



Join the
change



Sustainability 2019

Highlights 2019



By the end of 2019, we had improved the cumulative energy efficiency of our production by

1,707 GWh/a compared to 2012

Fortum's Board of Directors set a new and more ambitious target for specific CO₂ emissions from total energy production for 2020:

≤180 gCO₂/kWh

We redefined our Group-level **sustainability priorities**



We developed the world's first **straw-based textile** as part of our Bio2X R&D programme

We significantly improved **contractor safety** and focused on the role of executive management in improving the safety culture



We published our first **TCFD** (Task Force on Climate-related Financial Disclosures) **report**

Our investments in CO₂-free production increased by more than

EUR 100 million

We want to share Fortum's success with personnel –

41% of our employees participated in the new forShares Employee Share Savings programme

Sustainability 2019

Highlights 2019	1
Table of contents	2
Sustainability at Fortum	3
We support the SDGs	4
Sustainability priorities	7
We create value	11
Business ethics and compliance	12
Climate and resources	14
Energy	17
Climate	23
Circular economy	32
Emissions	36
Water	38
Biodiversity	41

Personnel and society	43
Personnel	45
Safety and security	51
Stakeholders	55
Customers	61
Supply chain	64
Human rights	68
Corporate citizenship	69
Appendices	72
Governance and management	72
Policies and commitments	76
Reporting principles	78
Reported GRI disclosures	80
Independent limited assurance report on Fortum's Greenhouse Gas Emissions 2019	83

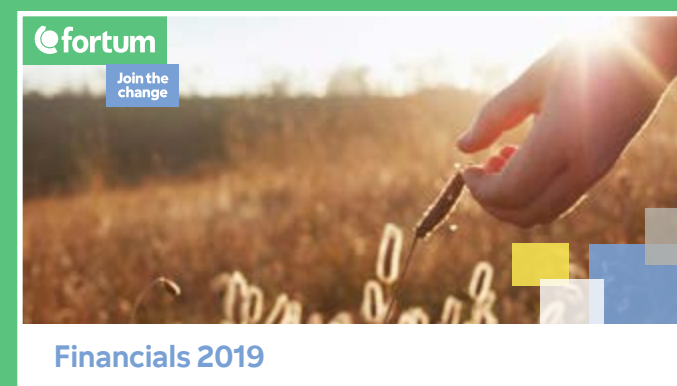
Notes:

- Fortum's TCFD report for 2019 is included in the section Climate, pages: 23–30 and in Financials 2019, pages: 20–22, 27–28 and 31.
- Fortum's Non-Financial Information report is included in the Financials 2019, pages: 9 and 20–24

Fortum's 2019 reporting entity



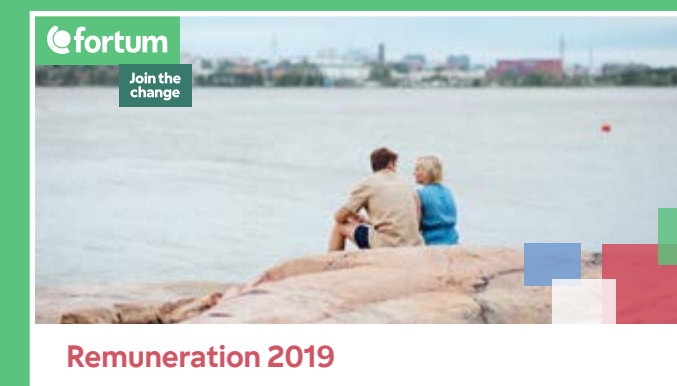
CEO's Business Review



Financials



Governance



Remuneration



Tax Footprint



Sustainability

Sustainability at Fortum



The entire energy sector is undergoing a transformation. The faster pace of climate change is accelerating the need for structural changes in society. The need for low-carbon electricity is growing because fossil fuels must be replaced in transportation, industry and heating.

In addition to climate change, changes in the regulatory environment and the fast pace of technological development create new challenges and opportunities for us. Our role is to respond to the changing operating environment by reshaping the energy system, improving resource efficiency and providing smart solutions. This way we deliver excellent shareholder value, minimise our adverse impacts, and ensure sustainable and low-carbon business.

Sustainability is at the core of Fortum's strategy and our values – curiosity, responsibility, integrity and respect – form the foundation for all our activities. In our operations, we give balanced consideration to climate and resource issues, as well as our impacts on personnel and society. We see sustainable energy and circular economy solutions as today's competitive advantage and a prerequisite for business growth and success.

- ▶ [Fortum's vision, mission and strategy](#)
- ▶ [Fortum's values](#)
- ▶ [Fortum in Sustainability indices](#)

We support the UN Sustainable Development Goals

Fortum’s operations as a provider of energy and circular economy solutions support the UN Sustainable Development Goals (SDG) on the journey towards a low-carbon society. In line with our vision, we are driving the change for a cleaner world.

Sustainable Development Goals and Fortum

The **Sustainable Development Goals (SDGs)** adopted by the United Nations in 2015 are global goals set to solve economic, social and environmental challenges by 2030. The 17 goals have been set based on science and research, and they aim to solve global-level social problems. Through the goals, the UN is calling for and inviting companies to take action to solve the challenges using business means and the creativity and innovation characteristic to companies.

We at Fortum want to do our part to promote the achievement of these goals in our own value chain. We see business opportunities in the goals, but we also aim to shoulder our responsibility for our adverse impacts and to prevent them. Nine of the Sustainable Development Goals that are key for us are presented in the graphic. Through innovative products and services, we offer solutions for six of the goals on the right (Our opportunities). We are pursuing a low-carbon society not only within the framework of our own operations, but also through offering solutions to **other sectors**.

Goals 5 and 8 on the left (Our responsibilities) are important to us from the social-society perspective, for personnel, contractors and our entire supply chain. As for goal 15, we know the responsibility we have for our impacts and dependency related to aquatic ecosystems and biodiversity.

Key UN Sustainable Development Goals for Fortum



Fortum supports the Sustainable Development Goals.

Examples of measures we implemented in 2019 that promote the achievement of the Sustainable Development Goals

Sustainable Development Goal (SDG)

Measure



- We worked to advocate for a tighter European climate policy, and we declared our strong support for [▶ the European Green Deal initiative](#); and we teamed up with other Nordic energy players to demand a [▶ more ambitious climate policy](#), quick tightening of the long-term (2050) climate goal to align with the Paris Agreement, and consistent intermediate targets for 2030 and 2040 from the EU in order to achieve climate neutrality in Europe by 2050
- Within the framework of the Climate Leadership Coalition (CLC), we put forth a proposal calling for more ambitious climate reduction targets from the EU and suggesting a pan-European systemic and market-driven solution to achieve the targets
- Our [▶ carbon capture and storage project \(CCS\)](#) in Norway is advancing; we signed an agreement with six other European companies to develop carbon capture value chains. We are also exploring the possibility for our joint venture in Stockholm, Sweden, to utilise CCS, which would make Stockholm Exergi's biofuelled district heating [▶ carbon negative](#).
- We have partnered with 22 companies to develop the world's first marketplace for [▶ CO₂ removals](#); the marketplace piloted three auctions and now continues the regular trading of carbon removal certificates at the [▶ Puro.earth](#) marketplace



- By investing in energy efficiency, we achieved energy savings of about 70 GWh/a in 2019
- Refurbishments of hydropower plants in Sweden and Finland produced 13.5 MW of new CO₂-free production capacity
- We commissioned the first wind turbines of the total 97-MW Sørfjord wind power park in Norway and a new 250-MW solar power plant in India
- We won the right to build a new 250-MW [▶ solar power plant](#) in Rajasthan state, India
- We won the right to build 5.6 MW of [▶ solar capacity](#) in a Russian Capacity Supply Agreement (CSA) auction, in addition to the 110-MW solar capacity
- The Fortum-Rusnano investment fund was active in 2019; the investment fund started a 200-MW [▶ wind power project in Kalmykia](#) and a 50-MW [▶ wind power project in the Rostov region](#), in Russia
- We partnered with Nordkraft to establish a joint venture to develop [▶ wind power](#) in Norway
- We started construction of the first large Finnish 90-MW [▶ wind power farm](#), Kalax, in Närpiö, Finland
- We are part of a project aiming to mitigate climate change and to promote the spreading of small modular reactors (SMR) in Europe



- We offer [▶ services to our customers](#) for the treatment, analysis, purification and utilisation of their waste and sludge waters and other severely polluted waters
- We implemented [▶ voluntary hydropower environmental projects](#) valued at EUR 570,000
- In the vicinity of River Klarälven in Sweden, we removed invasive lupine plants and improved the terrestrial ecosystem for indigenous plants and insects
- We worked with our partners to improve reproduction areas for the endangered Gullspång landlocked salmon by reshaping and gravelling the riverbed
- We removed four small dams in Sweden that had proved to be insignificant for hydropower production, and we restored river habitats for trout and crayfish
- We continued to work with our collaboration partners on a three-year-long wetland habitat restoration project at Lake Oulujärvi in Finland to protect the endangered moor frogs and dragonflies
- We strengthened the assessment of risks related to supply chains and procurement countries



- We received about 2.2 million tonnes of waste from our customers
- One of the biggest demolition projects in Finnish industrial history is nearing completion; all of our Inkoo coal-fuelled power plant's boiler buildings have been demolished and over 90% of the materials have been recycled
- We developed an [▶ innovation](#) that enables over 80% of EV lithium-ion battery materials to be recycled. Additionally, we acquired the entire shareholding in the Finnish growth company [▶ Crisolteq](#) that developed the recycling process for batteries. This strengthens our position in the recycling of high-value materials in Europe.
- We were the first in Finland to commission an ash refinery that processes ash generated in waste incineration
- We are testing [▶ new MOPS technology](#) for cleaning up contaminated sand in Denmark; purified sand can be utilised as a raw material in, e.g., the construction industry

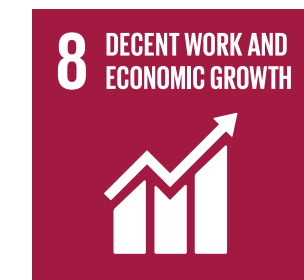


Sustainable Development Goal (SDG)

Measure



- ▶ **Espoo Clean Heat** project accelerates our work to make district heating in Espoo, Finland, carbon-neutral in the 2020s; ▶ **we will discontinue the use of coal already in 2025**
- We completed the Nordic ▶ **high-power charging corridor** between Helsinki, Stockholm and Oslo for electric vehicles
- We are creating, with the City of Oslo, the world's first ▶ **wireless fast-charging infrastructure for EV taxis**
- We are collaborating with MG Motor India to establish ▶ **fast-charging EV stations in India**
- We supplied combustion solutions reducing NO_x emissions to customers in Finland, Sweden, Czech Republic and ▶ **India**



- We conducted 14 supplier audits covering working conditions and other issues
- We offered work for over 1,400 contractor workers in our solar power plant sites in India
- One coal supplier in Kazakhstan was assessed against the Bettercoal Code by a third party
- Our executive management participated in the "Safety walks" training programme in our power plant areas; a special focus was on executive management's role in improving the safety culture and on systems and structures that support the transformation of the safety culture
- Taxes borne in our three biggest production countries, Finland, Sweden and Russia, are in total EUR 311 million



- Our demand response is expanding: Finland's biggest private housing investment company Kojamo and two major shopping centres in Espoo will begin using district heating demand response; at the same time, the shopping centres are switching to heat that is produced fully with renewable fuels and with excess heat
- We brought to the market a ▶ **plastic compound** made from recycled plastic and natural cellulose fibre; the fully recyclable compound is suitable for injection moulding and 3D printing
- We started ▶ **research collaboration** with Indian Haryana Agricultural University to produce paddy straw-based textile fibre, valuable chemicals and materials used in, among others, the food, cosmetics and construction industries
- We partnered with Spinnova to develop ▶ **the world's first clothing made from wheat straw**
- We invested in the start-up ▶ **Infinited Fiber Company**, which is developing and will license technology used to manufacture cotton-like fibre for the textile industry from recycled fibre and cellulose using considerably less water and chemicals in the process compared to traditional cotton
- We signed a three-year Memorandum of Understanding with Finnish Aalto University to strengthen our collaboration to develop the bioeconomy and circular economy
- Taking ▶ **lithium-ion batteries into use** at the Forshuvud hydropower plant in Sweden strengthens the regulating capacity of renewable energy
- We collaborated with universities in our operating countries, and Fortum Foundation awarded about EUR 660,000 in scholarships
- We used a total of EUR 67 million for research and development



- We were the main supporter of the Equality Week organised by the KTH Royal Institute of Technology in Sweden; during the week, we also hosted topic-related internal events, like lectures, discussions and workshops
- In Sweden, we took part in the Female Leader Engineer programme, which aims for gender equality in engineer-intensive sectors; in the programme female engineer students compete for internships in industrial companies
- Together with Tieto and Microsoft, we hosted a kick-off breakfast event for the Women in Tech (WIT) week in Espoo, Finland. WIT is an organisation network for promoting technology careers for women.
- Fortum Charge & Drive hosted the ▶ **Future Female event** in which the discussion focused on the future of electric mobility
- In 2019, females accounted for 30% of Group- and division-level management
- In 2019, females accounted for 42% of the participants in the Navigator training programme targeting future talent among personnel

Sustainability priorities

Sustainability priorities have been defined to support sustainable business. In our operations, we take into consideration climate and resource issues as well as our impacts on personnel and society. The priorities reflect not only the views of our personnel and stakeholders regarding our most important impacts, but also our values – curiosity, responsibility, integrity, and respect towards each other and our stakeholders.

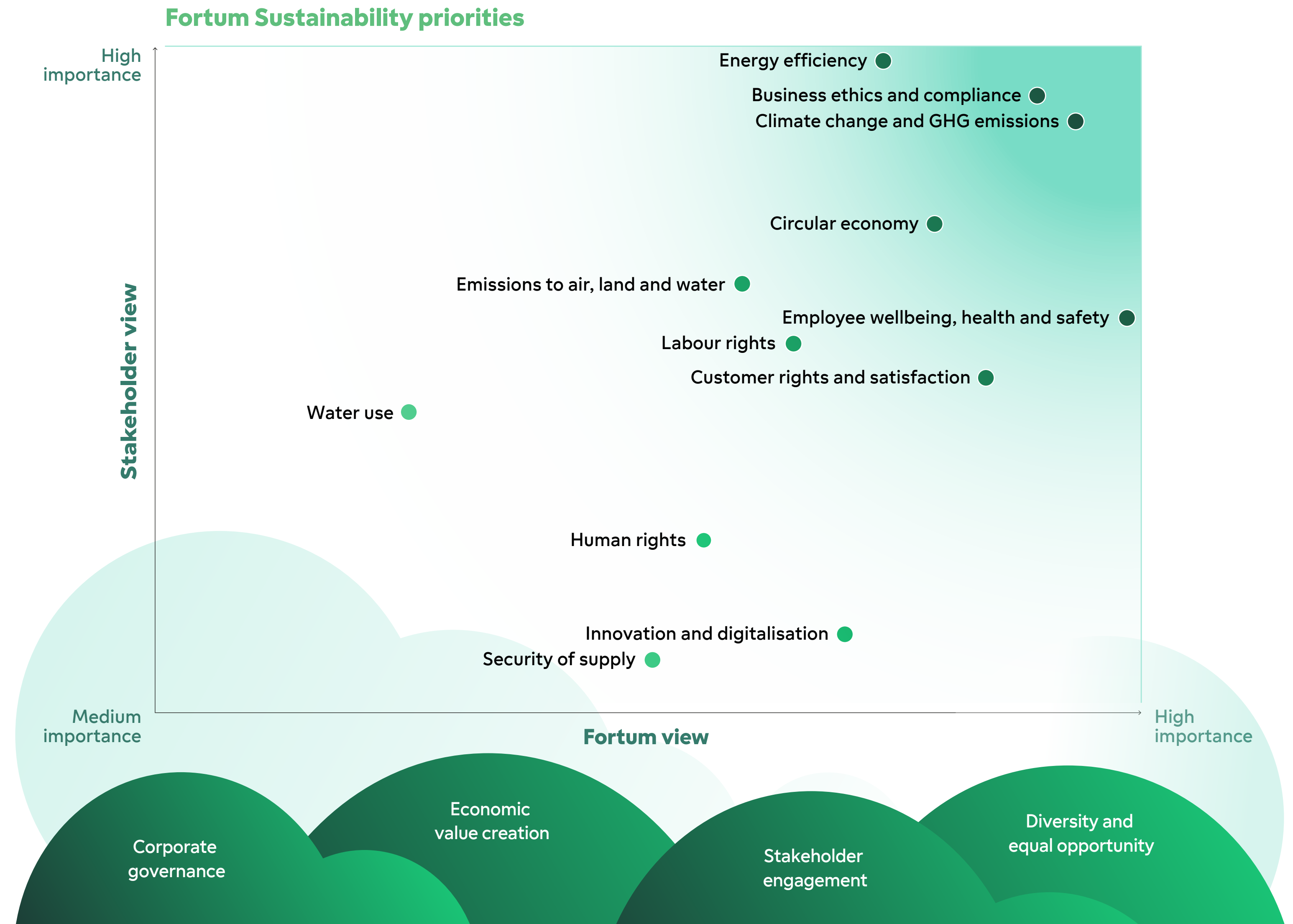
In 2019, we conducted a broad analysis of material sustainability themes for Fortum and its stakeholders. The material themes are associated with risks and opportunities for Fortum, and on the other hand, our operations have an impact on them.

In the materiality analysis, we used artificial intelligence and big data-driven application, which uses a large volume of data available from public sources to analyse the sustainability themes we have defined. We included in the review the following data sources:

- energy sector’s annual and sustainability reporting
- circular economy sector’s annual and sustainability reporting
- mandatory regulation
- voluntary initiatives and recommendations
- news
- social media

We supplemented the data-based analysis with Nordic media tracking and with stakeholder surveys sent to more than 900 representatives of NGOs, customers, public administration, capital markets, research institutes, industry organisations and opinion leaders.

We clarified Fortum’s internal view about the most important sustainability themes through a survey sent to more than 6,700 Fortum employees, and in a workshop for top management and experts.





As a final result, we got both the stakeholders' external and the company's internal view of sustainability themes most material for Fortum; the most important of which are presented in the graphic (on page 7) as priorities. We also decided to highlight four general themes that form the foundation for Fortum's corporate responsibility: corporate governance, economic value creation, stakeholder engagement, and diversity and equal opportunity.

We believe that the results of the materiality analysis will help us to prioritise the most important sustainability themes in our business operations, steer our sustainability work, and better respond to stakeholder expectations.







Sustainability targets affect every Fortum employee

Sustainability targets affect every Fortum employee and safety-related targets are part of Fortum's short-term incentive (STI) programme. In addition to the Group-level targets, divisions have their own targets. Fortum's Board of Directors annually decides on the sustainability targets to be included in the incentive programme. The combined injury frequency for Fortum employees and contractors was included in the incentive programme in 2019. However, the Board can, at its discretion, take into consideration in the result also other safety-related incidents and especially the number of severe occupational accidents. The target for severe occupational accidents is zero. In 2019, one severe occupational accident took place in our operations.

The 2020 short-term incentive programme remains unchanged in terms of safety targets (the injury frequency rate for personnel and contractors). Likewise, as in 2019, the Board has the option to take into consideration also other safety incidents. The weight of the target in the incentive programme is 10% (2019: 10%).

In December 2019, Fortum's Board of Directors approved a new target for specific CO₂ emissions from total energy production, applicable for 2020: ≤180 gCO₂/kWh. This target will be revised after consolidation of Uniper. Additionally, the Board approved total CO₂ emissions from energy production as part of the earnings criteria for the 2020–2022 long-term incentive (LTI) plan for key employees and executives.

Group sustainability priorities, SDGs, Group targets and performance in 2019

Sustainability priority	SDG	Fortum and SDG	Group target	Group target 2019	Status at the end of 2019	Group target 2020
Climate and resources						
Climate change and GHG emissions		Fortum supports an ambitious, market-driven climate policy, and develops and builds energy solutions that reduce CO ₂ emissions.	Specific CO ₂ emissions from total energy production, gCO ₂ /kWh, 5-year average	≤200	186 ●	-
			Specific CO ₂ emissions from total energy production, gCO ₂ /kWh	-	-	≤180
Energy efficiency		Fortum offers and develops affordable and reliable energy solutions for customers, improves the energy efficiency of production, and invests in renewable energy, e.g. solar power in India and wind and solar power in Russia.	Energy-efficiency improvement by 2020, baseline 2012, GWh/a	≥1,900	1,707 ●	≥1,900
Security of supply			Energy availability of CHP plants, %	≥95.0	95.9 ●	≥95.0
Emissions to air, land and water	 	Fortum aims to reduce the environmental impacts of its own operations on aquatic and terrestrial ecosystems and biodiversity. Fortum prevents customers' hazardous substances from ending up in water and land and treats contaminated materials safely.	Major EHS incidents ¹⁾	≤18 ²⁾	11 ²⁾ ●	≤14 ²⁾
Water use						
Circular economy		Fortum focuses on circular economy and resource efficiency. Fortum offers solutions to promote waste recycling and reuse and promotes efficient incineration and safe final disposal of waste.	No specific Group target, but many ► measures addressing SDG 12			
		Fortum impacts urban air quality by developing e-mobility charging solutions and by reducing flue-gas emissions at power plants. Fortum also develops flexible and low-CO ₂ district heating and cooling solutions.	No specific Group target, but many ► measures addressing SDG 11			

1) Major fires, leaks, explosions, dam safety incidents, environmental non-compliances and INES events level ≥1
INES = International Nuclear and Radiological Event Scale

2) The figure does not include the exceedances caused by possible changes in permit limits in Russia

Sustainability priority	SDG	Fortum and SDG	Group target	Group target 2019	Status at the end of 2019	Group target 2020		
Personnel and society								
Customer rights and satisfaction			Reputation index, based on One Fortum Survey	≥73.0	72.3 ●	≥72.5		
			Customer Satisfaction Index (CSI), based on One Fortum Survey	Level good (70–74)	54–80 ●	≥70		
Employee wellbeing, health and safety		Fortum promotes good working conditions and safety of its own and contractors' employees and requires service and goods suppliers to respect labour rights and adhere to anti-corruption principles.	Lost Workday Injury Frequency (LWIF) ³⁾ , own personnel and contractors	≤1.7	1.7 ●	≤1.6		
Labour rights			Number of severe occupational accidents ⁴⁾ , own personnel and contractors	0	1 ●	0		
Human rights			Fortum generates economic added value for its investors, suppliers and the public sector.	Quality of investigation process of occupational accidents, major EHS incidents and near misses	Level 3.0	Level 3.0 ●	Level 3.0	
Business ethics and compliance				GAP index, implementation of EHS minimum requirements	Level 3.0	Level 3.0 ●	Level 3.0	
					Contractor safety improvement index	Level 2.0	Level 2.0 ⁵⁾ ●	Level 3.0
					Sickness-related absences, %	≤2.5	2.9 ●	≤2.8
Innovation and digitalisation				Fortum advances innovations related to energy, circular economy, digitalisation, biomaterials, and electricity storage solutions. Fortum also invests in start-ups and creates partnerships to gain synergy and scale.	No specific Group target, but many ► measures addressing SDG 9			
Diversity and equal opportunity		Fortum supports workplace diversity and provides equal opportunities to its personnel.	Board target on gender equality can be found in ► Governance 2019					

3) LWIF = Lost Workday Injury Frequency, injuries per million working hours

4) Fatality or an accident leading to permanent disability or an accident with severe and life-threatening injuries

5) The reporting of the Contractor safety improvement index started in the second quarter of 2019. The figure is still excluding City Solutions' solar power sites.

We create value

Fortum operates mainly in the Nordic countries, the Baltic countries, Russia, Poland and India. The impacts and added value of our operations are visible locally, regionally and globally. The figure shows examples of the value created by Fortum at all three levels.

Global value

- In Europe 96% and globally 59% of our total energy production was CO₂-free
- We invested EUR 401 million in CO₂-free energy production; our total investments were EUR 700 million
- Our actions to mitigate climate change include:
 - Investments in renewable energy, e.g. wind, solar and hydropower
 - Transition from coal-fuelled generation to CO₂-neutral generation
 - Electrification of transport
 - New business models, R&D and cooperation to support CCS and CO₂ removal
- Our carbon footprint:
 - Coal-based production capacity, 1,240 MW
 - Share of coal-based power production of total power production, 3%
 - Share of coal-based sales of total sales, 4%
 - CO₂-free power production, 45 TWh
 - Specific CO₂ emissions of total energy production, 189 gCO₂/kWh
 - CO₂ emissions of total energy production, 19.1 Mt
- We improved the cumulative energy efficiency of our production by 1,707 GWh/a compared to year 2012
- We are developing the refining of agro biomasses – primarily straw – as a substitute for fossil raw materials
- Our purchases were EUR 3.8 billion; over 60% of our procurements is made in Europe
- We emphasize sustainable business practices with our ~14,000 suppliers
- We have a strategic roadmap for digitalisation to create value in future electricity markets and for our customers



Regional value

- Taxes borne in our three biggest production countries, Finland, Sweden and Russia, were EUR 311 million
- We provide security of energy supply in our operating countries and regions; our Loviisa nuclear power plant alone generates over 10% of Finland's electricity
- We engage in active dialogue with EU- and national-level decision-makers to provide solution-oriented proposals for policies and regulations related to energy transition, climate change mitigation and the circular economy
- Our innovations improve resource efficiency and help customers fulfil recycling obligations:
 - Waste reception, recycling, reuse, incineration and/or safe final disposal in six European countries
 - Detoxification of materials and safe removal of hazardous substances from circulation
 - Plastic recycling and refining
 - Metal recycling
 - Cleansing and reuse of industrial oils
 - Commissioning of Fortum's and Finland's first ash refinery
- Our biggest investments, totalling EUR 188 million, were made in Finland
- Our support for activities promoting the common good in Russia totalled EUR 1.4 million
- We have about 2.4 million consumer customers in Finland, Sweden, Norway and Poland; we offer them easy choice of CO₂-free electricity as well as related value-added and digital services



Local value

- 96.8% of our employees held permanent positions
- We hired 220 summer workers in our European operations
- Energise Your Day wellbeing programme for our personnel is active in all our operating countries
- Total amount of our employee benefits was EUR 480 million
- Our contractors' occupational safety improved significantly
- We offered work to more than 1,400 contractor workers at our solar power plant sites in India
- We implemented voluntary hydropower environmental projects valued at EUR 570,000
- Three Fortum-owned fish farms produce almost one million salmon and trout a year
- We improve local air quality with efficient nitrogen oxide (NO_x) reduction solutions; we delivered NO_x reduction solutions to 22 customers in Finland, Sweden, the Czech Republic and India
- We supply heat in 24 cities and towns
- With the Espoo Clean Heat project we will discontinue the use of coal in our Helsinki metropolitan area district heating network in Finland in 2025



Business ethics and compliance

We believe there is a clear connection between high standards of ethical business practices and excellent financial results. As an industry leader, we obey the law, we embrace the spirit of integrity, and we uphold ethical business conduct wherever we operate.

Code of Conduct sets the basic requirements

The Fortum Code of Conduct and Fortum Supplier Code of Conduct define how we treat others, engage in business, safeguard our corporate assets, and how we expect our suppliers and business partners to operate.

Fortum's Board of Directors is responsible for the company's mission and values and has approved the Fortum Code of Conduct. The online training on the Code of Conduct is part of the induction programme for new employees. The Supplier Code of Conduct is based on the ten principles of the UN Global Compact and has been approved by the Head of Procurement in collaboration with the purchasing steering group.

About 97% of Fortum's total purchasing volume is purchased from suppliers with a purchasing volume of EUR 50,000 or more. Geographically they target mainly suppliers in Russia, Finland, Sweden and Norway. The Supplier Code of Conduct is part of purchase agreements with a contract value of at least EUR 50,000.

In line with the Code of Conduct, Fortum has zero tolerance for corruption and fraud and does not award donations to political parties or political activities, religious organisations, authorities, municipalities or local administrations.

Compliance risks

The compliance risks related to our business operations include the potential risk of bribery or corruption, fraud and embezzlement, non-compliance with legislation or company rules, conflicts of interest, improper use of company assets, and working under the influence of alcohol or drugs. Compliance risk management is an integrated part of business operations. Key compliance risks, including action plans, are identified, assessed and reported annually. This applies also to the management of risks related to sustainability.

Training

Fortum has a Compliance programme covering key areas of regulatory compliance and business ethics. It is managed with a risk-based prioritisation.

Training is a fundamental part of Fortum's Compliance programme. In 2019 personnel of Joint Venture projects in India and Indonesia were trained. Training on the Market Abuse Regulation including insider regulations was provided for new individuals who needed it based on their role. Training on competition law issues was provided also for new individuals responsible for sales.

Reporting misconduct

In addition to internal reporting channels, Fortum has an external ▶ **"SpeakUp" channel** which was renewed in July 2019. The new external channel replaced the old internal channel. The same mechanism is used for reporting any suspected misconduct relating to the environment, labour practices or human rights violations, and it is available to all stakeholders. In Russia, Fortum has a separate compliance organisation in place and employees there are encouraged to use the channels

provided by the compliance organisation. They may, however, also use the "SpeakUp" channel should they so wish.

Suspected misconduct and measures related to ethical business practices and compliance with regulations are regularly reported to the Audit and Risk Committee by the Group Compliance Officer.

Suspected cases of misconduct

A total of 102 reports of suspected misconduct were made in 2019. By year-end, all cases had been reviewed. There was no cause for action to be taken in 36 of the cases investigated. As a result of the investigations, nine employment contracts were terminated and four written warnings were given.

More than 60% of the investigated cases were related to non-compliance with company rules. In these cases, corrective action was taken by reviewing and developing existing processes and instructions and by providing training for employees.

Fortum has zero tolerance towards alcohol and drug use, and thousands of random breathalyser tests are conducted annually. In 2019 altogether 19 cases related alcohol or drug use during working hours were identified.

No cases of corruption or bribery were confirmed in 2019. Fortum also requires its goods and service suppliers as well as its business partners to comply with a zero tolerance policy towards corruption and bribery.

We deal with potential cases of corruption in a professional manner, in accordance with the defined compliance investigation process, in line with applicable laws and with respect to the rights and personal integrity of all parties involved.

Restricting competition

In 2019 there was one ongoing investigation case in Russia for which Fortum was given a warning but not ordered to pay a fine. Other cases related to restricting competition were not reported.

Other significant fines

There were no significant fines issued during the year.

In Russia Fortum paid fines totalling RUB 10,000 (EUR 137) for exceeding the wastewater emissions limits. Fortum also paid fines totalling SEK 50,000 (EUR 4,736) because the minimum flow obligation was not met at one hydropower plant in Sweden in 2016. The police investigation regarding a possible environmental violation at a waste incineration and treatment site initiated in 2018 in Sweden was still ongoing.

Environmental enquiries and grievances

Power plants receive environmental enquiries and other contacts every year, and they are mainly handled locally. The aim is to communicate in advance about upcoming measures that have possible environmental impacts, for example, through local media and at public events. Fortum's website also has a grievance channel that our stakeholders can use to report problems possibly caused by our operations. No new environment-related grievances were reported to us through this channel in 2019.

- ▶ [Fortum Code of Conduct](#)
- ▶ [Fortum Supplier Code of Conduct](#)
- ▶ [Labour practices and human rights grievances](#)
- ▶ [Incidents of discrimination](#)



Climate and resources



Fortum’s aim is to provide customers with environmentally benign and reliable products and services. We strive to continuously reduce the impacts our operations have on the environment by using the best available practices and technologies.

In our operations, we emphasise a circular economy, better resource and energy efficiency, and climate change mitigation. We base our energy production mainly on carbon dioxide-free hydro and nuclear power production, and on energy-efficient combined heat and power production, and we invest in renewable energy production, such as wind and solar power.

Environmental impacts

Some of the environmental impacts of energy production are global or wide-reaching, some are regional or local. We manage our environmental impacts with environmental management systems. 99.8% of our electricity and heat production globally is certified to the ISO 14001 environmental management system standard.

In terms of Fortum’s operations, the key environmental aspects include:

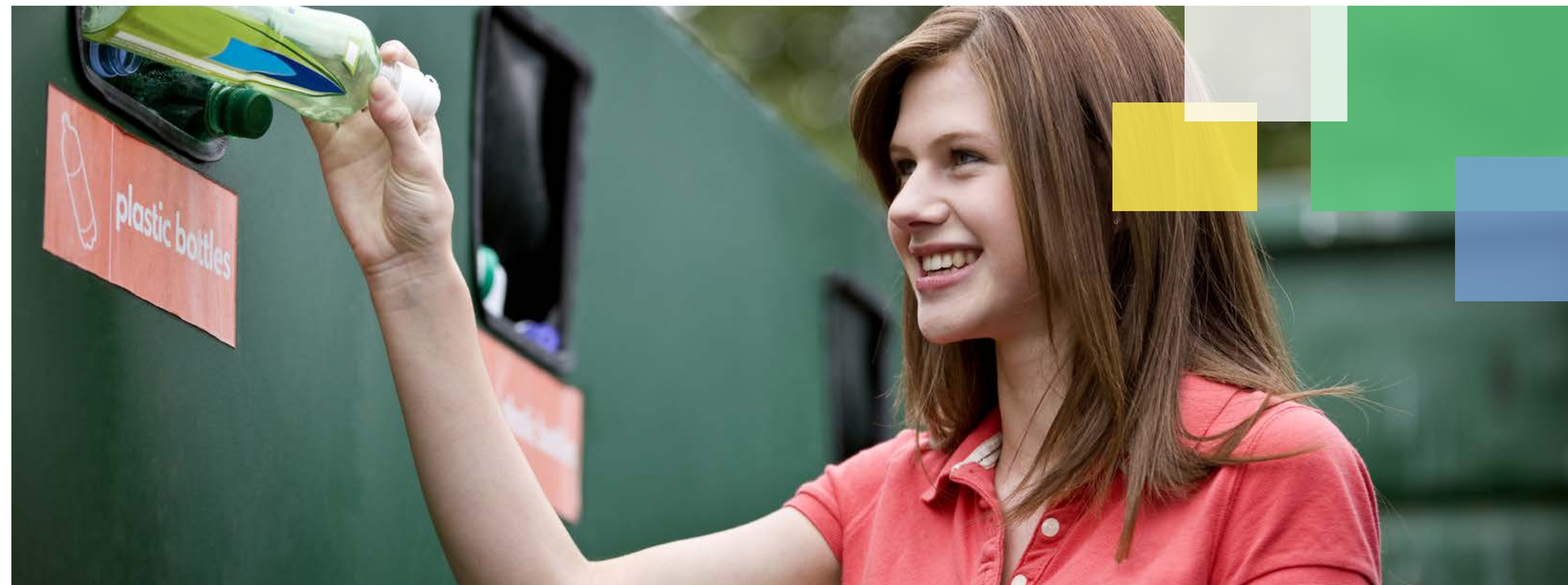
- Climate change
- Renewable energy production
- Circular economy
- Emissions
- Environmental impacts
- Fuel procurement

Climate change mitigation

We can reduce our greenhouse gas emissions by increasing carbon dioxide-free energy production and the use of renewable energy, and by improving the energy efficiency of our power and heat production. In line with the strategy, Fortum targets a multi-gigawatt wind and solar portfolio, which is subject to the capital recycling business model.

59%

Share of carbon dioxide-free electricity production of total power generation



Circular economy boosts resource efficiency

We recycle significant amounts of waste and energy production by-products generated in our operations. Additionally, in circular economy services, we recycle, reuse and recover waste received from customers as materials or energy production. The continuous improvement of resource and energy efficiency is important in terms of the sufficiency of natural resources and climate change mitigation.

Advanced combustion technology

Fuel use generates sulphur dioxide, nitrogen oxide and particle emissions that degrade air quality and cause acidification of soil and water systems. Flue-gas emissions can be effectively reduced with various flue-gas cleaning technologies and combustion technology solutions. All our power plants operate in line with environmental permits. We

have supplied also other energy companies with combustion technology solutions designed to reduce nitrogen oxides.

Mitigation of hydropower’s environmental impacts

Damming rivers and regulating water systems change the natural water levels and cause changes in aquatic habitats. We actively take part in research activities in the sector and implement voluntary and permit-based measures to develop biodiversity, fish populations and the multi-use of water systems where we produce hydropower.

- ▶ **Environmental impacts from our energy production**
- ▶ **Sustainable fuel purchasing**

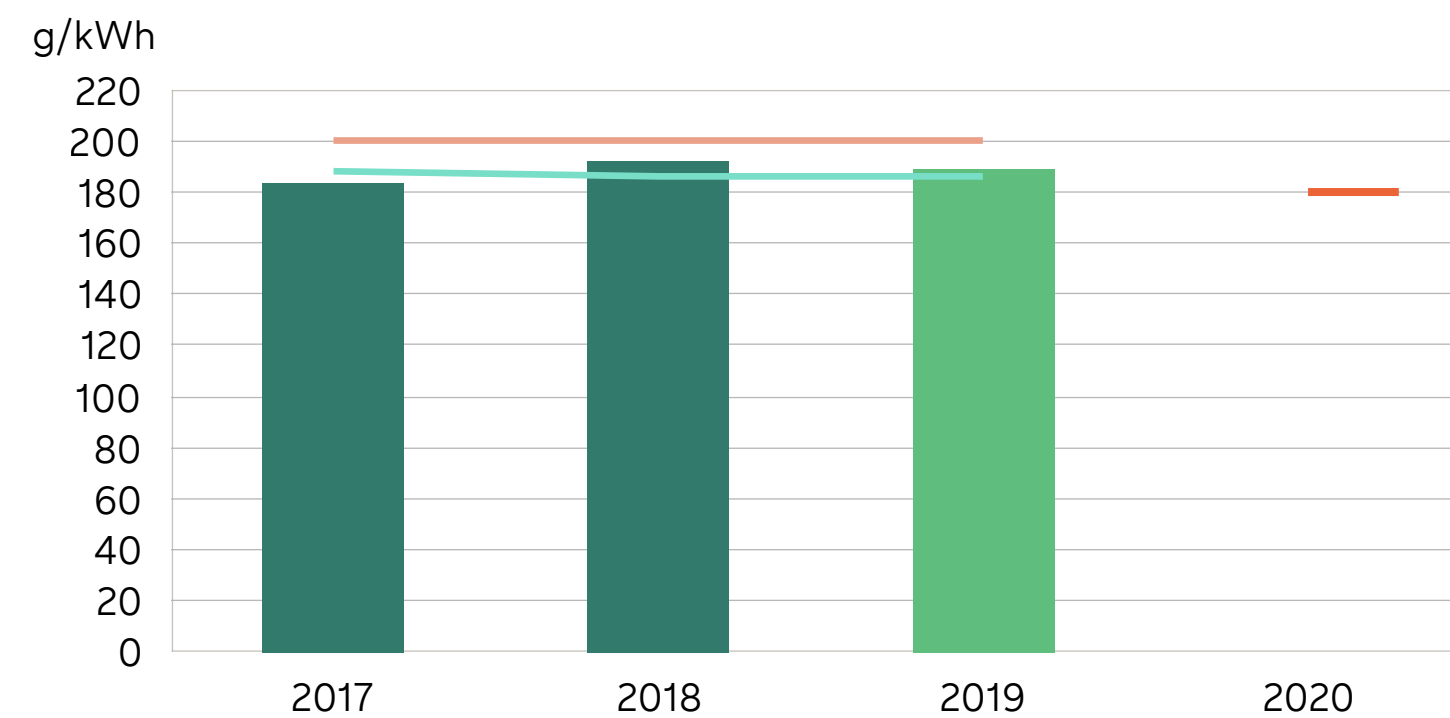
Key figures related to climate and resource efficiency

The table and graphs present our key targets and figures related to climate and resource efficiency.

Key figures related to climate and resource efficiency

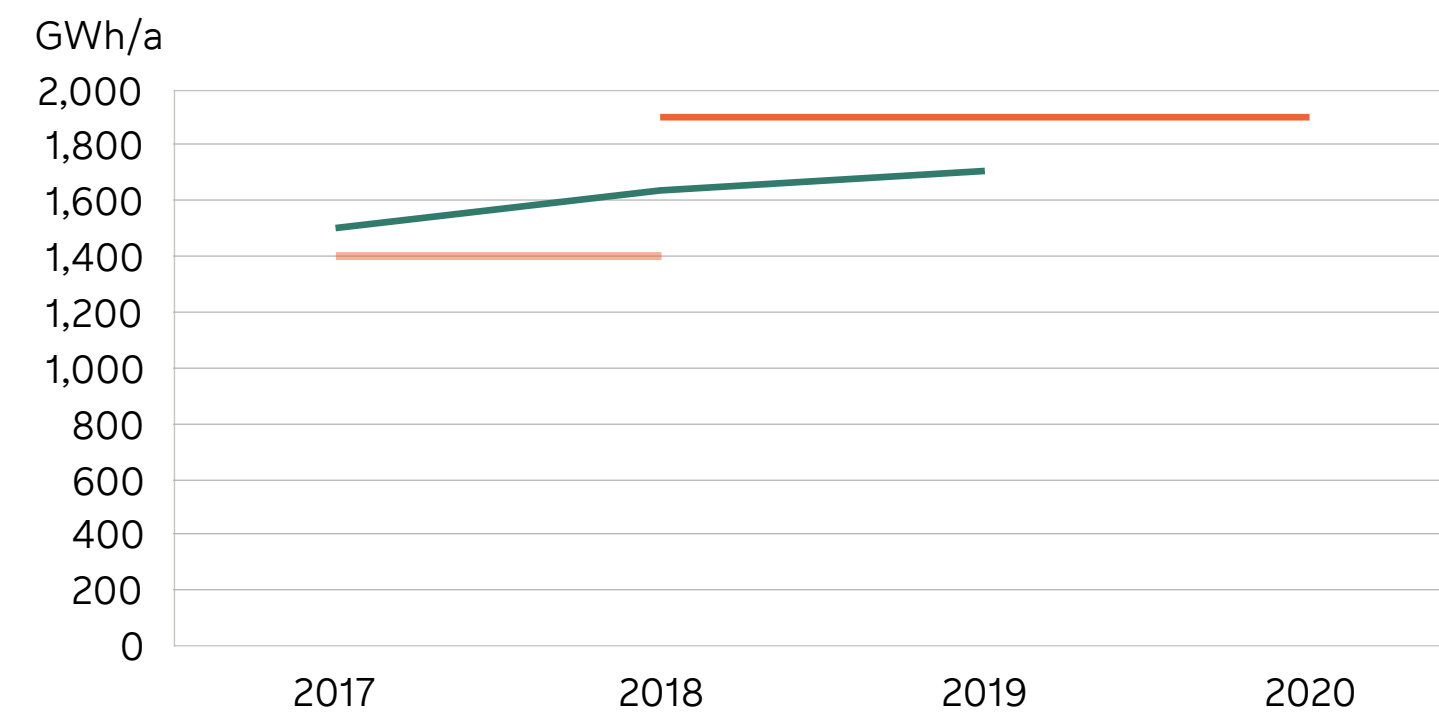
	2019	2018	2017
Carbon dioxide emissions (Scope 1), million tonnes	19.1	20.1	18.4
Sulphur dioxide emissions, 1,000 tonnes	14.9	16.8	18.8
Nitrogen oxide emissions, 1,000 tonnes	24.9	26.1	26.4
Particle emissions, 1,000 tonnes	11.7	9.6	15.8
Specific CO ₂ emissions of power generation, g/kWh	183	186	174
Specific CO ₂ emissions of power generation in Europe, g/kWh	27	26	28
Specific CO ₂ emissions of total energy production, g/kWh	189	192	184
5-year average, g/kWh	186	186	188
Share of CO ₂ -free energy production in power generation, %	59	57	61
Share of CO ₂ -free energy production in power generation in Europe, %	96	96	96
Share of renewable energy in power generation, %	29	28	30
Share of renewable energy in heat production, %	10	9	9
Energy-efficiency improvement, GWh/a	70	135	131
Energy availability of CHP plants, %	95.9	96.4	96.1
Utilisation of gypsum originated from energy production, %	100	99.5	100
Utilisation of ash originated from energy production, %	48	51	47
Material recovery rate of waste received from customers, %	67	59	57
Water withdrawal in production operations, million m ³	2,090	2,140	2,130
of which cooling water, million m ³	1,960	2,000	1,990
Major EHS incidents, no.	11	18	20
of which environmental permit violations, no.	2	2	2
ISO 14001-certified operations in power and heat production, % of sales	99.8	99.9	99.8

Specific carbon dioxide emissions of total energy production in 2017–2019



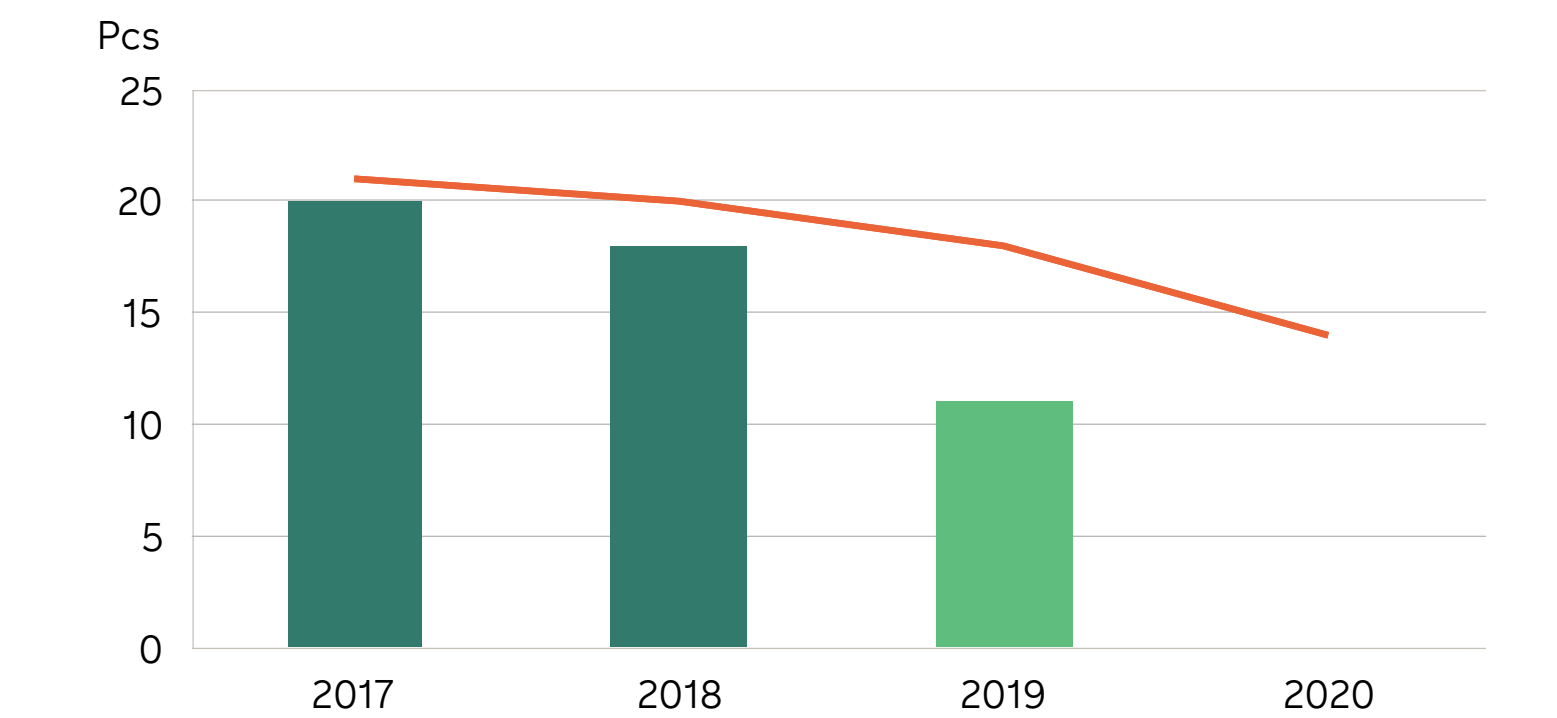
- Annual specific emissions
- Specific emissions (5-year average)
- Old target (5-year average)
- New target (only in 2020)

Annual energy-efficiency improvement achieved in 2017–2019



- Cumulative energy-efficiency improvement from 2012
- Old target (by 2020)
- New target (by 2020)

Number of major EHS incidents in 2017–2019



- Number of major EHS incidents
- Target

Energy

Fortum is committed to working for cleaner energy production in line with our vision – For a cleaner world. Our energy production is based primarily on carbon dioxide-free hydro and nuclear power and on energy-efficient combined heat and power.

By improving the energy efficiency of power and heat production, we can also reduce emissions to the environment in relation to the produced energy and decrease our production costs. Implementing our vision also requires providing customers with a secure energy supply at a competitive price.

Energy production

In 2019, 59% (2018: 57%) of our power generation was carbon dioxide-free and 29% (2018: 28%) was produced from renewable energy sources. 10% (2018: 9%) of our heat production was produced from renewable, carbon-neutral energy sources.

The figures in the tables and graphs also include figures from Fortum’s share in associated companies and joint ventures that sell their production to the owners at cost.

Power generation by energy source in 2017–2019 (GRI 302-1)

TWh	2019	2018	2017
Natural gas	28.3	28.4	25.3
Nuclear power	23.5	22.8	23.0
Hydropower	20.3	19.1	20.7
Coal	2.3	2.2	2.6
Biofuels	0.8	0.9	0.8
Wind, solar	0.7	0.8	0.5
Waste-derived fuels	0.5	0.4	0.3
Other ¹⁾	0.1	0.2	0.1
Total	76.3	74.6	73.2

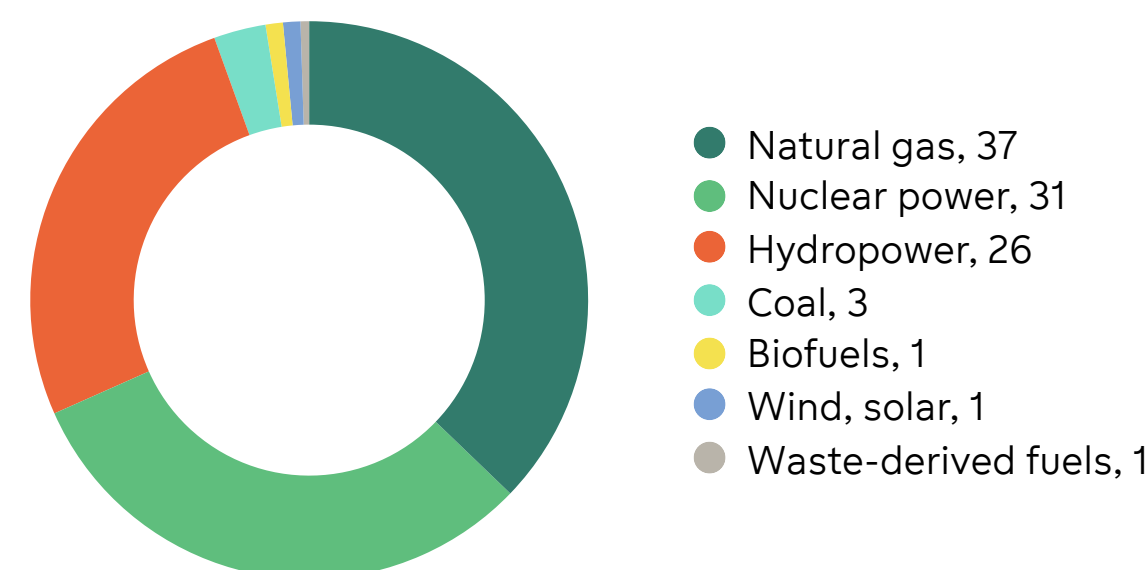
1) Peat, other

Heat production by energy source in 2017–2019 (GRI 302-1)

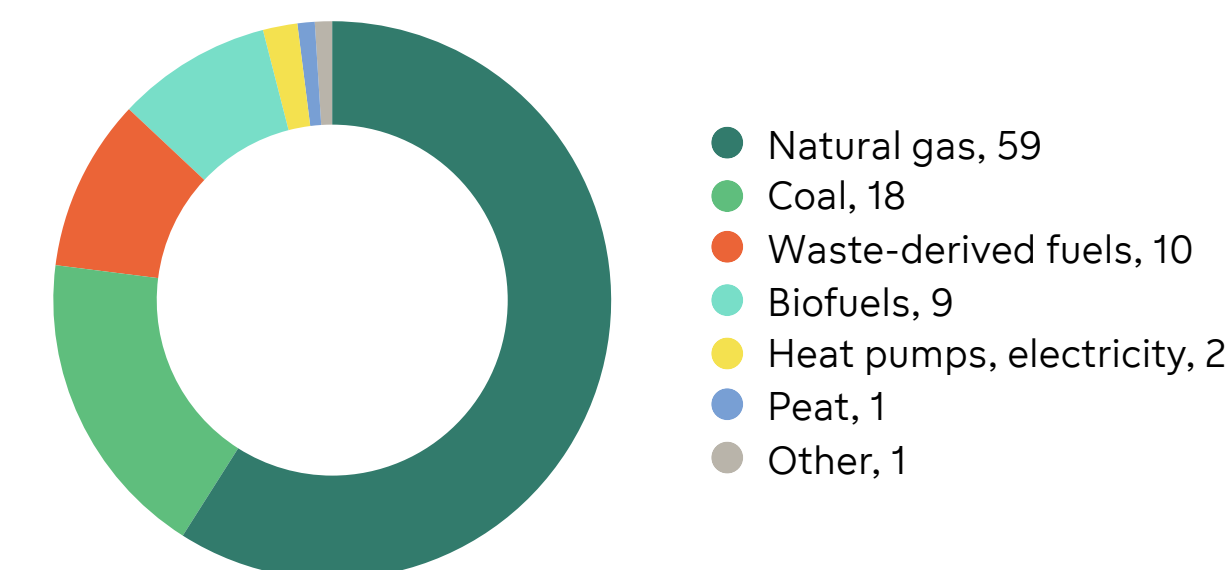
TWh	2019	2018	2017
Natural gas	15.6	19.2	18.6
Coal	4.7	4.7	4.8
Waste-derived fuels	2.6	2.0	2.3
Biofuels	2.3	2.3	1.9
Heat pumps, electricity	0.6	0.9	0.6
Peat	0.3	0.4	0.4
Other ¹⁾	0.2	0.2	0.0
Total	26.4	29.8	28.6

1) Fuel oil, other

Power generation by energy source, %



Heat production by energy source, %



More renewable energy

In 2019, we made investment decisions and invested in new wind and solar power. At the end of 2019, we commissioned the first wind turbines of the total 97-MW Sørfjord wind park in Norway. Fortum also has the 90-MW Kalax wind farm under construction in Finland.

In December 2019, Fortum signed an agreement on the divestment of an 80% share of its Nordic wind power plants. Fortum retains a 20% minority ownership and continues its responsibility for the construction and operation of the plants. The arrangement is subject to Fortum's capital recycling business model.

In late 2019, the Fortum and Rusnano investment fund with 50/50 ownership decided to start a 200-MW wind power project in Kalmykia, Russia, and a 50-MW wind power project in the Rostov region. An additional 300 MW of wind power is under construction in the Rostov region, and electricity production is estimated to start in 2020. The projects are part of the investments approved for the 1,823 MW of construction rights. A separate investment decision will be made for each project. At the beginning of 2019, the new 50-MW Ulyanovsk-2 wind park, the first partnership project, was commissioned.

In 2018 and 2019, Fortum also won the right to construct a total of 116 MW of solar power in Russia. The production of the solar power plants is estimated to start in 2021–2022.

In 2018, Fortum sold its majority share in the Indian solar power plants in line with its capital recycling business model. In 2019, Fortum commissioned the 250-MW Pavagada 2 solar power plant in Karnataka, India. Additionally, the production of the new 250-MW solar power plant is estimated to start in Rajasthan State in the fourth quarter of 2020.

Refurbishments of Fortum's own hydropower plants in Sweden and Finland produced 13.5 MW of new renewable electricity production capacity in 2019.

New low-carbon production

Fortum is replacing some of the coal use in heat production by building the Kivenlahti bioheat plant in Espoo, Finland. Its maximum heat output will be 58 MW, and production is estimated to commence in summer 2020. The Otaniemi geothermal plant is expected to be commissioned in late 2020, and the new heat pump unit utilising waste heat from wastewater is estimated to start its operations at the Suomenoja power plant in 2021. With these actions, Espoo's district heating production is estimated to achieve 50% carbon neutrality in 2022.

Fortum and the City of Espoo have together committed to make Espoo's district heating network carbon-neutral in the 2020s. Fortum has set an intermediate goal to discontinue the use of coal in Espoo in 2025. The accelerated project for carbon-neutrality in 2020's is called

▶ **Espoo Clean Heat.**

▶ **Our energy production**



Energy efficiency

Improving energy efficiency at power plants refers to measures we implement to increase the efficiency of production processes or reduce the energy consumption of plants or equipment. This enables us to produce more electricity or heat for our customers without increasing fuel consumption.

The energy efficiency of power plants can be increased through investments and technical improvements, preventive maintenance, and by training personnel in the optimal operation of the plant and in monitoring the plant's operating economy. Improving power plant availability also increases energy efficiency, as unplanned plant start-ups are reduced.

Energy-efficiency investments

In fuel-based energy production, we aim to utilise the fuel's energy as efficiently as possible. Our most important means to improve the energy efficiency of fuel use is to increase combined heat and power (CHP) production. In CHP production, up to 90% of the energy content of the fuels can be utilised. Separate electricity production's efficiency is about 40–60%.

Significant projects improving energy efficiency were completed in 2019, among others:

- Hydropower plant refurbishments in Sweden and Finland, 30 GWh
- Tartu district heating and cooling construction projects in Estonia, 10 GWh

The combined annual energy savings of the energy-efficiency improvement projects is about 70 GWh. Fortum's Group-level target is to achieve an annual energy-efficiency improvement of ≥1,900 GWh by

2020 compared to 2012. By the end of 2019, the cumulative energy-efficiency improvement achieved was 1,707 GWh/a.

Energy-efficiency services for homes and businesses

Fortum has introduced energy-efficiency services for private customers in Finland and Sweden. Fortum's customers can, for instance, monitor their electricity consumption with an in-home display or control and optimise the heating of their homes based on electricity price and use.

Fortum's operation and maintenance services also have been improving the energy efficiency of our customers' power plants already for decades. In 2019, a project was launched to improve energy efficiency and plant capacity at the Riihimäki waste-to-energy plant in Finland; the results of the project will be ready in 2020.

▶ Energy-efficiency services for homes

▶ Energy-efficiency services for businesses

1,707 GWh/a

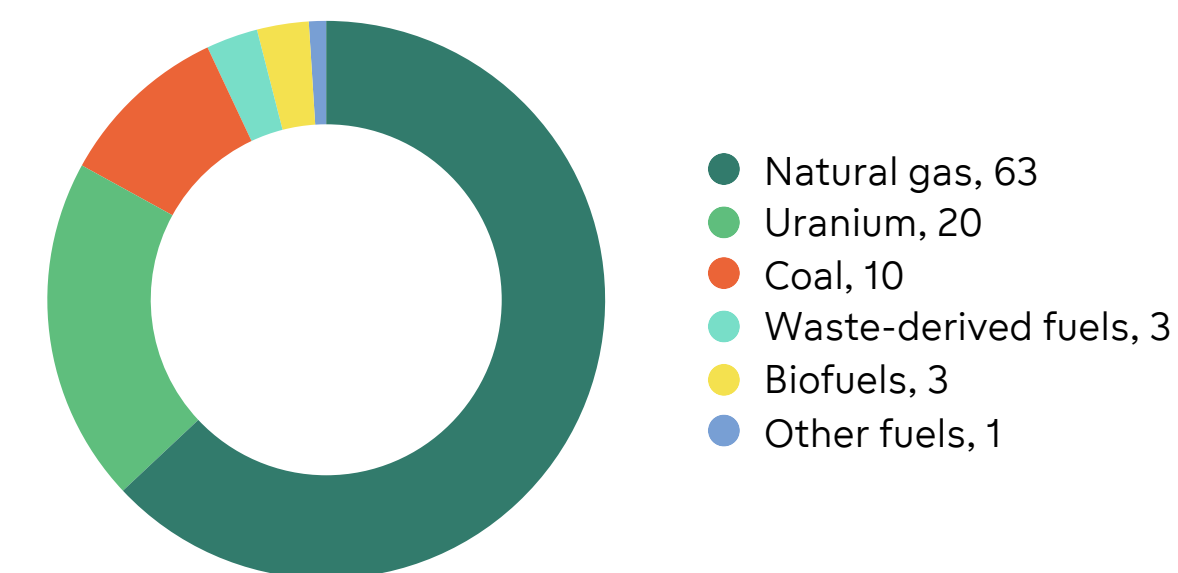
Energy-efficiency improvement
Target: ≥1,900 GWh/a by 2020

Fuel consumption

The most significant fuel used in our energy production was natural gas. The next highest fuel used was uranium and coal. Our goal in the future is to produce increasingly more added value from biofuel and waste-derived fuel.

In 2019 in Finland, we combust bedding-manure mixture at the Järvenpää power plant and bio-oil at a heat plant in the Joensuu power plant area and at the Vermo heat plant in Espoo. In addition to Finland, biofuels were used in Poland, Estonia, Latvia and Norway.

Fuel consumption in energy production, %



The energy-specific fuel consumption has been calculated based on the usage volumes and fuel-specific caloric values measured at the power plants. Uranium consumption has been calculated from the thermal heat generation in the reactors.

In 2019, Russia's share of our total energy-specific fuel consumption was about 67%. Russia accounted for 99% of our use of natural gas. We used coal in Russia, Finland and Poland. Russia accounted for 57% of our use of coal, Finland for 23% and Poland for 20%.

Energy intensity

In 2019, our fuel consumption in electricity and heat production was a total of 144 (2018: 119) TWh, or 412 (2018: 430) PJ. Additionally, we acquired 840 (2018: 990) GWh, or 3.0 (2019: 3.6) PJ, of electricity from external electricity suppliers. The electricity used in electric boilers in Norway has been added to electricity procurement figures.

With these energy resources, we produced 40,000 GWh of electricity, 26,300 GWh of heat, 40 GWh of cooling, and 30 GWh of bio-oil. The total energy consumption, calculated as the difference between the procured energy resources and net production, was 48,900 (2018: 51,400) GWh, or 176 (2018: 185) PJ.

In combustion-based energy production, we aim to utilise the fuel as efficiently as possible. In 2019, our average fuel use efficiency was 58% (2018: 58%). The increased condensing power production in Russia and the increased use of waste-derived fuels have contributed to the decrease in the fuel use efficiency. The efficiency has been calculated by dividing the electricity and heat energy produced with the fuel by the energy content of the fuel used in the production.

The energy intensity of our own production was 1.7 (2018: 1.7). The intensity figure has been calculated by dividing the amount of used energy resources by the total net production of energy products, including also hydropower, wind power and solar power.

► Origin of our fuels

Fuel use in 2017–2019, energy (GRI 302-1)

petajoules	2019	2018	2017
Natural gas	258.6	272.7	246.1
Uranium	84.2	91.4	83.8
Coal	39.2	36.4	39.0
Fossil waste-derived fuels	8.8	8.8	7.6
Peat	1.6	2.1	1.9
Other fossil fuels	0.5	0.4	0.3
Non-renewable fuels total	392.8	411.8	378.8
Biofuels	13.3	11.9	11.2
Renewable waste-derived fuels	5.5	6.3	4.4
Renewable fuels total	18.9	18.2	15.6
Fuels total	411.7	430.0	394.4

Fuel use in 2017–2019, mass/volume (GRI 301-1)

	2019	2017	2017
Non-renewable fuels			
Natural gas, million m ³	7.596	8.058	7.151
Coal, 1,000 t	1.888	1.782	1.999
Fossil waste-derived fuels, 1,000 t	867	863	751
Peat, 1,000 t	154	221	190
Fuel oil, 1,000 t	14	16	10
Uranium, t	22	20	23
Renewable fuels			
Biofuels, 1,000 t	1.302	1.180	1.142
Biogas, million m ³	3	3	3
Renewable waste-derived fuels, 1,000 t	513	589	428

Fuel use by country in 2019 (GRI 301-1)

	Finland	Russia	Poland	Estonia	Denmark	Other countries	Total
Non-renewable fuels							
Natural gas, million m ³	77	7.491	1	4		22	7.596
Coal, 1,000 t	365	1.178	346				1.888
Fossil waste-derived fuels, 1,000 t	196		19		182	470	867
Peat, 1,000 t	100			54			154
Fuel oil, 1,000 t	8	1	1		3	1	14
Uranium, t	22						22
Renewable fuels							
Biofuels, 1,000 t	466		127	484		226	1.302
Biogas, million m ³	3						3
Renewable waste-derived fuels, 1,000 t	146		26			341	513

Security of supply

A functional society requires an uninterrupted and reliable supply of energy. With hydropower, we are balancing the growing, but weather-dependent, fluctuating production of other renewable energy forms, like solar and wind, and we are enabling their growth. ▶ **Hydropower's flexibility** is needed to secure the functionality of the energy system and the power grid also during energy consumption peaks and to balance fluctuations in the price of electricity.

If a sufficient supply of hydropower is not available, adjustable power production based on natural gas can be used to balance fluctuations in renewable energy production and to secure the supply of electricity. With planned preventive maintenance and condition monitoring, we ensure that our power plants operate reliably to produce the electricity and heat customers need.

Power plant availability at a good level

We measure the availability of our CHP and hydropower plants with an energy availability indicator. Energy availability is calculated by dividing the power plant's actual production in the period under review by the theoretical maximum production. Planned maintenance outages are not included in the calculation. If the outage at a CHP plant is longer than planned, it is considered a production interruption, which decreases the energy availability. The energy availability of our CHP plants in 2019 was, on average, 95.9% (2018: 96.4%), outperforming the target of $\geq 95.0\%$.

For hydropower plants, outages due to a failure and unplanned or prolonged outages decrease the availability factor only if they lead to spillage. The energy availability of our hydropower plants was 99.6% (2018: 98.5%).

The load factor describing the availability of the Loviisa nuclear power plant is among the best in the world for pressurised water reactor power plants. The Loviisa nuclear power plant's load factor in 2019 was 92.4% (2018: 88.4%), and Loviisa power plant's unit 1 set a new production record.

Interruptions in heat distribution

Fortum has about 3,100 km of district heating networks in Finland, Poland, Norway and the Baltic countries. The aim is to keep interruptions in district heat distribution as short as possible by carrying out planned and preventive refurbishment and maintenance activities.

95.9%

Energy availability of CHP plants
Target: $\geq 95.0\%$



Case | Hydropower supports climate change mitigation and security of power supply

Hydropower has been used in energy production for centuries. Hydropower is a renewable natural resource widely used in the Nordic countries and its carbon footprint is small. In addition to electricity production, hydropower has key role in ensuring electricity system flexibility and security of supply. Water reservoirs can be used for brief, one-second adjustments or for season-long regulation. In recent years, also large batteries have been deployed for short-term hydropower regulating capacity.

Versatile and flexible hydropower

Compared to other small carbon footprint energy production forms, like solar, wind and nuclear, the advantage of hydropower is that it can be adjusted based on the electricity demand. Wind and solar energy production fluctuates based on weather conditions, and nuclear power produces mainly base-load power. Hydropower – especially hydropower that utilises reservoirs, in which water is stored behind a dam – ensures secure supply of electricity regardless of whether the wind is blowing or the sun is shining. Additionally, hydropower can ensure sufficient electricity production also during demand peaks.

The flexibility potential of hydropower makes it an important enabler for the growth of renewable energy production, like wind power in the Nordic countries. Hydropower also contributes to balance in the electricity grid, together with of electricity users' demand response and battery storages. This is increasingly more important in a situation where fossil fuel-based energy production is decreasing while energy demand is growing as a result of the electrification of society.

Battery innovation in Sweden

In 2019, Fortum showcased a new, innovative battery project at the Forshuvud hydropower plant in Sweden. The plant has been equipped with a large set of lithium-ion batteries that have a total storage capacity of 6.2 MWh. The project improves the hydropower plant's ability for short-term regulation.

The benefits of the innovative project are many. The water flow continuously charges the large set of batteries, and the energy stored in the batteries can be fed to the grid without delay based on the fluctuation in demand. This reduces the wear of the hydropower plant's mechanical parts because the plant turbines and generators are no longer used for short-term regulation. The batteries also reduce the need to regulate water levels in the waterway. This brings local environmental benefits, like less erosion of riverbanks, which is good news for residents along the river and for the local ecosystem.



Climate

Climate change mitigation requires political commitment and ambitious actions from different players in society. We believe that electrification will be a key enabler for decarbonisation in many sectors. Electrification mitigates climate change, when energy is produced and supplied by low-emission and renewable energy sources. There is also an increasing need for low-carbon energy, as fossil fuels are being replaced in heating and cooling, transport and industry.

The following Climate section is **► Fortum’s Task Force on Climate-related Financial Disclosures (TCFD) report.**

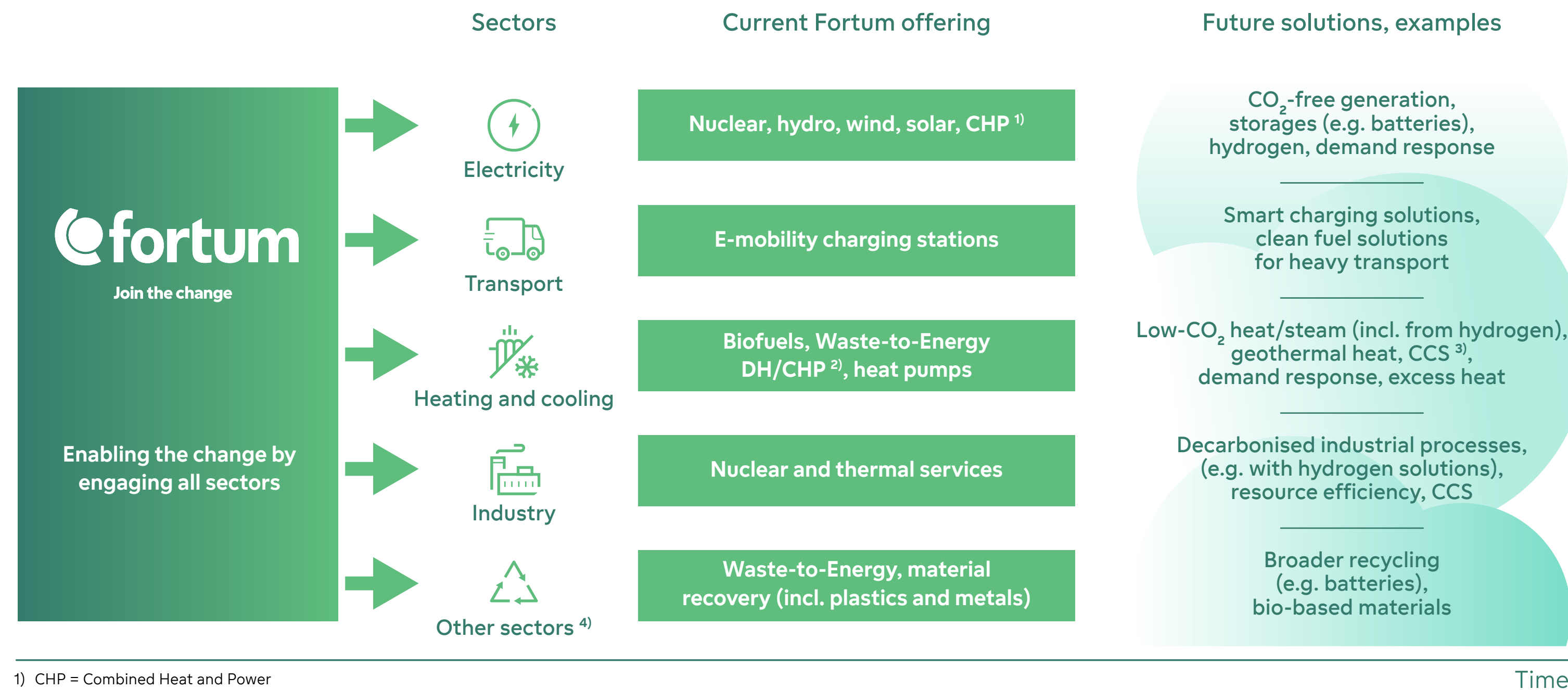
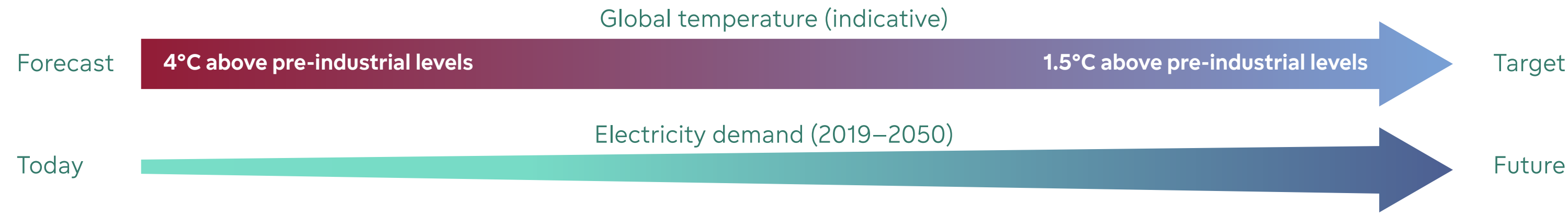
Governance

Sustainability is an integral part of Fortum’s strategy. The highest decision-making authority on sustainability and climate-related matters is with the members of the Board of Directors, who share joint responsibility for these matters. The Board of Directors annually approves Group performance targets, including sustainability and climate-related targets. The Audit and Risk Committee (ARC), members of Fortum Executive Management (FEM), and other senior executives support the Board of Directors in the decision making in these matters, when necessary.

The Senior Vice President, Corporate Affairs and Communications, has the overall responsibility for sustainability, including also climate-related issues. He is a member of Fortum Executive Management, and as a C-suite officer he has the executive level responsibility for Fortum’s TCFD reporting. Key climate-related risks are reported to FEM and the ARC as part of the annual review of material risks and uncertainties for the Group. Responsibility for providing a consolidated view of Fortum’s production portfolio, its long-term development and its alignment with



Decarbonising society



1) CHP = Combined Heat and Power
 2) DH/CHP = District Heating/Combined Heat and Power
 3) CCS = Carbon Capture and Storage
 4) Other sectors = non-energy related emissions: industrial processes and product use, waste management, agriculture, fugitive emissions

the Group’s strategy and climate-related targets falls under the strategy function. Concrete actions are executed by the line management according to the annual planning.

Strategy

Climate change is one of the main drivers behind Fortum’s strategy. Our strategy is designed so that Fortum will be successful in a decarbonised society.

The Paris Agreement aims at limiting the global warming to well below 2°C and pursuing efforts to limit it to 1.5°C by the end of the century. A central part of the agreement is to strengthen the global response to climate change mitigation. Ambitious actions and investments are required to ensure the transition to the sustainable and low-carbon energy system needed to limit global warming.

Fortum believes that the transformation of the electricity sector is making good progress, and, e.g., the EU emissions trading system will increasingly steer investments towards CO₂-free production technologies. This will accelerate the low-carbon transition in society and create new business opportunities, but it alone will not be sufficient for the EU to meet the Paris Agreement targets. In December 2019, the European Council agreed on the goal to achieve climate neutrality by 2050, although Poland didn’t commit to the timetable in question. This requires a reduction in carbon dioxide emissions by all sectors. In addition to the electricity sector, emissions must be reduced in, e.g., heating and cooling, transport and industry, and, at the same time, carbon capture and negative emissions must be increased.

Fortum is accelerating the change towards a low-carbon energy system, improving resource efficiency and providing smart solutions for customers. In the power production value chain, Fortum is focusing on growth in CO₂-free hydro, wind and solar power, while efficiently operating the existing assets needed for security of supply during the energy transition as efficiently as possible.

Most relevant climate-related risks in Fortum's scenarios

Fortum's scenario	Transition risks	Physical risks
	Policy and legal risks <ul style="list-style-type: none"> EU climate policy framework and regulations lose importance Market risks <ul style="list-style-type: none"> Electricity price volatility due to changing weather patterns Lower heating demand Power generation revenue risks due to changes in market design 	Acute risks <ul style="list-style-type: none"> Extreme weather conditions Precipitation, inflow and temperature changes Stronger storms with heavy wind, rain and floods Chronic risks <ul style="list-style-type: none"> Change in long-term weather patterns Climatic changes in the Nordic countries bigger than the global average
	Policy and legal risks <ul style="list-style-type: none"> Ambitious EU climate policy framework and regulations maintained Technology risks <ul style="list-style-type: none"> Accelerated decline in renewable costs, while CO₂ price stay moderate Electricity price decreases due to increase in continental solar power Market risks <ul style="list-style-type: none"> Low success in sector coupling and electrification Reputation risks <ul style="list-style-type: none"> Sustainable finance definitions set by EU impact on availability of financing Increased activities by NGOs impacts negatively on Fortum 	Acute risks <ul style="list-style-type: none"> Precipitation, inflow and temperature changes Chronic risks <ul style="list-style-type: none"> Change in long-term weather pattern Climatic changes in the Nordic countries bigger than the global average
	Policy and legal risks <ul style="list-style-type: none"> Russian climate-related policy framework develops sooner and more ambitiously than anticipated Highly ambitious EU climate and energy targets introduce inefficient and non-market-based mechanisms Banning or tighter restrictions on incineration and fuel use Technology risks <ul style="list-style-type: none"> Disruptive technologies create cheap sources of flexibility Speed of technological developments for carbon capture, storage, utilisation and direct air capture Market risks <ul style="list-style-type: none"> Market design for electricity moves from energy-only to capacity market Reputation risks <ul style="list-style-type: none"> Stricter sustainability requirements from stakeholders 	Chronic risks <ul style="list-style-type: none"> Change in long-term weather patterns

We are pursuing solutions to decrease the carbon footprint of our customers. We also offer new solutions, such as the use of green hydrogen produced with renewable energy, batteries and demand response, which are necessary in the future low-carbon energy system. We are also focusing on the circular economy and resource efficiency through waste recycling, material recovery as well as bio-originated materials, such as biotextiles.

Scenario analysis

Fortum has applied a scenario analysis framework based on Fortum's assumptions derived from external benchmarks, such as IEA, BloombergNEF and IHS Markit, together with internal industry expertise in the strategy development. We currently operate with five different scenarios describing varying degrees of ambition in climate change mitigation, technological development and evolution in the political landscape.

Among the scenarios, the two most optimistic ones in terms of climate are consistent with the 1.5 and 2 degrees -pathways. Transition risks are most relevant and increase in +1,5–+2°C -scenarios. On the other hand, acute and chronic physical risks increase in higher temperature scenarios.

Fortum's main scenario assumes that Europe's electricity sector can almost fully decarbonise by 2050. Reducing carbon dioxide emissions in other sectors is based on Fortum's scenarios of varying degrees of sector integration, where electrification drives the integration of transport, heating and cooling, and industrial energy consumption, directly and indirectly, through the increased production of green hydrogen.

The pricing of greenhouse gas emissions is a central factor in Fortum's scenarios, and the EU emissions trading system is expected to remain a central factor in reducing carbon dioxide emissions. However, we see a clear need globally for more ambitious actions to both reduce emissions and improve resource efficiency.

Emissions trading

About 75% of carbon dioxide emissions from our energy production in the Nordic countries, the Baltic countries and Poland are within the sphere of the EU emissions trading system (ETS). We had a total of 50 plants in six countries within the EU ETS in 2019. Fortum was granted free emission allowances corresponding to 0.7 (2018: 0.8) million tonnes. Our carbon dioxide emissions within the EU ETS were 2.1 (2018: 2.5) million tonnes. In terms of emission allowances, we had a deficit and purchased the shortfall of emission allowances from the markets.

We also want to promote the establishment of a global carbon pricing and carbon market. We are participating in a number of international initiatives promoting the role of business in climate change mitigation. These include, for example, the UN Global Compact's Caring for Climate initiative and the World Bank's Carbon Pricing Leadership Coalition. In Finland, Fortum is a member of the Climate Leadership Coalition (CLC).

Towards low-carbon energy production

Fortum's specific carbon dioxide emissions are among the lowest compared to other power companies in Europe. In 2019, 96% (2018: 96%) of our electricity production in Europe was CO₂-free. Of our total electricity production, including the Russian power generation, 59% (2018: 57%) was of CO₂-free, i.e. Fortum is still among the low-carbon energy utilities. Over the past decades, Fortum has significantly increased its annual CO₂-free power production: from around 15 TWh in 1990 to 45 TWh in 2019.

In line with the strategy, Fortum targets a multi-gigawatt solar and wind portfolio, which is subject to the capital recycling business model. The majority of our greenfield investments in Europe and solar power investments in India are CO₂-free. In order to enable more investments into renewable production, Fortum cooperates with other financial investors. In 2019, we invested in new wind power production in the

Nordic countries and Russia, as well as in hydropower refurbishments in Finland and Sweden.

In Russia, over 90% of our energy production is based on natural gas. Since a significant reduction in CO₂ emissions is not possible with Fortum's current Russian production portfolio, Fortum aims to reduce emissions by improving energy efficiency. Our new plants in Russia are mainly based on CCGT (Combined Cycle Gas Turbine) technology, which represents the best available technology in natural gas combustion (efficiency 80–85%).

In 2019, Fortum invested EUR 401 (2018: 278) million in CO₂-free production. Investments in hydro, wind and solar power and bioenergy totalled EUR 344 (2018: 180) million. Projects under construction and decisions on new investments are described in more detail in the section [► Energy production](#).

Fortum's R&D activities aim at building a platform for future growth in, for example, wind and solar power, batteries, demand response, and bio-fractionation. To improve resource efficiency, Fortum is also focusing on material recovery. In 2019, Fortum spent EUR 67 (2018: 56) million on research and development; over 80% of this amount targeted R&D on mitigating climate change.

Carbon funds

Fortum is a participant in the World Bank's Prototype Carbon Fund (PCF). In 2019, we received a total of about 36,000 Carbon Emission Reduction (CER) units from this fund. So far, we have received a total of 2,856,000 CER units, and we estimate that we will still receive about 13,000 units during the PCF's operating period. Fortum uses the CER units it has received from the PCF to compensate greenhouse gas emissions generated by employee air travel. Emissions from employee air travel have been compensated since 2007.



Climate-related risks

Management of climate-related risks is integrated into Fortum's risk management framework and follows the same governance and processes as Fortum's other material risks and uncertainties. Climate-related risks can be divided into two categories: transition risks and physical risks. The identified physical risks are generally found in the operational risk category, whereas transition risks are generally longer-term and part of the strategic risk category.

Our climate-related risks are also described in our [► Financials 2019](#) report in the section Risk management, particularly page 31.

Key climate-related transition risks

Risk description	Impact assessment	Key mitigating actions
Policy and legal risks • Insufficient rate of decarbonisation, resulting in achievement gaps in ambitious and revised EU targets • Banning or tighter restrictions on incineration of waste and biomass	Hundreds of MEUR	Lobbying for: <ul style="list-style-type: none"> • Coherence of targets and policies within the EU • Increased demand through electrification • Increased demand flexibility to balance variable supply • Stronger and more interconnected grids to keep up with increase in variable RES • Carbon pricing as the main instrument in decarbonisation and clear EU criteria for market-based capacity remuneration • Energy recovery of waste as part of the circular economy • Sustainable biomass in energy production
Technology risks Disruptive technologies creating, e.g., cheap sources of electricity storages, and decreased costs of renewable production forms	Hundreds of MEUR	<ul style="list-style-type: none"> • Preparation for the decommissioning of unprofitable conventional assets • Monitoring technology development to ensure correct timing of investments and divestments • Early insight through venturing and selectively investing in technology innovations
Market risks Lower and more volatile electricity prices, and lower heating demand due to change in weather patterns	Hundreds of MEUR	<ul style="list-style-type: none"> • Preparation for the decommissioning of unprofitable assets • Modelling of climate change scenarios • Project participation in long-term storage solutions
Reputation risks Stricter demands from stakeholders, incl. rules of sustainable finance, lower carbon thresholds for investors, increased activities by NGOs, and increased exposure due to Uniper investment	Reputation and brand impact	<ul style="list-style-type: none"> • Constant evaluation of asset base • Clear communication of our strategy • Wider market approach • Lobbying for definitions of sustainable finance • Diversification of bond portfolios • Continuous dialogue with NGOs

Key climate-related physical risks

Risk description	Impact assessment	Key mitigating actions
Acute risks Extreme weather conditions leading to local damages and production losses, e.g.: <ul style="list-style-type: none"> • Intense storms with heavy rains and flooding • Flash floods, increasing the risk of dam breaches • Extreme heat and dry spells causing forest fires 	Tens of MEUR	<ul style="list-style-type: none"> • Increased preparedness for local flooding, storms and forest fires • Investments in long-term dam safety, incl. climate change risk assessments
Chronic risks Changes in long-term weather patterns (e.g., precipitation and inflow, incl. longer wet or dry periods, increased average temperatures, and more or less wind) impacting on power and heat demand and supply, availability of biofuels and raw materials, as well as increased need for cooling water	Tens of MEUR	<ul style="list-style-type: none"> • Increased flexibility in fuel use • Investments in power production flexibility • Preparations for changes in the sourcing of cooling and process water • Ensuring climate change scenarios are included in investment decisions in new businesses

186 g/kWh

Specific CO₂ emissions,
5-year average
Target: ≤200 g/kWh



Climate-related opportunities

We believe that the growing awareness and concern about climate change will increase the market demand for low-carbon and resource- and energy-efficient products and services. We are leveraging our know-how in CO₂-free hydro, nuclear, wind and solar power and in energy-efficient combined heat and power (CHP) production by offering low-carbon energy solutions and services to our customers.

We also believe that the electrification of transportation, industry and services will increase the consumption of low-carbon electricity in particular. Business opportunities creating climate benefits are further supported by our business area-specific targets.

In building options for significant new businesses, Fortum is focusing on the circular economy and resource efficiency through waste recycling and recovery and new bio-originated products. Our circular economy services utilise waste stream materials as efficiently as possible and reduce the formation of greenhouse gases generated from biodegradable waste at landfills. Additionally, the use of non-recyclable and non-recoverable waste in energy production replaces fossil fuel.

The following investments and projects, among others, directly or indirectly reducing carbon dioxide emissions were completed in 2019:

- Refurbishments of hydropower plants in Sweden and Finland
- New Pavagada 2 solar power plant in India
- New wind turbines in the Sørfjord wind power park in Norway

Fortum has a business model of capital recycling in its solar and wind power portfolio. In line with the model, Fortum sells the majority share in its solar and wind power portfolio and releases capital for new solar and wind power investments.

We also offer our customers a range of energy services and energy products to help them improve their energy efficiency and reduce their carbon footprint:

- CO₂-free electricity products and carbon-neutral heat products
- Real-time monitoring and optimisation of energy consumption
- Electric vehicle charging solutions
- Solar panel solutions

We are expanding our offering also by investing in start-ups that are developing new technologies.

Metrics and targets

Fortum's Group-level target for specific CO₂ emissions from total energy production, five-year average, is ≤200 gCO₂/kWh. The five-year average, including 2019, was 186 (2018: 186) gCO₂/kWh, which is below the Group-level target of ≤200 gCO₂/kWh. Our specific carbon dioxide emissions (Scope 1) from total energy production in 2019 were 189 (2018: 192) gCO₂/kWh.

In December 2019, Fortum's Board of Directors approved a new target for specific CO₂ emissions from total energy production, applicable for 2020: ≤180 gCO₂/kWh (one year performance). This target will be revised after consolidation of Uniper. The Board of Directors also approved inclusion of total CO₂ emissions from energy production in the 2020–2022 long-term incentive (LTI) plan for key employees and executives.

Fortum has also evaluated possibilities to establish a science-based target for the reduction of greenhouse gas emissions for its stand-alone fleet. However, a science-based target should be set for a minimum of five years ahead, so it was not regarded as sensible at this transition point.

Our specific carbon dioxide emissions from total electricity production (Scope 1) in 2019 were 183 (2018: 186) g/kWh. Our specific

carbon dioxide emissions from electricity production in Europe were 27 (2018: 26) g/kWh. The specific carbon dioxide emissions from our electricity production, measured as gCO₂/kWh, are low compared to other major European electricity producers. Our specific emissions in 2018 were one of the smallest among European electricity utilities. European reference data for 2019 is not yet available.

In the calculation of electricity production's specific emissions, CHP plant emissions have been allocated for electricity and heat using the efficiency method presented in the Greenhouse Gas (GHG) Protocol guidelines, with heat production efficiency of 90% and electricity production efficiency of 40%.

The boundary for specific carbon dioxide emissions generated from electricity production differs from other environmental [reporting principles](#).

The figures include also figures from Fortum's share in associated companies and joint ventures that sell their production to the owners at cost. This electricity production is based on hydro, wind and nuclear power, and the production doesn't cause direct carbon dioxide emissions.

Fortum also has a Group-level target to achieve annual energy-efficiency improvement of ≥1,900 GWh by 2020 compared to 2012. Our energy-efficiency improvements are described in more detail in the section [Energy efficiency](#).

Our power and heat production is described in the section [Energy production](#), and our water withdrawal at power plants, located in high and extremely high water-stressed areas, are described in the section [Water](#).

Greenhouse gas emissions

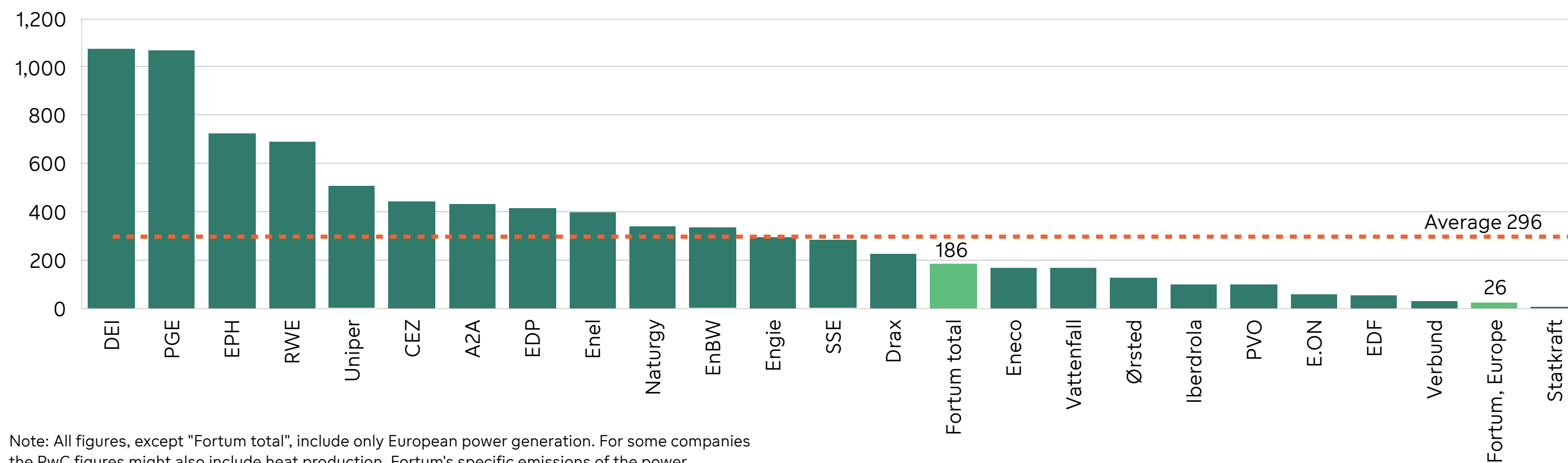
Fortum has defined targets and key performance indicators for climate-related risks and opportunities in line with its strategy and risk management process. Greenhouse gas emissions are defined and reported according to the Greenhouse Gas (GHG) Protocol guidelines. Our greenhouse gas emissions in 2019 totalled 25.2 (2018: 26.4) million tonnes. Scope 1 emissions were 19.3 (2018: 20.2) million tonnes, Scope 2 emissions 0.1 (2018: 0.1) million tonnes, and Scope 3 emissions 5.8 (2018: 6.1) million tonnes. The figures for the comparison years for greenhouse gas emissions have not been adjusted, due to insufficient data.

Direct greenhouse gas emissions – Scope 1

The majority of our greenhouse gas emissions are generated from the use of fossil fuels in electricity and heat production. A small amount of emissions is generated from the use of company vehicles. Our direct CO₂ emissions were 19.1 (2018: 20.1) million tonnes, and our direct greenhouse gas emissions were 19.3 (2018: 20.2) million CO₂-equivalent tonnes. The share of carbon dioxide emissions from our direct greenhouse gas emissions was 99%. Scope 1 greenhouse gas emissions accounted for about 77% of our total greenhouse gas emissions.

Of the direct carbon dioxide emissions, 85% (2018: 84%) originated from the Russian operations, 7% (2018: 8%) from Finland and 4% (2018: 4%) from Poland. Direct CO₂ emissions decreased primarily because of the decreased power and heat production. Fortum's direct biogenic carbon dioxide emissions were 1.6 (2018: 1.5) million tonnes.

Specific CO₂ emissions of major utilities in Europe, gCO₂/kWh electricity, 2018



Note: All figures, except "Fortum total", include only European power generation. For some companies the PwC figures might also include heat production. Fortum's specific emissions of the power generation in 2019 in Europe were 27 g/kWh and in total 183 g/kWh. Source: PwC, December 2019, Climate change and Electricity, Fortum

Direct greenhouse gas emissions in 2017–2019 (GRI 305-1)

Mt CO ₂ -eq	2019	2018	2017
CO ₂	19.1	20.1	18.4
CH ₄	0.01	0.01	0.01
N ₂ O	0.1	0.09	0.09
HFCs	0.00	0.00	0.00
SF ₆	0.00	0.00	0.00
Total	19.3	20.2	18.5

Direct carbon dioxide emissions by country in 2017–2019 (GRI 305-1)

Mt	2019	2018	2017
Russia	16.3	16.9	15.4
Finland	1.3	1.7	1.7
Poland	0.8	0.8	0.7
Other countries	0.7	0.8	0.6
Total	19.1	20.1	18.4

The calculation of greenhouse gas emissions covers carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), fluorinated hydrocarbons (HFCs) and sulphur hexafluoride (SF₆). Carbon dioxide emissions as well as methane and nitrous oxide emissions have been calculated on the basis of plant-specific fuel data. The amounts of HFC compounds and SF₆ are reported on the basis of the amounts of gas added to the equipment. Specific emission factors of gases are based on IPCC publications.

Indirect greenhouse gas emissions – Scope 2

Greenhouse gas emissions from the production of electricity purchased for our own use were 84,200 (2018: 92,200) tonnes of carbon dioxide equivalent. Carbon dioxide emissions accounted for 92% of Scope 2 greenhouse gas emissions. Scope 2 greenhouse gas emissions accounted for 0.3% of our total greenhouse gas emissions.

The electricity used in electric boilers in Norway has been added to the Scope 2 emissions calculation. The Scope 2 emissions calculation for 2019 also takes into consideration lifecycle greenhouse gas emissions.

About 94% of the market-based Scope 2 greenhouse gas emissions have been estimated based on data from electricity suppliers. Scope 2 greenhouse gas emissions in Russia have been estimated based on a country-specific breakdown of electricity production and emission factors.

Market-based indirect greenhouse gas emissions (Scope 2) in 2017–2019 (GRI 305-2)

t CO ₂ -eq	2019	2018	2017
CO ₂	77,800	91,800	102,300
CH ₄	4,900	100	75
N ₂ O	1,500	290	370
Total	84,200	92,200	102,700

Location-based indirect greenhouse gas emissions (Scope 2) in 2017–2019 (GRI 305-2)

t CO ₂ -eq	2019	2018	2017
CO ₂	122,800	98,100*	109,900
CH ₄	8,000	200*	100
N ₂ O	3,300	600*	600
Total	134,100	98,900*	110,600

* Added electricity used in electric boilers in Norway

Other indirect greenhouse gas emissions – Scope 3

The majority of our Scope 3 greenhouse gas emissions are caused by the purchases of goods and services, investments and the production and transportation of fuels. The transportation of waste received from customers also creates greenhouse gas emissions in our circular economy business. Other operations (e.g. employee travel and waste management) accounted for 0.4% of Scope 3 greenhouse gas emissions.

Our Scope 3 greenhouse gas emissions in 2019 were an estimated 5.8 (2018: 6.1) million tonnes. Scope 3 greenhouse gas emissions accounted for about 23% of our total greenhouse gas emissions. We estimate that all our Scope 3 emissions come from fossil energy sources.

Indirect greenhouse gas emissions (Scope 3) in 2017–2019 (GRI 305-3)

t CO ₂ -eq	2019	2018	2017
Fuel procurement	5,195,700	5,489,600	4,225,800
Purchased goods and services	319,900	260,900	371,700
Capital goods	273,300	310,700	229,400
Other activities	20,400	19,700	17,600
Total	5,809,300	6,080,900	4,844,500

We report Scope 3 greenhouse gas emissions in accordance with the requirements of the Corporate Value Chain (Scope 3) Accounting and Reporting standard. The volumes describing the scope of the various activities have been obtained from our monitoring and reporting systems.

About 7% (2018: 12%) of the purchases were excluded from the purchasing categories defined by Fortum's Procurement function, due to insufficient reporting. The emissions for these are estimated with the average emissions factor of the specified purchasing categories. The specific emissions factors used in calculating the greenhouse gas emissions are based on different literature sources. We updated the emissions factors in 2018, so the calculated greenhouse gas emissions are not fully comparable with 2017.

► [Fortum's CDP Climate Change 2019 response](#)

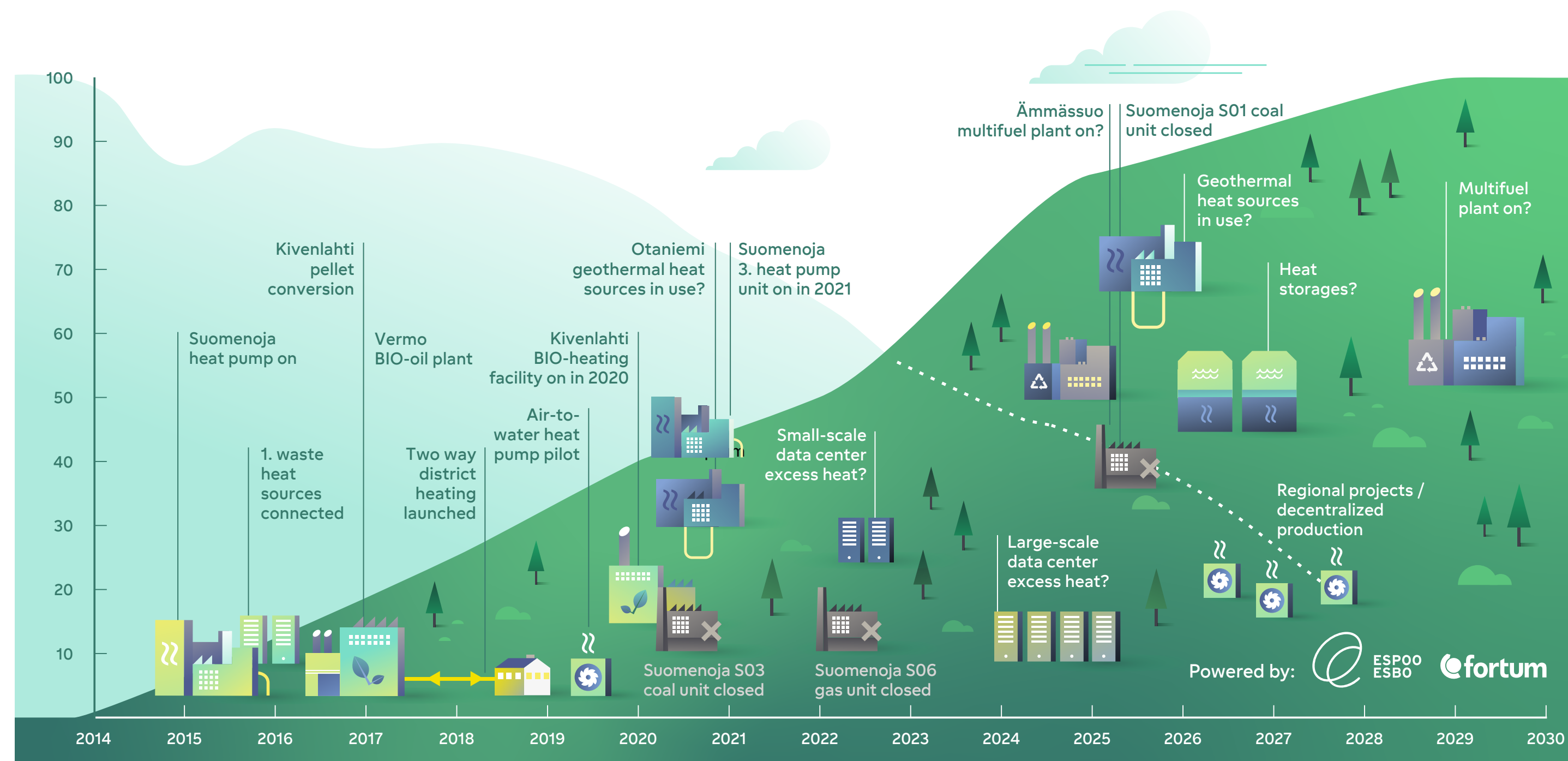
Case | Toward carbon-neutral district heating

Espoo district heating transformation journey 2014–2029

Illustrative

■ % CO₂ emissions in relation to 2014 level ■ % share of carbon neutral production

Espoo
Clean
Heat



Espoo Clean Heat

The use of coal for energy production will end in Finland in May 2029, as stipulated by law. We want to be forerunners and will discontinue the use of coal in Espoo’s district heating network already in 2025. We and the City of Espoo have together committed to carbon-neutral district heating in the district heating network operating in the Espoo, Kauniainen and Kirkkonummi regions in the 2020s. The accelerated project for carbon-neutrality is called Espoo Clean Heat. The Espoo Clean Heat concept is based on replacing fossil fuels with smart and flexible solutions that utilise CO₂-free electricity, excess heat, geothermal energy, and biofuels in energy production.

Recovery of excess heat from industrial processes

Fortum recovers excess heat from many sources, such as treated wastewater, office premises and data centres. Data centres are one of the world’s fastest growing energy-intensive sectors and they offer interesting opportunities for recovering heat. Currently, 99% of data centre excess heat globally goes unused, which is a huge energy loss. A data centre’s energy efficiency also significantly improves if the excess heat is recovered for district heating use.

As an energy architect and energy partner for data centres, Fortum is creating the conditions for having data centres in the Nordic countries. In 2019, Fortum started development work related to two big data centre sites in the Espoo district heating network area; the aim is to create the prerequisites for a hyperscale data centre operator. One 100-MW data centre could heat up to 35% of the region’s district heating network, which would be a significant step towards the target of making district heating carbon-neutral during the 2020s.

► Fortum – A Clean Energy Architect for Data Centres

Circular economy

Challenges for rapidly growing major cities and growth centres include not only the management of emissions, but also growth in waste volumes. Reliable waste management and resource efficiency are important in a sustainable society. We offer customers sustainable circular economy services and expert solutions. We also recover by-products and wastes generated in our own energy production whenever possible.

Waste received from customers

Fortum's aim is to promote the transition towards a more comprehensive circular economy and resource efficiency. By circular economy, we mean that materials are utilised as efficiently as possible and hazardous materials are removed from circulation. The aim is to make new raw material from waste whenever possible and to keep valuable materials in circulation.

Our circular economy business is expanding

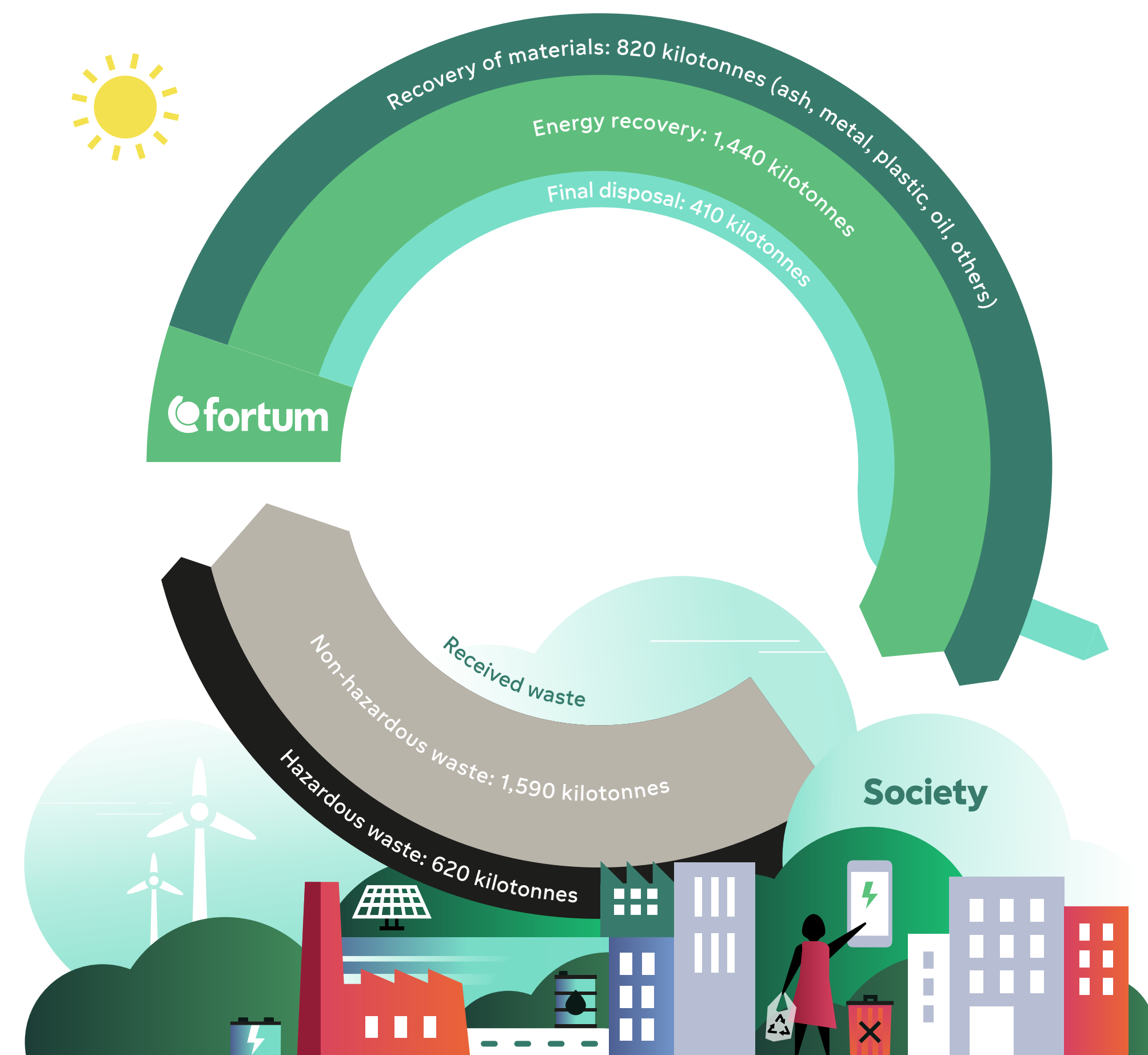
In autumn 2019, Fortum commissioned Finland's first ash refinery in Pori. About one-third of the fly ash generated at Finnish waste incineration plants is salt. Pursuant to the requirements of the EU Landfill Directive, waste containing salt can no longer be piled in landfills, as was done earlier, because in exceptional conditions the salt can dissolve into the environment. Also, the indirect carbon dioxide emissions are high.

In the ash refinery process, the heavy metals are bonded together with the ash and then the ash is taken to a landfill. The salt, that has been washed from the ash in the first phase of the process, is released into the sea with the discharge water. The washing water's impacts on the seawater are estimated to be minimal. The goal is that in the future the salt can be recovered and utilised, for example, as road salt.

In early 2019, the new Zabrze CHP plant in Poland was commissioned into operation. In addition to coal, the plant also combusts refuse-derived fuel (RDF), and waste accounts for about 40% of the fuel use.

In 2019, we also started the use of REcovered Fuel (REF) in Finland at the Järvenpää power plant. The REF is delivered from our Riihimäki plant.

Received and treated waste from customers in 2019





Our waste management services

We offer waste management services for customers in the Nordic countries, Lithuania and Poland. As much of the waste stream as possible received from customers is recycled, reused or recovered as raw material.

Waste that is unsuitable for recycling or reuse as a material is incinerated in our waste-to-energy plants. This reduces the use of virgin fossil or renewable fuels in electricity and heat production. Waste that is unsuitable for recovery is disposed of at landfilling sites.

In 2019, we received a total of 2.2 (2018: 2.2) million tonnes of waste from our customers, 62% (2018: 67%) of which was recovered in waste-to-energy plants. Of the waste received, about 1.6 (2018: 1.6) million tonnes was non-hazardous waste, with ash accounting for 11% (2018: 12%) and contaminated soil for 10% (2018: 9%). We also received about 620,000 (2018: 620,000) tonnes of hazardous waste from our customers; ash accounted for 12% (2018: 13%) and contaminated soil for 12% (2018: 10%).

Recovery of materials

Various types of waste can be reused as raw materials. In 2019, of the waste received from our customers, we recovered as materials about 820,000 (2018: 656,000) tonnes; various environmental construction materials accounted for 63% (2018: 64%) of that amount, recoverable ash accounted for 18% (2018: 20%), and processed raw materials and products accounted for 11% (2018: 11%).

The material recovery rate of the waste was 67% (2018: 59%). In addition, about 182,000 (2018: 225,000) tonnes of recoverable materials originated at Fortum's own power and heat plants.

Received and treated waste from customers in 2019

kilotonnes, 1,000 t	Finland	Sweden	Norway	Denmark	Other countries	Total
Received waste from customers						
Non-hazardous waste	633	270	380	0	310	1,590
Hazardous waste	241	155	0.1	223	0	620
Recovery and disposal						
Recovery of materials ¹⁾	223	490	58	45	4	820
Energy recovery (waste incineration)	375	172	380	204	311	1,440
Final disposal ¹⁾	188	63	70	14	76	410

1) Includes received waste from customers and also ash from waste incineration

We are continuously developing activities that increase the proportion of waste materials kept in circulation:

- We produce ▶ **recycled plastic** out of plastic packaging waste received from customers.
- We process and recycle ▶ **metals** separated from customers' waste and from the boiler slag in customers' energy production. We recycle scrap metals generated in the maintenance activities of also our own power and heat plants.
- We pick up and process customers' waste oils to be refined and recycled as industrial lubrication oils.
- We process slag, sand, sludge, dredging masses and slurry from energy production and other industries for reuse in various types of environmental construction and earthwork projects.

Hazardous waste treatment

We offer solutions to treat ▶ **hazardous waste**, we take hazardous waste out of circulation in a sustainable manner and we clean the hazardous substances from materials that end up in recycling. At the same time, we produce energy and ensure the safe final disposal of waste.

High-temperature incineration is the best available solution for the destruction of hazardous substances. We have three high-temperature incineration plants: in Riihimäki, Finland; Kumla, Sweden; and Nyborg, Denmark. At these facilities, about 347,000 (2018: 359,000) tonnes of hazardous waste and, additionally, about 321,000 (2018: 320,000) tonnes of non-hazardous waste were incinerated in 2019, producing electricity and district heating for the surrounding areas.

Contaminated soil

In 2019, we received and treated about 236,000 (2018: 209,000) tonnes of contaminated soil from our customers. We directed metal, rocks, concrete and wood, sieved from the soil for reuse as raw materials. Soil that is suitable for environmental construction is used at our own construction sites and industrial waste treatment centres.

Waste and by-products from our energy production

Ash is a by-product generated in the use of fuels in power and heat production, and gypsum and other desulphurisation products are by-products of flue-gas desulphurisation. Ash and desulphurisation products account for a more than 90% share, on average, of the by-products and waste from our energy production.

The maintenance of power and heat plants generates scrap metal and other conventional industrial waste and, to a smaller extent, waste oil and other hazardous waste. We aim for the highest possible utilisation and recovery of by-products and waste. The waste management service providers we use are properly licensed and reliable waste management companies.

In addition to conventional industrial waste, the Loviisa nuclear power plant also generates radioactive waste, which we treat in accordance with the requirements of Finnish nuclear energy legislation. The volume of radioactive waste generated is small, but special solutions are needed in its treatment and final disposal.

The total volume of by-products and waste generated at all Fortum's power and heat plants in 2019 was about 740,000 (2018: 770,000) tonnes. Of this volume, about 47% (2018: 50%) was recovered. With the growth of our circular economy business, the use of waste-derived fuel has increased and, consequently, the volume of by-products.

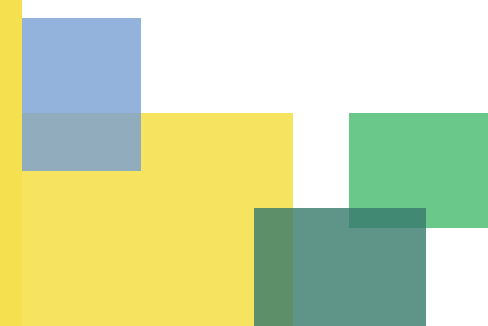
Ash and gypsum as by-products

Ash is created in the combustion of all solid fuels. About 65% of the ash from our plants operating in Europe is utilised as a raw material, e.g., for the construction industry, road construction and soil improvement, and as backfill. Ash from the power plants in Russia is stored in ash basins, because there is no demand for wet ash sludge in Russia.

Coal-fired power plants generate either a wet or semi-dry desulphurisation by-product. Gypsum created as a by-product in the wet desulphurisation process at the Meri-Pori power plant in Finland is suitable for use as raw material for the construction industry.

Material recovery rate of waste received from our customers

67%



In 2019, 100% (2018: 99.5%) of the gypsum was recovered. The desulphurisation product created at the Suomenoja power plant is not suitable for utilisation.

In 2019, about 700,500 (2018: 730,000) tonnes of ash, 1,600 (2018: 3,300) tonnes of gypsum, and 13,200 (2018: 11,600) tonnes of the other desulphurisation product were generated. 26% of the ash was generated at Russian plants, 19% in Finland and 15% in Poland. The ash recovery rate was 48% (2018: 51%). By-products that cannot be utilised are transported to the appropriate final disposal at landfilling sites or in Russia to ash basins.

The reported volumes of ash and gypsum from our European power plants are based on the weighing of the truckloads. Ash volumes at our Russian power plants are calculated on the basis of the ash content of the coal.

Ash and gypsum handling in energy production plants in 2017–2019 (GRI 306-2)

t	2019	2018	2017
Ash recovery	340,000	370,000	377,000
Ash disposal	360,000	360,000	433,000
Gypsum recovery	1,600	3,300	4,000
Gypsum disposal	0	15	0

Conventional and hazardous waste

Conventional waste generated during the operation and maintenance of power and heat plants is sorted, and waste that can be recycled, such as metal, is sent for further processing. Hazardous waste is delivered to licensed hazardous waste treatment facilities.

In 2019, the power and heat plants generated a total of about 32,400 (2018: 34,700) tonnes of waste, about 1,300 (2018: 1,700) tonnes of which was hazardous waste. Additionally, about 13,100 tonnes of soil was removed for disposal in Norway.

In 2019, the demolition project at the Inkoo power plant generated a total of about 38,400 (2018: 24,400) tonnes of waste, about 3,000 (2018: 1,000) tonnes of this was hazardous waste. Over 90% of the demolition waste was recovered. The reported volumes of non-hazardous

and hazardous waste are based mainly on the information provided by the waste management companies.

Waste handling in energy production plants in 2017–2019 (GRI 306-2)

t	2019	2018	2017
Material recovery of non-hazardous waste	6,100	8,900	3,100
Energy recovery of non-hazardous waste	600	500	300
Final disposal of non-hazardous waste	24,500	23,500	27,500
Material recovery of hazardous waste	500	450	200
Energy recovery of hazardous waste	300	300	800
Disposal of hazardous waste	500	1,000	2,200
Total	32,400	34,700	34,200

Radioactive waste

The Loviisa nuclear power plant’s low-level radioactive maintenance waste is disposed of in Loviisa’s repository. In 2019, 14 (2018: 13.9) tonnes of low-level radioactive waste and 12 m³ of intermediate-level radioactive waste went into final disposal. Intermediate-level radioactive liquid is generated mainly from spent ion exchange resins and wastewater from the controlled area. Liquid waste is processed into solid form at the solidification plant for liquid radioactive waste before final disposal in Loviisa’s repository. The final disposal of intermediate-level waste started in December 2019.

High-level spent nuclear fuel is stored in an interim storage at the Loviisa power plant site. In 2019, 21.9 (2018: 20.3) tonnes of spent nuclear fuel was removed from Loviisa power plant’s reactors. 2.7 (2018: 2.6) g/MWh of spent fuel was generated per produced energy unit.

Fortum and Teollisuuden Voima have established Posiva Oy to handle the technical implementation of the final disposal of the spent fuel, and final disposal is scheduled to begin at Olkiluoto in Eurajoki in the 2020s. Final disposal of Loviisa’s spent nuclear fuel will begin in the 2040s.

- ▶ Nuclear waste management
- ▶ Final disposal of spent nuclear fuel



Emissions

Energy production and other production operations generate emissions to the environment, such as to air and water. We aim to control emissions caused by our operations and to reduce their environmental impacts by using technological solutions and cleaning technology.

At the Group level, we monitor the number of major EHS incidents, such as leaks and environmental permit violations. These, in part, reflect the quality of environmental management.

Emissions to air

Greenhouse gases that accelerate global climate change are generated primarily from the use of fossil fuels and the combustion of fossil-based waste. Flue-gas emissions causing local environmental and health effects are generated from all combustion.

We aim to reduce impacts on air quality

Nitrogen oxides (NO_x) are generated from the nitrogen contained in the fuel and in the combustion air. Sulphur dioxide (SO₂) is generated from the sulphur that is an impurity in, for example, coal, peat and oil. Particle emissions are fine-grained ash generated primarily in the combustion of solid fuels and waste. Depending on the origin of the fuel and waste, the particles contain various heavy metals.

It is possible to decrease nitrogen oxide, sulphur dioxide and particle emissions through fuel choices, combustion technology, and various flue-gas cleaning technologies. Fortum has world-class know-how in combustion technology. We aim to reduce emissions to air from our own operations, and we also offer solutions to reduce our customers'

flue-gas emissions. We have delivered combustion technology solutions to reduce nitrogen oxide emissions to many customers' power plants. In 2019, we implemented projects to reduce the nitrogen oxide emissions of customers' coal- and oil-fired boilers in Finland, Sweden, Czech Republic and India.

In Finland, our Meri-Pori and Suomenoja power plants are equipped with a desulphurisation plant. Our waste incineration plants located in Riihimäki, Finland; Kumla, Sweden; Nyborg, Denmark; Oslo, Norway, and Klaipeda, Lithuania are equipped with efficient flue-gas cleaning systems. Harmful emissions to air are minimised with various filters and scrubbers selected on the basis of the waste to be incinerated.

Our carbon dioxide emissions are reported in the section ▶ **Climate**.

Flue-gas emission requirements

The EU has set very strict limits for flue-gas emissions; meeting the requirements necessitates the use of best available technology (BAT). Emissions limits became stricter when the Industrial Emissions Directive came into force in 2016. Fortum's power plants operate in compliance with the terms of their environmental permits, and, for the most part, the plants also meet the new emissions requirements.

During the past five years, we have reduced SO₂ emissions in Europe by nearly 40%. The demolition of the Inkoo coal condensing power plant and the minimal electricity production of the Meri-Pori power plant and its transition to peak-load reserve capacity in 2020 contributed to the reduced emissions in Finland. We have also reduced SO₂ emissions in Poland with the commissioning of the new Zabrze CHP plant and, correspondingly, the decommissioning of the old Zabrze and Bytom CHP plants.

Particle emissions have also decreased in Europe by about 15% primarily as a result of the commissioning of the new Zabrze plant and the decommissioning of the old plants. The old Zabrze and Bytom plants will be removed completely from operating capacity after 2022.

In 2019–2020, we will invest in Poland in systems reducing NO_x and SO_x emissions at the Rejtana heat plant. We also invested in a flue-gas cleaning system at the Czestochowa CHP plant, and the intention is to complete the investments in 2021.

In 2019, we continued the optimisation of combustion at the Suomenoja power plant in Finland to reduce nitrogen oxides emissions and to boost the operational efficiency of the desulphurisation plant.

Emissions at Russian power plants are limited in accordance with Russian legislation. Upon enactment of new legislation in Russia, the emissions regulations may become stricter.

In 2019, our Chelyabinsk CHP-3 and Tyumen CHP-1 and CHP-2 plants as well as our Nyagan power plant commissioned a system to continuously monitor flue-gas emissions, such as, among others, NO_x and CO₂ emissions, via the Internet. A similar system to monitor flue-gas emissions is in use also at the Chelyabinsk CHP-2 and CHP-4 plants.

Our flue-gas emissions

Our nitrogen oxide (NO_x) emissions were 24,900 (2018: 26,100) tonnes, our sulphur dioxide (SO₂) emissions were 14,900 (2018: 16,800) tonnes, and our particle emissions 11,700 (2018: 9,600) tonnes. 82% (2018: 80%) of nitrogen oxide, 81% (2018: 75%) of sulphur dioxide, and 98% (2018: 97%) of particle emissions originated from Russian operations.

Flue-gas emissions in 2017–2019 (GRI 305-7)

	2019	2018	2017
NO _x , t	24,900	26,100	26,400
SO ₂ , t	14,900	16,800	18,800
Particles, t	11,700	9,600	15,800
HCl, t	1,024	930	960
Lead, kg	4,000	4,240	3,990
Mercury, kg	116	118	118
Cadmium, kg	99	103	96
Dioxins and furans, mg	562	630	430

The most significant source of particle emissions, 6,300 (2018: 4,900) tonnes, was the Argayash CHP power plant in Russia. The wet flue-gas cleaning system for particle emissions at the Argayash CHP plant has helped to cut the power plant’s particle emissions by half during the past five years.

At least the reporting of nitrogen oxide, sulphur dioxide and particle emissions from our European power plants is based on continuous measurements. Other flue-gas emissions data is based on discontinuous measurements or are calculated using fuel consumption data and specific emission factors. Specific emission factors are based on measurements taken at regular intervals, on information from the equipment supplier, or on regulatory norms.

Emissions to water

Wastewater generated at power plants and other production facilities is treated either at the plant’s own wastewater treatment plant and discharged into a water system or it is piped to a municipal wastewater treatment plant for further processing. Even after treatment, plant wastewater may contain solids, nutrients, like nitrogen and phosphor, and heavy metals.

Wastewater effluents can impact local water quality as well as the nutrient and oxygen balance of the water system. In 2019, about 1.3 (2018: 1.0) tonnes of oil were released into water systems through wastewater.

At the Argayash CHP plant and the Chelyabinsk CHP-2 plant in Russia, the wet method is used to pump ash from power plants into ash ponds. Some of the water from the ponds is recycled back to the power plant and some is released into a water system after sedimentation.

In 2019, the Chelyabinsk CHP-2 and CHP-3 plants, and the Argayash CHP plant had temporary permit limits for wastewater discharges. At the

Argayash plant, the wastewater discharge limits were exceeded in the first half of the year prior to the enforcement of temporary permit limits.

Investment plans for these power plants have been made to improve the wastewater treatment and to ensure that wastewater discharges comply with the permit limits. The Chelyabinsk CHP-3 plant investment project is estimated to be completed in 2022, the Chelyabinsk CHP-2 plant project in late 2024, and the Argayash CHP plant project in 2026.

Environmental non-compliances

At the Group level, we monitor the number of major EHS incidents; in 2019, the Group-level target was ≤18 major EHS incidents. Significant environmental incidents include spills and leaks of over 100 litres into the environment, significant environmental permit violations, and other environmental non-compliances that have a significant impact on environment. In 2019, major EHS incidents didn’t include the exceedance of wastewater emissions limits in Russia arising from environmental permit changes.

In 2019, there were 11 (2018: 18) major EHS incidents; six (2018: 6) of these were significant environmental incidents: leaks of over 100 litres into the environment were four (2018: 4) and environmental permit violations were two (2018: 2).

Additionally, there were three (2018: 11) fires, one (2018: 0) explosion, and one INES (International Nuclear Event Scale) level 1 incident. There were no other major EHS incidents (2018: 1).

Spills and leaks into the environment

There were two incidents of refrigerant leaks at the Suomenoja heat pump plant in Finland. One of the leaks was to air and caused by a seal

malfunction, and the other, a leak in the condenser, went to district heating water.

A defective hose caused a leak to water at the Nyborg waste treatment facility in Denmark when a shipment of oily water was offloaded at the port. A technical malfunction was the cause of an oil leak to water at a hydropower plant in Sweden. The incidents have been investigated to develop preventive maintenance activities and to determine the corrective actions. The incidents did not have significant environmental impacts.

Environmental permit violations

At the Kumla waste incineration plant, untreated wastewater got into a trench and further into a waterway when the wastewater treatment plant’s capacity was exceeded during a period of heavy rain. The incident has been investigated to determine the corrective actions, and the incident did not have significant environmental impacts. The Suomenoja power plant experienced an electrostatic precipitator malfunction that resulted in an exceedance of the particle emissions limit. The incident did not have a material impact on air quality.

▶ Business ethics and compliance

▶ Occupational and operational safety



Water

We use water mainly as cooling water in our condensing power plants. Water is also a prerequisite for Fortum’s hydropower production. Our responsibility for water use is related not only to water volume and availability, but also to its quality and the aquatic habitat. We are improving the efficiency of our own water use, and we offer services also to our customers for the treatment, analysis, purification and utilisation of their waste and sludge waters and other severely polluted waters.

We use water within the limits set by our plants’ environmental and other permits. Permit regulations affect, e.g., the water intake volume, the quality of discharge water, and discharges and water levels at hydro power plants. Additionally, we carry out water-related local measures in order to take into consideration also the needs of other water users. Collaboration with local communities, municipalities, authorities and research institutes is important in the implementation of these measures.

In our supply chain water is used especially in fuel production, but we estimate that our own water use is more significant than the water use in our supply chain.

Risks and opportunities related to water use

The risks related to Fortum’s water availability are, based on our assessment, relatively small. The majority of our water withdrawal is seawater for cooling at condensing power plants. In most cases we don’t consume water in our operations; it is discharged into the same water system from which it was withdrawn. 15% of Fortum’s water withdrawal is in Russia, Poland and India in water-stressed regions, where, by definition, water use is generally large compared to the water resources available. In water-stressed regions, the risks may be related to water availability, increased cost of water, or restrictions in power production.

With efficient water management in hydropower production we can produce electricity at the right time, and manage the impacts on the environment and on stakeholders. Hydropower is good regulating power that enables other renewable energy sources, like wind and solar power, to be added to the grid. In Sweden, implementation of the EU Water Framework directive will reduce the country’s total amount of hydropower production by about 2% at most. Fortum is a participant in the joint hydropower environmental fund of companies operating in Sweden, which is used to fund environmental measures and to compensate for production losses so that the environmental benefits are maximised and the impact on the renewable energy production system is minimised.

Fortum is systematically reducing risks related to dam safety. A long-term programme is in place for improving the surveillance of the condition of dams and for securing the discharge capacity in extreme flood situations.

In our operations we are preparing for changes in water availability and hydrological conditions also in the future as the climate changes. The preparation is related to, for example, production planning, investments, dam safety, flood protection, the rise in the cooling water temperature as well as decrease in biomass availability.

In hydropower production planning we are preparing for climate change by taking into consideration changes in precipitation and temperature and extreme weather phenomena, which can cause droughts or flooding. We are also monitoring the need for adjustments to regulation permits with changes in seasonal variation as a result of climate change.

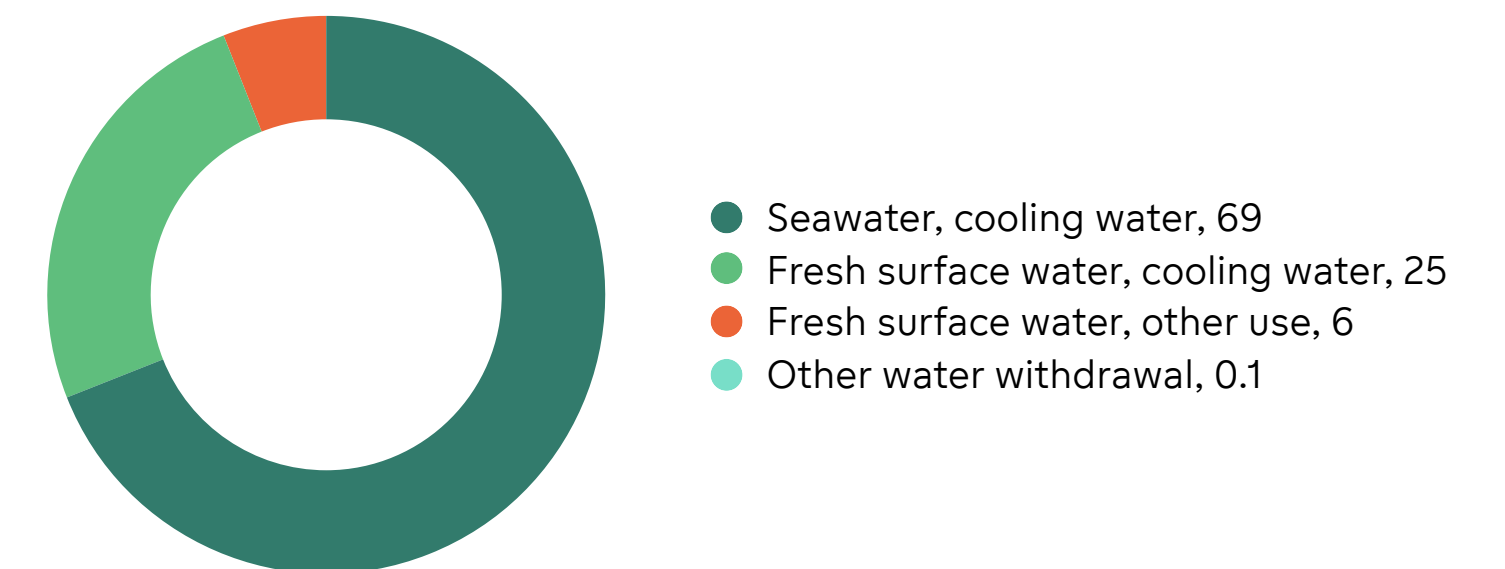
Improving the efficiency of water use at our power plants can reduce environmental impacts, generate cost savings, ensure the acceptance of our operation, and ensure the supply of water also for other purposes and for other users.

Water withdrawal and forms of water use

The majority of our power and heat production using water is located in the Nordic countries, Russia, Poland and the Baltic countries. The Baltic Sea and local freshwater systems are our most important water sources. Brackish water of the Baltic Sea is reported here as seawater. Additionally, municipal tap water is used at CHP plants and in waste treatment services.

Our water withdrawal in 2019 was about 2,090 (2018: 2,140) million m³, of which seawater accounted for about 70%. We recycled 13 (2018: 13) million m³ of water. The reported water withdrawal, water use and discharge volumes are based on measurements and on calculations of water consumption.

Water withdrawal in production operations, %



Water withdrawal in production operations in 2017–2019 (GRI 303-3) ¹⁾

million m ³ , i.e. 1,000 megalitres	2019	2018	2017
Seawater, cooling water	1,440	1,508	1,519
Seawater, other use	0.4	0.5	0.4
Fresh surface water, cooling water	523	496	471
Fresh surface water, other use	127	130	134
of which at fish farms	30	37	43
Municipal tap water	2	3	2
Groundwater	0.1	0.1	0.1
Other external water supplier, fresh water	0.3	0.3	0.3
Total water withdrawal	2,093	2,138	2,127

¹⁾ The figures also include the separately reported water withdrawal in water-stressed areas

Cooling water in energy production

Condensing power production requires large volumes of cooling water. Cooling water accounts about 94% of our water withdrawal. Fortum has two condensing power plants in Finland: the Loviisa nuclear power plant and the Meri-Pori power plant, which will transition to peak-load reserve capacity in 2020. Both use direct seawater cooling. No water is consumed in the cooling process, and water withdrawn from the sea is discharged back into the sea, albeit at a warmer temperature. The thermal load discharged into water systems with cooling water was 16 (2018: 16) TWh, of which 98% from the Loviisa nuclear power plant.

The Loviisa nuclear power plant withdrew and discharged back into the sea 1,380 (2018: 1,311) million m³ of cooling water. Temperature measurements indicate that the cooling water has increased the temperature of surface water by 1–2°C within a 1–2 kilometre radius from the discharge point.

In Russia, Fortum has the Nyagan condensing power plant, which uses river water for cooling. The plant also uses cooling towers, in which some of the cooling water evaporates into the atmosphere.

Condensing power is occasionally produced also at our CHP plants. In most cases, the cooling water is withdrawn from a local water system,

such as a river or lake. Several CHP production plants in Russia and Poland use cooling towers.

Process water

A power plant needs water in the water-steam cycle when electricity is generated with a steam turbine. Because of leaks in the pipes, occasionally water must be added to the water-steam cycle. Water is also needed in power plant auxiliary processes, for example in flue-gas cleaning with wet scrubber technology, and in radioactive waste handling and storage at nuclear power plants.

Water is also used in processes at waste treatment facilities. In 2019, we started using air cooling at the Kumla plant in Sweden in the cooling of a waste-fired furnace. Air cooling reduces water consumption by at least 150,000 m³ a year, which is a significant decrease in the Kumla plant’s water consumption.

District heating water

Fortum is a major supplier of district heat in Finland, Poland, Norway and the Baltic countries. Fortum has a total of about 3,100 kilometres of district heat pipes. Water is used as the heat transfer medium in district heating. Because of leaks in district heating pipelines, make-up water must be occasionally fed into district heating networks. The volume of make-up water for Fortum’s district heating networks in 2019 was 0.5 (2018: 9) million m³. The make-up water for the district heating networks decreased due to the divestment of the Russian district heating networks.

Hydropower production

Fortum produces hydropower from water flowing in rivers in Finland and Sweden. Our power plants are typically located in big rivers that have no problems in terms of water supply. We do not produce hydropower in water-stressed areas. Water is not consumed in hydropower production, the water quality is not changed, and it is not typically directed to

another water system. However, the water system is often regulated for hydropower production, and the regulation changes the water flow and level patterns compared to their natural state. The water use-related environmental projects implemented with stakeholder groups are reported in the section ▶ **Corporate citizenship**.

We have precise knowledge of the water situation in those waterways where we produce hydropower, and we use real-time hydrological forecasts in production planning. Fortum doesn’t report river flows as a hydropower production-related water withdrawal.

We farm and stock fish to offset impacts of hydropower production. The majority of the fresh water withdrawn for fish farming is returned into the bodies of water with only a slight change in its properties. Discharged water is purified, when necessary, and its nutrient content is monitored in line with permit conditions. The new fish farm facility commissioned in Sweden uses significantly less water than the previous facility, so our water withdrawal for fish farming decreased in 2019.

Our water use in water-stressed areas

According to the WRI Aqueduct Water Risk Atlas, of Fortum’s power plants the four Chelyabinsk CHP plants and the Argayash CHP plant in Russia as well as the Czestochowa CHP plant in Poland are located in an area with a high (40–80%) water-stress level, and the Pavagada 2 solar power plant in India is in an area with an extremely high (> 80 %) water-stress level. Our water withdrawal in water-stressed areas was 323 (2018: 307) million m³, which was about 15% (2018: 14%) of our total water withdrawal. 99.9% of the water withdrawal in water-stressed areas is in Russia, 0.1% in Poland and 0.00004% in India.

Water withdrawal in production operations in water-stressed areas in 2017–2019 (GRI 303-3)

million m ³ , i.e. 1,000 megalitres	2019	2018	2017
Fresh surface water, cooling water	257	242	231
Fresh surface water, process water	66	65	59
Municipal tap water	0.5	0.5	0.5
Groundwater	0.0001	0.01	0.003
Total water withdrawal	323	307	289

All the Chelyabinsk CHP plants use cooling water towers, which reduces the amount of water needed for cooling.

The Argayash CHP plant withdraws cooling and process water from a nearby lake. The water volume of the lake can be maintained with water pumped in from another lake. Until 2017, the amount of additional water pumped in wasn't sufficient and the water level decreased significantly. In 2017–2018, we were allowed to increase the amount of pumped water, and the water level rose to a sufficient level. Fortum has an ongoing investment project to improve water use efficiency in ash processing.

The investment project was developed and received regulatory approval in 2019. When the investment project is completed in 2026, water will be returned to the plant's production process, thereby reducing the amount of water withdrawal.

Water is used at the Czestochowa CHP plant as process water and, in summer, for cooling. Air cooling is also used for cooling.

In water-stressed areas in Russia and Poland we recycled 5 (2018: 6) million m³ of water.

Even though our water use in India is minimal, we aim to reduce water use in the country suffering from water stress. We use robotic waterless cleaning solutions to clean solar panels. At the end of 2019, 54% of Fortum's solar capacity (including co-owned plant) in India were cleaned using robotic waterless cleaning; the target is to increase the share to 90% by the end of 2020. In 2018, Fortum sold its majority share in the Indian solar power plants. Thus our water withdrawal in water-stressed

areas in India covers only the Pavagada 2 solar plant commissioned in 2019 and which uses groundwater. At the Pavagada 2 power plant, we use waterless solar panel cleaning on 92% of the panels.

Water discharge

We pipe the majority of cooling water back into the same water system from which the water was withdrawn. In 2019, the water discharge was 2,017 (2018: 2,063) million m³, 3% of which was process water and wastewater and the rest was cooling water. About 55% of the process water and wastewater is discharged water from fish farms. 97% of the process water and wastewater was purified, when needed, and discharged back into the environment; 3% was piped to municipal wastewater treatment plants. The discharged water in water-stressed areas is mainly cooling water released into fresh surface water. Emissions into water are reviewed in the section ▶ **Emissions to water**.

Water discharge by recipient in 2017–2019 (GRI 303-4)¹⁾

million m ³ , i.e. 1,000 megalitres	2019	2018	2017
Sea, cooling water	1,440	1,508	1,519
Fresh surface water, cooling water	523	496	471
Cooling water total	1,963	2,003	1,990
Sea, process water	0.6	0.7	0.7
Fresh surface water, process water	51	57	62
of which from fish farms	30	37	43
Municipal sewage	1.6	1.7	1.7
Other recipient	0.1	0.1	0.1
Process water and wastewater total	54	59	64
Discharge water total	2,017	2,063	2,054

1) The figures also include the separately reported water discharge in water-stressed areas

Water discharge by recipient in water-stressed areas in 2017–2019 (GRI 303-4)

million m ³ , i.e. 1,000 megalitres	2019	2018	2017
Fresh surface water, cooling water	257	242	231
Fresh surface water, process water	14	12	11
Municipal sewage	0.4	0.5	0.6
Other recipient	0.08	0.09	0.09
Discharge water total	271	255	242

Water consumption

Our water consumption includes cooling water that has evaporated from cooling water towers in Russia and Poland, water leakage from district heating networks, water used in power plant and other production plant processes, water used to move ash in Russia and water used to clean solar panels. In 2019, our own water consumption was about 60 (2018: 68) million m³. We estimate water consumption as the difference between water withdrawal and water discharge. Fortum's own water consumption doesn't include the 7 million m³ of water supplied to external customers or the approximately 10 million m³ of water leaked from the district heating networks owned by others.

In water-stressed areas in Russia, Poland and India, our water consumption was about 40 (2018: 44) million m³.

- ▶ **Our water responsibility in terms of the aquatic habitat**
- ▶ **Our water responsibility in terms of emissions to water**
- ▶ **Water treatment services for customers**
- ▶ **Fortum's CDP Water Security 2018 response**

Biodiversity

The degradation of biodiversity is one of the biggest environmental problems globally. We need to know our impacts and dependencies on biodiversity and ecosystem services to be able to assess the related risks and opportunities.

Our impacts on biodiversity

Our impacts on biodiversity are primarily related to Fortum's hydropower production operations in Finland and Sweden. Construction of hydropower and water regulation related to hydropower alter the conditions in water systems and thus impact locally the diversity of the aquatic habitat and, in particular, the fish population. Emissions from fossil fuel-based energy production may decrease local biodiversity, especially in Russia, where most of our fossil-based production is located.

Indirect impacts may be caused by, for example, large-scale procurement of biomass for use as fuel or raw material as well as the procurement of other fuels. However, our production of carbon dioxide-free energy replaces fossil fuel-based energy production and thus mitigates climate change, which is globally one of the greatest threats to biodiversity.

Our responsibility for biodiversity

Fortum's [Biodiversity Manual](#) defines the company's principles related to biodiversity. According to the manual, biodiversity issues are systematically considered as part of our environmental management processes and our operations throughout Fortum. The manual contains specific instructions for biodiversity issues in current operations, new projects and the supply chain, as well as for reporting and communication. In 2019, we updated our [Biodiversity Action Plan](#), the content of which has been designed based on the voluntary environmental measures compiled by the Generation division. The

Biodiversity Action Plan describes Fortum's goals, responsibilities, timelines and partners for biodiversity projects.

We aim to improve biodiversity in connection with our operations, we carry out biodiversity-related projects, and we collaborate with our stakeholders in projects. We also assess the impacts our new projects have on biodiversity. Additionally, we offset and reduce the biodiversity impacts of hydropower production. In 2019, we carried out our fish obligations valued at EUR 2.4 million and several types of voluntary environmental projects valued at EUR 570,000.

Managing impacts in the supply chain

We manage the impacts of our fuel procurement on biodiversity by using international certification and assessment systems. We pay special attention to the procurement of wood-based biomass and coal.

Biomass sustainability criteria have been actively debated in recent years particularly at the EU level as part of the updating of the Renewable Energy Directive. Fortum has called for EU-wide, harmonised and binding sustainability criteria for all bioenergy. The sustainability criteria defined in the Renewable Energy Directive approved in 2018 are in line with Fortum's position. Sustainability of biomass is assessed on a risk-basis and primarily country-specifically. Certification systems offered by third parties can also be used to show sustainability. The implementation of the directive has started in member countries.

Certified wood-based biomass fuel originates from sustainably managed forests in which the preservation of biodiversity has been a focus. We annually collect data on the share of certified wood-based biomass fuel used in our power plants in Finland, Norway, Poland and the Baltic countries. In 2019, we improved the Chain of Custody management system for wood-based biomass fuel by strengthening supplier risk assessments.

Fortum is a member of the Bettercoal initiative and uses the Bettercoal Code and tools in assessing the sustainability of the coal supply chain. Biodiversity aspects related to coal mining are covered in Bettercoal

assessments. Assessment criteria are related to, e.g., preventing the disappearance or fragmentation of habitats, combating invasive species, and preventing adverse hydrological changes, nutrient accumulation and environmental pollution. By the end of 2020, we have committed to purchasing 70% of coal from suppliers whose mines have undergone a Bettercoal assessment.

► Sustainable fuel purchasing

Habitat restoration and other projects

Most of our habitat restorations and other projects improving biodiversity are related to hydropower production. Most of the projects described below are included in our Biodiversity Action Plan. Additional information about our hydropower-related projects supporting biodiversity is available on our [website](#).

Innovative solutions for migrating fish

To strengthen the lifecycle of fish we use a number of solutions, like fish stocking, habitat restoration, various types of fishways, and trap and transport systems to transfer fish over the dams. In 2019 at the Spjutmo power plant on the River Dalälven in Sweden, we started using a Finnish fishway innovation called Fishheart. Fishheart is a hydraulic fishway that uses water pressure to get fish around migration obstacles. In 2020, we will begin using Whoossh equipment at the Forshaga power plant on the River Klarälven in Sweden. Whoossh is an innovative and effective method enabling the fast sorting and transporting of fish over the dam.

River continuum restoration projects

Fortum has continued its programme of dismantling small dams in Sweden. There are a total of 80 dams in the programme which are no longer significant for water regulation and energy production. In conjunction with the dam removal work, the river continuum is restored and stream water

habitats can be re-established. The projects are implemented in close collaboration with local actors and residents.

In autumn 2019, we carried out the planned dismantling of four small dams on the River Klamma. In conjunction with the dismantling of the dams, the riverbed was reshaped and restored by bringing in rocks and gravel. The purpose of the project is to improve trout migration opportunities in the river and to restore the European crayfish habitats. Additionally, in 2019 we submitted applications to Swedish Environmental Court to remove four dams.

Restoring habitats

In summer 2019, we restored five rapids areas on the River Miesjoki in Finland together with the fisheries related stakeholders in the area. The goal was to create suitable spawning areas for grayling and trout by adding gravel in and around rapids. Habitat restoration efforts will continue in 2020 in order to improve the natural breeding of trout on the Myllypuro stream adjacent to River Miesjoki.

In 2019, Fortum took part in projects restoring a total of 6.5 hectares of habitats, as the accompanying table shows.

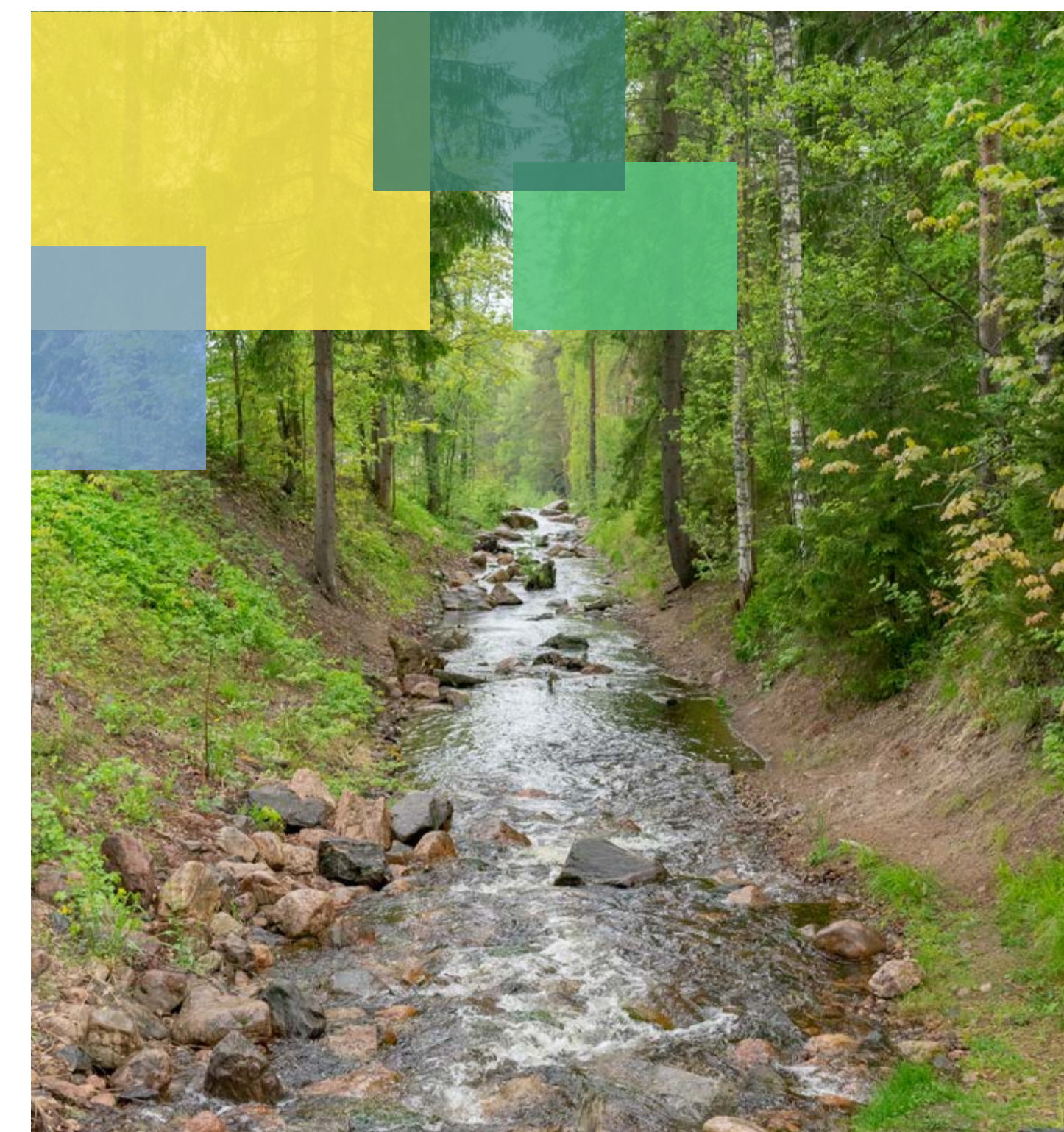
Protection of red-listed species and combating invasive species

At Lake Oulujärvi in Finland, we are taking part in biodiversity enhancing measures in the Önköri area in Käkilahti in a three-year-long project. The aim of the project is to reduce overly dense aquatic vegetation and to create wetland habitats for multiple red-listed species, such as moor frogs and Laucorrhinia dragonflies, as well as several bird species. In 2019, dredging was carried out, excess aquatic vegetation was removed, and small ponds and channels were dug out for aquatic bird habitats.

In 2019, we also started measures to improve the biodiversity in the vicinity of Fortum’s power plants on the River Klarälven in Sweden. In autumn, the removal of invasive species of lupine was started on the upper section of the river. The goal of the project, implemented in

collaboration with the County Administrative Board, is to secure habitats for endangered bees. By removing the lupine with their roots, sandy areas are created to enable indigenous plants and pollinators and other insects to spread.

► Environmental impacts of hydropower production



Habitat restorations in 2019

Site	Waterway, country	Target species of restoration	Type of restoration	Total area m²
Bollnäsströmmarna rapid section	River Ljusnan, Sweden	Trout, grayling	Riverbed shaping, graveling	20,000
Ängåsen	River Klarälven, Sweden	Indigenous vegetation, bees	Removal of invasive species from riverbank	12,000
Lilla Årosforsen rapid section	River Gullspångsälven, Sweden	Landlocked salmon	Riverbed shaping, gravelling	3,500
River Klamma	River Klarälven, Sweden	Trout, European crayfish	Riverbed shaping, gravelling	160
Önköri channel	Lake Oulujärvi, Finland	Moor frog, aquatic birds, dragon flies	Dredging the channel, removal of aquatic vegetation	25,000
Mellonlahti bay	River Vuoksi, Finland	Grayling	Dredging the bay, riverbed shaping	4,200
River Miesjoki	Lake Oulujärvi, Finland	Grayling, trout	Gravelling of the river	62

Personnel and society



We aspire to be a responsible employer and to offer a safe workplace for our employees and for the contractors who work for us. The sustainable solutions we offer to our customers in energy production and consumption as well as waste treatment also support a circular economy. We engage in an active dialogue with different stakeholder groups and we strive to find a balance between their various expectations.

Impacts on personnel and society

The emphasis in Fortum’s personnel responsibility is particularly on operational and occupational safety and on employee wellbeing and development. As a financial player, the company has a significant role in Finland, Sweden, Norway, Russia, Poland, and the Baltic countries. Satisfied customers are key to Fortum’s success and active consumers will have a significant role in the future energy system.

Fortum also has indirect responsibility for its supply chain. We conduct business with viable companies that act responsibly and comply with the Fortum Code of Conduct and the Supplier Code of Conduct. Ethical business practices and respecting internationally recognised human rights are the foundation of Fortum’s Codes of Conduct. Fortum’s sustainability approach also includes being a good corporate citizen and taking care of the surrounding communities.

Key figures for personnel and social responsibility

Our key figures for personnel and social responsibility are presented in the table and graphs.

► Business ethics and compliance

Key figures for personnel and society

	2019	2018	2017
Average number of employees	8,248	8,767	8,507
Number of employees, 31 December	8,191	8,286	8,785
Departure turnover, % of permanent employees	11.2	16.1	10.5
Female employees, %	32	32	32
Females in management, %	30	30	29
Sickness-related absences, %	2.9	2.8	2.2*
Lost workday injury frequency (LWIF) ¹⁾ , own personnel	0.8	0.2	1.2
Lost workday injury frequency (LWIF) ¹⁾ , contractors	3.3	4.8	4.2
Severe occupational accidents ²⁾ , own personnel and contractors	1	4	1
of which fatalities to contractors	0	2	0
Safety-certified ³⁾ operations in power and heat production, % of sales	96.5	97.0	98.4
Supplier audits, number	14	13	11
Support to society, EUR million	3.0	3.8	4.9

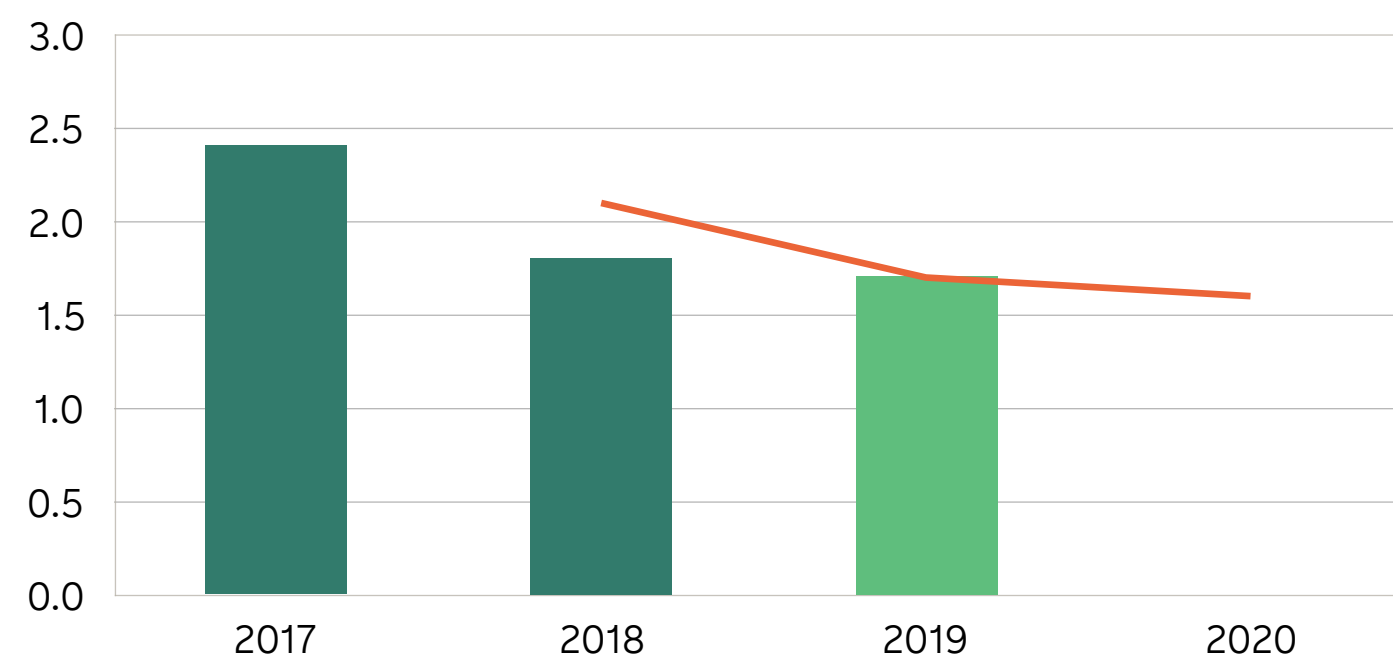
1) LWIF = Lost Workday Injury Frequency, injuries per million working hours

2) Fatality or an accident leading to permanent disability or an accident with severe and life-threatening injuries

3) OHSAS 18001 or ISO 45001

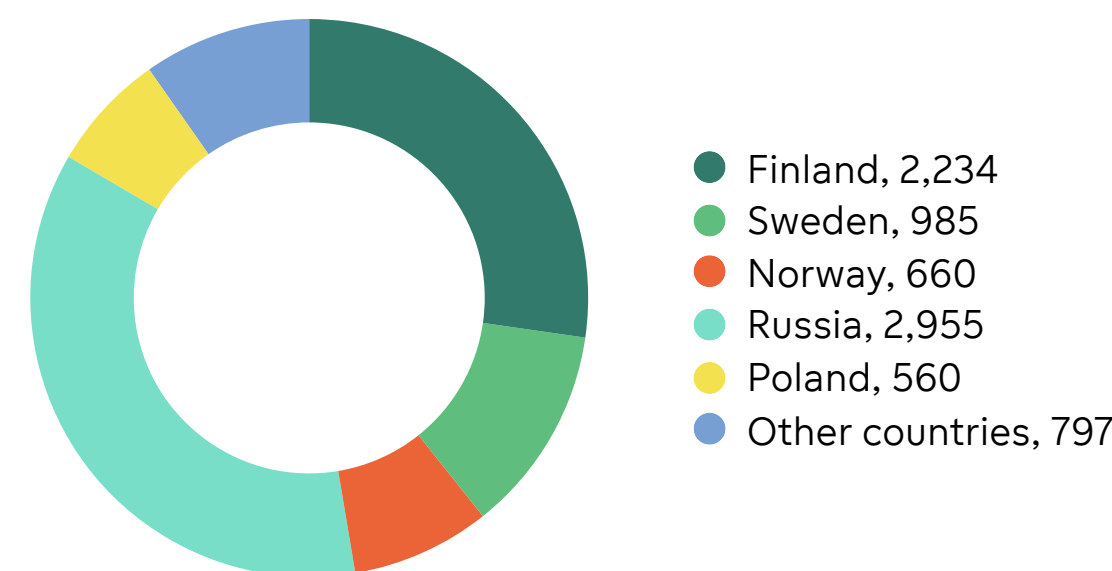
* Excluding DUON, Hafslund

Lost workday injury frequency (LWIF), own personnel and contractors

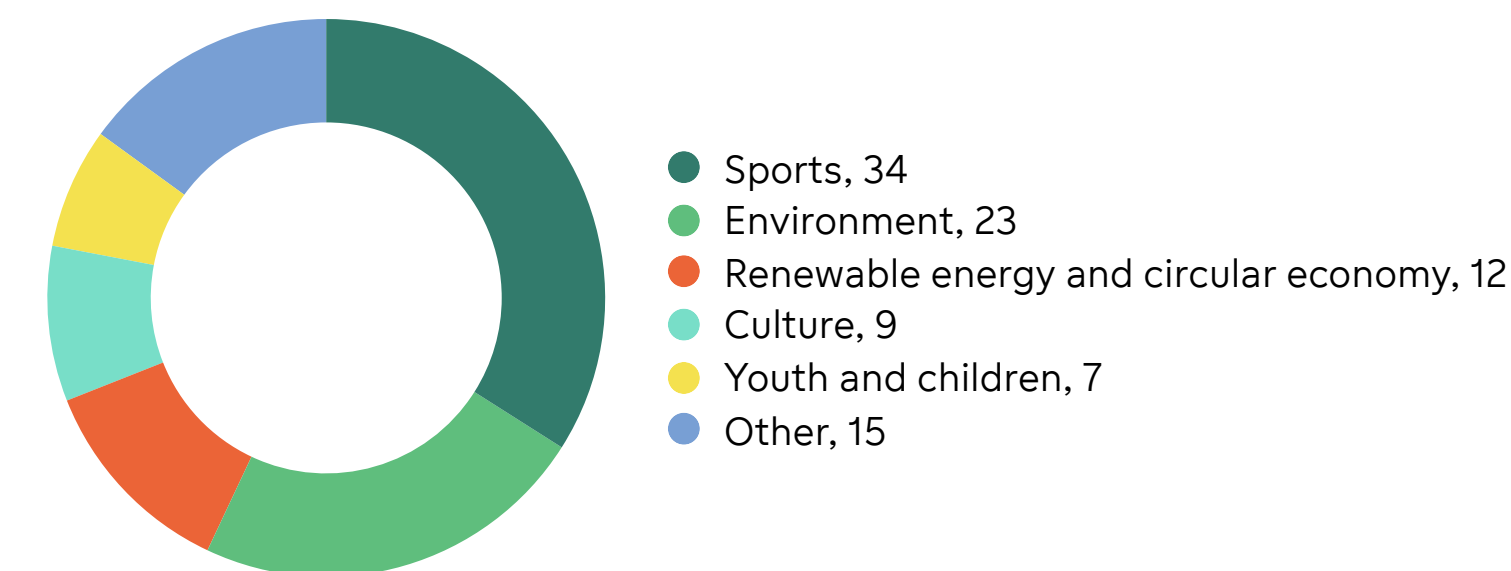


■ LWIF (own personnel and contractors)
— Target

Number of employees by country, 31 December 2019



Fortum’s support to society by target, %



Personnel

The change towards a low-carbon energy system requires a new direction in energy production. We can make this change together. We aspire to be a responsible employer that offers a motivating work environment and invests in personnel development and wellbeing.

In 2019, an average of 8,248 (2018: 8,767) employees worked at Fortum. The highest number of employees was in Russia, 2,942 (2018: 3,378) on average.

Permanent employees accounted for 96.8% (2018: 95.9%) of the personnel. Of these, the share of full-time employees was 97.7% (2018: 98.2%). During the year, 936 (2018: 799) new permanent employees joined Fortum and 885 (2018: 1,258) employment relationships were terminated, 297 of which by the employer. The number of employment relationships terminated for production and financial reasons was 120. Departure turnover in 2019 was 11.2 % (2018: 16.1%). Voluntary departure turnover was 7.8% (2018: 7.2%).

Contractors' employees worked at Fortum sites for a total of approximately 1,050,000 (2018: 1,007,500) days during the year. The figure is based on contractors' hourly logs and on estimates made on the basis of job costs and average hourly rates. The figure has been calculated on the basis of an 8-hour work day.

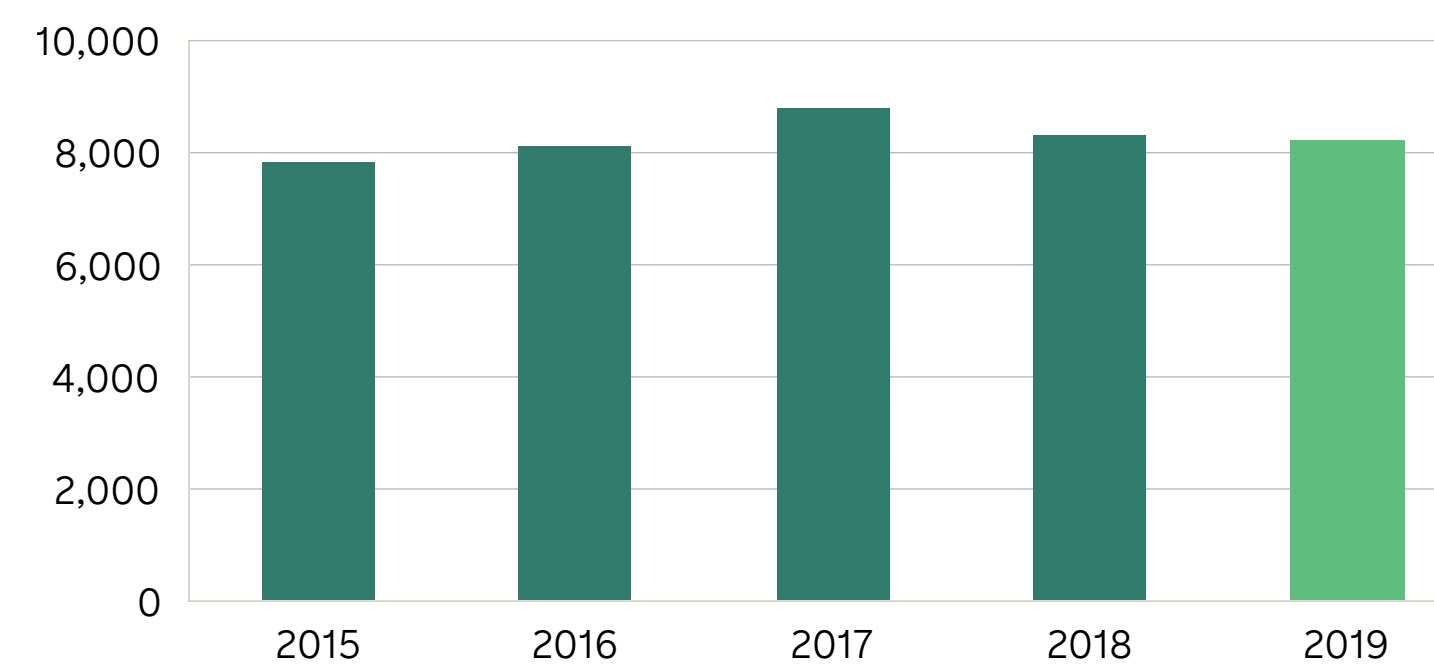
Personnel statistics from 2019, by country

	Finland	Sweden	Norway	Russia	Poland	Other countries	Total
Personnel at year-end	2,234	985	660	2,955	560	797	8,191
male	1,547	601	400	2,200	274	565	5,587
female	687	384	260	755	286	232	2,604
Personnel, average	2,228	986	660	2,942	650	781	8,248
Personnel expenses, million euros	201	83	61	71	18	46	480
Personnel expenses per person, 1,000 euros	90.3	84.2	91.7	24.2	27.2	59.7	58.2

Workforce by employment contract and employment type, by country and by gender (GRI 102-8)

	Finland		Sweden		Norway		Russia		Poland		Other countries		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Employment contract	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Permanent	1,492	655	591	369	397	253	2,167	681	269	276	558	220	5,474	2,454
Fixed-term	55	32	10	15	3	7	33	74	5	10	6	12	112	150
Employment type (permanently employed)	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Full-time	1,475	622	583	334	381	223	2,167	678	268	273	548	195	5,422	2,325
Part-time	17	33	8	35	16	30	0	3	1	3	10	25	52	129

Number of employees, 31 December



Total number and rate of new permanent employee hires and employee turnover, by age group, gender and country (GRI 401-1)

	Finland		Sweden		Norway		Russia		Poland		Other countries	
	M	F	M	F	M	F	M	F	M	F	M	F
New employee hires												
age group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
under 30	33	24	48	30	37	17	66	14	15	26	25	7
30-50	71	45	37	14	33	12	148	44	15	17	82	14
over 50	8	8	3	1	2	2	12	8	1	1	15	1
New recruits, %	7.5	11.8	14.9	12.2	18.1	12.3	10.4	9.7	11.5	15.9	21.9	10.0

	Finland		Sweden		Norway		Russia		Poland		Other countries	
	M	F	M	F	M	F	M	F	M	F	M	F
Employees leaving												
age group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
under 30	17	12	22	19	27	11	17	9	7	16	3	3
30-50	55	26	30	22	30	20	105	56	36	18	19	12
over 50	34	14	16	12	4	1	84	20	77	11	17	3
Departure turnover, %	7.1	7.9	11.5	14.4	15.4	12.6	9.5	12.5	44.6*	16.3	7.0	8.2

* Departure turnover was impacted by the decommissioning of two old power plants

	Finland		Sweden		Norway		Russia		Poland		Other countries	
	M	F	M	F	M	F	M	F	M	F	M	F
Employees leaving, employee initiative												
age group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
under 30	17	11	18	19	26	11	15	7	4	11	1	1
30-50	51	24	26	20	30	19	87	33	7	14	15	11
over 50	30	11	11	12	3	0	41	11	2	7	11	1
Voluntary departure turnover, %	6.6	7.0	9.3	13.8	14.9	11.9	6.6	7.5	4.8	11.6	4.8	5.9

Diversity and equal opportunity

We promote equal treatment and opportunities in the recruiting, remuneration, development and career advancement of personnel, regardless of the employee’s ethnic background, religion, political views, gender, age, nationality, language, sexual orientation, marital status or disabilities.

In Finland, we annually draft company-specific gender equality plans in collaboration with personnel representatives. Using various statistics, the gender equality plans examine the realisation of equality between men and women. Additionally, the plan lays out measures to further promote

equality. The separate equality promotion plan addresses various forms of equality and is drafted annually at the corporate level for units operating in Finland. Its purpose is to assess the realisation of equality at the workplace and to develop working conditions and ways of operating to be followed when selecting employees and when making decisions affecting to employees.

In Sweden, Fortum was the main supporter of Equality Week 2019. During the event, among other things, we organised lectures, discussions and workshops on equality-related themes for our personnel. Additionally, we take part in the Female Leader Engineer programme in Sweden;

the programme aims to strengthen the role of women in the corporate world and especially in engineering-dominated sectors where men are in the clear majority. Through the programme, female engineering students compete for internships in industrial companies. Fortum is also a participant in the **Equal by 30** campaign, which aims to get governments, energy companies and other energy sector organisations to endorse principles related to equal pay, equal opportunities and equal leadership by 2030 in line with the UN Sustainable Development Goals.

The average age of our permanent employees was 42.7 (2018: 42.9) years. The share of employees over 50 years old was 28% (2018: 29%). Females accounted for 32% (2018: 32%) of our total personnel. Females accounted for 30% (2018: 30%) of the Group- and division-level management. At the end of 2019, the Board of Directors comprised eight members, three of them were women.

We ranked 50th in the 2019 Equileap Gender Equality Top 100 (2018: 50th). Equileap annually collects data on over 3,000 companies worldwide. Its assessment criteria are related to the gender balance in leadership and workforce, equal compensation, work/life balance, and policies promoting gender equality in, e.g., recruiting and career development.

Any form of harassment is forbidden and addressed immediately. In Finland, Sweden, and India, for example, there are separate guidelines in place for workplace harassment and discrimination. There were no harassment or discrimination incidents reported to Fortum’s reporting channels in 2019, but a former Fortum employee reported to the Regional State Administrative Agency about experienced bullying during the employment. Fortum has issued a report about the matter, and the review of it is ongoing.



Age distribution of permanent employees, by age group and gender (GRI 405-1)

age group	Finland		Sweden		Norway		Russia		Poland		Other countries		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
under 30	148	67	135	88	86	51	228	40	34	90	54	25	685	361
30-50	874	383	282	180	228	155	1,390	427	139	156	313	127	3,226	1,428
over 50	470	205	174	101	83	47	549	214	96	30	191	68	1,563	665

Basic salary of women compared to men (GRI 405-2)

Country	Difference between basic salaries			
	All roles, %	Clericals and operative roles, %	Specialists and supervisors, %	Professionals and middle management, %
Finland	-3		N/A ²⁾	-4
Sweden	-3			-8
Norway	-5			-6
Denmark ¹⁾	3			
Russia	-19	-16		-19
Poland	-13	-18		N/A ¹⁾
Estonia ¹⁾	-9			
Latvia ¹⁾	2			
Lithuania ¹⁾	5			

1) Role-specific differences are not reported because of the small group sizes

2) No uniform job-grade classification

Equal remuneration

Salary levels at Fortum are compliant with established industry practices in each country, local legislation and sector-specific labour market and other agreements.

Remuneration is based on job-grade levels, job performance and the individual's competence development. We remunerate personnel for achievement of the strategic business targets and successful implementation of changes. The short-term incentive pay portion of the

annual salary is determined based on the individual's job. The amount of incentive pay to be paid is based on the individual's salary and on the achievement of the goals of the business unit and the individual.

In 2019, Fortum's Board of Directors decided on a new employee share savings programme. The first savings period begins in 2020. The purpose of the programme is to encourage employees to become Fortum shareholders and to strengthen their commitment to increasing shareholder value. Participation in the share savings programme is

Group and division-level management, by age and gender (GRI 405-1)

age group	Male	Female
under 30	0	0
30-50	30	11
over 50	28	14

voluntary and is offered to all Fortum Group employees, except in countries where prohibited by local legislation or other similar reasons, such as Russia. The employee share savings program was of interest, and 41% of the personnel signed up for the first savings period.

The global human resources data system and the harmonised job-grade classification system enable the examination of pay equality for the base salary in all our operating countries. In the table, we have reported the most significant countries in terms of the number of personnel. There is no reporting for other operating countries due to the low numbers of employees.

Our reporting covers all personnel groups except individuals working in blue-collar positions, which account for 28% of Fortum's total personnel. A male/female comparison of blue-collar positions is not reported because of the small group sizes.

The total number of personnel included in the comparison was 3,945, of which 1,489 (38%) were female. The base salaries of female employees in 2019 were, on average, 5% (2018: 4%) lower than the male base salaries. When examining the differences by employee group and by country, the differences ranged between -25% and +5%. The average number of years of service for female employees was 9 and for male employees 11. Among other things, the fact that women more commonly work in support functions rather than technical positions contributed to the salary differences in Russia, as did regional differences in wages.

Employee-employer relations

Fortum's business operations are developed and strengthened in good collaboration with employees. We believe that the successful management of business is built on relationships of trust between management and employees and on the free flow of information. Fortum respects employees' freedom of association and the right to collective bargaining.

In our operating countries, freedom of association and collective bargaining are guaranteed by law. The exception to this is India, which has not ratified the International Labour Organisation's (ILO) Convention on the right to freedom of association and collective bargaining. In India, we comply with the same practices as in other countries of operation, and we do not limit or prohibit the right to freedom of association.

We apply local collective bargaining agreements in compliance with the scope of each respective agreement in all our operating countries. Collective bargaining agreements cover nearly 85% of Fortum's employees in our biggest operating countries and range from about 4% coverage in Latvia to over 90% in Finland, Sweden, Norway and Russia. There are no collective bargaining agreements in Lithuania, Poland and India. In these countries, employment contracts are based on local legislation and on the company's human resources policy.

Fortum European Council

Fortum European Council (FEC) is Fortum's Europe-level cooperation function in which personnel and employer representatives meet. In 2019, the FEC held a meeting in Finland, and personnel representatives from Finland, Sweden, Norway, Poland, Estonia and Denmark participated. The Council's meeting focused on, among other topics, Fortum's strategy and business outlook, capacity for change in the changing working environment, and occupational safety.

Additionally, the FEC personnel representatives convened their own annual meeting. In addition to Fortum European Council meetings, local level meetings are held several times a year in different countries as needed.

Restructuring situations

In situations of organisational restructuring, we negotiate with personnel representatives in compliance with each country's local legislation and contractual procedures. In situations involving personnel reductions, we want to primarily support the reemployment of the personnel.

In restructuring situations, the length of the obligatory negotiation period depends on the scale of upcoming changes and varies in Fortum's different operating countries. The shortest period for obligatory negotiations is three weeks (Finland) and the longest is 90 days (India). There is no statutory obligatory negotiation period in Sweden, Norway and Lithuania.

The minimum notice period is based on local legislation, collective labour agreements or employment contracts, which are in harmony with the local legislation and agreements. In situations involving personnel reductions, we offer outplacement services on a per case and per country basis, and, in cooperation with local unemployment authorities or service providers, we investigate the possibilities to arrange vocational or other training that enhances employability. Retraining for employees who continue working is arranged based on organisational and individual needs. In situations involving personnel reductions, the content of the support package that we offer is decided based on local needs. The financial compensation of the package is usually based on the years of employment at Fortum.

Employee wellbeing

By improving work wellbeing, we support the work environment and a business culture that promotes our employees' health, occupational safety and the functionality of the work community.

Energise Your Day wellbeing programme

The Energise Your Day wellbeing programme aims to support and encourage all Fortum employees to maintain and improve their overall wellbeing. The Energise Your Day programme was expanded to Hafslund-

background companies in Finland, Sweden, Norway and Poland, and is now under way in all of Fortum's operating countries.

The Energise Your Day programme starts with a self-assessment-based wellbeing survey, which nearly 5,000 Fortum employees responded to in 2019, resulting in a response rate of 66%. Based on the responses, the most sought after support and tools are for recovery, stress management and increasing the daily activity level. The strongest areas, based on the employees' responses, were working capacity and nutrition.

Based on the wellbeing survey results, employees are offered various wellbeing services, such as lectures, wellbeing coaching and measuring and other wellbeing activities. The focus areas in 2019 were overall wellbeing, recovery, sleep, and wellbeing in knowledge work.

We also challenged the personnel to participate in the Carbon Footprint Challenge campaign, which supports Fortum's vision for a cleaner world. The purpose of the campaign is to develop one's own wellbeing by collecting eco-friendly kilometres, e.g., by walking or bicycling. In 2019, Fortum employees racked up 485,000 eco-friendly kilometres.

A total 3,600 Fortum employees responded to the Wellbeing Pulse Survey conducted in 2019. Based on the feedback, work wellbeing is at a good level. The results were good especially regarding teamwork. According to the personnel, wellbeing can be further improved by, e.g., focusing more on training issues.

We promote wellbeing at the workplace also through what is called an early-support model. We increase open communication between employees and supervisors by discussing and mapping the reasons for absences. Training is arranged for supervisors in the management of working capacity and work wellbeing.

Occupational safety and health care

Occupational safety and health care are organised in our operating countries in line with local legislative requirements. The occupational safety committees represent all personnel groups, and they regularly address issues related to occupational safety and workplace wellbeing.

A workplace study is the foundation of occupational health collaboration. It is used to identify the work, the working environment and the working community's resources and possible factors endangering and burdening employee health and safety. A workplace study provides researched information about the workplace's working conditions, making it possible to target measures in a sensible manner to improve occupational health activities and working conditions. The conclusions and recommended actions of a workplace study are taken into consideration in the occupational health care's operating plan. A workplace study is a statutory obligation for employers in Finland and a prerequisite for the reimbursements of occupational health expenses from Kela (The Social Insurance Institution of Finland).

All our employees are within the sphere of occupational health care. We emphasise the significance of preventive activities in promoting wellbeing in the company. The occupational health care costs per person in Finland, before the share reimbursed by Kela, were EUR 467 (2018: 485).

Fortum conducts regular medical examinations of its personnel in accordance with local laws. Employees who in their work are exposed to, e.g., noise, dust, radiation or who perform shift work are within the sphere of the examinations. Occupational health care also participates in various discussions and assessments in the work community. The occupational health care professionals support supervisors by providing information, methods and tools related to preventive actions as well as alternatives when the ability to work decreases. In 2019, there was a special emphasis in Finland on ergonomics and on carrying out targeted workplace studies.

In 2019, the percentage of sickness-related absences was 2.9 (2018: 2.8), which was higher than the target level of ≤2.5. Sickness absences increased especially in Russia and Norway. For males, the percentage of sickness-related absences was 2.4 (2018: 2.3) and for females 4.3 (2018: 4.0). The sickness absence rate is calculated based on the theoretical working hours of the permanent employees. In addition to expansion of the Energise Your Day wellbeing programme, the management of sickness-related absences was one of our focus areas in 2019.

There was one (2018: 5) case of suspected occupational disease in Finland. The case was related to noise and involved a male employee. The case was not determined to be an occupational disease. In addition, three cases of suspected occupational disease raised prior 2019 were determined to be non-occupational.

An indication of the good management level of working capacity and workplace wellbeing at Fortum is the average retirement age, which was 62 (2018: 62) years. In 2019, the average effective retirement age in the earnings-related pension scheme in Finland was 61.5 years (Source: Finnish Centre for Pensions).



Sickness absence rate of permanent employees in 2017–2019, %

	2019		2018		2017	
	Male	Female	Male	Female	Male	Female
Finland	2.2	2.6	2.3	2.6	2.2	2.6
Sweden	4.0	9.1	3.6	9.5	2.8	8.0
Norway ¹⁾	3.0	8.7	3.6	6.6	-	-
Russia	2.1	1.9	1.5	1.9	1.5	1.5
Poland	2.7	5.1	3.1	5.9	2.7	3.1
Other countries	2.2	2.0	3.0	2.2	2.5	2.3

1) The figures from 2017 are not reported because they are not comparable with the 2018 figures due to the change in the number of personnel

Employee development

Our goal is to be a forerunner in the future energy system. This means that we must continuously invest in the development of leadership and personnel competence and in the support of an open and flexible corporate culture.

In 2019, we performed so called 360 assessments based on our open leadership principles to more than 400 supervisors, and we arranged several events focusing on open leadership-related themes. Our Russia Division published a Russian-language handbook about open leadership.

We re-launched the Navigator programme targeting future talent, and 38 Fortum employees started in the programme. The programme consists of five modules that were arranged in Fortum's different operating countries. The training programme focused especially on developing leadership skills and expanding business understanding.

We offered our personnel a variety of new online training modules, and we held Fortum Talks events to share information about current topics related to Fortum's business. Additionally, we created the Fortum Lens data platform that aims to improve the personnel access to real-time data and figures related to business.

Job rotation is seen at Fortum as an important way to develop personnel expertise and to support open leadership principles. Job rotation reached a record-high rate in 2019, and 20% of the personnel either transferred permanently to a new position or took part in a project that was unrelated to their own job.

The total number of all training hours in 2019 was 50,749 (2018: 64,831). Training costs in 2019 totalled EUR 4.5 (2018: 4.0) million.

Training hours in 2019

	Total number of training hours for employees	Average training hours per employee	Total number of training hours for females	Average training hours per female	Total number of training hours for males	Average training hours per male
Finland	36,761	17	8,252	13	28,509	19
Sweden	1,102	1	717	2	385	1
Norway	367	1	262	1	105	0
Poland	980	2	318	1	662	2
Russia	10,314	4	3,529	5	6,785	3
Other countries	1,225	2	78	0	1,147	2
Total	50,749	6	13,156	5	37,593	7

Performance and development discussions

We support employee development through the annual performance and development discussions; all employees are within the scope of the annual discussions. The main target of the performance and development discussion is to ensure that the employee has clear targets that align with the business as well as the competencies supporting the achievement of the targets and professional growth.

The achievement of the targets forms the basis for payment of incentives. All permanent employees who have a minimum of three months of employment in Fortum are within the scope of Fortum's incentive scheme.

Faster feedback from personnel

The most important elements of Fortum's leadership principles include giving and getting feedback. That is why we use a real-time and flexible pulse tool to find out employee opinions; the tool allows supervisors and employees to see the results as soon as the feedback is given. The opportunity to constantly track the development of issues supports a coaching management approach.

Every six months, we measure personnel engagement and satisfaction with ten questions. The response rate of the survey carried out in November 2019 was 62% (2018: 57%). According to the results, 68% (2018: 66%) of the personnel feel a commitment to the company and 83% (2018: 83%) is proud to work at Fortum. Based on the survey, the principles of open leadership have gained a stronger foothold within the company, and 78% (2018: 73%) of the personnel saw progress in this area.

Compared to the results of the previous year, the biggest improvement was seen in the increase in collaboration between the divisions and units and in the open, two-way communications. Based on the results of previous surveys, collaboration between divisions and units in particular had been identified as a target of development; measures to promote it will continue. Nearly half of the personnel still feel that decision-making in their own unit is too hierarchical, and the results in this area did not change from the previous year. We aim to have more focus on developing this area in open leadership.

Safety and security

For Fortum, excellence in safety is the foundation of our business, and safe performance is a sign of professionalism. We strive to be a safe workplace for our employees and for the contractors and service providers who work for us.

Occupational and operational safety

We believe that all work injuries and EHS non-compliances are preventable when competence and the right attitude prevails, when potential risks are addressed and when measures are taken to safeguard against them.

Occupational health and safety management

Safety is developed systematically in all our operations. Fortum has Group-level EHS instructions and minimum requirements that set requirements for all the operations for which we have operative responsibility. We regularly update the requirements, and we assess the divisions' performance in complying with the revised requirements. Safety development plans are made as part of the annual business planning and they are based on the principle of continuous improvement. We actively conduct external and internal audits to improve operations.

For 2019, we set Group-level targets for the following key figures:

- Lost workday injury frequency (LWIF), own personnel and contractors
- Number of severe occupational accidents
- Quality of investigation process of injuries, major EHS incidents and near misses
- GAP index, implementation of EHS minimum requirements
- Contractor safety improvement index

The safety targets apply to all Fortum employees and are part of the Group's [▶ short-term incentive programme](#).

Calculated in terms of sales, 96.5% (2018: 97.0%) of Fortum's electricity and heat production operations at the end of 2019 were OHSAS 18001 or ISO 45001 certified. The decrease in coverage was due to Fortum Oslo Varme, whose operations are not yet certified.

Safety performance

In 2019, we achieved significant improvements in the safety performance of contractors. We put special focus on assessing contractor safety, and the contractors' lost workday injury frequency (LWIF) decreased to 3.3 (2018: 4.8).

The lost workday injury frequency (LWIF) for own personnel and contractors was 1.7 (2018: 1.8), and the set target level (≤ 1.7) was achieved. The injury frequency of our own personnel increased slightly, but the achieved level of 0.8 (2018: 0.2) can still be considered good.

The Group target in 2019 was zero severe occupational accidents. Unfortunately, one case of occupational violence took place in Russia, and it was classified as a severe occupational accident.

We achieved the set target levels for all the three leading indicators. The quality of investigation process for occupational accidents, major EHS incidents, and serious near misses was at level 3.0. The GAP index, describing the implementation of the EHS minimum requirements, was also 3.0. The most significant deviations were detected in companies that Fortum has acquired in recent years and at new sites that are just starting to implement Fortum's ways of operating. The most common deviations were related to work permits, high risk work, and contractor management processes.

The contractor safety improvement index, in use since the second quarter of 2019, measures how well Fortum has managed to implement measures targeting improvements in contractor safety. The contractor safety index was at level 2.0. However, the assessment has not covered all Fortum operations.

Occupational safety risk assessment and incident investigation

Occupational risk management includes all levels, from strategic risks and business planning to daily work. A risk management plan is drafted on the basis of a risk assessment. Assessments and plans are made together with those working at the worksites and they are updated at agreed intervals and when conditions change.

At Fortum, work in closed and particularly confined spaces, working at heights, and heavy lifting work, as well as the handling of hazardous chemicals have been classified as high-risk work. Requirements related to, e.g., personnel training and experience, the provision of instructions, and the pre-job verification to be performed have been defined for performing high-risk work.

Fortum's senior management is responsible for occupational safety risk management principles, targets, and development and maintenance of the risk management process, as well as for evaluating the effectiveness of risk management. Local management is responsible for the practical risk assessment and management work.

The risk management process is developed based on continuous improvement principles and takes into consideration incidents and deviations at Fortum and other companies. During incident investigations it is concluded whether the risk assessments have been correct and the preventive actions sufficient.

Fortum line management is responsible for incident investigations as well as for providing the required resources and taking care of the communication. When relevant, Fortum's crisis management and crisis communication procedures are followed. Every organisation has a group of trained incident investigators who are actively involved in investigations.

The findings of investigations are documented in Fortum's incident-handling system FRIDA. The learnings are shared with the organisations through digital safety bulletins. The quality of conducted investigations is verified by the divisions with quarterly process maturity assessments.



Key safety figures in 2017–2019 (GRI 403-9)

	Target 2020	Target 2019	2019	2018	2017
Lost workday injury frequency (LWIF) ¹⁾ , own personnel and contractors	≤1.6	≤1.7	1.7	1.8	2.4
Lost workday injury frequency (LWIF) ¹⁾ , own personnel			0.8	0.2	1.2
Lost workday injury frequency (LWIF) ¹⁾ , contractors			3.3	4.8	4.2
Lost workday injuries, own personnel			11	3	17
Lost workday injuries, contractors			28	39	42
Severe ²⁾ occupational accidents	0	0	1	4	1
of which fatalities, own personnel			0	0	0
of which fatalities, contractors			0	2	0
Major EHS incidents ³⁾	≤14 ⁴⁾	≤18 ⁴⁾	11 ⁴⁾	18 ⁴⁾	20

1) LWIF = Lost Workday Injury Frequency, injuries per million working hours

2) Fatality or an accident leading to permanent disability or an accident with severe and life-threatening injuries

3) Major fires, leaks, explosions, dam safety incidents, environmental non-compliances and INES events level ≥1
INES = International Nuclear Event Scale

4) The figure does not include the exceedances caused by possible changes in permit limits in Russia

Occupational accidents, accident frequencies and absence days due to occupational accidents in 2019 by country (GRI 403-9)

	Finland	Sweden	Norway	Russia	Poland	Others
Own personnel						
Occupational accidents causing absence	4	3	1	2	0	1
LWIF	1.0	1.7	0.9	0.4	0.0	0.7
Absence from work due to occupational accidents, days	28	70	1	69	0	60
Contractors						
Occupational accidents causing absence	14	8	3	1	0	2
LWIF	6.9	7.8	9.2	0.4	0.0	1.0
Absence from work due to occupational accidents, days	132	63	27	57	0	5

1.7

LWIF own personnel and contractors
Target: ≤1.7

11

Major EHS incidents
Target: ≤18

Training and development projects related to occupational safety

To further improve the occupational safety level, we implemented a training programme aimed at top management. The programme was conducted by one of the world's leading consultant companies in the field of safety. In the programme, special focus was put on top management's role in improving the occupational safety culture, and it included coaching and practical training related to the necessary personal leadership skills. It also focused on the systems and structures that support the safety culture transformation.

We continued the assessment of contractor safety performance as part of the supplier qualification process and evaluated safety practices in a more systematic manner also during work. We use the contractor safety index to measure progress in applying the instructions and in implementing the mutually agreed practices.

To communicate information about the various ways, guidelines and tools to improve safety, we updated and published new safety materials in ten languages: we released two online training courses and a safety video, and we updated our Safety and Security Handbook.

Occupational hygiene

In recent years, Fortum has expanded its business in the recycling and waste management sectors. This change has subjected our operating environment to new kinds of exposure agents, like chemicals that are processed in hazardous waste treatment plants, and microbes related to handling of mixed waste, which may cause adverse effects for employees.

For us to work safely, we must be aware of the risks related to exposure agents and follow the best practices in order not to cause harm to health, safety or environment. In 2019, we strengthened our know-how in this area by recruiting an occupational hygienist, whose job it is to support our operations in identifying and managing operating environment-related exposure agents, as well as to develop uniform procedures and ensure their implementation.

The work in 2019 focused particularly on supporting Fortum Recycling and Waste Solutions. Additionally, we wanted to develop chemical safety by launching an online training. The training is designed especially for those who handle chemicals in their work, but also for other Fortum employees as a refresher on the safe handling of chemicals.

Operational safety

We track major environmental, health and safety (EHS) incidents as a Group target; these incidents cover major fires, leaks >100 litres into the environment, explosions, nuclear and dam safety incidents, and environmental non-compliances. There were 11 (2018: 18) EHS incidents in 2019; the target was ≤18. The major EHS incidents included three (2018: 11) fires, two (2018: 2) environmental non-compliances, four (2018: 4) leaks, one (2018: 0) explosion, and one (2018: 0) INES (International Nuclear Event Scale) level 1 incident. There were no other major EHS incidents (2018: 1). The incidents did not cause significant harm to people, Fortum's operations or the environment.

Dam safety

In 2019, Fortum continued the high-quality work to ensure dam safety and to develop dam safety processes and practices. The main development measures focused on dam performance monitoring, on river plans with the aim to improve preparedness for emergency situations, on preparations to select a new operation and maintenance partner in Sweden, and on investment analyses. Fortum has actively participated in the updating of Sweden's dam safety guidelines (RIDAS).

In 2019, the preparation and implementation of dam safety investments proceeded as planned. Three dam safety projects, Långströmmen and Ljusneströmmar in Sweden and the Imatra project in Finland, were completed. Our new, extensive dam safety project at the Trängslet dam in the **► Dalälven water system** in Sweden was approved in autumn 2019, and the work at the dam has started. In terms of output capacity, Trängslet is our biggest hydropower plant, and the Trängslet

dam is the highest dam in Sweden. For 2020, we are planning two new large-scale dam safety projects for the Forshuvud dam in Sweden and the Tainionkoski dam in Finland.

The most significant of our dam safety projects in the preliminary planning phase are the Letten and Dejefors dams in the **► Klarälven water system**, and the Lanforsen and Untra dams in the Dalälven water systems in Sweden. The construction work on these will commence in 2021 or 2022. The most important goals of the projects are to bring the dams up to current dam safety standards by increasing discharge capacity and by refurbishing structures, and to extend the useful life of the dams. Fortum had no significant operative challenges related to dam safety in 2019.

Nuclear safety

Loviisa power plant's flood control project was completed in 2019. The modifications reduced the flood risk caused by an estimated sea-level rise exceeding three meters. The modernisation of the Polar cranes in the reactor buildings was also completed. This significantly reduced the drop risks of heavy lifts and loads.

A modification of the primary water purification system's filtering was also implemented in both Loviisa power plant's units; consequently, a further significant decrease is expected in radiation doses during annual outages. Additionally, to ensure sufficient data transmission capacity and availability, a fibre optic connection was installed through the containment building.

The transmitters for the emergency make-up water tank surface-level measurements in the Loviisa power plant's unit 1 were replaced with transmitters from two different suppliers. The change reduced the possibility of a combined failure in measuring, which in turn significantly reduced the risk of damage to the power plant's reactor core.



Corporate security

Through corporate security, we strive to ensure the uninterrupted continuity of business and the safety of people, information, our assets and processes in normal and exceptional situations. Uninterrupted energy production and distribution is important – both for Fortum’s business operations and for an energy-dependent society.

Our Corporate Security unit is responsible at the Group level for cyber, personnel and operational security. The business divisions play an important role in implementing security. The Business Technology function offers cyber security services for the company.

Securing personnel and business

Compliance with the minimum security requirements improves our operational ability to withstand and recover from disruptions and thus improves productivity. We assess risks related to people, business and information in all operating countries and in countries where we have potential operations or business travel. Risks impacting the company and business operations may be directly or indirectly related to political situations, terrorism, crime, conflicts and business partners. Corporate security is improved also by gaining a deeper understanding of the security situation, which is provided to support business decision making.

Cyber security

We have a cyber security programme to ensure the security of the information we handle and the security of our IT systems. The cyber security programme focuses on data, digital and IT services security, and security of automation systems. The aim is to ensure the production and distribution of power and heat and the functioning of digital services offered to customers. We also aim to secure partner-related risks to the extent that they relate to the company’s processes.

In information security, we aim to ensure the accessibility, integrity and confidentiality of critical information. We also take seriously our compliance with the regulations related to the protection of personal data. Customer data protection is discussed in the ▶ **Product responsibility** section.

We actively engage in collaboration with authorities and other stakeholders to identify and prevent increasing and changing cyber threats. We improve the information security awareness of our employees through training and instructions.

Contingency planning

Political uncertainty and climate change, as well as the growing dependence on partners may cause disruptions to the company’s operations. For this reason, we have invested in preparing for disaster and emergency situations.

Fortum’s crisis and emergency management instructions are prepared for Group, division and site levels. We updated the crisis management plans to correspond with the changes implemented in the business functions and organisations. The testing and updating of the crisis management and continuity plans are the responsibility of each division and line organisation. Crises impacting Group operations more broadly are managed at the Group level.

Crisis management and crisis communication instructions have been prepared for, e.g., power and heat outages, for the Loviisa nuclear power plant and for hydro power production. Corporate Security is responsible for crisis management development, e.g., for organising rehearsals. Group Communications is responsible for crisis communications.

In 2019, the annual emergency preparedness exercise related to a nuclear power accident was held at the Loviisa power plant. Additionally, several business-specific exercises were held during the year.

Regulatory compliance

In recent years, safety and security related regulations have increased, and we have initiated supplementary measures required by these regulations. For dam and nuclear safety, emergency preparedness obligations in Finland and Sweden are based on regulatory provisions; likewise, there are terrorism-related preparedness obligations in Russia. Regarding other areas, Fortum independently defines, based on its own risk assessments, the crisis and non-compliance situations for which it prepares and drafts action plans.

Stakeholders

Our way of operating responsibly includes a close dialogue with our stakeholders and continuously identifying their views. Good collaboration and openness are the key ways to promote a mutual understanding with our stakeholders. We distribute added value to our various stakeholders through the payment of taxes, employee wages and dividends, and through investments and procurements from suppliers of goods and services.

Stakeholder collaboration

Collaboration with different stakeholder groups helps Fortum to assess and meet the expectations that stakeholder groups have towards the company. We engage in an active dialogue with the different stakeholders associated with our operations. We conduct annual stakeholder surveys. We monitor and assess the public dialogue in the countries where we operate, and we have increased the dialogue with our stakeholders also through social media channels. Feedback from customers drives the development of our products and services. Additionally, our activities in national and international organisations help to deepen our understanding of global sustainability issues and their connections to our business.

Management of stakeholder collaboration at Fortum is assigned particularly to communications, public affairs, group sustainability, the functions responsible for electricity and heat sales and energy production, as well as many of our experts. Responsibilities for managing stakeholder collaboration are primarily determined by stakeholder group or interaction themes. Key interaction areas, e.g., public affairs, and corporate communications, have annual plans that guide the activities.

Our stakeholder surveys

Survey	Target groups	Target countries	Frequency
One Fortum Survey	Customers General public Public administration Capital markets Non-governmental organisations Opinion leaders Personnel Media	Finland, Sweden, Norway, Poland, Germany, Baltic countries, Russia, India	Customer satisfaction is measured semi-annually Reputation is measured annually
Media tracking	Media	All operating countries	Daily
Brand tracking	General public and customers	Finland, Sweden, Norway, Poland, Germany, Baltic countries	Continuously in Finland, Sweden and Norway, annually in other countries
Pulse survey	Own personnel	All operating countries	Monthly
Stakeholder survey as part of the sustainability materiality analysis	Customers Public administration Capital markets Non-governmental organisations Opinion leaders Research facilities and industry associations Personnel	Finland, Sweden, Norway, Denmark, Poland, Baltic countries, Russia, India	In 2019, if needed

Fortum has an informal Advisory Council consisting of representatives of Fortum’s key stakeholder groups as invited by the Board of Directors. The Advisory Council aims to increase the dialogue and the exchange of views between the company and its stakeholders.

Information through surveys

In collaboration with third parties, we annually conduct surveys regarding stakeholder collaboration. The aim of these surveys is to help Fortum assess and respond to the important stakeholder groups’ expectations of the company. The surveys also measure the success of our stakeholder collaboration. Additionally, the surveys provide information about emerging sustainability trends and risks we should acknowledge. We use the survey results in business planning and development and in identifying priorities for sustainability.

We use the extensive One Fortum Survey to annually measure customer satisfaction and our reputation and the factors that impact them. The survey is conducted yearly in spring in all of Fortum’s business functions. The survey results in terms of customer satisfaction are presented in the section ▶ **Customers**. As part of the One Fortum Survey, we also regularly survey what our stakeholders consider to be our ▶ **sustainability priorities**.

The table above presents our different stakeholder surveys, the target groups, target countries and frequency.

Most important expectations stakeholders have towards Fortum, and Fortum's actions in response to them in 2019

	Stakeholder expectations	Fortum's actions in 2019		Stakeholder expectations	Fortum's actions in 2019
	Lenders and shareholders <ul style="list-style-type: none"> Long-term value creation High-yield share Responsible operations 	<ul style="list-style-type: none"> We achieved our two long-term financial targets Our goal is to pay a stable, sustainable and over time increasing dividend of 50–80% of earnings per share excluding one-off items Our responsibility for climate, resources, personnel and society plays a key role in our business 		Authorities and decision makers <ul style="list-style-type: none"> Compliance Integration of sustainability with strategy and business, risk management Transparency and reliable reporting Maintaining dialogue Constructive, knowledgeable and open lobbying, reliable partner in policy development 	<ul style="list-style-type: none"> We communicate openly and we actively engage in a dialogue with authorities and decision makers: in 2019, among other things, we emphasised the advancement of competitive and energy transition-supportive taxation in our operating countries, and we highlighted the energy and climate themes important to us related to the EU elections, the preparation of the new Commission's work programme and the national elections in our operating countries We provide authorities with constructive suggestions on legislative proposals: in 2019, we participated in the preparation of the EU sustainable finance legislation, we proposed content for the new Commission's European Green Deal initiative, and we participated in creating the Nordic electricity market vision We publish position papers and views on energy sector and policy development, and we actively communicate them in multiple media: in 2019, we published two Energy Reviews We follow the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) in 2019 reporting, and we disclose our financial impacts related to climate change
	Customers <ul style="list-style-type: none"> Competitively priced products Understanding customers' needs Useful additional services High-quality advice and customer communications 	<ul style="list-style-type: none"> With the Operational Excellence programme, we look for ways both internally and externally to improve our operations and ensure that our customers receive products of excellent quality at competitive prices With the Business Technology unit's new digital priorities, our aim is to make Fortum an industry frontrunner in the development of digital services We interviewed over 8,300 customers and 5,300 other stakeholders for our One Fortum Survey in 2019 			
	Personnel <ul style="list-style-type: none"> Equal treatment and open interaction Job security and incentivising compensation Opportunities for professional development Occupational safety and work wellbeing 	<ul style="list-style-type: none"> We established the forShares Employee Share Savings programme for employees We offered new online training modules for personnel and the Break Pro break exercise application We performed the so called 360 assessments based on our Open Leadership principles to more than 400 supervisors; additionally, our Russia Division published a handbook on open leadership 20% of our personnel participated in job rotation We held Fortum Talks events for personnel to share information about current business topics We developed the Fortum Lens data platform to improve personnel access to business-related information and figures in real-time We restarted the Navigator training programme targeting future talent We carried out a wellbeing survey in all operating countries (4,900+ respondents): based on the survey results, various Energise Your Day wellbeing services and events were arranged 		Media <ul style="list-style-type: none"> Reliable corporate communications that understands media's needs 	<ul style="list-style-type: none"> We communicate fairly, proactively and openly. In 2019, we had a special focus on communicating Fortum's Uniper investment and our strategy We offer newsworthy topics to the media and we help to find the best possible experts Our media desk personnel responds to incoming media inquiries during office hours without exception In 2019, we organised several media events in which also the company's top management took part
	Future talent <ul style="list-style-type: none"> Attractive employer brand Interesting career opportunities and diverse job responsibilities Competitive compensation for work Company values and operating culture Business ethics and responsibility 	<ul style="list-style-type: none"> We clarified Fortum's current employer promise together with our employees, and we increasingly made the promise part of internal and external communications We participated in several recruiting fairs, and we presented Fortum at educational facilities and other events In the 2019 Most Attractive Employers in Finland survey, conducted by the research company Universum, we improved our ranking to 46th (up from 76th place in 2018) among business sector professionals; among students we ranked 70th. Our ranking among technology sector professionals was 18th, and among students 12th. In Sweden, we participated in the Female Leader Engineer programme aiming for gender equality in engineer-intensive sectors. In the programme, female engineer students compete for internships in industrial companies. 		Energy sector organisations <ul style="list-style-type: none"> Advocating on behalf of the shared interests of the sector Dialogue and expertise 	<ul style="list-style-type: none"> We actively participate in organisational activities of our sector: in 2019, we were represented in several dozen organisations at the EU level and in our operating countries In addition to sector organisations, Fortum is involved in several international initiatives promoting market-driven energy and climate policy: the UN Caring for Climate initiative, the World Bank's Carbon Pricing Leadership Coalition and the Finnish Climate Leadership Coalition (CLC). In 2019, within the framework of the CLC, we made, e.g., a proposal calling for more ambitious EU-level emissions reduction targets, and a Europe-wide systemic and market-driven solution to achieve the targets. We participate in the international Corporate Responsibility and Sustainability Council, which is part of The Conference Board of Europe
	Service and goods suppliers <ul style="list-style-type: none"> Good financial position and the ability to take care of the agreed obligations Fair and equal treatment of suppliers Long-term business relations and collaborative development of business and products/services Responsible operations 	<ul style="list-style-type: none"> We held Fortum Supplier Day for our strategic suppliers We developed supplier safety assessments and targets related to contractor safety We updated guidelines related to new safety legislation in Sweden 		NGOs <ul style="list-style-type: none"> Responsibility for operations and risk management Promoting renewable energy production and discontinuing the use of coal Reliable and open reporting 	<ul style="list-style-type: none"> We invest in renewable energy: in 2019, a total of EUR 344 million in hydro, wind and solar power, and bioenergy We had an active dialogue with NGOs about the schedule of coal phase-out We published a Fortum and coal press kit on our website We have developed climate risk management as part of the company's risk management process
				Local communities <ul style="list-style-type: none"> Operational safety Developing employment, infrastructure and recreational use Reducing emissions, noise and other detriments 	<ul style="list-style-type: none"> Group-level emergency preparedness exercises were held in 2019 at the Loviisa nuclear power plant and in some other operating locations. Additionally, a safety assessment was conducted at critical power plant locations in the Nordic countries, Poland and Russia. We updated the company's crisis management instructions and business continuity plans We improved the preparedness for cyber threats, and the divisions invested in power plant security We collaborate with local communities in all our operating countries: Examples of our activities in 2019

Uniper's coal power a target of campaigns by environmental organisations

The dialogue about Fortum's Uniper investment and Uniper's coal power continued actively with environmental non-governmental organisations (NGOs) in 2019 and in early 2020. The NGOs are particularly opposed to Uniper's plan to commission the new Datteln 4 coal-fired power plant in Germany. The organisations have elevated the plant as a symbol for their campaigning against climate change and have demanded that Fortum stop Uniper from connecting the plant to the grid.

The environmental organisations have tried to bring attention to their agenda through social media, demonstrations and by organising various public events and webinars. Fortum has responded to the concerns raised by these organisations in social media, at meetings and at the General Annual Meeting. Fortum's experts have also responded to presented questions, through blogs postings and by giving numerous media interviews.

In its own communications, Fortum has called for perspective and comprehensive solutions instead of symbols. We have pointed out that Germany is shutting down half of its electricity production with the phase out of nuclear power and of hard coal- and lignite-fired plants. The transition to clean energy must be implemented systematically, without compromising the security of supply and with consideration to regional aspects. Energy affordability for electricity consumers and industry must also be a factor.

For years, Fortum has been one of the biggest supporters of EU emissions trading and has tried to get decision makers to focus also on decarbonisation of the heat and transport sectors. In fact, emissions trading has already proven its effectiveness – while the price of emission allowances increased considerably in 2019, Europe's CO₂ emissions decreased by more than 20%, or 80 million carbon dioxide tonnes.

National decisions set the pace of coal power phase-out in Europe

Energy companies play a key role in Europe's transition towards emissions-free energy production and carbon neutrality. In all the northern and western European countries where Fortum and Uniper have coal power, there are also national decisions to discontinue the use of coal. Great Britain is giving up coal power in 2024, Finland in 2029, and The Netherlands in 2030. The premise of the German government's draft law is that coal use will be discontinued by 2038 at the latest. Of Fortum's operating counties, the most dependent on fossil energy are Poland and Russia. These countries have not yet set a time frame for discontinuing coal power.

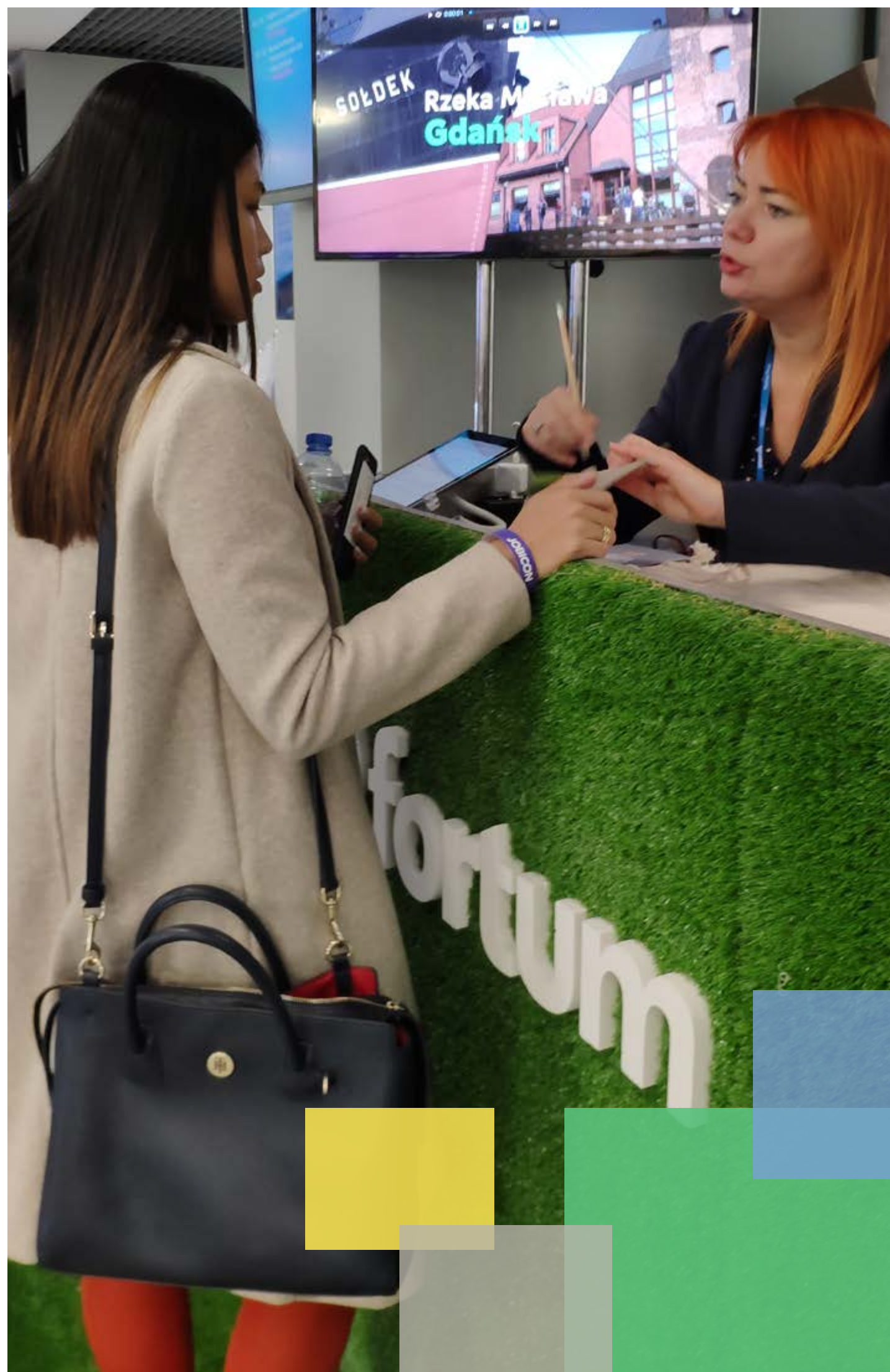
Uniper and Fortum's voluntary decisions to phase out coal power

Uniper's share of Germany's coal capacity is less than 9%, and the company has announced that it will decommission most of it. In late January 2020, Uniper announced that it will decommission four coal-fired units already within two years and two more units within five years presuming that Germany's coal legislation comes into effect. The total output of the plants to be decommissioned by 2022 at the latest is 1.5 GW, and the total output of those to be decommissioned by 2025 at the latest is 1.4 GW. Uniper has stated that the company's emissions from coal-fired power production in Germany will decrease by 40% by 2025 when the old plants are decommissioned and Datteln 4 has started its operations. In addition, the company has announced the divestment of its share in the lignite-fired Schkopau power plant to the plant's co-owner. The sale will be completed in 2021.

Fortum, in turn, will discontinue the use of coal in Espoo in an accelerated time frame already in 2025. The Kivenlahti bioheat plant to

be commissioned in 2020 will replace one of the two Suomenoja coal units. To replace the remaining coal production, Fortum is pursuing new solutions utilising the excess heat from data centres, wastewater and industry, electric heat pumps, geothermal, smart demand-response solutions and bioenergy. Additionally, Fortum and the City of Espoo have committed to carbon-neutral district heat production in the district heating network operating in the Espoo, Kauniainen and Kirkkonummi regions in the 2020s.

Fortum's other joint ventures and associated companies are also discontinuing coal use. Stockholm Exergi will decommission its last coal boiler in 2020, and Turun Seudun Energiantuotanto announced that it will decommission the old coal boiler unit 2 this year.



Reputation

According to the One Fortum Survey, our reputation remained very stable during 2019. The reputation index change compared to 2018 was one point, at maximum, within all stakeholder groups except decision makers. Among decision makers, the reputation index decreased by three points in 2019, resulting in a rating of 78 (on a scale of 0–100).

In general, our reputation remained on a very good level (≥ 75 points) among decision makers, opinion leaders, organisations, investors and personnel. Among media, the reputation index was on a rather good level (68). Among the general public, the result was clearly lower (58) compared to other stakeholder groups.

Our most significant strengths in terms of reputation are our operational expertise and reliability as an employer. We have most room for improvement in social responsibility. To improve social responsibility, we drafted a new sustainability programme for the company in 2019. Its implementation will begin in 2020.

The Group-level target for our reputation in 2019 was a rating of 73.0 in the One Fortum Survey, measured as the average rating by all stakeholders included in the survey. We achieved a rating of 72.3. Our target for 2020 (72.5) includes the same stakeholder groups as in 2019.

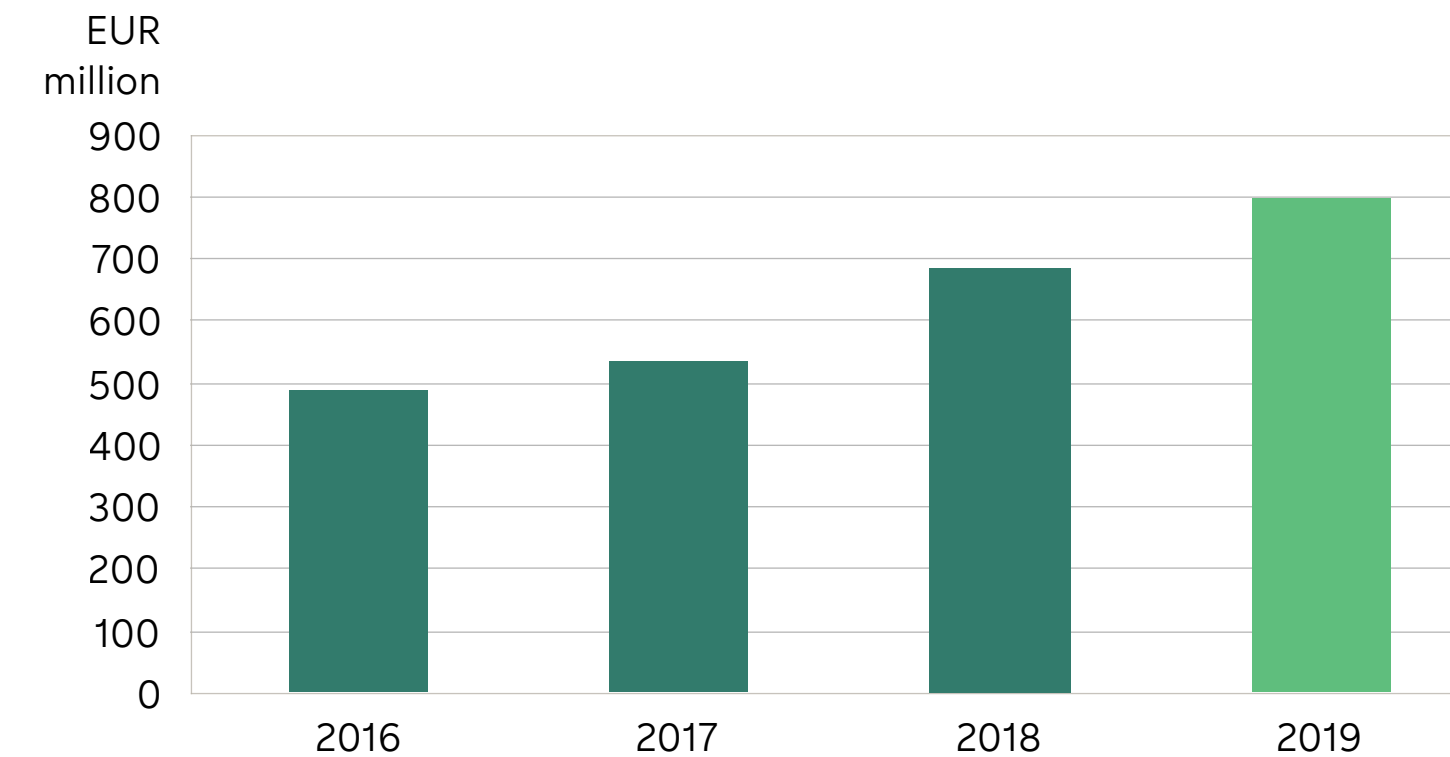
72.3
Reputation
Target: 73.0

Brand

We continuously monitor the development of the Fortum brand, i.e. the image of our company. Brand tracking includes the measurement of, e.g., brand awareness, preference and brand attributes.

We also monitor the development of the Fortum brand with the Brand Value study performed by Brand Finance, an independent business valuation consultancy. According to the study, Fortum’s brand value in 2019 was EUR 796 million, compared to EUR 684 million in 2018.

Brand value development in 2016–2019



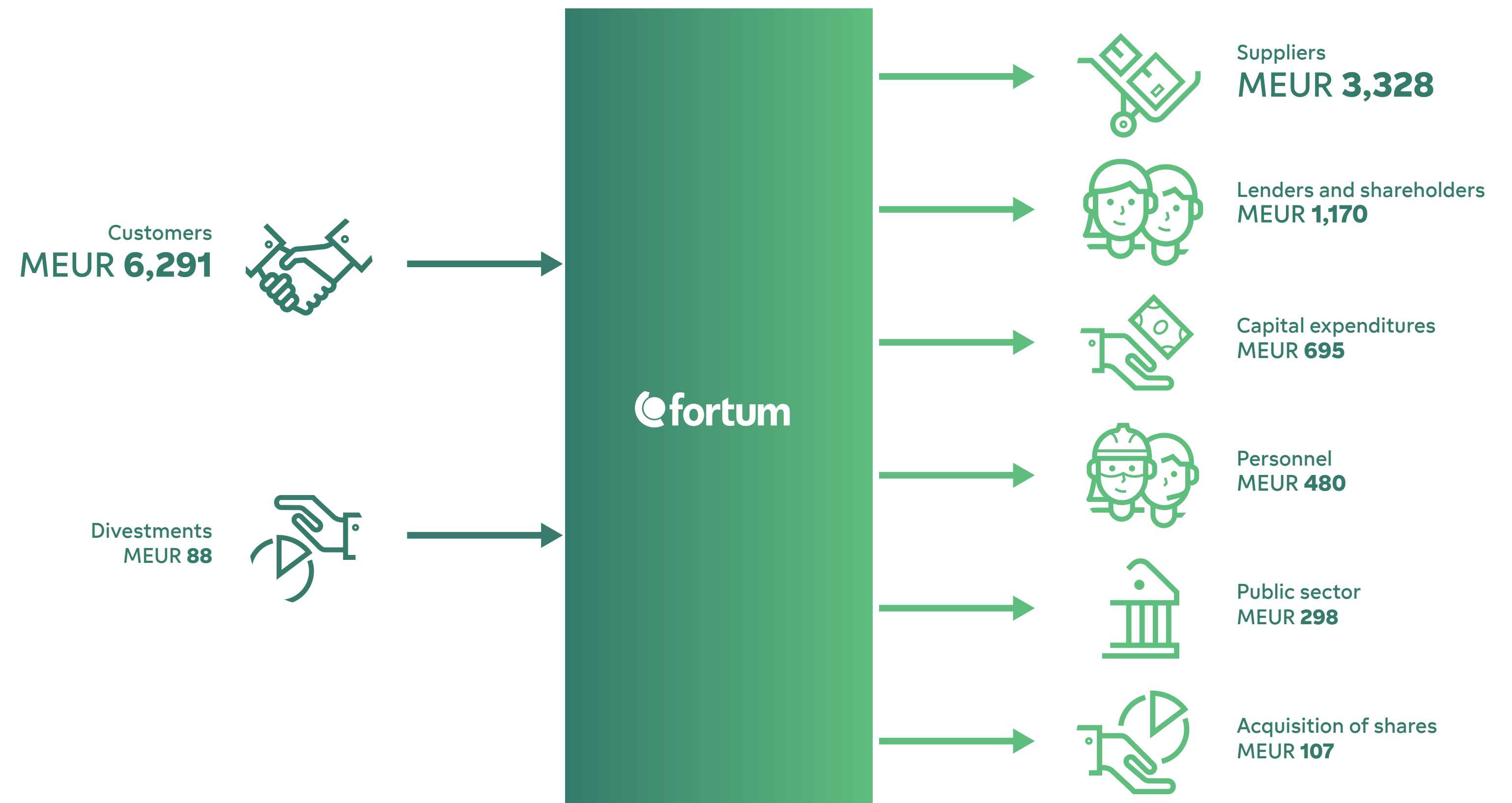
Economic impacts

Fortum is a significant economic actor in Finland, Sweden, Russia, Poland, Norway and the Baltic countries. We continuously monitor the impact and added value generated by our operations to our stakeholders. The key stakeholders include lenders and shareholders, customers, personnel, suppliers of goods and services, and the public sector.

Direct and indirect impacts

The most significant direct monetary flows of Fortum's operations come from revenue from customers, procurements of goods and services from suppliers, compensation to lenders, dividends to shareholders, growth and maintenance investments, employee wages and salaries, and taxes paid. Our operations also have indirect economic impacts. The Finnish State owns 50.8% of Fortum's shares, and we contribute to a functioning society by, among other things, paying taxes and dividends. These secure society's basic functions and build wellbeing. Investments and the procurement of goods and services provide employment both locally and outside our operating areas. New investment proposals are assessed against sustainability criteria. In terms of suppliers of goods and services, we also assess the global impacts, paying particular attention to suppliers of goods and services operating in risk countries. The wages and taxes paid have a positive impact on local communities.

Distribution of added value



Monetary flows by stakeholder group in 2017–2019 (GRI 201-1)

EUR million		2019	2018	2017
Generation of added value				
Income from customers	Income from customers on the basis of products and services sold and financial income	6,291	4,755	4,643
Divestments	Income from divestment of shares, business activities or plants	88	298	749**
Purchases from suppliers	Payments to suppliers of raw materials, goods and services	-3,328	-3,276	-2,622
Fortum produced added value		3,050	1,777	2,770
Distribution of added value				
Compensation to employees	Wages, salaries and remunerations and other indirect employee costs	-480	-459	-423
Compensation to lenders and shareholders	Dividends paid to investors, interest, realised foreign exchange gains and losses and other financial expenses	-1,170	-923	-1,270
Public sector	Income and production taxes paid, support for society and donations	-298	-270	-312
Distributed to stakeholders, total		-1,948	-1,652	-2,004
Surplus/deficit cash		1,102	125	765
Capital expenditures		-695	-579	-657
Acquisitions of shares		-107	-4,088*	-972**
Surplus/deficit including investments		-300	-4,542	-864

* In 2018, acquisitions of shares mainly include the acquisition of Uniper SE shares. Further information in Financial Statements Note 3 Acquisitions, disposals and assets held for sale.

** In 2017, divestments and acquisitions of shares are mainly related to the restructuring of the ownership in Hafslund

In 2019, the difference between added value generated and distributed to stakeholders was EUR 1,102 (2018: 125) million for the development of own operations.

The distribution of the economic added value generated by our operations to the most significant operating areas is reported in the following parts of the annual reporting:

- ▶ **Sales by market area based on customer locations:**
Financial Statements, Note 6 Segment reporting
- ▶ **Employee costs by country**
- ▶ **Tax footprint 2019**

We have included investments in our own assessment of economic impacts, as their annual volume and impact on society is significant. In 2019, we invested EUR 401 (2018: 278) million in CO₂-free energy production. Capital expenditure by country and by production type is presented in the Financial Statements, in section Key figures 2010–2019, Capital expenditure.

Provisions related to nuclear power are covered in the Financial Statements, Note 29 Nuclear related assets and liabilities. Financial implications and other risks and opportunities due to climate change, as well as emissions trading are reported in the section ▶ **Climate**. Our pension arrangements conform to the local regulations and practices in each operating country; the arrangements are discussed in the Financial Statements, Note 31 Pension obligations.

Support from the public sector

In 2019, we received financial support from the public sector in the form of investments, R&D and other significant grants totalling EUR 2.1 (2018: 4.0) million. The figure excludes free emission allowances and electricity certificates as well as electricity and heat price-related subsidies.

Customers

As a responsible actor in the electricity, heat and circular economy business, Fortum offers consumers environmentally friendly and cost-efficient products and services. It also ensures the reliability of its marketing and communications. Fortum mirrors its operational responsibility through customer satisfaction amongst customers.

Product responsibility

Fortum is the third largest power generator and the largest electricity retailer in the Nordic countries. We are one of the world's largest producers of heat. We also offer district cooling, energy efficiency services, recycling and waste solutions, and the largest electric vehicle charging network in the Nordic countries.

CO₂-free and guarantee-of-origin-labelled electricity

Hydro and nuclear account for two-thirds of our electricity production, making us one of the Nordic countries' leading sellers of carbon dioxide-free and guarantee-of-origin-labelled electricity. We sell CO₂-free electricity to our customers in the Nordic countries. The origin of the electricity produced from renewable energy sources, such as hydro, wind and solar, was guaranteed with European guarantees of origin. Some of the electricity we sell is also guaranteed with the pan-European EKOenergy label granted by environmental organisations and, in Sweden, with the Bra Miljöval label.

Services for customers

In recent years, Fortum has introduced many new services that reduce environmental impacts and give customers better opportunities to control their electricity consumption and costs. The sustainable solutions we offer in energy production, traffic and waste management also

support a circular economy. The number of consumers participating in energy production is growing. The solutions offered by Fortum are related to home automation, smart EV charging, local energy production and storage, and flexible demand. Additionally, we offer diverse expertise services for energy systems, electricity and heat production, and for the process industry. Our waste and circular economy service covers, e.g., the safe treatment of hazardous waste, the recycling, processing and manufacturing of plastic and metal into secondary raw materials for industry, and environmental construction services by utilising industry's side streams.

Marketing communications

Our goal is to present products and services truthfully in all our marketing and communication materials. We follow responsible marketing communication guidelines, and we do not present misleading statements. In statements regarding environmental issues, we follow the regulations for environmental marketing.

In 2019, Fortum received from the Finnish Energy Authority a decision regarding the pricing of certain electricity products. Fortum has implemented the decision and has, in order to seek further certainty on the interpretation of the decision, appealed to the Market Court. In addition, Fortum received from the Finnish Energy Authority and from the Finnish Competition and Consumer Authority certain requests for clarification regarding consumer products. We have addressed these requests for clarification within the deadline.

In Sweden, the Swedish Consumer Agency and the Ethics Committee for Direct Marketing instructed Fortum to implement certain changes to our marketing communications and processes. We are cooperating with the authorities and are in the process of implementing the requested changes. Fortum has been identified by the Swedish Consumer Energy Markets Bureau as one of the electricity companies with a relatively large number of customer complaints. We have launched an improvement

programme that has so far decreased the number of complaints by more than 75%.

In Norway, Fortum received a decision from the Norwegian Consumer Authority regarding sales practices. Fortum appealed the decision and it was subsequently annulled by the Market Council. In addition, Fortum received from the Norwegian Consumer Authority certain inquiries and instructions relating to the sales processes with consumer customers. We have been in dialogue with the Consumer Authority and are in the process of implementing the requested changes.

Fortum received from the Polish Competition and Consumer Authority an inquiry on certain consumer products. We replied to the inquiry and are in the process of implementing certain modifications to the products subject to the inquiry. Since Fortum's reply, no further actions from the authority have been taken.

Customer data protection

The Fortum Privacy Programme ensures that we have the appropriate processes in place so that the rights of our customers are being fulfilled and so that our business is able to utilise and process data in accordance with laws.

Fortum received further inquiries from the Finnish and Polish Data Protection Authorities about its data processing activities related to marketing activities. We have provided the authorities with responses to these further inquiries.

Fortum notified the Norwegian Data Protection Authority of three personal data breaches. In all three cases, the Norwegian Data Protection Authority has closed the cases based on the information Fortum provided.

Fortum notified the Danish Data Protection Agency of one personal data breach. The Authority has not made any further inquiries based on the information Fortum provided.

▶ Products and services

Customer satisfaction

For Fortum, customer satisfaction is a top priority in implementing the company’s strategy and in growing the business. We have set a Group-wide target for customer satisfaction (≥70).

We measure customer satisfaction as part of the extensive One Fortum Survey. The survey is conducted yearly in spring in all Fortum’s business functions. The Consumer Solutions division also measures satisfaction in autumn. In 2019, about 8,300 customers from seven different business functions took part in the yearly survey.

As a whole, for a large share of Fortum’s business functions the customer satisfaction is at a good level (customer satisfaction index ≥70 on a scale of 0–100) or at a very good level (≥75).

Of all Fortum’s customer groups, the most satisfied customers are in the Nuclear Services and the Recycling and Waste Solutions units. The customer satisfaction rating of both business units was on the rise in 2019, and both received an excellent (80) rating. Satisfaction amongst our district heating customers remained virtually unchanged (business customers 74 and consumer customers 70). The customer satisfaction of Fortum eNext, which provides power plant services, decreased slightly, but was still at a good level (74).

Satisfaction amongst electricity retail customers decreased for virtually all brands, and overall the rating was clearly lower than the previous year’s level (consumers 66 and business customers 60). Customer satisfaction with Fortum Charge & Drive, offering charging solutions for electric vehicles, increased slightly among consumers, but decreased among business customers. However, the rating for both in 2019 was clearly below expectations (consumers 59 and business customers 54).

The customer satisfaction target set for 2020 is the same for all business areas, i.e. a rating of “good” (≥70), measured with the One Fortum Survey.

Other public customer satisfaction results

The international and independent EPSI Rating annually surveys the level of satisfaction of electricity retail company customers in Finland, Sweden and Norway.

Customer satisfaction ¹⁾ in 2017–2019

	2019	2018	2017
Finland			
Fortum	63.4	74.1	75.6
Sweden			
Fortum	64.6	59.8	56.1
Göta Energi	66.5	64.4	64.7
SverigesEnergi ²⁾	-	58.2	60.5
Norway			
Fortum	68.8	-	71.1
Hafslund Strøm	65.0	66.5	68.2
NorgesEnergi	68.4	68.6	71.9

1) In Finland and Norway, the survey is conducted by EPSI Rating. In Sweden, the survey is conducted by Svenskt Kvalitetsindex, which is part of the international EPSI Rating Group.

2) SverigesEnergi and Göta Energi have merged and the company continues under the name Göta Energi.

54–80
 Customer satisfaction
 Target: ≥70





Case | From wheat straw to clothing

Field biomass is largely an unutilised resource that is either left on the ground or, in some countries, burned at its growing site. At the core of Fortum's Bio2X research and development programme is the utilisation of wheat straw to create high-value bioproducts, in addition to grains for food. One of the many areas of application is ecologically produced textile fibres. In collaboration with Spinnova, a Finnish supplier of new fibre technology, Bio2X has developed the first textile fibre made from fractionated wheat straw. The companies were first in the world to showcase fabric samples and a sample knitted shirt made from the fibre as well as a jacket and skirt made of a woven fabric at the Textile Exchange Sustainability Conference in Vancouver, Canada, in October 2019.

Sustainable textile

In terms of life-cycle analyses, fractionated straw pulp and the textile fibres derived from it are very comparable to commercially available fibres that are least environmentally burdensome, like organic cotton and lyocell. Very little water is used in the process, the chemicals used are non-toxic, and the energy is generally produced with renewable energy production forms, so the CO₂ emissions of the process are minor. With high resource efficiency fractionation, only about 5% of the original field biowaste goes unused. This share can be utilised in the energy production for the process.

Supply chain

Fortum is a significant purchaser of goods and services. Suppliers are an important part of a successful business, and through responsible supplier selections we also support the achievement of sustainability targets.

Electricity purchases and investments play a significant role

Fortum's total purchasing volume in 2019 was EUR 3.8 (2018: 3.7) billion. Electricity purchased from the Nordic wholesale electricity market for retail sales, investments, and fuel purchases accounted for the majority of Fortum's purchases.

Of our purchases, EUR 695 (2018: 579) million targeted various investments. The biggest investments, EUR 188 million, were made in Finland. A large share of the investments is contracted out in full, with materials, installation and other service as well as contractor work included in the total purchase.

Fortum's fuel purchases in 2019 totalled EUR 591 (2018: 561) million. We purchase fuels from international and local suppliers. Our fossil fuel purchases totalled about EUR 488 (2018: 496) million, biomass fuels about EUR 72 (2018: 61) million, and nuclear fuel about EUR 30 (2018: 32) million.

The rest of our purchases, EUR 2.5 (2018: 2.6) billion, consist of other goods and services. The figure includes electricity purchased from the Nordic wholesale electricity market for retail sales. The other goods and services purchases were related to, for example, operation and maintenance as well as to other functions, such as IT solutions, marketing and travel.

Over half of purchases from Europe

Over half, i.e. about 60%, of the purchasing volume was purchased from suppliers operating in Europe, mostly in Finland, Sweden and Norway. This does not include electricity purchases from the Nordic wholesale market. About 40% (2018: 39%) of Fortum's purchases were from risk countries. The majority of these purchases were from Russia.

Violations related to work conditions and human rights are more likely in risk countries than in non-risk countries. Fortum's risk-country classification is based on the ILO's Decent Work Agenda, the UN Human Development Index and Transparency International's Corruption Perceptions Index.

In 2019, we had about 14,000 (2018: 14,000) suppliers of goods and services. About 1,170 of the suppliers were in risk countries. Excluding the Russia Division's local suppliers, there were about 105 suppliers in risk countries.

Sustainable fuel purchasing

The most significant environmental impacts of our supply chain are related mainly to fuels, particularly to coal and biomasses. There are significant environmental aspects associated with coal mining, including natural resource efficiency, emissions to air, water and soil, and impacts on biodiversity. Significant occupational health and safety risks can be related to working in underground mines. The sustainability aspects of biomass sourcing are related primarily to biodiversity, but risks particularly outside the EU can also include, for instance, illegal logging or human rights violations.

In fuel purchasing, special attention is paid to the origin of the fuel and to responsible production. In 2019, we had about 170 suppliers in our fuel supply chain, 6% of them operated in risk countries.

Purchases ¹⁾ by operating countries, 2017–2019

EUR million	2019	2018	2017
Nordic countries	2,157	2,184	1,548
Russia	543	588	586
Poland	298	286	375
Other countries	90	69	56
Total	3,088	3,127	2,565

1) Excluding investments

Natural gas

The natural gas used in Russia, the Baltic countries and Finland originated from several different suppliers in Russia. The natural gas used in Poland originated mainly from Poland and the natural gas used in Norway originated from Norway.

Coal

The coal used in Finland originated from Russia. The coal used in Poland originated from Poland. The power plants in Russia used coal originating from Kazakhstan and Russia. Fortum has published the names of its significant coal suppliers on its [website](#). Fortum is a member of the [Bettercoal](#) initiative, and uses the Bettercoal Code and tools in assessing the sustainability of the coal supply chain. There is more about Bettercoal assessments in the section [Supplier audits support assessments](#).

Biomass

The biomass we used originated from Finland, Russia, the Baltic countries and Poland. Slightly over 50% of the wood-based biofuel used by Fortum in 2019 originated from certified or controlled sources. In 2019, we developed elements of a Chain of Custody management system for wood-based fuel by strengthening the systematic assessment of risks related to supply chains and procurement countries.

Waste-derived fuel

We use waste-derived fuel at our power plants in Finland, Sweden, Norway, Denmark, Lithuania and Poland. The fuel used is mainly municipal and industrial waste collected locally.

Uranium

The fuel assemblies used at the Loviisa power plant in Finland are completely of Russian origin. The fuel supplier acquires the uranium used in the fuel assemblies from Russian mines in accordance with Fortum’s agreement. In 2019, the uranium originated from the Krasnokamensk, Khiagda and Dalur mines. All three uranium mines have ISO 14001 environmental certification. The Khiagda mine has also an OHSAS 18001 certified occupational health and safety management system. ARMZ Uranium Holding Co., a uranium producer, and TVEL, which is responsible for refining and manufacturing uranium, have certified environmental and occupational safety systems in place in all their plants, as do the plants manufacturing zirconium material, uranium oxide pellets and fuel assemblies.

We regularly assess the quality, environmental, and occupational health and safety management systems of our nuclear fuel suppliers and the manufacturing of nuclear fuel assemblies. In summer 2019, Fortum’s representatives assessed the operations of Fortum’s Russian fuel supplier’s conversion and enrichment plants. The plants were in good technical condition, and their integrated management system covered certified quality, environmental as well as occupational health and safety management systems. Additionally, the plants have in place a certified system for energy management.

► **Fuel consumption**

Origin of fuels used at Fortum in 2019 ¹⁾

Fuel	Country of origin
Biomass	Finland, Poland, Russia, Baltic countries
Coal	Russia, Kazakhstan, Poland
Natural gas	Russia, Poland, Norway
Uranium	Russia
Oil	Russia
Peat	Finland, Estonia, Latvia

1) Biggest countries of origin by purchase volume in 2019

Sustainable supply chain

We expect our business partners to act responsibly and to comply with the Fortum Code of Conduct and the Supplier Code of Conduct. Fortum’s key tools in supply chain management are supplier qualification and supplier audits.

Codes of conduct cover basic requirements

The Fortum Code of Conduct forms the foundation for ethical business conduct and defines how we treat others, engage in business, and safeguard our corporate assets.

The Supplier Code of Conduct includes the sustainability requirements for suppliers of services and goods. The Supplier Code of Conduct is based on the principles of the United Nations Global Compact initiative and is divided into four sections: anti-corruption, human rights, labour standards, and the environment.

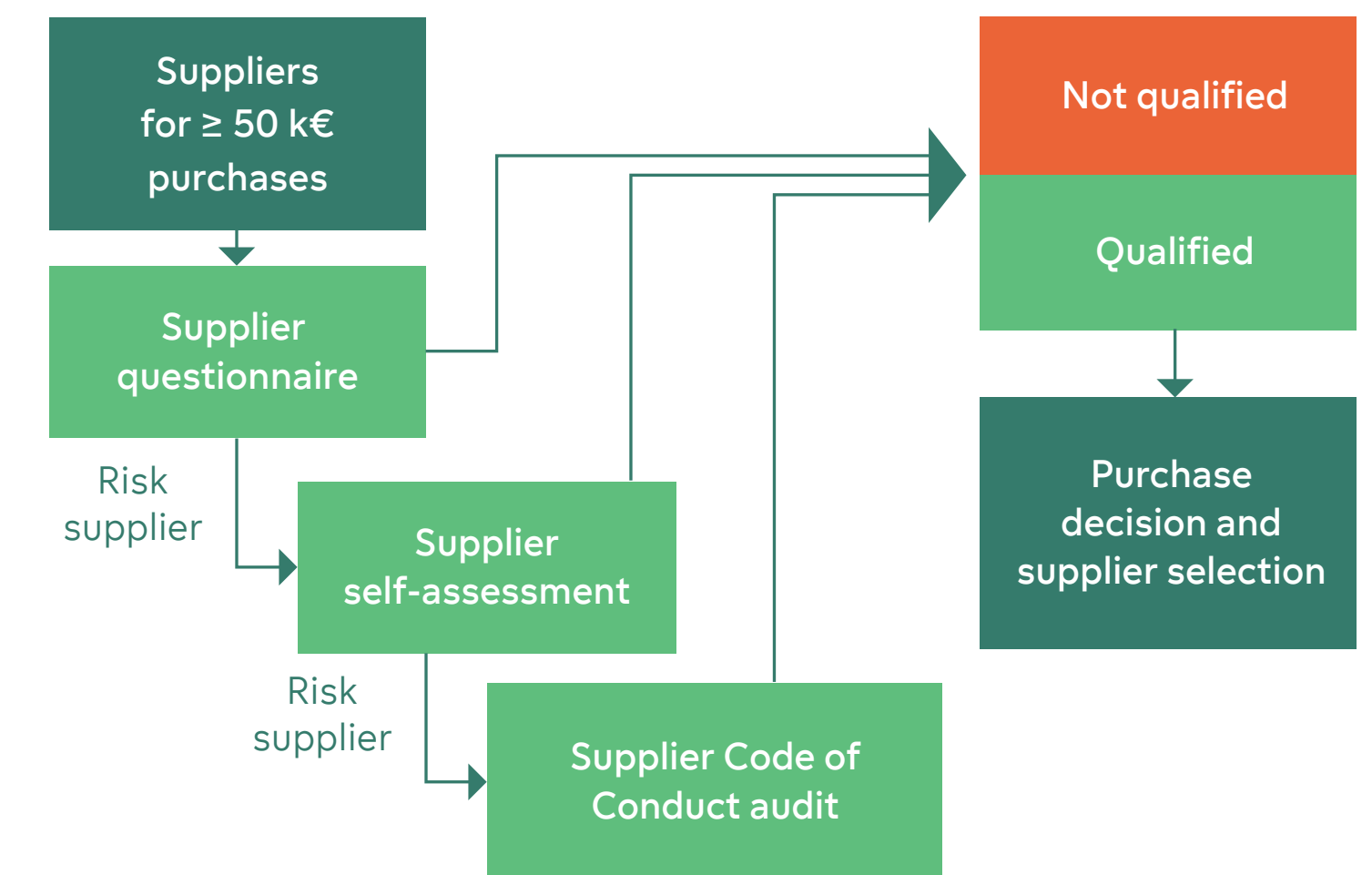
The Supplier Code of Conduct is used in all our countries of operation and is included in all purchase agreements with a contract value of EUR 50,000 or more.

Supplier qualification

We assess the sustainability performance of our business partners through supplier qualification and supplier audits. A supplier qualification is made when the purchase volume is EUR 50,000 or more. In the qualification process, we determine and assess, among other things, the supplier’s possible operations in risk countries, certified management systems, and the occupational safety performance of the contractors. We also pay special attention to anti-corruption practices. We manage potential risks by requesting the supplier to carry out a self-assessment, when needed, or by performing a supplier audit.

The Russia Division uses its own supplier qualification process that is based on Russian procurement law. In the Russian operations, we set supplier requirements for business principles, ethics, environmental management, and occupational health and safety practices.

Supplier qualification



Supplier audits support assessments

In supplier audits, we assess the supplier’s compliance with the requirements in Fortum’s Supplier Code of Conduct. Audits are always done on-site, and they include production inspections, employee interviews, and reviews of documents. If non-compliances are found, the supplier makes a plan for corrective actions and we monitor the implementation of them. Fortum uses an international service provider for conducting audits, especially in risk countries. In Fortum’s own operating countries, the audits are performed mainly by own personnel.

In 2019, a total of 14 (2018: 13) supplier audits were conducted in Indonesia, China, India, Vietnam, Russia and Poland. The majority of the non-compliances identified in the audits were related to overtime and pay as well as to occupational safety. Non-compliances related to freedom of association and employee collective bargaining rights were discovered with six suppliers. We issued a recommendation to two suppliers to strengthen their practices related to the prohibition of forced labour and a recommendation to three suppliers to strengthen their practices related to the prohibition of child labour. Additionally, we issued a recommendation to four suppliers to strengthen their anti-discrimination practices. All observations related to freedom of association and employee collective bargaining rights as well as to the prohibition of forced or child labour and discrimination were made with potential Fortum suppliers with whom we have not yet initiated collaboration. Some of the suppliers were not qualified due to poor audit results.

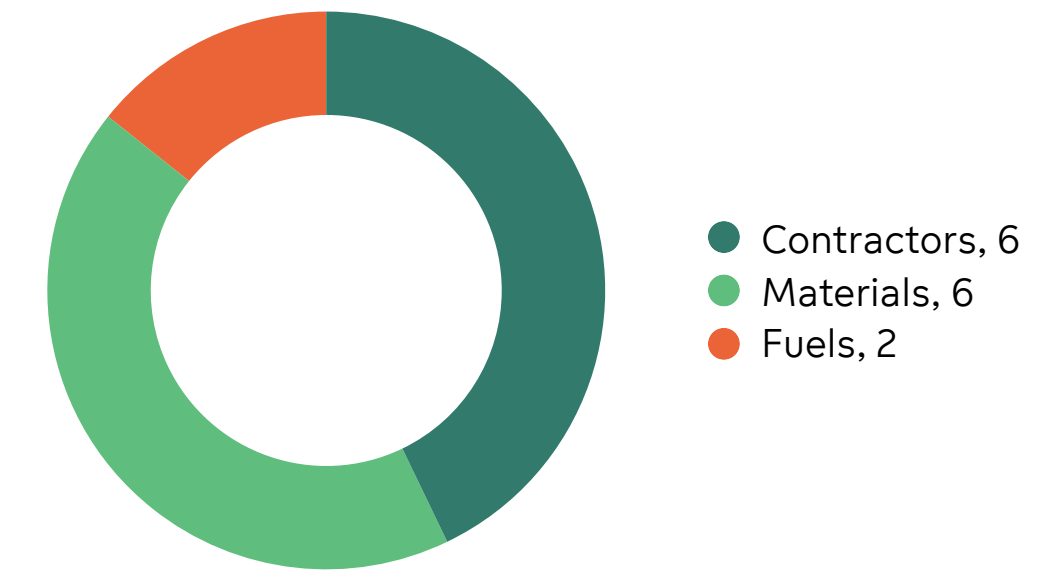
Fortum uses the Bettercoal Code and tools in assessing the sustainability of the coal supply chain. The Bettercoal Assessment Programme includes the suppliers’ Letter of Commitment, self-assessment, and site-assessment. Based on the assessment,

a continuous improvement plan is drafted for the suppliers, and its implementation is monitored regularly. Site-assessments are always performed by an external assessor approved by Bettercoal. All coal suppliers participating in the Bettercoal programme and their status in the assessment process are listed in the [Bettercoal website](#).

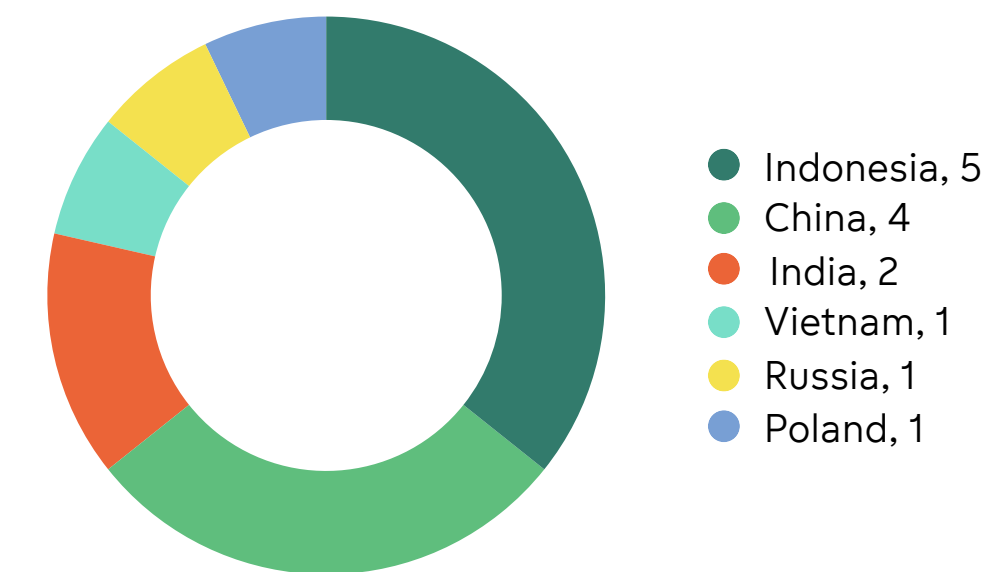
In 2019, Fortum’s Kazakhstani coal suppliers’ mines were assessed against the Bettercoal Code. Additionally, four Fortum coal supplier mines were audited in previous years. In 2018, we made a commitment that 70% of all our coal purchases by the end of 2020 would be from suppliers whose mines have undergone a Bettercoal site assessment. In 2019, the share increased to 66%.

At the end of 2018, Bettercoal launched working groups to support its operations in two significant coal procurement countries for its member companies: Russia and Colombia. The purpose of the working groups is to support the suppliers participating in the Bettercoal assessment programme in the continuous operational improvement and to increase the number of suppliers participating in the programme, identify country risks and find ways to address them, and to improve communications between the different stakeholders. Fortum is a participant in the Russia working group’s activities.

Supplier audits by supplier type



Supplier audits by country





Fortum is building solar power in India

Fortum launched its operations in India in 2012, and right from the start the focus has been on solar energy. The new 250-MW solar power plant, Pavagada 2, was commissioned in August 2019. The Pavagada 2 solar power plant is included in the scope of sustainability reporting in 2019. Additionally, a new 250-MW solar power plant is estimated to start production in Rajasthan state in late 2020.

In the India operations, Fortum applies a business model based on capital recycling which enables continuous investments in the building of new, renewable capacity. At the end of 2019, Fortum operated a total of 435 MW of solar power capacity in India.

India's solar power plants are susceptible to sand dust, and they traditionally use water to clean the solar panels. This is a challenge in India where acute water shortage prevails in many places. Fortum has started to use robotic waterless cleaning solutions. By the end of 2019, 54% of the solar panels are cleaned with a robotic waterless cleaning method, and the aim is to increase the share to 90% by the end of 2020.

Case | Fortum is building clean energy and improving air quality in India

Fortum eNext

Fortum eNext supplies nitrogen oxide reduction solutions to India

Fortum exports combustion technology solutions to India to reduce nitrogen oxides (NO_x). Specialising in reducing emissions and improving energy efficiency, Fortum eNext signed in June 2019 its first commercial project with Hindalco Industries Limited, one of Asia's biggest producers of primary aluminium. The project enables the power plant to comply with the tightened restrictions on NO_x emissions in India and to keep its emissions clearly below the permitted emission limits. With the Fortum eNext solution, the power plant boiler's annual nitrogen oxide emissions will decrease by 60%, which means 1,500 tonnes less NO_x emissions per year per boiler.

The main goal of the combustion technology developed by Fortum since the early 1990s is to significantly reduce the generation of NO_x emissions in the combustion process primarily with burner modification. The solution also improves power plant efficiency through optimisation of the boiler, which improves energy efficiency. By the end of 2019, the solution had reduced a total of 800,000 tons of customers' NO_x emissions in seven European countries.

Fortum Bio2X[®]

Fortum Bio2X a refiner of bamboo and paddy straw

Fortum has biorefining-related research projects in India. In north-east India, a joint venture owned by Fortum, the Indian state-owned oil refining company Numaligarh Refinery Limited (NRL) and the Finnish biorefining company Chempolis is establishing a biorefinery to produce bioethanol, furfural, acetic acid and electricity from bamboo. The refinery is part of Fortum's Bio2X research and development programme that is developing the refining of agro biomasses and residues into high-

value products. The plant's basic planning is nearing completion, and procurement of the main equipment is under way. The plant is estimated to start production in 2022. Raw material sourcing chain, including sustainable bamboo harvesting, aims to have a positive impact on the livelihood of the local communities.

In September 2019, Fortum signed a Memorandum of Understanding (MoU) on paddy straw research collaboration with India's CCS Haryana Agricultural University. The goal is to produce straw-based textile fibres and other chemicals and materials for use in the food, forage, construction and other industries. The longer term goal is to establish a biorefinery using paddy straw as raw material.



Fortum charge & drive electrifying transportation in India

The Indian government is pursuing electrification of transportation. Fortum is supporting the effort by developing an EV charging network in India for traditional electric vehicles and for three-wheeled vehicles. Currently

Fortum has 67 charging stations in five Indian cities: Delhi-NCR, Hyderabad, Bengaluru, Mumbai and Ahmedabad.

Fortum's collaboration with the Swedish Clean Motion company offers an innovative battery swap service for three-wheeled vehicles. The service enables drivers to exchange a discharged battery for a new, charged battery in less than three minutes. The main target groups of the service are major taxi companies and other organisations operating large fleets of vehicles.

Fortum also provides other Indian electricity charging station operators an opportunity to manage their infrastructure with a cloud-based SaaS (Software as a Service) platform.

Human rights

Fortum supports and respects internationally recognised human rights, which are included in the key human rights treaties. Our operations have a direct or indirect impact on the realisation of the human rights of our own personnel, those working in the supply chain, and members of local communities.

Management of human rights issues and personnel training

Our goal is to operate in accordance with the UN Guiding Principles on Business and Human Rights, and the OECD Due Diligence Guidance for Responsible Business Conduct, and to apply these principles in our own operations as well as in country and partner risk assessments and supplier audits.

Our approach to the management of human rights issues is described in more detail in section [▶ Governance and management, Sustainability management by topic, Human rights](#).

Fortum's Corporate Sustainability unit is responsible for conducting human rights impacts assessments and Group-level coordination and development of other human rights issues.

The online training on Fortum's Code of Conduct covers human rights-related issues. The online training is part of the induction programme for new employees. The online training is continuously available to all employees, and the entire personnel undertakes the training in conjunction with the updates of Code of Conduct. The Supplier Code of Conduct includes human rights requirements for suppliers and they are addressed as part of the Supplier Code of Conduct training.

Assessment of human rights impacts

A human rights assessment is part of investment project planning especially in new operating countries. It is also part of a country and counterparty risk assessment. Depending on the project, we assess risks based on either public sources or a more in-depth assessment. An assessment based on public sources is always completed for all new countries to which one of our business units is planning to sell products or services. In 2019, we performed six (2018: 7) such assessments. For investment projects targeting risk countries, we perform an in-depth assessment in which we often use also external local experts. No in-depth assessments were carried out in 2019.

Identified impacts on human rights and corrective measures

We define measures for projects to manage human rights risks to comply with Fortum's own requirements and, e.g., with lender requirements. We also aim to support favourable impacts in collaboration with local communities and other stakeholders. For example, we report on community projects we have implemented in India in the section [▶ Corporate citizenship](#).

All forms of child and forced labour are strictly prohibited and in violation of Fortum's Code of Conduct and the Supplier Code of Conduct. We have not identified risks related to the use of child or forced labour in our own operations. Support of employees' right to freedom of association and collective bargaining are discussed in the section [▶ Employee-employer relations](#) and the equal treatment of personnel in the section [▶ Diversity and equal opportunity](#).

Fortum's supplier audits cover the most important human rights aspects related to purchases. The supplier audits conducted in 2019 and their results are described in more detail in the section [▶ Supply chain](#).

Human rights-related grievances

Internal reporting channels used for reporting any suspected misconduct relating to labour conditions or human rights violations are defined in Fortum's Code of Conduct. In addition to internal reporting channels, Fortum has an external "SpeakUp" channel, which is available to all stakeholders. In 2019, there were no grievances related to human rights filed through Fortum's grievance channels, nor were there any grievances carried over from the previous year. During the year there was one grievance filed related to workplace bullying which is reported in the section [▶ Diversity and equal opportunity](#).

Fortum's subsidiaries operating in Great Britain published a statement required by the Modern Slavery Act on our [▶ website](#). We support the principles defined in the Act and condemn practices that are in violation of the Act. We ensure compliance with our principles and Code of Conduct through internal monitoring and reporting practices and supplier assessments.

Corporate citizenship

Social responsibility is a cornerstone of Fortum’s operations. Our operations impact the local communities where our plants are located, and we engage in many kinds of collaboration with local stakeholders. We support activities promoting the common good in society, including the work of organisations and communities in our operating countries. Fortum also engages in collaboration with different research and development projects with universities.

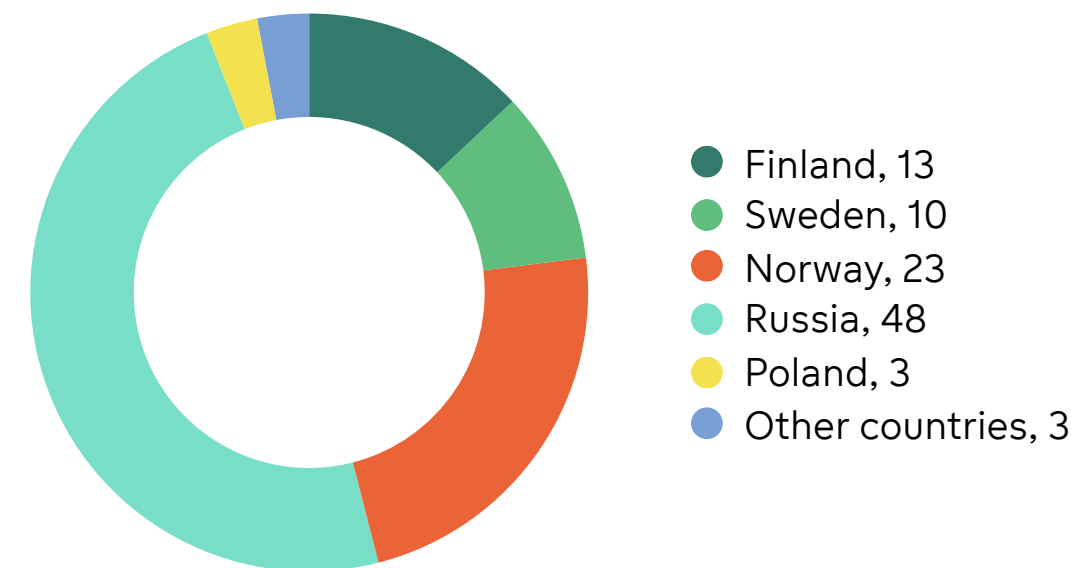
Local impacts

We are an important employer and significant tax payer in our operating areas. In addition, our investments improve the local infrastructure.

Of our energy production forms, hydropower has the most significant **impacts on local communities** and local forms of land use. Hydropower construction and use may alter the fluctuation range and rhythm in the discharge and water level in waterways as well as the fish fauna. These changes impact fishing, recreational use, and boating. We mitigate and compensate the adversities caused by hydropower production through numerous measures, such as stocking fish and building boat launch ramps.

We communicate openly, honestly and proactively, and we engage in a dialogue with the stakeholder groups located in the vicinity of our power plants. We carry out collaboration projects with local communities. We conduct environmental impact assessments (EIA) for our projects in accordance with legislative requirements. The hearing of stakeholders is part of the EIA process. In addition, relevant stakeholders are heard in all permit procedures.

Fortum’s support to society by country, %



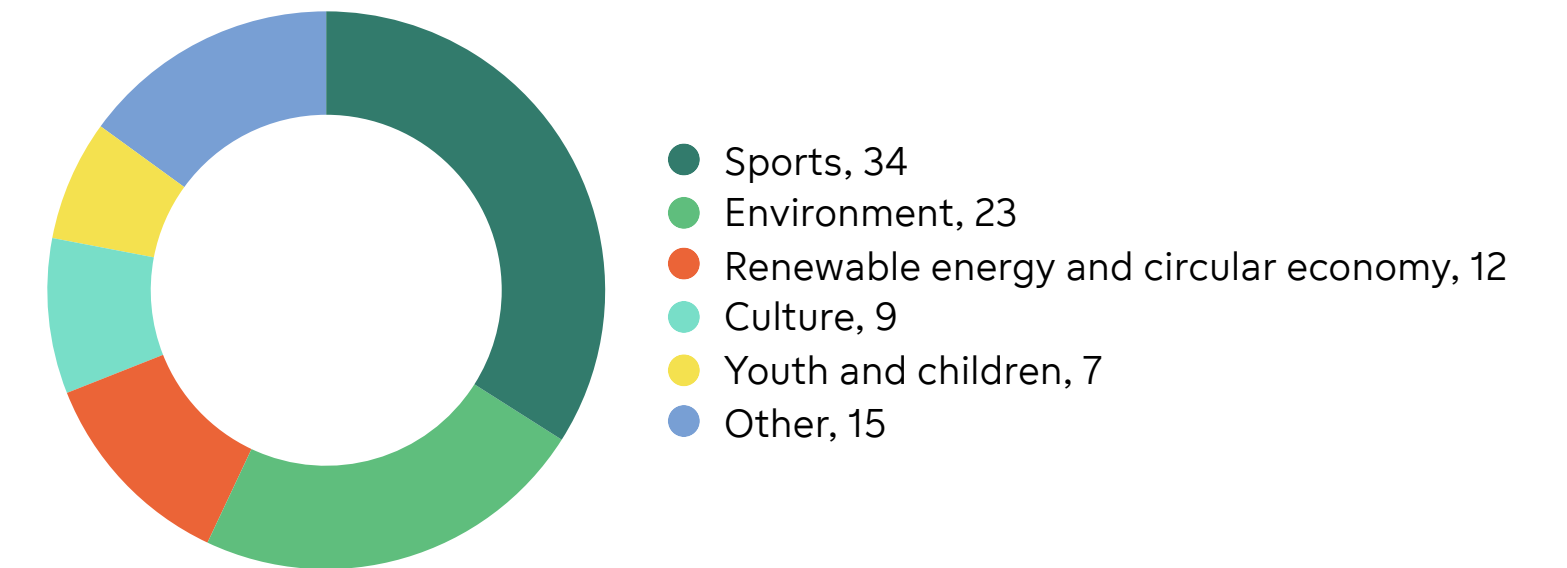
Collaboration with local communities

We continued publishing the Naapurina ydinvoimala (Nuclear power plant as a neighbour) magazine in Loviisa, Finland, and maintained an active dialogue with local residents and representatives of the city of Loviisa. We engage with local decision-makers, associations and residents in Riihimäki and Hausjärvi through, e.g., the collaboration meetings that convene twice a year. Additionally, we participate in the City of Riihimäki’s sustainability programme. The aim of the letter of intent we signed with the city in 2019 is for the district heating sold to customers to be carbon neutral by 2030.

In Wrocław, Poland, Fortum continued “Clean energy for Wrocław”, a programme that primarily aims to develop the district heating network in the city centre to improve air quality. In Jelgava, Latvia, we engaged in dialogue with stakeholders in connection with the environmental assessment process of fuel diversification of the CHP plant. The plan is to start using RDF (Refuse Derived Fuel) in addition to the biomass fuel currently used.

Projects aiming to mitigate the adverse environmental impacts of hydropower were under way in Finland and Sweden in collaboration

Fortum’s support to society by target, %



with municipalities, research facilities, fishermen and universities. The traditional collaboration continued with local players in the Oulujoki water system. A barrier-free fishing area was completed in the vicinity of the Ämmä power plant with the help of Suomussalmi fly fishers, and improvements were made to the Ristijärvi municipality swimming beach and boat landing. Projects promoting boating were started also elsewhere in the Oulujoki water system. During the year we also held several open-door events at our hydropower plants to talk about our activities and to engage with local residents. In Sweden, one of the most popular open-doors events was held in October in Gullspång in conjunction with the International Year of the Salmon 2019 event. Visitors had an opportunity to hear about the actions to help the endangered Gullspång landlocked salmon, and to watch them spawn in the river section in its natural state a mere 100 meters from the power plant dam.

In Russia, we continued the About Energy programme, which was in use in 100 educational institutions, reaching about 13,000 students in Tyumen, Chelyabinsk, Nyagan and the Ulyanovsk region. The programme aims to teach students about using resources efficiently and to encourage them to take environmental issues into consideration in their

thinking. As part of the programme, students wrote about saving energy. The essays will be published in a book called “Energy Tales”. The students also focused on sorting waste and on water and energy consumption, and they conducted their own research on saving energy.

In Klaipėda, Lithuania, Fortum continued to support the conscious parenting centre “Saulė ir Mėnulis”. The collaboration allows a new generation kindergarten to develop its activities. The funds are also used for broadcasting local radio shows giving parents advice on how to raise and educate their children.

We continued supporting local communities through several projects in the vicinity of the Kapeli and Bhadla solar power plants in India. Fortum has been undertaking activities for community empowerment around three themes – Education, Hygiene and Women Empowerment. Among other things, Fortum has improved the water and electricity supply in the villages and has supported local schools by building a new classroom, constructing toilets for girls and furnishing the kitchen that provides lunch for the children. In the villages near the Bhadla power plant, a community development programme was continued. Within its framework, local adults have been taught to read, programmes to support the digital skills of teachers and students have been implemented, advice related to health and hygiene has been provided, and the livelihood of women in particular has been supported by teaching them tailoring and how to sew clothes on a sewing machine. The Self Help Group for local women continued its activities.

Support for society

According to Fortum’s Policy for Sponsoring and Donations, our sponsoring focuses on the wellbeing of children and youth, renewable energy projects, R&D, and innovations supporting Fortum’s strategy, recycling, recovery and reuse. In 2019, Fortum’s support for activities promoting the common good totalled about EUR 3.0 (2018: 3.8) million.

Additionally, we support research, education and development in the natural, technical and economical sciences in the energy sector through

Fortum Foundation. The grants awarded by Fortum Foundation in 2019 totalled about EUR 660,000 (2018: 680,000). Fortum Foundation is not part of Fortum Group.

The goal of the collaboration with universities and colleges is to develop Fortum’s business, promote energy-sector research and development, and foster Fortum’s recruiting and training opportunities. In 2019, we participated in three EU Horizon 2020-funded research projects in the Baltics. The Estonian ►**RELaTED** project is developing an Ultra-Low Temperature (ULT) district heating network solution. The concept utilises low-temperature heat sources, and it enables more efficient utilisation of waste heat and the reduction of CO₂ emissions. In Latvia, Fortum continues to take an active part in the ►**THERMOS** (Thermal Energy Resource Modelling and Optimisation System) project. In addition, we joined in the ►**SocialWatt** project, which will develop and provide energy suppliers with appropriate tools for effectively engaging with their customers and working together towards alleviating energy poverty.

Sponsorship projects

Fortum was a main sponsor of Øyafestivalen 2019 – an annual music festival held in Oslo, Norway. As part of Fortum’s activities at the festival, Fortum launched a concept called ►**“The Green Rider”**. The idea was to get artists to sign a pledge calling for festivals to become more sustainable, e.g. when providing the artist with sound, lighting and backstage services. In addition to several famous artists, more than one thousand people from the general public also signed the pledge. During the festival Fortum had environmental ambassadors in the festival area who talked with the festival visitors about environmental issues and about the actions that had been taken to reduce the carbon footprint of Øyafestivalen.

Fortum joined as a partner in Neste’s ►**“Zero Island”** project in Lidö, Sweden. The aim of the project was to make the island climate-neutral in just twelve months. We delivered an 80-panel solar power system to the island, and we were also responsible for the renewable electricity that

was transmitted through the power grid. As a result of the project, the island’s emissions were reduced by an impressive 78% from their previous levels.

In Finland, we continued collaboration with ►**Yrityskylä** and the ►**Crisis Management Initiative** (CMI). The Yrityskylä is a learning environment for sixth-graders where students work in a profession and earn money for their work. In Fortum’s miniature company, students perform activities in various tasks related to renewable energy. The CMI is an independent Finnish organisation that works to prevent and resolve violent conflicts through informal dialogue and mediation. During Ahtisaari Days held in November, the organisation’s representatives visited Espoo schools with the goal of teaching the students skills related to conflict-resolution, peace mediation and reconciliation.

At the beginning of 2020, Fortum HorsePower received the Best Sports Sponsorship Award related to the collaboration with the Helsinki International Horse Show. As a result of the collaboration, the electricity for the event was produced entirely with horse manure.

To advance Fortum’s social responsibility, we created in 2019 a new sustainability programme for the company. Sustainability projects, sponsorships, donations and local as well as university collaboration are grouped under the programme’s three themes: climate, people and materials. Implementation of the programme will begin in 2020.



Case | Cleaning the environment, on land and in the water

Environmental cleaning as a Fortum service

Fortum's Recycling and Waste Solutions offers innovative environmental cleaning solutions, like remediation of soils for restoring contaminated land areas and the treatment of hazardous oils and chemical waste. In 2019, Fortum started testing the new Multi-purpose On-site Phase Separator (MOPS) technology to clean contaminated sand and soil. The technology is currently being tested in practice in Denmark in a contaminated shoreline area that was previously used as a deposit site for toxic waste from a chemical factory. MOPS removes mercury, pesticides and other toxins from contaminated sand.

Fortum's new technology not only cleans the sand, it also converts the toxic waste into a raw material that can be used in the construction industry, among others. After the technology testing with sand has been completed, Fortum plans to test MOPS also with other waste streams. The aim is to complete the pilot plant tests during the first quarter of 2020.

► **Cleaning contaminated sand using MOPS technology in Denmark**

Plogging – cleaning urban landscapes and rivers while exercising

Plogging, i.e. rubbish runs, is a new way to combine exercise and picking up litter. Plogging can also be done in water by picking up litter while kayaking. In 2019, Fortum participated in a variety of jogging and paddling events to clean up urban landscapes and rivers in several of our operating countries.

Since 2018, Fortum has arranged a total of nine plogging events in Finland together with the "Siivospäivä" brand. The highlight of 2019 was the participation in Finland's biggest running event, Helsinki City Run, as

a plogging team. In 2019, Fortum held plogging events also in Stockholm (Sweden), Ulyanovsk (Russia), and in Gdańsk, Warsaw, Łódź and Wrocław (Poland). Additionally, Fortum personnel in Gdańsk and in Warsaw participated in a kayaking river clean-up event with the residents of Gdańsk.

Young people helping river clean-up in Sweden

Rivers are a valuable natural resource for Fortum, and we want to help them remain healthy and clean. Since 2013, Fortum has collaborated with the environmental organisation Städa Sverige (part of a local sports organisation), and has encouraged local youth in Sweden to take part in clean-up efforts on five rivers where Fortum has hydropower plants. The initiative is called Älvstädningen, and in 2019 it succeeded in cleaning about 23 tonnes of waste from rivers. This year, the initiative started paying attention also to the water quality of the rivers by taking samples and analysing the microplastics. The 2019 analysis revealed that four of the ten river water samples contained polyvinyl chloride (PVC) plastic.

In addition to cleaning up rivers, Älvstädningen helps Fortum to increase young peoples' knowledge of hydropower as a renewable energy source. It is also a great way to give local youth an opportunity to make a tangible impact on the environment and to get them to join the change for a cleaner world.

Governance and management

Sustainability management at Fortum is strategy-driven and is based on the company's values, the Code of Conduct, the Supplier Code of Conduct, the Sustainability Policy and other policies and their specifying instructions defined at the Group level.

We comply with laws and regulations. All of our operations are guided by good governance, effective risk management, adequate controls and the internal audit principles supporting them.

Fortum's goal is a high level of environmental and safety management in all business activities. Calculated in terms of sales, 99.8% (2018: 99.9%) of Fortum's electricity and heat production operations at the end of 2019 were ISO 14001 environmentally certified and 96.5% (2018: 97.0%) were either OHSAS 18001 or ISO 45001 safety-certified. The decrease in safety certification coverage was due to Fortum Oslo Varme, whose operations are not yet certified. The divisions and sites develop their operations with internal and external audits required by environmental, occupational safety and quality management systems.

Responsibilities

As sustainability is an integral part of Fortum's strategy and operations, the highest decision making on sustainability and climate-related matters falls on the duties of the members of the Board of Directors, who share joint responsibility for these matters. Therefore, Fortum has not established a specific Sustainability Committee for the decision making on economic, environmental and social matters. The Audit and Risk Committee, members of the Fortum Executive Management, and other senior executives support the Board of Directors in the decision-making in these matters, when necessary.

Fortum Executive Management decides on the sustainability approach and Group-level sustainability targets that guide annual planning. The targets are ultimately approved by Fortum's Board of Directors. Fortum Executive Management monitors the achievement of the targets in its monthly meetings and in quarterly performance reviews. The achievement of the targets is regularly reported also to Fortum's Board of Directors.

Fortum's line management is responsible for the implementation of the Group's policies and instructions and for day-to-day sustainability management. Realisation of the safety targets is a part of Fortum's short-term incentive programme. In December 2019 Fortum's Board of Directors also approved inclusion of total CO₂ emissions from energy production as part of the earnings criteria for the 2020–2022 long-term incentive plan for key employees and executives.

Fortum's Corporate Sustainability unit is responsible for coordination and development of sustainability at the Group level and for maintaining an adequate situation awareness and oversight regarding sustainability.

- ▶ [Corporate Governance Statement 2019](#)
- ▶ [Remuneration Statement 2019](#)
- ▶ [Code of Conduct](#)
- ▶ [Supplier Code of Conduct](#)
- ▶ [Sustainability Policy](#)

Sustainability management by topic

Sustainability management in the areas of economic responsibility, environmental responsibility and social responsibility is described in more detail in the accompanying table. Additionally, more detailed information about the management of different aspects and impacts and about measures, processes and projects is presented by topic in this Sustainability Report. Fortum's "SpeakUp" channel has been described in the section ▶ [Business ethics and compliance](#). The purpose of the sustainability management approach is to ensure our operational compliance and to avoid, mitigate and offset the adverse impacts from our operations and to increase the positive impacts.

Management of economic responsibility

	Description
Targets and approach	<p>For Fortum economic responsibility means competitiveness, performance excellence and market-driven production that creates long-term value for our stakeholders and enables sustainable growth. Satisfied customers are key to our success and active consumers will have a crucial role in the future energy system. Fortum has indirect responsibility for its supply chain. We conduct business with companies that act responsibly.</p> <p>Each new research and development project is assessed against the criteria of carbon dioxide emissions reduction and resource efficiency. Likewise, new investment proposals are assessed against sustainability criteria as part of Fortum's investment assessment and approval process. In our investments we seek economically profitable alternatives that provide the opportunity to increase capacity and reduce emissions.</p> <p>We measure financial performance with the return on capital employed (long-term target: at least 10%) and capital structure (long-term target: comparable net debt / EBITDA around 2.5x). The realisation of financial targets in 2019 is reported in the Financial performance and position section of the ► Financials.</p>
Policies and commitments	<p>The financial management system is based on Group-level policies and their specifying instructions, and on good governance, effective risk management, sufficient controls and the internal audit principles supporting them. Other key elements steering financial management are presented in the section ► Policies and commitments.</p>
Responsibilities	<p>The CFO and the Group's Financial unit, division management, and ultimately the CEO and the Board of Directors are responsible for issues related to finances and financial statements and for broader financial responsibility issues.</p> <p>Our sustainability responsibilities are presented in the section ► Governance and management.</p>
Monitoring and follow-up	<p>The Board decides on the company's financial targets as a part of the annual business planning process. Realisation of the targets is monitored on monthly basis both at the division level and by Fortum Executive Management. Fortum's management monitors the realisation of financial targets quarterly as part of the business performance assessment, and key indicators are regularly reported to Fortum's Board of Directors. Financial key indicators related to investments are monitored in divisions' investment forums and by Fortum Executive Management.</p> <p>We report regularly on the direct and indirect financial impacts on our most important stakeholder groups. Fortum also uses the GRI Sustainability Reporting Standards indicators to measure economic responsibility.</p>

Management of environmental responsibility

	Description
Targets and approach	<p>Fortum's aim is to provide its customers with environmentally benign products and services. We strive to continuously reduce the environmental impacts of our operations by using best available practices and technologies. We emphasise a circular economy, resource and energy efficiency, the use of waste and biomass, and climate change mitigation in our environmental responsibility. Our company's know-how in carbon dioxide-free hydro and nuclear power production and in energy-efficient combined heat and power production, investments in solar and wind power, as well as solutions for sustainable cities play a key role in environmental responsibility. We measure the realisation of the environmental responsibility with the following indicators, for which we have set ► Group-level targets:</p> <ul style="list-style-type: none"> • Specific CO₂ emissions • Energy efficiency • Energy availability of CHP plants • Major EHS incidents • Quality of investigation process of occupational accidents, major EHS incidents, and near misses • GAP index, quality of implementation of EHS minimum standards <p>Additionally, we have a Group-level target for the number of supplier audits.</p>
Policies and commitments	<p>Environmental management is based on Fortum's Sustainability Policy. Other key elements steering environmental management are presented in the section ► Policies and commitments.</p> <p>We assess environmental risks as part of the Group's risk assessment process. The risk assessment process is reported in the section Operating and financial review/Risk management of the ► Financials. Climate-related risks are reported in the section ► Climate and resources: Climate.</p>
Responsibilities	<p>Our sustainability responsibilities are presented in the section ► Governance and management.</p>
Monitoring and follow-up	<p>The Group's key indicators are reported regularly to Fortum's Board of Directors and are published in Fortum's interim reports. Major EHS incidents are reported monthly, specific CO₂ emissions, energy availability of CHP plants, the quality of investigation process of major EHS incidents and the GAP index are reported quarterly, and energy-efficiency improvement is reported annually to Fortum Executive Management.</p> <p>The divisions and sites follow and develop their operations with audits required by environmental management systems.</p> <p>Internal and external auditors regularly audit our ISO 14001 standard-compliant management system. The CO₂ emissions of plants within the sphere of the EU's emission trading scheme are audited annually on a per plant basis by an external verifier accredited by the emissions trading authority. The verification addresses the reliability, credibility and accuracy of the monitoring system and the reported data and information relating to emissions. The plants must annually submit to the authorities a verified emissions report of the previous calendar year's carbon dioxide emissions.</p> <p>Our supply chain monitoring system covers also environmental responsibility and is presented in the section ► Personnel and society: Supply chain.</p> <p>We map our stakeholders' views annually with the One Fortum survey and with separate sustainability surveys.</p>

Management of social responsibility: Employees

	Description
Targets and approach	<p>We aspire to be a responsible employer who invests in the development and wellbeing of our employees. We aim to be a safe workplace for our employees and for the contractors and service providers working for us.</p> <p>We measure the realisation of social responsibility with the following indicators, for which we have set ► Group-level targets:</p> <ul style="list-style-type: none"> • Lost workday injury frequency (LWIF), own personnel and contractors • Number of severe occupational accidents • Quality of investigation process of occupational accidents, major EHS incidents, and near misses • GAP index, quality of implementation of EHS minimum standards • Contractor safety improvement index • Percentage of sickness-related absences
Policies and commitments	<p>Safety management is based on Fortum's Sustainability Policy. Other key principles steering labour practices and safety management are presented in the section ► Policies and commitments.</p> <p>We assess safety risks as part of the Group's risk assessment process. Everyday safety management is guided with about 20 Group-level Environment, Health and Safety (EHS) instructions.</p>
Responsibilities	<p>Our sustainability responsibilities are presented in the section ► Governance and management.</p>
Monitoring and follow-up	<p>Fortum personnel and contractor injury frequencies and the number of severe occupational accidents are reported monthly to Fortum Executive Management. The Group's key indicators are reported regularly to Fortum's Board of Directors and are published in Fortum's interim reports. The divisions and sites follow and develop their operations with audits required by safety and quality management systems. Internal and external auditors regularly audit our OHSAS 18001 or ISO 45001 standard-compliant management system.</p> <p>Work wellbeing, indicated as a percentage of sickness-related absences, is reported to the Fortum Executive Management every quarter. In addition, work wellbeing is monitored through other Group-level indicators, such as the ratio between actual retirement age and the statutory start of the retirement pension. Feedback about the personnel's wellbeing and job satisfaction is received also from wellbeing survey as part of the Energise Your Day programme and from personnel survey.</p> <p>We map our stakeholders' views annually with the One Fortum survey and with separate sustainability surveys.</p>

Management of social responsibility: Human rights

	Description
Targets and approach	<p>Fortum supports and respects internationally recognised human rights, which are included in the key human rights treaties. Our goal is to operate in accordance with the UN Guiding Principles on Business and Human Rights and the OECD Due Diligence Guidance for Responsible Business Conduct.</p> <p>Our social responsibility includes taking care of our own personnel and the surrounding communities. We advance responsible operations in our supply chain and more broadly in society.</p> <p>We have set a Group-level target for the number of supplier audits. Targets related to our own personnel are presented in the section ► Personnel and society: Personnel.</p>
Policies and commitments	<p>Key elements steering human rights management are presented in the section ► Policies and commitments.</p>
Responsibilities	<p>Our sustainability responsibilities are presented in the section ► Governance and managements.</p>
Monitoring and follow-up	<p>The key tools for monitoring the impacts of human rights are country and partner risk assessments, supplier qualification, and supplier audits. A sustainability assessment is carried out for our investment projects and takes into consideration also human rights. The assessments are presented to Fortum Executive Management and to the Board of Directors when needed.</p> <p>Fortum has set a target for the number of audits, and the audits that are conducted are reported in our interim reports. For coal, we use the Bettercoal Code and tools in assessing the sustainability of the supply chain.</p> <p>Monitoring systems related to our own personnel are presented in the section ► Personnel and society: Personnel.</p> <p>We map our stakeholders' views annually with the One Fortum survey and with separate sustainability surveys.</p>

Management of social responsibility: Business ethics (incl. anti-corruption and anti-bribery)

	Description
Targets and approach	<p>We believe that an excellent financial result and ethical business are intertwined. We follow good business practices and ethical principles defined in our Code of Conduct in all our operations. We work within the framework of competition laws and Group competition instructions. We avoid all situations where our own personal interests may conflict with the interests of the Fortum Group. Notably, we never accept or give a bribe or other improper payment for any reason.</p> <p>Our customer relations are based on honesty and trust. We treat our suppliers and subcontractors fairly and equally. We select them based on their merit and we expect them to consistently comply with our requirements and with Fortum's Supplier Code of Conduct.</p>
Policies and commitments	<p>Key elements steering social and compliance management are presented in the section ► Policies and commitments.</p>
Responsibilities	<p>Our sustainability responsibilities are presented in the section ► Governance and management.</p>
Monitoring and follow-up	<p>Suspected misconduct and measures related to ethical business practices and compliance with regulations are regularly reported to the Fortum Executive Management and to the Board's Audit and Risk Committee.</p> <p>Fortum has a ► "SpeakUp" channel available to all stakeholder groups for the reporting of misconduct. Monitoring systems related to the supply chain are presented in the section ► Personnel and society: Supply chain</p>

Management of social responsibility: Product responsibility

	Description
Targets and approach	<p>An uninterrupted supply of energy is necessary for a functioning society. We ensure the reliable operation of our power plants with preventive maintenance and continuous monitoring.</p> <p>Our goal is to present products and services truthfully in all our marketing and communication materials. We strictly follow responsible marketing communication guidelines and the regulations for environmental marketing. We assume responsibility for customer data protection and comply with the valid regulations related to the handling of customer data.</p> <p>We have set Group-level targets for the energy availability of CHP plants and for customer satisfaction and reputation indices.</p>
Policies and commitments	<p>Key elements steering product responsibility management are presented in the section ► Policies and commitments.</p>
Responsibilities	<p>Our sustainability responsibilities are presented in ► Governance and management.</p>
Monitoring and follow-up	<p>The Group's key indicators are reported regularly to Fortum's Board of Directors and are published in Fortum's interim reports.</p> <p>Figures related to the availability of power plants are reported monthly to Fortum Executive Management.</p> <p>Customer satisfaction is monitored annually with the One Fortum survey. The results of the survey are presented to Fortum's management and they are used to develop the business.</p>

Policies and commitments

Fortum is a participant of the UN Global Compact initiative and the UN Caring for Climate initiative. We support and respect the international initiatives and commitments and the national and international guidelines listed in the table. They guide our operations in the areas of economic, environmental and social responsibility.

Fortum's EHS minimum requirements are updated annually. In 2019, we further specified instructions on the safe handling of chemicals and the qualification requirements for high-risk work. We monitor the implementation of the renewed guidelines with the GAP index, which reflects how well the Group's EHS minimum requirements are realised at the power plant level.

We report on the training related to the updated instructions in the sections **► Business ethics and compliance**, **► Supply chain** and **► Occupational and operational safety**.

The company's Group-level policies are approved by Fortum's Board of Directors. The Group-level instructions are approved by either the President and CEO or Fortum Executive Management.

International and national initiatives, commitments and guidelines

	Climate and resources		Personnel and society		
	Economic matters	Environmental matters	Social and personnel matters	Human rights	Anti-corruption and bribery
UN Universal Declaration of Human Rights			x	x	
International Covenant on Economic, Social and Cultural Rights	x		x	x	
International Covenant on Civil and Political Rights			x	x	
UN Convention on the Rights of the Child			x	x	
Core conventions of the International Labour Organisation			x	x	
UN Global Compact initiative	x	x	x	x	x
UN Caring for Climate initiative		x			
UN Guiding Principles on Business and Human Rights			x	x	
OECD Guidelines for Multinational Enterprises	x	x	x	x	x
OECD Due Diligence Guidance for Responsible Business Conduct	x	x	x	x	x
International Chamber of Commerce's anti-bribery and anti-corruption guidelines	x				x
Bettercoal initiative's Code on responsible coal mining	x	x	x	x	x
Responsible advertising and marketing guidelines			x		
Environmental marketing guidelines			x		

Fortum's main internal policies and instructions guiding sustainability

	Climate and resources		Personnel and society		
	Economic matters	Environmental matters	Social and personnel matters	Human rights	Anti-corruption and bribery
Values	x	x	x	x	x
Code of Conduct	x	x	x	x	x
Supplier Code of Conduct	x	x	x	x	x
Disclosure Policy	x		x		
Group Risk Policy	x	x	x	x	x
Sustainability Policy (including environmental, and health and safety policies)	x	x	x	x	x
Minimum Requirements for EHS Management		x	x	x	
Biodiversity Manual		x			
Group Manual for Sustainability Assessment		x	x	x	x
Human Resources Policy			x	x	
Leadership Principles			x	x	
Accounting Manual	x	x	x		
Investment Manual	x	x	x		x
Tax Principles	x		x		
Group Instructions for Anti-Bribery	x		x		x
Group Instructions for Safeguarding Assets	x		x		x
Group Instructions for Conflicts of Interest	x		x		x
Anti-Money-Laundering Manual	x		x		x
Compliance Guidelines for Competition Law	x		x		x
Security Guidelines		x	x	x	
Privacy Guidelines	x		x	x	
Policy for Sponsoring and Donations	x		x	x	x
Group Instructions for Compliance Management	x	x	x	x	x

Reporting principles

We report on sustainability in this Sustainability Report. Non-financial reporting, in line with the Accounting Act, is included in the Operating and Financial Review in the Financials. Additionally, we describe sustainability-related governance practices in the Corporate Governance Statement, and strategy and the CEO's view in the CEO's Business Review. Our reporting entity also includes the Tax Footprint.

We apply the specific disclosures of the GRI Sustainability Reporting Standards we have identified as material.

We gain information about our stakeholders' views through the One Fortum Survey, the stakeholder sustainability survey and other stakeholder collaboration. Our selection of sustainability priorities is based on the materiality analysis conducted in 2019 in which we surveyed Fortum personnel's and our stakeholders' views on priority themes for us. We report sustainability information annually in Finnish and English. In our annual reporting we describe Fortum's operations in 2019 as well as some information from January–February 2020.

The previous reporting was published in March 2019, and our next reporting will be published in spring 2021. In addition to the annual reporting, we report on our sustainability activities in Fortum's interim reports.

Reporting scope and boundaries

Reporting related to operations and management covers all functions under Fortum's control, including subsidiaries in all countries of operation. The figures for power and heat generation and investments include also figures from Fortum's share in associated companies and joint ventures that sell their production to the owners at cost. Possible deviations to these principles are reported in conjunction with information

applying different boundaries. A list of Fortum's subsidiaries is included in the **► Financial Statements** Note 40 Subsidiaries by segment on 31 December 2019.

Information from previous years is mainly presented on the basis of the organisation and the functions of each year; the impacts of ownership changes in production facilities, for example, have not been updated afterwards in the previous figures.

Stockholm Exergi is treated in the Financial Statements as a joint venture and Uniper as an associated company. Both companies are consolidated with the equity method. Stockholm Exergi and Uniper are not included in Fortum's sustainability targets and indicators nor in the descriptions of management practices. Stockholm Exergi's and Uniper's sustainability information are available in the companies' sustainability reports that can be found on the companies' own web pages. Exceptions to the accounting practice are presented in conjunction with each figure.

Capacity changes

In 2019, Fortum commissioned the 250-MW Pavagada 2 solar power plant in India. In the end of the year, we commissioned the first wind turbines of the total 97-MW Sørfjord wind power park in Norway. The new capacity is included in the reporting starting from its commissioning.

In December 2019, Fortum signed an agreement to sell an 80% stake in its Nordic wind power portfolio. The transaction is part of Fortum's capital recycling business model; the model is used in Nordic wind power and in solar power in India.

Measurement and calculation principles

Data for economic performance indicators are collected from the audited Financial Statements and from financial accounting and consolidation systems.

The environmental information of the report covers the plants for which Fortum is the legal holder of the environmental permit. In such cases, the plant information is reported in its entirety.

Fortum utilises a Group-wide database with instructions for collecting site-level environmental data. Sites are responsible for data input, emissions calculations and the accuracy of the information provided. The Corporate Sustainability unit compiles the data at the Group level and is responsible for the disclosed sustainability information.

Fortum's CO₂ emissions subject to the EU emissions trading system (EU ETS) are annually verified at the site level by external verifiers. Direct and indirect greenhouse gas emissions have been reported in accordance with the Greenhouse Gas (GHG) Protocol on the basis of the Greenhouse Gas Analysis performed by an external consultant.

Fortum's human resources (HR) management system is used in all Fortum's operating countries and is the main system for employee-related personal and job data. In Russia, the employee data system covers mainly superiors. In addition, Russian operations have their own, local data system.

Other social responsibility data, such as occupational health-related data, originates from various data systems. Designated individuals collect the information and deliver it to the Corporate Sustainability unit primarily in the format recommended by the GRI Standards.

► Financials 2019

Assurance

Deloitte Oy has provided limited assurance in accordance with ISAE 3410 for the reporting period of 1 January 2019 to 31 December 2019 on GHG emissions calculations (Scope 1, 2 and 3) based on the Greenhouse Gas (GHG) Protocol.

Global Compact and Caring for Climate reporting

Fortum has been a participant of the United Nations Global Compact initiative since 2010. In our 2018 Sustainability Report, we describe the realisation of the Ten Principles of the Global Compact initiative in our operations in the sections ▶ **Climate and resources**, ▶ **Personnel and society**, and ▶ **Business ethics and compliance**. We use the GRI Sustainability Reporting Standards disclosures to measure compliance with the principles of human rights, labour standards, the environment and anti-corruption.

Fortum joined the UN Caring for Climate initiative in 2013. Fortum meets the reporting requirements of the Caring for Climate initiative by annually participating in the assessment in the CDP Climate Change questionnaire and by publishing its response on the CDP website.



COMMUNICATION ON PROGRESS

This is our **Communication on Progress** in implementing the principles of the **United Nations Global Compact** and supporting broader UN goals.

We welcome feedback on its contents.

Reported GRI disclosures

This Sustainability Report 2018 references the following Disclosures from the GRI Topic-specific Standards presented in the table.

All other standards except Water and Effluents (GRI 303), Occupational Health and Safety (GRI 304) and Tax (GRI 207) follow version 2016. Standards GRI 303 and GRI 304 follow version 2018. Standard GRI 207 follows version 2019.

DISCLOSURE	DESCRIPTION	SECTION
GRI 103: MANAGEMENT APPROACH		
103-1	Explanation of the material topics	<ul style="list-style-type: none"> ▶ Sustainability at Fortum / Sustainability priorities ▶ Governance and management / Sustainability management by topic Additionally reported by topic
103-2	The management approach and its components	<ul style="list-style-type: none"> ▶ Governance and management ▶ Policies and commitments ▶ Governance and management / Sustainability management by topic ▶ Sustainability at Fortum / Business ethics and compliance ▶ Climate and resources / Emissions / Environmental non-compliances ▶ Personnel and society / Human rights
103-3	Evaluation of the management approach	<ul style="list-style-type: none"> ▶ Governance and management / Sustainability management by topic Additionally reported by topic
ECONOMIC RESPONSIBILITY		
GRI 201: Economic performance		
201-1	Direct economic value generated and distributed	▶ Personnel and society / Stakeholders / Economic impacts
201-2	Financial implications and other risks and opportunities due to climate change	<ul style="list-style-type: none"> ▶ Climate and resources / Climate ▶ Financials / Operating and financial review / Risk management
201-3	Defined benefit plan obligations and other retirement plans	▶ Financials / Notes to the consolidated financial statements / 31 Pension obligations
201-4	Financial assistance received from government	▶ Personnel and society / Stakeholders / Economic impacts
GRI 205: Anti-corruption		
205-1	Operations assessed for risks related to corruption	▶ Sustainability at Fortum / Business ethics and compliance
205-2	Communication and training about anti-corruption policies and procedures	▶ Sustainability at Fortum / Business ethics and compliance
205-3	Confirmed incidents of corruption and actions taken	▶ Sustainability at Fortum / Business ethics and compliance

DISCLOSURE	DESCRIPTION	SECTION
GRI 206: Anti-competitive Behavior		
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	▶ Sustainability at Fortum / Business ethics and compliance
GRI 207: Tax		
207-1	Approach to tax	▶ Tax principles
207-2	Tax governance, control, and risk management	<ul style="list-style-type: none"> ▶ Tax footprint ▶ Financials / Operating and financial review / Risk Management ▶ SpeakUp channel ▶ Financials / Auditor's report
207-3	Stakeholder engagement and management of concerns related to tax	<ul style="list-style-type: none"> ▶ Tax footprint Fortum statement to Finnish Government Programme: Sustainable development tax reform (in Finnish) ▶ SpeakUp channel
Nuclear plant decommissioning		
103	Management Approach	▶ Financials / Notes to the consolidated financial statements / 29 Nuclear related assets and liabilities
System efficiency		
EU11	Average generation efficiency of thermal plants	▶ Climate and resources / Energy / Fuel consumption / Energy intensity
ENVIRONMENTAL RESPONSIBILITY		
GRI 301: Materials		
301-1	Materials used by weight or volume	▶ Climate and resources / Energy / Fuel consumption
301-2	Recycled input materials used	<ul style="list-style-type: none"> ▶ Climate and resources / Energy / Fuel consumption ▶ Climate and resources / Circular economy
GRI 302: Energy		
302-1	Energy consumption within the organisation	<ul style="list-style-type: none"> ▶ Climate and resources / Energy / Energy production ▶ Climate and resources / Energy / Fuel consumption ▶ Climate and resources / Energy / Fuel consumption / Energy intensity
302-3	Energy intensity	▶ Climate and resources / Energy / Fuel consumption / Energy intensity
302-4	Reduction of energy consumption	▶ Climate and resources / Energy / Energy efficiency

DISCLOSURE	DESCRIPTION	SECTION
GRI 303: Water and effluents		
303-1	Interactions with water as a shared resource	<ul style="list-style-type: none"> ▶ Climate and resources / Water ▶ Personnel and society / Corporate citizenship
303-3	Water withdrawal	▶ Climate and resources / Water
303-4	Water discharge	<ul style="list-style-type: none"> ▶ Climate and resources / Water ▶ Climate and resources / Emissions / Emissions to water
303-5	Water consumption	▶ Climate and resources / Water
GRI 304: Biodiversity		
304-3	Habitats protected or restored	▶ Climate and resources / Biodiversity
GRI 305: Emissions		
305-1	Direct (Scope 1) GHG emissions	▶ Climate and resources / Climate / Greenhouse gas emissions
305-2	Energy indirect (Scope 2) GHG emissions	▶ Climate and resources / Climate / Greenhouse gas emissions
305-3	Other indirect (Scope 3) GHG emissions	▶ Climate and resources / Climate / Greenhouse gas emissions
305-4	GHG emissions intensity	▶ Climate and resources / Climate / Metrics and targets
305-7	Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions	▶ Climate and resources / Emissions / Emissions to air
GRI 306: Effluents and Waste		
306-2	Waste by type and disposal method	▶ Climate and resources / Circular economy / Waste and by-products of our energy production
306-3	Significant spills	<ul style="list-style-type: none"> ▶ Climate and resources / Emissions / Emissions to water ▶ Climate and resources / Emissions / Environmental non-compliances
GRI 307: Environmental Compliance		
307-1	Non-compliance with environmental laws and regulations	<ul style="list-style-type: none"> ▶ Sustainability at Fortum / Business ethics and compliance ▶ Climate and resources / Emissions / Environmental non-compliances
GRI 308: Supplier Environmental Assessment		
308-2	Negative environmental impacts in the supply chain and actions taken	▶ Personnel and society / Supply chain / Sustainable supply chain
SOCIAL RESPONSIBILITY		
102-8	Information on employees and other workers	▶ Personnel and society / Personnel
102-41	Collective bargaining agreements	▶ Personnel and society / Personnel / Employee-employer relations
GRI 401: Employment		
401-1	New employee hires and employee turnover	▶ Personnel and society / Personnel

DISCLOSURE	DESCRIPTION	SECTION
GRI 403: Occupational Health and Safety		
403-1	Occupational health and safety management system	▶ Personnel and society / Safety and security / Occupational and operational safety
403-2	Hazard identification, risk assessment, and incident investigation	▶ Personnel and society / Safety and security / Occupational and operational safety
403-3	Occupational health services	▶ Personnel and society / Personnel / Employee wellbeing
403-5	Worker training on occupational health and safety	▶ Personnel and society / Safety and security / Occupational and operational safety
403-6	Promotion of worker health	▶ Personnel and society / Personnel / Employee wellbeing
403-9	Work-related injuries	▶ Personnel and society / Safety and security / Occupational and operational safety
403-10	Work-related ill health	▶ Personnel and society / Personnel / Employee wellbeing
GRI 404: Training and Education		
404-1	Average hours of training per year per employee	▶ Personnel and society / Personnel / Employee development
404-2	Programs for upgrading employee skills and transition assistance programs	▶ Personnel and society / Personnel / Employee development
404-3	Percentage of employees receiving regular performance and career development reviews	▶ Personnel and society / Personnel / Employee development
GRI 405: Diversity and Equal Opportunity		
405-1	Diversity of governance bodies and employees	<ul style="list-style-type: none"> ▶ Personnel and society / Personnel / Diversity and equal opportunity ▶ Governance / Corporate Governance Statement / Board of Directors
405-2	Ratio of basic salary and remuneration of women to men	▶ Personnel and society / Personnel / Diversity and equal opportunity
GRI 406: Non-discrimination		
406-1	Incidents of discrimination and corrective actions taken	▶ Personnel and society / Personnel / Diversity and equal opportunity
GRI 407: Freedom of Association and Collective Bargaining		
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	<ul style="list-style-type: none"> ▶ Personnel and society / Personnel / Employee-employer relations ▶ Personnel and society / Supply chain / Sustainable supply chain
GRI 408: Child Labor		
408-1	Operations and suppliers at significant risk for incidents of child labor	▶ Personnel and society / Human rights

DISCLOSURE	DESCRIPTION	SECTION
GRI 409: Forced or Compulsory Labor		
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	▶ Personnel and society / Human rights
GRI 412: Human Rights Assessment		
412-1	Operations that have been subject to human rights reviews or impact assessments	▶ Personnel and society / Human rights
412-2	Employee training on human rights policies or procedures	▶ Personnel and society / Human rights
412-3	Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	▶ Personnel and society / Human rights
GRI 413: Local Communities		
413-2	Operations with significant actual and potential negative impacts on local communities	▶ Personnel and society / Corporate citizenship
GRI 414: Supplier Social Assessment		
414-2	Negative social impacts in the supply chain and actions taken	▶ Personnel and society / Supply chain / Sustainable supply chain
GRI 415: Public Policy		
415-1	Political contributions	▶ Sustainability at Fortum / Business ethics and compliance
GRI 417: Marketing and Labeling		
417-3	Incidents of non-compliance concerning marketing communications	▶ Personnel and society / Customers / Product responsibility
GRI 419: Socioeconomic Compliance		
419-1	Non-compliance with laws and regulations in the social and economic area	▶ Sustainability at Fortum / Business ethics and compliance ▶ Personnel and society / Personnel / Diversity and equal opportunity ▶ Personnel and society / Human rights ▶ Personnel and society / Customers / Product responsibility
Disaster/Emergency planning and response		
103	Management Approach	▶ Personnel and society / Safety and security / Corporate security
Access		
EU30	Average plant availability factor	▶ Climate and resources / Energy / Security of supply

Contact information ▶ [Sustainability contact information on our website](#)

Independent limited assurance report on Fortum's Greenhouse Gas Emissions 2019

To the Management of Fortum Corporation

We have been engaged by Fortum Corporation (hereafter: Fortum) to provide a limited assurance on Fortum's Greenhouse Gas Emissions calculations (Scope 1, 2 and 3) based on Fortum's Reporting criteria according to the requirements published by CDP (Verification of Climate Data) for the reporting period of January 1, 2019 to December 31, 2019 (hereafter: GHG Emissions Disclosures). The calculations subject to the assurance engagement is presented on pages 29-30 in the section "Climate" of Fortum's Sustainability Reporting 2019 (hereafter: GHG Reporting).

Management's responsibility

Management is responsible for the preparation of the GHG Reporting in accordance with the reporting criteria as set out in Fortum's Reporting principles and the Greenhouse Gas Protocol (hereafter: Reporting criteria). This responsibility includes: designing, implementing and maintaining internal control relevant to the preparation and fair presentation of the GHG Reporting that are free from material misstatement, whether due to fraud or error, selecting and applying appropriate criteria and making estimates that are reasonable in the circumstances.

Assurance provider's responsibility

Our responsibility is to express a limited assurance conclusion on the reported GHG Emissions Disclosures within Fortum's GHG Reporting based on our engagement. Our assurance report is made in accordance with the terms of our engagement with Fortum. We do not accept or assume responsibility to anyone other than Fortum for our work, for this assurance report, or for the conclusions we have reached.

We conducted our assurance engagement in accordance with International Standard on Assurance Engagements (ISAE) 3410 to provide a limited assurance on GHG Emissions Disclosures. This Standard requires that we comply with ethical requirements and plan and perform

the assurance engagement to obtain a limited assurance whether any matters come to our attention that cause us to believe that the GHG Emissions Disclosures have not been presented, in all material respects, in accordance with the reporting criteria.

We did not perform any assurance procedures on the prospective information, such as targets, expectations and ambitions. Consequently, we draw no conclusion on the prospective information.

A limited assurance engagement with respect to the GHG Emissions Disclosures involves performing procedures to obtain evidence about the reported GHG Emissions. The procedures performed depend on the practitioner's judgment, but their nature is different from, and their extent is less than, a reasonable assurance engagement. It does not include detailed testing of source data or the operating effectiveness of processes and internal controls and consequently they do not enable us to obtain the assurance necessary to become aware of all significant matters that might be identified in a reasonable assurance engagement.

Our procedures on this engagement included:

- A review of management systems, reporting and data compilation processes related to the calculations presented on pages 29 and 30 in the Fortum's Sustainability Reporting 2019.
- Selected interviews of persons conducting Scope 1, 2 and 3 analysis and data owners
- Review of assumptions and emission factors used in calculations
- Analytical testing of consolidated data
- Testing of source data on spot check basis

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Our independence, quality control and competences

We complied with Deloitte's independence policies which address and, in certain cases, exceed the requirements of the International Ethics

Standards Board for Accountants' Code of Ethics for Professional Accountants in their role as independent assurance providers and in particular preclude us from taking financial, commercial, governance and ownership positions which might affect, or be perceived to affect, our independence and impartiality and from any involvement in the preparation of the report. We have maintained our independence and objectivity throughout the year and there were no events or prohibited services provided which could impair our independence and objectivity.

Deloitte 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. This engagement was conducted by a multidisciplinary team including assurance and GHG Reporting expertise with professional qualifications. Our team is experienced in providing reporting assurance.

Conclusion

On the basis of the procedures we have performed, nothing has come to our attention that causes us to believe that the GHG Emissions Disclosures subject to the assurance engagement is not prepared, in all material respects, in accordance with the Reporting criteria.

Our assurance statement should be read in conjunction with the inherent limitations of accuracy and completeness of the GHG Reporting.

Helsinki 4 March 2020

Deloitte Oy

Lasse Ingström

Authorized Public Accountant