

Environment

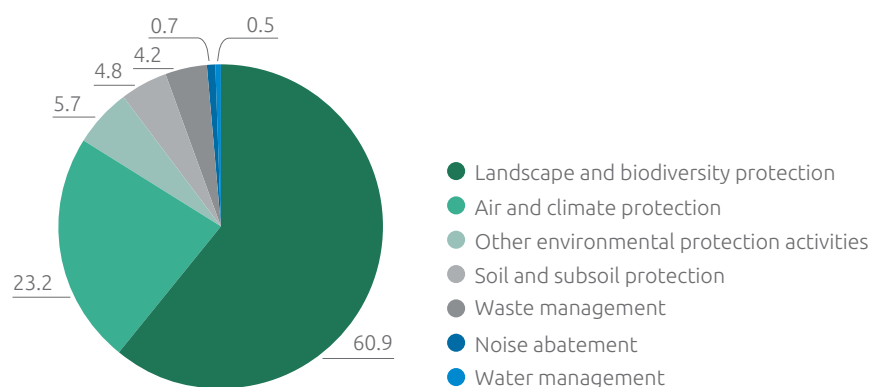


Protecting the environment, biodiversity, and the territory are integral parts in defining Snam's corporate policies and investment decisions. To guarantee the efficient and transparent management of its environmental aspects, all of Snam's activities are monitored by certified environmental management systems (ISO 14001). In addition, Snam's commitment is also reflected in the challenging targets of the new 2019-2023 Strategic Plan where the Company is committed to reduce its methane emissions by 40% by 2025 (compared with the previous target of 25%) and total Scope 1 and Scope 2 CO₂ equivalent emissions by 40% by 2030 compared with the 2016 figures.

Aware of the role that innovation and new clean energy sources have in achieving the decarbonisation goals, Snam is investing in the development of innovative solutions in its core activities and in the creation of new more sustainable business lines related to energy efficiency, green gases, such as hydrogen, biomethane and bio-LNG and to sustainable mobility.

To safeguard the environment, in 2019 Snam spent around **€114.4 million** (€101 million on investments and €13.4 million on management costs).

Enviromental Expenses (%)



Snamtec:

40 projects

10 different initiatives:

- energy efficiency
- reduction of emissions
- new energy vectors
- optimisation of the management
- remote control of assets

INNOVATION FOR BUSINESS DEVELOPMENT

The development of more efficient and sustainable technologies is of vital importance in the reduction of the environmental impacts of a company. In 2019, 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. Many of these projects have been conducted with the Snamtec (Tomorrow's Energy Company).



Governance and monitoring of the network and plants

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

- **Remote control:** development of the Smart Tel project aimed at analysing the requirements of data acquisition and management processes relating to the control and running of the network, in particular:
 - adoption of IIoT solutions (Industrial Internet of Things) for reporting field data not available to date, for the diagnostics and operation of equipment aimed at making the gas transportation network increasingly more smart also defining supervision and maintenance logics that are appropriate and optimised for all equipment (for example, predictive maintenance);
 - study of preheating plant engineering solutions with automated management aimed at optimising energy efficiency and reducing emissions;
 - rationalisation of transmission equipment in order to have standardised, modular equipment to make the management and maintenance processes for the actual equipment more efficient;
 - creation of a repository with all the data to facilitate the maximum integration and availability of validated data and the implementation of Big Data and Advanced Analytics.
- **Security:**
 - initiatives for protection against fire in plant control rooms through vacuum technology. A project was later launched to install similar fire detection/extinguishing systems in the technical rooms of the compression stations.
 - replacement of plant security management systems by installing electronic systems with SIL certification (Safety Integrity Level)
- **Monitoring compression units:** in 2019 a project was launched for the modernisation of a telediagnostic system for the compression units through the acquisition of thermodynamic and functional parameters for the future development of predictive analysis aimed at improving performance. In addition, in 2019 a project was completed for the development of a dashboard that collects the main important parameters needed for dispatch for the improved management of the turbochargers.
- **Electro-compressors:** study for the introduction of electro-compressors at storage sites.
- **Trigeneration:** in 2019 works were completed to put high-efficiency trigeneration plants into operation at the Gallese and Istrana compressor stations. The start up of the system at the Gallese station took place in the last quarter of 2019 achieving an energy saving of more than 65% with further improvement margins following the tuning in 2020.

- **Treatment systems:** installation of latest generation, high performance equipment with a low environmental impact. The first installation of the new generators at the Fiume Trieste facility is expected from 2020.



Physical integrity of infrastructures

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

- **Collaboration with the EPRG:** it is ongoing the collaboration with the EPRG (European Pipeline Research Group, www.eprg.net), the association for research into pipelines of which Snam is a member.
- **Protection against fire:** installation of safety devices that, in the case of accidental breakage or faults, provide protection against the danger of pressurised gas emissions during the accident scenarios in the case of fire.
- **Micro-seismic monitoring:** an innovative system to protect plants against earthquakes composed of accelerometers capable of instantly detecting seismic events and activating the automatic plant safety systems.



Maintenance and checking of networks

Launch of trial projects for optimising and reinforcing maintenance and checking activities for the transportation networks in the following areas such as:

- initiatives aimed at reducing emissions, with the definition of all preparatory activities for the implementation of an LDAR programme (Leak Detection and Repair) for measuring and repairing leaks in Snam plants.
- maintenance processes: continuation of the Smart gas project aimed at improving the effectiveness of technical and operational processes, for the purpose of a comprehensive revision of the work processes and regulations relating to corporate asset maintenance activities. Specifically, the Smart LNG design and realisation phase was launched in 2019 for operations at the Panigaglia LNG terminal. The dematerialisation of the archives in the regional units continued through the eDoc document system which will be fully integrated in Smart gas.
- leak detection: implementation of a system aimed at locating gas leaks along the transport network, based on the analysis of the pressure waves and the detection of possible disruptions.

- checks with flyovers: development of drone flight infrastructure in BVLOS mode (Beyond Visual Line of Sight).



Gas metering

Development of innovative technologies and methodologies for metering and controlling natural gas and related impact in the following areas:

Alternative instruments and quality measurement:

- technological adaptation project with the installation of quality analysers and the automation and remote reading of the main measurement and reserve measurement.
- project for the installation of dew point H₂O meters and hydrogen sulphide analysers.
- Estimating natural gas emissions: evaluation of methods for estimating natural gas emissions and research into the potential impacts, throughout the gas supply chain, of chemical components present in traces in biomethane is continuing in order to create the conditions for its safe development in conjunction with the European research group GERG (Groupe Européen de Recherches Gazières, www.gerg.eu).



New businesses

Creation of dedicated working parties to take an in-depth look into issues related to the development of new businesses with special reference to:

- Innovative use of existing infrastructures: sharing of information and expertise on the use of infrastructures in relation to their capacity for transporting and storing gases other than natural gas, including hydrogen: The following initiatives were also examined under the scope of European associations (Marcogaz):
- Power 2 Gas: the process through which the electricity produced by renewable sources that is surplus to immediate consumption is transformed into hydrogen to be injected directly into the network (limited to the technically-acceptable quantities) or used for the production of synthetic methane (SINGAS) also to be injected into the network and possibly stored later.
- Adsorbed Natural Gas (ANG): this is one of the latest technological developments for the storage of natural gas in tanks. The adsorption of natural gas in a porous sorbent injected into a recipient (tank/canister) takes place at ambient temperature and low pressure (25 - 35 bar).



Protecting the climate and the air

Snam's management of the environmental aspects aims to protect the climate and the air, in line with the Company's commitment to a sustainable energy transition. By its nature, the natural gas, Snam's core business, offers an energy solution that has far less of an impact compared with traditional fossil fuels such as diesel and oil, facilitating the domestic and European journey towards decarbonisation.

In the 2019-2023 Strategic Plan, Snam has reinforced its objectives, increasing the target previously set for reducing its methane emissions by 2025, going from -25% to -40% compared with the 2016 figures, through a reduction in emissions from LNG transportation, storage and regasification activities. An investment plan was implemented to reach these targets that makes it possible to maintain and develop natural gas recovery programmes from maintenance activities by 33% every year until 2022. Snam has also established an ambitious climate altering emissions reduction plan, setting a target of a -40% by 2030, compared with the 2016 values for (Scope 1) direct CO₂eq emissions and (Scope 2) indirect emissions from energy use, including through the definition of a new target related to the use of green electricity by 2030.

-40%
by 2025

Reduction of natural gas emissions
(compared to 2016)

-40%
by 2030

Reduction of GHG emissions Scope 1+2
(compared to 2016)

55%
by 2030

Green electricity used

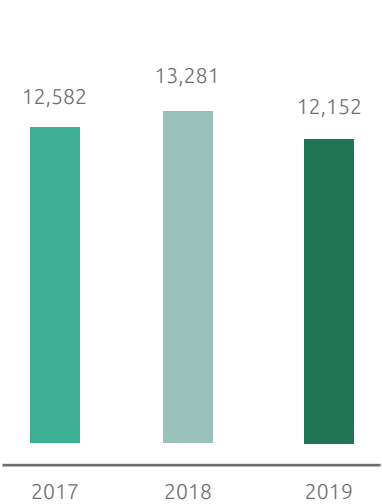


ENERGY CONSUMPTION

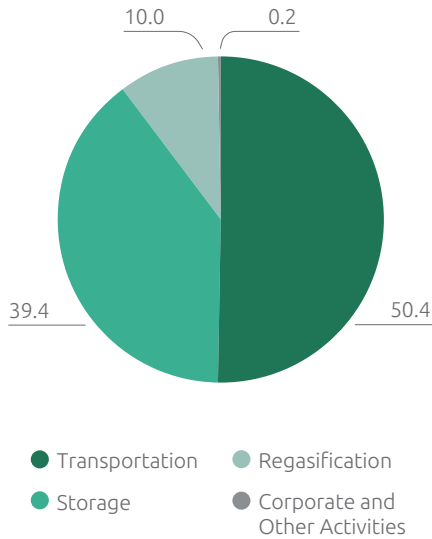
2019 total energy consumption: **-8.5%** compared to 2018

In 2019 the total energy consumption stood at 12,152 TJ (-8.5% compared with 2018) in spite of an overall increase in the gas injected into the network (+3.5%). This result was facilitated by the fact that, compared to 2018, the gas was imported from less energy-intensive routes, namely there was less use of the North Africa backbone network.

Energy consumption (TJ)



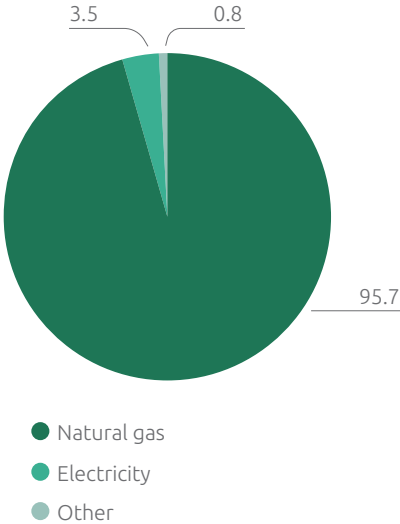
Energy consumption by activity (%)



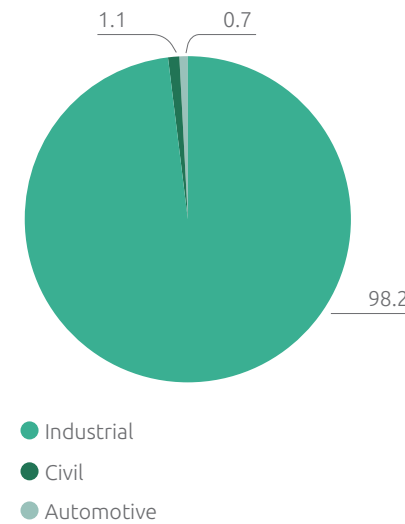
Natural gas **95.7%** on total energy mix used

The energy mix used by the Company is made up almost totally of natural gas (95.7% of the energy requirements). Other sources used are electricity (3.5%), other fuels (diesel, oil, LPG) and heat, which together represent the 0.8% of consumption. Most of the Snam's energy consumption is due to the gas turbines used in the compression systems which provide the pressure required for gas transportation (thrust consumption) and to storage activities, which, overall, represent the 81% of total consumption, down by 88% from 2018. In 2019 there was an increase in the energy consumption for the gas regasification plant, equal to the 10% of the Group's total consumption (3.5% in 2018). This is due to the increase in the quantity of regasified gas (+170%).

Energy consumption by source (%)



Energy consumption by use (%)



THE PRODUCTION OF ENERGY FROM RENEWABLE SOURCES

In line with the Snam's commitment to reduce the energy consumption relating to its activities, in 2019 the Company committed to improving the energy efficiency of its buildings (territorial headquarters and maintenance centres) and its gas storage facilities, through the installation of solar panels. In 2019 the total number of plants reached 1,794 units (+17% compared to 2018) and the installed power increased by 75 kW compared to 2018, passing from 1,054 kW to 1,129 kW (+7%).

This increase mainly involves the installation of 258 new back-up systems and a new photovoltaic system connected to the electricity grid.

In 2017 specific KPIs and a quantitative target for energy efficiency, to be reached by 2022, were set. The results achieved during the year were in line with the expected trend with the exception of the target for the electricity production from photovoltaic plants, which went from around 1,128,400 kWh in 2018 to around 830,000 kWh in 2019. This reduction was caused by the non-availability of several systems adversely affecting the forecasted annual production.

Renewable source plants

Type	2017			2018			2019		
	(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	1,366 (*)	984	1,044,309	1,534	1,053	1,128,383	1,793 (*)	1,127	829,459
Total	1,367	986		1,535	1,054		1,794 (*)	1,129	

(*) including 1,755 back-up plants.

Key Performance Indicators (KPI)

Description of KPI	KPI Year	KPI quantitative target	Target reached in 2019	Sector	Activity
Increase production of electricity from photovoltaic plants	2017	Produce at least 860 MWh annually (until 2022)	830 MWh	Snam	●
High-efficiency heat generators	2017	Install a power of 100 MW by 2022	66.5	Transportation	●
Trigeneration plants	2017	Produce 5,200 MWh by 2022	359 MWh (1)	Transportation	●
Installation of LED lighting systems	2017	Replace 534 kW by 2022 with a saving of 1860MW	351 kW installati 273 MWh risparmiati (2)	Transportation Storage	●
Energy efficiency improvement for buildings	2017	Restructure buildings annually saving 75,000 m ³ of gas and 210 MWh of electricity by 2022	15,000 m ³ of gas	Transportation	●

(1) production is calculated at 1 site that came into operation at mid year. The other site came into operation at the end of the year therefore production is negligible.

(2) some plants came into operation at the end of the year so the savings are negligible.

● Annual target not reached (KPIs with multiyear targets)

● Activity in progress

In May 2018 Snam acquired a controlling share, equal to 82% of the share capital, of TEP Energy Solution (TEP), one of the main Italian companies operating in the energy efficiency sector.

TEP is an ESCo (Energy Service Company), accredited at Gestore dei Sistemi Energetici S.p.A. (GSE), which is mainly involved with energy requalification and deep renovation operations for apartment buildings and industrial sites for civil and service sector.

TEP also provides advisory services to support energy-intensive businesses and large companies to identify the actions necessary for the reduction of the energy consumption and the environmental impact in relation to their corporate processes (carbon footprint and LCA, energy diagnoses, energy management systems compliant with ISO 50001:2018).

In 2019, TEP market activities concentrated on various lines of intervention, integrating energy efficiency solutions in domestic, tertiary and industrial sectors.

Apartment blocks - integrated solution called "CasaMia"

The company offers energy diagnostic services for the design and realisation of interventions with innovative solutions (modernisation of thermal power stations, construction of thermal walls, improvement of seismic class, etc.) that make it possible to guarantee the heating and climate control requirements and needs are met at the same time reducing consumption and CO₂ emissions. In 2019 29 interventions were carried out which led to a reduction in CO₂ emissions of around 765 tonnes/year.

"Mosaico Verde" (Green Patchwork) Campaign

The company joined the national reforestation campaign promoted by Legambiente and AzzerCO₂. Under the scope of this initiative, in 2019 TEP created the first urban wood in Padua by planting 1,000 new native trees (linden, oak, field maple and Guelder-rose) in an urban area that was previously grassland.

The goal is to create a green lung to curb atmospheric and acoustic pollution, absorb CO₂ emissions (by around 20 tonnes per year) and improve the quality of life of the area, with a recreational area for residents and children in the nearby schools.

Industrial and tertiary sector - ESCO energy efficiency interventions

The Company carries out operations that involve the adoption of efficient technologies for reducing the environmental impact of production activities and processes, with the guarantee of achieving the savings estimated in the design stage. The interventions mainly relate to the utilities (thermal power stations, lighting, cogeneration, purification, environmental climate control) with savings main in thermal energy. In 2019, 3 new plants were built which, together with the 5 plants constructed previously and managed by TEP, has led to an overall reduction of CO₂ emissions into the atmosphere of around 1,050 tonnes/year.

Energy Efficiency Certificates TEE (so-called White Certificates)

TEEs are incentives recognised by the GSE for energy efficiency actions where the savings actually achieved can be measured and reported. TEP supports customers, mainly in the industrial sector, with the management of projects for recognising these certificates and for the subsequent calculation of savings to report to the GSE. In 2019 59,612 TEEs were produced. The TEEs produced in the year, counting the production activities and processes of end users, certify a reduction in CO₂ emissions of around 134,000 tonnes (83,000 for the reduction of thermal consumption and 51,000 for the reduction of electricity consumption) counted for the production activities and processes of end users.



GREENHOUSE GAS EMISSIONS

The main greenhouse gas emissions (or GHG) resulting from 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 the normal plant operation, by operations to connect new gas pipelines and the maintenance thereof, or by accidental events occurring on infrastructure, whereas the CO_2 produced is directly correlated with fuel consumption and the fuel. In 2019, like last year, the marginal contribution to direct emissions from the use of hydrofluorocarbons (HFC) in refrigeration systems was assessed as equal to approximately 1.48 kt $\text{CO}_{2\text{eq}}$.

In line with the international reporting methods for GHG emissions, Snam broke down and analysed its emissions into Scope 1 direct emissions and Scope 2 indirect emissions from energy use and Scope 3 other indirect emissions. Direct emissions refer to Snam's fuel consumption, while indirect emissions refer to electricity consumption and heat consumption (Scope 2) and other CO_2 emissions released along the company's value chain (Scope 3).

The total GHG emissions stood at around 1.92 thousand tonnes of $\text{CO}_{2\text{eq}}$ (-2.6% compared to 2018). The total reduction in emissions is mainly due to the interventions implemented to reduce direct emissions (Scope 1), which, however, was mitigated by the increase compared with the previous year of Scope 3 indirect emissions relating to business travel and the emissions generated along the supply chain. Specifically, Snam adopted various initiatives to reduce emissions, such as, for example:

- recovery of natural gas emissions;
- production of electricity from photovoltaic plants;
- acquisition of green electricity;
- installation of LED lighting systems;
- renovation and efficiency improvements for buildings;
- greater use of smart working among employees.

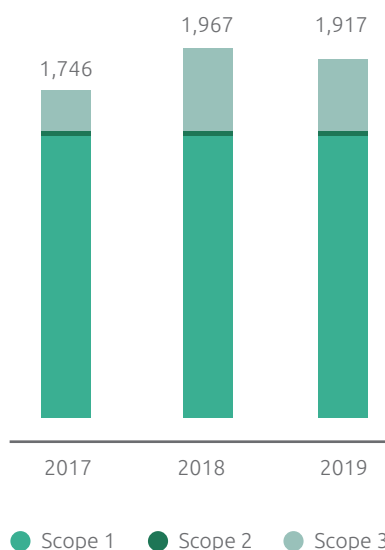
GHG total emissions

-2.6%

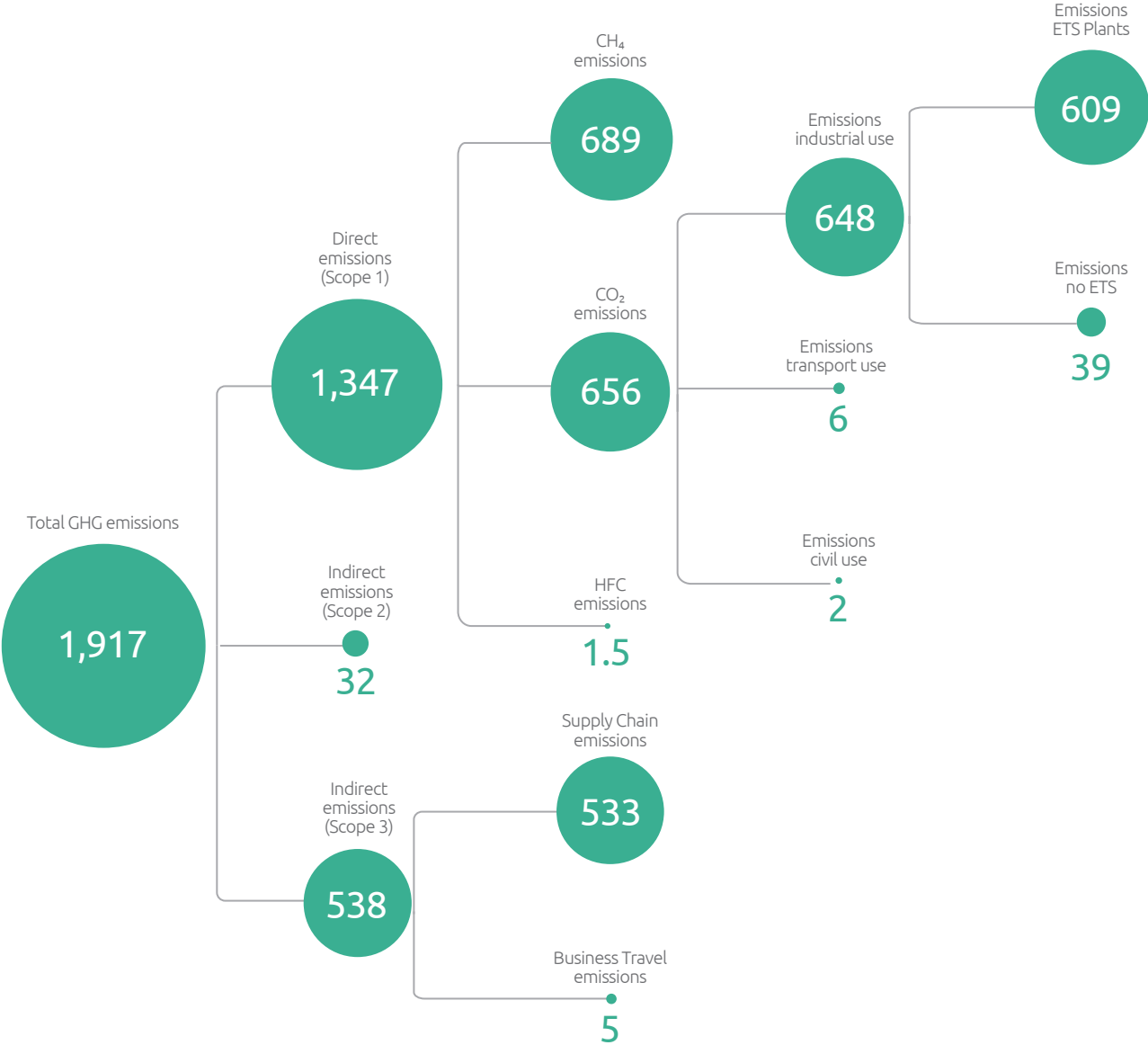
compared to 2018

These activities have allowed the Company to prevent the emission into the atmosphere of **181,800 tonnes of $\text{CO}_{2\text{eq}}$** , the highest figure in recent years (+17% compared to 2018).

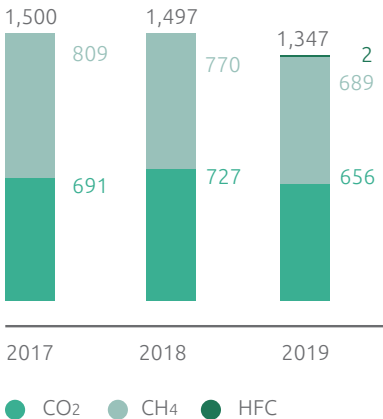
GHG emissions (kt $\text{CO}_{2\text{eq}}$)



Greenhouse gas (GHG) emissions kt CO_{2eq}



Total direct GHG emissions
Scope 1 (kt CO_{2eq})



DIRECT CO_{2eq} EMISSIONS (SCOPE1)

The direct emissions of CO_{2eq} stood at around 1.35 million tonnes, a clear reduction compared with 2018 (-10%). CO₂ emissions from combustion stood at around 0.656 million tonnes (-9.7% compared with 2018), while CO_{2eq} emissions from methane and HFC emissions stood at around 0.69 million tonnes (-10.4% compared to 2018).

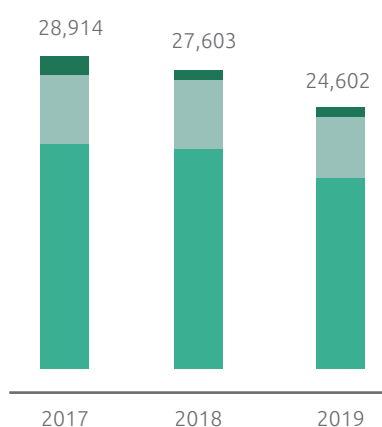
Natural gas emissions stood at 39.2 Mm³, a reduction compared with the figure of 44.4 Mm³ in 2018 (-11,7%).

3) The measurement of CO_{2eq} was carried out in accordance with the scientific study of the Intergovernmental Panel on Climate Change (IPCC) "Fifth Assessment Report IPCC" which gave methane a Global Warming Potential (GWP) score of 28.

The In-line gas recompression interventions, interventions with tapping machines, technology that makes it possible to disconnect pipelines in operation for new connections without an interruption to the service, and other initiatives have allowed Snam in 2019 to prevent the emission into the atmosphere of 9.4 million cubic metres of natural gas, equal to around 165,000 tonnes of CO_{2eq} (+16% compared with the figure of 142,000 tonnes of CO_{2eq} in 2018).

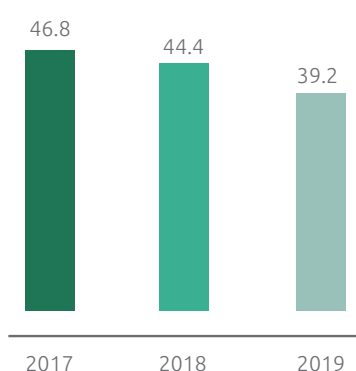
As a confirmation of the benefit of the measures taken, emissions of methane per kilometre of network for the transportation activities fell further (-12% compared to 2018 and -15.4% compared to 2017).

Methane emissions (t)

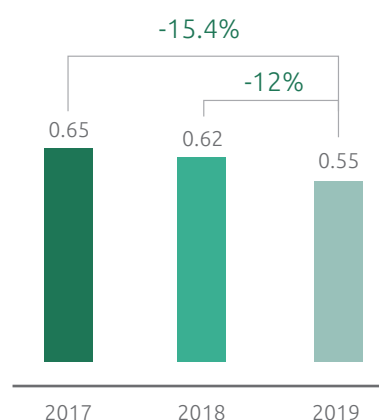


● Transportation ● Storage ● Regasification

Natural gas emissions (Mm³)



Methane emissions/network (t/km)



The Company's performance indicators are in line with its methane emission reduction targets. Specifically, in 2019 Snam increased its reduction target for CH₄ emissions by 2025, from -25% in 2018 to -40%. The current situation is in line with this target (-19%).

Furthermore, in 2019 Snam recovered the 56% of natural gas emissions during maintenance activities, in line with its target of 33% per year by 2022.

Key Performance Indicators (KPI)

KPI description	KPI Year	KPI quantitative target	Target reached in 2019	Sector	Activity
Natural gas recovered over total potential emissions from maintenance activities	2019	Recover at least 33% every year (up to 2022)	59%	Transportation	●
Limit natural-gas emissions (*)	2019	Reduce emissions by -40% by 2025 compared to 2016	-19%	Transportation, Storage and Regasification	●

● Annual target reached (KPI with multiyear targets)

(*) The KPI was reprogrammed with more challenging targets

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

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

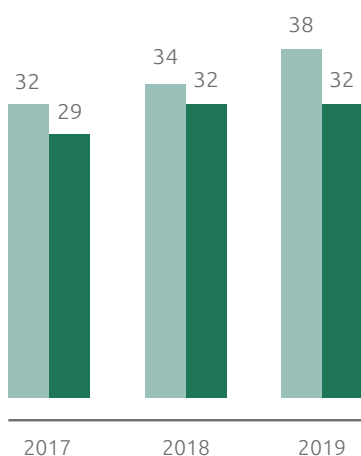
Electricity consumption, equal to around 117,380 MWh, increased by 12% compared to 2018. Specifically, the increased consumption is due to the LNG regasification facility, which, in 2019, regasified a greater quantity of gas, and the Digital Transformation and Technology (DT&T) activities for the redistribution and movement of the data centres. The greater consumption resulting from the LNG site was completely neutralised in terms of Scope 2 emissions thanks to the procurement of green electricity, while the emissions due to the greater consumption recorded on the other sites were partly mitigated by a new gas power plant switching to an electricity power plant certified as renewable on the Enna site. This plant joins those of Messina and Terranuova B. (SRG), Brughiero (STG), the Panigaglia LNG Plant and several areas of Snam4Mobility. CO_{2eq} emissions calculated according to the MB method stood at around 32 thousand tonnes, in line with 2018 in spite of an increase in total electricity and heat consumption of 13% if calculated using the LB method, evidence of the continuous increase in energy produced from renewable sources.

Specifically, the ratio between the use of electricity produced from renewable sources and total electricity consumption increased further going from 37% in 2018 to 44% in 2019, thereby preventing the emission into the atmosphere of around 16,100 tonnes of CO_{2eq} (+ 4,000 t compared to 2018).

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

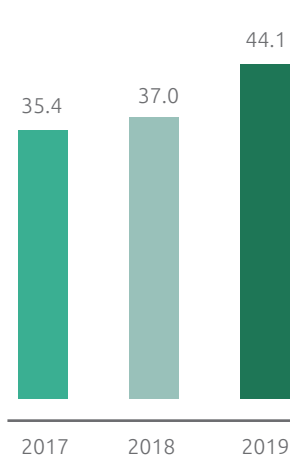
Indirect CO_{2eq} emissions stood at approximately 538 thousand tonnes, a 22.8% increase compared to 2018 following an increase in procurement and the different nature of the supplied materials and goods. This category of emissions stems around 99% from the supply chain and the remaining share is due to employees' business travels. Further initiatives are ongoing and aimed at promoting a culture of energy saving and minimising indirect emissions associated with Snam's activities: the adoption of green procurement criteria for goods and services, sustainable mobility initiatives and the implementation of initiatives for energy savings directed at employees (company shuttle services, public transport subsidies, smart working and the use of video-conferencing for meetings) and the launch of the supply chain CDP programme are just some of the initiatives in progress that contribute to the reduction of this type of emissions.

**Indirect GHG emissions
Scope 2 (kt CO_{2eq})**

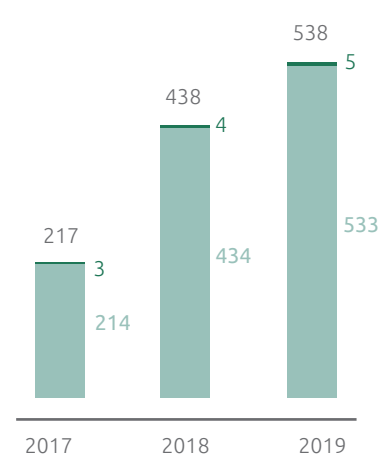


● LB ● MB

**Green electricity/Electricity
consumption (%)**

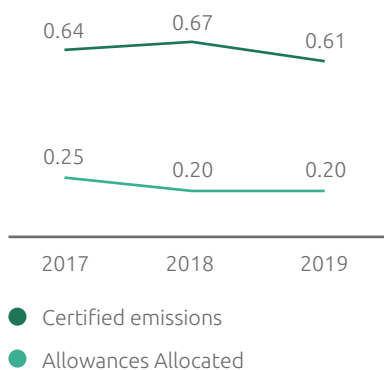


**Indirect emissions
Scope 3 (kt CO_{2eq})**



● Supply chain ● Business Travel

CO₂ emissions from ETS plants (10⁶t)



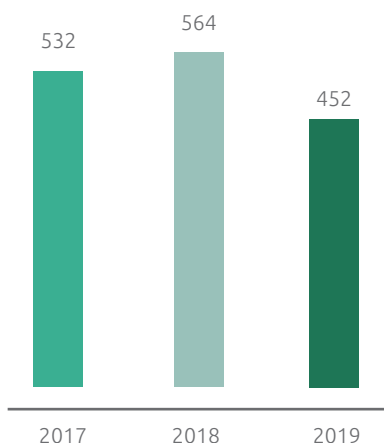
EMISSIONS TRADING SYSTEM (ETS)

The carbon dioxide emissions of the Snam Group facilities subject to the ETS were overall greater than the emission shares allocated. The annual allocation of free allowances by the competent national authority gradually reduced over the years as set out from the third regulatory period in Article 10 bis of Directive 2009/29/EC. In view of around 0.609 million tonnes of carbon dioxide emitted into the atmosphere, around 0.202 million tonnes were allocated free of charge, resulting in a 0.407 million tonne deficit. The allowances allocated also include those intended for the new gas compression plants of Minerbio and Sergnano in 2018 and 2019.

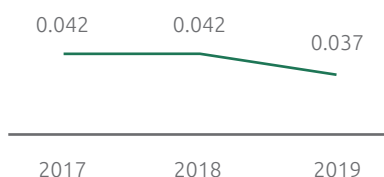
Snam Emissions Trading Systems

Activities	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	Panigaglia LNG regasification facility

Total NO_x emissions (t)



NO_x emissions/energy used (kg/GJ)



NITROGEN OXIDE EMISSIONS

The use of natural gas as the main energy source allows sulphur oxides and particle emissions to be minimised compared to the use of other fossil fuels. Of these, the only significant emissions are those of nitrogen oxides (NO_x), that derive mainly from the combustion of natural gas in the gas turbines installed in the compression plants (thrust and storage). A programme was launched in recent years to curb these emissions by replacing traditional turbines with low emission turbines which, to date, account for almost all the turbines installed. Specifically, with the DLE turbine coming into operation in 2019 in the Minerbio storage plant as well, all the storage sites were operating with low emission units.

The reduction in energy consumption and the virtually total use of DLE turbines has led to a reduction in total nitrogen oxide emissions, in absolute terms of -20% compared to 2018 and a reduction in the ratio between nitrogen oxide emissions and energy use of 12%.

Average NO_x emissions for the installed power of the storage machinery were further reduced by almost 30% going from 5.2 to 3.7 ([mg/Nm³]/MW) while those for thrust remained unchanged, taking into account that they had already reached 3.8 ([mg/Nm³]/MW) last year.

Emissions of NO_x into the atmosphere were calculated based on direct measurements or, if not available, through emission factors in literature (EMEP/EEA "Air pollutant emission inventory guidebook" European Monitoring and Evaluation Programme/European Environment Agency).



Protecting the local area and biodiversity

INFRASTRUCTURE SECURITY

During the year and in the transportation sector alone, **99 meetings** were held with local administrations and associations to illustrate works projects. **Eight agreements** were concluded with these associations regarding easements.

During the design of the network, Snam takes into account aspects related to transportation and infrastructure security, the technical and economic feasibility of the works and their environmental impact. In addition, great importance is also attributed to the inclusion of the work in its context and in complying with landscape equilibrium with the visual and natural impact kept to a minimum. Advanced procedures and technologies were adopted in the realisation of the works which, subject to technical and economic feasibility, minimise the impact on the environment as far as possible. Where possible, as an alternative to traditional excavation techniques, Snam uses suitable advanced techniques such as, for example, trenchless techniques, for the construction of tunnels or micro-tunnels, thereby also reducing the use of site equipment and the extent of the work area. Following the design and installation phase, Snam guarantees 360° monitoring of its assets, engaging in the research and development of technologies that allow complete control of the infrastructures. In order to detect potentially critical situations in the network and act promptly in the case of unforeseen external phenomena, the pipelines are inspected regularly by specialist personnel on foot, in vehicles and by helicopter. The same attention is also devoted to connection lines between storage facilities (compression and treatment) and the related auxiliary systems.

The Company relies on advanced technologies capable of exponentially improving the quality and quantity of checks on all its assets. The use of drones and satellites for checking networks and systems is evidence of the Snam's commitment to making its infrastructures increasingly more secure and efficient: with this in mind, in 2019, Snam launched the first trial of a long-distance civil flight of a remote-control operated drone for monitoring the network. Snam also uses smart pigs to check and inspect the pipelines; these are smart devices equipped with sensors which, travelling inside the pipelines, can detect the presence of any defects or irregularities in the material or the minimal movement of the pipes. Geological inspections were also conducted and any land slippage at specific points of the route kept in check with the help of real time data collection systems that use a specific remote detection method, interferometric satellite SAR and CGPS stations.

Snam continuously monitors and checks the storage facilities through detection systems that automatically activate the security system as needed. The most frequently used systems are: explosive mixture detectors, fire detectors, smoke detectors, high or low pressure switches, pressure transmitters, fuse plug systems and heat sensitive cables, sound-level meters for detecting gas leaks and extinguisher systems.

Monitoring and inspecting the network

	2017	2018	2019
network inspected using smart pigs (km)	1,632	1,651	1,651
network inspected by helicopter (km)	16,274	18,462	20,178
network subject to geological inspection (km)	4,080	4,209	5,163

The dispatching centre

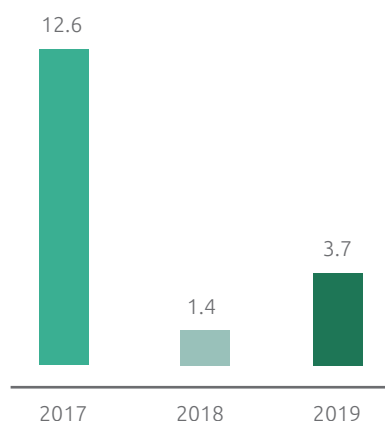
Dispatching involves the monitoring and remote control of transportation, receiving data from around 3,800 plants located throughout Italy, 1,600 of which are remotely controlled.

With the use of specific software applications, the information collected allows, even on the basis of historic consumption data and climate condition forecasts, the formulation of short-term forecasts for redelivery demand and the simulation and optimisation of gas flows in the network, guaranteeing the best arrangement of the compression systems to reduce their consumption and curb emission levels. Network activities and the physical balancing of the system are constantly guaranteed by an operating room functioning 24 hours a day, 7 days a week, based on the programming defined by customers and in conjunction with the operators of foreign infrastructures connected to the Italian network, ensures the correct movement of the gas from the injection points to the withdrawal points. The dispatching centre remotely controls over 9 storage facilities, planning and carrying out surface treatment, well area and compression activities, guaranteeing secure execution in any operating conditions, routine or abnormal.

THE PROTECTION OF BIODIVERSITY

Once the installation phase of the pipeline is completed, the Company launches a series of operations aimed at restoring the pre-existing vegetable and morphological conditions, guaranteeing the stability and natural balance of the surrounding habitat and promoting the biological functionality of the area. This commitment is explained through the launch of a plan for at least fifteen years of reforestation, care and maintenance of plants and shrubs following by an environmental monitoring phase of the surrounding natural area, comparing the conditions after restoration with the original conditions.

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



Environmental restoration and monitoring (network km)

	2017	2018	2019
Restoration	203	227	63
New reforestation*	21	21	8
Plant care	59	74	73
Environmental monitoring	388	445	747

* In 2019 the new reforestation area involved an area of around 157,500 m² (410,500 m² in 2018)

The Natura 2000 sites are the main instrument used by the European Union's policy for preserving biodiversity. Established pursuant to the Habitat Directive 92/43/CEE for preserving the natural habitats in the EU, the Natura 2000 network is composed of Sites of Community Interest (SCI), Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In 2019 the SCI IT 9350136 "Vallata dello Stilaro" in Calabria was affected by Snam's activities, for a total distance of 3.7 km, following the construction of the "Sant' Andrea Apostolo dello Ionio - Caulonia" pipeline and associated works.

-100% of plastic
in industrial packaging
by 2023

Snam Plastic Less

As well as being a serious risk for the environment and animals, plastic is also a danger to human beings. Proof of this is the report published by the Center for International Environmental Law (CIEL) which stresses the urgency of adopting precautionary principles to protect mankind from plastic pollution.

According to Assorimap, the national association for plastic recyclers and regenerators, in Italy one a quarter of the 2.1 million tonnes of plastic used is recycled. According to the report "The New Plastics Economy: Catalising Action" by the Ellen MacArthur Foundation, only the 14% of plastic packaging used globally is collected and sent correctly to the recovery plants; all of the rest is incinerated, sent to landfill or dispersed into the atmosphere.

Snam wants to make its contribution to reducing the use of plastic and, for this reason, in 2019, it launched the **"Snam Plastic Less"** initiative aimed at reducing the use of plastic in industrial packaging by 100% by 2023 and eliminate single-use plastic in drinks vending machines at all its company premises by 2020. A plan aimed at interventions in the supply chain and communication to Company employees.

In addition, Snam plans adopt new supplier evaluation systems in future tenders capable of assessing the use of single-use plastic in packaging and promoting alternative packaging.

Key Performance Indicators (KPI)

KPI description	KPI Year	KPI quantitative target	Sector	Activity status
Reduction of the plastic quantity in the packaging of industrial supplies	2019	100% in 2023	Snam group	

 Project in progress: multi-year objective

In order to correctly evaluate the environmental and safety aspects and impacts associated with its works, Snam carries out preliminary analyses under the scope of Environmental Impact Assessment (EIA) and Integrated Environment Authority (IEA) procedures, following which the administrations, both centrally and locally, release the authorisation required by applicable 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 2019, the collaboration project with the Department of Economics and Management of the University of Brescia, for the revision of the methodology used adopting a regionalised input-output model, was concluded. This model made it possible to evaluate the impact of a project, calculating the added value generated by the investment starting with the total value of production.

Hydraulic studies and mitigation measures, environmental restoration

Some of the most obvious consequences of climate change can be observed in the increase of acute weather conditions, such as flooding, landslides and droughts. Increasingly prolonged heavy rain seasons cause serious erosion of the banks of waterways, especially in valleys and overflow areas, with a consequent direct loss of habitats and biodiversity.

In order to mitigate and reduce the risk of potential erosion and guarantee high levels of protection and security for the pipes, Snam has produced detailed studies of hydraulic characterisation of the waterways affected by project works, in order to increase familiarity with the water environment affected by the works and to be able to plan the most appropriate hydraulic restoration works. In the design phase naturalistic engineering techniques are regularly employed involving the joint use of inert materials such as gravel, earth and timber, combined with plants and/or parts of plants (cuttings), which, thanks to the progressive development of radical equipment, are capable of exercising an important consolidation and stabilisation action on the soil, at the same time increasing the drainage capacity.

The bank and riverbed reconstruction technique is normally adopted for the consolidation of the banks and the riverbed. It is usually called **“breakwaters”** and **“covering the riverbed with boulders”**, using natural rocks that are available locally. Thanks to this technique it has been possible to establish actions to protect the banks, prevent the risks of soil consumption and loss through erosion, conserve the environmental balance and guarantee excellent harmony and aesthetic-landscape integration in the natural environment in which the work is carried out. The combined use of cuttings and the planting of native plants and shrubs helps establish the naturalisation process and the preservation of the biodiversity of the areas.

A recent morphological and hydraulic restoration through naturalistic engineering works was carried out in Sicily, in the province of Enna in the municipality of Piazza Armerina on the pipeline “Upgrading imports from Algeria to Italy - DN 1200 (48”)”, which runs through the Schiavo stream, affecting a stretch of the valley floor about 1,500 m long.

The bank reconstruction work with a covering of boulders fits perfectly in an environmental setting featuring undulating morphology with areas of grassland, meadows, arable land, hygrophilous vegetation and some sections of eucalyptus forests.

This work constitutes an important action for safeguarding the area from extreme meteorological events such as those that took place between 2016 and 2018 during which there was very serious bank erosion.

EIA decrees obtained during the year

Name	Length (km)	Regions involved	Authority	Date of decree
Pipelines				
San Salvo - Biccari reconstruction	87,000	Apulia	Ministry of the Environment and Protection of Land and Sea	08/11/2019
Mestre – Gonas Overhauling and Downgrading	80,200	Veneto - Friuli Venezia Giulia	Ministry of the Environment and Protection of Land and Sea	05/11/2019
Ravenna Mare - Ravenna Terra reconstruction	25,980	Emilia-Romagna	Ministry of the Environment and Protection of Land and Sea	29/10/2019
Campodarsego - Castelfranco Veneto reconstruction	23,360	Veneto	Ministry of the Environment and Protection of Land and Sea	26/09/2019
Pieve di Soligo - San Polo di Piave - Salgareda reconstruction	34,700	Veneto	Ministry of the Environment and Protection of Land and Sea	05/09/2019
Gagliano Termini Imerese	38,340	Sicily	Ministry of the Environment and Protection of Land and Sea	06/03/2019
Rimini-Sansepolcro pipeline reconstruction and associated works	81,915	Emilia Romagna and Tuscany	Emilia Romagna Region	25/03/2019

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

Name	Length (km)	Regions involved	Authority	Date of order
Pipelines				
Variant crossing the Trigno River By-pass for Trivento-Agnone	0.977	Molise	Ministry of the Environment and Protection of Land and Sea	21/11/2019
By-pass for Altino 2nd Tronco variant hydraulic construction works for the River Secco	0.070	Abruzzo	Ministry of the Environment and Protection of Land and Sea	02/04/2019
Tortona - Alessandria - Asti - Turin Reconstruction FR 39.1	3.680	Piedmont	Ministry of the Environment and Protection of Land and Sea	06/03/2019
Variant for PIDI insertion no. 18.2 at Chieti - San Salvo (CH)	1,132	Abruzzo	Ministry of the Environment and Protection of Land and Sea	26/02/2019
S. Anna River Crossing reconstruction (KR)	0.640	Calabria	Ministry of the Environment and Protection of Land and Sea	15/02/2019
HPRS IS64/24 bar Castellana Grotte system on Castellaneta - Castellana Grotte pipeline	-	Apulia	Ministry of the Environment and Protection of Land and Sea	16/01/2019

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

Name	Length (km)	Regions involved	Date of submission
Pipelines			
Variants S. Eufemia - Crotona S. Anna River Crossing reconstruction (KR)	0.640	Calabria	25/10/2019
Annex BIO ECOAGRIM s.r.l. of Lucera	1.052	Apulia	13/06/2019
Sestri Levante - Recco	47.800	Liguria	23/05/2019

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

Name	Length (km)	Regions - Provinces involved	Date of submission
Pipelines			
Alessandria – Cairo Montenotte - Savona Trappole	-	Piedmont - Liguria	19/12/2019
By-pass for Matera in the Municipality of Lauria	21.800	Basilicata	02/12/2019
Optimisation of the Recanati-Foligno Frazione Colfiorito layout	16.960	Marche - Umbria	28/10/2019
Benevento-Cisterna variants	2.097	Campania	03/10/2019
Pessano - Calolziocorte variants	5.185	Lombardy	25/06/2019

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

Name	Capacity (MW)	Regions - Provinces involved	Date of submission
"Sernano Storage" Concession - Installation TC1	25 mechanical-66.9 thermal	Lombardy	03/07/2019

WATER AND WASTE MANAGEMENT

Water consumption, water discharge and the production of waste are environmental aspects for Snam to be carefully managed, both from the perspective of quality and quantity, in order to reduce the associated environmental impacts. The Company started to develop a production cycle that is as circular and efficient as possible, improving performances in relation to the consumption of the resources used.

From the point of view of consumption, sea water and fresh water are used respectively in the production process and in company premises. In 2019, approximately 6.23 million cubic metres of water (6 million cubic metres of sea water and 0.23 million cubic metres fresh water) were extracted. The sea water was collected for cooling the auxiliary systems in the LNG plant and the same volume was discharged back into the sea, at a higher temperature (within the legal limits). The withdrawal was 51% higher than in 2018 following the increased operation of the plant equipment. Upstream storage activities produced approximately 6,159 cubic metres of process water (+4% compared to 2018), all sent to an external purification plant for treatment.

The extraction of fresh water, used mainly at the company premises activities, for fire-protection systems and to irrigate green spaces, increased by 70% compared to 2018. With regard to water discharges, the waste water is channelled into the sewage networks (42% of the total) or discharged, after treatment, into the soil and into surface water bodies (58% of the total).

The sites that cannot be connected to the sewerage system have closed-cycle phyto-purification systems, a technology that allows domestic waste water discharges to be eliminated because they are treated and fully absorbed by the planted vegetation.

The production of waste comes mainly from plant maintenance and management activities (71%) and well drilling activities (29%). In 2019 the total production of waste stood at approximately 27,823 tonnes (-2% compared to 2018) of which more than 80% belonged to the non-hazardous waste category. 42% of waste from production activities was sent for recovery.

