



**ACTING FOR AN AFFORDABLE  
ENERGY TRANSITION  
AND DESIRABLE FOR ALL**

This report has been validated by the Executive Committee and the members of the Board of Directors' Committee on Ethics, Environment and Sustainable Development (EESDC). The Statutory Auditors have also validated the compliance of certain indicators.

## ENGIE recognized by international indices and rating agencies

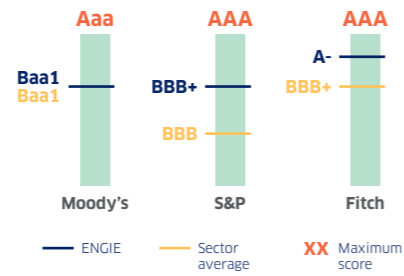
### ● MAIN INDICES

Listed in Paris and Brussels (ENGI), the Group is represented in the main financial indices: CAC 40, Euronext 100, FTSE Euro 100, MSCI Europe.

ENGIE is listed in the principal non-financial indices: DJSI World, Euronext Vigeo Eiris Europe 120, Euronext Vigeo Eiris Eurozone 120, Euronext Vigeo Eiris France 20, MSCI EMU ESG Screened, MSCI EUROPE ESG Universal Select, Stoxx Europe 600 ESG-X, CAC 40 ESG, Bloomberg Gender-Equality 2023 Index.

ENGIE has been included in the 2022 CDP Supplier Engagement Leaderboard and is among the top 8% of companies in terms of its suppliers engagement on climate change.

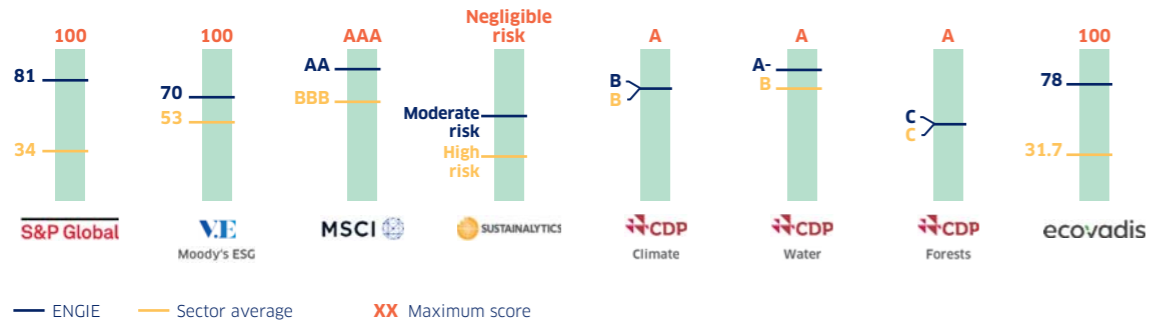
### ● CREDIT RATINGS AT 02/22/2024



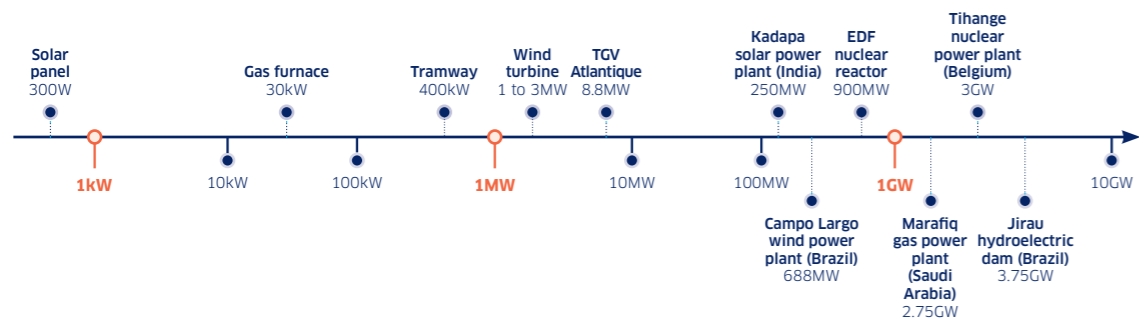
EDF, ENEL, Iberdrola, Orsted, SSE, EON, Fortum, Naturgy, EDP (+Vattenfall +Verbund +EnBW pour S&P), (+Vattenfall +Verbund +EnBW +RWE pour Moody's), (+RWE pour Fitch)

### ● 2023 CSR RATINGS

ENGIE favors rating agencies with which the Group can maintain and develop constructive relationships to improve its CSR performance and pays particular attention to the evolution of these ratings.



### SOME POWER LEVELS AT FACILITIES ON A (LOGARITHMIC) SCALE



### SOME ORDERS OF MAGNITUDE

• 1 metric ton of CO<sub>2</sub> equals a Paris-New York round trip flight per passenger, or four Paris-Berlin (8,000 km) round trips in a thermal car, or one year of heating a 40 m<sup>2</sup> home with average insulation.

• A French person emits on average 12 metric tons of CO<sub>2</sub> per year.



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The information relating to the Task Force for Climate-Related Financial Disclosures, the United Nations Sustainable Development Goals and the European Union's Green Taxonomy can be found in the integrated report on the following pages:

TCFD	Climate Notebook	p. 68
OBJECTIFS DE DÉVELOPPEMENT DURABLE	ENGIE's contribution to the SDGs Business model	p. 16-17 p. 24-25
TAXONOMIE VERTE EUROPÉENNE	Sustainable finance	p. 48-49

ENGIE's Climate and biodiversity strategies are detailed in the Climate and Nature notebooks, respectively.

# ENGIE at the heart of the energy transition

As a leader in Zero-Carbon Energies, ENGIE contributes to accelerating the transition to a carbon-neutral world through its strategic choices, investments and actions, with the support of its stakeholders. A benchmark global group specializing in the supply of low-carbon energy and related services, it has developed a diversified energy mix in which renewable energy plays an increasingly important role. Guided by its purpose, which is enshrined in its bylaws, the Group designs and implements more energy-efficient, cleaner solutions in all its businesses, allowing its customers to participate in the decarbonization process. Present in 31 countries, ENGIE's simplified business model is entirely focused on making the energy transition a reality.

## 2023 KEY FIGURES



**97,300**  
employees



**31.2%**  
of women  
in management



**31**  
countries

**€82.6 bn**  
in revenues

**€9.5 bn**  
EBIT ex. Nuclear  
**€10.1 bn**  
EBIT

**€8.1 bn**  
in growth investments

**No. 1**  
in natural gas distribution  
in Europe

**No. 2**  
in natural gas  
transmission in Europe

**No. 1**  
worldwide in urban  
cooling networks

**No. 3**  
worldwide in urban  
heating networks



**52 Mt**  
of greenhouse gas  
emissions (scopes 1 & 3)  
from energy generation

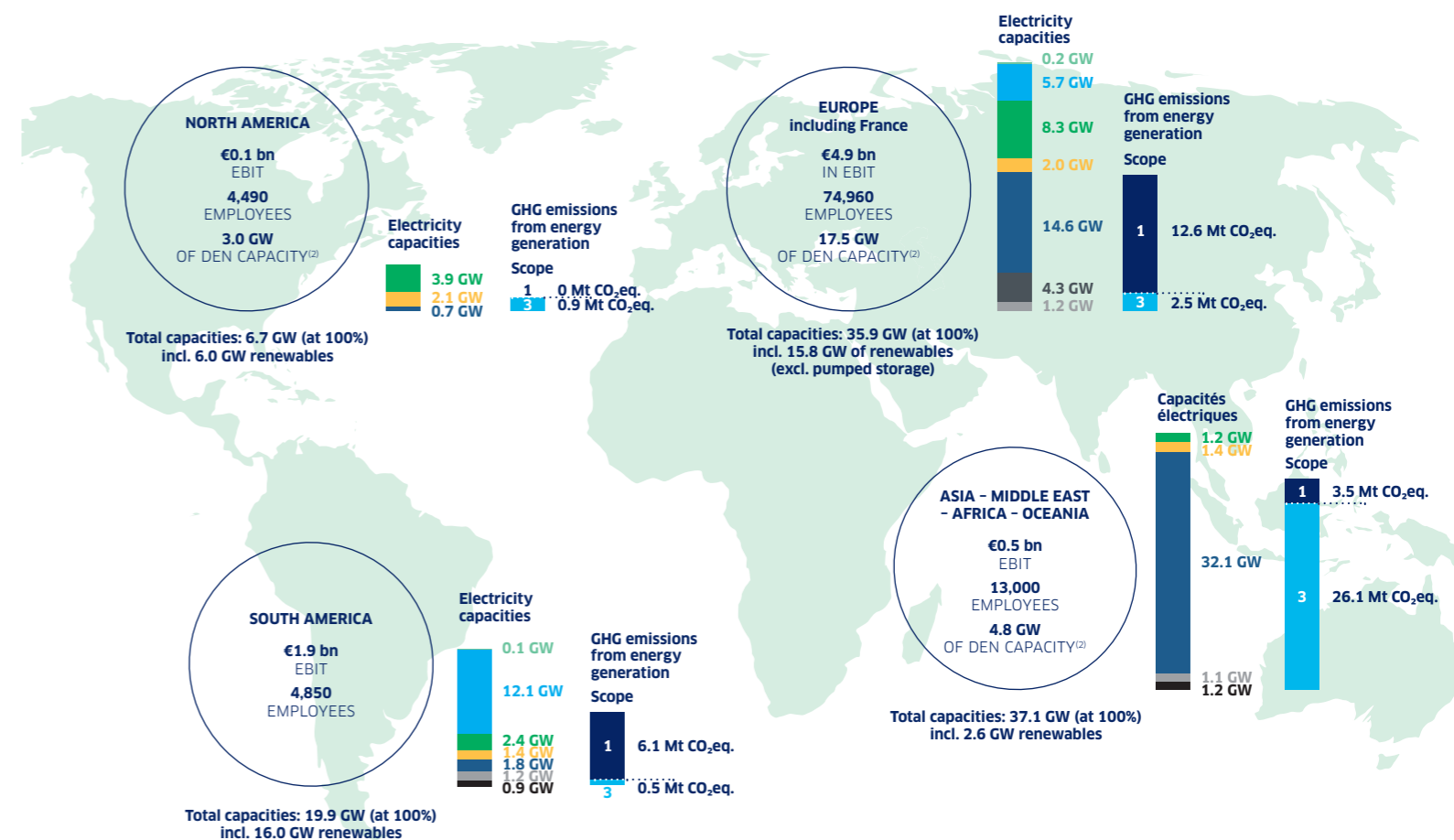
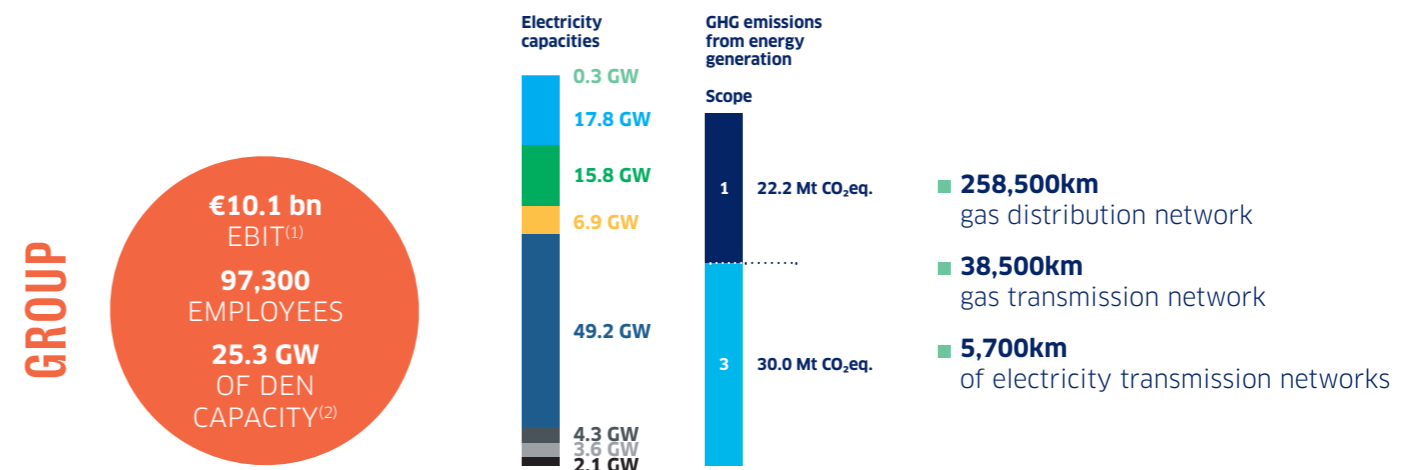


**41%**  
renewable energy  
in electricity  
production capacity

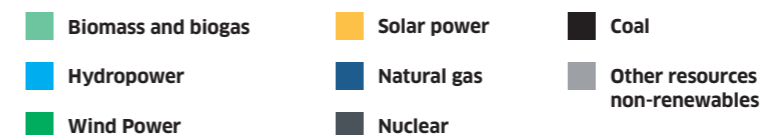


**No. 1**  
in wind and solar power  
in France

**100 GW (AT 100%) OF ELECTRICITY PRODUCTION\* CAPACITY, INCL. 41 GW OF RENEWABLES**  
excl. decentralized electric capacity (3 GW incl. 1 GW of renewable)



### BREAKDOWN OF ELECTRICITY PRODUCTION CAPACITY BY TECHNOLOGY



(1) Total EBIT : for geographical areas EBIT without Other activities including GEMS (€2.7 bn)  
(2) Decentralized Energy Network Capacities

\* excluding pumped storage (3.3 GW) and battery capacity (1.3 GW) classified as electricity storage capacity and excluding Portfolio Drawing Rights (50 MW)

# EDITORIAL

## How do you view the transformation of the global energy landscape?

**Jean-Pierre Clamadieu:** A new world energy order has taken shape, driven by the need to simultaneously secure our supply and decarbonize our economies. 2023 was a record year for the energy transition, both in terms of the additional renewable electricity production capacity installed around the world (+500 GW!) and investments in clean energy (€1.7 trillion). However, these transition-accelerating trends are set against a backdrop of uncertainty, marked by heightened geopolitical tension and a shift in regional alliances. The energy markets remain volatile, in a macroeconomic environment that is characterized by low growth and high interest rates. There is increasing international competition around these transition activities, with the implementation of the Inflation Reduction Act (IRA) in the United States as a notable example. Europe is mobilizing to provide a strong response to the risk of deindustrialization. This is a vital debate to which we are actively contributing. Finally, we are seeing an increasing polarization in how stakeholders are responding to the climate crisis, with varying levels of support for the energy transition.

## What do these transformations mean for Europe and its energy mix?

**Jean-Pierre Clamadieu:** The challenge we are facing is threefold: we must decarbonize our energy mix, ensure that our economies remain competitive and secure our energy supply. We are convinced that accelerating the energy transition is key to success on all three counts. This is borne out by our 2050 decarbonization scenario for Europe. A Net Zero Carbon trajectory that meets these three objectives is within our grasp. It is based on a balanced energy mix, which guarantees the reliability and resilience of the system while minimizing its costs. We can draw five specific conclusions from this scenario. First, we need to action all the potential

drivers of decarbonization. Second, the combination of the electron and the molecule is key to the success of the energy transition. Third, we need to massively scale up renewable electricity, with a sixfold increase in our solar and wind electricity production. Fourth, we must make ready the major flexibility capacity (batteries, hydroelectricity, etc.) that we will need in order to balance our networks. Finally, energy saving and efficiency will also be essential to achieving our objectives, with an expected reduction in energy demand of 34% by 2050 in Europe.

## How does ENGIE's integrated model ensure that it is uniquely positioned to lead the transition?

**Catherine MacGregor:** ENGIE's integrated model is based primarily on the complementarity of our activities, with our four GBUs<sup>(1)</sup> developing all the components of a low-carbon energy mix, and GEMS<sup>(2)</sup>, our energy management entity, at the heart of this model. We are one of the global leaders in renewable energy with a platform that we are continually expanding: 41.4 GW of installed capacity. We operate the networks necessary to the security of our supply, both electricity and gas: 5,700 km of power lines along with a biomethane injection capacity of 11 TWh on our networks. We are developing our portfolio of flexibility solutions in addition to renewables, with, in particular, 1,260 MW of battery storage in operation at the start of 2024. We are also developing the decentralized networks needed for the decarbonization of our customers, such as our portfolio of heating networks (20 GW in operation). But above all, and beyond the sum of these activities, we stand out thanks to our ability to integrate them into effective and optimized energy management, ensuring that electrons and molecules are available in the right place, at the right time. We have a portfolio of complementary assets, optimally managed thanks to our thorough understanding of the markets. This is what enables ENGIE to make a difference. In 2023, thanks to the



**Catherine MacGregor**  
Chief Executive Officer

**Jean-Pierre Clamadieu**  
Chairman of the Board of Directors

strength of this model, we achieved excellent operational and financial performance.

## How is minimizing the cost of the transition essential to its social acceptability and success?

**Catherine MacGregor:** If the energy transition is not accepted by society, we will not be able to implement it – and this battle has not yet been won, far from it. The main argument against the transition is its cost, since people's standard of living and geographical location affects their ability to support the energy transition. As such, proving that we can achieve an energy transition that is affordable, socially equitable and in everyone's best interest is vital. I am convinced that the energy transition will bring about

major opportunities for our economies. It will be a key generator of stable and local employment. According to the International Energy Agency's Net Zero scenario, 17 million jobs will be created in the energy sector by 2030. Moreover, the energy transition will not fuel rising energy prices. Renewables are now more competitive than thermal gas or coal assets, and they are less dependent on the geopolitical context, which means they provide price assurance in times of crisis. Compared to the devastating cost of inaction, which would lead to huge economic losses and deepen existing inequalities – 68 to 135 million people could be pushed into poverty by 2030 because of climate change – the energy transition paves the way to a brighter future and protects our prosperity and social cohesion.

## What progress has the Group made regarding its ESG commitments?

**Jean-Pierre Clamadieu:** First of all, we met our climate commitments in 2023. We continued to reduce our greenhouse gas emissions from energy generation. In terms of renewable capacity, we have achieved our target of an additional 4 GW installed capacity, with the share of renewables in our energy mix now at 41%. In addition, in 2023 we issued green bonds worth nearly €6 billion, more than any other company in the world. At the same time, we launched ambitious initiatives to contribute to the decarbonization of our suppliers. We strengthened our commitment to nature conservation, as part of the Act4nature initiative. This included our commitment to reducing the freshwater consumption related to our energy generation activities by 70% by 2030 compared to 2019. Finally, we have made progress on our societal commitments, in particular by achieving our 2023 target of 31% female managers.

## In terms of its strategy, what are the Group's priorities for transforming its industrial culture?

**Catherine MacGregor:** If we are to lead the energy transition, we need to become an increasingly integrated, industrial and digital group, with all the expertise and skills necessary for the jobs of tomorrow. A transformation therefore continues, at the heart of our operational priorities. Our top priority remains health and safety, and we are continuing to roll out our "ENGIE One Safety" plan. This is a new safety culture that we are integrating, across all Group entities and geographic areas, which has made significant progress. In 2024, we will step up our efforts to achieve our goal of zero fatal accidents. We will also accelerate the deployment of our digital plan, to develop our solutions at Group level – particularly with regard to data management and generative AI. Finally, in a talent war and transformation of energy professions context, we are prioritizing the skills development of our employees.

(1) Global Business Units  
(2) Global Energy Management and Sales

# OUR AMBITION

## OUR PURPOSE

ENGIE's purpose is to act to accelerate the transition toward a carbon-neutral economy, through reduced energy consumption and more environmentally friendly solutions. This purpose brings together the company, its employees, customers and shareholders and reconciles economic performance and positive impact on people and the planet. ENGIE's action is assessed in its entirety and over time.

## Accelerating the transition to a carbon-neutral economy

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Multiple commitments for a positive impact

# Decarbonization investments need to pick up pace

In 2023, energy markets regained a degree of stability, with prices and volatility declining significantly. Although many investments in the energy transition are already relevant from an economic point of view, efforts still need to be made to limit global warming to 1.5°C, the limit set by the Paris Agreement.

## A lull in energy markets

Following the end of the pandemic, the global economy saw a strong recovery in 2021. This, coupled with Russia's invasion of Ukraine, triggered a global energy and inflationary shock. In 2022, global inflation stood at 8.7%, and is expected to reach 6.8% in 2023 and 5.8% in 2024. In response to this inflation, most major economies have tightened their monetary policies, slowing global growth from 3.5% in 2022 to around 3% in 2023 and 2024.

Faced with a sharp reduction in Russian gas supply and issues with nuclear and hydroelectric power generation, electricity and gas prices rose sharply and fluctuated in Europe in 2022. To cope with these difficulties, all European Union countries adopted temporary measures for 2022 to reduce energy consumption, protect consumers from soaring prices and recover producers' inframarginal revenue. Prices have fallen sharply since the beginning of 2023, following the trend in gas prices, due to a mild winter, a drop in Chinese domestic demand (surplus of US LNG in Europe) and very high storage levels in Europe at the end of summer 2023. However, markets are tense and expect higher prices in 2025 and 2026, due to the resumption of economic growth and the lack of new LNG export capacity.

In June 2023, the European Commission recommended against extending these stabilization measures, given the market lull. In October, it presented an electricity market reform designed to accelerate the roll-out of renewables, promote transparent and fair competition on the European market, better protect consumers, and improve the competitiveness of the European industry. ENGIE is in regular contact with regulators to share its expertise on the energy markets and participate in this reform.



Against this backdrop, and since 2022, ENGIE has been committed to combating high prices (profit sharing and inframarginal revenue caps). In addition, ENGIE continues to support its Retail customers in all countries, in particular through the following voluntary initiatives:

- payment spreading plans for customers in difficulty,
- energy saving information and awareness-raising campaigns,
- implementation of digital tools to monitor and control energy consumption,
- creating incentives for customers to consume at the best time in order to optimize their bills.

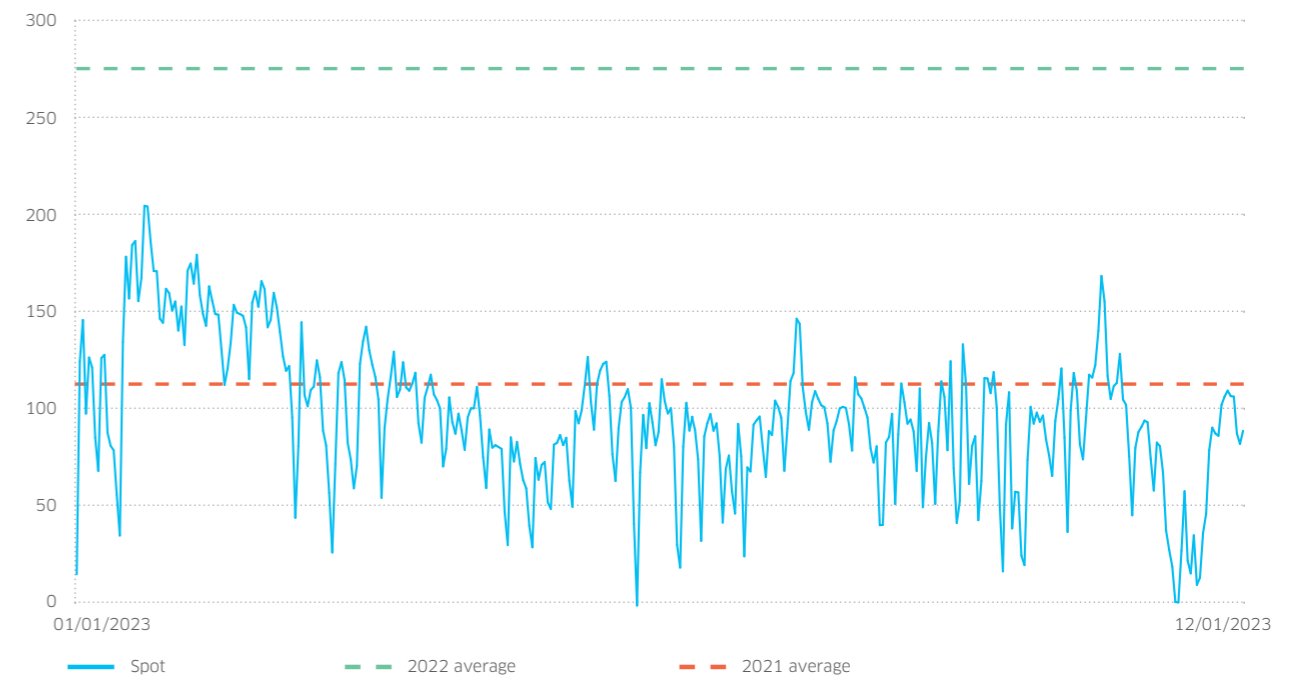
## COP 28 IS A SUCCESS IN TERMS OF COMMITMENTS

- Global recognition that the world has entered the "beginning of the end of fossil fuels."
- Triple renewable energy generation and double energy efficiency by 2030.
- Intensified efforts to reduce coal-fired power generation without carbon capture.
- Significant reduction in emissions of greenhouse gases other than CO<sub>2</sub> (particularly methane) by 2030.

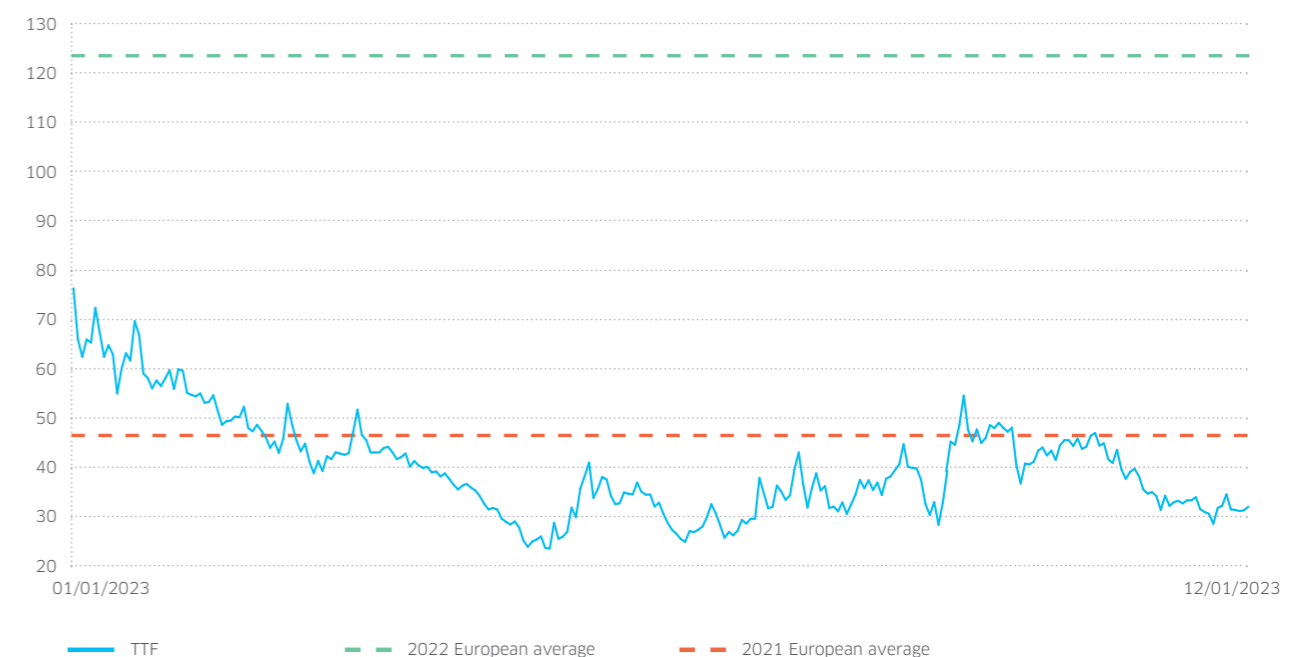
However, the implementation, timing and scope of these commitments have yet to be defined.

These two graphs show the average daily reference prices in 2023 for electricity in France (spot price) and for gas in Europe (Title Transfer Facility - TTF price), and the annual averages for 2021 and 2022.

**ELECTRICITY SPOT PRICE IN FRANCE IN 2023 (€ / MWh)**



**REFERENCE GAS SPOT PRICE IN EUROPE IN 2023 (€ / MWh)**



# The Group's energy scenarios

## Global CO<sub>2</sub> emissions still on the rise

In 2023, global energy-related CO<sub>2</sub> emissions rose by 1.1% compared to 2022, reaching a record 37.5 billion metric tons. This is due in particular to the rise in air transport, which has almost returned to its 2019 level, and to the increase in emissions associated with the use of coal (+1% compared to 2022).

In terms of global electricity production, although coal remains the main source of energy, the development of renewables, dominated by wind power and solar power, is accelerating significantly. According to the International Energy Agency (IEA), the world installed almost 510 GW renewable in 2023, 50% more than in 2022. While the USA, Europe and Brazil set installation records this year, China is set to reach its 2030 installed capacity targets as early as 2024. This trend is due not only to policies supporting renewable energy, but also to the economic advantages of these technologies. According to the IEA, 96% of the capacity installed in 2023 has lower production costs than new gas- or coal-fired power plants.

From 2025, this acceleration should make renewable energy the leading source of energy for power generation, surpassing coal. According to its latest *New Energy Outlook* report, Bloomberg New Energy Finance (BNEF) estimates that installed solar and wind capacity in 2030 will be 1065 GW, an increase of 16% compared to its previous forecast. The Africa, Middle East, Asia (AMEA) region is the main driver of capacity growth (x3.5), which should reach 546 GW by 2030. Europe is the only region where wind power will outweigh solar power in the 2030 renewable mix (60% of solar and wind capacity). Europe will also lead the way for offshore wind power in 2030 (70 GW), ahead of North America (26 GW) and AMEA (10 GW).

## Efforts to achieve carbon neutrality remain insufficient

Despite these forecasts and the acceleration of investment in decarbonized energy technologies in 2023 (+40% vs 2019), efforts remain insufficient:

- The IEA estimates that there needs to be more than double the 2023 investment by 2030 (\$4,000 billion) in order to achieve carbon neutrality by 2050.
- The IPCC considers that the nationally determined contributions (NDCs) pledged until COP 27 position the world on a 2030 climate trajectory of around 2.5°C, and at best around 1.7°C if all pledges are taken into account.

Furthermore, while most developed countries had responded positively to the climate emergency, even in the face of the resurgence of geopolitical risk (IRA, REPowerEU, etc.), the political context and public opinion are undermining this momentum.

## The advantages of investing now are not just economic

It is not wise to postpone investments and commitments for decarbonization, as this will have negative consequences not only for the climate, but also for the economy and society.

Projections of economic losses due to climate change range from 11% to 14% of global GDP in 2050 if we do not pick up the pace now.

On the other hand, studies estimate that the cost of combating climate change would be relatively moderate, between 1 and 3% of GDP per year in Europe up to 2030, with beneficial effects on growth estimated at +4% of GDP in the same timeframe. There are also other indirect benefits, such as:

- Job creation: depending on the IEA scenarios, the energy transition could create between 6 and 17 million jobs in energy-related sectors by 2030.
- Preserving purchasing power: according to the European Central Bank, an accelerated energy transition visibly and rapidly improves household disposable income.
- The fight against inflation: according to the IMF, delaying climate action by four years rather than acting now would lead to significantly higher inflation.

More detailed analyses show that acting now will already pay off. In the domestic transport, energy, industry, and residential and commercial building sectors, competitive decarbonization solutions could reduce the European Union's emissions by 50% by 2030.

ENGIE's customer studies confirm this analysis: 60% of the industrial sites of the customers surveyed could be totally decarbonized while generating savings.

Another example is wind and solar power, whose total production costs are now lower than those of conventional solutions, and which have proven to be excellent insurance against supply shocks: the IEA estimates that the 150 GW installed between 2021 and 2023 by Europe have avoided an additional supply cost of around €100 billion for the EU as a whole.

Day after day, ENGIE's 97,300 employees strive for an affordable and desirable energy transition for all, through their work in renewable energies, flexible production, energy infrastructure, energy solutions and energy management.

## ESTIMATES OF THE COST OF THE ENERGY TRANSITION, IN RELATION TO GDP

Source	Scope	Cost in % of GDP
European Central Bank	UE 27	2.8
McKinsey	UE 27	1
Climate Change Committee	United Kingdom	2.3
Pisany-Ferry	FR	1.9
BNEF	World	3.7
IRENA	World	2.8
Oxford University	World	~4

Source: ENGIE

Thanks to its international presence and experience with various decarbonization levers, ENGIE is able to produce its own energy scenarios. This has allowed it to make up for the lack of granularity in publicly available scenario data, to continuously monitor its performance, and to refine its understanding and measurement of risk.

## In Europe: stepping up efforts to achieve energy sobriety and efficiency

In June 2023, ENGIE shared its vision of the energy transition in Europe and France. ENGIE's decarbonization scenario highlights the need to combine all renewable energy sources to ensure the resilience of the energy system and the competitiveness of European economies. Given the strong interconnection of energy systems across Europe, the decarbonization trajectory is modeled by integrating 15 European countries<sup>(1)</sup>. The scenario takes into account all decarbonization levers when technologies are sufficiently mature.

The following are some of the main conclusions of ENGIE's scenario:

- All of the levers, whether existing or in development, need to be implemented to make Net Zero Emissions a reality in less than 30 years. A variety of technological choices is necessary, without a dogmatic approach.
- To meet Europe's climate commitments, we need to step up our efforts in energy efficiency and sobriety, with the aim of achieving a 34% reduction in energy consumption by 2050, and, in particular, massively increase the number of high-performance building renovation projects.
- A very significant step up in the development of renewable energy, primarily electrical (wind power, solar power), is essential to meet European climate targets and limit costs. With electricity demand set to almost double by 2050, renewable energy will have to cover 78% of demand in 2035 and up to 90% in 2050. In concrete terms, this means that European wind and solar power production must see a 3.5-fold increase by 2035, and a six-fold increase

by 2050. The massive development of renewable energy is essential, as it is the only way to rapidly and cost-effectively meet the growing needs associated with the electrification of uses.

- Flexibility capabilities (battery storage, pumped storage, combined-cycle gas turbines) will play a key role at the heart of the energy system as renewable energy develops. This development entails the need for 600 GW of additional capacity (almost a four-fold increase in current capacity).
- Gas will be totally decarbonized by 2050, and will play a key role in the energy transition. Methane demand will be halved in France and Europe. In France, biomethane will play a dominant role, accounting for two-thirds of demand by 2050. The biomass potential in France is sufficient to cover the demand for solid, liquid and gaseous biofuels.
- Decarbonized hydrogen and molecules produced from hydrogen (e-molecules) will play a key role in transport and for certain industrial uses. Demand for hydrogen and e-molecules - driven by the need to decarbonize heavy mobility and industry - will increase eight-fold by 2050 (75% for transport and 25% for the industrial sectors most difficult to decarbonize, such as steel). Nearly half of this hydrogen will be produced locally.
- Investment in electricity infrastructure will increase massively, while existing gas infrastructure can be adapted to a fully decarbonized energy mix at a limited cost. By minimizing the costs of the energy transition, these investments meet the challenges of peak demand and energy system flexibility.

## In Latin America: meeting increasing electricity demand with renewable energy

In Brazil and Chile, significant growth in electricity demand is expected, mainly due to economic growth. The development of new uses will also contribute to growth in demand, such as electric mobility or the development of air conditioning.

Renewable energy (wind power, solar power, hydroelectricity) is abundant and competitive, and will meet a large portion of electricity demand in the long term. Hydroelectricity, which is highly developed in both countries (but whose potential is already largely exploited), will provide a large part of the flexibility needed by the electricity system and will be supplemented to a greater or lesser extent by gas-fired power plants, depending on the growth in demand.

Furthermore, Chile and Brazil could eventually become major producers of green hydrogen, some of which could be exported, particularly to Europe. However, some of this additional electricity demand would be met by dedicated renewable energy generation facilities, with little or no impact on wholesale electricity prices.

In the shorter term, electricity prices will reflect very different situations in the two countries.

In Brazil, they should remain low for a number of years, as wind and solar power capacity is growing faster than consumption, while the country already has a large hydroelectric generation fleet (even though hydroelectric input has fallen in recent years).

In Chile, still dependent on its gas-fired power plants (a phenomenon exacerbated by the planned closure of coal-fired power plants), electricity prices are likely to remain high if international gas prices also remain high.

(1) Austria, Belgium, Czech Republic, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Spain, Switzerland, United Kingdom.

# ENGIE’s strategic priorities

ENGIE is working toward an energy transition that is affordable and desirable for all, in order to meet climate imperatives in a context of multiple uncertainties.

The global energy landscape is shaped by structural geopolitical and geo-economic trends. They are reflected in the persistence of crises in international relations, changes in government regulations and policies, and major macroeconomic disruptions. Rising interest rates and persistent supply chain reliability and quality issues are just two examples.

While volatility, uncertainty, complexity and ambiguity are more prevalent than ever in the world, new and more positive trends are beginning to emerge. The energy transition is underway and accelerating. It should make it possible to respond to climate imperatives, growing customer demand for green energy and investors’ desire for profitability.

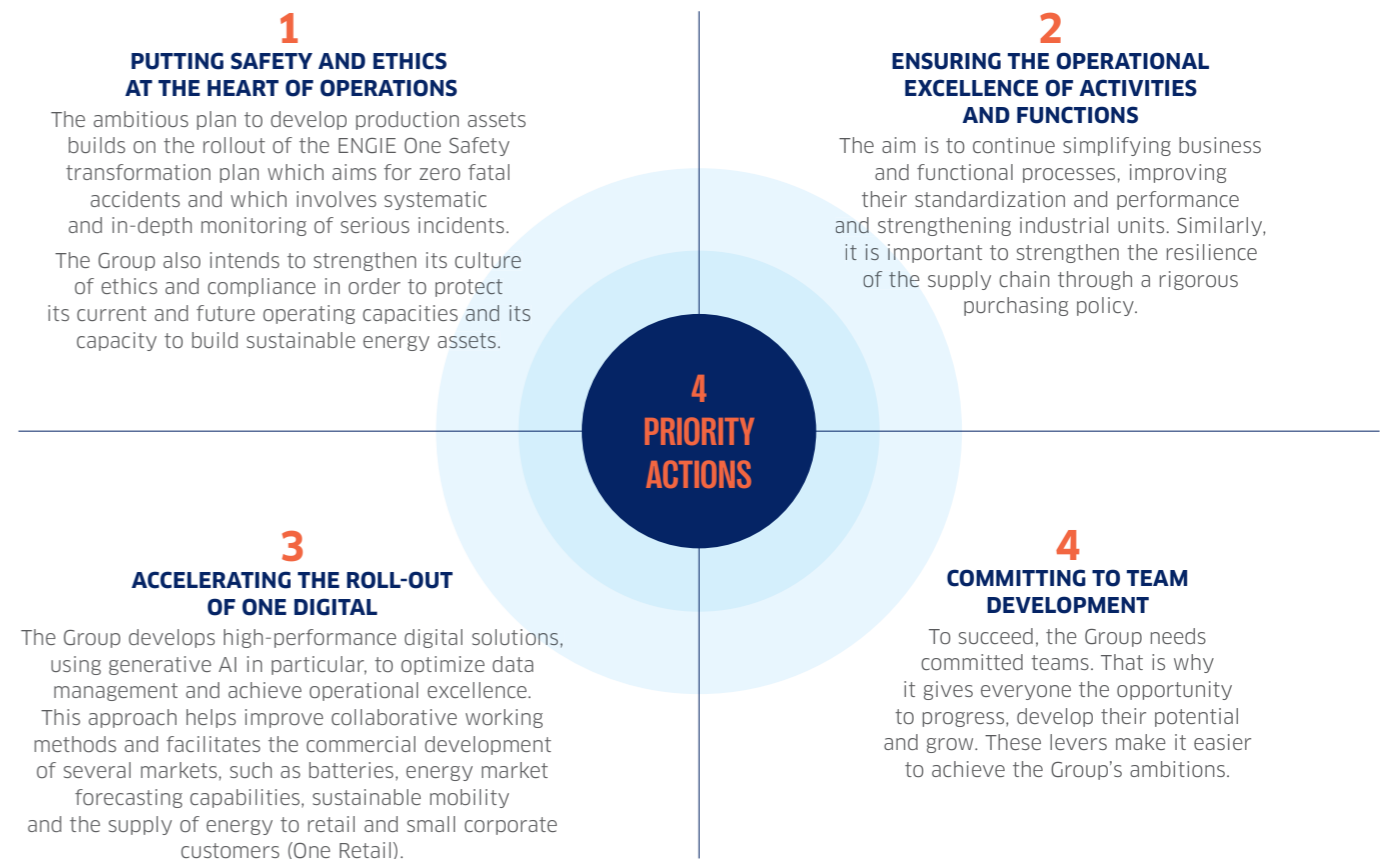
Taken as a whole, these various developments reinforce ENGIE’s long-term vision and its ambition to make the energy transition affordable and desirable for all, in line with its purpose. To achieve this ambition, the Group has defined strategic objectives which are being implemented in a coordinated fashion, thanks to the engagement of all our teams and steering at the highest level.

To see the energy transition through, ENGIE is focusing on the development of renewable energy and the flexibility of the energy system. This also means continuing to develop reliable, sustainable energy infrastructure by building urban energy networks and rolling out decarbonization solutions for retail, industrial and service sector customers. The Group’s integrated, collaborative model lends itself perfectly to these different focus areas and their mutual success.



## ENGIE AIMS:

- To achieve Net Zero Carbon by 2045 in its three greenhouse gas emission scopes.
- To support customers in their decarbonization process, avoiding 45 million metric tons of CO<sub>2</sub> per year by 2030.
- To have 80 GW of installed renewable capacity by 2030.
- To develop 10 GW of electric battery capacity by 2030.
- Produce 20 TWh per year of green energy for local energy and on-site production networks by 2030.
- Promote green energies, with the potential to produce 4 GW of hydrogen by 2035 and 10 TWh / year of biomethane by 2030.



## MAKING DATA AND DIGITAL TECHNOLOGY KEY SUCCESS FACTORS

Initiated in 2016, ENGIE’s digital transformation has established solid data and digital foundations. The Group today relies on a central data analytics ecosystem and a suite of digital platforms and tools scaled globally. It ranks amongst industry leaders in mass cloud migration, and has made significant progress on its major IT convergence programs. Over the past year, the emergence of generative artificial intelligence (AI) has brought additional opportunities for leveraging data and digital technology to enable ENGIE’s mission. In 2024, the Group will accelerate the deployment of its digital plan, through three main priorities:

- Scale up the value created from digital assets and data. This includes further integration into strategic commercial offerings and operations, and taking advantage of opportunities arising from generative AI.
- Embed the digital and data culture, from General Management to the field operations, to prepare employees for an AI-augmented world.
- Continue modernizing IT networks and workplaces, and delivering on Group-wide application convergence programs to offer secure, reliable, efficient and intuitive user experiences to employees and customers.



# Analysis of the dual materiality of ESG issues

The Corporate Sustainability Reporting Directive (CSRD) and its associated standards, the European Sustainability Reporting Standards (ESRS), define European non-financial reporting obligations, the first stage of which is the analysis of the dual materiality of sustainability issues.

From September 2023 to February 2024, ENGIE analyzed the impacts, risks and opportunities (IRO) linked to the sustainability issues (ESG) of its operations and those of its value chain.

### Dual materiality, a strategic exercise

The dual materiality analysis allows ENGIE to identify ESG matters on which it has a significant socio-environmental impact (positive or negative) and those that have a major effect (risks or opportunities) on the Group's financial performance. In the context of the CSRD, the aim of this exercise is to identify the gross material impacts, risks and opportunities (IROs) associated with each ESRS standard, in order to deduce the scope and expectations for CSRD reporting. To this end, the Group has broken down each ESRS standard into sustainability matters (ESG), which have served as a framework for defining and assessing IROs. An ESG matter becomes a material sustainability challenge if it currently includes, or could include in the future, a single material impact, risk or opportunity (IRO). The purpose of this strategic exercise is to ensure that the Group's governance bodies can manage these material challenges, with a strategy that includes policies responding to material IROs supplemented by objective action plans backed up by monitoring indicators, some of which are required to be published by ESRS standards.



### A four-stage analysis

To identify and assess the materiality of IROs and the associated sustainability challenges, ENGIE carried out an analysis in four stages.

#### 1 Determining sustainability challenges relevant to ENGIE's activities

This first stage was carried out on the basis of the challenges listed in the Group's current Non-Financial Statement (NFS), the sustainability matters identified in the CSRD, a benchmark of peers and other standards (GRI, SASB, etc.). This led to the identification of 17 sustainability challenges deemed to be material for the Group and its value chain.

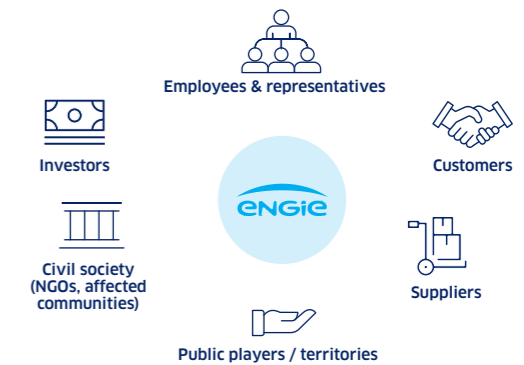
#### 2 Identifying and formalizing IROs for each challenge

The Group has associated impacts, risks or opportunities (IROs) with each of these 17 challenges, which are broken down into sub-challenges. These IROs were identified through an analysis of ENGIE's operations and value chain, followed by the organization of thematic workshops, and resulted in the creation of a list of positive or negative impacts as well as a list of associated risks or opportunities.

#### 3 IRO evaluation by consensus

Each of these gross IROs was evaluated through the organization of several work groups involving a total of around 50 different individuals from the Group's support functions and business lines, and the consultation of external contacts through targeted interviews.

As illustrated in the graphic, the Group has made an effort to consult all types of stakeholders, either directly (investors, suppliers, customers, shareholders, trade unions), or indirectly through in-house experts playing the role of these stakeholders (public players, regions, affected communities, NGOs). This step helped us enrich the evaluations with qualitative comments that will make it easier to subsequently update the analysis.



#### 4 Determining the materiality of IROs

The evaluation of IROs has helped us determine their materiality, which will serve as the basis for selecting indicators for the future sustainability report.



### List of material challenges

The table below lists the Group's material challenges and how they correspond to the ESRS standards.

ESRS	Translation into ENGIE challenges	ESRS	Translation into ENGIE challenges
ESRS E1 Climate change	Climate change adaptation	ESRS S1 Own workforce	Working conditions and social dialog
	GHG EMISSIONS		Equity and diversity
	Energy transition		Talent and skills
ESRS E2 Pollution	Industrial pollution	ESRS S2 Workers in the value chain	Worker health, safety and security
			Workers in the value chain
ESRS E3 Water and marine resources	Water	ESRS S3 Affected communities	Stakeholders
ESRS E4 Biodiversity and ecosystems	Biodiversity and ecosystems	ESRS S4 Consumers and end-users	Customers and end-consumers
		ESRS G1 Business conduct	Cybersecurity / Industrial safety and security
ESRS E5 Resource use and circular economy	Resource use and circular economy		Sustainable purchasing
			Business conduct and ethics

▲ The dual materiality analysis was conducted at the IRO level, identified for each sub-challenge.



The dual materiality approach (socio-environmental and financial) adopted under the CSRD Directive is highly compatible with the financial materiality approach recommended by the ISSB (International Sustainability Standards Board), which is responsible for proposing international sustainability reporting standards. This helps ensure interoperability between the two approaches, and avoids the need for additional materiality reporting.

# Contribution to Sustainable Development Goals

ENGIE's commitments as part of its strategy to accelerate the transition toward a carbon-neutral world are contributing to 14 Sustainable Development Goals of the UN's Agenda 2030. In operational terms, the strategy entails the rollout of numerous actions as a concrete response to the issues expressed by its stakeholders.



## A RIGOROUS METHODOLOGY



- Study of the contribution of the ENGIE materiality challenges to the SDGs and their related targets.
- The Group's contribution to an SDG is key when at least one fundamental, decisive, or major issue of the Group contributes to the SDG and its related targets and this contribution is monitored through a Group indicator and target.
- The Group's contribution to an SDG is significant when at least one material issue of the Group contributes to the SDG and this contribution is driven by a Group commitment.

## 6 SDGS FOR WHICH ENGIE'S CONTRIBUTION IS KEY

ENGIE contribution	Examples of actions in 2023
<b>5 ÉGALITÉ ENTRE LES SEXES</b> ENGIE is committed to equal opportunities for women and men and to women fully participating and accessing managerial positions without discrimination.	<ul style="list-style-type: none"> <li>• Be.U@ENGIE prize awarded to ENGIE Peru's <i>BECAS + Mujeres en Energia</i> project. This project encourages women to embark on careers in science (STEM<sup>(1)</sup>) and the energy sector: 85 female students supported.</li> <li>• Fifty-fifty: 17 EDGE-certified (<i>Excellence in Designing for Greater Efficiency</i>) entities, including six in 2023</li> </ul>
<b>7 ÉNERGIE PROPRE ET D'UN CÔTÉ ABORDABLE</b> ENGIE contributes to universal access to energy, the development of renewable energy and improved energy efficiency.	<ul style="list-style-type: none"> <li>• 41% renewable energy in the electricity production capacity mix - 40.4 GW</li> </ul>
<b>8 TRAVAIL DÉCENT ET CROISSANCE ÉCONOMIQUE</b> ENGIE contributes to the economic and social development of regions and prioritizes the health and safety of everyone everywhere in the world.	<ul style="list-style-type: none"> <li>• Rollout of the mandatory training course "Safety induction - ENGIE One Safety"</li> <li>• Launch of ENGIE One Safety Culture, the program to transform the health and safety culture of managers</li> </ul>
<b>9 INDUSTRIE, INNOVATION ET INFRASTRUCTURE</b> ENGIE mobilizes its R&I to modernize and green its networks, and works to share value with its stakeholders.	<ul style="list-style-type: none"> <li>• <i>European H2 Backbone: MosaHYC</i> project to convert 45 km of gas pipelines on the French side and 30 km on the German side for hydrogen transmission</li> </ul>
<b>11 VILLES ET COMMUNAUTÉS DURABLES</b> ENGIE contributes to the city of tomorrow through its urban planning tools and its clean energy and services offerings.	<ul style="list-style-type: none"> <li>• Electric mobility: launch of the ENGIE Vianeo brand in June 2023, with 1,000 operational charging points in France and 12,000 by 2025</li> </ul>
<b>13 MESURES RELATIVES À LA LUTTE CONTRE LES CHANGEMENTS CLIMATIQUES</b> Driven by its purpose and strategy, ENGIE promotes energy efficiency and renewable electricity production.	<ul style="list-style-type: none"> <li>• Renewable Academy programs to enhance renewable energy skills</li> </ul>

## 8 SDGS FOR WHICH ENGIE'S CONTRIBUTION IS SIGNIFICANT

ENGIE contribution	Examples of actions in 2023
<b>3 BONNE SANTÉ ET BIEN-ÊTRE</b> By increasing its clean energy generation, ENGIE improves living conditions. Its employees all benefit from social protection.	<ul style="list-style-type: none"> <li>• Rollout of the "ENGIE Care" program in 2023</li> <li>• 2023 progress report in % of employees covered                             <ul style="list-style-type: none"> <li>- Maternity (14 weeks): 90.7%, paternity (4 weeks): 62.3%</li> <li>- Hospitalization (min. 12 months' salary): 98.6%, disability (min. 12 months' salary): 87%</li> <li>- Death (min. 12 months' salary): 97.2%</li> </ul> </li> </ul>
<b>6 EAU PROPRE ET ASSAINISSEMENT</b> Access to, and preservation and rationalized use of this shared asset are incorporated into the Group's water management strategy.	<ul style="list-style-type: none"> <li>• Since 2010, ENGIE in Brazil has been part of a program to preserve freshwater sources located near 14 of its electricity production plants: +2,000 water sources protected</li> </ul>
<b>10 INÉGALITÉS RÉDUITES</b> ENGIE contributes to local economic development by participating in a just transition and providing access to jobs without discrimination.	<ul style="list-style-type: none"> <li>• Energy Transition Academy: 63 graduates out of 81 outgoing students, i.e. an average success rate of 78%</li> <li>• Average retention rate: 53%, half in employment and half on work-study contracts</li> <li>• General rate of hiring as employees or on work-study (ENGIE and outside ENGIE): 83%</li> </ul>
<b>12 CONSOMMATION ET PRODUCTION RESPONSABLES</b> Optimized use of its resources and waste and the promotion of sustainable practices in its value chain are part of ENGIE's purpose.	<ul style="list-style-type: none"> <li>• 93.1% reduction in the production of hazardous waste in the Group vs. 2017</li> </ul>
<b>14 VIE AQUATIQUE</b> Preserving the oceans and their flora and fauna is crucial for the balance of the ecosystems. ENGIE is a signatory of the <i>Sustainable Ocean Principles</i> .	<ul style="list-style-type: none"> <li>• Preventing the risks related to offshore wind: studies and monitoring of the sea floor, air surveillance</li> </ul>
<b>15 VIE TERRESTRE</b> ENGIE is committed to mitigating its impact on life on land by working for the preservation of ecosystems (act4nature - biomass).	<ul style="list-style-type: none"> <li>• New act4nature international commitments</li> </ul>
<b>16 PAIX, JUSTICE ET INSTITUTIONS EFFICACES</b> ENGIE excludes any form of corruption and deploys forums for dialog to improve the transparency of its communication.	<ul style="list-style-type: none"> <li>• Group ISO 37001 certification</li> </ul>
<b>17 PARTENARIATS POUR LA RÉALISATION DES OBJECTIFS</b> ENGIE is forging solid relationships with a broad panel of partners and is now a recognized player in the regions.	<ul style="list-style-type: none"> <li>• Extension of the TED (<i>Transition Énergétique Durable - Sustainable Energy Transition</i>) label to six new countries in addition to France: Belgium, Chile, Spain, Italy, United States and Canada</li> </ul>

(1) Science, Technology, Engineering, and Mathematics

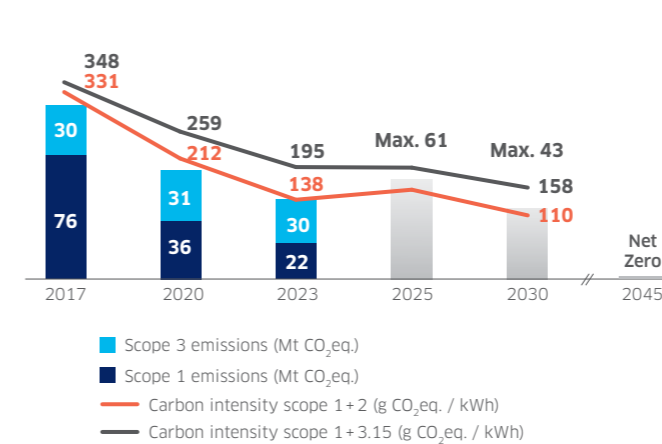
# Value creation objectives for 2030

ENGIE has divided its objectives and performance management indicators into three categories: the Planet, People and Economic Prosperity - which benefit from the value created by the Group in the medium and long term.

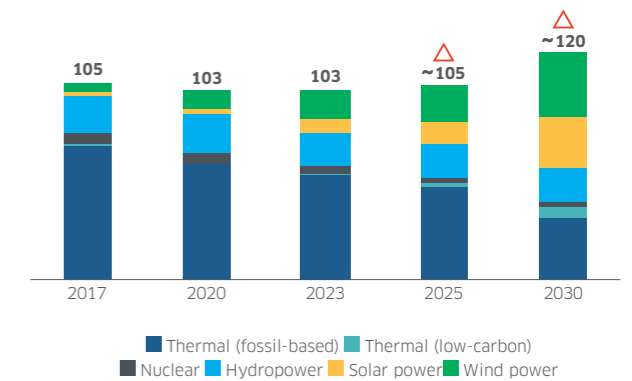
Planet		2021	2022	2023	TARGET 2030
<b>Objectives monitored by the governance bodies (EESDC)</b>					
CO <sub>2</sub> Energy generation	GHG emissions from energy generation (scopes 1 and 3) in Mt CO <sub>2</sub> eq.	65	60	52	43
CO <sub>2</sub> Energy generation and consumption	Carbon intensity of direct energy generation (scope 1) and energy consumption (scope 2) in g CO <sub>2</sub> eq. per kWh	181	156	135	110 (< 149: SBTi well-below 2°C threshold)
	GHG emissions from final gas sales in Mt CO <sub>2</sub> eq.	66	61	53	52
CO <sub>2</sub> Energy sales	Carbon intensity of energy sales produced (scopes 1 and 3) and purchased (scope 3) in g CO <sub>2</sub> eq. per kWh	252	221	225	152 (SBTi target well-below 2°C threshold)
CO <sub>2</sub> Other	Other GHG emissions, including scope 3 from procurement, capital goods and the upstream of purchased fuels and electricity (scopes 3.1, 3.2, 3.3) in Mt CO <sub>2</sub> eq.	101	90	82	85 (SBTi well-below 2°C threshold)
Renewable capacities	Share of renewable capacities (@100% and excluding pumped storage) in electricity production (scopes 1 and 3)	34%	38%	41%	58%
Decarbonation of our customers	Emissions avoided at the customers' sites through Group's products and services in Mt CO <sub>2</sub> eq.	27	28	25	45
Decarbonization of our suppliers	Rate of top 250 SBT-certified or aligned preferred suppliers	20%	23%	24%	100%
Biodiversity	Rate of industrial sites with natural management of green spaces without the use of chemical plant protection products	28%	34%	58%	100%
Water	Fresh water consumption per energy produced in m <sup>3</sup> / MWh	0.342	0.301	0.275	0.1
<b>Operational objectives followed by the Group Executive Committee</b>					
Renewable capacities	Renewable capacities <sup>(1)</sup> (@100% and excluding pumped storage) of electricity production in GW	34	38	42	80
CO <sub>2</sub> Energy generation	Carbon intensity from energy generation (scopes 1 and 3) in g CO <sub>2</sub> eq per kWh	240	216	203	158
Decarbonization of our work practices	GHG emissions linked to our working practices in Mt CO <sub>2</sub> eq.	0.3	0.3	0.3	0 (after offsetting-maximum of 0.2 Mt CO <sub>2</sub> eq.)
Environment	Rate of activities with an environmental plan established in consultation with stakeholders	37%	53%	66%	100%
	NOx emissions reduction rate vs 2017	-46%	-63%	-71%	-75%
	SOx emissions reduction rate vs 2017	-34%	-95%	-98%	-98%
Pollution	Total particle emissions reduction rate vs 2017	-21%	-54%	-61%	-60%
	Non-hazardous waste generation reduction rate vs 2017	+4%	-47%	-73%	-80%
	Hazardous waste generation reduction rate vs 2017	-91%	-94%	-93%	-95%
Methane emissions	Direct methane emissions on gas infrastructures in Mt CO <sub>2</sub> eq.	1.62	1.26	1.45	30% vs 2017 or 1.45 Mt CO <sub>2</sub> eq.
Electricity storage	Electricity battery capacities (GW)	-	0.05	1.26	10 GW

(1) including decentralised electricity capacity

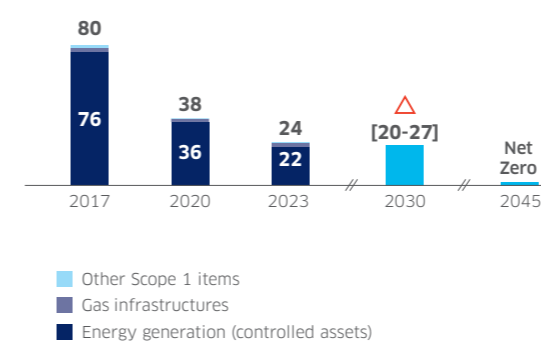
**GHG EMISSIONS FROM ENERGY GENERATION** (Mt CO<sub>2</sub>eq.)



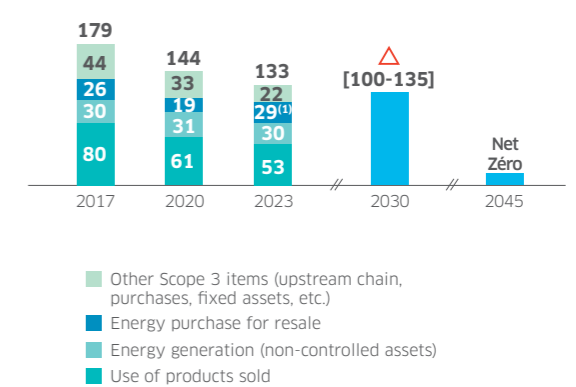
**EVOLUTION OF INSTALLED ELECTRICITY GENERATION CAPACITY (GW@100%)**



**SCOPE 1 DIRECT GHG EMISSIONS** (Mt CO<sub>2</sub>eq.)



**SCOPE 3 INDIRECT GHG EMISSIONS** (Mt CO<sub>2</sub>eq.)



(1) Indicator audited for the first time in 2023.

## COMMENTARY YEAR 2023

2023 was an unusual year, given the low load factors seen in France and across Europe more generally. The actual emissions from electricity production and gas sales were well below our forecasts. An in-depth study will be carried out in 2024 to determine the role of cyclical factors in these developments and, conversely, the role of more structural and therefore recurring changes. Potential adjustments to the 2025 and 2030 targets will be reviewed as part of the next update of the Group's climate strategy, to be presented at the 2025 Shareholders' Meeting.

△ These data are forward-looking estimates updated annually in the Medium-Term Plan (MTP). They have no objective value and are shared as part of a Group transparency approach vis-a-vis external parties.

# Multiple commitments for a positive impact

Involved in different networks and coalitions that assist it in improving its practices and energizing its value creation for the benefit of its stakeholders, ENGIE combines economic performance and positive impact.

People		2021	2022	2023	TARGET 2030
<b>Objectives monitored by the governance bodies (EESDC)</b>					
Health & Safety	Lost time injury frequency rate <sup>(1)</sup> for employees and subcontractors on closed sites with controlled access	2.5	2.0	1.8	1.8 <sup>(1)</sup>
	Fatality rate	0.045	0.014	0.020	0 each year
Diversity	Share of women in Group management	28.9%	29.9%	31.2%	[40-60%]
Equity	Gender pay gap	-	1.73%	1.92%	< 2%
Learning	Rate of apprentices in the workforce in France	7.2%	8.5 <sup>(2)</sup>	8.5%	>10%
Training	Rate of employees trained each year	82%	84%	86%	100%
Responsible purchasing	Responsible purchasing index (excluding energy): CSR assessment and inclusive purchasing	40	38	54%	100
Fraud and corruption prevention	Rate of training of staff most exposed to the risk of corruption	49%	55%	68%	> 95%
<b>Operational objectives followed by the Group Executive Committee</b>					
Stakeholder dialog	Rate of activities with a societal plan for consultation with stakeholders	36%	46%	49%	100%
Access to energy	Number of beneficiaries with access to sustainable energy in millions <sup>(3)</sup>	7M	9.5M	12M	30M

Economic prosperity	2021	2022	2023	FINANCIAL OUTLOOK FOR 2024-2026
<b>Indicators (Published data)</b>				
Growth investments (€ bn)	4.3	5.5	8.1	€22-25 bn for 2023-2025 extended to 2026 on an annual average
Asset rotation program (disposals) (€ bn)	2.0	9	0.3	-
Performance program (€ m)	85	424	178	~200 m€ per year
EBIT (€ bn)	6.1 / 5.2 excl. nuclear	9.0 / 8.0 excl. nuclear	10.1 / 9.5 excl. nuclear	€7.5-8.5 bn (excluding nuclear) in 2024 €7.9-8.9 bn (excluding nuclear) in 2025 €8.2-9.2 bn (excluding nuclear) in 2026
Economic net debt / EBITDA	3.6x	2.8x	3.1x	less than or equal to 4.0x over the long term
Net recurring income, Group share (NRIGs) (€ bn)	2.9	5.2	5.4	€4.2-4.8 bn in 2024 €3.9-4.5 bn in 2025 €3.7-4.3 bn in 2026
Dividend payout rate / Net recurring income, Group share	66%	65%	65%	65%-75% with floor dividend of €0,65 per share
Credit rating	strong investment grade	strong investment grade	strong investment grade	strong investment grade

(1) Target revised to 1.8 from 2024 with extension of scope to all people working for the Group  
 (2) Scope excluding regulated entities in France (GRDF, GRTgaz) as from 2022  
 (3) This target will be replaced in 2024 by another target more in line with the Group's geographical refocusing and taking into account the positive impacts of the Energy Gathering Fund, and incorporating the positive impacts of the Energy Gathering Fund.





# OUR IMPACT

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# Social transformation of the Group to support the energy transition

## RESOURCES

**Financial capital**

- €35.7 billion in shareholders' equity
- €23.6 billion in cash and cash equivalents
- €29.5 billion in financial net debt
- 3.1x economic net debt / EBITDA

**Industrial capital**

- €8.1 billion in growth Capex
- €2.5 billion in maintenance Capex
- €22.4 billion in B2C contracts
- 258,512km gas distribution networks
- 103 GW of installed electricity production capacity, of which 42 GW of renewable energy including decentralised capacities

**Intellectual capital**

- 650 researchers
- €142 million allocated to R&D
- €8.6 million invested in start-ups in 2023
- €200 million invested in ENGIE New Ventures

**Human and societal capital**

- 97,297 employees
- 16,195 hires
- 8.5% apprentices in France.
- €38.5 million invested by Rassembleurs d'Energies
- €7.8 million annual endowment for the ENGIE Foundation

**Natural capital**

- 217 TWh of primary energy consumption (excluding own consumption)
- 62 million m<sup>3</sup> of water consumed
- €925 million in environment expenditure (investments and recurring expenses related to environmental protection)
- 2.2 Mt of biomass in France

## OUR WAYS OF WORKING

- Focus on business
- Collaborate
- Commit to deliver
- Engage
- Prioritise

## 4 CORE BUSINESSES



**AMBITIONS**  
**20 TWh** per year of green energy<sup>(1)</sup> production (heat, cooling and electricity) delivered to customers by 2030 for local energy networks and on-site production activities.

**AMBITIONS**  
**50 GW** in 2025 → **80 GW** in 2030

**AMBITIONS**  
**~10 TWh** of biomethane production per year in Europe by 2030

**AMBITIONS**  
**~10 GW** of battery storage capacity by 2030

**AMBITIONS**  
**~4 GW** of hydrogen capacity by 2035

**ENERGY MANAGEMENT EXPERTISE**  
Marketing renewable energy, optimizing our fleet and monetizing its flexibility

## VALUE CREATION

**2023 RESULTS**

**People**

- 31.2% women in Group management → **OBJECTIVES 2030**
- 1.92%: gender pay gap → **[40% to 60%]**
- 1.8: frequency rate of occupational accidents for employees and subcontractors on sites with controlled access → **<2%**
- **1.8<sup>(1)</sup>**

**Planet**

- 52 Mt CO<sub>2</sub> eq. of GHG emissions (scopes 1 and 3) for energy generation → **2030**
- **43 MtCO<sub>2</sub>eq.**
- 135 g CO<sub>2</sub>eq. / kWh of carbon intensity of direct energy generation (scope 1) and energy consumption (scope 2) → **110 g CO<sub>2</sub>eq. / kWh**
- 53 Mt CO<sub>2</sub> eq. of GHG emissions related to gas end sales → **52 MtCO<sub>2</sub>eq.**
- 225 g CO<sub>2</sub>eq. / kWh of carbon intensity of energy sales produced (scopes 1 and 3) and purchased (scope 3) → **152 g CO<sub>2</sub>eq. / kWh**
- 41% of renewable electricity production capacity → **58%**
- Customer decarbonization:
  - 25 Mt CO<sub>2</sub>eq. of emissions avoided by customers through ENGIE's products and services → **45 Mt CO<sub>2</sub>eq.**
- Supplier decarbonization:
  - 24% of the top 250 suppliers (excluding energy) SBT certified or aligned → **100%**

**Economic prosperity**

- €5.4 billion in Net recurring income / (loss), Group share (NRIGs) → **2024-2026**
- **[€4.2-4.8 bn] in 2024**
- **[€3.9-4.5 bn] in 2025**
- **[€3.7-4,3 bn] in 2026**
- €1.43 dividend per share to be paid out for fiscal year 2023 (65% of 2023 net recurring income, Group share) → **65 to 75%**
- €8.1 billion in growth CAPEX → **€22-25 bn**
- €0.3 billion in asset rotation

- 3.1x: Economic net debt / EBITDA ratio → **≤4x**
- Credit rating: strong investment grade

## CONTRIBUTION



(1) From renewable or recovered sources

(1) Target revised to 1.8 from 2024 with extension of scope to all people working for the Group.

# Renewables

GBU Renewables contributes to decarbonizing and balancing the energy mix, essentially by developing solar and wind power.

## EXPERTISE

### Development and operation of renewable projects

Design, build, operate:

- Hydroelectricity
- Solar power
- Onshore wind
- Offshore wind
- Battery storage associated with a renewable asset

### Related goals

- Achieve a portfolio of **50 GW** by 2025 and **80 GW** by 2030

## STRATEGY PURSUED

The Group is investing heavily in decarbonized energy generation facilities and intends to increase its capacity by an average of 4 GW per year between now and 2025 and by 6 GW per year from 2026. The majority of investments are expected to be focused in the five priority markets of the GBU, namely the United States, France, Brazil, Chile and offshore wind.

## PROGRESS MADE

En 2023, ENGIE increased its renewable capacities by 3.9 GW, bringing the Group's total renewable installed capacities to 41.4 GW at the end of 2023. The year was marked by the acquisition of BTE Renewables in South Africa, and a record level of projects under construction, at almost 6.3 GW at the end of 2023.

**5,100**  
employees  
worldwide

**€2.0 bn**  
EBIT 2023

**41.4 GW**  
in 100% installed  
capacities

**No. 1**  
in wind  
and solar  
power in France

# Flex Gen & Retail

The Flex Gen & Retail GBU produces flexible and affordable electricity and thus contributes to the development of renewable energy.

## EXPERTISE

### Flexible production and storage

- Gas-powered electricity production
- Electricity storage
- Large-scale renewable hydrogen production
- Seawater desalination

### Related goals

- Availability rate of production assets **> 90%**
- Coal phase-out by 2025 in continental Europe and by 2027 worldwide
- Production capacities of battery energy storage systems at **10 GW** in 2030
- Low carbon hydrogen production capacity of **4 GW** in 2030

### Energy supply to individuals

See page 31

## STRATEGY PURSUED

ENGIE is continuing to invest in renewable energy and intends to develop its thermal capacities in a targeted manner. It provides the flexibility that the electric system needs and supports its customers in moving toward decarbonization through its energy and services contracts. Against the backdrop of a planned withdrawal from coal, it is set to further green its portfolio of assets, due to the improved efficiency of its assets, the development of battery storage, and the combustion of biomethane and hydrogen.

## PROGRESS MADE

With the current strong growth of renewable energy, ENGIE benefits from a large portfolio of flexible production and energy storage assets. Its gas-fired power plants (49 GW), pumped storage plants (4 GW) and batteries (543MW) are essential to compensate for the intermittent nature of renewable energy. In order to meet growing demand for seawater desalination, ENGIE deploys daily capacity of 6 million m<sup>3</sup>, using new technologies such as inverse osmosis, reducing the CO<sub>2</sub> footprint.

**16,000**  
employees worldwide  
o/w Retail

**€2.1 bn**  
EBIT 2023

**49 GW**  
in gas-fired electricity  
production capacity at  
100%

**€22.4 m**  
in BtoC contracts  
worldwide

## + BUSINESS CASE



**Robert Skjodt**  
Chief Executive Officer of  
Renewables for ENGIE South Africa

### A key acquisition in South Africa

With the acquisition of BTE Renewables, effective at the end of 2023, ENGIE has doubled its presence in renewable energy in South Africa. The Group already operates 1.3 GW of assets, including over 0.3 GW of renewable energy. With this transaction, ENGIE is adding 340 MW of wind and solar power operating capacity to its portfolio. It is also adding over 3 GW of projects at an advanced stage of development, in a growing market. For Robert Skjodt, former Chief Executive Officer of BTE Renewables and now Chief Executive Officer of Renewables for ENGIE South Africa, "joining forces with ENGIE enables a powerful synergy which will help realize our common vision of a carbon-neutral world. This integration helps us exploit our collective strengths to the benefit of a portfolio with several projects in advanced development which, without a shadow of a doubt, will further the ambitions of South Africa in the area of renewable energy."



**Oscar Diaz**  
Director of Engineering,  
Purchasing, Construction and  
Installations of Ocean Winds

### Launch of construction of 2 GW of offshore wind

Ocean Winds, a 50:50 joint venture between ENGIE and EDP Renewables, has started construction of **two offshore wind farms in France**, off the islands of Yeu and Noirmoutier, and Dieppe-Le Tréport, representing almost 1 GW of capacity. They follow the pilot project Éoliennes Flottantes du Golfe du Lion (Gulf of Lion floating wind turbines) in the Mediterranean. These three wind farms will supply clean energy to 1.7 million homes. The construction of the Moray West 882 MW offshore wind farm in Scotland, with structures on the ocean floor, started in October 2023. For Oscar Diaz, Director of Engineering, Purchasing, Construction and Installations of Ocean Winds: "Despite a difficult environment of rising interest rates, inflation and supply chain constraints, we are on track to successfully deliver close to 2 GW of offshore wind power spread over four different projects. After a fantastic year of growth with 8 GW of new projects secured in 2022, 2023 was focused on the construction and safe delivery of our projects."

## + BUSINESS CASE



**Leigh Newbery**  
Chief Executive Officer of  
ENGIE Australia & New Zealand

### Battery energy storage system comes to life in Australia

Made up of 342 modules, the batteries plant opened by ENGIE in Australia, on the site of the old Hazelwood power plant, is the largest battery energy storage system (HBESS<sup>(1)</sup>) ever commissioned by the Group. With an installed capacity of 150 MW / 150 MWh, the system can store the equivalent of one hour of electricity produced by the solar power systems on the roofs of 30,000 homes in the State of Victoria; and inject this power into the grid during peak demand. For Leigh Newbery, Chief Executive Officer of ENGIE Australia & New Zealand, this is significant progress, since "it increases the stability of the State's power grid and illustrates ENGIE's commitment to the development of assets which provide the flexibility needed by energy systems." This project is a milestone for ENGIE, which is aiming for installed capacity from batteries of 10 GW worldwide by 2030.



**Yannick Balusson**  
Director of the DK6  
power plant

### Project Phoenix: extending the lifespan of DK6

Commissioned in 2005, the DK6 plant is a 788 MW combined cycle power station, supplied by the gas from the ArcelorMittal steel plant in Dunkirk and also by natural gas. The renewal of the partnership between ENGIE and ArcelorMittal in 2022 opened the way for the Phoenix project to extend the lifespan of the plant until 2034. The first part of the works, with a budget of €55 million, was successfully concluded in 2023, and the second stage is planned for 2024.

With 300 people on site, 150,000 hours of work and almost 100 subcontractors, health and safety is the number one priority in this project.

For Yannick Balusson, Director of the plant: "ENGIE is supporting DK6 over the long term, investing in what has made it successful since its creation: circular technology, contribution to the local economy, energy performance, flexibility and contribution to the electricity supply."

(1) H for Hazelwood

# Networks

Thanks to its accelerated development of renewable gases in Europe and electricity transmission networks in Latin America, GBU Networks is contributing to the decarbonization of energy systems, meeting climate and sovereignty challenges.

## EXPERTISE

### Gas infrastructures

- Distribution and transmission of natural gas and renewable gases
- Gas storage
- Management and regasification of liquefied natural gas
- Production, transmission and distribution of biomethane

### Electricity transmission

#### Related goals

- **700 km** of hydrogen transmission networks in 2030
- **10 TWh** of biomethane production capacity in Europe (i.e. 10% market share)
- **50 TWh** of biomethane injected into the French network by 2030
- **30% less** methane emissions by 2030 (vs 2017)
- Develop **1 TWh** of underground hydrogen storage capacity in salt caverns by 2030

## STRATEGY PURSUED

The Group seeks to combine performance, secure supplies and developing of a zero-carbon energy mix. It pursues four key strategic objectives: maximising the value of existing assets, internationalising its portfolio developing its electricity transmission and promoting the production of biomethane production in Europe, while promoting the conversion of some of its to renewable gases.

## PROGRESS MADE

ENGIE is continuing to progress in renewable gases and has confirmed its presence on the electricity transmission market.

- In France, more than 130 new biomethane production units have been connected to the GRTgaz and GRDF networks, bringing the total number of connected units to 624, with an installed capacity of almost 11 TWh/year. In 2023, ENGIE commissioned 9 units in France, bringing to 33 the number of units in operation, with a production capacity of 691 GWh/year. The acquisition in 2023 of the 3 units of Ixora Energy Ltd in the United Kingdom will provide additional capacity of 160 GWh/year.
- In hydrogen, ENGIE has inaugurated its first pilot project for underground storage of hydrogen in France (HyPSTER).
- On the electricity transmission market, essential for facilitating the rollout of renewable energy, ENGIE has won a new contract in Brazil for the construction of 1,000 km of electricity transmission lines.

**21,800**  
employees worldwide

**€2.3 bn**  
EBIT 2023

**296,980 km**  
of gas transmission and distribution networks worldwide

**5,720 km**  
of electricity transmission networks and 1,000 km under construction

## + BUSINESS CASE



**Erika de Mattos Abranches**  
Business Developer,  
ENGIE Brasil Energia

### A 30-year concession for 1,000 km of electricity transmission in Brazil

ENGIE has strengthened its electricity transmission activity in Brazil by winning a new concession for the development of 1,000 km of high voltage lines. The concession, won in an auction organized by the Brazilian electricity agency, will enable continuing integration of renewable energies, while meeting energy demand in the states of Bahia, Minas Gerais and Espírito Santo. ENGIE will be responsible for the design, construction, operation and maintenance of these lines. The Group has already installed over 2,700 km of electricity transmission lines in Brazil. *"The Asa Branca project will contribute to the modernization and growth of the electricity transmission network, as part of the country's energy transition strategy. We are currently working on significant auctions planned for 2024. Our aim is to win new projects for the Group,"* said Erika de Mattos Abranches, Business Developer, ENGIE Brasil Energia.



**Charlotte Roule**  
Chief Executive Officer of Storengy

### Heading for the industrialization of the hydrogen sector in Europe with HyPSTER

In September 2023, ENGIE inaugurated, on the Etrez site (France), its first demonstrator for storage of renewable hydrogen in salt caverns. Dubbed HyPSTER, this pilot project, supported by the European Union and by the Clean Hydrogen Partnership, will test the production and storage of 400 kg per day of hydrogen from local renewable energies and a 1 MW electrolyzer. According to Charlotte Roule, Chief Executive Officer of Storengy, *"the challenge is three-fold: to ensure, during the experimental phase, that safety standards are similar to those for gas; to prepare rollout on an industrial scale from 2024 onwards; and to open the way for it to be replicated on other sites in Europe."* This demonstrator, the fruit of a collaboration between academia, industry via Storengy, a subsidiary of ENGIE, and local authorities, underlines the importance of gas infrastructure, which is set to play an essential role in the decarbonization of Europe.

# Energy Solutions

GBU Energy Solutions contributes, through its offerings and services, to decarbonizing the local energy infrastructure of its city, local authority, industrial and service sector customers. It helps them to lower their consumption and to consume more virtuous energy.

## EXPERTISE

### Local energy grids based on regional networks

- Urban heating and cooling networks
- Local distribution networks
- Sustainable mobility: electric, biogas, hydrogen
- Public lighting and low-carbon cities

### On-site energy generation through customer-specific networks

- Solar power on site and storage
- Utilities

### Energy performance

- Energy performance services
- Engineering and decarbonization consulting

#### Related goals

- **20 TWh** per year of green energy<sup>(1)</sup> production (heat, cooling and electricity) delivered to customers by 2030 for local energy networks and on-site production activities.

(1) From renewable or recovered sources

## STRATEGY PURSUED

With its integrated decarbonization solutions, the Group helps its customers to reduce their costs and energy consumption, as well as their CO<sub>2</sub> emissions. It uses long-term contracts and has a panel of diversified and complementary offerings. It helps to accelerate the energy transition of its customers, and prioritizes the development of decentralized energy networks (urban heating and cooling networks, building of utilities on the customer's site, decentralized solar power, urban infrastructure and low-carbon mobility) and associated services.

## PROGRESS MADE

The Group is continuing to support its customers, towns and local authorities, industries and businesses in their efforts to reduce carbon emissions, with :

- Contracts signed for the construction, extension and greening of heating networks (Cannes, Toulouse Matabiau, Barcelona, etc.), for on-site energy production with industrial companies (in the automotive, chemicals and agri-food sectors in particular) and energy performance contracts (in particular for local authorities, with the contract for the buildings of the city of Florence).
- The launch of the ENGIE Vianeo brand for electric mobility in France.
- The commissioning of new facilities and the improvement of the operational performance of heating, cooling and cogeneration assets in France.

**42,200**  
employees worldwide

**€0.4 bn**  
EBIT 2023

**25.3 GW**  
of decentralized installed energy capacities

**N°1**  
cooling network operator in the world and

**3 rd**  
largest heating network operator

## + BUSINESS CASE



**Patrick Berardi**  
Chief Executive Officer  
of Thassalia

### Ocean thermal heating has the wind in its sails

Ocean thermal heating involves exploiting the energy potential of the sea. *"With two projects already operating and two under construction, ENGIE currently has recognized expertise in the area,"* said Patrick Berardi, Chief Executive Officer of Thassalia. In Marseille, ENGIE uses the energy of the Mediterranean at its Thassalia power station, which, since 2016, has been supplying the heating and cooling networks for some of the buildings in the Euroméditerranée eco-district, enabling a 70% reduction in greenhouse gas emissions. In Monaco, the Principality chose ENGIE in 2020, via its subsidiary SMEG, to manage two ocean thermal heating networks, with a view to accelerating its energy transition. With 35 GWh of decarbonized energy, this local production reduces CO<sub>2</sub> emissions by 6,025 tonnes. Finally, in early 2023, the Cannes Pays de Lérins urban area awarded a contract to ENGIE Solutions to build and roll out a new urban heating and cooling network based on ocean thermal heating, as part of the "La Croisette re-invents itself" project. This 25-year contract will prevent emissions of over 125,000 tonnes of CO<sub>2</sub>. Furthermore, at the end of 2023 the town of Port-de-Bouc entered into a SEMOP public-private partnership in the area of ocean thermal heating.



**Gavin Shen**  
Head of ENGIE Delivery Office

### Performance commitment contract with Pfizer in Singapore

As part of its sustainable development and operational efficiency strategy, Pfizer, a world leader in life sciences, called on ENGIE to supply it with energy in seven units of its new factory in Singapore. This performance commitment, in the form of a BOOT (*Build Own Operate & Transfer*) model, includes finance and execution, and high operating standards. It highlights ENGIE's commitment to producing results in tight timeframes with high safety standards. *"The design and construction of a CUB (Central Utilities Building) ready to provide energy services on a tight deadline has been a real challenge. Thanks to close collaboration with Pfizer, we have commissioned, after over 700,000 hours of work with no accidents, all the systems, on time,"* said Gavin Shen, Head of ENGIE Delivery Office. This flagship project shows ENGIE's capacity in Southeast Asia to support industrial groups in their manufacturing excellence and decarbonization process.



# GEMS (Global Energy Management & Sales)

GEMS is at the heart of ENGIE's integrated model. GEMS optimizes the value of the Group's electric, gas and renewable assets, manages the portfolio risks on behalf of ENGIE and ensures a secure and sustainable energy future for more than 190,000 customers.

## EXPERTISE

### Optimization of assets

- Management of supply flows and optimization of electricity production assets of ENGIE and third parties
- Management of gas storage, supply and transmission contracts, leveraging flexibility on markets
- Optimization of portfolio of LNG and biomass contracts.

### Risk management and supplying energy to customers

- Management of the security of supply, of risks and access to the market for ENGIE and its customers
- Supply of natural and low carbon gas and renewables to customers
- Supply of electricity and renewable electricity to customers

## STRATEGY PURSUED

GEMS optimizes and extracts the value in the flexibility of its customers' and ENGIE's assets: production of thermal and renewable electricity, energy storage, cross-border transmission capacity and a large LNG and biomass portfolio. GEMS continues to expand its green energy management portfolio, which includes renewable electricity, green and low-carbon gases, sustainable biomass, guarantees of origin and green certificates to support the Group and its customers in the energy transition.

## PROGRESS MADE

En 2023, GEMS enjoyed a record level of activity, optimizing the options in its long-term contracts. GEMS made a big contribution to the development of renewable energy through Green PPAs (Power Purchase Agreements). A total of 21 TWh of Green PPAs was signed in 2023 in the gas sector, the first large BPA (Biomethane Purchase Agreement) came into force.

**3,600**  
employees  
worldwide

**€3.6 bn**  
EBIT 2023

**310 TWh**  
of gas and electricity  
supplied to B2B  
customers

**58 GW**  
of electricity  
assets managed

## + BUSINESS CASE



**François Joris**  
BESS (Battery Energy Storage Systems) Trader

### Algorithm to optimize the battery storage system of the Drogenbos power plant

GEMS has successfully launched the optimization on intra-day markets of the battery storage system at ENGIE's Drogenbos site in Belgium. GEMS developed an algorithm to optimize the use of batteries in order to address intra-day imbalances. "Every day, each battery triggers hundreds of transactions on the intra-day market, reacting to the price imbalance signal published by the network operator," said François Joris, BESS Trader at ENGIE. "This requires a high data-intensity optimization engine, which is completely automated and autonomous, in addition to human expertise."

### ENGIE signs a major contract with Arkema to supply biomethane

This agreement is one of the largest private contracts for the purchase of biomethane in Europe. As part of this 10-year partnership, ENGIE will supply Arkema with 3 TWh of biomethane, supporting the group in its decarbonization process, and very significantly reducing the carbon footprint of its high-performance bio-sourced polyamides. This agreement will also boost the biomethane sector in which ENGIE is already a major player in France.

For Cédric Fousse, Co-Head European Sales & Origination, "this agreement directly improves the sustainability of Arkema's finished products. We are delighted to support the company in its transition toward a more sustainable economy. At ENGIE, we are convinced that biomethane will play an essential role in the European energy mix and this agreement demonstrates its viability as a flexible, distributable and storable decarbonization solution. This historic contract consolidates ENGIE's status as a key player in the biomethane sector in Europe."



**Cédric Fousse**  
Co-Head European Sales & Origination

# Retail

Retail accelerates the energy transition of its retail and business customers in six countries (France, Belgium, Romania, Netherlands, Italy, Australia).

## EXPERTISE

### Integrated energy solutions for retail and business customers

- Gas and electricity sales
- Flexible decentralized solutions
- Energy services and sale of equipment

### Related goals

- **-34%** CO<sub>2</sub> emissions between 2017 and 2030
- **3 GW** of flexible nominal capacity installed and **1.5 million** customers able to manage their energy in 2030
- **10%** of green gas in gas sales and **12 million** electricity contracts in 2030

## + BUSINESS CASE



**Guillaume Chicco**  
Product Owner Home Energy Management

### Optimize, an intelligent system for the management of domestic electrical appliances on the residential Belgian market

In the current context of the electrification of transport, heating and the majority of domestic uses, Optimize is a box and an intelligent application which automatically ensures the electrical balance of the home, particularly the local production of solar panels on the roofs of homes and the consumption of an electric vehicle recharging station, in accordance with the other needs of the house and the requirements of the network during peak consumption. This optimization means that residential customers in Flanders can play their part in the energy transition, boost the flexibility of the overall electricity system, and reduce their bills, which are based on peak electricity demand, preventing demand from exceeding capacity. "Optimize allows customers to monitor their production, consumption and savings in real time," said Guillaume Chicco, Product Owner Home Energy Management.

## STRATEGY PURSUED

Retail intends to accelerate the energy transition in the home and office thanks to integrated solutions offering green energy combined with decentralized installations. They will enable electrification, the production of renewable energy and the management of consumption. Developing customers' demand flexibility will reduce their energy bills and will also be a new driver of growth.

## PROGRESS MADE

With its portfolio of 22 million contracts and its downstream presence in the energy chain, Retail contributes to the Group's integrated model and to its strategy, thanks to the greening of its energies, the electrification of uses and the development of its customers' demand flexibility.

**€0.6 bn**  
EBIT 2023

**6**  
countries of  
operation

# Nuclear

With regard to its Nuclear activity, ENGIE is working on extending the lifespan of two nuclear power plants until 2035 and on the decommissioning of five reactors.

## STRATEGY PURSUED

Its nuclear power is a low-carbon energy produced by Electrabel – a subsidiary of the Group – on the Doel and Tihange sites in Belgium. In 2022, with the war in Ukraine, the Belgian government sought to increase the country's security of supply. In 2023 it negotiated, with ENGIE, extending the life of the two most recent units to 2035, i.e. an electricity capacity of 2 GW extended for 10 years. This agreement is subject to the approval of the European Commission and the vote to modify legislation. So ENGIE is managing an ambitious plan to decommission five nuclear reactors (two of which have already stopped operating) and extend the life of two reactors. The nuclear activities transition plan stresses environmental aspects, the local economy and open communication, and commits to offering all employees short- and long-term prospects.

## + AGREEMENT

### Extending the lifespan of two nuclear reactors

The finalized agreement puts in place a legal structure for these two reactors, held in equal shares by the Belgian State and ENGIE. This ensures the long-term validity of the commitments made, notably through a Flexible Long-Term Operation (LTO) for investments of between €1.6 billion and €2 billion. This structure enables a balanced distribution of risks, with a Contracts for Difference mechanism and an operator incentive for good technical and financial performance from the facilities.

The parties have set a fixed amount of €15 billion for the future costs of treating nuclear waste from all the Group's nuclear facilities. The Group has offset this in its 2023 accounts with an amount in the order of €4.5 billion before tax, with no impact on the Group's medium term guidance. This extension, and the decommissioning work on the five other units will mean that about 4,000 direct and indirect jobs will be kept, and 200 people will be recruited.

**2,000**  
employees

**€0.6 bn**  
EBIT 2023

**4 GW**  
electricity  
production  
capacity

**5**  
reactors

# Making the transition to Net Zero Carbon a reality

As part of its Climate strategy, ENGIE is simultaneously activating various levers with one predominant objective: to accelerate the energy transition.

## Pursuing an ambitious decarbonization plan

To be Net Zero Carbon by 2045 on its three scopes, ENGIE has built an ambitious decarbonization trajectory, certified “well below 2°C” by 2030 by SBTi and rated NZ-2 by Moody’s with an ambition aligned with a 1.5°C trajectory and a solid level on the implementation of objectives.

This strategy focuses on reducing the Group’s greenhouse gas emissions by 2045, and offsetting residual emissions by the same date to keep them as low as possible. This strategy:

- covers scopes 1, 2 and 3 defined by the GHG Protocol, i.e. the direct and indirect emissions produced by the company, its subsidiaries and its value chain: suppliers, customers and companies in which ENGIE has a minority interest;
- sets the year 2045 as its target, which is a fairly short time frame for a company with a strong gas identity.

Beyond this ambition, ENGIE is contributing to a reduction in its customers’ emissions with a target of 45 Mt CO<sub>2</sub> eq. of avoided emissions targeted each year from 2030, without reducing the Group’s carbon footprint.

For its various targets, the Group is aiming for a total coal phase-out, accelerated development of its renewable electricity fleet, battery storage and conversion of infrastructure to renewable gas.

## Delivering ambitious climate targets

Succeeding in this trajectory requires taking action on the main sources of greenhouse gas emissions.

- Energy generation: this item includes electricity, heat and cooling produced by centralized units as well as at customer sites or on urban networks. The 2030 objective is not to exceed the target of 43 Mt CO<sub>2</sub>eq. for emissions linked to energy generation under Scopes 1 and 3.
- Gas sales to end customers: this involves a target of 52 Mt CO<sub>2</sub>eq. for 2030 emissions linked to gas sales to end customers.

As part of its “well below 2°C” SBTi certification in February 2023, ENGIE has made three additional commitments between now and 2030:

- reduce the carbon intensity of energy generation (scope 1) and energy consumption (scope 2) to less than 110 g CO<sub>2</sub>eq. per kWh;
- achieve carbon intensity of energy sales produced (scopes 1 and 3) and purchased (scope 3) of less than 153 g CO<sub>2</sub>eq. per kWh;
- ensure that other greenhouse gas emissions are below 85 Mt CO<sub>2</sub>eq., a target which includes scope 3 from procurement, capital goods and the upstream emissions of purchased fuels and electricity (scopes 3.1, 3.2, 3.3).

It should be noted that this initial reduction commitment goes beyond SBTi requirements, with a 66% reduction over the period from 2017-2030 instead of the 55% required by SBTi.

## Decarbonizing thermal assets

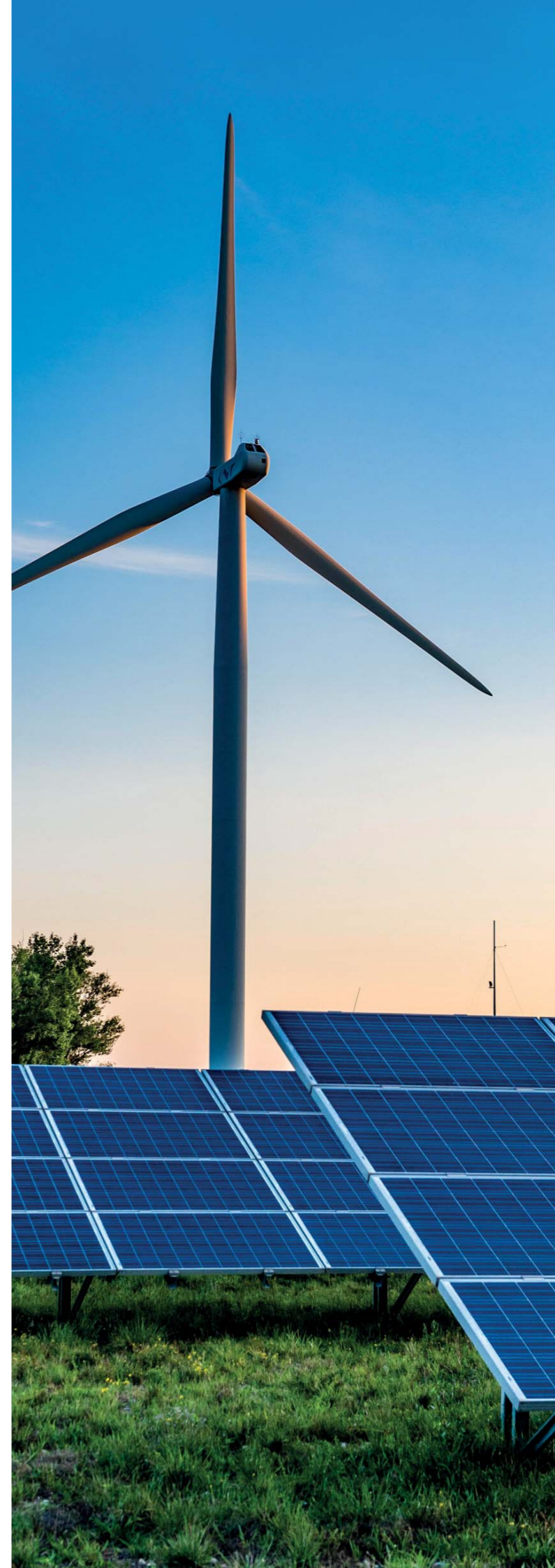
ENGIE’s trajectory has been assessed by Moody’s as 1.5°C-aligned with a solid level of implementation, while the SBTi has certified it “Well-below 2°C”. To be 1.5°C-aligned according to SBTi criteria would mean setting the target for the reduction in the carbon intensity of the Group’s energy generation at 78% vs. 66% for the 2017-2030 period. Achieving that ratio within such a short a timeframe would mean selling numerous thermal assets in Europe which, if closed, would jeopardize the security of the power system to which they are connected. These assets would therefore continue to emit greenhouse gases.

ENGIE has therefore chosen not to divest its European assets, while committing itself to decarbonizing them. To achieve this, ENGIE intends to use technologies such as biomethane, carbon capture and even hydrogen, for which the regulatory framework, particularly at the European level, is currently evolving, which will encourage the implementation of investments. However, it will take around 20 years to fully industrialize these technologies and achieve decarbonization by 2040-2045.



**Julia Maris**  
Vice President CSR

“All ENGIE employees have a role to play in the Group’s decarbonization trajectory. This is why ENGIE has equipped itself with various management tools, such as the CO<sub>2</sub> medium-term business plan (CO<sub>2</sub> MTBP), which since 2021, in line with the financial MTBP, makes it possible to manage CO<sub>2</sub> with annual CO<sub>2</sub> budgets for each business unit (GBU) until 2030. In addition, quarterly business reviews (QBR) facilitate the monitoring of greenhouse gas emissions during business reviews; CO<sub>2</sub> flexibility allows the available CO<sub>2</sub> budget for any new investment or sales contract to be continuously monitored; and strategic scenarios include region-specific carbon price lists for project developers. Compensation for senior executives also includes criteria relating to the achievement of annual decarbonization objectives.”



## + FIVE LEVERS FOR A SUCCESSFUL DECARBONIZATION PLAN

### 1. Coal phase-out

In 2015, ENGIE pledged not to develop any new coal projects. In 2021, the Group went a step further by setting a precise timeframe for phasing out coal. At the end of 2023, coal represented less than 3% of the Group’s centralized electricity production capacity. The total phase-out of coal is scheduled for 2025 in continental Europe and 2027 for the rest of the world.

### 2. Accelerating development of the renewable electricity production fleet

ENGIE’s target is to hold 58% of renewable electricity capacity by 2030 (compared with 41% in 2023). To deliver on this objective, the Group aims to achieve renewable electricity capacity of 50 GW in 2025 and 80 GW in 2030. It also intends to meet annual average targets for the commissioning of additional renewable capacity of about 4 GW per year in the 2022-2025 period and 6 GW per year in 2026-2030, which represents between €13 billion and €14 billion of investment by 2025.

### 3. Stepping up battery storage

To complement its production of electricity from gas and pumped storage, the Group intends to have, by 2030, about 10 GW of battery capacities, mainly in Europe and the United States.

### 4. Industrial development of renewable gases

Capable of being stored and distributed on demand, renewable gases contribute to the resilience of the energy system and are set to play an essential role in the energy transition. Thanks to the gradual greening of gas by the use of biomethane, renewable hydrogen and Carbon Capture, Utilization and Storage (CCUS) technologies for residual fossil gas.

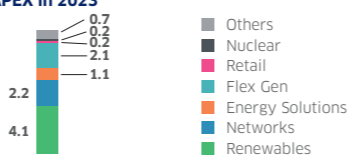

- **Biomethane**, a future industrial solution, makes (agricultural) farms more profitable, enables recycling of agricultural and food waste, and encourages local development, without exacerbating global warming. ENGIE would like to be producing 10 TWh from biomethane per year in Europe (5 TWh in France) by 2030 and to inject 50 TWh from biomethane into its networks in 2030 in France, which represents an investment of €2.5 billion.
- **Renewable hydrogen** is a promising technology in the process of being industrialized. Resulting from the electrolysis of water using renewable electricity, it does not emit greenhouse gases. It also offers the possibility of storing the electricity surplus in the form of hydrogen and possibly methane (after methanation), two gases which can be injected into infrastructure. By 2035, ENGIE aims to develop 4 GW of electrolysis capacity, and by 2030, to bring into operation 700 km of dedicated hydrogen networks, 50 hydrogen vehicle recharging facilities and 1 TWh of hydrogen storage capacity. ENGIE will invest approximately €4 billion over the period 2023-2030, €1 billion of which will be dedicated to hydrogen transmission and storage.

### 5. Reduction of methane emissions

Methane emissions from the Group’s gas infrastructures (transmission, distribution, storage and LNG terminals) linked to venting (planned and unplanned), flaring and fugitive emissions must fall by 30% compared with 2017, a year restated for the gas exploration and production business being conducted at the time. Although this target was met in 2022, it remains ambitious due to the reliability of these data as regards the Group’s international share and to the entry into force of the EU regulation on methane emissions.

# Dialog with local stakeholders

ENGIE maintains relationships of trust with all its stakeholders. The conditions for dialog that have been put in place provide a lasting structure for discussions and enable the Group to enrich its strategic thinking in order to accelerate the transition to a carbon neutral economy.

<p><b>CUSTOMERS</b></p> <p>Individual, professionals, companies and regional authorities</p>	<p><b>€82.6 bn</b></p> <p>OF REVENUES IN 2023</p>	<p><b>DIALOG PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Marketing / satisfaction studies / Net promoter score</li> <li>• Consumer panels</li> <li>• Responses to calls for tender</li> <li>• Co-construction</li> <li>• Mediation</li> </ul>
<p><b>SUPPLIERS</b></p>	<p><b>€49.7 bn</b> Purchases of raw materials and related network costs</p> <p><b>€7.3 bn</b> Purchases of services</p> <p><b>83,000</b> suppliers of which <b>263</b> preferred</p> <p><b>58%</b> of purchases excluding energy outside France</p>	<ul style="list-style-type: none"> <li>• Vigilance plan</li> <li>• Submission of tenders</li> <li>• CSR assessment by EcoVadis / audits</li> <li>• Business reviews by purchasing category</li> <li>• Supplier days</li> </ul>
<p><b>EMPLOYEES AND THEIR REPRESENTATIVES</b></p> <p>Employee representative bodies at the European, national and local levels</p>	<p><b>€8.1 bn</b> of personnel costs including <b>€1.6 bn</b> employer social security contribution</p> <p><b>97,297</b> employees</p> <p><b>16,195</b> recruitments</p> <p><b>8.5%</b> apprentices in France</p> <p><b>86.1%</b> of employees trained</p>	<ul style="list-style-type: none"> <li>• European Works Council (EWC)</li> <li>• French Group Works Council</li> <li>• Local representative bodies</li> <li>• The World Forum</li> <li>• ENGIE &amp; ME commitment survey</li> <li>• Biannual "Link" employee shareholding plan</li> </ul>
<p><b>REGIONS</b></p> <p>International, European and national authorities and bodies</p>	<p><b>€3.6 bn</b> Income tax and operational taxes</p> <p><b>2.25 M</b> of jobs supported worldwide in 2022</p> <p><b>66%</b> of activities covered by an environmental plan established with stakeholders</p>	<ul style="list-style-type: none"> <li>• Participation in think tanks</li> <li>• Consultations</li> <li>• Partnerships</li> <li>• Corporate patronage</li> </ul>
<p><b>INDUSTRIAL PARTNERS</b></p>	<p><b>€4.9 bn</b> amortization linked to investments</p> <p><b>€10.6 bn in CAPEX in 2023</b></p> 	<ul style="list-style-type: none"> <li>• Calls for innovative projects</li> <li>• Support via the New Ventures investment fund</li> <li>• Vigilance plan</li> <li>• Submission of tenders</li> </ul>
<p><b>FINANCIAL PARTNERS</b></p> <p>Banks, insurance companies, socially responsible investments, financial analysts, ratings agency</p>	<p><b>€2.1 bn</b> Net financial income</p> <p><b>€46.5 bn</b> Net economic debt</p> <p><b>3.1X</b> Net economic debt / EBITDA</p>	<ul style="list-style-type: none"> <li>• Roadshows</li> <li>• Interviews</li> <li>• Capital Market Day</li> <li>• Responses to evaluation questionnaires</li> </ul>
<p><b>SHAREHOLDERS</b></p>	<p><b>€3.5 bn</b> dividend for 2023: €1.43 / share</p> <p><b>Shareholder structure at 31/12/2023</b></p> 	<ul style="list-style-type: none"> <li>• Shareholders' Club</li> <li>• Events (visits to Group sites)</li> <li>• Meetings (face-to-face and online)</li> <li>• Annual General Shareholders' Meeting</li> <li>• Employee shareholding plan</li> </ul>
<p><b>CIVIL SOCIETY</b></p> <p>NGOs, associations, residents, communities, professional organizations, academic institutions</p>	<p><b>49%</b> of industrial activities, including the Group's development projects and sites undergoing decommissioning with a societal plan for consultation with stakeholders</p>	<ul style="list-style-type: none"> <li>• Informal meetings</li> <li>• Meetings and consultations</li> <li>• Partnerships</li> <li>• General public information meeting</li> <li>• Dissemination of information on major projects</li> <li>• Stakeholders' Committee</li> </ul>

**SUPPLIERS**

**ENGIE Supplier Day**

Following on from the Supplier Day event launched in 2022, ENGIE has renewed this approach at the regional level with an event targeting the supplier ecosystem in Romania. On September 14, 2023, ENGIE brought together around 100 suppliers with the aim of sharing its strategic road map and rallying them around their decarbonization approach. Through the contributions of ENGIE Romania and suppliers, the need to step up the development of decarbonized solutions and invest in renewable energy was highlighted as a challenge of the energy transition that needs to be faced collectively.

**CUSTOMERS**

**ENGIE4Decarbonization**



ENGIE for Decarbonization

After Paris in 2022, the ENGIE4Decarbonization event was held in Abu Dhabi in March 2023. ENGIE has been operating in the Middle East for 30 years, which allowed the Group to bring together 236 customers for a serious discussion on the transformations needed to follow a decarbonization trajectory. E4 presented 10 key decarbonization challenges faced by its customers, offering them the opportunity to move beyond the status quo in order to understand the role of decarbonization and ENGIE's solutions to ultimately reduce their impact.

**CIVIL SOCIETY**

**48 hours for the climate**



September 20 and 21, 2023, ENGIE Solutions organized an innovative challenge throughout France: a large-scale volunteer mobilization of employees and stakeholders.

The objective was to raise awareness of climate change by organizing Climate Fresco Workshops and identifying solutions to the urgent challenge of climate change.

The turnout was impressive: 8,000 people (2,900 employees, 2,800 customers, 300 suppliers, 2,000 students and 250 organizers) came together to take on the challenge, and 400 climate frescoes were created.

**EMPLOYEES AND THEIR REPRESENTATIVES**

**Second World Forum**

ENGIE held its second annual global forum on October 4, 2023 in the presence of Catherine MacGregor, Chief Executive Officer. This global forum is a place for social dialog at the international level. It monitors the implementation of the global social agreement on fundamental rights signed in January 2022. The discussions focused on the Group's social responsibility strategy, in particular the ENGIE Care and ENGIE One Safety programs, the vigilance plan and whistleblower reports.

# Four questions for our stakeholders

ENGIE has given the floor to some of its stakeholders to illustrate the content of the discussions it holds on an ongoing basis so as to continuously improve its relationships.

**Emmanuelle Le Guern,**  
Industrial Sales Development Manager, BWT

**What is the nature, content and history of your interactions with ENGIE?**

BWT has been a supplier to ENGIE for many years in the field of water treatment.

We manufacture equipment and products for industrial water treatment, covering the entire water cycle within the plant, with a service offering for maintenance and technical support for all sectors, and a nationwide presence.

We have been bound by a European framework contract since at least 2012, governing the supply of water treatment products, services and basic equipment. As far as possible, we try to offer and implement our innovations with ENGIE to increase added value for end customers. These areas of improvement and innovation should allow end customers to save on water, energy and chemicals, and limit their impact on the environment by offering “greener” solutions.

**Jérémy Assayag,**  
Head of Energy Purchasing, Arkema

**In your interactions with ENGIE, what strengths would you highlight?**

Responsiveness, professionalism and creativity. We work with transparency and trust.

**Conversely, what needs to be improved? Why? And by when?**

Arkema is a global industrial group. We need a partner who can support us in every region of the world. ENGIE is strong in France, but needs to strengthen its position internationally.

**Didier Gouye,**  
Senior Key Account Manager,  
Veolia Water Technologies & Solutions

**In a context where socio-environmental impacts are becoming increasingly important, would you say that your relationship with ENGIE has changed? If so, in what way?**

It has indeed changed, firstly from supplier to partner, as our respective operational teams have worked together in a more committed, open and therefore more effective way. Secondly, ENGIE’s strategic priorities and the significant rotation of its assets during this period led to the redeployment of business flows, which redrew the mapping and content of our interactions, which required us to adapt. Finally, it should be noted that the acceleration of the consideration of environmental issues linked to climate change, the use of resources, our dependence on energy, the acceptability of industrial and regional projects, and changes in our approach to work, partly due to the Covid crisis, have impacted and guided the evolution of our relationships, the quality of the solutions and services offered, and our prospects for innovation.

**Florence Clap,**  
Program Officer Biodiversity Policies,  
IUCN French Committee (International Union  
for Conservation of Nature)

**In your interactions with ENGIE, what strengths would you highlight?**

ENGIE is a group that listens to its partners and the steady challenges we offer. The creation of a biodiversity / nature network, bringing together employees from across the Group in France and abroad who are working on this subject, is an important element that allows employees to share their experiences and roll out biodiversity initiatives. Thanks to the voluntary biodiversity actions taken, this proactive approach will allow the Group to respond more easily and robustly to new European regulatory requirements such as the CSRD.

“ Over the past year or so, we have seen an increase in the number of specific requests from ENGIE’s Central Purchasing Departments concerning decarbonization, the life cycle of our products, etc. This is very positive, and even ahead of many other companies with regard to this subject.

**Emmanuelle Le Guern,**  
Industrial Sales  
Development  
Manager, BWT



“ The relationship between Arkema and ENGIE became stronger when we had to switch from words to actions. ENGIE has helped us both carry out our projects and build our decarbonization roadmap.

**Jérémy Assayag,**  
Head of Energy  
Purchasing, Arkema



“ I think we’ve established a calm, constructive relationship based on stability and reliability. Communication is well organized at all levels, and well-managed digital tools help us to react and anticipate operational drifts and their financial consequences more quickly.”

**Didier Gouye,**  
Senior Key Account Manager,  
Veolia Water Technologies  
& Solutions



“ The coercive landscape of environmental and biodiversity preservation at the both national and European level has gained traction in recent years. Similarly, the global framework for biodiversity is more ambitious.”

**Florence Clap,**  
Program Officer Biodiversity  
Policies, IUCN French  
Committee



**+ FOR FURTHER INFORMATION**

Read the full interviews on our website [engie.com](https://www.engie.com)



# A low-carbon strategy tailored to every B2B customer profile

ENGIE has many solutions which will reduce its customers' annual CO<sub>2</sub> emissions by 2030 by 45 million tonnes. The Group supports cities, and industrial and service groups, building tailor-made decarbonization pathways.

## Innovative solutions for industrial groups

### Waste Heat Recovery from a cement plant

ENGIE Solutions has designed, financed, built and managed the operations of an innovative 10 MW Waste Heat Recovery (WHR) system for the cement plant of the Holcim group on the Fujairah site in the United Arab Emirates. The solution, which was commissioned at the end of 2023, is based on the ORC<sup>(1)</sup> technology and a Build Own Operate Transfer<sup>(2)</sup> contract, a first for the cement production sector in the region. This model guarantees increased energy efficiency, reliability and resilience, with no investment in capital on the part of the customer or need for additional staff. Based on a closed-loop thermodynamic cycle, the ORC system will help Holcim to cut annual emissions by 29 kilotonnes of CO<sub>2</sub>, i.e. 28% of emissions linked to electricity.

### Decarbonization by injecting waste heat back into the production circuit of a fermentation plant

In November 2022, ENGIE Solutions and Lesaffre, a global fermentation group, signed a 15-year partnership for the design, financing, production, operation and maintenance of a waste heat recovery unit at the heart of its largest yeast plant, on its historical Marcq-en-Barœul site. The heat, created by the fermentation activity, will be re-used thanks to the installation of two high-power heat pumps which will be commissioned in 2025. Lesaffre will thus be able to cover 70% of its heat needs and cut its annual CO<sub>2</sub> emissions by about 30,000 T and reduce its water consumption by 150,000 m<sup>3</sup> per year. This visionary project has been recognized by ADEME in its call for decarbonization projects.

## Large-scale energy renovation programs for cities

On September 12, 2023, the city of Florence launched a large energy renovation program for its main buildings, in partnership with ENGIE. The emblematic Palazzo Vecchio, which serves as both a town hall and a world-famous museum, 152 schools, museums and 274 other buildings in the city (cultural buildings, offices, retirement homes, homes and sports facilities) will be renovated with a view to reducing their energy consumption and producing environmental, economic and social benefits for the whole city. Over 3,000 interior lights will be replaced by LED technology and photovoltaic systems will be installed on several sites. These energy efficiency measures will save 30% in thermal energy consumption and 23% in electrical energy consumption. In total, some 50,000 T of CO<sub>2</sub> emissions will be prevented.

## Sustainable mobility solutions for the service sector

Keen to promote the energy transition and the transformation of mobility, B&B HOTELS has chosen ENGIE Vianeo to provide charging stations for electric vehicles in all its hotels in France. By 2024, 4,200 charging points, supplied with renewable electricity, will be available in over 340 hotels, i.e. 20% of parking spaces equipped with electric vehicle charging points. The charging points are often located in the immediate vicinity of major roads and will be accessible to the establishments' customers and to users of electric vehicles passing through. In order to cater for the diversity of uses of electric vehicles, ENGIE Vianeo has proposed the installation of 3,600 charging points with a power rating of 22 kW and 600 higher power (300 kW) points.

## 25 MT CO<sub>2</sub> EQ. AVOIDED BY OUR CUSTOMERS

With 25 Mt CO<sub>2</sub> eq. avoided by its customers in 2023, ENGIE is maintaining its performance, albeit with changes in emission factors. It has now reached 55% of its 2030 target of avoiding 45 Mt CO<sub>2</sub> eq. each year. In 2024, the method of accounting for these avoided emissions will change to comply with the recommendations published by the WBCSD<sup>(3)</sup>. This will include a review of the scope of the products/services covered by this indicator, as well as a more detailed assessment of the calculation of avoided emissions with, for example, a marked-based approach for calculating the impact of electricity sales.

## + EXAMPLE

### Providing Microsoft with 24-7 renewable energy supply

In 2023 ENGIE and Microsoft concluded an innovative agreement with a view to supplying renewable energy to cover the consumption of data centers managed by Microsoft in Texas. This is building on the Corporate Power Purchase Agreements (CPPAs) linking the two companies since 2019. Microsoft has a 100 / 100 / 0 target: this involves 100% of electricity consumption, 100% of the time, being covered by carbon-free energy by 2030. For ENGIE, the challenge is to develop on key markets, such as that of Microsoft, carbon-free electricity exchange programs, 24 hours a day, 7 days a week, with electricity produced from carbon-free energy sources, particularly wind and solar power.

# Suppliers, essential players in decarbonization

ENGIE is mobilizing its suppliers with a view to reducing their carbon footprint and their impact on the environment, while committing to a more inclusive economy and going beyond strict regulatory obligations.

## Reducing the carbon footprint of its purchases

ENGIE has set itself the target of having 100% of its 250 top preferential suppliers (excluding energy suppliers) certified or aligned with Science Based Targets by 2030. But this call for decarbonization is not limited to these 250 largest suppliers, all are invited to make progress.

The Group, which is glad to have French SMEs on its panel of suppliers, and aware of how difficult it is for an SME to allocate resources to this kind of action, is supporting them through two initiatives. Firstly, via the Alliance for the Decarbonization of SMEs, headed by Pacte PME and alongside seven other large French groups, and secondly, in a direct partnership with ADEME and BpiFrance. These two operations aim to support SME suppliers in their decarbonization, giving them access to simple and effective solutions, at moderate costs. They will thus be able to produce greenhouse gas statements, build transition plans and showcase their commitment to their stakeholders.

## Controlling the impact of its procurement on nature

ENGIE has committed to analyzing the impacts and dependencies of its industrial activities in relation to biodiversity on the whole of its value chain. With this in mind, it is looking to identify the most critical upstream chains in the area of impact on nature, in order to commit, with suppliers, to an action plan to mitigate impacts.

To achieve this, the Group has integrated the biodiversity criteria into Life Cycle Analyses (LCAs) of its projects, so as to better identify the stages which have an impact on ecosystems. These analyses are compared with the work carried out in 2022 as part of the Science Based Targets for Nature (SBTN) pilot project, with the use of the ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) database and with the implementation of the LEAP (Locate, Evaluate, Assess and Prepare) method to ensure that results obtained, which will be used to draw up an action plan, are based on science.



## Controlling the human impact of its procurement

Since 2022, the Group has had an inclusive procurement policy in France to benefit businesses which employ people with disabilities (Protected and Adapted Work Sector) and people who have been unemployed long-term (Integration through Employment). In parallel, the other countries where the Group has a presence decide their own initiatives in the area of inclusive procurement. Nine countries have already completed this work: United States, Australia, South Africa, Peru, Mexico, Brazil, Romania, Spain and Saudi Arabia.

In France, ENGIE is part of a group dedicated to inclusive procurement, within the Collective of businesses for a more inclusive economy. The group includes 39 large French companies which are committed to a more inclusive economy. These companies have made the commitment to collectively increase, by 30% by 2025, the amount of purchases from sectors employing people with disabilities and the long-term unemployed. More generally, the Group intends to use its influence on its suppliers to encourage them to make progress on CSR. This includes increasing the weighting of CSR criteria in the competitive tendering process (up to 15% of the overall decision),

a contractual commitment from suppliers, and the development of a network of ambassadors within the Procurement teams in order to spread good practice.

In parallel with this, ENGIE is working on compliance with regulations and vigilance in the area of human rights and environmental risks. Since September 2023, the Procurement Department has had a Due Diligence tool to strengthen ethics and better monitor UBOs (Ultimate Beneficial Owners). Provided by the Altarea company, IndueD combines Dun & Bradstreet data to identify suppliers with Dow Jones data to research the shareholding and governing bodies. IndueD then sorts and selects the natural persons likely to be the effective beneficiaries of the supplier. This enables a check on whether UBOs comply with sanctions lists and embargo policies. The tool suggests an ethical rating for the supplier which the Procurement Department can combine with the CSR rating provided by EcoVadis to set a risk level. As part of WindEurope, the advocacy group which promotes the use of wind power in Europe, the Group has decided to join the sector-based initiative proposed by EcoVadis. It is a platform for players in the wind power industry, which enables the sharing of good practice, improved transparency of the supply chain and, therefore, a reduction of CSR risks.

(1) Organic Rankine Cycle  
 (2) Energy as a service  
 (3) World Business Council for Sustainable Development: Guidance on Avoided Emissions (wbcso.org)

# Increasing involvement of employees in the Group’s transformation

In order to provide the best support to its teams during the energy transition and to lead a just transition under the right conditions, ENGIE has introduced a pro-active and ambitious human resources policy.

## Aligning management of resources and company strategy

For ENGIE, the development of tomorrow’s resources must combine **three prerequisites for success**: the capacity to **attract** and **retain** the skills the Group needs to implement the energy transition, the capacity to support this talent and **maintain its employability** in a fast-changing environment, and the capacity to **foster its commitment**. That is why ENGIE, which has made the just transition one of its objectives, intends to offer its employees a safe and fulfilling work environment, tailor-made career paths and unique development opportunities.

A project was set up in 2023 to **anticipate the Group’s needs over a 3-5 year period** in terms of resources and skills, so it can execute its strategy and maintain its competitive advantage. The challenge is two-fold: **to anticipate the skills** which ENGIE will need in future and to build action plans in the area of **recruitment**, retention, training and **career development**. The needs analysis carried out on the four GBU in 2023 has shown the need to recruit and train project managers and business developers to support the development of the Group’s business model. Likewise, growth drivers like batteries, hydrogen and biomethane require **specific resources**, hence the importance of identifying the key skills needed and having an effective training policy. Every GBU has committed to building a **skills development plan** so that these challenges can be faced, and evolving needs can be anticipated as much as possible.

## DEVELOPMENT POLICY

- Focusing people reviews on securing succession plans
- Strengthening the development programs of future Group leaders around the new ENGIE Ways of Leading leadership model
- Rolling out the Talent Management strategy

## MOBILITY POLICY

- Strengthening the international mobility policy
- Improving employee employability and encouraging staff to build their own career paths

## DIVERSITY POLICY

- Promoting diversity, equity and inclusion on a global scale with the launch of Be.U@ENGIE.

## LEARNING POLICY

- Training for 100% of employees every year by 2030

## Investing in training and developing skills

In order to successfully implement its strategy to 2045, ENGIE has set itself the target of training 100% of its employees every year to 2030.

In order to achieve this, various initiatives have been developed:

- introduction of a Learning Management System (LMS) at Group level, to improve access to training and optimize management of training plans;
- introduction of academies of professions by the GBU, procurement and HR in partnership with ENGIE University which has, for example, created new tailor-made training programs to meet tomorrow’s skills needs in professions of the future such as hydrogen, renewable gases and energy storage batteries;
- rollout from the end of 2023 of a training path for all Group managers, focused on strengthening their skills;
- introduction of the ONE ENGIE Onboarding Path accessible in 11 languages;
- organization of learning & development events, bringing together hundreds of people throughout the year;
- **Temporary campuses** –U.camp– in France and abroad, (H2 Days, BESS Days, Decarb’Week, Regional Learning Days).

## Making inclusion a reality

ENGIE puts diversity, professional equality and inclusion at the heart of its strategy, recognizing these principles as **essential catalysts for innovation and performance**. In 2023, its ongoing commitment to diversity was reflected in the rollout of initiatives to encourage inclusivity in

teams. Initial results point to a significant increase in the recruitment of female managers, with a rise of over 5 points to 35.6% in 2023, compared with 30.5% in 2022.

The promotion of diversity in the workplace was also highlighted through the ENGIE Awards, an event aiming to showcase and share best practice in the area. In 2023, the Grand Prix was awarded in Peru, drawing attention to the innovative project BECAS ENGIE: + Mujeres en Energia. This project, which aims to increase women’s involvement in the energy sector, received the prestigious Be.U@ENGIE prize, thus illustrating ENGIE’s concrete commitment to diversity and inclusion.

A project to **overhaul the talent development strategy was also launched in 2023**. Built on inclusiveness, it aims, thanks to the potential and commitment of each person, to guarantee the Group’s collective performance and strengthen its leading position in the zero-carbon transition, while offering diverse career opportunities. With over 16,000 staff recruited in 2023, and 8.5% work-study students, ENGIE continues to transform and adapt its human resources policy in close collaboration with its employees, thus strengthening its commitment to the professional development and fulfillment of its teams.

# ENGIE One Safety, at the heart of the Group’s health and safety transformation

In order to eradicate, over the long term, serious and fatal accidents, in 2023 ENGIE rolled out its ENGIE One Safety transformation plan. Its key objective is to modify the health and safety culture of everyone working for the Group.

ENGIE is determined to prevent serious and fatal accidents suffered by everyone – employees, subcontractors or temporary workers – who contributes to the company’s success. In order to meet this objective, “ENGIE One Safety” has several initiatives, such as the introduction of **Safety Essentials**, the rollout of new training aimed at **all managers** and the implementation of a new **internal audit** process focused on the prevention of the most serious accidents.

## Respecting Safety Essentials under all circumstances

During the world day for Safety and Health at Work, in April 2023, the Group revisited the **five key behaviors** which everyone subject to accident risks must apply under all circumstances, whatever their activity. These behaviors constitute ENGIE’s **Safety Essentials** They are summarized in a pocket booklet, which can easily be referred to in the field. A mandatory Group safety training, entitled ENGIE One Safety Induction that aims to **embed** these Safety Essentials **into daily practices** has been rolled out as an e-learning course for all the Group’s employees. Furthermore, the implementation of the **Life-Saving Rules** (LSRs) has been strengthened by the publication of a Group Rule that specifies what is expected from operators and managers in this area.

## + Five essentials for increased safety

- **Complying with the Life Saving Rules**
- **The Minute that Saves before starting any activity**
- **Stop the Work in the event of doubts about safety**
- **Shared Vigilance which involves also paying attention to the safety of people working in the same environment.**
- **The identification and handling of incidents which could lead to a serious accident (“HiPo” events)**

A Group standard complements the initiative, with details for each LSR of the practical action to be taken, including **feedback from serious and fatal accidents** suffered at ENGIE in the past.

## Improving the efficiency of managers in the field

The presence of managers in the field, along with the appropriate messages and behaviors, are essential in order to have prudent behaviors adopted by operators, employees, subcontractors and temporary workers when facing risks. That is why, in order to ensure that the expected behaviors are applied, the Group has defined new **management rituals for safety**, based on the prevention of serious and fatal accidents, including different types of safety visits. Likewise, with a view to making the introduction of these rituals efficient, ENGIE has organized **new training** in two phases for all managers:

- a classic training phase reviewing the context, the rituals to develop and the keys to understanding how people behave when faced with the major risks;
- **an original coaching phase** deployed in a real-life situation, with an operator in the field for months.

## Having an accurate vision of safety conditions in the field

In order to monitor the introduction, by teams in the field, of the rules aimed at preventing serious and fatal accidents, the Group has set up a **new procedure for internal audits** focused on the management of major risks. What is the objective? To identify **areas for improvement** and to establish **corrective recommendations**, followed by an action plan created by the entity concerned. These audits will also help detect the strengths to be shared with other Group entities. ENGIE has created a pool of about 60 auditors to carry out these **five day audits**. The auditors have proven expertise in the area of health and safety and are from various operating entities.

## “ENGIE ONE SAFETY CULTURE,” AN INNOVATIVE PROGRAM TO TRANSFORM THE HEALTH AND SAFETY CULTURE OF MANAGERS

“After a phase to prepare for the rollout of the training, a workshop to “accelerate values” is held by each entity. This workshop involving the entity’s management team helps to identify the prerequisites for success and to draw up a specific action plan for program rollout within the entity. Every manager then has training to develop their leadership in health and safety, focused on the five safety management rituals rolled out by the Group. After this classroom training, the managers are invited to put into practice, in the field, the safety visit procedures they have been taught. They are accompanied in this phase by a specifically trained trainer / coach who ensures that the methods and behaviors applied comply with expectations. This shadowing phase is structured into several coaching sessions and lasts several months in order to embed the behavioral practices learned for the long term.”



**Marie-Véronique Deydier**  
Project manager for ENGIE One Safety Culture management training

# A just transition plan to meet the challenges of the energy transition

In order to limit the impacts on its stakeholders caused by the transition toward a Net Zero Carbon economy, ENGIE has drawn up a just transition plan based on four main areas. This ties in with the Group's purpose and with its commitments.

ENGIE is fully on board with the objectives of the Paris Agreement on the climate adopted in 2015, which mentions the "imperatives of a just transition for the working population and the creation of decent and quality jobs complying with the development priorities set at national level." So the Group's just transition plan and policy include the expectations of the Paris Agreement, and also the recommendations of the International Labor Organization (ILO) on the same subject. The just transition plan was presented and challenged during the Group's stakeholders' committee in November 2022, the monitoring indicators of which are presented below.



## THE JUST TRANSITION PLAN



### 1 Customers

In 2023 ENGIE continued its policy of supporting its customers both in terms of **access to energy** and **management of their consumption**. For the retail markets where the Group has a presence, ENGIE has supported 1,053,000 retail customers facing fuel poverty, either through mechanisms decided by public authorities (social tariff, energy check, staggering of payments etc.), or through initiatives to help with the management of energy consumption. ENGIE's offers also focus on decentralized production solutions which enable self-consumption.

For companies, ENGIE continues to develop Power Purchase Agreements or PPAs (2.7 GW versus 2.0 GW in 2022) as well as energy performance contracts. With satisfaction rates ranging from 69% to 86% for individuals, depending on the country managed by One Retail, and 84% for businesses, the vast majority of customers are satisfied with ENGIE's offers and services.

Thanks to the combined actions of Energy Access, Energy Assistance and the ENGIE Foundation, 2,464,297 new homes worldwide benefited from access to energy (2,499,968 in 2022).

### 2 Regions

Customers, employees, suppliers and all other stakeholders of ENGIE are committed actors in their regions. Whatever the country, ENGIE is keen to **form partnerships**, maintain quality relationships and in this way be a **recognized economic actor**. To this effect, the previous global study of the Group's social and economic footprint was updated in 2023. The update aims to highlight not just the contribution of ENGIE to the GDP in the various countries where it has a geographical presence, but also the number of direct and indirect jobs supported. With 97,297 employees of the Group worldwide (against 96,454 in 2022), and €5.06 billion in taxes and duties paid (compared with €6.6 billion in 2022), ENGIE is a leading player and has supported 2,250,818 jobs in 2022.

In order to fully contribute to the long-term development of regions, the Group has set itself a target of a rate of **activities covered by a societal plan** and an environmental plan for dialog with stakeholders (49% and 66% in 2023 and 46% and 53% in 2022) and is developing its **TED** (Sustainable Energy Transition) label. Launched in 2022, it currently covers seven countries and certifies the method employed by ENGIE to implement renewable energy projects in dialog with regional stakeholders.

### 3 Employees

Aware that the just transition will be achieved first and foremost by its employees, ENGIE is strongly committed to **high quality management-employee dialog**. Proof of this is the global agreement on fundamental social rights and social responsibility renewed in 2022 with international trade union federations ISP, IndustriAll Global Union and IBB. In 2023, the roll-out of the social protection section of this ENGIE Care agreement had reached 90.7% of employees for maternity, 62.3% of employees for paternity, 87% of employees for disability, 97.2% of employees for death and 98.6% of employees for hospitalization. This agreement is complemented by others at international, European and national levels, such as the global agreement on health and safety which is a worldwide priority for the Group so that every employee can be sure of benefiting from the best working conditions.

The energy transition is a long process which requires **new expertise**, so ENGIE aims to train 100% of its employees every year by 2025. It managed 86.1% in 2023, compared with 83.8% in 2022. No less than 2,328,349 hours of training were provided (2,126,584 in 2022) worldwide, opening up development prospects for several employees (mobility including 29.3% of new permanent-contract hires in 2023 compared with 20.4% in 2022). In the shorter-term, employees impacted by sites which have closed or been converted are systematically **offered a solution** (internal transfer, training, external transfer, help with personal plans). 100% of the entities affected by reorganizations have defined and proposed social support measures.

Every site conversion project is subject to dialog and, depending on the legal regulations in force in the country, negotiations with staff representatives.

The just transition also covers diversity and inclusion, areas in which the Group launched a global policy in 2022, BeU@ENGIE. ENGIE aims to increase the share of women in management, reduce the pay gap between men and women, and to improve disabled people's access to the company's professions.

### 4 Suppliers

ENGIE's procurement policy is based on a **charter** which specifies expectations regarding suppliers in terms of health and safety, ethics, respect of embargoes, anti-corruption, and social responsibility. ENGIE has EcoVadis assess its key suppliers, of which there are about 1,500, on the following four themes: environment, human rights, workers' rights, and ethics and sustainable procurement. The target is a **minimum score of 45 out of 100**, i.e. a managed CSR risk, according to the **EcoVadis** framework. In 2022, 24% of suppliers assessed had a score above 45, compared with 43% in 2023, and the Group's target is to have 100% of its key suppliers with a score of above 45 out of 100 in 2030. ENGIE has also set itself an index target of 100 in 2030 in terms of **responsible procurement** with a score of 54% in 2023 (compared with 38 in 2022). Finally, ENGIE also supports its suppliers in their decarbonization and is aiming for 100% of its 250 preferred suppliers to be SBT certified in 2030 (compared with 23% in 2022 and 24% in 2023).

## TOWARD A EUROPEAN AGREEMENT ON THE JUST TRANSITION IN THE GAS SECTOR

The European Commission has set up sectoral committees to encourage dialog between employers and unions at the European level. The body for the gas sector meets three to four times a year with representatives from Eurogas, the European association of gas companies, from the Union Federation of Public Service Unions (EPSU) and IndustriAll (industry) and from the directorates-general of the European Commission. Since the gas sector is particularly impacted by the European Green Pact, the gas sector dialog committee commissioned a study over two years entitled "Challenges and opportunities for employment in the gas sector in the context of the European Energy Transition: ensuring a just transition for workers." Following the presentation of the results of this study in January 2023, employers and unions decided to start talks in July 2023 on the just transition in the gas sector, covering the subjects of anticipating expertise, the professional transition, training, management-employee dialog, and diversity. This agreement is expected to be concluded in 2024. ENGIE is heavily involved by chairing the Eurogas Task Force in charge of the negotiations, but also through the presence of several of its employees alongside the trade union federations.

# The zero-carbon transition is coming to life in the regions

ENGIE supports the regions in their decarbonization policies, exploiting renewable local energy resources. This policy is necessary in order to reach Net Zero Carbon by 2045, and it also encourages the economic development of regions with real benefits in terms of attractiveness, jobs and the creation of industrial and regional ecosystems.

## Combining decarbonization and economic opportunities

In order to decarbonize regions and contribute to the rise in renewable energies such as wind and solar power, green gases, geothermal and ocean thermal heating, more dedicated infrastructure is needed. These production units favor the development of the local economy, **help create jobs and make regions more attractive**. In order to accelerate the energy transition of regions, ENGIE places all its expertise, investment capacity and customer support policies at the service of decarbonization of these regions, actively supporting the zero-carbon transition. To achieve this transition, it is committed to developing different energies. With biomethane, produced from local resources, and renewable hydrogen, ENGIE has two interesting energies at its disposal, since both are backed by the development of industrial ecosystems and the roll-out of partnerships with local players. Likewise, urban heating and cooling networks constitute significant levers for decarbonization. The Group designs, installs, operates and maintains cutting-edge energy networks on several continents. It adapts to regional peculiarities and supplies urban heating and cooling networks with energy in line with their potential, thus encouraging the recovery of waste energies (waste heat, wastewater, Energy Recovery Units), local energies (aquathermal, geothermal, solar etc.) and renewables (biomass, biomethane).

## Repowering, an approach that is set to grow

ENGIE already has reliable solutions to make the energy transition a reality in communities. For example, the Group implements repowering, which consists of replacing old wind turbines (which have an average lifespan of 25 years) with better-performing models. This approach **increases production of assets without taking up additional land**.

In fact it uses less. It is sustainable and contributes to ENGIE's road map to producing 80 GW of renewable energy in 2030 (compared with 41.4 GW today). In the short term, the re-powering market is set to register very strong growth, especially in Europe. The approach is also expected to **be used soon on** photovoltaic solar panels. There were two success stories in this regard in 2023:

- **On September 20, 2023, ENGIE inaugurated the Karstädt-Waterloo (France) repowered wind farm.** After 20 years of operation, 20 wind turbines were decommissioned and placed by seven new turbines. Thanks to this measure, the Group has increased the installed capacity of the wind farm (from 26 MW to 43.4 MW) which now produces four times more energy on the same surface area as before, about 110 million kWh a year.
- Likewise, **the recycling of the Plouarzel (France) wind farm**, which started in 2018 with the municipality, highlights the regions' attachment to wind power. Commissioned in 2000, the Plouarzel 1 wind farm was one of the first in Brittany. Four new wind turbines were installed there (Plouarzel 2) in 2007 for a total installed power of 7.7 MW.

## The recovery of waste heat, a technique registering strong growth

Several initiatives involving the recovery of waste heat were rolled out in 2023:

- **ENGIE Solutions has been operating the renewable heating network of Rungis (France) Market since 2019 and the RIVED Energy Recovery Plant (ERP)<sup>(1)</sup> since 2022**, via its subsidiary Valorgis. This heating network, 99% supplied by renewable energy (its own Energy Recovery Unit), is a benchmark in the area of the circular economy, installed in the heart of Rungis International Market. The ERU recovers an average of 113,000 tonnes of waste per year in renewable heat. The recovered waste provides the equivalent of 45,000 homes

with large-scale decarbonized heating and hot water through various heating networks.

- **Town heating network in Aoste (Italy) designed, built and operated by ENGIE.** It uses the waste heat produced by a neighboring steel plant. It is one of the most innovative systems in the country
- **Amiens Énergies, the first energy SEMOP<sup>(2)</sup> in France, has started a new greening operation, extending the town's heating network.** In March 2023 it signed a contract to create, by 2025, a second biomass boiler, and 25 km of virtuous networks, which will benefit the equivalent of 9,000 additional homes. For five years the Amiens heating network has been based on a diversified mix of local, waste heat and renewable energies. The rate of renewable and recovered energies will increase from 60% to 72% in 2025. Eventually, the equivalent of 26,800 homes in Amiens will benefit from this heat, most of which is local and renewable.

## First airport applications for hydrogen

On December 4, 2023, **HYPOR** inaugurated Europe's first **green hydrogen production and transmission station** in an airport zone, at Toulouse-Blagnac airport. HYPOR is 51% held by ENGIE Solutions and 49% by the Occitanie regional energy and climate agency. The station has been designed to facilitate the use of green hydrogen (hydrogen produced by electrolysis using electricity from renewable energies) by all regional players. It is appropriate for mobility, logistics and industrial uses. HYPOR produces green hydrogen used in hydrogen buses that transport its passengers. The HYPOR station is the result of the mobilization of all the industrial and institutional regional and national players committed to the energy transition. All of HYPOR's partnerships were with Occitan industrial groups embedded in the region, encouraging

other actors in the economy to convert their fleet to this major alternative fuel, hydrogen. This hub consists of two green hydrogen distribution stations, and an import-export zone for hydrogen in order to supply actors external to the airport and so that HYPOR itself can also receive hydrogen.

## The TED label continues to be rolled out

Launched in 2022, jointly designed with Bureau Veritas, TED<sup>(3)</sup> is a label which certifies the integrity of ENGIE's approach to its renewable energy development projects. The Group would like to extend TED to all regions in which the Group develops, builds and operates solar and onshore wind projects. So far, seven countries have been audited and certified: France, Belgium, Chile, Spain, Italy, the United States, and Canada. Others will follow. These certified countries

rigorously implement the commitments stipulated by ENGIE, from the design to the decommissioning of a wind or solar project. The TED label is a real guarantee of quality and certifies the knowhow of ENGIE's employees and their commitment alongside local actors.

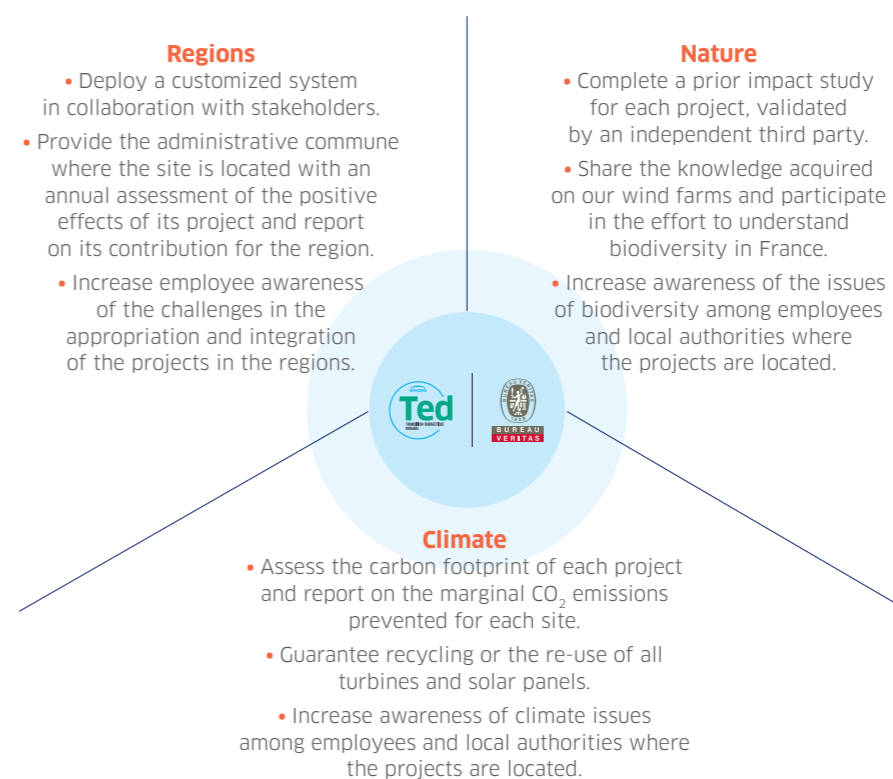
## A label for the sustainable management of hedgerows

On September 29, 2023, ENGIE Solutions committed to **the development of the Hedges Label**. The aim is to encourage the wood-energy sector to adopt more sustainable production of supplies, preserve biodiversity and adapt to the effects of climate change. By signing a convention with Afac-Agroforesteries<sup>(4)</sup> aiming to develop virtuous hedge-growing practices, ENGIE Solutions has promised that the whole of the Group will source **20% of wood chips** used in biomass boilers from operations with the Hedges label by 2026.

## NEW GROUP COMMITMENT ON ENERGY CROPS USED FOR PRODUCTION OF BIOMETHANE

- The new biomethane production units built by ENGIE (*greenfield projects*) must use a very low proportion of energy crops. The proportion of energy crops in the annual tonnage of inputs at the country scale must be single-digit.
- Where ENGIE acquires existing biomethane installations operating with energy crops (*brownfield projects*), a plan to gradually phase out energy crops, as soon as possible and at the latest within 10 years (just transition for farmers) is implemented. If there are still inputs from energy crops, the average annual tonnage in the total portfolio of the country should be no more than single digit in percentage terms.

## THE THREE MAIN LINES OF THE TED LABEL

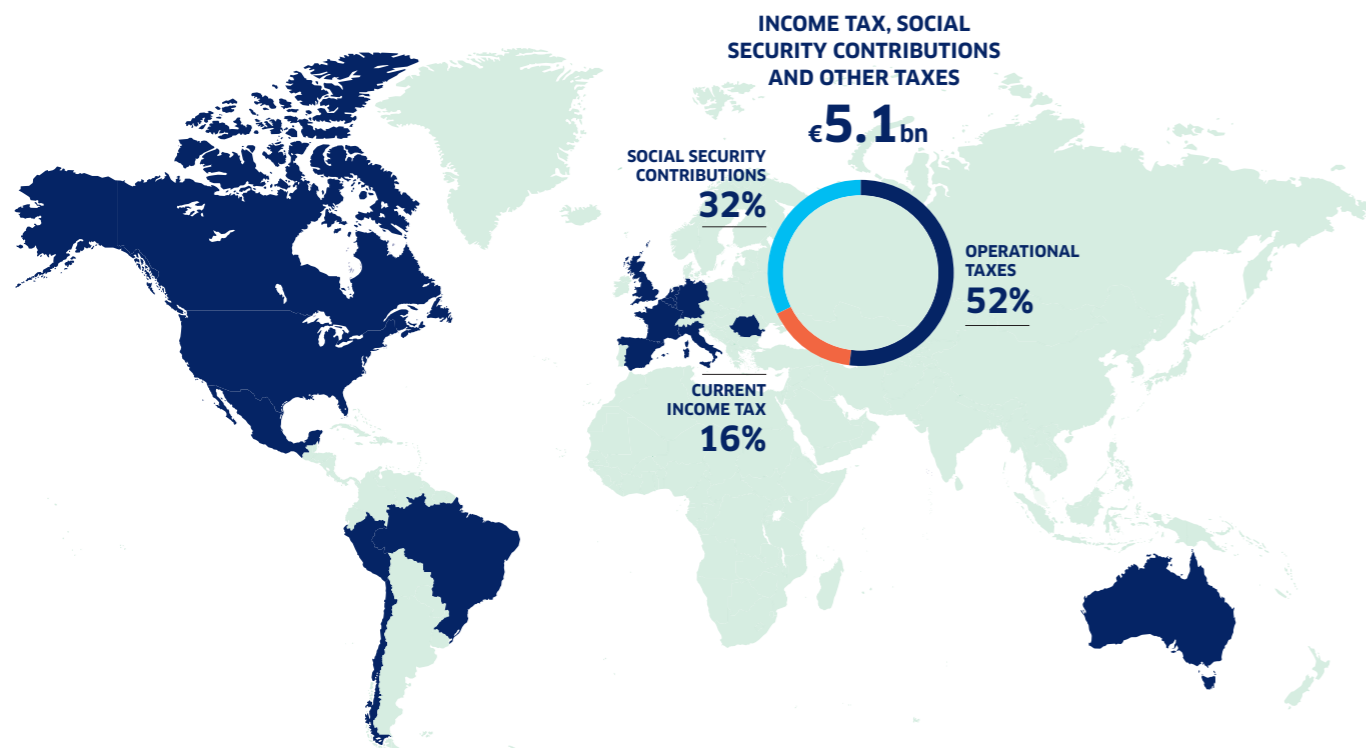


(1) Customized Corporation for the Recovery and Use of Waste of the Rungis region  
 (2) Single Operation Public-Private Partnership  
 (3) TED: Sustainable Energy Transition  
 (4) Association Française de l'Arbre Champêtre-Agroforesteries (French Rural Agroforestry Association)



# Responsible taxation

In 2023, ENGIE generated revenues of €82.6 billion and recorded income tax, social security contributions and other taxes (“ITCS”) of €5.1 billion, of which 16% was for current income tax, 52% for operational taxes (e.g. land, overproduction, environmental, and nuclear taxes), and 32% for employer social security contributions. The reconciliation of the revenue rate and ITCS rate in the following 14 main countries shows alignment between activity and taxation with the exception of a few countries with a high tax burden. In 2023, the Group demonstrated its attitude as a responsible taxpayer by challenging certain tax provisions that affect its ability to invest, while actively collaborating with the relevant authorities to improve these provisions over the long term.



## AMERICAS

- United States**  
5.2% of revenues  
2.1% of ITCS
- Mexico**  
1.1% of revenues  
1.3% of ITCS
- Peru**  
0.9% of revenues  
0.7% of ITCS
- Brazil**  
2.7% of revenues  
2.5% of ITCS
- Chile**  
2.2% of revenues  
1.1% of ITCS

## EUROPE

- France**  
45.5% of revenues  
47.8% of ITCS
- United Kingdom**  
4.9% of revenues  
9.3% of ITCS<sup>(1)</sup>
- Belgium**  
10.8% of revenues  
28.7% of ITCS<sup>(1)</sup>
- Spain**  
2.0% of revenues  
2.7% of ITCS
- Netherlands**  
5.5% of revenues  
0.6% of ITCS

- Germany**  
3.4% of revenues  
1.9% of ITCS
- Romania**  
3.0% of revenues  
2.8% of ITCS
- Italy**  
6.3% of revenues  
2.6% of ITCS

## OCEANIA

- Australia**  
1.2% of revenues  
0.1% of ITCS

(1) Belgium: differences linked to sectoral taxes (excess revenue charges, nuclear, etc.) - United Kingdom: differences linked to taxation on final energy sales

## ENGIE'S SOCIOECONOMIC FOOTPRINT THROUGHOUT THE WORLD

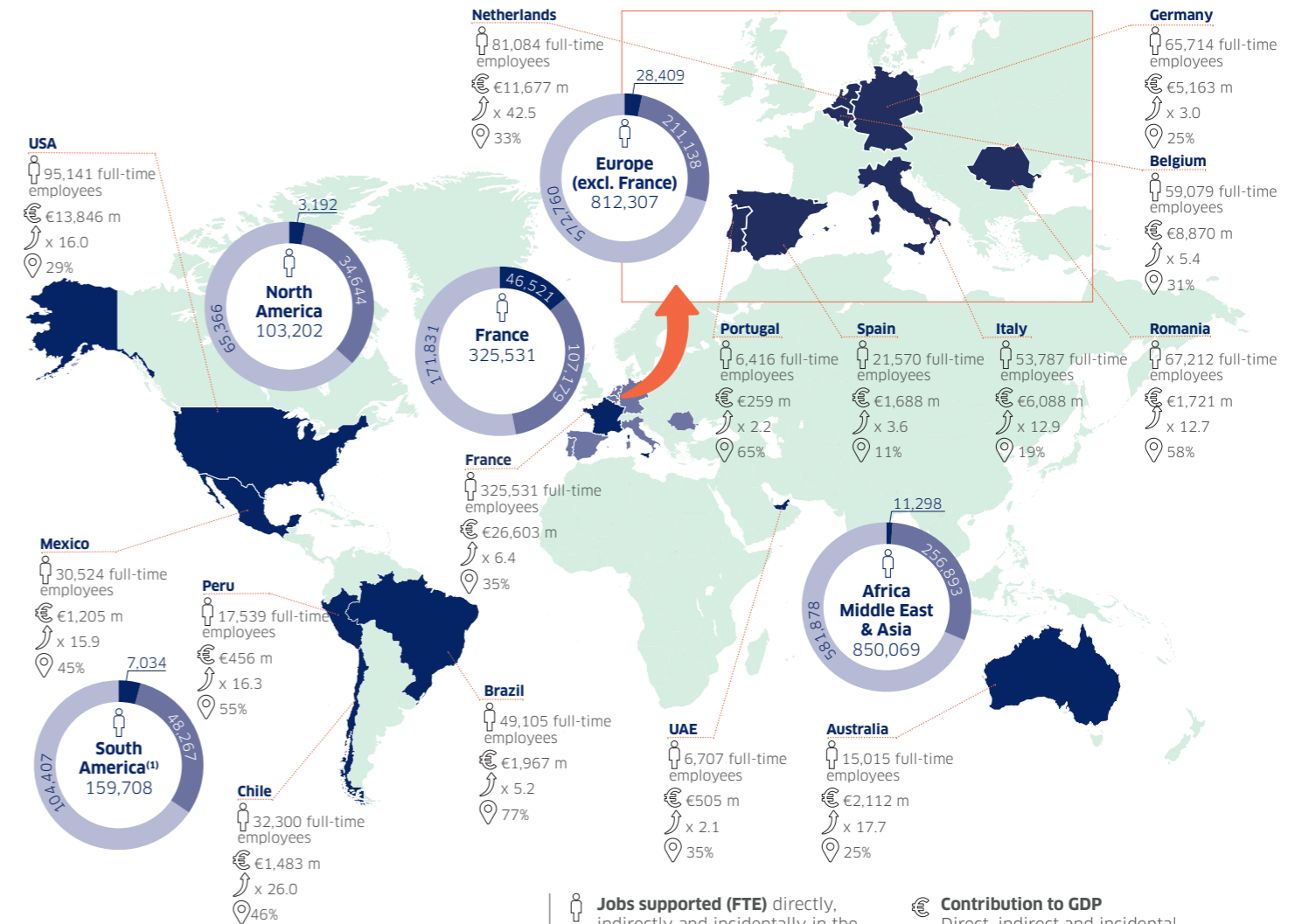
In 2023, ENGIE updated its assessment of its socioeconomic footprint throughout the world, using the LOCAL FOOTPRINT® tool developed by consulting firm UTOPIES. ENGIE's socioeconomic footprint includes:

- direct impacts corresponding to ENGIE Group jobs, i.e. 96,454 FTEs (full-time equivalents) in 2022,
- indirect impacts linked to the Group's purchases from its entire supplier chain, i.e. 658,121 FTEs in 2022,

• as well as the impact of salaries and taxes paid by ENGIE and its entire supplier chain, which drive household consumption and government spending, i.e. 1,496,242 FTEs in 2022.

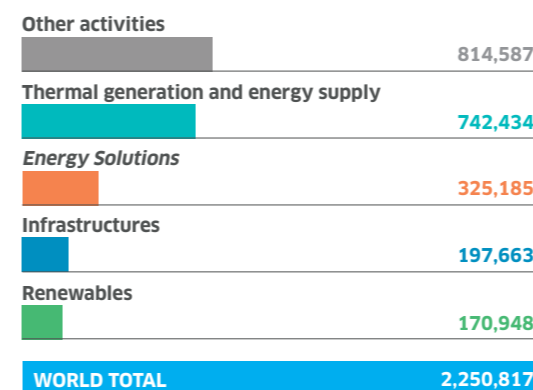
According to this methodology, ENGIE supported 2,250,817 FTEs with an overall multiplier coefficient of 23.3: for every one direct ENGIE job, 22.3 additional jobs were supported in the global economy.

Focus was placed on 15 countries where ENGIE operates in order to determine its local presence and the local multiplier coefficient linked to ENGIE's activity in such countries, as well as the contribution to their GDP. This contribution to GDP is measured by the sum of direct, indirect and incidental added value.



## SOCIO-ECONOMIC FOOTPRINT OF EACH ENGIE GROUP BUSINESS LINE

In number of jobs supported (in FTE)



- Jobs supported (FTE)** directly, indirectly and incidentally in the area by ENGIE activities worldwide
- Direct jobs (FTE)**  
ENGIE employees in the area
- Indirect jobs (FTE)**  
Employees of the supplier chain located in the area and supported by ENGIE activities worldwide
- Jobs generated (FTE)**  
Employees located in the area and supported by the salaries and taxes paid by ENGIE and its chain of suppliers worldwide
- Contribution to GDP**  
Direct, indirect and incidental value added by ENGIE's activities worldwide
- Local multiplier coefficient**  
Ratio between jobs supported in the country by ENGIE's operations in the country, and ENGIE's direct jobs in the country
- Local presence**  
Percentage of jobs located in the country that are supported by ENGIE's operations in the country

(1) Includes Central America

**Reading:** ENGIE contributes €2,112 million to Australia's GDP and supports 15,015 FTEs in Australia. Each direct ENGIE job in Australia supports 16.7 additional jobs in Australia. 25% of the jobs supported by ENGIE's Australian operations are located in Australia.



# Sustainable and responsible finance

In line with its purpose, ENGIE relies on green finance to finance its activities in a sustainable and responsible manner while maximizing value creation for its shareholders.

## A very strong financial performance in 2023

ENGIE had another excellent year in 2023, with EBIT up 18% and strong cash-flow generation. These results demonstrate the progress achieved in executing its strategy, and they confirm its capacity to move forward within a volatile energy market environment. The year 2023 was marked by several achievements: further rapid development in Renewables with 3.9 GW of new capacity commissioned bringing our renewables fleet to 41.4 GW at year-end. In 2023, ENGIE has also taken a major step forward in flexible generation assets, which are crucial to the deployment of a decarbonised energy system, notably a pivotal move in battery storage through the acquisition of BRP in the US. Lastly, the Group finalized a transforming agreement with the Belgian government related to the extension of two reactors in that country and obligations related to nuclear waste, thereby de-risking the Group to a considerable degree. Over the last three years, ENGIE has been transforming itself, with the ambition to contribute to tomorrow's energy system through its own profitable growth. A reliable and affordable energy system, based on the alliance of the molecule and the electron, on flexible technologies, on decarbonization solutions, and on a robust infrastructural network.

The Group has reaffirmed its dividend policy with a payout ratio of 65-75% of net recurring income Group share, and a floor of €0.65 per share for the 2024 to 2026 period. For 2023, the Group has proposed a payout ratio of 65%. This translates to a dividend of €1.43 per share, which will be proposed for shareholder approval at the Annual General Meeting on 30 April 2024.

## European Green Taxonomy

With the European Green Taxonomy, the European Union aims to steer European industrial investment toward activities considered environmentally sustainable, so that the European Union can achieve carbon neutrality by 2050.

To this end, companies must assess the sustainability of their activities in relation to six environmental objectives:

1. Climate change mitigation
2. Climate change adaptation
3. Water and marine resources
4. Circular economy
5. Pollution and biodiversity
6. Ecosystems

Ecosystems and compliance with minimum guarantees in terms of human rights policy, duty of vigilance, and ethical monitoring systems. Companies must therefore publish the share of their activities that contribute to one of these six environmental objectives, without harming the other five.

The notion of sustainability is determined by the constitution of two ratios:

- the share of taxonomy-eligible activities, i.e. from a list of about 100 potentially sustainable activities according to the European Union,
- the share of taxonomy-aligned activities, i.e. the portion recognized as sustainable because it satisfies the previous eligibility and technical criteria of contributing to and not harming the environmental objectives.

After analyzing the economic activities covered by all the environmental objectives of the European Green Taxonomy, the Group is mainly concerned with the climate change mitigation objective in line with its decarbonization strategy.

Its eligible and aligned portions are expressed on three financial indicators: revenue, capital expenditure (CAPEX taxonomy) and operational expenditure (OPEX taxonomy).

All taxonomy aggregates are detailed in the Universal Registration Document. The Group has decided to focus here on CAPEX, and particularly growth CAPEX, which it considers to be a good indicator of its future choices.

In fact, in its definition of CAPEX, the EU has chosen to include maintenance CAPEX that is required of the company, to exclude (i) sustainable acquisition CAPEX, which is one of the means for a company to green its activities, and (ii) sustainable CAPEX in minority interests that contribute to market sustainability. In addition to analyzing the sustainability of its activities, the Group also calculates its growth CAPEX (development and financial) to measure its actions towards the transition in line with its strategy.

Growth CAPEX eligibility and alignment rates are higher in 2023 mainly due to the BRP acquisition in the US Batteries business, which is eligible and aligned, and to higher development investments in 2023 compared to 2022 in FlexGen's Batteries business and in R-GBU.

## Green bonds, essential for the energy transition

With its green bond issue at a new record level of €5.99 billion in 2023, ENGIE has issued €20.89 billion in Green Bonds since 2014. These bonds are issued in accordance with the principles of the June 2023 *Green Financing Framework*.

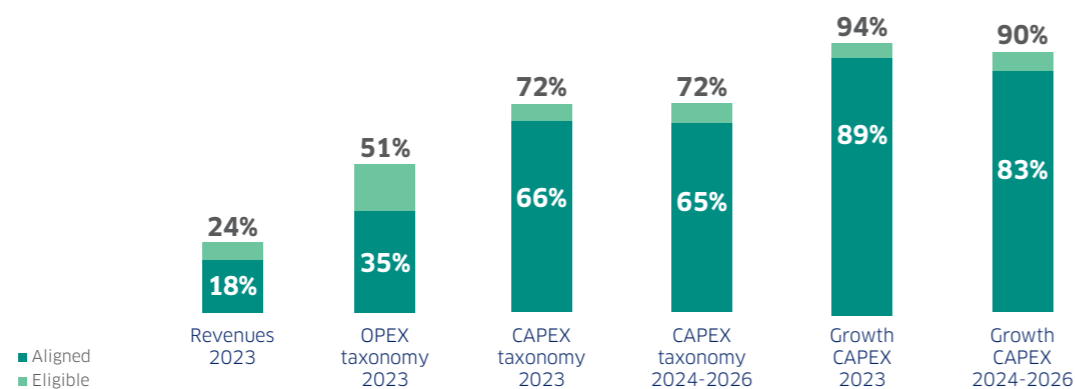
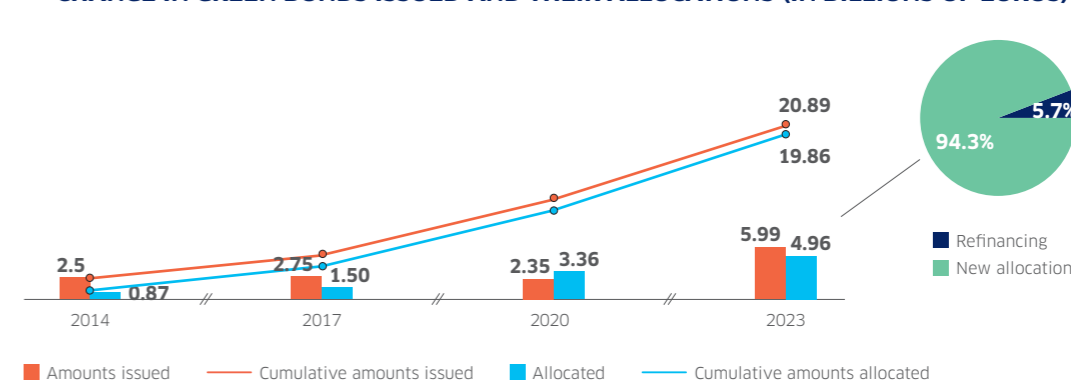
These principles are as follows:

- funds are only allocated to projects supporting the transition to a low-carbon economy, directly linked to the Group's strategy and meeting certain technical criteria,
- communicate on the allocation of funds until they have been fully allocated,

- the funds may be allocated to Green Eligible Projects carried out after the issue of the green financing instrument or used to refinance capex or opex that has taken place in the 24 months prior to the issue,
- the funds raised can be allocated for refinancing other green financing instruments previously issued by ENGIE,
- as of December 31 of each year, the Group must hold cash (and cash equivalents) of an amount at least equal to the funds raised by the Green Bond, less amounts allocated to fund Green Eligible Projects at that date.

The 2023 issues and previous issues allowed €4.96 billion to be allocated to finance projects in 2023 that are part of ENGIE's transformation toward decarbonized assets and energy efficiency, and which should help avoid the emission of at least 3.5 Mt CO<sub>2</sub>eq. per year. The Group publishes an impact report for each allocation, which calculates the CO<sub>2</sub> emissions avoided or reduced.

CHANGE IN GREEN BONDS ISSUED AND THEIR ALLOCATIONS (IN BILLIONS OF EUROS)





# OUR GOVERNANCE

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# A Board of Directors to uphold strategic choices

In line with ENGIE's purpose and in connection with the expectations of its stakeholders, the Board of Directors defines the strategic directions of the Group and ensures their implementation. It is made up of 14 directors with a wide range of complementary expertise.

## Careful monitoring of the Group's challenges

The Group has a training and onboarding program for all new directors, and regularly organizes specific information sessions.

In 2023, during the annual strategy seminar, the Directors discussed the Group's strategic developments, and in particular those of the Hydrogen and Energy Solutions activities. They also discussed the electricity markets and the work launched on ENGIE for 2030.

ENGIE is also in regular dialog with its shareholders, main institutional investors and proxy advisors as part of governance roadshows and at other times. During this period of dialog, the Chairman of the Board explains to them the strategic directions pursued by the Group and asks them about their expectations so that these can continue to be better taken into consideration.

## Strengthening of the expertise held

The Board's objective is to have members that correspond to ENGIE's activities, strategic directions and challenges. This is what allows the Board to make decisions consistent with the need to accelerate the transition to a carbon-neutral, eco-friendly economy.

ENGIE also ensures that the individual competencies of its directors are wide-ranging and complementary. The diagram opposite compiled in February 2024 (with the exception of length of service calculated on April 30, 2024) presents the three key skills of each director among the 12 types of expertise selected.

## Staggered Board reappointments

The terms of office of Fabrice Brégier and Lord Peter Ricketts of Shortlands will expire at the end of the 2024 Shareholders' Meeting of April 30, 2024.

ENGIE's Board of Directors, which met on February 21, 2024, decided, on the recommendation of the Appointments, Compensation and Governance Committee, to propose at the Annual General Meeting to be held on April 30, 2024 the appointment of Michel Giannuzzi as an independent director to replace Lord Peter Ricketts of Shortlands and the renewal of the independent directorship of Fabrice Brégier.

At the end of this Meeting, and subject to approval of the proposed resolutions, the Board of Directors will consist of 14 members.



(1) according to AFEP-MEDEF code

## MAJOR WORK CARRIED OUT IN 2023

In 2023, members of the Board of Directors held discussions on the following topics:

- **The Group's strategic directions** on Renewables and Energy Services, gas supply policy, and on nuclear power in Belgium.
- **Review of investments and asset sales**
- **Finance and audit, 2023 risk review, including the prioritized cybersecurity risk.**

### Governance

Evaluation of Board operations, compensation of corporate officers, etc.

### CSR

Review of CSR objectives for 2030 and the priority risk of climate change, professional and salary equality, annual health and safety report.

## 2023 INFORMATION SESSIONS

- Nuclear safety
- Biodiversity and nature
- Digital strategy
- The global energy landscape and regulatory developments in European energy markets

□ Directors elected by the Shareholders' Meeting (● independent)

● <b>Jean-Pierre Clamadieu</b> Chairman of the Board of Directors	<b>Catherine MacGregor</b> Chief Executive Officer	● <b>Fabrice Brégier</b>	● <b>Marie-Claire Daveu</b>	● <b>Ross McInnes</b>
<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 5 years and 11 months</li> <li>• Two terms<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 2 years and 11 months</li> <li>• One term<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 7 years and 11 months</li> <li>• Two terms<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 2</li> <li>• One term<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 5 years and 11 months</li> <li>• Two terms<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>

● <b>Marie-Josée Nadeau</b>	● <b>Lord Peter Ricketts of Shortlands</b>	<b>Patrice Durand</b>	<b>Lucie Muniesa</b>	<b>Céline Fornaro</b>
<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 9 years</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 7 years and 11 months</li> <li>• One term<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 7 years and 4 months</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 1 year</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 78%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 1 year and 11 months</li> <li>• Two terms<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 83%</li> </ul>

□ <b>Christophe Agogué</b>	□ <b>Yoan Kosnar</b>	□ <b>Magali Viot</b>	□ <b>Jacinthe Delage</b>
<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 5 years and 11 months</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 2 years</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 2 years</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Length of service<sup>(1)</sup>: 2 years and 11 months</li> <li>• No offices held<sup>(2)</sup></li> <li>• Attendance rate at Board meetings in 2023: 100%</li> </ul>

## LIST OF THE 12 COMPETENCIES SELECTED

	General Management		Energy sector		Finance		Digital, innovation, new technologies
	Administration of large companies		Services sector		CSR, climate, dialog with stakeholders		Geostrategic challenges
	Industrial sector		Public sector		Social dialog, HR		Regulatory environment

(1) Length of service on the Board of Directors at April 30, 2024  
(2) Offices in other listed companies (excl. ENGIE)

# Four committees to assist the Board of Directors

They are each chaired by an independent director. Their mission is twofold: to support the Board of Directors in its deliberations, and to help it prepare certain decisions through their recommendations.

## THE AUDIT COMMITTEE

### Missions

Reviews the financial statements and financial position, and reviews internal and external controls and mapping of significant risks for the Group.

### Main work in 2023

- Review of the Group's consolidated financial statements, financial trajectory and 2023 guidance
- Annual review of risks and analysis, attended by the Director of Group Finance, Risks and Insurance; market risks; review of priority risks: cybersecurity, safety, supply chain, nuclear
- Focus on energy purchases / sales
- Monitoring of the effectiveness of the Group's internal control systems and procedures and internal audit.



**98%**

Participation rate

**66%**

Independence rate

### MOST REPRESENTED COMPETENCIES

- Administration of large companies
- Finance
- Energy sector

## THE STRATEGY, INVESTMENT AND TECHNOLOGY COMMITTEE

### Missions

Gives its opinion on major strategic directions, in particular for the strategic plan. Examines projects for external or internal growth or disposal, strategic agreements, alliances or partnerships. Also examines strategic choices with regard to technological developments, modernization of industrial equipment or procurement policy and significant real estate projects.

### Main work in 2023

- The medium-term business plan in terms of strategy;
- The monitoring of industry trends and sector highlights
- The agreement with the Belgian government on nuclear power in Belgium
- The GET (Global Enterprise Transformation) project aimed at aligning and standardizing support function processes and related IT systems



**99%**

Participation rate

**60%**

Independence rate

- Administration of large companies
- Finance
- Industrial sector

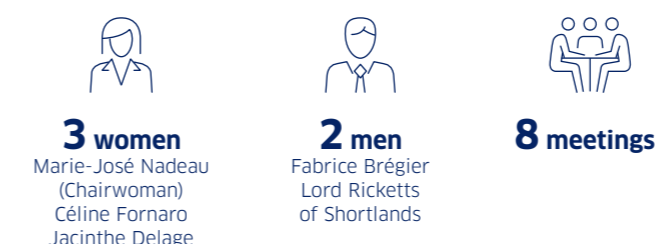
## THE APPOINTMENTS, COMPENSATION AND GOVERNANCE COMMITTEE

### Missions

Reviews and makes recommendations regarding the composition and operations of the Board, the selection of the Chief Executive Officer, the succession plans and the compensation of the corporate officers.

### Main work in 2023

- Membership, diversity policy and assessment of the functioning of the Board and its committees: independence and expertise of directors
- Monitoring of the increase in the number of women in management bodies
- Succession plans
- Compensation for corporate officers
- Equity ratios, monitoring the promotion of ONE ENGIE culture, talent policy
- Performance share plan



**90%**

Participation rate

**75%**

Independence rate

- Public sector
- Energy sector
- General Management and administration of large companies

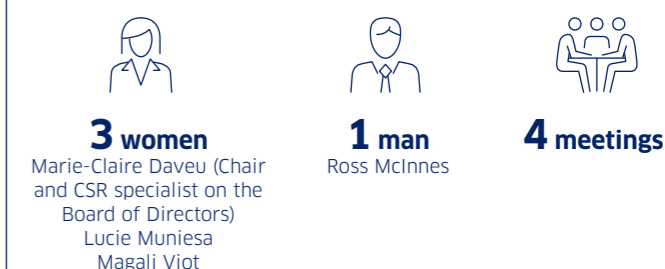
## THE ETHICS, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT COMMITTEE

### Missions

Ensures the Group has the right level of commitment with regard to ethics, compliance, and corporate, social and environmental responsibility. Reviews human resources policies and ensures that a corruption prevention and detection system is in place. Ensures that the Group takes into account CSR issues and long-term perspectives.

### Main work in 2023

- CSR objectives for 2030 and their rollout
- CO<sub>2</sub> Medium-Term Plan
- Monitoring of the "climate change" priority risks and "HR risks related to the challenges of transformation"
- Draft integrated report and NFS
- Review of each fatal accident and progress of the ENGIE One Safety health and safety plan
- Professional and salary equality
- Review of the annual ENGIE&ME employee engagement survey
- Review of ethics and compliance activities and the new Ethical Code of Conduct



**80%**

Participation rate

**66%**

Independence rate

- CSR, climate, dialog with stakeholders
- Energy sector
- Administration of large companies

# General Management that serves the strategy

The Executive Committee is ENGIE's guiding body. In keeping with the guidelines set out by the Board of Directors, it establishes the strategic decisions that are then implemented and monitored operationally by the Operational Management Committee (OP'COM).

## EXECUTIVE COMMITTEE

### MEMBERS:

- Chief Executive Officer
- Executive Vice Presidents

**10 members** 4 women **(40%)** 5 nationalities

### TARGET:

at least **40% women** and at least **40% men** by 2025

### MISSIONS:

- Makes strategic decisions in line with the guidelines set by the Board of Directors
- Develops the long-term vision
- Ensures that short-term objectives are met



**Catherine MacGregor**  
Chief Executive Officer



**Paulo Almirante**,  
Executive Vice President in charge of Renewables activities and Energy Management



**Sébastien Arbola**,  
Executive Vice President in charge of Flex Gen & Retail activities, responsible for Hydrogen activities



**Jean-Sébastien Blanc**,  
Executive Vice President in charge of Human Resources and Corporate



**Biljana Kaitovic**,  
Executive Vice President in charge of Digital and Information Systems



**Frank Lacroix**,  
Executive Vice President in charge of Energy Solutions



**Cécile Prévieu**,  
Executive Vice President in charge of Networks



**Pierre-François Riolacci**,  
Executive Vice President in charge of Finance, Corporate Social Responsibility and Purchasing



**Thierry Saegeman**,  
Executive Vice President in charge of Transformation & Geographies and Nuclear Production



**Claire Waysand**,  
Executive Vice President in charge of the General Secretariat, Strategy, Research & Innovation, Communication

## OPERATIONAL MANAGEMENT COMMITTEE (OP'COM)

### MEMBERS:

- Chief Executive Officer
- Executive Vice Presidents
- Entity CEOs
- Directors of GBU, regions and main countries
- Heads of main functional departments

**54 members** 22 women **(40.7%)** 13 nationalities

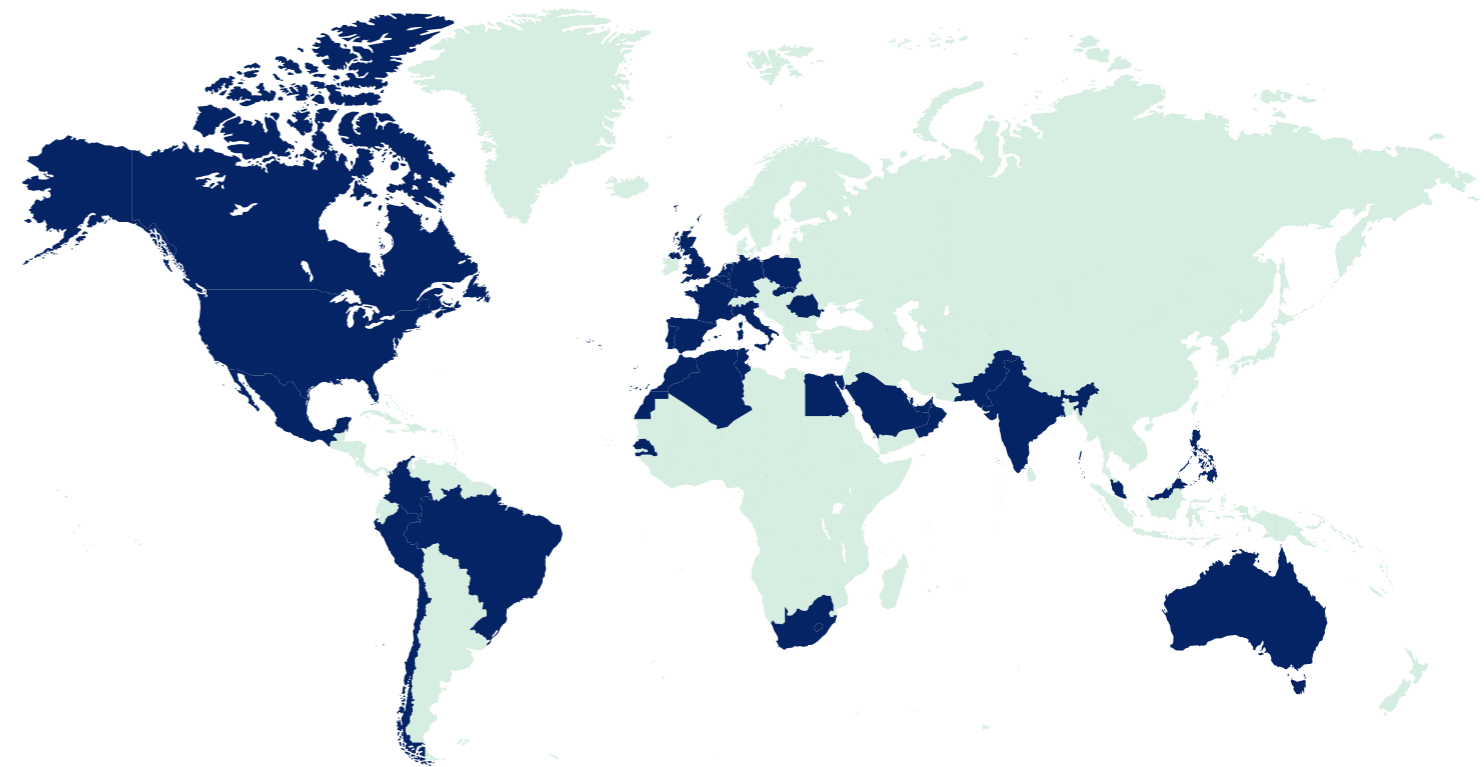
### MISSIONS:

- Implements ENGIE's strategic decisions
- Carries the Group's transformation as close as possible to the regions

# An organizational structure focused on a successful energy transition

The new Group organization, established in 2021, resulted in a refocusing of the activity and a tighter geographic footprint of 31 countries at the end of 2023. The new structure is geared to the success of the energy transition and aims to improve simplicity, operational performance and efficiency.

## A STRONG PRESENCE IN FRANCE AND IN THE FOUR REGIONAL HUBS OF EUROPE, NORTHAM, SOUTHAM AND AMEA



### NORTHAM



**North America:**  
Canada, United States

### SOUTHAM



**Central and South America:**  
Brazil, Chile, Colombia, Mexico, Peru

### EUROPE



Belgium, Germany, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, United Kingdom

### FRANCE

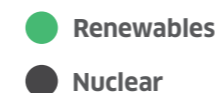


GRDF, GRTgaz, Elengy, Storengy

### AMEA



**Asia, Middle East, Africa, Australia**  
India, Malaysia, Pakistan, Philippines, Singapore, Gulf Cooperation Council (Bahrain, Kingdom of Saudi Arabia, Kuwait, Oman, Qatar, United Arab Emirates), Algeria, Tunisia, Senegal, Egypt, South Africa, Morocco, Australia

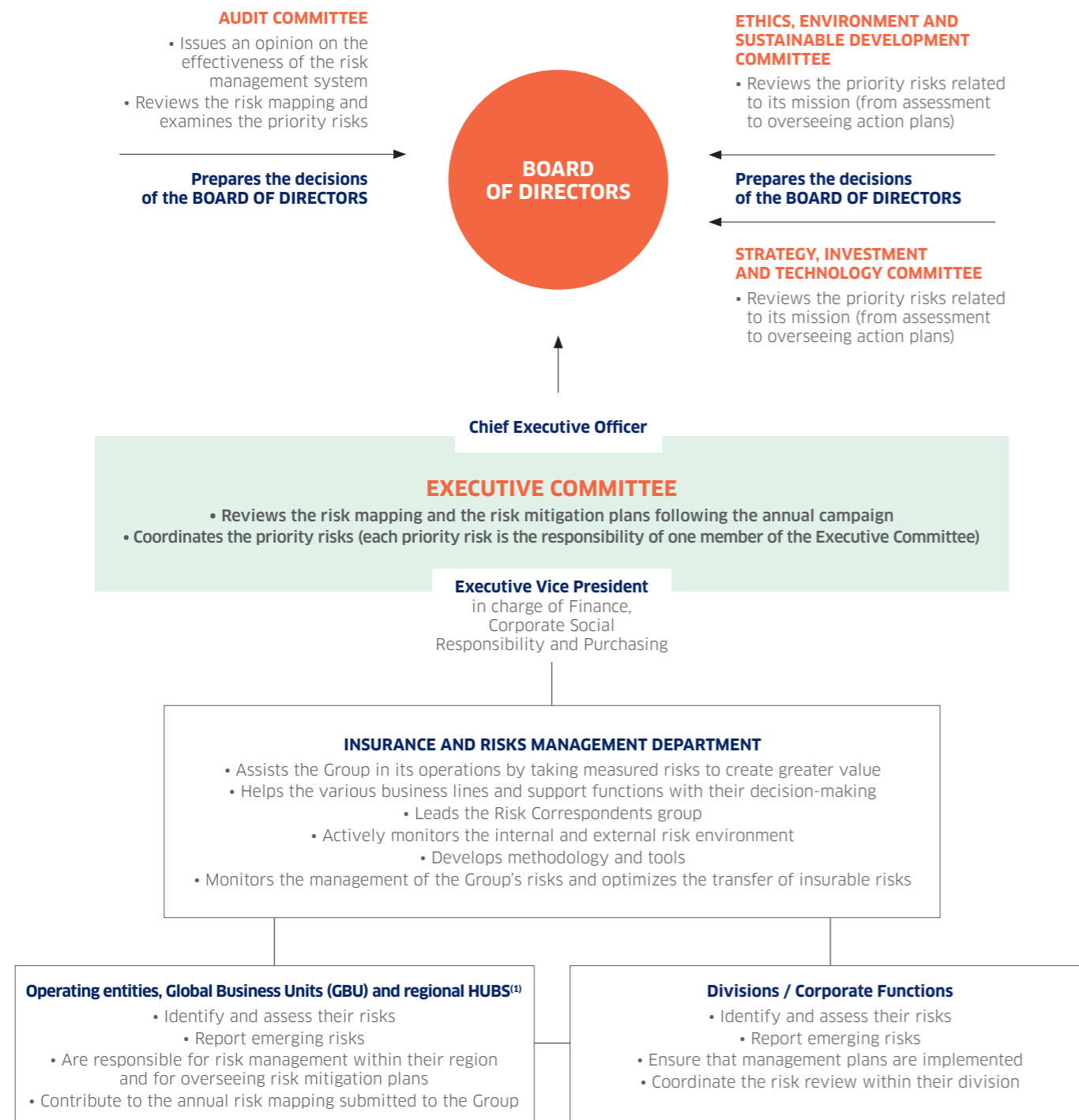


Energy Solutions

Flex Gen & Retail

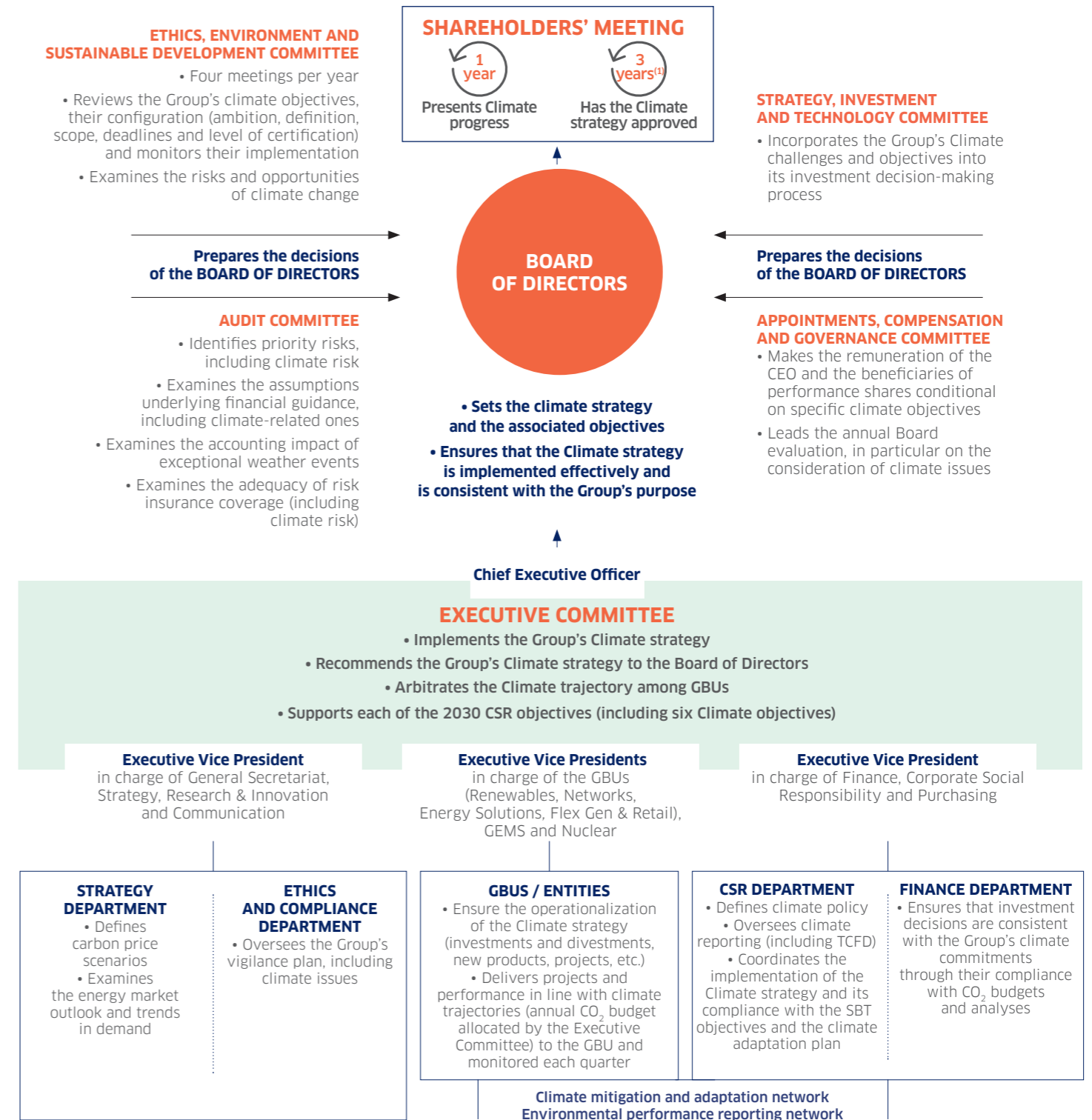
# Governance dedicated to risk management

Exposed to various risks as part of its activities and in relation to its commitments, ENGIE has rolled out a risk management system and associated governance in order to manage these as effectively as possible in the event of an occurrence. The Group also has specific governance for climate-related matters and for ethics, two major issues in which it is involved at the highest level.



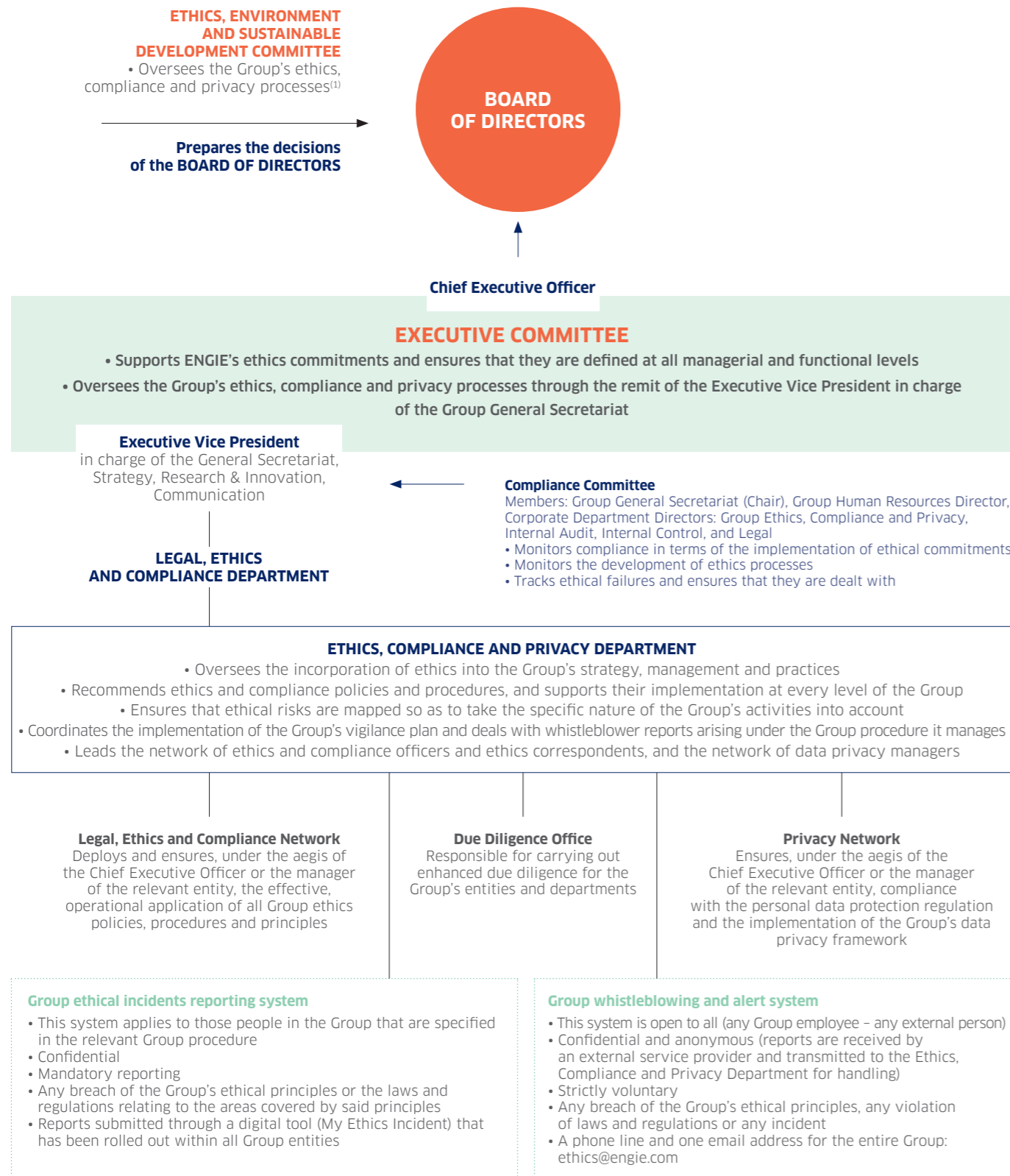
(1) The analysis and management of division-specific risks is carried out in collaboration with the relevant Group division (e.g.: HR risk, cyber risk, etc.).

# Governance to guide the Climate strategy



(1) Every three years or at every major change

# Governance to support ethical commitments



(1) In 2023, the Group adopted a new Code of Ethical Conduct, which replaces ENGIE's Ethics Charter and Practical Guide to Ethics.

# A vigilance plan with dedicated governance

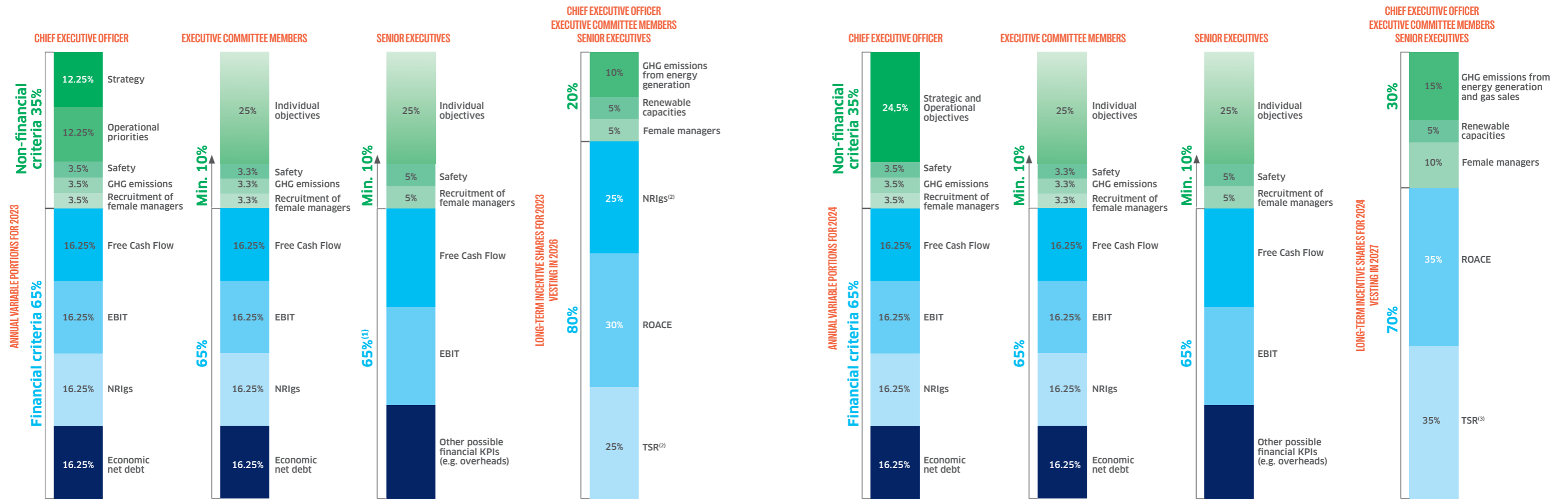
Fully supported by the ethical organization, ENGIE has a vigilance plan in place that aims to identify and prevent harm to human rights and fundamental freedoms, the health and safety of people and the environment. It comprises the following elements:

	HUMAN RIGHTS	ENVIRONMENT AND SOCIETAL	HEALTH, SAFETY AND SECURITY	SUPPLIERS
RISKS	<ul style="list-style-type: none"> <li>Fundamental rights of workers</li> <li>Rights of local communities</li> <li>Safety of employees and sites</li> <li>Practices of partners and suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Climate</li> <li>Biodiversity and ecosystem rehabilitation</li> <li>Air, water and soil pollution</li> <li>Waste</li> <li>Impact of the Group's activities on local communities and their social consequences</li> </ul>	<ul style="list-style-type: none"> <li>Harm to the health, safety and security of people working for the Group (employees, temporary workers and subcontractors)</li> <li>For people working for the Group or for local residents, living near to the Group's industrial facilities or facilities that the Group maintains and / or operates on behalf of customers</li> </ul>	<ul style="list-style-type: none"> <li>Risky purchasing categories</li> <li>Human rights</li> <li>Health, safety and security</li> <li>Environmental and societal</li> </ul>
RELATED POLICY	<p>The Group's human rights policy specifies ENGIE's commitments and provides for regular processes to identify and manage risks.</p> <p>In this way, each entity can ensure compliance with it in the context of its activities and commercial relations. Commercial partners are also the subject of ethical due diligence, which explicitly includes human rights.</p>	<p>The Group's CSR Policy regulates the vigilance process with regard to environmental and societal matters. An analysis of the risks and the implementation of action plans at different levels to prevent, reduce and, if necessary, offset the impacts of the Group's activities. It is defined at the level of each GBU, subsidiary and site, and is implemented through objectives and action plans that are reviewed every year. In addition, before any decision to launch a project is reached, an analysis of the environmental and societal risks is conducted using a set of CSR criteria.</p>	<p>The Group's health and safety at work policy and rules set out the basic rules. They apply to all Group employees, temporary workers, and subcontractors. The risks related to the operation of industrial facilities are controlled by safety management systems based on the principle of continuous improvement. ENGIE has developed control processes to ensure the implementation of actions that help to prevent risks and achieve the Group's objectives. In the area of security, the policy to protect people and tangible and intangible assets contains measures adapted to the criticality of the geographic area or activity concerned.</p>	<p>For non-energy purchases, the Group Purchasing Charter defines a set of minimum requirements in terms of human rights, health and safety at work, ethics and the environment. The Charter's implementation relies on a selection process involving inspections and external evaluations (due diligence, audits, EcoVadis ratings, etc.)</p> <p>For energy purchases, risks relating to the Group's energy supply have been identified as a specific vigilance issue for the Group. Action plans are defined for any risks identified.</p>
DEPARTMENT IN CHARGE	ETHICS, COMPLIANCE & PRIVACY	CORPORATE SOCIAL RESPONSIBILITY	HEALTH, SAFETY AND SECURITY	PURCHASING
<p><b>Shared processes: Vigilance monitoring committee • Due diligence procedures • Whistleblowing and collection of alerts mechanism • Monitoring of the plan's roll-out within the entities • Management of disputes • Training • ENGIE global framework agreement</b></p>				
2022 MONITORING	<p>Monitoring of the policy by the ethics compliance report and internal control</p> <ul style="list-style-type: none"> <li>97.5% effective roll-out of the policies by the entities</li> <li>Face-to-face and e-learning training on human rights for the entire Group</li> <li>100% of Due diligence (with regard to human rights risk) on partners in connection with the Group's investment committees</li> <li>Alerts received through the whistleblowing mechanism (82 of these alerts concerned issues related to the duty of vigilance)</li> </ul> <p><b>For more information:</b>  <a href="https://www.engie.com/en/group/ethics-and-compliance/policies-and-procedures/human-rights-referential">https://www.engie.com/en/group/ethics-and-compliance/policies-and-procedures/human-rights-referential</a></p>	<ul style="list-style-type: none"> <li>Continued roll-out of the CSR objectives for 2030</li> <li>Monitoring of the actions taken for each CSR objective</li> <li>Assessment of the effectiveness of action plans during performance reviews</li> <li>Training on CO<sub>2</sub>, biodiversity, stakeholder commitment, CSR matrix</li> <li>Deployment of the new CSR matrix designed to integrate the environmental and societal dimensions into the Group's decision processes</li> </ul> <p><b>For more information:</b>  <a href="https://www.engie.com/en/analysts/governance/duty-of-vigilance-environmental-societal-risks">https://www.engie.com/en/analysts/governance/duty-of-vigilance-environmental-societal-risks</a></p>	<ul style="list-style-type: none"> <li>Definition of a Group health and safety transformation plan called ENGIE One Safety, designed to permanently eradicate serious and fatal accidents</li> <li>Rollout to all employees of the Safety Essentials and e-learning so that they are fully familiar with the practices (security reception)</li> <li>Launch of a training and coaching program for managers to increase the impact they have on the safety behavior of employees, temporary workers and subcontractors</li> <li>Strengthening of the system to assess the management of major risks</li> <li>Launch in 2023 of the induction course approach to increase the safety of employees and their families staying in countries with security risks.</li> </ul>	<ul style="list-style-type: none"> <li>Updating of the risk matrix by purchasing category</li> <li>After France, rollout of inclusive purchasing policies across the Group's geographies</li> <li>Launch of an initiative to support 1,000 SMEs on their decarbonization pathway.</li> <li>In-depth vigilance action plan (risks of forced labor practices in the Group's supply chains in China)</li> <li>Participation in the sectoral initiative proposed by WindEurope and EcoVadis to enhance the transparency of the wind power division.</li> </ul> <p><b>For more information:</b>  <a href="https://www.engie.com/en/group/suppliers/sustainable-purchasing-policy">https://www.engie.com/en/group/suppliers/sustainable-purchasing-policy</a></p>



# A compensation policy that promotes sustainable performance

Compensation for executives is defined according to demanding quantifiable and qualitative performance criteria, both financial and non-financial.



Each year, the compensation policy of the two corporate officers is reviewed by the Board of Directors, based on the recommendation of the Appointments, Compensation and Governance Committee and submitted for the approval of the Shareholders' Meeting.

For 2023, the Chairman's compensation amounted to a fixed sum of €0.45 million, i.e. 7.4 times the average compensation of ENGIE employees in France.

For the year 2023, the Chief Executive Officer's compensation broke down into three portions: a fixed portion of €1 million; an annual variable portion of €1,305,000 (with a maximum amount set at 140% of the fixed portion) and a long-term incentive portion of 120,000 performance shares valued at €1,189,200 for a maximum amount of 120,000 performance shares. The Chief Executive Officer's fixed and variable annual compensation amounted to 54.6 times the average compensation of ENGIE employees in France.

(1) The weighting of the financial criteria for senior executives varies according to the individual's responsibilities.  
(2) Panel: EDP, ENEL, Iberdrola, Naturgy, Snam and RWE

The quantified objectives of the annual variable criteria for 2023 have been set in line with the budget and objectives for the year 2023. Targets for long-term variable criteria have been set in line with long-term objectives, and in particular the trajectory established to achieve the 2030 objectives, with the exception of TSR and RNRpg, which are compared with the performance of a panel<sup>(2)</sup>.

### Success rate in meeting the criteria for the variable annual compensation of the Chief Executive Officer

Financial criteria	Non-financial criteria
Success rate: 130.4%	Success rate: 130.7%
<ul style="list-style-type: none"> <li>Free Cash Flow: 140%</li> <li>EBIT: 140%</li> <li>NRIGs: 140%</li> <li>Economic net debt: 101.7%</li> </ul>	<ul style="list-style-type: none"> <li>Strategy: 140%</li> <li>Operational priorities: 135%</li> <li>Safety: 80%</li> <li>GHG emissions: 140%</li> <li>Recruitment of female managers: 124%</li> </ul>

For 2024, the fixed compensation of the Chairman and Chief Executive Officer remains unchanged. Annual variable compensation and long-term incentives for the Chief Executive Officer, Executive Committee members and senior executives are detailed in the chart above.

2024 will see a significant increase in the weighting of ESG criteria - from 20% to 30% - in the long-term incentive share of the Chief Executive Officer, Executive Committee and senior executives, and a corresponding reduction in the weighting of financial criteria.

In addition, the scope of the GHG emissions criterion has been expanded to include GHG emissions linked to gas sales covering 70% of the Group's emissions.

(3) In comparison with Eurostoxx, Utilities indice

The Statutory Auditors' report on selected published social and environmental information published in the Integrated Report will be included shortly.

Operational Indicators	2021	2022	2023
Installed electricity generation capacity (GW) <sup>(1)</sup>	100.3	102.7	100.1
Capacity under construction (GW) <sup>(1)</sup>	3.6	5	6.9
Installed renewables capacity (%) <sup>(1)</sup>	34	38	41
Installed renewables capacity (GW) <sup>(1)</sup>	34.4	38.1	40.8
- of which hydro (excl. pumped storage)	17.9	17.9	17.8
- of which wind	11.8	14.5	15.8
- of which solar	4.1	5.3	6.9
- of which biomass / biogas	0.3	0.3	0.3
Net Promoter Score of BtoC customers:			
• France (8.6 million market offer contracts in 2023)	+19	+32	+32
• Belgium (3.8 million contracts in 2023)	+2	+1	0
• Italy (0.9 million contracts in 2023)	+29	+37	+34
• Romania (2.1 million contracts in 2023)	+49	+38	+47
• Netherlands (0.7 million contracts in 2023)	+12	+37	+31
• Australia (0.7 million contracts in 2023)	+5	-2	-6
R&D expenditure (€ m)	138	135	142
Gas sales to end customers used to calculate Scope 3 (TWh) <sup>(2)</sup>	362	338	291
Total electricity sales (TWh) <sup>(2)</sup>	213	234	219
Electricity purchases for resale (TWh) <sup>(2)</sup> (used for Scope 3)	93	109	98
Electricity generation at 100% (TWh) <sup>(1)</sup>	420.2	421.5	385.5
Energy generation (Scopes 1&3) (TWh) <sup>(1)</sup>	278	276	255
Load factor of gas stock (%)	55	56	50.6
Load factor of coal stock (%)	55	60	49.7
Availability of nuclear power plants (%)	92	84	89
RAB distribution France (€ bn) <sup>(3)</sup>	15.3	16.2	16.9
RAB transmission France (€ bn) <sup>(3)</sup>	8.6	8.8	9.3
RAB storage France (€ bn)	3.8	4	4
RAB LNG terminals France (€ bn)	0.9	0.9	0.9
Quantity of energy distributed by GRDF (TWh)	276.8	256.9	242.2
Storage capacity sold (TWh)	118.6	123.3	124.3
Length of distribution networks (km)	267,594	255,394	258,512
Length of GRDF network (km)	204,233	201,000	206,714
Length of transmission networks (km)	39,360	39,504	38,468
Length of GRTgaz network (km)	32,727	32,000	33,818
Engineering - Order book (€ m)	784	669	866

Financial indicators data as published	2021	2022	2023
Revenues (€ bn)	57.9	93.9	82.6
EBITDA (€ bn)	10.6	13.7	15.0
EBIT (€ bn) <sup>(4)</sup>	6.1	9	10.1
Net recurring income / (loss), Group share (€ bn) <sup>(5)</sup>	2.9	5.2	5.4
Gross investment (€ bn)	8	7.9	10.6
of which growth investments (€ bn)	4.3	5.5	8.1
of which maintenance investments (€ bn)	2.4	2.4	2.5
Cash flow from operations (CFFO)	6.5	8	13.1
Economic net debt (€ bn)	38.3	38.8	46.5
Economic net debt / EBITDA	3.6x	2.8x	3.1x
Ordinary dividend for year N paid in year N+1 (€/share)	0.85	1.40	1.43

(1) Counted at 100% regardless of the ownership interest, and excluding decentralised capacity  
(2) Sales figures are consolidated in accordance with accounting standards  
(3) Regulated Asset Base as of January 1

(4) Current operating income after share in net income of equities accounted for using the equity method  
(5) Cash Flow from Operations: Free Cash Flow before maintenance CAPEX

Environmental indicators	2021	2022	2023
Total GHG Emissions - Scope 1 (Mt CO <sub>2</sub> eq) ■■■	36.7	29.9	24.5
of which emissions from energy generation (controlled assets)	34.4	27.9	22.2
of which CH <sub>4</sub> emissions	1.6	1.3	1.5
Total GHG Emissions - Scope 2 location-based (Mt CO <sub>2</sub> eq.) ■■■	0.5	0.9	0.7
Total GHG Emissions - Scope 2 market-based (Mt CO <sub>2</sub> eq.)	-	-	0.8
Total GHG Emissions - Scope 3 (Mt CO <sub>2</sub> eq)	122.6	144.5	133.3
of which use of products sold	65.6	61.3	52.5
of which emissions from energy generation (equity-accounted assets)	31.5	32.7	30.3
CO <sub>2</sub> emission ratio - Energy generation - Scope 1 (kg CO <sub>2</sub> eq / MWh) ■■■	180.1	151.7	131.4
CO <sub>2</sub> emission ratio - Energy generation - Scope 3 (kg CO <sub>2</sub> eq / MWh) ■■■	355.4	350.3	349.5
CO <sub>2</sub> emission ratio - Energy generation - Scopes 1 & 3 (kg CO <sub>2</sub> eq / MWh) ■■■	235.6	217.9	204.7
NOX emissions (kt) ■	49.8	34.2	27
SO <sub>2</sub> emissions (kt) ■	106.0	7.4	3.4
Fine particle emissions (kt) ■	5.8	3.4	2.8
Mercury emissions (KG)	347	139	104
Total primary energy consumption (excluding own consumption) (TWh) ■■■	318	278	217
Total freshwater and non-freshwater consumption (Mm <sup>3</sup> ) ■	96	80	62
Total freshwater use (Mm <sup>3</sup> )	65	56	47
Rate of fresh water consumption per energy produced (Scope 1)(%)	0.342	0.301	0.275
Environmental risk prevention plan (% of relevant revenues)	83	96	94
Environmental expenditure (€ m)	633	903	925
Environment-related complaints (no.)	13	20	4
Environment-related convictions (no.)	2	1	0
Amount of compensation (€ k)	697	9	0
Non-hazardous waste recovery rate (%)	84	80	83
Hazardous waste recovery rate (%) ■■■	15	21	24
Certified environmental management system (% of relevant revenues)	74.2	75.6	74.9

Social indicators	2021	2022	2023
Number of employees ■■■	101,504	96,454	97,297
Managerial staff in the workforce (%) ■■■	30.2	30.4	31.4
Employees on permanent contracts (%) ■■■	91.5	91.5	91.7
No. of permanent contract and fixed-term hires ■	15,522	16,974	16,195
Voluntary turnover (%)	5.2	6.5	5.4
Internal lost-time occupational accident frequency rate for employees ■■■	2.8	2.3	2.1
Lost time injury frequency rate for employees and subcontractors on sites with controlled access ■■■	2.5	2.0	1.8
Accident seriousness rate (employees) ■	0.1	0.06	0.07
Number of fatal accidents (employees) ■	2	0	2
Number of fatal accidents (subcontractors)	11	4	4
Women in the workforce (%) ■■■	25.1	26.1	26.5
Women in management positions (%) ■■■	28.9	29.9	31.2
Gender pay gap (%)	-	1.73	1.92
Trained workforce (%) ■■■	82	83.8	86.1
Hours of training (no.) ■	2,254,023	2,126,584	2,328,349
Average number of hours per person trained	28	27	28
Percentage of apprentices in France excluding regulated entities (%) ■	7.3	8.5	8.5
Overall employment rate of employees with disabilities in France (%)	3.4	3.4	3.5
Employee engagement (%)	83	86	87
Employee shareholding (% of share capital held)	3.2	3.9	3.3

Employee and environmental information identified by the symbols ■ and ■■■ indicate opinions by the Statutory Auditors of moderate assurance and reasonable assurance respectively.

Social indicators (continued)	2021 <sup>(*)</sup>	2022 <sup>(*)</sup>	2023
Employees covered by an annual appraisal interview (%)	100	100	100
Employees eligible for at least 14 weeks paid maternity leave (%)	-	-	90.7
Employees eligible for at least 4 weeks paid paternity leave (%)	-	-	62.3
Employees covered for 75% of their hospitalization costs (%)	-	97.3	98.6
Employees covered by a minimum benefit of 12 months' salary in the event of total disability	-	78.4	87
Employees covered by a minimum benefit of 12 months' salary in the event of death	-	94.7	97.2

Societal indicators	2021	2022	2023
Percentage of activities with a societal plan for stakeholder consultation (%)	36	46	49
Percentage of activities with an environmental plan drawn up in consultation with stakeholders (%)	37	53	66
Responsible purchasing index (excluding energy): CSR assessment and inclusive purchasing	40	38	54
Number of Elec Vert + customers in France (2024 target: 300,000)	53,000	147,500	232,250
Number of customers in France who joined "Mon programme pour agir" (target: 1 million by end-2023)	85,000	500,000	700,000
Number of beneficiaries with access to sustainable energy (in millions)	7	9.5	12

Governance indicators	2021	2022	2023
Number of directors (post-Shareholders' Meeting in year N+1)	14	14	14
Number of nationalities represented on the Board of Directors (post-Shareholders' Meeting in year N+1)	4	4	4
Attendance rate on the Board of Directors (%)	100	100	97
Independence rate of the Board of Directors (%) (post-Shareholders' Meeting in year N+1)	60	64	60
Gender diversity rate of the Board of Directors in accordance with the AFEP-MEDEF Code (%) (post-Shareholders' Meeting in year N+1)	50	50	50
Gender diversity rate of the Board of Directors (%) (post-Shareholders' Meeting in year N+1)	43	53	50
Senior managers trained in combating corruption (%)	96	100	100
Training of staff most exposed to the risk of corruption (%)	49	55	68

Employee and environmental information identified by the symbols ■ and ■■■ indicate opinions by the Statutory Auditors of moderate assurance and reasonable assurance respectively.

# CLIMATE NOTEBOOK

## 2024 TCFD\* REPORT

In line with its purpose to act to accelerate the transition to a carbon-neutral economy, ENGIE undertook in 2021 to become Net Zero Carbon by 2045 across its three emissions scopes. To do so, the Group set an ambitious trajectory certified “well below 2°C” by 2030 by the SBTi and given a score of NZ-2 by Moody’s with its trajectory rated as 1.5°C and its target implementation as “solid”. The Group thus set quantified targets for 2030 on three pillars, which are (1) reducing emissions induced by ENGIE, (2) supporting customers in their avoided emissions and (3) removing carbon from the atmosphere by contributing to the increase in carbon sinks. ENGIE incorporates climate issues into all of the Group’s governance chains, from the operational management of its activities to the executive and strategic decision-making bodies (Executive Committee, Board of Directors and General Management). This governance includes both climate change mitigation and adaptation.

\* Task Force on Climate-Related Financial Disclosures

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Our decarbonization in numbers

- **39%**  
since 2017 of annual emissions, i.e.

- **100 Mt CO<sub>2</sub>eq.**

### The levers of ENGIE’s decarbonization based on medium and long term science-based targets

**2030**

#### No. 1 Reducing the emissions induced by ENGIE

- 43 MtCO<sub>2</sub> eq. linked to energy generation
- 52 MtCO<sub>2</sub> eq. linked to the use of sold products (gas sales)
- 99% of the carbon footprint covered by public 2030 objectives

#### No. 2 Reducing the emissions of ENGIE’s customers (avoided emissions)

- 45 MtCO<sub>2</sub> eq. emissions avoided through ENGIE products and services per year

No. 3 Remove carbon from the atmosphere at the same level as the residual emissions from ENGIE’s activities in four countries (including Brazil) and the ways of working of the whole Group

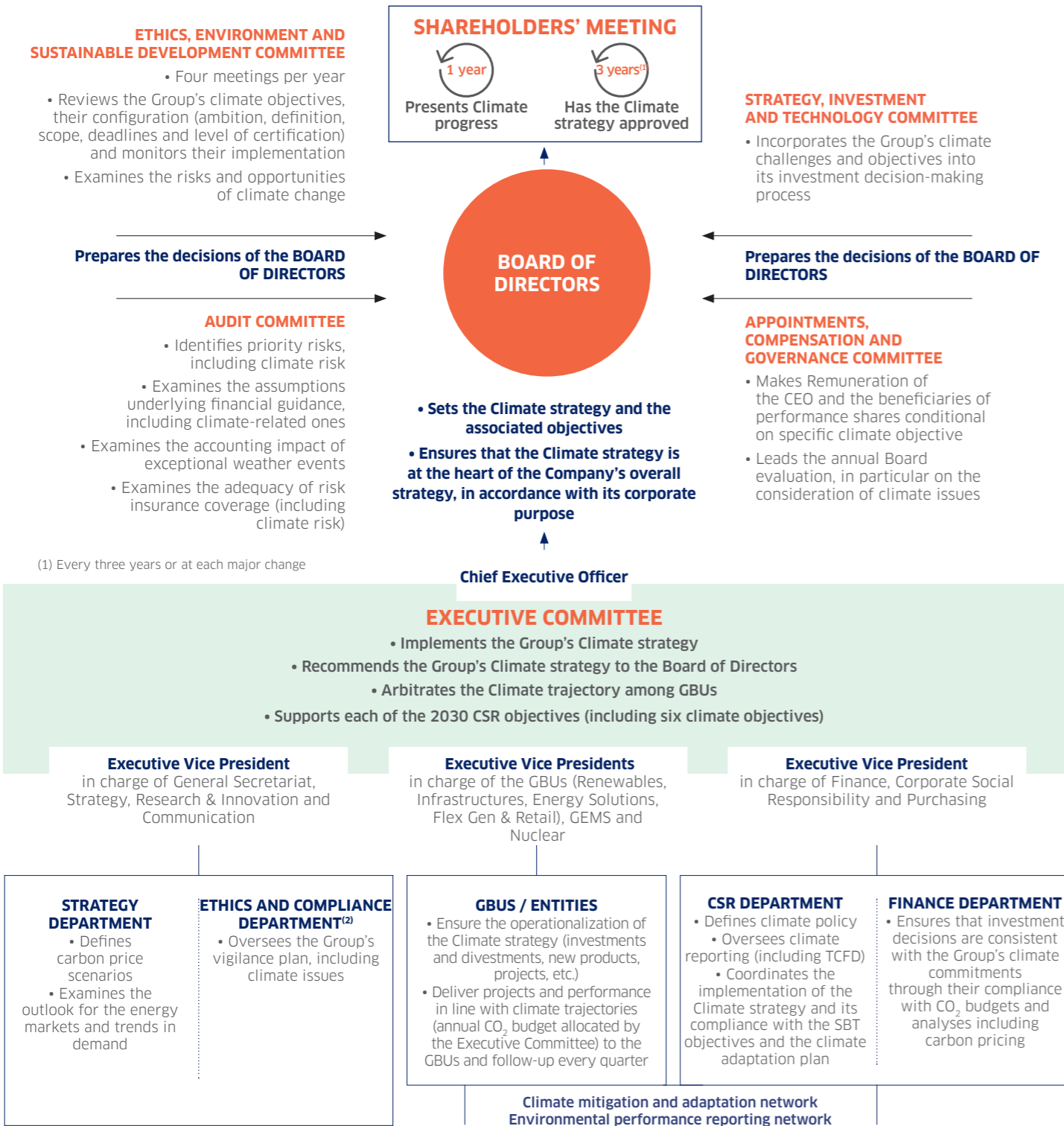
**2045**

ENGIE is committed to being Net Zero Carbon for all its scopes (1, 2 and 3). Reduce ENGIE’s direct and indirect GHG emission by at least 90% compared to 2017. Increase carbon sinks to neutralize the Group’s residual emissions across the Group’s full value chain.

# Governance

## Climate governance

Implementing the Net Zero Carbon trajectory across all ENGIE's activities required the adaptation of various governance processes. Whether at the level of steering and corporate governing functions, investment processes or Research and Innovation, climate challenges permeate all the Group's decision-making channels. Since 2021, the Group Corporate and Social Responsibility Department (CSR), which is responsible for the Group's Climate strategy, has reported to the Executive Vice President in charge of Finance, CSR and Purchasing, in order to converge financial and non-financial processes.



(1) Every three years or at each major change

(2) Reporting to the Legal, Ethics and Compliance Department

## Presenting the Climate strategy and its progress to shareholders

During the 2022 Shareholders' Meeting, ENGIE was one of the first CAC40 companies to consult its shareholders on its Climate strategy, which they overwhelmingly approved (97%).

In 2023, ENGIE publicly undertook, in the form of a letter from its Chairman, to put the Group's Climate strategy to the shareholder vote in the case of every major change and no later than every three years.

The Group also undertook to present on the implementation of its Climate strategy annually at its Shareholders' Meeting with a dedicated agenda item followed by a discussion.



ENGIE 2023 Shareholders' Meeting. From left to right, Pierre-François Riolacci, Executive Vice President in charge of Finance, Corporate Social Responsibility and Procurement; Catherine MacGregor, Chief Executive Officer; Jean-Pierre Clamadieu, Chairman of the Board of Directors; Claire Waysand, Executive Vice President in charge of the General Secretariat, Strategy, Research & Innovation and Communication; Julia Maris, Vice-President Group Social and Environmental Responsibility.

## Aligning lobbying activities with the Paris Agreement

In accordance with its commitment to fight climate change and accelerate the transition to a carbon-neutral economy, ENGIE is committed to ensuring that its lobbying activities and membership to sector associations are aligned with the objectives of the Paris Agreement and the company's climate strategy. In 2023, 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 updated in the first half of 2024.

## Correlate compensation with the achievement of climate objectives

Compensation policies for the Chief Executive Officer, the Executive Committee and the senior executives include criteria linked to the Group's Climate objectives. In 2024, 3.5% of the CEO's variable compensation was dependent on meeting the GHG reduction target related to energy generation.

In addition, the Group's performance shares (long-term incentives) granted to the Chief Executive Officer, senior executives and 5,000 employees take climate criteria into account, with 15% of those on GHG emissions related to energy generation and gas sales, and 5% related to installed renewable capacity, i.e. a total of 20%, up 5 points on the previous plan. A draft resolution on this new plan will be put to the vote at the next Shareholders' Meeting in April 2024.

## Engaging and training employees

The engagement of ENGIE's employees is driven by its strategic guidelines for the energy transition. The annual survey, to which 78% of ENGIE's employees responded, shows that 89% believe in ENGIE's objectives and 87% believe in its ability to accelerate the decarbonization of the economy (+7 points compared with 2022), in a socially responsible manner (87%, +4 points compared with 2022). As ENGIE's employees are the first witnesses to ENGIE's transformation, they are above all the main actors. 91% of employees state that they contribute to the strategic objectives of their entity through their daily work.

The Group believes that acculturation, skills development and the commitment of its employees are a powerful lever to support the transformation of its business. Thus, ENGIE created its Sustainability Academy in 2021. The Sustainability Academy enables ENGIE employees to act as internal ambassadors for the Group's strategy and its operational implementation. All of the Sustainability Academy's initiatives are created internally thanks to the expertise and efforts of employees.

In 2023, all of the Group's employees were successfully trained in ENGIE's Net Zero Carbon strategy. This gives them an insight into the levers of success and an understanding of the complementarity of the professions and expertise within the Group's integrated model.

Training modules on topics such as stakeholder engagement, energy saving, green IT and biodiversity also invite employees to understand and rethink traditional patterns of consumption and production.

## Mobilize research on decarbonization

Comprising more than 600 employees, ENGIE's Research and Innovation division contributes through its actions and initiatives to the operational performance, the integration of technologies, new solutions in strategic areas and disruptive technology. Its work is focused as a priority on carbon neutrality with solar power, wind power and storage, the decarbonization of urban heating and cooling networks, the large-scale underground storage of hydrogen, the liquefaction of hydrogen and methanization. ENGIE Research is developing numerous academic partnerships, particularly major partnerships with the Alternative Energies and Atomic Energy Commission (CEA) in France (electrolysis, photo catalysis, bio-themes and production of renewable molecules), with the National Renewable Energy Laboratory (NREL) in the United States (wind power, solar power and hydrogen) and finally with EnergyVille in Belgium (solar power, electro-reduction in molecules, transmission and storage of electricity and heat). The ENGIE New Ventures entity also makes minority investments in start-ups (www.engieventures.com), with the aim of decarbonizing and optimizing the world of energy. Over the past 10 years, it has already invested in more than 50 innovative startups, facilitating strategic collaborations with ENGIE.

## FOR FURTHER INFORMATION

See Mr. Clamadieu's answer to some shareholders



**MITIGATION: reducing our emissions using high-performance management tools**

In order to achieve its CO<sub>2</sub> emissions reduction targets, the Group has begun a transformation that has enabled it to shift from a reporting approach to a performance management approach, thus carrying out large-scale operational change. To this end, ENGIE has developed management tools for both long-term strategic projections and for investment decisions, as well as for infra-annual operational management.

**1 Define Group CO<sub>2</sub> targets**

ENGIE's management has assigned limits that must not be exceeded for the main GHG emission sources of its activities (energy generation, gas and electricity sales). They are set as milestones throughout the Group's Net Zero trajectory (2025 and 2030) and allocated to each GBU.

**2 Allocate and manage CO<sub>2</sub> budgets**

Since 2021, the Group has integrated non-financial items in its medium-term financial plan (MTP) to assign CO<sub>2</sub> budgets. The GBUs develop their operational decarbonization strategy so as not to exceed the limits set (budget N+1, 2025, 2030 and 2045). As of 2023, an infra-annual management of emissions was conducted using quarterly GHG indicators. It has been integrated in the management dialog on the operational and financial performance via the Quarterly Business Reviews (QBR).

**3 Integrate CO<sub>2</sub> in investment management**

Each investment decision must be made respecting the carbon budgets assigned to the GBUs. To do this, the Group has developed a CO<sub>2</sub> budget management tool similar to the management of CAPEX budgets. It allows the remaining CO<sub>2</sub> budget to be tracked to avoid exceeding the limits set. In addition, an internal price of CO<sub>2</sub> is integrated in the financial valuation of the project. This price is based on changes in carbon pricing according to internal scenarios of market decarbonization.

**ADAPTATION: prepare resilience by mobilizing all existing processes**

Climate change is already having numerous impacts on the energy sector, particularly with regard to asset integrity, the changing energy supply-demand balance and employees health. Alongside climate change mitigation efforts, ENGIE is therefore rolling out a process of climate change adaptation, in order to increase the resilience of its assets and operations. Analyses are carried out based on several medium- and long-term climate change scenarios (RCP 4.5 and RCP 8.5 for 2030, 2050 and 2070).

**1 Model climate change**

To reach a better understanding of climate change and its impacts on ENGIE, a partnership with the Institut Pierre Simon Laplace has been signed. The goal is to model, as precisely as possible, future trends in energy generation as a function of the IPCC climate change scenarios (RCP 4.5 and RCP 8.5) as well as the impact of extreme events on all the Group's technologies in the different regions of the world.

**2 Ensure the resilience of the Strategy**

The impact of climate change on the Group's strategy is also studied as part of a country-by-country approach or through an analysis of the major climate regions that are of interest to ENGIE. The Group examines this impact according to four main factors: country risk, the value of existing assets, the strategic objectives for 2030 and strategic challenges specific to the countries studied in the context of the broad spectrum of IPCC climate scenarios (RCP 2.6, RCP 4.5 and RCP 8.5).

**3 Ensure the resilience of our sites**

Physical risks linked to climate change are now part of the Group's ERM (Enterprise Risk Management) process. Various risks are studied:

- changes in production / energy demand;
- the integrity of assets and local supply chains in relation with the evolution of extreme events ;
- the health of employees, particularly because of changes in thermal stresses.
- the global portfolio of the supply chain for fuel, products and services.

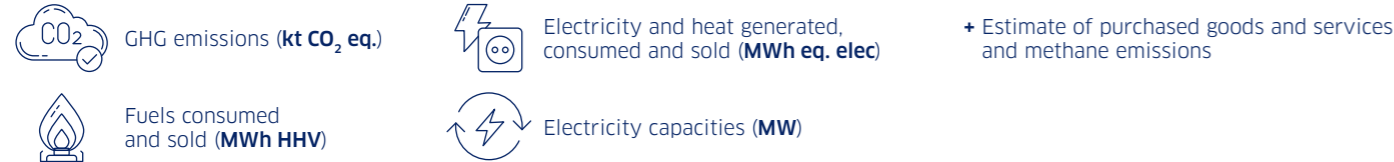
**4 Ensure the resilience of our new projects**

Adaptation to the physical risks of climate change is embedded in the Group's investment process. Before any new investment, a sensitivity analysis has to be carried out on changes in energy generation or demand, as well as the evolution of extreme events, as part of the new project development process.

**THE CO<sub>2</sub> MEDIUM-TERM PLAN (CO<sub>2</sub> MTP)**

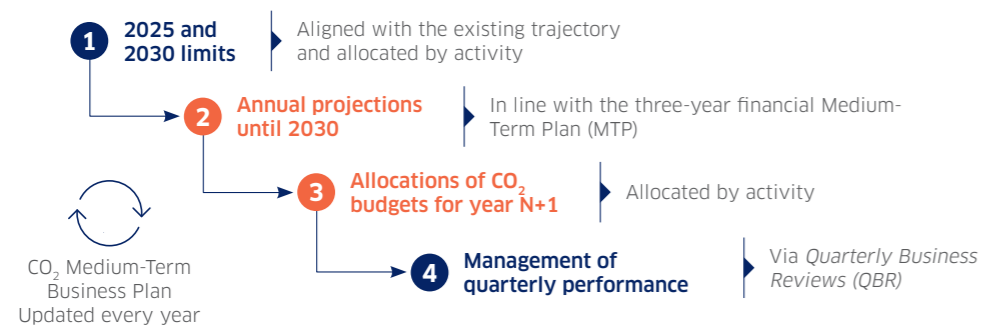
A granular projection model, based on in-depth knowledge of the Group's operational performance.

A 2030 projection of the Group's energy generation and sales activities via the consolidation of the following indicators:



- ➔ based on operational assumptions common to the entire Group, aligned with the financial projections, all combined with internal scenarios on market decarbonization;
- ➔ at the level of each sales entity and each generation asset (as a function of their technology, load factors, country, consolidation methods, etc.).

A reliable management process that secures the execution of the Group's Climate strategy:



The Group's climate road map is built on interactions with nature-related issues as well as societal-related issues, more particularly, the imperative for a just transition.

**Nature**

Responses to climate challenges are intrinsically linked to the challenge of restoring nature and contributing to a trajectory of positive nature: climate disruption is one of the five major causes of the biodiversity collapse, while Nature-based Solutions are a sustainable response to the need for climate resilience. The Group is committed to limiting its impact on the planetary boundaries connected with nature, with targets for biodiversity, water, forests, pollution, waste, etc. (see Nature Notebook).

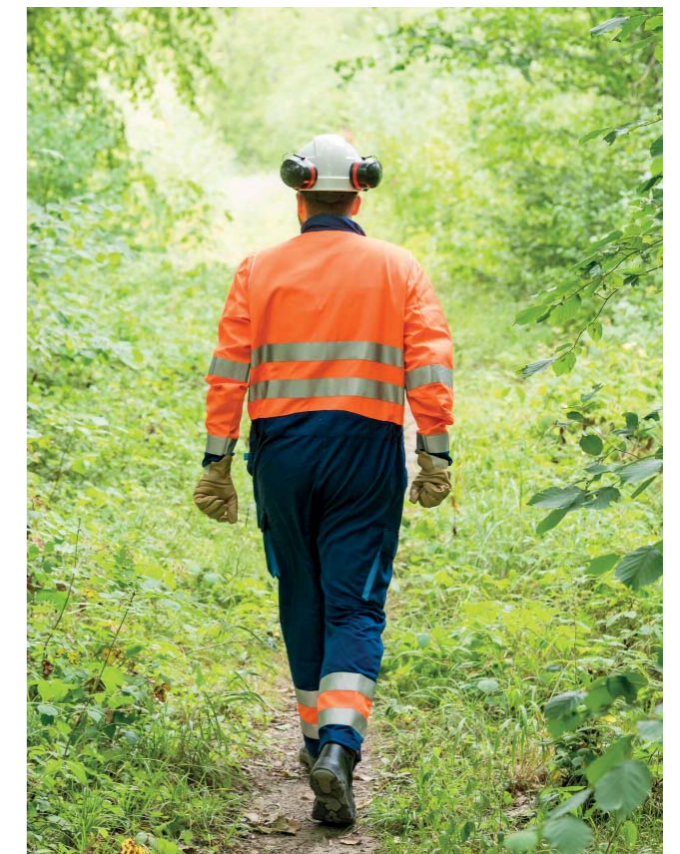
**Just transition**

ENGIE is committed to a Net Zero Carbon trajectory, which has to be implemented as part of a just transition for all of our stakeholders, whether internal (employees) or external (customers, regions, suppliers, local communities, indigenous populations and affected communities). Thus, the Group's just transition policy and plan were presented in November 2022 at the Stakeholders' Committee, which gave its opinion on the subject. The details of the plan and the main associated indicators monitored are included in the Social and Societal Notebook.

**Resources**

Questions of resource availability arise both when it comes to the end of fossil fuels and to the development of renewable energy. The Group notably conducts studies on the following issues:

- the criticality of certain resources required for the successful development of renewable energy and batteries;
- conflicts of usages on certain renewable resources such as wood biomass and methanization inputs.



# Strategy

## The climate strategy pursued

ENGIE has set a 2045 Net Zero Carbon<sup>(1)</sup> target for its entire value chain (scopes 1, 2 and 3), via an ambitious decarbonization trajectory, certified “well below 2°C” by 2030 by the SBTi and given a score of NZ-2 by Moody’s with a trajectory aligned 1.5°C and a target implementation as “solid”. In this way, by 2045, the Group is reducing its direct and indirect greenhouse gases (GHG) emissions by at least 90% compared with 2017<sup>(2)</sup>. At the same time, it plans to work on the development of carbon sinks in order to neutralize its residual emissions over the long term and thus contribute at the right level to planetary carbon neutrality. The Group is also committed to supporting its customers in the reduction of their GHG emissions in order to accelerate the decarbonization of its own value chain.

ENGIE’s strategy to decarbonize its value chain is based on three pillars (**Reduce** (Pillar 1), **Avoid** (Pillar 2), **Remove** (Pillar 3)), in line with the methodological framework of the Net Zero Initiative<sup>(3)</sup>:

<p><b>Reduce ENGIE’s GHG emissions</b></p> <p>First, reduce the direct and indirect GHG emissions resulting from ENGIE’s activities by at least 90% compared to 2017.</p>	<p><b>Remove carbon up to ENGIE’s residual emissions</b></p> <p>Then, increase carbon sinks to neutralize the last residual emissions that are the most difficult to abate.</p>	<p><b>Avoid customers’ GHG emissions through ENGIE’s solutions</b></p> <p>Support customers’ decarbonization so that they can reduce their GHG emissions.</p>
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### ENGIE’s 2045 Net Zero Carbon target

(1) Definition of the Net Zero standard of the Science Based Target initiative (SBTi)  
 (2) Reference year for ENGIE’s climate objectives as defined with the SBTi  
 (3) Carbone 4 initiative supported by ADEME

## ENGIE’s vision for the energy transition in Europe: a balanced mix of molecules and electrons

Given the prevailing uncertainty regarding the evolution of the energy mix, public policies and the development of the sectors, every year ENGIE builds different scenarios for Europe’s energy future (hypertext link: <https://www.engie.com/decarbonation-scenario-engie>). Each scenario quantifies the volumes and prices of the main commodities (electricity, gas, coal, hydrogen, oil and CO<sub>2</sub>) of the 15 main European energy markets between 2023 and 2050. The reference decarbonization trajectory chosen by ENGIE achieves carbon neutrality in 2050 by means of a balanced energy mix. Energy efficiency, the electrification of uses and the development of renewable gases together ensure optimum levels of efficiency (technical and economic) and resilience in the energy system. In addition, energy sufficiency and efficiency are an integral part of the efforts to reduce GHG emissions.

Studies carried out by the Group for the European scope have shown that large-scale electrification would generate additional costs of more than 15% by 2050 and would increase the vulnerability of the electricity system, in terms of both production and electricity infrastructures (new lines to be built,

acceptability of decarbonized production assets, whether wind, solar or nuclear).

In an electricity mix dominated by renewable energy, the electricity system must balance supply and demand by making greater use of the various flexibility solutions (pumped storage stations, thermal power plants, combined cycle gas turbines) with strong links to gas storage. Battery electric storage was recently added to the range of flexibility tools and now constitutes a key storage technology for the future. Batteries can respond very rapidly to requests from the electricity network, in around one second, and several times in the same day. This makes them a preferred tool for intra-day balancing.

Gas continues to play a major role, by:

- Supplying flexibility solutions<sup>(1)</sup> to ensure the balance of the energy system. In the medium-term, only thermal assets can meet this need for balance and flexibility on an intra-weekly and inter-seasonal basis. In 2022, for example, gas assets played a central role in the balance of the French electrical power system when there was strong pressure on supply.
- Avoiding making the electricity system too large (production and networks) by supplying all of the energy requirements in peak periods (particularly heating).

Over the long-term, the fleet of thermal assets will progressively decline (end of life of power plants, partially replaced

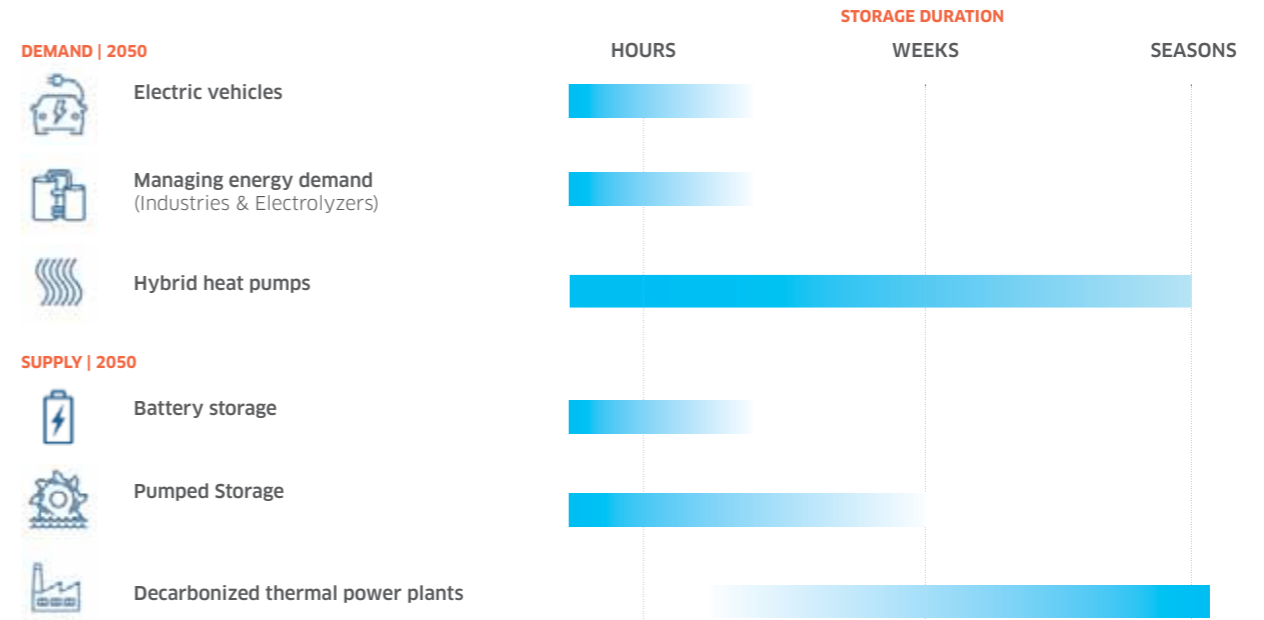


by renewable production) and the remaining assets will stay to help balance the system (peak assets). Furthermore, the gas-fired thermal plants will be decarbonized by 2040-2045.

(1) A fourfold increase in flexibility needs by 2035, according to the IEA in its Net Zero Emission

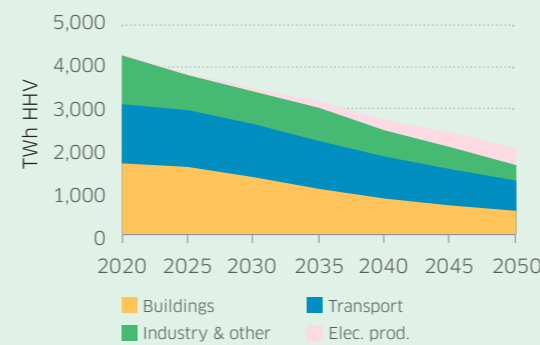
## FLEXIBILITY TECHNOLOGIES: DIFFERENT TIMESCALES FOR ACTIONS

### DIFFERENT TECHNOLOGIES TO MEET SPECIFIC NEEDS

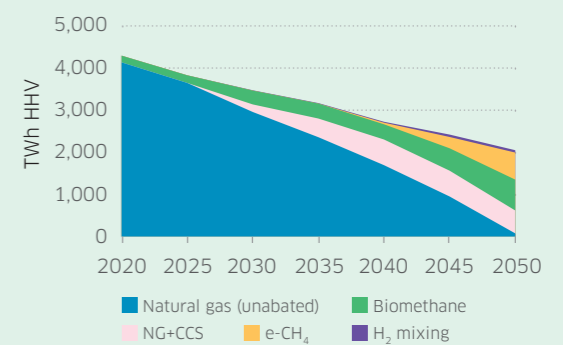


## ENGIE SCENARIO FOR GREENING METHANE IN EUROPE

EU15 METHANE DEMAND\* (TWh HHV)



EU15 METHANE SUPPLY\* (TWh HHV)



Different gases will contribute to the energy system of tomorrow. Biomethane, the first contributor, is part of a circular economy and decentralized production and creates local jobs. It can be injected

into all existing infrastructures without adaptation. Renewable hydrogen produced by electrolysis from renewable energy sources will be key to decarbonizing high-temperature industrial processes

and heavy transport. Finally, synthetic methane will complete the possible solutions. More details on the role of Low carbon technologies can be found in the “renewable gases” notebook.

\* These charts track methane demand and supply only. It should be noted that ENGIE’s reference decarbonization scenario integrates hydrogen for approximately 1,000 TWh HHV in 2050 (excluding e-CH<sub>4</sub>).

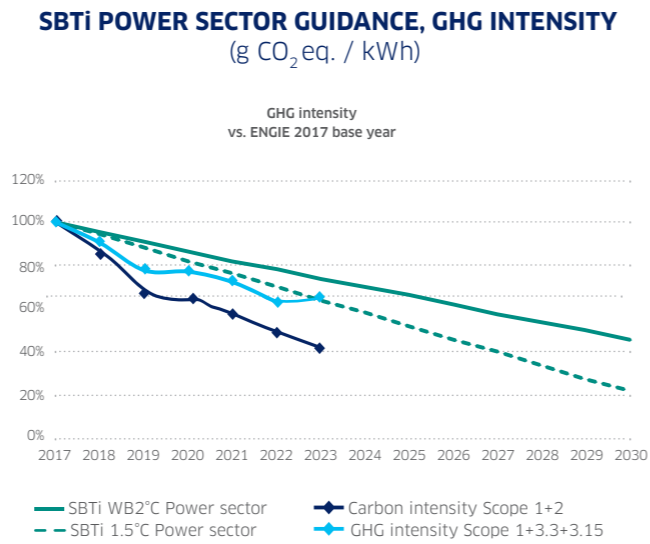
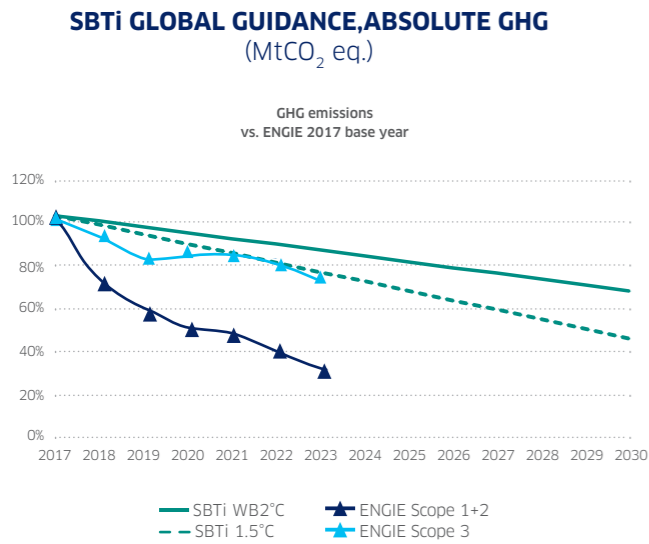
### Alignment of our aims with the Paris Agreement

In 2021, ENGIE committed to achieving Net Zero Carbon by 2045 across its three emission scopes. To do so, the Group set an ambitious trajectory certified “well below 2°C” by 2030 by the Science Based Target initiative (SBTi), considered as aligned with a 1.5°C trajectory by 2030 according to the Transition Pathway Initiative (TPI) and given a score of NZ-2 by Moody’s with its trajectory rated as 1.5°C and its target implementation as “solid”. This shows the complexity of communication on alignment with the Paris Agreement, without a reference framework shared by the entire international community.

#### SBTi certification

ENGIE has been certified “Well-below 2°C” since early 2023 by the Science Based Target initiative (SBTi), after an initial certification of “2°C” in 2020. ENGIE committed to reduce the carbon intensity related to energy generation and consumption (scope 1 and 2) that goes beyond the SBTi requirements with a commitment of -66% over the period from 2017-2030 instead of the -55% required by the SBTi.

A gap remains with an SBTi-certified 1.5°C trajectory. In its global guidance (all sectors combined - chart on the left below), a linear reduction of 4.2% per year on scopes 1 and 2 is requested. ENGIE meets these criteria. However, more ambitious targets are required of companies in the Power sector (graph on the right below) on the generation and sale of electricity and heat, on which ENGIE is not aligned at this stage. Below, the gap from the Group’s trajectory with a global warming limited to 1.5°C according to SBTi:



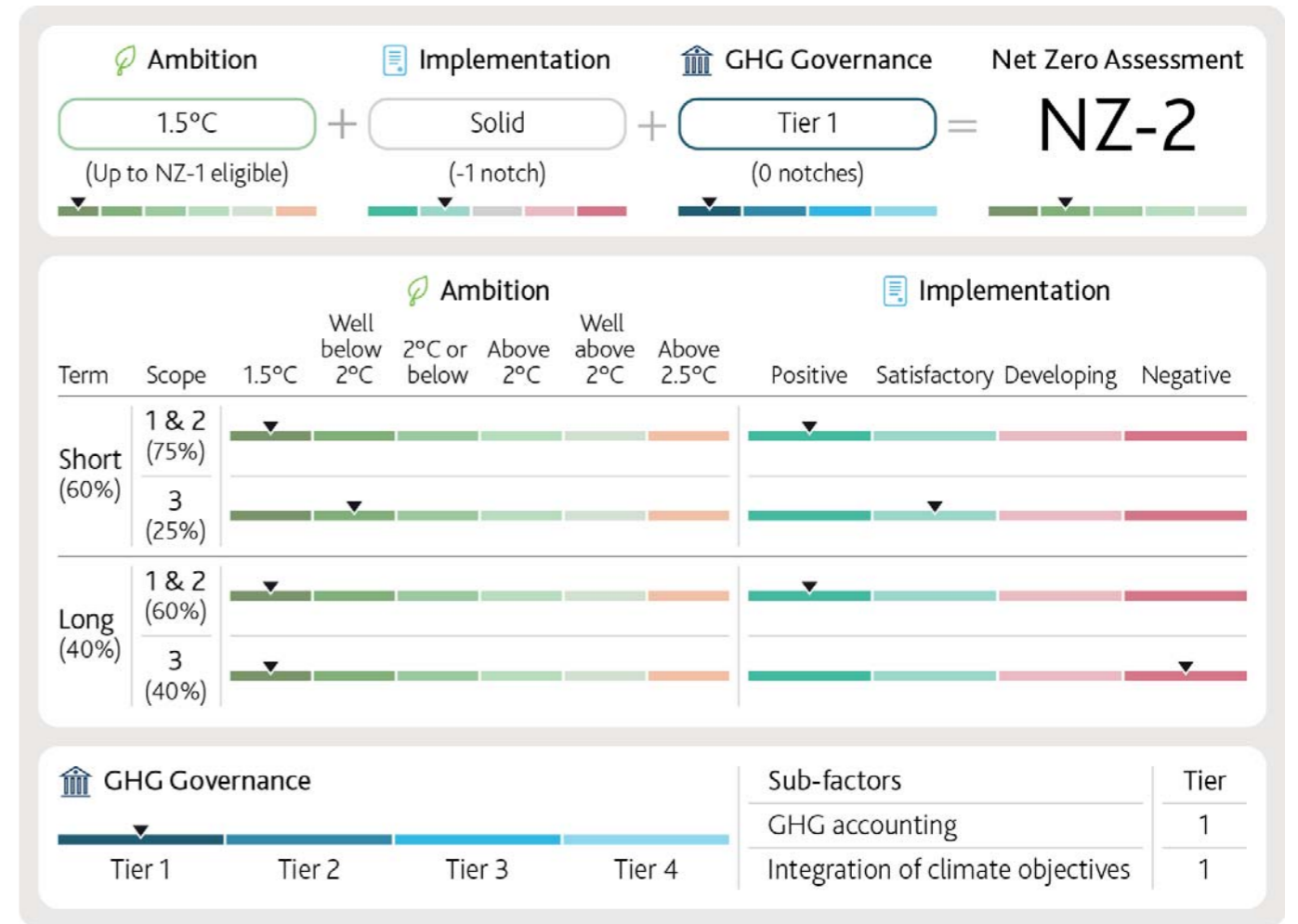
Being aligned with 1.5°C based on SBTi criteria would mean reducing the carbon intensity of the Group’s energy generation to 78% vs. 66% currently over the 2017-2030 period. In such a short space of time, such a ratio would require selling a large number of thermal assets in Europe which, if shut down, would jeopardize the safety of the power system to which they are connected. These assets would therefore continue to emit greenhouse gases. ENGIE has therefore chosen not to divest its European assets, while committing itself to decarbonizing them. ENGIE is in the best position to decarbonize these assets given its positioning in renewable gas technologies.

On energy sales, the 1.5°C trajectory would require increasing the reduction target linked to energy sales (electricity and heat) from -56% to around -80% between 2017 and 2030. ENGIE communicated for the first time on purchases for energy resale in 2022. This indicator is therefore recent and requires more maturity in terms of data before any additional levers of decarbonization can be explored.

### Moody’s assessment

Moody’s assessed ENGIE’s transition plan, giving it a rating of NZ-2, corresponding to aims aligned with a trajectory aligned 1.5°C and a “solid” level on the implementation of objectives.

A summary of the assessment can be found below. The full report is directly available on the Moody’s website ([https://www.moody.com/researchdocumentcontentpage.aspx?docid=PBC\\_1388307](https://www.moody.com/researchdocumentcontentpage.aspx?docid=PBC_1388307)).

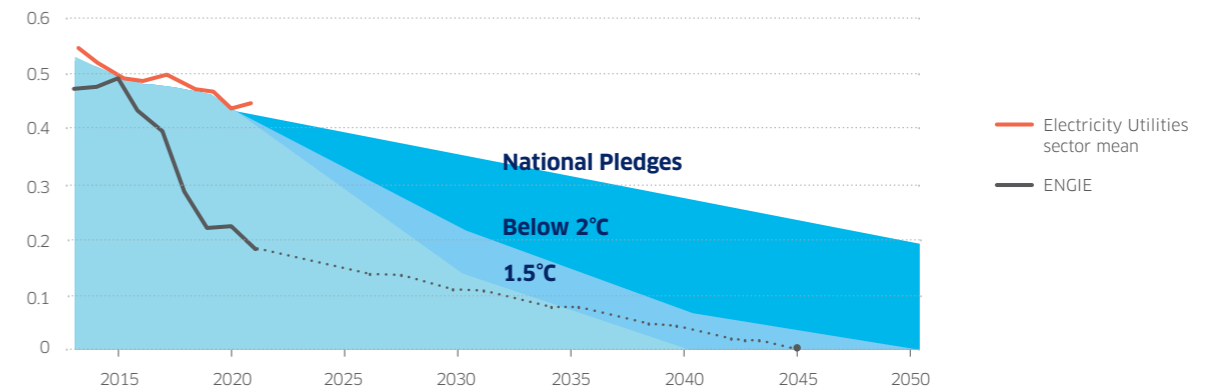


### Assessment of the Transition Pathway Initiative

The *Transition Pathway Initiative*, a partner of the Climate Action 100+, also regards the Group as 1.5°C-aligned by 2030. The

analysis is based on the IEA’s 2022 Net Zero Emissions scenario. The results are presented below.

### CARBON INTENSITY OF ENERGY GENERATION (metric tonnes of CO<sub>2</sub> per MWh of electricity generated)





# Action plan

## Pillar 1 The reduction of induced emissions

### The Group's GHG emission reduction targets (Pillar 1)

The Group steers its induced GHG emissions reduction trajectory (scopes 1, 2 and 3) using both long-term and medium-term targets, and undertakes to:

- 2045** Reduce ENGIE's GHG emissions by at least 90% across all scopes 1, 2 and 3, compared with 2017.
- 2030** Reduce the GHG emissions, both direct and indirect, of all of ENGIE's activities, thus covering 99% of the Group's scope 1, 2 and 3 emissions.

### Objectives related to ENGIE's carbon footprint

Scopes	2030 objectives	Coverage of the 2023 carbon footprint	GBUs concerned	Decarbonization levers	
<b># KPI Absolute objectives</b>					
1. Carbon footprint of energy generation (MtCO <sub>2</sub> eq.)	1, 3.15	43 MtCO <sub>2</sub> eq. -59% vs 2017	32%	Flex Gen Energy Solutions	<ul style="list-style-type: none"> <li>Coal phase-out by 2025 in Europe and by 2027 worldwide of gas consumption</li> <li>Reduction and greening of Renewable heat</li> <li>Energy Efficiency</li> </ul>
2. Carbon footprint of use of sold products (MtCO <sub>2</sub> eq.)	3.11	52 MtCO <sub>2</sub> eq. -35% vs 2017	33%	GEMS Retail Energy Solutions Infrastructures	<ul style="list-style-type: none"> <li>Reduction and greening of gas sales</li> <li>Energy efficiency and sufficiency</li> </ul>
3. Methane emissions from gas infrastructures (MtCO <sub>2</sub> eq.)	1	-30% vs 2017	1%	Infrastructures	<ul style="list-style-type: none"> <li>Modification of industrial security technologies</li> <li>Reduction of venting and flaring</li> </ul>
4. Carbon footprint of ways of working (MtCO <sub>2</sub> eq.)	1, 2, 3.6, 3.7	Net Zero	< 0.5%	ENGIE group	<ul style="list-style-type: none"> <li>Energy sufficiency of buildings</li> <li>Low-carbon service and company vehicles</li> <li>Reduction of air travel</li> <li>Development of soft mobility</li> </ul>
5. Other GHG emissions, including scope 3 from procurement, capital goods and upstream emissions of purchased fuels and electricity (MtCO <sub>2</sub> eq.)	3.1, 3.2, 3.3A and B	85 MtCO <sub>2</sub> eq. -32.5% vs 2017	15%	ENGIE group	<ul style="list-style-type: none"> <li>Procurement: incentives to the top 250 preferred suppliers to be SBTi-certified or aligned</li> <li>Upstream emissions of purchased fuels: reduction of the volumes of fuels sold and consumed</li> </ul>
<b># KPI Intensity objectives</b>					
6. Carbon intensity related to energy generation and consumption (gCO <sub>2</sub> eq. / kWh)	1, 2	110 g CO <sub>2</sub> eq. / kWh -66% vs 2017	14%* 0,5%	ENGIE group	<ul style="list-style-type: none"> <li>Idem levers objective 1</li> <li>Growth of renewable production</li> <li>Consumption of green electricity</li> </ul>
7. Carbon intensity related to purchases and generation of energy for resale	1, 3.3D, 3.15	152 g CO <sub>2</sub> eq. / kWh -56% vs 2017	50%* 18%	ENGIE group	<ul style="list-style-type: none"> <li>Idem levers objective 1</li> <li>Growth of renewable production</li> <li>Sale of green and low-carbon electricity</li> <li>Energy sufficiency</li> </ul>

Cumulative coverage: 99% of the Group's carbon footprint

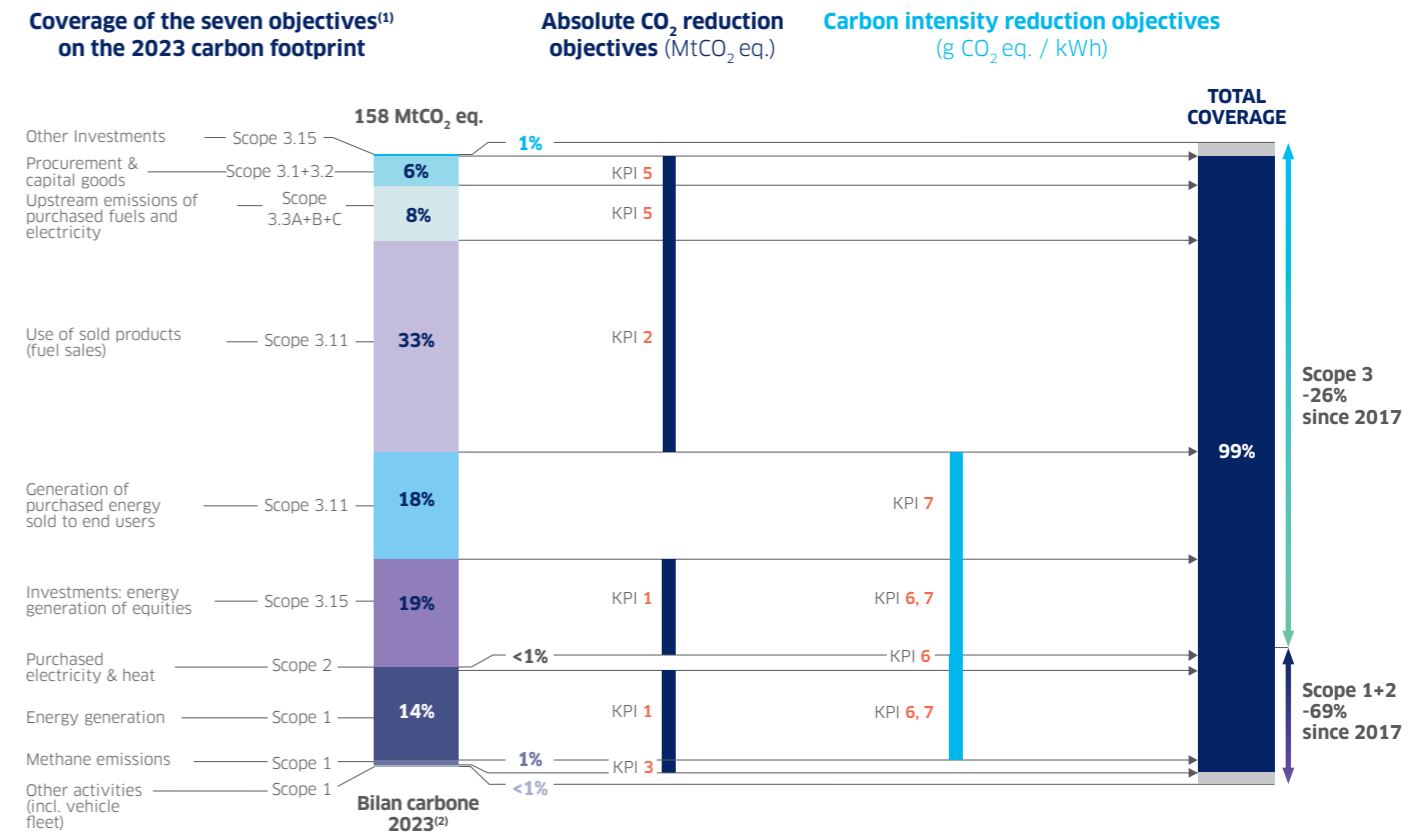
\* Non-cumulative coverage: a carbon intensity indicator that includes absolute indicators already covered.  
For Indicator 6: it includes part of Indicator 1 (additional coverage of scope 2 <1% of the 2023 carbon footprint)  
For Indicator 7: it includes Indicator 1 (additional coverage of purchases for the resale of scope 3.3.D energy = 15% of the 2023 carbon footprint)

### Dual management of GHG emissions in absolute value and intensity

The complexity of the GHG emissions reduction targets is a consequence of both the implementation of an efficient management process, and the alignment with the targets required by the SBTi certification. In fact, as mentioned on p.76, the Group has established a management system incorporating absolute CO<sub>2</sub> limits allocated to each of the Global Business Units (GBUs) that they are not permitted to exceed. At the same time, for ENGIE's "Well-below 2°C" certification, SBTi requires energy

generation sector companies to make commitments in terms of carbon intensity in gCO<sub>2</sub> eq. / kWh (Sectoral Decarbonization Approach - SDA). These correspond to the target for the generation and consumption of energy of the consolidated assets (KPI 6) as well as the target for all production and purchases for the resale of energy (KPI 7). In total, these targets enable ENGIE to cover all of its activities (99% of the Group's carbon footprint in 2023, as the chart below shows), with exhaustive operational

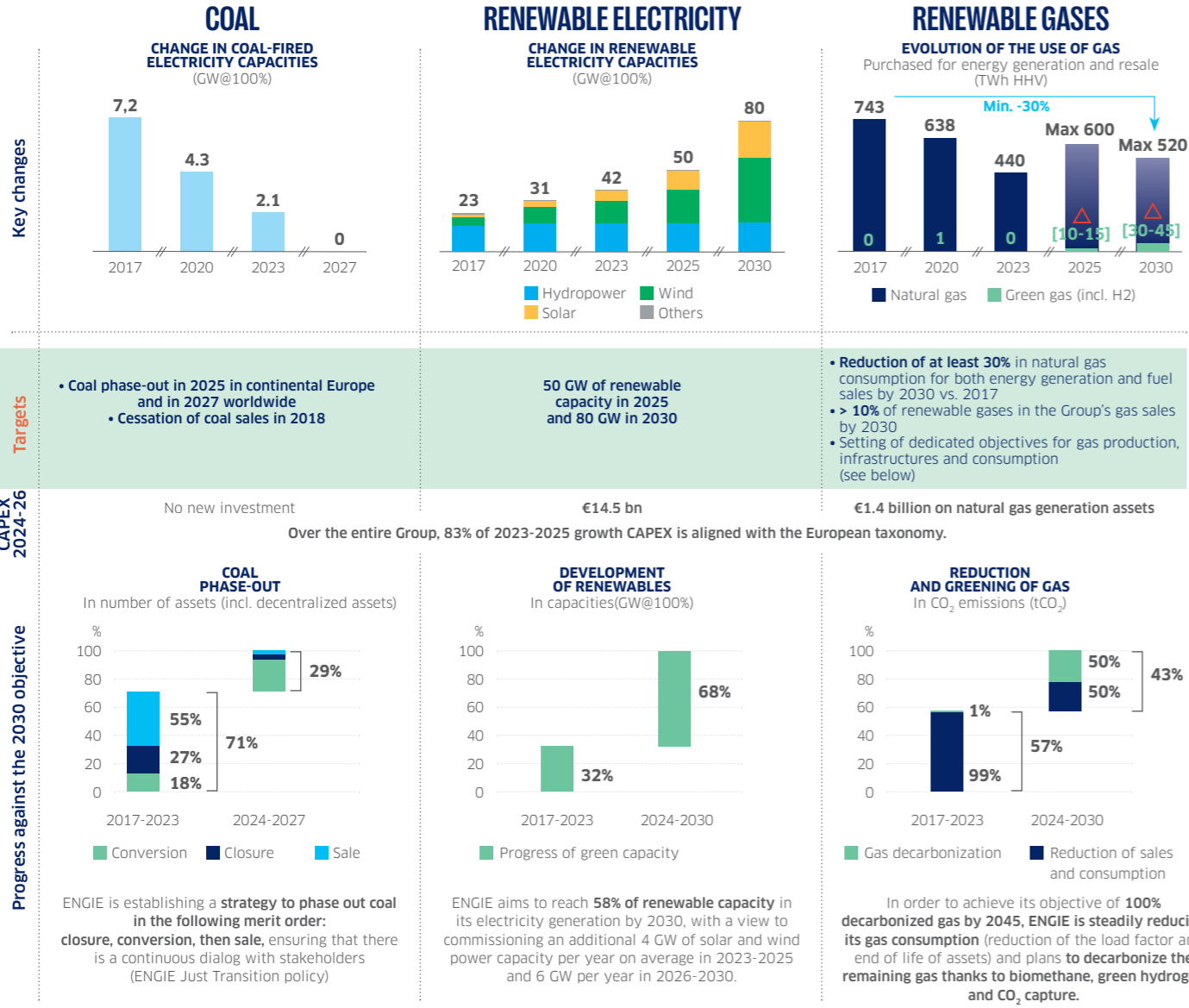
indicators and effective management of carbon performance. On the basis of these objectives and the annual projections of the Medium-Term Plan (MTP CO<sub>2</sub>), it is possible to estimate the Group's total GHG emissions in 2030 as follows: between 20 and 27 MtCO<sub>2</sub>eq. for scope 1, between 1 and 2 MtCO<sub>2</sub>eq. for scope 2 and between 100 and 135 MtCO<sub>2</sub>eq. for scope 3, for a total of between 120 and 165 MtCO<sub>2</sub>eq.



KPI 1: Carbon footprint of energy generation (MtCO<sub>2</sub> eq.)  
KPI 2: Carbon footprint of use of sold products (MtCO<sub>2</sub> eq.)  
KPI 3: Methane emissions from gas infrastructures (MtCO<sub>2</sub> eq.)  
KPI 4: Carbon footprint of ways of working (MtCO<sub>2</sub> eq.)  
KPI 5: Other GHG emissions, including scope 3 from procurement, capital goods and upstream emissions of purchased fuels and electricity (MtCO<sub>2</sub> eq.)  
KPI 6: Carbon intensity related to energy generation and consumption (gCO<sub>2</sub> eq. / kWh)  
KPI 7: Carbon intensity related to purchases and energy generation for resale

(1) The Group also has a 2030 Net Zero objective on its ways of working (IT, business travel, employee commuting, building consumption) which represents 0.15% of the carbon footprint in 2022.  
(2) Figures in MtCO<sub>2</sub> eq.

The Group's Pillar 1 levers



△ These data are forward-looking estimates, updated annually within the Medium-Term Plan (MTP). They are not targets and are shared in a spirit of transparency towards external stakeholders



ENGIE is committing financial resources in line with its decarbonization ambition.

At least 83% of these growth investments are aligned with the European taxonomy. As an indication, this would correspond in particular to the development of:

- low-carbon energy generation (€14 to 15 billion);
- low-carbon networks (electric transport, low-carbon mobility and heating and cooling networks) (between €2 and €3 billion);
- green gas production (biogas, biomethane and hydrogen) as well as storage capacities such as batteries (€3 to 4 billion).

Regarding the 17% not aligned with the European taxonomy:

- Between €1 to 2 billion relate to centralized or decentralized generation

assets which today operate with fossil gas, but which have the capacity to decarbonize by 2045. These are either investments aimed at optimizing their efficiency and reducing their greenhouse gas emissions or additional capacities necessary to bring flexibility to the electricity system.

- Less than €1 billion relates to gas networks. Given the thresholds of the taxonomy, these infrastructures are not considered eligible to date, but will change over time with the increase in the volumes of renewable gas in the networks. In addition, these projects respond to requests whose execution is made mandatory by the European regulatory system: connections to

new customers and strengthening and improvement of existing networks, including digitization measures.

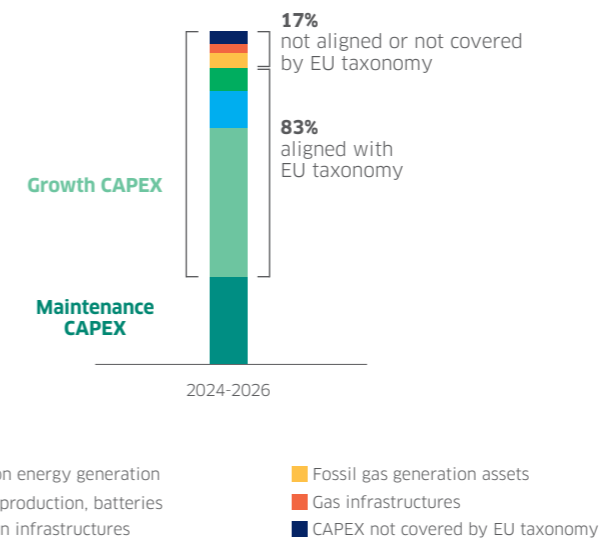
- Finally, part of CAPEX is not aligned because it is not covered by the European taxonomy. This notably includes the development of digital solutions and gas and electricity sales (between €2 and 3 billion).

To deliver its ambitions, ENGIE is committed to aligning all its CAPEX with its decarbonization strategy. The Group is thus confirming its target of €22 to €25 billion in CAPEX growth between 2023 and 2025, and plans to invest a similar amount on yearly average in 2026.

DEVELOP SUSTAINABLE FINANCE

In 2024, the Group is the leading corporate issuer of green bonds in the world, with €6 billion of green bonds issued (€21 billion since 2014). The Group has also integrated into its syndicated credit lines the margin adjustment mechanisms linked to compliance with performance indicators in terms of CO<sub>2</sub> emissions (absolute emissions from energy generation and growth in the proportion of renewable capacities).

ENGIE published its new Green Financing Framework on June 13, 2023. This new framework achieved a sustainability quality score of SQS2 (Very Good) from Moody's, which provided a Second Party Opinion (SPO) on its green characteristics. In this new framework, the technical eligibility criteria of eligible green projects are consistent, when this is relevant and possible, and to the extent possible, with the eligibility criteria of the EU Taxonomy Regulation and the Delegated Acts on Climate Change Mitigation and Adaptation adopted in June 2021 (the "EU Taxonomy").



2030 GREEN GAS OBJECTIVES

DIFFERENT TECHNOLOGIES TO MEET SPECIFIC NEEDS

Alongside its production and sale objectives for green gases (biomethane and hydrogen), ENGIE has implemented a strategy to roll out network infrastructures needed for the development of the green gas sector (e.g. a dedicated network for hydrogen, connections to the existing network for biomethane). The Group's objectives for the roll-out of green gas networks cover the injection needs of ENGIE's production sites as well as the injection needs of third parties. Between now and 2030, €4 billion will thus be invested in hydrogen and €2.5 billion for biomethane connections to the networks.



~10 TWh of annual biomethane production capacity in Europe

~30 TWh / year of biomethane sold

~50 TWh of annual biomethane production capacity connected to ENGIE networks in France



4 GW of renewable hydrogen production capacity by electrolysis in 2035

700 km of network dedicated to hydrogen

30 TWh of hydrogen in the energy management portfolio

10 GW of battery capacity.

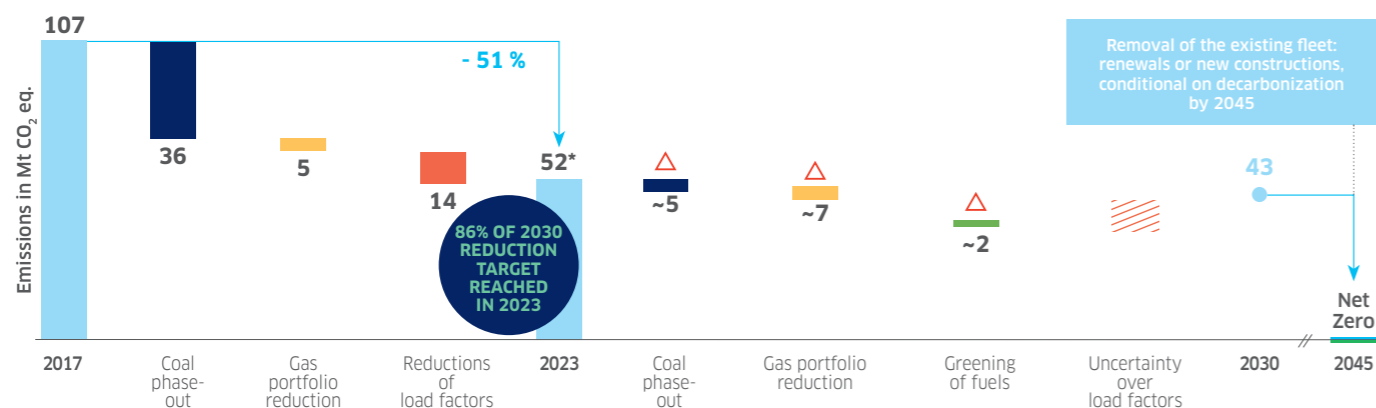
Decarbonize production and sales

2023 RESULTS

2023 was an unusual year due to low load factors and the under-consumption of electricity and gas seen in France and, more globally, in Europe. Electricity production emissions and gas sales were therefore below budget forecasts, with 52 Mt CO<sub>2</sub>eq. for energy generation and 53 Mt CO<sub>2</sub>eq. for fuel sales including gas. Several factors may explain this better-than-expected result, notably the unfortunately historic record of global warming (+1.48°C for the world in 2023 compared with pre-industrial levels) and high energy prices. An in-depth study will be carried out in 2024 to determine the role of cyclical factors in these developments and, conversely, the role of more structural and therefore recurring changes.

Decarbonize energy generation (scopes 1 and 3)

CHANGE IN GHG EMISSIONS RELATED TO ENERGY GENERATION TO 2030 (SCOPES 1+3)



\* Note that the 2025 target of 61 Mt CO<sub>2</sub> eq. related to the energy generation was exceeded as early as 2023.

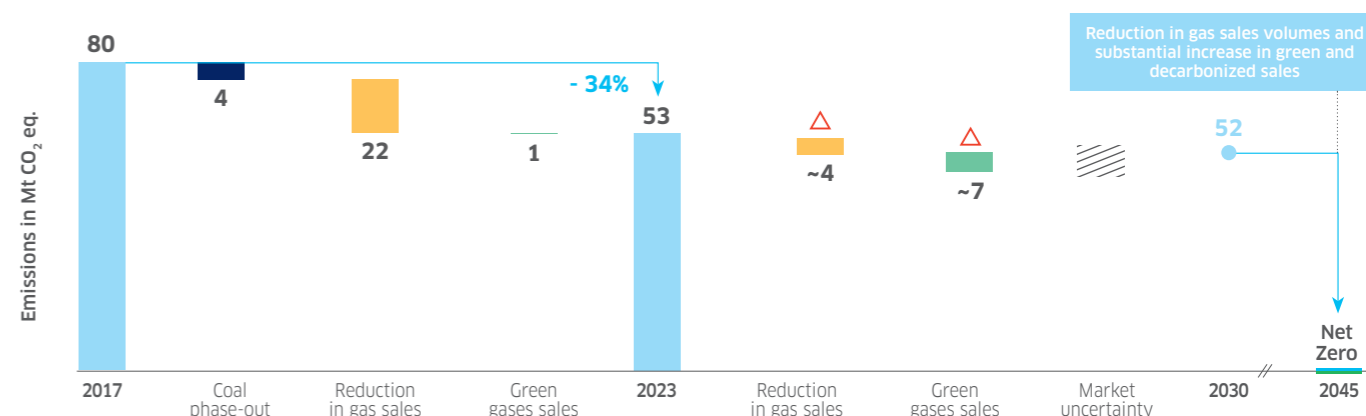
**Four primary levers are used:** the phase-out from coal, the reduction of the gas-fired power plants (closure of several plants at the end of life), the reduction in the utilization time of gas assets (reduction of the load factors) and the decarbonization of the heating networks. Between 2017 and 2023, thermal generation (coal and gas) fell by 50% (-110 TWh). The strong growth in the centralized renewable fleet, as a replacement for thermal assets, plays an essential role

in the Group's decarbonization and enabled a reduction from 348 gCO<sub>2</sub>eq. / kWh to 203 gCO<sub>2</sub>eq. / kWh in the carbon intensity of the energy generation (scopes 1+3) between 2017 and 2023. Moreover, in 2023, renewable energy and recovery energy represented more than 50% of the energy mix of ENGIE's large heating networks and industrial services in France. In 2030, gas-fired power plants in Europe will act primarily as peak capacity to

support the development of renewable energy, with a substantially decreased load factor. The Group currently estimates that the Ukrainian crisis accelerated the decreases in the use of fossil gas and the utilization rate of our power plants over the 2025-2030 period; the uncertainties related to the evolution of the energy system mean that any increase in the 2030 targets remains difficult at this stage.

Decarbonize the use of sold products (fuel sales, including gas)

CHANGE IN GHG EMISSIONS RELATED TO THE USE OF SOLD PRODUCTS TO 2030 (SCOPE 3)



**Three main levers are used:** the end of coal sales since 2017, the reduction in gas sales (related to energy sufficiency, energy efficiency and the transfer to other energy vectors) as well as the greening of sales (biomethane and hydrogen). This last lever will become more important between 2023 and 2030, before becoming one of the main decarbonization levers between 2030 and 2045. At this stage, all the reductions in sales volumes between 2017 and 2023 have been replaced by the development of renewable electricity sales.

Decarbonize electricity purchased for resale (electricity and heat)

Emissions from energy sales (electricity and heat) correspond to emissions linked to energy purchased to be resold to end customers (B2C and B2B). This is a recent indicator for the Group, relatively immature and complex to calculate, and presenting uncertainties given the market statistical information currently available. In fact, it requires access, in particular, to reliable data on emissions and consumption of guarantees of origin, both real and projected, in order to estimate a residual mix of the network. The calculation of emissions linked to energy sales thus requires access to the CO<sub>2</sub> intensity of the residual mix of the network, which corresponds to the

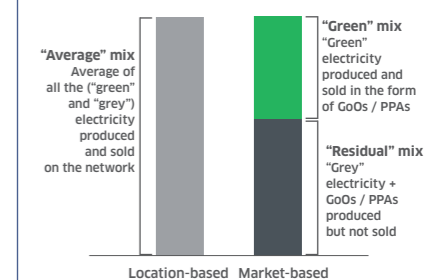
production of "grey" assets as well as to green energy generation certificates (mainly dry guarantees of origin or as part of a long-term energy purchase contract - PPA) not sold. Currently, the internal calculation of this indicator is based on a residual emissions factor for Europe, for which the data are available, and on a network average for the rest of the world. In order to move toward a precise assessment of the energy sales indicator, it is vital to be equipped with reliable and comparable global databases on the consumption of guarantees of origin as well as a shared vision of developments in this system on the part of private and public bodies.

MARKET-BASED OR LOCATION-BASED?

Emissions related to energy sales may be calculated according to two methods: location-based or market-based.

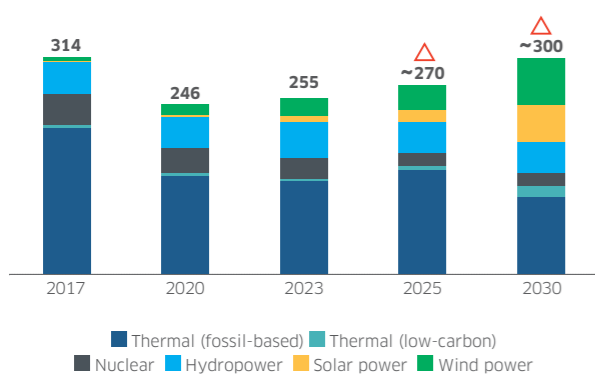
The location-based method applies an average network CO<sub>2</sub> content to all energy volumes sold, while the market-based method applies a different CO<sub>2</sub> content to "green" and "grey" sales volumes.

"Green" energy sales have a certificate proving that the electricity sold was produced using renewable technologies. In this case, we talk about "Guarantees of Origin" (GoOs) or Power Purchase Agreements (PPA). Electricity whose origin is not certified is known as "grey."

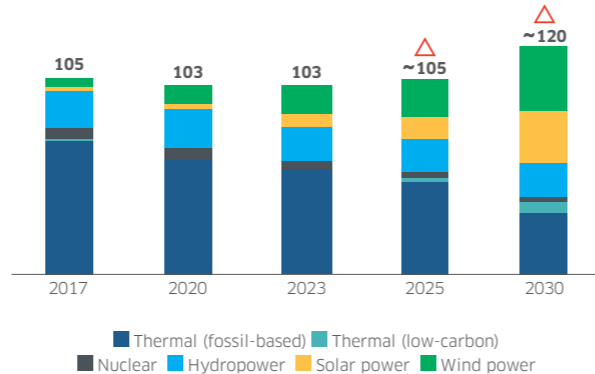


In calculating the emissions of a business, therefore, only the market-based approach makes it possible to value efforts to green energy sales.

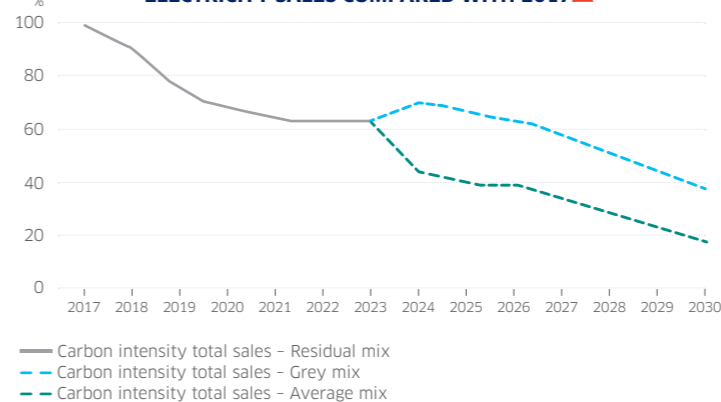
EVOLUTION OF THE ELECTRICITY AND HEAT PRODUCTION MIX (TWH)



EVOLUTION OF INSTALLED ELECTRICITY GENERATION CAPACITY (GW@100%)



EVOLUTION OF THE CARBON INTENSITY OF TOTAL ELECTRICITY SALES COMPARED WITH 2017



△ These data are forward-looking estimates, updated annually within the Medium-Term Plan (MTP). They are not targets and are shared in a spirit of transparency towards external stakeholders.

△ These data are forward-looking estimates, updated annually within the Medium-Term Plan (MTP). They are not targets and are shared in a spirit of transparency towards external stakeholders.

**Decarbonize ENGIE's other activities**

**GHG emissions related to the upstream emissions of fuels and electricity (8% of the carbon footprint)**

This emissions item represents 15 Mt. It corresponds to the upstream emissions of the fuel consumed for our power plants and our sales. Following the war in Ukraine, ENGIE had to renew 20% of its supply contracts in 2023. The strategy of renewing the Group's natural gas supply portfolio is compatible with a decreasing demand for natural gas in Europe between now and 2045. This strategy includes the mobilization of additional volumes from the North Sea, as well as new LNG contracts put in place with companies, particularly American ones. Based on internal data available to date, for the entire life cycle from extraction to combustion, the difference in emissions between LNG from the USA and natural gas from Russia is estimated at approximately 10%. These contracts do not call into question the Group's ability to achieve its Net Zero objective by 2045, nor its greenhouse gas emissions objectives for 2030 and they end before 2045. In the meantime, they offer the Group the flexibility to be able to reroute these volumes.

**GHG emissions related to suppliers (6% of the carbon footprint)**

ENGIE is committed to supporting its top 250 preferred suppliers (excluding energy purchase) so that they are all certified or aligned with the Science Based Target initiative by 2030. This would cover 20% of the Group's purchases in terms of expenses. At the end of 2023, 24% of the top 250 preferred suppliers were already certified or aligned. As a founding member of the First Movers coalition - which aims to accelerate the creation of a competitive and carbon neutral supply chain - ENGIE is committed to ensuring that 10% of its wind turbines will be made of low-carbon steel by 2030. In 2023, ENGIE launched a carbon dialog with all of its "preferred," "major" and "top emitter" suppliers (i.e. more than 55% of the carbon purchasing footprint) in order to understand their maturity with respect to decarbonization (effective measure over their three scopes, calculated figures and restrictions, etc.). This will allow for the multiplication of industrial projects to decarbonize the Group's procurement and to support our suppliers appropriately on this decarbonization pathway.

**Methane emissions from gas infrastructures (1% of the carbon footprint)**

The methane emissions related to gas infrastructures controlled or operated by the Group are primarily due to venting safety

procedures. ENGIE has been committed for many years to reducing its methane emissions, which accounted for 1.5 t CO<sub>2</sub> eq. in 2023. In 2020, the Group's French subsidiaries (GRDF, GRTgaz, Elengy and Storengy) joined the Oil & Gas Methane Partnership 2.0 (OGMP), an initiative managed by the United Nations Environment Program, which intends to share an internationally recognized reporting framework and minimize the associated methane emissions. In this respect, these operators were classified in 2023 at the highest level of commitment - the "gold standard." It should be noted that the reduction target has been increased again this year, from -25 to -40% between 2016 and 2025 for Storengy France. Also new this year is the commitment to reducing methane emissions from the distribution subsidiary, Distrigaz Sud Retele, in Romania through its adherence to the Oil & Gas Methane Partnership (OGMP) 2.0. Going forward, the Group's strategy is to encourage and support all its entities in signing up to OGMP 2.0 by the end of 2024. As well as the commitments of these entities, ENGIE has set an overall worldwide target of a reduction of 30% in its methane emissions related to its consolidated gas infrastructures (transport, distribution, LNG terminals and storage) between 2017 and 2030.

It should be noted that the management of energy infrastructures (electricity and gas) involves GHG emissions whether it is the losses of the electrical grids or the methane emissions in the gas networks. Thus, in France for example, these networks result in fewer emissions per MWh, despite the global warming potential of the methane and the low carbon intensity of the electricity.

**Emissions related to ways of working (0.15% of the carbon footprint)**

ENGIE has set a target of Net Zero Emissions of CO<sub>2</sub> by 2030 on its ways of working (emissions related to office buildings, digital tools and practices, business travel, commuting, and the vehicle fleets). ENGIE reduced its CO<sub>2</sub> emissions in these areas by 61% between 2019 and 2023. Between 2022 and 2023, buildings emissions fell by 10%, thanks to centralized management of a sufficiency plan that aims to cut electricity consumption by 35% by 2030 (compared with 2019), as well as optimization of the real estate portfolio. The same trend (-12%) can be seen in commuting. The gradual replacement of the Group's vehicle fleet with electric or hybrid vehicles also allows for a reduction in fuel-related emissions of 2% between 2022 and 2023.

In 2023, 16% of CO<sub>2</sub> emissions related to ways of working were from business travel (43 kt CO<sub>2</sub>). To reduce this percentage, ENGIE has updated its policy on business travel to seminars. If travel is necessary for the life of the company and operational performance, each employee should assess whether it is relevant and have it approved. International seminars of more than 20 people are limited and better coordinated so that employee travel is pooled. Flights are prohibited for any journey of less than four hours by train. Lastly, residual emissions after reduction efforts will be offset annually by the operating entities. At the same time, employees are made aware of better use of their IT and digital tools, whose emissions represent 7% of emissions related to all ways of working.



**Long-term vision (2030-2045)**

Over the longer term, the Group will continue to use all the levers presented and is targeting a reduction of at least 90% in its absolute emissions compared to 2017 across all scopes. Managing emissions upstream of the value chain will become, in the long term, the main challenge in achieving Net Zero Carbon. ENGIE's GHG emissions mitigation strategy will evolve from the reduction of emissions related to fossil fuels (representing ~70% of the carbon footprint in 2017) to the optimization of upstream emissions (which is expected to represent ~80% in 2045 according to the Group's latest estimates<sup>(1)</sup>). The main sources of emissions will be the upstream chain of fuels sold and consumed (mainly biomethane), purchases of energy for resale and purchases of goods and services. The Group expects to see a major decrease in the use of fossil fuels in 2045 compared with 2017.

**Oil & Gas Methane Partnership (OGMP) 2.0 aimed at reducing the methane emissions of the infrastructures**

**CH<sub>4</sub><sup>(1)</sup> intensity of 0.125% by 2025**

**-80% CH<sub>4</sub> emissions in 2025 compared with 2016**

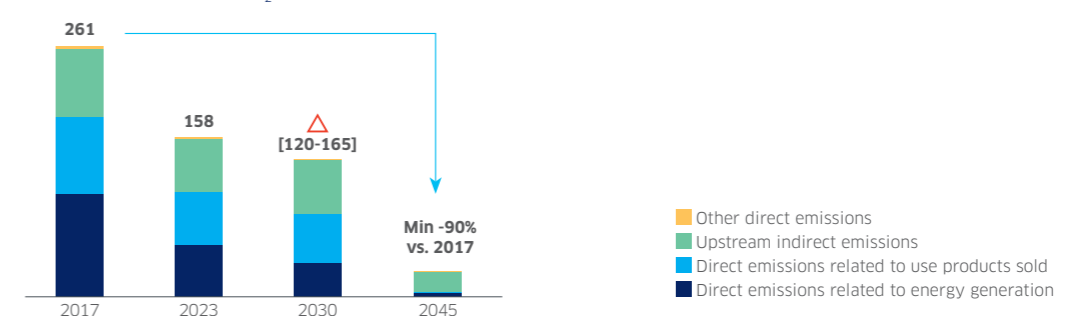
**-40% CH<sub>4</sub> emissions in France; -45% in the United Kingdom; -35% in Germany in 2025 compared with 2016**

**30% CH<sub>4</sub> emissions in 2025 compared with 2015**

**CH<sub>4</sub><sup>(1)</sup> intensity of 0.093% by 2028**

(1) CH<sub>4</sub> emissions / volume of gas distributed

**EVOLUTION OF ENGIE'S EMISSIONS BY 2045 (MTCO<sub>2</sub> EQ.)**



Massive use of renewable gases (biomethane, renewable hydrogen, etc.) will progressively become one of the Group's primary decarbonization levers with renewable electricity capacity. To become competitive, renewable gases will have to benefit from public support, the creation of partnerships and market mechanisms in order to scale up these new energy vectors. This will also imply an adaptation of existing gas infrastructures in order to achieve the goal (in the case of France) of 100% renewable or low-carbon gases in the transport and distribution infrastructures in 2050.

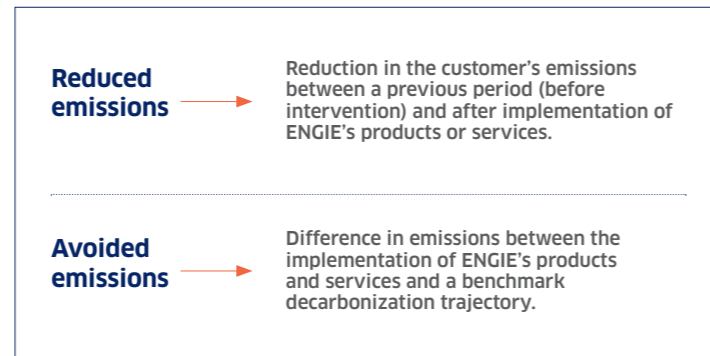
ENGIE is also planning new technology developments in carbon capture, utilization and storage (CCUS), mainly to supply decarbonization services to industries whose emissions are hard to reduce and to capture biogenic CO<sub>2</sub> from biomass combustion (bioenergy with CCS). CCUS can also be used to support the decarbonization of flexible electricity production assets but will play a secondary role and could serve as the final element of mitigation.

(1) This value is not a target. Data estimated during the latest projection exercises for the Group's emissions to 2045 for the feasibility of the Net Zero 2045 commitment.   
 △ These data are forward-looking estimates, updated annually within the Medium-Term Plan (MTP). They are not targets and are shared in a spirit of transparency towards external stakeholders.

## Pillar 2

### Decarbonize our customers through our products and services

ENGIE's aim is to accelerate the transition toward a carbon-neutral economy by proposing energy-saving and environmentally friendly solutions. The Group is committed to helping its customers reduce their carbon footprint by supplying them with adapted products and services. In 2020, ENGIE developed a methodology to quantify avoided emissions and set a goal of decarbonizing its customers by 45 MtCO<sub>2</sub> eq. / year by 2030. In 2023, ENGIE contribution to customer decarbonization was already 25 MtCO<sub>2</sub> eq. ENGIE participates in international working groups such as the World Business Council for Sustainable Development (WBCSD) and the Net Zero Initiative in order to accelerate the development and deployment of a comparable indicator that can be used by all.



#### + EXAMPLE

##### Decarbonization of the heating needs of the CANSON site in Saint-Marcel-Lès-Annonay

Last November, ENGIE Solutions made official a 10-year partnership with CANSON, a subsidiary of the Italian group FILA (Fabbrica Italiana Lapised Affini), for the design, building, operation and maintenance of a biomass boiler at the Ardeche site, Saint-Marcel-Lès-Annonay, of CANSON, a paper manufacturer for the fine arts market.

From 2026, this project will ensure that CANSON's plant will be supplied with renewable, local heat, produced by a biomass boiler with 5 MW of power, enabling 89% of the plant's steam needs to be met. The wood used will be composed of 80% forest chips and 20% pallet shreds, sourced locally. This biomass facility will thus enable avoidance of emissions of close to 5,715 metric tonnes of fossil-based CO<sub>2</sub> per year. ENGIE Solutions will thus provide close to 31 GWh of useful heat per year in the form of steam.

Aligned with French industry's decarbonization strategy, this biomass infrastructure was financed by the French State, as part of France 2030, which is operated by ADEME and funded by the European Union - NextGenerationEU.



#### Supporting energy sufficiency and electrification of uses

Together with its 22 million B2C customers, ENGIE contributes to societal behavioral change.

With *Mon Programme pour Agir* (My Program to Act), the Group rewards customers who consume less and better and gives them the power to act for the ecological transition. This program now has 700,000 active customers, enabling 130 environmental, societal and start-up projects to be supported. Since 2020, more than 350,000 people have taken

part in eco-challenges to reduce energy consumption, for a total saving of more than 40 GWh.

In addition, the free service *Mon Pilotage Elec* (My Electricity Management) enables users to manage their electric radiators remotely and to take part in the energy transition by agreeing to help balance the French electricity network during periods of peak consumption. Last November and December, users of *Mon Pilotage Elec* reduced their electricity consumption by 18% on

average. In three years, the program is expected to reach an electricity network shedding capacity of nearly 100 MW. Also, the energy transition will require the electrification of a large number of uses in the residential sector. In this sense, the Group actively supports the development of electric mobility. Engie has therefore launched a "Drive" energy tariff and app (in Belgium) for owners of electric vehicles.

## Pillar 3

### Remove carbon up to ENGIE's residual emissions

Aligned with the latest scientific research, to achieve carbon neutrality on a global scale and comply with the Paris Agreements, humanity will have to drastically reduce its greenhouse gas emissions (by around 85%) but will also have to rely on carbon sequestration: between 6 and 10 Gt CO<sub>2</sub> per year in 2050 according to the GIEC<sup>(1)</sup>.

To this end, ENGIE intends to first reduce its GHG emissions by at least 90% across its three scopes by 2045 and then contribute to the increase in carbon sinks within and beyond its value chain in order to neutralize its residual emissions. The removal strategy is constructed in two main steps.

By 2030, the Group has set a target of being Net Zero in four countries (including Brazil) and in its ways of working. To this end, nature-based solutions<sup>(2)</sup> will mainly be used, as these are the only ones that can capture significant volumes of carbon in the short term. Carbon dioxide removal will mainly be carried out through

the use of carbon credits, which will be selected with the best standards in effect for unicity, permanence, additionality, co-benefit, and zero net harm. The carbon credits used will be of removal type only (no use of avoided emissions credits type for the Net Zero commitments). To date, ENGIE only purchases carbon credits up to the emissions linked to business travel of ENGIE's Coporate Direction (3.2 kt CO<sub>2</sub> in 2022). Furthermore, a Group policy was signed in December 2023 to make the purchase of carbon credits mandatory for business travel for all ENGIE employees, to encourage them to reduce their air travel. To give itself the resources it needs to achieve its aims, ENGIE has created a dedicated office (*Carbon Desk*) within its Global Energy Management (GEMS) entity, in order to source high-quality carbon credits, for both the Group's needs and those of ENGIE's customers. ENGIE has also invested in The Shared Wood Company<sup>(3)</sup>, created by experienced forestry experts, who develop nature-based solutions

projects, mainly in Africa, Latin America and Europe. In the long term, ENGIE will be able to rely on negative emissions technology solutions by integrating them into the energy generation value chain. For example, bioenergy-based carbon capture technologies (BE-CCS), such as the capture of biogenic CO<sub>2</sub> in the digesters or the capture of biogenic CO<sub>2</sub> in thermal power plants running on biomass (biogas, biomethane or wood), can be essential levers in achieving the Group's 2045 Net Zero Carbon target.

(1) IPCC AR6

(2) For example: afforestation, reforestation, regenerative agriculture, mangroves etc.

(3) ENGIE invests in *The Shared Wood Company* press release

#### + EXAMPLE

##### ENGIE captures biogenic CO<sub>2</sub> with its digesters

ENGIE, through its entity Renewable Gases Europe (RGE), is targeting a production of 10 TWh of biomethane / year in Europe by 2030. With ENGIE BiOZ within the France scope, it is already developing partnerships with expert players in CO<sub>2</sub> capture on its digesters. This captured biogenic CO<sub>2</sub> can then be recovered for industrial or agricultural uses to replace fossil-based CO<sub>2</sub> and even sequestered in recycled construction materials. In 2024, ENGIE and VERDEMOBIL Biogaz will commission two CO<sub>2</sub> purification and liquefaction units at Allonnes (72) and Montoir-de-Bretagne (44), which will be able to capture up to 4,000 tCO<sub>2</sub> per year.



"Melle BioCO<sub>2</sub> VERDEMOBIL"

# Risks and opportunities

## Transition risks review – climate mitigation

### ENGIE gas infrastructures: a necessary transformation toward total decarbonization

The reduction of the volume of gas in certain networks (transport, storage or distribution) or in certain sectors (buildings, electricity production) and the imposition of stricter carbon criteria for methane currently represent major challenges for ENGIE's activities and for its gas networks in particular.

► **The acceleration of Europe's climate ambitions cannot be accomplished without the use of these assets, which guarantee European energy security and decarbonization through their transformation.**

- Continuity of the methane supply and the coupling of different energy vectors are essential for a decarbonized energy system since they can support the electricity network during demand peaks. This is especially true with the development of hybrid heat pumps.
- French infrastructures guarantee the gas supply in Europe in a complex geopolitical environment and will, in the future, enable the distribution of biomethane synthetic gas and even hydrogen. They provide assurance to the French and European system in the event of incidents on the other energy vectors (reduced nuclear availability, for example).
- Finally, a good portion of the transport or storage network can be converted to hydrogen.

### Renewable electricity: a supply chain that is mature but under pressure and a growing demand for exemplary behavior

The supply of renewable electricity is a key element in ENGIE's decarbonization. At a time of accelerated development of new installed capacities, the manufacturing ability of the wind and solar components and batteries industry will determine the extent to which operators are able to meet their climate ambitions.

► **Thus, the value chain is a key element in the strategy implemented by ENGIE, which has set up an action plan designed to best integrate these risks in investment decisions, reduce its exposure to them by promoting the re-use and eco-design of turbine components (the Zebra project) or solar panels, and diversify its supply chain.**



### Low carbon gas: promising technologies to be industrialized

Accelerating decarbonization is also based on a massive roll-out of low carbon gases (biomethane, hydrogen and synthetic methane), which requires substantial investment in capital and human resources. These technologies remain exposed to regulatory constraints and growing conflicts of use (e.g. wood energy or agricultural waste). Sufficient production quantities will be necessary, particularly to guarantee the continuity of the gas-fired power plants, which are responsible for ensuring the balance of the electricity networks. The need to transform or build adapted infrastructures could also delay the hydrogen economy.

► **The Group is committed to a proactive role in low carbon gases to minimize the hazards to its business and push back these technological boundaries. ENGIE thus plays a significant role in developing the new technologies around 2G biomethane and synthetic molecules (ENGIE Lab), as well as CCS (Carbon Capture and Storage), which will support the decarbonization efforts of its customers in sectors that are difficult to decarbonize.**

### An ambition facing major social and societal challenges.

The energy transition that ENGIE is undertaking includes major social transformations, particularly with employees, the regions, customers and suppliers. These transformations carry a reputational and development risk for the Group, such as the exclusion from certain markets on the basis of the requirements in bid tenders and their criteria for sustainability, or the lack of competitiveness to attract talent.

► **In addition to its climate ambitions, the Group is also committed to a Just Transition (see the Social and Societal Notebook) to assist its most disadvantaged customers, the regions in which the Group operates and the employees when fossil activities are closed down especially in the case of the coal phase-out. Development of renewable energy, both mature and in development, requires an increase in training that is both quantitative (number of persons trained) and qualitative (level of expertise). In this regard, ENGIE has set up training courses to enhance the skills of its employees (Renewables Academy).**

## Physical risks review – climate adaptation

Work has been carried out at Engie for four years to anticipate the chronic impact of climate change on production for the different technologies as well as the impact of the evolution of extreme events on the Group's assets. It has been supported by a collaboration with the Institut Pierre Simon Laplace and the mobilization of the Group's operational experts. The analyses are based on several medium- and long-term warming scenarios (RCP 4.5 and RCP 8.5).

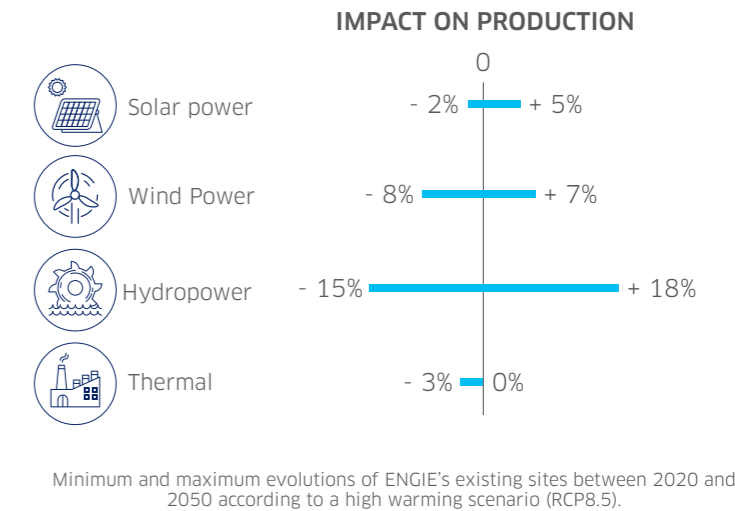
**Evolution of production.** While renewable energy (solar and wind power and hydropower) is essential in building a Net Zero Carbon system, it remains the most affected by the physical impacts of climate change. In the regions where ENGIE operates, hydroelectric generation is the most exposed technology with the strong variations in annual and infra-annual generation expected between now and 2050. Conversely, thermal assets are expected to be particularly resilient in terms of production variation.

### + EXAMPLE

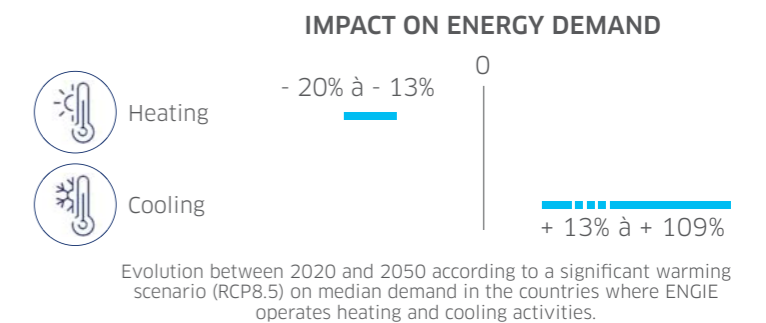
Existing impacts due to climate change:

**Cold wave in Texas in 2021:** -€30 to €40 million on net income / (loss) Group share

**Drought in France and Portugal in 2022:** "buybacks" of 1.3 TWh for €127 million in EBIT



**Evolution of demand.** The impact of climate change on the change in demand results in a change in heating and cooling needs. Heating needs should decline sharply, while cooling needs are expected to increase massively over the coming decades.



**Integrity of assets.** Asset integrity may be affected by the increase in the number of extreme events. For the past three years, the Group has been working to increase its resilience in the face of climate change. The main indicators concern heat waves, heat stress, water stress, floods, extreme winds, landslides, forest fires and coastal erosion. On this subject, the analyses are based on degrees of warming: +1.5°C and +2°C and since 2024 on +3°C and +4°C.

### + EXAMPLE

Existing impacts due to climate change:

**Spring 2023:** Wind damage at sites in Peru, Brazil and South Africa

**Summer 2023:** Exceptionally violent hail (hailstones 10 cm in diameter, very strong winds and heavy rain) at a solar farm in Italy

**Health of employees and subcontractors.** In addition to the risks discussed above, particular attention is paid to the impact of extreme heat and thermal stress (combination of temperature and humidity) on employees and subcontractors.

### + EXAMPLE

Existing impacts due to climate change:

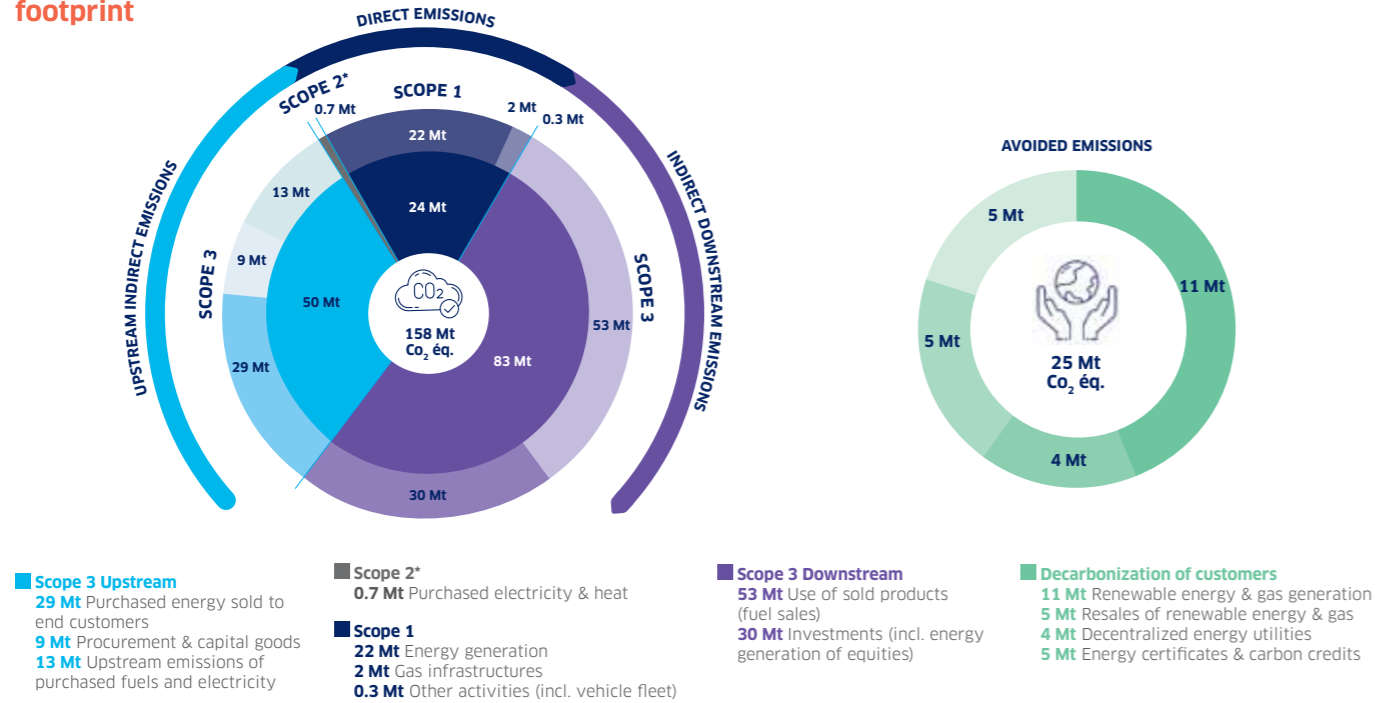
**Summer 2021:** Inability of ENGIE employees in the Middle East to come to work because of extreme heat (+50°C)

**Summer 2022:** Support of the housing relocation of ENGIE employees in Pakistan in order to ensure continuity of service following floods

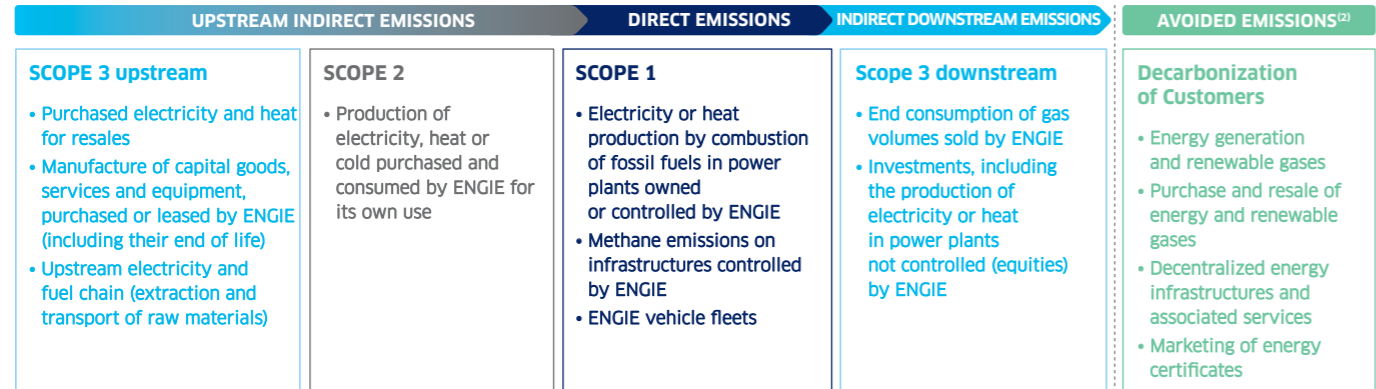
All this work allows for the roll-out of adaptation plans for the Group's assets and activities (after a pilot phase in 2022) as well as the integration of the impact of climate change in the Group's investment decision-making process.

# Decarbonization in numbers

## ENGIE's 2023 carbon footprint

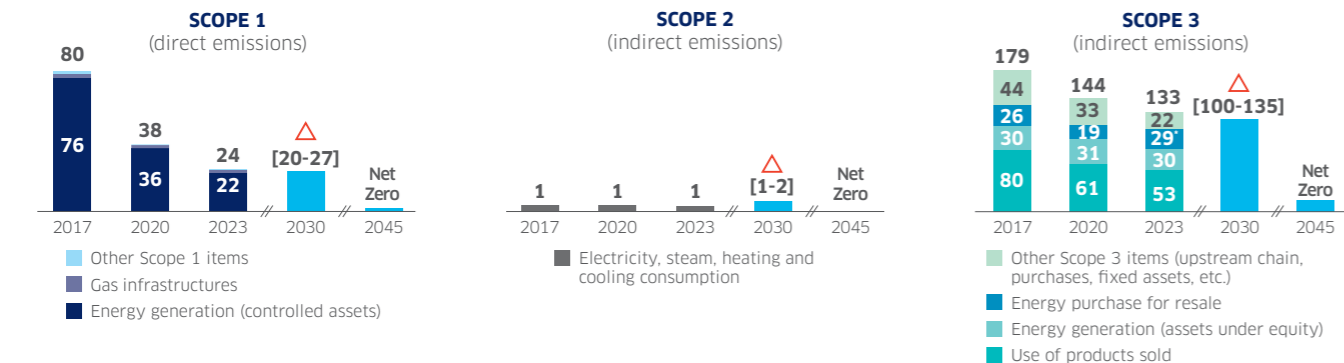


\* The scope 2 emissions shown on the chart above are calculated according to the location-based method. According to the market-based method, ENGIE's scope 2 emissions in 2023 were 0,8 Mt.



(1) The external databases used to calculate emissions related to purchased electricity and heat for resale are still under reliability improvement process. The figures could change in the coming years.  
 (2) Emissions avoided excluding the ENGIE carbon footprint

## GHG emissions since 2017 (MtCO<sub>2</sub> eq.)



△ These data are forward-looking estimates, updated annually within the Medium-Term Plan (MTP). They are not targets and are shared in a spirit of transparency towards external stakeholders

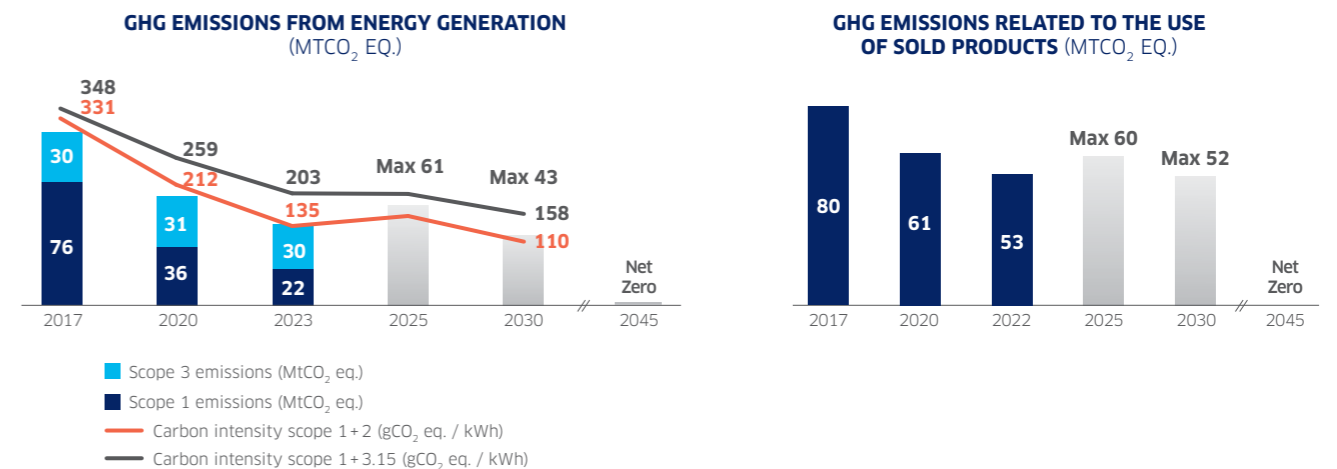
\* Indicator audited for the first time in 2023.

## 2030 Climate objectives

With the desire to leverage opportunities associated with climate change challenges and to capitalize on its expertise in terms of decarbonization, ENGIE has set itself long-term as well as short- and medium-term objectives.

	RESULTS 2017	RESULTS 2020	RESULTS 2023	OBJECTIVES 2030
Carbon footprint of energy generation (Mt CO <sub>2</sub> eq.) (scopes 1 and 3.15)	107	68	52	43 Mt CO <sub>2</sub> eq.
Carbon footprint of use of sold products (MtCO <sub>2</sub> eq.) (scope 3.11)	80	62	53	52 MtCO <sub>2</sub> eq.
Carbon intensity related to energy generation and consumption (gCO <sub>2</sub> eq. / kWh) (Scopes 1 and 2)	331	212	138	-66% vs. 2017 110 gCO <sub>2</sub> eq. / kWh
Carbon intensity related to purchases and production of energy for resale (Scopes 1 and 3.3 and 3.15)	346	250	225	-56% vs. 2017 152 gCO <sub>2</sub> eq. / kWh
Other GHG emissions, including scope 3 from procurement, capital goods and the upstream of purchased fuels and electricity (scopes 3.1, 3.2, 3.3) in MtCO <sub>2</sub> eq.	126	103	82	-32.5% vs 2017 85 MtCO <sub>2</sub> eq.
Methane emissions from gas infrastructures (MtCO <sub>2</sub> eq.) (Scope 1)	2.2	1.5	1.5	-30% vs 2017 1.5 Mt CO <sub>2</sub> eq.
Decarbonization of customers: emissions avoided through ENGIE products and services (MtCO <sub>2</sub> eq.)	N/A	21	25	45
Decarbonization of the top 250 preferred suppliers (excluding energy): portion of suppliers SBT certified or aligned	N/A	15%	24%	100% of the top 250 suppliers
Decarbonization of our ways of working: GHG emissions (MtCO <sub>2</sub> eq.) (Scopes 1, 2 and 3)	N/A	0.49	0.26	Net Zero
Share of renewable capacities (@100% & pumped storage excluded) for electricity production	23%	31%	41%	58%

## Evolution of the two main indicators of the Group's decarbonization (including carbon intensity)



## Operational indicators

## Power generation installed capacity

Technology	UNIT	2017	2020	2023
Thermal (fossil-based)	GW@100%	72	62	57
Thermal (low-carbon)	GW@100%	1	0	0
Nuclear	GW@100%	6	6	4
Hydropower	GW@100%	20	21	18
Solar power	GW@100%	2	3	7
Wind power	GW@100%	5	10	16

## Energy generation (electricity and heat)

Technology	UNIT	2017	2020	2023
Thermal (fossil-based)	TWh electric eq.	211	142	133
Thermal (low-carbon)	TWh electric eq.	5	3	3
Nuclear	TWh electric eq.	44	36	31
Hydropower	TWh electric eq.	47	45	51
Solar power	TWh electric eq.	1	3	8
Wind power	TWh electric eq.	7	16	28

## Energy consumption (electricity and heat)

Technology	UNIT	2017	2020	2023
Electricity	GWh electric	4	3	4.5
Heat	GWh thermal	0.1	0.1	0.1

## Fuel consumption and sales

Type of fuel	UNIT	2017	2020	2023
Natural gas	TWh HHV	744	638	542
Natural gas + CCS	TWh HHV	0	0	0
Coal	TWh HHV	138	40	13
Biomass	TWh HHV	22	18	11
Biomethane	TWh HHV	0	0	3
Hydrogen	TWh HHV	0	0	0
Others	TWh HHV	18	14	14

## European taxonomy

Indicator	UNIT	2017	2022	2023
Revenue taxonomy alignment	%	N/A	15%	18%
OPEX taxonomy alignment	%	N/A	39%	35%
CAPEX taxonomy alignment	%	N/A	58%	66%
Three-year growth CAPEX plan taxonomy alignment	%	N/A	76%	83%

# ENGIE's carbon footprint in 2017 and 2023

(- 39% between 2017 and 2023)

Emissions (t CO<sub>2</sub> eq.)

	2017	2020	2022	2023
Scope 1	80,489,233	38,606,036	29,943,790	24,496,514
Energy generation	76,377,307	36,394,644	27,9183,015	22,243,521
Gas infrastructures	2,625,857	1,913,998	1,712,245	1,962,875
Methane emissions from gas infrastructures	2,069,736	N/A	1,263,608	1,453,447
Other emissions from gas infrastructures	556,121	N/A	448,637	509,428
Other activities	1,486,068	297,394	313,530	290,118
Scope 2 - Location-based	916,698	613,714	850,154	654,073
Scope 2 - Market-based	N/A	N/A	N/A	847,043
Scope 3	179,335,290	149,782,745	144,543,263	133,337,361
1. Purchased goods and services	14,868,671	8,976,422	5,465,933	5,936,639
2. Capital goods	2,947,153	3,273,440	2,820,304	3,051,298
3. Fuel- and energy-related activities	51,485,306	38,471,413	42,168,536	41,451,946
Upstream emissions of purchased fuels and electricity	25,757,416	19,343,594	15,847,895	12,918,744
Generation of purchased energy sold to end users	25,727,890	19,127,819	26,250,871	28,533,202
11. Use of sold products (fuel sales)	79,515,748	61,496,829	61,288,580	52,536,380
15. Investments	30,136,474	31,150,692	32,709,929	30,259,065
Energy generation of equities	30,136,474	N/A	32,184,853	29,969,276
Other investments	0	N/A	522,076	289,789
<b>TOTAL scopes 1, 2 and 3</b>	<b>260,741,220</b>	<b>189,002,495</b>	<b>175,337,207</b>	<b>158,487,948</b>

(1) Location-based

In order to monitor the deployment of its climate strategy, ENGIE conducts a thorough reporting of its activities.

- Greenhouse gas emissions reporting is based on the GHG Protocol, the benchmark carbon accounting standard.
- Environmental reporting is aligned with financial reporting: @100% for consolidated entities and @share for equity-accounted entities. It should be noted that only scopes 1 and 2 are included in category 3.15 (for equity-accounted entities). The impact of the CSRD is regarded as minimal at this stage.
- All figures are in CO<sub>2</sub> equivalent, as the reporting takes into account all the greenhouse gases that are then converted into CO<sub>2</sub> equivalent (via the global warming potential - sixth assessment report of the IPCC).
- The combustion emission factors are based on the IPCC (IPCC *Guidelines for National GHG Inventories*, Vol. 2 Energy). It should be noted that the electricity emission factors are based directly on the ENTSO-E (European Network of Transmission System Operators for Electricity) database and on the ENERDATA database for the rest of the world. The databases on the residual emission factors are very poor: it is a matter of urgency to develop reliable and comparable global databases on the consumption of guarantees of origin as well as a shared vision of developments in this system on the part of private and public bodies.

- In order to achieve a generation volume of electrical energy equivalent (GW<sub>heeq</sub>), the conversion factor for thermal energy produced (GW<sub>hth</sub>) in electrical energy (GW<sub>he</sub>) is set at 0.61 (on the basis of Delegated Regulation 2015/2402 of the EU Commission).
- More precisely, by type of activity, the reporting relates to the following elements (not exhaustive, see Chapter 3.5.3 of the Reference Document for more details):
  - Energy generation:** includes direct emissions related to fuel combustion as well as GHG leaks (e.g. SF<sub>6</sub>, an insulator used in all the electrical facilities) or emissions linked to chemical processes (desulfurization process).
  - Use of products sold:** includes direct emissions related to fuel sales (all primary energy) to end users. Trading sales are not included in the Group's carbon footprint.
  - Purchasing of energy for resale:** includes direct and indirect emissions related to energy sales (all secondary energy: electricity, heating and cooling) to end users. Trading sales are not included in the Group's carbon footprint.
  - Gas infrastructures (transport, distribution and storage):** includes, in particular, methane emissions including voluntary and involuntary flaring or venting and the combustion of fuel for compression stations.
  - Electricity infrastructures (transport, distribution and storage):** includes, in particular, emissions related to the electrical losses of infrastructures and GHG leaks (similar to energy generation facilities).





# NATURE NOTEBOOK

According to the *World Economic Forum*, more than 50% of global GDP is dependent on services provided by nature. All economic players are concerned.

December 2022 was a major step for biodiversity with the signing of the Kunming-Montreal Global Biodiversity Framework (GBF). Numerous economic players, including ENGIE, joined forces during this 15<sup>th</sup> Conference of the Parties to demonstrate their involvement and underline the need to act immediately to halt the loss of biodiversity and reverse the downward trend, while also continuing efforts to respect the Paris Climate Agreement. Climate change and Nature are closely linked and are two elements that each company must act on simultaneously, while also integrating societal challenges, to ensure a successful energy transition.

In addition to global agreements, new international (TNFD and SBTn) and European (CSRD) frameworks are structuring the integration of Nature-related challenges in corporate strategies, the analysis of impacts and dependencies, risks and opportunities, monitoring indicators and objectives to be set. This integrated approach to Nature challenges are based on scientific knowledge, including planetary boundaries.

In 2023, ENGIE continued to work on developing SBTn guides and took part in the TNFD Forum. To identify the necessary steps to become aligned with the European directive and the new international frameworks, the Group has analyzed how its practices deviate from these regulations, then worked on the implementation of the LEAP method (Locate, Evaluate, Assess, Prepare).

2023 was also marked by the second United Nations Conference on water. This meeting was a driving force of engagement, during which the Group joined business leaders in the call to accelerate water-related action: *Open Call for Positive Water Impact* ([wateractionnow.org](http://wateractionnow.org)). As such, ENGIE is involved in identifying collective actions in the 100 priority watersheds in which it carries out its activities.

The nature notebook presents the governance, strategy, policies, action plans, metrics and targets implemented by the Group on biodiversity, water and oceans, air pollution and the circular economy.

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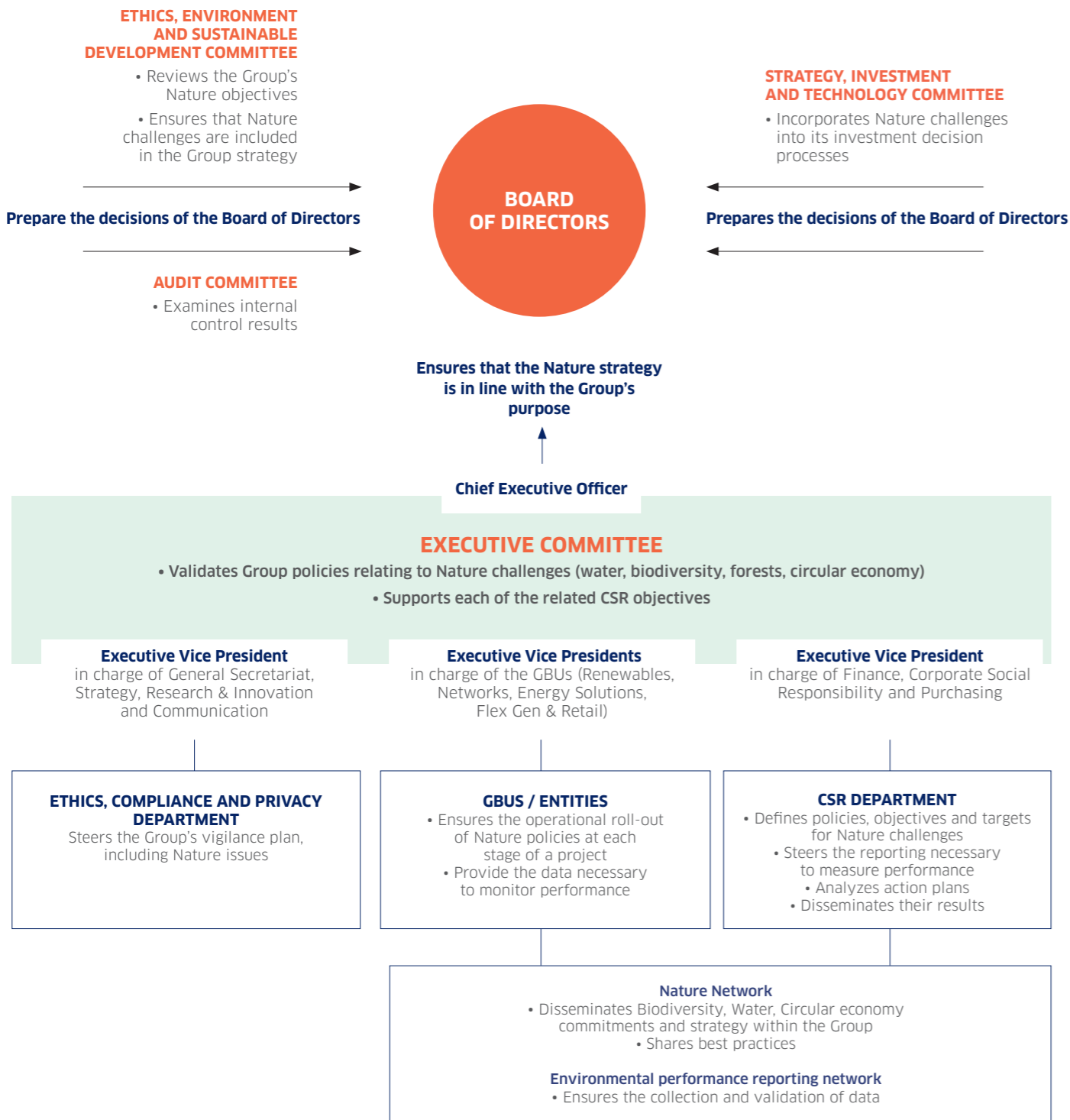
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Metrics and targets



# Governance

## Nature governance which mobilizes management bodies

The Nature strategy is rolled out from the highest level of the company to the operating entities through policies, objectives and the monitoring of action plans. Performance monitoring is carried out through annual reporting, internal control and the presentation of results to the Executive Committee and to the relevant Committees of the Board of Directors. The themes covered in 2023 were biodiversity, water, air pollution and waste. Monitoring of the oceans and land use themes remained within the scope of the Group's CSR Department due to ongoing discussions on creating relevant, consolidated Group-wide indicators.



# Strategy

## Process to identify and assess impacts and dependencies, risks and opportunities

From 2021, as part of its involvement in the SBTn<sup>(1)</sup> pilot phase and the work carried out on Life Cycle Assessment (LCA) as part of the partnership with the IUCN French Committee, the Group has worked on an analysis of its impacts and dependencies by activity. In 2023, the Group enhanced this analysis using the LEAP<sup>(2)</sup> method, recommended by the CSRD<sup>(3)</sup>, with the support of ERM consulting. In order to carry out an initial review of the impacts and dependencies, we have used the results of the sectoral work of the WBCSD's Energy pathway<sup>(4)</sup>, to which ENGIE has contributed.

## NATURE-RELATED IMPACTS

PRESSURE ON NATURE		ENGIE'S ACTIVITIES										
		Thermal power plants			Renewable energy					Gas infrastructures		Desalination
		Nuclear power plants	Coal-fired power plants	Other thermal power plants	Hydroelectricity	Wind power	Solar power	Geothermal energy	Biomass	Storage & Transport	Gas distribution and sales	Water services (directly extracted from ENCORE)
Changes in land, water and ocean use	Use of terrestrial ecosystems	H	NA	NA	VH	VH	H	NA	VH	H	VH	H
	Use of freshwater ecosystems	H	H	H	VH	L	NA	NA	NA	H	NA	H
	Use of marine ecosystems	NA	NA	L	NA	M	NA	NA	NA	H	H	NA
Exploitation of resources	Use of water	VH	VH	VH	VH	NA	M	VH	H	H	NA	H
	Use of other resources	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Climate change	GHG emissions	L	VH	H	M	NA	NA	M	M	H	H	NA
Pollution	Atmospheric pollutants other than GHGs	L	VH	M	NA	NA	NA	NA	H	H	NA	NA
	Water pollutants	M	M	L	H	L	L	H	H	VH	NA	L
	Soil pollutants	L	M	M	H	L	L	H	NA	L	NA	L
	Solid waste	H	M	L	NA	L	L	NA	H	NA	M	NA
Invasive species and other	Disturbances	H	H	H	NA	M	NA	H	VH	VH	NA	NA
	Biological alterations / Interference	NA	NA	NA	H	NA	NA	NA	VH	VH	NA	NA

● Very High = VH    ● High = H    ● Medium = M    ● Low = L    ● Not available (NA)

(1) SBTn: Science Based Targets Network - <https://sciencebasedtargetsnetwork.org/how-it-works/the-first-science-based-targets-for-nature/>  
 (2) "Locate-Evaluate-Assess-Prepare"  
 (3) Corporate Sustainability Reporting Directive <https://eur-lex.europa.eu/eli/dir/2022/2464/oj>  
 (4) <https://www.wbcsd.org/Imperatives/Nature-Action/Nature-Positive/Roadmaps-to-Nature-Positive/Resources/Roadmap-to-Nature-Positive-Foundations-for-the-energy-system>

### Impacts by activity throughout the value chain

Impact analysis is based on the work in progress using the LEAP (Locate, Evaluate, Assess, Prepare) method recommended by the CSRD and the TNFD, as well as on the LCAs (life-cycle assessment) carried out within the Group (underground gas storage, electricity production by ground-mounted solar panels, 1G and 2G biomethane production, electricity production by hydroelectric power stations, hydrogen production and gas and heat networks), and the analysis of impacts and dependencies as part of the SBTn pilot in 2021 and 2022 using the ENCORE and EXIOBASE tools. These tools are generic databases that can notably estimate upstream chain challenges.

For each of the challenges, the analysis covers direct and indirect impacts and dependencies (supply chain). The challenges covered address the challenges of the CSRD and international standards (TNFD<sup>(1)</sup> and SBTn), i.e., biodiversity, water, oceans, pollution, use of land and resources, as well as invasive species. The impacts are presented as gross risks without the mitigation measures implemented.

#### Thermal power plants:

- Land footprint of the sites, potential disruption to ecological continuity and land artificialization
- Light pollution near sites that may have an impact on ecosystems
- Water use, notably for cooling, representing a challenge in areas subject to water stress or periods of regular drought
- Releases into water with two main impacts: temperature modification and possible presence of chlorine residues
- Extraction of raw materials (dependence on fossil fuel and impacts on soil, water and biodiversity)
- Greenhouse gas emissions (mainly CO<sub>2</sub>, SF<sub>6</sub> and N<sub>2</sub>O)
- Atmospheric pollutant emissions (NO<sub>x</sub>, SO<sub>2</sub>, particulate matters, etc.)
- Production of non-hazardous and hazardous waste at all stages of the life cycle
- Potential habitats for undesirable invasive species in the green areas around the sites
- Potential residual radioactive emissions

#### Desalination:

- Land footprint of the sites, potential perturbation to ecological continuity and land artificialization
- Light pollution near sites that may have an impact on ecosystems
- Withdrawal of seawater which could have an impact at the water supply point
- Discharge into the ocean of water with a high salt content which presents a potential risk of disturbance to ecosystems

#### Hydroelectricity:

- Potential disruption to ecological continuity
- Aquatic footprint (fish)
- Light pollution near sites that may have an impact on ecosystems

#### Onshore wind power:

- Aerial footprint on birds and bats, potential disruption to ecological corridors
- Foundation-related ground footprint
- Production of end-of-life waste

#### Offshore wind power:

- Aerial footprint on birds
- Footprint on marine flora and fauna depending on the type of wind turbine (floating or fixed) and the wiring required for the transmission of electricity
- Production of end-of-life waste

#### Solar (ground-mounted solar panels):

- Foundation-related ground footprint
- Potential impact on birds due to the mirror effect of solar panels
- Use of critical materials in the upstream chain having a potential impact on soil, water, and pollution of the environment
- Production of end-of-life waste

#### Geothermal energy:

- Impact on soil when digging sinks
- Impact on water depending on the process
- Light pollution near sites that may have an impact on ecosystems

#### Biomass:

- Potential impact on the wood sector
- Greenhouse gas emissions (mainly CO<sub>2</sub>, N<sub>2</sub>O) for the heating plants
- Atmospheric pollutant emissions (NO<sub>x</sub>, SO<sub>2</sub>, particulate matters, etc.) for heating plants
- Indirect impacts from the production of biogas (use of agricultural or forest waste)
- Odor pollution near biomethane plants
- Production of non-hazardous and hazardous waste
- Light pollution near sites that may have an impact on ecosystems

#### Gas storage:

- Land footprint of the sites, potential disruption to ecological continuity and land artificialization
- Impact on soil when digging sinks
- Light pollution near sites that may have an impact on ecosystems
- Greenhouse gas emissions (mainly CH<sub>4</sub>)

#### LNG terminals<sup>(2)</sup>:

- Land footprint of the sites, potential disruption to ecological continuity and land artificialization
- Light pollution near sites that may have an impact on ecosystems
- Water use, notably for cooling, representing a challenge in areas subject to water stress or periods of regular drought
- Releases into water with two main impacts: temperature modification and presence of chlorine residues
- Greenhouse gas emissions (mainly CH<sub>4</sub>)
- Potential habitats for undesirable invasive species in the green areas around the sites

#### Electricity storage in batteries:

- Land footprint of the sites, potential disruption to ecological continuity and land artificialization
- Light pollution near sites that may have an impact on ecosystems
- Use of critical materials in the upstream chain having a potential impact on soil, water, and pollution of the environment

#### Gas transmission:

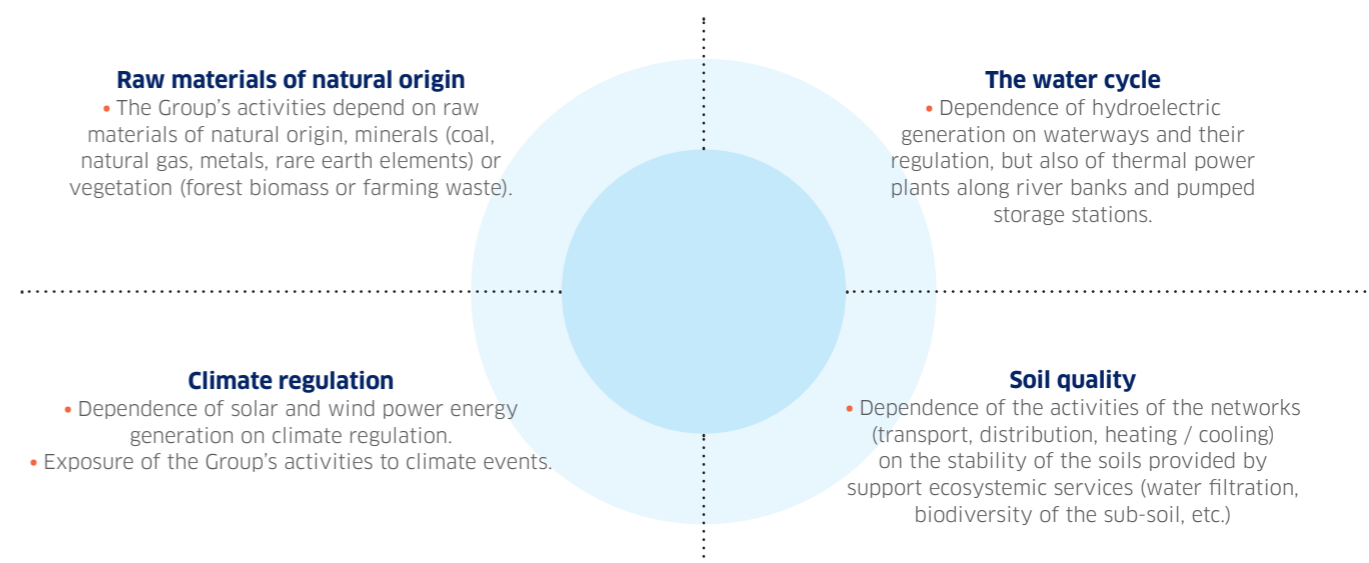
- Potential dissemination of invasive species due to excavation work to lay pipelines
- Greenhouse gas emissions (mainly CH<sub>4</sub> leaks)
- Atmospheric pollutant emissions (mainly NO<sub>x</sub>) for major compression stations

#### Gas distribution and sales:

- Potential dissemination of invasive species due to excavation work to lay pipelines
- Greenhouse gas emissions (mainly CH<sub>4</sub> leaks)

### Dependencies on nature in the value chain

As is the case for all industrial and human activities, the Group's activities are dependent on several ecosystemic services.



### Opportunities

Certain opportunities have already been tested within the Group, such as:

- Optimizing the use of fresh water within a watershed by sharing industrial water or reusing it
- Agrivoltaics, or solar sharing, which consists of farming or breeding under solar panels
- The sharing of spare part inventory between sites
- The design of recyclable wind turbine blades
- Supporting a region to preserve freshwater resources or agricultural resources

In 2023-2024, a more in-depth analysis of impacts, dependencies, risks and opportunities using the LEAP method, as recommended by the CSRD and the TNFD, will allow for even greater detail in terms of the identification and understanding of impacts and dependencies, notably in the supply chain, and to identify risks and opportunities on the basis of scientific data.

### A REGENERATIVE AGRICULTURAL PROJECT IN BRAZIL

The Regenera+ project is an initiative launched by Engie Brasil Energia and Sebrae RS to promote regenerative agriculture in the region of the Passo Fundo hydroelectric power plant. The project aims to improve the resilience, efficiency and sustainability of rural properties, while at the same time reducing production costs and carbon emissions. The project involved 17 rural producers and more than 10 agronomy, biology, ecology and humanities experts. Training initiatives, best agricultural practice monitoring and action plans have been developed in response to 20 socio-environmental requirements.

In its first year of operation, Regenera+ achieved a real reduction of 32.06% in

cereal production costs, covering an agricultural area of 533.64 hectares. The properties presented a carbon emissions and carbon removals balance of -1,004.53 metric tons of CO<sub>2</sub> eq., demonstrating that, overall, the communities removed more carbon than they emitted into the atmosphere. As regards the application of organic inputs, 16,400 liters of syrups produced on the properties were applied. From the second year of operation, monitoring of the socio-environmental indicators revealed that 50% of the criteria assessed had seen their scores increase. In addition, 30% of the properties invested in equipment to improve the uptake of regenerative crops.



(1) Taskforce on Nature-related Financial Disclosures - <https://tnfd.global/>

(2) Included in the Storage and Transmission section of the "Impacts & dependencies" table on page 97

# Policies

ENGIE's environmental policy showcases the Group's purpose in terms of Nature.

The Group aims to achieve an environmental performance which places it among the most proactive in its sector of activity. To do so, it has set ambitious objectives for 2030 and encourages proactive measures in order to:

- Decrease the negative impact of its activities on the environment by systematically implementing the "Avoid-Reduce-Offset" approach, and by complying with the first two steps of this approach at most, and increasing their positive impacts each time this is possible.
- Take advantage of the opportunities offered by environmental protection in its service offerings and in its relations with its stakeholders, and turn them into a growth driver.

## Biodiversity policy

The Group analyzes its impacts and dependencies according to the five major pressures that weigh on biodiversity, to identify measures to contribute to the reduction of its impacts and the management of its dependencies, while respecting the common commitments of the Act4Nature International and Entreprises Engagées pour la Nature (Companies Committed to Nature) initiatives and within the framework of partnerships with biodiversity stakeholders.

To reduce its soil footprint, contribute to the restoration of ecological corridors and reduce the presence of invasive species, the Group:

- Implements the ecological management of its sites whenever possible. This means, at the very least, that no chemical phytosanitary products are used and that green spaces are managed differently.
- Identifies protected areas near the sites and defines measures in consultation with stakeholders to reduce impacts as much as possible, or even transform them into positive impacts.
- Commits to apply the "Avoid-Reduce-Offset" approach worldwide and to implement, when possible, nature-based solutions, in compliance with the standard defined by the IUCN.
- Contributes to developing local knowledge on biodiversity.
- Continues to raise awareness and train its employees.

## Forest policy

To contribute to the fight against deforestation, ENGIE aims to:

- Avoid and reduce its impact on forests via its own activities and in its value chain first and foremost, and through offsetting as a last resort.
- Prevent any negative impacts on species and their habitats.
- Use and sell sustainable biomass.
- Favor local supply channels to facilitate the integration of small forest owners into the supply chain.
- Not source biomass from sensitive areas and not to use high-quality wood such as wood from sawmills.
- Respect the rights and livelihoods of local communities, in line with the United Nations Declarations.
- Raise awareness among stakeholders, including subcontractors and suppliers.

**For further information:** please see the Group's environmental policy: [https://www.engie.com/sites/default/files/assets/documents/2023-06/Engie\\_Politique%20environnementale\\_GB.pdf](https://www.engie.com/sites/default/files/assets/documents/2023-06/Engie_Politique%20environnementale_GB.pdf)

- Contribute directly or through its suppliers to initiatives in favor of the environment or reforestation.
- Commit to ensuring that its activities and assets do not cause or fuel forest fires.
- Publicly report on its actions and work relating to forests.

## Water policy

Faced with the risk of water shortages in several countries, in terms of quantity or quality, and the risk of conflicts of use, ENGIE is seeking to continually improve its commitment to water management throughout the world. ENGIE undertakes to:

- Identify industrial sites which are subject to water stress, and draw up action plans for all sites located in areas of high or very high water stress.
- Analyze the water-related risks and opportunities of projects and implement appropriate measures.
- Contribute to improving water management and governance in the regions and work on implementing measures in consultation with stakeholders at the watershed level.
- Implement all available technologies to reduce its impact on discharges to water.
- Identify suppliers that present an issue for water, based notably on work carried out on water footprints, and encourage them to develop action plans.
- Integrate the sustainable management of water in services proposed to customers.
- Take steps to promote access to water, its treatment and hygiene in the workplace.

## Circular economy policy

As a major player in the ecological transition, ENGIE applies the principles of a circular economy and is committed to:

- Increasing the recycling rate of waste generated by industrial activities.
- Reducing the use of fossil fuels.
- Developing green gases such as biomethane and hydrogen.
- Recovering an optimal amount of waste heat from the networks.
- Identifying recycling channels and thus reducing the impact on resources, notably for renewable solar and wind energy.
- Using resources in a sustainable manner via certified or recognized sectors (e.g. biomass).
- Encouraging eco-design in products used and services.
- Fighting against deforestation in the supply chain and using only biomass sourced from the sustainable management of forests (see the forest policy).
- Encouraging the re-use of spare parts and the circulation of inventory within the Group using a dedicated platform (BeeWe).

## Stakeholder policy

To provide structure to its commitment with stakeholders, the Group has introduced an integrated approach to managing environmental and societal challenges for a site, activity or project, based on appropriate dialogue with stakeholders.

This approach thus helps:

- Develop and secure the Group's activities by adapting them as effectively as possible to the demands and expectations of stakeholders and regions.
- Minimize any loss of value generated by a potential bad relationship by winning the support of the various players in the Group's ecosystem for its activities.
- Build bridges with the regions and foster relations with organized civil society.

The policy aims to ensure better awareness of the demands and expectations of our stakeholders, and that such stakeholders better understand and appropriate the Group's activities.

**For further information:** please see the Group's stakeholder engagement policy: [https://www.engie.com/sites/default/files/assets/documents/2023-04/Engie\\_Politique%20Parties%20prenantes\\_GB\\_VF\\_0.pdf](https://www.engie.com/sites/default/files/assets/documents/2023-04/Engie_Politique%20Parties%20prenantes_GB_VF_0.pdf)

## Interaction with stakeholders

ENGIE works with numerous stakeholders Group-wide and at its sites. The main exchanges with external stakeholders at the Group level are described below. At the operating site level, teams are in contact with local environmental associations. Moreover, the sites draw on the external expertise of consultants specialized in impact studies and monitor Nature restoration / conservation indicators.

### CROSS-DIVISIONAL



#### Employees

- The Group's networks are open to all employees: environmental correspondents, environmental experts, operational experts and all employees with an interest in the subject
- The Biodiversity network meets at least four times a year, with a regular contribution from external bodies, including the IUCN French Committee
- The Water network meets at least twice a year, with a regular contribution from external bodies
- The Nature network: merger of the two networks + circular economy - first meeting at end-2023



- Participation in the Biodiversity, Environmental Health, and Ocean Commission
- Member of the international act4nature steering committee



- Discussions with companies and players from civil society who are committed to Nature
- Participation in the Biodiversity, circular economy, and CSR reporting WGs



- Contribution to the Nature WG's work on the Energy Pathway
- Discussions with international energy sector companies committed to Nature

### WATER



- Founding member since 2007
- Contribution to the work and signature of the 2023 call to action, including the mobilization of economic players for the preservation of 100 priority watersheds



#### OECD water governance initiative

- Participation in the initiative forums since 2011
- Relaying governance principles

### POLLUTION



- Founding member and member of the Board of Directors
- Participation in meetings of the Cross Border Pollution Forum

### CIRCULAR ECONOMY



- ENGIE Solutions France is a member of the Cirul'R Club
- Lab Crigen has joined "la Fabrique" in measuring circularity in order to propose a framework of indicators and measure the benefits of the circular economy in the ecological, economic and sociological fields.
- ENGIE's CSR Department took part in a workshop on circularity-related communication.

### BIODIVERSITY



- Commitment to the "Nature is business everywhere" call to action and the "Make it mandatory" campaign at the end of 2022



- Member of the Align project
- Participation in annual European summits



- Partner since 2009
- Exchange meetings twice a year with correspondents
- Annual three-hour awareness-raising session for employees on compliance with the "Avoid" and "Reduce" components of the ARO approach



- Entreprises Engagées pour la Nature (Companies Committed to Nature Initiative)
- Participation in webinars and meetings of the "Club des engagés" (Committed Club)



#### Biodiversity footprint of the French electricity system

- Participation by ENGIE, along with various players from the French energy sector, in work to measure the biodiversity footprint of the French electricity system



#### SBTN - Corporate Engagement Program

- Completion of a pilot covering stage one of the SBTn framework
- Participation in exchange meetings and sharing of comments



- Participation in Forum meetings



- Partner since 2008
- Meeting between the Director of the IUCN French Committee and the Group's CSR Director
- ENGIE is the chair of the Biodiversity and Corporate WG from 2023 to 2025
- Use of the IUCN standard to identify and qualify Nature-based solutions in the Group's activities



- Partner since 2022
- Discussions relating to phase one of the SBTn framework
- Webinars to raise awareness among Group employees
- Discussions with international energy sector industrial players

# 2023-2025 Action plan

The 2023-2025 Nature road map is strongly influenced by new European and international reporting criteria: CSRD and its European Sustainability Reporting Standards (ESRS), the global framework for Biodiversity, the TNFD and the SBTn's guidance.

The Group's commitment and the progress of Nature-related objectives are reviewed annually through:

- Environmental reporting.
- Environmental action plans, including biodiversity and water action plans.
- Monitoring the implementation of the act4nature international and Entreprises Engagées pour la Nature commitments.
- Monitoring actions related to the *Water call to action* and the *Sustainable Ocean Principles* initiatives to which the Group is committed.

In 2023, the Executive Committee validated:

- The progress of objectives, commitments and action plans.
- The new act4nature international commitments.

In addition to Nature-related challenges, the Group also strives to implement an integrated approach covering Climate, Nature and social challenges as it believes that the energy transition will only be a success if these three cornerstones are addressed as a whole, in perfect harmony.

## Roll-out of environmental action plans

On-site environmental teams and project managers are responsible for environmental reporting and the implementation of environmental action plans which cover the action plans of priority sites for biodiversity and of sites located in areas of water stress. Risk analysis is carried out each year based on eight criteria (GHG – greenhouse gases, NO<sub>2</sub> – nitrogen dioxide, SO<sub>2</sub> – sulfur dioxide, PM – particulate matters, Water, Biodiversity, Soil, Waste) and action plans are updated by the operational teams and analyzed by the *Chief Sustainability Officers* in the countries and GBUs, then by the CSR Department. They are also audited by the Statutory Auditors using a sample-based approach.

## Identification and commitment of sites in water-stressed areas

Water stress is analyzed each year using the Aqueduct tool's *Water stress* indicator developed by the *World Resources Institute*. All sites located in high or extremely high water stress areas, and which consume fresh water, must draw up an action plan in consultation with stakeholders.

## Identification and commitment of priority sites for biodiversity

A site is considered priority when it is located less than 15 km from IUCN-protected areas (I to VI), UNESCO World Heritage sites (natural and mixed), Natura 2000 areas, Ramsar sites, key biodiversity areas and biosphere reserves (MAB). Priority sites are identified using data taken from the IBAT tool, which is managed by the UNEP WCMC<sup>(1)</sup>.

All sites identified as priority sites for biodiversity implement action plans established in consultation with stakeholders. These action plans are accounted for through the monitoring of environmental plans.

## Implementing on-site ecological management

The Group promotes the ecological management of sites for all of its industrial activities. A scale of maturity is recommended to each site, with a mandatory minimum requirement: the elimination of the use of chemical phytosanitary products and a maintenance of green spaces in keeping with the local ecosystem. A guide for ecological management is available to each site to support them in their approach.

Certain sites, such as gas storage facilities, have demonstrated the feasibility of this ecological management, even in areas with a high risk of explosion. We are nonetheless faced with some challenges in certain regions of the world, such as tropical areas, where species develop much faster. Specific support will be provided to these entities in the years ahead.

## ECOLOGICAL MANAGEMENT PLANS FOR STORENGY SITES

To maintain its industrial estate, Storengy, the Group's gas storage operator, created the *Eco Facility Management* concept (ECO-FM) which it then rolled out in 2018 across all of its 15 French industrial sites. The governance of ECO-FM includes local stakeholders who work with Storengy to draw up Ecological Management Plans (EMPs) for each site, which will be used to implement ECO-FM. Drafting and monitoring duties are entrusted to local bodies.

Eight Storengy sites currently have an EMP in place. Drawing up an EMP for a site is a major undertaking, generally requiring two years of study to identify the ecological issues and translate them into around ten action sheets to be implemented over a five-year period. These EMPs are also intended to be included in current local policies and are a key form of communication with Storengy's local stakeholders.

The local center for environmental initiatives (Centre Permanent d'Initiative pour l'Environnement - CPIE) in Boucles de la Marne drafted the EMP for the Germigny-sous-Coulombs (France) storage site. It was appointed by Storengy in 2022 to lead the community of EMP managers for Storengy sites. This community meets two to three times a year to discuss common issues, including: "How to involve employees in biodiversity initiatives?" (2022), "Biodiversity and regional presence" (2023), "Light pollution and biodiversity" (discussion scheduled for the beginning of 2024).



Hedges surrounding well pads which contribute to strengthening the local green infrastructure (Germigny-sous-Coulombs EMP)

© Storengy

## Integrating biodiversity in the life-cycle assessments of the Group's activities

Since 2021, the Group has been working on the integration of biodiversity criteria in life-cycle assessments in order to perform an in-depth analysis of the impacts and dependencies on biodiversity related to the Group's activities throughout the value chain, with a view to identifying the issues and the appropriate solutions to tackle them. The results of these assessments will allow the Group to better understand both direct impacts and, more importantly, impacts in the upstream chain.

## Financing research

The Group contributes to improving and sharing knowledge regarding the preservation of biodiversity by financing research (doctorates, internships and academic partnerships) and by publicly sharing its data, such as for example on the GBIF (Global Biodiversity Information Facility) platform.

## Raising employee awareness of biodiversity

The Group promotes in-house training on Biodiversity as part of its Sustainability Academy training program. Since 2021, an e-learning module, developed with the IUCN French Committee, allows employees to learn the basics of biodiversity and understand the Group's commitments. Storengy has made this training mandatory and included it in its employee profit-sharing criteria. The Group also runs a Biodiversity Fresco workshop in three languages (English, French, Spanish), via in-person or video-conference sessions, across all entities to raise employee awareness. All interested employees can become a trainer. The Group has offered Biodiversity Fresco workshops in all entities since 2022. For several years, the Group has had an internal Biodiversity network, open to all employees, which brings together environmental correspondents, environmental experts, operational experts and project developers. In just four years, this network has grown from 20 to 230 members.

**1,522**  
employees trained  
via e-learning

**543**  
employees who have  
contributed to a fresco



## CONTRIBUTING TO THE DEVELOPMENT OF KNOWLEDGE

### The Group contributes to the supervision of four doctoral studies:

- **Thesis No. 1 (thesis interrupted): "The development of an integrated spatial methodology for selecting sites to maximize the avoidance of impacts on biodiversity"** from August 1, 2020 to December 31, 2023 supervised by the French national history museum (Muséum national d'Histoire naturelle - MNHN). The objective of this thesis is to develop a method to identify urban wastelands, which allows their potential ecological value to be defined in advance for avoidance purposes (within the meaning of the ARO approach) in areas where wasteland has a high ecological value.
- **Thesis No. 2: "Towards ecologically sustainable renewable energy production: Using detailed information on bird flight and ranging behavior to mitigate the impact of wind farm development on bird populations"** from November 12, 2020 to December 31, 2023 jointly supervised by the University of Aix-Marseille (France) and the University of Groningen (the Netherlands). The objective of this thesis is to model the flight behavior of several species of birds of prey, notably flying height and time spent in flight, and to establish an index of the risk of collision with onshore wind turbines.
- **Thesis No. 3: "Scientific and legal analysis of compensation, in the ARO approach, applied to an industrial site"** from September 1, 2022 to August 31, 2025 (thesis in progress) jointly supervised by the University of Corsica (France) and Panthéon-Assas University (France). The objective of this thesis is to track changes in flower populations, pollinating insect populations and the interactions between the two, in correlation with the sites' compensatory measures.
- **Thesis No. 4: "Characterization and improvement of ecological trajectories in photovoltaic facilities"** since September 2022 at ENGIE Green, supervised by the University of Tours (France). The objective is to improve knowledge regarding the impacts of photovoltaic facilities on vegetation, factoring in several scales of analysis and several sites in France, and to carry out an experiment to reinforce / restore plant populations and their associated pollinators.

### As well as three academic partnerships:

- ENGIE is the financial partner and supplies the pilot sites for the Lépinoc project (<https://en.noe.org>). The participatory science project, launched by the environmental NGO Noé, involves monitoring moths in the Île-de-France region.
- The ENGIE Foundation has signed a partnership with the French Biodiversity Office (OFB) to support two biodiversity programs in the community: the communal biodiversity atlas (the ABCs of biodiversity) and a network for the protection of *Posidonia oceanica*: Mediterranean Posidonia Network.
- The Foundation finances the monitoring of migratory birds with the Royal Belgian Institute of Natural Sciences.

(1) <https://www.unep-wcmc.org/en>

**Protecting wetlands**

Since 2023, ENGIE has undertaken, in collaboration with the stakeholders concerned, to contribute each year to the preservation of at least one Ramsar-listed wetland in each of the geographic areas in which the Group operates (North America, South America, Asia / Pacific, Europe and France). This contribution may be financial or technical depending on local needs.

**+ EXAMPLE**

**Preserving the habitat of the common**

At ENGIE North America, protecting the health and safety of the environment in which the Group operates is essential. The Group follows the voluntary U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines for assessing and addressing the biological impacts of wind power projects. These implement a Bird and Bat Conservation Strategy on which all site employees receive training. The site of the Triple H wind power project in South Dakota (United States) carried out pre-construction biological studies which identified a potential wetland for migrating common cranes. In April 2022, the wind power site was informed by the Public Utility Commission that a group of migrating sandhill cranes and a pair of whooping cranes had been spotted in this wetland. The site's operators reacted by stopping the turbines in the area and employing a biologist to monitor these endangered species until they continued their migration. Thanks to the implementation by Triple H Wind of the Bird and Bat Conservation Strategy and the permit agreement established with the Public Utility Commission, this species was protected.



**Rolling out Nature-based solutions**

The CSR Department works with the operating teams to identify Nature-based solutions among the Biodiversity management / restoration / conservation best practices implemented by the industrial sites with external stakeholders.

Given the regional adaptation to climate change challenges and greenhouse gas emission offsetting needs, the Group's priority is to identify solutions that respond to these issues. The diagram below presents the types of possible solutions.

Since 2022, around 10 best practices have been identified within the Group. They are currently being analyzed using the matrix of the standard's eight criteria, in partnership with the IUCN French Committee.



Source: ©IUCN



<https://www.iucn.org/our-work/nature-based-solutions>

**+ EXAMPLE**

**Mangroves are amphibious forest ecosystems made up mainly of mangrove trees, found mainly in the intertidal zones of tropical and subtropical regions.**

**Their protection is important:**

- Mangrove forests can sequester and store three to five times more carbon per hectare than other vegetated ecosystems.
- Coastal mangroves help to attenuate the force of incoming waves, protect the coast from erosion and extreme weather events, and contribute to water quality by filtering nutrients and sediments.
- Mangroves are a source of firewood and charcoal with a high calorific value.
- Mangroves are ideal habitats for marine species to feed and reproduce.

**Restoring Abu Dhabi's mangroves**

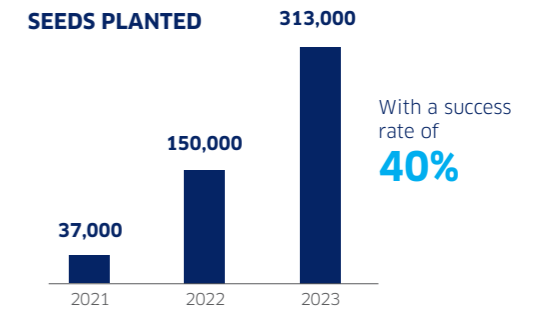
Since 2020, ENGIE has joined forces with the Environment Agency - Abu Dhabi (EAD) as part of a partnership aimed at restoring and protecting the mangrove near its energy generation site in Mirfa, Abu Dhabi. Thanks to cutting-edge drone technology developed in partnership with local start-up Distant Imagery, the restoration project led to the successful planting of 500,000 young trees covering a surface area of 30 hectares.

The use of the innovative drone technique to plant mangrove saplings has not only protected the integrity of existing mangroves, but also facilitated ongoing restoration efforts in less densely populated areas.

ENGIE initiated this collaboration with the EAD and Distant Imagery as of 2020 and actively supported the progress of planting during the following years:

- **2020:** pilot phase with the planting of 2,000 seeds, reaching a success rate of 20 to 25%.
- **2021:** planting of 35,000 seeds, with a success rate ranging from 30 to 35%.
- **2022:** planting of 150,000 mangrove trees, with a success rate of 40%.
- **2023:** planting of 300,000 mangrove trees, with a success rate of 40 to 45%.

This pioneering project was validated by the French Committee of the International Union for Conservation of Nature (IUCN) as a Nature-Based Solution, actively contributing to the health and well-being of marine ecosystems. Moreover, the restoration of the mangrove ecosystem is in line with the country's Net Zero strategy, aimed at contributing to the natural carbon sequestration objectives and its national commitments in terms of biodiversity, i.e., the planting of 100 million mangrove trees by 2030.



**Contributing to coastal reforestation in Bangladesh**



**FRIENDSHIP**

**The ENGIE Foundation supports the Friendship organization with the reforestation of 14 hectares of mangroves to improve the resilience of ecosystems and communities in Bangladesh.**

**The project has a threefold aim and addresses three fundamentals:**

- 1 The environment:** planting 3,000 trees of at least five different varieties per hectare along rivers exposed to the tide significantly improves the biodiversity and productivity of these biotopes, both terrestrial and aquatic (crabs, prawns, fish, fruit, honey, etc.).
- 2 The socio-economic conditions of local communities:** the inclusion of the poorest local residents via an awareness-raising and capacity-building program helps to develop their livelihoods and thus improve their living conditions. Knowledge of the importance of mangroves helps guarantee that the trees planted reach maturity without being degraded by livestock or those driven into poverty. The ongoing involvement of the local authorities and their cooperation with Friendship and the local communities will ensure the long-term sustainability of the reforested areas.
- 3 Resilience:** the strengthening of income-generating activities and the restoration of mangrove forests, which will limit the erosion of embankments and therefore prevent the destruction of homes and the salinization of agricultural soils, have a joint and immediate effect: improving the ability of the most vulnerable communities to adapt and their resilience in the face of climatic disasters.

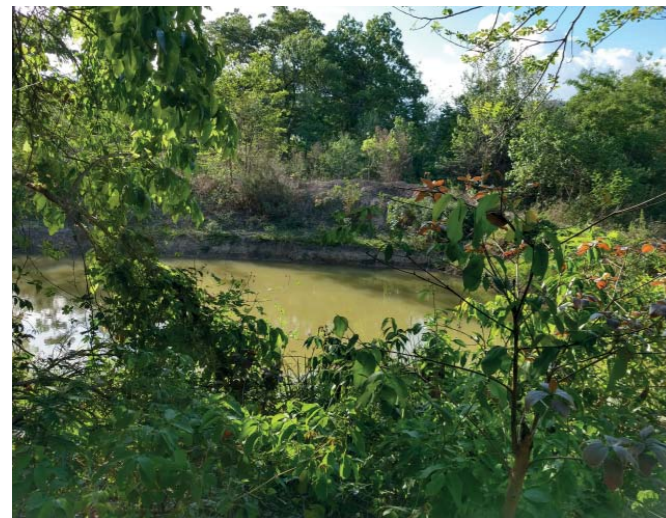
**Managing water resources and contributing to the conservation of priority basins**

ENGIE has incorporated the conservation of water resources in its processes since 2007. An assessment of exposure to water stress is carried out each year for existing sites, but also on an ad-hoc basis for each new project.

In the event of exposure to water stress, the sites draw up action plans to reduce their impact on water resources, in consultation with other entities in the watershed.

In 2023, 53 sites were located in areas with extremely high water stress, i.e., 7% of sites (excluding solar and wind power), for which action plans have been finalized and are being implemented. The impact of water stress is relative, however, as it depends on the site's activity and fresh water needs. Only five out of the 53 sites have substantial freshwater requirements (more than 100,000 m<sup>3</sup> / year). For the others, the challenge is rather how to indirectly help to preserve water resources, for example by proposing the reuse of the water by other entities in the watershed.

Against the backdrop of the second United Nations Water Conference held in March 2023, the Group has joined forces with other global economic players to contribute to water resilience (mitigation plans, supply chain optimization), and work together to restore 100 priority basins worldwide.



**+ EXAMPLE**

**Collectively protect water resources in Brazil**

Since 2010, ENGIE Brazil has been part of a program to preserve freshwater sources located near 14 of its electricity production plants. Their teams actively work with government and local authorities, as well as organizations and specialized NGOs, to ensure the success of this program which, to date, has helped protect more than 2,000 water sources. This notion of "preservation" encompasses a wide range of actions, including monitoring water quality, building infrastructure to protect the waterways, and reforesting the banks (a natural filter), all with the close involvement of the local communities, who are directly concerned for their health and well-being. But ultimately, because the sources feed the rivers and recharge water tables, this approach does not just benefit riverside communities.

**Integrating the circular economy within the Group's activities**

The Group believes that the integration of its activities into a more circular economy is a key factor in its economic and environmental performance. Action is taken at several levels: reusing organic waste (biomethane production), managing the end-of-life of materials (wind turbines, solar panels, etc.), and the sustainable use of resources. The circular economy often leads to a reduction in production costs, an increase in added value, and greater consumer loyalty.

Each site or activity works on the recovery and / or recycling of its waste. The Group, notably through research & development teams, works with designers, suppliers and recycling channels to decrease the impact on resources.

In 2022, the Group affirmed its commitment to the circular economy from various angles:

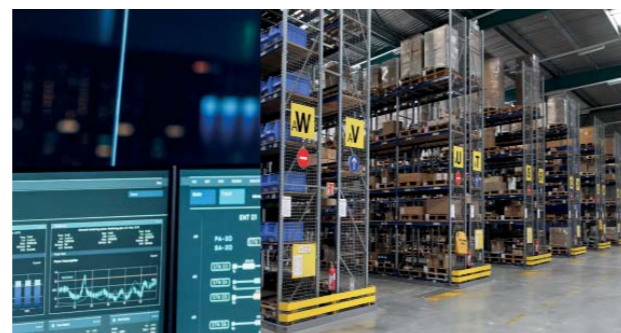
- Increasing its renewable gas production target in Europe to reach 10 TWh per year in 2030.
- Developing energy recovery from industrial and tertiary processes.
- Reducing the production of hazardous and non-hazardous waste.
- Recycling workwear (a pilot scheme in France at ENGIE Solutions).

In 2023, the Renewables GBU strengthened its commitment as a leader in energy transition built on circular business models. From setting concrete targets to key performance indicators and industrial partnerships, the R-GBU aims to increase the number of circular initiatives in renewable energies, reinforcing the messages carried by the Group. To this end, in October 2023, together with GEMS, it brought together its main suppliers and the International Energy Agency to identify avenues for cooperation aimed at reducing its critical materials requirements and increasing circularity in RE.

**+ EXAMPLE**

**Optimizing spare parts management using digital solutions: BeeWe**

ENGIE has developed a collaborative economy platform to generate procurement savings, extend the useful life of products and reduce the carbon footprint of spare parts. A digital catalog of all spare parts in stock within the Group, i.e. 350,000 products, can be accessed by all operators. The catalog can be used to identify products that are common to each site and encourages spare parts to be put back into circulation. This platform is therefore a tool for monitoring and analyzing existing stock and future purchases, as well as a decision-making aid for reducing unnecessary purchases.



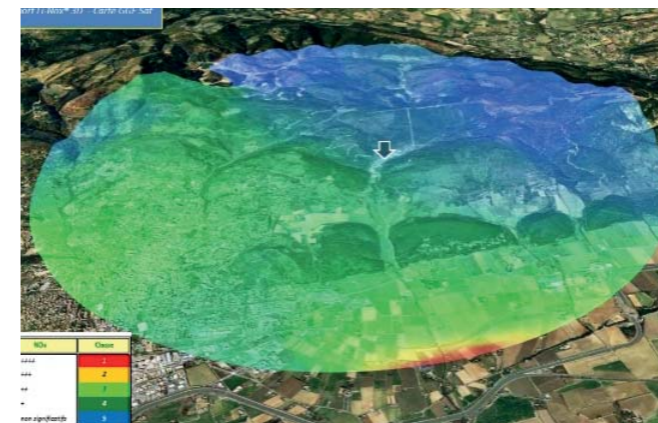
**Taking care to respect air quality**

Some of the Group's activities, such as thermal power plants, heating plants, LNG terminals and compression stations, emit atmospheric pollutants, mainly nitrogen oxides (NOx) and particulate matters.

The Group ensures not only that it complies with current regulations, but also implements the best available techniques at the various energy generation sites to reduce emissions as much as possible. These emissions are permanently monitored and any limits that are exceeded are declared to the local authorities.

In addition to compliance with regulations, ENGIE also works to reduce atmospheric pollutant emissions and has set objectives for 2030.

In order to measure the potential impact in the vicinity of its sites, the Group has set up nature-based air quality monitoring at certain facilities.



ENGIE - mapping of lichen biomonitoring around a site

**+ EXAMPLE**

**Assessing air quality through lichen biomonitoring**

Lichens are highly sensitive to atmospheric pollutants. They are very accurate biological probes, as each species reacts to pollutants in a different manner, both in terms of quality and quantity. The exclusive lichen biomonitoring process developed by the Aair Lichens laboratory is non destructive. It involves carrying out an inventory of lichen flora on a network in which each node corresponds to a tree. As a complement to traditional dispersion studies, the analysis of lichen species associations on each node makes it possible to calculate a global air quality index (Indice Global de la Qualité de l'Air - IGQA®), the impact of nitrogen oxides (Li-Nox®), acidity levels and ammonia and nitrogen influences. When applied to a sufficiently dense network of trees, this method provides a fine mapping of the impact of local activity on air quality for each pollutant. In practical terms, it opens up the possibility of being able to fine tune corrective measures on industrial equipment, such as adjusting a chimney or a vent, by directly measuring their impact on living organisms over the long term. This approach was successfully implemented at four of Storengy's sites.

**Taking action to clean up sites**

Due to prior industrial activities, the Group has a few sites where decontamination measures need to be implemented.

Pollution risks are identified at the design stage of a project and structures are dimensioned accordingly, with facilities adapted to avoid impacts (chemical product discharge, for example).

Particular attention is also paid to pollution risks when decommissioning plans are drawn up for sites. All measures are taken to limit risks and, where appropriate, decontaminate when necessary.

**+ EXAMPLE**

**Revitalizing two valleys in Belgium**

From 1952 until the end of 2016, more than 2.33 million metric tons of ash covered two valleys in the Flémalle region. ENGIE carried out the remediation of the site. This project is unique for several reasons:

- The site will be restored to its original state and will once again become a biodiverse green area for local residents.
- Thanks to an agreement with cement plants, the coal ash from the slag heap has a second life. After transport by ship, a highly sustainable form of transport, it will be recycled.
- Finally, ENGIE places great importance on the well-being and support of local residents. Ash is transported via a closed conveyor belt, which reduces noise pollution and the accumulation of residues to an absolute minimum. Local residents, authorities and academic experts have been, and will continue to be involved from start to finish.



The Héna slag heap, May 2023

# Metrics and targets

The Group has defined several objectives to reduce its impact on nature. The biodiversity objectives and targets set out in the commitments can be broken down into four areas. Objectives and results for 2023 relating to climate change mitigation are presented in the “Climate notebook” section.

Global Nature objective	2022	2023	2025	2030
Implementation of environmental plans for industrial activities (projects, sites and activities in operation and sites being decommissioned).	53%	66%	80%	100%

Water objective	2022	2023	Target
Reduction of freshwater consumption by energy generation activities to reduce pressure on ecosystems.	0.301	0.275	2030: -70% compared with 2019, i.e., achievement of a ratio of 0.1 m <sup>3</sup> / MWh

Forest objectives (biomass)	2022	2023	Target
<b>TRACEABILITY AND COMPLIANCE</b> Biomass is traceable and complies with European regulations governing wood (or equivalent) in all cases, to ensure compliance with the European taxonomy.	85%	100%	2023: 100 %
<b>SUSTAINABILITY</b> <b>Option a.</b> Biomass is certified against PEFC non-controversial sources, FSC controlled wood, SBP or an equivalent voluntary scheme recognized by the European Commission under the EU RED II directive. <b>Option b.</b> Where such certifications are not available, a sourcing policy (indicating sustainable forest management that respects ecosystems) is defined and communicated to raw material suppliers, and its application is verified by due diligence on a recurring basis (at least every five years). The sourcing policy specifies that biomass should not be sourced from high-quality sawlogs or stemwood. In the specific case of plantations, biomass can only come from the products of a plantation if the plantation is certified as indicated in option a. If this is not the case, the biomass may come from plantation residues in accordance with option b.	95%	100%	2024: 100%

Air pollution objectives	2022	2023	2030 target
Reduction in NO <sub>x</sub> emissions vs 2017 (92,209 metric tons)	34,197	27,037	-75%
Reduction in SO <sub>2</sub> emissions vs 2017 (159,623 metric tons)	7,418	3,396	-98%
Reduction in total particle emissions vs 2017 (7,353 metric tons)	3,398	2,832	-60%

Waste objectives	2022	2023	2030 target
Reduction in the quantity of non-hazardous waste disposed of vs 2017 (2,773,419 metric tons)	1,459,706	753,711	-80%
Reduction in the quantity of hazardous waste disposed of vs 2017 (386,783 metric tons)	23,506	26,797	-95%

Biodiversity objectives*	2022	2023	Target
<b>Soil footprint and ecological continuity</b>			
Implementation of ecological site management <sup>(1)</sup> for all of the Group's industrial activities.	34%	58%	2025: 50% 2030: 100%
Use of at least 40% local / endemic plants and no use of invasive species for all planting operations.	Objective set at the end of 2023	not provided	2030: 100% of sites comply with this criterion
Continued development of action plans <sup>(2)</sup> for sites classed as priority sites <sup>(3)</sup> , regardless of their activity, located in or near a biodiversity hotspot.	60%	62%	2025: 80% of priority sites equipped with action plans established in consultation with stakeholders concerned <sup>(4)</sup> . 2028: 100% of priority sites
Application of the “Avoid-Reduce-Offset” approach to the Group's development projects throughout the world, in consultation with stakeholders, avoiding negative impacts in biodiversity-sensitive areas and protected areas, and aiming for a net gain for biodiversity. The biodiversity criterion is an integral part of a CSR matrix that also factors in pressures linked to water, climate change and pollution.	80%	90%	2024: 100% of files submitted to the Group Investment Committees and Global Business Unit are analyzed for biodiversity issues in consultation with the relevant stakeholders. 2025: All Group projects are analyzed for biodiversity issues.
<b>Climate change</b>			
To take simultaneous action on the challenges of climate change and biodiversity, make a financial or technical contribution to the implementation of local Nature-based Solutions (NBS).	The solution to restore mangroves in the United Arab Emirates was confirmed as an NBS by the IUCN.	The Group analyzed 12 solutions all over the world. Four of these solutions are currently being analyzed by the IUCN.	2025: Implementation / monitoring of 10 projects identified that comply with the global IUCN Standard for Nature-based Solutions.
As a committed local player, ENGIE contributes to the protection of Ramsar-listed wetlands that are located near its sites, in partnership with the relevant stakeholders. This contribution may be financial or technical depending on local needs.	Objective set at the end of 2023	not provided	2025: A minimum contribution to the preservation of one wetland per regional hub per year from 2024, i.e. a minimum of five projects / year.
<b>Value chain</b>			
Since 2022, the Group has integrated biodiversity criteria in life-cycle assessments in order to perform an in-depth analysis of the impacts on biodiversity related to the Group's activities throughout the value chain:	<ul style="list-style-type: none"> <li>Underground gas storage</li> <li>Electricity production using ground-mounted solar panels</li> <li>1G and 2G biomethane production</li> <li>Hydroelectric power plant electricity production</li> </ul>	<ul style="list-style-type: none"> <li>Hydrogen production</li> <li>Gas and heat networks.</li> </ul>	2025: AS a minimum, analysis of two activities per year as of 2022 in order to achieve the objective by 2025.
<b>Sharing of knowledge and awareness raising</b>			
Raising awareness of biodiversity among all employees. Available tools: <ul style="list-style-type: none"> <li>an e-learning module developed with the IUCN French Committee, which explains the Group's principles and commitments, intended for people who contribute to these commitments through their missions;</li> <li>Biodiversity Fresco workshops which help raise employee awareness on the subject.</li> </ul>	2,533	2,065	2023: 3,000 employees / year 2024 and 2025: 5,000 employees / year
Sharing of biodiversity data, including non-regulatory data, on the GBIF (Global Biodiversity Information Facility) platform.	Objective set at the end of 2023	12 sharings	As a minimum, one instance of data sharing compliant with the GBIF format / country / year as of 2023.
Financing research to improve knowledge of biodiversity conservation by 2030.	<ul style="list-style-type: none"> <li>Supervision of four doctoral studies</li> <li>One six-month internship</li> <li>Two academic partnerships</li> </ul>	<ul style="list-style-type: none"> <li>Supervision of four doctoral studies</li> <li>Two six-month internships</li> <li>Two academic partnerships</li> </ul>	Number of theses <sup>(5)</sup> supervised by the ENGIE teams: three by 2025 Number of internships supervised by the ENGIE teams: five by 2025 Number of academic partners involved in monitoring this work: two by 2025

(1) Industrial sites included within the Group's environmental reporting scope, i.e., 796 sites in 2022.  
(2) Action plans comply with a model defined at the Group level and are verified on-site annually by the Statutory Auditors.  
(3) A priority site is an industrial site located within 15 km of a protected area or a biodiversity hotspot. The protected areas and biodiversity hotspots taken into account are: IUCN categories I to VI, Ramsar, UNESCO (natural and mixed), KBA, MAB, Natura 2000.  
(4) For each site or project, the various stakeholders are identified and discussions are initiated to better understand local challenges and to avoid placing too much pressure on biodiversity and the ecosystems.  
(5) These subjects are presented in the box on page 103.  
\* Objectives and results for 2023 relating to climate change mitigation are presented in the “Climate notebook” section.  
All of ENGIE's act4nature commitments can be found on the following website: <https://www.act4nature.com/wp-content/uploads/2023/10/ENGIE-VF.pdf>





# SOCIAL AND SOCIETAL NOTEBOOK

ENGIE has developed a strategy and action plans, including the Vigilance Plan, that take into account the impacts, risks and opportunities for all its internal and external stakeholders, particularly its employees, employees along its value chain, affected communities, and end-consumers.

The transition toward a carbon-neutral world represents a major break from previous practices. Although the objective is clear - introducing more energy-efficient and environmentally friendly solutions - the means to achieve this objective will require both a more gradual review of the Group's business model and a focus on developing a feasible and affordable transition, i.e., a socially acceptable transition, in accordance with the Paris Agreement's concept of a Just Transition and the European Union's *Green Deal*.

To mitigate both the socio-economic impact of the energy transition among its various stakeholders and its negative consequences, while at the same time maximizing its positive effects, ENGIE supports them with a twin aim: rallying them around the achievement of this extensive project and leaving no one behind. Involving the Group's decision-making and steering bodies at the highest level, defining ambitious policies, implementing specific and targeted actions plans, setting objectives for 2030 - all of these elements contribute to ENGIE's road map.

**112**  
The Company's  
human resources

**114**  
Employees across the value  
chain

**116**  
Affected communities

**118**  
Customers and end-consumers



# The Company's human resources

In line with its desire to support the company's team members in the energy transition as fairly as possible, ENGIE has implemented targeted human resources management policies that aim to work toward a just transition by limiting the negative impacts of the transition to a Net Zero Carbon economy and fostering its positive impacts.

## GOVERNANCE

ENGIE's decision-making and steering bodies are working together to ensure that the Group has all the necessary capabilities to step up the energy transition. These bodies are also the driving force behind the strengthening of the Group's Health and Safety policies relating to its employees, as well as those of its subcontractors.

### Board of Directors and its Committees

- **EESDC (the Ethics, Environment and Sustainable Development Committee):**
  - reviews the HR, Health and Safety, and Ethics policies and their action plans,
  - monitors the priority risks relating to employees, at the request of the Audit Committee.
- **Audit Committee:**
  - identifies priority risks.
- **ACGC (the Appointments, Compensation and Governance Committee):**
  - reviews the succession plans for managers and the appointment and compensation projects within the Executive Committee.
- **SITC (the Strategy, Investment and Technology Committee):**
  - reviews social impacts relating to growth projects and business disposal projects.

### Other governance bodies

- **The Executive Committee:** makes strategic decisions based on guidelines set out by the Board of Directors, ensures short-term achievements and long-term prospects are met.
- **OP'COM (Operational Management Committee):** implements strategic decisions and the Group's transformation.
- **Group Human Resources Department:** deals with social dialogue, talent management, diversity, compensation and related conditions, HR performance and training.
- **Group Health & Safety Department:** supports the entities in managing health and safety risks in the workplace, including psychosocial risks, the safety of the Group's industrial assets and improving well-being at work.
- **Ethics, Compliance and Privacy Department:** oversees the incorporation of ethics and compliance into the Group's strategy, management and practices.
- **French Group Works Council, European Works Council, World Forum:** Employee representative bodies.

## CODES AND POLICIES

Human Resources policies drawn up and implemented by the Group are adapted to energy transition challenges and market trends.

### Ethical Code of Conduct

- Guides employees to act in compliance with laws and regulations in place in each country in line with the Group's values and commitments in terms of social, societal and environmental responsibilities, in the areas of business ethics and data privacy.

### Development Policy

- Focuses talent reviews on securing succession plans.
- Strengthens the development programs of future Group leaders around the new "ENGIE Ways of Leading" leadership model.

### Mobility Policy

- Strengthens the international mobility policy.
- Improves employee employability and encourages them to build their own career paths.

### Diversity, Equity, Inclusion Policy

- Promotes diversity, equity and inclusion on a global scale with the launch of "Be.U@ENGIE."

### Learning Policy

- Aims to offer training courses for 100% of employees each year by 2030.

### Health and Safety Policy

- Defines the fundamental principles of the Group's health and safety management system.
- Implements the "No Life At Risk" and "No Mind at Risk" approaches to control the risk of accidents in the workplace, improve well-being at work and prevent psychosocial risks.

### Entities' Industrial Safety Policies

- Defines provisions for the safe operation of industrial assets.

### Just Transition Policy

- Implements controlled management of restructuring.

### Protection of Individuals Policy

- Aims to ensure the protection of all individuals at the Group's sites and facilities.
- Prevents the risks of damage to the Group's reputation.

### ENGIE Care Policy

- Creates a global social protection program.

## ACTION PLANS

Measures and processes implemented (to protect and ensure the rights of, support, train and retain employees) are in line with the objective of a feasible energy transition.

- Global agreement relating to fundamental rights and ENGIE's social responsibility.
- Strategic Workforce Planning.
- ENGIE Ways of Leading" (EWOL).
- ENGIE Ways of working" (WOW).
- Fifty-Fifty.
- Be.U@ENGIE.
- ENGIE University: Sustainability Academy
- ENGIE & ME annual commitment survey.
- ENGIE One Safety, the Group's health and safety transformation plan.
- Group Vigilance Plan.
- Just Transition Plan.
- U.Camp.
- GBU Academies.
- CFA apprentice training center.

## OBJECTIVES AND 2023 RESULTS

ENGIE has an ambitious 2030 human resources management road map

### 2030 objectives

- Equal pay, with gender pay gap of <2%.
- Gender equality with [40-60%] women in management positions.
- Share of apprentices in the French workforce, whether on permanent or fixed-term contracts, excluding regulated entities >10%
- Training: 100% of personnel trained.
- Full rollout of ENGIE Care by 2024.
- 0 fatal accidents directly related to work each year
- Lost time injury frequency rate for Group employees, temporary workers and subcontractors ≤1.8.

### 2023 results

**1.92%**

Gender pay gap

**31.2%**

Percentage of women in management positions

**8.5%**

Percentage of apprentices in France, excluding regulated entities

**86.1%**

Trained personnel

**2**

fatal employee accidents

**4**

fatal subcontractor accidents

**1.8**

Frequency rate of lost-time occupational accidents for employees, temporary workers and subcontractors on sites with controlled access

# Employees across the value chain

ENGIE is committed to taking care of the employees in its value chain via voluntary policies and action plans. The objective is threefold: contribute to the decarbonization of its supply chains, ensure that commitments made to suppliers are implemented and ensure that suppliers and subcontractors respect ENGIE's requirements in terms of human rights and ethics for their own employees.

## GOVERNANCE

ENGIE's governance bodies strive to ensure that commitments made relating to the Group's strategic decisions are applied to employees in the value chain.

### Board of Directors and its Committees

- **EESDC (the Ethics, Environment and Sustainable Development Committee):**
  - ensures that the Group takes into account extra-financial challenges and long-term perspectives that may affect the employees in its value chain.
- **Audit Committee:**
  - identifies priority risks, including procurement.

### Other governance bodies

- **The Executive Committee:** makes strategic decisions based on guidelines set out by the Board of Directors and ensures short-term achievements and long-term prospects are met.
- **OP'COM (Operational Management Committee):** implements strategic decisions and the Group's transformation.
- **Group Procurement Department:** steers governance for the procurement policy, which defines the principles for managing external expenditure (excluding energy) at the Group level and sets out 14 key rules for the Procurement function.
- **Ethics, Compliance and Privacy Department:** manages the human rights policy, drives the Group's vigilance plan and handles ethics whistleblowing.
- **Specific vigilance plan committee:** responsible for monitoring the vigilance plan, pays close attention to the value chain and its employees, the appropriate communication of the plan, the coordination of various measures, raising awareness within the entities and reporting back to the Group.
- **Compliance Committee:** monitors the ethics processes including business ethics and human rights, and the handling of any malfunctions.

## CODES AND POLICIES

ENGIE takes the interest of its suppliers' and subcontractors' employees into account via its vigilance plan, its various policies and, more specifically, its Procurement policy.

### Ethical Code of Conduct

- Guides employees to act in compliance with laws and regulations in place in each country in line with the Group's values and commitments in terms of social, societal and environmental responsibilities, in the areas of business ethics and data privacy.

### Procurement Charter

- Sets out ENGIE's commitments and requirements in its relations with suppliers and throughout its procurement chains.
- Achieves competitive and sustainable solutions, while also ensuring the health and safety of employees, in strict compliance with business ethics principles.

### Code of conduct for supplier relations

- Outlines the principles of supplier relations, including compliance with ILO conventions relating to:
  - fundamental rights at work (the prohibition of forced and child labor, non-discrimination and freedom of association);
  - health and safety and wellbeing at work;
  - decent working conditions (wages, working hours, etc.).
 In cases where laws and regulations do not specify a minimum wage, ensuring that the wages paid by our suppliers are fair and satisfy more than just primary needs.

### Ethics due diligence policy for suppliers, direct subcontractors, and partners

#### Inclusive Procurement France Policy

- Develops and manages procurement in the adapted work sector.
- Currently being rolled out in around 10 countries.

#### Human Rights Policy

- Defines the means necessary to comply with Group commitments across all of its activities using a global vigilance approach.

#### Health and Safety Policy

- Ensures the safety of employees in the value chain in line with Article 7 §36: *"The safety of individuals is an absolute priority for the Group which is committed to eradicating fatal accidents and reducing the frequency and severity rate of non-fatal accidents, for both Group employees and all those who work on its behalf."*

#### CSR / Environmental Policy / commitment to stakeholders

- Restates the need to respect human rights across the Group's entire value chain.

#### Just Transition Policy

## ACTION PLANS

ENGIE has defined various provisions and approaches aimed at protecting its suppliers' employees.

- Global agreement relating to fundamental rights and ENGIE's social responsibility in Article 16 §87 *"Criteria for the selection of partners, suppliers, service providers and subcontractors take into account the Group's commitments in terms of the fight against corruption, the respect of human rights, the right to work and union rights as well as the prevention of risks to health and safety and the conservation of the environment."*
- Human rights and procurement approaches of the vigilance plan.
- Sustainable Procurement commitments.
- Human rights and ethics due diligence.
- Whistleblowing system available to the entire value chain and management of alerts.
- Audit questionnaires for suppliers' production facilities relating to employees' working conditions and human rights (applied to solar and wind power procurement categories).
- Procurement terms and conditions: all Group Procurement agreements include a "15- ethics and CSR" clause.
- CSR matrix: for projects passing through the Group Investment Committee, a self-assessment matrix of 10 CSR criteria based on information from the EIA (*Environmental Impact Assessment*) and ESIA (*Environmental Social Impact Assessment*) including responsible procurement.
- Just Transition Plan.
- ENGIE One Safety, the Group's health and safety transformation plan.

## OBJECTIVES AND 2023 RESULTS

ENGIE intends to decarbonize its value chain by 2030 and work with suppliers who have high quality social commitments and whose CSR risks are well managed.

### 2030 objectives

#### Responsible procurement with a composite index:

- 100% of preferred and major suppliers with an EcoVadis rating higher than the "managed CSR risk" category (45 / 100).
- 100% of inclusive procurement in line with the recommendations of the *Collectif des entreprises pour une économie plus inclusive (GT3)*, a group of companies for a more inclusive economy which brings together around 30 French companies including BNP Paribas, Accor, Crédit Agricole and Danone, etc.

### 2023 results

**43%**

preferred and major suppliers with an EcoVadis rating > than the managed CSR risk level.

**80%**

inclusive procurement in line with GT3 recommendations.

# Affected communities

In ENGIE's view, the transition to a Net Zero Carbon economy must be socially just and acceptable. It is important therefore to engage in dialogue to identify and prevent harm to people. This dialogue with stakeholders affected by this transition should be constructive and respectful of their rights in order to take their expectations into account and provide them with the best long-term support.

## GOVERNANCE

A firm believer in the benefits of dialogue, ENGIE has created two specific bodies to interact with local players and the representatives of civil society. It aims to maintain quality dialogue over the long term to ensure the best possible transition to a Net Zero Carbon economy.

### Board of Directors and its Committees

- **EESDC (the Ethics, Environment and Sustainable Development Committee):**
  - monitors the implementation of the vigilance plan, human rights policy and commitment to stakeholders policy;
  - monitors ESG controversies involving stakeholders.
- **Audit Committee:**
  - identifies priority risks that may impact affected communities.

### Other governance bodies

- **The Executive Committee:** makes strategic decisions based on guidelines set out by the Board of Directors and ensures short-term achievements and long-term prospects are met.
- **OP'COM (Operational Management Committee):** implements strategic decisions and the Group's transformation.
- **Ethics, Compliance and Privacy Department:** manages the human rights policy, drives the Group's vigilance plan and handles ethics whistleblowing.
- **Specific risk vigilance plan committee:** oversees the updating of the risk mapping and their operational responsibilities regarding human rights, fundamental freedoms, health and safety of individuals and the environment.
- **Compliance Committee:** monitors the ethics processes including business ethics and human rights, and the handling of any malfunctions.
- **Stakeholders' Committee:** enables the Chairman and Executive Management to discuss its strategic directions and CSR commitments with certain representatives of civil society.
- **Dialogue and Transition forum:** enables *business developers* to consult with certain NGOs in a confidential manner regarding the potential impact of their projects and affected communities.

## CODES AND POLICIES

The policies designed and developed by ENGIE pursue the objective of constructive dialogue with a view to identifying negative impacts on affected communities that are directly and indirectly impacted by its activities and by the transition to a Net Zero Carbon economy.

### Ethical Code of Conduct

- Guides employees to act in compliance with laws and regulations in place in each country in line with the Group's values and commitments in terms of social, societal and environmental responsibilities, in the areas of business ethics and data privacy.

### CSR policy

- Commits the Group to creating shared value.
- Actively contribute to society's debates.

### Commitment to stakeholders policy

- Commits the Group to acting with integrity with regard to stakeholders and to listening to their needs, concerns and expectations.
- Ensures regular contact with stakeholders involved in or affected by its activities.

### Procurement Charter

- Sets out ENGIE's commitments and requirements in its relations with suppliers and throughout its procurement chains.
- Achieves competitive and sustainable solutions, while also ensuring the health and safety of employees, in strict compliance with business ethics principles.

### Due diligence policy for suppliers, direct subcontractors, and partners

### Just Transition Policy

### Crisis management policy

- Presents whistleblowing processes and crisis management applicable at all levels within the Group with due regard to subsidiarity.
- Defines the general operating principles and the roles of various stakeholders to ensure rapid notification and a response which is tailored to the situation.

## ACTION PLANS

The action plans and approaches implemented by ENGIE aim to take into account the rights and expectations of communities affected by its activities and by those of its supply chain.

- Global agreement relating to fundamental rights and ENGIE's social responsibility.
- TED label (Transition Énergétique Durable – Sustainable Energy Transition): certifying ENGIE's approach to its renewable energy development projects, particularly in relation to those affected.
- Annual human rights risk analysis surveys for the activities of the Group's entities and risk analyses for projects and new commercial activities.
- CSR matrix: for projects passing through the Group Investment Committee, a self-assessment matrix of 10 CSR criteria, including a criterion for dialogue with stakeholders, based on information from the EIA (*Environmental Impact Assessment*) and ESIA (*Environmental Social Impact Assessment*).
- Vigilance plan approach.
- Whistleblowing system available to the entire value chain and management of alerts.
- Just Transition Plan: classifies local communities as stakeholders with whom to hold dialogue and create solutions.

## OBJECTIVES AND 2023 RESULTS

The implementation of the Group's social policy is measured through social action plans applied to industrial sites in operation, under development or being dismantled. These community action plans provide a basis for dialogue and commitment with stakeholders, including the communities affected.

### 2030 objectives

- 100% of industrial activities, including those related to the Group's development projects and sites undergoing decommissioning, covered by a societal plan.

### 2023 results

## 49%

Industrial activities, including the Group's development projects and sites undergoing decommissioning, covered by a societal plan.

# Customers and end-consumers

ENGIE's relationship with its customers and end-consumers is built on quality and responsibility dynamics with a view to making the energy transition affordable and desirable. Based on ethical principles and a demanding data protection policy, it has been designed to limit incidents and to deal with them efficiently if they occur.

## GOVERNANCE

ENGIE is keen to maintain close relationships with its various customers – B2B, B2C, tertiary and local authorities – and has implemented a governance structure that is as close as possible to the issues at stake.

### Board of Directors and its Committees

- **EESDC (the Ethics, Environment and Sustainable Development Committee):**  
- reviews business ethics commitments relating to the Group's commercial practices.

### Other governance bodies

- **The Executive Committee:** makes strategic decisions based on guidelines set out by the Board of Directors and ensures short-term achievements and long-term prospects are met.
- **OP'COM (Operational Management Committee):** implements strategic decisions and the Group's transformation.
- **Compliance Committee:** monitors the ethics processes including business ethics and data privacy, and the handling of any malfunctions.
- **Ethics, Compliance and Privacy Department:** *drafts ethics policies, monitors ethics risks and steers the related vigilance plan by overseeing a network of ethics officers and data privacy managers.*
- **ENGIE One Retail Department:** supplies energy to retail and small corporate customers based on a country-specific organizational structure.
- **Energy Solutions GBU:** supports customers, towns and cities, local authorities, industrial and tertiary customers in their decarbonization and the management of their energy consumption.
- **GEMS:** supplies energy to large industrial and multinational customers (B2B) using cross-functional and geographic platforms coordinated with a B2B Supply Committee.
- **ENGIE Mediator:** examines persistent disputes with customers with a view to settling these.

## CODES AND POLICIES

ENGIE has defined a set of structuring policies and guidelines to ensure a high quality business relationship with its customers.

### Ethical Code of Conduct

- Guides employees to act compliance with laws and regulations in place in each country in line with the Group's values and commitments in terms of social, societal and environmental responsibilities, in the areas of business ethics and data privacy.

### Just Transition Policy

- Commits the Group to supply energy at an affordable cost.
- Proposes measures for fighting fuel poverty.

### Integrity Framework

- Business consultants policy.
- Gifts, invitations and technical travel policy.
- Policy for the prevention of conflicts of interest.
- Ethics due diligence policies for suppliers, direct subcontractors, and partners.

### Compliance Framework

- Whistleblowing mechanism.
- Group customers' personal data protection policy.

### CSR Policy

- Supports customers in the energy transition.

### Commitment to stakeholders policy

- Commits the Group to acting with integrity with regard to its stakeholders, in an open and transparent manner, and to listening to their needs, concerns and expectations.
- Ensuring regular contact with stakeholders involved in or affected by its activities.

### Human Rights Policy

- Safety of products sold by ENGIE.
- Respect for the privacy of customers and consumers, for example.

## ACTION PLANS

The aim of the measures designed and rolled out by ENGIE is to support customers and end-consumers in the energy transition under the best possible conditions. They have two major objectives: limiting risks and maintaining a high quality relationship under all circumstances.

- Changing customer behavior by designing offers with environmental components, such as the green offer for electricity, solar self-consumption, etc.
- Reducing our customers' emissions through adapted offerings and services.
- Proposing energy consumption management offerings for B2B (industrial and tertiary) and B2C (retail and small corporate) customers.
- Offering direct or indirect financial aid and suitable arrangements for customers or end-consumers who are struggling or at risk of poverty.
- Financing a social fund (Rassembleurs d'Énergies) which invests in social enterprises with a view to fighting fuel poverty and promote access to energy.
- Contributing to the financing of projects or measures by the ENGIE Foundation and ENGIE's internal NGOs (Energy Assistance) with a view to promoting access to energy for all and to fighting fuel poverty.
- Monitoring and handling customer complaints and alerts from the whistleblowing system, which is available to the entire value chain (incidents related to ethics, commerce or data protection).
- Contributing to customer satisfaction by making sure to meet their needs and limit customer disputes through amicable solutions or, failing this, through the ENGIE Mediator responsible for settling persistent disputes.

## OBJECTIVES AND 2023 RESULTS

To satisfy its customers and end-consumers, ENGIE decided to focus on various satisfaction indicators, including the Net Promoter Score. The Group thus aims to reduce the negative impacts of the transition to a Net Zero Carbon economy through various approaches which are adapted to the customers and regions concerned.

### 2030 objectives

- Satisfy customers (Net Promoter Score)
- -35% (52 Mt CO<sub>2</sub>eq.) CO<sub>2</sub> emissions from the use of products sold to customers (B2B and B2C) compared with 2017.
- 45 Mt of CO<sub>2</sub> avoided by customers through the Group's products and services.

### 2023 results

#### Net Promoter Score

- France: +33
- Belgium: 0
- Netherlands: +31
- Italy: +34
- Romania: +47
- Australia: -6

#### -34%

(53 Mt CO<sub>2</sub>eq.) CO<sub>2</sub> emissions related to the use of products sold to customers (B2B and B2C).

#### 25 Mt

of CO<sub>2</sub> avoided by customers through the Group's products and services.

# LOW CARBON TECHNOLOGIES NOTEBOOK

As part of its energy transition, ENGIE implements several low carbon technologies that are detailed in this notebook. The emerging technologies are also addressed.

Aiming for a Net Zero Carbon on its three scopes by 2045, ENGIE includes the transformation of its production assets and the energy sequestration in the core of its strategy. To achieve this, the Group relies on the development of low carbon technologies, to which it dedicates significant research and innovation efforts as well as numerous investments. While each one of them presents opportunities and challenges, it is clear that their diversity and complementarity will have to be built upon to ensure the stability of the energy system and to supply customers and end-users.

Thanks to research and innovation efforts made these past few years, low carbon technologies have been optimized and have become more flexible and sustainable, recyclable and productive. Concerned about generating positive impacts and limiting negative ones on the environment and people, especially on territories, the Group ensures that all stakeholders are taken into account at every step of these technologies' development process.

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# Low carbon technologies to support decarbonization objectives

Guided by its purpose, ENGIE aims to accelerate the transition to a carbon-neutral world, while reconciling economic and technical performance as well as positive impacts on people and the environment.

To this end, the Group has, for many years, been implementing most of the mature techniques in low carbon energy production and storage, both in its own assets and in its customers' and industrial partners' assets. All these technologies are based on research, innovation and development efforts that the Group has largely supported and will keep on supporting.

The main low carbon energy production and storage technologies currently implemented by ENGIE and detailed in this notebook are : **solar, onshore and offshore wind power, hydropower and its storage component, pumped storage, geothermal energy, batteries, biomethane and green hydrogen.** The industrial deployment of green hydrogen and biomethane relies on the Group's existing gas infrastructures, which

in turn need to be adapted to reduce the cost of the energy transition, in particular for its customers in sectors where short-term emissions reduction is difficult. The development of underground carbon storage (CCS-CCUS) is an avenue for the future that the Group is following closely, particularly for its customers in sectors where reducing emissions in the short term is difficult.

## OBJECTIVES 2030-2035

**50 GW**

of renewable electricity generation capacity (hydraulic, solar, wind)

## OBJECTIVES 2030

**80 GW**

of renewable electricity production capacity (hydraulic, solar, wind)

**10 TWh**

of biomethane annual production in Europe

**30 TWh**

of annual biomethane sales

**50 TWh**

of biomethane injection capacity in France's networks

**10 GW**

of electric battery capacity

**4 GW**

of hydrogen production capacity by electrolysis by 2035

**700 km**

of dedicated hydrogen networks

## OBJECTIFS 2045

**100%**

of renewable sales

**Net Zero Carbon**

with a residual emission below 26 Mt CO<sub>2</sub>.eq (-90% vs 2017).

## The contribution of research & innovation to the development of low carbon technologies

Achieving a Net Zero Carbon society requires the mobilization and collaboration of researchers working on low carbon energy technologies. These technologies must clearly improve their efficiency, circularity and integration. The alliance between renewable electrons and biogas or methane molecules will contribute to a sustainable balance in electricity production and distribution systems in the future. These technologies must enable competitiveness, resilience but also social acceptance and assure sustainable resource management.

Through its Research & Innovation Division, the Group is making a major contribution to improving low carbon technologies, as the three examples below demonstrate.

### 1 Reverse osmosis in a closed circuit to reduce water consumption (Belgium)

Reverse osmosis is a system for purifying water by means of a very fine filtering system that allows only the water molecules to pass through. Although widely used, this system has a maximum water recovery rate between 50% and 70%. The innovative CCRO (Closed Circuit Reverse Osmosis) technology is of major interest, as it can achieve a recovery rate of over 95%. This technology significantly reduces raw water withdrawal, waste generation and chemical consumption. In 2023, ENGIE Laborelec carried out a test at the Amercœur power plant in Belgium, confirming the added value of this technology for producing demineralized water, compared with conventional reverse osmosis technology.

### 2 Low carbon collective hybrid heating system (France)

ENGIE's Cylergie Lab has launched a low CO<sub>2</sub> boiler room project for the collective residential sector, proposing to replace old gas boilers with hybrid heating (gas boiler + heat pump). By 2023, ENGIE has demonstrated that this solution consumes less than half of the primary energy, with a 65% reduction in CO<sub>2</sub> emissions. The first operational heating system is for an 18-apartment communal building in Givone (France). Offers for the renovation of communal heating systems are already under consideration for major markets: ENGIE Solutions plans to replace 1,000 gas boilers a year, reducing CO<sub>2</sub> emissions by 33,000 tons by 2026

### 3 Continuous optimization of solar power plant yield

Since 2021, ENGIE has been testing several intelligent solar tracking algorithms to improve the yield of photovoltaic power plants. Smart tracking algorithms provided by Nexttracker have been sequentially implemented on several parts of the 158 MW Trompezon photovoltaic power plant of ENGIE in Mexico and compared with standard tracking algorithms. In 2023, this test allowed to validate a methodology to simulate photovoltaic power plants with smart tracking and

confirmed the expected gains of almost 3% in real configuration, generating additional revenues and a reduction in LCOE (Levelized Cost of Energy).

**Beyond these technologies, the Group is interested in emerging sustainable technologies. Following a study carried out in 2023, ENGIE has identified two emerging trends:**

1. The change in scale of photovoltaics and batteries - which are now reaching TW levels - creates a major challenge for the profitability and recyclability of critical materials. These materials, which are abundant in the earth's crust, remain concentrated in countries with high geopolitical, environmental and social risks, requiring strong extractive capacities that will reinforce current mining players.
2. The development of geoengineering to combat climate change, based on four emerging technologies:
  - Nature-based carbon sequestration solutions (NBS) such as afforestation or reforestation, wood construction, biochar derived from oxygen-free, high-temperature heating of wood residues, bioenergy with carbon capture and sequestration (BESC), coastal blue carbon stored by living organisms on the seashore and, finally, soil sequestration (SCS);
  - Solar space energy (SSE) captured in high Earth orbit and then converted into microwaves or lasers transmitted wirelessly to Earth, where it is converted into electricity.
  - Turquoise hydrogen from the pyrolysis of methane, enabling carbon to be stored in solid form.
  - The production of solar fuels, i.e. hydrogen or synthetic gases from CO<sub>2</sub> and water under the effect of sunlight, based on the model of organic photosynthesis.

## + FOR FURTHER INFORMATION



Consult the booklet on emerging sustainable technologies:



# Solar Power

## AMBITION

For several years now, ENGIE has been investing in solar energy, an adjustable, inexhaustible and low CO<sub>2</sub>-emitting form of energy. It is perfectly suited to today's challenges and has its place in a sustainable energy mix. **At the end of 2023, ENGIE had a 6.9 GW solar parc worldwide, making it the leading producer in France.** ENGIE also offers local authorities, manufacturers and businesses the opportunity to equip their sites - rooftops, parking lot shading, etc. - with solar panels and associated storage solutions in order to consume their own renewable electricity directly, thereby gaining resilience and autonomy while reducing their carbon footprint.

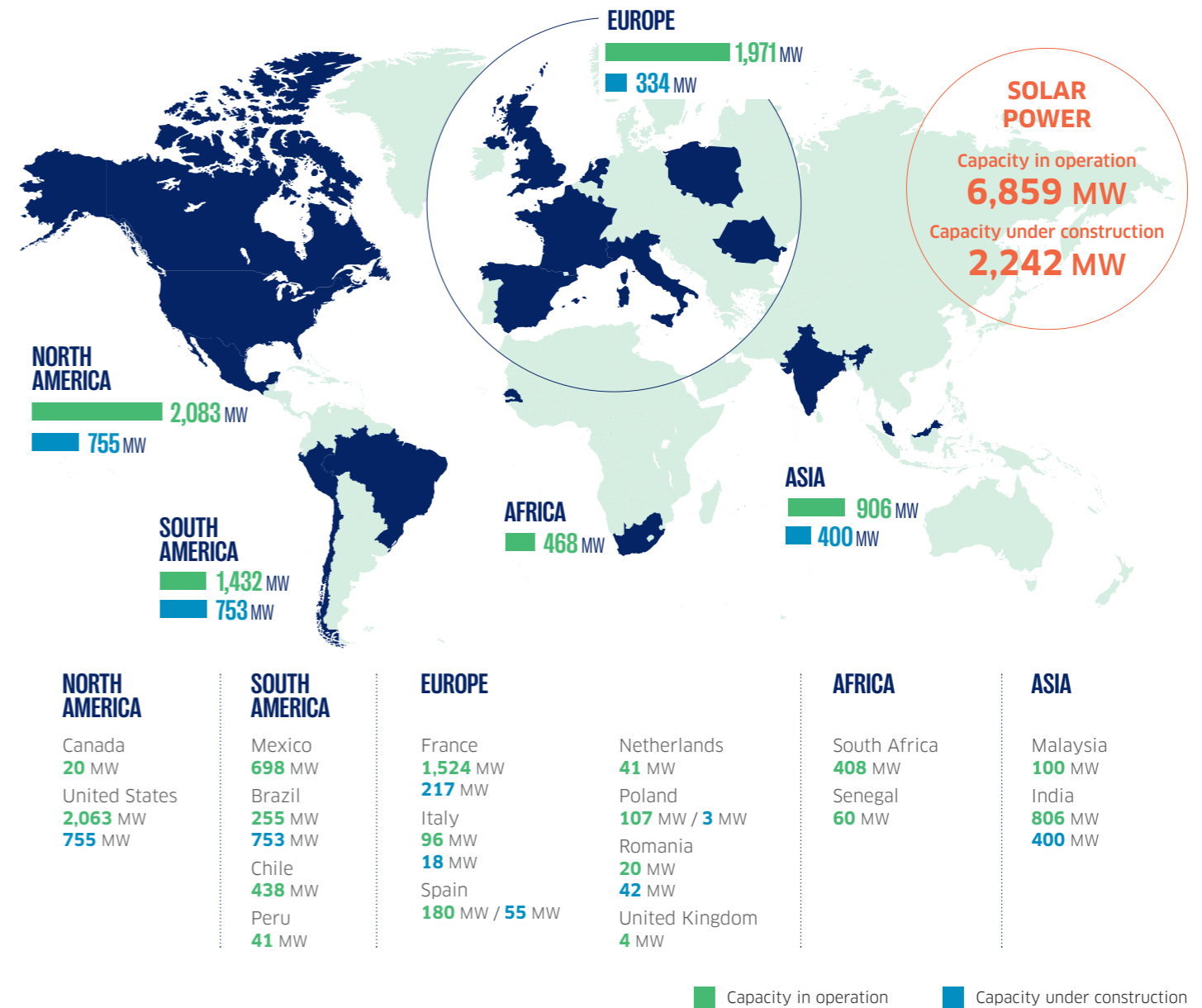


## ADVANTAGES

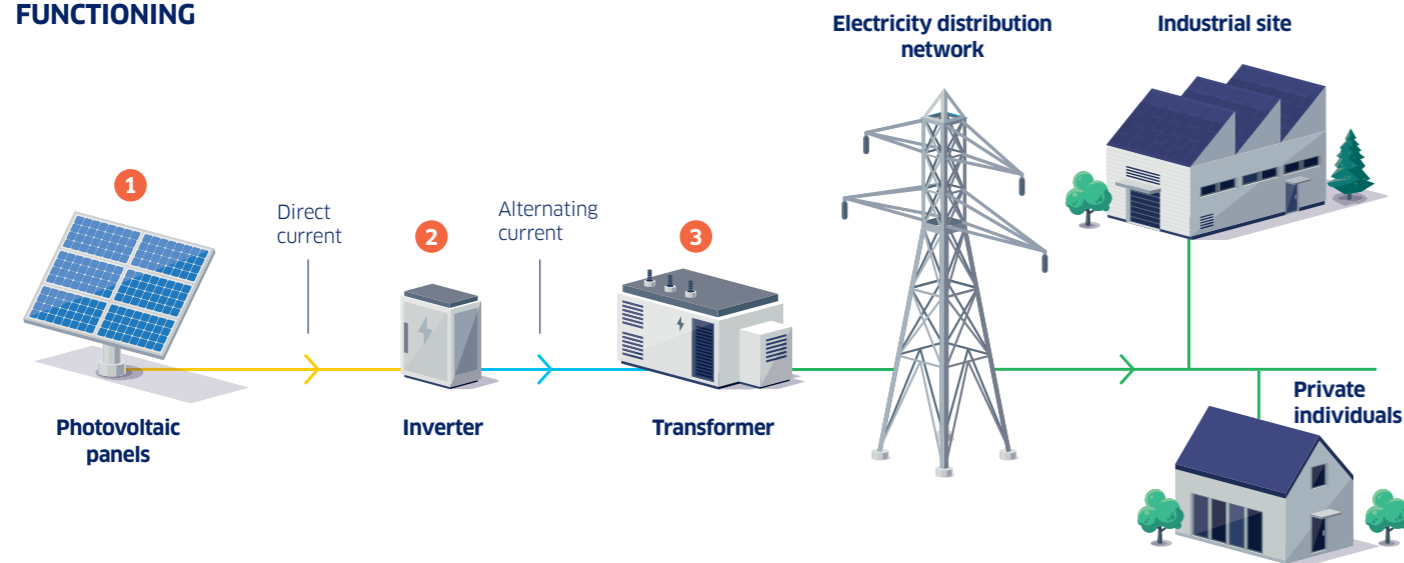
- Unlimited and widely available resource
- Easy, low-maintenance installation
- Quiet production
- Adjustable and 94% recyclable technology

## CHALLENGES AND SOLUTIONS

- Brightness dependency  
→ Use of sunshine forecasting tools and development of storage solutions
- Need for floor space  
→ Combining breeding and farming with solar power production, above-ground facilities : solar hedges, shading



## FUNCTIONING



- 1 The photovoltaic cells of the solar panel capture the sun's rays. These cells absorb photon energy and set them in motion, creating a direct electric current.
- 2 The inverter transforms the direct current into alternating current.
- 3 The transformer raises the voltage of the current so that it can be injected into the distribution network.

## SOME FLAGSHIP PROJECTS

- Sun Valley, Texas (USA):** 250 MW coupled with 100 MW battery
- Hopkins, Texas (USA):** 250 MW
- GUVNL2 in India:** 400 MW

## + BUSINESS CASE

### Inauguration of the Salt City solar farm near Chillicothe (Ohio-USA) in October 2023

This 50 MW project will supply around 15,000 homes for 30 to 35 years, thanks to 126,000 solar panels equipped with sensors that enable them to orient themselves to follow the sun and find the best position in the event of rain, snow or strong winds. This solar farm, located near the Kinnikinnick Fen nature reserve in a wetland area, respects the local ecology, with soils reseeded with native plants and shrubs providing shelter for local animals. In economic terms, the project has created 250 jobs during construction and 2 permanent local jobs for the operation and maintenance of the structure.



Salt City, United States



# Onshore Wind Power

## AMBITION

Onshore wind power is one of the booming pillars of the energy transition. With a capacity of 14.3 GW in 2023, ENGIE is the leading producer of wind-generated electricity in France. ENGIE is contributing to the growth of this technology by building new projects, modernizing existing wind farms through repowering, or by occasionally acquiring wind farm sites or projects. The Group also invests in innovation, particularly in the eco-design of materials, as in the Zebra project that aims to create a 100% recyclable wind turbine blade.

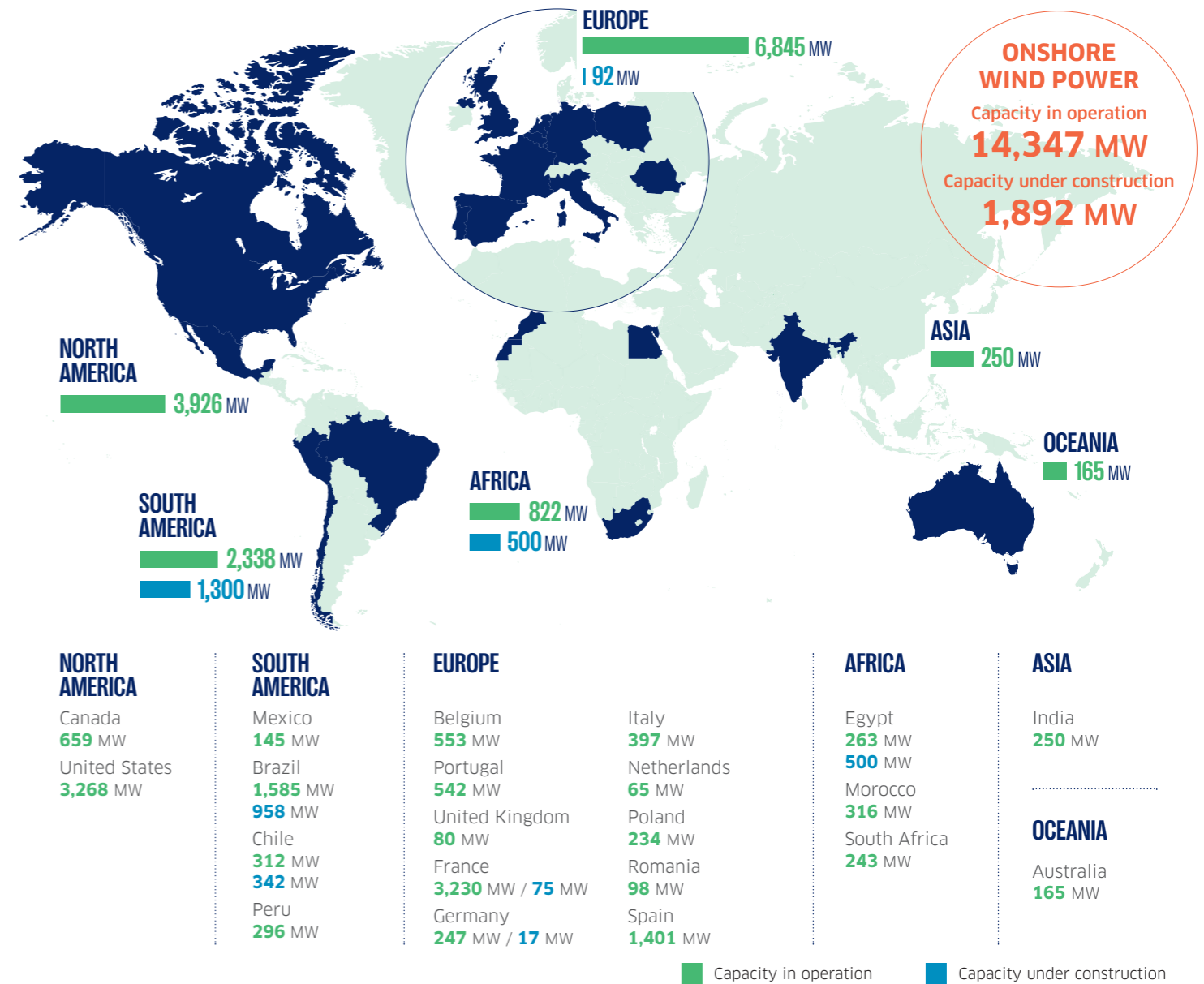


## ADVANTAGES

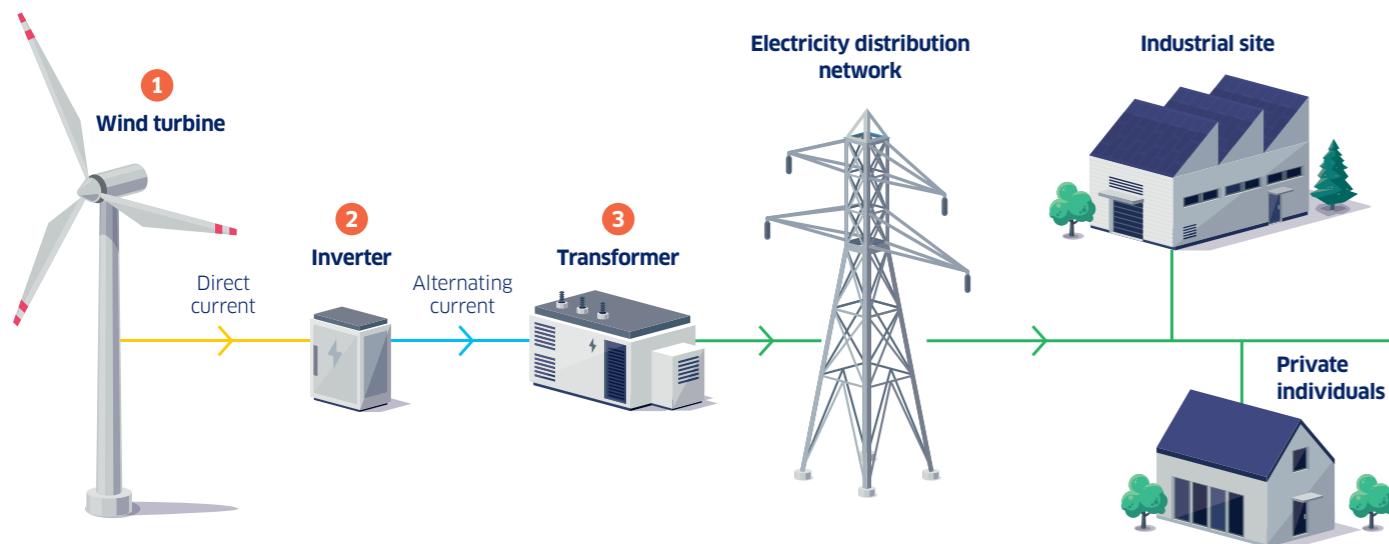
- Unlimited resource
- Over 90% recyclable technology
- Limited footprint on the ground

## CHALLENGES AND SOLUTIONS

- Intermittent and localized resource
  - Wind forecasting tools and associated energy storage solutions
- Protection of birds and chiropterans
  - Optimized siting, considering migratory routes
- Noise and visual impact on residents
  - Minimum distance from dwellings and stakeholder dialogue



## FUNCTIONING



- 1 A wind turbine works by capturing the wind with its blades. When the wind blows, the blades rotate around a central axis, creating a rotary motion. This motion is converted into mechanical energy and then into electricity.
- 2 The wind turbines are connected to each other by an internal grid. This grid transports electricity to the inverter, which converts the direct current into alternating current.
- 3 The electricity is then conducted into a transformer to raise its voltage and therefore to be injected into the distribution network, and then distributed to consumers.

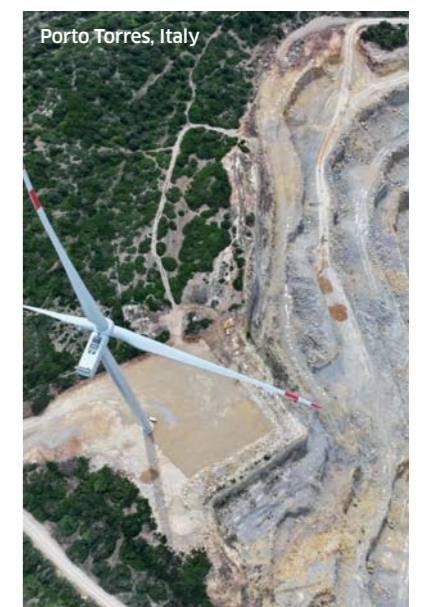
## SOME FLAGSHIP PROJECTS

- Red Sea wind energy in Egypt:** 500 MW
- Assurua and Santo Agostinho in Brazil:** 12.8 GW
- Lomas de Taital in Chile:** 342 MW
- Century Oak and North Bend in the United States:** 353 MW

## + BUSINESS CASE

### Commissioning of two wind farms in Italy

Since 2023 two new wind power plants in Porto Torres (Sardinia) and Rampingallo (Sicily) have been in operation in Italy, in line with the country's strategy of accelerating the development of renewable energy projects. The plants have a capacity of 29.4 MW each and together they will produce 142 GWh annually, which represents the annual energy consumption of 55,000 households. The use of latest-generation machines with larger turbines allows, for the same power, the number of wind towers to be minimized, for a better integration into the landscape. Each wind farm has 5 turbines, whereas more than ten would have been required with previous technologies. The two parks will save more than 45,000 tons of emissions per year.



# Offshore Wind Power

## AMBITION

Offshore wind power is one of the renewable technologies of the future, that ENGIE boosts through its Ocean Winds joint venture alongside EDP Renewables. **At the end of 2023, Ocean Winds has an offshore wind portfolio of 1.5 GW in operation, 1.9 GW under construction, and 13.2 GW under development (exclusive rights).** The Group selected projects primarily in Europe, the USA and certain regions of Asia which benefit from strong incentive measures because of high deployment targets.



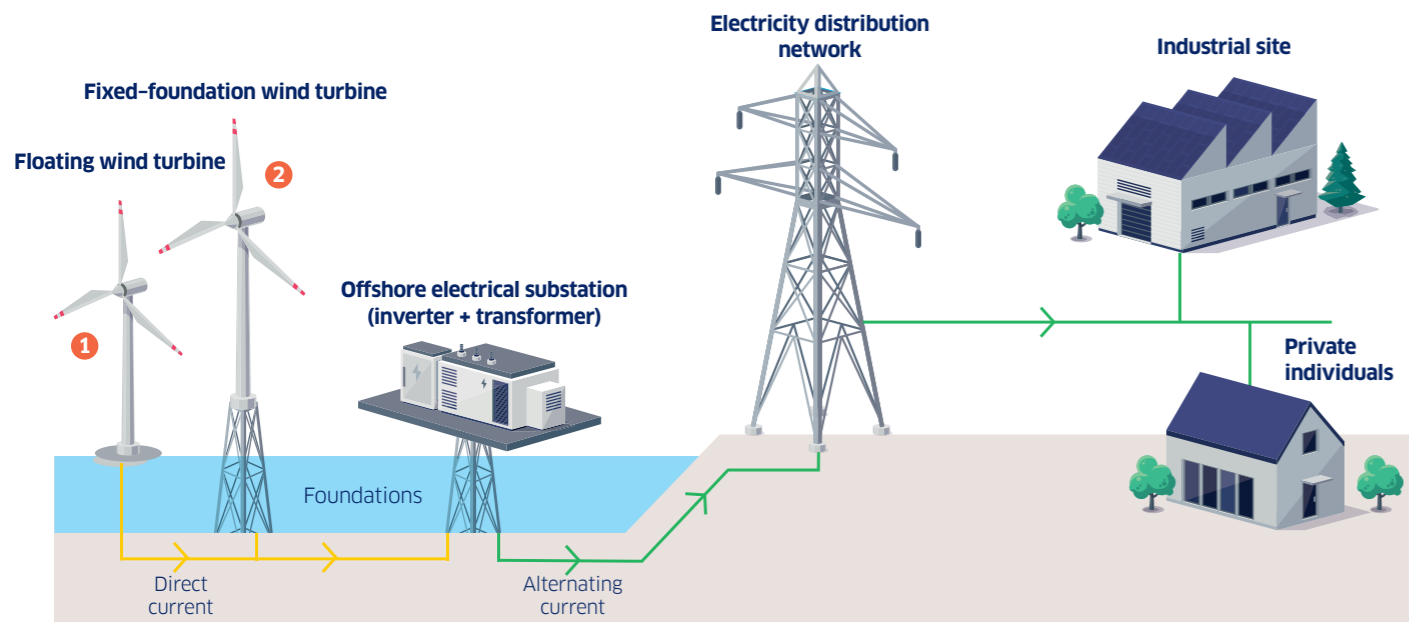
## ADVANTAGES

- Very low CO<sub>2</sub> emissions/KWh produced: overall reduction in CO<sub>2</sub> emissions from the power generation sector
- Greater installation potential than onshore, in particular in deepwater areas with the floating wind turbines technology
- Higher efficiency than onshore, thanks to more powerful wind turbines and stronger, more regular winds

## CHALLENGES AND SOLUTIONS

- Interferences with other sea users (fishing, traffic)
  - Dialogue and project adjustment with stakeholders concerned
- Impacts on biodiversity
  - Implementation of avoidance, reduction and at last resort compensation measures for any negative impacts, and reinforcement of any positive impacts (reef effect, ...).

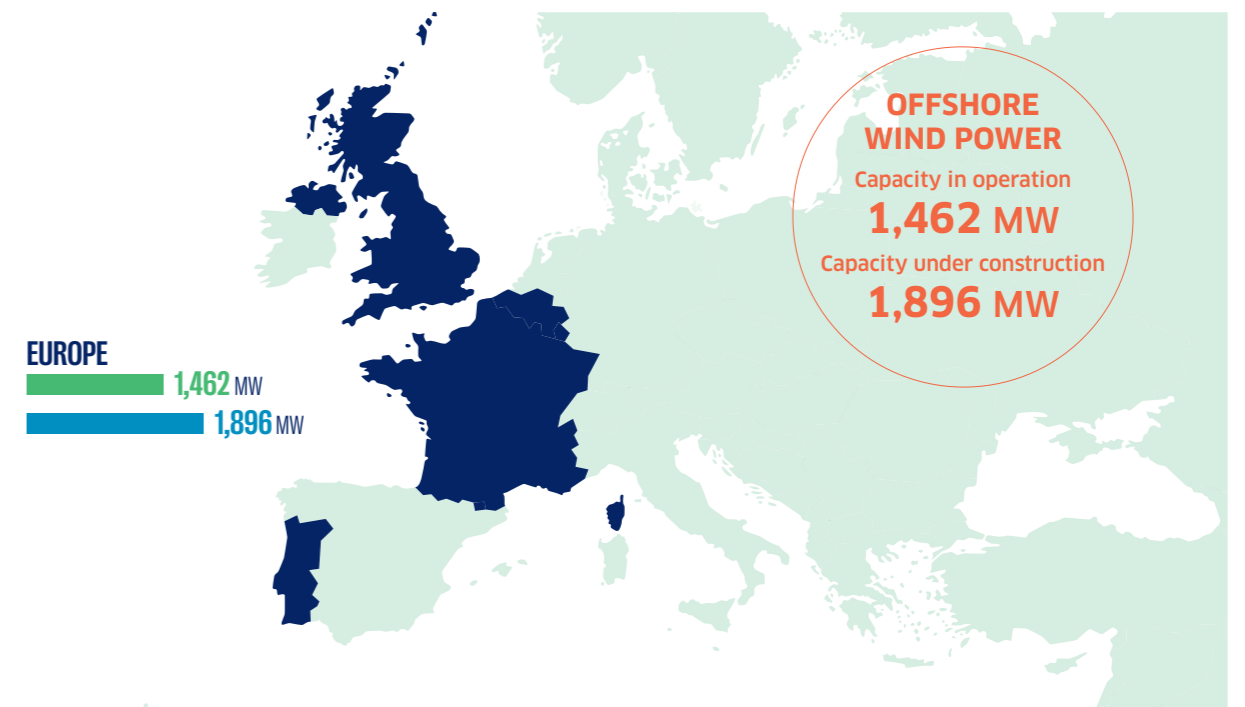
## FUNCTIONING



**1** A wind turbine with a floating structure connected to the sea floor by cables, enabling it to be installed in areas of great depth.

**2** Wind turbine with seabed foundations at a maximum depth of 50 to 60 m

Offshore wind turbines work on the same principle as onshore wind turbines. The voltage of the electricity created at sea is then taken in an electric offshore substation and transported to the coast via underwater cables. This electricity is then distributed to consumers.



## EUROPE

France	Belgium	Portugal	United Kingdom
1,014 MW	487 MW	25 MW	950 MW 882 MW

■ Capacity in operation ■ Capacity under construction

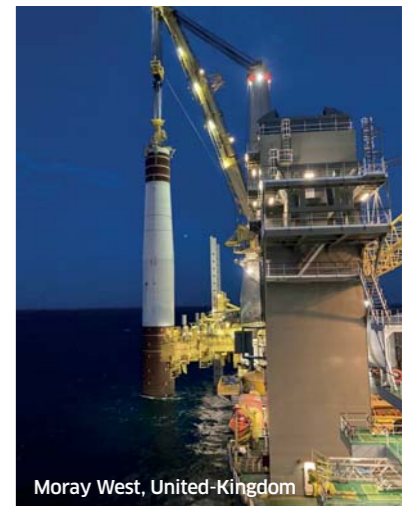
## SOME PROJECTS UNDER CONSTRUCTION

- Dieppe - Le Tréport in France : 500 MW
- Îles d'Yeu - Noirmoutier in France : 500 MW
- Moray West in the UK : 882 MW

## + BUSINESS CASE

### Moray West or how to contribute to Net Zero Carbon in the UK

The announcement in April 2023 of the financial close of the Moray West offshore wind farm in north-east Scotland has been a major breakthrough for Ocean Winds, that could start the construction of its parc. In the last quarter of 2023, Moray West reached further milestones in its first phases of onshore and offshore construction. On November 1, 2023, the 50/50 joint venture between EDP and ENGIE, dedicated to offshore wind power, took delivery of two offshore transformer modules. The first of the 62 monopiles and the first electrical substation were also installed offshore. Finally, the first blades for the 108-meter-long turbines were also completed at the Siemens Gamesa factory in Hull, UK. These are key steps in the construction of the wind farm. At almost 900 MW, Moray West is one of the UK's largest offshore wind projects. Guaranteeing the supply of electricity from renewable energies and thus meeting national decarbonization targets, it is due to start generating power from 2024. It will produce the equivalent of the clean energy needed by 1.3 million British households.



Total capacity  
**882 MW**  
based on 60 turbines at 14.7 MW/unit

**Technology** : offshore wind, fixed-bottom, XXL monopiles

Distance from coast  
**22 km**

# Hydropower

## AMBITION

With 17.9 GW of hydropower capacity (excluding pumped storage) at the end of 2023, ENGIE is a major player in this renewable energy sector, particularly in Brazil and France (1st private producer with 11.8 GW in Brazil and 3.9 GW in France). ENGIE intends to maintain these leading positions while remaining present in other key countries such as Portugal (1.7 GW), where it is the 2nd largest producer of hydroelectricity.



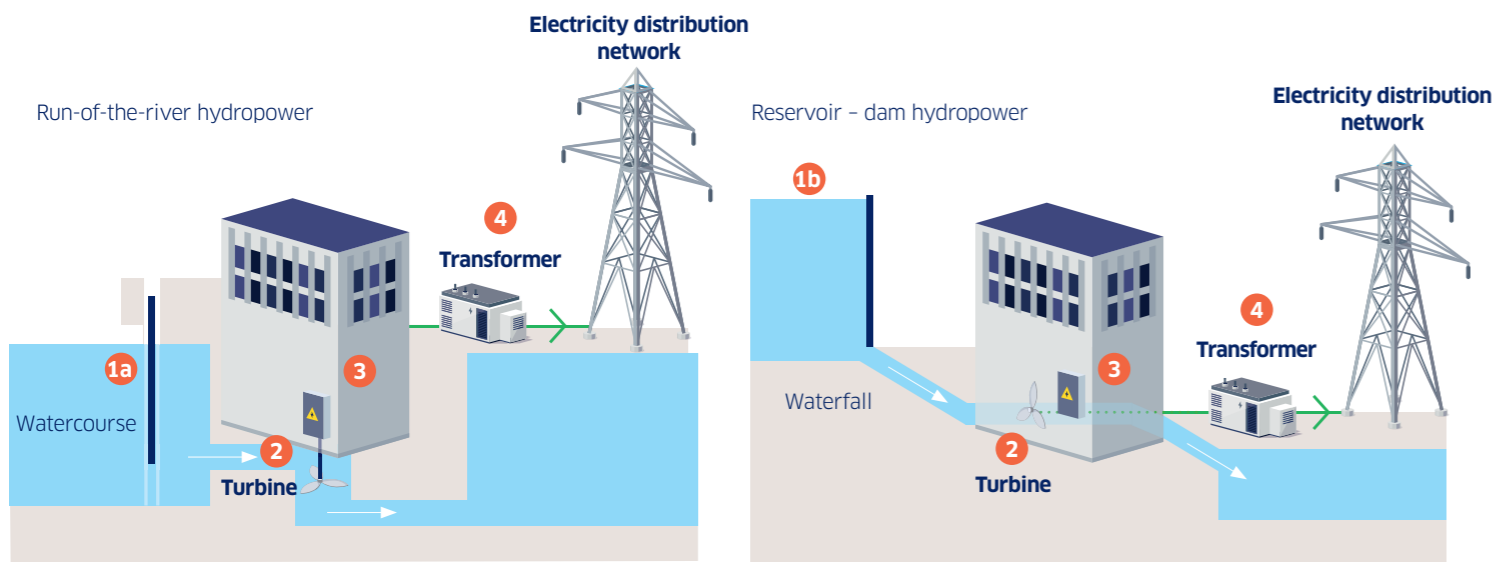
## ADVANTAGES

- Particularly clean and safe power generation technology
- State-of-the-art technology
- Complementary technology to other renewable generation sources

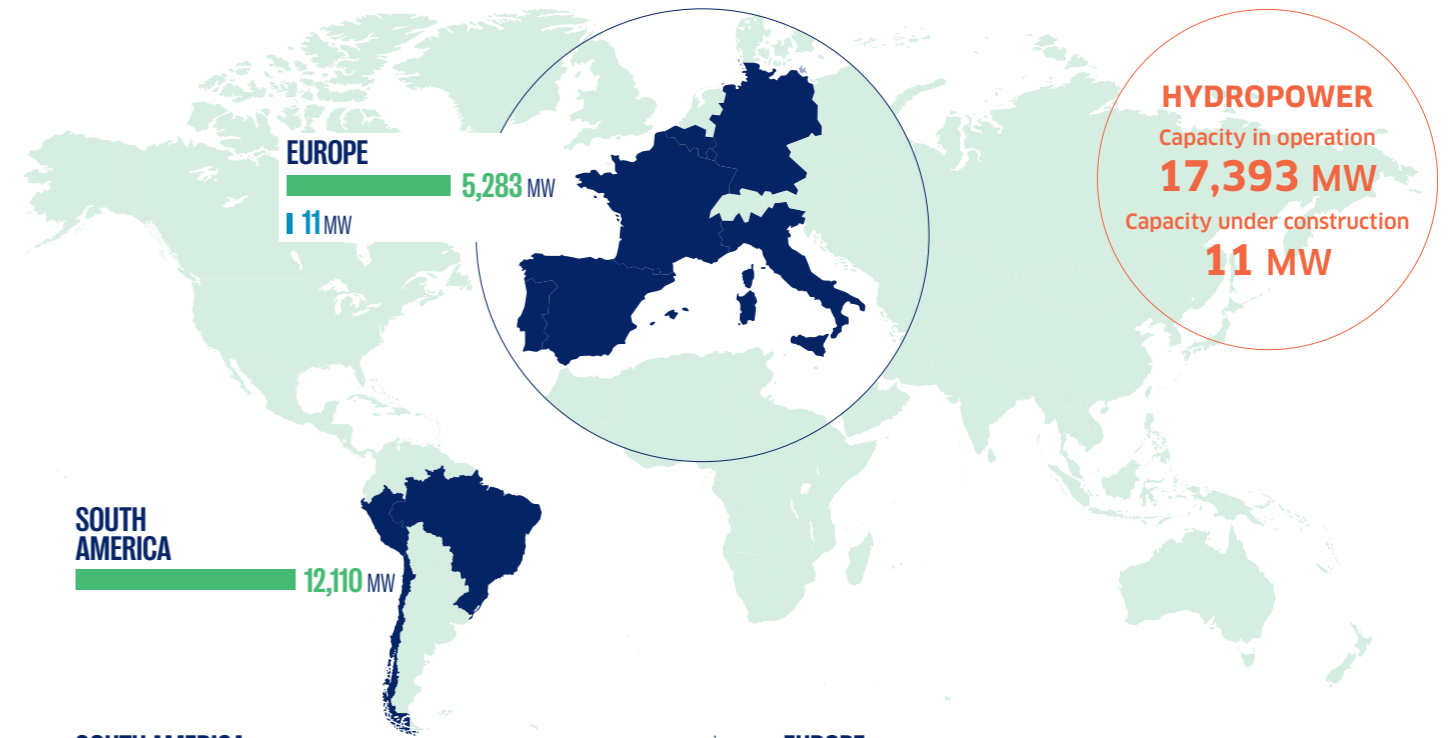
## CHALLENGES AND SOLUTIONS

- Preservation of the ecosystem and landscapes  
→ Studies to avoid, reduce and offset these potential negative impacts with stakeholders concerned and affected communities

## FUNCTIONING



- 1a** The power plant weirs the river and then lets the water flow into the pipe leading to the turbine.
- 1b** The power station is located below the dam, leaving the water free in its fall.
- 2** The water's descent, or the force of its fall, drives the turbines, which rotate at high speed.
- 3** The rotation of the turbines drives alternators which then produce electric current.
- 4** The transformer raises the voltage to inject the current into the distribution network.



**HYDROPOWER**  
Capacity in operation  
**17,393 MW**  
Capacity under construction  
**11 MW**

## SOUTH AMERICA

### RUN-OF-THE-RIVER HYDROPOWER

Brazil  
**8,632 MW**  
Chili  
**35 MW**  
Peru  
**117 MW**

### RESERVOIR-DAM HYDROPOWER

Brazil  
**3,179 MW**  
Chile  
**10 MW**  
Peru  
**137 MW**

## EUROPE

### RUN-OF-THE-RIVER HYDROPOWER

Germany  
**5 MW**  
Belgium  
**9 MW**  
France  
**3,126 MW / 11 MW**

### RESERVOIR-DAM HYDROPOWER

Italy  
**30 MW**  
Portugal  
**1,234 MW**  
Spain  
**65 MW**  
Belgium  
**13 MW**  
France  
**756 MW**  
Italy  
**45 MW**

■ Capacity in operation ■ Capacity under construction

## + BUSINESS CASE

### Brazil's Jirau hydroelectric power plant in Brazil stands out in environmental terms

Located on the banks of the Madeira River, 120 km from Porto Velho, Jirau is Brazil's 4<sup>th</sup> largest hydroelectric plant in terms of installed capacity, with 3,750 MW. Another success story is the plant's contribution to reducing carbon emissions. Certified by the United Nations under its Clean Development Mechanism (CDM), the plant generates carbon credits equivalent to 6 million tons of CO<sub>2</sub> avoided per year. Commercially operated for 10 years with ENGIE as main shareholder, Jirau received at the end of 2023 the highest level of certification in the world according to the Hydropower Sustainability Standard, issued by the Hydropower Sustainability Council at the end of 2023. It became the 1<sup>st</sup> hydroelectric plant in Brazil and the 2<sup>nd</sup> hydroelectric plant in the world to be recognized at this level of certification.



The plant's technology is such a success that, after just 8 years in operation, it has reached the top of the rankings in terms of operational availability, thanks to its Bulb hydraulic turbines which operate underwater like a submarine, providing

clean, sustainable energy. Finally, Jirau is equipped with a system for recovering tree trunks and floating debris of all kinds, another element of production security and technological differentiation.

# Pumped storage power

## AMBITION

Pumped storage is a form of electricity storage that takes electricity from the grid to store it in hydraulic form (pumping) and return it to the grid in the form of hydroelectricity (turbining). With a capacity of 3.8 GW at the end of 2023, ENGIE plays a major role in this technology in Europe, where it is mainly present in the UK (2.1 GW) and Belgium (1.1 GW). In the future, ENGIE intends to remain a major player in this low carbon technology, which contributes to the flexibility and security of the power system.



Dinorwig and Ffestiniog, United Kingdom

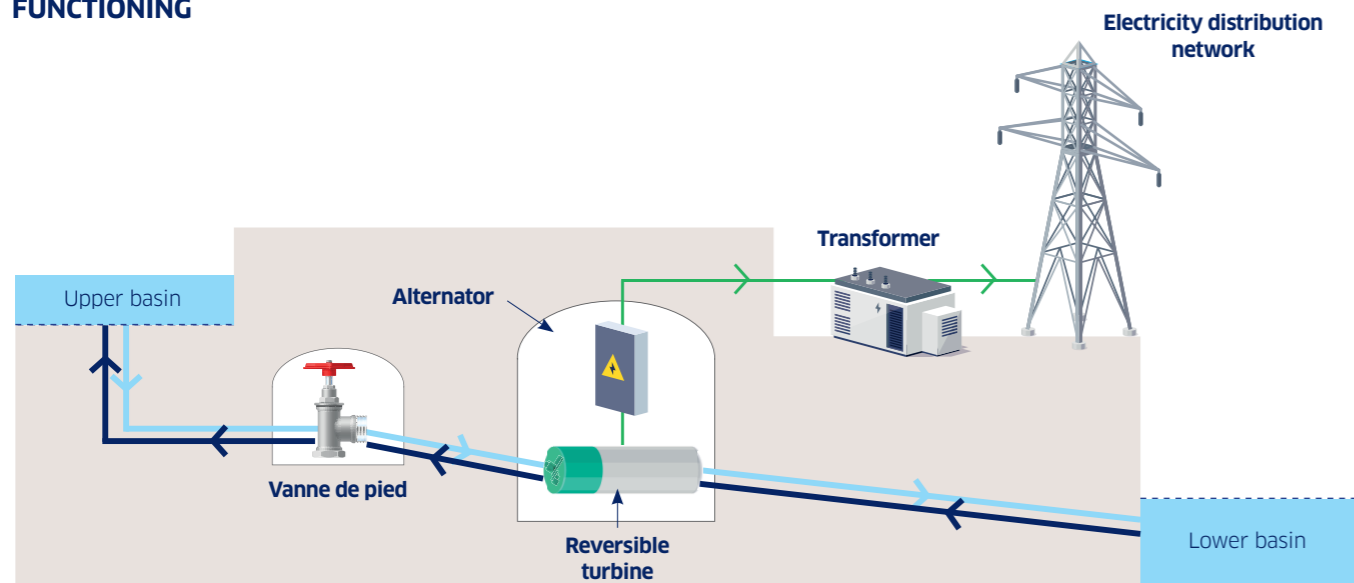
## ADVANTAGES

- Flexible, simple and proven technology
- Long-lasting installation

## CHALLENGES AND SOLUTIONS

- Electricity-consuming plants
  - Optimization of operation according to electricity prices
- Preservation of ecosystems and landscapes
  - Studies to reduce and compensate these potential negative impacts with stakeholders concerned and affected communities

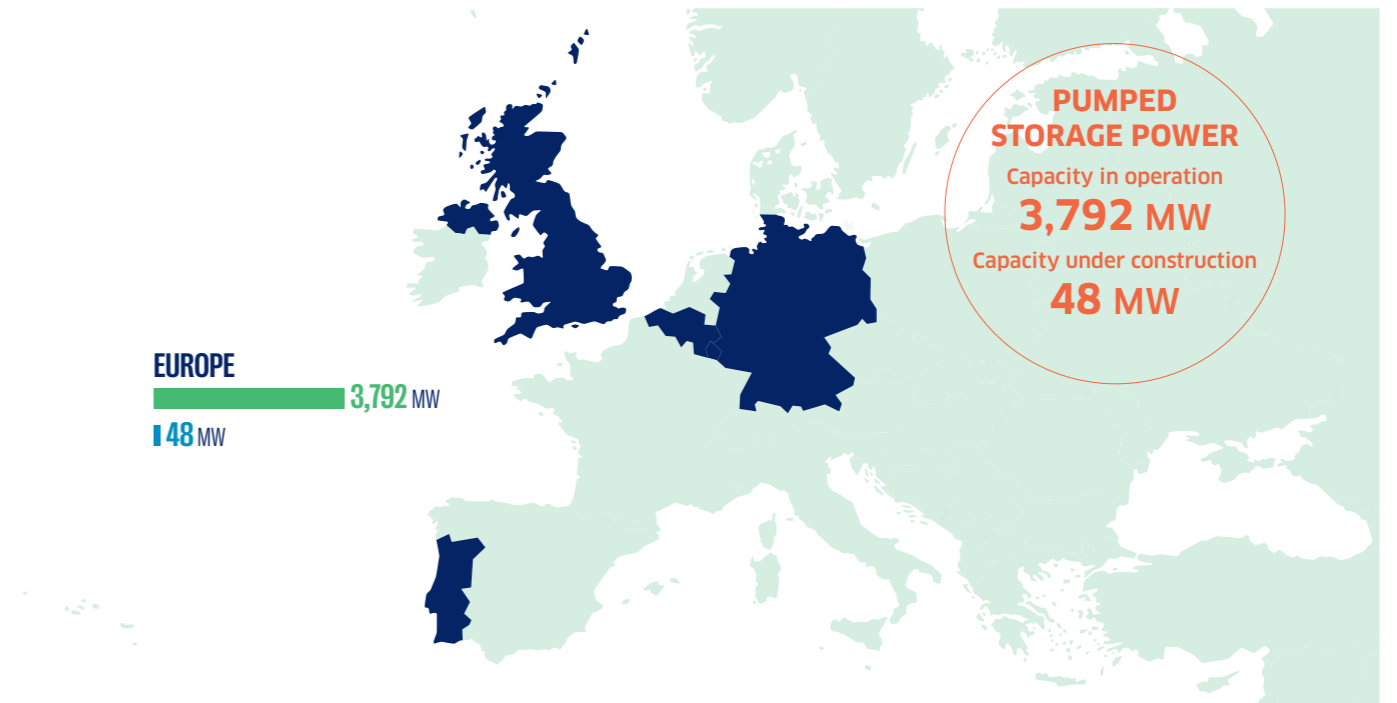
## FUNCTIONING



**Pumped storage:** This consists in generating electricity with a hydroelectric plant that alternates between production (turbining) and storage (pumping).

**Turbine:** Water is drawn from the upper basin. Its descent to the lower basin turns on turbines connected to alternators which generate electricity that is injected into the network.

**Pumping:** When electricity production exceeds demand, water is pumped from the lower to the upper basin. The motor then consumes electricity to turn the turbine on. This process enables the water to gain potential energy and thus store energy.



## EUROPE

### PUMPED STORAGE POWER

Belgium  
1,113 MW / 48 MW

Germany  
137 MW

United Kingdom  
2,088 MW

### HYBRID PUMPED STORAGE POWER<sup>(1)</sup>

Portugal  
454 MW

(1) Capacities classified as the renewable electricity production capacities

■ Capacity in operation

■ Capacity under construction

## + BUSINESS CASE

### Extension of the pumped storage power plant of Coo (Belgium)

The aim of this project is to increase Coo's capacity and storage volume by 7.5%. It involves increasing the energy stored by pumping by 450 MWh by raising the dikes of the second upper basin and carrying out a maintenance, renovation and extension campaign on the lower basin. In addition, the plant's power will be increased by 79 MW through the replacement of turbines, guide vanes, transformers and the adaptation of Coo I units' alternators. This extension will require an investment of €67 million, with work scheduled to run from 2021 to 2026.



Coo, Belgium

# Batteries

## AMBITION

Against a backdrop of growing energy consumption, the energy transition to a low carbon economy calls for greater integration of renewable energies into the system. At the same time, to ensure security of supply, there is a growing need for energy storage capacity to ensure the resilience of the energy system. According to the International Energy Agency, in its Net Zero Emissions scenario, the need for flexibility solutions is expected to quadruple by 2035. And battery storage is one of the solutions available to meet grid stability requirements. In addition to its proven daily, weekly and seasonal flexibility portfolio, ENGIE is accelerating the development of hourly flexibility activities for wholesale markets and is also contributing to the decarbonization trajectory of its B2B customers. **With portfolio of 1.3 GW in 2023, the Group aims to reach 10 GW of installed capacity by 2030 in Europe, the United States, South America (Chile, Peru), Australia and South Africa.** Due to its level of maturity, ENGIE is currently focusing on Li-Ion battery technology to deploy its Battery Energy Storage Systems (BESS) development projects.

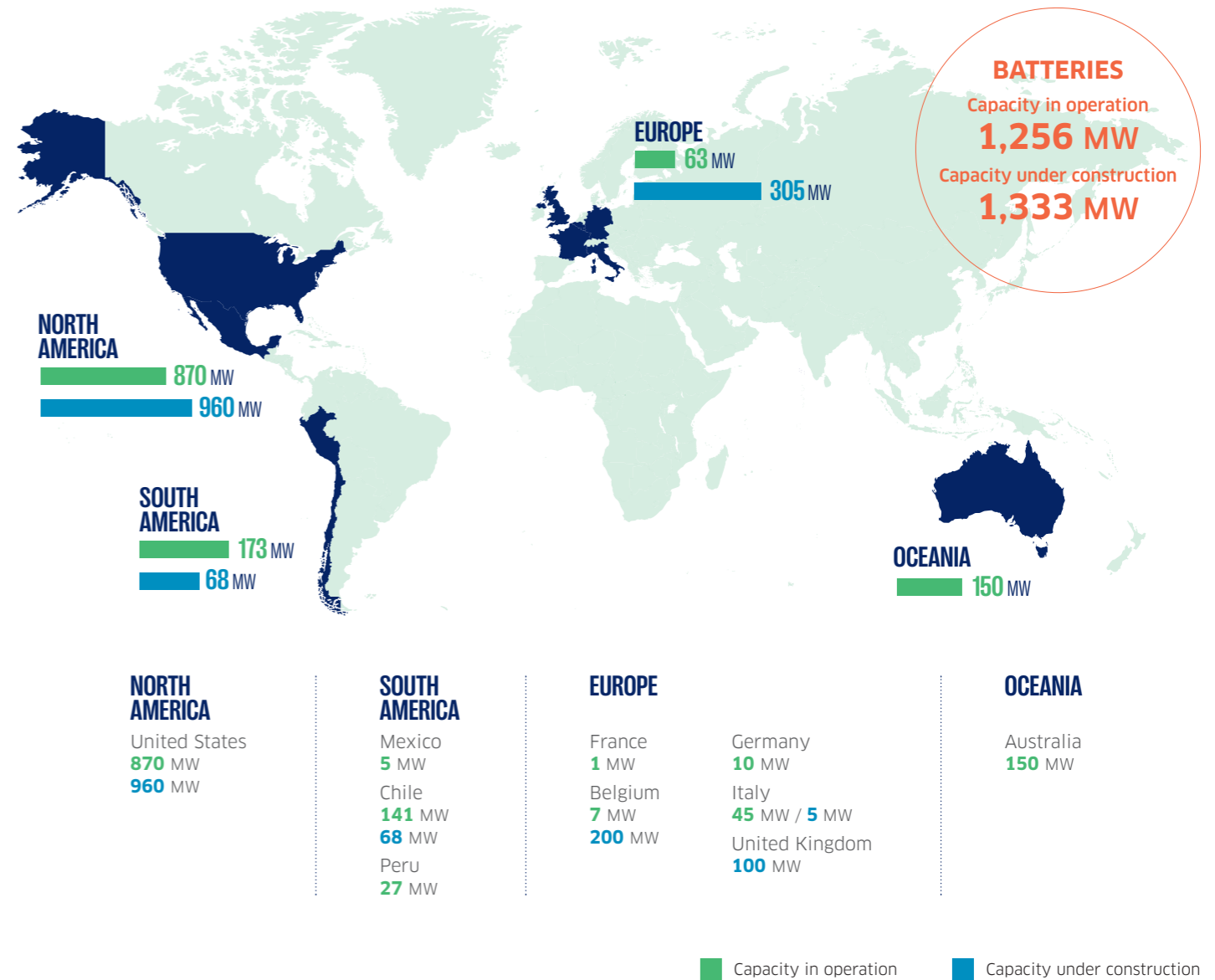


## ADVANTAGES

- Contribution to reducing transition costs
- High energy density
- Few installation constraints and modularity
- High reactivity, as mobilization is immediate

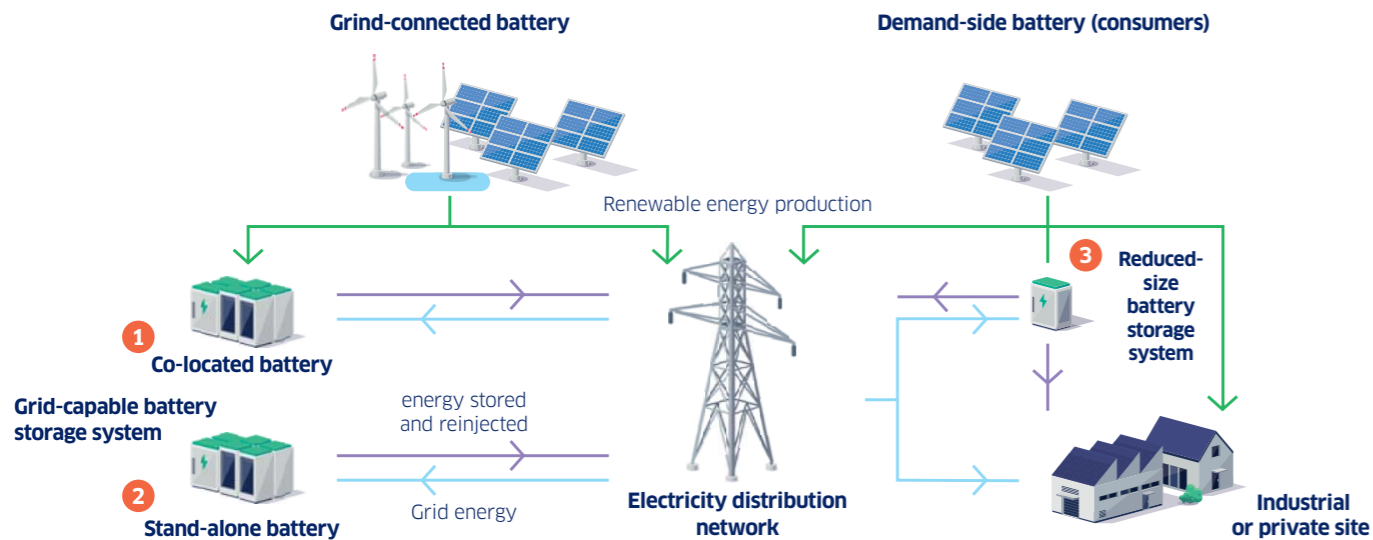
## CHALLENGES AND SOLUTIONS

- Fire and chemical pollution risks associated with the Li-Ion technology
  - Safe design, detection devices and means of intervention in the event of incidents on sites
- Recycling
  - Channel under development
- Availability of critical materials
  - Efforts to reduce their use by introducing other, non-critical materials



## FUNCTIONING

We need to differentiate: the grid-connected battery and the demand-side battery



- 1** The co-located battery is on a production site. It can store the produced energy or inject it into the grid.
- 2** The stand-alone battery that is not present on production site - can store energy coming from the grid and reinject it.
- 3** The demand-side battery:
  - stores energy from the grid, solar panels on the industrial site or the home
  - injects this energy back into the grid or makes it available for local consumption

## SOME FLAGSHIP PROJECTS

**Acquisition of Broad Reach Power in Texas (USA):**  
350 MW of capacity in operation and 880 MW under construction in service by the end of 2024

### Projects commissioned in 2023:

- Hazelwood in Australia (150 MW)
- Coya in Chile (139 MW)
- Cave (100MW), Five Wells (220 MW), Libra (200 MW), North Fork (100MW), Sun Valley Storage (100 MW) in the USA

### Projects under construction in 2023:

- Dickens (200 MW), Hydra (200 MW), Longhorn Storage (135 MW), Paleo (200 MW), Pavo (175 MW) in the USA
- Vilvorde BESS 1 et 2 (2 x 200 MW) in Belgium

## + BUSINESS CASE

**Sun Valley Battery Storage (Texas) : 100 MW to enhance ERCOT Grid's liability**

At the end of 2023, ENGIE commissioned a 100 MW battery storage facility co-located with the 250 MW Sun Valley solar power plant, enabling to stock and deliver a capacity of 100 MW in an hour. The unit, of a 20-year lifespan, is designed to compensate for production intermittent and demand growth on the ERCOT transmission grid in Texas. At peak times, the 308 battery cabinets could meet the needs of some 10,000 homes including at peak times. The land, formerly used to grow corn and cotton, has been reseeded by local vegetation. Battery projects close to power grids help to support both the growing demand for renewable energies and the increased reliability and resilience of the country's power grids.



# Geothermal

## AMBITION

Geothermal energy offers great potential for the development of a zero-carbon energy mix. It is all the more interesting in that it adds value to a local energy resource in a circular economy approach and is a particularly attractive solution for a variety of uses: heating or air-conditioning via district heating and cooling networks in cities or tertiary buildings, and decarbonizing industrial sites. In France, with a production capacity of 30 MW in surface geothermal energy and 130 MW in deep geothermal energy by the end of 2023, ENGIE produces and distributes 25% of the deep geothermal heat. ENGIE aims to become a major player with an ambitious target of 3 TWh by 2030 split 50/50 between deep geothermal energy and shallow geothermal energy.



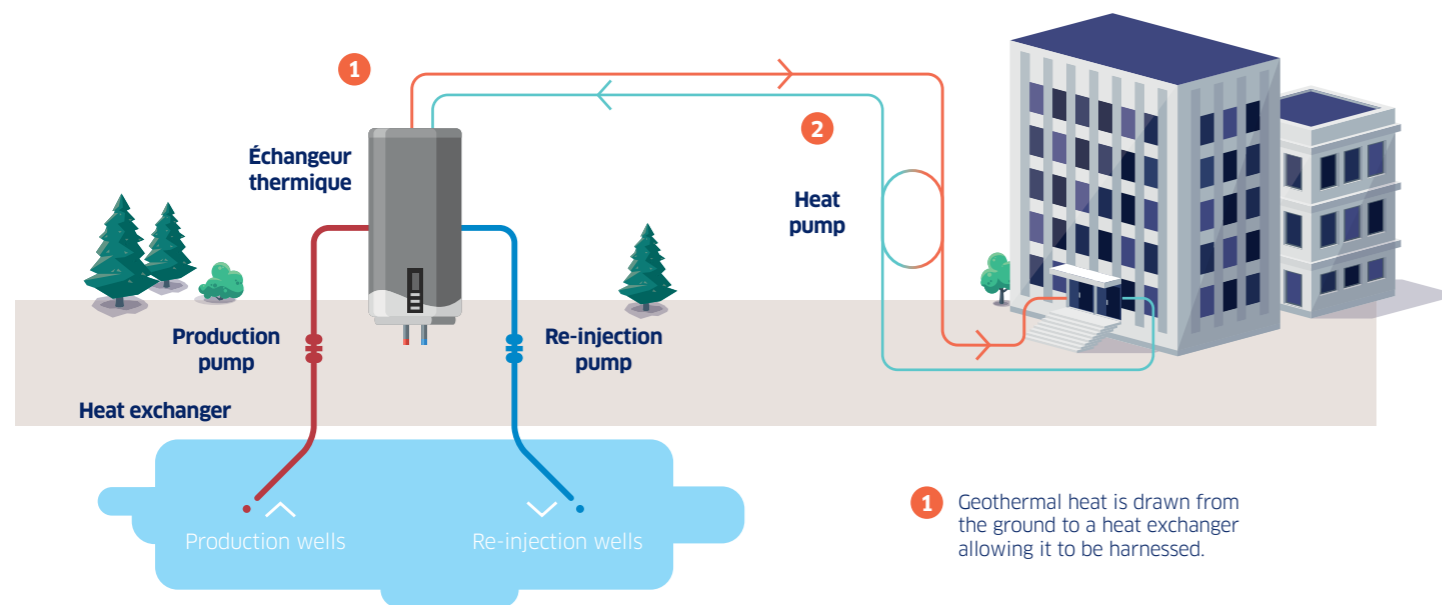
## ADVANTAGES

- An unlimited resource without weather dependence
- Simple, proven technology
- Minimal visual and noise impact
- No combustion

## CHALLENGES AND SOLUTIONS

- Risks of premature corrosion and ageing of wells
  - New materials (fiberglass)
- Exclusively local operation
  - Drilling located close to consumption areas
- Seismic risk
  - Upstream geological and seismic surveys and monitoring systems

## FUNCTIONING

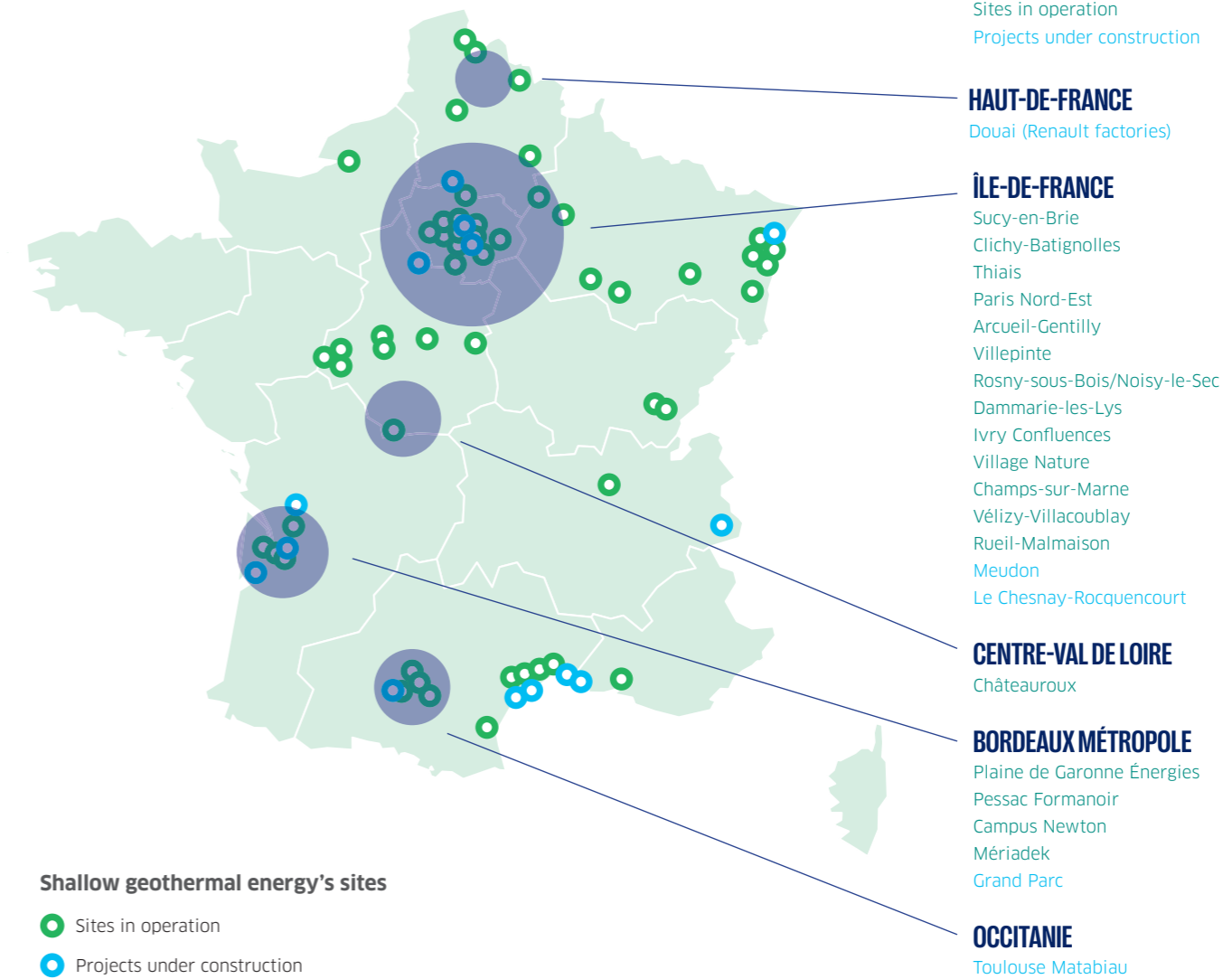


ENGIE exploits geothermal energy for heat need only, in two ways: at depths of up to 200m (shallow geothermal energy) and up to 5km (deep geothermal energy).

- 1 Geothermal heat is drawn from the ground to a heat exchanger allowing it to be harnessed.
- 2 The hot water is then injected into the water network for consumer use.

## Deep geothermal energy's sites

Sites in operation  
Projects under construction



### HAUT-DE-FRANCE

Douai (Renault factories)

### ÎLE-DE-FRANCE

Sucy-en-Brie  
Clichy-Batignolles  
Thiais  
Paris Nord-Est  
Arcueil-Gentilly  
Villepinte  
Rosny-sous-Bois/Noisy-le-Sec  
Dammarie-les-Lys  
Ivry Confluences  
Village Nature  
Champs-sur-Marne  
Vélizy-Villacoublay  
Rueil-Malmaison  
Meudon  
Le Chesnay-Rocquencourt

### CENTRE-VAL DE LOIRE

Châteauroux

### BORDEAUX MÉTROPOLE

Plaine de Garonne Énergies  
Pessac Formanoir  
Campus Newton  
Mériadek  
Grand Parc

### OCCITANIE

Toulouse Matabiau

## Shallow geothermal energy's sites

- Sites in operation
- Projects under construction

## SOME PROJECTS UNDER CONSTRUCTION

**Meudon in France:**  
GéoMeudon heating network

**Le Chesnay-Rocquencourt in France:**  
Grand Parc Nord

**Douai in France:**  
Renault factory

## + BUSINESS CASE

### Making Bordeaux a positive-energy territory

ENGIE Solutions is supporting the Bordeaux metropolitan area in its ambition to become an energy-positive region by 2050. To extend by 9 km the existing 4 km heating network in the Grand Parc district - comprising some 4,000 housing units - and make it greener by autumn 2024, the Group has designed and developed a local, virtuous energy solution, based on the construction of a geothermal system coupled with a biomass boiler plant. It will supply an additional 6,900 housing equivalents with heating and hot water, 86% of which will come from renewable energies. This unprecedented combination has the particularity of reactivating an old geothermal well while recharging a deficient drinking groundwater. The project is scheduled for completion by autumn 2024 and will eventually supply 52 GWh of energy - compared with 19 GWh today - and avoid the annual emission of

12,800 tons of CO<sub>2</sub> equivalent in the region. It represents a major step forward in the achievement of the city's energy objectives.



# Biomethane

## AMBITION

Biomethane, produced from organic matter, is set to play a major role in a fully decarbonized energy system by 2050.

In addition to being a low carbon energy source, biomethane is a genuine example of the circular economy in each territory, helping to strengthen its energy independence.

**By the end of 2023, ENGIE will have an annual production capacity of almost 1 TWh spread in France (1<sup>st</sup> largest biomethane producer with an annual capacity of 691 GWh) and the UK (160 GWh).**

**ENGIE has set itself a target of 10 TWh of annual production capacity by 2030, targeting 8 countries in Europe.** ENGIE also intends to sell 30 TWh by this date on the European market, which is becoming increasingly structured with the strengthening of sustainability evidence.

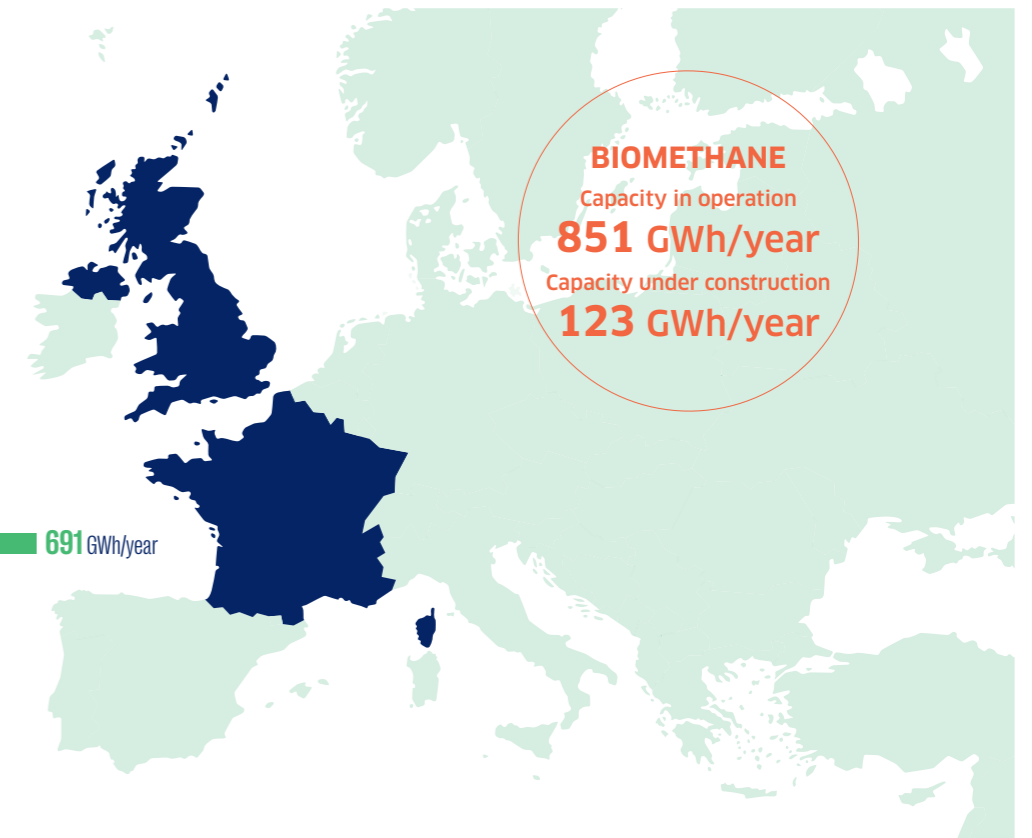
ENGIE commits to the sustainability of its biomethane through a commitment to reduce the use of dedicated energy crops:

- For **greenfield projects (new projects to be built)**: ENGIE's biomethane units that are newly built must use a very low proportion of energy crops. The annual feedstock tonnage across the country must have energy crops as a single-digit percentage at most.
- For **brownfield project (existing projects to be developed)**: In case ENGIE acquires existing biomethane plants running with energy crops, a plan to phase out energy crops, as soon as possible and the latest within 10 years (just transition for farmers), is implemented. If some dedicated energy crops shall remain, the average annual tonnage in the total portfolio of the country should represent a single-digit maximum percentage.



**UNITED KINGDOM**  
 Capacity in operation: 160 GWh/year  
 Capacity under construction: 55 GWh/year

**FRANCE**  
 Capacity in operation: 691 GWh/year  
 Capacity under construction: 68 GWh/year



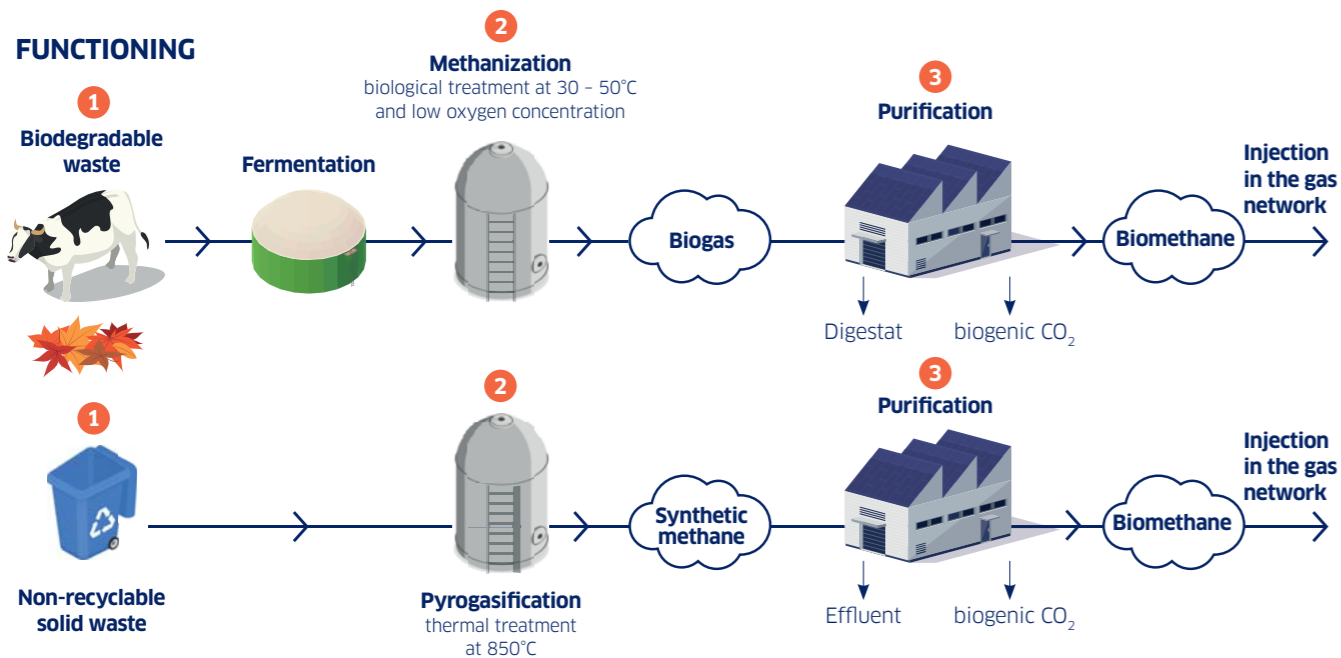
## ADVANTAGES

- Favors the creation of non-relocatable jobs
- Contributes to the development of the economy through waste recovery
- Valorizes residual organic matter (digestates)
- Transportable and storable gas in the actual network
- Continuous production with a positive impact on climate

## CHALLENGES AND SOLUTIONS

- Potential olfactive nuisance during input transport  
 → Optimization of input transport and storage on site
- Risks of ammonia emissions into the air or water pollution in the event of incident.  
 → Continuous monitoring of facilities, with on-site intervention resources in the event of incidents

## FUNCTIONING



- 1 Biogas is produced from the fermentation of biodegradable waste (organic waste...) or from the treatment of household waste.
- 2 This waste is then treated by methanization, pyrogasification or even hydro-gasification in the case of waste coming from water treatment plant.
- 3 At the end of these processes, biogas or syngas are recovered. These gases are then purified to extract injectable biomethane which is injected into the network, residues that can be used in agriculture (digestate, effluents...) and, biogenic CO<sub>2</sub> that can be reused in industrial processes, such as methanization that produces synthetic methane from green hydrogen.

## SOME PROJECTS UNDER CONSTRUCTION

**Biomethane plant in Val de Cher in France:**  
20 GWh/year

**Eurametha in France :**  
30 GWh/year

**Biogaz plant in Aize Parc in France:**  
19 GWh/year

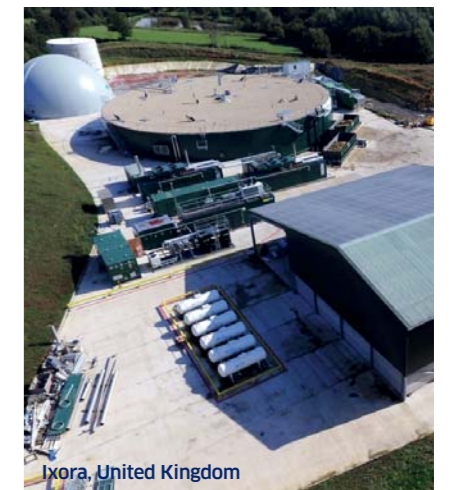
**AD Deal Farm in the United Kingdom:**  
55 GWh/year

## + BUSINESS CASE

**With Ixora, ENGIE accelerates its European development in biomethane**

Every year, the Group invests in renewable and low carbon energies that contribute to the development of a diversified, flexible and balanced energy mix. ENGIE is particularly focused on the development of biomethane, a local green energy in which it is the leader in France, with an installed production capacity of 691 GWh per year. Continuing its expansion in Europe, last September the Group acquired Ixora Energy Ltd, a UK-based biomethane producer since 2017, for £64.8 million. Located in Devon and Somerset, its three production units generate a total of 160 GWh of biomethane per year. ENGIE has revised upwards its biomethane production ambitions to 10 TWh per year in Europe by 2030, while setting a target of 30 TWh of renewable methane (biomethane and e-methane) sales per year worldwide via its ENGIE GEMS entity.

The Group's sustained investment in biomethane will help it achieve its Net Zero Carbon objective by 2045 and meet the decarbonization needs of its customers.



# Green hydrogen

## AMBITION

Green hydrogen is produced from water and renewable electricity without greenhouse gas (GHG) emissions. It can be stored directly as hydrogen or, after transformation, as synthetic methane. As a result, green hydrogen represents one of the levers of the future for achieving the transition to carbon neutrality.

To achieve its ambition of 4 GW of production capacity by 2035, ENGIE is positioning itself as a developer, integrator, investor and operator across the entire hydrogen value chain. For these projects, ENGIE favors geographical areas with competitive renewable energies, customers with high energy consumption (mines, steel, refineries, etc.) and project locations as close as possible to storage assets and networks.



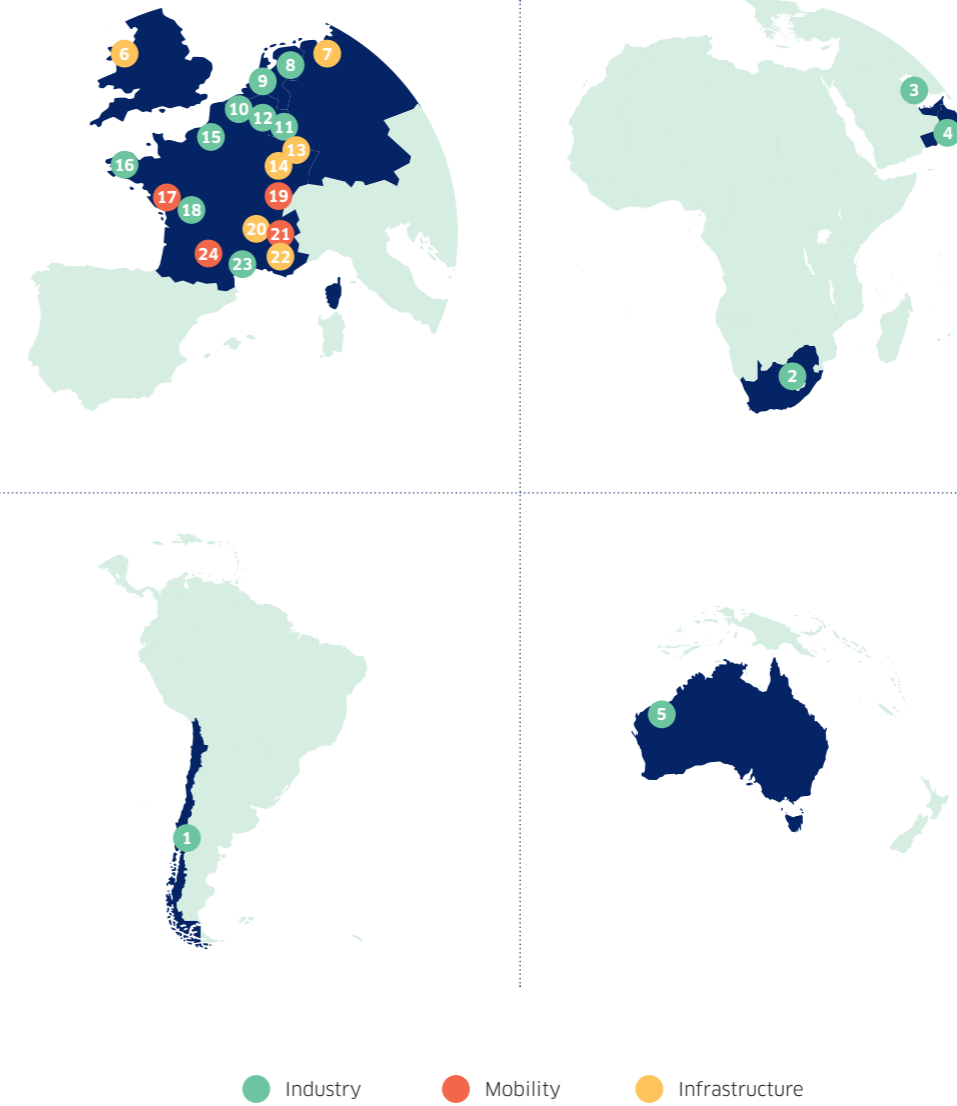
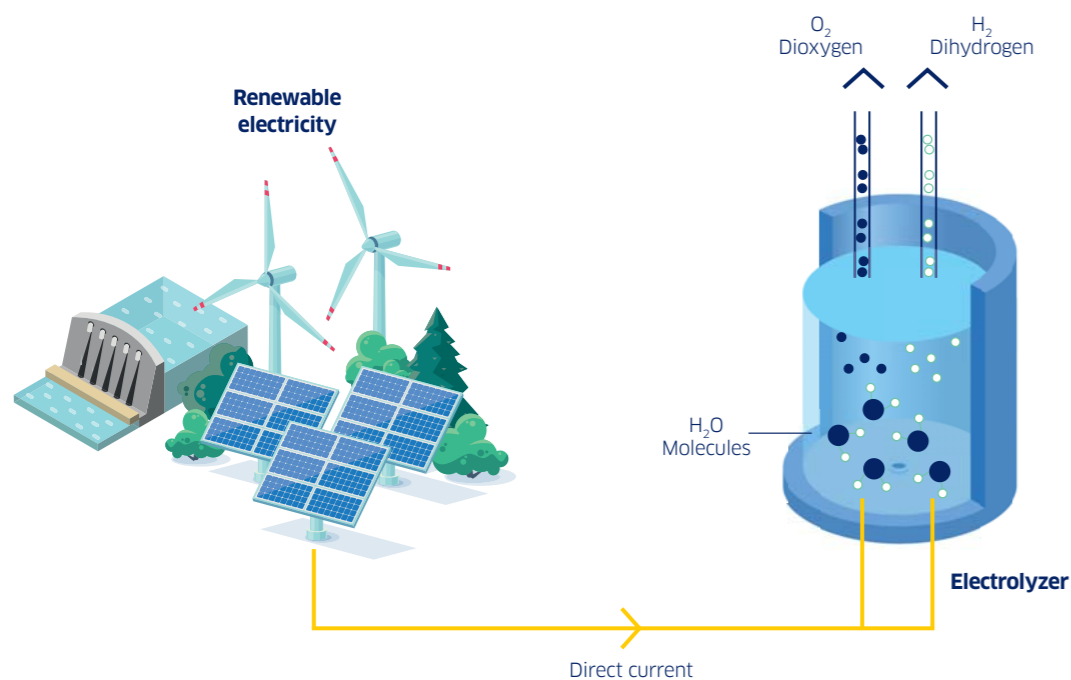
## ADVANTAGES

- A decarbonizing factor for several sectors such as industry, heavy mobility and energy.
- The molecule enabling the production of electricity without GHG emissions.
- Ability to be stored in large quantities
- Injection into existing natural gas networks up to a significant level (about 20%).
- Creation of local jobs.

## CHALLENGES AND SOLUTIONS

- Highly flammable gas (explosion and leakage)
  - Application of known and standardized safety solutions.
- Technologies in perpetual improvement
  - Test installations and in-depth feedback
- High production costs
  - Standardization and sizing of projects
- Need for dedicated infrastructures for an industrial development
  - Creation or conversion of dedicated networks

## FUNCTIONING



## PROJECTS

in progress  
under construction  
in operation

- 1 Wally
- 2 RHyno
- 3 Crystal
- 4 H2 Duqm Oman
- 5 Yuri
- 6 HyNet
- 7 SaltHy
- 8 HyNetherlands
- 9 MultiPHY
- 10 North-C Hydrogen
- 11 Columbus
- 12 H2BE
- 13 MosaHYc
- 14 StorgHyN
- 15 Reuze
- 16 France KerEAUzen
- 17 HyGO
- 18 HyFlexPower
- 19 DMSE
- 20 HyPSTER
- 21 ZEV-Hympulsion
- 22 HyGreen
- 23 Masshylia
- 24 HyPORT

## SOME PROJECTS INAUGURATED IN 2023

- HyFlexPower in France
- HyPSTER in France
- HyPORT in France

## SOME PROJECTS UNDER CONSTRUCTION

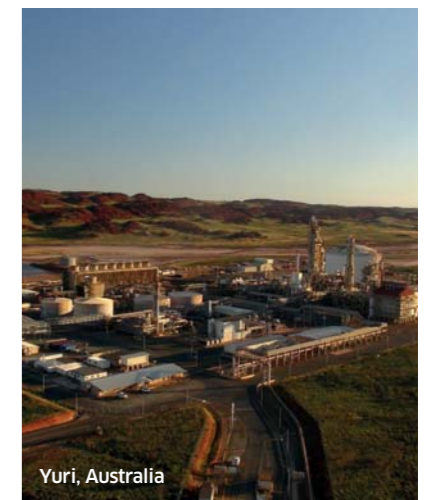
- DMSE in France
- HyGO in France
- Yuri in Australia

## + BUSINESS CASE

### Completing one of the first green hydrogen projects in Australia

Launched at the end of 2022 in Australia, Yuri is one of the world's first industrial-scale green hydrogen projects. Developed by ENGIE in collaboration with Japan's Mitsui Group, the project will produce green hydrogen for Norwegian fertilizer manufacturer Yara Pilbara Fertilizers' liquid ammonia plant near Karratha in the west of the country. Benefiting from subsidies from the Australian federal government and the state of Western Australia, Yuri is building a 10 MW electrolyzer, powered by 18 MW of photovoltaic solar panels and supported by an 8 MW battery energy storage system. Scheduled for commissioning at the end of 2024, the Yara plant aims to produce 640 tons of green hydrogen every year, from 2025 onwards, for its own use. It will thus become completely carbon-free. More broadly, the project will also foster the development of a green hydrogen hub that will supply local

and export markets, drawing on existing export infrastructures and the region's abundant renewable resources in the region.





# Adapting current infrastructures to decarbonization

Injecting biomethane or synthetic methane into gas infrastructures requires no adaptation, either of the network or of consumer installations. Hydrogen transport, for its part, relies on dedicated networks corresponding either to existing pipelines, or new pipelines.

**Biomethane and synthetic methane** are directly compatible with current gas infrastructures. Connecting production units to gas distribution and transmission networks ensures rapid, low-cost decarbonization. In France, for example, more than 600 biomethane production sites (around 30 of which belong to ENGIE) are already connected, with an annual injection capacity of over 11 TWh - the equivalent of almost two nuclear reactors. The industry aims to increase this injection capacity to 60 TWh by 2030, including 50 TWh from methanization and 10 TWh from pyrogasification, hydrothermal gasification and methanation.

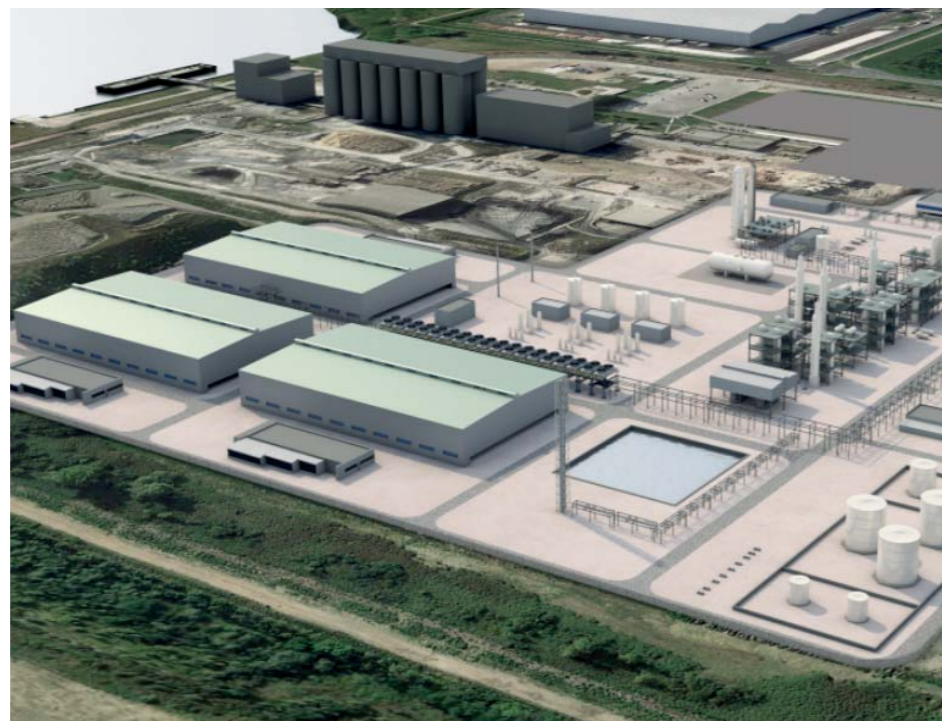
These processes are complementary, in terms of technologies deployed and inputs addressed. For each plant, network operators identify the most technically and economically appropriate connection solution, in line with the "right to injection" provisions of the French EGALIM law. At the local level of distribution networks, when facilities produce more than local consumption, reverse osmosis stations are installed, whose role is to compress excess gas and redirect it to the transmission network for onward transmission to more distant consumption zones and underground storage facilities.

**Although hydrogen** can be injected into gas transmission and distribution infrastructures in significant quantities (of the order of 20%), its production on an industrial scale will require dedicated transmission and storage infrastructures, as well as the conversion of certain parts of methane networks. As a member of the European H2 Backbone initiative, ENGIE is supporting the deployment of a network of almost 40,000 km in 21 countries, two-thirds of which would be made up of converted existing infrastructures.

## + BUSINESS CASE

### **Salamandre: Production and injection of synthesized biomethane into the gas network**

The Salamandre project is aimed at the industrial production of biomethane by pyrogasification from solid recovered fuels (SRF) made up of dry forestry residues, paper, cardboard and plastics, which until now have been destined for landfill because they cannot be recycled. This project, based on the GAYA semi-industrial demonstrator, will be commissioned in 2026 at the port of Le Havre. Salamandre is the result of a partnership signed in 2021 with CMA CGM, the French shipping giant, and aims to produce 200,000 tons of biomethane a year by 2030. This gas will be injected into the GRTgaz network and used to supply the ships of CMA CGM, co-shareholder, project partner and purchaser of all Salamandre production.



## + BUSINESS CASE

### **A pipeline dedicated to hydrogen transport**

MosaHYC is a project to build a 90 km hydrogen pipeline between France and Germany, using converted equipment or equipment specifically dedicated to transporting pure hydrogen. This project is being carried out by GRTgaz and CREOS Deutschland, within an Economic Interest Group (EEIG) bringing together the players in the hydrogen value chain. The hydrogen will be consumed on the Carling/Saint-Avold (France) and the Dillinger Hütte steelworks (Germany). This project has been awarded the European PIC (Project of Common Interest) label, which characterizes major energy infrastructures.

### **Four technological challenges were identified:**

- Adaptation of pipeline operations to ensure steel integrity
- Compliance of network equipment with the specific requirements hydrogen transport
- Deployment of quality measurement and metering equipment
- Definition and implementation of industrial safety measures



## + BUSINESS CASE

### **Conversion of a gas turbine into hydrogen**

The HyFlexPower consortium, which brings together Siemens Energy, Centrax, Arttic, the German Aerospace Center (DLR), ENGIE and four European universities, has made it possible for a gas turbine installed at the Smurfit Kappa paper mill in Saillat-sur-Vienne, France, to run on hydrogen, first at 30% in 2022, then at 100% in 2023. The hydrogen used as fuel was produced on site with a 1 MW electrolyzer and stored in a tank with a capacity of almost one ton. This project, which is a world premiere, was largely financed by the European Union as part of the Horizon 2020 research and innovation program and opens the way to other modes of conversion of gas-fired industrial processes into hydrogen.



## + BUSINESS CASE

### **The first underground hydrogen storage facility**

The first filling of a salt cavern with hydrogen is currently underway at Storengy's Etrez underground gas site in France, with the HYPSTER hydrogen injection project. See p.28.

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1 Place Samuel de Champlain, Fbg de l'Arche  
92930 Paris la Défense Cedex

France

[www.engie.fr](http://www.engie.fr)

