

A woman with long blonde hair, wearing a white knit beanie with a red top and a bright yellow jacket, is shown in profile looking out towards the ocean. The background is a clear blue sky and a calm sea. The image is overlaid with a white semi-transparent shape that contains the text.

GASUM
CORPORATE
RESPONSIBILITY

2019

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1 REPORTING YEAR 2019



ANNUAL REPORTING FOR 2019

Gasum's annual reporting documents for 2019 comprise the Financial Statements, Governance and Remuneration and the Corporate Responsibility Report.

The reports are available at www.gasum.com - [Key figures](#).

The Corporate Responsibility Report has been prepared in accordance with the Core option of the Global Reporting Initiative (GRI) Standards. The European Union Directive on non-financial reporting as well as the Finnish Government resolution concerning state ownership policy and tax reporting guidelines have also been taken into account in reporting. The report covers Gasum's social, environmental and economical responsibility performance.

At Gasum, corporate responsibility is derived from the strategy. The Nordic energy company Gasum seeks to promote sustainable development through the expansion of the gas market through its operations.

In accordance with Gasum's value proposition "*Purposefully and responsibly moving towards new opportunities*", responsibility is a key value advanced through [the Corporate Responsibility Program](#). The program summarizes the material themes relating to corporate responsibility and sets objectives for Gasum's responsibility work. The material themes are significant in terms of impacts or for [the various stakeholders](#). Gasum monitors progress made in corporate responsibility and reports on key outcomes annually in the Corporate Responsibility Report.

Gasum uses the Verso PRO digital solution for corporate responsibility reporting.

Read more [about company](#) and [strategy](#) and [highlights in 2019](#) >

1.1 Company in brief and strategy (102-1 General Disclosures)



CEO JOHANNA LAMMINEN COMMENTS ON 2019:

"In 2019, we took purposeful steps to advance our strategy and developed the Nordic gas market, enabling an even broader offering of low-emission energy solutions in response to growing demand among industrial as well as road and maritime transport customers."

[Read CEO's review >](#)

THE ENERGY COMPANY GASUM IN BRIEF

Gasum is the Nordic expert in the gas sector and in the energy market in the Nordics. Together with our partners, we promote development towards a carbon-neutral future on land and at sea.

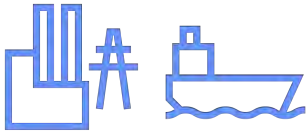
Our aim is clean mobility of people and goods on land and at sea. We offer for both industrial clients and combined heat and power (CHP) producers clean and cost-effective energy and raw materials in Finland, Sweden, Norway as well energy market services. [Read more about gas.](#)

We are the biggest distributor of liquefied natural gas (LNG) in the Nordic countries. We deliver LNG from our production plant in Norway and from sourcing partners in Europe. We strengthen the position and infrastructure of LNG and supply LNG for maritime transport, industry and heavy-duty road transport. We promote the circular economy and are a significant supplier of renewable biogas and recycled nutrients in the Nordic countries. We supply sustainable biogas to our customers in transport, industry and energy production.

We increase the availability of cleaner energy to all transport segments by developing the filling station network and distribute low-carbon fuels for road transport. With our energy market services, we help our customers to master the energy market throughout the chain by providing comprehensive expertise and consultancy.

In 2019, the Gasum Group had around 370 employees in Finland, Norway and Sweden. Gasum is fully owned by the State of Finland. Our shares are held at 73.5% by the state-owned Gasonia Oy and 26.5% directly by the State of Finland. Read more [about our company.](#)

Business units*



GAS AND POWER SALES

- Selling gas and power to industry, energy production and maritime



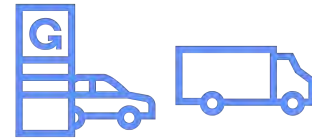
PORTFOLIO MANAGEMENT AND TRADING

- Sourcing of gas, power and other commodities
- Managing price and volume risk
- Offering energy market services



BIOGAS

- Ensuring biogas availability and increasing production capacity
- Supplying feedstocks
- Handling recycled nutrients and fertilizers



TRAFFIC

- Selling gas for heavy duty vehicles and light vehicles such as passenger cars, delivery vehicles, refuse vehicles and buses
- Developing the gas filling station network in the Nordic countries

*In 2020. Read more about the [Gasum Management Team](#).

Company's office locations in Finland, in Sweden and in Norway





STEP BY STEP TOWARDS A CLEANER TOMORROW

Our strategy provides the guidelines for our journey towards new business opportunities and a low-carbon future.

We believe that the expansion of the energy market and new innovations are prerequisites for a cleaner tomorrow. Renewal is a key element of Gasum's strategy and we are purposefully and responsibly moving towards new opportunities.

The company's strategy is to expand the energy market and build a bridge towards a carbon-neutral society on land and at sea in the changing operating environment together with our partners.

Our mission is *Cleaner energy* and our vision is *Leading the Nordic gas ecosystem*. The company's values have been summed up in a single proposition *Purposefully and responsibly moving towards new opportunities*.

The four components of our strategy form the foundation for our operations and affect everything we do from customer work and investments to advocacy and responsibility development.



GASUM STRATEGY

- GROW ENERGY BUSINESS.
- EXPAND NEW MARKETS.
- INCREASE CUSTOMER ORIENTATION.
- DEVELOP AGILE LEADERSHIP.

1.2 Highlights 2019



SUSTAINABILITY HIGHLIGHTS in 2019

We redefined our **Ethics and compliance framework** that oversees the implementation of responsible business

Up to **90%** Emission reduction with our biogas

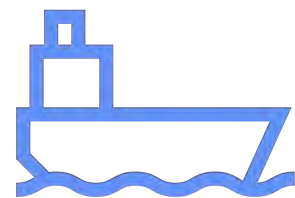
We promoted a healthy working place
1.5 Absence rate of employees

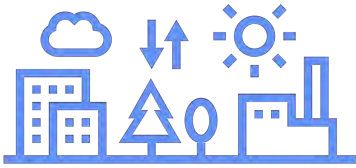


BEST SAFETY performance in 10 years
2 accidents that resulted in at least one day off work



We concluded our **200th Ship-to-ship** bunkering and increased accessibility of LNG at sea





GROWTH IN TRAFFIC SEGMENT

13

new gas filling stations
and market entry
into Sweden



Our Green Services
obtained

6.5 TWh

of renewable
energy

Guarantees of Origin

100%

Renewable electricity
used in our own
operations

We concluded a **Green loan agreement**

with financial institutions,
demonstrating
our climate change
mitigation actions

We promoted
circular economy
and turned

800,000 tonnes

of biodegradable biomass
into biogas and
recycled nutrients

Strong growth in
gas-fueled vehicles.

Amount of registrations

Currently is more than

10,000 in Finland
50,000 in Sweden

2 GOVERNANCE



RESPONSIBILITY HAS A KEY ROLE IN GASUM'S STRATEGY

The cornerstones of our responsibility agenda are set in our Corporate Responsibility Program.

We promote sustainable development and support the UN Sustainable Development Goals (SDGs) that aim to meet the urgent environmental, social and economic challenges facing our world.

Our framework for responsible business is an integral part of our management system and includes elements such as understanding our risks, having clear policies and procedures, providing training and communication as well as processes for raising and investigating possible violations of our Code of Conduct.

Active dialogue with our stakeholders is an important part of our responsibility.

Read more about [responsibility program](#), [guiding principles](#), [stakeholder engagement](#) and [risk management](#) >

2.1 Responsibility program

OUR RESPONSIBILITY APPROACH

We regard sustainability as a comprehensive approach that is closely connected to our strategy and take our social, environmental and economic responsibilities into account in our daily operations and decision-making.

Gasum has formulated a Corporate Responsibility Program to promote sustainability and steer the responsibility work in all operating countries.

The cornerstones of our responsibility agenda are set in our Corporate Responsibility Program. It steers the responsibility work in all our operating countries. The program considers the most material aspects of Gasum's responsibility and sets measurable goals where applicable.

A new Corporate Responsibility Program was adopted by the Gasum Management Team at the beginning of 2019. The updated Corporate Responsibility Program addresses six themes identified as material to Gasum and to our stakeholders: Safety and security, Climate change, Circular economy, Access to energy, People, and Responsible business. These themes and related objectives will guide our sustainability work towards cleaner tomorrow.



SAFETY AND SECURITY

Our target is zero harm to people and zero environmental breaches.

What we aim for:

- Zero harm to people: zero Lost Time Injury (LTI) and Medical Treatment Injury (MTI).
- Minimizing environmental impact and zero environmental breaches.

[Read more >](#)



ACCESS TO ENERGY

We develop a smart, efficient and sustainable gas ecosystem and fulfil customer needs on land and at sea.

What we aim for:

- Promoting awareness and availability of gas as a road fuel. A Nordic network of 50 HDV filling stations by the early of 2020s and 50,000 gas-powered vehicles on Finnish roads by 2030.
- Expanding supply solutions and services in the maritime sector, increased bunkering volumes of LNG and LBG for vessels.
- Expanding offering in carbon neutral power, building portfolio sourcing renewable power.
- Adding value to customers in the energy market. Increased traded volume of Guarantees of Origins, emission allowances, power and gas.

[Read more >](#)



CLIMATE CHANGE

We enable climate change mitigation through renewable energy, low-carbon products and energy efficiency.

What we aim for:

- Enabling emission reductions for our customers with low-carbon products.
- Decreasing greenhouse gas emissions in our operations. Increasing energy efficiency by 1% annually until 2025.

[Read more >](#)



CIRCULAR ECONOMY

We utilize a wide feedstock base in renewable fuel production and develop the market for recycled nutrient products.

What we aim for:

- Utilizing a wide feedstock base in biogas production and developing the market for recycled nutrients, and increasing biogas volumes.
- Developing the market for recycled nutrients.

[Read more >](#)



RESPONSIBLE BUSINESS

We maintain good business ethics and profitability, and ensure responsible business partnerships with zero unplanned disruptions in energy supply.

What we aim for:

- Ensuring compliance and accountability in our own operations and in business partnerships. Providing Code of Conduct training for personnel and assessing suppliers continuously.
- Creating value for the owner and society, reaching the financial targets set.
- Ensuring reliable energy supply. Zero unplanned disruptions in energy supply to customers.

[Read more >](#)



PEOPLE

We develop employee wellbeing, competence and leadership.

What we aim for:

- Promoting a healthy working environment, absence rate <2%.
- Developing and assessing Gasum culture and leadership continuously.

[Read more >](#)

Our contribution to the Sustainable Development Goals

The UN Sustainable Development Goals (SDGs) aim to meet the urgent environmental, social and economic challenges facing our world.

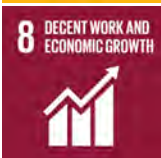
We promote sustainable development and support the SDGs. We have defined those goals towards which we contribute the most in our operations:



Gasum is committed to working towards the [United Nations Global Goals for Sustainable Development](#).



We offer and develop low-carbon and renewable energy products and energy market services for our customers. We increase access to cleaner fuels by developing the infrastructure in the Nordics, above all in maritime and heavy-duty road transport.



We provide jobs for 370 people and promote the well-being, work ability and competence of our personnel. We promote safe and secure working environments for our employees and contractors. We generate economic added value for our shareholders and the society.



We participate in the activities of various research and development networks advancing innovations related to circular economy and clean energy. We build circular economy and industrial ecosystem partnerships. We consider resource-efficient and environmentally sound technologies in our investments.



We impact local air quality by increasing the availability of cleaner fuels. We invest in the construction of around 50 gas filling stations for heavy-duty vehicles in the Nordic countries and continue to develop the filling station network also for lighter transport.



We offer circular economy solutions and treat a substantial share of society's biodegradable fractions of waste and side-streams as part of making biogas available. We participate in activities promoting the further development of technologies, feedstocks and partnerships in this field.



We enable greenhouse gas reductions for our customers with our low-carbon products and energy market services. We increase the energy efficiency of our operations and use 100% renewable electricity.



WE ARE PARTICIPATING TO THE SOCIETY'S COMMITMENT TO SUSTAINABLE DEVELOPMENT

Society's Commitment to Sustainable Development

An important tool for us in the implementation of the SDGs is to participate in the Society's Commitment to Sustainable Development, which is a key instrument for implementing the UN 2030 Agenda in Finland.

In 2019, we renewed our commitment with the following goals:

1. Expanding the biogas market to the terawatt-hours range by 2025.
2. Promoting awareness and availability of gas as a road fuel with a goal of 50,000 gas-powered vehicles on Finnish roads by 2030 in accordance with Finland's National Energy and Climate Strategy for 2030.

Management of sustainability

In day-to-day operations, we are all responsible for managing the efforts to advance Gasum's responsibility.

Sustainability work at Gasum is guided by our strategy and the Corporate Responsibility Program. Corporate responsibility issues are considered by the Gasum Board of Directors as well as the Gasum Management Team (GMT) and the Management Groups of the business units. The GMT provides the strategic policies for corporate responsibility, adopts the Corporate Responsibility Program and targets, and monitors their implementation and progress.

In Gasum's business units, sustainability is implemented through everyday operations and leadership. Annual planning, target-setting and the integrated management system support the successful implementation. The business units monitor progress and report monthly on their safety and environmental performance. Gasum's Health, Safety, Environment and Quality (HSEQ) unit and Human Resources (HR), Communications, IT, Finance and Legal organizations support the business units in their sustainability work.

We identify and assess the most significant [sustainability risks](#) and ensure responsibility of our operations through our [Code of Conduct](#), which applies to everyone at Gasum. In our annual Corporate Responsible Report we address the most material issues and views of our stakeholders and report on our progress towards the corporate responsibility objectives set.

In 2019, our sustainability related governance structure and procedures, including policies and goals, were assessed by [Cicero Shades of Green](#) in the context of Gasum's green funding framework. We were given a rating of Excellent.

Materiality

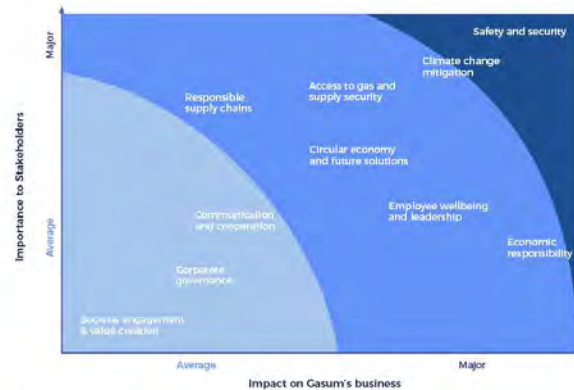
- key responsibility topics

Our responsibility focus areas are based on our own and our stakeholder's views of the significance of the impacts of our operations on the company and the society.

In order to ensure that we focus our responsibility work on the most important sustainability topics, we conduct materiality analyses regularly. The latest update was released at the beginning of 2019, when we conducted a survey among more than 1,000 representatives of various stakeholder groups.

The survey provided valuable input for reviewing and focusing Gasum's responsibility work and helped to ensure that the stakeholder expectations and important topics are addressed in the updated Corporate Responsibility Program.

Gasum's materia topics relate to the following six themes, as outlined in our [Corporate Responsibility Program](#): Safety and security, Climate change, Circular economy, Access to energy, People, and Responsible business.



Integrated management system

To be able to improve our customer focus, continuous improvements and agile way of working and to achieve operational excellence, we need to secure a common HSEQ system baseline. The key system in this baseline is our integrated management system (IMS).

We employ an integrated management system (IMS) that covers quality (ISO 9001:2015), environmental (ISO 14001:2015), energy (ISO 50001:2011), and occupational health and safety (OHSAS 18001:2007) management system requirements as well as a biomethane sustainability scheme as an integrated entity.

In 2019, we merged and aligned all our management systems into a single system to ensure that we will be able to demonstrate our commitment and ability to deliver products and services to our customers. We developed a new, easy-to-use content description and structure that will help all employees in finding the relevant procedures, processes, guidelines, instructions, templates and methodologies. The personnel are trained in the renewed IMS with an e-learning tool.

The integrated management system consists of systematic approaches that translate decisions made by the senior management into practical operations. The system is applied to the Gasum Group companies and operations as well as products and services sold by the Group.

System conformity is evaluated annually through internal audits as well as audits conducted by an external organization. We conducted a comprehensive internal audit program in 2019. The status of the integrated management system and related performance indicators as well as progress made in development actions are presented in management reviews.

2.2 Guiding principles



GUIDING PRINCIPLES

Business ethics and compliance

We re-defined our framework for responsible business. Gasum Ethics and Compliance work supports and oversees the implementation of responsible business. Our framework for responsible business is an integral part of our management system and includes elements such as understanding our risks, having clear policies and procedures, providing training and communication as well as processes for raising and reviewing possible violations of our Code of Conduct. We expect our business partners to comply with the same standards on transparent and ethical business and have implemented a process for knowing who we do business with and related monitoring.

Our Ethics and Compliance (E&C) work supports and oversees the implementation of responsible business practices as defined in the Gasum Code of Conduct. This work includes raising concerns via whistleblowing channel, human rights, anti-corruption, competition, privacy, trade sanctions, and business partner (including supplier, reseller and customer) management as determined from time to time based on Gasum's risk profiling.

Compliance with laws and regulations is an operational responsibility and business management are responsible and accountable for compliance within the day-to-day operations. The Gasum Group Compliance Officer ensures that adequate procedures have been designed, provides implementation support and monitors the implementation. The work is overseen by the Gasum Management Team and the Board of Directors, or the Board Committee.

Gasum utilises a Responsible Business framework to manage its E&C risks. The framework is founded upon leadership and tone from the top and based on established standards as to what constitutes the cornerstones of an effective E&C program.



Code of Conduct

Our code of conduct describes our way of doing responsible business and how we work with our customers, our stakeholders and together at Gasum.

As part of our strategy implementation and corporate responsibility, we recently launched an updated Code of Conduct. It defines the principles of how we do responsible business with our customers, work with our stakeholders and together within the company.

The Code of Conduct applies to each and every one working at or on behalf of Gasum; employees, consultants, resellers and representatives and our affiliates. We expect our business partners to comply with the same standards on transparent and ethical business.

Corporate governance

Corporate governance sets principles the company complies with in its governance and day-to-day operations.

The Gasum Group's Corporate Governance sets forth the legal framework and decision-making powers of the corporate bodies and determines the operational instructions for Gasum's daily operations. Gasum Ltd's corporate governance is based on the Articles of Association, the Limited Liability Companies Act, the rules issued by the Ownership Steering Department of the Prime Minister's Office and other legislation and regulations on the governance of limited liability companies. Gasum is fully owned by the State of Finland. Our shares are held at 73.5% by the state-owned Gasonia Oy and 26.5% directly by the State of Finland.

The highest decision-making power lies with the shareholders of the company who exercise their rights at the General Meeting. The Annual General Meeting elects the Chairman and the members of the Board of Directors. [Gasum Ltd's Board of Directors](#) has established two committees to assist the Board in its work: an Audit and Risk Committee and a HR Committee. The Board of Directors nominates the Group's CEO, who with [the Gasum Management Team](#), manages the company's operations. The HR Committee confirms the nomination of the members of the Gasum Management Team on the CEO's proposal. The Gasum Management team consists of six members in addition to the CEO.

Market risk management process and optimization of the commodities portfolio at Gasum is monitored by the Market Risk Committee, chaired by the CFO, and having as members the CEO, the Head of Portfolio Management and Trading and the Group Risk Controller. The Market Risk Committee is the main forum for risk related decision-making and responsible for overall risk

control. The Group Risk Controller monitors the risk limit usage and is responsible for operational risk reporting and escalation and mitigation of the limit breaches.

The management is responsible and accountable for the compliance with laws and regulations within the daily operations. The Gasum Group Compliance Officer ensures that adequate procedures have been designed, provides implementation support and monitors the implementation.

Read more about [Governance and Remuneration 2019](#).

Collaborative and personnel models

Gasum's operations are developed in collaboration with employees.

Successful management of business is built on trust between management and employees. An open dialogue and free flow of information are important at Gasum. Our collaborative models between personnel and management are defined according to the country practices and procedures.

2.3 Stakeholder engagement



STAKEHOLDER ENGAGEMENT

Active dialogue with our stakeholders is an important part of our responsibility. Understanding the views and expectations of the stakeholders improves the identifying of challenges and opportunities in our operating environment.

Our stakeholders include entities that have an impact on our business, or are affected by our activities, products and services. Our most important stakeholders include customers, personnel, shareholders, suppliers, partners, public authorities and policymakers, and the media. All of them have an important role in the development of our operations.

Stakeholder collaboration is an important part of our daily work. We engage in an open dialogue with the stakeholders associated with our operations, and cooperate and interact in the context of events, meetings and working groups. We conduct stakeholder surveys and collect feedback. In addition, we participate in the activities of various international organizations and industry associations.

Management of stakeholder collaboration within our organization is primarily defined by the stakeholder group and the form and theme of collaboration. Functions responsible for our stakeholder collaboration include Gasum's business units, communications and public affairs, and sustainability.

The Gasum Code of Conduct sets the standards of how we work with stakeholders, covering topics relating to themes such as legal compliance, conflict of interest, bribery, corruption, principles of fair operations, transparency and non-discrimination.

Information through surveys and feedback

In order to obtain information and to improve, we conduct surveys that measure the success of our stakeholder collaboration and identify the important expectations our stakeholder groups have on us.

We survey regularly topics such as customer satisfaction and employee satisfaction. We also survey what our stakeholders consider to be the most important sustainability aspects of our operations. Read more about [Materiality and stakeholder dialogue](#).

A customer survey conducted for our Energy Market Services in 2019 showed that customers appreciated our expertise and the

reliability of our services, as well as our active communication with customers. Respondents hoped to see development in reporting. The Net Promoter Score (NPS) measuring customer's overall satisfaction with our company and service was 64.

In addition to customer surveys, we monitor customer satisfaction daily through customer feedback. Feedback is important in finding concrete and practical ways to improve the customer experience and quality of our service. Feedback is obtained through our account managers who meet and keep in touch with our customers around the year. Consumer customer feedback is received primarily through our customer service, but also through websites and social media.

Customer relationship management (CRM) is part of the daily routines and processes employed to document customer interaction and feedback received to ensure professional and complete follow up.

Open communications

We communicate about our operations, goals, strategies and financial position to our stakeholders.

We seek to increase the attractiveness of and, awareness about, the gas sector and the energy company Gasum as a reliable and modern employer.

The key principles of our communications are reliability, openness and consistency. We communicate both positive and negative information consistently, clearly and comprehensively, taking all identified stakeholders into consideration.

The use of diverse communication channels ensures access by all of Gasum's stakeholders, customers and personnel to enough information about issues that are current and interesting to them.

Public affairs work

We continued to engage in active dialogue with national legislators and other decision makers in Finland, Sweden, Norway, and with relevant EU bodies.

In our public affairs work, we emphasized promoting the use of versatile and low-emission gas and ensuring the competitiveness of the circular economy solutions and low-carbon energy. In 2019 the total value of this advocacy cooperation in Brussels was around €80,000. The amount is based on figures reported to the EU Transparency Register.

We do not provide support to political parties or contribute to election campaigns of individual candidates.

Partnerships and commitments

We collaborate with a range of international organizations and industry associations.

Through this cooperation, we are involved in developing the energy and gas sector's industry practices as well as influencing development in fields including marine fuels, bioenergy, climate change mitigation, circular economy, waste management and energy research.

We are a participant in the following programs, projects, networks and commitments promoting sustainability:

- Baltic Sea Action Group (BSAG)
- Carbon Neutral Municipalities project (HINKU)
- Climate Partners network of the City of Helsinki and business life
- Climate Leadership Coalition (CLC)
- CLIC Innovation Ltd
- Finnish Business and Society (FIBS), corporate responsibility network
- Helsinki Metropolitan Smart & Clean Foundation
- Society's Commitment to Sustainable Development (Finland)
- 2030 secretariat (Sweden)
- Zero Accident Forum

An essential element of Gasum's R&D work is partnerships with research institutions and enterprises. Gasum is a member of Linköping University's Biogas Research Centre and a shareholder of CLIC Innovation Ltd. Gasum is actively involved in the development of joint research projects with other enterprises and research institutions in areas such as [biogas production](#) and [recycled nutrients](#).

Donations and funding

The aim of Gasum's funding and support activities is to support our strategic objectives, responsible business, corporate image management and marketing.

Gasum provides grants to researchers every year through [the Gas Fund](#), one of the special funds run and administered by the Finnish Foundation for Technology Promotion (TES). The fund aims to respond to society's transformational challenges by developing energy solutions based on gas and producing information supporting the development of the gas sector.

In 2019, the Gasum Gas Fund gave out eight grants totalling €62,200 (2018: €40,800). Grants are given to doctoral students who are pursuing their studies in the following thematic areas: gas-related circular economy and bioeconomy, gas transport and logistics, distributed energy solutions promoting gas use, and gas-based energy storage technologies (such as power-to-gas). Gasum Gas Fund grants have been provided since 2005.

[Gasum supports programs](#) of the Finnish Olympic Committee promoting physical activity among children and young people nationally via the Star Club activities, the joint operating model of the Olympic Committee and sport-specific associations. Cooperation between Gasum and the Finnish Olympic Committee aims to promote the wellbeing of children and young people by enabling them to take part in physical activity. In 2019, Gasum and the Olympic Committee granted 14 regional Star Club incentive awards amounting to €1,000, and one Star Club of the Year award amounting to €5,000.

In 2019, Gasum's Christmas gift funds were donated to UNICEF and its work in emergencies and humanitarian context across the globe.

OUR MOST IMPORTANT STAKEHOLDER GROUPS



2.4 Risk management



APPROACH TO RISK MANAGEMENT

Gasum operates in the energy sector and its financial performance entails financial, economic, strategic and political risks. At Gasum, risk management is an integral part of management processes and good corporate governance.

All employees make decisions every day that consist of many different risk elements. The decisionmaker carries the responsibility for risks involved in the decision. In order to help Gasum's employees and management to make conscious decisions, Gasum uses the formalized Enterprise Risk Management Policy (ERM) framework to not only identify risks but also to assess and handle possible risks involved in decision-making.

The Enterprise Risk Management Policy, together with the Gasum Code of Conduct, outlines the risk management principles and frameworks.

The goals of Gasum's risk management are:

- to improve the identification of threats and opportunities when setting business objectives and targets;
- to set the risk levels for major risk classes;
- to increase the likelihood of achieving Gasum's business objectives and targets;
- to improve governance;
- to comply with legal and regulatory requirements, relevant to Gasum's business, and international norms;
- to enhance health, safety and environmental performance;
- to ensure the organisation's ability to function in all situations.

ERM is an integral part of decision-making at all organization levels at Gasum. To achieve the objectives Gasum ERM is continuously improved with the support of methodology and the best practices of risk management, especially ISO 31000 and ISO 9001.

The significance of risks is assessed as a combination of probability and impact of the potential risk or incidence. Gasum's risk management process includes identification of risks, assessments of risks, and ensuring that there is a plan to handle and mitigate the identified risks. The effectiveness of the actions taken are evaluated and the risk is reassessed against these results. The risk identification and assessment process is executed and reported at Gasum in a systematic manner.

The Gasum Board of Directors approves risk policies and sets risk limits. The CEO is responsible for the Gasum risk management

framework. Implementation, development and monitoring of the risk management process is coordinated by the Risk Manager, and the Business and Support Unit heads are responsible for risk management in their respective areas of responsibility.

Strategic, operational and financial risks

Among the largest risks Gasum faces, the majority are strategic in nature. These strategic risks are related to Gasum's market position, and to our operating environment.

Strategic risks are managed through the execution of our strategy.

As we at Gasum continuously develop our business to improve our products and create value to our owner, we also face operational risks related to our business processes. These risks are identified and managed in our business units, following our group level risk policies.

The strategic, political, operational and market and financial risks that Gasum's business operations are exposed to, are reported as part of the [Gasum Financial Review](#).

Main sustainability risks

Health, safety and security

As the nature of our business includes handling and shipping gas-related products, we identify health and safety risks as a substantial part of our total risk environment. These risks include accidents, product safety, leaks and chemical hazards. Any large scale damage or accident creates an image risk. Security risks include intentional harmful activities related to our assets and information security.

Gasum's approach: The mitigation of these risks is the top priority in all our operations. We need to continuously strive for operational excellence. We aim to ensure that solid procedures are in place so that we can continue to deliver safe products to customers and handle any hazard risks. Gasum has implemented comprehensive safety and security rules and procedures and is committed to continuously develop the safety and security practices. As regards especially health and safety risks in particular, Gasum has a clear zero accident policy and will continue to improve and align work procedures and safety culture to achieve it. Many of these risks are mitigated through process development in the business units and training activities that cover also our contractors. Gasum is currently establishing a new business continuity plan including emergency preparedness, crisis management and cyber security.

Working environment and employee-related matters

Employee well-being, competence and leadership are all necessary for Gasum's success. Providing a healthy and safe working environment and ensuring well-being play a key role in avoiding risks such as accidents, work-related illness and stress. The ability to recruit and retain competent personnel and develop leadership culture are prerequisites for avoiding shortages of competent and motivated personnel.

Gasum's approach: Skilled and motivated personnel is a key element of Gasum's success. Our tools for successful talent management include solid onboarding practices, training, career development opportunities and remuneration policy. We continuously develop and assess our leadership culture. We promote a healthy and safe working environment, where preventive action plays a key role. Safety representatives, the Working Environment Committee and company health service support this work. We focus on increasing smoothness of work, maintaining work ability and reducing disability retirement due to disability.

Ethics and compliance

Illegal activities such as fraud, misconduct, or criminal offence can present a threat to us. Non-compliance may lead to legal processes or serious reputational damage to the company.

Gasum's approach: We do not tolerate any form of illegal activities. We strive to act in full compliance with legislative and regulatory provisions as well as our commitments both within Gasum and in relation to customers, public authorities and other stakeholders. Our ethical principles are set out in our Code of Conduct. We expect every employee in the Gasum Group to comply with these principles. In addition to our principles, our activities are guided by internal guidelines on a variety of themes, and we train, audit, and supervise our personnel to ensure compliance.

Climate change

Climate change poses a threat to nature and society as extreme weather conditions will increase globally. The global aim is to curb the average temperature rise at the level that limits the threat. Businesses are influenced by global, EU-level and national energy and climate policies and regulatory changes. In addition, operations are exposed to the physical risks including extreme and chronic changes in weather patterns that could also impact Gasum's assets and value chains, as well as energy demand.

Gasum's approach: For Gasum, climate change is creating opportunities. Gasum is a significant low-carbon energy supplier. Solutions that reduce emissions and help adaptation to climate change create new business opportunities for Gasum during the transition to the low-carbon future. Our main tools for climate change mitigation include enabling greenhouse gas emission reductions for customers with renewable and low-carbon products, as well as offering the energy markets with green services. We aim at reducing our own carbon footprint by increasing our energy efficiency and using renewable electricity in our operations.

Environmental impact from emissions to air and water

Gasum is subject to large a variety of laws, regulations and additional requirements set by stakeholders and the society, that aim at reduced environmental impact. Environmental requirements are becoming more stringent in the EU.

Gasum's approach: Our main tools for environmental management are processes that ensure continuous compliance with environmental law and regulations, such as our Integrated Management System that is compliant with the international ISO standard. Adequate understanding of the environmental aspects of Gasum's business is the key to managing the adverse environmental impacts from emissions to air and water. We support sustainability in our own operations and expect the same from our business partners.

3 SOCIAL RESPONSIBILITY



SAFETY AND OUR PEOPLE MATTER

Safety first. This section outlines how we develop our pro active safety culture. Our aims are high: zero harm to people and minimized environmental impact with zero environmental breaches.

We develop Gasum together and we invest in the well-being, competence and leadership of our personnel.

Read more about [people](#) and [safety and security](#) >



Gasum is committed to working towards the [United Nations Global Goals for Sustainable Development](#).

3.1 People

PEOPLE



OUR TARGET IS TO DEVELOP
EMPLOYEE
WELLBEING, COMPETENCE AND
LEADERSHIP.

13

Training hours
per employee

1.5

Absence rate
of employees

5

Average score (1–6)
for line managers for
their leadership skills

WHAT WE AIM FOR

- We promote a healthy working environment. We aim at an absence rate of <2%.
- We develop the Gasum culture. We continuously assess our working culture and leadership.

WHAT WE ACHIEVED IN 2019

- We promoted a healthy working environment and reached our target of employee absence rate (below < 2%).
- We anchored our redefined leadership principles, which are a tool for every Gasum employee. We believe that each individual living by these principles brings good leadership alive and strengthens our company culture.
- We conducted a new 360-feedback process for all line managers. The very good results provide a solid foundation for us to continue leadership development at Gasum.
- We launched a renewed onboarding process including all pre-, on- and offboarding activities. Onboarding practices are always based on the Gasum strategy and provide a tool for successful talent management.

3.1.1 Wellbeing



WELLBEING AT WORK IS THE KEY TO SUCCESS

Our goal is that all Gasum Group employees are able to do their work well and be productive in a good place to work.

Important focus areas in wellbeing include developing good leadership, increasing the smoothness of work, maintaining work ability and reducing disability pensions. In addition to the internal collaboration between all Gasum's stakeholders such as management, human resources and line managers, we have developed a cooperation model with external partners occupational health care and insurance companies to anticipate and respond to potential work-related problems together.

An important part of wellbeing is how people experience working at Gasum. Wellbeing entails a personal experience of feeling positive about and looking forward to coming to work, having a meaningful job with a high level of motivation, and a well-functioning organization and collaboration. Our wellbeing goal is that all Gasum Group employees are able to do their work well and be productive in a good place to work. Everyone is also responsible for looking after their personal wellbeing.

The crucial part of employee wellbeing is how well the employees are integrated into Gasum. A good onboarding process is a critical part of that. We launched a renewed onboarding process including all pre-, on- and offboarding activities. Onboarding practices are always based on Gasum strategy and provide a tool for successful talent management. We need to ensure that everyone understands how their tasks are connected to the Gasum strategy and story. In addition, an Employee Idea Box was created to ensure a common channel for new business-related ideas at Gasum, to encourage people to discuss ideas directly with business-responsible people, and to support change in Gasum culture and employee management.

3.1.2 Leadership



LEADERSHIP PRINCIPLES DEFINED

Gasum defined its Leadership Principles in 2018 and anchored them in all relevant HR processes during 2019. The principles form a strong foundation for the company culture.

The Leadership Principles are tools for every Gasum employee, and they also have a crucial role in the HR processes. Each individual living by these principles on a daily basis makes good leadership a reality. Leadership matters – be it in collaboration, learning, successful performance, wellbeing at work or meaningfulness of work.

Gasum conducted a 360-degree feedback process for all line managers during autumn 2019. The 360 questions were based on our leadership principles. The response rate was 85.5%, which guarantees the reliability of the results. The participating line managers received very good feedback from the respondents, with the total average score being 5.00 on at the scale of 1-6.

The personal results were discussed with each line manager in a personal feedback session. Also, a personal 360 development plan was made. These feedback sessions were carried out by Gasum HR.



GASUM GROUP LEADERSHIP PRINCIPLES

- I SET CLEAR AND AMBITIOUS TARGETS, FOLLOW UP AND DELIVER RESULTS.
- I ENCOURAGE PEOPLE TO FIND SOLUTIONS.
- I GIVE AND TAKE FEEDBACK CONSTRUCTIVELY.
- I BUILD TRUST.
- I ENERGIZE AND INVOLVE PEOPLE.
- TOGETHER WE CELEBRATE OUR SUCCESS.

3.1.3 Competence



GROWING GASUM'S PROFESSIONAL TALENT

Gasum focuses on personnel competence development in a target-oriented manner.

At Gasum we believe in our people – everyone is seen as a talent. Gasum's strategy provides the framework through which it grows, innovates and creates a future with the defined purpose. We grow people and business together.

The aim is to ensure that everyone's efforts are directed towards achieving our strategic targets and that every employee has a clear sense of purpose and understanding of what is expected of them. Gasum offers challenging tasks and opportunities to grow, and employees are encouraged to take ownership of personal development.

Development discussions are carried out between line managers and employees once or twice a year as a minimum. The discussions give an opportunity to create a shared view of key issues and focus areas for the future, as well as setting targets and following up on personal development.

In 2019, the focus areas in trainings under the Gasum Academy umbrella were leadership and safety. Leadership trainings concentrated on the Gasum strategy, Leadership Principles and leaders' role in Gasum. The safety trainings aimed at increasing awareness, trust and engagement in improving Gasum's safety culture. The number of training days in 2019 totaled 2.2 per person.

Gasum Academy

Gasum supports employees' competency development with the Gasum Academy.

The Gasum Academy is the umbrella concept for all people development activities at Gasum. The offering and methodology used

are based on Gasum's strategy, values, leadership principles, feedback and learning methods. The basic principle of the Gasum Academy is to offer training to all Gasum personnel. In order to guarantee this, the focus in the Gasum Academy is more and more on providing e-learning training.

Gasum continued to utilize e-learning, which brings flexibility and standardizes training by providing the same level of training to everyone. E-learning is a useful way of delivering courses and helps the business units and support functions in spreading information widely and efficiently.

Remuneration

The remuneration of personnel within the Gasum Group is based on the Group's remuneration principles and the remuneration principles laid down by the Ownership Steering Department of the Prime Minister's Office of Finland.

The company aims for a target-oriented company culture in which all employees can affect results, and connect the strategy into business performance and individual accountabilities.

At Gasum, remuneration is based on total remuneration which may, in addition to the base salary, include short and long-term incentive programs. We want to incentive whole personnel from a good performance and we operate annually a performance-based bonus scheme linked to company wide and personal targets. The remuneration system also includes other benefits and intangible incentive methods.

The HR Committee is a committee assisting [the Board of Directors](#) with its tasks including preparing proposals on matters concerning the personnel and their remuneration and approving (within the scope of authority given by the Board) the nomination and remuneration of other top management members than the CEO.

The HR Committee had three meetings in 2019. Read more about [Governance and Remuneration in 2019](#).



3.1.4 People performance in 2019

DEVELOPMENT IN NUMBER OF EMPLOYEES

At the beginning of 2019, the Gasum subsidiary Gasum Technical Services was divested, which decreased the number of Gasum employees by 100 at that time.

At December 31, 2019 the Gasum Group had a total of 373 employees. We renewed our organizational business structure at the beginning 2019. Based on that organizational renewal we had a very ambitious recruitment plan for the new positions in the businesses.

Employee turnover

Gasum's exit rate of employee turnover in 2019 was 10.5% (2018: 12.7%) and the entry rate was 19.8% (2018: 15.8%). The turnover figures reflect Gasum's, development of operations and approaches as well as competence development through several recruitments. The impact of the Gasum Technical Services divestment is not included in the turnover rate.

The exit rate is calculated by taking the number of permanent employees leaving the organization during the year (38) and comparing it with the number of permanent employees at year-end (363). The entry rate is calculated by taking the number of permanent employees joining the organization during the year (72) and comparing it with the number of permanent employees at year-end (363).

KEY PERSONNEL DATA 2019

The key figures related to type of employment (contract type and working hours), diversity of employees (age and gender) and personnel breakdown by personnel groups, business functions and countries are presented below.

The share of women of the total workforce (27%) as well as the share of permanent employment contracts (97%) increased slightly from the previous year.

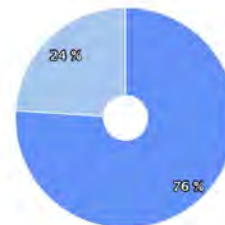
In 2019 Gasum had four business units - Natural Gas & LNG, Biogas, Traffic and Portfolio Management & Trading. The support functions comprised Finance, Legal & IT, Communications and HR & HSEQ. A total of 308 employees worked in the business units and 65 in support functions.

GASUM EMPLOYEES BY BUSINESS FUNCTION Dec 31, 2019, %



■ Natural Gas, LNG 38% ■ Biogas 30% ■ Traffic 8% ■ Support functions 17%

GASUM GENDER RATIO Dec 31, 2019, %



■ Men 76% ■ Women 24%

GASUM TYPE OF EMPLOYMENT ACCORDING TO WORKING HOURS Dec 31 2019, %



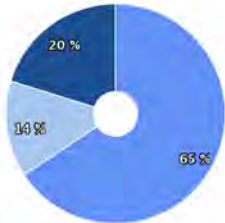
■ Full-time 97% ■ Part-time 3%

GASUM TYPE OF EMPLOYMENT CONTRACT Dec 31 2018, %



■ Permanent 96% ■ Fixed-term 4%

GASUM TOTAL WORKFORCE BY COUNTRY Dec 31 2018, %



■ Finland ■ Norway ■ Sweden

GASUM PERSONNEL BREAKDOWN BY PERSONNEL GROUP Dec 31 2018, %



■ Executive ■ Managerial & expert ■ White-collar ■ Blue-collar

GASUM PERSONNEL BY AGE Dec 31 2019, %



■ < 30 years ■ 30-50 years ■ 50+ years

3.2 Safety and security
(403-1 Occupational Health and Safety)

SAFETY AND SECURITY



OUR TARGET IS ZERO HARM TO PEOPLE AND MINIMIZED ENVIRONMENTAL IMPACT.

71%

Reduction in the number of injuries from 2016 > 2019

4,600

Recorded preventive safety actions performed

9

Life-saving rules launched as key actions

WHAT WE AIM FOR

- Zero injuries to people
- Minimized environmental impact with zero environmental breaches

WHAT WE ACHIEVED IN 2019

- Our safety target of zero accidents was not achieved, but the rate of injuries decreased. Our occupational safety performance was the best in more than 10 years.
- Our safety culture continued to be pro-active: The number of corrective or preventive safety measures, as well as safety walks increased in number during 2019.
- We launched the "Lifesaving Rules" safety campaign with key actions to improve safety performance.
- We established new e-learning training in safety and security.

3.2.1 Safety culture

(403-1 Occupational Health and Safety, 403-3 Occupational Health and Safety)

SAFETY IS AT THE CORE OF GASUM'S OPERATIONS

We believe that all accidents related to people, environment and assets can be prevented. We strive to be recognized as an industry leader in safety and security.

We continued to expand our safety-first culture and promote the safe production, handling and use of gas. Our target is zero injuries, zero harm to the environment and assets, and zero unplanned disruptions in gas supply. A safe and secure working environment has been, and will continue to be, a strong focus at management level in the organization and is crucial to achieve our goals.

Preventing harm pro-actively

Safety and wellbeing at work are an integral part of daily operations at Gasum. We reduced the number of lost time injuries in 2019.

Every one of us is responsible for following safety and security instructions, making observations and eliminating hazards, and for taking part in safety and security training. Documenting observations helps to prevent damage, accidents and injuries, and to ensure we continuously improve our daily operations.

Occupational health and safety issues are managed and monitored as regards the number of accidents, lost time injury frequency (LTIF), risk assessments and safety and security observations. Where risks are identified, we set deadlines and responsibilities for corrective actions in response to them and also monitor these actions. We also develop safety together with our partners to make our work safer. Our goals and occupational safety indicators encourage us to continuously improve our operations.

Our safety target of zero accidents was not achieved in 2019. However, during 2019 we reduced the number of lost time injuries resulting in at least one day off work from 4 to 2 compared with 2018. This result is at its lowest in 10 years. From 2016 to 2019 the reduction has been in total 71%.

Proactive safety culture was demonstrated by the increased number of recorded corrective and preventive actions in response to incidents, observations and safety walks in 2019. HSEQ plans were created and preventive safety action was in focus at all biogas plants in Finland and Sweden. The LNG business continued with the excellent safety track record: Since 2010, there have been zero accidents and injuries involving our employees.

Safety has a key role also in Gasum's investment projects, where HSEQ related observations are recorded and weekly safety inspections on construction sites are carried out.

Organisation and responsibilities

Safety and security issues are covered monthly by the Gasum Management team as well as the Board of Directors, and regularly communicated through internal communication channels.

The business functions report on their respective safety and environmental performance on a monthly basis.

A Working Environment Committee was established for our Norwegian operations in 2019, and Gasum now has a Working Environment Committee in each operating country. The duties of the committees include consideration of occupational health and safety and health care action plans, reporting and follow up on health care, risks, incidents, injuries and environmental issues.

We have established a common safety representative organization with one main safety representative in each operating country. The safety representatives cooperate across business units and countries. They safeguard the interests of employees in matters relating to the working environment and ensure that all employees can perform their work in a safe and secure manner.



OUR HEALTH AND SAFETY PRINCIPLES

WE COMPLY WITH THE FOLLOWING HEALTH AND SAFETY PRINCIPLES IN OUR OPERATIONS:

- By complying with safety and security guidelines and safe working methods, each employee is responsible for safety and wellbeing.
- We maintain and develop a management system with integrated safety and security guidelines.
- We are committed to safety and security guidelines and regulations.
- We identify the risks and hazards relating to our activities, make improvements and take corrective actions to remove or prevent hazards and reduce risks, and take them into consideration in planning and work performance.
- We provide personnel training and encourage compliance with safe working methods.
- We expect our partners to have a corresponding safety and security level.

Safe operations

Process safety involves ensuring our plants and facilities and gas filling stations are well designed, safely operated, secured and properly maintained.

Process safety starts with the design phase of building facilities and extends throughout their lifecycle, ensuring they are operated safely, well maintained and inspected regularly to identify and deal with any potential process safety hazards.

Keeping our employees and contractors safe and secure is our top priority, and they are required to follow [Gasum's Lifesaving Rules](#). Our safety and security training programs help to create a safety-first working culture that increases risk awareness and prevents major incidents.

We introduced the use of the chemical safety data sheet (SDS) service Ecobio Manager in the Nordic countries in 2019. The system covers all of Gasum's terminals, and biogas plants in Finland, Sweden and Norway. The system improves chemical safety within Gasum by ensuring that the latest safety data sheets are in use and that the sites have the right chemicals lists.

I am safety

We organized a safety campaign to raise awareness and strengthen our commitment.

We extended our "I am safety" campaign from the previous year by launching the "Lifesaving Rules" defined by the International Association of Oil and Gas Producers (IOGP). The nine Lifesaving Rules are key actions to improve safety performance and prevent fatal injuries during high risk activities.



OUR I AM SAFETY MAIN MESSAGE
IS
SAFETY AND SECURITY
ARE PART OF EVERYTHING
WE DO AND APPLICABLE TO ALL.

Safety training

In 2019 we launched new e-learning courses.

Our new e-learning courses were targeted at visitors to Gasum LNG terminals to ensure their safe and secure visit to our LNG sites. The e-learning courses include an introduction to the terminal, chemicals on the site, emergency exits and muster points, required personal equipment, and safety instructions.

We also started establishing safety e-learning trainings for contractors working at the LNG terminals, and for LNG truck drivers. These will all be launched at the beginning of 2020. In addition, in late 2019 we planned for and started introducing e-learning for visitors, contractors and drivers at biogas plants.

Safe products

We maintain information to support our collaborative work to make our products safer.

Our products biogas, natural gas, liquefied natural and liquefied biogas, and recycled nutrients are used in industry and energy production, maritime and road transport and in agriculture. We ensure that these products are safe from production to use.

Special attention has been paid to natural gas safety throughout the history of gas usage in Finland. Our safety work has been highly successful: natural gas has not caused any fatal accidents in Finland.

We maintain information to support our collaborative work to make our products safer. This information includes Safety data sheets, which set out clearly the hazards associated with specific products and any relevant local regulatory requirements. Safety data sheets are available on our website.

Safe logistics

Safety is a key concern in our road and maritime activities. We transport, deliver, process, and store gas, biowaste and recycled nutrients.

All transportations, whether on land or at sea, is dealt with by our logistics service providers. Whether delivering fuel to customers, equipment for projects or traveling to meetings, we work hard to keep all our drivers safe.

Our road safety approach focuses on driver skills and behavior, the condition of the transport fleet, road and local environment. Our employees, drivers and suppliers are required to comply with Gasum's safety rules. All safety incidents are reported and investigated.

We manage logistics safety through careful selection and evaluation of our logistics service providers. In 2019 our logistics operations emphasized on environmental, health and safety matters with our partners, with a focus among other things on truck to ship deliveries of LNG.

Transports of LNG by road or sea fall under the regulation of ADR and IMO, but we also provide the drivers with additional training, both theoretically and in practise involving exercises including extinguishing LNG fires in pits.

Preparedness for exceptional situations

Gasum monitors operational preparedness for emergency situations continuously.

Emergency preparedness is practiced also in annual collaborative exercises together with public emergency services and customers.

3.2.2 Safety and security performance in 2019
(403-1 Occupational Health and Safety, 403-3 Occupational Health and Safety)

DEVELOPMENT IN NUMBER OF SAFETY AND SECURITY IN 2019

The following figures present key safety data for Gasum.

ACCIDENTS THAT RESULTED IN AT LEAST ONE DAY OFF WORK



NUMBER OF RECORDED SAFETY OBSERVATIONS, RISK ASSESMENTS, SAFETY MOMENTS AND SAFETY WALKS



NUMBER OF CORRECTIVE OR PREVENTIVE SAFETY MEASURES



The number of corrective or preventive safety measures in response to registered safety observations. Does not include our LNG operations.

Other important safety figures

Our other relevant safety performance figures, including absentee days and rate, occupational accidents and lost time injury frequency rate, are shown in the table below.

SAFETY PERFORMANCE FIGURES*	2017	2018	2019
Absentee days due to accident/disease	3,090	2,589	1,359
Absentee rate	2.9	2.6	1.5
Occupational accidents	10	6	7
Lost days due to occupational accidents	287	84	133
Lost time injury frequency rate	11.7	8.4	11.2
Injury rate	0.27	0.08	0.15
Occupational disease rate	0	0	0
Work-related fatalities	0	0	0

***Absentee days due to accident /disease =**

(Total lost days (due to occupational accident/disease) in the reporting period / Total number of hours scheduled to be worked in the reporting period) x 100

Absentee rate = *(Number of actual absence days lost in the reporting period / Total days scheduled to be worked in the reporting period) x 100*

Occupational accidents = *Includes zero-day accidents and accidents that resulted in at least on day off work*

Lost time injury frequency rate = *(Number of occupational injuries in the reporting period / Total hours worked in the reporting period) x 1,000,000*

Injury rate = *Includes zero-day accidents and accidents that resulted in at least on day off work*

Occupational disease rate = *Number of occupational disease / Total hours worked in the reporting period*

4 ENVIRONMENTAL RESPONSIBILITY



CLEANER ENERGY IS OUR MISSION

We offer our customers a range of products and services that, help them reduce their carbon footprint:

- Biogas and liquefied biogas for use in road and maritime transport, industry and energy production
- Natural gas and liquefied natural gas for use in road and maritime transport, industry and energy production
- Renewable energy with Guarantees of Origin for electricity for electricity users
- Real-time monitoring of the emission allowances market, trading and managing carbon market risks
- Voluntary offsetting / Voluntary emission reductions (VERs) for companies wishing to support emission reduction projects in less developed countries and at the same time offset emissions from their own activities
- Recycled nutrient and fertilizer products for use in agriculture and industry
- Smart waste management services that enable energy and material recovery of biodegradable waste
- Organic matter for the soil, a side-stream from our biogas production

Read more about [climate change mitigation](#) and [circular economy](#) >



Gasum is committed to working towards the [United Nations Global Goals for Sustainable Development](#).

4.1 Climate change (307-1)

CLIMATE CHANGE



WE ENABLE CLIMATE CHANGE MITIGATION THROUGH RENEWABLE ENERGY, LOW-CARBON PRODUCTS AND ENERGY EFFICIENCY.

Up to
90%
Emission reduction
with our biogas

>10,000
Gas vehicles
in Finland

100%
Renewable
electricity used

WHAT WE AIM FOR

- We enable greenhouse gas emission reductions for our customers with low-carbon products by reaching our volume targets set.
- We increase energy efficiency in our operations. We aim at 1% annually until 2025.

WHAT WE ACHIEVED IN 2019

- We increased the availability of gas in the transport sector: we made a market entry into Sweden and constructed 13 new filling stations in the Nordics.
- We enabled strong growth in gas-fueled vehicles: in Finland there are now more than 10,000 and in Sweden more than 50,000 gas-vehicle registrations.
- We partnered with several heavy-duty transport operators and enabled emission cuts for industry and retail in their value chains.
- We increased LNG accessibility at sea: we extended our geographical coverage and made more than 1,000 deliveries of low-carbon fuel for the LNG-fueled vessel fleet.

- Greenhouse gas emission savings from our sustainability-certified biogas totaled 111,000 tonnes, which equals removing more than 40,000 cars from roads. The emission reduction is up to 90% compared to fossil diesel.
- Sustainability of our biogas product continued to be demonstrated with certified sustainability systems and the Nordic Swan Eco-label.
- We obtained 6.5 TWh of Guarantees of Origin of hydropower, bioenergy and wind power for our customers.
- We continued to use 100% renewable electricity in all our operations.
- We reached our annual energy saving targets.

4.1.1 Cleaner energy (102-6)

CLEANER ENERGY IS OUR MISSION

We enable CO₂ emission reductions for our customers with low-carbon energy.

We provide our customers with a range of products and services that help them reduce their carbon footprint. Our energy products offer a competitive low-carbon alternative and help road and maritime transport as well as industry and energy production reduce their emissions. Our Green services in the gas and energy markets offer carbon neutral power and adds value to customers in the energy market.



RENEWABLE BIOGAS
ENABLES UP TO 90%
EMISSION REDUCTIONS

Biogas and liquefied biogas

We are aiming to increase our biogas volumes significantly over the coming years as a gas producer and a supplier.

We offer biogas for use in transport on land and at sea, as well as to customers in industry and energy production. Biogas reduces emissions in several ways. This is as it replaces fossil fuels, but also because recycled nutrient products replace mineral products in agriculture and industry. There is potential to reduce emissions further when manure is used as a feedstock in biogas production, as methane emissions from manure management are reduced.

Fueling with the 100% renewable biogas products LBG (liquefied biogas) and CBG (compressed biogas) makes it possible for users to cut their greenhouse gas emissions generated over the fuel life cycle by up to 90% compared with traditional fossil fuels. LBG and CBG are produced from biodegradable waste and agricultural fractions.

Sustainability guaranteed

We are proud of the sustainability elements of our biogas. The biogas produced in Finland is the only Finnish fuel for vehicles that has been awarded the Nordic Swan Ecolabel.

Our biogas produced in Finland and used in transport fulfils the Nordic Swan Ecolabel criteria. The label makes it easy for consumers and professional buyers to choose the environmentally best goods and services.

The Nordic Swan Ecolabel guarantees that:

- the emission reduction is at least 60% when using sewage sludge as the raw material and 70% if the raw material is biodegradable waste;
- palm oil, soybean oils and sugar cane are not used as a raw material; and
- genetically modified plants are not used as a raw material.

In addition, biogas sold for transport use in Finland and all biogas produced in Sweden is covered by certified sustainability systems, which ensure that biofuels released for consumption meet the sustainability criteria laid down by the Renewable Energy Directive (82009/28/EC). Compliance with the criteria is reported to the energy authorities in Finland and Sweden annually, and compliance is verified by an external and independent auditor.



**USE OF GAS AS A FUEL
CAN HELP TO REDUCE LOCAL
AIR EMISSIONS IN URBAN AREAS**

Natural gas and liquefied natural gas

We offer natural gas and liquefied natural gas (LNG) for use in transport on land and at sea, as well as customers in industry and energy production.

Liquefied natural gas (LNG) is an environmentally friendly and a highly energy efficient and versatile fuel that is used to replace the use of for example petroleum-based fuels in industry, marine sector and heavy-duty road transport. The use of natural gas and LNG in road and maritime transport, as well as in industry, enabled fuel users to reduce their greenhouse gas emissions by 20% compared with fossil diesel life-cycle emissions.

In addition, use of gas as fuel can help to reduce local air emissions in urban areas. Cleaner burning than other fossil fuels, the combustion of natural gas, as well as biogas, produces negligible amounts of sulfur and small particulates, and up to 85% lower levels of nitrogen oxides (NOx), which are precursors to smog. Heavy-duty vehicles that use gas as fuel also have significantly lower noise levels compared to vehicles that use other fuels.

LNG infrastructure can be utilized for the distribution of renewable liquefied biogas (LBG). LBG works in the same engines as LNG, so the switch to LNG means an immediate possibility to start using LBG without any special investments.



**WE ENABLE AN EASY SWITCH
TO RENEWABLE ELECTRICITY
FOR OUR CUSTOMERS**

Energy market services

We aim at expanding the offering in carbon neutral power and adding value to customers in the energy market.

Our Energy Market Services operates in risk management and trading relating to emission allowances, electricity guarantees of origin and gas trading. Favoring renewable electricity is an excellent opportunity for enterprises and other actors to implement their environmental responsibility. Guarantees of Origin and other Green Certificates help our partners to reduce their carbon footprint.

We offer renewable energy with Guarantees of Origin for electricity for electricity users and voluntary offsetting and Voluntary Emission Reductions (VERs) for companies wishing to support emission reduction projects in less developed countries and at the same time offset emissions from their own activities. In addition, we do real-time monitoring of the emission allowances market, trading and managing carbon market risks. Read more about [Green services in gas and energy markets >](#)

4.1.2 Solutions for road transport (102-6)

SOLUTIONS FOR CLEANER ROAD TRANSPORT

Gas will play an even more important role in road transport in the years ahead. Role of renewable biogas will be emphasized considerably.

Gasum aims to promote awareness and availability of gas.

In road transport, the transition to more extensive use of natural gas and biogas is advancing at a rapid rate. We continued to develop the filling station network and sell compressed and liquefied natural gas and biogas for road transport in the Nordic countries. The growing filling station network responds to the rapidly growing demand particularly in heavy-duty transport in Finland, Sweden and Norway.

Alternative fuels are a necessity

Positive attitudes to cleaner energy and transport are highlighted in the Nordic countries on their way to a carbon neutral future.

Transport represents almost a quarter of Europe's greenhouse gas emissions. Within the transport sector, road transport accounts for more than 70% of all greenhouse gas emissions.

EU-wide emission limits for heavy-duty vehicles (HDV) set a clear direction for the segment. According to the targets set by the European Commission, carbon dioxide emissions from new heavy-duty vehicles (HDV) must be 15% lower by 2025 and 30% lower by 2030 compared with the 2019 level.

In the Nordics, positive attitudes to cleaner energy and transport are highlighted in the transition to climate neutral future.

- **In Finland**, the new Government Programme outlines, that Finland aims to be climate neutral by 2035. Decreasing transport-related emissions is a key priority and Finland aims to decrease the transport-related emissions by 50% by 2030 (compared to 2005) and eliminate greenhouse gas emissions in transport by 2045. Biogas plays a major role in decreasing transport emissions and various support mechanisms support gas-fueled transport. Finland has set the goal of 50,000 gas-powered vehicles on the roads by 2030, and this target will be corrected upwards based on real market development.
- **Sweden** aims to be fossil-free by 2045. The aim for road transport is to reduce greenhouse gas emissions by 70% from the 2010 level by 2030. Sweden's national freight transport strategy sets targets for continuously improving energy efficiency and breaking dependence on fossil fuels in order to reduce the climate impacts of the transport system. The Swedish Government has allocated almost to SEK 2 billion (around €200 million) under the Climate Leap programme for local initiatives to reduce greenhouse gas emissions. National investment support has been granted for biogas production, filling station infrastructure and buying low-emission vehicles.
- **In Norway**, the target is to cut greenhouse gas emissions by at least 40% by 2030 and to become a low-emission society by 2050, with greenhouse gas emissions 80–95% lower than in 1990. To reach these targets, national financial support is offered for initiatives that help to reduce greenhouse gas emissions and to develop new energy and climate technologies.



FILLING STATION NETWORK IS DEVELOPING RAPIDLY
 WE EXPANDED OUR NORDIC GAS FILLING STATION NETWORK BY 13 NEW STATIONS IN FINLAND AND IN SWEDEN DURING 2019.

Committed to construct a network of 50 gas filling stations

We are constructing a gas filling station network to respond particularly to the rapidly growing demand in heavy-duty transport in Finland, Sweden and Norway.

We are committed to constructing a network of 50 filling stations in the Nordic region in the beginning of 2020s. The new stations will be located in high-traffic areas, enabling a significant increase in the use of LNG and LBG in heavy-duty transport. Together with other actors, Gasum has already built a network of around 30 stations for long haul gas trucks in Finland, Sweden and Norway.

A total of 13 new stations were constructed in 2019. In Sweden, we opened eight HDV stations, one of which serves also lighter traffic, such as passenger cars, delivery vehicles, refuse vehicles and buses. Our Swedish network now covers a distance of around 1,000 km between the stations in Kristianstad in the south, and Östersund in the north.

In Finland, we constructed altogether five new stations. Three of them serve HDVs and four are intended for lighter vehicles. The Gasum filling station network in Finland currently comprises 34 stations, with the southernmost ones located in Helsinki and the northernmost ones in Oulu. Overall there is a network of around 50 gas filling stations in Finland.

More logistics companies choose LNG or LBG

Emission reduction targets set for heavy-duty transport at the EU and national levels steered actors towards gas-fueled operations.

Demand for low-emission solutions by the HDV transport segment and logistics buyers continued to grow. Around 150 tractor units powered by liquefied gas started operating on Finnish and Swedish roads during 2019.

The growing demand has been partly driven by the emission reduction standards of the European Union. The expanding gas filling station network makes it easier than earlier to choose gas-fueled vehicles. Development of vehicle technology in heavy-duty vehicles and cost efficiency are also driving the growing demand for gas. The gas solution is based on proven technology and already available today.

We continued to collaborate and develop new partnerships with several logistics companies and logistics buyers.

- In Sweden, [Elgiganten in collaboration with Gasum and Volvo](#) entered a testing period in which Elgiganten's transport partners will run the outgoing transport from Elgiganten's Nordic distribution centre in Jönköping on liquefied biogas. In addition, Mejeritransport AB, one of Arla Food's logistics contractors in Värmland, Sweden started operating Arla's first LBG truck in Sweden. Arla is aiming to be fossil free in the near future.
- In Finland, [Heinon Tukku started to use a biogas delivery truck in its deliveries](#). By switching to biogas, the delivery vehicle can reduce emissions by around 35 tonnes compared to diesel in one year. Also Freja Transport started semi-trailer transport with an LBG truck for running its deliveries.
- [Gasum and Valio launched cooperation](#) as Valio introduced a biogas-fueled tractor unit in the collection of organic milk. The vehicle running on biogas is part of Valio's objective to make the milk production chain entirely carbon neutral. Valio also supplies waste fractions to Gasum for use as raw material for biogas.
- Logistics solutions provider [PostNord brought into use four biogas-fueled delivery vehicles](#) in Finland, as part of their goal of

cutting the company's carbon dioxide emissions by 40% by 2020 compared with the 2009 level.

- [NCS Finland Oy, a transport and logistics company](#), and its subcontractor Pinecape Oy brought into use LNG fueled Volvo tractor unit. Likewise, two Finnish transport companies operating for DB Schenker, Sepi Trans Oy and K&O Tiilikainen, started to use tractor units fueled by LNG. Schenker intends to reduce 30% of its CO₂ emissions during the period between 2006 and 2020.
- The distribution services provider for [McDonald's in Finland](#), [HAVI Logistics](#) has replaced half of its delivery fleet by biogas-fueled vehicles. The biogas-fueled delivery fleet will help McDonald's and HAVI Logistics cut their annual carbon dioxide emissions by up to 355 tonnes. In addition, Kuusakoski, a Finnish company in the recycling business, started using its first compressed natural gas (CNG) truck.
- [The City of Lappeenranta continued to develop cleaner public transport](#). Two new gas buses of Savonlinja bus company started service public transport in Lappeenranta. The city aims to cut transport emissions by 50% by 2030.



**RECORD GROWTH
IN GAS VEHICLE NUMBERS**
THE NUMBER OF GAS VEHICLE
REGISTRATIONS INCREASED IN
FINLAND AND IN SWEDEN.

The number of gas vehicle registrations increased considerably last year

The total number of gas-fueled vehicles on Finland's roads now exceeds 10,000 and in Sweden 50,000.

Gas as a fuel is attracting interest among public and private transport operators due to the increased awareness of the cost-effectiveness and low emissions of gas cars. In addition, national support measures targeted at gas-fueled transport actively promoted the development of gas-fueled vehicle fleets and distribution infrastructure in the Nordics.

In Finland, the amount of registered gas vehicles exceeded 10,000 in 2019. The number of gas-fueled vehicles almost doubled in 2019 as more than 4,000 new gas cars were registered. Altogether 2,200 of the new registrations were first registrations (more than 1,200 in 2018), in addition to which 1,800 used gas cars were imported (more than 1,400 in 2018).

Finland's National Energy and Climate Strategy has set the goal of having 50,000 gas-fueled vehicles in domestic transport by 2030. The current popularity of gas cars is, however, indicating that the goal may be exceeded ahead of schedule.

In Sweden, there are a total of 54,000 gas cars on the roads. In 2019, the positive trend for gas driven vehicles in Sweden continued and ended up with over 5,300 registrations in 2019, which is an increase of 65% compared to 2018.

The expanding filling station network and plenty of car models available as a gas-fueled option support the growth. Gasoline-fueled cars can be retrofitted with a gas system, and used gas cars are imported to Finland from countries such as Sweden that have a large fleet of gas cars. In addition to private consumers, an increasing amount of companies choose gas cars.

Around 150 trucks powered by liquefied gas started operating on Finnish and Swedish roads during 2019.

4.1.3 Solutions for maritime

ENERGY SOLUTIONS FOR MARITIME SECTOR

Gasum is building the maritime infrastructure in Northern Europe. International regulation steers maritime transport towards the use of cleaner fuels. The role of liquefied natural gas (LNG) will be strengthened.

LNG offers several benefits by reducing local and global pollution in the maritime sector and is rapidly becoming more commonly used as a cost-effective alternative to traditional fuels for vessels.

We continued to focus our actions on expanding the LNG supply solutions and services to make LNG more accessible. We offered safe and swift bunkering services in the Baltic Sea, North Sea and in the ARA region with options to deliver LNG by truck-to-ship, terminal-to-ship or bunker by ship-to-ship. We continued to work closely with our customers to formulate the best LNG bunkering solutions and services and guide them through the process. [Read more about our logistics >](#)

Demand on the rise

Strict environmental regulations make LNG a very attractive alternative for compliance.

Up to 80% of the volume of world trade is carried by sea. Emissions from maritime transport are high: ships account for around 2.5% of global greenhouse gas emissions. In addition to greenhouse gas emissions, they also generate harmful local emissions, such as sulfur emissions, which have adverse effects on the environment and human health.

The new IMO 2020 Sulphur regulation of the International Maritime Organization (IMO) regulates the global sulfur limit to 0.5% from 2020 onwards. This is a decrease from the previous limit of 3.5%, entailing a reduction of over 85% shipping emissions. The new limit does not have an impact on Baltic Sea transport as the maximum limit for sulfur has been 0.1% since 2015 within the Baltic Sulphur Emission Control Area (SECA).

The IMO has also set a target to reduce greenhouse gas emissions from vessels by at least 50% by 2050 compared to 2008. In addition, the IMO has set strict regulations for the emissions of nitrogen oxides (NO_x). Further reduction requirements will follow for NO_x after 2021 when the emissions need to be reduced by 80% compared to the current emission level.

Switching to LNG enables the future use of renewable gases. The distribution infrastructure we are building for LNG use can also be utilized in the future for fully renewable LBG or its blend. Biogas is produced from biodegradable waste such as household biowaste or municipal sewage sludge and its use can help to cut greenhouse gas emissions by up to 85% compared with conventional fuels.



**LBG IS A 100% RENEWABLE
ALTERNATIVE**
AVAILABILITY OF RENEWABLE
LIQUEFIED BIOGAS IS ON THE RISE

Emission reductions with LNG

LNG offers several benefits by reducing local and global pollution from the maritime industry. LNG technology enables further emission reductions with renewable LBG.

LNG is rapidly becoming more commonly used as a cost-effective alternative to traditional fuels in the maritime industry. LNG is suitable for all vessel types, including ferries, passenger vessels, tankers, bulk carriers, supply and container vessels.

Using LNG means close to zero emissions of sulphur oxides (SO_x) and particulate matter (PM), and a reduction of nitrogen oxides (NO_x) emissions of up to 85% compared with current conventional petroleum-based maritime fuels.

The maritime sector's use of LNG reduces the climate impact approximately by 20%. A scientific life-cycle study conducted in 2019 by Thinkstep and commissioned by SEA\LNG and SGMF showed that, on an engine technology basis, the absolute Well-to-Wake emissions reduction benefits for LNG-fueled engines compared with HFO fueled vessels today are between 14% to 21% for 2-stroke slow speed engines and between 7% to 15% for 4-stroke medium speed engines. A total of 72% of the marine fuel consumed today is by 2-stroke engines with a further 18% used by 4-stroke medium speed engines.



ACCESSIBILITY AND INCREASED
EFFICIENCY FOR CUSTOMERS
AT SEA INCREASED
GASUM COMPLETES 200th SHIP-
TO-SHIP LNG BUNKERING

Accessibility at sea increased

Providing availability and security for the LNG-fueled fleet.

Our LNG bunker vessel, Coralius, continued to deliver LNG through ship-to-ship bunkering at sea and in port. [Ship-to-ship bunkering](#) increases our flexibility and responsiveness to vessels that require LNG.

In 2019, Coralius provided bunkering for the first time in the ARA area (Amsterdam-Rotterdam-Antwerp), in the port of Rotterdam. Another important milestone was reached as Gasum conducted its first ship-to-ship bunkering to a cruise ship. [LNG was supplied to the newbuild Costa Smeralda of Carnival Corporation](#), at the Meyer Turku shipyard. Costa Smeralda is the first cruise ship in a series of newbuilds at Meyer Turku fitted with LNG propulsion.

Coralius provided altogether 107 ship-to-ship bunkerings to various customers with the focus being mainly on Gothenburg waters in Sweden. In early 2020, Coralius performed her [200th LNG bunkering operation](#). We foresee an increase in the average volume of delivered stems, due to bigger and bigger LNG vessels coming on the water.

Increased efficiency for customers

In 2019, we expanded our [maritime fuel supply by the new Swedegas' facility](#) in the port of Gothenburg. This enables Gasum to broaden its bunkering services to LNG-fueled vessels. The benefit of the new set up is that our customers can solve two issues at the same time, both getting fuel and handling cargo. The first bunkering took place with the oil and chemical tanker Tern Ocean chartered by our customer Preem.

4.1.4 Solutions for energy production and industry (102-6)

SOLUTIONS FOR ENERGY PRODUCTION AND INDUSTRY

The diverse properties of natural gas and LNG come into their own particularly well in a variety of process applications.

Gas offers a reliable alternative and multitude of uses for industries as well as power production. It is a practical choice for industries operating in the fields of processing, paper and metal, for example. Gas flames and clean flue gases can be utilized in contexts such as heating, drying and cooking of products as well as a raw material in process industry. Restaurants use biogas or natural gas for heating and cooking. In energy production, natural gas is particularly suitable for use as a fuel for heat and steam production as well as in combined heat and power (CHP) production.

Liquefied natural gas (LNG) and liquefied biogas (LBG) bring the benefits of gas to areas outside the gas pipeline network throughout the Nordic countries.

As a diverse and clean energy source and material of industry, natural gas will still be an important part of energy consumption across future decades as well. In terms of synergies between electricity and heat, the usage of natural gas will be increasingly emphasized as a reserve fuel that is used to meet extra demand for electricity during periods of peak energy consumption.

Gas offers industrial operators a good alternative to achieve emissions targets

We entered into new partnership agreements on the supply of LNG with different industry players, such as [the cleantech company Forchem Oy's tall oil distillery in Rauma, Finland](#), and [Eastman Chemical Company Oy's production site in Oulu, Finland](#). Also Metsä Tissue began using LNG in the production processes of its Mänttä Tissue Paper mill in Finland. For all companies, LNG will support reducing their environmental footprint in the future.

The LNG will be delivered from our LNG terminals in Pori and Tornio. The Manga LNG terminal in Tornio is significantly improving the availability of LNG for maritime, traffic and industrial segments in Northern Finland and Sweden.

In Norway, Prima Protein factory in Egersund began using LNG to generate the steam used in production. Gasum delivers LNG to a customer terminal constructed at the protein factory. Natural gas was selected as fuel as it is an available and a low-emission option.

In Sweden, deliveries of LNG to LKAB's Pelletizing Plant in MalMBERGET began in 2019. In addition, agreement was made on the supply of LNG including storage tank needed for gas supply to SSAB's steel plant in Oxelösund, Sweden. OxGas AB is a subsidiary established and wholly owned by Oxelösund Hamn.



GAS OFFERS INDUSTRIAL OPERATORS A GOOD ALTERNATIVE TO ACHIEVE EMISSIONS TARGETS METSÄ TISSUE BEGAN USING LNG IN THE PRODUCTION PROCESSES OF ITS [MÄNTTÄ TISSUE PAPER MILL](#) IN FINLAND.

4.1.5 Serving energy markets

GREEN SERVICES IN GAS AND ENERGY MARKETS

We enable an easy switch to renewable electricity for our customers. Guarantees of Origin and other Green Certificates help our partners to reduce their carbon footprint.

We aim at expanding the offering in carbon neutral power and adding value to customers in the energy market. Our Energy Market Services operates in risk management of and trading relating to emission allowances, electricity guarantees of origin and gas trading.

Favoring renewable electricity is an excellent opportunity for enterprises and other actors to implement their environmental responsibility. Guarantees of Origin (GoO) are a market-based method to support renewable energy production. The Gasum's Energy Market Services obtains GoOs of renewable electricity for its partners. There are certificates verifying that the electricity is produced from renewable energy sources.

In 2019, Gasum obtained a total of 6,5 TWh of GoOs. Gasum's customers favored Nordic hydropower, bioenergy and wind power. In addition, Gasum provided brokerage and consulting services for labeling electricity with the international EKOenergy ecolabel. It ensures a positive environmental impact for the choice of electricity and oversees that the impacts of electricity generation on the climate and biodiversity have been taken into account.



GREEN SERVICES IN GAS AND ENERGY MARKETS

WE ENABLE AN EASY SWITCH TO RENEWABLE ELECTRICITY FOR THE CUSTOMERS

Gasum is an expert in the compliance-based emission trading system as well as in voluntary offsetting

Gasum monitors actively the emission allowances market and political decision-making processes, and assists its partners in emission allowances trading. Voluntary offsetting enables enterprises to, for example, support emission reduction projects in less developed countries and at the same time offset emissions from their own activities.

We find projects of specific interest to our partners and take care of trading in voluntary emission reductions (VERs) on the partner's behalf. Gasum always brokers emission reduction units approved and supervised in compliance with well-known standards.

4.1.6 Solutions in Gasum's own operations

SOLUTIONS IN GASUM'S OWN OPERATIONS

Commitment to improve energy efficiency.

Our aim is to continuously improve energy efficiency in our operations. Our tools include systematic energy management, commitment to the voluntary Energy Efficiency Agreement and internal campaigns. Read more about our recent energy management activities in the [Environmental and energy management](#) section of this report.

Energy Efficiency Agreements are an important part of Finland's Energy and Climate Strategy and a primary tool for the promotion of efficient energy use in Finland. We are committed to the voluntary Energy Efficiency Agreement for industries for the period of 2017–2025 under the Energy-Intensive Industry Action Plan.



100% RENEWABLE ELECTRICITY
WE CONTINUED TO FAVOR THE USE
OF RENEWABLE ELECTRICITY IN ALL
OF GASUM OPERATIONS

100% renewable electricity in all operations

All electricity consumed by Gasum in 2019 was generated from Nordic hydropower.

A significant proportion of the electricity sourced goes to the production of liquefied natural gas (LNG) in Risavika, Norway. The biogas plants use heat energy in their processes. Process heat is produced from non-upgraded biogas, natural gas and landfill gas. Part of the process heat is purchased as district heat.

Studying product chain life cycle emissions

To understand our impact, we study the value-chain lifecycle emissions of our products.

In 2019, we commissioned international consulting company [Afy \(former Pöyry\)](#) to study the lifecycle environmental impacts of the [natural gas supplied from Russia to Finland](#). Greenhouse gas emissions were found to be the most significant environmental impact in the natural gas lifecycle. Of the total climate impact, 19% originates from production and transmission in Russia, 1% from transmission in Finland, and 80% from the combustion by end-user, respectively. Carbon dioxide makes up most of the greenhouse gases.

We have worked over the years to continuously reduce methane emissions. Our emissions have been cut significantly during the past 10 years. Measures taken have included repair of natural gas pipeline leakages, including fugitive emissions; efficient operation during maintenance and projects; and sold distribution network business. During the planning stage of projects and investments, methane emissions are one parameter in selecting technologies. The Afy 2019 report showed that methane loss in the natural gas supply chain amounts to 0.34% of the natural gas supplied from Russia. Different studies show that natural gas has a lower climate warming potential than coal when methane emissions account for less than 1.7–5.5% of the amount of methane transmitted. The figure calculated in Pöyry's report is well below these figures.

For biogas released for consumption in transport in Finland and Sweden, we are obliged to demonstrate the greenhouse gas emission reductions. The certified sustainability systems set the framework for the solid greenhouse gas emission calculation that takes into account the entire value chain in accordance with the Renewable Energy Directive (82009/28/EC):

- *Collection, transport and processing of feedstocks*
- *Biogas production, upgrading and injection into the gas network or logistic container*
- *Biogas distribution logistics*
- *Transport use of biogas*

Compliance with the sustainability criteria is reported to the Energy Authorities in Finland and Sweden annually, and verified by an external and independent auditor.



IN OUR BUSINESS, WORK TO
MINIMIZE METHANE EMISSIONS
HAS BEEN ADVANCED FOR SEVERAL
YEARS, THE EMISSIONS HAVE
REDUCED SIGNIFICANTLY DURING
THE PAST 10 YEARS

Mapping the methane emissions

Our biogas plants in Sweden have participated in the Swedish Waste Management Association's program.

Methane emissions have been systematically mapped, measured and minimized in biogas production and upgrading. Based on experience gained in Sweden, we plan to conduct similar methane emission analyses in Finland. In addition, a procedure to map gas emissions by using a thermographic camera has been taken into use in Finland.

Read more about our [greenhouse gas emissions](#).

4.2 Circular economy

CIRCULAR ECONOMY



WE UTILIZE WIDE FEEDSTOCK BASE
IN RENEWABLE FUEL PRODUCTION
AND DEVELOP MARKET FOR
RECYCLED NUTRIENTS PRODUCTS.

660 GWh

Our biogas
production
capacity

800,000

tonnes

**BIODEGRADABLE
feedstocks**

740,000

tonnes

**NUTRIENTS
products**

WHAT WE AIM FOR

- We continue to increase the availability of biogas in the market by for example increasing biogas production capacity.
- We aim at utilizing a wide feedstock base in biogas production.
- We develop the market for recycled nutrients to promote circular economy.

WHAT WE ACHIEVED IN 2019

- We strengthened growth in the biogas market by building new biogas plants, modernizing and investing in the existing plants and increasing capacity through acquisition.
- We launched new partnerships to increase the availability of biogas.
- We developed partnerships for recycled nutrients.
- We advanced circular economy concepts in several R&D projects.

4.2.1 Biowaste and biodegradable feedstocks

CIRCULAR ECONOMY IS A KEY ELEMENT OF THE GASUM STRATEGY

Circular economy addresses the two key global challenges: climate change and resource efficiency. The role of biogas as one of the most efficient ways to promote the circular economy will be strengthened.

We promote the circular economy by making biogas available to the market, where a wide base of biodegradable waste, residues and side-streams in producing renewable energy and recycled nutrients. Increasing the availability of biogas and developing opportunities in the nutrient markets are key elements of the Gasum strategy. The circular economy is seen as a necessity in supporting climate change mitigation and sustainable growth.

Promoting the circular economy is also a prominent component of the agenda of the new European Commission that took office in 2019, and concrete measures are in the pipeline already for the year 2020. The EU's new Waste Framework Directive and its recycling targets provide concrete support to increases in biogas production. In addition, several national policy measures in the Nordic countries support the development of the biogas sector and create clear incentives for the channeling of waste and side streams to biogas production and for rapid increases in the transport use of biogas.



Turning biowaste into biogas and nutrients

We are a major processor of biodegradable fractions of waste generated in the society.

The circular economy targets set by the EU provide increased steering towards ways of processing biowaste and sludge, where the benefits obtained from side streams are fully utilized. According to these targets, 65% of municipal waste must be recycled by 2030. The current rate in Finland is 42% and 50% in Sweden.

We process biomass from agricultural side streams, crops, manure, inedible food waste from retail outlets, food industry side streams, spoiled batches, and sewage and grease trap sludge. In 2019, we processed a total volume of 757,000 tonnes of biodegradable feedstocks in Finland and Sweden (744,000 in 2018). The feedstock stream consisted of 74% biodegradable waste and residues, 22% municipal wastewater sludge, and 4% agricultural by-products and crops.

Our waste processing service enables the re-use of biodegradable waste material as energy, thereby reducing the energy lost in processes such as waste combustion or composting. In addition, nutrient residues such as nitrogen and phosphorus arising as a by-product in biogas production are returned either as recycled nutrients for industry or as recycled fertilizers for agriculture. Our network of fairly [large biogas plants](#) improves economy of scale and efficiency, and allows biomass processing to be optimized between plants depending on, for example, logistics, capacity, market conditions and different feedstock fractions.

Biodegradable feedstocks

We are focused on finding new feedstocks to increase the production volumes of biogas.

Relying on our Nordic experiences with manure-based biogas production in Sweden, we explore the potential of using animal manure also in Finland. A fresh national biogas programme in Finland identifies a large potential for biogas production from manure. Utilizing manure as a feedstock in biogas production is an efficient way to reduce emissions, as the methane emissions from traditional manure management can be avoided.

In Sweden, a number of our biogas plants aim at utilizing a wider feedstock base in biogas production. During 2019, the Jorberga and Västerås plants invested in raw material handling to enable utilization of more diverse fractions of waste and by-products more efficiently, for example slaughter house waste in Västerås.

In Finland, [Gasum entered into a letter of intent with Valio](#) to begin studies to find a collaboration model as to how animal manure could be used to produce renewable biogas road fuel. To initiate such large circular economy cooperation throughout the value chain and ultimately provide economically feasible transport fuel is currently a challenge due to issues including expensive logistics.

[Gasum also launched partnership with waste-to-energy company Oulun Energia](#) on the basic design for a biogas plant in conjunction with their Laanila eco power plant. The planned biogas plant would use the biodegradable material mixed in with municipal general waste as a feedstock.



4.2.2 Renewable biogas



STRENGTHENING AVAILABILITY OF BIOGAS

We are continuing to ensure availability of biogas to the market and increase our own biogas production capacity. In 2019, several steps were taken to further strengthen the availability of biogas.

We own 16 (2 under construction) biogas plants in Finland and Sweden and buy biogas from our partners. We continued to invest in increasing the production capacity and improving the efficiency and upgrading capacity of our biogas plants.

We are currently implementing two new biogas plant projects. At Nymölla, Sweden, a new plant is being constructed at [Stora Enso's pulp and paper mill](#) site. The biogas plant has an expected annual production capacity of 80 GWh of liquefied biogas (LBG). The plant will convert the organic material in the mill wastewater to renewable energy in the form of a fuel for cars, buses and trucks.

[At Lohja, Finland, a biogas plant project](#) is progressing and being constructed in conjunction with the Lohja Munkkaa waste management center. The plant is expected to produce more than 40 GWh of biogas and 50,000 tonnes of organic fertilizers per year. At the same time, a biowaste transfer station is being constructed in Vantaa to serve the feedstock deliveries from Helsinki area especially to the Lohja plant, but also other biogas plants.

[The expansion of the Turku biogas plant in Finland](#) was completed in 2019 and the commercial production of liquefied biogas (LBG) started in early 2020. The biomass processing capacity was increased and new refined recycled nutrient products were launched to the market. The plant will produce around 60 GWh of LBG a year from biowaste and sewage sludge.

During 2019, we also acquired [a biogas plant in Kouvola](#), Finland from Kouvola Vesi Oy. The transaction enables Gasum to invest in the expansion of the plant with the aim of increasing biogas production and modernizing the processes at the plant.

In Finland, we began investments at the plants in Oulu and Huittinen that will enable biogas utilization as a transport fuel. In Sweden, the modernization investment at the Västerås plant was completed and the Jordberga plant's feedstock intake was

improved for increased flexibility and availability.

In addition, we entered into a pre-agreement with [Tampere Regional Solid Waste Management](#) whereby we will buy the biogas produced by the new biogas plant to be built in 2020 in Koukkujärvi in Nokia.

Our biogas plant projects have been granted investment subsidies. The Swedish Environmental Protection Agency has granted an investment subsidy of €12.7 million to the Nymölla biogas plant project. The Finnish Government has granted the Turku plant €7.97 million and the Lohja biogas plant project €7.83 million under the “Bioeconomy and clean solutions” key project.



Sustainability elements of biogas

Biogas is 100% renewable, locally produced fuel, and meet the sustainability criteria laid down by the Renewable Energy Directive.

Raw biogas, that is non-upgraded biogas, is either used locally as an energy source or upgraded into biomethane. When we talk about biogas, we actually refer to biomethane, which has a composition equal to natural gas but is 100% renewable.

Upgraded biogas is injected into the existing natural gas pipeline network or transported in separate containers to destinations such as gas filling stations located in areas that are not covered by the pipeline network. Upgraded biogas can be liquefied as well. The liquefied biogas (LBG) is delivered by trucks.

The ability to utilize existing gas pipeline networks makes the supply chain energy- and cost-efficient. The amount of biogas in the gas pipeline network is managed with the Biogas Certificate system. In practice, when biogas is injected into the gas pipeline network, one Biogas Certificate is created for the system for each megawatt hour. When biogas is sold, a corresponding number of certificates is cancelled in the system. This ensures that the amount of biogas sold equals the amount of biogas produced and that biogas cannot be sold multiple times for different uses.

Biogas can be used for all the same purposes as natural gas: as a transport fuel, in combined heat and power (CHP) production, industrial facilities, home heating and cooking.

All biogas produced in Sweden, and biogas produced in Finland and sold as a road vehicle fuel are covered by [certified sustainability systems](#). The sustainability systems ensure that biofuels released for consumption meet the sustainability criteria laid down by the Renewable Energy Directive (82009/28/EC).



LOCAL VALUE CREATION
BIOGAS PRODUCTION CREATES
LOCAL JOBS AND ENHANCES
RURAL DEVELOPMENT.

In Finland, Gasum's biogas has been awarded the Made in Finland Key Flag Symbol. This demonstrates that the product has been manufactured in Finland, creating Finnish jobs.

The right to use the Key Flag can be awarded to products with at least 50% Finnish content, referring to the proportion of the Finnish cost of the break-even cost of the product. Biogas produced in Finland is made from 100% Finnish raw materials.

4.2.3 Recycled fertilizer products and nutrients

RECYCLED FERTILIZER PRODUCTS AND NUTRIENTS

Biogas production also produces domestic fertilizer products and nutrients. The safe and sustainable use of nutrient-rich by-products is important to us.

We produce high-quality organic fertilizer products, such as liquid and solid digestates containing recycled nutrients for agricultural and industrial use. We offer nutrient fractions also for other uses, such as forest industry wastewater treatment facilities.

In 2019, our biogas plants produced 740,000 tons of nutrient products. Utilisation of our recycled nutrient products in agriculture and industry replaced large quantities of mineral fertilizers, with reduced emissions as a result.

We are active in developing new products, technologies and partnerships in this area. We aim at expanding opportunities for the use of nutrient-rich digestate. New advances in biogas production have the potential to change the nutrient and fertilizer market in the same way that biogas is changing the transport sector.

The nutrients contained in recycled nutrients originating from the biogas production process can be utilized well as agricultural fertilizers or nutrient products in industry.

The use of recycled nutrients and fertilizers reduces the use of fossil based mineral nutrients such as the use of scarce phosphorus resources. Using recycled nutrients and fertilizers also cuts emissions originating in the manufacture of fossil nutrients.

The use of the digestion residue from biogas production as a soil-enhancing product also improves soil health. Digestion residue-based soil-enhancing products contain carbon compounds that make soils more fertile for food production. This can buffer the effect of climate change in agricultural soils and lower the related risks. Unlike, for example, burning biomass as energy source and releasing the carbon it contains into the atmosphere, the carbon containing soil-enhancing products helps bind carbon into the soil.

High quality is important

Nutrient products are high in hygiene quality.

All biodegradable fractions delivered to biogas plants in Finland, and fractions containing animal by-products in Sweden go through a rigorous treatment process where they are processed into organic fertilizer products. Any pathogens and pests are destroyed by heating the feedstock mass to a temperature above 70 °C.

Gasum's fertilizers are produced in compliance with fertilizer product legislation, and the operations are supervised by Finnish and Swedish authorities. In Finland, our production complies with the Decree on Fertilizer Products and operations are overseen by the Finnish Food Safety Authority (Ruokavirasto). The amount of metals and pathogens in fertilizer products is controlled through systematic sampling.

In Sweden, all of Gasum's fertilizers are certified through SPCR 120 and most of the volume is also certified for organic use. The quality standard includes tests and analyses throughout the process from raw material to the final product, a certified biofertilizer.

Handprint of our nutrient products

We took part in a Finnish research project aiming at developing a science-based method to calculate environmental handprints, i.e. demonstrate positive impacts such as emission reductions of products and services. We are studying the climate potential and nutrient resource perspectives of our recycled nutrient products. The research is led by VTT Technical Research Centre of Finland and Lappeenranta University of Technology.

RESEARCH AND PRODUCT DEVELOPMENT

During 2019, the focus in Gasum's research and product development was on the development of the Biogas business, particularly in Finland and Sweden.

The circular economy and recycled nutrients are at the core of our research and product development. We continued product development relating to new digestate processing solutions and potential uses of nutrient residues in collaboration with our partners. The aim is to process nutrient residues from biogas production to meet the needs of industrial processes, for example.

Research and product development costs related to the development of the Biogas business totaled €1.6 million (2018: €2.1 million).

Finding new feedstocks

In 2019, we were involved in several projects related to finding new feedstocks as well as processing methods to improve methane production from materials.

In Sweden, we continued work in projects under the third phase (2018 – 2022) of the Biogas Research Centre at Linköping University, in which Gasum participates in five research areas. We also worked with RISE Research institutes of Sweden, including "Residues from cereal farming" (2018–2021) aiming for improved use of agricultural residues for biogas production, "Deep litter pre-treatment" (2018–2019) developing technologies for more efficient biogas production from manure as well as in "Forest Jet II" (2018–2019) where the goal is to produce jet fuel and biogas from lignocellulosic material.

In addition to the biological biogas process, renewable methane can be produced by using gasification and methanation technologies. With partners, we are involved in developing synthetic methane gas (SNG) concepts, for example in a project financed by the Swedish Energy Agency named "Biological methanation of syngas from gasification of lignocellulose". In gasification, product gas containing hydrogen is produced from, for example, lignocellulosic biomass. Product gas can be upgraded using biological or synthetic methanation into renewable methane.

Other examples of projects and initiatives related to quality and development of circular economy from biogas plants include

- Biofibers as littering material in dairy production (Region Skåne) 2018–2021
- Developing biogas siloxane removal technology based on geopolymers from industrial side streams (Biogas for Future Electric and Gas Grids – BIOFEGG) 2018–2020
- Development of national (Finland) quality system for recycled nutrient products (LARA). The project is implemented during 2018–2019
- The occurrence of Legionella in circular economy products and the effect of hygienisation on Legionella (Legisafe). Project led by the Finnish Food Authority during 2018–2020
- Recovering nutrients from reject water using microalgae (Leväsieppari-project) during 2018–2020.



CASE: GASUM AND STORA ENSO SET EXAMPLE IN CIRCULAR ECONOMY

GASUM'S BIOGAS PLANT IS BEING BUILT AT THE SITE OF STORA ENSO'S NYMÖLLA PAPER MILL IN SWEDEN.

Gasum's biogas plant is being built on the site of Stora Enso's Nymölla paper mill

Turning the organic content of the mill's wastewater effluent into renewable energy sets an example for strategic collaboration around reuse of resources.

Producing liquefied biogas (LBG) from the wastewater stream of the mill means that the amount of pollutants that need to be processed at the wastewater treatment plant is reduced in Nymölla, offering an immediate advantage to Stora Enso.

With an expected annually production capacity of 80 GWh of LBG, Gasum's Nymölla plant will provide a significant source of renewable and environmentally friendly fuel. When used in [heavy-duty vehicles](#) (HDV), LBG offers greenhouse gas emission reductions of up to 85% compared to fossil fuels, such as diesel. The plant's production volume is equivalent to the amount of fuel needed for up to 250 longhaul trucks annually.

Gasum is currently expanding its [gas filling station network](#) for HDVs in the Nordics, in response to the increasing demand for low emission traffic. The LBG produced in Nymölla will service these operations. [Read more about the cooperation.](#)

Developing ecosystems and partnerships for recycled nutrients

During 2019, we continued work in a project to develop ecosystems and partnerships for recycled nutrients.

The project is partly funded by the Ministry of Economic Affairs and Employment. The last phase of the project in 2019 included piloting and testing of new technologies with partners in Finland, Sweden and Norway. Hydrothermal carbonization (HTC) and a new electrochemical method to enrich and preserve nitrogen in digestate were among the tested technologies. Also, within the project, the quality and quality-control of a novel recycled nitrogen product ammonia water, produced at the Turku biogas plant was developed.

During 2019 new nitrogen and phosphorus recovery technology developed at Aalto University was piloted at the Riihimäki biogas plant under NPharvest research project. We are also participating in the successor project, launched from the beginning of 2020 and aiming to commercialization of the technology.

Many of our activities regarding the circular economy related to our farm-based production plants focused on the fiber fraction in the biofertilizer. During 2019 the implementation of fiber separation took place in Katrineholm in Sweden, where the fiber can both be used as biofertilizer and as a substrate for further biogas production. Our cooperation with Hasselfors Garden continued during 2019, leading to more biofibers with the right quality being sold by Hasselfors. During 2019, SLU Alnarp was granted a three year project for developing greenhouse farming using Gasum biofibers. The project started 2019 and involves SLU Alnarp, Gasum and Hasselfors Garden. Apart from developing the biofiber product we also developed a process for and started to produce a liquid fertilizer for potted greenhouse grown herbs. It is now used in commercial scale in several greenhouses in Sweden.

4.3 Environmental management and performance in 2019

(302-1 Energy, 303-3, 305-1 Emissions, 305-2 Emissions, 305-3, 305-7 Emissions, 306-2 Effluents and Waste, 307-1)

ENVIRONMENTAL AND ENERGY MANAGEMENT AND PERFORMANCE IN 2019

100%

Renewable electricity
used in our own
operations

1.5%

Decrease
in total electricity
consumption of
Gasum Group

95%

Reduction in effluent
environmental load
at Turku biogas
plant

We aim at minimizing our environmental impact and increasing energy efficiency.

We strive to use materials, energy and water in a sustainable way. This section outlines our environmental and energy management and performance in 2019.

Our certified integrated management system (IMS) supports our work in continuous improvement of energy efficiency and prevention of environmental degradation. The IMS consists of quality, environmental, energy, occupational health and safety management systems (ISO 9001, ISO 14001, ISO 50001 and OHSAS 18001 standards), as well as the sustainability system. 63% of our facilities and offices are covered by a certified system. Gap analyses took place at Gasum's biogas plants in Finland in 2019 concerning increasing the coverage of quality, energy, environmental, occupational health, and safety and security management systems.

System conformity is evaluated annually through internal audits as well as audits conducted by an external organization. The status of the IMS and related performance indicators as well as progress of development actions are presented in regular management reviews.

Environmental management

Our key environmental aspects include air emissions, energy consumption, odor nuisances, and environmental impacts caused during project construction.

We continued to invest in maintenance and process improvements to improve our environmental performance. In 2019, the focus was on minimizing flaring at our biogas plants and LNG terminals and improving odor treatment at biogas plants.

We introduced the use of the chemical safety data sheet (SDS) service in the Nordic countries in 2019. The system covers all of Gasum's terminals, and biogas plants in Finland, Sweden and Norway. The system improves chemical safety within Gasum by ensuring that the latest safety data sheets are in use and that the sites have the right chemicals lists.

Our ISO 14001 environmental management system scope includes supply, purchasing, transmission and distribution of natural and biogas, as well as supply of liquefied and compressed natural and biogas including filling stations and gas related energy services. The national gas grid with its operations were part of the Gasum environmental management system until the end of 2019.



WE CONTINUED TO INVEST IN MAINTENANCE AND PROCESS IMPROVEMENTS TO IMPROVE OUR ENVIRONMENTAL PERFORMANCE

Environmental compliance

We are determined to adhere to all applicable laws and regulations affecting us in our daily operations.

Compliance with laws and regulations is tracked and managed with a compliance tool that allows us to identify and assess all regulatory needs. During 2019, the system was expanded with country and business unit specific law collections and implemented for new business units in Norway, Sweden and Finland.

No environmental fines or non-monetary sanctions were recorded in 2019.

All sites systematically follow up on any deviations, pro-actively report observations, conduct safety walks and compile risk assessments. We use reporting tools in the management and reporting of the environment-related actions, which helps us improve the environmental performance and awareness.

In 2019, we reported more than 50 environmental observations, and 7 environmental breaches (5 in 2018). The breaches occurred at our biogas plants. Six breaches were minor and related to exceedance of air and water emission limits, as well as odor from plants. One breach of microbe concentration in rainwater is under further investigation. Gasum has reported the breaches to the authorities and to local stakeholders where relevant. Measures were taken to normalize the situation and the breaches were investigated to prevent similar occurrences in the future.

Water management

In most of our biogas plants, we reuse the process and waste waters.

Gasum's total water withdrawal in 2019 was 263,000 cubic meters (262,000 in 2018). The figure includes municipal water, groundwater and rainwater. Water is used mainly as process water in biogas plants and as tap water in offices.

Our target is to utilize recycled water in the biogas production process as much as possible. We see internal recycling of reject water as a logical solution for operating the plants and valuable from the economical and environmental point of view.

At biogas plants, the internal recycling of reject water not only reduces the need for water withdrawal, but also improves the plants' heat balance and reduces the amount of wastewater. Water consumption is also reduced by utilizing sites' run-off waters in the biogas process, and by optimizing the production processes.

Some of the excess process water is utilized in forest industry. Nitrogen-rich process water is used as a nitrogen source for microbes at forest industry waste water treatment plants.

At many of our plants, waste waters are not produced at all due to efficient recycling. The plants where waste waters are produced are equipped with efficient technologies for water purification and recovery of nutrients and organic carbon. We aim at increased recovery of nutrients from the waste water, which helps to lower the effluent's environmental load before discharging to waste water treatment plant.

The water consumption (intake of clean process water), as well as the volume of waste water are measured and reported.

In our LNG supply chain, sea water is used as ballast water in the vessels. After use, ballast water is released back to the sea unpolluted. The amount of seawater used as ballast water in LNG supply chain vessels totaled 157,000 cubic meters in 2019 (217,000 in 2018).



AT MANY OF OUR BIOGAS PLANTS,
WASTE WATERS ARE NOT
PRODUCED AT ALL DUE TO
EFFICIENT RECYCLING

Examples of how we have developed our water management

- AN INVESTMENT AT OUR TURKU BIOGAS PLANT included a commissioning of an efficient evaporator and stripping process, which enables 95% recovery of the effluent's nitrogen as a valuable ammonium-water concentrate, utilized in the industry. In addition, the process recovers phosphorus and organic carbon from the effluent. The evaporator and stripping process reduces the effluent's environmental load up 95%, after which it is treated at a local waste water treatment plant. Part of the effluent is utilized by recycling it back to the biogas production process.
- AT OUR VEHEMAA BIOGAS PLANT, effluent is treated with evaporator and reverse osmosis filtration. This technology enables the recovery of nutrients and organic carbon as a concentrate and purifies the effluent to a level that meets with quality requirements of releasing the water directly into the environment. The equipment also recycles practically all process water that the biogas plant consumes.

Waste management

The majority of Gasum's process waste is recycled or recovered.

The total amount of waste generated in 2019 was 10,013 tonnes (6,525 tonnes in 2018). The amount of waste from the natural gas transmission operations was increased due to one decommissioning project. Waste weights from natural gas pipeline were reused for road construction and noise protection barriers.

Our most significant proportion of solid waste consists of sand and package materials removed from the raw material stream received for biogas production. In 2019, we received several batches of low-quality feedstock, which contributed to the increased waste volume from our biogas plants. The amount of waste generated compared to the feedstock handled by the biogas plants is however very low, about 1%.

Energy management

We continued to develop our energy efficiency through the certified ISO 50001 energy management system.

Our energy management system scope included our biogas operations (upgrading and liquefaction), natural gas operations (production of LNG and supply of natural gas) and gas logistics (LNG /LBG and CNG/CBG via terminals, vessels, trucks, filling stations and injection units). The Finnish national gas grid with its operations was part of the Gasum energy management system until the end of 2019.

In 2019, systematic work was done to improve the energy efficiency of the LNG terminals, ships and trucks. Our Øra LNG terminal in Norway invested in six new vaporizers to secure increased demand and gain energy savings. Projects contributing to energy efficiency included also constructing a biogas liquefaction unit in Turku and investing in biogas upgrading units in Oulu and Huittinen. Energy efficiency was in a key role when choosing filling station technologies. Within the natural gas transmission system, pressure reduction boiler renewals were continued and two leaking gas outflow valves were repaired in 2019.

The total energy consumption of Gasum in 2019 was 428 GWh (438 GWh in 2018). Gasum's electricity consumption totaled 154 GWh (156 GWh in 2018) and fuel consumption 254 GWh (221 GWh in 2018). The fuel consumption includes biogas, raw biogas, natural gas, light fuel oil, diesel and LNG. The renewable energy source is mainly biogas used in the biogas plants' own processes.

In 2019, the total energy consumption in the supply chain (scope 3) was 135 GWh (79 GWh in 2018), including both diesel and LNG

consumption.

We participate in the voluntary Finnish Energy Efficiency agreement for the 2017-2025 period.

Our energy saving target is 7.5% by 2025, including an intermediate target of 4% in 2020. The target applies to the use of electricity, heat and fuels. Our energy saving target for the agreement period has been updated because of the changed company structure in 2019: the new target is 6,207 MWh (3,200 MWh) by the end of 2020 and a total of 11,639 MWh (6,000 MWh) by 2025.

We monitor the fulfillment of the objectives of the agreement on an annual basis and the achievement of the objectives is progressing as planned.



TOTAL ELECTRICITY CONSUMPTION
OF GASUM GROUP DECREASED
BY 1.5% in 2019.

Air emissions

Gasum's greenhouse gas emissions consist mainly of carbon dioxide and methane emissions.

Our greenhouse gas emissions in 2019 totaled 74,000 t CO₂eq (78,000 in 2018). This figure includes our direct greenhouse gas emissions and the emissions from the purchased energy (market-based). The majority of the direct greenhouse gas emissions are generated in our LNG supply chain. Of the scope 1 and scope 2 (market-based) greenhouse gas emissions, 43% originated from our operations in Finland, 19% in Sweden and 38% in Norway.

Due to the switch to using 100% renewable electricity in all operations, Gasum's carbon dioxide emission from electricity under the market-based method is zero.

A significant proportion of the methane emissions originated from the natural gas transmission system. The increased emissions in 2019 are mainly due to several on-going projects and maintenance activities in natural gas transmission system, where gas pipeline had to be emptied for ensuring safe working conditions.

We have worked continuously over the years to reduce methane emissions, and in a 10-year period the reduction has been significant. For several years, emission reduction work has been advanced at our biogas plants in Sweden, where we have participated in the Swedish Waste Management Association's (Avfall Sverige) program. In 2019, we continued systematic methane measurements together with an external partner. A reliable baseline of measurements supports us in setting further goals for methane emission reductions. We will continue self-monitoring according to the new and upgraded program, organized by the Swedish Waste Management Association and the Swedish Water Management Association (Svenskt Vatten).

Based on experience gained in Sweden, we plan to conduct similar methane emission analyses in Finland. In addition, a procedure to map gas emissions by using a thermographic camera has been taken into use in Finland.

In 2019, we commissioned a study on [the lifecycle environmental impacts of the natural gas supplied](#) from Russia to Finland. The study was conducted by Afry (former Pöyry). Of the total climate impact of the entire value chain, CO₂ made up most of the greenhouse gases, and 3% was caused by methane. The report also showed that methane loss in the supply chain amounts to 0.34% of the natural gas supplied. Different studies show that natural gas has a lower climate warming potential than coal when methane emissions account for less than 1.7–5.5% of the amount of methane transmitted. The figure calculated in Afry's report is well below these figures.

The total amount of Gasum's (scope 1) nitrogen oxides (NO_x) emissions was 29 tonnes in 2019 (35 in 2018). In addition, LNG supply-chain emissions from outsourced vessels and trucks equaled 454 tonnes of nitrogen oxides in 2019 (271 in 2018).

KEY ENVIRONMENTAL DATA 2019

	2019	2018	2017
FEEDSTOCKS total, tons	757,000	744,000	782,000
Agricultural side streams	31,000	172,000	136,000
Biodegradable waste	556,000	410,000	464,000
Municipal wastewater sludge	170,000	162,000	182,000
ENERGY CONSUMPTION, GWh			
Fossil fuel consumption	157.6	155	91.1
Renewable fuel consumption	96.5	64.2	46.5
Electricity consumption	154.1	156.2	122.6
District heat consumption	31.6	25.9	32.8
Steam consumption	31.5	47.5	44.7
Steam sold	0	0	2.7
Heat sold	7.1	6.6	11.7
Electricity sold	4.5	4.7	6.3
Total energy consumption	428.2	437.5	317

	2019	2018	2017
EMISSIONS INTO AIR, tons			
Direct CO ₂ eq emissions (Scope 1)	66,000	64,000	45,000
Indirect CO ₂ eq emissions (Scope 2, location-based calculation)	15,000	24,000	50,000
Indirect CO ₂ eq emissions (Scope 2, market-based calculation)	8,000	14,000	-
Total CO₂eq emissions (Scopes 1 and 2, location-based calculation)	80,000	88,000	95,000
Total CO₂eq emissions (Scopes 1 and 2, market-based calculation)	74,000	78,000	45,000
Other indirect GHG emissions (Scope 3)	28,000	16,000	38,000
Direct CH ₄ emissions (included in Scope 1 emissions)	459	388	244
Direct biogenic CO ₂ emissions	80,000	13,000	9,000
Nitrogen oxides, t	29	35	26

	2019	2018	2017
NON-HAZARDOUS WASTE			
Reuse	592	0	8
Recycling	208	106	97
Composting	439	919	338
Recovery	5,864	2,249	4,788
Incineration	175	1,090	543
Landfill	3	10	14
Other	2,640	2,086	1,149
HAZARDOUS WASTE			
Reuse	1,7	64,7	70
Recycling	1,7	0	0,3
Composting	0	0	0
Recovery	17	27	33
Incineration	472	11	14
Landfill	0	0	0
Other	24	26	30
ENVIRONMENTAL FINES			
Fines, €	0	0	€5,700

	2019	2018	2017
WATER WITHDRAWAL, m³			
Municipal water	179,876	195,600	207,565
Groundwater	29,732	24,871	27,812
Seawater	156,503	217,188	0
Rainwater	53,221	39,998	12,207
Surface water	0	0	451

Principles of data calculation and descriptions of scopes

- Scopes 1, 2, 3 are accordance with the Greenhouse Gas (GHG) Protocol and GRI Standards:
 - Scope 1: Includes facilities and sites which are owned by Gasum or its subsidiaries.
 - Scope 2: Includes facilities and sites which are owned or controlled by Gasum or its subsidiaries. Emissions from purchased energy come from the use of heat, electricity and steam. Amount of cooling energy is negligible, and is not reported separately. Indirect greenhouse gas emissions from electricity and heat procurement are determined based on the location-based and market-based methods. The Finnish Energy Authority updated the location-based emission factor of Finland's electricity from 128.5 g CO₂e/kWh to 117 g CO₂e/kWh based on 2018 data.
 - Scope 3: Includes business flights and train journeys, as well as vessel and truck transports operated and owned by cooperation partners.
- Changes in scope of environmental and energy data compared to previous year:
 - Scope has been extended to include Kouvola biogas plant, Jyväskylä office and 13 new filling stations. 5 offices have been removed from the reporting scope (Risavika, Lohja, Oslo, Göteborg and Stockholm, where altogether 49 of our employees work). In addition, Gasum Technical Services was owned by Gasum for the first two months of 2019 and was included in reporting for that time period.
- Biogenic carbon dioxide is emitted at the biogas plants in the combustion of biogas and landfill gas for energy production, in flaring, and in biogas upgrading process. Biogas is a biofuel whose carbon dioxide emissions are not counted in the total emission amounts of Gasum's greenhouse gases. The scope and coverage of reporting of biogenic carbon dioxide emissions has been extended from previous years.
- The global warming potential (GWP) of methane is considered to be 28 times that of carbon dioxide based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

- Location-based calculation of greenhouse gas emissions: A location-based method reflects the average GHG emissions intensity of grids on which energy consumption occurs, using mostly grid-average emission factor data.
- Market-based calculation of greenhouse gas emissions: A market-based method reflects emissions from electricity that an organization has purposefully chosen. It derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy.

5 ECONOMIC RESPONSIBILITY

(201-1 Economic Performance, 201-3 Economic Performance, 203-1 Indirect Economic Impacts)



RESPONSIBLE BUSINESS

For us, implementing economic responsibility means operating profitably, transparently and competitively. That allows us to generate economic value for shareholders and to be a reliable employer, investee and partner for stakeholders.

This section outlines our continuous development of the Nordic gas market together with our partners. We describe our impact on the surrounding society through the payment and collection of taxes and by being a solid payer of dividend.

Read more about [tax foot print](#), [green finance](#) and [economic performance in 2019](#) >



Gasum is committed to working towards the [United Nations Global Goals for Sustainable Development](#).

5.1 Tax footprint

(201-1 Economic Performance, 201-3 Economic Performance, 203-2 Indirect Economic Impacts)

TAX FOOTPRINT



GASUM COMPLIES WITH COUNTRY-SPECIFIC LEGISLATION AND REGULATIONS IN TAX PAYMENT, COLLECTION, REMITTING AND REPORTING.

GASUM AS A TAXPAYER

Gasum complies with country-specific legislation and regulations in tax payment, collection, remitting and reporting.

Taxation is always a consequence of business activity and taxes are paid in compliance with legal provisions in the country where the activity is located. Gasum's tax strategy aims to ensure the realization of investments, flexibility of operations and capability to pay dividends to shareholders.

Gasum makes efforts to manage and reduce any taxation-related uncertainties, and our aim is to manage tax issues in a manner enabling timely response to future challenges. Taxation-related matters are evaluated continuously whenever changes take place in external regulation and our operations expand to new areas.

We participate continuously in the development of tax legislation and policies and want to be involved in the development of a fair, clear and consistent tax system. As part of tax management, in spring 2018 Gasum entered into an enhanced customer relationship with the Tax Office for Major Corporation in Finland. Enhanced customer relationship is an ongoing collaboration between Gasum and tax office and has continued during 2019.

The Collaboration with Tax Office for Major Corporation supports Gasum's tax strategy and intent to be a responsible taxpayer and promote smooth and interactive collaboration with the authorities. In our tax reporting, we also comply with the guidelines concerning state-owned companies issued by the Ownership Steering Department in the Prime Minister's Office.

Tax environment in 2019

Changes in Finnish energy taxation enhance the competitiveness of gas against coal.

In the beginning of 2019, changes in the Finnish energy taxation entered into force, which enhance the use of natural gas in combined heat and power production. The changes increased the taxation of coal in CHP production by around €3 per megawatt hour and decreased the taxation of natural gas by around €0.7 per megawatt hour. Moreover, no new tax increases for heating fuels were introduced in the government budget for 2020. In Finland, biogas continues to be exempt from the excise duty and governmental actions to guarantee the predictability of biogas' tax status are currently underway.

In Sweden, the national tax scheme encourages shift from oil and coal to gas. Natural gas is charged with full CO2 tax but

exempted from energy tax in the traffic sector, which encourages a transition from diesel to gas-powered vehicles. In 2019, the Government of Sweden increased the tax on diesel in the mining sector, which made gas a more viable option. Biogas is exempted from both CO₂ and energy tax in all sectors. At the end of 2019, a Government inquiry on biogas was presented. It proposes keeping the current tax exemption on biogas while introducing a broader and more robust production subsidy.

In Norway, the 2020 national budget, presented in September 2019, contained tax increases on natural gas affecting the industry, maritime and traffic sectors. The Ministry of Climate and Environment is expected to present a new action plan on biogas during 2020. As of now, the use of biogas is exempted from tax.

Tax footprint

The tax footprint illustrates the taxes and tax-like payments, by country, received by society from the company's operations.

Gasum is striving transparency in its tax reporting and ensure that the tax footprint is correctly understood and reported. In our communication we report our taxes transparently, consistently and reliably. Our quantitative tax data is presented in the following table.

The periods are not directly comparable with each other:

- In February 2019, Gasum sold its subsidiary Gasum Tekniikka Oy to the industrial maintenance partner Viafin Service Oyj.
- In August 2018, Gasum acquired the energy market services business of Enegia, which covered the shareholdings in Enegia Consulting Oy (currently Gasum Consulting Oy), Enegia Portfolio Services Oy (currently Gasum Portfolio Services Oy) and IntStream Oy. In addition, Gasum acquired a further holding in Skangas AS (currently Gasum AS), raising Gasum's holding in the company to 100%.
- In early 2017, Gasum sold its Finnish heat business and local distribution network gas sales to Auris Kaasunjakelu Oy. In addition, Gasum acquired a further shareholding in Skangas AS in Norway and carried out the acquisition of Swedish Biogas International, which resulted in the transfer of 100% of the shares of Swedish Biogas International AB (currently Gasum AB) and its subsidiaries to Gasum.

Acquired and divested companies are included in the figures reported for the periods during which they have been part of the Gasum Group.

TAX FOOTPRINT*

€ thousand	FINLAND			NORWAY			SWEDEN			TOTAL		
	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Taxes paid												
Corporation taxes	27,356	31,435	31,454	161	122	549	0	-158	107	27,517	31,399	32,11
Asset-related taxes**	185	330	170	52	58	92	66	74	72	303	462	333
Employer's contributions	4,722	5,095	5,336	203	192	184	2,055	1,48	1,148	6,98	6,767	6,668
Total taxes paid	32,263	36,86	36,96	416	371	825	2,121	1,396	1,327	34,8	38,628	39,112

TAXES COLLECTED

	FINLAND			NORWAY			SWEDEN			TOTAL		
Value-added tax, sales	234,811	241,315	184,755	19,202	22,679	19,653	22,842	32,556	8,664	276,333	296,55	235,386
Value-added tax, purchases	67,281	38,725	26,414	25,98	38,542	33,949	35,664	33,7	6,58	128,678	110,968	78,578
Value-added tax, net	167,594	202,589	158,341	-6,778	-15,863	-14,296	-12,822	1,144	12,084	147,655	185,5825	156,809
PAYE deductions from salaries	7,152	7,464	6,98	1,724	1,722	1,636	0	1,47	1,102	8,615	10,656	9,718
Employee's social security contributions	653	1,246	1,691	0	0	0	0	796	654	1,553	2,042	2,345
Energy taxes, sales***	63,052	67,18	59,646	6,39	6,39	607	742	742	835	70,184	74,312	61,089
Energy taxes, purchases***	65,793	68,556	60,376	15,421	896	198	0	46	923	81,214	69,498	61,497
Energy taxes, net	-2,742	-1,376	-729	-9,031	5,494	409	742	687	-88	-11,031	4,814	-408
Taxes at source	0	34	30	0	0	0	0	0	0	0	34	30
Total taxes collected	173,638	209,957	166,312	-14,086	-8,648	-12,251	-12,08	1,819	13,752	146,792	203,129	168,493
Total taxes paid and collected	205,901	246,817	203,272	-13,67	-8,276	-11,426	-9,958	3,216	15,079	181,593	241,757	207,605
Revenue by country	945,185	940,839	728,47	76,032	86,102	65,434	106,383	150,507	131,083	1,127,599	1,177,448	924,987
Profit before tax	89,713	114,439	115,214	25,433	-15,132	-11,647	8,539	1,247	1,247	123,685	100,554	99,884
Personnel on average	244	329	292	53	62	53	76	56	50	373	446	395

*Includes continued and discontinued operations.

**Real estate tax and asset transfer tax.

***Includes energy tax, strategic stockpile fee and carbon dioxide tax.

The Group companies at December 31, 2019 by country are as follows:

- Finland: Gasum Ltd, Gasum LNG Oy, Gas Exchange Ltd, Oulun Biotehdas Oy, Riihimäen Biotehdas Oy, Gasum Consulting Oy, Gasum Portfolio Services Oy, IntStream Oy, Suomen Kaasunsiirtopalvelut Oy, Baltic Connector Oy
- Norway: Gasum AS
- Sweden: Gasum LNG AB, Gasum AB, Gasum Västerås AB, Gasum Stigtomta AB.

5.2 Green finance

GREEN FUNDING IMPACT REPORT

Gasum's Green Funding Framework covers Gasum's renewable energy production, circular economy products, waste management operations and energy efficiency measures.

In July 2019 Gasum renewed its external credit facility. In the same context, Gasum set Green Funding Framework in order to promote company's value in the transition towards low carbon society. As of end of 2019, 39% of the loans taken out from the credit facility were used to finance businesses with the positive environmental and climate impacts.

The credit facility was issued by SEB (Skandinaviska Enskilda Banken AB), Nordea and OP Corporate Bank and [was evaluated by CICERO Shades of Green](#) (Center for International Climate Research). CICERO Shades of Green gave Gasum's Green Funding Framework the grade of dark green, which is allocated to the most climate friendly projects or business solutions that promote the long-term vision of the transition to a low-carbon society. The shades in the evaluation ratings are dark green, medium green and light green.

In addition, Gasum's financing and corporate responsibility management was evaluated as being of an excellent standard by CICERO. CICERO's methodology aims to provide transparency for investors and a chance to see the climate risks and impacts in business activities.

Use of proceeds

The amount equal to the net proceeds of the Green Funding, totalling 152 million EUR, were allocated to finance/refinance Gasum's biogas portfolio assets. The biogas assets are eligible with the criteria of verified asset category 'Renewable or circular economy adapted products' within the Gasum's Green Funding Framework.

The financed renewable energy production is doing its part to promote positive climate impacts of the company's business. In 2019, we continued to invest in increasing the production capacity of biogas and improving the efficiency and upgrading capacity of our biogas plants. We utilized a wide base of biomass in biogas production, totaling 757,000 tonnes of biodegradable feedstocks consisting of 74% biodegradable waste and residues, 22% municipal wastewater sludge, and 4% agricultural by-products and crops. The financed renewable energy generation in 2019 totaled 419 GWh, and the corresponding annual greenhouse gas emission reduction was 106,000 tonnes of CO₂ equivalent.

Biogas produced by Gasum is 100% renewable, locally produced fuel, and meets the sustainability criteria laid down by the Renewable Energy Directive. Biogas can be utilised in road and maritime transport, industry and energy production. In addition, nutrient residues arising as a by-product from the biogas production process, are returned either as recycled nutrients for industry, or as recycled fertilizers for agriculture.

Funded operations spread in across 17 localities in Finland and Sweden. At two localities the operations are in construction phase.

EXPECTED ENVIRONMENTAL IMPACT



ANNUAL GHG EMISSIONS
REDUCED IN 2019,
106,000 tonnes of CO₂ equivalent.

ANNUAL RENEWABLE ENERGY
GENERATION IN 2019, 419 GWh.

Calculation principles

The greenhouse gas reduction made possible as a result of assets to which green funding proceeds have been allocated has been calculated according to methodologies and assumptions described here.

The calculations were carried out on the basis of portfolio-based specific emission calculation, based on an annual level analysis for the year 2019.

The greenhouse gas emission calculations are based on the guidelines on the sustainability criteria provided by the Finnish Energy Authority and the Swedish Energy Authority. The determination of greenhouse gas reductions is in accordance with the Renewable Energy Directive (RED 2009/28/EC). The amount of CO₂ emissions avoided is based on the emission calculations carried out in the context of Gasum's certified sustainability systems in Finland and Sweden. The sustainability systems and the calculations are verified annually by an independent certification body.

The emissions of the Finnish plants that do not belong to Gasum' sustainability system are estimated based on emission data of other plants.

Grid factors used in calculation of greenhouse gas emissions are 117 g CO₂eq/kWh for Finland and 47 g CO₂eq/kWh for Sweden. Fossil fuel comparators used in calculation of the greenhouse gas emission saving are 83.8 g CO₂eq/MJ for traffic use, 85 g CO₂eq/MJ for cogeneration, 77 g CO₂eq/MJ for heat production, and 91 g CO₂eq/MJ for electricity production.

Carbon dioxide (CO₂), nitrous oxide (N₂O) and methane emissions (CH₄) are taken into account in the greenhouse gas emission calculations. The Finnish and Swedish authorities refer to the GWP100 values defined in the Renewable Energy Directive (2009/28/EY), thus the GWP value of 23 for methane and 296 for N₂O were used in the calculations.

5.3 Economic performance in 2019

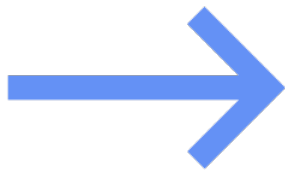
(102-1 General Disclosures, 201-1 Economic Performance, 201-4 Economic Performance)

ECONOMIC RESPONSIBILITY PERFORMANCE IN 2019

For us, implementing economic responsibility means operating profitably, transparently and competitively. That allows us to generate economic value for shareholders and to be a reliable employer, investee and partner for stakeholders.

In 2019, Gasum Group's financial performance met the set targets. Our objective is to create value to the owner and the society. We set targets and measure our performance with key financial metrics such as Return on Capital Employed (ROCE) and different profitability measures.

The financial performance figures are reported more specifically in the Financial reports. Read more about [Gasum's business development, balance sheet, the financial position, capital expenditure and acquisitions](#).



GREEN FUNDING
OUR FINANCING STRATEGY
PROMOTES TRANSITION TO A LOW-CARBON SOCIETY.

Direct economic value generated and distributed

Gasum is a significant economic player in its operating environment in the Nordic countries.

The most significant direct cash flows in our operations arise from sales revenue from customers, energy purchases including energy taxes, purchases of goods and services from suppliers, payments to financiers and shareholders, growth and maintenance investments, personnel expenses, and taxes paid.

No changes took place in the company's ownership structure in 2019. The State of Finland has 100% ownership of Gasum. Of the shares, 73.5% are held by the state-owned Gasonia Oy and 26.5% directly by the State of Finland. Our contributions to society include paying dividends and taxes for securing the basic functions of the welfare society. Capital expenditures as well as purchases of goods and services provide employment locally as well as outside Gasum's operating areas.

The following table presents Gasum's cash flows to various stakeholders, such as personnel, providers of capital, suppliers, shareholders and the public sector.

The periods are not directly comparable with each other:

- In February 2019, Gasum sold its subsidiary Gasum Tekniikka Oy to the industrial maintenance partner Viafin Service Oyj.
- In August 2018, Gasum acquired the energy market services business of Enejia, which covered the shareholdings in Enejia Consulting Oy (currently Gasum Consulting Oy), Enejia Portfolio Services Oy (currently Gasum Portfolio Services Oy) and IntStream Oy. In addition, Gasum acquired a further holding in Skangas AS (currently Gasum AS), raising Gasum's holding in the company to 100%.
- In early 2017, Gasum sold its Finnish heat business and local distribution network gas sales to Auris Kaasunjakelu Oy. In addition, Gasum acquired a further shareholding in Skangas AS in Norway and carried out the acquisition of Swedish Biogas International, which resulted in the transfer of 100% of the shares of Swedish Biogas International AB (currently Gasum AB) and its subsidiaries to Gasum.

All of these companies are included in the figures reported for the periods during which they have been part of the Gasum Group.

Financial support received from government

In 2019, Gasum received a total of €56.3 million in investment support.

Financial assistance was received for current and future investments in Finland and Sweden. Support was mainly targeted at biogas plant investments, filling station construction and the interconnector pipeline under construction between Finland and Estonia.

Direct economic value created and distributed

DIRECT ECONOMIC VALUE CREATED AND DISTRIBUTED*		TOTAL		
Economic value generated, € thousand		2019	2018	2017
Customers	Earnings from sales and purchases of products and services, including energy taxes	1,127,599	1,177,448	924,987
Total economic value generated		1,127,599	1,177,448	924,987
ECONOMIC VALUE DISTRIBUTED				
Suppliers	Purchases of products and services	865,803	886,772	660,653
Personnel	Salaries, remuneration and employer's contributions	38,151	40,117	38,452
	Interest and other financial costs	3,556	3,844	5,091
Financial institutions	Other financial institutions (finance lease)	13,540	13,474	6,002
Shareholders	Dividends**	32,902	32,902	50,000
Public sector	Taxes payable for the period and energy taxes of purchases	109,034	101,358	93,940
Community	Donations	20	18	6
TOTAL ECONOMIC VALUE DISTRIBUTED		1,063,007	1,078,691	854,144
	Economic value retained	64,592	98,757	70,843

*Includes continued and discontinued operations.

**Dividends are presented on a cash basis.

Development and impact of infrastructure investments and services supported

Gasum continued to make significant investments supporting society and the environment in 2019 by investing in the increased operational efficiency of its biogas plants and in the production of organic nutrient products.

The feedstocks base of the biogas plants in Sweden is being expanded from agricultural side streams to biowaste. The development of the Biogas business promotes the circular economy and improves access to renewable energy. Increased production of renewable energy promotes society's emission reduction aims. With our energy market services, we facilitate our customers' energy efficiency management and their carbon footprint reductions through Guarantees of Origin for electricity.

The Gasum Group's capital expenditure on intangible fixed assets and property, plant and equipment 2019 totaled €124.4 million (2018: €48.0 million). Most of this was to do with the construction of new filling stations, biogas plant expansion investments and the interconnector pipeline under construction between Finland and Estonia.

6 ACCESS TO ENERGY



ACCESS TO ENERGY

We develop a smart, efficient and sustainable energy ecosystem and fulfill customer needs on land and at sea.

This section outlines our products and the versatile infrastructure we have in place for the sourcing, transmitting and liquefying of gas, as well as delivering the products via terminals and other logistical means. In addition, our networks of biogas plants and filling stations are presented.

We offer a low-carbon alternative to petroleum-based fuels and coal, and help our clients achieve their emission reduction targets.

Read more [about gas](#), [sourcing](#), [logistics](#) and [energy market services](#) >



Gasum is committed to working towards the [United Nations Global Goals for Sustainable Development](#).

6.1 About gas

THE ROLE OF GAS

The role of gas as an energy source will increase further as action is taken against climate change and the Nordic countries are moving towards carbon-neutral energy production.

Gas can help road transport, industry and maritime to meet the emission targets. Gas offers sustainable, efficient and competitive alternatives on our journey towards carbon neutrality.

Gas is being used above all to replace coal and oil-based fuels. Gas is an affordable and low-emission source of energy that can help to achieve significant emissions reductions in industry, power and heat production as well as in road and at maritime transport.

Natural gas and biogas help to meet the emission targets

Natural gas and biogas can be used for the same purposes and the existing infrastructure can be utilized without any modifications.

Natural gas and biogas can be converted into liquid gas by cooling them to $-162\text{ }^{\circ}\text{C}$. After liquefaction, biogas is referred to as liquefied biogas (LBG) and natural gas as liquefied natural gas (LNG). Liquefied gas can be used in the same cars, trucks, ships and tanks for both products. Liquefied gas can be delivered outside the gas pipeline network. In the liquid state, it only takes 1/600 of the volume of gas in the gaseous state. This is why liquefied natural gas and liquefied biogas can be stored, transported and used conveniently and cost-effectively. Natural gas and biogas has a net calorific value (NCV) of 10 kWh/m^3 .

Biogas is made from 100% local feedstocks and is a renewable energy source. It is produced through the processing of various types of organic waste. The gas is purified and upgraded to approximately 97% methane.

Natural gas is almost pure methane, odorless, tasteless and non-toxic, and it does not contain sulfur, fine particulate matter or heavy metals. Natural gas is the cleanest of the fossil fuels in terms of greenhouse gases and other flue-gas emissions with relation to produced energy.

The production of renewable synthetic natural gas (SNG) is also under development and an option in the futures. Renewable SNG can be produced by gasifying biomass such as wood (bio-SNG) or through electrolysis from renewable electricity (e-SNG).



GAS CAN BE USED FOR MANY PURPOSES

- industry
- road transport for heavy-duty and light duty-vehicles
- maritime
- combined heat and steam production
- combined heat and power (CHP) production
- instead of electricity in many processes
- a variety of process applications
- heating, drying and cooking of products

[Read more](#) about how we enable climate change mitigation through renewable energy and low-carbon products and energy efficiency >

6.2 Sourcing and production

WE SOURCE GAS AND ENERGY RESPONSIBLY

Gasum sources gas, energy and other commodities for customers.

Our main sourcing categories are natural gas, LNG, power and other commodities. We work together with our suppliers to enhance our competitiveness through continuous development and proactive risk management.

Natural gas sourcing

Gasum sources natural gas from Russia originates from Western Siberia, presumably from the gas fields of Yamburg and Urengoy. The gas company Gazprom is in charge of natural gas production and transmission on the Russian side up to the Finnish border.

LNG production and sourcing

For LNG production, Gasum sources natural gas off-shore via a subsea pipeline system in Norway. The LNG production facility is located in Risavika, Norway, has a production capacity of 300,000 tonnes LNG per year.

LNG is produced by removing CO₂ and water from natural gas, and by liquefying the product by cooling it down to approximately 162 °C below zero. LNG is stored at atmospheric pressure in a large containment tank.

LNG is also imported to the Nordic countries via terminals in Northwestern Europe. We deliver LNG for fuel use to areas not covered by the gas pipeline network. The terminals are located in Øra and Risavika, Norway, Lysekil, Sweden, and in Pori and in Tornio at the joint venture Manga LNG terminal, in Finland. [Read more about logistics >](#)

Power sourcing

Gasum Portfolio Services take care of electricity sourcing and optimization of electricity production. In addition Gasum Portfolio Services provides portfolio management services for power consumers and producers of various sizes as well as for operators within the emission trading system.



POWER SOURCING

GASUM PORTFOLIO SERVICES TAKE CARE OF ELECTRICITY SOURCING AND OPTIMIZATION OF ELECTRICITY PRODUCTION.

Sourcing principles

The Gasum Group complies with the principles of openness, transparency and non-discrimination regarding suppliers and other stakeholders in all of its operating countries. The Group expects its suppliers to comply with the same principles and rules that the Group follows in its operations.

Our procurement guidelines describe and determine our procurement processes and principles that must be followed in sourcing. We expect that our suppliers comply with the same principles and rules that govern our operations.

We evaluate the performance of our critical partners. By evaluating suppliers in conjunction with procurements, we make sure cooperation with suppliers is in compliance with our adopted principles.

We are improving our supplier network and we set as a goal for 2019 to extend the scope of our assessments to include all our critical suppliers. In 2019, 58 critical suppliers were identified from the Gasum Groups supplier base. The selected critical suppliers were subject to both internal and self-assessments, followed up by an interview to verify the results.

The assessments help Gasum to validate each supplier and consider their capability to deliver services to Gasum. Selected suppliers will be audited base on results from the internal and self-evaluation, the focus area which for 2019 was Safety (i.e suppliers working at our sites in activities related to maintenance, services, construction), and specific Business Unit needs/interests (size, importance of product/service, cost amounts etc.). Based on these criteria 10 critical suppliers have been selected and will be audited together with an external partner during winter 2020.

Network for Sustainable Procurement

Gasum is a member of the Ecolabelling Network for Sustainable Procurement.

We seek to look for and favor ecolabeled products whenever possible. Alternative ecolabeled products are explored in conjunction with sourcing, and decisions on products to be procured are made as cost-effectively as possible. Suppliers that show awareness of the external environment and energy consumption (compliant with ISO 14001 and ISO 50001) are preferred.



Increase biogas production capacity

We are continuing to increase the biogas market and biogas production capacity. Our Nordic network of [biogas plants](#) in Finland and in Sweden is a model example of circular economy implementation.

We own 16 (2 under construction) biogas plants in Finland and Sweden and buy biogas from our partners. We continued to invest in increasing the production capacity and improving the efficiency and upgrading capacity of our biogas plants. Read more about [Circular economy - Biogas >](#)



Open gas market

Gasum owned the Finnish natural gas transmission pipeline network and acted as the Finnish transmission system operator (TSO) with system responsibility until the end of 2019.

At the start of 2020, the Finnish pipeline gas market opened up to competition and the unbundling of Gasum's transmission business was completed as a new company, Gasgrid Finland Oy, commenced its operations on January 1, 2020.

6.3 Logistics and distribution

SAFE LOGISTICS AND DISTRIBUTION

We transport, deliver, process, and store gas, biodegradable biomass and recycled nutrients

All transportations, whether on land or at sea, are dealt with by our logistics service providers. Whether delivering fuel to customers, equipment for projects or traveling to meetings, we work hard to keep all our drivers safe. Gasum is the biggest distributor of LNG in the Nordic countries.

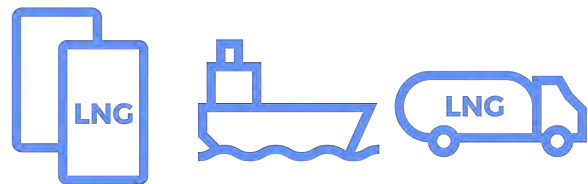
Fuel deliveries for maritime and industry customers

We deliver liquefied natural gas (LNG) and liquefied biogas (LBG) to all our customers from our production plants in Norway and in Turku as well as from sourcing partners in Europe.

Gasum is the biggest distributor of LNG in the Nordic countries. We are able to load LNG at world-scale terminals and operating area is in the North Sea and the Skagerrak area.

Our ways of delivering gas to customers:

- truck-to-ship
- terminal-to-ship
- ship-to-ship bunkering at sea and in port
- to terminal by truck
- via local gas grids to industry located nearby
- trucks to industrial facilities with customers' terminals



The terminals are located in Øra and Risavika, Norway, Lysekil, Sweden, and in Pori and in Tornio at the joint venture Manga LNG terminal, Finland. Read more about [our terminals](#) and [shipping portfolio](#) >

Gas filling station network serves the transportation customers

We are actively developing the gas filling station network and aim to increase the number of Gasum stations in Nordic.

Gasum is promoting cleaner road transport in the Nordic countries. We are committed to investing in the development of the low-emission gas market. We will construct around 50 [gas filling stations](#) in Finland, Sweden and Norway by the beginning of the 2020s. The investment will multiply the size of the Nordic heavy-duty vehicle gas filling station network, enabling considerable emission cuts.

The key criteria for our filling station investments are demand, location, technical feasibility and management of operational and maintenance operating models.



Feedstocks and biogas deliveries for biogas production

Gasum's biogas plants provide services in waste treatment, biogas production and distribution of recycled fertilizers.

Upgraded biogas is injected into the existing natural gas pipeline network or transported in separate containers to destinations such as gas filling stations located in areas that are not covered by the pipeline network.

Feedstocks used in biogas production include biodegradable waste, such as inedible biowaste from food retail outlets, agricultural side streams, and sewage sludge, as well as agricultural biomass. Feedstocks are delivered to Gasum biogas plants by trucks.



Supply certainty at excellent level

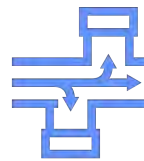
Our target is that there are no unplanned disruptions in the supply of natural gas or biogas. Supply certainty is maintained in a systematic and preventive manner and disruptions are extremely rare.

The supply certainty of natural gas, LNG and biogas was at a good level throughout the year, and there were no delivery disturbances in gas supply.

In 2019, natural gas business had no unplanned supply disruptions in natural gas supply to its customers. Several planned activities occurred but due to careful planning they did not affect the amount of gas deliveries. The supply certainty of natural gas has been at an extremely high level more than 40 years. Key roles are also played by systematic and planned maintenance work, continuous gas network monitoring, real-time alerts and backup system maintenance.

Supply certainty in LNG deliveries was strengthened by the introduction of the world's first LNG carrier holding the Ice Class 1A Super the year earlier, Coral EnerglCE. The vessel enables disruption-free deliveries in all weather conditions.

In addition, the supply certainty of biogas has been excellent over the past years and also remained at an excellent level in 2019.



6.4 Energy market services

ENERGY MARKET SERVICES TO CUSTOMERS

Gasum enables easy operations and adding value to customers in the energy market with partners.

As part of the Gasum strategy to develop the Nordic gas market, we offer energy wholesale users and producers comprehensive services, the latest market information and the most flexible software solutions in the market.

Gasum's Energy Market Services assist customers to operate successfully in the energy market, providing the strategic planning of long-term sourcing and production and risk management strategy and speedy response to changes in the market situation. Our services include taking care of power sales, sourcing and production for our customers throughout the market chain. We operate in risk management and trading relating to emission allowances, electricity guarantees of origin and gas trading.

Our portfolio management services provide access to the best possible power prices for up to several years ahead. In the wholesale physical power market, we can participate in trading on behalf of our customers and tap into market opportunities around the clock. We are in power sourcing [cooperation partner with Kesko](#).

We entered into [a three-year contract with the Finnish electricity transmission system operator Fingrid](#), under which Gasum is responsible for portfolio management and trading services relating to Fingrid's loss power. The volume of losses in Finland's power transmission grid is around 1.2 TWh a year, which equals to 1.5% of Finland's entire electricity consumption.



WE ENTERED INTO
A CONTRACT WITH FINGRID
THE VOLUME OF LOSSES IN
FINLAND'S POWER TRANSMISSION
GRID IS AROUND 1.2 TWh A YEAR,
WHICH EQUALS TO 1.5% OF
FINLAND'S ENTIRE ELECTRICITY
CONSUMPTION.

The control room monitors the energy market around the clock

In the [Gasum Control Room](#), the energy market is monitored 24/7. This real-time monitoring enables careful power balance management, power price optimization and access to the reserve market.

It also provides customers with day-ahead forecasts and carries out trading in the day-ahead market. It offers customers' adjustable capacity in the reserve market and takes care of communication between the transmission system operator and the customer.

We also help our customers operate responsibly by obtaining Guarantees of Origin for electricity. Favoring renewable electricity is an excellent opportunity for enterprises and other actors to implement their environmental responsibility. In addition, we act as an expert in emission allowances trading. Read more about [Gasum energy market services](#).

7 REPORTING AND DATA



REPORTING PRINCIPLES

Gasum reports annually on its sustainability performance at the Group level. The Corporate Responsibility Report for 2019 presents Gasum's approach to sustainability and disclosures on significant performance topics.

Relevant disclosures to our operations, products and stakeholders have been selected based on an assessment of the material sustainability issues for Gasum and its stakeholders. This report has been prepared in accordance with the GRI Standards: Core option.

Financial statements are prepared and disclosed in compliance with the International Financial Reporting Standards (IFRS) and governance-related reporting in compliance with Finnish legislation. Our economic performance indicators are based on audited data. Personnel and health and safety figures as well as reporting on environmental aspects are in accordance with the GRI Standard, while costs are reported in compliance with the Finnish Accounting Board's general guidelines for recording, accounting and disclosing of environmental issues as part of the financial statements. Gasum's reporting takes place under Finnish law and the guidelines issued by the Ownership Steering Department in the Prime Minister's Office.

Information concerning many of the reported disclosures can also be found in Gasum's Year 2019 news feed, Gasum Financial Review 2019, and Gasum Governance and Remuneration 2019. All of these documents can be found online at www.gasum.com - [Key figures](#).

The report was published in English on [the Gasum website](#) on March 6, 2020.

Reporting scope and data

Our reporting covers the whole Gasum Group and other support functions (Finance, Legal & IT, HR & HSEQ, Communications).

The reporting period of this Corporate Responsibility Report is the same as that of the Financial Statements, i.e. the financial year from January 1 to December 31, 2019. Each GRI disclosure is stated in the [GRI Content Index](#). The reporting boundaries include the entire Group unless otherwise stated in the GRI Content Index.

Gasum collects environmental and safety data from the CRM system, CSM environmental database, Generis database,

weighing scales system and the Quentic accident and incident reporting system. Human resources data is from the Personec W payroll system and Sympa system. Economic indicator figures have been calculated from accounting figures obtained from the CRM system. The figures correspond to those presented in the financial statements. There are no significant changes in disclosure calculations.

The HSEQ unit is responsible for sustainability, safety and security, and environmental indicator monitoring and the compilation of the Corporate Responsibility Report. The HR organization is responsible for the monitoring and compilation of indicators relating to social responsibility. The financial indicators for the report are produced by the Finance organization.

UNITS USED IN THE REPORT



1 terawatt hour (TWh)	1,000 gigawatt hours (GWh)
1 gigawatt hour (GWh)	3.6 terajoules (TJ)
1 cubic meter (m3)	1,000 liters (l)
1 tonne (t)	1,000 kilograms (kg)
1 tonne of carbon dioxide equivalent (t CO2e)	1,000 kilograms of carbon dioxide equivalent (kg CO2e)
1 tonne of LNG	49.3 gigajoules (GJ)
Liquefied biogas (LBG), liquefied natural gas (LNG)	For heavy duty vehicles
Compressed natural gas (CNG), Compressed biogas (CBG)	For passenger cars, delivery vehicles, waste management vehicles and buses

8 CONTACT INFORMATION



CONTACT INFORMATION

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Gasum in briefly

The Energy Company Gasum is a Nordic gas sector and energy market expert.

We offer cleaner energy for combined heat and power production and industry as well as cleaner fuel solutions for maritime and road transport. We support our customers to decrease their own carbon footprint and that of their customers. Together with our partners, we are building a bridge towards a carbon-neutral future on land and at sea. We promote circular economy and are the leading supplier of biogas and processor of bio-degradable waste. We are also the leading liquefied natural gas (LNG) player in the Nordic market. The Gasum Group has around 350 employees in Finland, Norway and Sweden. Gasum is owned by the State of Finland. Read [more about Gasum responsibility >](#)

In Accordance - Core

Gri Indicator	Topic	Page	Comments	Assurance	Location
GRI 102: GENERAL DISCLOSURES					
Organizational Profile					
102-1	Name of the organization	Company in brief and strategy			
102-2	Activities, brands, products, and services	ACCESS TO ENERGY			
102-3	Location of headquarters	CONTACT INFORMATION			
102-4	Location of operations	Company in brief and strategy			
102-5	Ownership and legal form	Company in brief and strategy GOVERNANCE			
102-6	Markets served	Solutions for energy production and industry Climate change Solutions for road transport Solutions for maritime Recycled fertilizer products and nutrients			
102-7	Scale of the organization	Company in brief and strategy			
102-8	Information on employees and other workers	People			
102-9	Supply Chain	ACCESS TO ENERGY			
102-10	Significant changes to the organization and its supply chain	ECONOMIC RESPONSIBILITY REPORTING AND DATA			

102-11	Precautionary principle or approach		In line with the precautionary principle, Gasum acts with care and diligence to prevent environmental degradation and takes into account the probability or the risk of degradation, accident risk and opportunities to prevent accidents and mitigate their impacts.
102-12	External initiatives	Stakeholder engagement	
102-13	Membership of associations	Stakeholder engagement	
	Strategy		
102-14	Statement from senior decision maker		
102-15	Key impacts, risks, and opportunities	Risk management	
	Ethics and integrity		
102-16	Values, principles, standards, and norms of behavior	Guiding principles	
102-17	Mechanisms for advice and concerns about ethics	Guiding principles	
	Governance		
102-18	Governance structure	GOVERNANCE	
102-20	Executive level responsibility for economic, environmental, and social topics	GOVERNANCE	
102-26	Role of highest governance body in setting purpose, values, and strategy	GOVERNANCE	

102-31	Review of economic, environmental, and social topics	Responsibility program	
102-35	Remuneration policies	Guiding principles Competence	
	Stakeholder engagement		
102-40	List of stakeholder groups	Stakeholder engagement	
102-43	Approach to stakeholder engagement	Stakeholder engagement	
102-44go	Key topics and concerns raised	GOVERNANCE	
	Reporting practice		
102-46	Defining report content and topic boundaries	GOVERNANCE REPORTING AND DATA	
102-47	List of material topics	Responsibility program	
102-49	Changes in reporting	GOVERNANCE	
102-50	Reporting period	REPORTING AND DATA	January 1 to December 31, 2019
102-51	Date of most recent report		March , 2018
102-52	Reporting cycle	REPORTING AND DATA	
102-53	Contact point for questions regarding the report	CONTACT INFORMATION	
102-54	Claims of reporting in accordance with the GRI Standards	REPORTING AND DATA	
102-55	GRI content index		

GRI 200: ECONOMIC TOPICS

GRI 201: Economic Performance

GRI 103: Management Approach

103-2	The management approach and its components	GOVERNANCE	
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201-1	Direct economic value generated and distributed	Economic performance in 2019
201-2	Financial implications and other risks and opportunities due to climate change	Risk management
201-4	Financial assistance received from government	Economic performance in 2019

GRI 203: Indirect Economic Impacts

203-1	Infrastructure investments and services supported	Economic performance in 2019
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GRI 300: ENVIRONMENTAL TOPICS

GRI 301: Materials

GRI 103: Management Approach

103-2	The management approach and its components	GOVERNANCE Environmental management and performance in 2019
301-1	Materials used by weight or volume	Environmental management and performance in 2019
301-2	Recycled input materials used	Biowaste and biodegradable feedstocks

GRI 302: Energy

GRI 103: Management Approach

103-2	The management approach and its components	Environmental management and performance in 2019
302-1	Energy consumption within the organization	Environmental management and performance in 2019
302-2	Energy consumption outside of the organization	Environmental management and performance in 2019
302-4	Reduction of energy consumption	Environmental management and performance in 2019

GRI 303: Water

GRI 103: Management Approach

303-1	Water withdrawal by source	Environmental management and performance in 2019
303-3	Water recycled and reused	Environmental management and performance in 2019

GRI 305: Emissions

GRI 103: Management Approach

305-1	Direct (Scope 1) GHG emissions	Environmental management and performance in 2019	
305-2	Energy indirect (Scope 2) GHG emissions	Environmental management and performance in 2019	
305-3	Other indirect (Scope 3) GHG emissions	Environmental management and performance in 2019	
305-7	Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	Environmental management and performance in 2019	SOx, VOC and PM emissions are not significant in our operations.

GRI 306: Effluents and Waste

GRI 103: Management Approach

306-2	Waste by type and disposal method	Environmental management and performance in 2019
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GRI 307: Environmental Compliance

GRI 103: Management Approach

307-1	Non-compliance with environmental laws and regulations	Environmental management and performance in 2019
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GRI 400: SOCIAL TOPICS

GRI 401: Employment

GRI 103: Management Approach

103-2	The management approach and its components	GOVERNANCE People
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401-1	New employee hires and employee turnover	People performance in 2019
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GRI 403: Occupational Health and Safety

GRI 103: Management Approach

103-2	The management approach and its components	GOVERNANCE Safety and security
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403-1	Workers representation in formal joint management-worker health and safety committees	Safety culture
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403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	Safety and security performance in 2019
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GRI 404: Training and Education

404-1	Average hours of training per year per employee	Competence
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404-2	Programs for upgrading employee skills and transition assistance programs	Competence
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GRI 405: Diversity and Inclusion

405-1	Diversity of governance bodies and employees	People performance in 2019
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GRI 415: Public Policy

415-1	Political contributions	Stakeholder engagement
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