



Press kit

ENGIE

Research & Innovation

ENERGY FOR CHANGE

Energy is the lifeblood of our planet, fueling the economy, travel, leisure, technology, health and creativity.

Energy companies provide that lifeblood, day in and day out, year by year, at the flick of a switch.

But today our planet is in danger and we must all find new ways of living our lives, individually and collectively.

Our world is getting warmer and more polluted with devastating consequences for the climate, for humanity and all species on Earth.

The world needs change, and it needs it now.
We at ENGIE believe that energy companies must be the heart of that change. That is our historic challenge, our responsibility and unique opportunity.

We place ourselves at the frontline of that challenge, leading by example, by knowledge and by expertise, embracing change for ourselves and for our customers.

ENGIE's transformation is already well advanced.
We have cut our own CO₂ footprint drastically in just a few years.
As impressive as that is, it is still only the beginning.

We are driving and supporting innovation by investing money, talent and unmatched expertise into exploring and implementing sustainable energy solutions wherever they are to be found, in our own labs and engineering centers, and at creative cutting-edge companies across the world.

We are leading the transition to carbon neutrality.

Here is how.

Kathu, South Africa

ENGIE: Inventing the energy of the future

As many other industries, the energy one is in full transition. A transition towards a cleaner and greener future, enabled in particular by new technologies and disruptive business models. ENGIE has embraced these changes early on, and set its ambitions to lead the transition towards carbon-neutrality. To do so, Research and Innovation are crucial.

Four years ago, in a world turning more and more decarbonized, decentralized and digitalized, we decided to reposition ourselves to put the energy transition at the heart of our business. And we have significantly progressed in this transformation. We have more than halved our direct CO₂ emissions since 2012 and we have returned to organic growth in 2017.

Today, we are also committed to helping our clients – mainly companies and local authorities – to achieve their own transition, providing them with more efficient, greener and smarter energy solutions. To do so, we have decided to focus mainly our investments on client solutions and renewables, while relying on our strong positions in electricity and gas grids and optimizing our thermal assets.

Research and Innovation play a key role in enabling us to stay relevant in an ever evolving world, allowing us not only to improve our operational efficiency but also to prepare the future by sourcing, testing and deploying new technologies and business models. We decided to put a special focus on energy efficiency, carbon neutrality, distributed energy systems, future buildings and industries, green mobility, smart cities and grids, and energy access, to name a few. These activities represent the future of energy: they are all consistent with a carbon neutral trajectory and will grow at a rapid pace.

In the following pages, you will learn more about the projects in ENGIE which make Research and Innovation a reality, with the aim of delivering future growth. From our Research & Technology teams developing and testing new technologies for our future, all over the world, in the domains of new energy sources and uses; to our Corporate Venture Capital fund, ENGIE New Ventures, creating options via minority investments in cutting edge startups whose technologies and business models are promising for tomorrow's energy world; to our internal incubator scaling up energy and services projects into global new businesses; and our dynamic internal ecosystem of researchers, innovators and intrapreneurs in our entities across the globe, working together and with external stakeholders.

All of them can be proud of the collective intelligence of their global community that will bear the fruits of a better and greener energy future.



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- Green Gases
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ENGIE Research & Innovation

New challenges, new responses: Research & Innovation are key to ENGIE's strategy to propel the Group towards the future, fostering technical and business model innovation through research, entrepreneurship, and collaboration.

ENGIE fosters an open ecosystem for ideas, both within and outside our company, where we find, test and implement new technologies and business models in the spirit of collaboration and the sharing of new projects that propel us and our customers further and faster along the path to the energy transition.

■ Research at ENGIE Visions to discover, invent, co-create and de-risk technologies to provide long-term competitive advantage for the group

Through its 23 thematic labs, ENGIE Research identifies, develops and tests new technologies, develop tools and products enabling ENGIE to meet its strategic objectives and help BUs pursue operational excellence. ENGIE Research makes a vital contribution to the carbon neutrality transition as it watches out for emerging technologies, supports our new and existing businesses and fosters partnerships, giving ENGIE access to a pool of advanced global talent and expertise in renewable energy production and storage, green mobility, hydrogen, homes of the future and many other areas.

■ Within ENGIE Open Innovation rests on 3 pillars

Startup Investments: Our Corporate venture capital ENGIE New Ventures invests in promising startups across the world, giving ENGIE access to cutting-edge solutions. With new venture capital of 180 million euros, ENGIE's fund has invested in 25 companies across the world, typically 3-5 million in each company, out of more than 500 companies scouted

per year. Criteria for investment are a disruptive business or technology model, a scalable business and immediate strategic, operational and financial value for ENGIE.

Venture Building: ENGIE Factories in Paris, Singapore and Santiago build new ventures and scale selected businesses over three to five years, turning them into high-performing assets for ENGIE. These ventures rely on startups we have invested in, internal startups & intrapreneurs as well as external entrepreneurs in residence to bring the necessary skills, motivation and expertise for success.

Innovation Ecosystems: with a global and decentralized organization it is essential to manage & animate the internal and external innovation ecosystems, to share expertise, to collaborate and co-create and to celebrate and fuel the innovative energy of our employees, partners and local communities. We do this through our platforms, innovation challenges and communities. The ENGIE Innovation Trophies have been organized for 35 years, showcasing over 500 innovative projects of our employees every year. Our platforms unite over 26,000 employees and 5000 startups forming a vibrant community of 'Imaginative Builders' exchanging ideas and sharing a purpose: to bring innovative solutions to fuel the energy transition.

ENGIE'S INNOVATION HUB AT A GLANCE



190 million euros investment in research per year group-wide



8 research and development centres in 7 countries



23 thematic research labs



900 researchers



10 patents filed in 2019



41 scientific articles published in 2019



A corporate venture capital fund of **180 million euros**



Investments in 26 startups since 2014



50 million euros invested in startups in 2019




500 startups scouted per year



500+ internal candidates to the Innovation Trophies each year



26,000+ employees in the innovation community



ENGIE's transition and acceleration towards a carbon neutral future

By 2021, ENGIE will have added 9 gigawatts of renewable energy to its mix. This target is supported by a multitude of projects and innovation programs to make generating, storing, distributing and selling green energy more efficient, smarter and more digital.

We must both reduce the overall volume of energy we use, and decarbonize what remains. The challenge is to make these greener forms of energy, as far as possible, as available and as flexible as fossil fuels.

Because of the climate crisis, we have very little time to achieve this.

ENGIE explores solutions at every stage of the energy value chain, from production (biogas, solar panels) and storage (batteries, hydrogen) to the endpoint of consumption (new heating and cooling systems).

Green Gases

Biogas and Hydrogen, a double solution

■ Biogas, a green alternative

Biogas is produced when organic material decomposes during an anaerobic digestion process. It is clean and it is renewable, a green alternative to natural gas and part of the circular economy.

ENGIE Researchers develop several projects to decrease biogas production costs. Biomethane can also be produced from gasification of dry biomass, wastes and RDF (Refuse-Derived Fuels). The maturity level is lower than for anaerobic digestion.

With its industrial-scale demonstration platform GAYA in France, ENGIE is a frontrunner in this area.

But there are challenges: in order to find the right composition to inject into gas grids or for use in passenger vehicles, biogas needs to be cleaned and pressurized, adding significant costs. Suitable substrates (organic waste) are mostly available in non-urban areas far from usage centers, and given the biological nature of the process, it is sensitive to any changes in the organic feedstock, temperature, etc.

■ Hydrogen, squeaky clean...

Green hydrogen is one of the most promising options to bring clean energy to industry and mobility, as well as store and transport renewable energy. Whereas hydrogen is traditionally produced from natural gas

(methane) through a steam reforming process, green hydrogen is produced from renewable sources. As such the full cycle process is completely clean, with zero emissions. Hydrogen can then be used either as a fuel for transportation, heat generation, direct use in industrial processes or to make electricity.

■ ... And efficiency is rising

The main challenges for generating green hydrogen are still technological. The energy efficiency of producing hydrogen has been between 60 and 70 % and thus there needs to be abundant and cheap renewable energy resources for it to be economical. But there is progress: methods such as high temperature Solid Oxide (SOEC) electrolyzers have brought efficiency to 90-95 %. The storage and transportation of hydrogen is still a challenge as it needs high pressure, very low temperatures for liquid hydrogen, or a carrier (as ammonia or methane/methanol) in which it can be more stable. For these technologies to mature and become economical hydrogen production will need to scale much as renewable technologies have in the past.

Another major challenge lies in hydrogen's low energy density, a key factor when considering an energy carrier for mobile use. Even after increasing the pressure, hydrogen's energy density is at best six times lower than gasoline, a challenge for its use in transport.



How we're making progress

Three questions about H2SITE

ENGIE New Ventures has invested in H2SITE, based in Bilbao, Spain, which aims at commercialize a system capable of producing, on site, hydrogen of high purity, based on methane, especially bio-methane.

■ Who is behind H2SITE?

H2SITE is a spinoff created by Tecnia, a European research and technological centre, and the Eindhoven University of Technology. ENGIE has taken a minority stake in the capital of H2SITE and participates in its research and development work.

■ Why hydrogen?

ENGIE believes that hydrogen is an essential component of the energy transition that meets many needs in mobility, energy storage and industrial applications. The H2SITE technology platform offers a solution to customer demands for the decentralised production, transport and storage of hydrogen.

ENGIE identified and evaluated their disruptive technology in various collaborative research projects.

■ What's different about H2SITE?

H2SITE's target is to support savings for customers and, at the same time, pave the way to green future mobility. Producing on-site quality hydrogen is key to both. On-site production of green hydrogen, using biogas, bioethanol or biomethanol, saves transportation costs and energy during compression and decompression. This previously unthinkable solution has become reality thanks to H2SITE's proprietary technology and advanced A-SMR (steam-methane reforming) reactor design.



Johann BOUKHORS,
Managing Director of ENGIE
New Ventures



H2SITE



Gaya

Found in the forest France

With the GAYA platform in southeastern France, ENGIE now produces green gas from forest waste, which is then used instead of natural gas in transmission and distribution networks and natural gas vehicles. It is Europe's first platform to cover the entire chain for producing green gas from dry biomass. Next challenge for the platform: produce green gas from waste.

Zero-carbon down under Australia

In Springfield, Australia, ENGIE has entered a strategic alliance to co-create a model city for the 21st century with clean energy and hydrogen at the heart of its development: The Zero Net Energy Vision for Greater Springfield.

Australia, a country with abundant sunshine, wind and space for renewable energy developments, is positioning itself as a key producer in the H2 economy, where hydrogen could take over as the world's new green energy carrier. With this 50-year project and research collaboration ENGIE is taking part in this transition and providing carbon neutrality solutions.

Sun and Wind

Clean and renewable

The sun and the wind are available, clean and unlimited sources of energy. Solar and wind installations are already producing cheaper energy than coal and gas plants in many parts of the world, and without pollution. The strong decline in the costs of solar technologies also allows for more decentralized ways of harnessing the sun's rays to produce electricity, giving us the possibility to produce energy on-site and essentially converting any structure into a power plant.

ENGIE, as the leader in wind energy in France, has contributed to the worldwide growth of onshore wind as an economically attractive source of energy which we believe is at the heart of the energy transition not least because it is relatively cheap for consumers.



How we're making progress

The wind of change Portugal

In January 2020, ENGIE signed an agreement for a joint venture with Portuguese group EDPR to create a world leader in offshore wind energy. ENGIE and EDPR will combine their offshore wind assets, know-how, and project pipeline, starting with a total of 1.5 GW under construction and 4 GW under development, with the objective of reaching between 5 GW and 7 GW of projects in operation or under construction and between 5 GW and 10 GW in advanced development by 2025.

Darwin's evolution Europe

With its DARWIN software, ENGIE helps operators collect and analyze data from their renewable energy assets in real time, allowing them to raise revenues and optimize costs. Designed by ENGIE Digital, DARWIN collects and hosts data in the cloud from renewable plants located in 21 countries. A total of more than 16 GW are connected in this way. The platform is currently used to ensure the remote control and monitoring of 100 wind farms and 17 solar energy plants in France, Belgium, Italy, Germany, Poland, Romania and the Netherlands.

Mirror, mirror South Africa

ENGIE's solar power plant in Kathu, South Africa, is one of the country's largest renewable energy projects with a 100 MW capacity. The concentrated solar power plant uses parabolic trough technology that is equipped with a molten salt storage system. This allows the storage of electricity in form of thermal energy for up to 4.5 hrs which can then be used on days with less radiation, or during peak demand. The site covers 4.5 km² with 384,000 mirror panels.



Heliatek

Sun architects Germany

With its investment in German startup Heliatek, a specialist for photovoltaic solar film for buildings, ENGIE has gained tools for its ambition to become an energy architect for buildings. Heliatek produces the world's first industrial-grade organic solar film, enabling buildings to become energy neutral. Its organic photovoltaic technology (OPV) uses carbon-based molecules to convert sunlight into energy. This method allows the creation of innovative solar products that are ultra-light, flexible and completely green.

Power to the millions Africa

ENGIE aims to provide tens of millions of people around the world with access to clean decentralized energy. In Africa, ENGIE is a leader in off-grid electrification, using mini-grids and Solar Home Systems (SHS). It has already brought off-grid power to over 4 million people in nine African countries. Nearly 90 percent of the world's rural population does not have access to electricity, a challenge particularly big for sub-Saharan Africa, Asia-Pacific and Latin America.

WHAT'S A MINIGRID?

Minigrids are containerized solutions for the generation, storage and distribution of electricity at the village level. The minigrid consists of solar panels with all the necessary elements of a mini-power plant are inside the container. Village houses, shops and other consumers are then connected to the container through smart meters and pay for the electricity they consume.

Food for thought

According to the United Nations, by 2050 more than two thirds of the 9 billion people on earth will be living in cities. This means food will have to be produced close to urban centres, and by using cleaner energy. The energy consumed in the food industry accounts for more than 30 percent of global primary energy and more than 20 percent of greenhouse gas emissions. ENGIE has been working in field projects with farmers and agronomists to meet their needs. One such project concerns the ideal distribution of land between food and solar energy production. Another studies how to reduce emissions from greenhouse crops. A third project addresses the production of sustainable fertilisers.



Darwin

Storing energy

Keeping it for a rainy day

As the world moves away from fossil fuels and towards renewables, the question of storing energy becomes crucial. Renewable energy can only become mainstream if we can find efficient ways to store it for use on days when the wind does not blow and the sun does not shine. Storage is also used for much shorter periods to balance the uneven energy generated by natural sources – a cloud passing by, or the wind changing speed or direction. Experts call this “intermittency”. Storage solutions can thus increase the quality and reliability of electricity for every day and critical uses, and as storage becomes cheaper, it becomes more profitable to use renewable energy.

According to a study by the US National Renewable Energy Lab, solar energy combined with storage cut energy costs at commercial buildings in several cities, in some cases by up to 24 percent.



How we're making progress

Looking for new technologies

Researchers in the ENGIE “Energy Storage” lab focus on technologies and solutions to make energy storage competitive, eco-friendly and adapted to large industries. We are always on the lookout for new technologies that are both practical and profitable.

For several years our focus has been on lithium-ion (Li-ion) batteries and their application to ENGIE and its customers’ use cases. Our work has allowed us to understand the electrochemical functioning of this technology family and its multiple variations, their limitations, ageing mechanisms, their fire and explosion risks. Through this understanding we can provide guidelines to select the best Li-ion battery for each use case and operate the batteries in the most efficient and safe way, thereby contributing to the success of commercial projects.

We have launched a research roadmap on redox-flow batteries (RFB), a new, less mature and completely different technology family that promises many advantages like a lower levelised cost of storage, the absence of fire and explosion risks, a longer life time without performance degradation due to ageing, and a better fit with use cases requiring several hours of storage capacity, like renewable energy shifting.

We performed a comparative study of many RFB technologies and companies (mostly startups) developing them. The most promising ones have already been tested in our laboratory facilities, and are preparing first industrial pilot projects in 2021.

A revolutionary platform

ENGIE EPS is a startup acquired by ENGIE in 2017, which has since become the technological division of ENGIE focusing on energy storage systems, microgrids and eMobility, enabling the paradigm shift in the global energy system towards renewable sources and decentralized energy production.

With a unique team of engineers (over 100 people, 15 nationalities, a third with either a PhD or MBA), it has filed 130 patents in 33 countries, and over 500 industrial secrets. ENGIE EPS products are fully developed on the HyESS platform, a revolutionary proprietary technology that allows integrating every renewable source with all energy storage formulas, including electric vehicles. The company has installed storage systems and microgrids in 23 countries and is set to install the largest and fully renewable island electrification systems in the world.



Lifou

Lifou, bringing green energy storage to life

New Caledonia

Since 2017, ENGIE has been implementing a project to generate clean energy that is then stored on the island of Lifou in New Caledonia with the aim of replacing the diesel generators at the island’s thermal power plant. Solar and wind power generate energy, and a large-scale storage unit, driven by an innovative energy management system, went into its second phase in 2019. The system supplies Lifou with 100 percent green energy for several hours per day and stores excess energy which is then returned to the grid when needed, thus reducing diesel consumption. ENGIE believes that Lifou, once its energy needs are met with 100 percent renewable sources, will be a global model for green energy.

Human energy & imagination

People are everything: our Innovation Trophies

The ability of humans to focus their energy, creativity and imagination on the challenges of the transition to carbon neutrality is fundamental to everything we do at ENGIE.

To showcase this energy, we organize Innovation Trophies for our staff all over the world annually for over three decades now.

In 2019, we received more than 500 projects from 48 countries, and awarded 15 Trophies in areas as diverse as energy storage, green mobility and clean heating systems. Here are some examples:

■ A floating alternative

ENGIE France Renouvelables won an Innovation Trophy for an idea to replace offshore met masts, colossal measurement structures fixed on the seabed to measure the intensity of wind on the sea. The alternative developed by ENGIE France Renouvelables is an ultra-discreet floating raft that takes measures by laser.

■ Solar pay-as-you-go

ENGIE subsidiary Fenix in Uganda won the Operations, Techniques and Technologies award for ReadyLink, a secure low-power wireless network for pay-as-you-go solar home systems that is already equipping more than 25,000 power systems.

■ Carbon out, ashes in

ENGIE Cofely won the special prize for “Sustainable Development” for incorporating ashes from biomass boiling rooms in a filter used to clean biogas, replacing active carbon which is a polluting product.



Carbon dioxide's new role

CO₂ as a resource: disruption in action

ENGIE has reduced its own CO₂ emissions by 50 percent.

That's just the beginning. We are constantly looking for ways to cut our CO₂ footprint further, and to help our clients achieve the same.

Much of the world's greenhouse gas is emitted by the steel, cement and glass industries which respond to ever greater construction and transport needs especially in cities, and are therefore part of the so-called energy-intensive industries (EIIs). Industries whose core business makes their CO₂ footprint hard to reduce also need to join the race against the clock, and ENGIE is helping them.

One area is material efficiency, looking for example of a breakthrough in lightweight steel to make lighter vehicles using less fuel. Transforming any given material by heating, melting or evaporation is a highly-polluting process that can be made 90 percent more efficient with the right high-performance burners. Replacing fossil fuel-run power systems used in the EIIs with electricity systems is another promising route.

We are also treating CO₂ not just as a problem, but as a resource, to be transformed into fuels, chemicals and building materials.

The largest consumer of CO₂ is the fertiliser industry, followed by oil and gas. Other areas of application include food and beverage production, metal industries, cooling, fire suppression and greenhouse plant growth stimulation.

The use of CO₂ as a resource enables the conversion of green hydrogen into fuels, for example jet fuel. CO₂ can also replace fossil fuels as raw materials in chemicals and polymers.

Our twin approach is to reduce CO₂ in the atmosphere, while creating a new value substance.

However, many challenges remain, mostly related to cost.



Michael Webber,
Chief Science & Technology Officer, ENGIE

ENGIE's research labs are ideally positioned to find solutions for cheaper CO₂ capture and more efficient hydrogen production technologies.

EIIs are particularly well suited to carbon capture solutions because their source of carbon emissions is centralised at a single location. ENGIE is running research projects and pilot experiments to determine the most efficient carbon capture processes, and ensure the further use of CO₂ without releasing it back into the atmosphere.

From problem to solution

Nobody knows exactly what the energy mix of the future will look like.

What we can be sure of is that we will encounter some surprising ideas and solutions along the way towards a neutrality carbon energy world.

To think that CO₂, a big factor in global warming and climate change, is now being harnessed as clean energy is already astonishing.

CO₂ is perhaps the most elegant and disruptive

example of how we use innovation to think outside the box, and turn today's problem into tomorrow's solution.

We at ENGIE are putting all our creativity, expertise and experience into the service of a cleaner future for our planet.

With innovation leading us, the clean energy revolution is on its way.

The upshot

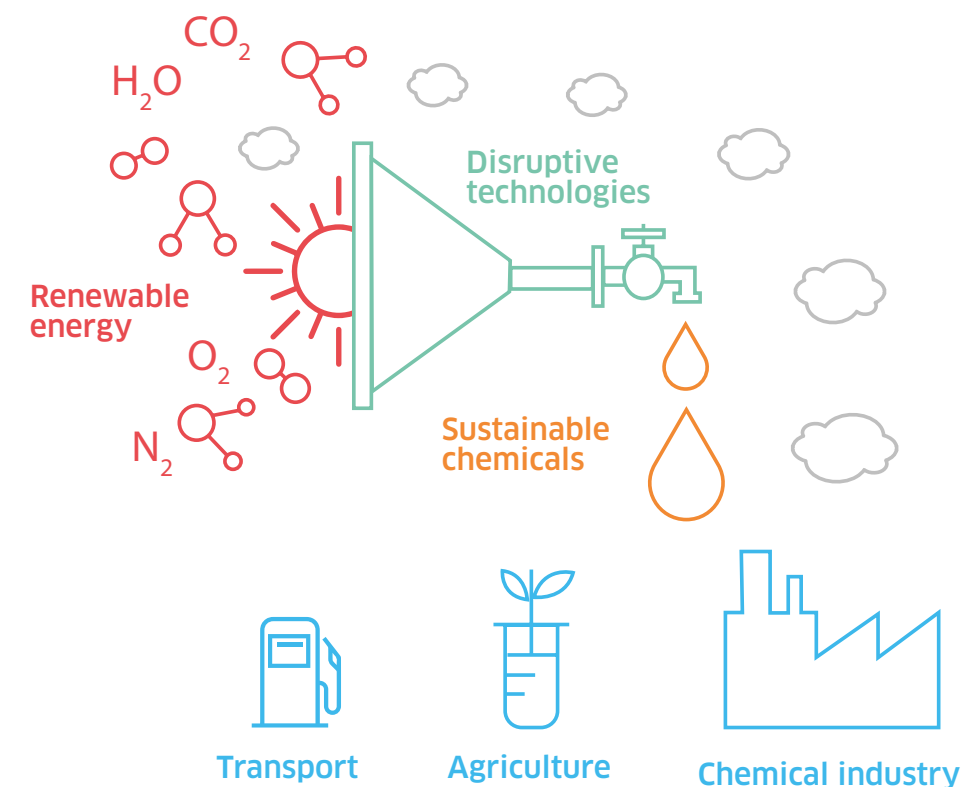
Not everything can be electrified, and therefore hydrocarbons will continue to be necessary for certain energy (heating & combustion) needs. Some industries also use hydrocarbons as a key feedstock -like fertilizers, ammonia and plastics.

Producing renewable hydrocarbons in a sustainable way would let us decarbonize while leveraging existing assets (machinery) designed for use with hydrocarbons.

Hydrocarbons (synthetic gas) can thus be produced from green hydrogen and a carbon source. Starting from CO₂ as a carbon source proves to be a sustainable alternative to biomass if your energy source is renewable. This would put less strain on biomass resources and avoid competing for land use with food production. In the same fashion, we can use such sustainable hydrocarbons to produce renewable plastics, fertilizers and other chemicals, as well as add to the production of cement and other building materials.

Carbon is the basic element of life and CO₂ can be thus used to re-create life. Greenhouses and agricultural store-rooms have been using CO₂ for a long time. New technologies are looking at converting CO₂ into a feed-source for microorganisms, fish and other animals.

This is just the beginning. Recycling and re-use of CO₂ will be the game-changer in tackling our climate-change problem while bringing circularity into our energy and industry systems.



Source: the SUNRISE EU large scale research initiative vision of which ENGIE is a founding member

Innovation around the world

UNITED STATES

Redaptive (an ENGIE New Ventures startup investment) provides accelerated capital investment and managed deployment of technologies. It reduces energy consumption and drives long term OPEX savings from global commercial and industrial real estate portfolios, without investment from the customer. Its Efficiency-as-a-Service solutions provide turnkey efficiency upgrades through funding. Clients realize immediate utility bill savings and note actual kWh savings are verified through Redaptive's metering (560 million kWh: savings reduced over 5 years). Redaptive manages portfolios of efficiency programs for many leading industrial and commercial clients.

\$250 million

Financial savings under a Redaptive contract over 5 years

CHILE

ENGIE is designing the bifacial solar power plant of the future in the middle of the Atacama Desert in Chile, an area with plenty of sunshine and no rain. After evaluating the results from ENGIE's 2017 bifacial pilot, we have now commissioned our bifacial Testing and Innovation Center. Bifacial solar panels yield around 11 percent more energy than monofacial panels with the same technology in the same surface area, as reflected and diffuse sunlight is captured, in addition to direct sunlight. The installation uses cutting-edge data management: every minute we add 500 measurement points to our database. The Center focuses on how to find the best panel/tracker combination, make use of smart string inverters, perfect robotic cleaning and develop remote access and control, among other targets.

11% more energy production from bifacial solar panels

PORTUGAL

ENGIE is a partner in the WindFloat Atlantic project, a 25 MW wind farm off the coast of Portugal consisting of 3 floating wind turbines. The floating wind technology unlocks a huge potential for harvesting previously inaccessible wind energy in deep waters.

25 MW

renewable power generation in deep offshore waters

BRAZIL

How can cities rationalize existing infrastructure operations and plan for future development? ENGIE's answer is Livin', a scalable tool to develop smarter infrastructure for better cities. Niteroi, in the greater Rio de Janeiro area, has been struggling with traffic congestion. It has now introduced an intelligent, automated and real-time urban traffic management based on Livin', and achieved 30% reduction in traffic congestion as a result. Further benefits include a heightened security due to the numerous security cameras around the city.

91 million

cars on Brazilian roads

BELGIUM

Often we don't know what to do with electric car batteries once the vehicles are no longer in use. In 2019, ENGIE and Umicore, a global player in the production and the recycling of materials for rechargeable batteries, inaugurated a "second life" battery system, turning 48 used batteries into one large storage unit with a capacity of 1.2 MW and an energy content of 720 kWh.

720 kWh

stored in 48 used car batteries

SOUTH AFRICA

Using parabolic trough technology, ENGIE is operating its first Concentrated Solar Power (CSP) installation in Kathu in South Africa, a site that covers 4.5 km2 with 384,000 mirrors. A molten salt storage system allows for 4.5 hours of thermal energy storage to provide reliable energy in the absence of solar radiation and during peak demand.

384,000

mirrors at the Kathu solar power installation in Kathu

MYANMAR

ENGIE invested in Mandalay Yoma, which provides Myanmar with renewable energy solutions driven by an international highly-qualified team. Mandalay Yoma and ENGIE have teamed up to develop off-grid solar farms to accelerate the provision of electricity to rural villages, help businesses use solar energy for productive use (solar pumps for irrigation, rice de-husking, refrigeration, etc.) and provide consulting and research. Fifty off-grid solar sites are currently under development.

27million

people in Myanmar without access to electricity

NEW CALEDONIA

With the help of ENGIE, the island of Lifou in New Caledonia is aiming for an energy future that is 100-percent fueled by renewable sources. Energy will come from the sun and the wind and then be stored to even out the island's supply. This will eventually replace the diesel generators at the island's thermal power plant.

100%

renewable energy for Lifou in the future



UNITED STATES



CHILE



SOUTH AFRICA



BELGIUM



BRAZIL



NEW CALEDONIA



About ENGIE

Our group is a global reference in low-carbon energy and services. Our purpose ("raison d'être") is to act to accelerate the transition towards a carbon-neutral world, through reduced energy consumption and more environmentally-friendly solutions, reconciling economic performance with a positive impact on people and the planet. We rely on our key businesses (gas, renewable energy, services) to offer competitive solutions to our customers. With our 170,000 employees, our customers, partners and stakeholders, we are a community of Imaginative Builders, committed every day to more harmonious progress.

Turnover in 2019: 60.1 billion Euros. The Group is listed on the Paris and Brussels stock exchanges (ENGI) and is represented in the main financial indices (CAC 40, DJ Euro Stoxx 50, Euronext 100, FTSE Eurotop 100, MSCI Europe) and non-financial indices (DJSI World, DJSI Europe and Euronext Vigeo Eiris - World 120, Eurozone 120, Europe 120, France 20, CAC 40 Governance).

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