Environment

Protecting the climate and the air

With regard to environmental protection, Snam spent approximately €**100.3 million** (€89.2 million on investments and €11.1 million on operating costs).
In 2018 approximately €**0.4 million** were allocated to the territory as donations and sponsorships and about €**2.3 million** in environmental compensation.

The fight against climate change and the land and biodiversity protection are the challenges at the centre of the work of many companies that strive to combine the objectives of business and social responsibility. When creating new infrastructures and managing the existing ones, Snam has a tight, transparent, collaborative and constructive approach to ensure the environmental compatibility of the sites and to facilitate the stakeholders' acceptance.

Snam is present, through its infrastructure, in almost all the country's regions, in areas and communities that vary in terms of culture, traditions and economic, social and environmental conditions.

Protecting the environment, biodiversity, and the territory are integral parts in defining Snam's corporate policies and investment decisions.

All of the Snam's activities are monitored by certified environmental management systems (ISO 14001).

Natural gas is an energy source that can guarantee a pathway to decarbonisation at a national and European level. Snam is investing to develop the infrastructures necessary to enhance the security of energy supplies, to facilitate the creation of an European market and to promote the use of compressed natural gas in the transportation sector, to increase the use of liquefied natural gas and biomethane.

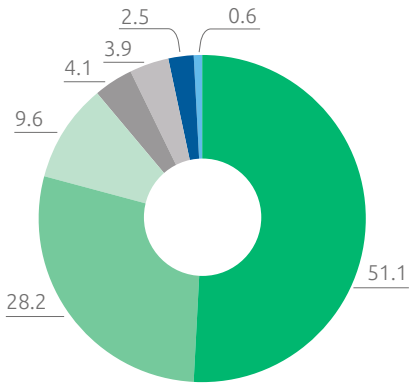
SUSTAINABILITY OF THE GAS SYSTEM

In the coming years there will be a significant increase in the global gas demand, driven by the Americas and by China, where an increase in energy requirements will be accompanied by the growing role of renewable energy, more efficient technology and the gradual transition from other fossil sources to natural gas. The main factors fuelling the global energy demand, according to the future scenarios developed by the International Energy Agency (IEA), are the economic growth and the increasing populations of emerging countries. Natural gas will be a protagonist in the evolution of the energy mix, taking on different roles in different geographical areas.

Gas will continue to play a central role in the European decarbonisation, in line with the EU objectives already or to be defined (2020 Climate & Energy Package and Clean Energy Package) specifically making an important contribution to the transport and thermoelectric sectors, while coal gradually being phased out of production and increasing intermittent renewable sources. The use of the latter, which is hardly foreseeable, will require greater support from natural gas, a source which, by definition, can be programmed.

Volumes in Italy remain essentially stable.
European trends in demand, together with the decline in the domestic and coal production, will require the development of new import routes.

Enviromental Expenses (%)



Investment plan (2018-2022)

€ 5.7 Bn

of which € 850 million will be allocated to the TEC Project, in order to accelerate Snam's innovative capacity

In this context, Snam anticipates an acceleration of the investment plan (€5.7 billion in the five-year period 2018-2022), with a confirmed focus on replacement and maintenance activities in order to guarantee the maximum flexibility and efficiency of the existing infrastructure. Under the scope of the investment plan, €850 million will be allocated to the TEC Project (Tomorrow's Energy Company), whose goal will be to accelerate the Snam's innovative capacity and its assets to take advantage of the opportunities offered by the development of the energy system. The TEC Project will focus, in particular, on four areas: greater operational efficiency, reduction of methane emissions (-25% by 2025); energy transition; innovation and the strengthening of core competencies.

Natural gas can contribute to the goal of guaranteeing a progressive decarbonisation together with other non-programmable renewable sources such as wind energy and solar energy. A greater use of natural gas means fighting climate change and lower emissions of sulphur dioxide, nitrogen oxides and particulates, with a crucial impact on the air pollution abatement measures in cities.

Additionally, the gas system could facilitate the options of decarbonisation and renewable consumption thanks to the introduction into the network of:

- renewable gases, such as biomethane, bio syngas and "green" hydrogen, obtained from anaerobic digestion and biomass gasification technologies, electrolysis of renewable electricity;
- low carbon natural gas and hydrogen, obtained from technologies that capture carbon and then store or reuse it (CCS/CCU).

Furthermore, other options which contribute to decarbonisation are made possible thanks to the spread of technologies based on the possibility of incorporating renewable energy from the environment (gas heating pumps) or using renewable gases very efficiently producing combined renewable electricity and heat and/or renewable hydrogen.

Hack4Talents

Hack 4 Talents is the Snam's initiative created with a view to attracting young talent, extremely innovative from a digital perspective, to join the Digital Transformation & Technology department. The initiative was presented last August through the launch of the **online platform for gathering candidates** (around 150 applications were received) and, after selecting the best ones, which was concluded in October, the young talents were directly involved in a Hackathon day at the Roncade H-Farm, a digital platform innovation hub designed to host events such as this. A 14-hour marathon in teams - three groups in competition over three projects striving to achieve the best possible result for each of the challenges assigned, working in "agile" mode. Currently 3 people who took part in the initiative have joined the company.

Innovation for business development

Innovation and exploitation of technological assets are important tools in the Company's strategy. During 2018, various research and development activities launched in previous years were either continued or completed. At the same time, some new projects were launched with a potential impact on various areas of corporate operations.

Gas metering

The development of innovative technologies and methods for metering and monitoring natural gas and the related impact in the following areas:

- **Alternative instruments:** the gradual introduction into the transport network of instruments for measuring the quality of gases as an alternative to gas chromatography, the installation of quality analysers and automation and remote reading, the adaptation of the parameters of the quality of the gas meters installed in the network
- **Forecasting demand:** new gas demand forecasting based on the use of machine learning methodology
- **Estimating natural gas emissions:** under the scope of collaboration with the European research agency GERG (Groupe Européen de Recherches Gazières, www.gerg.eu), the evaluation of two methods for estimating international natural gas emissions and research into the potential impacts, on the entire gas chain, of the chemical components present in traces of biomethane in order to create the conditions for safe development.

Governance and monitoring of the network and plants

Installation of innovative systems for controlling and monitoring the network and plants in the following areas:

- **Remote control:** the development of the Smart Tel project designed to analyse the requirements of acquisition processes and the management of network control and operating data,
- **Security:** the installation of phonometric type systems for detecting any accidental system leaks, initiatives for fire safety, the replacement of security management systems at facilities and the installation of new electronic systems with SIL certification (Safety Integrity Level),
- **Monitoring of compression units:** the creation of an acquisition and display system for the main compression unit operating and monitoring data,
- **Electro compressors:** a preliminary feasibility study into the introduction of electro compressors at storage sites,
- **Cogeneration:** the installation of a trigeneration plant at the gas compression stations of Gallese and Istrana.

Integrity of infrastructures

Creation of experimental projects and the development of collaboration aimed at guaranteeing the physical integrity of infrastructures in the following areas:

- **Collaboration with EPRG:** collaboration with the EPRG (European Pipeline Research Group, www.eprg.net), an association that carries out research into issues concerning pipelines which Snam is a member of
- **Electrical protection:** innovation project for the electrical protection system, aimed at testing innovative operating solutions and equipment
- **Geochemical and micro-seismic monitoring:** the creation and installation of geochemical and micro-seismic monitoring prototypes in the area of storage.

Maintenance and monitoring of networks

The launch of experimental projects to optimise and strengthen maintenance and monitoring activities for transportation networks in the following areas:

- **Revision of maintenance processes:** the implementation of the "Gas Transportation Network Asset Maintenance System", which is aimed specifically at completely overhauling work processes and regulations related to the transportation network, compression stations, metering and remote control systems.
- **Experimentation with leak detection:** the trialling of a system aimed at identifying and locating gas leaks along the transport network, based on the analysis of the pressure waves and the detection of possible disruptions
- **Experimentation with monitoring overflight aircraft:** the evaluation of currently available satellite detection technologies and participation in experimental activities, conducted by ENAV and ENAC, into the development of flight infrastructure for drones in BVLOS mode (Beyond Visual Line of Sight).

New businesses

The creation of dedicated working groups for taking an in-depth look at issues related to the development of new businesses, with special reference to:

- **Working group for the innovative use of existing infrastructure**: a working group dedicated to sharing information and experience on the issue of the use of infrastructure in relation to its capacity to transport (and possibly store) gases other than natural gas, including hydrogen.

Natural gas represented

96.4%

of the Company's energy requirements

ENERGY CONSUMPTION

The Snam energy mix, in line with the company's commitment to fighting climate change, is composed almost entirely of natural gas. In 2018, natural gas represented 96.4% of the Company's energy requirements.

Snam's main energy consumption is due to gas turbines used in the compression plants that provide the pressure needed to transport gas (boost consumption) and storage concessions (storage consumption), which globally represent 88% of total consumption.

In 2018, energy consumption totalled around 13,281 TJ (+5.6% compared with 2017). This increase is mainly due to greater natural gas consumption due to the increase in the quantity of gas stored in deposits (+9%).

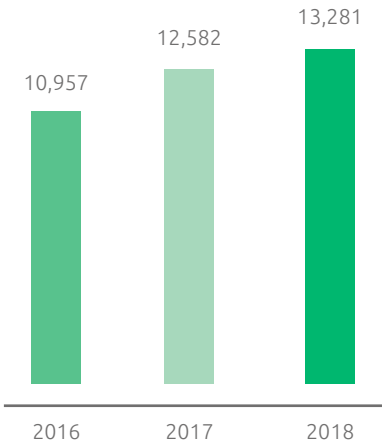
The energy consumption from transportation, which depends on a series of factors, some of which are out of the Company's control because they are depend on the commercial decisions of customers (e.g. gas delivery and collection points and therefore which backbone corridor is used), have essentially remained unchanged compared with 2017 in spite of two new stations (Minerbio and Sergnano) coming into service which has led to greater consumption of fuel gas through their commissioning.

The energy consumption from the regasification activity, which has a relative low weight on total consumption (3.5%), increased by 42% compared with 2017, perfectly in line with the increase in the quantity of gas regasified.

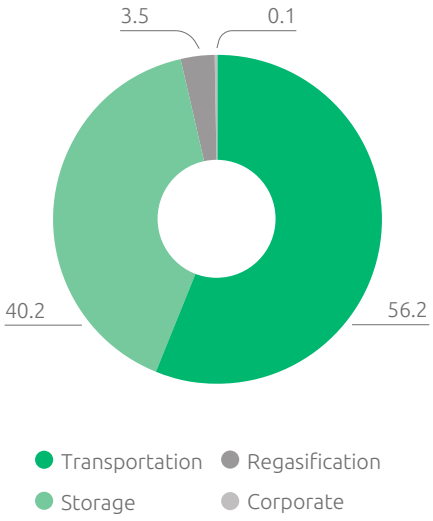
In addition to natural gas, the other energy sources are electricity (2.8%) and other fuels (diesel fuel, petrol, LPG and heat), which together amount to 0.8% of the total consumption.

In February 2018, Snam acquired the **82% of Tep Energy Solution (Tep)**, one of the major Italian companies active in the energy efficiency industry as an energy service company (ESCO). Tep's mission is to make its customers more competitive by reducing energy expenses. The acquisition falls within Snam's strategic plans focused on facilitating the decarbonisation and a better use of energy.

Energy consumption (TJ)



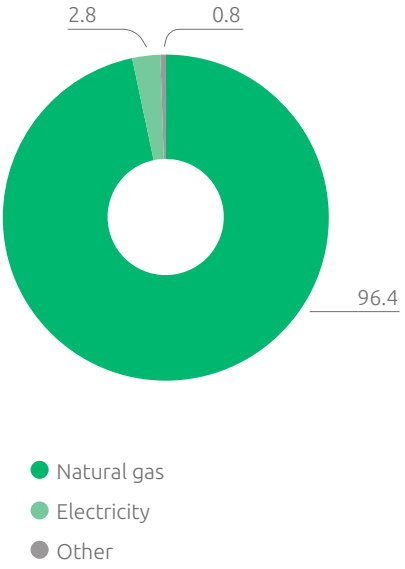
Energy consumption by activity (%)



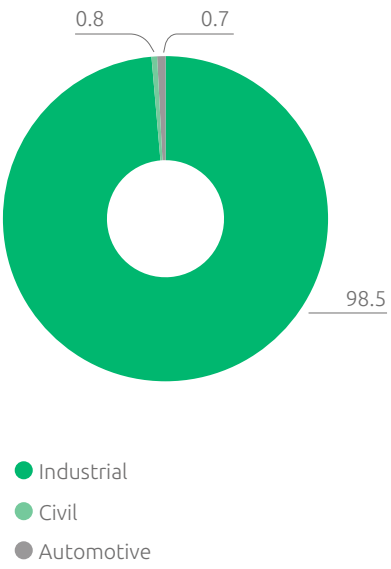
The future is already out there

There was an advertising campaign in 2018 dedicated to biomethane and energy efficiency. The multi-channel communication project was aimed at a wide-ranging audience with the objective of publicising the company's commitment to the decarbonisation of cities through the use of renewable gas and the optimisation of energy consumption. In addition to social networks and digital media, the campaign, with the slogan "The future is already out there", was released throughout the country and in Milan, specifically, through images telling of the importance of the circular economy and the energy efficiency of buildings to improve air quality and the battle against climate change.

Energy consumption by souce (%)



Energy consumption by use (%)



THE PRODUCTION OF ENERGY FROM RENEWABLE SOURCES

Snam installed photovoltaic plants on several of its real estate properties (territorial headquarters and maintenance centres) and also at some of the gas storage facilities.

In 2018 the total number of plants reached 1,535 units (+12% compared to 2017) and the installed power increased by 68 kW compared to 2017, passing from 986 kW to 1,054 kW (+7%).

This increase mainly regards the installation of 168 new back-up plants.

The total energy produced by the renewable-source plants increased by approximately 8% compared to 2017, going from 1,044,300 kWh to 1,128,400 kWh in 2018. This increase is due to the connection of equipment previously installed but not yet connected to the network.

Renewable source plants

Type	2016			2017			2018		
	(no.)	Total capacity (kW)	Energy Produced (kWh)	(no.)	Total capacity (kW)	Energy Produced (kWh)	(no.)	Total capacity (kW)	**Energy Produced (kWh)**
Wind generators	1	1.7		1	1.7		1	1.7	
Photovoltaic plants	1,153	938.2	844,608	1,366 (*)	984.4	1,044,309	1,534 (*)	1052.7	**1,128,383**
Total	1,154	940		1,367	986		**1,535 (*)**	**1054.4**	

(*) Including 1,497 back-up plants.

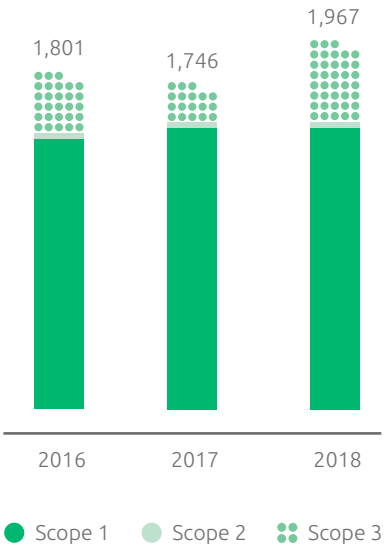
Key performance indicators (KPI)

KPI name	KPI date	Set target	Target achieved in 2018	Sector	Activity
Increase the production of electricity from photovoltaic plants	2017	Produce at least 860 MWh annually (Up until 2022)	1,128	Snam	●
High-efficiency heat generators	2017	Install power of 100 MW in 2022	20.7	Transportation	●
Trigeneration plants	2017	Produce 5,200 MWh in 2022	under construction	Transportation	●
Installation of LED lighting systems	2017	Replace 534 kW in 2022 with a saving of 1860 MWh	209 kW installed 44 MWh saved (*)	Transportation Storage	●
Improved energy efficiency of buildings	2017	Renovation of buildings annually saving 25,000 m^3 of gas and 65 MWh of electricity by 2022	under construction	Transportation	●

(*) The saving is calculated at 3 sites because the remaining plants came into service at the end of the year and therefore the saving is negligible.

● Annual target reached (KPI with multi-year target) ● Activity in progress

GHG emissions (kt CO_{2eq})



GREENHOUSE GAS EMISSIONS

The greenhouse gases (GHG) emitted in the atmosphere by the Snam's activities are methane (CH_4), the main component of natural gas, and carbon dioxide (CO_2). Methane emissions arise from the release of natural gas into the atmosphere and are generated by normal plant operation, by operations to connect new gas pipelines and the maintenance thereof, or by accidental events occurring at infrastructures, whereas the CO_2 produced is directly correlated with fuel consumption. In 2018 Scope 1 direct emissions also evaluated the marginal contribution from the use of hydrofluorocarbons (HFCs) at refrigeration plants which was around 0.14 kt CO_{2eq}.

In 2018, the total GHG emissions (direct Scope 1, indirect Scope 2MB and Scope 3) amounted to approximately 1.97 million tonnes of CO_{2eq} (+12.7% compared with 2017). The increase is entirely due to Scope 3 emissions which doubled compared with the previous year.

Greenhouse Gas Emissions (GHG)
(kt CO_{2eq})

In 2018, tons of CO_{2eq} avoided

154,800

In 2018, the various initiatives undertaken by the Company (lost natural gas emissions, the production of electricity from photovoltaic plants, the acquisition of green electricity, the installation of LED bulbs to replace other light fittings, smart working) made it possible for us, globally, to prevent the emission of 154,800 tonnes of CO_{2eq} into the atmosphere.

DIRECT CO_{2eq} EMISSIONS (SCOPE1)

In 2018 direct CO_{2eq} emissions amounted to approximately 1.5 million tonnes (stable compared with 2017). CO_2 emissions from combustion amounted to approx. 0.727 million tonnes (+5.2% compared with 2017), whereas the CO_{2eq} emissions deriving from the methane emissions amounted to approximately 0.77 million tonnes (-4.8% compared with 2017). Natural gas emissions were equal to 44.4 Mm^3, down compared with the figure of 46.8 Mm^3 in 2017.

The company, in accordance with its sustainable growth model, sets the targets to reduce its natural gas emissions by 2022 and 2025, respectively, by 15% and 25%, excluding emergencies, compared with 2016.

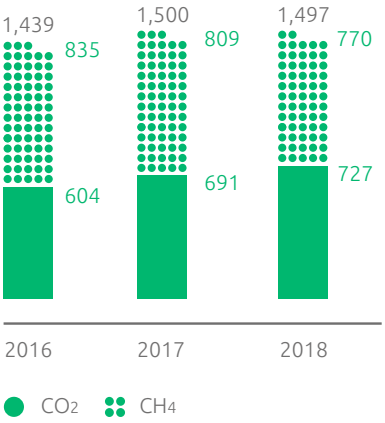
3 The CO_{2eq} was assessed in accordance with the instructions of the most recent Intergovernmental Panel on Climate Change (IPCC) "Fifth Assessment IPCC Reports" that assigned methane a Global Warming Potential (GWP) of 28.

In 2018, 8.2 million cubic metres of natural gas were prevented from being emitted, equal to around 142,200 tonnes of CO_{2eq} (+99% compared with the figure of 71,500 tonnes of CO_{2eq}. in 2017). These performances were made possible by the recompression of line gas (13 operations compared with 8 in 2017) and interventions with tapping machines, a technology that makes it possible to detach methane gas pipelines in operation for new connections without a break in service. These initiatives led to a decrease in natural gas emissions by 7.9% compared with 2016, a trend which is absolutely in line with the general reduction goal.

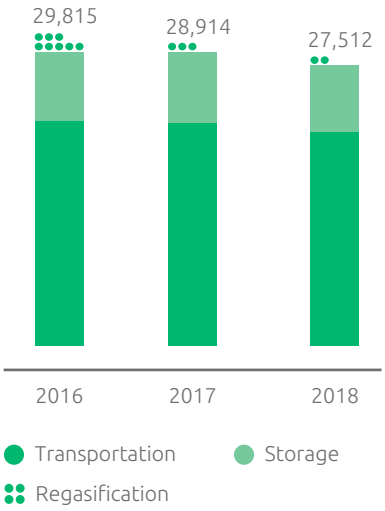
The methane emissions per kilometre of transportation network decreased by a further 4.3% compared to 2017 and by 6% compared with 2016.

Natural gas emissions (Mm^3)

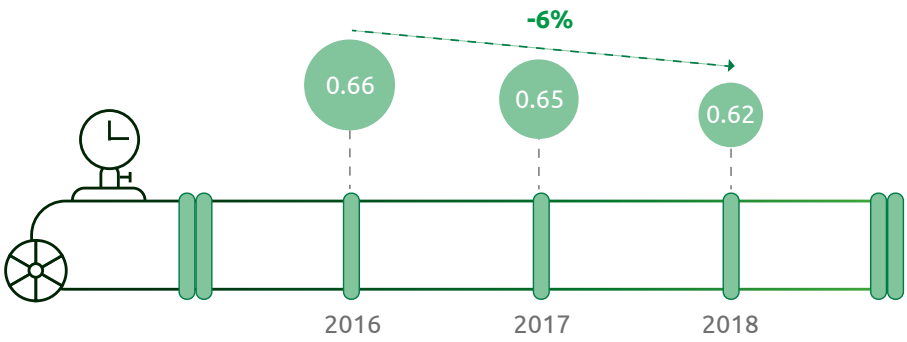
Direct GHG emissions - scope 1 (kt CO_{2eq})



Methane emissions (t)



Methane emissions /km network (t/km)



Key performance indicators (KPI)

KPI name	KPI date	Set target	Target achieved in 2018	Sector	Activity
Natural gas recovered over total potential emissions from maintenance activities	2017	Recover at least 33% every year (up to 2022)	56%	Transportation	●
Limit natural-gas emissions (*)	2018	Reduce 2022 emissions by -15% and 2025 emissions by -25% compared with 2016, excluding emergencies	-7.9%	Transportation, Storage, Regasification	●

(*) The KPI was reprogrammed with more challenging targets.

● Annual objective reached (KPIs with multi-year target)

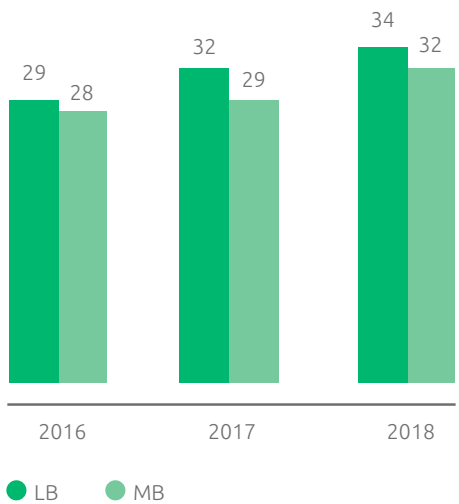
INDIRECT CO_{2eq} ENERGY EMISSIONS (SCOPE 2)

The Indirect CO_{2eq} energy emissions are due to the procurement of electricity and heat produced by third parties and used by Snam for its activities. Snam calculates indirect CO_{2eq} emissions through the Market Based (MB) approach, which gives a nil CO_{2eq} emission factor for energy consumption from renewable sources, and the Location Based (LB) approach, which instead considers an average CO_{2eq} emission factor of the national electricity grid.

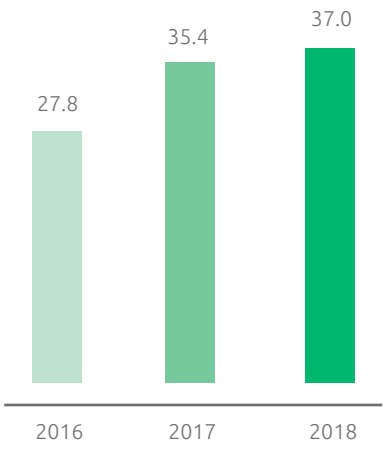
In 2018, total electricity consumption increased by +12% compared with 2017, as a result of two new compression stations (Minerbio and Sergnano) coming into service and greater use of storage plants as a result of the greater amount of gas stored (+9%) and increased ICT consumption (+18%) due to the installation of new equipment.

Emissions (calculated using the MB method) stood at 31,887 tonnes of CO_{2eq} (+10.9% compared with 2017), a lower rise compared with energy fees. In 2018, Snam increased the consumption of electricity produced from renewable sources, which went from 35.4% in 2017 to 37% in 2018, thus avoiding emissions into the atmosphere of approx. 12,100 tonnes of CO_{2eq} (11,040 tonnes of CO_{2eq} with respect to those of 2017). The emissions avoided correspond to approximately 39% of total indirect Scope 2 emissions.

Indirect GHG emissions scope 2 (kt CO_{2eq})



Green electricity/ total electricity consumption (%)

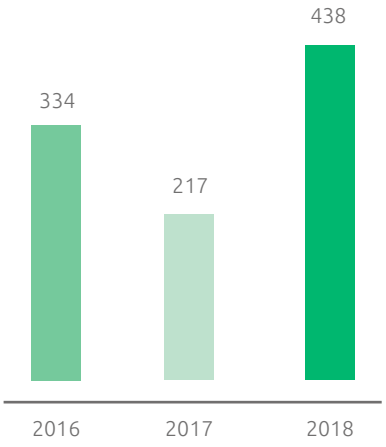


OTHER CO_{2eq} ENERGY EMISSIONS (SCOPE 3)

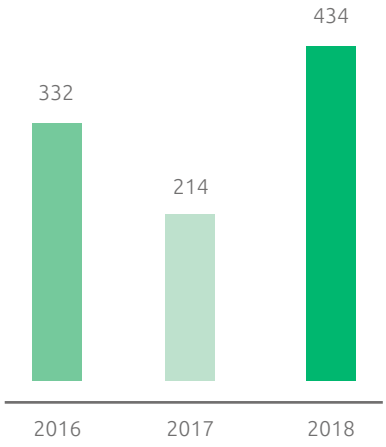
Indirect Scope 3 emissions in 2018 stood at around 438,000 tonnes of CO_{2eq}, up compared with 2017 figures (217,000 tCO_{2eq}) and they refer for the 99% to the supply chain emissions and for the remaining part to the employees' commute to work and business trips.

The supply chain emissions were calculated by applying a method developed by a leading international company in the field of the Carbon Footprint analysis. The considerable increase in emissions compared to 2017 is mainly due to a substantial increase in the procurement activities (+80%) and to the different types of procured goods and services.

Indirect GHG emissions scope 3 (kt CO_{2eq})



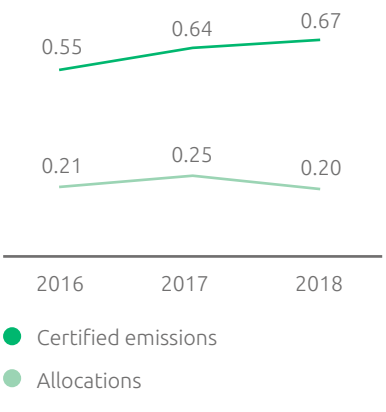
Supply Chain indirect GHG emissions scope 3 (kt CO_{2eq})



EMISSION TRADING

In 2018, the total CO_2 emissions from Snam ETS plants certified by an accredited body according to the instructions given by the competent national authority, amounted to approximately 0.67 million tonnes, out of total annual allowances of approximately 0.20 million assigned by the Ministry for the Environment, Land and Sea (for a negative balance of 0.47 million in allowances). This deficit is partly offset by the shares already in the Snam plant registers, thanks to the accumulated surplus from previous years and the acquisition of around another 0.20 million tonnes from the European market.

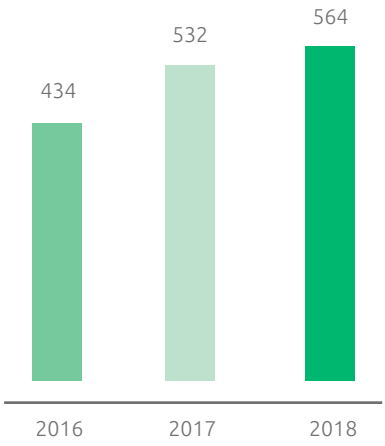
CO_2 emissions ETS plants (10^6t)



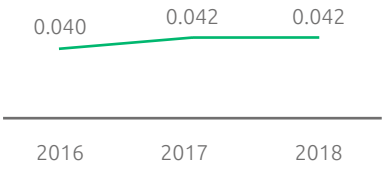
Snam Emission Trading Plants

Activity	Number of plants	Name of plants
Transportation	13	Gas compression stations in Enna, Gallese, Istrana, Malborghetto, Masera, Melizzano, Messina, Montesano, Poggio Renatico, Tarsia, Terranuova Bracciolini, Minerbio, Sergnano
Storage	8	Storage gas compression stations in Cortemaggiore, Fiume Treste, Minerbio, Ripalta, Sabbioncello, Sergnano, Settala and Bordolano
Regasification	1	Liquefied natural gas regasification plant in Panigaglia

NOx emissions (t)



NOx emissions/ energy use (kg/GJ)



NITROGEN OXIDE EMISSIONS

Nitrogen oxide (NOx) emissions, the only significant pollutant emissions from Snam's activities, is mainly due to the combustion of natural gas in turbines installed in the compression systems (thrust and storage).

The use of natural gas as the main energy source allows sulphur oxides and particulate emissions to be minimised.

Total emissions of nitrogen oxides in 2018 amounted to 564 tonnes (+6.0% compared with 2017), while the indicator that parametrises emissions over the energy used remained unchanged.

The increase in NOx emissions is mainly due to the increase in the gas storage activity (+9%) and the need to use non-low emissions turbines (DLE- Dry Low Emissions) in the Minerbio storage plant. In 2019 the Minerbio storage plant will be equipped with DLE turbines only.

To contain emissions, a programme that calls for modifying certain turbines already in operation and the installation of new units with low emission combustion systems has been in the process of being implemented for years.

In 2018, 5 new DLE turbines came into service for transport operations in the Sergnano and Minerbio thrust plants. With these new turbines the average emissions ratings for the machinery installed capacity already low, were further reduced by 13.6% going from 4.4 to 3.8 ([mg/Nm^3]/MW).

4 Emissions of NOx in the atmosphere were calculated based on direct measurements or, if not available, by means of emission factors present in the literature (EMEP/EEA "Air pollutant emission inventory guidebook" European Environment Agency).

Protecting the local area and biodiversity

The Dispatching Centre

The Dispatching Centre provides to the monitoring and remote controlling of the transport network operations, receiving data from around **3,800 plants** located along the transport network, with more than **1,600** of them controlled remotely.
Through the use of a specific software application, the data collected, also on the basis of historical consumption and weather forecasts, makes it possible to formulate short-term forecasts for the gas demand and to simulate and optimise the gas flows in the network, guaranteeing the best arrangement for the compression stations to thereby reduce their consumption and containing in this way the emission levels.
The network operations and the physical balancing of the system are constantly guaranteed by an operations room staffed **24/7**, which, based on the programming defined by customers and in coordination with Italian and foreign infrastructure operators connected to the transportation network, ensures the correct movement of the gas from the injection points to the withdrawal points.
In addition to that, the dispatching Centre remotely controls more than 9 storage plants, planning and carrying out the operations for the surface treatment plants, shaft and compression area, guaranteeing a secure execution in ordinary, irregular or emergency operating conditions.

INFRASTRUCTURE RELIABILITY

The infrastructure reliability is central to the design and management of the gas network. During the design phase, the routing of the gas pipelines is chosen from various alternatives based on considerations involving the reliability of transportation, technical and economic feasibility and the environmental impact: specifically, it is necessary to ascertain that the routing shall not interfere with the existing ecosystems' balance, avoiding passing through areas of significant natural, cultural, or archaeological interest or at least keeping it to a minimum and through geologically unstable or man-made areas.

During the construction phase, in accordance with the technical feasibility, advanced excavation and installation procedures and technologies which interfere as little as possible with the surrounding environment are used: reduction of the width of the work zone, minimisation of the infrastructures and construction site vehicles, trenchless techniques (tunnels and micro tunnels) as an alternative to traditional excavation methods.

When the installation is complete a thorough environmental restoration is carried out to return the area to its original morphological and vegetation conditions keeping the pre-existing natural balances. During the operations, the network infrastructures are monitored by the dispatching centre, using simulation and optimisation programmes that guarantee the optimum arrangement for an efficient and secure transport service, with the goal of reducing fuel consumption for the gas thrust and therefore containing emission levels.

The reliability of the natural gas pipelines is guaranteed in various ways, through their regular inspection carried out on foot, with vehicles and helicopters to detect potentially dangerous situations caused, for example, by the work of third parties near the pipelines or by potential instability that has occurred along the track. Geological inspections are also conducted and any landslide in specific areas of the pipeline layout is kept under control with the help of the most suitable and sophisticated equipment. Periodically, a smart device equipped with sensors runs inside the network; this so-called "pig" makes it possible to detect the presence of any faults or irregularities with the material and even the slightest movement of the pipeline.

Monitoring and inspecting the network

	2016	2017	2018
network inspected using smart pigs (km)	1,660	1,632	**1,651**
network inspected by helicopter (km)	16,218	16,274	**18,462**
network subject to geological inspection (km)	1,478	4,080	**4,209**

In addition to the drills required by the Seveso Directive, in 2018, at the Panigaglia regasification terminals, Snam conducted monthly safety drills simulating accidental leaks of LNG. A joint Security and Safety exercise was also carried out with the Port Authority, the local fire department, the national police, and the emergency medical services.

During the course of the year and in the transport sector alone, **127 meetings** were held with local government authorities and regional associations to present projects involving the construction of works. Together with these associations, **3 agreements** concerning easements were stipulated.

PROTECTION OF BIODIVERSITY

Special attention is paid to safeguarding the natural heritage of the local areas affected by the operational activities.

Morphological and vegetation restoration operations, carried out after the installation works, are designed to reconstruct the pre-existing natural landscape as accurately as possible and to encourage the resumption of the biological functioning of the area and the development of biodiversity.

Snam's commitment does not end with this environmental restoration, but continues with the launch of a cultivation treatment plan lasting at least five years to look after and maintain the plants and shrubs planted, which the company guarantees will become an integral part of both the restoration process per se and the environmental monitoring required by the institutions.

Environmental monitoring and restoration (km of network)

	2016	2017	2018
Restoration	227	203	**227**
New reforestation *	3.7	21	**21**
Plant care	98	59	**74**
Environmental monitoring	565	388	**445**

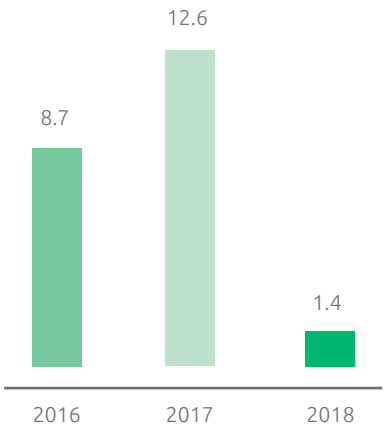
* In 2018 the new reforestation areas covered approximately 410,500 m² (380,000 m² in 2017).

Monitoring projects concern the extensions of some methane pipelines that interfere, even marginally, with the natural local areas high in fauna and ecological value, and aim to the verification of the process of re-naturalising areas affected by construction works, comparing the conditions after the restoration ("post-completion") with the original conditions ("pre-completion"). Monitoring is normally performed for the most significant habitats identified in the design phase.

As far as storage activities are concerned, in 2018 5 shaft (mining) areas were closed and, after environmental investigations, the terrain was completely restored and returned to the owners for agricultural use (involving a total area of 28,977 m²).

The Natura 2000 sites are the main instrument in the European Union's policy for preserving biodiversity. Established pursuant to the Habitat Directive 92/43/CEE for preserving the natural habitats at EU level, the Natura 2000 network is made up of Sites of Community Importance (SCIs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). In 2018, Snam's activities only involved an area of around 1.4 km (SIC IT 3120079 Lago di Loppio) for upgrading works on the "Arco-Riva del Garda" pipeline.

Distance covered by pipelines in Natura 2000 networking sites (km)



Fauna study in Sardinia

In order to direct the planning of works, environmental restoration and mitigation activities and ante operam environmental monitoring, during operations and post operam, under the scope of the Environmental Impact Assessment procedure for some investments, a detailed study was carried out into the fauna of the area that will be affected by the planned methane gas pipeline construction works.

This research took into consideration **fauna species protected at an international, national and local** level also taking into account the presence of Natura 2000 sites (SCIs, SACs, SPAs), bird protection sites known as Important Bird Areas (IBAs) and specific reproduction habitats of internationally protected bird species, such as, for example the little bustard (Tetrax Tetrax).

The aim of the work was to identify and map the habitats which play an important role in the conservation of the rarest and threatened bird species and to check, with regard to the position of the planned works layouts, the degree of interference with them and the temporary disturbance in order to be able to calibrate the actions for monitoring the environmental impact of the works and the consequent mitigation and restoration measures.

The environmental preferences were analysed for all the species identified to define the link with the habitats in the area studied. A matrix was then implemented in which a coefficient was assigned for each habitat according to its recognised availability for each species.

Having defined the "species/habitat" environmental preference level, to estimate the fauna suitability figure the rarity of the actual habitats and the presence of protected areas were also taken into consideration.

The habitat rarity coefficient is a parameter that was evaluated in order to enhance less widespread habitats which are therefore more exposed to the risk of erosion, alteration, fragmentation or disappearance.

In addition, the areas within the boundaries of Natura 2000 sites were developed by applying a coefficient taking into consideration the particular protection status which makes them more practical for the conservation of the fauna.

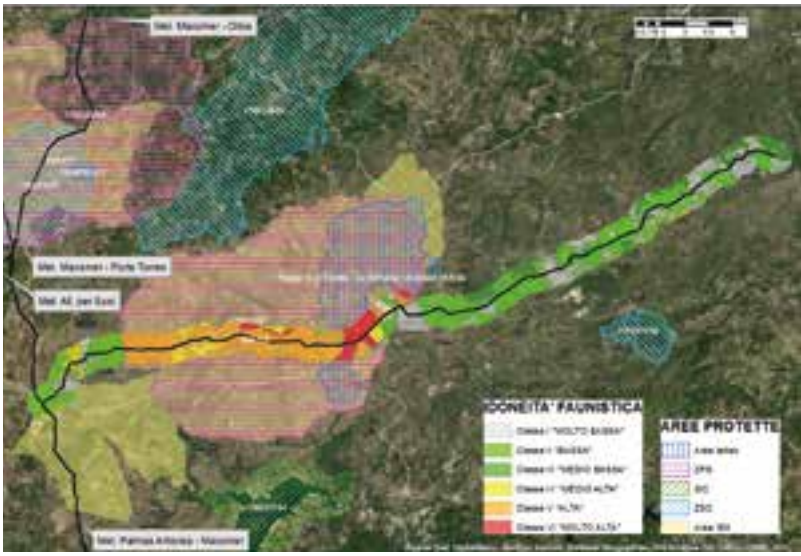
In this way, once the **fauna suitability for all habitats is defined in a standardised way**, the protection role that the establishment of protected areas can offer with regard to habitats giving them a higher status compared with the same areas outside of the protected boundaries was enhanced.

Based on the figures obtained, a **map on a scale of 1: 10,000** was drawn up where, by superimposing the layout of the planned methane pipelines, the fauna suitability areas of the habitats, greater or lesser depending on the environmental characteristics in the area or depending on the habitats present, were shown using different chromatic solutions.

The map is therefore an operational tool which makes it possible to highlight the different "values" of the area in relation to its role in fauna conservation and, specifically, the rarest or threatened species and it provides useful information support for the **correct planning of the works**.

In conclusion, the research and the Fauna Suitability Map produced have made it possible to define the fauna potential of the habitats affected by the construction of the Methanisation of north Sardinia project.

Specifically, the Map refers to internationally, nationally and regionally protected fauna species and their connection to the habitats near the areas affected by planned works, thereby providing useful information support for the correct plan of the works.



For the development of new sites, in addition to the technical-economic feasibility criteria, Snam adopts procedures that meet strict environmental compatibility and safety assessments.
The assessments of the environmental effects involve all the phases of the work life cycle, site selection, planning, construction, operation and decommissioning. These assessments are made within the purview of the Environmental Impact Assessment (EIA) and the Integrated Environmental Permit (IEP) procedures, at the end of which the central and local administrations issue the permits required under the current law.

Snam also evaluates, in relation to the performance of the most important works (compression systems or large natural gas pipelines), the direct and indirect economic and social impact on the territory and on the local communities with "**Social Impact Assessment**" tools and methods. Specifically, in 2018, the methodology used was reviewed, in conjunction with the Department of Economics and Management of the University of Brescia, and a regionalised **Input-Output model** was adopted. This model makes it possible to assess the impact of a project, calculating the added value created by the investment starting with the total value of production.

EIA decrees obtained during the year

Name	Length (km)	Regions involved	Competent agencies	Date of decree
Pipelines				
Overhauling of the Rimini-Sansepolcro methane pipeline and ancillary works	81.915	Emilia Romagna and Tuscany	Tuscany region	18/06/2018

IEP decrees obtained during the year

Name	number of compression units	Regions involved	Competent agencies	Date of decree
Gas compression stations				
Gallese (review for substantial modification)	3	Lazio	Ministry of the Environment and Protection of Land and Sea	11/05/2018

Provisions for verification of whether subject to EIA obtained during the year

Name	Length (km)	Regions involved	Competent agencies	Date of decree
Pipelines				
Mornico al Serio-Travagliato-Chiari-Travagliato section	24.94	Lombardy	Brescia province	03/05/2018
Asti-Cuneo Variants for the construction of pig launch/ reception systems	3.941	Piedmont	Ministry of the Environment and Protection of Land and Sea	26/09/2018

EIA applications submitted to Ministry of the Environment and Ministry of Cultural Heritage

Name	Length (km)	Regions involved	Date of submission
Pipelines			
Overhauling of Ravenna – Chieti - Ravenna-Jesi section	142.6	Emilia Romagna - Marche	30/04/2018

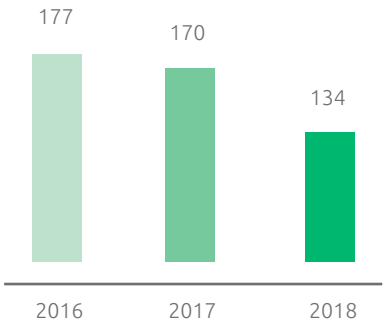
Applications submitted to the Ministry of the Environment to check EIA requirements

Name	Length (km)	Regions – Provinces involved	Date of submission
Pipelines			
Reconnection - Connection of Torino di Sangro (CH)	1.132	Abruzzo	22/06/2018
Variant for PIDI insertion no. 18.2 at Chieti - San Salvo (CH)	0.113	Abruzzo	22/06/2018
HPRS IS64/24 bar Castellana Grotte system on Castellaneta - Castellana Grotte pipeline	–	Apulia	17/07/2018
Tortona - Alessandria - Asti - Turin Overhaul FR 39.1	3.68	Piedmont	26/07/2018
Variants S. Eufemia – Crotone Ref. S. Anna River crossing (KR)	0.64	Calabria	01/08/2018
By-pass for Altino 2° Tronco Variant construction of Secco River hydraulic works	0.07	Abruzzo	21/12/2018
Asti-Cuneo Variants for the construction of pig launch/reception systems	3.941	Piedmont	28/03/2018

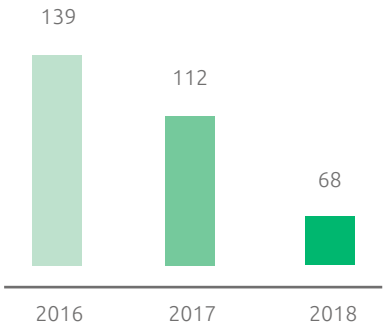
Applications for Integrated Environmental Permit (IEP) reviews submitted to the Ministry of the Environment

Name	number of compression units	Regions – Provinces involved	Date of submission
Gas compression stations			
Melizzano (review)	4	Campania-Benevento	24/12/2018
Montesano sulla Marcellana (review)	4	Campania-Salerno	24/12/2018
Tarsia (review)	4	Calabria-Cosenza	24/12/2018
Istrana (review, renewal and substantial modification)	4	Veneto-Treviso	27/11/2018

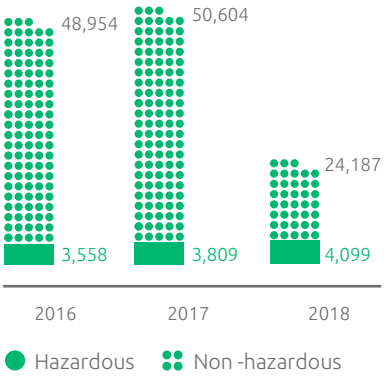
Fresh water procurement (10^3 m^3)



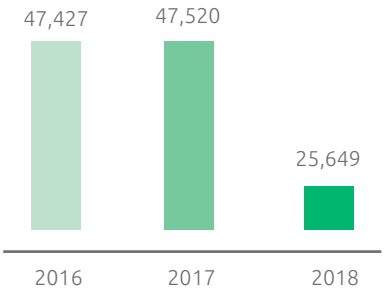
Fresh water discharge (10^3 m^3)



Waste production (t)



Waste by production activities (t)



WATER AND WASTE MANAGEMENT

Snam's water procurement and disposal activities are of little environmental significance, both in relation to the quantities used and the type of discharge. However, the Company considers water a resource that should be conserved and in that respect it is committed to keeping down its consumption and reducing its environmental impacts. Consistent with the activities carried out in previous years, in 2018 a closed-loop constructed wetland plant was installed in the Masera gas compression plant, which will make it possible to eliminate domestic waste water discharges, because they are treated and totally absorbed by the planted vegetation. With this latest installation all the compression plants, except for the Messina compression plant, which is connected to the national sewage system, are equipped with constructed wetland plant systems.

In 2018, approximately 4.13 million cubic metres of water (4 million cubic metres of sea water and 0.13 million cubic metres fresh water) were extracted. The procurement of sea water remains practically constant over time, as it is used for cooling auxiliary equipment in the LNG regasification plant. The extraction of fresh water, used mainly for office activities, fire-protection systems and for the watering of green areas, fell by 23.5% compared with 2017 and stands at around 134 thousand m^3.

With regard to water discharges, the sea water is released into the sea as it is, without any treatment, since it is only used for cooling circuits, while the waste water is channelled into the sewage networks (58% of the total) or discharged, after treatment, into the soil and into surface water bodies (42% of the total).

The upstream storage activities produced approximately 5,913 cubic metres of process water (+20.6% compared with 2017). Of all this water, 2,185 cubic metres were re-injected as it is, while another (3,728 cubic metres) were sent to a purification plant for treatment.

In 2018, total waste production stood at 28,286 tonnes (-48% compared with 2017), of which over 86% belonged to the category of non-hazardous waste. 91% of waste products is connected to the maintenance and management of plants and 9% to shaft drilling activities. 60% of waste from plant maintenance and management was sent for recovery.

The lower amount of waste produced in 2018 is attributable to the lack of extraordinary works for the replacement of pipelines, activities which were carried out in the previous two-year period and which involved the production and recovery of many tonnes of ferrous metals.