of all owned vessels with associated fuel consumption. All GHG estimation procedures are based on individual vessel assessments.

Scope 2 emissions

Indirect CO₂e emissions include emissions from purchased electricity, heating, and cooling. As per GHG Protocol definitions, the location-based accounting method quantifies scope 2 GHG emissions based on average energy generation emission factors for defined locations, including local, subnational, or national boundaries. In our case, location-based emission factors are obtained from EPA eGrid for the USA and for all the other countries we use IEA Emission factors developed by the International Energy Agency, OECD/IEA.

The market-based accounting method quantifies Scope 2 GHG emissions based on the emissions emitted by the generators from which the reporter contractually purchases electricity bundled with instruments, or unbundled instruments on their own. In our case, applicable market-based residual emission factors are employed for sites located in Europe (obtained from the Association of Issuing Bodies (AIB)), the United States and Canada (obtained from Green-e). Those sites that purchase certified renewable electricity are assigned an emission factor of zero based on the quantity of green energy employed. If supplier-specific emission factors are not available, location-based emission factors are applied.

GHG emissions associated with purchased steam and heat are calculated employing the applicable EPA emission factor, which is based on the assumption that natural gas was used to fuel a boiler exhibiting an efficiency of 80%. GHG emissions associated with purchased chilled water and cooling are calculated employing the same country emissions factors as electricity, based on an assumed efficiency of 100%. Emissions avoided due to the purchase of renewable energy are verified utilizing Guarantees of Origin (GOs) and Green Tariffs in Europe, as well as International Renewable Energy Certificates (I-REC) in China.

Scope 3 emissions

For relevant Scope 3 categories the calculation methodology for estimating emissions is described. For non-relevant Scope 3 categories, an explanation is provided.

1. Purchased goods and services: emissions are reported based on data collected with CDP Climate Survey from Nokia's biggest suppliers, representing 55% of total purchase spend in 2019 (46% in 2018). In 2019 we used a hybrid method, using emissions allocated for Nokia by the suppliers and also intensity based (GHG/€) allocation, where allocated emissions were not available or allocation was not reliable based on different internal quality measures. Collected data is then multiplied to cover 100% of spend. In 2019 calculation we included only suppliers' Scope 1+2 emissions, not Scope 3 emissions, which were reported only by a small share of respondents. Suppliers providing transportation services for products are excluded as "emissions from transportation and distribution" are reported in a separate Scope 3 category. 2019 disclosure is based on the latest CDP data representing suppliers' year 2018 emissions. We recognize that this emission category includes a lot of uncertainty, as suppliers have different qualities in their own reporting and in allocating emissions to Nokia, and due to the extrapolation Nokia does for data to represent 100% of Nokia spend.
2. Capital goods: the relevance of emissions from this category to be included in the Scope 3 inventory is assessed each year, as capital goods purchases vary from year to year. The threshold for inclusion is 0.5% of total Scope 1+2+3 emissions. Emissions from capital goods are based on financial data on property, plant, and equipment additions during the reporting year and estimated by using the GHG Protocol Scope 3 Evaluator tool.
3. Fuel and energy related activities not included in Scope 1 and 2: not presently being assessed, because emissions are by calculation less than 0.1% of total Scope 3 emissions.
4. Upstream transportation and distribution: Data includes emissions from inbound and outbound logistics. Data is based on the top 19 (19 in 2018) logistics supply partners (LSP) delivery data (tonne-km) and transportation mode. Reporting is done with real weight, by using EPA's CO₂e emission factors. Upstream emissions include emissions from transportation paid by Nokia.
5. Waste generated in operations: not assessed because emissions are by calculation less than 0.1% of total Scope 3 emissions.
6. Business travel: emissions are reported for business air travel, which has the biggest impact out of business travel modes. Travel information is obtained from our assigned Travel Agencies. Supplied data includes distance travelled, delineated by flight distance ranges and cabin class. Data from travel agencies is consolidated in a system which is used to calculate emissions from air travel. Emissions factors are obtained from EPA.
7. Employee commuting: We conducted an employee commuting survey in 2018. Survey results are a representative sample from several countries. Those results are extrapolated to represent commuting of all employees for 2018-2019 emissions. 2016-2017 emissions are reported based on a worldwide survey conducted

- at former Alcatel Lucent in December 2015. Since no employee commuting survey had been conducted for the combined Nokia company, the results of the previous survey were extrapolated, based on 2016–2017 Nokia headcount.
8. Upstream leased assets: not presently being assessed as leased vehicles and facilities are presently assessed in Scope 1 emissions.
 9. Downstream transportation and distribution: not presently being assessed as the share of transportation and distribution paid by the customers is so small that emissions of this category were below 0.5% of total Scope 3 emissions.
 10. Processing of sold products: not considered relevant because processing is not required for sold Nokia products.
 11. Use of sold products: The calculation formula is following: Σ [total lifetime expected uses of products (hours) x number of products sold in reporting period x product power consumption (kW) x emission factor for electricity (kg CO₂e/kWh)]. Data covers products from Nokia's Network business groups. Product use time varies between 6 and 15 years, depending on the products. Energy use calculations are based on product group specific standards, e.g. by ETSI, wherever standards have been published. The objective is to have a product coverage above 80%; in 2019 we are above 90%. Calculations are so far based on assumption that all products are powered by grid electricity. Since 2018, we have been using the IEA's latest world average CO₂ equivalent emission factor.

Earlier, the IEA's latest four-year world average CO₂ emission factors were.

12. End-of-life treatment of sold products: not considered relevant. Based on an LCA done by Nokia for a typical Nokia mobile network product (urban base station site in Europe), the use phase accounts for over 84% of global warming potential, production (supply chain and own operations) for 14%, logistics for 2% and end-of-life treatment rounds to 0%. End-of-life treatment emissions are not significant either in other Nokia product categories.
13. Downstream leased assets: not presently being assessed because emissions are by calculation less than 0.1% of total Scope 3 emissions.
14. Franchises: not applicable, as Nokia does not have franchises.
15. Investments: not applicable, as this category is designed primarily for private financial institutions.

Reported emission data is rounded to hundred metric tons. We ensure the total Scope 1, 2 and 3 amount is rounded correctly. This might lead to small rounding exceptions with the sub-metrics.

Social data

Year-end headcount is as published in financial reporting. Some personal and transactional job related detail data is however not included in Nokia's central HR databases. In 2019, the number of employees whose individual detail data was not tracked centrally was 5 375 in 2019 (5 374 in 2018, 3 055 in 2017 and 1 669 in 2016).

Hiring and attrition rates are calculated against the average at month-end permanent headcounts. Number of new employee hires includes "Hire, Rehire & Convert from Contractor/External transactions activity" and excludes merger and acquisition activity. Employees with permanent contracts include internal employees not having data indicating employee is on a fixed-term contract or a trainee. The definition of Line Manager is a manager with one or more subordinates. Nokia's executive management board is the Group Leadership team. Senior management is defined to have job grade 13+ and leadership 12+.

Training and education data is obtained from the NokiaEDU department. Training provided for externals is not included in the employee-related numbers but reported separately. One training day includes seven training hours. The average number of all training hours per employee also includes training arranged by Business Groups or external parties, and training records approved by a Line Manager.

Mobility data is obtained from the HR department's databases and includes long-term assignments. Occupational health and safety data is obtained from the Health, Safety, Security and Environment (HSSE) department. The indicator name defines, whether the data covers Nokia employees and or contractors and sub-contractors. Cut-off day of incident reporting is in early January. There can be some cases, especially from contractors,

reported after the cut-off day. Nokia's HSSE organization puts most effort on prevention of critical and fatal incidents and we realize lost-time incidents data may not be as accurate as the aforementioned data.

Community investments include contributions as cash, value of time and value of in-kind. In 2016–2017 cash has represented minimum 95% of the total contributions, around 90% in 2018 and 84% in 2019. The number of beneficiaries includes beneficiaries from corporate and key regional programs. Related to monetary contributions, since 2017 we have also been able to track part of local programs in addition to global and regional ones.

Ethics data

Data on reported concerns and investigations are obtained from the Business Integrity Group as recorded in the Case Management Tools, and included to the best of the team's knowledge.

Supply chain data

Data on audits and supplier assessments are obtained from Procurement Quality Office. The EcoVadis platform is utilized in metrics related to EcoVadis assessments and the CDP platform related to climate change management. Conflict-free

smelter information is reported through the Conflict Minerals Reporting Template (CMRT), consolidated to the Master Template and compared against Responsible Mineral Initiative's audit program lists.

Environmental data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Greenhouse Gas Emissions							
Total GHG Scope 1 (Direct emissions from facilities and mobile sources) (metric tons CO₂e)	189 200	143 500	134 500	125 000	-7%		3
Emissions from Nokia facilities							
Emissions of GHGs from fuel combustion in facilities (stationary and mobile sources)	34 000	33 600	29 000	20 800	-28%		4
Emissions from Hydro-Fluoro-Carbon (HFC) refrigerants	1 000	400	600	300	-46%		
Emissions from Nokia fleet							
Emissions from fuel combustion in car fleet	36 300	34 300	32 000	29 600	-8%		
Emissions from fuel combustion in marine fleet	117 900	75 200	72 900	74 300	2%		
GHG Scope 2 (Indirect emissions from purchased electricity and heat), Market-based (metric tons CO₂e)	465 700	446 900	364 900	327 200	-10%		5
Emissions from purchased electricity	451 700	423 400	347 300	311 300	-10%		
Emissions from purchased cooling	3 300	12 000	7 900	8 200	5%		
Emissions from purchased heating	10 700	11 500	9 700	7 700	-21%		
GHG Scope 2 (Indirect emissions from purchased electricity and heat), Location-based (metric tons CO₂e)	519 400	482 800	436 900	421 900	-3%		5
Emissions from purchased electricity	505 400	459 300	419 400	406 000	-3%		
Emissions from purchased cooling	3 300	12 000	7 900	8 200	5%		
Emissions from purchased heating	10 700	11 500	9 700	7 700	-21%		
Total Scope 1 and 2 GHG emissions, Market-based (metric tons CO₂e)	654 900	590 400	499 400	452 200	-9%		5
Total Scope 1 and 2 GHG emissions, Location-based (metric tons CO₂e)	708 600	626 300	571 400	546 900	-4%		5

Environmental data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
GHG Scope 3, Indirect emissions (metric tons CO₂e)	45 601 000	42 660 700	44 673 500	39 276 200	-12%		
Emissions from purchased goods and services	1 725 900	1 428 500	5 284 000	3 063 000	-42%		6,7
Emissions from upstream transportation and distribution	268 400	298 500	384 300	303 600	-21%		6
Emissions from capital goods	408 700	499 900	398 200	417 000	5%		
Emissions from business air travel	113 300	98 000	81 500	71 700	-12%		8
Emissions from employee commuting	154 700	135 800	118 400	110 900	-6%		9
Emissions from the use of sold products	42 930 000	40 200 000	38 410 000	35 310 000	-8%		6, 10
Total Scope 1, 2 and 3 GHG emissions, Market-based	46 255 900	43 251 100	45 172 900	39 728 400	-12%		5
Total Scope 1, 2 and 3 GHG emissions, Location-based	46 309 600	43 287 000	45 244 900	39 823 100	-12%		5
GHG intensities and miscellaneous GHG information							
Total Scope 1 and 2 GHG emissions per net sales (€ million), Market-based	28	26	22	19	-12%		
Total Scope 1 and 2 GHG emissions per net sales (€ million), Location-based	30	27	25	23	-7%		
Car fleet CO ₂ e/vehicle km	139	139	135	129	-5%		
Emissions avoided due to purchased renewable electricity	100 300	90 000	129 700	145 900	12%		
Biologically sequestered carbon	0	0	0	0			11

Environmental data

	2016	2017	2018	2019			
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Year-on-year 2018–2019 ²	2019 data assured	Notes
Other air emissions (metric tons)							
Ozone Depleting Substances (ODS), as ODP	0.01	0.00	0.02	<0.01	-82%		
Criteria air pollutants	53.7	54.3	63.5	36.1	-43%		
Volatile Organic Compounds (VOC) emissions	1.4	1.4	1.6	1.0	-41%		12
NO _x	26.3	26.0	30.9	18.1	-41%		
SO _x	2.4	4.3	3.7	0.8	-77%		
Total Particulate Matter (PM) emissions	2.1	2.2	2.6	1.4	-45%		
Other criteria air contaminants	21.4	20.4	24.8	14.8	-40%		
Energy consumption							
Energy consumption in Nokia facilities (GWh) (1 GWh = 3 600 GJ)							
Electricity, total	1 091	1 039	1 005	961	-4%	●	
Heating, total	47	51	43	34	-21%	●	
Cooling, total	6	24	17	27	60%	●	
Fossil gas, total	138	154	141	111	-21%	●	
Fossil oil, total	17	17	11	2	-79%	●	
Biofuel, total	3	0	0	0		●	
Facilities' energy, total (GWh)	1 325	1 285	1 217	1 135	-7%	●	
Direct energy	180	170	153	113	-26%	●	
Indirect energy	1 145	1 115	1 064	1 021	-4%	●	
Renewable energy	213	209	269	302	12%		

Environmental data

	2016	2017	2018	2019			
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Year-on-year 2018–2019 ²	2019 data assured	Notes
Renewable electricity	213	209	269	302	12%	●	
Renewable electricity share of total electricity (%)	19%	20%	27%	31%	5 pp	●	
Total energy per net sales (MWh/€ million)	56	56	54	49	-10%		
Energy consumption in Nokia fleet (GWh)							13
Marine fleet (Fossil oil use)	450	286	278	285	2%		
Energy consumption outside of Nokia (GWh)							
Energy consumption of the sold products	81 770	77 760	78 090	71 790	-8%	●	6, 10
Water							
Total water withdrawal (thousands m³)	2 681	2 305	1 791	1 737	-3%	●	14
Total water withdrawal per employee (m ³)	24	23	18	18	3%		15
Water withdrawal by source (%)							
Municipal water supply	100%	100%	100%	100%	0 pp		
Recycled/reused water (thousands m³)	23	26	20	17	-19%		
Recycling/reuse % of total withdrawal	0.9%	1.1%	1.1%	1.0%	0 pp		
Total water use (thousands m³)	2 703	2 331	1 811	1 753	-3%		

Environmental data

	2016	2017	2018	2019			
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Year-on-year 2018–2019 ²	2019 data assured	Notes
Waste and recycling							
Waste and recycling within Nokia (metric tons)							
Total waste	28 400	15 000	13 600	8 000	-41%	●	16
Reuse	2 200	1 500	200	200	10%	●	16
Recycle	20 100	8 200	6 000	3 300	-45%	●	16
Energy recovery	3 300	2 300	400	400	-4%	●	16
Landfill	2 800	3 000	7 100	4 100	-42%	●	16
Incineration without energy recovery	0	0	0	0	0%	●	16
Total waste per employee (kg)	254	143	136	84	-38%		15, 16
Total non-hazardous waste	24 800	13 000	13 000	7 500	-42%	●	16
Reuse	2 200	1 500	200	200	3%	●	16
Recycle	16 700	6 400	5 400	2 900	-47%	●	16
Energy recovery	3 200	2 300	400	400	-3%	●	16
Landfill	2 700	2 800	7 000	4 100	-42%	●	16
Incineration without energy recovery	0	0	0	0	0%	●	16

Environmental data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Total hazardous waste	3 600	2 000	600	500	-24%	●	16
Reuse	<100	<50	<50	<50	5562%	●	16
Recycle	3 400	1 800	600	400	-29%	●	16
Energy recovery	<100	<50	<50	<50	-11%	●	16
Landfill	<100	200	<50	<50	50%	●	16
Incineration without energy recovery	0	0	0	0	0%	●	16
Hazardous waste by types							
Electronic waste from facilities	3 300	1 800	600	400	-25%	●	16
Other hazardous waste	300	200	<100	<100	-18%	●	16
Utilization rate %	90%	80%	48%	49%	1 pp	●	
Product end-of-life treatment (metric tons)							6
Weight of equipment returned from customers for recycling	2 450	2 580	4 100	4 000	-3%	●	
Weight of equipment returned from customers incinerated with energy recovery	140	120	160	330	104%	●	
Weight of equipment returned from customers sent to landfill	70	20	20	30	36%	●	
Number of returned equipment items reused (no. of items)	85 800	68 000	56 100	56 300	0%	●	
Weight of packaging materials reused in distribution hubs (metric tons)	2 300	3 700	4 200	3 200	-25%		6, 17

Notes

1. Nokia Group values are including Nokia Group Continuing operations, i.e. excluding Discontinued operations referring to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015. All supply chain management data, with the exception of data on the share of conflict-free smelters, covers only Nokia's Networks segment.
2. Year-over-year change is expressed as percentage change (%) when the indicator value is in general number format. When the indicator value is in percentage format, the change is expressed as percentage points (pp).
3. "Emissions of GHGs from manufacturing, R&D and product development" and "Emissions from fire suppression system losses" are not reported from 2018 onwards, since those are not material emissions for Nokia.
4. Includes CO₂e from all GHGs (CO₂, CH₄ and N₂O).
5. Nokia uses internally market-based (not location-based) values for example in target setting. If only one value is given without further information, it refers to the market-based one.
6. Data covers Nokia's Networks business.
7. We used a hybrid method, using emissions allocated for Nokia by the suppliers and also intensity based (GHG/€) allocation. See the chapter on Data reporting principles for more details.
8. 2017 data includes Nokia Group but not Comptel.
9. Based on total headcount reported in financial reporting.
10. Until 2017, the world average IEA emission factor used includes GWP only from CO₂, not other greenhouse gases. For 2017–2019 measured data covered all product lines across Nokia's Networks business.
11. Biologically sequestered carbon (i.e. carbon dioxide emission from burning biomass/biofuels) and emissions from fermentation are not relevant for Nokia as we do not burn or ferment biomass or biofuels on-site. We used biogas in fuel cells in one of our offices during 2016.
12. The source of VOC emissions is fuel combustion. No significant quantities of VOC from solvents and halogenated hydrocarbon, so these emissions are not relevant for Nokia and therefore not consolidated.
13. Energy consumption is presented only for the marine fleet, as energy consumption data from Nokia's vehicle fleet is not available.
14. No significant quantities of heavy metals discharges into water. The indicator is not relevant to Nokia and therefore not consolidated.
15. Years 2016–2018: Based on average headcount calculated from monthly site-specific headcount statistics from facilities database. This calculation procedure results in a different total headcount than the total headcount as of December 31 (disclosed in the Social indicators section of the report). Year 2019: based on total headcount reported in financial reporting.
16. Due to the changes in Nokia's waste estimation methodology, year-over-year (2017–2018 and 2018–2019) figures are not directly comparable.
17. 2016 data is available only for distribution hubs, which were part of Nokia before Alcatel Lucent acquisition, however excluding Nokia Technologies, which does not have significant distribution hubs. 2017 and 2018 data includes more hubs than previously. 2019 data includes all hubs.

Social, ethics, and management systems data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Employment							
Number of employees, year-end situation	100 875	102 761	101 203	94 723	-6%		
Share of employees with full-time contract	99%	99%	99%	99%	0 pp		
Share of employees with permanent contracts	97%	98%	96%	97%	1 pp		
Number of new employee hires	8 310	9 430	8 849	4 493	-49%		
Rate of new employee hires, %	8%	10%	10%	5%	-5 pp		
Female share of new hires	21%	24%	23%	24%	1 pp		
Total number of leavers	10 749	10 033	9 998	11 211	12%		
Total attrition rate	11%	10%	11%	13%	2 pp		
Attrition rate of voluntary leavers	6%	6%	5%	6%	1 pp		
Percentage of open positions filled by internal candidates	42%	59%	51%	49%	-2 pp		
Average length of service (in years)	11	11	11	11	0%		
Number of long-term expatriates worldwide	477	397	334	180	-46%		
Diversity & Equal Opportunity							
Share of women within workforce	22%	22%	22%	22%	0 pp		
Share of female line managers	17%	17%	16%	16%	0 pp		
Share of women within senior management	14%	13%	13%	13%	0 pp		
Share of women within leadership	16%	15%	15%	15%	0 pp		
Share of women on the executive management board	17%	13%	14%	22%	8 pp		
Share of women in the Board of Directors	25% (2 of 8)	30% (3 of 10)	40% (4 of 10)	40% (4 of 10)	0 pp		
Number of nationalities in the executive management board	8 (of 12)	8 (of 15)	8 (of 14)	10 (of 18)	25%		
Share of non-Finnish in the executive management board	92%	93%	93%	83%	-10 pp		
Average age of employees at year-end	40	41	41	41	0%		
Number of nationalities within workforce	-	-	166	166	0%		3

Social, ethics, and management systems data

	2016	2017	2018	2019			
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Year-on-year 2018–2019 ²	2019 data assured	Notes
Training & Education							
Total amount of training days provided by NokiaEDU to employees	249 100	234 300	309 400	242 800	-22%		
Total amount of training days provided by NokiaEDU to customers and suppliers	111 000	119 800	110 000	95 800	-13%		
Average number of all training hours per employee	19	16	34	34	0%		
Number of attendees in corporate leadership programs	-	3 526	3 862	3 191	-17%		
Training costs of employee by NokiaEDU, € million	54	49	29	29	-3%		
Percentage of employees that completed a performance evaluation	90%	94%	99%	99%	0 pp		4
Workplace Relations & Employee Engagement							
Share of employees responding to the engagement survey	20%	21%	31%	35%	4 pp		5
Employee engagement (percentage of favorability towards the company)	76%	82%	80%	78%	-1 pp		5
Occupational Health & Safety							
Near miss incidents reported (including contractors)	303	417	454	362	-20%		
Lost-time incidents of employees	57	41	39	14	-64%		
Work-related fatal incidents involving employees	0	0	0	1		●	
Work-related fatal incidents involving contractors or sub-contractors	7	5	1	6	500%	●	
Community investments							
Total value of contributions (EUR million)	5.02	6.84	6.53	2.26	-65%		
Number of direct beneficiaries	868 300	254 100	304 200	206 900	-32%	●	

Social, ethics, and management systems data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Ethics							
Total number of concerns reported	637	678	887	994	12%		
Conflict of Interest	34	55	55	69	25%		
Controllership	119	71	74	88	19%		
Dealing with Government Officials	3	2	0	1			
Fair Competition	2	5	9	2	-78%		
Fair Employment (all HR related)	200	231	336	416	24%		
Guidance	120	141	186	164	-12%		
Human Rights	0	2	2	1	-50%		
Improper Payments	12	11	13	11	-15%		
Intellectual Property & Confidential Information	51	31	59	54	-8%		6
Privacy	8	0	8	7	-13%		7
Trade Compliance	0	6	5	5	0%		
Wellbeing, Health, Safety and Environment	60	23	24	27	13%		
Working with Suppliers	25	40	58	64	10%		
Other	3	60	58	85	47%		
Number of investigations by the Ethics & Compliance Office	228	257	248	289	17%		
Number of allegations substantiated with "cause found" after investigation	86	127	92	106	15%		
Number of employees given a verbal counselling related to Code of Conduct	11	13	9	10	11%		
Number of employees given a written warning on grounds of violation of Code of Conduct	40	45	16	30	88%		
Number of employees dismissed on grounds of a violation of the Code of Conduct	17	47	24	32	33%		

Social, ethics, and management systems data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Share of employees who have completed the annual training on ethical business practises (Ethical Business Training), %	-	86%	95%	97%	2 pp		8
Management systems							
ISO 14001 certified environmental management system, percentage sites covered	39%	52%	57%	56%	-1 pp		9, 10
OHSAS 18001 certified occupational health and safety management system, percentage sites covered	39%	46%	56%	54%	-2 pp		9, 10
ISO 9001 certified quality management system, percentage sites covered	51%	61%	68%	63%	-5 pp		9, 10
ISO 14001 certified environmental management system, percentage employees covered	-	-	83%	85%	2 pp		10, 11
OHSAS 18001 certified occupational health and safety management system, percentage employees covered	-	-	78%	79%	1 pp		10, 11
ISO 9001 certified quality management system, percentage employees covered	-	-	93%	93%	0 pp		10, 11

Social, ethics, and management systems data

Notes

N/A means this metric is not applicable for that scope. "-" means we do not have data available for that particular year or scope.

1. Nokia Group values are including Nokia Group Continuing operations, i.e. excluding Discontinued operations referring to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015. All supply chain management data, with the exception of data on the share of conflict-free smelters, covers only Nokia's networks segment.
2. Year-on-year change is expressed as percentage change (%) when the indicator value is in general number format. When the indicator value is in percentage format, the change is expressed as percentage points (pp).
3. In 2019, nationality data covers 86% of the total employee headcount.
4. From 2017 onwards this process is called Annual Development Review.
5. In 2016 Nokia switched away from the annual Employee Engagement Survey (EES) towards a more focused approach called Culture Cohesion Tracker (CCT). The CCT was deployed five times in 2016, and twice during 2017 and 2018, and once in 2019. In 2016, we used an average favorability of all CCT engagement questions as an indication of our Employee Engagement favorability towards the company. From 2017 onwards, we followed favorability based on average of the following two target questions: "Overall, as a company, Nokia is heading in the right direction" and "Overall, Nokia's culture is heading in the right direction." Due to Nokia's commitment to protect employee anonymity during the electronic survey process, we do not know whether each CCT round had unique respondents. In 2019 we reached an average of approximately 35% of the employee population.
6. Includes also category: Guidance-Investigation.
7. In 2016, the category was called Health, Safety & Labor Conditions.
8. Nokia acquired Alcatel-Lucent in 2016, and there was no new ethical business training for legacy Nokia employees in 2016. 90% of the former Alcatel-Lucent employees completed Nokia's ethical business training in 2016.
9. Nokia acquired Alcatel-Lucent in 2016, and the approach to certification of the two companies was very different in 2016. Nokia took the approach of implementing global management systems and certifying, under one certificate, almost all locations to the management system standard. Former Alcatel Lucent held multisite certificates for these management system standards but did not cover all locations within those certifications. The management systems were merged and all current Nokia business operations and processes are in line with globally defined standards and processes. In addition to large offices, a portion of our headcount is distributed at multiple locations such as small sales, project, and field offices in customer premises, and in the majority of these facilities we have very little to no control over the building or space.
10. Scope is Nokia's Networks business (Comptel included for 2017 data). Multiple buildings on the same site are counted as one site. Excludes buildings classified as carparks, restaurants and warehouses. Covers year-end situation or as close to year-end as good quality data available.
11. Nokia acquired Alcatel Lucent in 2016, and there was no comparable data available for 2016 and 2017 to calculate the percentage of employees covered by the certification.

Supply chain management data

	2016	2017	2018	2019	Year-on-year 2018–2019 ²	2019 data assured	Notes
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Number of Corporate responsibility (CR) on-site audits (focused on labor conditions and environment) against Nokia Supplier Requirements and SA8000	45	72	75	45	-40%	●	
Closure percentage of non-conformities identified at CR-audits, within audit closure target time	-	58%	52%	52%	0%	●	
Number of on-site system audits against Nokia Supplier Requirements	39	47	38	46	21%	●	
Cumulative number of valid Health & Safety Maturity assessments	382	975	1 406	1 674	19%	●	
Number of suppliers assessed on corporate responsibility in EcoVadis Sustainable Supply Management platform	306	274	251	241	-4%	●	
Percentage of active suppliers rated “satisfactory” or above on their assessment of sustainability by EcoVadis	70%	71%	74%	74%	0	●	
Number of suppliers assessed on their climate change impact based on their CDP reporting for Nokia	243	292	314	404	29%		
Number of suppliers that set GHG emission reduction targets (in CDP)	127	153	187	234	25%	●	
Number of suppliers participating in Nokia sustainability workshops and webinars	355	328	393	255	-35%		3
Number of management-level supplier employees participating in Nokia sustainability workshops and webinars	522	549	606	360	-41%		3
Share of smelters that have been validated as conflict-free or are active in the validation process (out of known smelters in Nokia’s supply chain), %	84%	83%	84%	82%	-2 pp	●	

Notes

- Nokia Group values are including Nokia Group Continuing operations, i.e. excluding Discontinued operations referring to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015. All supply chain management data, with the exception of data on the share of conflict-free smelters, covers anyhow only Networks segment.
- Year-on-year change is expressed as percentage change (%) when the indicator value is in general number format. When the indicator value is in percentage format, the change is expressed as percentage points (pp).
- In the 2019 report, we have corrected the numbers for 2016–2018. In our 2018 report, data reported for 2016 and 2017 incorrectly covered only supplier and management-level supplier employee participation to workshops, not including webinars. For 2018, the number of suppliers participating in Nokia sustainability workshops and webinars did not include webinars either. These numbers have been updated in the 2019 report, covering now both workshop and webinar participation.

Financial data

Financial data	2016	2017	2018	2019	2019 data assured ²
	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹	
Net sales (EUR million)	23 614	23 147	22 563	23 315	●
Operating profit/loss (EUR million)	-1 100	16	-59	485	●
R&D expenses (EUR million)	4 997	4 916	4 620	4 411	●

Notes

1. Values are including Nokia Group Continuing operations, i.e. excluding Discontinued operations referring to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015.
2. Financial indicators are included in the audited financial statements. Please see Auditor's Report from page 214 onwards in our Annual Report; Nokia in 2019.

Independent practitioner's assurance report

Our key sustainability indicators have been assured by an independent auditor, PricewaterhouseCoopers Oy.

Independent practitioner's assurance report

To the Management of Nokia Corporation

We have been engaged by the Management of Nokia Corporation (hereinafter also "the Company") to perform a limited assurance engagement on selected Nokia Group's sustainability information for the reporting period 1 January 2019 to 31 December 2019 as set out in Nokia's People & Planet Report 2019 on the Company's website (hereinafter "the Selected sustainability information").

Selected sustainability information

The scope of our work was limited to assurance over the information summarised below. The information covers Nokia Group (Continuing operations), as indicated in the People & Planet Report 2019. We have not been engaged to provide assurance on any information relating to prior reporting periods or to any other information in the People & Planet Report 2019.

Environmental indicators

- Scope 1 greenhouse gas (GHG) emissions, by sources (metric tons CO₂e)
- Scope 2 GHG emissions, market based and location based (metric tons CO₂e)
- Combined Scope 1+2 GHG emissions: 2019 emissions and progress against 2030 Science-based target
- Scope 3 GHG emissions: use of sold products (metric tons CO₂e). 2019 emissions and progress against 2030 Science-based target.
- Energy consumption within Nokia, by types of energy (GWh) and change to 2018 (%)

- Renewable electricity amount (GWh) and portion of total electricity consumption (%)
- Water withdrawal in facilities (m3) and change to 2018 (%)
- Waste amount within Nokia by treatment type (metric tons) and utilization rate (%)
- Energy savings achieved in 2019 due to network modernization
- Voluntary product takeback from customers: Weight by treatment type (metric tons) and number of returned equipment reused/refurbished

Social indicators

- Number of fatal work related incidents involving employees and number of fatal work related incidents involving contractors and subcontractors
- Share of employees who have completed the annual training on ethical business practices (Ethical Business Training) (%)
- Number of Compliance Controls Framework reviews
- Number of concerns received as alleged violations of our anti-bribery policies, involving 3rd parties, and the number of such concerns substantiated
- Share of women within leadership (%)
- Number of managers trained on inclusive leadership best practices
- Share of high-risk projects with impact assessment completed, and share of those projects meeting our minimum non-negotiable requirements (%)

Improving people's lives indicators

- Number of subscriptions Nokia's radio networks customers provided service for
- Number of lives improved through corporate and key regional community investment programs

Supplier indicators

- Number of forced labor non-compliance instances found in supplier audits
- Share of suppliers delivering high-risk activity assessed by using Nokia Health & Safety Maturity Assessment Process and share of assessed suppliers meeting "H&S compliant supplier"-status (%)
- Share of smelters that have been validated as conflict-free or are active in the validation process (out of known smelters in Nokia's supply chain) (%)
- Share of suppliers who have full visibility to smelters in our supply chain (%)
- Number of suppliers that set GHG emission reduction targets (in CDP)
- Number of system audits against Nokia Supplier Requirements
- Number of corporate responsibility on-site audits (focused on labor conditions and environment) against Nokia Supplier Requirements and SA8000, and closure percentage of non-conformities (%)
- Number of suppliers assessed on Corporate Responsibility in EcoVadis Sustainable Supply Management platform and share of suppliers with a satisfactory performance level (score ≥45/100) (%)
- Share of cases coming to Human Rights Due Diligence (HRDD) process resolved as "go", "no go" and "go with conditions" (%)

Management's responsibility

The Management of Nokia Corporation is responsible for preparing the Selected sustainability information in accordance with the reporting criteria as set out in the Company's own documented standards and GHG Protocol (hereinafter "the Reporting criteria"). The Management of Nokia Corporation is also responsible for such internal control as the management determines is necessary to enable the preparation of Selected sustainability information that is free from material misstatement, whether due to fraud or error.

Practitioner's independence and quality control

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

PricewaterhouseCoopers Oy applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Practitioner's responsibility

Our responsibility is to express a limited assurance conclusion on the Selected sustainability information based on the procedures we have performed and

the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 (Revised) "Assurance Engagements Other than Audits or Reviews of Historical Financial Information". That standard requires that we plan and perform the engagement to obtain limited assurance about whether the Selected sustainability information is free from material misstatement.

In a limited assurance engagement the evidence-gathering procedures are more limited than for a reasonable assurance engagement, and therefore less assurance is obtained than in a reasonable assurance engagement. An assurance engagement involves performing procedures to obtain evidence about the amounts and other disclosures in the Selected sustainability information. The procedures selected depend on the practitioner's judgement, including an assessment of the risks of material misstatement of the Selected sustainability information.

Our work consisted of, amongst others, the following procedures:

- Interviewing senior management of the Company;
- Visiting one site in Finland
- Conducting a web conference with one site in India
- Interviewing employees responsible for collecting and reporting the Selected sustainability information at the group level as well as at the site level
- Assessing how group employees apply the reporting standards and procedures of the Company

- Testing the accuracy and completeness of the information from original documents and systems on a sample basis
- Testing the consolidation of information and performing recalculations on a sample basis.

Limited assurance conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that Nokia Corporation's Selected sustainability information for the reporting period ended 31 December 2019 is not properly prepared, in all material respects, in accordance with the Reporting criteria. When reading our assurance report, the inherent limitations to the accuracy and completeness of sustainability information should be taken into consideration.

Our assurance report has been prepared in accordance with the terms of our engagement. We do not accept, or assume responsibility to anyone else, except to Nokia Corporation for our work, for this report, or for the conclusions that we have reached.

Helsinki 3 April 2020

PricewaterhouseCoopers Oy

Pasi Karppinen
Authorised Public Accountant (KHT)

Sirpa Juutinen
Partner, Sustainability & Climate Change

NOKIA

Nokia Head Office

Karakaari 7
FI 02610 Espoo, Finland
FINLAND

Tel. +358 (0) 10 44 88 000
Fax +358 (0) 10 44 81 002
www.nokia.com