

# Climate change: scenarios and challenges





The **Intergovernmental Panel on Climate Change (IPCC)** is the United Nations body that evaluates climate change and its impacts. Composed of **195 member states**, the IPCC was established in 1988 by the United Nations Environment Programme (UNEP) and by the World Meteorological Organization (WMO) with the aim of providing political decision-makers with regular and stringent scientific evaluations for developing climate policies and instruments to support international negotiations on climate change

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) published the “Special Report on the impacts of Global Warming of 1.5°C”. The report comes under the scope of the more wide-ranging actions under the Paris Agreement to keep the average rise in global temperature well below 2°C in relation to pre-industrial levels and to try and limit the increase to 1.5°C, given that this would significantly reduce the risks and impacts of climate change.

According to the Special Report, human activity has already caused global warming of around 1°C compared with the pre-industrial period, with visible effects such as the intensification of heat waves and extreme meteorological events, a rise in sea levels and coral reef decline, a fall in biodiversity, the thinning of arctic sea ice and continental glaciers, a fall in crop yields.

With current production rates, greenhouse gas emissions will cause a temperature rise of +1.5°C by 2040, exceeding +2°C in subsequent years with catastrophic effects for our planet.

Keeping global warming below 2°C, with the ambitious and challenging goal of keeping it to 1.5°C, will be decisive because it will make it possible to reduce the complex impacts on ecosystems, health and well-being.

It is therefore vital to reduce the global CO<sub>2</sub> emissions produced by the human activity: a goal that can only be achieved through forward-looking actions in all areas of society and in all sectors of the economy and industry facilitating a journey towards decarbonisation, a journey which should be guided by rapid interventions and solutions which have immediate, if not definitive, impacts, taking into consideration that a tonne of CO<sub>2</sub> eliminated now is equivalent to at least 30 times the amount less in 2050.

The scientific community has identified several priority areas involving energy production and consumption. For example, one of the mainstays of the strategy outlined is to increase the quantity of electricity produced from renewable sources: it is estimated that in 2050 between 63% and 81% of electricity should be produced from renewable sources, replacing coal and oil. Other energy sources, such as natural gas, nuclear power plants and biomass will be fundamental in providing for global energy demand, guaranteeing that consumer demand is met and covered in full. Specifically, gas, a flexible and programmable energy source, can be used in multiple innovative applications or to replace fossil fuels with greater emissions. In particular, the use of natural gas in cities offers decisive advantages in terms of fighting air pollution, producing zero particulate gas emissions and virtually zero emissions of sulphur dioxide and nitrogen oxide. Natural gas produces 40% less climate changing emissions compared with coal and 20% less than oil. A tangible example is the city of Beijing, as reported in the Global Gas Report published by Snam in 2018 where, in 2017, thanks to a reduction in the use of coal in the residential and industrial sector and subsequent implementation of the use of natural gas instead, there was a significant improvement in air quality with a 54% reduction in the particulate emissions.

## What's already changed with 1°C rise



## Keeping global warming at 1.5°C rather than 2°C can make a lot of difference.

-  Fewer risks related to extreme temperatures and heat waves
-  Reduction in the global rise in the sea level by 10 cm less, which will limit the exposure of around 10 million people to the risks associated with flooding and damage caused to coastal infrastructure
-  Less health risks, especially related to heat waves, concentration of ozone and transmission of diseases such as malaria and dengue fever
-  Less loss of biodiversity, ecosystems, number of extinct species (50% for plants and invertebrates and 66% for insects)
-  In many areas of the planet, less heavy rain and risks of flooding and/or low rainfall and drought
-  Reduction in the increase in the temperature of the ocean and related risks of acidification and fall in oxygen levels, which would limit the irreversible loss of marine life, with consequences for fish and aquaculture
-  Lower levels of poverty and risks to more vulnerable populations, especially for indigenous populations and communities that depend on agriculture and fishing for their subsistence
-  Less risk of food security, linked to the reduction in crop yields (corn, rice and wheat) and sustainability of livestock



## New solutions for fossil fuels and renewable energy

First of all, it will be necessary to reduce the amount of energy produced using fossil fuels and to direct investments and research efforts towards greater production from renewable energy sources.



## Energy efficiency and reducing consumption

The commitment of governments and society to the reduction of demand for energy, the more efficient use of energy and the reduction of waste will also be vital, with significant investments directed at the overhaul and replacement of energy transportation infrastructures that are already obsolete.



## Carbon capture and storage

In order to reduce greenhouse gas emissions, the excess CO<sub>2</sub> in the atmosphere will also have to be removed. It will actually be very difficult to achieve and maintain zero emissions by 2050 without the CO<sub>2</sub> capture and storage technology.

The guidelines provided by the international scientific community coincide with the direction taken by the European Union and the Italian government, which have made a commitment to limiting global warming. In 2017 the Italian government published the National Energy Strategy (SEN): the ten-year plan for anticipating and managing the energy system change.

The 2017 SEN outlines the actions which have to be achieved by 2030, through a route that is also consistent with the long-term scenario of 2050 established by the European Road Map, which includes the reduction of emissions by at least 80% compared to 1990. In order to achieve these objectives, the interventions involve various strategic areas such as energy efficiency, renewable energy, sustainable mobility, the circular economy, carbon capture and storage, the improvement of infrastructure and interconnections. With the publication in December 2018 of the “Clean Energy for All Europeans” package, the European Commission updated the new climate targets, identifying the main target as achieving the rate of at least 32% of energy to be produced from renewable sources by 2030.

The objective of the strategy adopted by the Ministry of Economic Development and by the Ministry for the Environment, Land and Sea is to make the national energy system more:

- Competitive, continuing to reduce the gap between Italian and European energy prices;
- Sustainable, working to achieve the decarbonisation targets defined at European level and aligned to the goals set by COP21;
- Safe, continuing to improve supply security and the flexibility of the energy infrastructure and strengthening the national energy independence.

Tra gli obiettivi individuati nella SEN, attenzione specifica è rivolta al settore del gas naturale, per il quale sarà necessario stanziare nuovi investimenti per garantire flessibilità, adeguatezza e resilienza delle reti, maggiore integrazione con le infrastrutture europee, diversificazione delle fonti e delle rotte di approvvigionamento e gestione più efficiente dei flussi e dei picchi di domanda.

The objectives identified in the SEN include specific attention aimed at the natural gas sector for which new investments must be allocated to ensure the flexibility, adequacy and resilience of networks, greater integration with European infrastructures, diversification of sources and procurement routes and a more efficient management of flows and peak demand.

In the same way, the national energy and climate plan (PNEC), in the process of gaining approval (an EU instrument prepared by the individual member states), intends to implement strategies for a profound decarbonisation of the energy system and promote the circular economy, energy efficiency and the rational and fair use of domestic resources.

The challenge set by climate change does not respect national borders, but requires ambitious solutions coordinated at an international level, and cannot be separated from support from the private sector, cities and local communities. This awareness has also influenced the financial world which questioned the need to develop financial instruments which accompany and incentivise the adoption of sustainable practices.

# Sustainable finance as a tool for change

The change needed to limit global warming and, more generally, to guarantee sustainable development, entails the careful definition of projects, ideas and goals, not always easy to achieve and which have time constraints, but more especially economic ones. The UNCTAD (United Nations Conference on Trade and Development) estimated that achieving the SDGs (Sustainable Development Goals), the cornerstone objectives of the European Union in terms of sustainable development, would be possible through global investments in the period 2015-2030 of between USD 5 and 7 thousand billion. In the energy field alone, to achieve its objectives in terms of energy efficiency and investment in renewable resources, the European Union would need a sum equal to €180 billion per year, which would rise to €270 billion if the targets relating to transport, water and the waste sector are also taken into account. It is obvious how these figures could only be achieved through collaboration between private and public entities, creating synergies between sustainability and the financial sector and investments.

Climate change is perceived by investors as a systemic risk for the global economy which could threaten the capacity of the financial system to achieve results in the long-term.

According to the London School of Economics guidance "Climate Change and the Just transition. A Guide for Investor Action", the way in which society manages the transition towards a more resilient and low carbon emission economy will have important impacts on their licence to operate; the management of the social dimension will become increasing more important and material in achieving value targets. By incorporating a social dimension in their evaluations, investors manage to interpret the transition in relation to the prospect of traditional investments better. The successful outcome of this transition depends on an economy which functions well and which produces a social impact with the contribution of investors as well. The UNPRI (United Nations Principles for Responsible Investments) actually states that "a sustainable and economically efficient global financial system is necessary for the creation of value in the long-term".

## The just transition and the Sustainable Development Goals



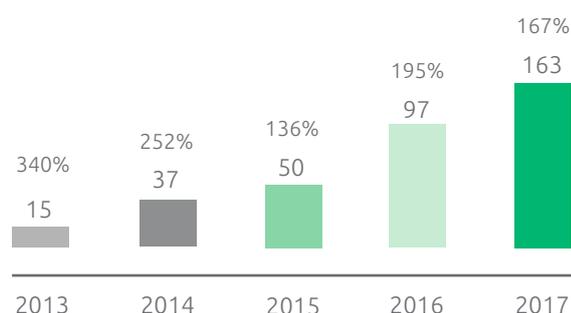
Source: Climate Change and the Just transition. A Guide for Investor Action, London School of Economics, Grantham Research Institute on Climate Change and the Environment, 2018.

There are several instruments like the SDGs which support investments in the transition towards a more resilient and low carbon emission economy.

Also according to the guide issued by the London Stock Exchange “Revealing the full picture”, the 17 SDGs provide an internationally recognised framework for drafting and prioritising the initiatives and investments in corporate business plans. The SDGs are consistent with the majority of the ESG reporting frameworks and measure progress in relation to the sustainable development global goals making sustainable investments comparable on a global scale.

Sustainable finance (or green finance) attempts to respond to these expectations, proposing a new way of financing, where the objective is to create value in the long-term, directing capital towards types of activity which can generate economic returns and benefits for society and the environment. As defined by the European Commission, sustainable finance is based on two fundamental principles: the first is aimed at improving the contribution of finance to sustainable growth and the mitigation of climate change; the second strives to strengthen financial stability incorporating environmental, social and governance considerations (ESG) in investment decisions.

Taking the European situation into consideration, in March 2018 the High-Level Expert Group on Sustainable Finance (HLEG), a group of experts set up in December 2016 by the European Commission with the task of drawing up guidelines for the development of sustainable finance in Europe, published an Action Plan on sustainable finance.



Source: World investment report 2018. Percentage growth year on year of green bonds and value in billions of dollars. 2013-2017

The document identifies ten actions aimed at directing capital flows towards sustainable investments, promoting the transparency of economic-financial activities and the better management of financial risks coming from climate change, the consumption of resources, environmental damage and social inequality.

In addition to this, EUROSIF (the European Forum for Sustainable and Responsible Investment) defined the different strategies of socially responsible investment, like choosing to invest in companies which demonstrate a better performance in ESG terms or the desire to invest in specific sectors (thematic investing) such as health and renewable energy, excluding those deemed unethical or not very ethical, such as the tobacco or arms industries. The EUROSIF report on responsible investment notes growing European interest in these new types of investing strategies, stressing how in the period 2015-2017 growth in responsible investment stood at 25%. In Italy also, there has been greater interest in sustainable investment with thematic investing between 2015 and 2017 rising from €2 to €53 billion, while as far as investments in companies performing well in ESG terms, the number increased from €4 to €58 billion.<sup>2</sup>

The support of banks and the bond market is important to ensure that companies can have access to sustainable finance instruments. Banks can act as consultants for companies and institutions that intend to issue sustainable bonds and can provide loans at preferential rates upon to certain ESG criteria. Insurance firms can also play a key role in supporting businesses in the management of non-financial risk by applying variable rates in relation to their ESG performance.



Source: The relation between ESG rating and market performance: cumulative return in percentage terms of the Stoxx Europe 600 index shares according to ESG rating 2012-2017

<sup>2</sup> <http://www.eurosif.org/wp-content/uploads/2018/11/European-SRI-2018-Study.pdf>

Equity securities more "sustainable" have increased by

15%

compared with other securities, in the period 2012-2017

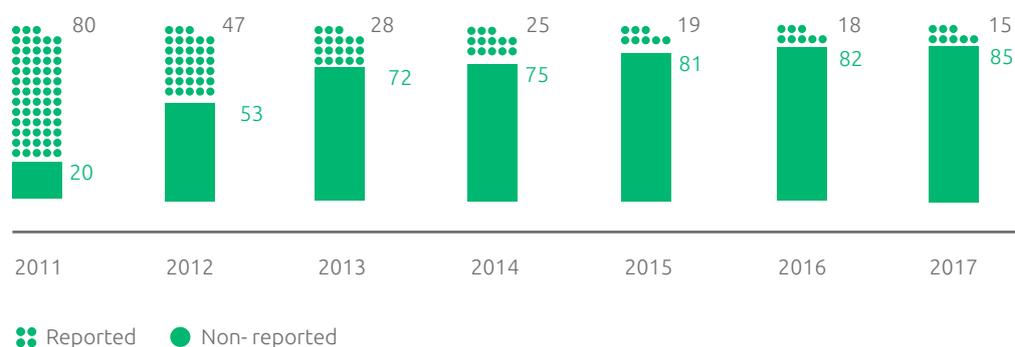
The most widely available sustainable finance instruments on the market are green bonds and social bonds, bonds issued to fund environmental and social projects, respectively. The availability of these new types of bonds has grown rapidly in recent years. In spite of green bonds only representing 0.2% of the entire bond market, their value and number increased exponentially, reaching around USD 163 billion in 2017. Another widely available financial instrument is represented by sustainable loans, loans aimed at promoting environmental sustainability within companies, at the same time guaranteeing an economic advantage.

The study "Relation between ESG rating and market performance", promoted by the Milan Polytechnic University, highlights how securities of companies with a high ESG performance have a better return than those with a lower performance. Equity securities deemed more "sustainable" have increased in the period 2012-2017, by 86% compared with 70.9% for securities defined as "less sustainable".

Evidently institutional investors and the financial sector have been demonstrating ever increasing interest in the sustainable performance of companies. In years to come businesses which do not manage environmental, social and governance aspects correctly could be partly excluded from investor's portfolio choices. As a result, developing structures and strategies capable of recognising, quantifying and managing these types of risks will be necessary for safeguarding the interests of companies in the financial market and beyond.

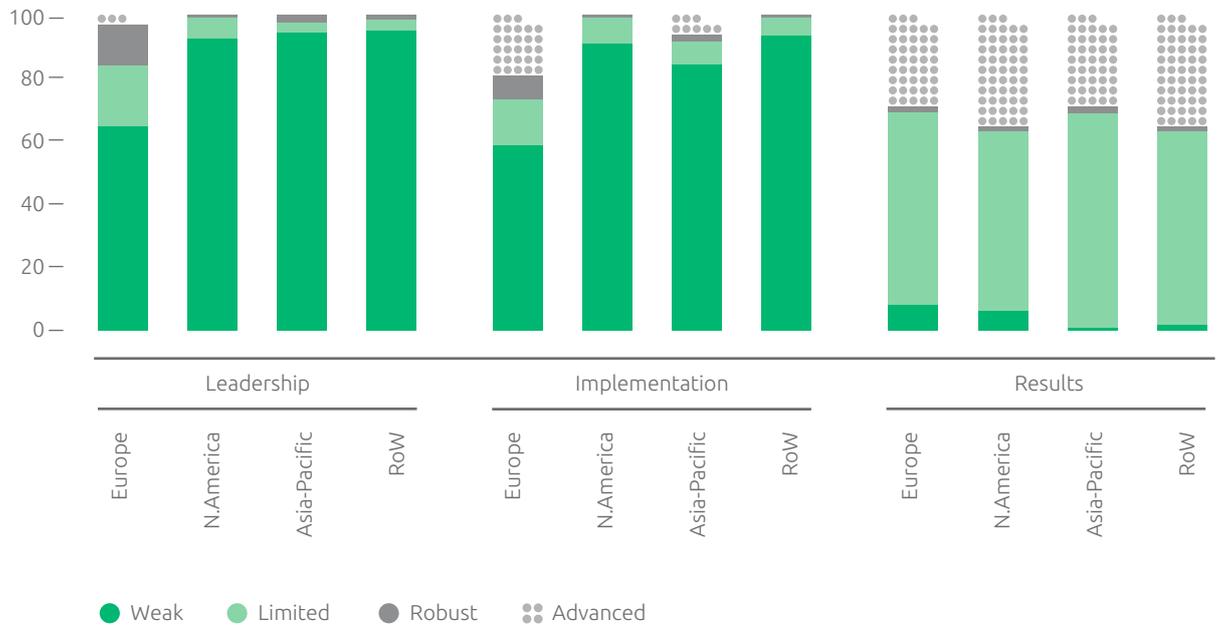
Alongside the correct management of these aspects there must be effective disclosure: the reporting of information relating to sustainability is strategic in the dialogue with investors and financial institutions. A 2017 study of the Governance and Accountability Institute into Standard & Poor 500 companies showed that accounting on ESG aspects increased considerably over the last 6 years, going from 20% to 85%.

### Growth of ESG Reporting by S&P 500 Companies (%)



Source: Governance and accountability Institute, Inc, 2017. Percentage growth of S&P index companies which report on ESG issues. 2011-2017

In this regard, the Financial Stability Board set up the Task Force on Climate Related Financial Disclosure (TCFD) in 2015 to develop the guidelines for clear and comparable reporting of corporate information in relation to financial risks and opportunities related to climate change. The final recommendations, published in 2017, were designed to include the risk of climate change in business decisions and to facilitate the allocation of capital to smooth the transition to a low carbon emission economy.



Source: Climate Change and the Just transition. A Guide for Investor Action, London School of Economics, Grantham Research Institute on Climate Change and the Environment, 2018

In 2018, the World Economic Forum (WEF), included a principle relating to reporting and disclosure among the 8 principles for climate governance. This principle refers to the responsibility of the Board to ensure that the strategic information and material risks and opportunities related to climate change are disclosed transparently and consistently to all company stakeholders in particular towards investors and, where required, to the regulatory authorities as well.

Disclosure by companies can therefore help investors understand better how to invest responsibly and "strategically". The fundamental element in this understanding is a correct evaluation of any exposure of portfolio assets to environmental and social risks. Vigeo Eiris, a European social and environmental ratings agency, developed a database of 365 companies throughout the world which generate over 20% of profits from activities associated with fossil fuels, classifying them on the basis of their ESG criteria, to support investors in their portfolio decisions. The results show how European countries have demonstrated that they perform better from an ESG perspective.

# Snam's central role: Tomorrow's Energy Company

In this context of change and innovation, at the end of November 2018 Snam launched the new Business Plan for 2019-2022 which follows a path that will enable the Company to rise to the challenges associated with climate change and contribute to the reduction in emissions, minimising the increase in global temperature and keeping down the cost of energy for end users. Through the adoption of the new Business Plan, and consistent with the previous one, Snam aims to act as a point of reference for the Italian and European journey towards decarbonisation. Natural gas and bio methane can be used to satisfy peak energy demand, compensating and supporting the production of energy from renewable sources. Specifically, Snam intends also to investigate the potential of hydrogen as a solution for energy storage and to promote a more efficient use of intermittent renewable energy.

Its activities place Snam in a key position to lead the country in the renewal of the energy sector. For this reason, in its Business Plan, Snam follows a route developed over various fronts, from energy efficiency to sustainable mobility, from the development of bio methane to the development of innovative technologies, all sustained and driven by challenging targets. In September 2018 in Linz, together with other European energy sector companies, Snam signed a commitment to support the use of hydrogen and its potential as a sustainable technology for decarbonisation and long-term energy security in the European Union.

In addition, in its Business Plan, Snam decided to also integrate ESG criteria (Environment, Society, Governance) identifying specific targets dedicated to the environment, governance, protection of individuals and dialogue with local communities.



## Environment

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### **Emissions reduction and efficiency:**

cogeneration plants, new generation heaters, electric compressors, DLE turbines, energy efficiency on real estate

### **Reduction of CH4 emissions:**

launched leak detection and repair campaign, technology update, in line gas recompression, ecc.

### **Energy transition:**

Snam4Mobility, Biomethane and CNG, SSLNG.

### **CH4 emission targets:**

-15% by 2022

-25% by 2025



## Social

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### **Snam4Safety:**

a new safety model to improve the employees and contractors' safety

### **Snam Institute:**

100,000 hours of training

### **Performance management:**

extended to 100% of employees

### **Smart working:**

open to 500 employees

### **Snam Foundation:**

corporate volunteering week, 300 employees involved



## Governance

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### **Business integrity and anti-corruption:**

One of 4 companies worldwide part of the Global Forum of Transparency International

More than 2,000 ethic and integrity pacts and repetitional checks on suppliers in 2018

### **Effective 6 integrated governance:**

ESG factors fully integrated in our governance;

BoD oversight climate risks and opportunities

Independence: 56% of BoD independent. All BoD

committees chaired by Independent Directors

Diversity: 44% of the Board is made up by women

From rules to purpose: from 650 procedures to 90 rules.

4 shared values for business conduct

As far as environmental protection is concerned, under the scope of the investments announced in the Business Plan, there are also new objectives for the reduction of methane emissions, ongoing efforts to reduce emissions and the maximisation of energy efficiency and the development of new businesses, such as bio methane, CNG and SSLNG. Specifically, reviewing the objective of the previous plan to reduce natural gas emissions by 10% by 2021 compared with 2016 levels, Snam set a new target in its Business Plan to reduce methane emissions, forecasting to reduce them by 25% by 2025 (with an interim target of -15% by 2022). Detailed information on Snam's environmental commitment is given in the Environment chapter.

To uphold the importance that the Company gives to the environmental sustainability, in 2018 Snam also subscribed to the Guiding Principles "Reducing methane emissions across the natural gas value chain", through which Snam commits itself to reduce methane emissions from the construction and management of natural gas infrastructure and to encourage its suppliers to do the same.

As far as the social dimension is concerned - and as detailed in the Social chapter – Snam's special emphasis is on safeguarding its employees and suppliers, also through specific development programmes such as "Snam4Safety", for the promotion and dissemination of the culture of workplace health and safety. As further confirmation of the Company's commitment to the ongoing professional development of its people, the Snam Institute provides yearly around 100,000 hours of training to company employees. Attention to the social dimension is also demonstrated by the activities of the Snam Foundation, established in 2017, with the goal of making the Company's skills and know-how available to contribute to the innovation, progress and growth of the country.

The ESG values are also included in Snam's corporate governance; it is the only Italian company and one of four in the world to have signed a global partnership with Transparency International in the fight against corruption. The Governance chapter describes the Snam's commitment to transparency and business ethics.

### **New targets for reducing methane emissions: the guiding principles subscribed by Snam**

In June 2018 Snam ratified the **Guiding Principles** developed in 2017 by the most important environmental protection and oil&gas industry players: the Environmental Defense Fund, the International Energy Agency (IEA), the International Gas Union, the Oil & Gas Climate Initiative Climate Investments, the Rocky Mountain Institute, the Sustainable Gas Institute, the Energy and Resources Institute and the United Nations Environment Programme (UNEP). The initiative is part of undertakings promoted by the global energy industry to ensure that **natural gas plays an important role in satisfying future global energy demand and in fighting climate change**, one of the greatest challenges of the 21st century. The guiding principles on the issue of reducing methane emissions were ratified, not only by Snam, but also by other important players in the oil&gas market such as BP, Chevron, Eni, Equinor, ExxonMobil, Gazprom, Qatar Petroleum, Repsol, Shell, Total, Wintershall and Woodside.

By signing this agreement, **Snam has made a commitment to reduce methane emissions and to steer all companies and organisations in its value chain in the same direction**

– from producers to end users - promoting the adoption of increasingly accurate emission measurement technologies and increasing transparency and support in formalising adequate policies and regulations on the subject.

The Guiding Principles outline a series of necessary actions:

- The definition of strategies for the reduction of methane emissions and ongoing support for the development of innovative technologies that allow them to be contained.
- The promotion of partnerships and collaborations with customers and suppliers with the shared goal of reducing methane emissions along the entire natural gas value chain.
- The improvement of the accuracy of the technologies for monitoring emissions.
- The promotion of adequate regulatory policies and instruments, which encourage improvements in performance and support the development of clean, sustainable technologies.
- Transparent communication of information relating to natural gas emissions, the promotion of the adoption of standardised calculation methods which allow the comparability of the data provided.

The route towards the future energy company, which uses and incorporates innovation, sustainability and development, is outlined within the scope of the TEC project – Tomorrow's Energy Company, launched by Snam during the presentation of the 2019-2022 Business Plan. The aim of this project is to accelerate the innovative capacity of Snam and its assets to take advantage of all the opportunities offered by the development of the energy system. There are four main areas of intervention in which €850 million will be invested: greater operational efficiency (e.g. the smart gas project for the maintenance of the gas network and transportation, the use of drones for monitoring assets), the reduction of methane emissions (e.g. the campaign for detecting and eliminating leaks), new businesses (e.g. bio methane, sustainable mobility, impacts on the natural gas network of the energy mix composed of hydrogen and methane, the possibility of integrating power-to-gas technologies for the production of hydrogen from renewable sources), innovation and development of core competencies.

Not only a technological revolution, with the aim of aligning its financial strategy as closely as possible to those of the medium-/long-term ESG goals and diversifying its investor base, Snam chose to use sustainable financial instruments which will allow it to fund projects, through specific "sustainable" instruments, in the area of environmental sustainability and the development of technological infrastructure, actively contributing to the fight against climate change.

To diversify and expand its business, integrating new technologies related to decarbonisation and demonstrating its desire to minimise the impact of its activities, in 2018 Snam pursued an acquisition plan to support the development of bio methane, energy efficiency and new solutions for sustainable mobility.

As far as the sector for the production and distribution of bio methane is concerned, in 2018 Snam gained control of IES Biogas and Enersi Sicilia through its subsidiary Snam4Mobility. IES Biogas, founded in 2008 in Pordenone, is one of the main Italian companies in the design, construction and management of biogas and bio methane production plants with a portfolio of 200 plants throughout Italy and abroad. The inclusion of IES Biogas will enable Snam to expand its expertise in the construction of bio methane plants and integration in the transport sector. The acquisition of Enersi Sicilia – a company authorised to build a facility for the production of bio methane from the organic fraction of municipal solid waste (FORSU) in the province of Caltanissetta – will enable Snam to create its first bio methane plant, which will handle 36,000 tonnes of urban waste per year, providing neighbouring municipalities with a renewable solution for the problem of waste disposal. The plant will

be created leveraging the managerial skills and know-how of IES Biogas, which will monitor its development and construction.

Through the newly established company Cubogas, wholly-owned by Snam4Mobility, Snam concluded the acquisition of the business unit of M.T.M., part of the Canadian Westport Fuel Systems Inc. Group, dedicated to the business of natural gas compressors for sustainable mobility. The company is one of the main international operators for the design, development and production of technological solutions for methane gas refuelling stations.

Still in 2018, TEP Energy Solutions also became part of the Snam Group. TEP is one of the biggest Italian ESCos (Energy Service Company) and, with more than 200 national and international customers, it operates in the field of the energy efficiency, with the main goal of guaranteeing its customers a decrease in consumption and expenses related to the energy use.

Beyond national borders, during the year Snam concluded new agreements and understandings, ratified with the aim of evaluating possible collaboration and partnerships with companies operating in international energy markets and outside Europe. A Memorandum of Understanding was signed at the Italian Embassy in Beijing, with State Grid International Development (SGID), controlled by the State Grid Corporation of China, the largest energy utility in the world. The agreement involves the joint target of evaluating possible opportunities of collaboration in China and to reduce CO<sub>2</sub> emissions at an international level, specifically in relation to the use of new technologies, research and development into renewable gas and sustainable mobility. Future collaborations include the construction of biogas and bio methane plants for the production of electricity in rural areas of China, where Snam will contribute by making its know-how available. Possible partnerships in another two countries in which SGID operates will then be evaluated, namely Australia and Portugal, for the maintenance and optimisation of natural gas transportation networks and storage sites.

Snam's launch in the Asian market will be strengthened further by the signing of a Memorandum of Understanding with Beijing Gas, the largest distributor and supplier of natural gas in China. This understanding involves the commitment of the two companies to evaluate possible collaborations in China, specifically in the sector of bio methane and technologies for natural gas storage. The agreement will allow Snam to evaluate expanding its business in the Chinese market, confirming its European leadership role in the gas transportation sector. At the same time, the understanding will make it possible to support the transition of the Chinese energy

mix towards more sustainable fuels, through projects linked to the use of natural gas developed in a country in which the energy scenarios include the tripling of methane demand between now and 2040.

## BIO METHANE: A CURRENTLY REALITY AND OPPORTUNITY FOR THE FUTURE

Bio methane is a renewable, flexible, efficient and programmable source, also thanks to existing transport and storage infrastructures, which are perfectly and totally integrated with other renewable sources like solar and wind energy.

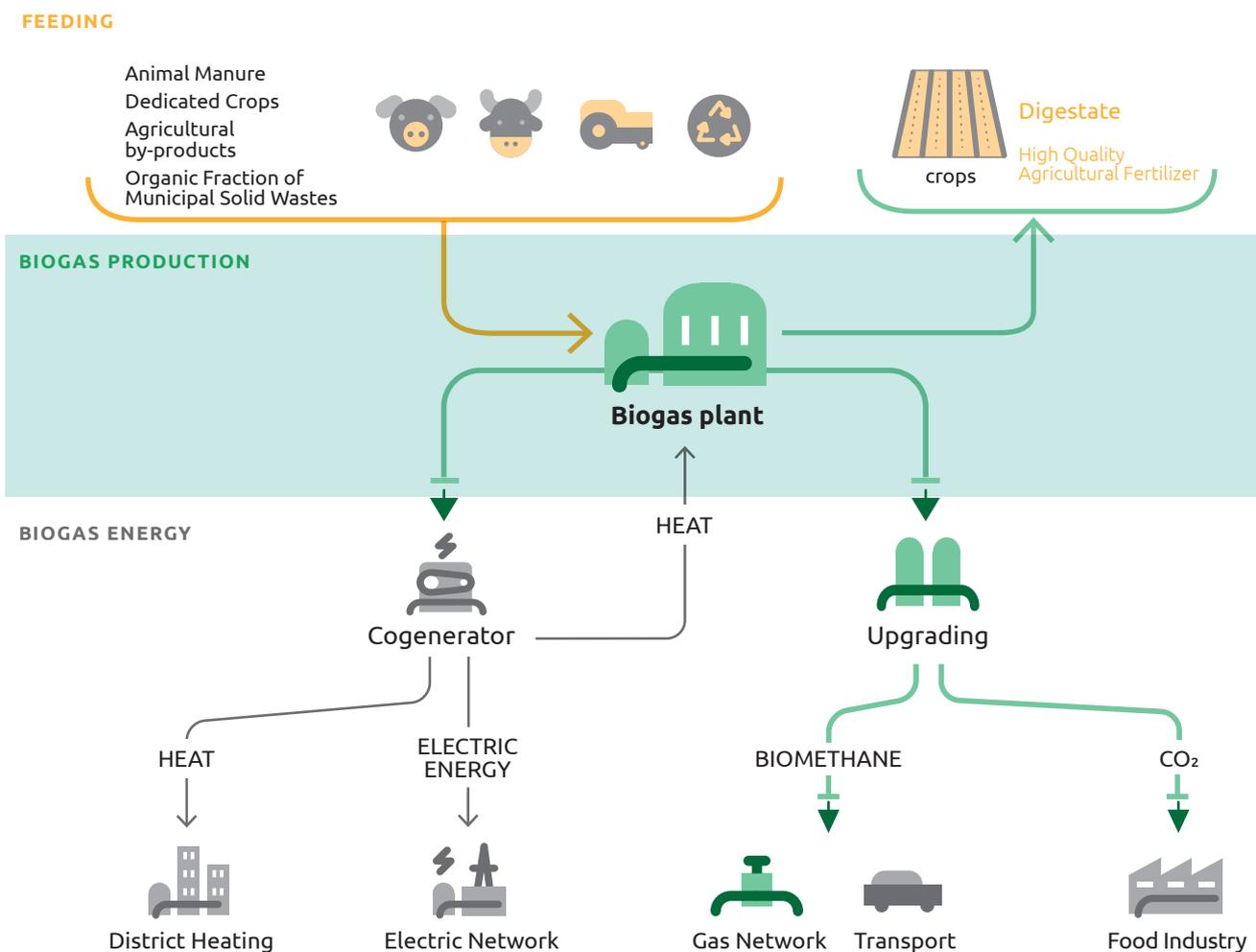
Dedicated plants produce both agricultural and agro-industrial by-products from anaerobic digestion and organic fraction of waste through a biogas upgrading process.

Bio methane can already be injected into the network and used in all sectors where the gas is present. Because it is a renewable energy, on March the 2nd 2018 the Italian government issued a Ministerial Decree which promotes the use of bio methane as a fuel for road transportation.

# 14 connection agreements

were concluded in 2018 for the injection of bio methane

### The biomethane cycle





Italy, with around **1,900** anaerobic digestion plants in operation, is currently the third largest producer in the world of biogas from agricultural matrices with approximately **2.4 billion** cubic metres per year. In addition, there is great potential for the production of bio methane in Italy from the organic fraction of urban waste.

Bio methane has many different advantages:

- A perfect example of the circular economy: both in the field of agriculture, agro-industry and with regard to the management of the organic fraction of municipal solid waste (FORSU), bio methane is produced through waste products and by-products which, once the anaerobic digestion process is completed, are used as totally natural fertilizers capable of restoring the necessary organic substances and nutrients to the soil from a circular economy perspective.
- An efficient, flexible and programmable energy source: the production of bio methane is per se inflexible and non-programmable; however, the presence of infrastructure such as gas transportation networks and storage facilities ensure that, unlike other renewable energies, once it has been injected into the Snam network, the consumption of bio methane can be modulated as needed without requiring additional investments;
- Totally renewable and sustainable: despite being a gas, bio methane is considered a neutral source from the perspective of greenhouse gas emissions and it is totally renewable since its production takes place through the transformation of waste and organic material which in any case would produce greenhouse gas emissions. In addition, it is acknowledged that for bio methane from agricultural sources, the carbon dioxide emissions produced during combustion are the same as the quantity of carbon dioxide absorbed by crops when growing, rendering the process neutral from an emissions point of view. The process can become "negative" from "neutral" if the carbon dioxide produced and separated during the biogas upgrading phase is used for industrial and/or food purposes. In addition, the production of bio methane does not compete with the production of food and promoting the use of particular "second harvest" energy crops it makes it possible to maintain the agricultural balances of the existing economy;
- It creates value for local communities: bio methane can be the source of a new economy at a local level, creating jobs, increasing tax revenues for local communities, answering to the needs of disposing and exploiting the organic fraction of urban waste and, through particular cultivation techniques; it also fights the effects of desertification, preserving and sometimes restoring specific soil nutrients;
- It minimises the costs of decarbonisation: bio methane becomes a fundamental source to achieve national and European objectives in terms of decarbonisation, as new investments in infrastructure are not required and helping to use waste and by-products.

Snam supports the Italian bio methane chain and will invest at least €100 million in this business segment by 2022. In addition to the previously mentioned acquisitions (IES Biogas and Enersi), in the bio methane production and distribution sector, Snam and BHGE (Baker Hughes, a GE Group company) signed an agreement in 2018 aimed at creating four micro-liquefaction plants in Italy. These plants will also be capable of liquefying bio methane produced from renewable sources and transforming it into bio LNG (Liquefied Natural Gas), which will then be used in the heavy road transport sector and to promote the expansion of this technology to sea transport in Italy.

The Consorzio Italiano Biogas (CIB) estimated a bio methane production potential in Italy of 10 billion cubic metres by 2030, 80% of which will be produced from agricultural origins. If used entirely in the transport sector, bio methane would guarantee the possibility of running a third of all the vehicles in Italy with renewable energy, which could rely on a distribution network of around 1300 facilities constantly increasing. In Italy the opportunities of exploiting and developing more the sustainable mobility have also been confirmed by what was established in the new Interministerial Decree of March the 2nd 2018, which promotes the use of bio-fuels and bio methane in the transport industry, in line with the provisions of the EU Directives promoting renewable energy sources and reaching the targets set for bio-fuels to be used in the transport sector. By 2020, 10% of the fuel used in the transport sector in EU countries should be renewable.

## DRIVING THE ENERGY OF THE FUTURE: SUSTAINABLE MOBILITY

The dissemination of natural gas in the transport sector and the integration of biogas and bio methane will play a crucial role in supporting the domestic economic growth and in fighting climate change, in a global transition process that is rapidly moving towards decarbonised economies.

The ease of transporting and storing natural gas allows the development of multiple projects linked to the deployment of compressed natural gas (CNG) for road transportation and liquefied natural gas (LNG) used in heavy land and sea

transport. In addition, bio methane can also be compressed, liquefied, transported and used as a renewable fuel.

Alongside the development of low emission fuels, Snam's commitment outlined in its Business Plan will lead it to upgrade the existing infrastructure in order to expand the network of natural gas refuelling stations. This objective will also be achieved through partnerships with other players in the industry, like the previously mentioned acquisition of Cubogas, engaged in the business of natural gas compressors for sustainable mobility.

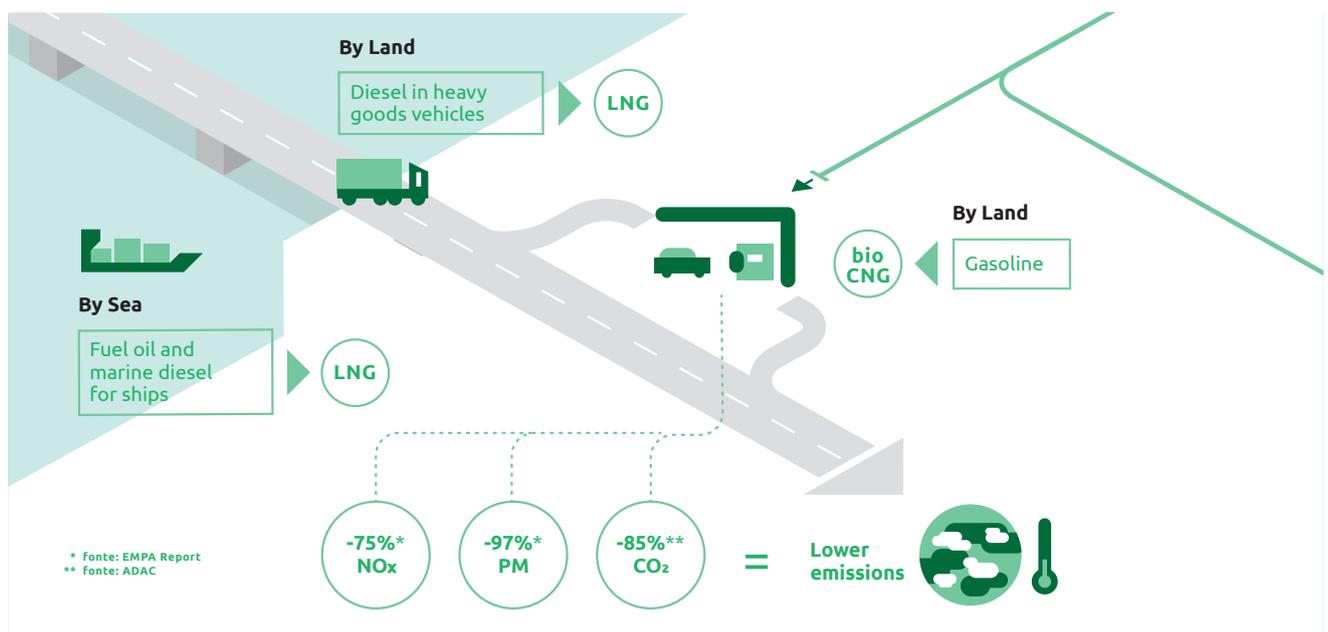
## Liquefied natural gas (LNG): a solution for reducing maritime and heavy transport emissions

LNG is produced starting with natural gas, which is cooled and compressed until it reaches a liquid state. In this form the gas can be easily stored and transported, and importing it by sea allows a further diversification of sources of procurement, with positive effects on national energy security.

The LNG can be used in traditional plants or as an alternative to other fossil fuels for automotive and sea transport, replacing diesel, fuel oil or marine diesel oil.

The use of LNG instead of diesel has significant environmental advantages with a considerable reduction in emissions both in terms of climate changing gases and local pollutants, specifically in the case of the use of methane produced from renewable sources.

### Alternative to traditional fuels



83 new cars

powered by natural gas  
in the Snam car fleet



This new partnership will allow the promotion of the further development of natural gas and bio methane sustainable development, both in Italy and across Europe, since it joins together two European leaders: us in the creation of innovative infrastructure and SEAT in the development of new sustainable car models.

## Compressed natural gas (CNG) for automotive transport: an effective response to the transport-related air pollution

The natural gas transported in the Snam network can be compressed and used as an alternative to traditional fossil fuels for cars, lorries and buses. The use of CNG instead of petrol and diesel fuel has considerable environmental advantages: compared with traditional fuels, CNG allows a reduction in the CO<sub>2</sub> emissions of around 33% (85% if from bio methane), nitrogen oxide (NO<sub>x</sub>) emissions of around 75% and particulate matter of around 97%. With a good extensive network of methane pipelines, which allows the transportation of CNG with very little impact on the environment and vehicle traffic, Italy is already the European market leader for methane consumption for automotive transport, with over one billion cubic metres consumed in 2017 and around one million vehicles currently on the roads.

During the year Snam ratified the agreements and partnerships with the goal of promoting sustainable mobility throughout the country.

At the annual Partners' Day, Snam and the Spanish car manufacturer SEAT signed a strategic agreement for the technological development and expansion of compressed natural gas and biogas refuelling facilities for sustainable mobility. This partnership will see Snam committed to the creation of an innovative infrastructure and the development, by SEAT, of new models of cars running on methane. The agreement concluded involves the commitment, by the two companies, to exploring development opportunities and initiatives aimed at retailers, commercial customers and car owners to promote the natural gas refuelling network and identify initiatives for the technological development of bio methane. The sharing of Italian, French and Austrian market strategies will enable SEAT and Snam to create synergies for the expansion of the CNG and bio-CNG market as alternatives to traditional fuels.

Under the scope of the promotion of sustainable mobility in Italy, in 2018 Snam was involved in the upgrading of the existing infrastructure necessary for the development of the CNG and LNG markets. In order to expand the network of refuelling stations for vehicles running on natural gas, during the year the Company made two important deals with two important players in the transport sector: Eni and API. Through its subsidiary Snam4Mobility, Snam is committed to developing the infrastructure for the use of natural gas in the transportation sector. In particular, in 2017 it signed the first agreements with different counterparts to develop 50 fuel stations (2 LNG and 48 CNG stations), including the first two batches for a total of 34 refuelling stations within the national Eni network of gas stations. 6 of the sales outlets in the contracts are already in service. Snam reached an agreement with the API Group for the creation of around 200 new natural gas and bio methane refuelling facilities, which will be included in the Italian IP fuel sales outlets. These refuelling stations will have gas compression systems produced by the subsidiary Cubogas. Snam's goal is to create over 250 new distributors on a national scale, which will be part of the existing network in Italy, to better balance the deployment in the different regions of the Country.

## EXPLOITING THE ENERGY OF CHANGE: SUSTAINABLE FINANCE

In 2018 Snam decided to diversify its sources of funding leveraging "sustainable finance" instruments for the purpose of aligning its financing strategy as closely as possible with the general goal of the Group of making its business more sustainable and climate-friendly in the medium/long term.

Snam decided to integrate its financing options with two types of financial products: sustainable loans (lines of credit linked to sustainability indices, ESG performance and business ethics) and climate action bonds (bonds whose issue is linked to projects with a positive impact on the environment).

With regard to the first of the two types of funding mentioned above, in 2018 Snam transformed its €3.2 billion syndicated loan into a sustainable loan, making it, in size, the third largest loan of this type in the world and the largest for a utility operating in the natural gas sector. This loan involves bonus/malus mechanisms dependent on the reaching of certain KPIs under the scope of ESG also including the attainment of specific corporate targets.

Specifically, the targets set in the loan agreement consist of:

- a reduction in the natural gas emissions;
- the recovery of the natural gas released each year during transport network maintenance activities;
- an increase in the dissemination of the performance management system within the company.

Whether or not these targets are reached, partly or totally, will result in a potential increase or decrease in the margin applied to the loan. The independent Standard Ethics Rating (SER) company issued a sustainability opinion to the lending banks, noting the consistency of the targets to be reached.

Additionally, during the year Snam published the Climate Action Bond Framework, which defines the criteria for the future issuance of bonds for financing investments under the scope of environmental sustainability. The funds from the issuance of the Snam Climate Action Bond will be used to fund existing or future projects for reducing emissions of pollutant gases, renewable energy, energy efficiency, the development of new green buildings and conservation of natural capital in areas affected by the Company's activities. The Snam's Climate Action Bond Framework received a second party opinion from the independent company DNV GL which gave a positive evaluation of the projects included in the framework and the decision-making process followed by Snam for selecting sustainable investments.

In addition to this, in September, the company became a supporter of the TCFD (Task Force on Climate-related financial disclosures) and made a commitment to report its strategic decisions integrating them with those related to climate change.

In 2018 Snam converted its

€ 3.2 Bn

syndicated loan into a sustainable loan (the third largest loan of this type in the world)



## 2018 Engagement activity

In addition to the normal activities of presenting the Strategic Plan and conference calls upon the publication of the Company's results (annual, semi-annual and quarterly) during 2018, the following were carried out:

- **11 road show** to meet shareholders and institutional investors at the major financial centres of Europe and North America;
- **15 industry conferences** allowing investors specialising in the utilities and infrastructure sectors to meet senior management;
- **117 one - to - one meetings** between management and investors, in addition to numerous group meetings (for a total of 161 meetings).

All the environmental and climate initiatives make Snam one of the leading Italian organisations in terms of sustainability issues. The company is actually included in many of the most important European and global sustainability indices. In 2018 also, Snam's shares were included on the main international SRI stock exchange indices, a fundamental instrument from the perspective of market transparency and comparability with peers. This result helps improve the company's visibility vis-à-vis investors, as well as the entire financial market. Specifically, Snam shares were confirmed for the tenth consecutive year on the Dow Jones Sustainability World Index, the most important global stock exchange index for evaluating the social responsibility of companies. It takes into consideration the top 300 Dow Jones Global Total Stock Market Index companies based on economic, social and environmental performance, also taking into account how the companies approach issues such as governance, the mitigation of climate change, risk management, the standards of suppliers and the conditions of employees.

This implies the non-participation of those companies which do not operate in an ethical and sustainable way and the exclusion of those already present but which are not committed to the continuous improvement of their performance. The overall share of Snam's institutional investors as at 31.12.2018 that include Corporate Social Responsibility criteria in their investment decisions stood at 9.7% of all institutional investors.

## RELATIONSHIP WITH THE FINANCIAL COMMUNITY

Snam believes that maintaining constant relations with investors and the entire financial community is of strategic importance for its reputation. In this respect, it endeavours to disseminate comprehensive and timely information, capable of effectively representing the business's strategy and performance, particularly enhancing the dynamics that ensure the creation of value over time.

## Snam's presence in sustainability indices

 <p>MEMBER OF <b>Dow Jones Sustainability Indices</b> In Collaboration with RobecoSAM</p>	<p>For the tenth year in a row, Snam's stock is listed in the Dow Jones Sustainability World Index, the world's most important stock market index assessing corporate social responsibility.</p>
 <p>FTSE4Good</p>	<p>Snam is once again present in the FTSE4Good, where it has been listed since 2002, an index created by the FTSE Group to encourage investment in companies that meet globally recognised social responsibility standards and is an important point of reference to establish benchmarks and ethical portfolios.</p>
 <p>ETHIBEL EXCELLENCE</p>	<p>Snam's listing is confirmed in the Ethibel Sustainability Index (ESI) Excellence Europe and in the Ethibel Sustainability Index (ESI) Excellence Global. Also reconfirmed in the Ethibel PIONEER and in the Ethibel EXCELLENCE Investment Registers: the Forum Ethibel decision indicates that the company can be characterised as an industry leader in terms of CSR.</p>
 <p>2015 Constituent MSCI Global Sustainability Indexes</p>	<p>Snam's listing has been confirmed for the fourth year running in the two sustainability indices MSCI ACWI SRI Index and MSCI ACWI ESG Leaders, by MSCI, an international leader providing IT tools to support the investment decisions of global investors. The MSCI Global Sustainability indices include companies having high sustainability ratings in their affiliated sectors.</p>
 <p>STOXX ESG LEADERS INDICES</p>	<p>Snam stock, for the ninth year in a row, is included in the STOXX Global ESG Leaders Indices, a group of indices based on a transparent process of selection of performances in terms of sustainability, of 1800 companies listed worldwide.</p>
 <p>ECPI Sense in sustainability</p>	<p>Snam is included in five of the main ECPI sustainability indexes. Snam's inclusion in the family of ECPI indices dates back to 2008. The ECPI methodology consists of screening based on testing more than 100 ESG (Environmental, Social and Governance) indicators.</p>

## ESG Awards

 <p>CDP DISCLOSURE INSIGHT ACTION</p>	<p>Included, for the sixth year running, among the top scoring companies of the CDP, as one of the leading international non-profit organizations dealing with climate change, which also included it in the A-List.</p>
 <p>100 Sustainability Stock Index powered by Sustainalytics</p>	<p>Snam was also listed, in 2018, for the fifth year running, in the United Nations Global Compact 100 index (GC 100), developed by the United Nations Global Compact with the research firm Sustainalytics, which includes the 100 companies that have distinguished themselves at global level both for attention to sustainability issues and to financial performance, and that adhere to the ten fundamental principles of the United Nations on human rights, labour, environment and anti-corruption issues.</p>
 <p>EURONEXT vigeo iris INDICES WORLD 120</p>	<p>Snam is confirmed to be included also in 2018 in the (Europe, Eurozone, World) NYSE Euronext Vigeo 120 indices, managed by Vigeo, a leading company at a European level in rating companies with regard to CSR issues.</p>
 <p>Corporate Responsibility Prime rated by oekom research</p>	<p>In 2018, Snam was confirmed at "PRIME" level (with rating B-) by Oekom research, a leading international agency rating socially responsible investments, which operates on behalf of institutional investors and financial services companies.</p>
 <p>SUSTAINALYTICS</p>	<p>Snam was also confirmed in the Sustainalytics index, the leading ratings agency for the evaluation of companies from an ESG perspective which the company has been on since 2013.</p>