

People & Planet Report 2018

NOVA



About this report

The scope of this report

The scope of this report is Nokia Group in 2018, including the Networks business, 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. Employee-related data presented throughout the report covers employees included in our central HR database, coverage of which was 95% in 2018. For more information on our financial results, operations, and reporting structure, please see www.nokia.com/financials.

For an explanation of how we chose what to include in this year's report, please refer to the section on materiality.

Unless otherwise indicated or evident from the context, we generally provide information for the year 2018, with comparisons to the year 2017.

In trend reporting we use the term "Comparable combined company" when we refer to information including combined Nokia Group and former Alcatel Lucent data prior to the acquisition of Alcatel Lucent in January 2016.

Reporting frameworks and assurance

In our reporting, we are committed to expanding our transparency and our coverage. To help ensure

compatibility with other organizations, our report is prepared in accordance with the Global Reporting Initiative GRI Standards, Core-option. Our report is also compliant with the advanced level of the UN Global Compact. The Global Reporting Initiative index is available as a separate PDF document at www.nokia.com/sustainability and some key sustainability data is included as a separate section at the end of this report.

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

Availability of this report

This report was published in May 2019 and it is only available in digital format. We have also published supplementary information related to this report online at www.nokia.com/sustainability. We have published annual corporate responsibility reports since 1999 and the reports are available in digital format on our website from as far back as 2003 at [our report archive](#).

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 in the United States*. The Board Review of 2018 Annual Accounts includes non-financial information as required by the Finnish Accounting Act implementing the EU Directive on disclosure of non-financial and

diversity information. The reports are available at www.nokia.com/investors.

In addition to our own reports, we provide detailed information through various external reports. In 2018, we again publicly reported our climate impacts to CDP – a leading global organization working with shareholders and companies to disclose the greenhouse gas emissions of major corporations. More information on the external ratings is available at www.nokia.com/about-us/investors/reports-and-filings.

* 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.

Your feedback

We welcome your views and questions on our activities and our performance. If you would like to share your opinions, please contact us at sustainability.global@nokia.com

Find us on social media

Connect with Nokia on [Twitter](#), [LinkedIn](#), [Instagram](#), [Glassdoor](#) and [Facebook](#). Follow our [blog](#).

Contents

1.0 Nokia today	4	5.5 Respecting the right to privacy and freedom of expression – preventing the misuse of technology	102
2.0 Our approach	7	5.6 Responsible sourcing	106
2.1 Letter from the President and CEO	8	5.7 Combatting modern slavery in the supply chain	113
2.2 Sustainability highlights and challenges in 2018	10	5.8 Materials traceability and conflict minerals	115
2.3 Our sustainability priorities and impacts	12	5.9 Data privacy and security	117
2.4 Our sustainability targets and performance	20	6.0 Respecting our people in everything we do	120
2.5 Managing sustainability	33	6.1 Highlights in 2018	121
2.6 Our recognitions and awards	36	6.2 Our commitments, targets and performance	123
2.7 Our economic impact	37	6.3 Who we are	125
2.8 Innovation and sustainability	40	6.4 Making Nokia a great place to work	126
3.0 Improving people’s lives with technology	42	6.5 Human capital development	128
3.1 Highlights in 2018	43	6.6 Ensuring decent working conditions and fair employment	132
3.2 Our commitments, targets and performance	45	6.7 Diversity, inclusion and anti-discrimination	137
3.3 Connecting people and things	47	6.8 Strengthening our health and safety performance	142
3.4 Technology that makes a difference	52	7.0 Making change happen together	146
4.0 Protecting the environment	54	7.1 Highlights in 2018	147
4.1 Highlights in 2018	55	7.2 Our commitments, targets and performance	149
4.2 Our commitments, targets and performance	57	7.3 Making change happen together	150
4.3 Circular economy	60	7.4 Supporting our customers’ sustainability goals	151
4.4 Sustainable product design and materials	63	7.5 Collaborating with NGOs	153
4.5 Our products and networks – energy efficiency and carbon emissions	68	7.6 Working with governmental and multilateral organizations	158
4.6 Our own operations – energy efficiency and carbon emissions	73	7.7 Collaboration with universities, cities, and other industries	162
4.7 Waste in our own operations	77	8.0 Key data and reporting principles	164
4.8 Circular practices and products	78	8.1 Data reporting principles	165
4.9 Water	80	8.2 Environmental data	170
5.0 Conducting our business with integrity	83	8.3 Social, ethics and management systems data	177
5.1 Highlights in 2018	84	8.4 Supply chain management data	182
5.2 Our commitments, targets and performance	86	8.5 Financial data	184
5.3 Ethical business and corporate governance	90	9.0 Independent practitioner's assurance report	185
5.4 Addressing human rights	101	9.1 Independent practitioner's assurance report	186

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 who use our solutions to support 6.1 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 faster, more secure and capable of revolutionizing lives, economies and societies. Nokia adheres to the highest ethical business standards as we create technology with social purpose, quality and integrity.

Nokia today

We are enabling the infrastructure for 5G and the Internet of Things and shaping the future of technology to transform the human experience.

We are a leader in mobile and fixed network infrastructure with the software, services, and advanced technologies to serve customers in approximately 130 countries around the world. We are driving the transition to smart, virtual networks and connectivity by creating one single network for all services, converging mobile and fixed broadband, IP routing and optical networks, with the software and services to manage them. Our research scientists and engineers continue to invent new

technologies that will increasingly transform the way people and things communicate and connect.

Our presence and employees in 2018

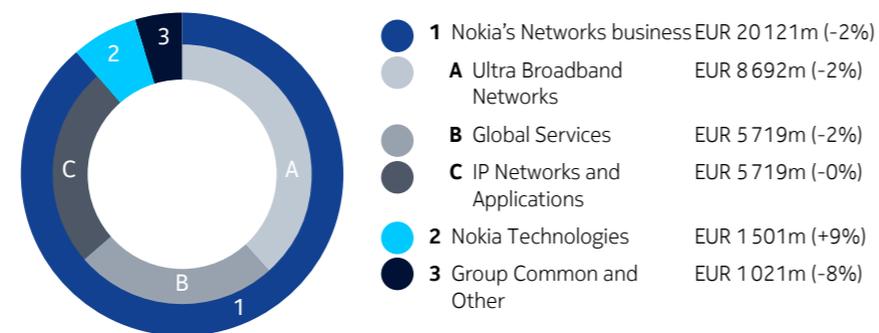
In 2018 we had six business groups, with operations in Europe, the Middle East & Africa, Greater China, North America, Asia-Pacific, and Latin America. At the end of 2018, we employed approximately 101 000 people, out of which more than a third worked within our research and development (R&D) in Europe, North America, and Asia and around 0.8% in production. You can read more on our employees in the [Who we are](#) section.

We closed 2018 delivering net sales of EUR 22.6 billion. We continued to make significant targeted R&D investments, a bedrock of our success in innovation, with R&D expenditures equalling EUR 4.6 billion in 2018.

Organizational structure and reportable segments

In 2018 we had organized our networks-oriented businesses into five business groups: Mobile Networks, Fixed Networks, Global Services, IP/Optical Networks, and Nokia Software, and kept our driver of future innovation and licensing, Nokia Technologies, as a separate, sixth business group. As of January 2019, we have seven main business groups: Mobile Networks, Fixed Networks, IP/Optical Networks, Global Services, Nokia Software, Nokia Enterprise, and Nokia Technologies. Nokia Bell Labs leads the company's research and development. For more information see our financial report at www.nokia.com/investors.

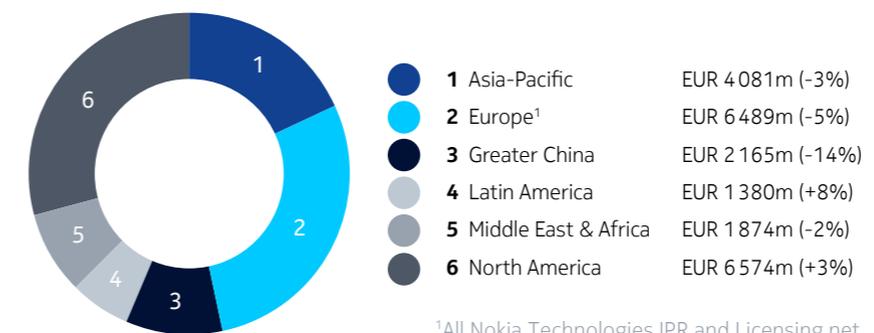
Net sales by business 2018¹



¹Includes net sales to other segments.

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

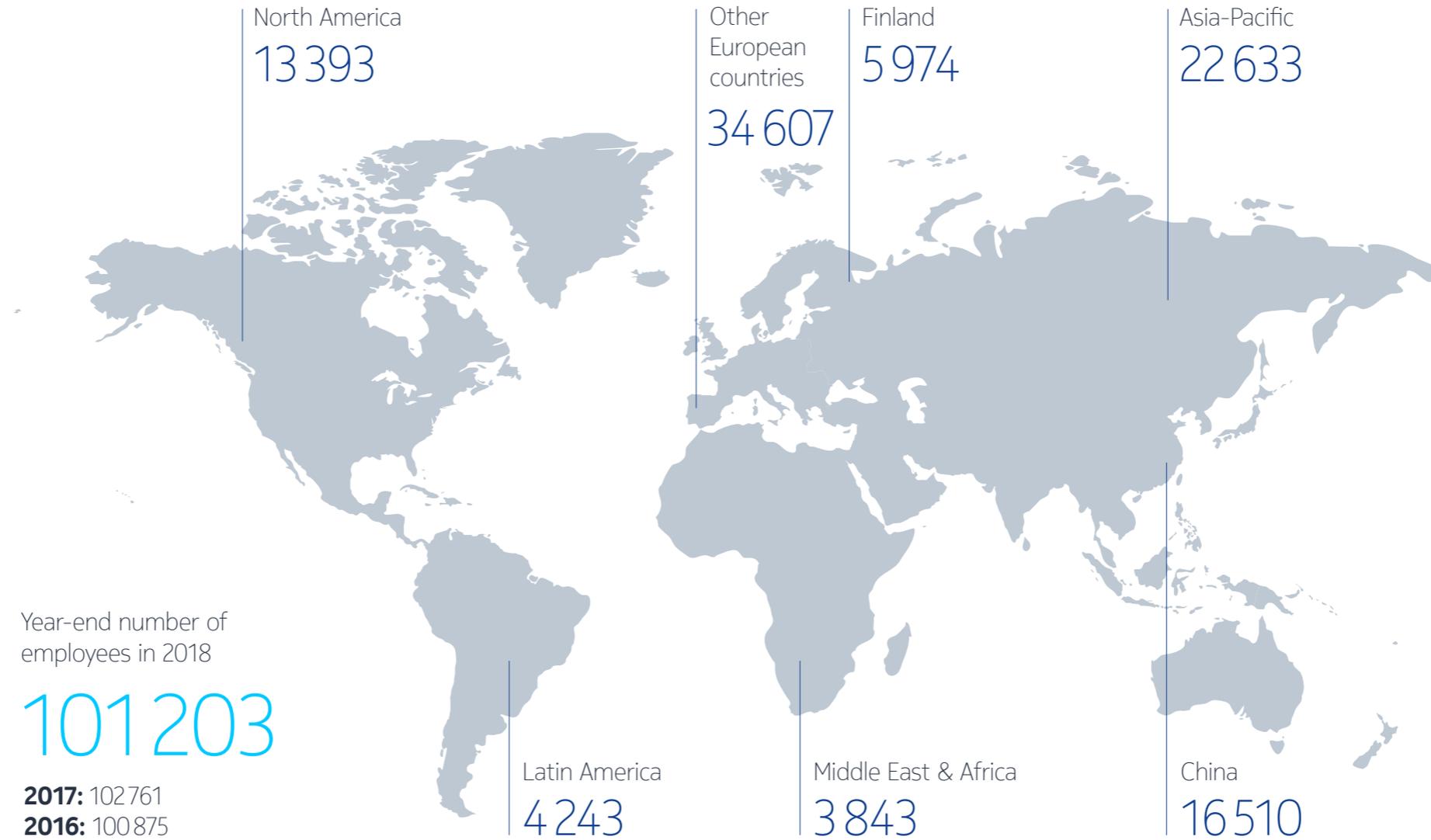
Net sales by region 2018



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 2018



Our approach

Our sustainability vision remains to create the technology to connect the world, in a responsible way. Together.



Letter from the President and CEO

Businesses have responsibilities.

To customers, of course. To shareholders and investors, absolutely. But also to employees, to society, and to the planet itself.

More and more businesses are realising the importance of these responsibilities. They are making their work more sustainable. But there is a long way to go. Climate change is still happening. Inequality still exists.

I want Nokia to be at the very forefront in addressing these urgent challenges. Not only through the technology we create, but through the values we represent, and the working practices that we employ across the breadth of our operations.

In order to gauge our progress, we benchmark ourselves against the globally-recognised standards of the United Nations' Sustainable Development Goals and assess our performance against the advanced level principles of its Global Compact.

This work is grouped into four areas: improving lives with technology, protecting the environment, conducting business with integrity, and respecting our people, and these activities are underpinned by our collaborations with other key stakeholders.

Improving lives with technology

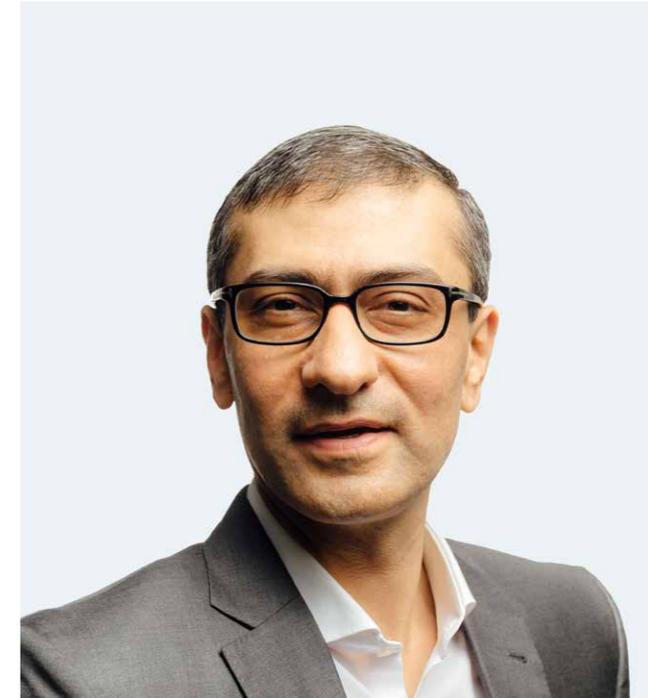
We create the technology to connect the world. That connection took a huge step forward at the end of 2018 when the first commercial 5G networks went live in the U.S. and Korea.

Greater connectivity will soon usher in the Fourth Industrial Revolution, which promises stellar gains in productivity and economic growth. But not only that: the technology that will revolutionize factories and workplaces will be of equal use in healthcare, in efficient agriculture, in smart power production. In other words, across the entire infrastructure of a healthy and sustainable society.

We are determined that these gains should not just be limited to certain countries or communities. They should be universal benefits.

Crucial to this aspiration is our work with Non-Governmental Organizations (NGOs). For example, in Indonesia we worked with the national Ministry of Health and UNICEF in order to deliver over 23 million vaccinations and 3 million anti-malaria bednets.

The number of people to have directly benefitted from our corporate community investments reached 1.4 million in 2018.



Protecting the environment

Like any type of infrastructure, connectivity can be resource-intensive. But that only makes it more important for companies like Nokia to reduce their environmental impact wherever possible.

We are investing heavily to make our portfolio the most energy efficient in the world. That investment is bearing fruit: our new radio networks use on average over 40% less energy than the ones they replace. And we have developed the world's first commercially deployed liquid cooled base station, which could reduce CO₂ emissions by up to 80% when emitted heat is circulated around apartment buildings to utilise heat that would otherwise go to waste.

In addition, we have committed to decreasing our emissions from our own operations by 41% by 2030, compared to 2014 figures. We are on track to achieve this. In 2018 our facilities consumed less electricity and water, and emitted less greenhouse gas, than they did in 2017, and we are targeting further reductions in 2019.

Conducting business with integrity

This is the second year running that the Ethisphere Institute has ranked us among the World's Most Ethical Companies. For us, ethics and integrity are not a 'nice to have' but a fundamental part of our business model.

At the core of this is our Code of Conduct, taken as training and acknowledged by every employee. It sets

down our ethical business approach and explains how employees, suppliers and other stakeholders should contribute to it.

The Code requires all employees to follow five directives: obey laws and follow policies, be fair and honest, treat each other with respect, declare conflicts of interest and avoid appearance of impropriety, and report any concerns promptly. Alongside other tools, such as our Human Rights Due Diligence and Nokia Supplier Requirements, this allows us to set high standards of transparency, ensure cast-iron data security, mitigate the risks of misuse of technology, and maintain responsible supply chains.

Respecting our people

Telecommunications is a competitive sector. To succeed you not only need the best people – you need the best people to be empowered.

We have done well at this. Anonymous surveys show that our employees value both our culture and the direction of our business. Other metrics are equally pleasing: the number of paid hours that employees spent volunteering more than doubled in 2018. Our work on LGBT+ and diversity is also going well.

But there is still more to do, on gender diversity in particular.

Just 22% of our employees are women. The percentage of female leaders is even lower. This is not good enough and we are taking action to change it.

We run two career development programs for talented women. 35% of those who complete these schemes have moved on to higher level positions. In addition, we provide training for leaders and managers on unconscious bias; almost 1 000 employees received this training in 2018.

We also support Greenhouse – a professional women's network – and StrongHer – an employee network that aims to create more opportunities for women across Nokia – among other initiatives.

Finally, I regret to say that a Nokia subcontractor lost his life in a fall last year. Any serious incident of this type is unacceptable. We will carry on trying to reduce accidents by providing best-in-class equipment, training and supervision to avoid accidents.

Technology plays a huge and increasing role in all our lives. For us, that means that we have a responsibility to act in a way that benefits people and the planet. Not just through our products and services but through our values.

These values have allowed us to be more ethical, trusted and transparent than ever before. We should all be proud of that – I certainly am, but we will also push forward to be even better.

Warm regards,

Rajeev Suri
Nokia President and CEO

Sustainability highlights in 2018

- ✓ The challenges posed by climate change grew ever more pressing with the release of The Intergovernmental Panel on Climate Change (IPCC) report on global warming at 1.5°C, and we are pushing even more strongly ahead with our environmental programs and activities. In early 2019 we announced the first commercial liquid cooled base station site with the Finnish telecom operator Elisa. The solution can reduce CO₂ emissions by up to 80 percent and recapture wasted heat to feed into the heating system for the apartment building. This work is just one way to reach our science based long-term targets. Read more in the [Protecting the environment](#) section.
- ✓ We were again recognised by a number of independent organisations for our work in sustainability. At a time when calls for greater integrity and ethical business behaviour are growing, we were again recognized by the Ethisphere Institute as one of 2019's World's Most Ethical Companies based on our activities in 2018. In November 2018, we were also acknowledged by the independent annual sustainability report review, commissioned by FIBS, Finland's leading non-profit corporate responsibility network for our reporting in 3 categories including winning Finland's report of the year for the first time. See more of our recognitions at www.nokia.com/about-us/who-we-are/our-awards.
- ✓ Our products in use create the greater part of our carbon footprint and we again helped customers around the world to reduce that footprint. In 2018, we delivered zero emission products to over 140 customers globally and the customer base-station sites we modernized used on average 43% less energy (44% in 2017) than those where our customers did not modernize. Read more in the [Protecting the environment](#) section.
- ✓ From the time we began to calculate the impact of modernization on energy use (around 3–4years ago), we have calculated that over that period we have saved as much electricity in total (by selling better products) as we use in one year at Nokia.
- ✓ We continued to drive the dialog forward in business and human rights. In 2018, we undertook a Human Rights Impact Assessment (HRIA) of our business in terms of the most salient human rights risks arising from the potential misuse of the products and technology we provide. The HRIA was conducted by an external human rights expert and will help us identify areas for improvement. It will also provide preparation for the Global Network Initiative's human rights assessment in the first half of 2019. Read more in the [Addressing human rights](#) section.
- ✓ Our supply chain is long and complex, and we work with our suppliers in improving Environmental, Social and Governance (ESG) issues and promoting transparency and collaboration. We carry out audits and assessments, and in 2018, we had 74 percent (71 percent in 2017) of suppliers on EcoVadis with a satisfactory performance score. Although this is an improvement on 2017, we still have a lot of work to do to reach our 2020 target. 2018 was also the first year of active engagement with our suppliers on the efficient use of water. Furthermore, 100 percent of suppliers delivering high risk activities were covered by H&S maturity assessments. Read more in the [Responsible sourcing](#) section.
- ✓ In 2018, around 304 200 (254 100 in 2017) lives were improved through our corporate community investment programs, and cumulatively between 2016–2018, around 1 426 600 people have already directly benefitted from our programs.

Sustainability challenges in 2018

- ✓ In 2018, there was one fatal incident (four in 2017), resulting in the death of one (five in 2017) contractor/subcontractor employee while carrying out work on our behalf. The accident was related to work at height. Any such serious incidents while working for Nokia are unacceptable.
- ✓ We have zero tolerance for the use of forced or child labor, or any form of modern slavery. In 2018 calls for increased supply chain transparency grew stronger and we must ensure we keep training and collaborating with our suppliers to avoid the types of labor issues and other related concerns explained in this report under the **Responsible Sourcing** section.
- ✓ In our own operations the share of landfilled waste increased significantly (from 20% to 52%) and we need to work hard to decrease this. Improvements in how we estimate waste for non-reporting sites is the main reason for this significant increase.
- ✓ In 2018, we had 15.3% women in leadership positions, disappointingly down from the 2016 baseline of 15.5%. We continue working, within our gender balance action plan, towards the 2020 target of increasing the percentage of women in leadership by 25%.

Our sustainability priorities and impacts

Our core business is connectivity and related activities, and we aim to deliver our technology in a responsible way, where purpose and sustainability are an integral part of how we operate and what we provide. We take the responsibility for the impact we have globally, both positive and negative, in order to make a positive difference in people's lives and to the planet.

Our greatest impact in accelerating the realization of the United Nations Sustainable Development Goals (SDGs) remains in the development and delivery of our technology that connects people and things; improves lives by providing access to education; information, better healthcare, and opportunity; and may enable a safer, healthier planet. The technology we provide can create a more equitable society by connecting the unconnected.

Collaboration is paramount in creating the greatest impact on the sustainability challenges of our time. There is power in joining together to create shared value. No single company, organization or government can solve the challenges alone, but technology and connectivity will continue to play an ever-increasing role in creating a better world for all.

Our priorities



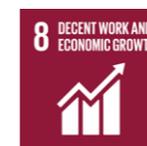
Improve people's lives

Create and deliver technology solutions and products that connect people and things. Our sustainability-related products and services will help people thrive and live better and healthier lives on a cleaner planet. This is the core of our business.



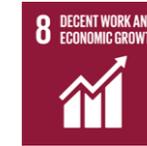
Protect the environment

- Help customers reduce energy use and emissions
- Increase product energy efficiency, develop product eco-design, and manage materials
- Reduce environmental impact of our operations (emissions, waste, resources)



Conduct our business with integrity

- Uphold the highest principles of business ethics and corporate governance
- Tackle issues related to privacy, data security, and potential technology misuse
- Ensure suppliers meet our high ethical, labor, and environmental standards



Respect our people

- Provide fair and just labor conditions in own operations
- Maintain health & safety as a priority
- Foster employee satisfaction, engagement, and development
- Strive for greater diversity, inclusion, and anti-discrimination



Make change happen together

Engage actively with our stakeholders to contribute to global efforts towards a more sustainable, socially responsible world

Global macro trends impacting our sustainability approach

Key global macro trends that impacted our sustainability approach in 2018 were identified as technology with a purpose, the growing demands for improved privacy, data security and protection against cybercrime, the need for business integrity, transparency and ethical behavior, the fight against climate change and sustainable use of natural resources, and the importance of attracting and retaining talent. New developments during the year such as societal changes have further emphasized a number of these trends and the importance in our sustainability work.

The human potential of technology

Our strategy reveals the following global technology related megatrends: network, compute and storage, IoT, augmented intelligence, human and machine interaction, social and trust economics, and digitalization and ecosystems.

Our technology expertise, breadth of portfolio and ability to connect people and things puts us in an excellent position to play our part in addressing today's global challenges with the UN Sustainable Development Goals as our North Star.

Our customers' networks served 6.1 billion subscriptions worldwide by the end of 2018. Connectivity in itself enables increased productivity and potential for economic growth. Nokia Bell Labs have looked at the elements that combined to make earlier major gains in productivity

growth possible and concluded that four physical networked technologies, all widely diffused and working together, made the difference in the past. The technologies were in energy, transportation, health and sanitation, and communication networks. Digitalization will play a key role in reducing poverty, increasing industrial efficiency, improving human wellbeing in an equitable way, reducing environmental damage and provide better methods of managing scarce resources.

Privacy and data security

As the digital transformation of life touches everyone and changes the way we live, work and play, the potential risks of these massive changes and the use of technology are in constant discussion. Over 2018, there has been more debate on automation and the changing nature of jobs, the use and potential misuse of AI and the impact on society of smart devices when everything and everyone is connected.

In 2018 we have seen growing concerns around the issue of privacy as the amount of sensitive and personal data grows exponentially on networks. As more IoT and smart devices become connected, data and cyber security concerns increase. Debate has increased on the vulnerability of information systems, data fraud and theft, breakdowns in critical information systems and the misuse of technology. Technology designed to mitigate these risks and thwart those who misuse technology is a necessity. Our design for privacy, security solutions and due diligence processes to avoid misuse help to ensure the benefits of the technology will be enjoyed by all.



High ethics and transparency

Development in many countries is restricted by corruption, unethical behavior, and a lack of respect for human rights and acceptable labor conditions. Increased regulation on the need for greater transparency are growing. Non-financial sustainability reporting requirements continue to increase. Our unyielding integrity is our most important asset. By upholding our high standards of integrity internally and in our supply chain, we can make a positive difference.

Climate change and the sustainable use of natural resources

Climate change and its effects remain the biggest global challenge. During 2018 concern about the likelihood and impacts as well as the urgency and magnitude of the needed actions became even more evident. While minimizing impacts from our own operations, we also have the opportunity to help our customers meet the growing demand for communications in an environmentally sustainable way. We design products and services that are more energy efficient, encouraging the use of renewable energy, and helping our customers and other industries reduce their impact.

Societal changes

Increasing urbanization and aging will put pressure on existing infrastructure and create demand for new solutions. At the same time, economic and political polarization and nationalism (countries increasingly focusing on their own interests) will challenge all – economic, social and environmental aspects of sustainability. Connectivity and technology can help manage and solve societal challenges and enable freedom of expression and opinion when technology is used for its intended purpose.

Attracting and retaining talent

Attracting, keeping, and motivating the best talent is key to business success and the market for skilled employees in our business remains extremely competitive. We continue to build a motivational corporate culture that provides equal opportunity and fosters innovation and continuous learning. A company that leads in profit with purpose will attract new talent as sustainability becomes one of the key criteria for potential employees.

Materiality

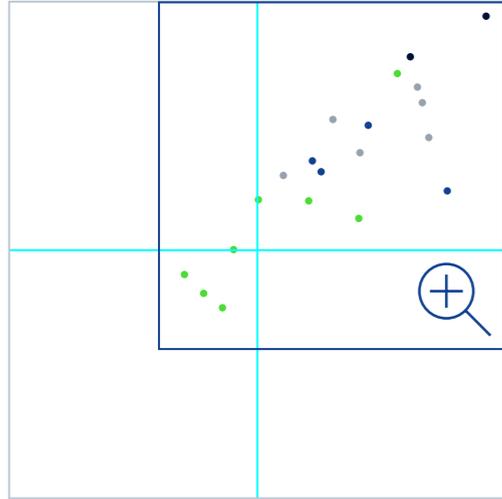
We continue to focus our corporate responsibility activities on the most material topics in relation to our business and the impact on sustainable development. We identify our material topics based on a combination of the factors which include our strategy and vision, risks and opportunities, feedback from stakeholder interaction, customer and legal requirements, our Code of Conduct, both macro



and market trends, international sustainability frameworks, our value creation analysis and the UN Sustainable Development Goals. We look at our activities in terms of the shared value that we can create to maximize positive impacts and minimize negative ones.

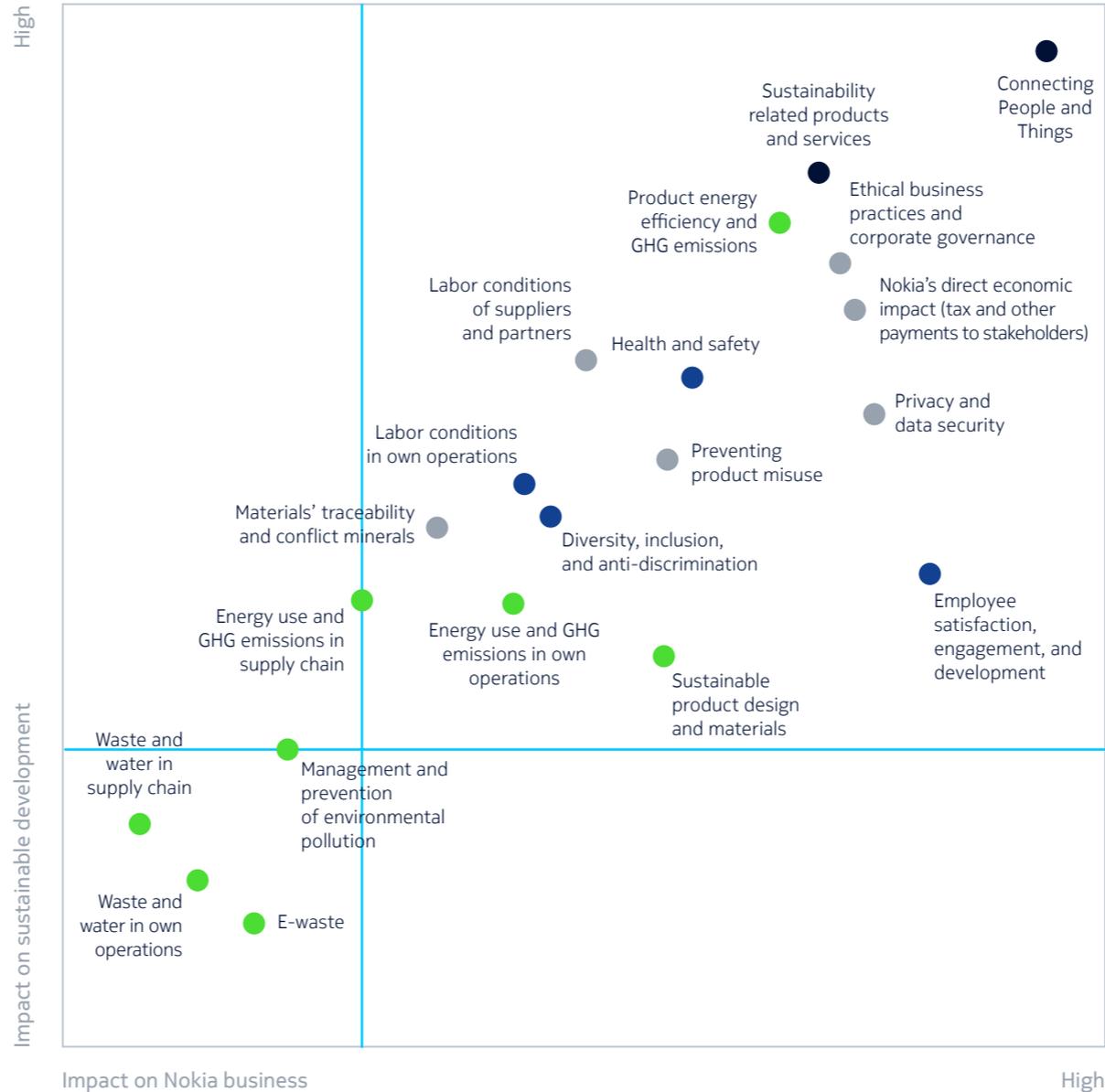
In 2017, we finalized the review and update of our materiality analysis, completing interviews with a broad range of stakeholders, both internal and external. The analysis was reviewed by Nokia Responsibility Council, Board of Directors, and by external sustainability experts. We plan to make the

Our sustainability: Impact on business success and sustainable development



- Improving lives with technology
- Protecting the environment
- Respecting our people
- Conducting our business with integrity

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



next review and update of our materiality analysis by the end of 2019.

Based on the outcomes of the assessment and review, we concentrated our efforts on the benefits of connectivity and sustainable products, and environmental impact and climate change challenges. We work hard to ensure ethical business practices and support the increasing need for data privacy and freedom of expression, supply chain responsibility and transparency, health & safety, and employee engagement as well as increased diversity.

The materiality map shows the 20 most material topics and their relevance to sustainable development and our business success. For more details on aspects of our materiality, the process as well as key business and sustainability drivers, visit [our website](#).

Our impact and influence on sustainable development throughout the value chain

We have a long and complex value chain where we are able to positively influence sustainable development in many ways. For more on our impact and influence on our value chain visit [our website](#).

Value creation

In recent years, a variety of stakeholders have become increasingly interested in understanding the overall quantified positive and negative impacts of companies on the environment, the economy, and society.

We have been one of the forerunners in this value creation thinking. For example, we participated in Aalto University's CEMS program in Finland, which carried out an extensive analysis of Nokia's positive and negative social, environmental, and economic impacts throughout the value chain in terms of monetary value, to the extent possible. We also presented some of our value chain impact analysis in [our previous People & Planet report](#). Moreover, the conclusions of our materiality analysis and sustainability related risks and opportunities in our enterprise risk management system are also to some extent based on the analysis of our positive and negative impacts in terms of monetary value.

We were one of the first companies to join. The Upright Project, which looks at value creation analyses and methodologies with several companies and organizations.

In the Upright model, the negative and positive value creations with monetary values are analyzed and shown in five main dimensions: economic, environmental, health, social and knowledge. Each of these dimensions is divided into several impact areas.

The conclusions for the 20 impact areas, shown in the chart on the next page, are from The Upright Project, and estimations are based on public data and various assumptions. For example, in the economic area, the values of paid salaries and taxes are based on reported euro values, and in the environmental area, the Nokia reported GHG emissions, water usage and waste figures are converted by Upright into euro figures using sources such as the Kering E P&L, carbon tax country-specific pricing, and global water tariff averages.

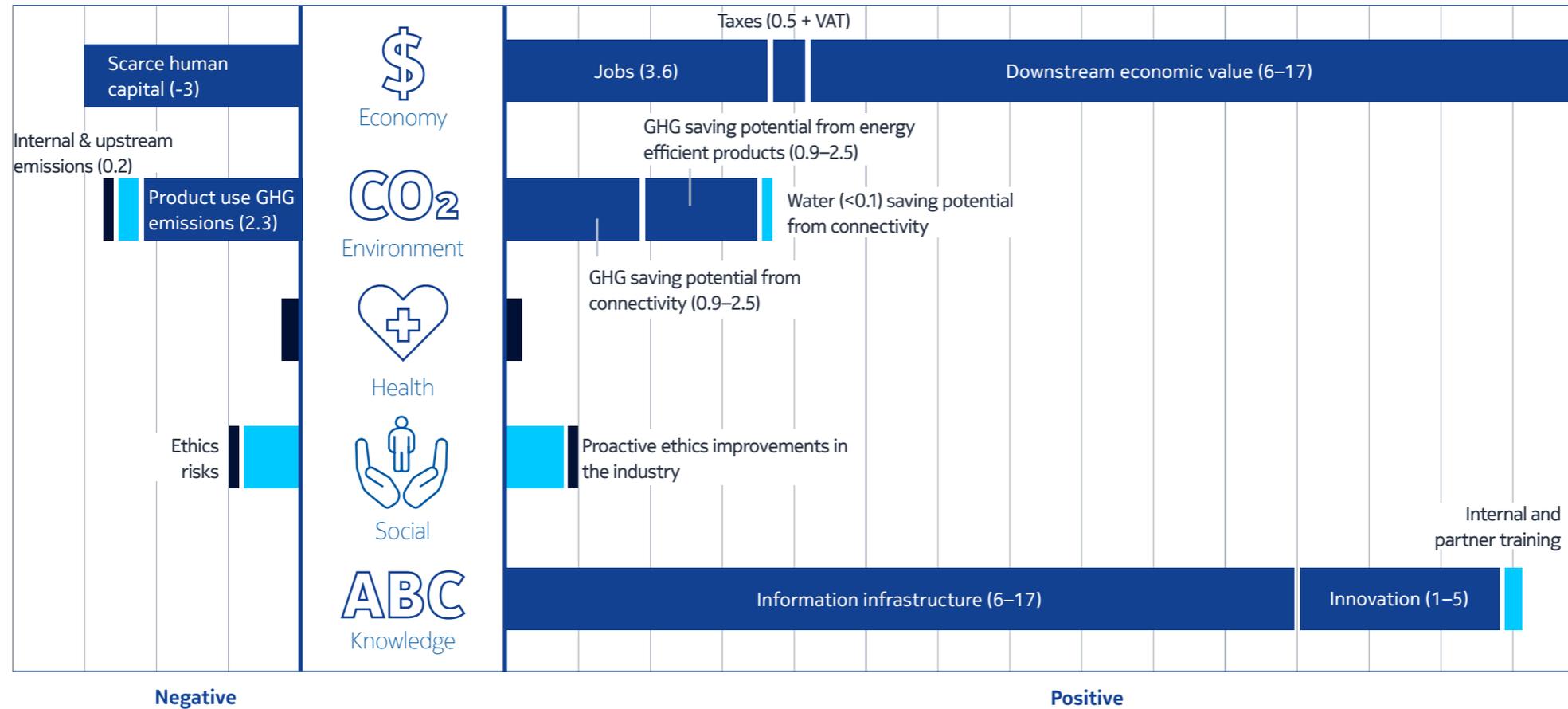
The analysis was completed by The Upright Project in early 2018 and reviewed by both the Nokia Responsibility Council and the Board. Based on the analysis our main impacts were shown to be related to our network technology. It brings major net positive impact through knowledge creation (information infrastructure and related innovations), economic benefits and job creation throughout the value chain. Moreover, the project showed that in environmental issues, the positive impact of

communications technology exceeds the negative impacts of our own operational activities, for example, by enabling other industries to become more energy efficient.

It is generally a challenge to value impact and then convert it into euro equivalents. The approach of the Upright Project was to grasp the scale of different impacts rather than try to measure each one accurately.

9 main impacts found for Nokia by Upright value creation model

€ billion equivalents 2016



Note that this is a rough estimation by The Upright Project based mostly on public data, assumptions and conversions to euro equivalents. Chart is based on data available from 2016. The idea is to grasp the scale of different impacts rather than measure each one accurately.

● Main impacts ● May be significant ● Small impacts

The UN Sustainable Development Goals and our business

In 2018, we increased our work and commitment towards contributing to the 17 ambitious Sustainable Development Goals (SDGs) adopted by the United Nations Assembly in 2015. We further evaluated the relationship between the SDGs and our business, sustainability focus areas, materiality analysis, targets and the support we can provide in reaching these goals. This relationship has also been presented to our Board of Directors and the leadership team.

In 2018 we reviewed our SDG approach using the Practical Guide on Integrating the SDGs into Corporate Reporting, developed by the UN Global Compact and GRI (published in August 2018). As described in the Guide we have:

- defined priority SDGs, related targets and report content
- set business objectives and targets accordingly
- implemented/continue implementing defined actions
- collected, analyzed and reported activities and performance related data

We have also reviewed other best practices such as GRI and UN Global Compact SDG Compass when reporting on the SDGs. In 2018 our SDG reporting was recognized as the best in Finland's independent annual sustainability report competition.

During the year we also renewed our commitment to the Finnish Commitment2050 (Sitoumus2050) program and reported the progress of our target to connect the next billion. Read more about the program at www.sitoumus2050.fi/en.

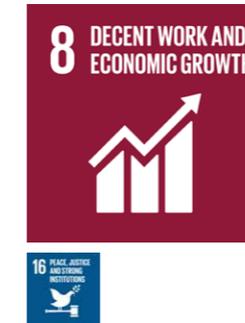
Improving people's lives with technology



Protecting the environment



Conducting our business with integrity



Respecting our people in everything we do



Making change happen together



The technology and the solutions we invent, create, and deliver can potentially contribute to every goal. The illustration highlights our strategic sustainability priority areas and how they correlate to the SDGs. We aim to further integrate the SDGs into our sustainability strategy, programs, and activities.

The four goals on the next page are the most material for our business and emphasize the areas

in which we can have the greatest impact. Beyond these, we believe the technology we produce can positively contribute to all 17 UN SDGs.

In addition to the analysis of the 17 SDG Goals, we have also identified the most material of the 169 SDG Targets for Nokia. These key targets have been incorporated into sections of this report where we address our performance against the Targets.



Improving people's lives with technology

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. This is the most material SDG for us in the area of improving people's lives with our technology. It is directly linked to our core business of delivering technology innovation and network infrastructure and services that improve lives. Our core business also allows us to contribute to all other goals. People, devices, sensors, vehicles, objects – all connected, opening up a world of opportunity for all. According to GSMA, the number of Internet of Things (IoT) connections (cellular and non-cellular) will increase more than threefold worldwide between 2017 and 2025, reaching 25 billion. The technology we provide can help make our planet safer, healthier, more sustainable, more efficient, and more productive. It can positively influence every aspect of the human experience.

In 2018 we delivered products and services that brought secure innovations and connectivity for public safety, mission-critical communications, and healthcare and wellbeing, as well as automation solutions to enterprises driving efficiencies in operations; we also connected the unconnected with our customers through our network solutions: improving access to education, economic opportunity and health care. Read more on [pages 42–53](#).

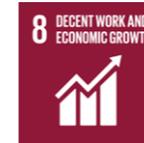


Protecting the environment

Goal 13: Take urgent action to combat climate change and its impacts. This is the most material goal from an environmental perspective for us. Our environmental activities clearly support this goal. We do our utmost to help combat climate change. The equipment and technologies we create have a positive impact on the world through the innate benefits of connectivity and digitalization, but our products in use in our customers' networks create the majority of our carbon footprint. It is imperative we continuously find ways to improve the energy efficiency and power consumption of our products, and work to drive up the use of renewable energy sources in our solutions.

Our operations are a small part of our total carbon footprint, but we drive many internal environmental programs, as well as initiatives as part of the product life cycle process. We also work on decreasing the energy, waste, water and other resources used in our operations, and offer refurbishment and recycling services for old telecom equipment.

In 2018, we continued to achieve some excellent environmental performance results in our own operations. We also launched new products that help our customers decrease energy use, emissions, and space requirements, while increasing material efficiency. Read more about our environmental activities on [pages 54–82](#).



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

Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all is the most material development goal for both Conducting our business with integrity and Respecting our people in everything we do. At the end of 2018, we had around 101 000 people globally, while through our supply chain of some 14 000 suppliers, we continued to create greater business and employment opportunities beyond our own employee numbers.

We conduct our business in accordance with internationally recognized ethical and responsible business practices. We require the same high standards of our suppliers. Health and safety remained a key priority for our own employees and our supply chain, and we are committed to a diverse workforce that reflects the gender and diversity balance of the real world. An employee mix of women and men from different age groups enriches our company and is one reason we invest in encouraging women and girls into STEM education. We foster programs that develop and nurture talent. Read more on [pages 120–146](#) under the Respecting our people section.

In 2018 we emphasized key areas in human rights, ranging from freedom of expression, through to increased dialog on combatting modern slavery, increasing our work with our supply chain, to working harder on conflict minerals issues. Read more on our achievements and challenges on [pages 26–29](#) under the Conducting business with integrity section.



Making change happen together

Goal 17: Revitalize the global partnership for sustainable development. In our collaboration with stakeholders, our activity is directly aligned with Goal 17. We understand we cannot achieve a more sustainable world on our own. We collaborate with a broad range of stakeholders on the key challenges and opportunities of building a responsible business. Our collaborations reflect both our business need and our desire to do the right thing. We work with our customers, suppliers, other industries, enterprises, organizations, authorities, and NGOs.

In 2018, we engaged with stakeholders to enhance the use of technology for the good of people and the planet. We worked with NGOs and other organizations to provide access to education, improve connectivity for rural communities, increase public safety, and to empower girls and women. Additionally, our collaborative activities promote inclusive and sustainable economic growth, employment and decent work for all, and they reduce inequality within and among countries. For more information on some of our programs and projects with different stakeholders in 2018, see the Making change happen together section on [pages 146–164](#).

To see more examples of how we can support all 17 SDGs visit [our website](#).

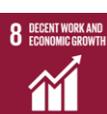
Our sustainability targets and performance

The table on the following page provides the status of our 39 long- and short-term targets, linked to our most material topics. It includes a short description of the related performance and achievements for each. We also specifically set and received acceptance of the targets including our science-based targets on carbon emissions both for our products in use and for our operations. We were the first major telecoms vendor to set these targets, showing our true commitment to take action in the fight against climate change.

By the end of 2018, of the 39 short-term and long-term targets:

- ✓ 10 targets for 2018 were achieved and 5 were not achieved.
- ✓ 15 of the 24 longer term targets were ongoing/on track, while 4 were ongoing/not on track and 2 were achieved and 3 not achieved.
- ✓ 4 of these targets were not achieved as the Digital Health products business was divested.
- ✓ We also set 10 new targets for 2019 and beyond.

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Improving people's lives with technology</p>                 	Connecting People and Things	<p>2022 Helping our customers to connect the next billion measured by the number of subscriptions in Nokia radio customers' networks and by the number of fixed network lines shipped to our customers.</p>	At the end of 2018 the radio networks we delivered to our customers served around 6.1 billion subscriptions worldwide, compared to around 5.5 billion at the end of 2016. ✓ Assured	 Ongoing - on track
	Sustainability-related products and services	<p>2018 2-3 Nokia Saving Lives solution kits provided and supported by Nokia and used by selected partner organizations in the humanitarian field, proving that Nokia technology saves lives.</p>	Since the target was set in 2016, we have established three kits out of which one was partially funded by GSMA. In 2018 one in the Philippines for the exclusive use of the Red Cross, an earlier one in Germany for Rapid response cases, and one as a spare kit in case of replacements, new developments and for remote support.	 Achieved
		<p>NEW target 2019: Establishment of a global rapid response team that can quickly respond in case of disasters.</p>		
		<p>NEW target 2019: Establishment of further international relationships with rescue forces and potential funds, so that Nokia Saving Lives can be deployed in a similar mode to other teams as done for the Philippine Red Cross.</p>		
		<p>2025 Improve the life of 2 000 000 persons through our corporate and key regional community investment programs (baseline 2016), focusing our action on gender balance, education and health and on how Nokia products and services improve people's lives.</p>	In 2018, our corporate and key regional community investment programs had around 304 200 direct beneficiaries. Since the baseline, already around 1 426 600 people have benefitted from our programs. ✓ Assured	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Improving people's lives with technology</p>                 	Sustainability-related products and services	<p>2018 Ensure participation of all Nokia employees in corporate health programs to reduce the incidence of cardiovascular disease.</p>	In the first half of 2018, as a continuation of our three employee wellness challenges in 2017, we organized a “Relay for Health” step challenge globally, with over 1200 employees participating. In 2018 Nokia divested its dedicated health device business and therefore discontinued the follow-up of this measurement, though we continue to roll out a successful employee wellbeing program.	 Not achieved
		<p>2020 Support the extension of remote patient monitoring of chronic diseases by rolling out patient care solutions using Nokia devices to over 100 000 patients.</p>	As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.	 Not achieved
		<p>2020 Reduce the rate of uncontrolled hypertension from an average 50% of hypertensive adults to less than 10% among the Nokia wireless blood pressure user community.</p>	As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.	 Not achieved
		<p>2020 Ensure integration of data from smart health devices into all major electronic health records accessible to doctors.</p>	As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.	 Not achieved

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment 	Product energy efficiency and GHG emissions	2030 GHG reduction of 75% compared to the 2014 baseline (scope 3, use of sold products) (This target is accepted by Science Based Target initiative).	Scope 3 emissions included in SBT are on target. ✓ Assured	 Ongoing - on track
	Energy use and GHG emissions in own operations	2018 Achieve at least 25% utilization of renewable electricity, compared to total purchased electricity.	27% of our total purchased electricity was from renewable sources. ✓ Assured	 Achieved
		NEW target 2019: At least 30% utilization of renewable electricity, compared to total purchased electricity.		
		2018 Achieve a facility electricity usage reduction of 3%, compared to 2017 level.	Electricity consumption across our facilities decreased by 3% as compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: Facility energy usage reduction of 3%, compared to 2018 level.		

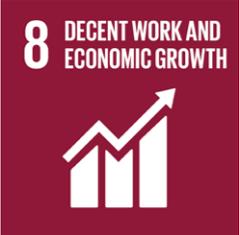
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment     	Energy use and GHG emissions in own operations	2018 GHG emission reduction of 1.8% from facilities, compared to 2017 level (Scopes 1+2).	GHG emissions from facilities decreased by 18% as compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: GHG emission reduction of 3% from facilities, compared to 2018 level (Scopes 1+2) .		
		2030 GHG emission reduction of 41%, compared to the 2014 baseline (Scopes 1+2). (This target is accepted by the Science Based Target initiative).	Scope 1&2 emissions included in SBT are on target. ✓ Assured	 Ongoing – on track
	Energy use and GHG emissions in supply chain	2020 180 suppliers setting emission reduction targets.	In 2018, 187 of our suppliers had emission reduction targets in place via CDP Supply Chain program. ✓ Assured	 Achieved
		2018 90 dedicated one-to-one reviews with suppliers, collaborative emission reduction projects.	Due to delays in CDP's assessment cycle in 2018 for all of its clients, the 2018 reviews were postponed to 2019.	 Not achieved
		NEW target 2019: 90 dedicated one-to-one reviews with suppliers, collaborative emission reduction projects.		

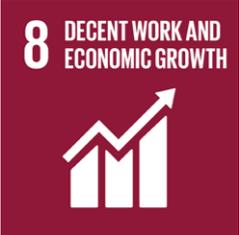
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment     	Waste and water in own operations	2018 Reduce the water use in our facilities by 2% compared to 2017.	Water use decreased by 22% compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: Reduce the water use in our facilities by 1% compared to 2018.		
		NEW target 2019: Recycle at least 60% of facility waste.		
		NEW target 2020: Recycle at least 75% of facility waste.		
	Waste and water in supply chain	2018 Deployment of non-carbon related projects with suppliers.	In 2018 we conducted a Water Assessment Program with 150 suppliers engaged and assessed via CDP Water Program. In addition we also conducted a pilot study for recycled materials content among our components suppliers.	 Achieved

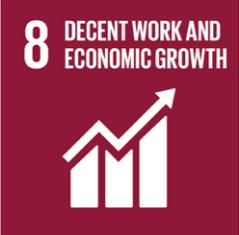
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Conducting business with integrity</p>  	Ethical Business Practices and Corporate Governance	<p>2020 Employee/Line Manager engagement on importance of ethics and compliance. 75% favorable answers targeted.</p>	Progress of this target is measured with a question in our anonymous employee survey (CCT) "Does your line manager periodically talk with you and your team members about the importance of ethics and compliance?" In 2018 77% (72% in 2017) of responding employees gave a favorable response.	 Achieved
		<p>2030 Employee/Line Manager engagement on importance of ethics and compliance. 85% favorable answers targeted.</p>		 Ongoing - on track
		<p>2018 Ethical Business Training (EBT) completion: 95%.</p>	The training was completed by 95 % of Nokia employees. ✓ Assured	 Achieved
		<p>2020 EBT completion: 98%.</p>		 Ongoing - not on track
		<p>2030 EBT completion: 100%.</p>		 Ongoing - not on track
		<p>NEW target 2020 (to replace the 2020 and 2030 targets): Ethical Business Training (EBT) completion: 95%.</p>		

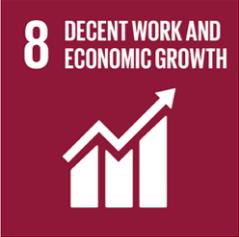
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Conducting business with integrity</p>  	Privacy and Data Security	<p>2020</p> <p>Our aim for 2020 is that Nokia be recognized as an industry leader in security and privacy. This will be assessed through external benchmarking.</p>	Protection of critical information ecosystems on target level, 95% of identified critical and high audit findings closed. Employee engagement with security culture program clearly above targets.	 <p>Ongoing - on track</p>
	Preventing product misuse	<p>2018</p> <p>Conduct a formal Human Rights Impact Assessment for the new Nokia product portfolio with an externally verified expert.</p>	Human Rights Impact Assessment for the Nokia product portfolio was conducted with an externally verified expert between July 2018 and March 2019.	 <p>Achieved</p>
		<p>2019</p> <p>Successful completion of the first GNI assessment.</p>	Preparation for the GNI assessment was started in late 2018 and will be completed by October 2019.	 <p>Ongoing - on track</p>
		<p>2020</p> <p>Nokia as externally recognized leader in vendor related issues in freedom of expression and right to privacy according to external benchmarking, e.g. Ranking Digital Rights.</p>	In 2018 we continued our strong Human Rights Due Diligence (HRDD) program to mitigate potential misuse of technology to limit freedom of expression and privacy. We published further anonymized cases in this report and continued to engage in stakeholder dialog through speaking and other events.	 <p>Ongoing - on track</p>

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Conducting business with integrity</p>  	Labor conditions / suppliers and partners	2020 Comprehensive supplier sustainability risk mitigation (90% of suppliers assessed with Satisfactory Sustainability Score and 100 on-site audits conducted per year).	74% suppliers achieved a satisfactory EcoVadis score (71% in 2017) and we conducted 75 on-site audits (72 in 2017). ✓ Assured	 Ongoing - not on track
		2020 Establish supplier worker empowerment program (enabling trainings on NokiaEDU and Worker Tollfree Helpline).	Nokia Ethics Helpline enables capturing supplier grievance. Channel is communicated to suppliers at Suppliers Corporate Responsibility Workshops.	 Ongoing - on track
	Materials traceability and conflict minerals	2018 Achieve full traceability to the smelters in our supply chain and their conflict-free status (Mobile Networks).	97% of our suppliers have achieved full visibility into the smelters in our supply chain. 84% of smelters identified as part of Nokia's supply chain were validated as conflict-free or are active in the validation process. ✓ Assured	 Not achieved
		2020 Achieve full traceability to the smelters in our supply chain and their conflict-free status (Nokia Group).	(The same percentages are valid both for Mobile Networks and Nokia Group).	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Conducting business with integrity</p>  	Health, Safety, and Wellbeing	<p>2018 100% of all suppliers delivering high-risk activity to be assessed using Nokia H&S Supplier Maturity Assessment Process.</p>	100% of suppliers delivering high risk activities were covered by H&S Maturity Assessments. ✓ Assured	 Achieved
		<p>2020 50% of suppliers delivering high risk activity to meet or exceed “H&S preferred supplier” status.</p>	We are first focusing on getting 100% of suppliers to “compliant”-level (score 3/5; 89% of suppliers in 2018) ✓ Assured and concentrating then gradually to “preferred”-level (score 4/5).	 Ongoing – on track
		<p>2030 100% of supplier delivering high risk activity to meet or exceed “H&S preferred supplier” status.</p>	We have an active program ongoing, please see comments on 2018 and 2020 targets.	 Ongoing – on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Respecting our people in everything we do</p> 	Employee satisfaction, Engagement and Development	<p>2020 Sustained focus on CEO-sponsored Nokia Culture Principles.</p>	<p>In 2018 we continued to measure the favorability of employee perceptions with an anonymous employee survey (CCT). The two CCT target question scores (company direction = 80 percent, culture direction = 79 percent) remain in the green, albeit the average for % favorability for these two CCT target questions was 2% down from 2017. ✓ Assured</p>	 Ongoing - on track
		<p>2020 Nokia to be the employer of choice (in our size) for all of our major hubs in locations around the world and become the best regarded employer in our industry globally.</p>	<p>Nokia Location Development (LD) is the global program aiming 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 Nokia organization team up as one team to make it happen, The Location Head is the project leader. The program focuses on: Local Attractiveness, Local Best Employee Experience and Engagement, Ensuring One Nokia culture across Business Group and across functions locally.</p>	 Ongoing - on track
		<p>2020 Foster the spirit of employee volunteerism across the company and increase their engagement.</p>	<p>Guidance to all employees on volunteering is provided through our Volunteering guidelines. In 2018, our employees contributed around 18 500 hours of volunteering in paid working time, significantly up from 7 500 in 2017. In 2019 we look forward to encouraging and supporting more local programs around the world where our employees volunteer.</p>	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Respecting our people in everything we do</p> 	Employee satisfaction, Engagement and Development	<p>2018 Introduction of the renewed Employee Engagement model with increased frequency and depth.</p>	Initiative was cancelled. No new engagement model is going to be introduced.	 Not achieved
	Diversity, inclusion and anti-discrimination	<p>2020 Increasing the percentage of women in leadership by 25 percent (baseline 2016).</p>	<p>In 2018, we had 15.3 percent women in leadership positions, down from the 2016 baseline of 15.5 percent. We continue working, within our five-year gender balance action plan, towards the 2020 target.</p> <p>✓ Assured</p>	 Ongoing - not on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Making change happen together</p>  	Corporate community investment	<p>2018 100% of corporate community investment activities aligned with our Group-wide strategy, business drivers and SDGs.</p>	In 2018, 99.8% of the global and key regional contributions supported our three strategic CCI themes and when the local programs are included, 95% of our total contributions were aligned to the three thematic priorities. The CCI themes are aligned with our business drivers and SDGs.	 Not achieved
		<p>2018 100% of corporate community investment programs to be measured against a monitoring and evaluating system.</p>	All identified global and key regional programs were measured against a monitoring and evaluation system in line with the LBG methodology.	 Achieved

Managing sustainability

Sustainability and corporate responsibility 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 aim is to ensure that social and environmental matters are considered in everything we do. 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 2018, the Board of Directors reviewed our corporate sustainability status including targets, performance, achievements, and challenges as well as

the results of our value creation analysis. The Board of Directors also approved the Corporate Community Investment and University donations budgets for the year 2019, and had cybersecurity/information security, ethics & compliance and privacy updates.

The Board of Directors Review of Nokia 2018 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 & compliance, and internal audit and controls reviews. The Board of Directors' Personnel Committee

Our sustainability governance



Ethics and compliance office

Provides training and supports employees in making decisions that are ethical, legal, and consistent with our values. Investigates any concerns about potential breaches of our Code of Conduct.

* See more about the main committees with sustainability related roles in the text above and in the following page.

received culture, demography, and diversity updates, and reviewed the results of the Nokia Culture Cohesion Tracker survey in 2018.

The Nokia Group Leadership Team is chaired by the President and CEO. The Leadership Team reviews and approves sustainability related policies, strategy, targets, performance and the annual sustainability report and reviews also 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.

In 2018, our Chief Marketing Officer in Marketing and Corporate Affairs was responsible for corporate responsibility at the executive management level. During the year, corporate responsibility related topics were reviewed during CMO management team monthly meetings.

More information about our corporate governance practices is available in our annual reports and on our [website](#).

Risk and opportunity management

Sustainability aspects are also present in many of our key risks and opportunities which are analyzed, managed and monitored as part of business performance management. Key risks and opportunities are primarily identified against



business targets either in business operations or as an integral part of strategy and financial planning and those cover strategic, operational, financial and hazard risks. The most important risk factors, together with the principal factors and trends affecting our operations, are discussed in our [2018 annual report, our Form 20-F](#).

These include sustainability-related risks 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

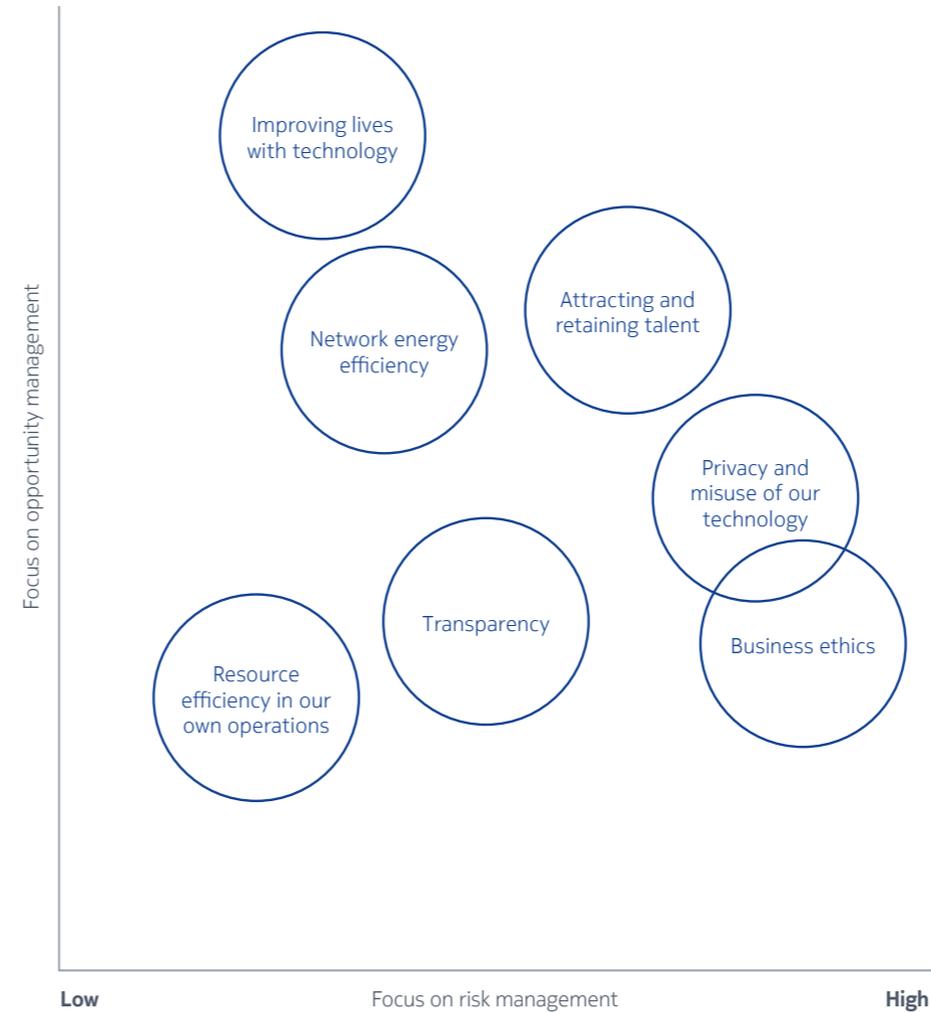
- violation of ethical standards, including our Code of Conduct
- labor unrest and strikes
- inability to retain, motivate, develop and recruit appropriately skilled employees
- purchasing boycotts and public harm to our brand
- risks related to issues with tariffs and taxation, including tax disputes
- 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.

The principles documented in the Nokia Enterprise Risk Management Policy, which is approved by the Audit Committee of the Board of Directors, require risk management and its elements to be integrated into key processes. One of the core principles is that the business or function head is also the risk owner, although all employees are responsible for identifying, analyzing and managing risks as appropriate, given their roles and duties. Our overall risk management concept is based on managing the key risks that would prevent us from meeting our objectives, rather than solely focusing on eliminating risks.

Key risks and opportunities are reviewed by the Group Leadership Team and the Board of Directors in order to create visibility on business risks as well as to enable the prioritization of risk management activities. The Board of Directors' role in overseeing risk includes risk analysis and assessment related to financial, strategy and business reviews, updates, and decision-making proposals. More information about the process please see page 93 of [Nokia Annual Report 2018](#).

We systematically analyze sustainability-related opportunities. Our innovations hold the potential to change the way we live, from technologies that improve people's lives to those that help reduce our environmental impact. In 2018, we further reviewed and aligned the risks and opportunities in our Enterprise Risk Management (ERM) system with our most material sustainability topics. We also reviewed the Task Force on Climate-related Financial Disclosure (TCFD) guidance related to climate-related risk disclosure and applied the recommendations in our publicly available CDP answers.

Illustrative examples of responsibility related opportunities and risks



Improving lives with technology, and network energy efficiency

There are revenue and, to some extent, also brand opportunities in creating technologies that improve people's lives and in developing more energy efficient networks.

Attracting and retaining talent

The ability to attract, motivate and keep talent has an impact on how well we are able to manage our revenue and cost-related opportunities and risks.

Privacy and business ethics

Privacy and ethics are brand, reputation and regulatory driven risk areas but there are as well opportunities in these areas. Ethics also covers how we work with suppliers and partners and risks related to the misuse of our technology.

Transparency

Increased transparency is required by governments, investors and various other stakeholders and it also has an impact on brand related risks and opportunities.

Resource efficiency in our own operations

Eco-efficiency in our own operations and logistics includes cost savings opportunities and these also have an impact on Nokia's brand perception.

Our recognitions and awards



Based on our 2018 response, we were ranked at leadership level by CDP for our work on and disclosure of climate change data. We were also included in the leaderboard of the supplier engagement rating related to climate change. This was the first year that the CDP questionnaire was aligned with the recommendations put forth by the Task Force on Climate-related Financial Disclosure (TCFD).



In 2018, we were in the top 1 percent of suppliers assessed by EcoVadis, achieving excellent scores in environment, sustainable procurement, and labor practices. EcoVadis is one of the platforms through which we provide annual sustainability information for evaluation, which is then shared with customers as requested.



Sustainalytics' February 2018 ESG Rating of Nokia placed us among the top-rated technology hardware companies assessed by Sustainalytics.



We received the Telecommunications Industry Association, TIA (previously QuEST Forum) 2018 Global Sustainability Award in the Network Equipment Category, for the second year in a row.



We were again included in the Euronext Vigeo Eiris indices, in the Europe 120, the Eurozone 120 and the Global 120 (both in June and December reviews).



In September 2018 we received a rating of AA on a scale of AAA-CCC in the MSCI ESG Ratings assessment¹.

¹ The use by Nokia of any MSCI ESG Research LLC data, and the use of MSCI logos, trademarks, service marks or index names herein, do not constitute a sponsorship, endorsement or promotion of Nokia by MSCI or any of its affiliates. MSCI services and data are the property of MSCI or its information providers. MSCI and MSCI ESG Research names and logos are trademarks or service marks of MSCI or its affiliates.



We were honored by the Ethisphere Institute both in 2018 and in 2019 as one of the World's Most Ethical Companies, owing to our strong compliance program, culture, and bold vision for the future².

² World's Most Ethical Companies" and "Ethisphere" names and marks are registered trademarks of Ethisphere LLC.



We were listed in the DJSI Europe index. Our success in one of the leading sustainability ratings has been a great recognition for our work. However, the workload related to answering is very high and for this reason we decided not to answer the DJSI questionnaire in 2018 and 2019.

World's 100 Most Sustainable Corporations

In 2018 and 2019 we are again among the World's 100 Most Sustainable Corporations as per Corporate Knights rating. This is the fifth year in a row that we have been included. The Global 100 ranking is widely associated with sustainability leadership and transparency.

For more information on all our sustainability awards and recognitions visit www.nokia.com/about-us/sustainability/our-approach.

Our economic impact

Connectivity and access to the Internet has created enormous economic and social advantages for billions of people globally, enabling people to live better lives.

We are a global company and 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. Connectivity and access to the internet has created enormous economic and social advantages for billions of people globally, enabling people to live better lives. As we move into the Fourth Industrial Revolution, new technologies such as 5G, IoT, AI and Virtual/Augmented Reality (VR/AR) will touch every aspect of our lives and planet, and drive significant change for the better. Read more in Improving Lives on [pages 42–53](#).

Economic impact (Nokia Group)

			2015	2016	2017	2018
	Stakeholder	Impact (EUR million)	Nokia Group	Nokia Group	Nokia Group	Nokia Group
Direct economic value generated	Customers	Net sales ¹	13 574	23 614	23 147	22 563
Economic value distributed	Suppliers	Total purchases of goods and services	6 810	13 544	12 752	14 118
	Shareholders	Dividends paid	512	1 501	963	1 081
	Employees	Wages and benefits ²	3 075	7 814	7 845	7 834
	Creditors	Financial expenses paid (+), Financial expenses refunded (-)	195	273	531	233
	Public sector	Income taxes paid (+)/ Income taxes refunded (-)	290	503	555	364
	Communities	Community investments ³	-	5	7	7

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 Net sales for Continuing operations in 2015 was 12 499 EUR million.

² Includes termination benefits and excludes social security expenses. 2016 and 2017 values are updated to reflect values as available in Nokia Annual Report on Form 20-F 2018.

³ Reporting with current methodology started in 2016. 2016 values include corporate and key regional contributions. 2017 and 2018 also include some local contributions.

Our tax payments

In recent years, one of the key subjects in global corporate responsibility discussions has been the transparency and sustainability of a company's tax planning, and the allocation of tax payments between the countries in which they operate. In 2018, Nokia paid a total of EUR 364 million in direct income taxes (EUR 555 million in 2017), of which EUR 107 million was paid in Asia-Pacific and EUR 340 million in Europe, the Middle East, and Africa. The Americas region was in net tax receivable position of EUR 84 million. Following the acquisition of Alcatel Lucent, our 2018 figures include both former Nokia and former Alcatel Lucent entities.

In addition to 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. Nokia is a major taxpayer and collector of indirect taxes and payroll-related taxes and 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 the new 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. In 2018 we achieved our tax related target to remain 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. The technology solutions and services we create and deliver drive positive change on a much broader scale.

Connectivity is beneficial in many ways and to many people and organizations. It has been shown to increase productivity and economic growth.

Connectivity helps to bring market and other relevant information to underserved communities, as well as financial and commercial services to remote areas. It enables new ways of doing business such as e-commerce, 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.

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”

We will see even greater economic and social benefits as countries gain improved productivity and efficiency enabled by greater use of mobile and IoT services. Technology will continue to also make major contributions to the funding of the public sector. The advent of 5G and the potential of AR, VR, AI and IoT to connect people and things with each other in new and faster ways could positively contribute to all 17 of the UN Sustainable Development Goals.

In 2018 we had sales in approximately 130 countries, delivering technology that improved network capacity and coverage in many emerging markets and announced new cooperation in countries such as Sudan, Egypt, Ivory Coast, Cameroon, Senegal, Mali, Guinea-Bissau, Niger, Lebanon, the Philippines, Nepal, and India. Examples of customer projects can be found at www.nokia.com/sustainability.

According to the GSMA’s ‘The Mobile Economy 2019’ report, mobile continues to make a significant contribution to socioeconomic development around the world. In 2018 mobile technologies and services generated \$3.9 trillion of economic value (4.6 percent of GDP) globally, a contribution that will reach \$4.8 trillion (4.8 percent of GDP) by 2023 as countries increasingly benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services. Further ahead, 5G technologies are expected to contribute \$2.2 trillion to the global economy over the next 15 years.

“The connectivity gap also continues to close: over the next seven years, 1.4 billion people will start using the mobile internet for the first time, bringing the total number of mobile internet subscribers globally to 5 billion by 2025 (over 60% of the population). This growth in connectivity is helping the mobile industry increase its impact across all the UN’s Sustainable Development Goals and is spurring adoption of mobile-based tools and solutions (for example, in agriculture, education and healthcare) that aim to improve livelihoods in low- to middle-income countries.”

Source: GSMA ‘The Mobile Economy 2019’

Innovation and sustainability

Technology innovation plays a key role in achieving a more sustainable planet and better, healthier lives for all people.

Nokia Bell Labs, the lead research arm of Nokia, is developing disruptive research for the next phase of human existence. It is renowned for its profound influence on the evolution of telecommunications and information technologies and consequently how people connect, collaborate, compute and communicate. For more information see www.bell-labs.com.

The Nokia CTO organization and Nokia Bell Labs Consulting continuously engage with customers, and through this and ongoing market and technology analysis, develop a long-term view of the most difficult problems to solve that will have the greatest impact on our lives.

In 2018, we held our Bell Labs prize competition for the fifth time, attracting the greatest creative minds to solve some of the greatest challenges for humankind. The year's winners were chosen from among five submission entries comprised of six individuals, who were in turn drawn from a total of over 250 proposals from around the world. We created the Bell Labs Prize to help develop game-changing ideas in science, technology, engineering or mathematics with the potential to solve broader

societal challenges that humans will face within the next ten years. Innovation is fostered throughout our organization. For more information visit www.nokia.com/innovation.

The Nokia Garage is an employee-centric innovation playground. The Garage is a place to make an innovation a reality. An idea has little value until it is realized. Using tools such as 3D printers, Arduino kits and software modeling programs, smartphone application simulators, and other tools, the Garage brings ideas closer to realization with fewer obstacles. The Garage approach fosters the startup spirit and enables intrapreneurship programs at Nokia. In 2018 we had Garages in Finland, France and Belgium, with more planned in other countries.

Open innovation

Open Ecosystem Network (OpEN) is a partner agnostic and technology independent, multi-purpose digital collaboration platform. This ecosystem-centric solution based on the principles of open innovation and data democracy was originally designed to enable ecosystem play across companies and industries. Nokia and partners are free to expose information on OpEN, ranging from public data such as innovation and sourcing challenges to confidential data such as product roadmaps and source codes, in a secure manner.

The information, which is exposed in public and private (invitation only) digital rooms, attracts the ecosystem to the platform, and enables them to discover new value propositions. Collaborating

companies are able to increase product/feature throughput and achieve faster time to market through co-creation on the platform.

The platform is designed to support multiple plug and play applications enabling users to co-create new value on the bottom and the top line. Users are able to utilize tools of their choice (from Slack, GitHub to Office 365 and enterprise tools) to collaborate in front of corporate firewalls. Teams can call APIs, access sandboxes, and both virtual and physical test labs to prove their products in the network environment and have a direct business incubation link to the decision makers. Products born through co-creation can easily be monetized to the ecosystem via the marketplace.

We are the first co-founder of OpEN. Many other brands recognize the value proposition and are joining the opening up movement, exposing their data and bringing their ecosystems with them. This creates gravitas and a multiplying effect, providing the scale required to disrupt business as we know it today.

The OpEN platform has, for example, worked on co-creation of solutions to resolve sustainability-related challenges. OpEN kicked off collaboration with the new United Nations Technology Innovation Labs (UNTIL) with two challenges shared via OpEN.

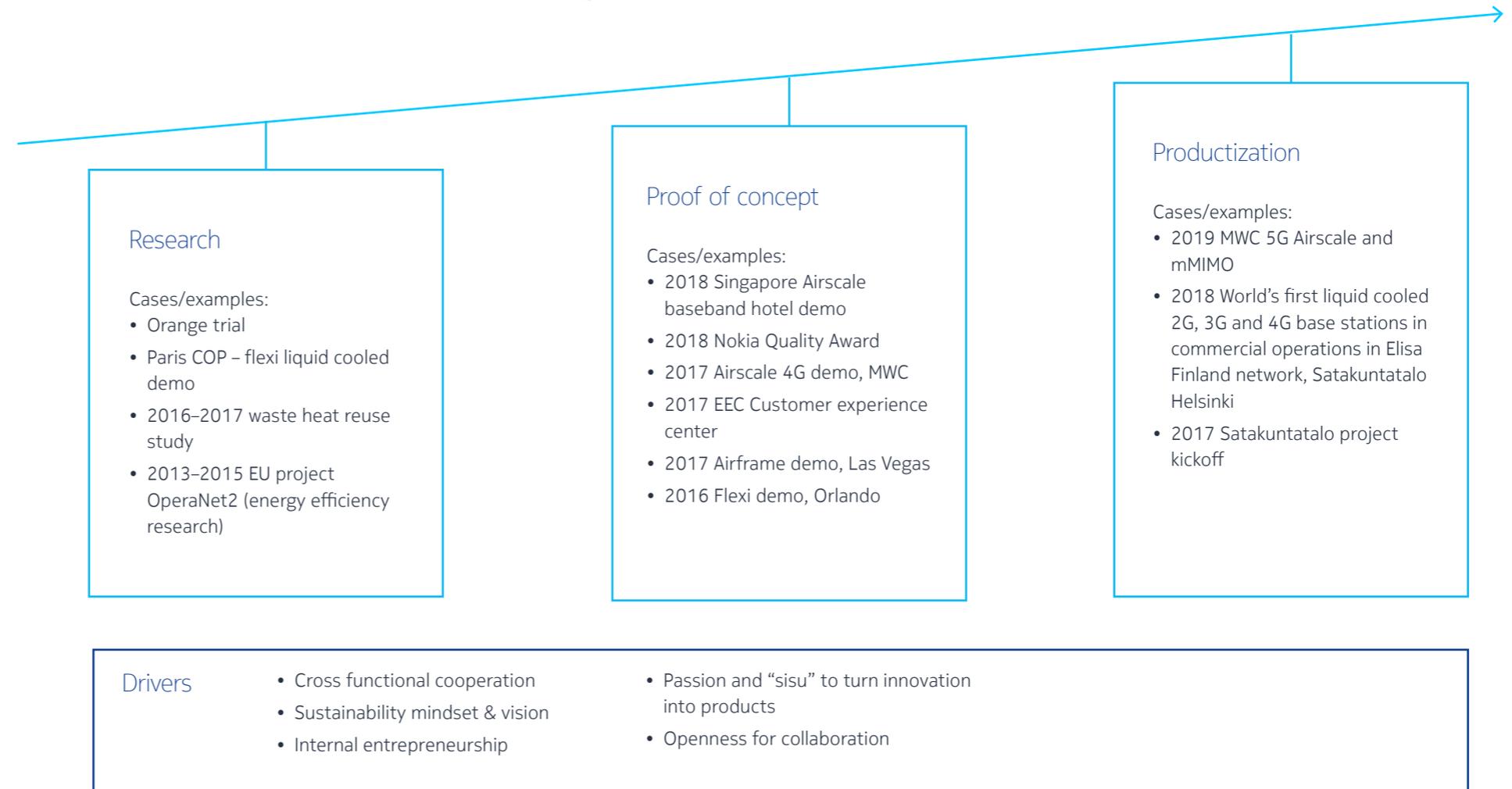
UNTIL are designed to move humanity forward faster by using innovative technology to solve some of the world's most pressing challenges. They utilize satellite data to deliver brilliant innovative solutions

for world peace, health, ecology, education and sustainability in the spirit of the ESA and NASA mottos 'for the benefit of all.'

Hack the Global Consumption aims to develop solutions and platforms which reduce the need for energy and/or reduce the levels of material consumption, and new economic and circular business model platforms.

OpEN looks at solutions which utilize AI, machine learning for prediction, personalization and easy transaction, trend and value analysis, as well as blockchain for adding trust, transparency and efficiency in value networks. For more information on OpEN visit www.open-ecosystem.org.

Innovation journey of liquid cooling



Read more on all of these topics at networks.nokia.com/5g

Improving people's lives with technology

We believe 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. The continued development and rollout of 5G and IoT has the potential to socially and economically empower any individual, community, industry or country.

Highlights in 2018

6.1

billion subscriptions
on our customers' networks

36

commercial 5G contracts
as of end April 2019

More than

1 000

mission critical
network references

More than

23 million

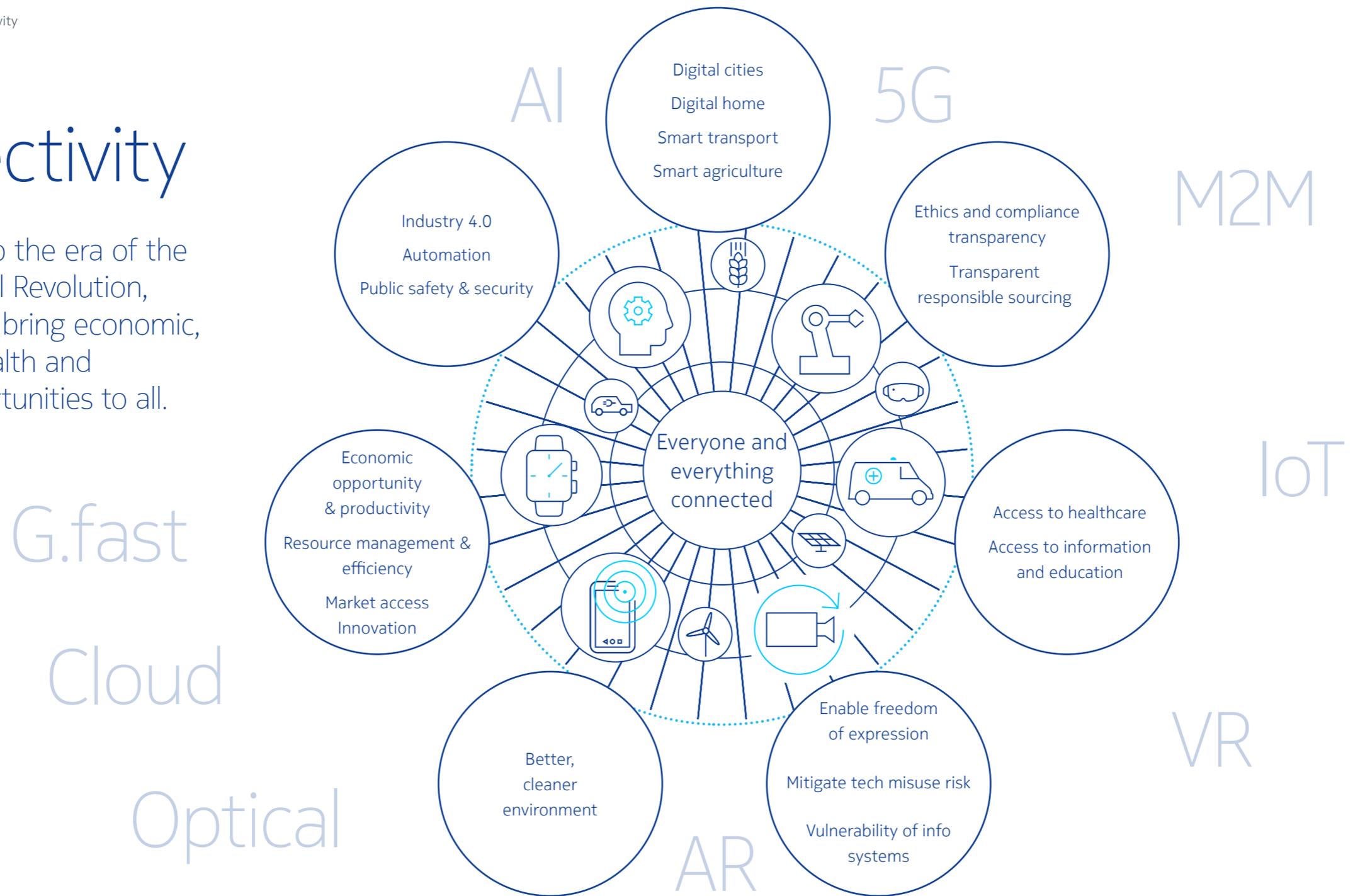
indirect beneficiaries with
UNICEF mHealth program in Indonesia

1.4 million

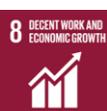
people have directly benefited
from our corporate community investments since 2016

Connectivity

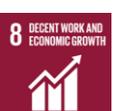
As we move into the era of the Fourth Industrial Revolution, connectivity will bring economic, educational, health and efficiency opportunities to all.



Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Improving people's lives with technology</p>                 	Connecting People and Things	<p>2022 Helping our customers to connect the next billion measured by the number of subscriptions in Nokia radio customers' networks and by the number of fixed network lines shipped to our customers.</p>	At the end of 2018 the radio networks we delivered to our customers served around 6.1 billion subscriptions worldwide, compared to around 5.5 billion at the end of 2016. ✓ Assured	 <p>Ongoing - on track</p>
	Sustainability-related products and services	<p>2018 2-3 Nokia Saving Lives solution kits provided and supported by Nokia and used by selected partner organizations in the humanitarian field, proving that Nokia technology saves lives.</p>	Since the target was set in 2016, we have established three kits out of which one was partially funded by GSMA. In 2018 one in the Philippines for the exclusive use of the Red Cross, an earlier one in Germany for Rapid response cases, and one as a spare kit in case of replacements, new developments and for remote support.	 <p>Achieved</p>
		<p>NEW target 2019: Establishment of a global rapid response team that can quickly respond in case of disasters.</p>		
		<p>NEW target 2019: Establishment of further international relationships with rescue forces and potential funds, so that Nokia Saving Lives can be deployed in a similar mode to other teams as done for the Philippine Red Cross.</p>		
		<p>2025 Improve the life of 2 000 000 persons through our corporate and key regional community investment programs (baseline 2016), focusing our action on gender balance, education and health and on how Nokia products and services improve people's lives.</p>	In 2018, our corporate and key regional community investment programs had around 304 200 direct beneficiaries. Since the baseline, already around 1 426 600 people have benefitted from our programs. ✓ Assured	 <p>Ongoing - on track</p>

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Improving people's lives with technology</p>                 	<p>Sustainability-related products and services</p>	<p>2018 Ensure participation of all Nokia employees in corporate health programs to reduce the incidence of cardiovascular disease.</p>	<p>In the first half of 2018, as a continuation of our three employee wellness challenges in 2017, we organized a “Relay for Health” step challenge globally, with over 1200 employees participating. In 2018 Nokia divested its dedicated health device business and therefore discontinued the follow-up of this measurement, though we continue to roll out a successful employee wellbeing program.</p>	 Not achieved
		<p>2020 Support the extension of remote patient monitoring of chronic diseases by rolling out patient care solutions using Nokia devices to over 100 000 patients.</p>	<p>As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.</p>	 Not achieved
		<p>2020 Reduce the rate of uncontrolled hypertension from an average 50% of hypertensive adults to less than 10% among the Nokia wireless blood pressure user community.</p>	<p>As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.</p>	 Not achieved
		<p>2020 Ensure integration of data from smart health devices into all major electronic health records accessible to doctors.</p>	<p>As Nokia sold its dedicated health devices business in 2018, this target was discontinued. We continue to supply network solutions to the healthcare industry.</p>	 Not achieved

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.

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

More people and more things will be connected to each other and the world around them. It is happening now. Nokia Bell Labs have looked at the key technological elements that came together and caused previous unprecedented positive change in social, economic and industrial arenas. These areas of technology change were related to energy, transportation, health and sanitation, and

communications. And today we see the digitalization of these key technology areas:



Digital energy: combining smart power grids and smart meters into platforms that dynamically match energy generation and demand from both new and traditional sources



Digital transport: moving people and goods across oceans, skies, and land autonomously



Digital health: remotely enabling connected health care from anywhere



Digital communication: connecting billions of people and things, allowing them to interact in new ways



Digital production: driving a major shift from mass production to distributed, localized production, enabling the creation of goods in near real time

Furthermore, the digitalization of production and manufacturing will result in a shift from centralized mass production to distributed and localized production facilities.

Technology and sustainable development

With the advent of such technologies as 5G, IoT, and AI, individuals and communities will be more economically and socially empowered. Through technology we are already seeing the initial efficiency promised by the fourth industrial revolution: smart cities that are more efficient, safer, cleaner and more secure; increased access to digital health; and better management of natural resources through digitalized utilities, building towards a purpose-driven economic model. As we move into a new era of technology, we also recognize and aim to mitigate potential risks, many already hotly debated in society as a whole. The social 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, the misuse of technology, and the impact of smart devices on society.

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 2018 we had sales in approximately 130 countries, delivering technology that improved network capacity and coverage in many emerging markets and announced new cooperation in countries such as Sudan, Egypt, Ivory Coast, Cameroon, Senegal, Mali, Guinea-Bissau, Niger, Lebanon, the Philippines, Nepal and India. We participate in the Telecom Infra Project (TIP) telecominfraproject.com and also created the Nokia Community Hosted Network solution to help connected rural and remote locations. Examples of customer projects can be found at www.nokia.com/sustainability.

5G – the great enabler

5G is one of the most important technologies to be introduced in decades, as it will drive fundamental and expansive changes to the communications network infrastructure. Delivering extreme broadband and highly reliable low latency connectivity at massive scale, it will provide new experiences for consumers and address the different needs of businesses, transforming every aspect of our lives.

5G is critical for use cases such as virtual and augmented reality, e-education and e-health, industrial applications, machine-to-machine (M2M) communications as well as mission-critical communications. Smart cities will be fully enabled by 5G. 5G will drive gains in healthcare and education, enable safer roads with connected cars, and even eliminate hazardous situations for workers as risky tasks could be performed by robots. We are continuing our work with the European Commission to advance the 2020 5G trial plan activity across

member states, and currently have approaching 100 engagements globally for 5G.

In 2018 we announced, among others, agreements and collaboration on 5G with China Mobile, and rain in South Africa, inked a 3.5 billion dollar multi-year 5G deal with T-Mobile in the US, collaborated with NTT DoCoMo in Japan on 5G applications, and launched Nokia Reefshark chipsets that will enable massive performance gains in 5G networks. Learn more about how 5G will deliver the extraordinary at networks.nokia.com/5g.

Our fiber access solutions support bandwidth-hungry consumer and enterprise services to homes and businesses. In January 2019, for example, we announced the collaboration with Open Fiber to bridge the digital divide in Italy by building high-speed fiber optic communication networks that will bring ultra-broadband services to the small towns and rural areas of Italy.

In 2018 we also worked, for example, with Telecom Egypt to offer higher-speed services to both broadband and mobile customers marking the first 200G long distance, single carrier transmission service in Africa.

IoT

Everything and everyone will be connected and the Internet of Things will continue to play a key role. IoT will be an integral enabler of smart cities, the smart home, utilities, agriculture, automotive, public safety and healthcare. As 5G takes off we will see a proliferation of IoT devices and this will

require increased security capabilities to defend against malware and bots with solutions such as our NetGuard Security Suite. Read more in our latest [Threat Intelligence Report](#).

For example, we are working with the world leader in package delivery services, with more than 500 hubs in the USA and another 400 around the world. We are creating a next-generation, fully automated wireless network that encompasses voice, data, mobile, and IoT for tracking packages and vehicles in one seamless system.

Artificial Intelligence

AI and Machine Learning are already playing a key role in making communications networks more efficient and will optimize future networks and enable a broad range of new services over 5G and cloud. In June 2018 we announced a memorandum of understanding with China Mobile to investigate the potential of AI and machine learning to enable these services. The companies will jointly establish a laboratory in Hangzhou, China, to develop the demo system to verify technology use cases using Nokia 5G Future X architecture. We also contribute to the responsible development of AI technology with participation in the EU High-Level Expert Group on AI which issued their ethics guidelines for trustworthy artificial intelligence. Read more at [Ethics guidelines for trustworthy AI](#).

Smart City Infrastructure

Shared + Secure + Scalable



Digital lives

As the world becomes more densely populated, as more and more people live in large cities, there are serious questions being raised about the livability of those cities.

Congestion, pollution, infrastructure, access to services, and many more issues are creating challenges on an unprecedented scale.

Smart cities

Cities can be smarter, safer and more sustainable by using smart technologies to connect, engage and empower citizens, to develop innovative city services, manage public safety more proactively, streamline

operations, reduce traffic congestion and ease stress on city infrastructure, and attract visitors, businesses and talented workers.

IoT for Smart Cities is a fully integrated, modular and scalable framework to efficiently deliver and manage smart city services like video surveillance, lighting, parking, waste management, and environmental sensing.

For example, Chattanooga, USA, is one of the only places on Earth with internet speeds as fast as one gigabit per second, and its unparalleled smart grid system has led to a string of entrepreneurs and start-ups taking advantage of Chattanooga's

advanced technology infrastructure. Learn more about [The Surprising City of the Future](#).

The city of Bristol, UK, has numerous awards. Driving this success is the unique digital infrastructure in place, offering state-of-the-art fiber broadband networking capability to its citizens. A new home of entrepreneurial tech industries is growing. In fact, their commitment to ensuring connectivity in the city is so great that they're investing millions of pounds to explore the possibilities of technology. Learn more at www.bristolisopen.com.

In 2018, we worked with Singapore-based telecom operator StarHub to look into new mobility analytics

use cases to help operators create value from the data in their networks to address the needs of digital cities. We also introduced services to solve challenges of urbanization. IoT for Smart Cities and Sensing as a Service show the benefits of IoT in building economically and environmentally sustainable cities.

In October 2018, we successfully demonstrated our Integrated Operations Center (IOC), a smart city management solution, to Viettel in Hanoi, Vietnam. Once deployed, the IOC will allow Viettel's customers to efficiently manage several smart and safe city use cases such as traffic monitoring, pollution detection and water quality monitoring.

In early 2019, MIRIS, a leading Norwegian real estate and technology firm, selected our AirFrame Open Edge data center technology to support delivery of smart city services in business parks and residential areas. MIRIS plans to build data centers in about 20 urban locations in Norway during 2019, followed by a wider roll out across the Nordic region. Read more in our [press release](#).

Learn more about our work with Smart Cities networks.nokia.com/industries/smart-city.

Public safety

We help public safety agencies use broadband networks and digital technologies to improve the effectiveness of first responders, address threats predictively and make faster, more informed decisions.

For example, we offer a comprehensive public safety services portfolio to simplify the evolution



towards broadband while assuring mission critical reliability and performance. We have more than 1 000 references for mission critical networks and 346 references for commercial LTE networks. For example, in Qatar, we are implementing a nationwide LTE network for public safety providing agencies like fire brigades and medical emergency services clear benefits of high-speed data in their daily work.

Nokia Scene Analytics solution processes thousands of simultaneous streams from CCTV cameras, audio

and IoT sensor data, allowing for real-time incident alerts. Security teams are immediately notified when the solution flags emergencies and potential criminal activity such as vandalism, theft, or drug and human trafficking.

For more information on our approach to public safety visit networks.nokia.com/industries/public-safety.

Our Future X architecture harnesses technologies such as Industrial Internet of Things, edge computing, cloud, artificial intelligence, machine learning, augmented and virtual reality, and high-performance networking – including 5G – to drive dramatic productivity improvements across a wide range of industrial sectors.

For urban safety, we introduced S-MVNO for Public Safety service, which enhances commercial LTE networks to meet mission critical requirements of public safety agencies.

Digital industry – Allwhere

Our Future X architecture is the foundation upon which industry will build its next great age. The Industrial Internet of Things will benefit all key industries – energy, utilities, manufacturing, automotive, health, and transportation among others.

For example, in 2018 we worked with Finnish operator Telia and Intel to conduct an industrial trial leveraging the ultra-low latency, high-bandwidth capabilities of 5G to support time-critical applications and enhance production and efficiency in a manufacturing environment. We announced our cooperation with Tencent in China, one of the world's biggest online service providers to develop new 5G applications while exploring 5G's potential in transportation, finance, energy, intelligent manufacturing and entertainment.

5G allows operators and businesses to connect assets and take advantage of new flexibilities and

capabilities such as machine learning, artificial intelligence and widespread automation to efficiently transform operations.

Utilities

Power utilities can build an efficient smart grid that enables new opportunities for sustainable energy offerings. Our solutions help manage grids more efficiently to deliver better power quality, improved resource efficiency and reduce carbon emissions. Our solutions provide power utilities with a network that can reconfigure itself, using real-time monitoring to detect and address issues as they arise.

In 2018, we were selected by French power utility EDF's R&D unit to test the performance of LPWA wireless networking technologies - key emerging standards for Internet of Things (IoT) device connectivity - to support critical operations for industries. The two companies will engage in a comprehensive testing regime, among the first of its kind in the industry, exploring the capabilities of LPWA technologies to support real-world industrial applications.

We also began work with Brazilian power distributor Elektro to deploy a private LTE network to increase the reliability and efficiency of the electrical grid in the City of Atibaia and surrounding areas in the state of Sao Paulo. This highly reliable wireless 4G network, the first of its kind in Brazil, will serve more than 75 000 homes and businesses.

Water utility companies also benefit from our technology. For example, in 2018 in Noida, India,

we made a commitment and investment in a smart water management end-to-end solution portfolio, where one of the main business results is reduction of water leakages from double to single digit percentages. We have also worked with the Thames Water authority in the UK on waste water management, improving resource utilization, minimizing failure on the network, and reducing flooding, and pollution.

For more information on how we are helping cities and communities go digital, visit www.nokia.com/sustainability.

Technology that makes a difference

Our advanced technical solutions help to reduce the impact of natural disasters and enable the transformation and modernization of community health services.

Saving Lives

Nokia Saving Lives (NSL) is an innovative non-profit initiative which aims to bring the advanced technical solutions to the crisis field for humanitarian purposes. Based on a portable LTE network, LTE connected drones, and a portable data center for analysis functionality, NSL is operated under the collaboration of humanitarian actors and Network Communications Service Providers.

NSL also supplies technical experts to operate the solution during disasters, following the rules and regulations of humanitarian actors. This helps to prevent a delay in the use of the solution in the emergency area due to a lack of understanding of operational processes and technology. During a disaster, network infrastructure can be severely damaged at a time when commercial network traffic dramatically increases as people try to reach their loved ones. The NSL's portable LTE network can be moved to wherever a network doesn't exist, to enable fast decisions and saves lives.

Furthermore, Network Communications Service Providers own the spectrum to implement NSL



©UNICEF/Rabenstein/2018. Children enrolled in Class One of Islamia Primary School in Nairobi are using the Digital Literacy Project tablets procured by the Kenyan Government.

effectively. Read more at networks.nokia.com/innovation/nokia-saving-lives. We progressed our Saving Lives Innovation initiative where we combine the capabilities of the ultra-compact LTE network with drones and drone video applications for search and rescue missions.

NSL was deployed for crisis management and rescue in the Philippines on 23 Nov 2018 in collaboration

with the Philippine Red Cross (PRC) and Smart Communications, who provided the spectrum to operate the solution. The NSL program in the Philippines is partially supported by GSMA.

The disaster management process was implemented to address two types of incidents (for example, landslides and pregnant women involved in car accidents) during search and rescue operations. After

LTE-connected drones mapped the disaster scenario, the information was safely and securely stored in the portable data center. The scenario was then analyzed using this data and the information was promptly forwarded to PRC for rescue and disaster management. Aside from mapping the impacted areas, the swarm of drones connected via this instant private LTE network also streamed live video to PRC, enabling the organization to save crucial minutes that spell the difference between life and death for those affected.

We will continue partnering with operators and NGOs on this initiative to help rescue operations in different countries, offering a limited number of our Nokia Saving Lives technical solutions on a non-profit basis.

Corporate community investments

Our corporate community investment emphasizes the role of technology in improving lives by connecting the unconnected, empowering women and girls, and saving lives. In 2018, we rolled out five corporate programs at the global level. These programs included connecting schools in Kenya and the mHealth program in Indonesia both with Unicef. We also finalized our long-running program of support for education in Myanmar with Save the Children. Our greenlight for girls program also continued in 2018. We also ran our Season's Greetings voting campaign amongst employees benefitting three chosen charities.

Making a real difference in 2018

With Nokia's support, Unicef Indonesia supports the Government of Indonesia to transform and

modernize community health services by introducing innovative mHealth applications, to improve health at the community level. Directly reached beneficiaries are those with whom we had direct contact in 2018, for example, 4 400 newborn-caregiver pairs who received immunization reminders to vaccinate their newborn children (pairs who had been registered in 2017 and continued to receive reminders due to continuous vaccination needs in 2018 and new pairs with newborns that were newly identified with vaccination needs, registered and received reminders in 2018), and also 51 000 vulnerable children who, with the support of RapidPro, were identified and connected to health facilities through UNICEF's program. Indirect beneficiaries are those vaccinated by the health facility staff (23 201 669 beneficiaries for year 2018) and those who received malaria bednets (3 133 556) as part of national Ministry of Health campaigns which were monitored and supported through the mHealth platform.

We also have regional and country-based NGO cooperation. Our strong presence in India is shown also in our ongoing local community investment programs which link closely to our three global corporate community investment themes. Our Kanchiloom project in India continued to enable weavers to learn IT and business skills in order to enhance their income by improving their market access. We also announced Smartpur project that aims to develop 500 digitally integrated and sustainable villages across India in line with the government's vision of Digital India. More details on our key programs can be found in the [Making change happen together](#) section of this report.

Protecting the environment

The Intergovernmental Panel on Climate Change (IPCC) released their special report on the impacts of global warming at 1.5 °C, underscoring the need for even greater action by all parts of society, business and government to increase activities to strengthen the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

The IPCC report argues that limiting climate-related risks to sustainable development can be enabled by an increase in investments and policies towards adaptation and mitigation, and an acceleration of technological innovation and behavior changes.

Highlights in 2018

We delivered zero emission products to over

140

customers globally

SBT

Science-based targets on track

Average energy savings
for customers whose networks we modernized

43%

Launch of the world's first liquid cooled base station
reducing CO₂ emissions up to

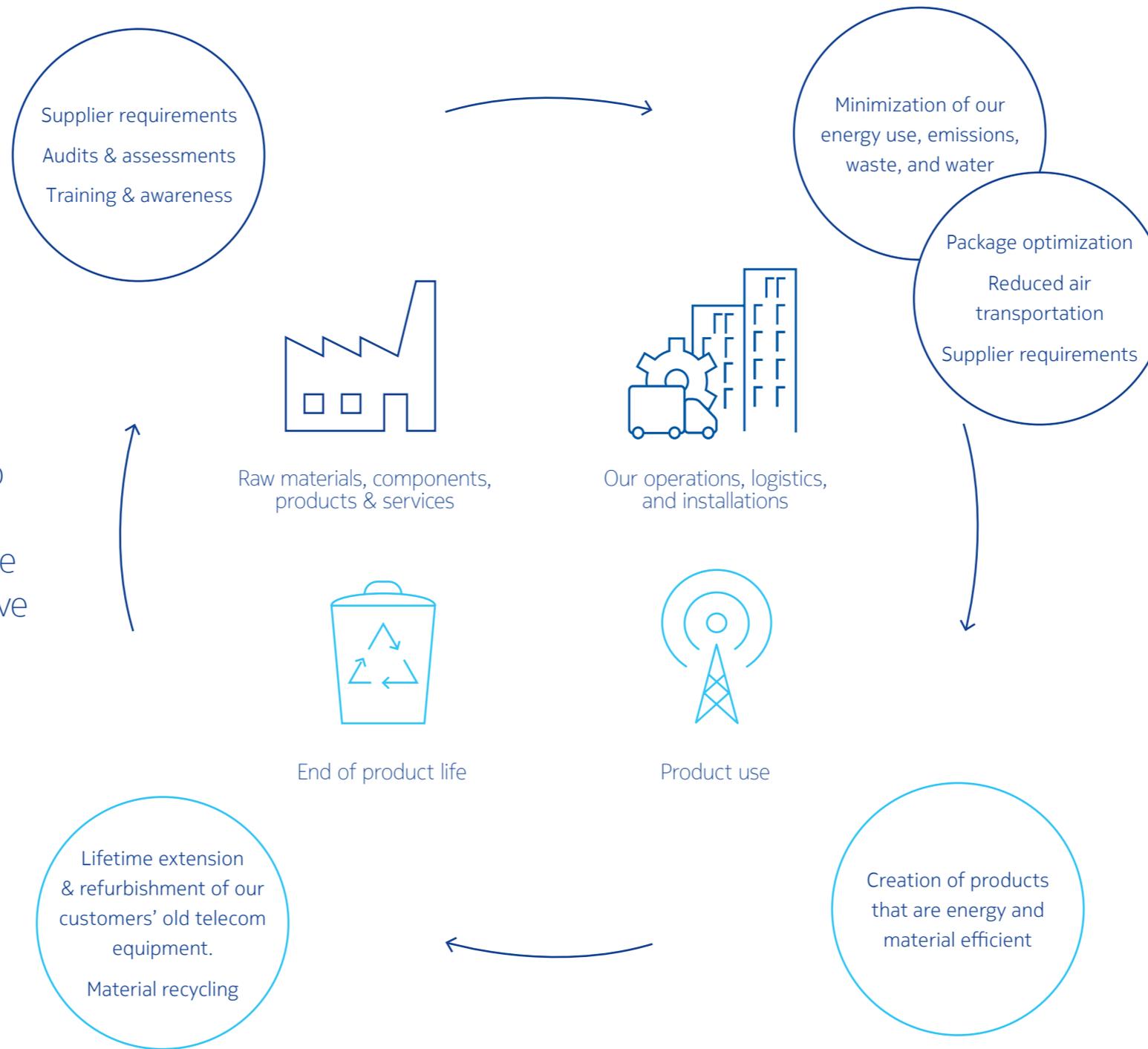
80%

99.5%

Material/energy utilization
from equipment end-of-life services

Environmental efficiency

A circular lifecycle approach to our operations and portfolio minimizes energy and resource use, and maximizes our positive impact on the planet.



Minimizing our footprint

Ensure our own operations are eco-efficient

Support a more eco-efficient supply chain

Maximizing our handprint

Help customers deal with increased data traffic in a sustainable way

Help other industries to reduce their energy use and emissions

Refurbish and recycle old telecom equipment

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment     	Product energy efficiency and GHG emissions	2030 GHG reduction of 75% compared to the 2014 baseline (scope 3, use of sold products) (This target is accepted by Science Based Target initiative).	Scope 3 emissions included in SBT are on target. ✓ Assured	 Ongoing - on track
	Energy use and GHG emissions in own operations	2018 Achieve at least 25% utilization of renewable electricity, compared to total purchased electricity.	27% of our total purchased electricity was from renewable sources. ✓ Assured	 Achieved
		NEW target 2019: At least 30% utilization of renewable electricity, compared to total purchased electricity.		
		2018 Achieve a facility electricity usage reduction of 3%, compared to 2017 level.	Electricity consumption across our facilities decreased by 3% as compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: Facility energy usage reduction of 3%, compared to 2018 level.		

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment     	Energy use and GHG emissions in own operations	2018 GHG emission reduction of 1.8% from facilities, compared to 2017 level (Scopes 1+2).	GHG emissions from facilities decreased by 18% as compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: GHG emission reduction of 3% from facilities, compared to 2018 level (Scopes 1+2) .		
		2030 GHG emission reduction of 41%, compared to the 2014 baseline (Scopes 1+2). (This target is accepted by the Science Based Target initiative).	Scope 1&2 emissions included in SBT are on target. ✓ Assured	 Ongoing – on track
	Energy use and GHG emissions in supply chain	2020 180 suppliers setting emission reduction targets.	In 2018, 187 of our suppliers had emission reduction targets in place via CDP Supply Chain program. ✓ Assured	 Achieved
		2018 90 dedicated one-to-one reviews with suppliers, collaborative emission reduction projects.	Due to delays in CDP's assessment cycle in 2018 for all of its clients, the 2018 reviews were postponed to 2019.	 Not achieved
		NEW target 2019: 90 dedicated one-to-one reviews with suppliers, collaborative emission reduction projects.		

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Protecting the environment     	Waste and water in own operations	2018 Reduce the water use in our facilities by 2% compared to 2017.	Water use decreased by 22% compared to 2017. ✓ Assured	 Achieved
		NEW target 2019: Reduce the water use in our facilities by 1% compared to 2018.		
		NEW target 2019: Recycle at least 60% of facility waste.		
		NEW target 2020: Recycle at least 75% of facility waste.		
	Waste and water in supply chain	2018 Deployment of non-carbon related projects with suppliers.	In 2018 we conducted a Water Assessment Program with 150 suppliers engaged and assessed via CDP Water Program. In addition we also conducted a pilot study for recycled materials content among our components suppliers.	 Achieved

Circular economy

We continue to emphasize our commitments to protecting the environment and supporting the fight against climate change.

We concentrate on ensuring environmental sustainability across our own operations and on working hard to reduce power consumption and energy use across our product portfolio and the networks we deliver to our customers. We also look at the many ways in which the technology we produce can help other industries lower their carbon footprint and improve resource efficiency.

We believe the potential benefits of digital technology innovations can play a significant role in not only reducing the negative impacts but also increasing the positive impacts of technology on industries, society and individuals. To make the greatest impact it is essential that all parties come together and play their part in nurturing the environment and accelerate the uptake of new digital technologies such as 5G, IoT, smart automation and cloud computing to halt the advance of climate change.

As part of our global Environmental Management System (EMS), we analyze our most significant environmental aspects annually. This analysis will determine our focus areas for the upcoming year and beyond. We take into account current and potential future regulatory and other related requirements, stakeholder interest, the magnitude of the

environmental impact, related environmental risks and opportunities, and current and potential changes in our business that contribute to how we determine our focus areas.

We minimize the impact of our operations and our products in use through a robust environmental management system, putting in place the process, procedure, and policy on a global level, which helps us to monitor our progress and identify needed improvements. Our own operational footprint is certified under the ISO 14001:2015 environmental management system (EMS) standard, and the current coverage of employees within the scope of that certification is around 83 percent. Our EMS covers all our Networks businesses. In 2018, our offices in Espoo, Tampere, and Oulu were certified under the WWF Green Office program.

Circular approach

Circular thinking is integrated into our whole value chain, including finding every opportunity to avoid waste generation. Circularity for us is about working efficiently to avoid waste generation and resource overuse through better design, serviceability, and product lifetime extension.

In order to achieve significant reduction in our environmental footprint, we realize we need to go beyond small incremental improvements in our operations and in equipment design, ensure intelligently distributed investment in R&D and network deployment, and to provide end-to-end solutions that deliver exponential growth and performance. We drive to develop networks and

“Deep collaboration and partnership between industries and sectors is what is needed to accelerate the transformation to a decarbonized future. By bringing together companies from around the globe and harnessing the potential of the Fourth Industrial Revolution, the Step Up Coalition is in a unique position to catalyze the change the planet needs.”

For more information on the Step Up Coalition visit stepupdeclaration.org/.

We have two key objectives:

- design products and services that reduce environmental impact in our customers' networks, and
- reduce our environmental impact by operating more efficiently, that is within our facilities where we perform our jobs, and in the facilities where our products are manufactured and distributed.

We combine circular and climate thinking across three domains:

- how digitalization helps achieve greater eco-efficiency in society
- how our products are designed and managed
- how our operations are managed

products that use no more energy in the future than they are using today, as the energy consumption of our products in use is by far our most significant negative environmental impact.

Climate commitment

In 2018, we continued to work towards our Science Based Targets. The targets were formally approved in June 2017. More information about the Science Based Targets Initiative at sciencebasedtargets.org and current status of both long-term targets can be found on [pages 57–58](#).

In 2018, we also declared our support for and participation in the Step Up declaration along with 20 other leading companies as part of the Mission 2020 initiative.

We have also aligned our climate related disclosures, including risks, in our CDP report according to the guidance of the Task Force on Climate-related Financial Disclosures (TCFD). In 2018 we continued analyzing various climate related scenarios and their impact on Nokia business. Some of the conclusions of this scenario analysis are included in our CDP disclosure covering year 2018.

Significant environmental aspects 2019

Energy & emissions	Natural resources & waste
 <p>Raw materials, components, products & services</p> <ul style="list-style-type: none"> • Energy consumption of our suppliers 	 <p>Raw materials, components, products & services</p> <ul style="list-style-type: none"> • Restricted materials and substances in products • Use of conflict minerals in products • Manufacturing waste at suppliers • Manufacturing water consumption at suppliers
 <p>Our operations, logistics, and installations</p> <ul style="list-style-type: none"> • Energy consumption of laboratories • Energy consumption of data centers • Energy consumption of offices • Low emission sources of energy 	 <p>Our operations, logistics, and installations</p> <ul style="list-style-type: none"> • Waste generated from production in Nokia factories • Packaging design and materials • Facilities operational waste • Single-use plastics • Waste from facility refurbishment projects • Management of contaminated land • Waste at customer project sites
 <p>Product use</p> <ul style="list-style-type: none"> • Energy consumption of Nokia products • Energy efficiency at customer sites; network optimization 	 <p>End of product life</p> <ul style="list-style-type: none"> • Takeback, refurbishment, recycling of Nokia products

Transparency is an accepted requirement in today’s commercial and digital world, but evidence is becoming the watchword of true transparency. The TCFD recommendations and the SDGs will change sustainability and its reporting, requiring companies to disclose validated data, quantify impact and prove future resilience.

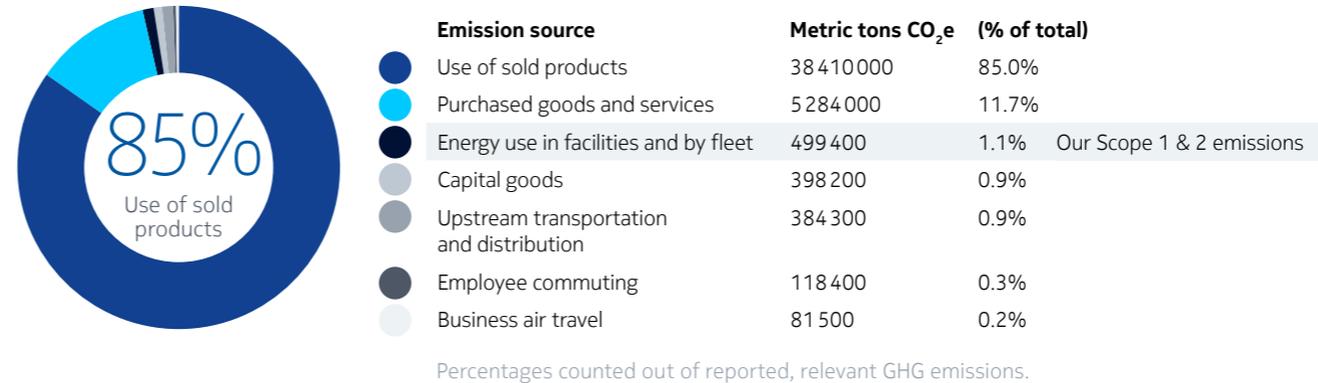
Climate change – risk and opportunity

Climate change and the depletion of natural resources perhaps provide the most pressing social and business risk of our time. The potential effects of climate change are wide ranging, from the natural disasters that could affect our supply chain and the world economy, to rising energy prices, greater regulation, and materials scarcity affecting production. But we also see the opportunity for the technology we develop to help others drive down their negative impact on the environment with energy efficient products, best use of materials, greater automation, and the digitalization of industries and society.

The day-to-day challenge of reducing our environmental footprint – using resources more efficiently and minimizing emissions and waste – is already business as usual. We have gone far beyond this and are developing products, services and technologies that also reduce the environmental impacts of our customers.

In contrast to the phrase carbon footprint, which refers to the negative environmental impact caused by greenhouse gas emissions throughout the life cycle of a product, the term carbon handprint refers to the positive environmental impact of a product

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



throughout its life cycle. We have been partnering with VTT Technical Research Centre of Finland in the development of a new approach for quantifying carbon handprint based on standardized methods. The result is a process of assessing and communicating the carbon handprint of a product or service in line with life cycle assessment and carbon footprint methods. Read more at: www.vtt.fi/handprint.

In one case study for Nokia – a system of mobile network radio base stations with 200 air cooled sites replaced with liquid cooling and energy harvesting – VTT estimated the carbon handprint (positive environmental impact) to be about 100 000 kg CO₂e per annum. Over an average base station operating lifetime of five years, the handprint is slightly greater than our manufacturing carbon footprint of the radio

base stations. You can read more about our first commercial liquid cooling case and an overview of the project from its very beginnings on [page 41](#).

Sustainable product design and materials

We are committed to protecting the environment and to mitigating climate change by making the products we deliver to our customers more efficient in terms of how they are made and how they operate.

We do this by designing for the environment, or DfE. Our DfE mission is clear and simple: to innovate technologies that ensure that we develop environmentally sustainable products.

Life cycle thinking is a key principle of our approach to reducing our environmental impact and improving material and energy efficiency across our own operations, product use-time and take-back, and through to our suppliers. It is integral to the products and services we deliver to customers from creation to end of life. 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 85% of our total carbon footprint comes from this part of our business.



As depicted in the diagram on the following page, our DfE Program is key to the development of environmentally sustainable products and is integrally linked to circular economy. There are services available for end-of-life takeback and treatment. Our customers can contract us for environmentally responsible management of obsolete equipment.

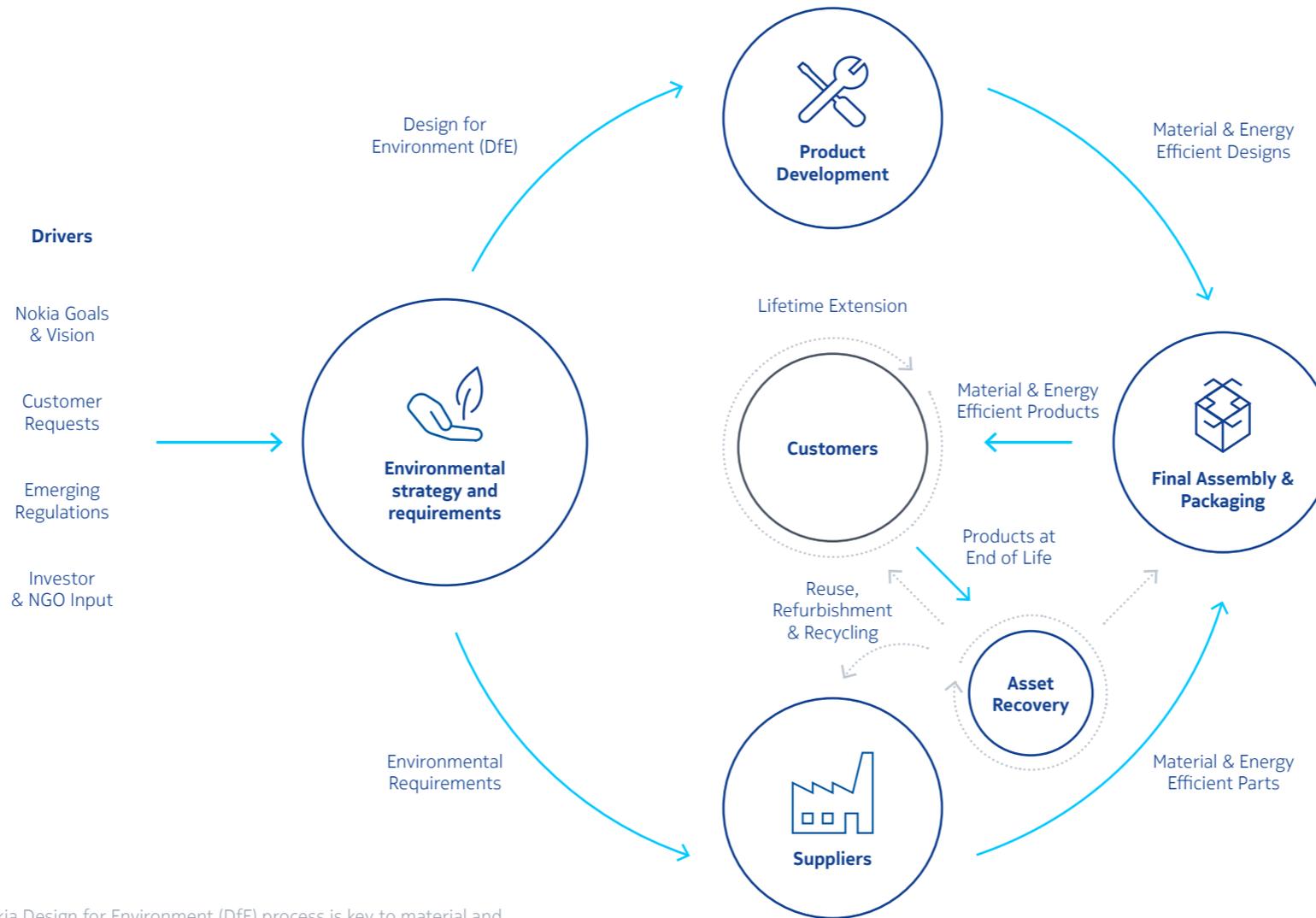
Our Asset Recovery services offer customers different ways to maximize the value of the obsolete equipment and to minimize the harmful impact of its disposal. The main scope of this end-to-end service is to reuse assets that are no longer usable by the customer owning the equipment. Depending on the state and age of the equipment, and on specific customer needs, it can be refurbished and

sold for reuse. As a secondary option, materials in the product can be recycled. After a product is developed, manufactured and put into use by our customers, and reaches its end of life, the user can contact our Asset Recovery services at asset.recovery@nokia.com.

DfE methodologies for product development

We have set a Science Based Target for 2030 (baseline 2014) to reduce by 75% our Scope 3 greenhouse gas emissions caused by the emissions from customer use of our sold products. The DfE program helps product developers to achieve this goal by setting targets and evaluating energy-saving features with each new product introduction.

Product design for circular economy



Nokia Design for Environment (DfE) process is key to material and energy efficient product development and the circular economy.

Some examples of recent energy efficiency improvements within our products include:

- new component technologies for routers
- improved software features such as low power and standby modes for fixed broadband, and
- improved thermal management – optimized cooling, such as fan efficiency, and liquid cooling.

DfE for software development

DfE is also intended for software development as it offers distinct means to control features and operational performance and thereby provide energy efficiency improvement for the intended hardware platform. In 2018, we developed a new guidance document for DfE for software in addition to the Energy Scorecard. Environmental impacts associated with network infrastructure equipment software are principally related to the energy consumed by the network equipment and the related greenhouse gas (GHG) emissions. Because the design of software can significantly affect the amount of energy used by the network equipment, software designers should understand how their code affects such equipment energy usage. Examples of the guidance that is provided includes: computational efficiency, such as from efficient algorithms, multithreading, vectorization, and accelerating an application domain; data efficiency; context awareness; and, avoiding software runtime bloat.

Materials and Restricted Substances

Materials and restricted substances are another key part of our DfE program. 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. In addition, future customer and legal requirements will have an influence on the choices made today in developing a product.

To ensure these needs are met, our products, including original equipment manufacturers' (OEMs) product parts, modules and components must meet the requirements stated in our 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.

Each year, the Nokia Substance List is updated to cover our concern over substances that may pose a potentially increasing risk to the environment and human health. For 2018, we further restricted beryllium compounds in a more unified approach for supplier awareness and avoidance. We continue to globally restrict the use of ozone depleting substances in products, 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.

In 2017, we registered with the European Union for the placement of products into the market which contain fluorinated gases. These materials are used

in small amounts as refrigerants in hermetically sealed units to cool critical electronic components in mobile network base stations. Although the amount of fluorinated gases we use is very small relative to the total EU market quota, we are working to eliminate the use of fluorinated gas based refrigerant materials.

We are compliant with the new declaration of conformity requirements for India Restriction of Hazardous Substances (RoHS) and Taiwan RoHS, and the new Hazardous Substance Table requirements for China RoHS. We continued our work to eliminate the use of the four phthalates that will be restricted under the European Union RoHS Directive. By mid-December 2018, we confirmed with our suppliers that all parts that we receive from the end of March 2019 will be free of these phthalates. This ensures, well in advance of the July 2019 deadline, that all our equipment continues to comply with the specified requirements. The EU Commission's draft decisions on the RoHS directive's exemptions missing from 2017 were published in 2018. They included time extensions for lead and cadmium in optical parts, lead in alloys of steel, aluminum and copper, and lead in high melting type solders. This provides additional time for us to phase out these specialized applications of lead within our supply chain and component inventories.

We are committed to comply with all applicable environmental laws and regulations such as EU RoHS Directive 2011/65/EU (as amended), all requirements of the EU WEEE Directive 2012/19/EU (as amended), all requirements of Regulation (EC) No 1907/2006

of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). For more information on REACH please see the [Reach Declaration](#).

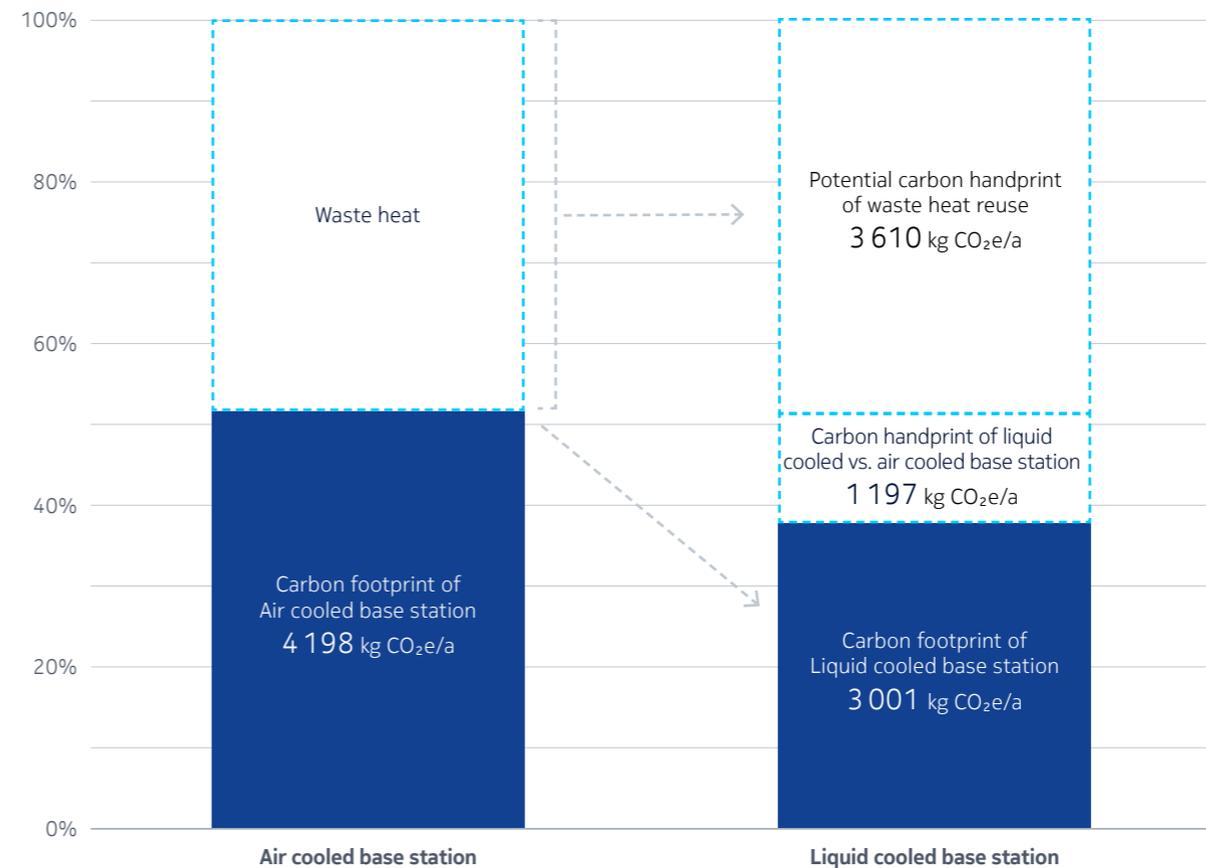
Circular economy thinking is another area that will have a significant impact on the way products are designed and manufactured globally. We are already seeing a rise in potential new regulations and industry voluntary agreements. To download the latest Nokia Substance List, go to www.nokia.com/about-us/sustainability/downloads.

Material Efficiency

Our Design for Environment process for all product development within the company includes design principles, guidance, and best practices to promote material efficiency of products. Material efficiency includes designing products that use less materials and energy while having increased throughput capacity and functionality.

In 2018, we finalized new in-house designed and developed chipsets with higher port density, integration features, and throughput per watt. For mobile networks, the resulting ReefShark chipsets reduce the power consumption of the AirScale 5G baseband module by 64 percent. And in a world first, Nokia, Elisa and Efore commercially deployed a liquid-cooled base station that can reduce CO₂ emissions by up to 80 percent. The liquid-cooled base station in Helsinki directs previously wasted heat to use in heating an apartment building. The removal of air-cooling components can also cut energy costs by up

Carbon handprint of an indoor installation of a base station, case Satakuntatalo



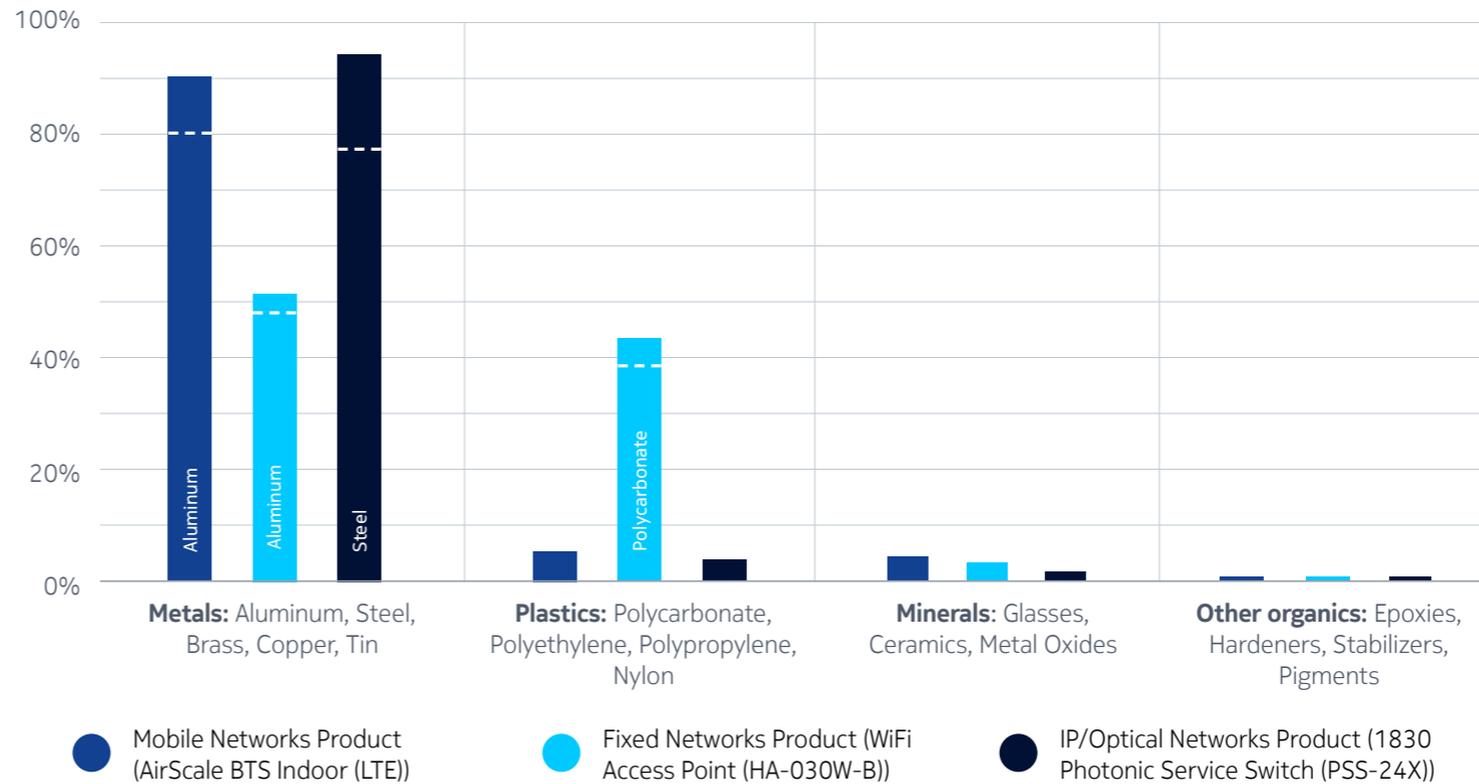
Calculation: VTT Technical Research Centre of Finland.

to 30 percent, creating silent base station sites. See the [press release](#).

Product Materials Breakdown

Our products are comprised predominantly of metals – more than 90 percent 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 – 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-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. According to life-cycle assessment, the use phase accounts for the majority of the global warming potential caused by our typical products.

Product Materials Breakdown



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

Our products and networks – energy efficiency and carbon emissions

Nokia Bell Labs predicts that in the next five to ten years, a new digital fabric will be created that augments our intelligence and enables the automation of every mundane task and the intelligent assistance of every complex task. Enterprises and industries will be massively transformed by the ability to become automated and virtualized.

To achieve this technological revolution, the underlying network has to become highly distributed to support the onslaught of virtual reality, the massive scale of devices (things) as well as the need to analyze the data coming from these devices. We believe a new network will emerge, the Future X Network, and it will need to provide and deliver the following fundamental, digital needs:

- seemingly infinite capacity: 100x capacity growth in less than ten years
- imperceptible latency: Millisecond latency for networks and new ‘human’ services
- terascale things: Optimize Total Cost of Ownership for a trillion things
- global-local alliance: Massive distribution of cloud infrastructure with global federation

- human cognitive operation: Human assistance and task automation at machine scale
- personalized protection: Enable dynamic, contextual security and trust at terascale

In the last few years alone, Nokia Bell Labs innovations have led to a complete turnaround in Fixed Networks (vectoring innovation) and Optical (100G Coherent detection innovation), and we are now pioneering the creation of 5G network technologies as well as novel IP and Optical routing algorithms and new analytics and deep learning techniques.

Currently researchers are working on projects to disrupt the field by a factor of 10x. What that means is 10x more capacity, 10x lower latency, 10x better energy consumption, 10x better reliability or 10x performance in some dimension. Every researcher works on a 10x challenge somewhere in the end-to-end network, from device to compute and applications as well as the control plane systems in between. 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 that controls everything and makes the different parts of the network look like one seamless whole. The ultimate goal is to “create time” for humans through the automation of everything. People will be able to interact with any media, object or person, anytime anywhere and mundane tasks can be handled by the network.

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. This contributes to reducing 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. The emerging challenge will be to address the energy demand of these exponentially increasing data-intensive services as they become more thoroughly embedded into normal, everyday life.

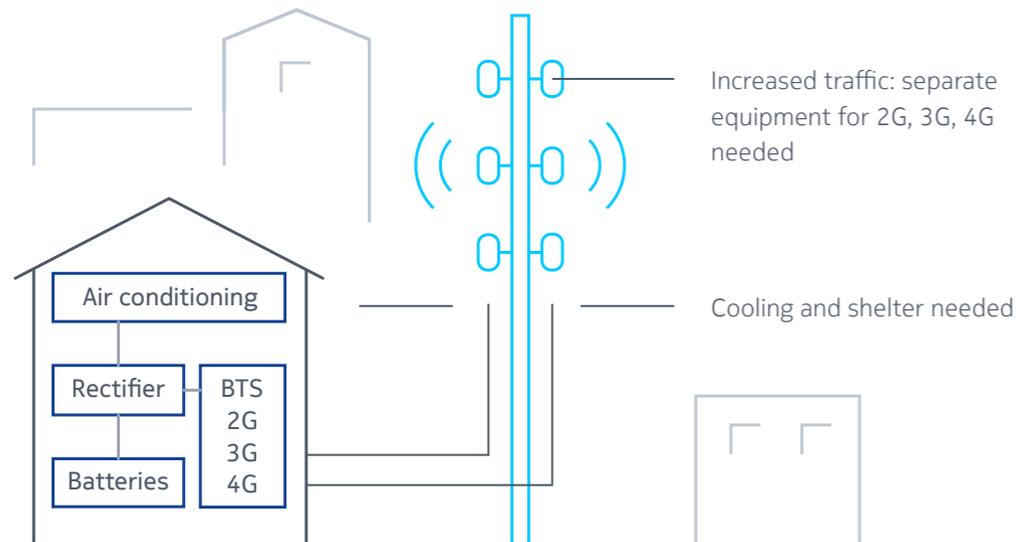
In 2018, we continued to make energy efficiency improvements across our product portfolio, supported customers with optimization and energy services – for example, through Nokia Bell Labs Consulting, further promoted the use of renewable energy sources, and provided software solutions to help manage and analyze energy consumption. We look at our whole product life cycle as part of Design for Environment, so that we understand where the greatest environmental impacts lie, and how research driven innovations can minimize or even reverse those impacts.

Read and view more on the Nokia Bell Labs Future X Network at: www.bell-labs.com/our-research/future-x-vision.

In the book The Future X Network: A Bell Labs Perspective, it is stated that global annual network energy spend is expected to quadruple by 2025, from USD 95 billion to USD 343 billion. The need to decouple data growth from energy usage has never been greater.

Traditional base station site

+2°C Traditional way of working leads to global warming

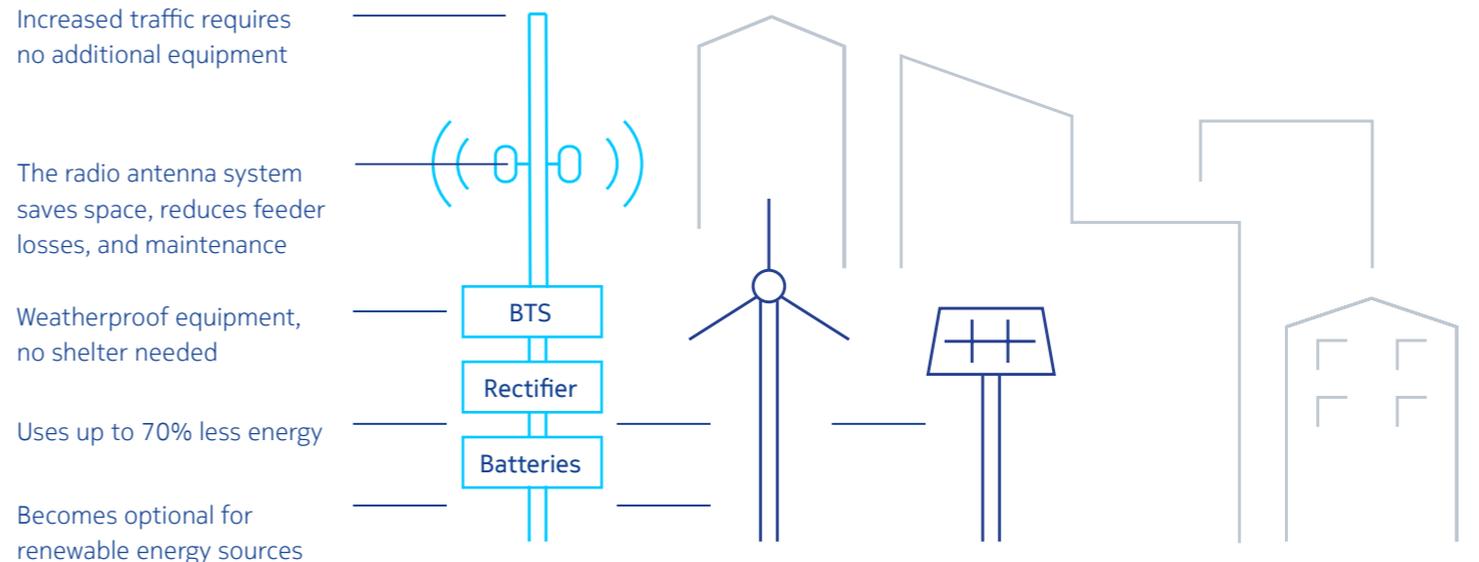


5G is natively greener technology than 4G and can provide more traffic with less energy thanks to new standardized features like Lean Carrier and Massive MIMO. Nokia is in addition investing heavily to improve the energy efficiency beyond the features standardized in 3GPP, and as an example we are developing energy efficiency software features to

Zero emission base station site

-70% Reduce emissions by AirScale Base Station

-43% Average lower energy consumption in 2018 cases



minimize the energy consumption of the Massive MIMO products in all traffic conditions.

The convergence, Wi-Fi, 5G and LiFi (Light Fidelity), foreseen as a promising technology for the next years, opens new challenges. Our target in Nokia Bell Labs Research was to propose for this emergent

market an energy efficient backhauling system based on mature and low-cost components. This new system is currently studied in close collaboration with Mobile Networks Business Group where perspectives for the industry 4.0 are also envisaged. One first goal is to demonstrate the support of high bandwidth applications, and the convergence 5G, Wi-Fi and LiFi

This activity supports SDG

Target 7.3:

“By 2030, double the global rate of improvement in energy efficiency”



in an integrated demonstrator between Nokia Bell Labs and our Mobile Networks Business Group.

Towards zero emissions

For mobile service providers most of their carbon emissions come from the radio access network. Our AirScale radio base station solution (BTS) spearheads our commitment to helping our customers build a sustainable business supported by a zero emissions network. Innovative hardware and intelligent software cut base station energy consumption.

R&D progress

Through 2018, we have dramatically expanded our AirScale Radio portfolio (4x more references), by introducing a wide range of single-band and multi-band Remote Radio Heads, as well as 6-pipe AirScale Radio Frequency Module, exhibiting a peak energy efficiency at unit level as high as 34 percent across various frequency bands. AirScale portfolio deliveries have represented more than 40 percent of all our Macro BTS deliveries over the year, and shipped baseband capacity has increased by over 50 percent while keeping the energy footprint almost unchanged (+2 percent).

Our Single RAN (SRAN) solution typically enables 45 percent 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 are able to 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 consuming energy without producing anything. 2018 has marked a significant year of change in the market as our SRAN solution is now used in over 14 percent 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. We expect the SRAN solution to reach 60 percent of our base station sites globally by 2022.

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/busy traffic conditions. Over 140 customers have installed energy efficiency software features to our products. In 2018 we experienced clear increase in market demand and for the first time ever over 10% of the Nokia radio products in the field have one or more energy efficiency software features activated.

We have demonstrated a Remote Radio Head (RRH) featured with a new Power Amplifier (PA) architecture breakthrough, delivering more than 20 percent energy savings compared to traditional PA.

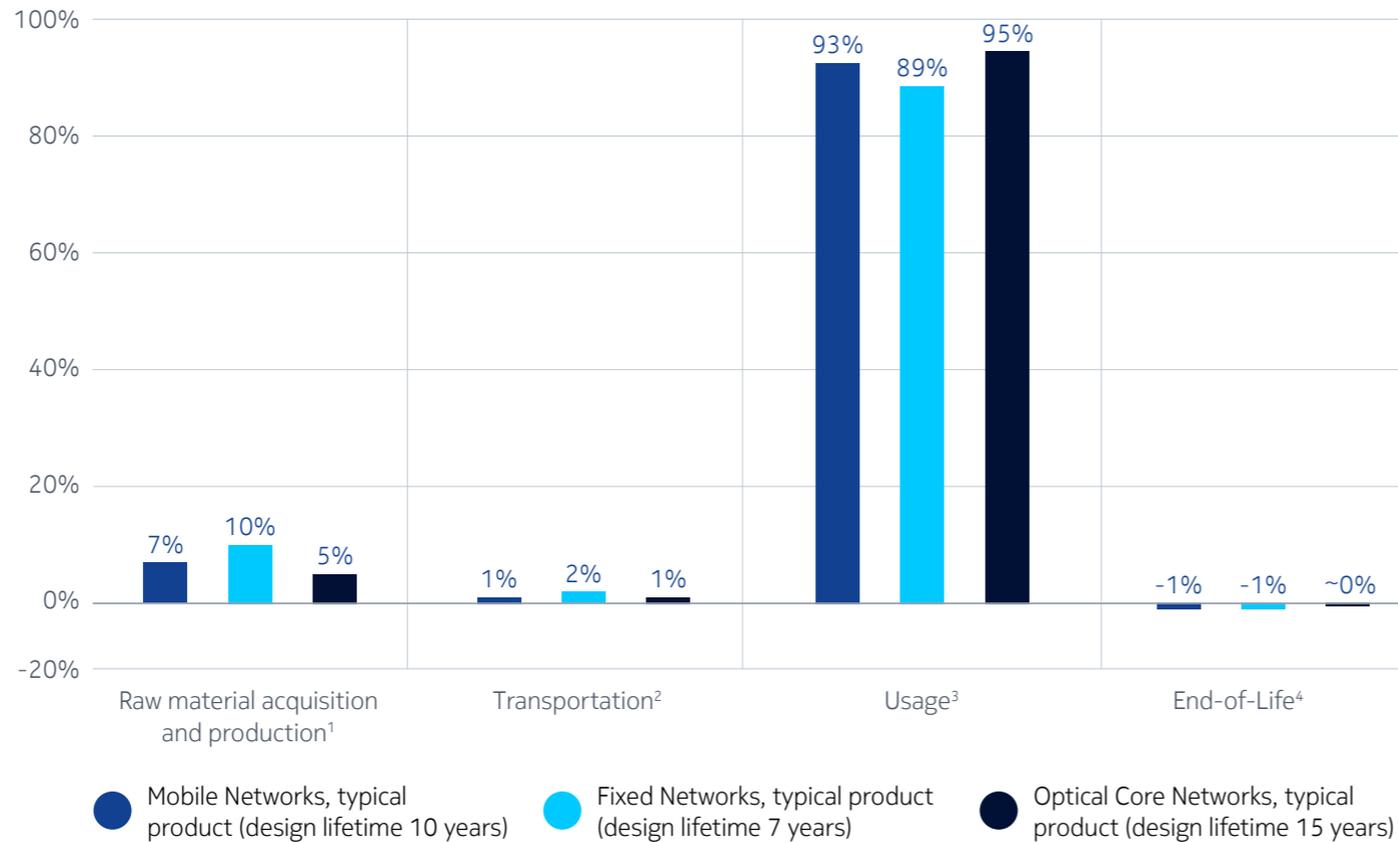
The energy efficiency of mobile networks can be significantly improved by using 5G power-saving features, by small cell deployments and by new 5G architecture and protocols. 5G has a significant potential for reducing energy compared to LTE by using sleep modes at low load – up to 50–60 percent gains at the base station level when networks operate at 10 percent average load, and up to

30–40 percent gains at 20 percent average load. Read more in the white paper [5G network energy efficiency](#).

The combination of greater energy efficiency and more cost-effective renewable energy sources are transforming the economics of radio access. Our Science Based Target (SBT) for Scope 3 emissions covers emissions from customer use of our products, by far the greater part of our total carbon footprint. Our target is to reduce these emissions by 75 percent by 2030 compared to 2014 baseline. The SBT scope is smaller than our total Scope 3 emissions from 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. The trend line is not linear and we can see that emissions are relatively stable during the initial years, but over time emissions will decrease. We are currently on track. In 2018 the amount of sold products increased including newer products where energy efficiency (performance vs energy use) was much better, though pure product energy consumption was in certain categories greater due to increased functionalities.

In 2018, 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 140 customers worldwide, and the networks we modernized brought on average energy savings of 43 percent for our customers. This not only reduces energy

% 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.

consumption and reduces carbon footprint, but also brings financial savings for our customers.

More information on zero emissions is available at networks.nokia.com/airscale/target-zero-emissions.

“Verizon's goal of a 50 percent carbon intensity reduction from 2016 to 2025 means that energy efficiency is essential to our sustainability strategy. As consumer demand for data grows, a more efficient network enables us to transmit more information using less energy per bit.”

We are working on energy efficiency across our product portfolio. In the fixed access segment, we are bringing cloud and Software Defined Access Networks (SDAN) solutions to increase the overall efficiency of networks, including power efficiency. Our SDAN solution enables fixed access network slicing, which is a very environmental concept: no excessive digging for parallel fiber networks in the ground, no duplication of patching room space, and reuse of the same hardware and fiber infrastructure which can be shared for various services, vertical industries, and network operators. Another example of how Nokia SDAN solution saves energy is our Gainspeed Distributed Access Architecture solution for cable operators. By moving control/management functionality to the cloud, this solution eliminates as much as seven times the amount of the equipment in the central office and reduces the energy consumption by a factor of eight.

We are the only global vendor that offers a comprehensive set of fiber (FTTx) solutions that now also includes a combination of fixed and wireless technologies with products launched in the first half of 2018. This approach enables operators to have fiber deep in the network and use licenced (4G, 5G) or unlicensed (WiGig) wireless technologies to deliver gigabit services to users' homes. In a typical scenario, the communications service provider would bring fiber to each side of a street and use wireless Passive Optical Networks (PON) to connect users in the street, eliminating the need to dig up streets and open building walls to install fiber. Our current solution also includes user modems that have over three times less power consumption than the industry norm.

In optical networks, in 2018 we announced the next generation of our Photonic Service Engine (PSE) family of super-coherent digital signal processors, underscoring our leading position in the industry and our innovation pedigree. The Nokia PSE-3 is instrumental in the evolution of communication service provider networks to meet the surging traffic demands of video, cloud and 5G, by maximizing the capacity and performance of every link in their optical networks. The new PSE-3 chipset is the first coherent digital signal processor to implement probabilistic constellation shaping modulation technique pioneered by Nokia Bell Labs. This modulation scheme pushes optical fiber transmission capacity to very near the Shannon Limit. It generates wavelengths that are more resilient to noise and other impairments, increasing capacity up to 65 percent over currently deployed

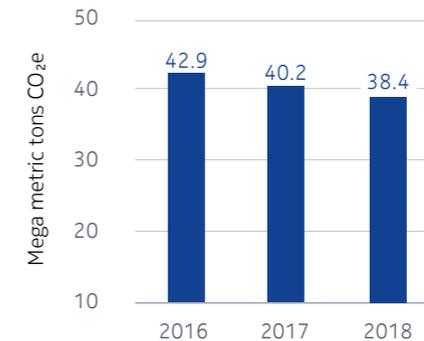
networks, while also reducing power per bit by 60 percent. Networks built with systems using the new chipset require up to 35 percent fewer optical transponders, resulting in significant long-term savings, and a reduced carbon footprint.

The evolution of Nokia Microwave transmission products takes into account key sustainable development principles like the energy efficiency improvement from one generation to the next. There are two main areas that contribute to the improved energy efficiency of these products.

Firstly, at the equipment level, particular care to decrease the energy necessary to transport every bit over a given distance, while maintaining high-quality at the transport level, is considered one of the primary goals. As an example, the introduction of a new class B power amplifier driven by a powerful digital radio frequency closed loop pre-distorter, allows significant savings compared to previous traditional class A power amplifier.

Secondly, at the system level, considering the evolution of the network, and the future potentialities enabled by machine learning and Software Defined Networks, we are studying specific mechanisms that can be useful for saving energy. For instance, we are investigating the equipment capability to reconfigure itself from a full traffic capacity and most energy demanding working state, to a lower traffic capacity demand and less energy hungry working state, that can anyway satisfy the actual request of traffic capacity and quality of service.

Scope 3 CO₂e-emissions from customer use of sold products reduced by 4% from 2017



Product use time varies between 6 and 15 years, depending on the products. Energy use calculations are based on product group specific ETSI standards wherever standards have been published. In 2017–2018 data has 100% business group coverage of Nokia's Networks business and estimated at least 90% coverage of product portfolio.

In the routing and switching domain, our silicon innovation drives other fundamental benefits in system efficiency. Each generation of FP silicon network processor provides unprecedented speed, scale and functionality while being more energy efficient. The new FP4 is the industry's first multi-terabit network processor silicon and provides a 6x performance improvement over the previous generation of FP while providing an over 50 percent decrease in watts per gigabit of throughput. This also comes with an up to 4x increase in features and scale.

Our own operations - energy efficiency and carbon emission

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

In 2018, for example, our electricity consumption across our facilities decreased by 3 percent as compared to 2017 and 27 percent of our total purchased electricity was from renewable sources. These actions reduce our Scope 1 and 2 emissions and help us in reaching the long-term climate target. Currently we are well on track.

In 2018 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 68 000 MWh representing a 5 percent reduction on our 2017 consumption. Larger capital investments included total cost of ownership techniques, the delivery of energy efficient and environmentally friendly projects such as new chillers in India and China, and boilers in the UK and France, as well as building envelope upgrades in Finland and France.

We also investigated and installed solar panels at our site in Portugal. LED lighting continued to be

deployed across our portfolio in both new and refurbished buildings with projects implemented in all regions along with improved Heating, Ventilation and Air Conditioning (HVAC) controls including products such as Ultrabox and Aironics, all aimed at reducing our energy use.

These best practice projects and techniques were shared across the Real Estate organization so that further reductions and efficiencies can be achieved. Sharing knowledge, increasing staff awareness and creating a culture of efficiency was promoted through a variety of campaigns, standards and tools, and communication.

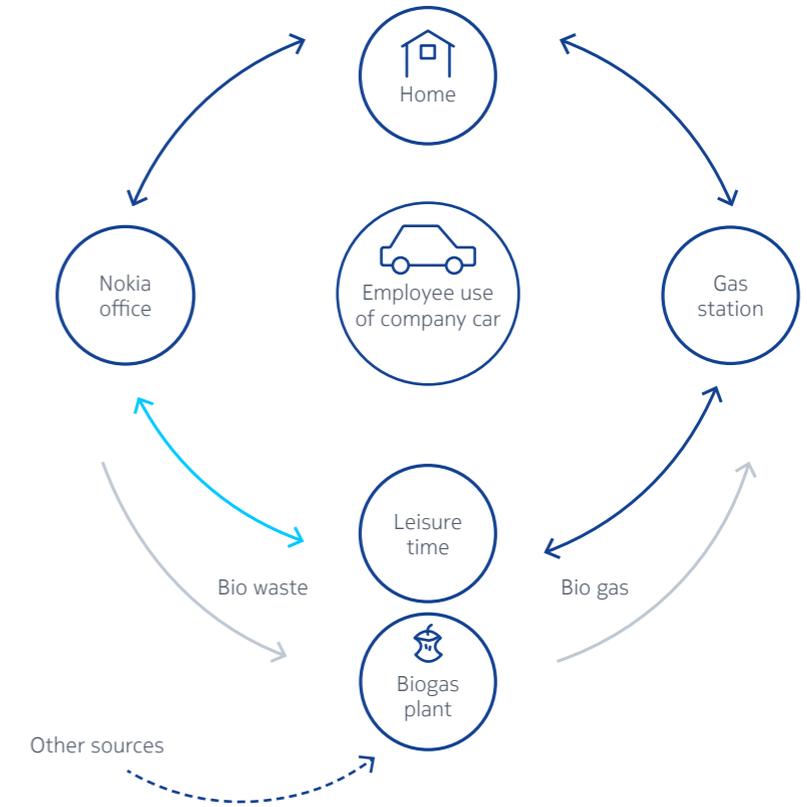
Real Estate implemented a global environmental data collection and reporting tool which, together with the new Waste Management Guidelines, has seen an increase in the number of sites reporting their utility data. We supported Earth Hour and through our Switch Off Campaign reinforced the message of energy 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 2018 we reached a significant milestone with our company car policies, reducing the carbon footprint of our car fleet at our headquarters in Finland. The first green company car policy was implemented in Finland in 2008, having a set baseline of 179 g/km average CO₂ emissions for new car leases. Ten

Biogas circular case



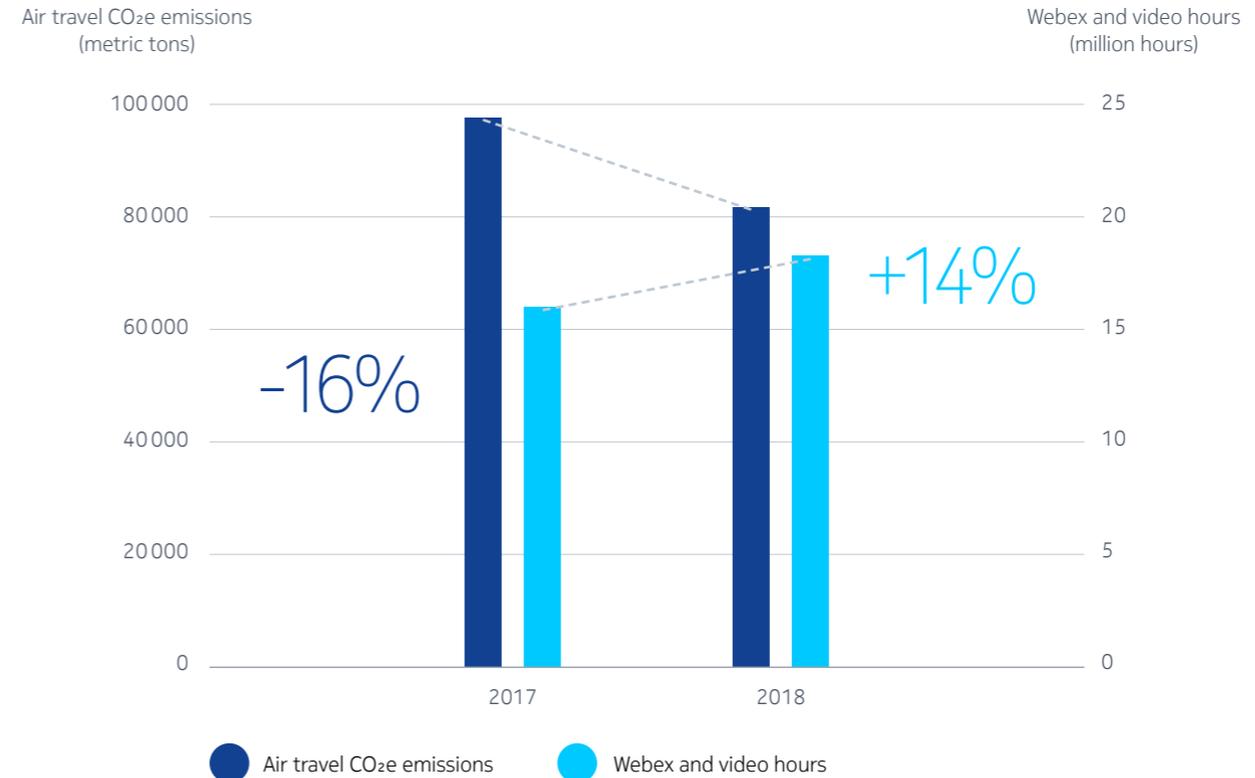
years later, in 2018, our average emissions of new car leases in Finland was 88 g/km, taking ten years to cut the emissions in half. This provides a great example of a long-term commitment to reduce emissions in our own operations. Our emissions have been on average almost 25 g lower than the market average of new passenger car registrations during these years.

It is also notable that a company's impact on car emissions in a country is significantly longer than the 3-4 years shown in most reporting. The average scrapping age of cars in Finland is over 20 years, thus our low emission cars remain on the used car market for another 17 years after our reporting period. When company registrations represent almost half of the new registrations on the market, the impact of company car policies on passenger car emissions is significant.

In 2018, we continued innovative approaches to reduce the carbon footprint of our fleet in Finland and introduced a new company car policy, promoting gas cars with bio gas cards. This underscores our circular economy approach as biofuel is produced from renewable waste. For example, all bio waste from our canteens is collected for gas production.

We had smaller than anticipated impact from the CO₂ measurement as a result of the change from the New European Driving Cycle (NEDC) to the Worldwide harmonized Light vehicle Test Procedure (WLTP) as the first countries to fully implement it were Finland and Germany. The reduced carbon intensity and reduced number of cars in our combined fleet led to

Virtual meetings increased, business travel emissions decreased



a reduction of 7 percent in greenhouse gas emissions from the car fleet, compared with 2017.

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 2018, our CO₂e emissions related to business travel were around 82 000 metric tons, meaning a 16 percent decrease when compared to 2017. Emissions were also reduced as our employees no longer needed to travel in relation to the Alcatel Lucent integration as was the case in 2017. We also continued internal lobbying and guidance to reduce the need for

internal business travel and encouraged the use of virtual meetings.

The use of virtual hours (webex people hours and video conference room hours) increased by 14 percent in 2018 when compared to 2017. This was enabled by IT, supporting virtual meetings with increased capacity and quality. Nokia had 330 videoconferencing facilities at the end of 2018.

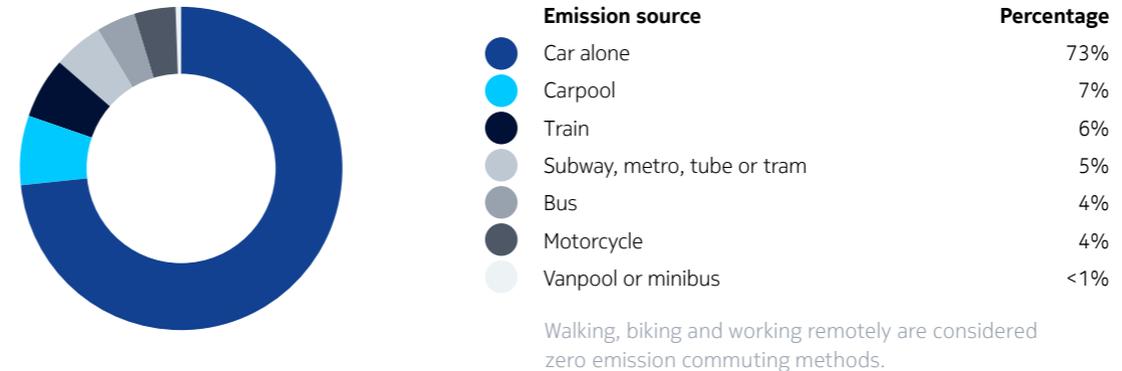
During 2018, we also continued to encourage the use of electric or low-emission cars, organized shuttle buses between hotels, offices, and airports, and encouraged employees to use public transport.

The Future of Mobility, which leans more towards a mobility budget-type of offering, provides flexibility for employees and better use of existing assets and services. This approach will combine both business travel and car fleet, with the aim to further reduce the carbon footprint of our own operations. The latest pilot case of this was announced in Finland at the end of 2018, to start in Q1 2019. This pilot will utilize the Mobility-as-a-Service (MaaS) solution for commuting tickets and mobility budget including small car, public transportation, city bikes and taxis.

Employee commuting

We conducted an employee commuting survey in 2018. Countries selected to survey represent over 80 percent of employees. Responses were adapted to the total headcount. Most of the employee commuting emissions come from single person car use. Remote work, walking and bicycle were considered as zero emission commuting.

Emissions from different modes of employee commuting [% of CO₂e]



We had also an awareness raising part in the survey. We found out that employees who drove cars alone were ready to consider public transportation if that service were easily available. We also found out that awareness of car CO₂ emissions is considerably higher in the countries where either Nokia or authorities have set benefits or restrictions related to car CO₂ emissions.

The recently published New Shared Mobility Study on Helsinki suggests that replacing private car travel with shared vehicles would end congestion, cut emissions, and free up public space. Under our Global Operations umbrella, Travel & Fleet and the Innovation Partner and Venture Management (IPVM) Ecosystem Advocacy teams took action to test solutions supporting the future development of mobility and towards a zero-emission digital future by launching challenges in the Open Ecosystem

Network – an open co-creation environment initiated by Nokia www.open-ecosystem.org.

In 2018, the Helsinki Regional Transport authority (HSL) chose Nokia as the winner of the 2018 Commuting Forerunner Award as the company actively encourages its employees to walk, cycle, use public transport or carpool. The Commuting Forerunner Award is given to an employer who strongly drives for more sustainable commuting and business travel while at the same time increasing and supporting wellbeing. To read more about the ways in which we have encouraged our employees to travel and commute wisely visit [our website](#).

Product transportation and distribution

We aim to limit the use of natural resources. In transportation, we always drive to save space, reducing the amount of packaging materials used, and

maximizing our transport efficiency through pallet or container load optimization, eliminating the need for additional trucks or containers where possible on both inbound and outbound shipments. Reuse of packaging materials also contributes to reductions in CO₂ emissions from deliveries. In 2018, we reduced use of new packaging materials by 4 200 metric tons (3 700 in 2017) by taking the packaging coming from suppliers and reusing it in customer deliveries. Our packaging designs use recycled materials in all aspects of our packaging where possible. OEM (original equipment manufacturer) packaging, such as packaging for cabinets, antennas, batteries, and cable reels, is typically 100 percent re-used.

As regards to the growing discussion and regulation around plastics, we are fully aware of the EU single-use plastics directive and will fulfill our obligations. At the beginning of 2019 we kicked off a focus project to analyze our plastic use across the value chain based on the current standardization work ongoing to define single-use plastic terminology for our industry. We will report on our activities concerning single-use plastics in next year's report.

To drive improvements in our transportation and distribution, we look at the most energy efficient ways of transporting components from suppliers to us, and in delivery of our products onwards to our customers.

In 2018, our Scope 3 GHG emissions related to upstream transportation, and distribution of our products stood at around 384 330 metric tons CO₂e,

an increase of 29 percent over the previous year. The main reason for the higher emissions was an increased amount of deliveries.

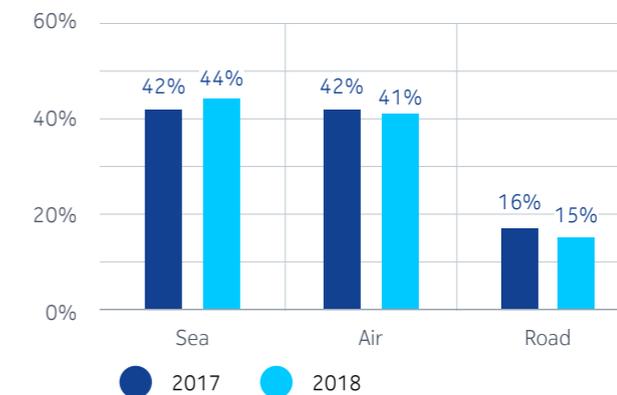
For 2019, our focus will be to further positively impact the environmental efficiency of the transportation of components from our suppliers to us and also highlight the issue to the customer projects with highest air shipment percentage.

We also have a marine fleet related to our separately managed undersea cables business, Alcatel Submarine Networks (ASN). The greenhouse gas emissions decreased in 2018 by 3 percent compared to 2017.

Our supply chain – energy efficiency and carbon emissions

The main target for our environmental work with suppliers is to encourage key suppliers to report their climate impacts and set carbon reduction targets through the CDP Supply Chain Program. This helps us to plan improvement programs with our suppliers and improve reporting of our Scope 3 emissions. For more detailed information please refer to the Responsible Sourcing section on [pages 106–112](#) of this report. Activities related to our product transportation and distribution suppliers are described in earlier sections of this chapter in connection with our own operations.

Share of transportation modes



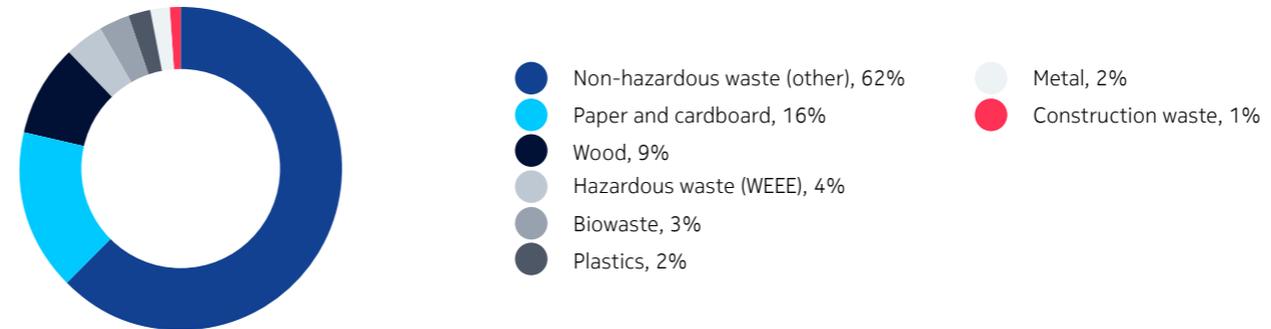
Waste in our own operations

Waste in our own operations is something we take seriously, and we have put in place a variety of waste reduction, reuse, and recycling programs.

Company policy dictates that all hazardous and electronic waste processing facilities utilized by Nokia facilities and operations, including Asset Recovery, shall undergo a Health, Safety & Environmental (HSE) Liability Assessment. Our hazardous and electronic waste shall 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. The goal is to maintain the minimum number of approved waste processing facilities needed to meet required services and minimize environmental liability. In 2018, we completed eight HSE liability assessments of e-waste recycling facilities located in the Philippines, USA, Indonesia, India, China and Hungary.

Overall, year on year, the total facilities waste reduced by 9 percent. During 2018 we improved the transparency of our waste report with a review and update of our waste categories and our calculation methodology. By improving the waste descriptions, our facilities are better able to understand and assign the waste generated to the correct categories

Types of waste generated by our own operations



which has improved the accuracy of our reporting. Estimated waste is calculated on the basis of headcount and given the amount of waste per employee remains similar to previous years, the overall total for 2018 remains in line with this.

Previous calculation methods allocated waste in every category to any sites requiring estimated data. The new calculation method only assigns Mixed Waste – Landfill to estimated sites as these sites do not segregate and measure waste for recycling. These new improvements to the calculation methodology have improved accuracy and reduced the amount of waste estimated by ~20 percent. At the same time this new estimation method has increased the share of reported landfill up to 52 percent (20 percent in 2017). The new calculation methodology enables us to set a

more accurate baseline against which to set future targets and measure performance against them.

Applying reuse to lead-acid batteries in the USA

Our facilities operations within the United States generate spent lead-acid batteries and we ensure that the potentially harmful chemicals in the batteries are available for reuse in new batteries. We utilize a battery manufacturer that operates a closed-loop system which recycles virtually 100 percent of each spent lead-acid battery, including the lead, plastic, steel and acid. This accounts for approximately two-thirds of all lead used in their manufacture of new batteries. Nokia recycled approximately 37 metric tons of lead-acid batteries from US operations in 2018, resulting in the recovery of approximately 26 metric tons of lead for use in the manufacture of new batteries.

Circular practices and products

We apply a circular economy approach, for example, offering an Asset Recovery Service, including refurbishment, reuse, and recycling of older equipment as part of product lifecycle management. In 2018, through our voluntary programs, we sent around 4 100 (2 600 in 2017) metric tons of old telecommunications equipment for materials recovery and we reused approximately 56 000 (68 000 in 2017) units.

In 2018 we were honored to be recognized by the Middle East Waste and Recycling Awards for success in adopting best practices in the environmental management business. The event recognized the outstanding individuals and organizations in the Middle East that have demonstrated leadership and innovation in their respective fields and have significantly contributed to environmental sustainability along with economic viability. The key theme for the event was the urgent need to now focus on the environment and protecting our natural resources for future generations. Organizers pushed the message that governments and private entities are all aiming to become sustainable,

with many cities set to go smart and green. Nokia was nominated in the Electrical and Electronic Equipment Recycling Company of the Year category.

Also this year, Nokia Shanghai Bell won the 2018 EUCCC CSR Award – Excellence in Responsible Value Chain, recognizing us for the excellence in integrating sustainability into the whole value chain and creating shared business and social impact. We are turning our supply chain from linear to circular by reusing our products, thanks to Special Customer Operations. During the past 27 years (since 1991), our circular supply chain has successfully brought benefits by delivering over tens of thousands of remanufactured products worth millions of euros to hundreds of customers worldwide. A circular supply chain is one of the many actions we implement with the belief in doing the right thing using Nokia technology inventions.

Extended Producer Responsibility (EPR)

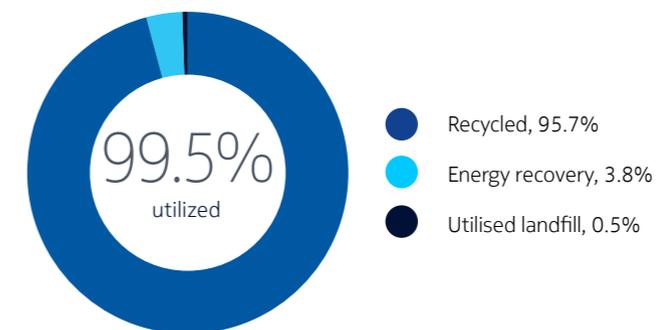
Compliance with relevant environmental regulations is an important part of our environmental policy. Extended Producer Responsibility (EPR) regulatory programs strive to decrease the environmental impact of covered products by making the manufacturer responsible for the entire life cycle of the product, especially end-of-life (EOL) management through product takeback. Since 1994 almost every OECD member country has implemented one or more EPR programs. Country EPR programs are expanding in scope (covered products and packaging) and globally (EU, Japan, South Korea, China, India, Canada, Peru, and others).

“Nokia has shown leadership and ambition in sustainability by embedding circular economy principals in their vision and operation model as well in business development.”

Jyri Arponen, Senior Lead, Business development, Circular Economy, Sitra The Finnish innovation Fund

A regulated producer means any person who manufactures and sells or resells under another brand or imports regulated products such as covered electrical or electronic equipment (EEE), batteries and packaging into an EPR regulating country. A producer can be the company’s corporate and/or local country legal entity. Companies that place covered products

Product take-back



on the market are responsible for their proper EOL management and are required to register and report to impacted country authorities. Producers bound by EPR legislation must handle EOL management of covered products and packaging individually or delegate EOL product takeback responsibility to a third party Producer Responsibility Organization (PRO), also called EPR compliance schemes which are paid by the producer. PROs typically are responsible for takeback of post-consumer products (collection and treatment of product at EOL) recycling target compliance and reporting to national authorities. PROs must have a monitoring system for quantities that have been put on the market, collected and recycled.

EPR program stakeholders include government authorities, producers, waste management organizations and PROs. EPR programs vary considerably due to differences in covered products, collection targets, and how responsibilities are shared among stakeholders. As EPR requirements differ between countries, the role of the PROs vary as well with differences in the type of responsibility, cost, and implementation procedures. Required reporting information varies by country and can include quantities/types of covered products and packaging placed on the market (sold or imported), collected, and treated in-country versus exported.

We report products and packaging sold or imported into EPR regulated countries. Our integration of IT data systems is required for product and packaging basic data, delivery relevant data, and environmental reporting relevant data. This is required to identify covered EEE, batteries and

packaging placed on the market, as well as the legal entity that was involved in the sales and/or import. Reporting systems need to be modified to comply with new or revised country reporting requirements, updating of legal entity names and product descriptions and de-registrations when no longer selling or importing into a regulated country.

Increasing product value recovery at end of life

We also worked over the past two years with other industry leaders through the iNEMI organization (www.inemi.org) to develop a metric that can address product value recovery at end of life. It focuses on the value of components and materials at end of life, their ease of liberation with current

and future recycling technologies, and regional market factors in reusing and recycling electronic products. The goal is to have designers use the metric as a means of scoring their product design early in the development process and then making suitable changes to improve that score. The industry group has developed a framework for the metric, which was presented at the Electronics Goes Green – CARE Conference in late 2018. Nokia and the iNEMI work group plan on refining the reuse and recycling metric in 2019 with further research and development in the future recycling technologies and the regional market factors. The tool created by the project team is being developed for industry use, and can be beta tested by visiting the [iNEMI project website](#).

A case on product take-back

While preparing for the launch of a critical new technology last year, we were able to maintain and grow the data network of a major US carrier by delivering refurbished mobile network units. After recovering used equipment from around the world, we refurbished, warranted and delivered 15 442 circuit packs to provide new service and ensure the ongoing integrity of the network. By strategically utilizing the remaining high value of used Nokia equipment, instead of manufacturing new units, we were able to, in this particular case example, avoid the creation of 1 235 metric tons of CO₂ emissions, which is equivalent to taking 262 passenger vehicles off the road for a full year.

This circular supply of products, bringing used units back to like-new condition for resale and reuse, is provided across the portfolio.

Water

Our biggest influence on indirect water withdrawal is from the generation of electricity used to power our products in customers' networks. We have analyzed our impact on water withdrawal based on a thorough life cycle thinking from product inception to final disposal. We have determined that the most environmentally impactful water withdrawal comes indirectly through the use of our products.

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.

Product impact on water withdrawal

We employ product **life cycle thinking** in how we develop products from an environmental

sustainability viewpoint. This approach considers the environmental impacts associated with all stages of a product's life cycle:

- raw material acquisition and production (including materials extraction, intermediate manufacturing, final product assembly and test, and packaging)
- transportation (storage, transport and final installation of the complete product at the customers' premises)
- usage (usage, repair and maintenance of the product at the customers' premises) and
- end-of-life disposition (removal of the product and its processing for end-of-life disposition such as refurbish / reuse, recovery, and recycling).

The environmental impacts associated with these product life cycle stages are then assessed by following our Design for Environment (DfE) process.

As the use phase of our products has the greatest indirect impact on water withdrawal where electricity is generated to power these products, we strive to design our products with innovative features that reduce power consumption (see more on energy efficient products on [pages 68–72](#)).

Estimates of the water withdrawal amounts for various Nokia product types have been determined based on historical product information over their respective life cycle stages. By using product information coupled with environmental impact life cycle databases for electronics components, we have summarized in the Water LCA Graph the percentage of total water withdrawal over the four main life cycle stages for three Nokia product types.

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. We have water-based air cooling in several facilities, but this is a closed cycle. Our laboratories are mostly similar to data centers, where water withdrawal is mainly caused by air cooling. We only have a few factories and those are final assembly factories. Processes in our factories use mainly electricity and water does not play a significant role other than for air cooling (closed water cycle).

We have a limited number of facilities where we have responsibility for irrigation since we lease most of our facilities. Where we are responsible, we aim to be as efficient as possible. We recognize there are areas with water scarcity and in those areas, we take extra care of water withdrawal by monitoring and promoting awareness among facility operations. Where it is within our control, we will focus on those sites in the top 20 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.

In 2018, we used 1 791 000 m³ (2 305 000 m³ in 2017) of water. Water use decreased by 22 percent compared to 2017, as water conservation measures were enhanced compared to the previous year. In

In addition in 2018 more accurate water data was obtained as less estimated data, which was more conservative, was employed.

In 2018, we aimed to reduce water consumption by 2 percent from 2017 levels but were able to achieve an impressive 22 percent reduction.

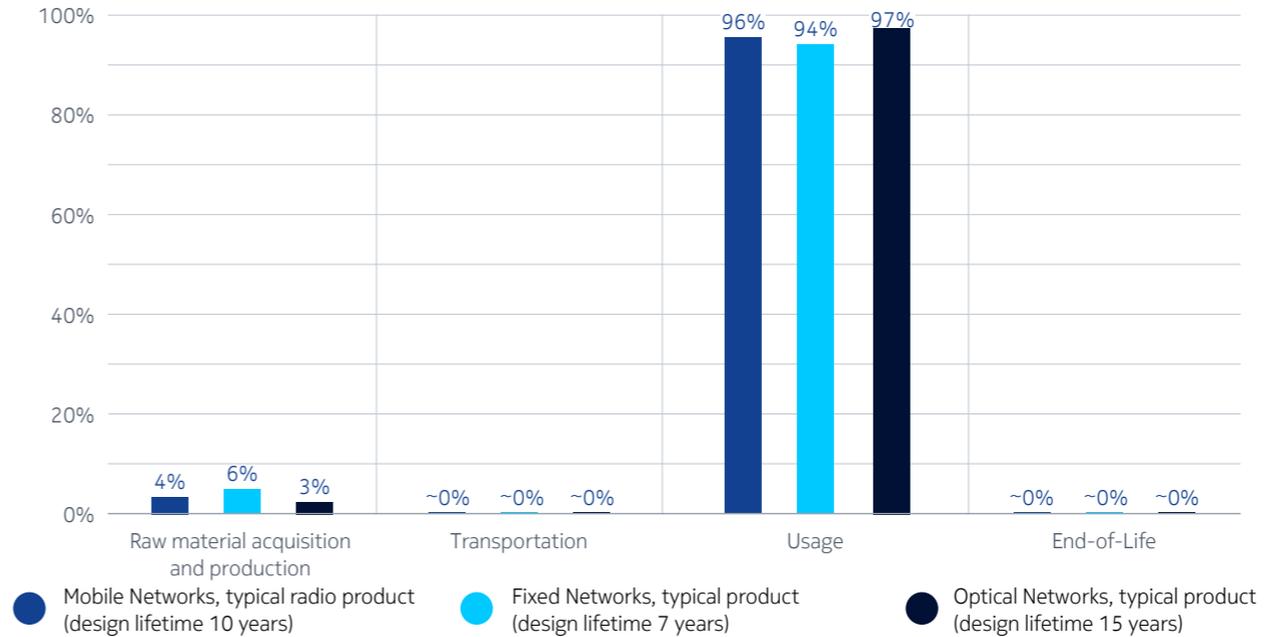
Water in our supply chain

2018 was the first year of active engagement on water issues with our suppliers. We have identified supplier categories where water may be a material risk and initially addressed them through a water assessment program.

As a result of our water assessment campaign, 150 of our top manufacturing suppliers representing 19 percent of total spend, participated in a water assessment via CDP water assessment program. Out of participating suppliers, 63 percent (94) had undertaken a water-related risk assessment for their direct operations and 41 percent have identified actual water-related risks in their operations such as increased water stress, flooding and higher water prices. 23 percent (34) of the responding suppliers also engaged with their own supply chain on water risk, and a further 9 percent are planning to do so in the upcoming two years. In comparison with our direct suppliers, who saw water stress, flooding and prices as core risks, tier 2 suppliers see also drought and increased water scarcity as issues.

55 percent (88) of the suppliers have a company-wide water policy, including elements such as commitment beyond regulatory compliance,

% of water from different product life cycle stages



Based on product life cycle assessments of typical configurations. Please see a list of processes included in each of the life cycle stages next to product greenhouse gas life cycle assessment chart on page 71.

commitment to water stewardship and collective action, description of business impact on water and description of water-related performance standards for direct operations as well as company water targets and goals.

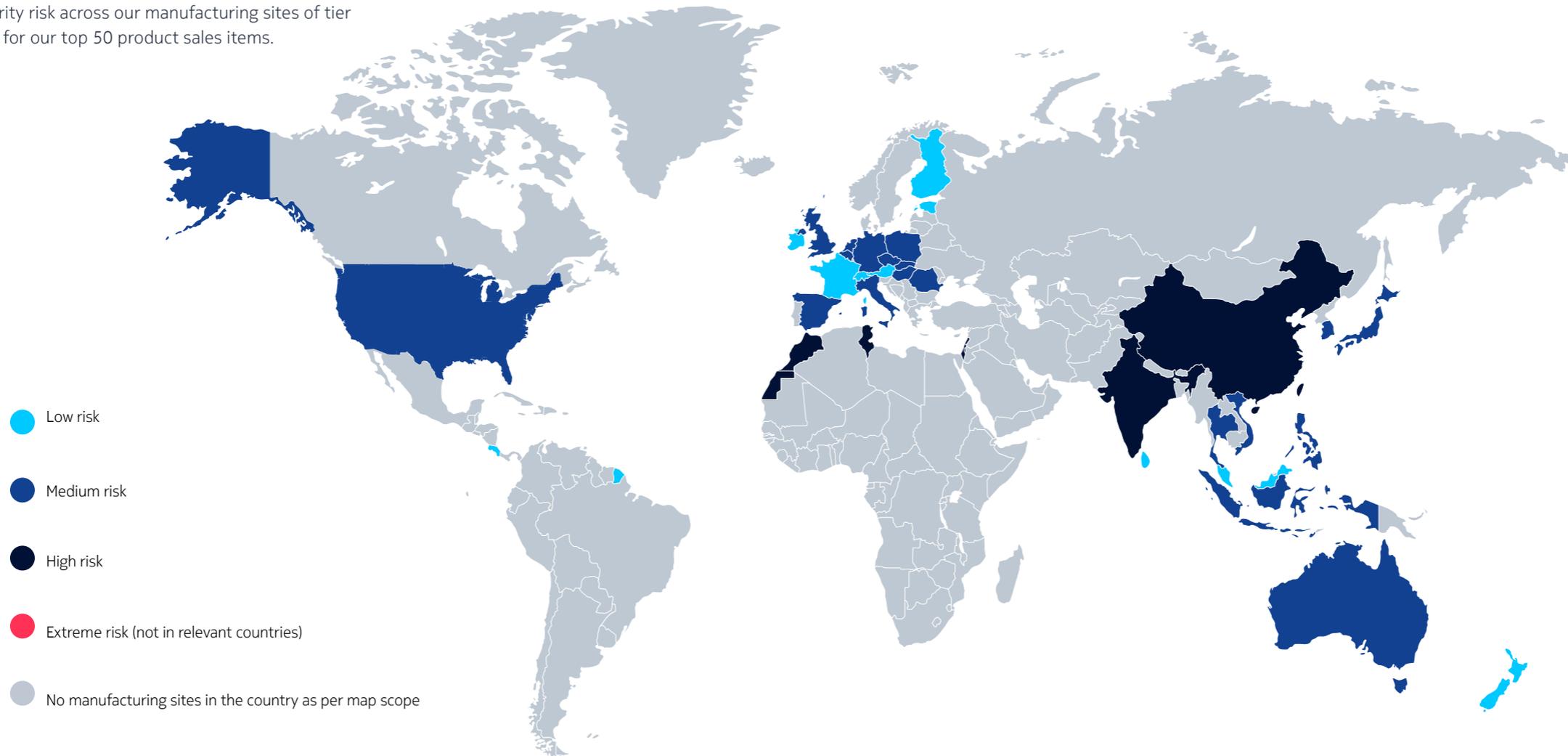
68 percent (102) of the suppliers reported water consumption information and 61 percent (91) water discharge information. 54 percent (81) of the suppliers reported a structured target or goal.

A structured target is considered to be one with a defined level (e.g. company-wide or basin), any quantified metric (e.g. percent reduction in total water consumption), and an end year.

Currently, a comparison to industry level responses in CDP Water is challenging due to the small amount of companies from our sector.

Water risk countries

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



Water security risk evaluation source Verisk Maplecroft.

Conducting our business with integrity

Our business is built on the foundation of trust. Our Code of Conduct expresses our personal commitment to earn this trust every day, in all of our business activities and in every country where we work. It reflects our values through clear and simple direction for all of our employees and business partners and defines the principles of ethical and compliant business practices.



Highlights in 2018

887

Ethical concerns
reported through our Ethics Helpline

364

Sustainability audits
implemented in supply chain

210

Ombuds leaders
in 75 countries in more than 150 cities

One
of the
World's Most Ethical Companies
as honored by the Ethisphere Institute
in 2018 and 2019

Internal
Human
Rights

Impact Assessment
undertaken by
external assessor

Ethical and responsible business

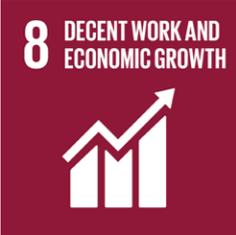
Integrity is at the core of how we do business and our Code of Conduct provides the foundation for our employees and other stakeholders to act responsibly.



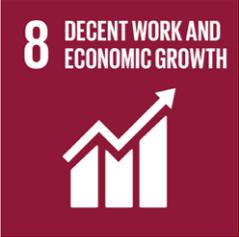
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Conducting business with integrity</p>  	Ethical Business Practices and Corporate Governance	<p>2020 Employee/Line Manager engagement on importance of ethics and compliance. 75% favorable answers targeted.</p>	Progress of this target is measured with a question in our anonymous employee survey (CCT) "Does your line manager periodically talk with you and your team members about the importance of ethics and compliance?" In 2018 77% (72% in 2017) of responding employees gave a favorable response.	 Achieved
		<p>2030 Employee/Line Manager engagement on importance of ethics and compliance. 85% favorable answers targeted.</p>		 Ongoing - on track
		<p>2018 Ethical Business Training (EBT) completion: 95%.</p>	The training was completed by 95 % of Nokia employees. ✓ Assured	 Achieved
		<p>2020 EBT completion: 98%.</p>		 Ongoing - not on track
		<p>2030 EBT completion: 100%.</p>		 Ongoing - not on track
		<p>NEW target 2020 (to replace the 2020 and 2030 targets): Ethical Business Training (EBT) completion: 95%.</p>		

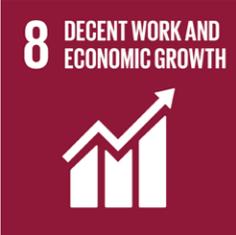
Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Conducting business with integrity  	Privacy and Data 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.	Protection of critical information ecosystems on target level, 95% of identified critical and high audit findings closed. Employee engagement with security culture program clearly above targets.	 Ongoing - on track
	Preventing product misuse	2018 Conduct a formal Human Rights Impact Assessment for the new Nokia product portfolio with an externally verified expert.	Human Rights Impact Assessment for the Nokia product portfolio was conducted with an externally verified expert between July 2018 and March 2019.	 Achieved
		2019 Successful completion of the first GNI assessment.	Preparation for the GNI assessment was started in late 2018 and will be completed by October 2019.	 Ongoing - on track
		2020 Nokia as externally recognized leader in vendor related issues in freedom of expression and right to privacy according to external benchmarking, e.g. Ranking Digital Rights.	In 2018 we continued our strong Human Rights Due Diligence (HRDD) program to mitigate potential misuse of technology to limit freedom of expression and privacy. We published further anonymized cases in this report and continued to engage in stakeholder dialog through speaking and other events.	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Conducting business with integrity  	Labor conditions / suppliers and partners	2020 Comprehensive supplier sustainability risk mitigation (90% of suppliers assessed with Satisfactory Sustainability Score and 100 on-site audits conducted per year).	74% suppliers achieved a satisfactory EcoVadis score (71% in 2017) and we conducted 75 on-site audits (72 in 2017). ✓ Assured	 Ongoing - not on track
		2020 Establish supplier worker empowerment program (enabling trainings on NokiaEDU and Worker Tollfree Helpline).	Nokia Ethics Helpline enables capturing supplier grievance. Channel is communicated to suppliers at Suppliers Corporate Responsibility Workshops.	 Ongoing - on track
	Materials traceability and conflict minerals	2018 Achieve full traceability to the smelters in our supply chain and their conflict-free status (Mobile Networks).	97% of our suppliers have achieved full visibility into the smelters in our supply chain. 84% of smelters identified as part of Nokia's supply chain were validated as conflict-free or are active in the validation process. ✓ Assured	 Not achieved
		2020 Achieve full traceability to the smelters in our supply chain and their conflict-free status (Nokia Group).	(The same percentages are valid both for Mobile Networks and Nokia Group).	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
Conducting business with integrity  	Health, Safety, and Wellbeing	2018 100% of all suppliers delivering high-risk activity to be assessed using Nokia H&S Supplier Maturity Assessment Process.	100% of suppliers delivering high risk activities were covered by H&S Maturity Assessments. ✓ Assured	 Achieved
		2020 50% of suppliers delivering high risk activity to meet or exceed H&S preferred supplier status.	We are first focusing on getting 100% of suppliers to compliant-level (score 3/5; 89% of suppliers in 2018) ✓ Assured and concentrating then gradually to preferred-level (score 4/5).	 Ongoing - on track
		2030 100% of supplier delivering high risk activity to meet or exceed H&S preferred supplier status.	We have an active program ongoing, please see comments on 2018 and 2020 targets.	 Ongoing - on track

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.

Throughout our more than 150-year history, we have nurtured and maintained a culture of high integrity where every employee is held accountable and responsible for upholding our ethical values and for conducting business with unwavering standards of integrity, embracing both values and rules.

Code of Conduct

We have a Code of Conduct that is applicable to all our employees, directors and management, as well as a Code of Ethics applicable to the President and CEO, Chief Financial Officer, Deputy Chief Financial Officer and Corporate Controller. Our Code of Conduct sets down the key principles and practices of our ethical business approach to all daily activities and business dealings and provides clear guidance to our employees as well as other stakeholders.

We are committed to following and upholding the laws and regulations in all countries where we operate. The high standards of our Code of Conduct

include basic legal guidance and information on key ethical behavior standards. Our Code promotes personal integrity and ethical decision-making in daily work and various business scenarios and protects our valuable reputation.

The Code of Conduct is further enhanced by non-exhaustive 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 Interests, 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.

The Code underpins all conditions of labor regulations and is supplemented and strengthened with human rights policies and procedures that underscore how we aim to ensure fair employment. Equality and respect are fundamental to our company's culture, where a diverse and inclusive workplace provides opportunities for achievement and growth based on merit. We strictly prohibit any form of discrimination, retaliation, or harassment, including sexual harassment.

In 2018, we launched a new initiative, Respect@ Nokia, aimed at raising awareness among our

Five simple principles define how our employees are expected to behave:

- Obey laws and follow policies
- Be fair and honest
- Treat each other with respect
- Declare conflicts of interest and avoid appearance of impropriety
- Report any concerns promptly

employees and ensuring that all employees give and receive respect, irrespective of their diverse backgrounds and orientation. The campaign also focused on raising awareness that in line with our values, we do not tolerate harassment of any kind, including sexual harassment, in our workplace. The campaign was jointly launched through a video message from our CEO and Chief Legal Officer.

Our Compliance Policy Owner program is a critical element of our overall compliance program. Each of the 14 key compliance policies in our Code is managed by a designated functional expert, who is the identified subject matter expert responsible for monitoring that the company remains compliant with laws and regulations, adapts to changing market conditions and business imperatives, and incorporates evolving best practices standards into their programs so that all employees are aware of the policies, laws, and regulations to which they must abide.

The Code is cascaded to employees via a mandatory Ethical Business Training that requires an acknowledgment and commitment to the Nokia Code. The 2018 Code acknowledgment requirement

was communicated broadly via intranet resources, emails, social media posts, and line manager notices. The Code is accessible from various resources, including a company mobile app, initially launched in 2015, to reach out to our highly mobile and tech-savvy workforce. The Code is available in 24 languages and publicly available in English, please see our [Code of Conduct](#).

We work closely with licensees to ensure adherence to the same standards of ethical business across all interactions and to help ensure responsible sourcing and globally acceptable labor practices. To this end, we require our licensees to follow strict requirements based on our Code of Conduct, privacy, security, and anti-corruption policies, human rights, trade compliance, environmental policy as well as marketing and product quality requirements.

Leadership engagement, accountability and compliance oversight

Our unceasing commitment to integrity spans the organization vertically from the Board of Directors, through the leadership to employees at every level of the organization, and horizontally from our base in Finland to our far-flung operations in Asia, Africa, Europe, the Middle East, and the Americas.

Our Chief Compliance Officer (CCO) presents separately and independently to the full Board 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 GLT members, once 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.

The structure of our organization is designed to maximize the effectiveness of the program. The Ethics and Compliance (E&C) organization is matrixed, with dedicated compliance leaders for each of the company's six regions plus China, which is covered by the Nokia Shanghai Bell (NSB) compliance team. Another compliance team is focused on supporting Nokia's business groups. This structure ensures that compliance risks are identified and managed both horizontally and vertically. In addition to the dedicated E&C organization, our Legal Team is an integral part of the compliance program and is vested with the responsibility to drive compliance in their daily operations and those of their assigned client groups.

The regional and business compliance program is complemented through other compliance operating forums, such as the Compliance Operation Reviews (CORs) and the Disciplinary Committees where leaders – and not the compliance team – own and are accountable for compliance. CORs are led by the business or country head, with active participation from senior leaders from the finance, HR, services and procurement teams, and are a critical part of our strategy of leadership engagement and ownership in all aspects of compliance. At each level and in each forum, leadership engagement is a critical part of the structure.

Compliance reimagined – 2018

In 2018, we continued to build on the theme of Compliance Reimagined. We executed on ambitious goals and implemented key initiatives supporting these goals throughout the year, including:

- Go Local initiative, which targeted compliance at the grassroots level
- Compliance training sessions, policies, and processes deployed in our Service Companies as well as in Joint Ventures
- Data analytics and monitoring activities incorporated into our Third-Party Program elements to stay ahead of risks
- Comprehensive 360-degree Compliance Risk Assessment, including soliciting employee feedback through an Employee Compliance Survey
- Global deployment of the Nokia Compliance Controls Framework (CCF) and mitigation of compliance risks by addressing identified gaps
- Compliance Operating Reviews, focused on identifying operating compliance risks in collaboration with business teams
- Robust compliance program deployed after a merger or an acquisition – ensuring that new employees were inducted into Nokia's culture early in the game
- Comprehensive and pertinent training calendar that included online training seminars as well as face-to-face training sessions to raise awareness and sustain the culture
- Anti-corruption risks managed by our specialized Center of Excellence (CoE) with emphasis on strengthening and streamlining policies, processes, and support and
- Year of the How, focused on establishing compliance as a strategic business partner.

Open reporting – Global Ombuds Program

The Ombuds Program was launched globally in April 2017 and continued to be deployed in 2018 to further strengthen our company’s 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 addressing wrongdoing by expanding the existing channels currently available for raising concerns.

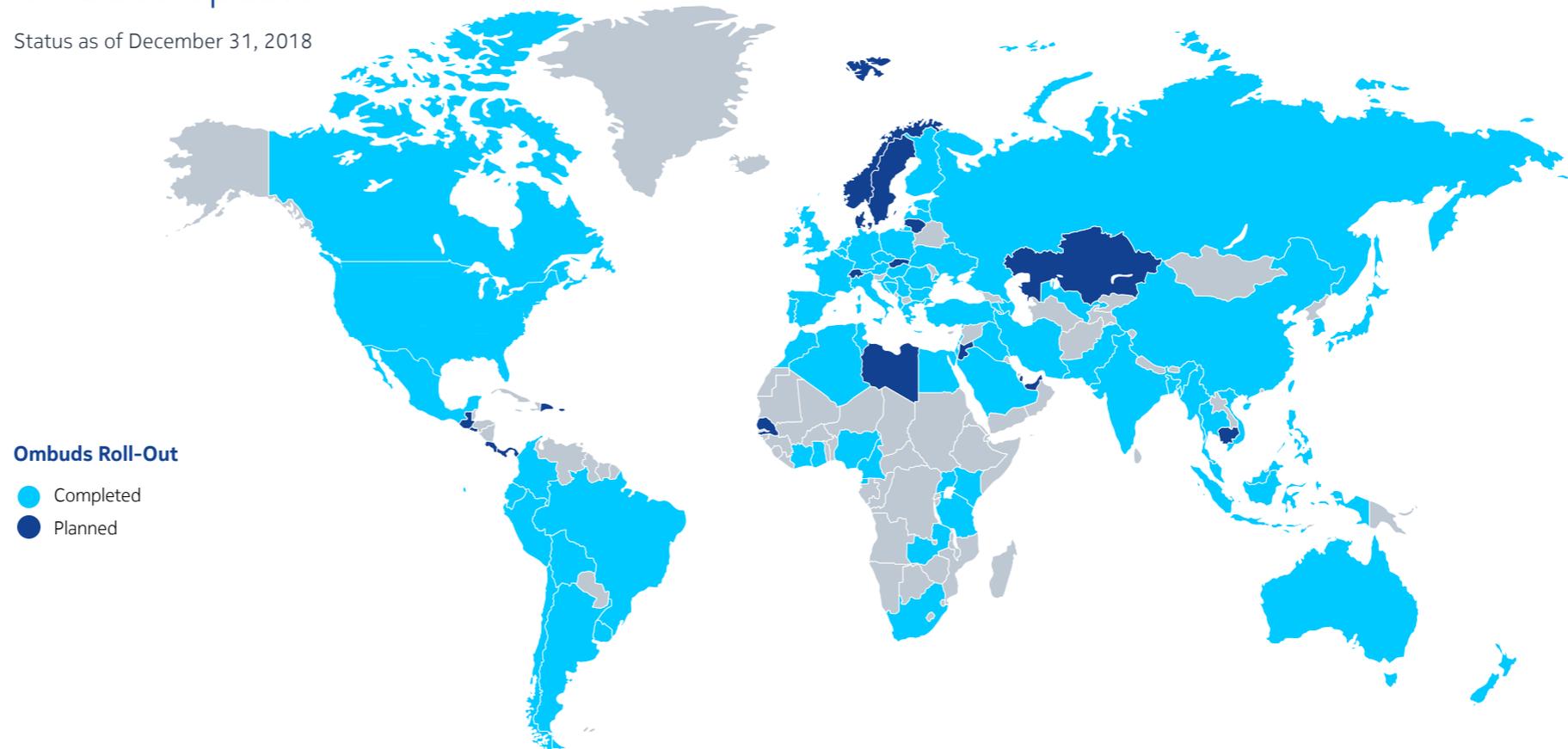
In addition to the program rollout, the Space to Speak awareness campaign was launched globally to spread awareness on the program and the role of local ombuds representatives.

Compliance risk assessment and mitigation

Evaluating ethics and compliance risk is critical to our success. As a result, we have implemented a systematic and structured approach to risk management across our business operations and processes. Key risks and opportunities are primarily identified against business targets, either in business operations or as an integral part of financial planning. These key risks and opportunities are analyzed, managed, monitored and identified as part of overall business performance management with the support of risk management personnel. Risk management covers strategic, operational, financial, and hazard risks and is focused on eliminating risk, as well as managing the key risks that would prevent Nokia from meeting its objectives.

Ombuds Update

Status as of December 31, 2018



Ombuds Roll-Out

- Completed
- Planned

Ombuds Landscape

- 210 Local Ombuds Leaders Based in
 - 75 countries
 - 150+ cities
 - ~80% employee coverage

2018 Statistics

- Overall, 750+ questions, concerns and requests for guidance raised
- 72 issues reported to Ethics Helpline
- 25 cause found cases

2019 Priorities

- Global rollout continuation
- 2019 refresh (Ombuds reaching 2-year tenure)
- Training/communications
 - Ombuds Handbook
 - eLearning module
 - Targeted compliance training
- 2019 Integrity Week Activities

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

1. Quarterly Enterprise Risk Management (ERM)
2. Annual company-wide compliance risk assessment exercise to understand potential compliance issues that employees may face and to provide appropriate support to help them deal with compliance risk and
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.

Each of these processes provides a unique opportunity to probe more deeply into the business, functional, country and/or entity specific risks. 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.

The CCF review is used as part of a compliance package and to enhance engagement, for example:

1. Round table with senior management on exceptional compliance risks faced and how to remediate them.
2. Targeted face-to-face training
3. Encourage open discussion of compliance risks faced and instigate buy-in and

Compliance Control Framework Reviews – The Concept



4. Demonstrate compliance presence and oversight in dark corners.

In 2018, E&C carried out 22 CCF reviews, including ten country CCF reviews, two Business Group reviews (ASN & India Global Delivery Center), eight Service Companies, and two Joint Ventures.

Gauging effectiveness

In addition to these assessments, we continuously engage with employees through anonymous surveys to gauge the effectiveness and understanding of our compliance program across the workforce. In 2018,

we introduced a new Employee Compliance Survey as part of our risk assessment program:

- 16 questions addressing: Tone from the Top, Compliance Program effectiveness, Improper Payments, Conflict of Interest, Data Protection, Privacy, Fair Competition & Trade Compliance
- Delivered by an online tool and responses were anonymous
- 19876 employees responded and
- Results were overall good – between 82 percent and 96 percent of the responses were favorable.

Findings from the Survey were integrated into the 2018 Compliance Risk Assessment alongside other inputs (CCF reviews, Compliance Operations Reviews and Internal Audit review results, Compliance investigations, CCT survey results, etc.)

Employee and other stakeholder inputs are actively sought to further develop the company's program through round-table meetings with business leaders at our sites around the world, as well as inclusion in external presentations to various stakeholder groups. This is shown through the inclusion of ethics and compliance in discussions with key suppliers as part of ongoing training and engagement. We use these multiple feedback channels to drive and enhance the culture of continuous improvement in our compliance program.

On an annual basis, our Internal Audit team also collaborates with the compliance team in audits and through other inquiries that assess the effectiveness of our compliance processes and controls. This included anti-corruption risk reviews covering expense statements, petty cash, bank account access, revenue recognition, selection and use of supplies. The Internal Audit team collaborated to take steps to mitigate all risks identified during these reviews.

And lastly, Internal Audit is called in by the E&C organization to assist with investigations that are financial in nature. These requests are treated with high priority and other work is reprioritized to provide the needed resources, often altering the internal audit plan to address these priorities.

Similarly, Internal Audit also attends the quarterly E&C regional reviews where issues that have been identified through audits are presented and discussed. Internal Audit also involves the E&C organization when ethics-related issues are identified in audits. This may involve potential issues of employee fraud, third party onboarding and/or due diligence, and gifts and hospitality policy.

Compliance training program

Effective and engaging compliance training for all employees is an essential component of our compliance program. We require that every employee completes annual training in ethical business practices, as well as other live and web-based targeted training, on topics such as anti-bribery, competition law, conflict of interest, and privacy.

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

Course content for both live and web-based training sessions is constantly assessed to ensure that it incorporates best practice standards for ethics and compliance training. All training includes real life scenarios, knowledge checks and links to important company policies, procedures and contacts, where applicable.

In 2018, live training sessions were delivered to business groups, to relevant stakeholders, to regional groups, including country engagement sessions, and

“Wisdom is knowing the right path to take. Integrity is taking it.”

to service companies, with over 7 800 individuals receiving face-to-face training in the 236 live training sessions held across the globe.

The Ethical Business Training module is one of the mandatory web-based training courses that was deployed in 2018. This training includes a review of all 14 policy areas in our Code of Conduct including: ethics in the workplace, fair competition and anti-trust, trade compliance, privacy, bribery and corruption, gifts, entertainment and hospitality, conflicts of interest, human rights, environment, equal opportunity, discrimination, and harassment. We achieved 95 percent completion globally by the December 31, 2018 deadline.

Compliance communications program

Compliance communications are necessary to ensure that all employees are knowledgeable about and understand the laws, regulations and policies that apply to them. In addition to formal training, we have developed a robust and comprehensive communication and awareness program to foster a culture of integrity, to enhance compliance awareness, and to ensure adherence to the Code and related policies.

We employ two different approaches for communications:

- Global – communications are distributed to all employees
- Regional – communications are customized to reflect local initiatives and requirements.

The Ethics & Compliance 2018 Communications Plan utilized various communication vehicles to keep the messaging dynamic and interesting, including: town hall meetings, push emails, newsletters, Yammer posts, compliance blogs, a dedicated line manager newsletter, and multimedia training. In addition, the dedicated Ethics & Compliance website consolidates essential compliance resources into one central location and facilitates continuous reinforcement of the company’s commitment to compliance and integrity.

In 2018, we also designed and deployed two engaging, informational videos. Our Open Reporting video emphasized the importance of a speak-up culture and reporting concerns. The video also attempted to demystify the investigations process by explaining what happens after a concern is raised. The Ombuds Program video reminded employees to utilize the growing Ombuds network, letting them know that we truly want to hear the voice of our employees, and it encouraged all employees around the world to feel empowered and comfortable speaking up about compliance.

To support the initiative, core and customized regional activities were planned that were designed to:

2018 Integrity Day

Total number of employees who read Chief Compliance Officer’s blog of November 7

2 288

(as of January 22, 2019)

Number of Compliance Hero Recipients

15

Number of employees who attended the on-site activities (estimated):

~7 520

Number of sites that reported on-site activities

90

- drive awareness of how integrity impacts employees in their everyday work
- promote integrity as a fundamental way of how we conduct business
- lead by example by providing tangible, concrete examples of integrity in the workplace
- engage and enable employees to comply and align with Nokia’s core values

Feedback from the 2018 Integrity Week was exceedingly positive, with robust and global engagement of employees and senior leaders. Local events were held at 90 sites globally with an estimated 7 500 attendees participating in person in the activities held around the globe. The Integrity

Integrity Day

In 2018, we hosted a global Integrity Day event, providing a dedicated opportunity to reinforce our core values and commitment to doing business with integrity. The goal of Integrity Day is to engage with employees globally to create awareness around the Code of Conduct, reporting channels, policies and other important compliance initiatives. We do this in numerous creative and interesting ways, reinforcing the message that business integrity is not just a corporate responsibility, but a personal one for every employee.

Day event wrapped up with the announcement of our 2018 Compliance Hero Award Recipients. This program, created in 2017, was designed to recognize employees who uphold and exhibit exemplary ethical values and behavior. In 2018 we received 29 nominations for the award, of which 15 employees were recognized as compliance role models in one or more of the following categories: Speak Up; Challenge; Determination; Respect and Excellence.

Reporting of ethical concerns without fear of retaliation

It is paramount that we maintain a culture and atmosphere of trust among our employees. This ensures all employees feel comfortable in bringing concerns and potential violations of the Code of Conduct to our attention, without fear of reprisals, retaliation, or negative response. We clearly state in our Code of Conduct that there is zero tolerance for retaliation related to reporting of ethical concerns. Confidentiality is guaranteed.

We offer multiple channels to report ethical concerns, through a dedicated email address, online portal, or via dedicated country-specific phone numbers. We respond to and investigate all concerns promptly and take any necessary corrective actions. All concerns are logged and tracked regularly. Our Helpline is open for employees and external stakeholders. Our Ethics Helpline allows for anonymous reporting.

In 2018, our Ethics & Compliance Office received 887 concerns of which 248 were investigated by our Business Integrity Group as alleged violations of our Code of Conduct and 92 allegations

Number of ethical concerns reported



were substantiated with “cause found” after investigations. For 2018, we also implemented corrective actions including 24 dismissals, and 16 written warnings, following these and other investigations. The number of concerns and requests for guidance reported to the Helpline increased by 30 percent from 2017. This increase is largely attributable to the continued efforts by the compliance team to promote a culture of open reporting in the company. Specifically, two concerns were received as alleged violations of our anti-

bribery policies, involving third parties, but neither of these concerns was substantiated.

During 2018, we expanded our efforts to encourage employees to use the Ethics Helpline beyond reporting concerns or potential compliance violations. The Helpline also welcomes requests for guidance on ethical dilemmas or questions regarding the application of company policy to particular situations. The result of these efforts was reflected in the increase in the number of reports in 2018.

Helpline Information: Email: ethics@nokia.com;
 Online website: www.nokia.ethicspoint.com; Phone:
www.nokiaphone.ethicspoint.com.

Number of ethical concerns reported in 2018

Conflict of interest	55
Controllership	74
Dealing with government officials	0
Fair competition	9
Fair employment (all HR-related concerns)	336
Guidance	186
Human rights	2
Improper payments	13
Intellectual property and confidential information	59
Privacy	8
Trade compliance	5
Wellbeing, health, safety and environment	24
Working with suppliers	58
Other	58
Total number of concerns reported	887

Number of investigations by the Ethics & Compliance Office



Number of employees dismissed on grounds of a violation of the Code of Conduct



Ethical business – case examples of reported concerns

Issue raised	Our guidance	Actions taken
Country IT Manager made purchases of phones and computers without POs and for personal gain.	Nokia Code section on Controllershship emphasizes that an employee must not misrepresent financial records, including falsifying expense reports.	The allegations were substantiated and employee was terminated for cause.
Employee (on last day of employment) was believed to have downloaded Nokia confidential and proprietary information for non-Nokia uses.	Nokia's confidential, proprietary, and trade secret materials are among its most valuable assets. Theft, misuse or misappropriation of Nokia's intellectual property is both a violation of company policy and – in many countries – a violation of the law.	The allegations were substantiated and Nokia took recovery action against the individual.
Alleged conflict of interest between Nokia employees and subcontractor that was paid several unusual one-off payments.	Nokia Code section on conflict of interests states we act in the best interests of Nokia and use Nokia property and resources primarily for Nokia's benefit.	The COI allegations were not substantiated; however, management visibility over certain cost centers was improved.
Previously blacklisted vendors secured subcontractor engagements with contractors hired by Nokia – in an attempt to circumvent the supply chain blacklist.	Nokia Code section on Working with Suppliers makes clear our expectation that suppliers be qualified to Nokia standards, approved for use, and share the values expressed in our code.	The allegations were substantiated and future supplier contracts modified to contain a clause prohibiting recurrence and for compliance visibility to subcontractors used by Nokia vendors.

Above are anonymized illustrative examples of investigations carried out in 2018 by our Business Integrity Group.

In 2018, 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 tax payments.

Anti-corruption, Center of Excellence & Third-Party Program

As part of our efforts to ensure continuous improvement, in 2017 we had launched a dedicated Anti-Corruption Center of Excellence (COE). The mandate of the COE is to efficiently manage the sales third-party onboarding processes, using

a risk-based approach; review and approve gifts, entertainment, hospitality, donations, and sponsorship requests and related monitoring, and engage in data analytics activities.

In addition to driving awareness through training and communications, the COE employs two critical tools to implement the company's anti-corruption program. First, requests to pre-approve gifts, hospitality, sponsorships and donations extended to external parties are entered by employees into the online Gifts, Travel and Entertainment (GTE) Tool in accordance with relevant procedural requirements. Second, all requests

to onboard sales third parties are entered in the online Third-Party Screening Tool (TPST) in accordance with relevant procedural requirements.

We employ a multi-faceted approach to anti-corruption issues. We have clear and unequivocal policies concerning improper payments, facilitation payments, gifts and hospitality, sponsorships and donations, and other risk areas. We carry out training and regularly communicate to our employees regarding risks, and we review these risks and our mitigation measures with the company's senior leadership and Audit Committee.

We carefully screen and monitor any commercial third-party representatives engaged to act on our behalf and we demand the same high standards of conduct from them. We conduct periodic audits and risk assessments to ensure that we identify and respond to anti-corruption risks. We expect employees to ask questions and raise concerns whenever they believe there is a potential law or policy violation, and we investigate all such concerns in a prompt, thorough and objective manner. When an investigation confirms a violation, individuals are held accountable.

To properly address anti-corruption related issues, the company has developed and implemented a global Improper Payments program that reaches all of our employees, as well as our business partners. The program is comprehensive and consists of several complimentary anti-corruption policies, procedures, processes and guidance designed to prevent the offering, giving, or receiving of improper payments, with emphasis on interactions with government officials. Such payments include facilitation or so-called “grease” payments, improper gifts, entertainment, gratuities, favors, donations or any other improper transfer of value.

The company works closely with its third parties (both on the sales side and purchasing side) to encourage adherence to the same standards of ethical business across all interactions and to help ensure responsible sourcing and globally acceptable labor practices. We actively engage with our distributor partners, based on a foundation

of mutual trust, helping them build their own robust compliance programs and at the same time establishing lasting relationships that extend beyond developing business.

Our program is designed to ensure that we only engage reputable commercial third parties who share our unwavering commitment to ethics and integrity and meet our stringent due diligence standards.

We require our sales third parties to acknowledge our **Commercial Third-Party Code of Conduct** (available in eight languages) during the onboarding process, after having gone through a thorough screening exercise. It relays Nokia’s expectations to its commercial third parties on ethical conduct and covers key compliance risks under the three main topics of: Legal and Regulatory Compliance (anti-corruption, trade compliance, insider trading, anti-trust, anti-money laundering); Ethical Business Practices (conflict of interest, privacy, intellectual property, record-keeping, confidential reporting); and Environmental and Social Regulations (fair employment, environment, health and safety and human rights).

We also follow a strict no agents rule that prohibits the use of commercial agents in virtually all of our commercial dealings, other than in exceptional cases or where required by law. We believe that every commercial partner we engage must bring tangible and material value. Agents who broker deals or provide only consultancy services in a deal are strictly

prohibited from working on our behalf. This reduces the risk of corruption considerably.

We drive awareness of the specific requirements of relevant procedures and processes through global communications and targeted trainings by delivered by our Regional and Business Compliance Counsels, not only covering our own employees, but also our sub-contractors and customers, where necessary.

Competition laws

Our competition law compliance program aims to ensure that we meet our goal of full compliance with applicable competition laws. We compete fiercely, but fairly. We are committed to complying with competition laws everywhere we do business. The competition compliance program consists of an implementation and monitoring framework, systematic awareness raising and mechanisms for incident reporting and management. Competition law compliance is integrated into our Code of Conduct through the competition policy statement and manifested in our group-wide Competition Law Compliance Policy. The policy statement highlights some key issues for employees to keep in mind and watch out for in the field of competition law.

Competition law compliance policy

Competition law is covered as one important compliance area in our annual Ethical Business Training that is mandatory for all employees. In addition to this mandatory training, Nokia arranges other types of training sessions and awareness-raising activities to ensure that relevant employees

are familiar with competition rules. We arrange for example web-based and face-to-face training exercises and refreshers for targeted employee groups in need of deeper understanding of applicable competition rules and potential risk areas.

In 2018, targeted competition training sessions were provided, for example, to our compliance leaders and to the L&C organization. These covered many competition areas including dealing with competitors and collaboration in tenders, procurement, and implementing our global dawn raid guidelines. Our group-wide Competition Law e-learning, revised and launched in 2016 to reflect the company reorganization, is required for all our employees to whom competition law may be relevant in their work.

The Competition Law e-learning provides employees with an overview of the basic competition rules on dealing with competitors, suppliers and other business partners, and the abuse of dominance. It provides some typical risk scenarios and covers different practical situations and case examples, thereby providing an understanding of how competition law may play into the daily work in different circumstances.

The Competition Law e-learning, the Competition Law Compliance Policy, along with some specific competition compliance guidelines and materials, as well as recorded training sessions and presentations, are available to our employees through the company intranet. There is a dedicated site for the competition compliance program under Fair Competition.

World's Most Ethical Award

We were honored in early 2019 for the second consecutive year, and third time overall, by the Ethisphere Institute as one of the World's Most Ethical Companies¹, owed to our strong compliance program, culture, and bold vision for the future. The award is given annually by Ethisphere, a leading organization for corporate ethics and compliance, to a small and select group of companies, following a rigorous evaluation process screening the company's policies, processes, social responsibility, governance, and compliance culture. Having weathered unprecedented technological change and absorbed companies with varying commitments to ethical practices, we have literally raised the bar for integrity in our field. In 2019 only four telecom companies globally were honored with this award.

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

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.

“As there is a growing movement and awareness regarding trust and integrity in today's businesses, Nokia is pleased to once again be recognized as one of the World's Most Ethical companies. It has long been part of the Nokia way to treat every business relationship according to the highest ethical standards.”

Rajeev Suri, President and CEO, Nokia

Addressing human rights

We are committed to the principles of the Universal Declaration of Human Rights and the United Nations' Global Compact, and we encourage our suppliers and business partners to share these values.

We endorsed the United Nations Guiding Principles on Business and Human Rights in 2011. On balance, we believe that connectivity and the technologies we provide are a social good that can support human rights by enabling free expression, access to information, exchange of ideas, and economic development. Freedom of expression is crucial to the development of knowledge and understanding and the access to information and ideas is essential to transparency and accountability.

Our Code of Conduct and Human Rights Policy guide our human rights work and activities. The most direct human rights risks related to our company and business involve the potential misuse of the technology we provide, particularly where it relates to lawful interception capabilities and activities by governments that relate to the network infrastructure equipment that we design, produce and support for telecom operators. Our Human Rights Due Diligence process helps ensure via our sales interface that human rights are not infringed

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 and 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

upon through the misuse of the technology we provide to our customers.

The ICT supply chain is multi-layered and diverse as we operate in many countries, and we recognize the risk that our employees, partners or agents may take actions that contradict our Code of Conduct or that customers and suppliers may similarly violate these principles, which could also have an adverse impact on our reputation, brand, or financial position. We therefore employ a range of processes and

procedures to mitigate these risks. Our work with our supply chain is discussed in more detail in the [Responsible Sourcing section](#) of this report.

The table above helps readers of this People & Planet report to find information on specifically mentioned human rights topics in relation to the requirements of the French duty of vigilance law. At this time, similar regulatory discussions are ongoing in other countries.

Respecting the right to privacy and freedom of expression – preventing the misuse of technology

Technology and services will have an even greater role in our daily lives as the world moves into what some call the Fourth Industrial Revolution.

5G, IoT, Cloud, AI and other newer technologies will enable digital lives, where billions of people and things are connected. The benefits are many – faster communication, access to social and economic opportunities, instant information and ideas, as well as social and environmental benefits. New technologies can make the world more inclusive.

However, we recognize that technology can be misused and as a communications technology equipment vendor, we have a responsibility to ensure our technology is not used to limit or infringe on human rights. We continue to work both in our own company and with the broader stakeholder community to drive the dialog on balancing the privacy rights of the individual with the increased need for security for both individuals and societies. For example, although our use of AI and machine learning is principally aimed at improving network performance and maintenance efficiency, we have proactively rolled out internal employee training programs that include internal and external expert presentations on AI in relation to privacy, data security, and human rights issues. We also have in place a Privacy by Design program across our product portfolio.



Our human rights due diligence

We carry out rigorous Human Rights Due Diligence (HRDD) investigations to mitigate potential risks posed by the misuse of our technology. The HRDD process is defined as a non-commercial cross-functional investigative process which is used to identify the potential risk of human rights violations through the misuse of our technology, while also attempting to identify ways to mitigate these risks to ensure compliance to our Human Rights Policy. Our approach provides a three-dimensional model to help identify potential risk cases early in the process and trigger the required HRDD investigation and senior-level approval/denial review where

necessary. Internal awareness and understanding of the potential human rights issues associated with the misuse of technology, as well as understanding of the Human Rights policy and HRDD process is paramount to ensuring our sales teams have the right knowledge to flag cases early in the sales process. Gatekeeping, checkpoints and triggers for the process are reviewed and where needed improved on an ongoing basis.

Our experience from HRDD case reviews over the last two years indicates a potentially rising trend in the so-called dual use of standard technology. When conducting risk assessments, we strive to

make a deliberate effort to focus on the operator or government's ultimate use of the technology (referring to this as the "use case"). Simply monitoring lists of individual product sales items is not a sufficient measure to adequately assess the intended use of the technology provided.

Transparency – a must to strengthen the overall dialog on human rights

Government requests for network shutdown or content blocking are received by telecom operators in many countries but are not received as such by network equipment vendors. Our customers, many of whom publish transparency reports on such requests, may on occasion come to us to implement a functionality in our equipment to comply with such requests, or in rare cases the authorities may be looking for equipment vendors to implement specific technical capabilities or solutions for example for direct access. We state clearly our position on these requests in our Human Rights Policy – we do not pursue business directly with intelligence agencies concerning such surveillance functionalities. Furthermore, we provide only passive lawful interception capability to those customers who have a legal obligation to provide such service as part of their license to operate – an obligation that is common worldwide for nearly all telecoms operators. This means we do not provide services or products related to post-processing, storage or analysis of interception data.

Working with others in our industry, we continue to call for increased transparency from governments

related to their surveillance activities and clarity on the laws and regulations governing these topics. We continue to actively engage with the industry, civil society, academia and authorities on achieving balance between the need for personal security and the rights to privacy and freedom of expression as fundamental human rights.

Commitment to external assessment

In 2018 we began the preparation process for our commitment to the Global Network Initiative (GNI) to undergo an external Human Rights assessment. We are a member of the board of GNI group of companies, civil society organizations such as human rights and press freedom groups, investors, and academics working together to protect and advance freedom of expression and privacy in the ICT sector.

As an initial step towards the GNI assessment, in 2018 we undertook an internal Human Rights Impact Assessment (HRIA) conducted by **The Business and Human Rights Group** (The BHR Group), a consultancy focused on human rights issues in the technology sector. The BHR Group worked closely with our human rights team in its preparation. The executive team at Nokia is the initial intended audience. The executive summary is available online.

In late 2018, we also began the planning and pre-assessment work for the full GNI external human rights assessment against the GNI Guiding Principles which can be found at globalnetworkinitiative.org/gni-principles. At the time of publishing this report the GNI assessment process is in the final stages of

reporting to the GNI board. We look forward to sharing more information in the near future.

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 2018 providing insight and examples on the robustness of our HRDD as well as showing both GO and NO GO 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.

Human Rights Due Diligence anonymized case examples

	Country	Requestor	Request	HRDD investigation	HRDD decision	Policy Principle
Case Example 1	High Risk Country	Governmental entity	To provide drones equipped with cameras for a Governmental transport authority for traffic safety purposes.	HRDD recognized the potential vulnerability for misuse for illegitimate surveillance purposes of camera-mounted drones. However, it was determined that in the proposed project (i) the Government end-user was exclusively focused on road and traffic governance and, in particular, had no duties or authority related to intelligence or law enforcement, and (ii) the cameras included in the project scope were not advanced enough to be well suited for surveillance (e.g. they could not be used to zoom in on license plates or in support of facial recognition technology). Consequently, taking account of country risks specifics, the nature of the end-users, and the technical capabilities of the equipment, the risk of the solution being misused for purposes other than legitimate traffic monitoring and road safety was determined to be very low.	GO 	Nokia will provide communication systems and standard networking capabilities to governmental customers for purposes such as public safety, railway communications, and smart city enablement. We will not, however, pursue business with intelligence agencies or similar institutions involving or relating to active surveillance.
Case Example 2	High Risk Country	Governmental entity	To provide a private 4G/LTE public safety network for Government use, including by law enforcement and intelligence agencies.	HRDD investigation determined that while the procuring entity and some end-users of the public safety network would be domestic intelligence agencies (potentially raising concerns given the human rights risk profile of the country), the project scope would not include any sensitive products or items that would provide any additional or enhanced surveillance capabilities with regard to existing commercial networks in the country. The closed network requested to be supplied would be used exclusively by national security related agencies and units for their internal communication and would not be connected to any networks open to the public. As a condition for engaging in the project, a specific signed certification would be obtained from the procuring agency confirming the nature and purpose of the network.	GO (with conditions) 	Nokia will not knowingly provide technology or services for the purpose of limiting political discourse, blocking legitimate forms of free speech, or otherwise contributing to activities that are not consistent with internationally recognized human rights standards. Nokia will provide communication systems and standard networking capabilities to governmental customers for purposes such as public safety, railway communications, and smart city enablement. We will not, however, pursue business with intelligence agencies or similar institutions involving or relating to active surveillance.

Human Rights Due Diligence anonymized case examples

	Country	Requestor	Request	HRDD investigation	HRDD decision	Policy Principle
Case Example 3	Extreme Risk Country	A non-governmental private entity	To provide a location-based monitoring enhancement feature to be activated in specific mobile network cells.	<p>The requested solution would enable the monitoring of the location of all subscribers connected to a given cell in a mobile network. The solution would track the location of all subscribers within the given cell (i.e. it would not be activated by/ targeted at individually selected user or device identifiers); however, it would only be implemented in specific cells (and not across any full network). The solutions would relay the required information to the standard 3GPP interfaces, and would not involve any features related to storing, analyzing, or post-collection processing of the information. Such a solution could be used, for example, to enable quick responses to unforeseen safety incidents in locations such as airports in situations where ID-based targeted tracking would not be possible within the required time to prevent serious injury to people or damage to property.</p> <p>HRDD further determined that the feature was a mandatory requirement for mobile operators in the relevant country. Furthermore, since the solution would be limited to selected cells, it would not enable indiscriminate mass surveillance or other large-scale monitoring activity. Conversely, the use case for specific safety sensitive locations such as airports was justified and could be effectively implemented through the requested solution.</p>	<p>GO</p> 	Nokia will provide passive lawful interception capabilities to customers who have a legal obligation to provide such capabilities. We will not, however, engage in any activity relating to active surveillance technologies, such as storing or analyzing of intercepted data.
Case Example 4	High Risk Country	Local telco operator	<p>The request was twofold with the aim of providing end-to-end lawful intercept via two independent solutions.</p> <p>1 Standard passive 3GPP/ETSI compliant lawful intercept capabilities for fixed and mobile networks in the telco network</p> <p>2 Active monitoring centre for Law Enforcement agency</p>	<p>1 Nokia does provide standard passive 3GPP/ETSI compliant lawful intercept capability to customers who have a legal obligation to provide such a service. This part of the request is acceptable and within our Human Rights Policy.</p> <p>2 The second part of this request included a monitoring center for the Law Enforcement agency. Given that Nokia does not, by way of policy, sell monitoring centers, nor any support or facilitation related to the implementation of monitoring centers (regardless of location or country), the request to supply a monitoring center was immediately declined</p>	<p>GO (passive standard lawful intercept)</p>  <p>NO GO (active monitoring center)</p> 	<p>Nokia will provide passive lawful interception capabilities as a feature of Nokia telecommunications products to customers who have a legal obligation to provide such capabilities. We will not, however, engage in any activity relating to active surveillance technologies, such as storing or analyzing of intercepted data.</p> <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.</p>

Responsible sourcing

The integrity of our supply chain is a critical but complex component of our own reputation and we work hard to collaborate with both customers and suppliers to drive transparency, sustainability and good ethical and business practice in the supply chain.

We put in place and communicate the processes, requirements, programs, procedures and policies to mitigate supply chain risks wherever possible. 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 drive improvements and share knowledge and experience.

We have three broad categories of suppliers:

1. Hardware suppliers which cover the materials that go into our products
2. Services suppliers which we offer to customers such as network planning, installation and maintenance and construction of the networks we supply and
3. Indirect suppliers which provide the goods and services we buy to conduct our business, (IT hardware and software, logistics, consulting, financial, legal, marketing and so on.

Our supply chain in a nutshell



Product + Services + Indirect

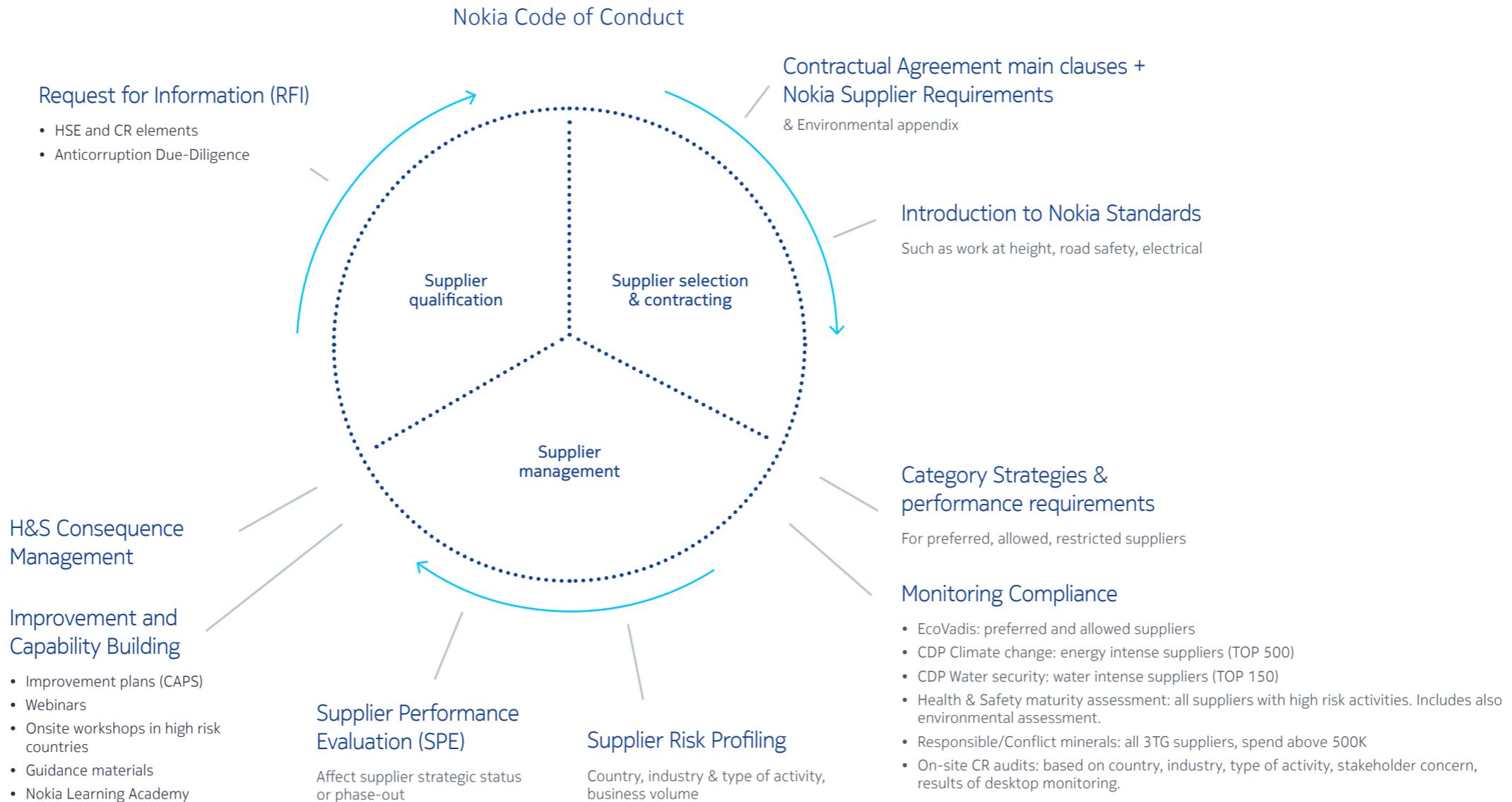
The majority of our manufacturing suppliers are based in Asia, whereas our services suppliers are located around the world.

In 2018, we had business with approximately 14 000 suppliers, 80 percent of our total supplier spend was distributed across approximately 450 suppliers. Our final assembly included our own factories in Finland, India and Poland as well as Flextronics, Foxconn, Jabil and Sanmina supplier sites.

Our Supplier Requirements are communicated to our suppliers as part of our supplier contracts, and we expect 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 addition, we have detailed appendices covering environmental requirements including Nokia Substance List applicable for hardware suppliers and health and safety for services suppliers.

We expect our suppliers to ensure they have in place the necessary management systems, resourcing, and a code of conduct that in practice show their commitment to good labor practices and working conditions, respect for human rights, and good ethical business conduct. We further expect and encourage our tier 1 suppliers to apply and cascade the same standards to their own suppliers. Our company purchasing procedures are strictly applied in our relationships with existing suppliers and whenever we engage with potential new 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 according to our standards and practices, requiring them to comply with all applicable laws and regulations, and show they share the values stated in our Code of Conduct.

Brief overview of supplier base management and corporate responsibility (CR)



Key figures of our supplier onsite audit program related to sustainability

Audit type	Corporate Responsibility audit	Supplier Requirements audit	Supplier H&S maturity assessment	Conflict Minerals audit
Content	Human and labour rights, health and safety, environment	CR elements covered as part of entire NSR sets of elements	Health & safety elements	Conflict minerals scoping, due diligence and risk management
Targeted suppliers	All	All	High risk services	Production (hardware)
Typical duration	1–2 days	1–2 days, CR few hours	3–4 hours onsite	1 day
Number of audits in 2017	72	47	900+ (cumulative)	10
Number of audits in 2018	75	38	~1 400 (cumulative)	10

Global supply chain related risks are identified as part of our materiality analysis and Enterprise Risk Management. We also carry out more in-depth analyses to determine all risks related to supplier activities. We take the outcome of these analyses and include them in our category strategies, noting the nature, magnitude, and monitoring as well as performance requirements for these risks. Our procurement teams revisit our category strategies annually. Our risk approach also takes into account the location of the supplier and the business context. We have both detailed KPIs and public global targets directly related to our supply chain activities. Suppliers and other externals also have the opportunity to raise any concerns through our Ethics Helpline. In 2018, out of the total 887 concerns raised via the Helpline, 58 cases related to working with suppliers (40 in 2017). 24 percent of these cases were reported by third party vendors. Read more on raising concerns on [page 90](#) under the Ethics and Compliance.

Overview on types of suppliers addressed through our CR programs

- Over 99 percent of relevant supplier base is covered by Supplier Health and Safety Maturity Assessment.
- Over 46 percent of supplier spend is covered by CDP supply chain climate change program.
- 98 percent of relevant supplier spend is covered by Conflict Minerals program.
- 58 percent of supplier spend is covered by EcoVadis sustainability assessments.
- 100 percent of supplier spend is covered by the Request for Information (RFI) process, related to anti-corruption due diligence, health and safety, and overall sustainability.

For on-site audits we do not measure the percentage as audits are risk-based.

Monitoring, assessment and auditing

We run assessments with our supplier network regularly to support them in meeting our ethical standards and improving performance where necessary. We monitor our suppliers through a variety of methods, of which the most important are:

Our Nokia supplier requirements audits

Our general audit covers the full set of supplier requirements, and of which corporate responsibility requirements are a subset. We commonly use this type of audit with new high-risk suppliers or when a supplier has seen a significant change in its business situation such as country location change.

Labor conditions and environmental management - in-depth audits

We 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 to review the environmental, labor, health, safety, ethics, and sustainable procurement management systems of our suppliers through a tailored questionnaire and supporting document reviews. We require suppliers to achieve at minimum a satisfactory score on EcoVadis and follow up with suppliers whose score is below satisfactory.

In 2018, we had 74 percent (71 percent in 2017) of suppliers on EcoVadis with a satisfactory performance score. We request that EcoVadis scorecards are renewed every 2 years.

In 2018, we implemented 364 (393 in 2017) supply chain audits which included 75 on-site audits on corporate responsibility topics; 38 were on-site audits against our full set of supplier requirements and 251 suppliers were assessed using the EcoVadis scorecards.

In 2018, we spent 190 auditor days conducting corporate responsibility in-depth audits (187 in 2017) at 75 supplier sites (72 in 2017). Countries covered by these audits were: Cameroon, China,

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)	3	0	3
Forced labor (contract agreement issues/fine/deduction etc.)	4	3	7
Health & safety	378	178	556
Freedom of association and right to collective bargaining	2	1	3
Discrimination	6	1	7
Disciplinary practices	10	1	11
Working hours	51	11	62
Remuneration	54	22	76
Management systems	180	125	305
Environmental management system	76	23	99
Total	764	365	1129

The table is based on 75 CR in-depth audits conducted in 2018.

Colombia, India, Malaysia, Mali, Mexico, Myanmar, Peru, the Philippines, Senegal and Togo and reached a total of around 49 000 supplier employees.

We found 764 instances of non-compliance of which 378 related to health and safety, 76 related to environment. Based on the findings, we made 1 129 recommendations for improvement, and these are being addressed through corrective action plans. See examples on the following page. As part of the 75

audits, seven of the audits were conducted through our customers' Joint Audit Cooperation (JAC) framework.

Audit closure is a continuous challenge – our target is to close CR onsite audit findings within six months of the audit. In 2018, timely closure of audits stood at 52 percent. We realize this must be improved and will make increased efforts to achieve a higher percentage closure going forward.

Examples of identified non-compliance and actions taken

Category	Non-compliance identified	Actions taken by supplier
Forced Labor	The proportional payment of the cost of the course / seminar / training is made in case of labor resignation within the following six months from the training.	This finding on forced labor is in the process of closing with Nokia's recommendation that paying back of the training course by the employees shall be stopped/not practiced in cases where the training is a necessity for executing the job a person is assigned to.
Remuneration	Workmen's compensation benefit is not in place.	The workmen compensation benefit was issued to employees.
Health & Safety	Health & Safety Hazard Identification and Risk Assessment is not done yet.	Health and Safety Hazard Identification and Risk Assessment were completed throughout the business units. Control measures have been put in place.
Working hours	Excessive overtime work observed for employees and there is no evidence of compensating the overtime work performed.	Working time ensured on a monthly basis jointly with Nokia though proper recording with assigned responsible person for the same so that the working time should not be exceeding the total manhours as per statutory requirement. Arrangements were done to change in shift timings where necessary. Additionally: 1. Supplier has plan to approach Nokia to share the projection for 15 days in advance to ramp up shift roster and train people to handle additional work volumes and reduce overtime hours. 2. Supplier has established a policy of no overtime work and the relevant employees, staff and supervisors were communicated and trained on the requirements related to overtime work.
Management systems	Employment contracts were not complete (including e.g. amount of working hours and total wage and benefits) for all sampled employees. Former contract workers who were changed to regular employees had just a "notice of change on employment status". Also employees with long working history in the company had very generic clauses in their contracts. Contracts were also not signed on all pages.	Update was done to current procedure indicating that all regular employees should have an employment agreement indicating working hours/salary/NDA for client/supplier and customers and with a signature on all pages.
Environmental management system	There is no environmental impacts and aspects analysis conducted yet. Inventory of the waste is not maintained. There is no improvement program for the identified environmental aspects such not targets set for waste reduction and reduction for the usage of energy.	Supplier started a program of identification of the environmental aspects and measurement of environmental impacts such as waste and energy usage to start a PDCA improvement cycle on these.

This table is based on 75 CR indepth audits conducted in 2018.

Capability building – driving improvements

Additionally, we ran 11 training workshops for suppliers operating in high-risk countries such as Cameroon, China, Colombia, India, Malaysia, Mali, Myanmar, Mexico, Peru, Senegal, and Togo. In 2018, we organized online trainings on conflict-free sourcing and climate change, and we arranged face-to-face training workshops establishing improvement plans and actions for 393 suppliers. Please refer to the diagram: Supplier participation in Nokia sustainability workshops and webinars.

Climate impacts – helping suppliers reduce and report

All our suppliers, except those with very low environmental impact, are required to have a documented Environmental Management System (EMS) in place. For key suppliers and for those with greater impacts, we require certification to ISO 14001, which we track through our audits and assessments.

We jointly create environmental improvement programs in order to improve our upstream Scope 3 emissions reporting through the CDP Supply Chain Program (overall Scope 3 equals all indirect emissions that occur in our value chain, including upstream and downstream). We encourage our key suppliers to report their climate impacts and set carbon reduction targets through CDP and work with them to build improvement programs.

In 2018, 314 of our key suppliers, an increase of 22 from 2017, representing 46 percent of our total procurement spend, responded to the CDPs

Supplier participation in Nokia sustainability workshops and webinars



Supplier climate disclosure figures

314

Suppliers disclosed data, >50% of Nokia spend

129

Suppliers purchased renewable energy

143

Suppliers engaged their own suppliers

247

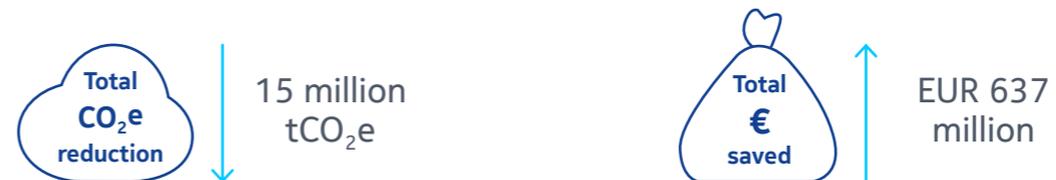
Suppliers reported GHG emissions (Scope 1/2)

211

Suppliers reported reduction (178 thanks to us) and have active targets for emission reduction

63

Highlighted collaborative opportunities with us



request to disclose their climate performance information. Of these 247 disclosed their carbon emissions (an increase of 33 from 2017) and 187 also provided emission reduction targets (an increase of 34 from 2017). The total saving from these carbon reduction initiatives was 14.6 million metric tons CO₂e and around USD 726.3 million during the course of the year.

It should also be noted that 143 suppliers engaged their next tier in CO₂ reporting. In addition, 118 of our suppliers calculated a Nokia allocation of their emissions based on the products and services we purchase from them and 88 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 totaled 2.1 million metric tons of CO₂e. By scaling up the allocated emissions to 100 percent of our suppliers, we estimated our scope 3 emissions from our supply chain to be approximately 5.3 million metric tons of CO₂e.

Water – resource management

2018 was the first year of active engagement with our suppliers on the efficient use of water. We have identified supplier categories where water may be a material risk and have begun to address these suppliers with a water assessment program. 150 of our suppliers have already disclosed their water data. More information on our activities concerning water management can be found in the water section of the Protecting the Environment chapter on [pages 80–82](#).

Developing Health & Safety Maturity

We carefully track working conditions as a key component of our sustainability approach to our supply chain. We place special emphasis on health and safety as our supply chain includes equipment installation and maintenance contractors who spend much of their time working at height, in confined spaces, and driving long distances. Armed with the necessary training, we endeavor to ensure these contractors are aware of the potential dangers associated with their work and have and use the appropriate safety equipment. We also augment our health and safety guidance with standards concerning road safety, work at height and working with electricity, which is further covered in our supplier workshops.

At the end of 2018, of those suppliers who provide us with high risk activities, (working at height, transportation, and electrical work), 100 percent were covered by our health and safety maturity assessments (on-site evaluations conducted by our regional health and safety professionals). 89 percent (an increase of 8 percent from 2017) of assessed suppliers met H&S compliant supplier status. Those not meeting the requirement were recommended for phase-out or for thorough improvement where we had no alternative choice. For example, in some developing countries we do not have suppliers capable of meeting our requirements, and we need to work hard to help them improve while putting strong supervision in place.

While strengthening learning and capability building around our health and safety requirements, we also made it clear that failure to have controls in place will result in business consequences. As part of consequence management for 44 supplier related fatal, critical or high potential incidents that occurred during 2018, we issued 29 warning notes to our suppliers and terminated business relationships with 2 suppliers. Of the total 31 cases 84 percent were “high potential” where no one was critically or fatally injured. The consequence management committee does not issue cards based on severity but rather considers the control the supplier has in place when deciding on the consequence.

Combatting modern slavery in the supply chain

This activity supports SDG Target 8.7:



“Take immediate and effective measures to eradicate forced labor, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labor, including recruitment and use of child soldiers, and by 2025 end child labor in all its forms”

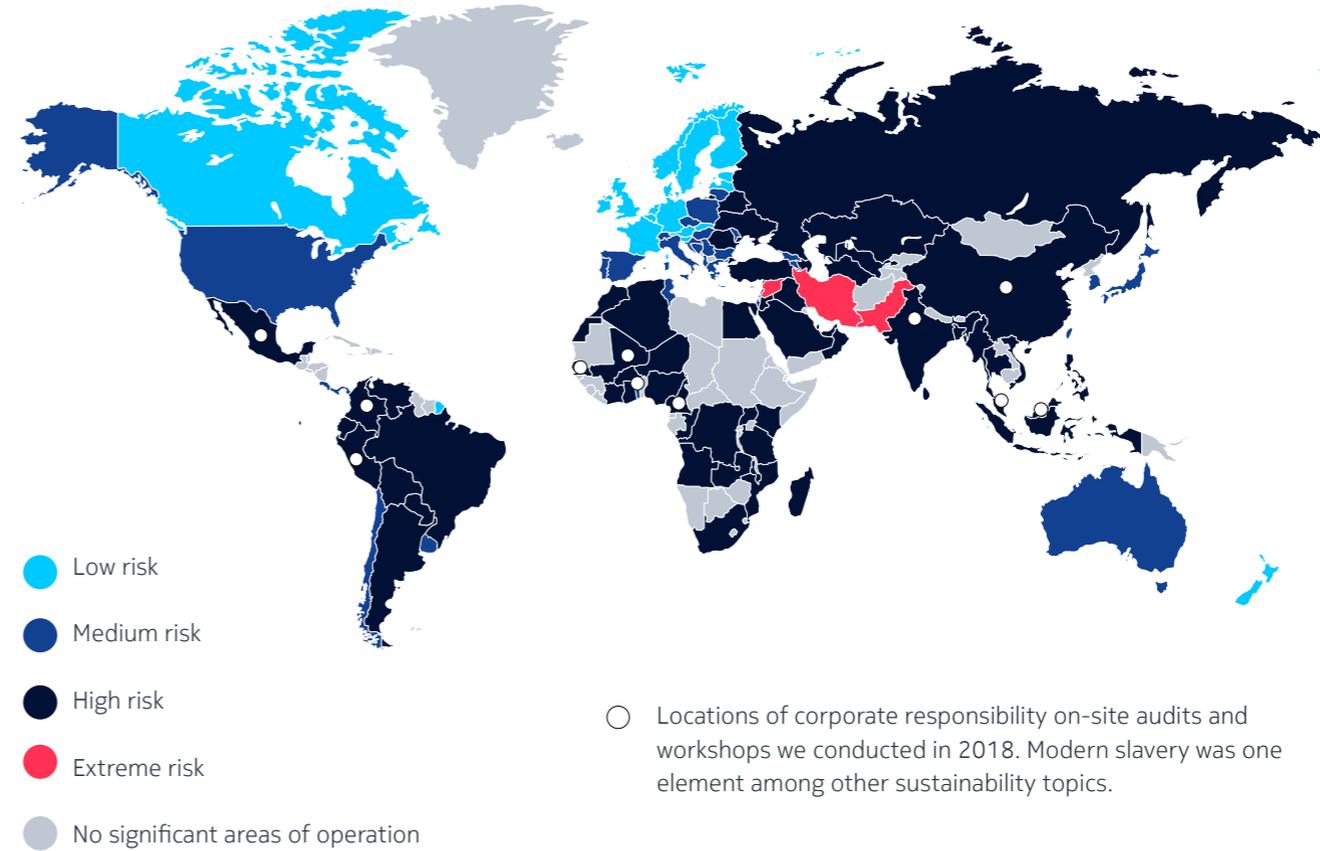
We do not tolerate slavery, servitude, trafficking in persons, and forced or compulsory labor in our own operations or in our supply chain.

In 2018 we published our second Modern Slavery statement, with an updated risk map. The statement can be found on our corporate website at www.nokia.com/about-us/sustainability/downloads.

Dealing with early warning signs

In 2018, as a result of our audits we encountered seven cases where we saw potential risk of forced labor and therefore classified it accordingly. Two of the cases were related to an obligation on employees to pay back course fees if they were to leave the company within six months after the training, which could place the employee at risk of being kept in a situation resulting in being forced to continue working as a result of not having the money to pay back the training fee. In another instance found in India, the supplier had not provided employees with appointment letters detailing relevant terms and conditions of employment. In another three cases, the percentage of dispatched workers exceeded the allowed 10 percent limit. And the last case was related to missing policy on forced labor.

Corporate responsibility risk map of our suppliers (including modern slavery, labor, health and safety and environmental risks)



This map is an aggregate of a selection of Verisk Maplecroft indices. The map covers countries where we have business with suppliers (exceeding a set minimum € threshold), but may not cover all countries where our suppliers operate. This was created based on Verisk .Maplecroft’s Global Risks Portfolio

These cases have been addressed with the suppliers as part of audit follow-up and the learnings have been shared with all of the suppliers at the supplier workshops in each location.

Child labor – zero tolerance

We have a strict policy against the use of child labor and we continuously work closely with our suppliers to scrutinize, monitor, and remediate any and all potential risks. We have strict ethical and human resources policies which have been designed to ensure that no one below the legal working age is hired in our business. If a child labor risk is identified, we immediately put in place a Child Labor Remediation Plan in line with SA8000 recommendations. In 2018, we encountered 3 findings at one of our audits related to a young worker who was working in a hazardous area (dust) and exposed to overtime. The factory also did not have the required registration approval for employment of young workers from the local labor bureau.

We further reiterated zero tolerance on the subject at all audits and workshops with suppliers, strengthening the message on requirements to map the related risks and develop child labor mitigation and remediation plans for direct and indirect forms of child labor, as well as special protection required for young people and student labor if they are employed.

Freedom of association and collective bargaining

All employees have the right to form or join their own organizations and conduct collective bargaining. We

expect our suppliers to uphold that right, without obstruction or discouragement. Where there may be legal restrictions in place, we find alternative means to enable both individuals and groups to raise concerns to management. As a rule, our corporate responsibility audits include a review of freedom of association as one component of employee-management communications.

In 2018, we again noted potential risks of non-conformities as part of onsite audits related to employee - management communication. These included such examples as missing anonymous feedback and complaint channels or records of worker union representative elections.

The role of ICT in tackling modern slavery

In June 2018, we published our second Modern Slavery statement, with updated information. We continued our collaborative work to investigate ways in which the technology we provide can be used to eradicate modern slavery. We realize the potential risks of traffickers and other criminal groups and individuals using technology to conduct their criminal activities. We also realize that only by working with other key stakeholders can we drive greater impact and encourage concrete solutions to tackling issues related to modern slavery on the fight against trafficking, forced labor or modern slavery.

In June 2018, as co-founders with BT and Microsoft, we announced the formation and goals of the Tech Against Trafficking initiative. This coalition of global technology companies, civil society organizations, and the UN have come together in a collaborative

effort to further support the eradication of forced labor and human trafficking. The company members of Tech Against Trafficking believe that technology can and must play a major role in preventing and disrupting human trafficking and empowering survivors. In 2018, the group began working with anti-trafficking experts to identify and investigate opportunities to develop and scale promising technologies.

The group embarked on an ambitious project to understand and map the landscape of existing technology tools being used in the anti-trafficking sector. Over 200 anti-trafficking tools were identified, with the majority (approximately 69 percent) working to identify existing victims of human trafficking and address and manage the risk of child and forced labor in corporate supply chains. The initiative intends to publish an interactive map of technology tools currently used to combat trafficking across the globe with the goal of increasing collaboration and encouraging the use of innovative technology. For more information visit [BSR website](#).

During 2018, we continued to advocate for greater dialog on the issue of modern slavery and human rights across industry and civil society, participating in a number of events in London and elsewhere in Europe and the US.

Materials traceability and conflict minerals

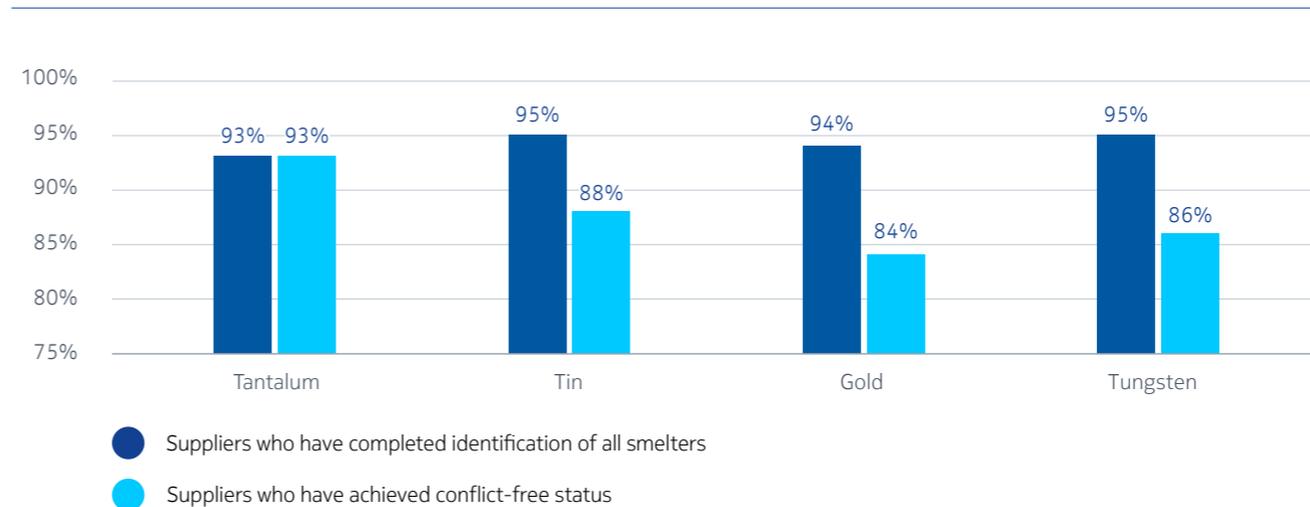
A key area of our work with our supply chain is the ongoing potential risks identified in the mining, extraction and trade of metals that provide key minerals in electronic components.

Risks include military conflict, human and labor rights violations and damaging impacts on the environment.

It is therefore paramount that we are able to trace the materials used in our products and ensure they are conflict-free. We recognize that there are many complex issues associated with conflict minerals*, but through our work in this area we aim to contribute to a long-term solution 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. We require our suppliers to show their commitment to only sourcing these materials, that either directly or indirectly contribute to conflict, from environmentally and socially responsible sources.

* Columbite-tantalite (coltan) (or its derivative tantalum), cassiterite (or its derivative tin), gold and wolframite (or its derivative tungsten).

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



As part of our work to ensure conflict-free minerals we collaborate with our industry peers through 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.

In 2018, we again underscored the need for our suppliers to establish full traceability of smelters in our supply chain and achieved a 97 percent rate of suppliers meeting our requirement. Where a supplier did not meet our objective or had no corrective action plan in place, we recommended phasing out this supplier from our supplier pool. We again

held two workshops on conflict minerals and cobalt sourcing in China, perhaps our most challenging market in this area. Ten audits covering conflict minerals due diligence were also carried out in China during 2018.

In 2018 as part of our ongoing work with the Responsible Minerals Assurance Program (RMAP) to identify and validate the smelters and refineries in our supply chain that are conflict-free or active in the validation process, we achieved an 84 percent validation level. A further 5 percent of smelters were identified where our due diligence efforts have demonstrated that the smelters can be reasonably considered as conflict-free, for example, due to

sourcing from recycled sources or from outside of the conflict affected areas.

We have continued our work with the Public-Private Alliance, further contributing to the development of in-region programs. In 2018, we also conducted mapping of cobalt in our components based on part material declarations. We addressed 48 relevant suppliers about Nokia requirements related to Cobalt and engaged them in exercising due diligence over cobalt supply chain by using the industry's Cobalt Reporting Template. Cobalt was also included in the scope of our workshops in China. We will continue cobalt-related due diligence in 2019. For more information on our due diligence results, please refer to our conflict minerals report available at the end of May 2019.

In 2018 we also engaged with our procurement category streams by setting minimum expectations for performance level of Preferred and Allowed status suppliers documented in procurement category strategies. The performance of suppliers across our sustainability monitoring programs such as onsite audits, CDP, EcoVadis, Supplier Health and Safety Maturity Assessment as well as Conflict Minerals program contribute to our sustainability pillar which is one of the six pillars of our Supplier Performance Evaluation.



Data privacy and security

How companies protect customer, employee, or other sensitive data is one of the most significant issues facing our industry today, and its importance grows ever greater as we see the implementation of 5G, IoT and AI, with everything and everyone connected.

We have dedicated processes firmly in place to address this, focusing 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 include 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 ongoing key programs to identify and protect critical data include:

- critical information protection program
- focused assessments
- nokia privacy program
- supply chain security program
- customer security requirements program
- common security controls program
- 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. Approximately 30 000 of our employees have already completed it. 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. Our top management tracks how many personal learning moments (engagements) our people on average have throughout the year. This includes in addition to our security accreditation program, phishing testing and e-learning other activities like participation to our roadshows, targeted briefings, breach management trainings and exercises, and other related presentations.

Our market research reveals that 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:

1. detection and analysis
2. containment, eradication, and recovery
3. 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 Global Delivery Centers

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 with Nokia and our security awareness and culture Key Performance Indicators (KPIs) are tracked on a monthly level.

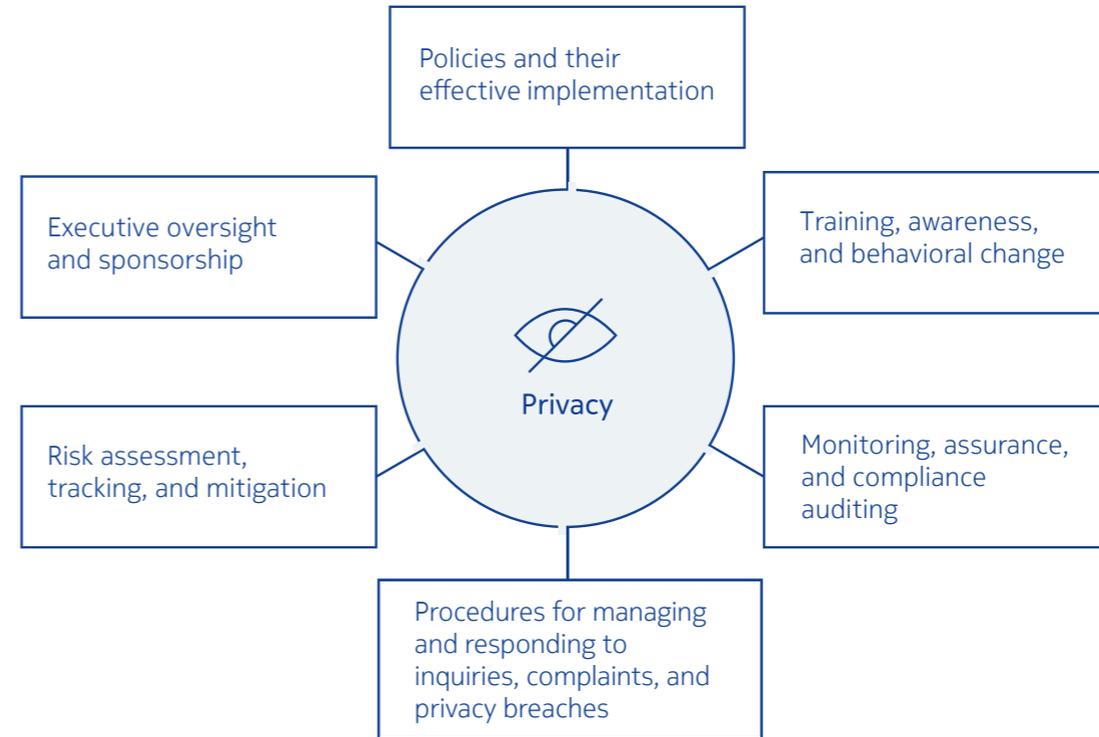
In 2018, we achieved our target to secure our defined critical information ecosystems and closed 95 percent of the identified critical and high vulnerabilities identified in our assessments and audits. We are well on track to achieve our 2020 target to be recognized as an industry leader in security and privacy.

Getting privacy right

With the growing complexities provided by today's technology and business environment, it is imperative that we lead and enable strategic and consistent management of privacy related risks, as well as ensuring we are in a position to make the most of all 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 not only desirable – it is a necessity.

We have established a comprehensive company-wide privacy program that is based on relevant laws, best practices and standards. This program is supported by and aligned with corporate, business group and

Our privacy management model



central functions level policies and processes. Our objective is to mitigate privacy risk in relation to the data we collect, process and store. Essential to this approach is observing the concept of data minimization, meaning we endeavor only to collect personal data that is necessary for the purpose for which they are collected and to retain such data for no longer than necessary.

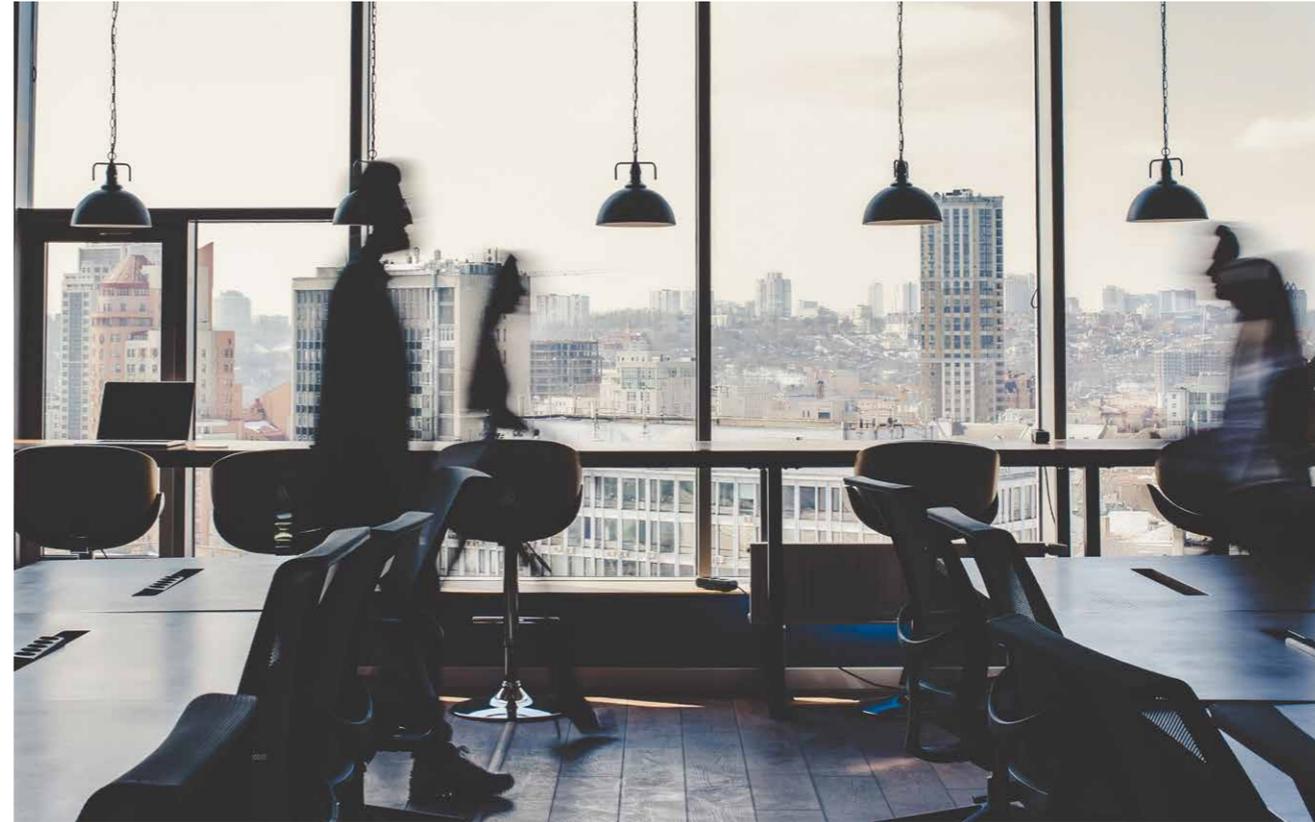
We then implement appropriate controls to ensure that all personal data is only accessed by persons with a clear and justifiable need to know. Should a personal data breach occur, we have a formal process in place to manage and mitigate any related risk to data subjects. These processes also include mechanisms to communicate with supervisory authorities, should that be required. To drive and

maintain privacy awareness, we have designed and delivered a program of awareness training targeting high-risk groups as well as all Nokia employees through a mandatory e-learning module. Employee responsibilities towards privacy are also covered in our Code of Conduct.

Our privacy management model is set out in our Group-wide Privacy Management Policy and supported by Nokia Executive Leadership. The model provides clear privacy principles and a governance framework to implement sound privacy related practices across our businesses. We continue to strengthen our framework with supporting policy and procedures. Thanks to our programmatic approach, we remain in a position of strength to safeguard personal data entrusted to us. During 2018, we updated our privacy processes in readiness for the GDPR (General Data Protection Regulation) ensuring they remain fit for purpose. We also rolled out mandatory privacy awareness training for all employees reminding everyone of the importance of protecting data and how they each have a part to play in relation to that objective.

Compliance with the new General Data Protection Regulation (GDPR) and other privacy laws as well as commitments to customers, are enforced via our Privacy Principles and Requirements.

There were no substantiated complaints regarding breaches of customer data in 2018.



Respecting our people in everything we do

Our people are our greatest asset and we aim to build a culture of trust, respect, diversity and opportunity for all.

Highlights in 2018

166

different nationalities
worked in Nokia

Over

900

leaders and employees
were trained on gender balance topics

99

%

of employees
completed their annual performance evaluation

Pledged our support for

LGBT+

people worldwide by signing the UN Standards
of Conduct for Business

2.2

million training hours
to our employees

Respecting our people

High performance and high integrity underpin our culture supported by our vision, brand, and values.



Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Respecting our people in everything we do</p> 	Employee satisfaction, Engagement and Development	<p>2020 Sustained focus on CEO-sponsored Nokia Culture Principles.</p>	<p>In 2018 we continued to measure the favorability of employee perceptions with an anonymous employee survey (CCT). The two CCT target question scores (company direction = 80 percent, culture direction = 79 percent) remain in the green, albeit the average for % favorability for these two CCT target questions was 2% down from 2017. ✓ Assured</p>	 Ongoing - on track
		<p>2020 Nokia to be the employer of choice (in our size) for all of our major hubs in locations around the world and become the best regarded employer in our industry globally.</p>	<p>Nokia Location Development (LD) is the global program aiming 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 Nokia organization team up as one team to make it happen, The Location Head is the project leader. The program focuses on: Local Attractiveness, Local Best Employee Experience and Engagement, Ensuring One Nokia culture across Business Group and across functions locally.</p>	 Ongoing - on track
		<p>2020 Foster the spirit of employee volunteerism across the company and increase their engagement.</p>	<p>Guidance to all employees on volunteering is provided through our Volunteering guidelines. In 2018, our employees contributed around 18 500 hours of volunteering in paid working time, significantly up from 7 500 in 2017. In 2019 we look forward to encouraging and supporting more local programs around the world where our employees volunteer.</p>	 Ongoing - on track

Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Respecting our people in everything we do</p> 	Employee satisfaction, Engagement and Development	<p>2018 Introduction of the renewed Employee Engagement model with increased frequency and depth.</p>	Initiative was cancelled. No new engagement model is going to be introduced.	 Not achieved
	Diversity, inclusion and anti-discrimination	<p>2020 Increasing the percentage of women in leadership by 25 percent (baseline 2016).</p>	<p>In 2018, we had 15.3 percent women in leadership positions, down from the 2016 baseline of 15.5 percent. We continue working, within our five-year gender balance action plan, towards the 2020 target.</p> <p>✓ Assured</p>	 Ongoing - not on track

Who we are

At the end of 2018, we had around 101 200 employees in 119 countries. Three percent of employees were located in our headquarters in Espoo, Finland.

In addition we outsource certain non-core activities and/or use subcontractors to meet customer needs or volume demands. At end of 2018 the number of temporary workers (external temporary labor, ETL) used for example to cover sickness was in the region of 4 500 people. Activities performed by externals, be them 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 2018

 **101 203**
employees in the year-end
(102 761 in 2017)

 **22%**
of employees were
women (22% also in 2017).

 **166**
different nationalities
worked in Nokia.

 **96%**
of employees had
permanent contracts (the
rest were trainees or had
fixed-term contracts)
(98% in 2017).

 **8 849**
employees were hired,
leading to 10% rate of
new employee hires
(9 430 in 2017).

 **9 988**
employees left Nokia,
leading to a 11% total
attrition rate (10 033 in
2017).

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 2018

Making Nokia a great place to work

Our core culture - common aspects



Drive

Passion for results, customers, and products



Dare

to earn and renew



Care

for the team before self

The market for skilled employees in our business is extremely competitive. Our workforce has fluctuated over recent years as we have introduced changes in our strategy to respond to our business targets and our endeavors.

Such changes and uncertainty have caused, and may in the future cause, disruption among employees as well as fatigue due to the cumulative effect of several reorganizations over the past years. As a result, we believe it is essential that we work on creating a corporate culture that is motivational, inclusive, and encourages creativity and continuous learning to meet challenges.

We foster a culture of high performance and high integrity, guided by our vision, brand, and values. It is through our people and culture that we shape technology to serve human needs. Our pursuit of performance with integrity and sustainability – a culture that stems from our Finnish roots – is key to why our customers and partners choose to work with us, and why our employees work for us.

Common shared cultural principles and focus on Drive, Dare and Care is the cultural platform we

use to shape our core common culture. We focus on selected business priorities and the behaviors which drive them best. For example, to drive relentless value creation and execution we need improved decision making; to have the attitude of entrepreneurs we need our people to feel empowered and autonomous; and to excel in team work we need to share and act inclusively.

To strengthen these behaviors we have facilitated activities to make them more applicable.

All company-wide guidance on our cultural direction, how we define it and what our employees think, are found on our internal global culture site. The site also provides a lot of support materials and resources for Line managers, teams, and employees.

Our pursuit of a common culture and high performance is always done in accordance with our values of:

- **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.

Integrity is fundamental to how we internally work and what we provide for our customers. Particularly in the standards-driven world of network technologies, the choice that customers make are often less between different products, and more between different relationships. We stand out as a trusted customer partner, sustaining long-term relationships through our proven ability to deliver, and fostering a level of trust we work relentlessly to earn and keep.

Engaging and working with our people – the Nokia Way

In 2018, Nokia Way manifested itself in initiatives which helped apply Drive, Dare, and Care. We concentrated on global webcasts featuring our Global Leadership team members, educational and fun cartoon strips to depict everyday situations where people chose the most culturally suitable one, a roving reporter who discovered true cases of the company spirit, and on applied neurosciences solutions to enhance bias free decision making and improved communication in teams.

Nokia Way global core culture webcasts had 20 000 active participants who provided more than 8 200 comments. The cartoons inspired more than 22 000 people who actively participated in Yammer conversations and the applied neuroscience solutions were used by more than 10 000 people, of which some 4 000 were line managers. The change facilitation in the businesses continued with 46 000 people participating in the change map survey, and 600 trained change managers facilitated better change leadership.

According to the latest results from our tracking of our culture cohesion, this has led to a good overall culture cohesion across, and belief in, our company, and a strong shared awareness of our Drive, Dare, Care mindsets and culture principles. Most pleasing is that we have seen significant improvement in the Dare related areas, where people have said we need more attention.

Our cultural progress and evolution is monitored with a company-wide employee survey, called the Culture Cohesion Tracker (CCT). The CCT's purpose is to measure [via aspirational cohesion ranges] employees' perceptions of our company and cultural direction. CCT results give us a continued quantitative and qualitative employee feedback loop on a wide variety of important topics.

Furthermore, the CCT helps identify areas of momentum that may be a cause for celebration inside the company and challenges we may face that imply a need for continued focus. The CCT was held during March and September 2018. 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.

All 2018 results below are now inclusive of the Nokia Shanghai Bell (NSB) joint venture, which participated for the full year in both 2018 survey rounds. Generally, the inclusion of NSB had a positive effect on 2018 survey scores.

The most important questions in the CCT are the following two target questions, which remain in the green during 2018.

The arithmetic average for % favorability for these two CCT Target Statements is 79.5 percent, down 2 percent and we are using this average when needing to report one value for employee engagement.

The overall CCT result rose 1.5 percent, from 82 percent to 84 percent favorability towards the company between 2017 and 2018, bolstered by the inclusion of Nokia Shanghai Bell (NSB) results.

Cohesion ranges

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

“Overall, as a company, Nokia is heading in the right direction” was 80 percent favourable, down 3 points from 2017.”

“Overall, Nokia’s culture is heading in the right direction” was 79 percent favorable, off one point from 2017.”

Human capital 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 to company goals, individual performance, talent management, career development, reward, and recognition. We are committed to people development and career growth. Regular manager and employee dialogs (1 in 90 dialogs) focus on five key areas including goals, feedback, wellbeing, development, and coaching.

Our forward-looking approach to talent development starts with all employees as well as development of top talent. All managers recommend development proposals for employees, outlining clear actions for the coming 12 months. We encourage employees to complete a Personal Development Plan (PDP) in discussion with their line manager. Personal development is key to retaining and engaging our employees and developing their skills.

Nokia People Focus aims to build a high performance, high integrity culture across the corporation.

End-2-End Employee Experience

In 2018 we focused on employee/user experience to make our people practices available, transparent and applied by ensuring they are agile and fit for purpose. We conducted interviews with employees to identify and validate pain points, excitements, and what they value or what we should discontinue. Based on this, we continued to simplify our performance and talent area, personal and career development, and how we communicate and engage our employees.

Annual Development Review Simplification in 2018

In Nokia we encourage managers to recognize performance, celebrate achievement and talk about employee's potential and career aspirations as well as plan for their development in the coming year. In 2018 we rolled out a further simplified Annual Development Review including automation of the process, simplified forms, improved user-interfaces, and focused communications and training with the object to reduce the administrative tasks and maximizing line managers time to focus more on the important dialog and feedback stages.

In 2018, 99 percent of all employees had an approved talent and performance assessment against a 94 percent rate in 2017. 2017 is the second year of the new integrated people processes and the introduction of a new simplified talent and performance assessment to our whole employee base.



Future Talent Growth

In 2018 we focus on talent identification and growth beyond the top 300 leaders. We profiled rising talent and high potential individuals and 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.

Personal and Career Development – UI/UX program

Personal and Career Development is a high impact topic affecting retention, productivity and engagement, while scoring rather low on the CCT (Culture Cohesion Tracker) results. Therefore, we have focused on the design and implementation of UI/UX program dedicated to the area of personal

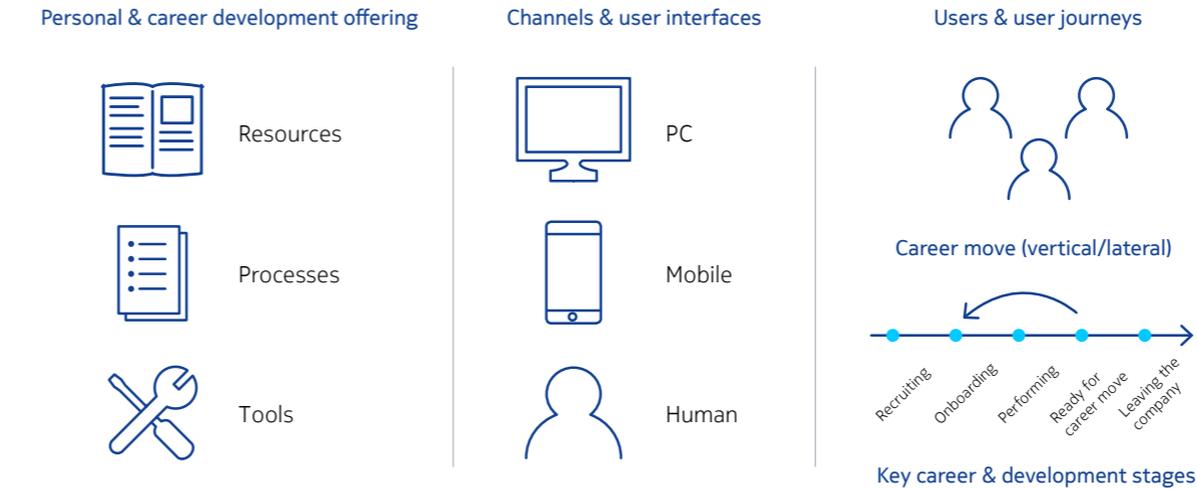
and career development. For 2018–2019, we have set three priority areas to improve the user experience: maximize the value of our current offering in personal and career development, make our user interfaces more convenient and personally significant, and broaden focus to meet the needs of different user groups. With focused communication and training, we created more visibility to employees on our service offering, increased the awareness and make our service offering more easily accessible, relevant and engaging. We can expect reduced attrition (e.g. especially for new hires and top talent), increase the Human touch in Human Resources and higher engagement (e.g. improved CCT results).

Leadership development

Our leaders are redefining themselves to stay relevant in a business world characterized by change, uncertainty, and new opportunities.

Our world in which we lead is an “and-or” not an “either-or” proposition – leaders are expected to be less authoritative and more supportive and challenging. They need to manage and lead, to control and let go, to lead by doing and empowering, to know and not know, and to tell and listen. To this end, we invest in the development of our leaders.

We deliver leadership programs across all levels from aspiring leaders to senior executives. Leadership programs are differentiated according to leadership levels and competencies. The company provides self-enrollment and nomination-based programs. The self-enrollment programs target aspiring leaders to senior leaders. The nomination programs target



executives and high potentials with “fast track” or “ready for next step” development plans. The nomination programs also include our Coaching for Success and Coaching for Growth programs to help our leaders lead in the 21st century, by not solving challenges for others, but helping others solve their own challenges. Our leadership programs aim to provide the mindset and skills for leaders to engage and inspire individuals and teams in a changing environment.

Some of our leadership programs seek to immerse leaders in experiential journeys which include external company visits to learn how other companies and leaders are doing in the space of Internet of Things (IoT) and to identify new opportunities for our company.

2018 Leadership Development Figures from Aspiring Leaders to Senior Leaders (excluding nomination-based programs)

- 14 percent more face-to-face workshop sessions than in 2017
- 22 percent more technology enabled virtual sessions than in 2017

In partnership with Harvard Business Publishing we have successfully introduced technology enabled virtual, 4–10 week leadership development journeys. Already close to 50 percent of the learners in senior leader level participated in an HBP program in 2018.

We leverage technology to bring online learning solutions to employees’ fingertips for immediate, relevant and best content.

3 862 Nokia leaders were developed in 2018 through Corporate leadership programs

Target group	Aspiring leaders	First Line Leaders	Leaders of Leaders	Senior Leaders	Executives	Several levels of leaders	Total
Number of individuals developed ¹	683 (+15%)	1 557 (+4%)	846 (+8%)	212 (-5%)	209 (-36%)	355 (+52%)	3 862 (+9%) ²

¹ In parentheses change to 2017.

² 24% of the participants were female.

346 leaders participated a new program called Communication, Collaboration and Coaching rolled out in 2018. The program was designed to support leaders with the challenges of constant change in a new agile environment.

Chatbot in Human Resources Digitalization and AI opportunities

In 2018, we introduced a new Global HR chatbot and a Finland HR chatbot. This now enables 24/7 HR service for selected global HR topics, and also available for all Finland employees. With the help of new chatbots, employees can get the relevant information faster, more easily and in a more condensed format. In addition, we understand better and faster what employees are asking for, and also get faster feedback on HR services.

NokiaEDU

The primary objective of NokiaEDU is to create a learning culture across the company, where our employees, customers, and partners can easily access relevant learning solutions. NokiaEDU works in close collaboration with its internal and external

stakeholders to understand their business objectives, develop essential competencies and recommend learning solutions to address performance gaps. Should an existing learning solution not meet the needs, a new learning solution is designed, developed, and delivered.

In 2018, NokiaEDU delivered 2.2 million training hours to our employees (1.6 million in 2017). Consistent with its digitalization strategy, about 75 percent of employee training was technology-enabled, saving the company time and money over traditional classroom training. Virtual instructor-led training accounted for 19 percent of employee training, compared to 21 percent in 2017.

NokiaEDU also provides training to customers and partners, which in 2018 totaled 770 000 training hours (838 000 in 2017). Our training not only instructs how to operate and maintain our products, but also includes more general technology training on topics such as Internet of Things. Overall, NokiaEDU learning solutions received a user satisfaction score of 96.9% in 2018 (97.7% in 2017).

In 2018, NokiaEDU targeted an increase in digital self-paced learning methods:

- overall learning for Nokia Employees Hours increased by 51 percent year-on-year
- overall average learning hours per learner increased from 16 hours in 2017 to 30 hours in 2018
- increase online learning unique registrations: Target: +20 percent. Result: +58 percent
- increase in virtual classroom sessions: Target: +25 percent. Result +29 percent
- increase in use of managed learning communities: Target: +20. Result: +28.
- development and execution of AR/VR solutions: Target: +5. Result: +10

Due to the fluctuations in headcount across the year, you cannot directly compare point 1 against point 2. Covers only “completed learning” via Nokia’s central learning hub and not “self-declared” learning as we have no way to validate that.

Learning Index

NokiaEDU's approach to creating a company-wide learning culture is driven by the Learning Index, an innovative application launched in 2018 to automatically and continuously monitor an individual's learning and sharing progress.

Following the principle of "What gets measured gets done," the Learning Index awards points for completing Defined, Recommended and Freestyle Learning, as well as Self Declared Learning and Social/Community Learning and Information sharing sessions.

Nokia's greater focus on professional development supported by the Learning Index resulted in a 48 percent increase in employee learning over its 2017 total recorded as formal completed learning, yet an overall 113 percent increase that includes learning that was completed outside of the formal learning environment, resulting in an increase from 16 hours to 34 hours of learning per person on average. NokiaEDU will continue to expand the reach of the Learning Index in 2019.

Personalized Learning

In response to numerous requests for improved access to relevant learning, NokiaEDU launched a Personalized Learning feature to the company's Learning & Development Hub. A complement to trending learning found in The Learning Store, Personalized Learning uses Machine Learning and social collaboration to offer relevant and engaging content.

Average number of training hours per employee more than doubled from 2017 to 2018



"Bravo! Best event of the year at Nokia."

2018 Global Day of Learning Participant

In addition to Personalized Learning, NokiaEDU introduced a number of improvements in 2018 offering a more cohesive and user-friendly experience for learners. This comprehensive initiative features a new askEDU chatbot designed to accelerate speed of responsiveness to learning-related inquiries.

Case: Global Day of Learning

Our third annual Global Day of Learning (GDOL) was a special event dedicated to reinforcing our culture of learning and our core value of renewal. It presented a unique opportunity through a full day's schedule of virtual and in-person learning events, where our leaders highlighted how we are shaping our company and the future of technology. At the end of the day, our goal was for all employees to gain a better understanding of our strategy, how different parts of the company contribute to it, and what we need to do collectively to realize our ambition. In the days following the live event, all the recordings of the sessions were made available as part of the Global Day of Learning Encore. The 2018 Global Day of Learning gathered 31 082 webcast participants across all sessions (53 percent increase over 2017), and 92 percent 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

We understand it is our basic responsibility to provide decent working conditions and to be seen to be fair and just in how we treat our own people. Our Code of Conduct provides the basis for our labor conditions and is underpinned by Nokia Global Human Resources Framework and local employment laws, policies and practises. We adhere to the United Nations Universal declaration of human rights and the Global Compact and wherever we operate we meet the requirements of labor laws and regulations, and oftentimes strive to exceed those 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 (SOP), and Code of Conduct are implemented to help achieve the high standards we have set ourselves. The policies cover:

- Child labor avoidance
- Forced labor avoidance
- Freedom of association and collective bargaining
- Non-discrimination
- Humane treatment
- Working time
- Disciplinary practices
- Compensation
- Occupational health and safety.

This approach is also applied to our suppliers and partners. You can read more on our supplier practices under Responsible Sourcing.

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. Where such a potential risk is identified, it is thoroughly investigated, and a remediation plan is put in place based on SA8000 recommendations. For more information on child and forced labor, see Conducting our Business with Integrity.

Per recruitment policy and practice 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

In line with our Code of Conduct, we respect the right to collective bargaining and freedom of association. Collective bargaining agreements are local, and in the vast majority of countries where we have collective bargaining agreements, those also cover employees who have chosen not to be members of a union. Furthermore, employees are free to join, not join, or leave unions and associations of their own choice, and select their representatives in accordance with the local and international practices. Our management supports, encourages, and implements active, open communication and dialog with employees and/or employee representatives.

In countries where local works councils operate, we recognize their importance and work with them as required. We communicate regularly and continuously with employees directly as well as in specific meetings such as the European Works Council (EWC) in Europe. In annual EWC plenary meetings both employees and management are represented in the teams preparing and participating in the meeting. We also offer the opportunity for free elections where employees can choose their union representatives. All our 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 are provided

the opportunity to use company infrastructure during the work day.

Below is a sample of countries where we operate and where 100 percent (or close to it) of the employees are covered by collective bargaining agreements.

- Algeria
- Austria
- Belgium
- Benin
- Brazil
- Burkina Faso
- Cameroon
- China
- Czech Republic
- Finland
- France
- Germany
- Italy
- Madagascar
- Mali
- Netherlands
- Niger
- Norway
- Portugal
- Romania
- Senegal
- Slovakia
- Spain
- Sweden
- Togo
- Tunisia
- Zambia

Non-discrimination

We do not tolerate discrimination in any way, shape, or form. We prohibit discrimination based on any personal attribute such as age, gender, nationality, opinions, memberships (such as membership or non-membership of a trade union), religion, or disabilities in all employment practices, including recruitment, promotions, training, and pay levels. Diversity is discussed later in the Diversity section of this chapter.

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. Working time is the time an employee must be available, ready to work and perform duties monitored and regulated by the employer. We provide guidance through the worktime standard operating procedure, and encourage project recording to address resource planning issues versus working hours. We guarantee the minimum one day off in every seven days in our production operations.

We take work/life balance seriously, providing training for managers on the signs and dangers of overload at work, as well as offering various extracurricular activities and facilities for sports, exercise, and wellbeing. We engage regularly with our employees on both a global and local level on these topics.

Disciplinary practices

We appreciate that our employees are generally motivated by their work, understand and follow our processes, and act consistently with our values and required standards of conduct and attendance. However, if an employee's conduct or attendance does not conform to these expectations, disciplinary action may be taken.

Our approach to disciplinary action, as stated in our disciplinary SOP, is to ensure fair and consistent treatment of all our employees. The procedure recorded in the SOP sets out the steps that may be adopted in relation to conduct and/or attendance issues. In cases where local law and/or collective agreement(s) require additional or different procedures, we follow local law and/or applicable collective agreements. We will not tolerate any form of physical, mental, or verbal abuse, or harassment.

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.

Furthermore, part-time or temporary workers are not excluded from our employee benefits plans due to the company policy or benefits practice. 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. Awareness raising on diversity,

that we included in training material to HR and managers during the annual salary review process, created a foundation for renewed success in this focus area.

This framework incorporates the following programs:

- The Everyday Excellence award, which has been created to foster a global and uniform approach to recognizing a colleague across the organization for on-the-spot peer-to-peer recognition throughout the year.
- The Business Excellence award is a flexible business driven award and is meant specifically for recognizing those whose contribution directly supports business objectives.
- The Premium award has a business-specific eligibility: Deal of the Month, Innovation, and Quality award programs are launched separately.

Our reward programs are designed to attract and retain key talents and engage our employees. They reflect our values, they are understood and valued by employees, and they 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. For more information see the Compensation section.

Our approach to performance management and rewards highlights the importance of quality dialogue



between line managers and employees, and greater rewards for individual contribution. Our employee reward and recognition program, Recognize Excellence, empowers employees and managers with a discretionary budget to perform peer-to-peer recognition and rewards. Aligned with and underpinned by our values, this allows more frequent and less formal ways of recognizing individual performance. The Recognize Excellence provides a tool and a mobile application, which makes it easy to acknowledge the contribution of colleagues.

Share in success

We offer an employee share purchase program called Share in Success. Under the program, employees are given one free matching share for every two shares they purchase and continue to hold for 12 months. We aim to invite as many employees to participate in the program as possible, subject to local laws and regulations. In 2018, 36 percent of the eligible population in 68 countries chose to participate in the program. In 2019, it is intended the total number of eligible

countries will be 72 (out of a total number of 123 countries where we operate).

In 2017, we won recognition for this program from the World Centre of Employee Ownership with our flagship award of Best International All-Employee Share Ownership Plan 2017 and were also recognized by the Global Equity Organization for Best Use of an Employee Share Plan in an Emerging Market.

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. Our approach is to ensure that we treat all candidates fairly and with respect. Candidates do not pay for recruitment costs. All recruitment costs are carried by Nokia. None of our vendors are charge candidates for recruitment costs.

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 2018, 51 percent of hires were internal, compared to 59 percent in 2017.

Gender diversity focused recruitment programs

We are committed to creating a dynamic work environment that values diversity and inclusion, respect and renewal, customer focus, and innovation. In 2018, globally, female share of hires stood at 23 percent out of the total hires, compared to 24 percent in 2017 and 21 percent in 2016.

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 because we know 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 2018, in India, our graduate diversity hiring improved to 49 percent from 40 percent (2017).

Social media for careers

On our Global Careers social media channels we share stories from daily life at Nokia and show our culture through authentic stories of our employees. You can find us on LinkedIn, Facebook, Twitter and Glassdoor.

Glassdoor is an authentic career community where current and former employees anonymously share reviews addressing company culture, values, and what their working life is really like. The platform has a huge range of reviews covering: CEO approval ratings, salary reports, interview reviews and questions, benefits reviews, office photos, and much

more. They also post the latest jobs and allow for companies to have their own profiles to promote their employer brand.

We take our Glassdoor reputation seriously and are proud to score among the best technology companies. We have observed a positive evolution of our overall rating from 4.0 to 4.2 (scale from 1 to 5) in the last 12 months which positions us as an employer of choice on the market. Also 85 percent of the review providers indicated they would recommend us to their friends compared to 83 percent in 2017 and see our culture and values (4.2 compared to 4.0 in 2017) and work/life balance (4.3 compared to 4.1 in 2017) as two of our main strengths.

More information on recruitment and careers can be found at www.nokia.com/careers. Or visit us on [LinkedIn](#), [Facebook](#), [Twitter @NokiaCareers](#). Learn more at www.glassdoor.com/nokia.

Supporting young talent and apprentices

We value the importance of supporting graduate trainees and apprenticeships. We implement a range of programs in various countries where we operate.

Our approach is by definition local, as it is part of the local community identity. Below are a number of examples from around the world in 2018.

In Canada, our Future Tech internship is a seven-week program for high school students to work

alongside our engineering teams solving real, technical problems.

In the United States, we offer students exposure to the latest technologies and industry challenges in telecom today. It is part of our culture to train young people and integrate them into our teams.

In India, our University Collaboration Program offers customized learning experiences designed for our prospective young talents.

In the Middle East and Africa, we launched our female graduate program in early 2017 running until the end of 2018.

In China, we have the Nokia Club, which is a Cooperation with universities for talent development.

In Asia Pacific and Japan, we ran an internship program in Singapore with a total of seven interns between May and July 2018 and in the Philippines, we managed to hire 70 graduates into R&D positions.

For more information on these programs visit [Respecting people section](#).

International mobility

We have a strong global presence and concentrate on attracting and retaining the most competent talent. Based on the mode of operation and business needs, we balance local talent development with global mobility opportunities.

Global mobility is typically encouraged and enabled through short-term assignments or alternatively, if the need is long-term or even permanent, transfers under local agreements. This is reflected in the further decrease of long-term assignees, as in 2018 we had 334 employees on long-term assignments across the regions (compared to 397 in 2017). In 2018, we had 2 604 employees on short-term assignments.

Providing support during restructuring

The business environment Nokia operates in is a challenging one: 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 & encourage redeployment activities for impacted employees to find new job opportunities in the company, including re-training as necessary.
- we also 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.

The overall number of employees decreased by 2 percent by year-end, while the attrition increased by one percentage point to 11 percent, when comparing 2018 with 2017.

Diversity, inclusion, and anti-discrimination

We cultivate a globally diverse workplace culture of respect across six continents. We believe that a diverse workforce is our platform for greater innovation, superior organizational performance, and delivering excellent service to our customers. We believe in the power of global sharing of ideas and culture.

As stated earlier we do not tolerate discrimination. We prohibit 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 2018, awareness was raised for the third year in a row on diversity by providing Gender Dynamics Workshops to Line Managers to make them aware of their biases, give them tools to mitigate them and make Nokia's leadership overall more inclusive.

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

At the end of 2018, Bloomberg made the decision to include Nokia in their 2019 Gender-Equality Index (GEI) for our transparency and commitment to advancing women's equality globally. The GEI is a comprehensive investment-quality data source on gender equality. With a Gender-Equality Index of 84.08 Nokia is ahead of the average of its peers (70.26 for the 26 technology companies listed).

Inclusion – highlights of our activities in 2018

- On March 8, the International Women's Day was celebrated across the majority of Nokia sites globally. The Village of Diversity published a special gamified chapter featuring strong female leaders and talents from within Nokia and outside. The gamification platform used was YOUnik, a game developed inhouse at Nokia to raise awareness on diversity and inclusion in an innovative way, by discovering human greatness and what makes everyone unique.
- In April, Nokia COO hosted a virtual event and jamming session to highlight the Three A's - Alzheimer's Asperger's and Autism. A lot of personal stories were shared, followed by discussions.
- On April 2, Nokia India started providing creche facilities for employees working across major

locations to help them balance the demands that come with being a working mother in India.

- In June, Nokia ran several global events during LGBT+ Awareness Month. There were variety of topics that related to speaking out for even greater inclusion.
- In July, Greenhouse hosted a unique startup X corporation event with its leading members.
- In September, Nokia employee group IDEAL (Individuals Dedicated to Enabling Accessibility in Life) hosted a Walk to End Alzheimer's in Naperville US to drive efforts and donations for finding a cure for Alzheimer's disease.
- In September, The Village of Diversity hosted a virtual event and jamming session about The Big C to raise Cancer Awareness with guest speakers sharing personal stories reaching ~3,000 active participants.
- In October, the U.S. Antenna (Women's Leadership Network), launched a US-specific StrongHer Award to recognize outstanding women in the organization.
- On November 16, we signed the UN Standards of Conduct for Business ([unfe.org/standards](https://www.unfe.org/standards)), pledging our support for LGBT+ people worldwide.
- On November 19, we celebrated Men's Day at many sites including Espoo, Noida, Oulu, and Tampere sites. The event was celebrated with all the fervour to acknowledge the spirit of wonderful men around us.
- In November, the annual Greenhouse event in Munich took place with the intention to boost women networking in and outside of Nokia. More than 100 top female leaders from 30 companies attended to discuss why gender diversity makes

business sense. The theme of the event was “Are you IN³ - inspirational, intuitive, innovative?”

- On November 19, our Chairman, Risto Siilasmaa, signed the pledge of the European Round Table of Industrialists. This way Nokia wants to carry higher societal responsibility to decrease social inequality and to promote inclusion and diversity in the workplace and inclusive growth in Europe.

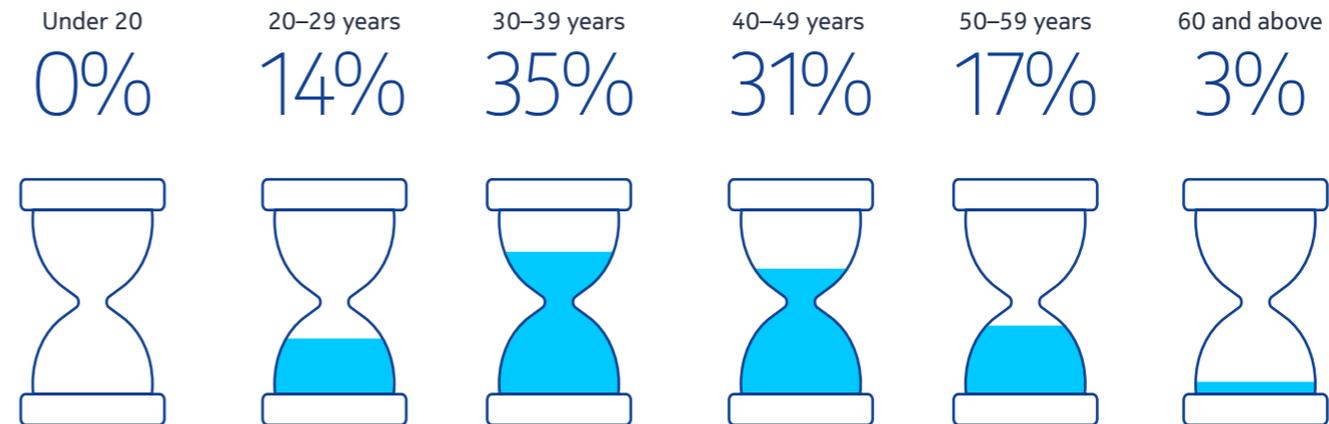
Gender balance

The diversity of our Board of Directors consists of a number of individual elements, including gender, generation, nationality, cultural and educational backgrounds, skills, and experience. We believe diversity is not a static concept, but rather a relevant mix of required elements for the Board as a whole that evolves with time based on, among other things, our relevant business objectives and future needs. Board diversity is treated as a means of improvement and development rather than an end in itself. At the end of 2017, the gender balance of our Board of Directors was 70 percent male and 30 percent female. Our aim was to have a minimum representation of 40 percent from both genders on our Board by 2020. We reached this milestone in 2018 with current representation of 40 percent female and 60 percent male.

In 2018, 15.3 percent of our leadership positions were held by women. In total, women accounted for 22 percent of our workforce. We are committed to:

- develop more talented women into leadership to bring the proportion of female leaders in every organization in line with the proportion of women in the workforce. We are running

Average age range of Nokia employees in 2018



two career development programs for talented women, who are undergoing one year's Executive Sponsorship, Mentoring, Networking and Executive Coaching. Among the alumni, 35 percent have moved on to higher level positions.

- support Nokia business groups, corporate functions and regions to develop their female employees and leaders and build a sustainable pipeline of female talents.
- foster a gender-neutral culture through training for leaders and managers on gender dynamics and unconscious bias, equipping them to best manage diverse teams and ensuring that all our processes and communications are gender-neutral and inclusive. In 2018, over 900 leaders and employees were trained on gender balance topics.

- participate in building a long-term female talent pipeline within the Information and Communication Technology (ICT) sector by helping to bring more women and school aged girls into Science, Technology, Engineering and Mathematics (STEM).

We hosted several G4G-events to drive the interest of 11–15-year-old girls for STEM. We collaborated with greenlight for girls, a non-profit organization focusing on driving girls' interest for STEM through interactive and fun workshops. In 2018, we invited around 1860 girls to experience a day of science at Nokia hosted by 600 Nokia volunteers.

In addition, our location teams also participated in the ITU initiated Girls in ICT Day and Girls Coding Day.

Here are some highlights:

- Throughout the year 2018 greenlight for girls events were organized at Nokia sites in Paris-Saclay, Murray Hill, Shanghai, Hangzhou, Madrid, Espoo, Tampere, and Oulu among other locations.
- In April 2018, Nanjing technology center participated in the international event of ITU called Girls in ICT Day, opening its door to 27 female students from Nanjing University of Posts and Telecommunications. The students visited the Nanjing R&D office and lab and enjoyed various technology workshops. Three female experts and Nokia role models shared stories from their career paths and examples of personal choices with the students. At the end, most of the participants enrolled for an internship program at Nanjing Technology Center. Also, Nokia Beijing opened its doors for 200 girls to engage in active planning of their careers in STEM.
- Greenhouse in Nokia in Germany hosted a Girls' Day, for girls over 10 years old, featuring workshops and various product stations, making engineering and technology very practical and interesting, as well as discussions about how to build a career path in STEM. It took place across four Nokia sites in Germany and hosted >200 girls.

Greenhouse and StrongHer – employee networks that promote gender balance

Greenhouse is a women's network for female Nokia employees as well as externals. The network kicked off in 2010 with the aim to put the best females forward and to connect talented women within Nokia

and across other firms. Within this network women connect, share and support each other. There are approximately 180 female leaders in this network, mainly in Europe, but spanning 12 countries in total.

Greenhouse wants to:

- discover, unveil, foster and grow women's potential
- promote women in their career
- enrich our skills via Workshops, Fireside Chats and Network extensions
- offer best-fit female talents for the organization
- place the right, qualified and successful ladies in top management
- provide a lifetime membership to encourage best possible networking and mentoring.

The Greenhouse vision for 2030:

- Women around the globe are connected via networks
- 50 percent of companies are run by women
- Empowered women in leadership roles are normal and we'll stop spotlighting them

In 2018, Greenhouse, started a cross-industry initiative to link women across 17 corporate women networks. Companies connected are for example Allianz, BMW, Deutsche Bank, Infineon, Kuka, Microsoft, M-Net, Siemens, SWM, and Unicredit, as well as several startups.

In 2019 and beyond our Greenhouse will be intensifying the work in the ecosystem across corporations, innovation and internationalization, while growing the network with further highly

qualified female leaders. A new monthly series of career workshop kicked-off to up the women's business acumen, presentation skills and technical knowledge across key themes.

StrongHer is an inclusive employee network aiming at a company where women have the same opportunities as men and are well represented in all business domains and functions.

Initiated and led by employees for employees, StrongHer is a multi award-winning initiative which contributes to women's empowerment, helping them unleash their potential and magnify their business contribution, and increase the representation of women at all levels and in all job functions in our company.

The network is a grassroots movement created in 2011 by six female employees in France and is open to all employees, men and women, executives and non-executives.

Statistics as of January 2019:

- 3 000+ members
- 70 countries on five continents
- 43 active chapters led by a community of 90+ leaders
- 24 percent male membership.

StrongHer advances gender diversity by offering networking opportunities, personal development, and a think-tank on leadership and management. It also provides exposure to diverse role models for women

and men, along with business contacts within and beyond the technology sector. StrongHer has been an eye opener on the many causes for low representation of women in the ICT industry and in leadership roles. There is not just one glass ceiling, but some often-occurring explicit or more implicit patterns and reasons that are encountered at various stages of women's lives and careers, caused by others and women themselves. StrongHer works on three axes: DARE, ACT, and INSPIRE.

To ensure impact on the three axes, StrongHer builds and deploys its emblematic worldwide programs in partnership between its network of worldwide chapters, Nokia Diversity & Inclusion organization along with the support of Nokia Executives:

- StrongHer Awards to spotlight talented women role models
- Knowledge, Information and Wisdom for employees with KIW-e Mentoring program to help employees promote innovation through the creation of an expert community to share business issues and improve visibility
- KIW-e webcast where executives and experts shared business relevant knowledge
- A charter for managers to explicitly walk-the-talk on gender balance, to publicly commit to take gender inclusive actions and become certified champions of the StrongHer values.

In 2018 StrongHer organized 120 local events with attendance by 5 600 employees worldwide, notably events in collaboration with external companies or networks including Capgemini, Deloitte, HP, Randstad,

Renault, Sanofi, EDF, Nestlé, Sodexo and customers like Vodafone and AT&T.

Following the GEM-TECH Award received from the International Telecommunications Union (ITU) and United Nations Women (UN Women) community, StrongHer has been invited to be part of the Advisory Board of the EQUALS (formerly GEM-TECH) Award since 2017.

StrongHer was awarded in 2018 DonaTIC award for Women in IT in Spain, initiative from the Government of Catalonia.

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.

Priority deliverables of the five BBBEE elements:

- We strive to comply with the minimum requirements of these priority elements)
- Ownership – We continue to maintain our effective black equity ownership with 31 percent black women ownership.
- Enterprise development – We continue to contribute to the development of smaller black

businesses to help them grow, ensure their sustainability and assist with job creation. We have a committee that continuously review the impact of our interventions/support and the success of those businesses.

- Skills Development – We established a dedicated and sustainable skills transfer program aimed more importantly at developing women with potential for advancing in leadership roles within the company. We have implemented learning programs for blacks including black women and disabled learners.

We also strive to implement a targeted procurement strategy geared to increase procurement spend from companies which have made significant progress in the area of BBBEE. Our community investment activities are managed by a dedicated committee to manage the initiatives linked to the socio-economic development of South Africa's disadvantaged communities.

We also have targets to increase the ratio of blacks in the company and we continuously measure achievement, equally importantly, women in leadership positions. As per our plan, we want to ensure we achieve our targets through our recruitment process and internal promotions. To achieve our target, we have a local Vetting Committee which evaluates and manages the appointment of new employees according to our BEE Management Control plan. We have also put in place targets for a women's graduate program as a plan to improve our women ratio and ensure a robust women talent pipeline.

LGBT+ inclusion

In November 2018, our company officially declared its support of the United Nations Standards of Conduct for Business and is the first company in Finland to do so. The standards are a framework for businesses to prevent discrimination based on sexual orientation and gender identity. This marks a significant step in our journey to take concrete actions to foster an inclusive workplace where everyone can be their authentic selves.

EQUAL! (the Nokia LGBT+ Employee Resource Group) is an educational and support group for our employees who are lesbian, gay, bisexual, transgender and other related groups (LGBT+) or who have family, friends, or colleagues who are LGBT+. 2018 was another year of expanded reach for EQUAL! through the internal employee social network with members roughly doubling in number, and expanded activities including:

- LGBT+ awareness month content which included three company-wide events to raise employee awareness on best practices, allyship and a more global perspective on what it means to come out.
- Increased visibility with the LGBT+ rainbow flag flown on several Nokia campuses (Paris-Saclay, Ottawa) during Pride Month and a pilot run of LGBT + Allies rainbow Nokia lanyards to express support to LGBT+ colleagues, and spark discussions of what inclusion means at Nokia.
- Several local events in Nokia sites (Budapest, Ottawa, Paris-Saclay) to bring up the topic of LGBT+ inclusion.

Equal opportunities for disabled employees

France - Mission Handicap

In France, the Mission Handicap program, designed in 2006 to better integrate disabled employees into the workplace, was established to meet the legal quota of 6 percent of disabled employees in French companies.

The program includes several action plans such as hiring activities, equipment adaptations, tool or facility accessibility, training of employees including managers, HR recruiter and colleagues, digital accessibility sensitization, as well as communication and awareness sessions for all employees. Nokia France reached a ratio of 4.55 percent of disabled employees by the end of 2018.

@talent Egal

We co-lead @talentEgal, a non-profit association gathering together Nokia, Safran, SII, Dassault Systèmes, GE Healthcare and several universities/ engineering schools in France. @talentEgal helps disabled postgraduate students gain employment by providing them with training, internships, or other forms of work experience. Learning through mentorship by partner's employees helps students reduce their self-censorship, improve their skills, and enables them to be prepared for successful occupational integration. Several of our employees accompany students and mentor them in developing their soft skills, their English skills, and their knowledge of the job market. In 2018, @talentEgal helped 78 disabled students.

Germany

Providing equal opportunities for disabled employees is a proven and professionally established commitment in Germany. Company and employee-elected representatives for severely handicapped employees work together to coordinate processes and actions for training and awareness, job postings, recruiting, working environment, and external partner cooperation. We have a sustainable implementation and a current disabled quota of 4–5 percent.

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 risks through training, analysis, assessments and consequence management.

We have established a wide range of programs to improve our health and safety (H&S) performance, a description of which is available in a table on the next page, and encourage reporting of near misses and dangerous incidents by employees and contractors.

Our health and safety management system serves as a basis for our overall program and is an integral part of how we manage health and safety and is



certified with the internationally recognized OHSAS 18001 standard and certified by a third party, Bureau Veritas. The management system covers activities within all networks business groups, customer operations and supporting corporate functions. As of year-end 2018, coverage of employees within the scope of that certification was around 78 percent.

Group Leadership representatives review our health and safety performance on a regular basis through a Consequence management committee. These meetings are held to review all fatal and high-

potential incidents and to set strategic direction. In addition, our senior leaders are increasingly involved in matters of safety through regular reviews and site tours. We aim to create a culture among our employees and contractors that identifies hazards and supports active risk prevention and action, so that we can significantly reduce the number of incidents that occur.

Our health, safety and labour conditions policy can be found at www.nokia.com/about-us/investors/corporate-governance/policies.

H&S programs

Method		Purpose and benefit	Embedded in	Applicable to
High Risk Project Implementation Assessment (HRPIA)		For all projects where high-risk activities are identified (such as work at height, driving or electrical work), the hazards are highlighted and assessed. Appropriate controls are defined and implemented using a consistent assessment format and criteria called High Risk Implementation Assessment (HRPIA) with project teams, safety and relevant stakeholders such as procurement and quality. Examples of some of the areas assessed are: adequate resources assigned to ensure project for safe delivery, suppliers evaluated and qualified prior appointment, Nokia non-negotiable H&S requirements and rules are implemented, expectations are communicated to and apply equally to any supplier, and H&S performance monitoring along with operational performance is linked. This process is embedded in Nokia's Sales & Execute Process and is a required step in project deployment.	Sales & Execute Process	Nokia
Supplier Maturity Assessment (SMA)		Supplier Maturity Assessment (SMA) is an evaluation method to determine the suitability of the safety controls implemented by suppliers performing high-risk activities on Nokia's behalf. As part of Supplier Base Management, the SMA is a detailed evaluation, typically conducted face-to-face at a suppliers premises by H&S professional to determine capability by looking at specific put controls and processes in place. This provides Nokia with a measure of the H&S Management Maturity of the supplier and the results are provided to the procurement and project teams to understand the risk and controls in place.	Supplier Base Management	Nokia and Suppliers
Incident investigation		Understanding incidents is important part of the H&S program so that future incidents can be prevented. All employees and contractors are encouraged to report incidents including near miss, medical treatment and lost time incidents. All fatal, critical and high potential near misses are fully investigated and preventive actions are put in place to prevent a similar incident from occurring. Actions are reviewed regularly and are tracked to completion. All incidents are reported and maintained in the database.	Health, Safety, Security and Environment (HSSE)	Nokia and Suppliers
OHSAS 18001 Certification and Operational Reviews		Nokia has two main processes for assuring H&S. External assurance is done by Bureau Veritas for the OHSAS 18001 global H&S certification. Internally, assurance is done by performing internal audits and conducting Operational Reviews, which are a comprehensive review of country risk and operational controls in place.	Quality, Internal Audit Process	Nokia
Consequence Management		Supplier performance is a key part of the H&S program. Failure to comply with H&S requirements that can lead to a fatal or disabling injury, or a major non compliance with H&S contractual requirements are addressed as part of the consequence management program and may result in a warning to the supplier (yellow card being issued) or to the termination of contract and the phase out of the supplier (red card being issued).	Procurement	Suppliers
Quality Awards		Recognition of achievements in H&S is important to generate innovative ideas and encourage participation in the H&S program. People Excellence is the category related to H&S and is part of the Quality Awards.	Quality Awards	Nokia

Addressing key risks through training and assessments

Health and safety are embedded within our Code of Conduct and is therefore included in our Ethical Business Training. In this training we emphasize the importance of identifying and avoiding risks and reporting incidents. In addition, we run campaigns that focus on the key safety risks for our employees and contractors and encourage open reporting of incidents and near misses by contractors and employees.

In 2018, we continued to emphasize our non-negotiable rules called the Nokia Life Saving Rules, which include six simple safety rules related to our top risk areas: driving, working at height, contractor management, and electrical activities. By the end of 2018, 100 percent of suppliers delivering high-risk activity had been assessed using our H&S Maturity Assessment Process and 89 percent (81 percent in 2017) of assessed suppliers met H&S compliant supplier status. Please read more on the 2018 performance of the supplier H&S related programs in the Responsible sourcing section.

We continue to conduct project readiness assessments to more closely review high-risk projects in each market. In 2018 we conducted 224 reviews across all markets (cumulatively over 800 since 2016). The assessments are conducted with a team of key health and safety stakeholders and project team members, assessing project controls using a formalized process and assessment tool. Projects are scored and tracked to identify improvements as needed.



In our collaboration event in Dar es Salaam, Tanzania Work at Height video was demonstrated to give those not familiar with tower climbing the opportunity to experience it.

Our health and safety performance

In 2018, there was one (four in 2017) fatal incident resulting in the death of one (five in 2017) contractor/subcontractor personnel while carrying out work on our behalf. The fatality was related to working at height. Any such serious incidents while carrying out work for Nokia are unacceptable.

Lost-time incidents of our employees decreased by 5 percent between 2017–2018, while there were 39 incidents in 2018. It is a positive sign of our safety culture that at the same time, reporting of near

miss incidents by both employees and contractors increased by 9 percent, with 454 incidents reported in 2018.

Wellbeing

In order to thrive in the programmable world, we need to establish a framework that supports and enhances the changing nature of how, where, and when we work. We are focusing on driving sustainable business value through productivity, innovation, and creativity. Our ambition is to embed wellbeing into our culture in such a way that it is recognized as a

key enabler of performance excellence and business success.

Our health and wellbeing framework consists of three pillars:

Thrive aims to create a culture of wellbeing and empower everyone to make smart decisions so that they can thrive both as individuals and teams in our agile, digital workplace. During the course of 2018, employees participated in the Relay for Health step challenge, powering a virtual baton across multiple time zones and countries, connecting everyone in Nokia globally and putting wellbeing on the agenda for a day. Over 1 200 employees participated across 124 countries travelling approx. 77 000km.

Manage is about establishing globally consistent people management practices that recognize and proactively support positive wellbeing. Line manager training on issues such as workload and pressure helps our people managers to openly and confidently discuss wellbeing concerns with their team. This enables them to identify the sources of stress early and to proactively address them. Our 1-in-90 process requires a regular dialogue between line managers and team members to enable mutual feedback. Having included a specific discussion point on employee wellbeing and work-life balance, this provides the platform to agree concrete actions which are followed up in the next round of discussion.

Care is one of the building blocks of the Nokia Way. In wellbeing terms this means building consistent support services globally and providing timely,

professional care for every employee. We know that from time to time, everyone experiences situations that affect their general wellbeing, which can have an impact on their performance. We want to make sure we provide the best possible support in these matters. The Personal Support Service is Nokia's Employee Assistance Program (EAP) providing confidential, professional support to all Nokia employees and their immediate families on a range of emotional, practical and work-life issues.

World Safety Day 2018

As part of our drive to make Nokia a great, safe and healthy place to work, we also celebrated World Safety Day during the week of 23 April 2018 across the company. Kicked off with a video message from our CEO, we held local events at 50 of our sites with a variety of people-centric activities.

Collaboration and best practice in Tanzania

Work at height and technology, two of our core activities, were present in a two-day workshop in Dar es Salaam, Tanzania. 120 representatives from the operators, customers, the telecom regulator and suppliers worked together and shared knowledge about lifting techniques and practices. Our Virtual Reality Work at Height video was also demonstrated to give those not familiar with tower climbing the opportunity to experience it.

We design products that transmit and receive radio frequency (RF) energy. We ensure that our product portfolio, including macro cells, small cells and Wi-Fi, comply with established national and international standards and regulations on RF exposure. We provide installation procedures and training to those working for and with Nokia to ensure that equipment is installed correctly and radio wave exposure levels are in compliance with established exposure limits. We engage with customers and partners about RF exposure to our products and provide detailed instructions to ensure they operate equipment appropriately to keep the general public and workers' exposure below the established exposure limits. For more detailed information see Nokia RF exposure statement at

www.nokia.com/about-us/sustainability/downloads

Making change happen together

Collaboration is key to creating shared value that underpins the drive for a more sustainable society and world. Together we can make a much greater impact on the social, environmental, ethical and economic challenges of our time.

Highlights in 2018

g4g

greenlight for girls
STEM events in eight Nokia sites around the world

More than
2x

employee volunteering hours compared to 2017

99.8
%

of our community
investment contributions
aligned with our three thematic priorities

33

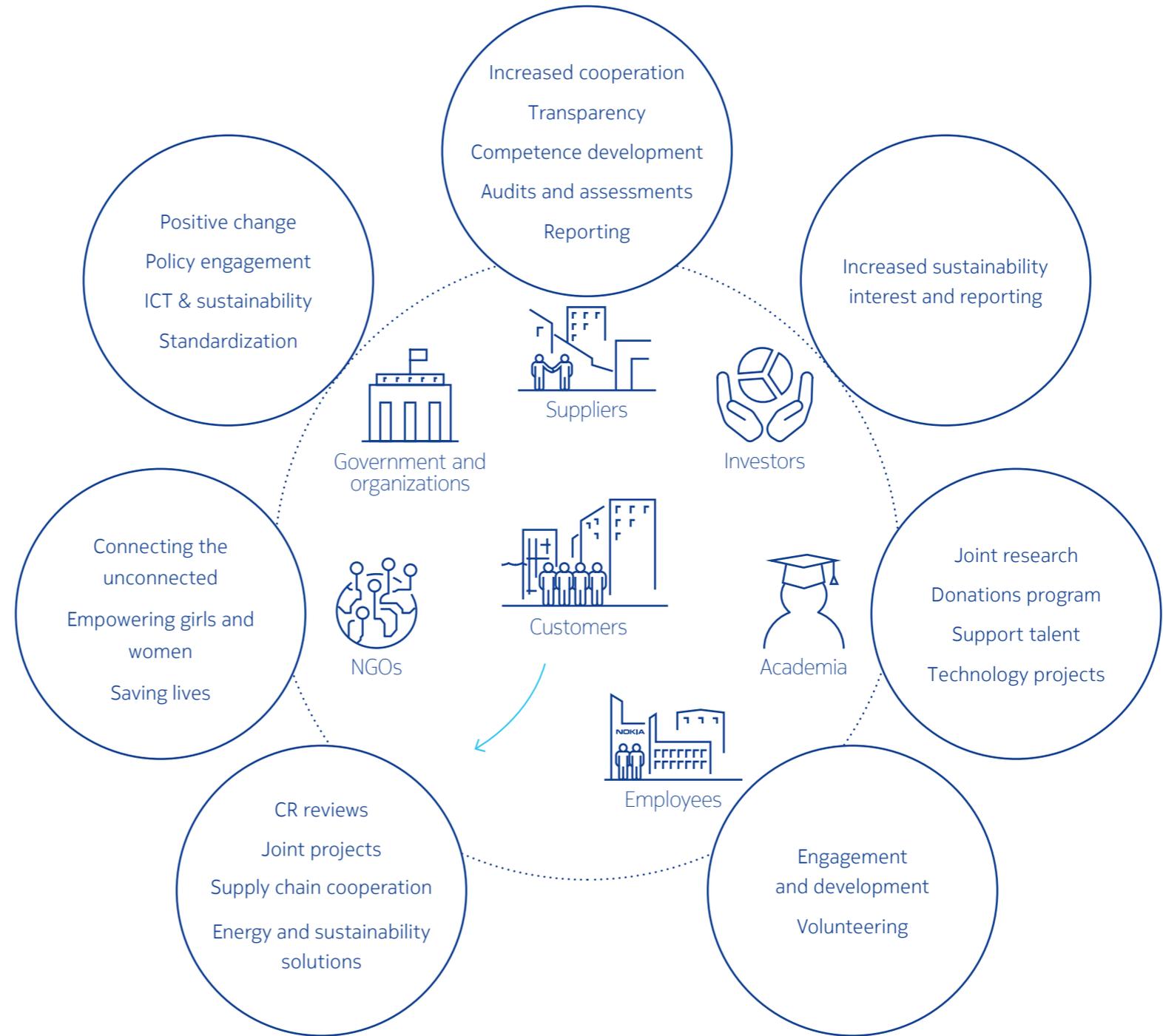
universities
supported through our University Donations program

Over
1 400 000

individuals
reached by our community investment programs since 2016

Making change happen together

We achieve the greatest positive impact through collaboration between industries, civil society, customer segments, employees and other stakeholders.



Our commitments, targets, and performance

Priority area	Material topic	Targets	Achievements 2018	Status
<p>Making change happen together</p>  	Corporate community investment	<p>2018 100% of corporate community investment activities aligned with our Group-wide strategy, business drivers and SDGs.</p>	In 2018, 99.8% of the global and key regional contributions supported our three strategic CCI themes and when the local programs are included, 95% of our total contributions were aligned to the three thematic priorities. The CCI themes are aligned with our business drivers and SDGs.	 Not achieved
		<p>2018 100% of corporate community investment programs to be measured against a monitoring and evaluating system.</p>	All identified global and key regional programs were measured against a monitoring and evaluation system in line with the LBG methodology.	 Achieved

Making change happen together

In order to accelerate achievement of the United Nations Sustainable Development Goals, we understand that we cannot just concentrate on our own actions and challenges. We need to work with a broad range of other stakeholders that can bring their skills, knowledge and power to the table to help resolve the environmental, social and governance challenges the world faces and create opportunities for all.

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.



Supporting our customers' sustainability goals

We continued our work with our customers, both communication service providers and enterprise, in a number of key areas of sustainability including energy and resource efficiency, critical communication and disaster response, efficient manufacturing, supply chain transparency, modern slavery and community involvement.

Our greatest positive impact in the fight against climate change comes through the products we supply to our customers, helping them reduce their carbon footprint with more energy efficient products. For more information see section 4.5 under Protecting the environment. We also offer a range of products, software and services that enable more efficient delivery of the end-user services our customers offer to their customers.

Our collaboration with the Joint Audit Cooperation (JAC) initiative, the association of some of the world's largest telecom operators who work together with suppliers such as Nokia to assess and develop corporate responsibility implementation across the manufacturing centers of those suppliers.



The association has 17 operator members. In 2018, we carried out some audits based on JAC requirements and also signed up to be part of the ongoing JAC Academy initiative to further develop auditors' knowledge of JAC's requirements. More information can be found at jac-initiative.com. Our representatives also again participated in the annual JAC Forum in Shenzhen, China covering topics such as circular economy, responsible sourcing, and health and safety in the supply chain.

Connecting the unconnected

Today, Internet penetration is at 55 percent with more than three billion people still unconnected. These unconnected users exist both in emerging markets as well as in developed markets. In emerging markets, the average revenue per user (ARPU) is not high enough to cover the building and operational costs (i.e. economic reachability is difficult). In developed markets, there are hard-to-reach areas with small populations, such as archipelagos or

mountain regions (i.e. geographic reachability is difficult).

Our Community Hosted Network solution is a revolutionary new product to address these issues. The solution addresses the cost structures surrounding base station installation and operation, and requires only any available public internet for backhaul connectivity. The base station is designed to be installed and maintained by a local user without prior telco experience. When the base station is powered on for the first time, it connects to a Cloud Operation Support System (OSS) that configures it to connect automatically to the operator network. The first commercial deployments of the solution were done in the first half of 2018 in Finland with local private LTE focused operator Ukkoverkot. During the summer of 2018, the team and Vodafone Hutchinson Australia conducted successful field trials in regional Australia, creating connectivity for local potato farmers to use LTE data and VoLTE as well as IoT connectivity to automated irrigation systems.

We also advocate for more urgency in connecting the unconnected through top level engagements in key international fora. For example our CEO continues to be active in the UN Broadband Commission; Nokia hosted a UN High Level Panel on Digital Cooperation in our own premises in Helsinki in March 2019. We contributed to the World Economic Forum (WEF) report "Our shared digital future" where along with other contributors (leaders from business, government, academia and civil society)

we collectively acknowledge the need for shared goals and coordinated action to shape an inclusive, sustainable, digital future.

Smart Agriculture as a Service

The Nokia Worldwide IoT Network Grid (WING) is a managed service that helps telecom operators go to market quickly and enable improved economic and social opportunity. It has been created as a service that can help operators and enterprises enter the world of IoT or further grow their existing IoT offerings. Smart Agriculture as-a-Service provides subscription-based access to regional climate and pest data for farmers to mitigate risks, thus improving the possibility for greater crop yield. Nokia delivered a smart farming solution to one large customer to increase farm production, reduce spoilage and reduce energy use and optimize operations costs. The solution provides a single view into all farm assets (agriculture / livestock) as well as reduced energy consumption in farm operations.

For more information visit networks.nokia.com/services/wing.

We work closely with our customers to connect the unconnected and bring the benefits of technology to all people, to bring efficiency to industries, and to minimize any potential misuse of technology while maximizing the positive use. Read more in the [Improving Lives](#) chapter and [the Human Rights section](#) of this report.

Collaborating with NGOs

Our work with non-governmental organizations continued in 2018 based on our three key pillars of connecting the unconnected, empowering women, and saving lives.

In 2018 our Corporate Community Investment (CCI) program was covered large programs on corporate and regional level and smaller volunteering-based initiatives locally. As per the London Benchmark Group (LBG) methodology, we also calculated our university donations as part of our total CCI contributions. You can read more on our university donations in [Collaboration with universities, cities, and other industries](#).

Corporate level programs

Our corporate level community investment approach is aligned with our corporate strategy, business drivers, and the UN Sustainable Development Goals. We aim to look at programs that have a long-term impact and create a sustainable platform for the future in the target communities. Firstly, connectivity can bring greater access to education, health services, disaster relief, and business and market opportunities to the underserved communities of the world. Through our technology and its inherent benefits, we aim to connect the unconnected. Secondly, we believe that empowering women and girls by enabling and encouraging opportunities to

Corporate Community Investment | Our CCI mission



Connect the unconnected

In cooperation with our partners, create network solutions and platforms to:

- Connect the unconnected
- Bring benefits of our technologies, such as access to education



Empowering women

- Empower women and girls with skills to participate and join the connected world
- Attract women and develop their careers in the ICT business and STEM



Saving lives

Our technologies and employees are part of the solution

- To build resilience and respond to worldwide challenges and natural disasters
- To connect people to better health



experience the world of ICT and STEM will provide the basis for a grassroots change to the current gender diversity in ICT and other industries that recognize the full capabilities of the other 50 percent of the world's population. Finally, the technology solutions we create and deliver can play an ever-increasing role in responding to global challenges and natural disasters, and building resilience in the most vulnerable places and communities.

In 2018 we had five large programs under the corporate level approach. These programs were the Unicef programs on mHealth in Indonesia and on digital learning and connecting schools in Kenya, the finalization of the long-term early education program in Myanmar with Save the Children, as well continuation of greenlight for girls' program across multiple countries and the Dreams program for young people in Finland.

You can read more on cases on [pages 156–157](#).

Our total CCI impact

Our collaboration with Corporate Citizenship and London Benchmark Group (LBG) on impact measurement, benchmarking, and data analysis of our community investment programs was continued for 2018.

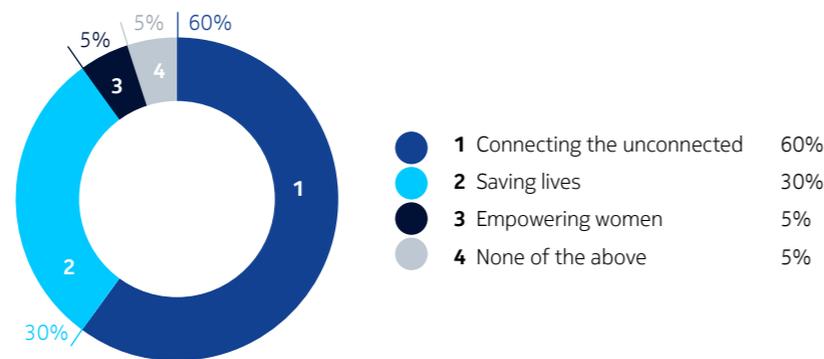
In 2018, we invested EUR 6.5 million in communities around the world, representing a 5 percent decrease in contributions from 2017. The decrease is largely due to multi-year partnerships in which funding was provided in previous years. 89 percent of the contributions were provided as cash, 11 percent as employee time and a minimal share as in-kind non-cash resources. The key regional (India and China) contributions covered 38 percent of the total spend, corporate

26 percent, university donations 23% and the remaining 12 percent came from local markets.

99.8 percent of the global and key regional contributions supported our three themes and when the local programs are included, 95 percent of our total contributions were aligned with the three thematic priorities. Most contributions in 2018 were classified under the Connecting the unconnected theme.

As output of the projects, we are proceeding well with our target of improving the lives of 2 000 000 people over the period 2016 to 2025 through our corporate and key regional community investment programs, focusing our action on our three themes. In 2018, our programs had around 304 200 direct beneficiaries. Since 2016, already around 1 426 600 people have benefitted from our programs. As type of impacts received, in 2018, our programs

95% of Nokia's total community investment contributions were aligned with the three thematic priorities



supported over 10 000 people to develop new skills or personal effectiveness and contributed to an improvement in the wellbeing or quality of life of over 57 000 people.

Volunteering

Guidance for all employees on volunteering is provided through our Volunteering guidelines and is further enhanced with our standard operating procedure (SOP) on charitable sponsorships and donations. In 2018, our employees contributed around 18 500 hours of volunteering in paid working time, significantly up from 7 500 in 2017. We see there is still a good deal of room to increase the number of hours, as the corporate guidance allows two days a year per an employee when and where possible. On the other hand, we do not have currently a global system in place to track all employee volunteering hours, so the reported time figure is likely under representative.

In 2019 we look forward to encouraging and supporting more local programs around the world where our employees volunteer. We will continue with select large signature programs, but also look at engaging and supporting our employees in their giving back to their communities.

Engaging with our communities on the ground

2018 was an active year for our Location Development teams around the world. In addition to their operational responsibilities, our employees invested volunteer hours, during their working time, into humanitarian, environmental, and local solidarity



Thein Zaw / Save the Children



©UNICEF/Noorani/2018

Examples of local volunteering

Location	Project description
India, Bangalore	Bio-diveristy Survey & Lake Clean up - Madiwala Lake conservation project. On World Wetlands Day 2018 Nokia and WWF India launched the conservation and management plan for Madiwala Lake in Bangalore, in collaboration with Karnataka Forest Department (KFD) and Lake Development Authority (LDA) - towards the cause of Wetlands for a Sustainable Urban Future. Nokia Bangalore volunteers were involved in these activities.
Poland, Krakow	Lego workshops were organized in one of Krakow's child care homes to teach children programming through play and to inspire them to become interested in technology.
China, Nanjing	Nanjing TC participated in the international events of ITU – “Girls in ICT Day”, opening its door to female students from Nanjing University of Posts and Telecommunications. The students visited Nanjing R&D office and lab, enjoyed technology demos and face-to-face communicated with female models.
France, Paris	Through our presidency of the @talentEgal association, we mentored disabled students to help them graduate and find employment.
China, Qingdao	Qingdao is a city with large population. Hospitals are short of blood for most of the year. We contribute blood every year for local hospitals badly in need of blood to save lives.
Germany, Ulm	Engagement to support integration for refugees. Buddy helps for example to deal with bureaucracy in Germany, explain different questions.

initiatives, in addition to the time taken for these activities on personal time.

Whether offering basic material aid – food, clothing, books, toys - or social support – tutoring for underprivileged children, fun outings for orphans, wellness visits to the elderly – our location employees have demonstrated that they are always willing to take time to make every person feel connected.

Our Location Development actively supported our Corporate Community Investment mission by continuing our CCI/CSR (Corporate Social Responsibility) award in 2018, to underscore the importance which our company attributes to helping

those in need. To take our sustainable achievements to the next level, we give particular distinction to our locations that not only lead several corporate responsibility initiatives, but also record the number of volunteers and beneficiaries. We do this so that we will be able to fully recognize their efforts and try to raise the bar of our involvement next year. Some of our key programs and related achievements in 2018 are summarized here. More information on our corporate community investment programs can be seen at [our website](#).



©UNICEF/Rabenstein/2018

Cases

These activities support various SDG Targets such as 5.b:



“Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women”.

Case 1: Early Childhood Care and Development in Myanmar with Save the Children

Since 2015, Nokia has supported Save the Children in Myanmar to improve access and quality of pre-school education, especially for the most marginalized children in remote areas of the country. Through this partnership, communities, as well as local and national authorities, have been supported to further develop and increase access to Early Childhood Care and Development (ECCD) services. Over the past two years, Nokia and Save the Children have also developed and deployed a mobile-based app to overcome challenges in collecting and sharing important data from ECCD centres. Read more at www.nokia.com/about-us/sustainability/making-change-happen-together/community-investment-and-ngos.

Case 2: Connecting the unconnected and empowering girls in Kenya with Unicef

We have been working with Unicef in Kenya since the beginning of 2018 to enable equitable access to quality education for children in Northern Kenya. This is being done by providing schools in remote locations with access to the internet, digital educational content in line with the new school curriculum and teacher training workshops to build capacity on how to effectively use the digital content and related hardware in schools.

By providing technical expertise and financial support, Nokia has worked with Unicef to establish a plan to

extend internet connectivity to remote, disadvantaged and unconnected schools and maximise the impact of the Kenyan government’s investment in the tablets. In 2018 the piloting process began, following approval from the Kenyan Government. For more information visit www.nokia.com/about-us/sustainability/making-change-happen-together/community-investment-and-ngos.

Case 3: greenlight for girls (g4g)

We again rolled out programs around the world in order to encourage young women and girls into STEM subjects. Read more under our [Diversity section](#).

Case 4: Save the Children and Nokia in India

Since 2014, we have worked with Save the Children in India to implement social protection programs and reduce the impact of natural disasters on vulnerable children and their families. We have helped to increase the resilience and capacity of children and their communities to reduce disaster risk and provide relief and rehabilitation when disasters hit, by creating critical infrastructure and raising awareness of disaster risk reduction. The task force groups formed in each village under the project have responded to both major emergencies such as the Bihar floods and the Vardha Cyclone, and daily risks such as fire accidents in the slums.

Read more about our work with Save the Children in India on page www.nokia.com/about-us/sustainability/making-change-happen-together/community-investment-and-ngos.

Case 5: Projects with Digital Empowerment Foundation in India

As a telecommunications technology leader, Nokia is committed to improving people’s lives through connectivity. We launched our flagship CSR project Smartpur with our partner 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. There are five key areas of development under the project – health, education, livelihood, governance and finance – to build a holistic, digitally integrated village. Read more at www.nokia.com/about-us/sustainability/improving-peoples-lives-with-technology/connectivity.

Project Kanchiloom was launched in 2017 with our partner NGO, Digital Empowerment foundation. This project concentrates on improving livelihood opportunities for the weaver cluster in Kanchipuram in the state of Tamil Nadu in the south of India. The project leverages digital technology to enhance the core skills of the weavers, facilitates financial inclusion by connecting weavers to various central and state government schemes, and eventually aims to connect the weavers directly to the market place through e-commerce.

Case 6: Improving education opportunities in China

Ninglang is a poverty-stricken county in Yunnan province, located in western China. 98 percent of Ninglang is mountainous terrain, populated by minorities with their own languages and dialects. As of today, there are still more than 40 000 people living in extreme poverty in the region, with an income of less than RMB 10 (USD 1.5) per day. Potatoes are the main food all year round for the people living in the Ninglang mountain regions and for the first time in 2018 when our employees visited they saw a reliable water source in one village where previously rain and snow were collected to provide water for the villagers.

For the last 16 years Nokia Shanghai Bell employees have been helping the people of Ninglang through focused educational support. The employees have built a hope school, provided long-term sponsorship to some classes, built internet classrooms, sent employee volunteers to teach local children as well as online distance learning classes run by our employees.

We have had 300–400 employees paired up with 300–400 underprivileged students (mainly girls), providing basic financial support (RMB 800 per year) to them to complete basic education. Cumulatively, our employees have contributed more than 5 000 hours of volunteer work to help the people of Ninglang.

In 2018, we donated towards building a smart classroom for Xiao Liangshan primary school, to build a playground in the NSB hope school, provided smart management training to county leaders, and had two employees working on the frontline in Ninglang. Our program of employees supporting Ninglang children in need and volunteer programs are ongoing.

We also support an Internet Classroom against Poverty program with the NGO Zhonggu, in other areas in China. For more information on those programs visit www.nokia.com/about-us/sustainability/making-change-happen-together/community-investment-and-ngos.

Case 7: Season's Greetings campaign

In 2018, we again held our annual festive internal charity campaign from mid-December to mid-January. three charities were chosen by the Corporate Responsibility team and a voting competition was opened to all of our employees to cast their votes for their favorite charity target. The three chosen programs were:

Red Cross Disaster Relief Fund, which provides funds, materials such as tents, blankets, food, and professionals in disaster situations around the world.

Oxfam Refugee Crisis Appeal which will provide clean water, sanitation and essential supplies to hundreds of thousands of Rohingya refugees in Bangladesh.

Plan International's Digital Gender Divide program, which builds up young people's work-related skills and capacities in Uganda and Ethiopia.

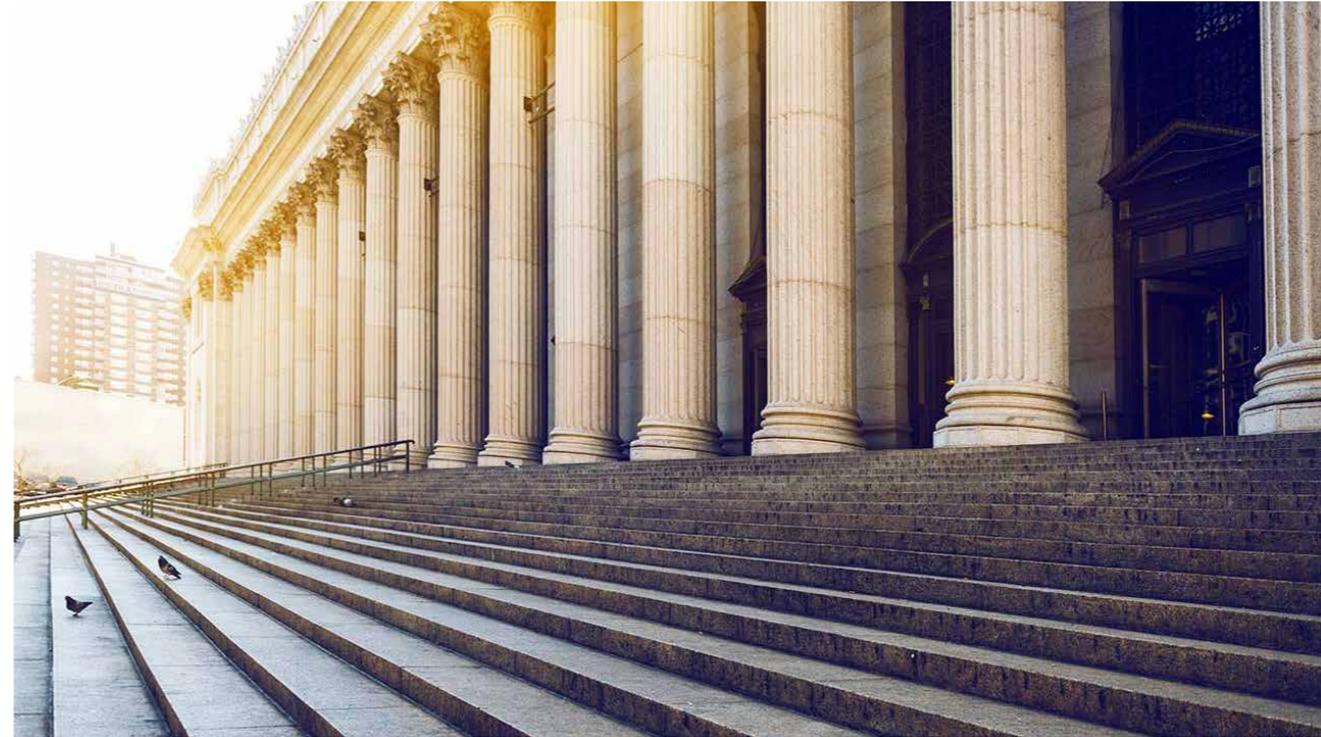
Despite the holiday season, the charities received over 3400 votes from employees in more than 100 countries. The votes were calculated via an external voting platform and each charity will receive the proportion of the total budgeted donation funds based on the percentage of votes they received. We will be reporting on how the money was used in next year's Sustainability Report.

Working with governmental and multilateral organizations

We believe in the power of collaboration by working with industry partners and engaging with policy makers, international and multilateral organizations, civil society and academia, to help transform towards a digital economy and society. We believe digital technology can strongly contribute to reaching the 17 United Nations Sustainable Development Goals (SDGS).

Our approach to governments

We build and maintain relationships with governmental stakeholders and ensure they understand our strategy and positions. We contribute to key policy debates fostering a connected society and the adoption of new technologies around the world. We share our opinions and recommendations in an open and transparent way with governments, legislators, trade associations, international organizations, and customers and partners to promote the opportunities of a connected world for all.



We are honest, truthful, and accurate when dealing with governments, and we follow Nokia policies and procedures, and any applicable laws in our dealings with government officials. We do not participate in the political or electoral process through direct donations to political groups, but we protect our interests through lawful and transparent advocacy with relevant stakeholders.

We interact with governments and governmental bodies at multiple levels and in a variety of ways - as a business providing goods and services, as a concerned citizen petitioning to protect our interests, as a taxpayer, and as a private sector participant providing jobs and economic opportunities in more than 100 countries around the world.

The special requirements that apply to our interactions with governments and state-owned enterprises and their employees, including, for example, procurement, lobbying, entertainment, hospitality, disclosure and record-keeping rules are defined in our corporate guidelines and standard operating procedures.

Our corporate guidelines for dealing with government officials include that we ensure that government officials, when requesting information from Nokia, have a right to such information and that we have a right to deliver such information, that we conduct due diligence to verify that all information provided is current, accurate and complete. Our standard operating procedure include, for example, conditions and limitations for offering hospitality and entertainment to government officials.

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. Every Nokia employee has an obligation to be aware of the Code and to act accordingly.

Industry cooperation

We are a member of industry and international associations and other initiatives and networks, representing the interests of the sector and striving for developments in the economy and society at a national, regional and global level.

More details of our activities with some of these industry and international associations can be found later in this chapter.

World Economic Forum

The World Economic Forum (WEF) is an international organization for public-private cooperation committed to improving the state of the world. The Forum engages the foremost political, business, and civil society leaders from all walks of life to shape global, regional, and industry agendas and create positive change in the world. Nokia is an active partner of the Forum with the engagement of our President and CEO Rajeew Suri and other executives. For example, in 2018 we initiated a project to analyze 5G socio-economic impacts at WEF and will provide a resource to drive it in 2019.

GSMA

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including Nokia. The GSMA also produces the industry-leading Mobile World Congress events held annually in Barcelona, Los Angeles and Shanghai. Nokia has joined MWC events for many years.

European industry associations

DIGITALEUROPE

A trade association representing digitally transforming industries in Europe and advocating for a regulatory environment that enables European businesses and citizens to prosper from digital technologies.

European Telecommunications Network Operators' Association (ETNO)

A key policy group for European electronic communications network operators.

The European Round Table of Industrialists (ERT)

A forum bringing together chief executives and chairmen of major multinational companies of European parentage covering a wide range of industrial and technological sectors.

Nokia is an active member (observer in ETNO) in all three associations. Our Chairman of the Board of Directors, Risto Siilasmaa, is a member of the ERT forum and Nokia Senior Executive Markus Borchert is currently President of DIGITALEUROPE.

Other national industry associations

We are also a member of national industry associations in various countries. Some examples are the Technology Industries of Finland in Finland, CTIA and Telecommunications Industry Association (TIA) in the USA, The French Alliance of Digital Industries (AFNUM) in France and Bitkom in Germany.

Annual membership fees of the above-mentioned key memberships sum up to a total 1.5 million euros.

Cooperation in standardization

In addition to industry association -type of memberships Nokia takes an active part in the standardization of progressing digitalization. Our key memberships in this arena include 3GPP, ETSI, ITU, IETF, 5G-IA, 5G PPP and Linux Foundation.

You can read more on the scope of each association on [our website](#).

A snapshot of our activities in 2018

World Economic Forum

In 2018, we continued our collaboration as a partner of the World Economic Forum (WEF). The Forum strives in all efforts to demonstrate entrepreneurship in the global public interest while upholding the highest standards of governance with moral and intellectual integrity.

Our President and CEO, Rajeev Suri, is a member of the Steering Committee of the Digital Communications Governors and of the Stewardship Board of the WEF Digital Economy and Society System. He and members of our global leadership team have made important contributions to the Forum by sharing their expertise on the advancement of digital technologies such as 5G, IoT, and AI to improve the state of the economy while empowering citizens. We have contributed to WEF's report "Our Shared Digital Future". and to the creation of Responsible Digital Transformation – Board Briefing. In 2018, we joined the Partnering Against Corruption Initiative (PACI). PACI operates as a global platform centered on global principles for countering corruption and works to enable companies to maximize their collective impact in the fight against corruption.

Education is key to preparing future generations to thrive in a digitized world. This is why we support WEF's Closing the Skills Gap 2020 project and within this framework we committed to focus on early education in Myanmar. Closing the Skills Gap 2020 is a global call for measurable commitments from leading companies to train, reskill and upskill the current and future workforce.

Leadership at the United Nations Broadband Commission for Sustainable Development

The International Telecommunications Union (ITU) and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) set up the Broadband Commission for Digital Development to strengthen UN efforts to meet the Millennium Development Goals (MDGs). The aim was to boost the importance of broadband on the international policy agenda and expand broadband access in every country as a driver of progress towards national and international development targets.

The Commission was relaunched in late 2015 as the Broadband Commission for Sustainable Development to showcase and document the power of ICT and broadband-based technologies for sustainable development.

As a UN Broadband Commissioner, our President and CEO actively engages to discuss how to connect the unconnected and advance the Sustainable Development Goals through technology.

Nordic CEOs for a sustainable future

Our CEO joined CEOs of some of the Nordic region's largest listed companies in a common commitment to integrate the UN Sustainable Development Goals into their respective business strategies and create a forum for exchange of experiences and exploration of shared initiatives. The aim behind the initiative is to speed up the realization of the world's most important "to do" list, achieving the UN SDGs. The initiative also creates a platform for Nordic prime ministers to engage directly with CEOs on how to move from sustainability as a compliance exercise to how to lead successful purpose-driven companies. A key objective is to explore ways to deliver more impact through collaboration. In summer 2018 some of the CEO representatives of the initiative met with the Norwegian Prime Minister to discuss how to accelerate achievement of the global goals. For the latest information on the initiative go to www.nordic-ceos.com.

EQUALS

We have been an official Partner of the United Nations and International Telecommunications Union (ITU) EQUALS Global Partnership to promote awareness, building political commitment, and leveraging resources and knowledge. EQUALS partners seek to achieve digital gender equality and through this, improve the livelihoods of millions around the world. More information www.equals.org/partners and on our activities in 2018 go to [page 137](#) under our [Respecting people](#) chapter.

Other selected activities

Digital4Development

Digital technologies and services are enablers of sustainable development and can accelerate reaching development policy objectives such as job creation, gender equality, agriculture and food security, good governance and rule of law (e-governance), sustainable energy and climate change mitigation, (e-energy and e-climate change), and addressing the root causes of irregular migration. That is why we, along with SAP, Orange, Philips, SES and Ericsson set up the D4D coalition to promote digital infrastructure investments in developing countries (initially in Africa). The D4D coalition serves as a private sector platform to consult on and help shape European aid and investment into the digital sector.

WSIS and ITU Telecom

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 participate and speak at the event. In September 2018 we also sponsored the ITU Telecom event in Durban, South Africa, and contributed to the discussions there.

Latin America and technology for good

Connecting the unconnected is also an important pillar of the collaboration we have with governments and multilateral organizations. We are highly engaged with the Inter-American Development Bank and its education efforts to government officials around the

region on the power of the digital economy. As such, we contributed to the Bank's online course (MOOC) - Opportunities and Challenges of the Digital Economy in Latin America, to highlight the importance of connecting the unconnected, the social and economic benefits of IoT, and the importance of gender parity in technology access and adoption. Join the MOOC [here](#).

Digital Declaration

Nokia joins global initiatives meant to confront global challenges created by digitalization. Nokia's CEO signed a Digital Declaration joining a cross-industry movement of CEOs committed to act ethically in the digital era (respect the privacy of digital citizens; handle personal data securely and transparently; take meaningful steps to mitigate cyber threats; and ensure everyone can participate in the digital economy as it develops). The Declaration helps companies deliver what matters most to digital citizens, industry and governments. We are also a signatory of The Paris Call for Trust and Security in Cyberspace and of The Cybersecurity Tech Accord. With those initiatives, we want to contribute to improve the security, stability and resilience of the cyberspace.

Board memberships in sustainability related organizations

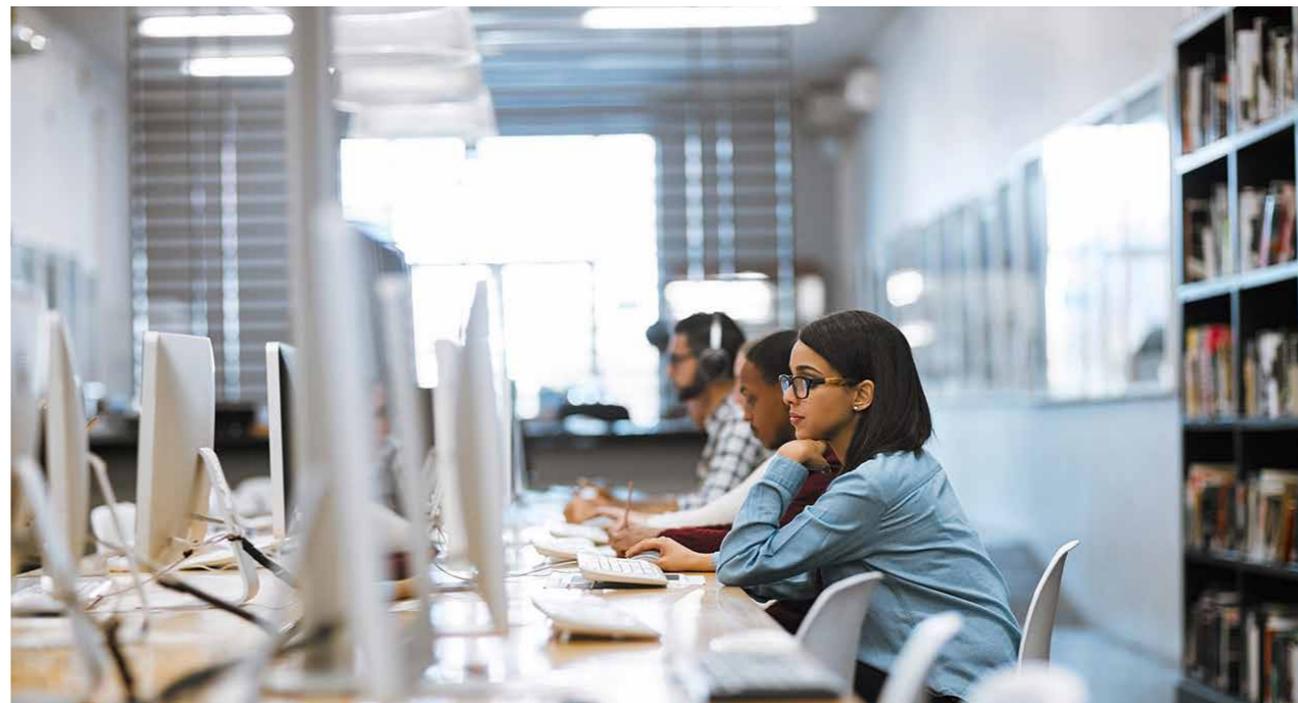
During 2018 Nokia employees were members of the board of directors of groups such as the Global Networking Initiative (GNI), Finnish Business and Society (FiBS) (vice chair) and the UN Global Compact Finland (founding board).

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 provides further opportunity to work with world-leading universities to further scientific exploration, develop talent, and share and create knowledge.

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, Industrial IoT. This network provides access to cutting-edge expertise to build our talent pipeline.

In 2018, Nokia Bell Labs launched new strategic initiatives with University of Cambridge in the UK and with Carnegie Mellon University (CMU) in the US;



- We became a founding partner of a new Centre for Mobile, Wearable Systems and Augmented Intelligence, based in Cambridge's Department of Computer Science and Technology. The Centre will advance the state of the art in a variety of fields including mobile systems, security, new materials, and AI to address one of the main human needs – the ability to communicate better with each other.

In addition to Nokia Bell Labs program, we have a University Donations Program. The generic guidance is to sponsor high quality research in areas that are close to our business interests, either rather directly,

like research of AI and future 6G, or indirectly, like other sectors of society where the role of ICT will be high. Contributing to universities is a crucial component of our work exploring how technology can improve people's lives. In 2018, we contributed EUR 1.5 million to 33 universities across the world to foster scientific innovation for this aim.

As an example, our donation to the Aalto University in Finland is enabling the development of technology to enlarge x-rays and subsequently reduce the time necessary to classify wrist injuries. We are also funding research at the University of Lancaster in

the UK to explore the use of sound for memory augmentation to help people living with dementia. Within communications, our donation to the Stevens Institute is helping to explore the future of communication in the age of digitalisation by advancing our understanding of the potential connection between humans and machine devices.

- We collaborated with CMU's CyLab to launch a new research initiative focused on building secure and privacy-respecting large city-scale IoT systems.

Working with cities

Cities are seeing unprecedented growth, bringing major challenges as they seek to remain sustainable, healthy and safe places for people to live and work. IoT offers new opportunities for cities to use data to manage traffic, cut pollution, make better use of infrastructure and keep citizens safe.

The competitiveness of cities and municipalities is increasingly dependent on the availability of technology. 5G, IoT, cloud computing, fiber and AI will bring high quality broadband services to address individual and business requirements. City and municipal governments see the need to transform their own telecom infrastructures to improve their internal processes, safety, security and resource efficiency and provide citizens and businesses with access to government and other services.

We are already working with cities across the globe to bring smart solutions and services to make these needs a reality. In 2018 we announced our cooperation with Hanoi, Vietnam, providing unified real-time management of all smart city assets and services. We

joined forces with Smart City Capital, LLC to launch a joint program to help Canadian cities fund and reduce the risks associated with smart city initiatives.

In India, we announced cooperation with Indian operator, BSNL and a Smart Telecom Pole project, which provides connectivity and is integrated with smart LED lighting system, CCTV cameras, digital billboards and environmental sensors. This smart pole solution has been designed and built in India to support smart city initiatives.

We also introduced enhancements to our in-home Wi-Fi solution that maximize Wi-Fi performance and simplify network management. The new Wi-Fi solution expands our portfolio with meshed Wi-Fi gateways and beacons, delivers a new Wi-Fi Home Portal for service providers, introduces a mobile application for users and provides new software functions and analytics that improve network intelligence.

For more information on how technology can improve the lives of people in cities around the world, see networks.nokia.com/industries/smart-city.

Industry and digitalization

Our end-to-end portfolio of solutions and services, and the skills of Nokia Bell Labs provide the gateway to the next age of industry and the Fourth Industrial Revolution where human, machine and intelligence will connect like never before.

In the public sector we offer solutions that improve quality of life, emergency decision-making and response through ultra-broadband networks. We

work with energy and utility companies to advance towards the next stage of automation, safety, efficiency and control of the most remote operations. We hyperconnected, safer and more sustainable transportation systems whether aviation, rail or road. And we work with multiple industries to drive improvements in automation and logistics. 5G, IoT and cloud computing will underpin a massive leap forward across all aspects of life.

In 2018 Nokia, ABB and Kalmar, part of Cargotec, successfully conducted industrial trials that leverage the low latency capabilities of 5G to support time-critical applications and enhance protection and efficiency in smart electricity grid and harbor automation. In India, we worked with BSNL, a leading telecom operator in India, to implement the next level of industrial automation, leveraging 4G LTE technology to enable greater operational efficiency at Nokia's Chennai plant. The project aligns with the Indian Government's Make in India program, which aims to promote excellence in manufacturing in the country. To address Industry 4.0, Nokia has applied a Conscious Supply Network concept at its factories leveraging digitalization, analytics, and robotics across the overall supply chain. In April 2018, we launched the industry's first Edge Cloud data center solution for the 5G era, supporting industry automation and consumer applications. These are just a few examples of the work we do to make industry more efficient, smarter and more sustainable. For more information go to networks.nokia.com/industries.

Key data and reporting principles

The sustainability data presented in the following pages covers Nokia Group, covering the calendar year 2018 and where available, trend data since year 2015. Before the data tables we describe the data reporting principles.

Data reporting principles

Scope and boundaries

The sustainability data presented in this report covers Nokia Group, including Networks business, 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 is covering the calendar year 2018 and where available, trend data since year 2015. Information dating back to 2003 is available on our [website](#).

On 2 November, 2016, we achieved 100% ownership of Alcatel Lucent. We use the term “Comparable combined company” when in the data trend reporting we refer to information including combined Nokia Group and former Alcatel Lucent data prior to the acquisition of Alcatel Lucent in January 2016. Other newly acquired companies will be included in the reporting scope when they have been legally consolidated and integrated into Nokia systems. Nokia Group data excludes Discontinued operations, which refer to the sale of the Devices and Services business in 2014 and the sale of the HERE business in 2015. Exceptions to this scope for certain indicators are specified in data table notes.

Adjustments and comparability

Adjustments to due structural change

Historical performance data for year 2015 is provided with two different scopes. The Nokia Group data covers Nokia as it was during 2015. The comparable combined company data aims to

provide a more meaningful historical comparison of the consolidated Nokia Group with Alcatel Lucent. Therefore, 2015 sustainability data from both legacy companies has been recalculated and combined for indicators where this was possible with the same definitions.

For longer term historical development, please see previous Nokia and Alcatel Lucent sustainability reports on www.nokia.com/about-us/sustainability/downloads/report-archive.

Adjustments due to methodology change

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 185](#).

Data collection

The data published in this report is collected through various internal and external reporting systems and consolidated on an annual basis for sustainability reporting purposes.

Environmental data

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

used tools, and emission factors. Below we explain key information from the Handbook.

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 non-hazardous waste generated in facility operations. In addition, we report separately 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 is estimated employing annual intensity factors based on kWh/m² (electricity and natural gas), m³/employee (water) and kg/employee (waste), as calculated from the reporting sites, thereby accounting for 100 percent of Nokia facilities. In 2018, these estimation procedures accounted for less than 5% of electricity usage, less than 5% of natural gas usage, less than 50% of waste generation and less than 30% of water use, when compared to total usage, respectively. Electricity used in subleased areas

represented approximately 3% of our reported electricity consumption.

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. E.g. all discarded batteries and electric & 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.

To ensure, that 100% of energy consumption is accounted for into the reporting, any invoice gaps will receive an estimated value.

Our carbon footprint

Nokia 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 carbon dioxide.

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 have decided to follow 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 IEA 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 Association of Issuing Bodies (AIB)), 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 46% of total purchase spend in 2018 (53% in 2017). In 2018 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 2018 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. 2018 disclosure is based on the latest CDP data representing suppliers' year 2017 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 (17 in 2017) 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 presently being 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 prorated to represent commuting of all employees. 2015–2017 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 prorated, based on 2015–2017 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: \sum [total lifetime expected uses of products (hours) X number of products sold in reporting period X products 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 2018 we are above 90%. Calculations are so far based on assumption that all products are powered by grid electricity. Since 2018 we use IEA's latest world average CO₂e -emission factor. Earlier IEA's latest four-year world average CO₂ -emission factors were used.
 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.
- Year-on-year comparison calculations for all environmental data are done with non-rounded values.
- Social data**
- Year-end headcount is as published in financial reporting. It should be noted however that the other

social data presented in the tables represent only employees included in Nokia's central HR databases, which differs from the total headcount value as follows: in 2018 a total of 5 374 employees were not included in the central HR database (3 055 in 2017, 1 669 in 2016 and 735 in 2015 scope: Nokia Group, Continuing operations).

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, which covers former Nokia Academy and ALU University. 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 and 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 are including contributions as cash, value of time and value of in-kind. In 2016–2017 cash has represented minimum 95% of the total contributions and around 90% in 2018. The number of beneficiaries includes beneficiaries from corporate and key regional programs. Related to monetary contributions, in addition to global and regional, since 2017 we are able to track also part of local programs.

Ethics data

Data on reported concerns and investigations are obtained from the Business Integrity Group (formerly Ethics and Compliance Investigation (ECI) team) 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 is 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 Conflict Minerals Reporting Template (CMRT), consolidated to Master Template and compared against Responsible Mineral Initiative's (formerly Conflict-Free Sourcing Initiative) audit programme lists.

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Greenhouse Gas Emissions								
Total GHG Scope 1 (Direct emissions from facilities and mobile sources) (metric tons CO₂e)	18 500	177 300	189 200	143 500	134 500	-6%	●	5, 6, 17
<i>Emissions from Nokia facilities</i>								
Emissions of GHGs from fuel combustion in facilities (stationary and mobile sources)	2 400	32 300	34 000	33 600	29 000	-14%	●	4, 17
Emissions from Hydro-Fluoro-Carbon (HFC) refrigerants	3 400	6 200	1 000	400	600	49%	●	17
<i>Emissions from Nokia fleet</i>								
Emissions from fuel combustion in car fleet	12 700	44 900	36 300	34 300	32 000	-7%	●	7
Emissions from fuel combustion in marine fleet	0	93 000	117 900	75 200	72 900	-3%	●	8
GHG Scope 2 (Indirect emissions from purchased electricity and heat), Market-based (metric tons CO₂e)	155 200	502 000	465 700	446 900	364 900	-18%	●	6, 17, 25
Emissions from purchased electricity	145 800	486 600	451 700	423 400	347 300	-18%	●	17
Emissions from purchased cooling	3 100	3 100	3 300	12 000	7 900	-35%	●	
Emissions from purchased heating	6 300	12 300	10 700	11 500	9 700	-16%	●	
GHG Scope 2 (Indirect emissions from purchased electricity and heat), Location-based (metric tons CO₂e)	219 300	559 900	519 400	482 800	436 900	-9%	●	6, 17, 25
Emissions from purchased electricity	209 900	544 500	505 400	459 300	419 400	-9%	●	17
Emissions from purchased cooling	3 100	3 100	3 300	12 000	7 900	-35%	●	
Emissions from purchased heating	6 300	12 300	10 700	11 500	9 700	-16%	●	

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Total Scope 1 and 2 GHG emissions, Market-based (metric tons CO₂e)	173 700	679 300	654 900	590 400	499 400	-15%	●	17, 25
Total Scope 1 and 2 GHG emissions, Location-based (metric tons CO₂e)	237 800	737 200	708 600	626 300	571 400	-9%	●	17, 25
GHG Scope 3, Indirect emissions	-	-	45 601 000	42 660 700	44 673 500	5%		19
Emissions from purchased goods and services	2 500 000	-	1 725 900	1 428 500	5 284 000	270%		9, 10
Emissions from upstream transportation and distribution	133 400	221 300	268 400	298 500	384 300	29%		6, 9
Emissions from capital goods	220 500	462 400	408 700	499 900	398 200	-20%		
Emissions from business air travel	55 000	112 100	113 300	98 000	81 500	-17%		11
Emissions from employee commuting	83 500	159 000	154 700	135 800	118 400	-13%	●	12, 26
Emissions from use of sold products	-	-	42 930 000	40 200 000	38 410 000	-4%	●	9, 24
Total Scope 1, 2 and 3 GHG emissions, Market-based	-	-	46 255 900	43 251 100	45 172 900	4%		19, 25
Total Scope 1, 2 and 3 GHG emissions, Location-based	-	-	46 309 600	43 287 000	45 244 900	5%		19, 25
GHG intensities and miscellaneous GHG information								
Total Scope 1 and 2 GHG emissions per net sales (€ million), Market-based	14	26	28	26	22	-13%		17
Total Scope 1 and 2 GHG emissions per net sales (€ million), Location-based	19	28	30	27	25	-6%		17
Car fleet CO ₂ e/vehicle km	-	150	139	139	135	-3%		
Emissions avoided due to purchased renewable electricity	68 300	72 700	100 300	90 000	129 700	44%		17
Biologically sequestered carbon	0	0	0	0	0	0%		13

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Other air emissions (metric tons)								
Ozone Depleting Substances (ODS), as ODP	0.03	0.04	0.01	0.00	0.02	1 896%		17
Criteria air pollutants	-	53.3	53.7	54.3	63.5	17%		17
Volatile Organic Compounds (VOC) emissions	-	1.4	1.4	1.4	1.6	21%		14, 17
NO _x	-	25.9	26.3	26.0	30.9	19%		17
SO _x	-	3.4	2.4	4.3	3.7	-14%		17
Total Particulate Matter (PM) emissions	-	2.1	2.1	2.2	2.6	15%		17
Other criteria air contaminants	-	20.5	21.4	20.4	24.8	21%		17
Energy consumption								
<i>Energy consumption in Nokia facilities (GWh) (1 GWh = 3 600 GJ)</i>								6
Electricity, total	414	1 138	1 091	1 039	1 005	-3%	●	17
Heating, total	28	54	47	51	43	-16%	●	
Cooling, total	6	6	6	24	17	-32%	●	
Fossil gas, total	12	149	138	154	141	-8%	●	
Fossil oil, total	0.5	19	17	17	11	-32%	●	
Biofuel, total	6	6	3	0	0	0%	●	

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Facilities' energy, total (GWh)	467	1 373	1 325	1 285	1 217	-5%	●	17
Direct energy	19	174	180	170	153	-10%	●	17
Indirect energy	448	1 198	1 145	1 115	1 064	-5%	●	17
Renewable energy			213	209	269	28%		17
Renewable electricity	206	228	213	209	269	28%	●	17
Renewable electricity share of total electricity (%)	50%	20%	19%	20%	27%	33%	●	17
Total energy per net sales (MWh/€ million)	37	52	56	56	54	-3%		
Energy consumption in Nokia fleet (GWh)								15
Marine fleet (Fossil oil use)	-	355	450	286	278	-3%		
Energy consumption outside of Nokia (GWh)								
Energy consumption of the sold products	-	-	81 770	77 760	78 090	0%	●	9, 24
Water consumption								
Total water withdrawal (thousands m ³)	787	2 623	2 681	2 305	1 791	-22%	●	6, 16, 17
Total water withdrawal per employee (m ³)	13	22	24	23	18	-22%		17, 18
Water withdrawal by source (%)								
Municipal water supply	100%	100%	100%	100%	100%	0%		
Recycled/reused water (thousands m ³)	11	11	23	26	20	-22%		
Recycling/reuse% of total withdrawal	1.3%	0.4%	0.9%	1.1%	1.1%	0%		17
Total water use (thousands m³)	798	2 634	2 703	2 331	1 811	-22%		17

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Waste and recycling								
<i>Waste and recycling within Nokia (metric tons)</i>								6
Total waste	13 100	24 900	28 400	15 000	13 600	-9%	●	
Reuse	2 200	2 300	2 200	1 500	200	-88%	●	27
Recycle	8 200	17 200	20 100	8 200	6 000	-28%	●	17, 20, 27
Energy recovery	1 800	1 800	3 300	2 300	400	-81%	●	20, 27
Landfill	900	2 900	2 800	3 000	7 100	137%	●	27
Incineration without energy recovery	0	700	0	0	0	0%	●	17, 21, 27
Total waste per employee (kg)	217	209	254	143	136	-5%		18
Total non-hazardous waste	12 700	22 000	24 800	13 000	13 000	0%	●	27
Reuse	-	-	2 200	1 500	200	-88%	●	19, 27
Recycle	-	-	16 700	6 400	5 400	-17%	●	19, 27
Energy recovery	-	-	3 200	2 300	400	-82%	●	19, 27
Landfill	-	-	2 700	2 800	7 000	149%	●	19, 27
Incineration without energy recovery	-	-	0	0	0	0%	●	19, 27

Environmental data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group			
Total hazardous waste	400	2 900	3 600	2 000	600	-69%	●	27
Reuse	-	-	<100	<50	<50	-89%	●	19, 27
Recycle	-	-	3 400	1 800	600	-68%	●	19, 27
Energy recovery	-	-	<100	<50	<50	-52%	●	19, 27
Landfill	-	-	<100	200	<50	-88%	●	19, 27
Incineration without energy recovery	-	-	0	0	0	0%	●	19, 27
Hazardous waste by types								
Electronic waste from facilities	400	2 400	3 300	1 800	600	-68%	●	27
Other hazardous waste	<50	500	300	200	<100	-73%	●	27
Utilization rate%	93%	86%	90%	80%	48%	-40%	●	17, 27
Product end-of-life treatment (metric tons)								9, 22
Weight of equipment returned from customers for recycling	1 670	3 620	2 450	2 580	4 100	58%	●	20
Weight of equipment returned from customers incinerated with energy recovery	90	90	140	120	160	36%	●	20
Weight of equipment returned from customers sent to landfill	30	170	70	20	20	16%	●	
Number of returned equipment items reused/ remanufactured (no. of items)	24 100	109 300	85 800	68 000	56 100	-17%	●	
Weight of packaging materials reused in distribution hubs (metric tons)	2 500	-	2 300	3 700	4 200	14%		9, 23

Environmental data

Notes

"-" means we do not have data available for that particular year or scope.

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. Comparable combined company refers to information including combined Nokia Group and former Alcatel Lucent data prior to the acquisition of Alcatel Lucent in January 2016.
3. Nokia calculated facility Scope 1 emissions only for stationary fuel combustion and HFCs in 2015.
4. Includes CO₂e from all GHGs (CO₂, CH₄ and N₂O).
5. Data for "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. Total Scope 1 emissions for 2015 still include data from removed data sources.
6. 2015 values for Nokia Group continuing operations recalculated with a methodology aligned for combined company in 2016. See Reporting principles -chapter for more details.
7. 2015 Nokia Group value recalculated with a methodology aligned for combined company in 2016. See Reporting principles -chapter for more details.
8. 2015 values recalculated to cover also vessels from ALDA Marine. See Reporting principles -chapter for more details.
9. Data covers Nokia's Networks business.
10. In 2016-2018 we used a hybrid method, using emissions allocated for Nokia by the suppliers and as new method, also intensity based (GHG/€) allocation. See Reporting principles -chapter for more details.
11. 2015 Nokia figures recalculated to be in line with updated emission factors from EPA. 2017 data includes Nokia Group but not Comptel.
12. 2015 Nokia continuing operations figure recalculated to be in line with calculation methodology of 2016.
13. 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 fermentate biomass or biofuels on-site. We used biogas in fuel cells in one of our offices during 2015–2016.
14. VOC source is from fuel combustion. No significant quantities from solvents and halogenated hydrocarbon, so these emissions are not relevant and not consolidated.
15. Energy consumption is presented only for marine fleet, as energy consumption data from Nokia's vehicle fleet is not available.
16. No significant quantities of heavy metals discharges into water, indicator not relevant and not consolidated.
17. Reported number for 2016 has changed during 2017 reporting process due to better data quality of some parts of actual data from 2016. This data was received after 2016 reporting period.
18. 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).
19. 2015 total not counted due to missing comparable Scope 3 categories data.
20. Former Alcatel Lucent data included in Combined comparable company has a combined figure for waste recycle and energy recovery and it's reported under recycle.
21. 2015 data, incineration without energy recovery-category includes data only from former Alcatel Lucent sites.
22. Former Alcatel Lucent data included in Combined comparable company includes product take-back, repairs and remanufacturing.
23. 2015–2016 data is available only for former Nokia sites, however excluding Nokia Technologies, which does not have significant distribution hubs. 2017 and 2018 data includes more hubs than previously.
24. Calculation methodology was updated in 2016 for the combined company. Due to labor intensity only 2015 Combined comparable company value was not recalculated with the new methodology. Until 2017 world average IEA emission factor used includes GWP only from CO₂, not other greenhouse gases. For 2017 and 2018 measured data covered all product lines across Nokia's Networks business.
25. Nokia uses internally market-based (not located-based) values for example in target setting and if only one value is given without further definitions, it's the market-based.
26. Based on the official year-end headcount.
27. Due to the change in Nokia's waste estimation methodology in 2018 YoY (2017-2018) figures are not directly comparable.

Social, ethics, and management systems data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Employment								
Number of employees, year-end situation	55 718	105 228	100 875	102 761	101 203	-2%		
Share of employees with full-time contracts	99%	99%	99%	99%	99%	0%		
Share of employees with permanent contracts	95%	-	97%	98%	96%	-2%		
Number of new employee hires	6 031	-	8 310	9 430	8 849	-6%		
Rate of new employee hires, %	11%	-	8%	10%	10%	-3%		
Female share of new hires	-	-	21%	24%	23%	-4%		
Total number of leavers	4 920	-	10 749	10 033	9 998	0%		
Total attrition rate	9%	-	11%	10%	11%	6%		
Attrition rate of voluntary leavers	6%	-	6%	6%	5%	-3%		
Percentage of open positions filled by internal candidates	38%	-	42%	59%	51%	-14%		3
Average length of service (in years)	-	-	11	11	11	0%		4
Number of long-term expatriates worldwide	-	-	477	397	334	-16%		
Diversity & Equal Opportunity								
Share of women within workforce	20%	22%	22%	22%	22%	0%		
Share of female line managers	15%	-	17%	17%	16%	-6%		
Share of women within senior management	12%	-	14%	13%	13%	-2%		
Share of women within leadership	-	-	16%	15%	15%	1%		
Share of women on the executive management board	0%	N/A	17%	13%	14%	8%		
Share of women in the Board of Directors	25% (2 of 8)	N/A	25% (2 of 8)	30% (3 of 10)	40% (4 of 10)	33%		
Number of nationalities in the executive management board	4 (of 4)	N/A	8 (of 12)	8 (of 15)	8 (of 14)	0%		
Share of non-Finnish in the executive management board	70%	N/A	92%	93%	93%	0%		
Average age of employees at year-end	38	-	40	41	41	0%		

Social, ethics, and management systems data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Number of nationalities within workforce	-	-	-	-	166	-		5
Training & Education								
Total number of training days provided by Nokia EDU to employees	163 600	278 400	249 100	234 300	309 400	32%		6, 8
Total number of training days provided by Nokia EDU to customers and suppliers	61 500	-	111 000	119 800	110 000	-8%		8
Average number of all training hours per employee	35	-	19	16	34	113%		
Number of attendees in corporate leadership programs	-	-	-	3 526	3 862	10%		7
Training costs of employee by Nokia EDU, € million	31	-	54	49	29	-41%		11
Percentage of employees that completed a performance evaluation	98%	-	90%	94%	99%	5%		9
Workplace Relations & Employee Engagement								
Share of employees responding to the engagement survey	92%	N/A	20%	21%	31%	48%		10
Employee engagement (percentage of favorability towards the company)	87%	N/A	76%	82%	80%	-2%	●	10
Occupational Health & Safety								
Near miss incidents reported (including contractors)	428	-	303	417	454	9%		
Lost-time incidents of employees	40	-	57	41	39	-5%		
Employee work-related fatalities	0	0	0	0	0	0%	●	
Contractor and sub-contractor work-related fatalities	6	-	7	5	1	-80%	●	
Community investments								
Total value of contributions (EUR million)	-	-	5.02	6.84	6.53	-5%		
Number of direct beneficiaries	-	-	868 300	254 100	304 200	20%	●	

Social, ethics, and management systems data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	Nokia Group ¹	Nokia Group ¹	Nokia Group ¹			
Ethics								
Total number of concerns reported	225	558	637	678	887	31%		
Conflict of Interest	14	31	34	55	55	0%		
Controllership	58	100	119	71	74	4%		
Dealing with Government Officials	4	7	3	2	0	-100%		
Fair Competition	1	7	2	5	9	80%		
Fair Employment (all HR related)	34	83	200	231	336	45%		
Guidance	68	141	120	141	186	32%		
Human Rights	2	2	0	2	2	0%		
Improper Payments	4	18	12	11	13	18%		
Intellectual Property & Confidential Information	9	36	51	31	59	90%		13
Privacy	7	9	8	0	8	-		14
Trade Compliance	2	4	0	6	5	-17%		
Wellbeing, Health, Safety and Environment	6	90	60	23	24	4%		
Working with Suppliers	16	20	25	40	58	45%		
Other	0	10	3	60	58	-3%		
Number of investigations by the Ethics & Compliance Office	124	257	228	257	248	-4%		
Number of allegations substantiated with "cause found" after investigation	51	141	86	127	92	-28%		
Number of employees given a verbal counselling related to Code of Conduct	32	54	11	13	9	-31%		
Number of employees given a written warning on grounds of violation of Code of Conduct	18	38	40	45	16	-64%		
Number of employees dismissed on grounds of a violation of the Code of Conduct	62	77	17	47	24	-49%		

Social, ethics, and management systems data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	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) (%)	98%	-	-	86%	95%	10%	●	15
Management systems								
ISO 14001 certified environmental management system, percentage sites covered	94%	-	39%	52%	57%	10%		16, 12
OHSAS 18001 certified occupational health and safety management system, percentage sites covered	93%	-	39%	46%	56%	22%		16, 12
ISO 9001 certified quality management system, percentage sites covered	94%	-	51%	61%	68%	11%		16, 12
ISO 14001 certified environmental management system, percentage employees covered	100%	-	-	-	83%	-		16, 17
OHSAS 18001 certified occupational health and safety management system, percentage employees covered	99%	-	-	-	78%	-		16, 17
ISO 9001 certified quality management system, percentage employees covered	100%	-	-	-	93%	-		16, 17

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 include 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 exception of share of conflict-free smelters, covers anyhow only Nokia's networks business.
2. Comparable combined company refers to information including combined Nokia Group and former Alcatel Lucent data prior to the acquisition of Alcatel Lucent in January 2016.
3. 2015–2016 data are not fully comparable due to methodology change. 2016 onwards data is from recruitment department.
4. Mobility data is covering Long Term Assignments.
5. In 2018 nationality-data covers 78% of total headcount.
6. For the 2015 combined comparable figure, Nokia EDU covers legacy Nokia Academy and ALU University.
7. In 2018, 24% of the participants were women.
8. Nokia migrated to a combined Learning Management System early 2017 and did a lot of data cleansing back to previous years data, hence the 2016 value is somewhat updated.
9. From 2017 onwards this process is called Annual Development Review.
10. In 2016 Nokia switched away from the annual 2015 Employee Engagement Survey (EES) – an annual census style deployment – towards a more focused approach of the Culture Cohesion Tracker (CCT). The CCT has a drastically reduced volume of questions, so was deployed five times in 2016, and twice during 2017 and 2018. 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 protecting employee anonymity during the electronic survey process, we cannot prove that each CCT round saw unique respondents; in 2018 we again continued to be more than satisfied that, while reaching an average of approximately 31% of the employee population over 2 survey rounds, we easily exceeded the necessary levels for statistical representation. In 2018 report we corrected a typo and updated the engagement percentage of year 2017, from 80% to 82%

11. In addition to NokiaEDU (formerly Nokia Academy) costs, 2015 costs include also Nokia Technologies overall training costs.
12. In 2016, the approach to certification of the two companies was very different. 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. To ensure this, we have extensive internal assurance processes to monitor the implementation and compliance in key areas such as supplier assurance (see section Responsible sourcing for more information), health and safety high-risk project control assessment, and we regularly report on progress. 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. After initial integration, the focus was on site consolidations and synergy savings which impact the coverage of the management systems until such time that the situation is more settled.

13. Includes also category: Guidance-Investigation
14. Category was called "Health, Safety & Labor Conditions" in 2015–2016.
15. There was no new ethical business training in 2016 for "legacy" Nokia employees. 90% of former Alcatel Lucent employees completed Nokia's ethical business training in 2016.
16. 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.
17. After the acquisition of Alcatel Lucent in 2016 comparable data to calculate the percentage of employees included for 2016 and 2017 was not available..

Supply chain
management
data

	2015		2016	2017	2018	YoY (2017–2018)	2018 data assured	Notes
	Nokia Group ¹	Comparable combined company ²	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	16	20	45	72	75	4%	●	3
Closure percentage of non-conformities identified at CR-audits, within audit closure target time	-	-	-	58%	52%	-10%	●	
Number of on-site system audits against Nokia Supplier Requirements	24	45	39	47	38	-19%	●	3
Cumulative number of valid Health & Safety Maturity assessments	-	59	382	975	1 406	44%		4, 5
Number of suppliers assessed on corporate responsibility in EcoVadis Sustainable Supply Management platform	155	376	306	274	251	-8%	●	
Percentage of active suppliers rated “satisfactory” or above on their assessment of sustainability by EcoVadis	61%	-	70%	71%	74%	4%	●	
Number of suppliers assessed on their climate change impact based on their CDP reporting for Nokia	180	-	243	292	314	8%		
Number of suppliers that set GHG emission reduction targets (in CDP)	92	-	127	153	187	22%	●	
Number of suppliers participating in Nokia sustainability workshops and webinars	159	-	238	253	309	22%		
Number of management-level supplier employees participating in Nokia sustainability workshops and webinars	208	-	389	423	606	43%		
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), %	83%	84%	84%	83%	84%	1%	●	6

Supply chain management data

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 exception of share of conflict-free smelters, covers anyhow only Networks business.
2. Comparable combined company refers to information including combined Nokia Group and former Alcatel Lucent data prior to the acquisition of Alcatel Lucent in January 2016.
3. Comparable company data includes former Alcatel Lucent on-site system audits done against Alcatel Lucent supplier requirements.
4. Comparable combined company values include data only from former Alcatel Lucent.
5. If supplier's evaluation result is satisfactory in H&S Maturity Assessment process, period between reassessments can be longer than a year, based on our internal guidelines taking into account different risks.
6. 2015 Comparable combined company value counted as average from Nokia and former Alcatel Lucent figures.

Financial data

Financial data	2015		2016	2017	2018	2018 data assured ²
	Nokia Group	Comparable combined company ¹	Nokia Group	Nokia Group	Nokia Group	
Net sales (EUR million)	12 499	26 606	23 614	23 147	22 563	●
Operating profit /loss (EUR million)	1 697	2 887	-1 100	16	-59	●
R&D expenses (EUR million)	2 080	-	4 997	4 916	4 620	●

Notes

Values include 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.

1. Comparable combined company historicals reflect Nokia's operating and financial reporting structure, including Alcatel Lucent, and are presented as additional information as described in the stock exchange release published on April 22, 2016. These values are non-IFRS.
2. Included in the audited financial statements. Please see Auditor's Report from page 203 onwards in the "Nokia in 2018" Annual Report.

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 2018 to 31 December 2018 as set out in Nokia’s People & Planet Report 2018 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 2018. 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 2018.

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: 2018 emissions and progress against 2030 Science-based target
- Scope 3 GHG emissions: use of sold products (metric tons CO₂e). 2018 emissions and progress against 2030 Science-based target
- Scope 3 GHG emissions: employee commuting (metric tons CO₂e)

- Energy consumption within Nokia, by types of energy (GWh) and change to 2017 (%)
- Renewable electricity amount (GWh) and portion of total electricity consumption (%)
- Water withdrawal in facilities (m³) and change to 2017 (%)
- Waste amount within Nokia, by treatment type (metric tons) and utilization rate (%)
- Energy savings achieved in 2018 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 work related employee fatalities and number of work related contractor and subcontractor fatalities
- Share of employees who have completed the annual training on ethical business practises (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
- Sustained focus on CEO-sponsored Nokia Culture Principles (measured with favorability of two target questions in the CCT employee survey)
- Share of women within leadership (%)
- Number of managers trained on inclusive leadership best practices

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) (%)
- Number of suppliers that set GHG emission reduction targets (in CDP)
- Number of system audits against Nokia Supplier Requirements
- Number of in-depth on-site audits (focused on labor conditions and environment) against Nokia Supplier Requirements and SA8000 and share of closed 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) (%)

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 France
- Conducting a web conference with two sites in India and USA
- 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 2018 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 13 May 2019

PricewaterhouseCoopers Oy

Pasi Karppinen
Authorised Public Accountant (KHT)

Sirpa Juutinen
Partner, Sustainability & Climate Change

NOKIA

Nokia Head Office

Karaportti 3
FI 02610 Espoo, Finland
FINLAND

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