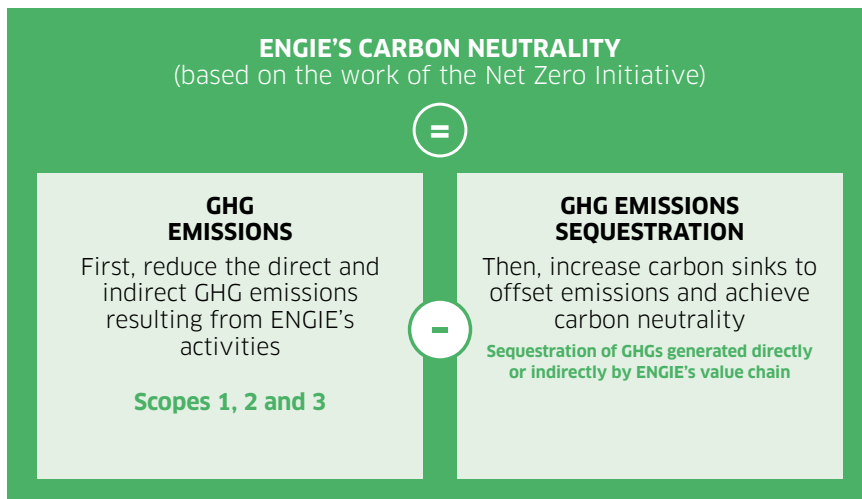


# CLIMATE REPORT TCFD REPORT 2022



# REACHING FULL-SCOPE NET ZERO BY 2045 FOLLOWING A “WELL BELOW 2°C” TRAJECTORY

ENGIE is aiming to offset all of its direct and indirect Greenhouse Gas (GHG) emissions by carbon sequestration, in order to achieve carbon neutrality by 2045. The Group is also committed to helping its customers reduce or avoid emissions.



## OFF-BALANCE-SHEET

### CUSTOMER DECARBONIZATION

Reducing customers' GHG emissions through ENGIE's products and services

**Emissions avoided or reduced**

### BIOGENIC CO<sub>2</sub> EMISSIONS

Carbon contained in agricultural or forestry biomass, emitted during its combustion or degradation.

*Definition of "biogenic emissions": Biogenic carbon is carbon contained in agricultural or forestry biomass, emitted during its combustion or degradation, as well as carbon in soil organic matter. CO<sub>2</sub> molecules come from two different types of sources, biogenic or fossil, but behave the same in the atmosphere.*

## Scenarios as a tool for projecting possible futures

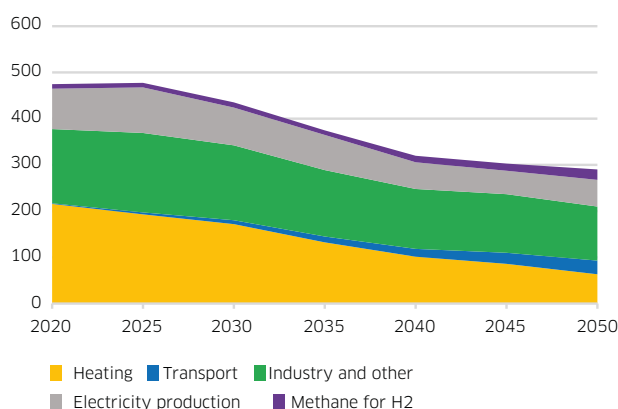
The trajectory chosen by ENGIE focuses on **a balanced mix**, in which renewable gas and CCUS (Carbon Capture, Utilization and Storage) solutions all have their benefits, in order to guarantee the best levels of efficiency and resilience of the energy system.

**Studies carried out by the Group at the European level** have shown that large-scale electrification would lead to additional costs of more than €10 billion per year by 2050 and increased vulnerability of the electricity system. The fact that we are depriving ourselves of the proven potential of various energy vectors, including renewable gas, decarbonization solutions such as CCS (Carbon Capture and Storage) and the use of existing networks, increases the problem of managing the electricity peak and matching

energy supply and demand. The Group also believes that the use of **a wider range of decarbonization options** puts players in the energy system in a better position to benefit from technological advances and meet the **needs of flexibility** inherent in the energy market. It also reduces the economic and political pressure on electricity infrastructure (new lines to be built, acceptability of decarbonized production assets, whether it is wind, solar or nuclear). On the basis of these studies and the development of a renewable gas sector, the Group has outlined internal scenarios for the decarbonization of the European energy system which have led it to the opinions described below.

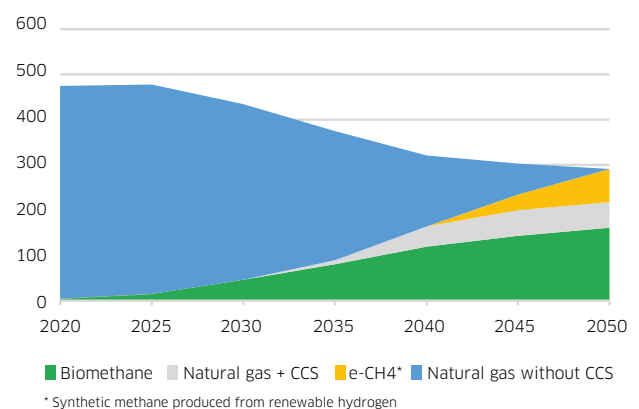
## Scenario based on the 'greening' of natural gas in France

**Demand for methane (TWh HHV\*)**



\* Higher heating value

**Supply of methane (TWh HHV)**



*Residual supply after exports to other countries to meet domestic demand.*



**Catherine MacGregor,**  
Chief Executive Officer



We are at a pivotal moment in the energy world. It is crucial to put the energy transition at the heart of stimulus packages in a post-pandemic context. With a corporate purpose, a strategy and a business model in line with these challenges, ENGIE is well-positioned to take advantage of all opportunities that this transition has to offer. Our commitment is reflected by tangible and ambitious objectives which are relevant to our activities and, more broadly, to our entire value chain. ”

### The Group's climate trajectory is based on four strong convictions regarding decarbonization scenarios:

- The Group's gas-fired power generation assets (or **thermal assets**) are now **essential to the security** and balance of the energy systems of which they are part.
- In an electricity mix dominated by intermittent renewable energies, the **need for flexibility** solutions to ensure the balance of the carbon-neutral energy system **will be greatly increased** (multiplied by 4 in 2035 according to the IEA in its Net Zero Emissions scenario).
- **Only thermal assets can provide this flexibility** on an inter-weekly and inter-seasonal basis. While pumped storage power stations (PSP) can usefully supplement these thermal assets, their potential remains limited. Moreover, at these time scales, the batteries are not suitable.
- **Gas-fired thermal assets can be completely decarbonized by 2040-2045** thanks in particular to biomethane and renewable hydrogen.

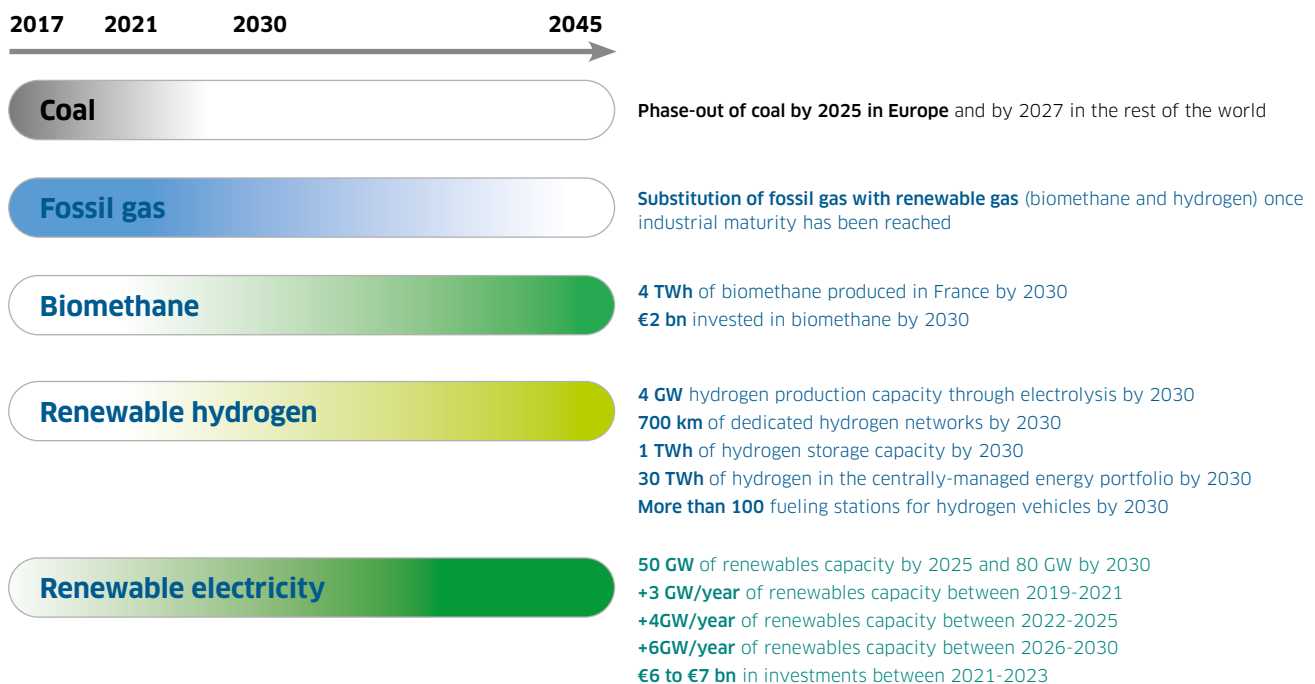
These convictions lead ENGIE to **adopt a "well-below 2°C" trajectory** in the process of being certified with a target level of GHG emissions linked to energy production (electricity, heat and cold) (scopes 1 and 3) of a maximum of 43 Mt CO<sub>2</sub> eq. in 2030<sup>1</sup>.

<sup>1</sup> - compared to 106 Mt CO<sub>2</sub> eq. in 2017  
<sup>2</sup> - compared to 348 gCO<sub>2</sub> eq./kWh in 2017

ENGIE has also set itself a **new carbon intensity reduction target** to reach 230 g CO<sub>2</sub> eq./kWh in 2025, then 158 g CO<sub>2</sub> eq./kWh in 2030<sup>2</sup>. This commitment consists of reducing carbon intensity of energy production by 55% over the period 2017-2030. By way of comparison, a 1.5°C 2030 trajectory would mean reducing carbon intensity by 78%. Such a reduction could not materialize without a large sale of assets. Indeed, these thermal assets could not be closed, otherwise the security of the electrical system to which they are connected would be jeopardized. They would therefore continue to emit GHGs.

Thus **ENGIE considers that it is more virtuous to remain at this stage a key player in thermal production** by committing to decarbonization of these assets made possible by several technologies (biomethane, carbon capture and, depending on technological developments, hydrogen) whose regulatory framework is currently changing rapidly (particularly in the EU) to enable the associated investments to be triggered. Twenty years will nevertheless be necessary to fully industrialize these technologies and achieve this decarbonization by 2040-2045.

### Levers to achieve carbon neutrality

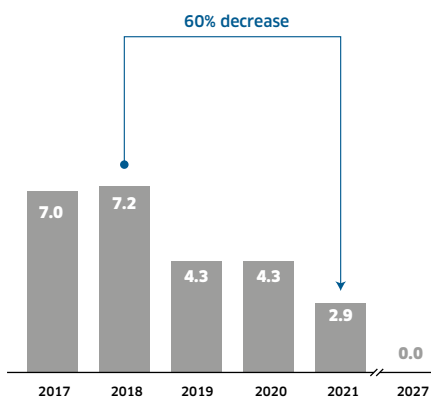


To achieve its zero-carbon target by 2045, ENGIE uses a strategy structured around several pillars.

### A complete exit from coal in the short term

The Group is aiming for a complete exit from coal in Europe by 2025 and in the rest of the world by 2027. In this context, ENGIE will **prioritize the closure or conversion** of its plants and will take into account the social consequences of its decisions on employees and local communities to ensure a just transition. In 2021, ENGIE completed the disposal of the Jorge Lacerda complex in Brazil, which includes a 0.7 GW coal-fired power plant, and shut down the Tejo plant in Portugal.

Change in coal capacity (GW (@100%))



### Long-term development of renewable gas

In order to achieve its 100% renewable gas objective by 2045, ENGIE intends to **decarbonize gas gradually, using biomethane, green hydrogen and CO<sub>2</sub> capture technologies**. These technologies will have to benefit from the public support required to become competitive. The development of renewable gas will support that of renewable electricity capacity, intermittent by nature, and optimize investments with a view to a carbon-neutral energy system.

**Biomethane** is part of a circular economy: it allows the deployment of decentralized solutions and the creation of local jobs. It may be injected into all existing networks.

**Renewable hydrogen** produced by electrolysis from renewable energy will be key to decarbonizing high-temperature industrial processes and transport. The sector should move from local production to a European market benefiting from the repurposing of existing gas networks. Scaling up will require the establishment of partnerships,

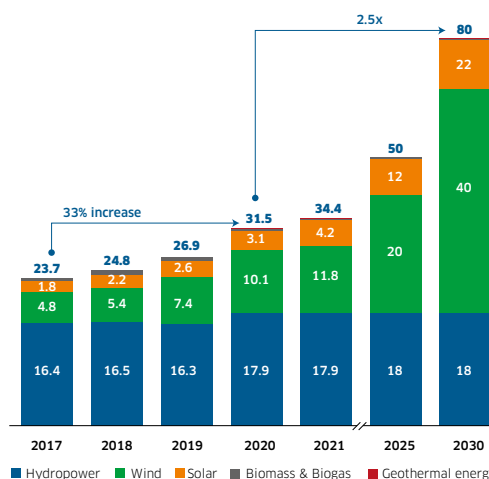
### Customer and supplier decarbonization

ENGIE is committed to supporting its 250 preferred suppliers and, ultimately, its 1,350 major suppliers to ensure their targets are **aligned with or certified by the Science Based Target Initiative by 2030**. This objective will represent 20% of total expenditure, with a view to achieving 80%. At the same time, the Group is involved in international working groups such as the WBCSD (World Business Council for Sustainable development) and the Net Zero Initiative,

### In the medium term, significant development of renewable energy production

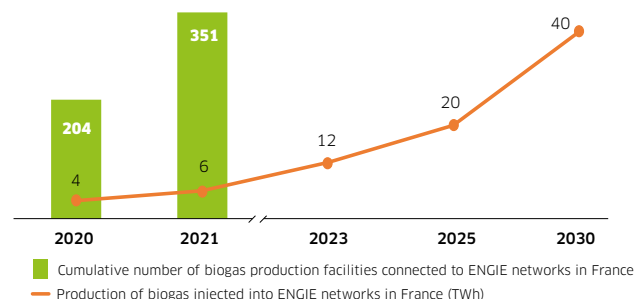
ENGIE is targeting **80 GW of renewables capacity by 2030** and 50 GW by 2025 (versus 34.4 GW at the end of 2021). This will allow the Group to reach **58% of renewables capacity** in its energy production by 2030, with targets for commissioning solar and wind power capacity at 4 GW per year in 2022-2025 and 6 GW per year in 2026-2030. This development is expected to **mobilize €6 billion to €7 billion in investment** in 2021-2023, an increase of 20% compared to the 2018-2020 period, and the capital used for renewables activities is expected to double between 2019 and 2025.

Change in renewables capacity (GW (@100%))



development of the sector with the need for market mechanisms and the mobilization of public authorities in particular.

Biogas: number of production sites connected to ENGIE networks in France (GRDF/GRTgaz - cumulative)



which has enabled it, together with peers and NGOs, to create a new indicator for measuring the decarbonization of companies and public players. Based on this indicator, ENGIE has set itself an objective of **helping to decarbonize its customers by 45 Mt of CO<sub>2</sub> equivalent by 2030**. In 2021, the Group's contribution to customer decarbonization was 28 Mt of CO<sub>2</sub> equivalent.

# ANTICIPATING THE PHYSICAL RISKS ASSOCIATED WITH CLIMATE CHANGE

ENGIE analyzes and adapts its activity to the physical risks associated with climate change.

## MAIN IMPACTS OF CLIMATE CHANGE

- Temperature increase
- Heatwaves
- Lack of rainfall
- Floods
- Extreme wind events

### Understanding climate change and its impacts

To better understand climate change and its impacts on ENGIE, a partnership has been established with the Pierre Simon Laplace Institute to model, as accurately as possible, future energy production trends and the impact of extreme events on all of the Group's technologies in the various regions of the world. In 2021, the impact of climate change on the evolution of the production of solar, wind and hydro-

## PHYSICAL RISKS FOR ENGIE

- Changes to the production profile of installations.
- Production losses and damage to assets and activities.
- Reduction of insurance cover and higher premiums.
- Health and safety risks for people working for the Group.
- Risks incurred via supply chains.
- Resilience of territories and their energy systems.

electric energy was mapped.

**>>> In 2022, the Group will finalize this analysis by studying the impact on thermal activities, the supply chain for biomass and biogas and on heating and cooling networks.**

To determine the vulnerability of each Group site and activity to extreme events, ENGIE uses an index that measures the sensitivity of each technology to exposure to extreme weather events. A list of priority sites was thus able to be defined during 2021.

**Vulnerability index  
specific to each ENGIE site  
and activity**



**Sensitivity of  
technology to extreme events**



**Geographic  
exposure to  
extreme events**

### Studying the impact of climate change by country

The impact of climate change on the Group's strategy is also studied using a country-by-country approach or by studying major climate regions of interest to ENGIE. The Group examines the impact according to four main factors: country risk, the value of existing assets, the strategic objectives for

2030 and strategic issues specific to the countries studied in the context of three IPCC climate scenarios.

**>>> By mid-2022, ENGIE will finalize the study for all countries and climate regions of interest.**

### Incorporating physical risks into the investment process

Adaptation to the physical risks of climate change is embedded in the Group's investment process.

**>>> In 2022, ENGIE will make the mapping available on climate change available to its developers.**

### Adapting sites and activities

Based on the climate impacts identified, ENGIE aims to develop plans for adapting all its sites and activities, starting with the sites most exposed to climate change. These plans will focus on:

- Changes to the production profile of installations.
- Production losses and damage to assets and activities.

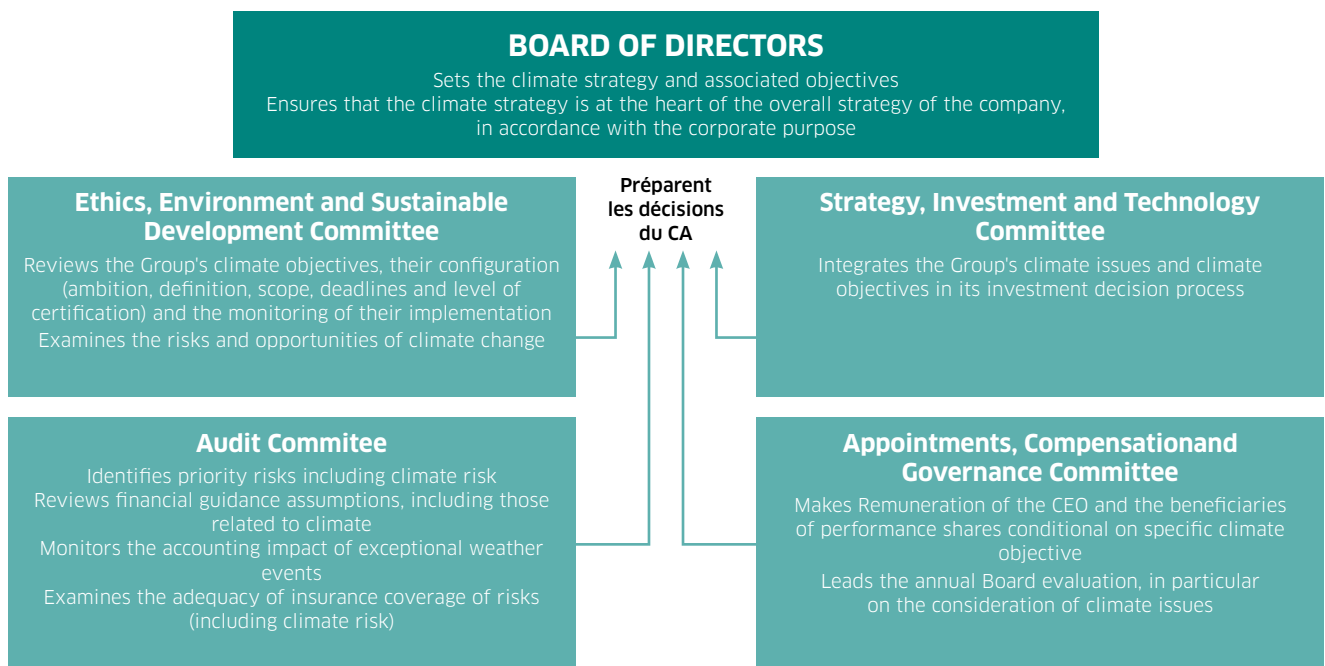
- Reduction of insurance coverage and higher premiums.
- Health and safety risks for people working for the Group.
- Risks incurred via supply chains.

**>>> In 2022, the Group will deploy the first plans for adapting all technologies used by the Group.**

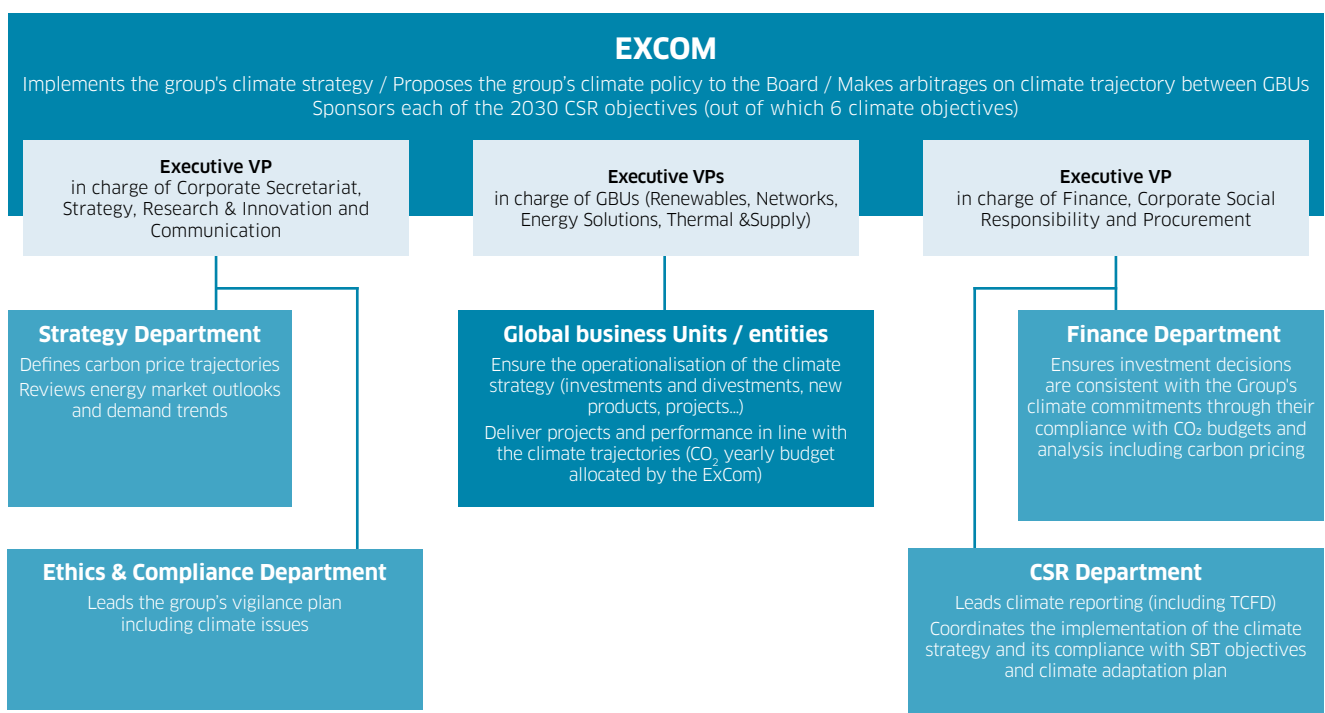
# THE CHALLENGES OF DECARBONIZATION AT THE HEART OF THE GROUP'S GOVERNANCE

Implementing the carbon-neutrality trajectory across all ENGIE's activities required the adaptation of various governance processes. Whether at the level of management bodies, investment processes or Research and Innovation, climate challenges permeate all the Group's decision-making channels.

## Climate governance - Board responsibilities



## Climate governance - Executive responsibilities



## Management supervision as close as possible to decarbonization challenges

### GOVERNANCE PROCESS DEDICATED TO NEW INVESTMENTS

Ensuring the Group's medium-term financial plan is consistent with the its GHG emission reduction trajectory until 2030  
Monitoring of GHG emissions at the Group's quarterly business reviews

### CLOSE MONITORING OF GHG EMISSIONS

Ensuring each investment is consistent with the Group's GHG emission reduction trajectory  
Taking into account carbon prices in investment decisions and long-term forecasts of energy prices

## Compensation policies

The compensation policies for senior managers and the Chief Executive Officer incorporate criteria related to the Group's climate objectives. The Chief Executive Officer's variable compensation is therefore partly dependent on meeting the objective of reducing CO<sub>2</sub> emissions related to energy production. For 2022, this objective represents 7.5% of the non-financial criteria of the annual variable portion and 10% of all criteria of the long-term variable incentive portion, the latter also comprising, at 5%, the objective of increasing the share of renewables in the Group's electricity mix capacities.

These two objectives also impact the long-term variable incentive portion of all the Group's executives and, more generally, the 7,000 beneficiaries of performance shares, in the same proportions as the Chief Executive Officer.

## Employee training

Achieving climate objectives requires a high level of skill of current and future ENGIE employees. To support this transition, the Group has set up a comprehensive training course on the challenges of decarbonization: the *Sustainability Academy*. Through three in-house programs: Explorers, Front Runners and Masters, the academy is designed to clarify the Group's strategy, give it meaning and explore its business impacts. E-modules, podcasts, climate and biodiversity murals, challenges around sustainability and the learning expedition on carbon offsetting, many components of the training program were deployed in 2021 and will continue to be deployed in 2022.

In addition, the Group provides its teams with various training courses, from the general level (*Energy Revolution towards Decarbonization, Sustainability with my customers*) to the most specific (30 training modules on the solar sector). Furthermore, the first "100% Renewable Energies" *Graduate Program* was launched in summer 2020. It aims to attract young high-potential graduates who are passionate about renewable energy and provide them, at the beginning of their careers, with a cross-functional vision of the range of solutions offered by the Group and teach them how to work together within ENGIE.

## Sustainable and responsible financing

The Group is one of the world's leading corporate issuers of green bonds with more than €14 bn of green bonds issued since 2014. In addition, the Group has incorporated margin adjustment mechanisms in its syndicated credit lines linked to compliance with annual CO<sub>2</sub> performance indicators.

## Research & Innovation

In addition to the skills acquired by all of the Group's employees, more than 500 employees from around the world contribute specifically to research and innovation in the areas of operational performance, technology integration, new solutions in strategic areas and technological disruptions. They focus their work as a priority on the zero-carbon transition, with large-scale solar power (especially bifacial), the decarbonization of urban heating and cooling networks, the large-scale underground storage of hydrogen and the liquefaction of hydrogen.

## Performance monitoring

### Climate performance tracked regularly:

The Group aims to report on its performance via a half-yearly publication offering high visibility on the progress of its climate strategy objectives. Through its publications, ENGIE provides details of its objectives for reducing greenhouse gas (GHG) emissions related to energy production and those concerning increases in the installed capacity of renewable energy. The Group reports annually on all objectives that are relevant to the implementation of its climate strategy.

### Performance measured according to the best international benchmarks:

The Group has been responding to the CDP Climat questionnaire for many years: in 2021, ENGIE was rated A-. In addition, ENGIE is committed to communicating its climate risks according to the recommendations of the *Task Force on Climate-related Financial Disclosures* (TCFD), particularly within this report. Furthermore, a correlation table in line with the SASB reporting standard will be available on the Group's website after the publication of the 2021 Universal Registration Document and the Group's 2022 Integrated Report.

### Transparent lobbying practices:

In 2021, ENGIE carried out a review of its membership of professional and industrial associations and conducted a detailed evaluation of the alignment of these associations with the objectives of the Paris Agreement. The evaluation document is available on the Group's website. The evaluation will be reviewed annually.

# A RIGOROUS AND AMBITIOUS DECARBONIZATION TRAJECTORY

With the desire to seize opportunities associated with climate change and to capitalize on its know-how in terms of decarbonization, ENGIE has set itself long-term as well as short- and medium-term objectives especially in the development of renewable capacities, as immediate action is essential in view of the climate emergency.

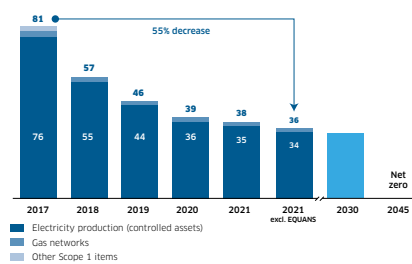
## Our decarbonization targets

	2019 Results	2020 Results	2021 Results	2030 Target
Carbon footprint of energy production (Mt CO <sub>2</sub> eq.) (Scopes 1 and 3)	75	68	67 65 excluding EQUANS	43
Carbon footprint of gas sales (Mt CO <sub>2</sub> eq.) (Scope 3)	61	61	66 66 excluding EQUANS	52
Customer decarbonization: emissions avoided through ENGIE products and services (Mt CO <sub>2</sub> eq.)	N/A	21	28 26 excluding EQUANS	45
Supplier decarbonization (excluding energy): SBT certified or aligned suppliers	N/A	15%	20% 20% excluding EQUANS	100%
Decarbonization of our work practices: GHG emissions (Mt CO <sub>2</sub> eq.) after offsetting up to 200 kt CO <sub>2</sub> - scopes 1, 2 and 3	0.68	0.49	0.58 0.30 excluding EQUANS	0

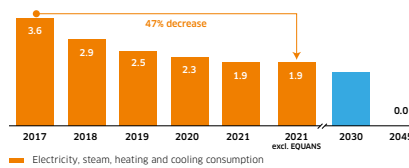
Our drivers for achieving these objectives (significant development in the production of renewable energy - complete exit from coal - development of renewable gas) are detailed on page 3.

## GHG emissions (Mt CO<sub>2</sub> eq.)

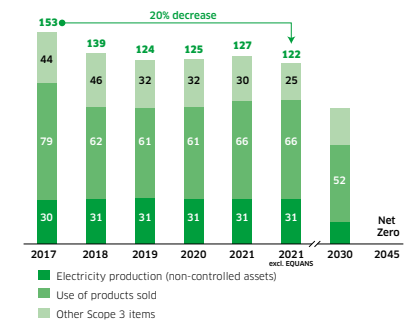
### Scope 1 (direct emissions)



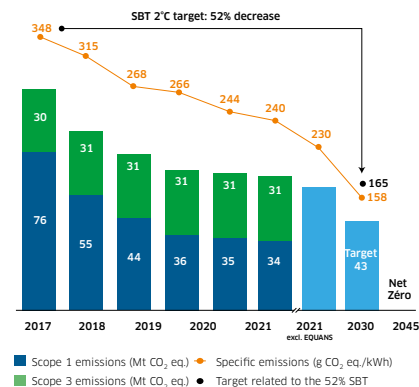
### Scope 2 (indirect emissions)



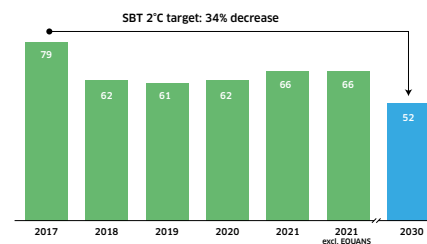
### Scope 3 (indirect emissions)



## GHG emissions from energy production (Mt CO<sub>2</sub> eq.)



## GHG emissions related to the use of products sold (Mt CO<sub>2</sub> eq.)



## GHG emissions avoided through ENGIE products and services (Mt CO<sub>2</sub> eq.)

