



PLANET

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INNOVATION IS PEOPLE

Frontline
Energy transition



PLANET

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PLANET

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ESTELLE BRACHLIANOFF
Chief Executive Officer of Veolia

“

The world is undergoing various transformations, including urban, digital and geopolitical shifts, to name a few. Energy transformation is not the least of these, because it cuts across all the others. It is one of the major components of ecological transformation, which Veolia supports with its cutting-edge know-how, its capacity to integrate complementary expertise and its global footprint.

Few professions are, like ours, at the heart of such a demanding but necessary energy revolution. To succeed, we must simultaneously reduce the energy content of the economy and reduce the carbon content of energy. We undoubtedly need varied, effective, sustainable and affordable solutions. Through its inventiveness and technologies,

to the diversity of its experience and its vast portfolio of contracts, our Group holds these solutions, which enable it to function as both a carbon-free energy producer and an energy-savings provider. These solutions have solidified our position as the leading company in decarbonization.

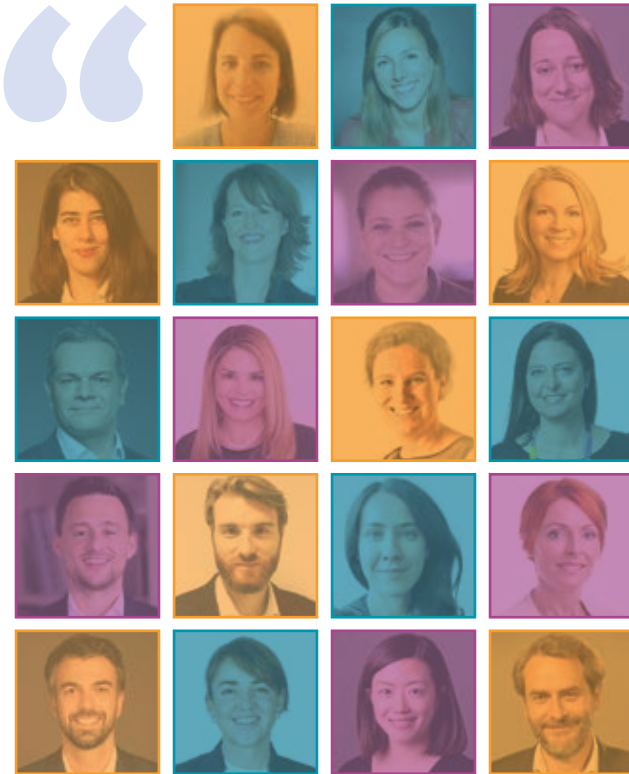
Our solutions have a dual distinctive feature. Firstly, they utilize energy sources that are not only renewable but also derived locally from the regions and employed within those regions. In essence, these are decentralized, locally sourced energy systems that effectively complement the broader regional energy supply infrastructure. Secondly, they harness

what was previously overlooked and discarded — waste heat from factories, calories from wastewater, organic waste, etc. Through the capabilities of our solutions, what was once considered waste is transformed into a valuable resource, turning the insignificant into something substantial and converting what was once harmful into something genuinely useful. This is a vital aspect of ecological transformation!

Through the services we offer to cities and industries, the energy revolution is translated into reality. Transformation is evidenced by tangible indicators: a reduction in fossil energy usage and an increase in renewable energy adoption; a decrease in CO₂ emissions and a rise in the utilization of locally sourced energy; a drop in energy consumption and a surge in product output; a diminished reliance on imported energy and a boost in energy self-sufficiency; a decrease in waste generation and an increase in energy efficiency. These are all clear manifestations of the positive impacts we bring to our stakeholders, the environment, natural resources, and the communities we serve. They represent compelling signs of our leadership in the global shift toward energy and ecological transformation.

“Through the services we offer to cities and industries, the energy revolution is translated into reality.”

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**213,000.
Us.
Employees at Veolia.**

Optimistic, determined and always together.
We are a unique team engaged
in ecological transformation.
We are Resourcers.

And this *Planet* is our magazine.
But it is also yours...
All of you who work every day for a more sustainable future.
Read about our stories and projects, as well as your own.
Let's share our commitment and our solutions for the planet.
Together we can turn the tide.
Together for ecological transformation.

Innovation is People.

Editors-in-Chief (left to right): Laure Antoni, Claire Billon-Galland, Manon Capmarty, Selen Daver, Fanny Demulier, Feryel Gadhoun, Carrie Griffiths, Jose Guerra, Denisse Ike, Eva Kucerova, Gabriella Lazzoni, Nicolas Levy, Robert Lozano Vergés, Evgeniya Mazalova, Kate Moonen, Romain Prudent, Cory Reynolds, Justine Shui, Arthur Thoux.

Catherine Ricou

Director of Innovation at Veolia

Catherine is a graduate of AgroParisTech with over 24 years' experience in the water industry and is joining Veolia as Director of Innovation. Catherine was formerly with SUEZ, where she was responsible for the regulated municipal water investment program in the USA, and headed SUEZ North America's Advanced Solutions division. In this role, she oversaw and managed a portfolio of contracts covering municipal water assets with over 4,000 municipal and industrial customers. She was previously VP for Marketing and Business Development at ENGIE, where she implemented the company's strategic growth plan.

Séverine Dinghem

Director of Business Support and Performance at Veolia

A graduate of France's Polytechnique and Ponts et Chaussées engineering schools, Séverine joined Veolia's international finance department in 2000. In 2007, she was tasked with managing water distribution on Paris' right bank. She was appointed head of the technical department of Veolia's Water business line in Ile-de-France before running the Choisy-le-Roi water treatment plant in 2011. In 2018, she was appointed head of Veolia's Water business line for the Marne and Oise region in France, then Director of Operations in 2020. Her responsibilities included responding to the COVID-19 health crisis. She is now Director of Business Support and Performance at Veolia.

Catherine Ricou

Séverine Dinghem



October 22

**WORLD
ENERGY
DAY**

ACCESS TO SUSTAINABLE ENERGY FOR ALL

For the past eleven years, October 22 has had a symbolic significance that is more relevant than ever in today's world: it represents international cooperation that works to provide access to energy for as many people as possible and highlights the energy challenges of tomorrow. For Veolia, a partner to cities and industrial customers around the world, it is also an ideal opportunity to highlight its unique expertise in energy efficiency, operating heating and cooling networks, and producing renewable energy.

www.worldenergyday.net

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ART FOR THE ENVIRONMENT

Art, the universal language, is surely unequaled in its power to highlight the impacts of the major ecological and health crises engulfing us. In its ability to evoke beauty in a way that helps us reinvent our future and together walk the path to a more desirable world. Many thanks to the seven artists carefully selected by Veolia's communications teams in each of the Group's geographical zones. Through their works that shine a light on the world's beauty and fragility, they inspire us and challenge us to focus on the changes that are taking place.



Faith Bebbington

Sculptor

This 2.5-meter-long Bengal tiger was created using over 300 plastic milk bottles. British sculptor Faith Bebbington washed, cut, colored and attached them to create the tiger's "fur." This was the first in a long series of sustainable projects commissioned from Faith by Veolia in the UK over the past decade, with other examples of the partnership including recycled Wembley Stadium lions, an elephant and a great white shark. The Bengal tiger featured in London as part of Tiger Tracks, one of the world's largest events devoted to protecting wild cats in danger of extinction.

Find out more



© CARL FOX/VEOLIA / TIGER AT ST PANCRAS STATION - FAITH BEBBINGTON





© IEVA SAUDARGAITĖ DOUAIHI



Ieva Saudargaitė Douaihi

Photographer

What happens to our coastal areas once sea levels rise? This is the question explored by Lithuanian-Lebanese photographer Ieva Saudargaitė Douaihi during her residency in Normandy as part of the *Les femmes s'exposent* [Women on Show] festival. Sea levels are forecast to rise anywhere from 40 centimeters to almost a meter by 2100, meaning that many French towns will be impacted. Her photos envision two scenarios for towns and the coast at the end of the Anthropocene. One is dystopian, while the other is a world of science fiction, where architecture has evolved to take on the appearance of living organisms. Her artistic practice seeks to raise questions about the most suitable mitigation measures.

Find out more



JR

Street artist

In *Homily to Country*, French artist JR draws attention to farmers confronted by the reality of climate change and water stress. He designed and created a procession of four large-scale portraits printed onto 30-meter canvases. They depict three orchardists forced to abandon their farms by the decline of flows in the Baaka/Darling River, and an Aboriginal elder from the Barkandji tribe. The portraits were carried in procession by groups of about 60 local people.

The event highlighted the struggle facing these farmers, who want to protect their environment and make a living wage from their work.

Find out more



© JR / "HOMILY TO COUNTRY, PROCESSION," LAKE CANNIDILLA, AUSTRALIA, FEBRUARY 27, 2022





© JANA HARTMANN

Jana Hartmann

Photographer

Why paint landscapes in cities? Is it simply to make concrete more beautiful? Or do these works reveal a deeply held yearning for nature in an ever more artificial environment? German photographer Jana Hartmann's work is a kind of travel diary in which the artist has captured locations around the world, with portraits of fictional natural landscapes rubbing shoulders with real settings. At a time when scientific studies indicate that a virtual experience of nature has a soothing and regenerative effect on humans, she invites us to experience nature in a new way.

Find out more





Fernando Maselli

Photographer

This image of a mountain looks like the real thing. Yet, just like all the other images in the book *Infinito Artificial* by Argentine artist and photographer Fernando Maselli, it is a landscape recreated from fragments of photographs that have been cut up and reassembled, repeated and superimposed. This technique produces an idealized mountain, enhancing the sense of endlessness, solitude and immensity. The beauty of the natural landscape is amplified, enveloping us in its magnificence and fragility. The work is a stunning tribute to glaciers, the true sentinels of climate change.

Infinito Artificial
images



© PAUL NICKLEN / "PIPELINE POETRY," MAKAHA, HAWAII, 2013 & "FACE TO FACE," SVALBARD, NORWAY, 2008



Paul Nicklen

Photographer

Canadian marine biologist and photographer Paul Nicklen's mission is to marvel at nature in order to protect it. His photographs tell us about the ocean and the glaciers and weave tales of adventure. Many of them depict encounters between animals, or between animals and humans, as well as the relationship between humans and nature. One example is the surfer riding a tube (a giant breaking wave) in Hawaii. Surfers were among the first to campaign for the protection of natural environments. But Paul Nicklen hasn't stopped at taking photographs; he also co-founded the ocean conservation non-profit Sea Legacy. Because it's time to begin "putting Earth – our home – first."

The photographer's website





HONG KONG

**WENTX:
Circular
economy
model in
Hong Kong**

In Hong Kong, the Veolia-China State Construction joint venture is set to design, construct, and manage the expansion of the non-recyclable waste recovery facility located in the Western New Territories (WENT), which Veolia has administered for three decades. This contract worth over €2 billion will contribute to Hong Kong's aim of reducing CO₂ emissions and achieving carbon neutrality by 2050. Dubbed WENTX, the extension is scheduled to launch operations in 2027. It will process up to 90 million metric tons of non-recyclable waste over two decades. Operating on a circular economy model, WENTX guarantees a 90% methane capture rate, making it possible to power the entire site with captured methane, thereby averting the annual emission of nearly 10 million metric tons of CO₂.

VEOLIA AND SOLVAY ARE BUILDING THE LARGEST SRF (SOLID RECOVERED FUEL) COGENERATION UNIT IN FRANCE AND ONE OF THE LARGEST IN EUROPE.

Located at Solvay's soda ash production facility in Eastern France at Dombasle-sur-Meurthe, the "Dombasle Énergie" project will halve the plant's CO₂ emissions and ensure that the site remains competitive.

BRAZIL

**Launch
of a fourth
biogas unit**

Veolia recently started up a biogas capture and flaring system in Santa Catarina, boasting a production capacity of 4.65 MWh. This addition joins three existing operational waste-to-energy sites in Brazil—located in São Paulo, Iperó (State of São Paulo), and Biguaçu (Santa Catarina). Together, these sites already produce more than 12,400 kW of renewable energy, enough to meet the annual needs of a city of around 42,000 inhabitants. Converting biogas into energy reduced CO₂e emissions by 1.4 million metric tons in 2022.

© VEOLIA

© METSÄ GROUP

TURKEY

Veolia decarbonizes Istanbul thanks to waste-to-energy conversion

Processing 1.1 million metric tons annually, the capacity of Turkey's first plant for recovering energy from non-recyclable household waste sets it as Europe's largest unit. Aligning with the country's 2053 carbon neutrality goals, this initiative will curtail around 1.5 million metric tons of CO₂ emissions. A pivotal aspect is the annual generation of 560,000 MWh of electricity, equivalent to powering a metropolis of 1.4 million people. Veolia will carry out both operation and maintenance, and pledges strict adherence to European Union environmental standards in handling all operational and maintenance aspects.

IN ITALY, SIRAM VEOLIA AND SIEMENS SIGN A MEMORANDUM OF UNDERSTANDING FOR THE DEVELOPMENT OF COLLABORATIVE PROJECTS aimed at accelerating energy and digital transformation. The ambition: jointly deploy sustainable solutions for different strategic structures, particularly hospitals.

FRANCE

TotalEnergies and the challenge of biomethane on a large scale

Veolia and TotalEnergies have signed an agreement covering more than 15 countries to produce up to 1.5 TWh of biomethane per year by 2025, using Veolia's waste and wastewater treatment facilities. The Group's high-potential areas include India, North and South America, and France. In practice, the two partners will develop and co-invest in a portfolio of international projects: one in biogas from its units, the other in the biomethane value chain. The biomethane produced will be collected, cleaned and marketed by TotalEnergies, either as fuel or to be fed into local gas networks. Eventually, production will be equivalent to the average annual natural gas consumption of 500,000 inhabitants and avoid the emission of approximately 200,000 metric tons of CO₂ per year.

FINLAND

Biomethanol from paper pulp

In what is set to be the world's largest biorefinery project, with a start-up date of 2024, Veolia has teamed up with market leader Metsä Fibre. The challenge is to convert the methanol generated during pulp production at Metsä Fibre's Äänekoski bioproducts plant into CO₂-neutral commercial biomethanol. Veolia will build and operate a crude methanol refinery connected to the plant at a cost of €50 million, of which €9.4 million will be financed by the Finnish Ministry of Economy and Employment. With an annual production capacity of 12,000 metric tons, the plant could reduce CO₂ emissions by up to 30,000 metric tons. Replicable in 80% of the world's pulp mills, this project points to a global biomethanol production potential of about 2 million metric tons per year.



UNITED STATES

Recycling contaminated diesel fuel

Teams at the Environmental Restoration Disposal Facility in Hanford, a major low-level radioactive and hazardous waste site operated by Veolia, have found a novel way to recycle diesel fuel from contaminated construction equipment. By transferring it to other equipment used in the contaminated areas of the site — without going through the process of treating and then disposing of it or sending it over 2,000 miles to an incinerator in Tennessee — thousands of dollars will be saved in transportation and treatment costs. Not to mention the environmental benefits, since another option would have been to run the equipment until the fuel ran out.

IN POLAND, VEOLIA AND INNARGI ARE EXPLORING A PIONEERING COAL ALTERNATIVE PROJECT with a geothermal energy unit of 100 MW for district heating in Poznań.

FRANCE

Val’Pôle Veolia, biomethane production in a local loop

In Claye-Souilly (Paris region), the Val’Pôle production unit recovers biogas from a non-hazardous waste landfill. Once recovered and treated, the biogas is transformed into biomethane, a 100% renewable gas that is then fed directly into the local gas network. The aim is to supply the region’s households and companies with gas for their traditional uses and also to decarbonize the transport sector with BioNGV. Fully automated and remotely controlled, the unit should produce 120 GWh of gas per year, equivalent to the gas used by 20,000 households or a fleet of 480 buses, and representing around 25,000 metric tons of CO₂ emissions avoided.



EXPANDED AND MODERNIZED, THE BONNEUIL-EN-FRANCE WASTEWATER TREATMENT PLANT WAS RECENTLY INAUGURATED IN THE PRESENCE OF SIAH AND VEOLIA. A true model of sustainable development, this innovative unit will provide green energy, notably thanks to Veolia’s MemGas™ process, which purifies biogas from sludge and injects it into the local gas network.

UNITED STATES

HPD® crystallization for lithium-ion battery recycling

The need for sustainable solutions to recover valuable materials from batteries prompted the Canadian company Li-Cycle to select Veolia’s HPD® crystallization technology for its Rochester recycling hub, which started operating in 2023 and is capable of giving new life to some 225,000 battery components each year. This technology is a key step in one of the final stages of the recycling process, optimizing the creation of nickel sulfate and cobalt sulfate from lithium-ion batteries and transforming them into raw materials ready to be used in new batteries. Li-Cycle uses Veolia’s HPD® crystallizers to produce between 42,000 and 48,000 metric tons of nickel sulfate and between 6,500 and 7,500 metric tons of cobalt sulfate per year, which can then be sold to battery manufacturers.

THE GRAPHITECH JOINT VENTURE (EDF AND VEOLIA) AND EDF SIGN A 4-YEAR CONTRACT WITH THE LITHUANIAN PUBLIC COMPANY IGNALINA NUCLEAR POWER PLANT for dismantling the two RBMK reactors.

FRANCE

The Riviera welcomes the first “Climate Transition Experimental Territory”

Committed to the design of its Territorial Climate-Air-Energy Plan and aware of the importance of having a private actor at its side to lead this fight, the French Riviera Community has signed the first “Climate Transition Experimental Territory” with Veolia, spanning three years. In a context of rising energy prices, depletion of natural resources and water deficit, the Group tackles the challenges linked to these three issues and assists the Community in managing its responsibilities: safeguarding water resources, exploring alternative resources, charting a course toward energy efficiency, and fostering recycling and waste recovery.

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The metaverse: a virtual world connected to real-world resources

The metaverse is a headline-grabbing innovation that is sweeping the planet. It is an online virtual territory that offers early adopters a fully immersive parallel world to explore as avatars, courtesy of their virtual reality headsets. This alternative reality is rapidly gaining fans from the private and corporate worlds. It relies on artificial intelligence (AI), virtual reality and blockchain, all highly energy-intensive technologies. According to a scientific study,¹ the training of a single AI model can emit over 284 metric tons of CO₂e, five times more than the lifetime emissions of an average US car!² On this basis, any massive shift to the metaverse would smash all existing records for energy use, regardless

of any anticipated positive rebound effects, such as the reduction of physical travel across the world and its consequent limitation of anthropic carbon emissions. For the time being, the metaverse is in its early stages, but exponential uptake in the near future,³ driven by a quest for profit, is certain to come into head-on conflict with the vital necessity for greater sobriety in energy use.

1. Training a single AI model can emit as much carbon as five cars in their lifetimes, Karen Hao, June 2019, © MIT Technology Review.
 2. Including manufacture.
 3. By 2030, Meta’s CEO expects to see around “a billion people in the metaverse.” A number of other studies agree. A report from US research and consulting firm Gartner says that 25% of individuals will spend at least an hour a day in the metaverse by 2026. (Source: O1Net, June 2022).



China, global EV frontrunner

By 2030, electric vehicles (EVs) are projected to make up two thirds of worldwide car sales, with China potentially reaching a 90% market share.¹ Over the past decade, China has emerged as the EV market leader, selling 4.4 million units in 2022. In the same year, the United States (800,000 EVs sold),

Germany (470,000), the United Kingdom (270,000), and France (210,000) completed the top five global markets. Despite this, China maintains a significant lead, accounting for over half of the top five sales. Its acceleration in electric mobility aligns with its substantial efforts in the energy

sector.² Committed to energy transition, China anticipates achieving its renewable production targets (including wind and solar) by 2025, five years ahead of schedule, with a production capacity of 1,200 GWh. ▀

1. Rocky Mountain Institute Study – September 2023
 2. IEA 2023 Global EV Outlook

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#OurPurposeInMotion:

Veolia's purpose highlighted by its employees

Expressing your commitment to ecological transformation alongside Veolia on social networks. This is the aim of the #OurPurposeInMotion campaign, which provides employees with the opportunity to describe how they actively engage in ecological transformation on a daily basis. As dedicated ambassadors for the Group, thousands of employees have already joined this global movement, by choosing from a selection of ten words that align with Veolia's purpose, reflecting their personal commitment and actions.



“Together we can make a remarkable difference in the world and bring the change our society needs. Ecological transformation is our purpose!”

Estelle Brachlianoff
Chief Executive Officer, Veolia

A VIRAL CAMPAIGN BASED ON PRIDE

over **1,200 posts** in **18 languages** on **5 continents**

published on LinkedIn

NZE 2050

THE IEA'S PATHWAY TO NET ZERO EMISSIONS

The International Energy Agency (IEA) is clear: we have to do more, faster, and better. Its recent report, *Net Zero Emissions by 2050 (NZE)*,¹ setting out the first global energy pathway for limiting temperature increases to 1.5°C, states that only one scenario will achieve carbon neutrality: NZE 2050.

This scenario combines a fall in global energy demand of around 8%, thanks to less wasteful use of energy and better energy efficiency, with meeting the needs of an economy that will have more than doubled in size and a global population with 2 billion more people than today. It envisages that renewables will provide 90% of electricity, with combined wind and solar accounting for nearly 70% of production. Fossil fuels will supply no more than one fifth of total energy, down from four fifths currently.

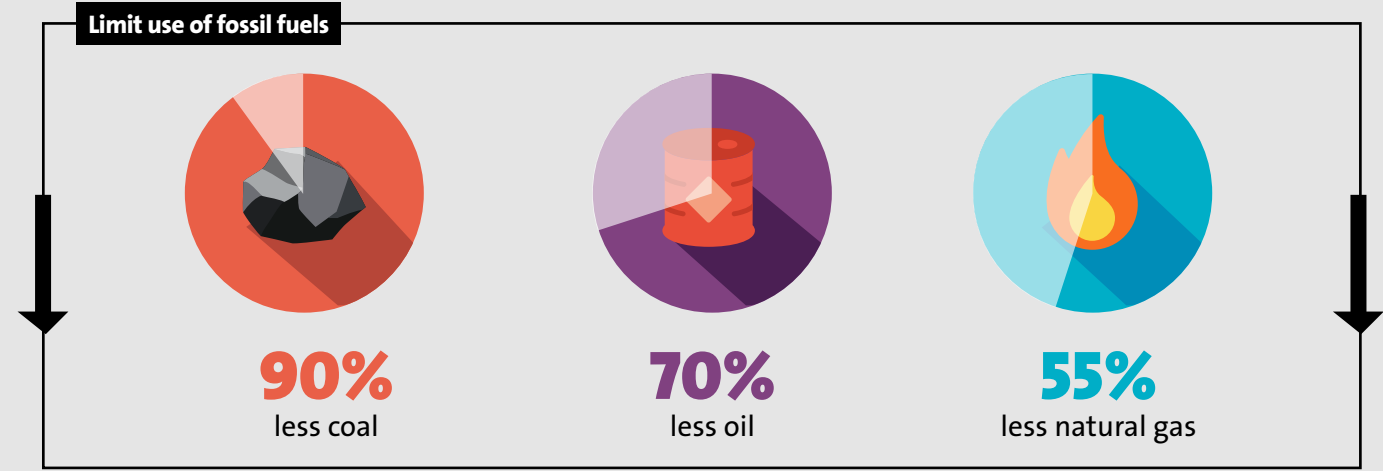
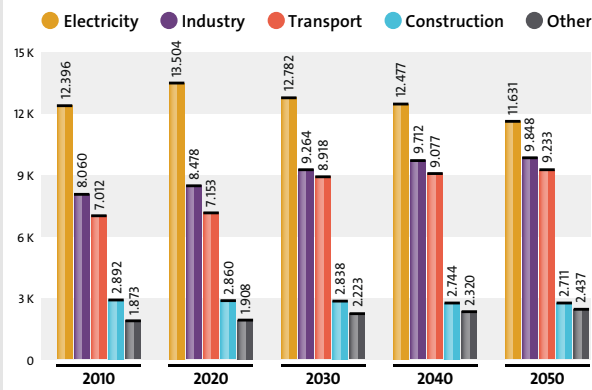
The IEA pathway sets out around 400 separate measures and includes two major milestones: 2030, for a 40% fall in CO₂ emissions, and 2050 for net zero emissions. Meeting these ambitious targets and deadlines will require, in particular:

- as of now, halting all investment in new fossil fuel supply projects and unabated coal-fired power plants;
- by 2030, a 4% annual increase in global energy efficiency;
- by 2035, halting the sale of new internal combustion engine passenger cars;
- by 2050, generalized rollout of existing decarbonized technologies, backed by massive investment to develop and kick-start the process of bringing new clean energy technologies to market. ▶

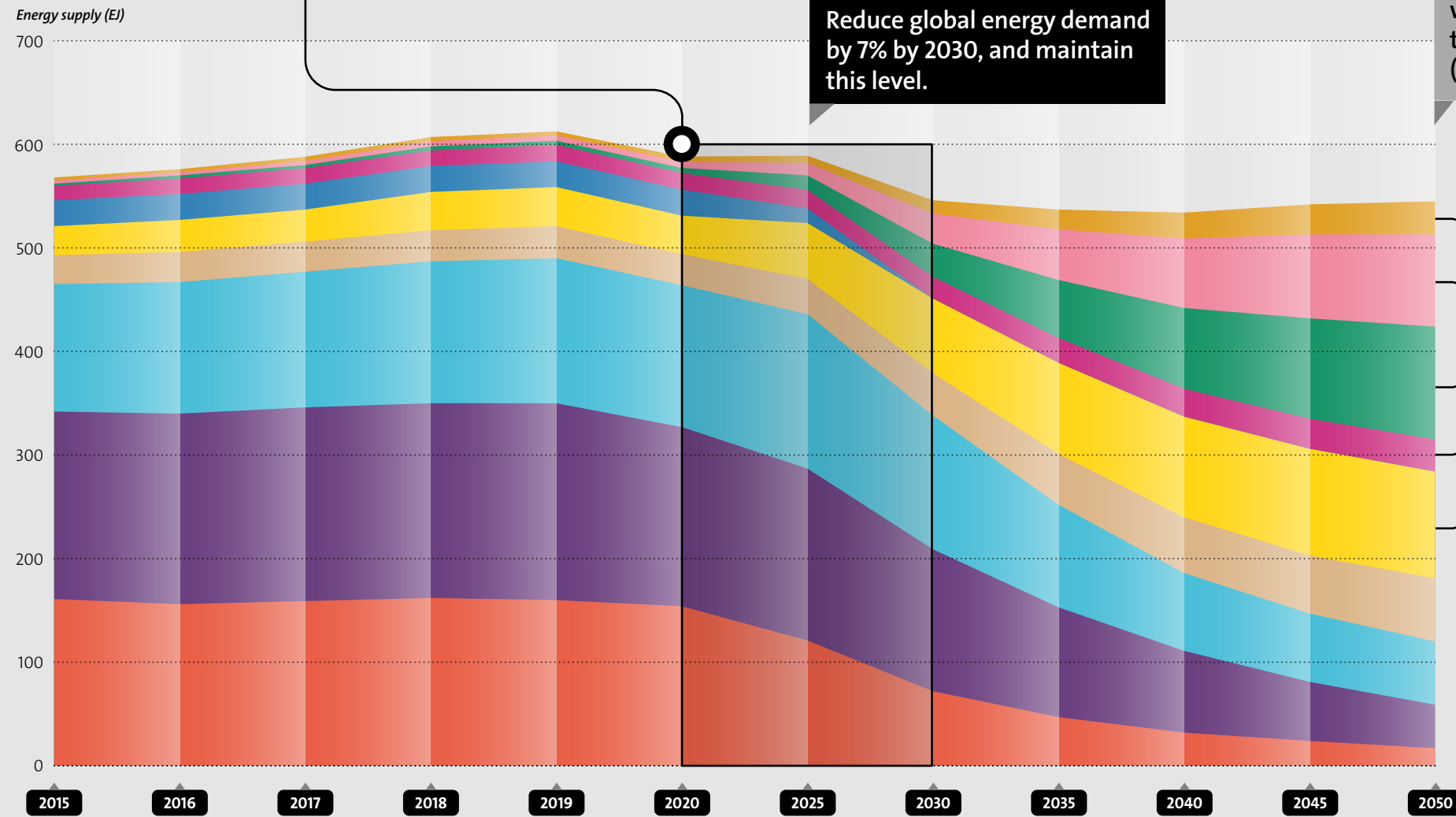
1. www.iea.org/reports/net-zero-by-2050, published in May 2021.

EMISSION TRAJECTORY TO 2050 IF NO ACTION IS TAKEN

in millions of metric tons of CO₂



2020: milestone warning



Accelerate rapid growth of advanced bioenergy techniques (biogas to recover energy from organic waste, etc.) and halt all traditional biomass uses (charcoal, etc.).

Renewables to meet **70%** of energy demand in 2050

- Coal
- Oil
- Natural gas
- Nuclear
- Advanced bioenergy
- Traditional biomass
- Hydroelectric
- Solar
- Wind
- Other renewables

O P E N L E T T E R

Simplifying our approach to climate change for faster results

By Estelle Brachlianoff

Chief Executive Officer of Veolia

As another summer of extremes — multiple heatwaves, dozens of forest fires, depleted waterways, historic water shortages, violent storms and flash floods— draws to a close, people of all political persuasions in France agree that we urgently need to address climate change.

At Veolia, we are ready to support all the actors in society in ramping up their ecological transformation efforts.

However, the implementation of this transformation can only reflect the challenges of climate change and the commitments made by private and public stakeholders if there is a legal and regulatory framework in place to bring together political will and solutions, both those already available and those that still need to be invented.

The good news is that many effective solutions already exist, including ones that optimize water management, conserve natural resources by using materials recovered from waste streams, save energy, promote renewables, and reduce pollution and greenhouse gas emissions.

The yet-to-be-invented solutions will present themselves organically if the previous ones have been optimally deployed, setting off a domino effect aided by a constant drive to innovate.

There is a desire among regions and economic actors to embark on a journey of ecological transformation. Affordable, easy-to-implement solutions do exist. However, one point that comes up time and again is the lack of a framework incentivizing eco-friendly practices.

Quite frankly, nowadays, it's simpler to contribute to pollution than to combat it. It's cheaper to use energy than to save it. It's easier to waste water than to conserve it. It's more convenient to use raw materials than recycled ones. In short, the easy way isn't necessarily the best way. This contradiction needs to end. Solutions need to be implemented across the board so that we can start turning the tide today. This process involves helping people, urban areas, industry and agriculture make changes to embrace existing solutions. It also involves deploying simpler, more enticing rules at a faster pace to help drive ecological transformation.

To meet regional energy needs, we can easily use biomass, solid waste and biodegradable waste. We can view stricter energy efficiency requirements as an opportunity to transform our entire ▶

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Opinion

approach. That's why I launched a plan in the spring of 2022 to help Veolia generate more sustainable energy using local resources and conserve energy at our facilities and those of our clients.

To avoid shortages like the ones we saw this summer, we can stop wasting resources by using more recycled materials and reusing treated wastewater more often.

To reduce our reliance on all strategic materials that are imported and to recycle significant amounts present in our waste streams, we can maximize sorting, recycling and recovery opportunities for electric batteries and electronic components, ensuring there is a secure supply.

To combat air pollution and its adverse health effects, we can step up the development and implementation of purification solutions to help save lives.

Companies are determined to take action to address these challenges, which all directly impact people's lives and well-being. However, they can only work efficiently if governments constantly advance the regulatory frameworks.

In today's global competition, we can set ourselves apart with an environmental strategy that leaves no one behind and favors listening over trading invectives, collaborating over issuing directives. A well-conceived environmental strategy reconciles sustainability with competitiveness and does not treat the "end of the world" and the "end of the month" as opposing challenges.

By providing the necessary impetus, we support a purposeful vision of ecology: an ecology that drives reindustrialization thanks to low-carbon transition, an ecology that creates offshore-proof jobs and increases people's purchasing power by keeping production local and affordable.

This is a mission that many people can support. I firmly believe that, together, we can achieve our ecological transformation goals. ▀

Key figures

25%
of Russian gas
can be replaced
with biomethane
produced in France

€150 million
invested over
two years in the
ReSource plan

2027
the year by which Veolia
commits to achieving
energy autonomy for
its services in France

“We can view stricter energy efficiency requirements as an opportunity to transform our entire approach.”

Estelle Brachlianoff





Meet Veolia employees around the world

Fatima, Marta and Viktor are part of a community of 213,000 Resourcers who “want the world as it could be.” Optimistic, determined and always together, they never give up in the pursuit of ecological transformation. Here are the first in a long series of portraits that will be published on veolia.com.

Fatima

Process Development Engineer, CEDILOR site (a SARP Industries subsidiary)

At 26, Fatima is aware that her generation has been brought up to protect the planet: “We have reached a stage where it is urgent to promote recycling and reduce the environmental and social impact of the extraction of raw materials, which is very polluting.” The CEDILOR site, her favorite ‘digging ground,’ is where our treasure hunter gives free rein to her commitment. With her colleagues, Fatima has developed several solutions for recycling used electric vehicle batteries. The idea is to extract the strategic metals to be reused to manufacture new batteries. In other words, how to make the electric car truly sustainable, when it is predicted that there will be 100 million EVs on the road worldwide by 2030, compared with 10 million today. “The project arose out of the exponential market for EV batteries over the past 20 years, even though we don’t necessarily know how to recycle them.”

The batteries are first delivered to the neighboring Euro Dieuze Industries site (another SARP Industries subsidiary), where they are dismantled and then shredded to

separate the less valuable elements from the more valuable ones. Three main materials are obtained: paper/plastics, aluminum/copper/steel and, finally, black mass, a kind of powder mixture of carbon, nickel, lithium and cobalt. “Black mass is what we recover at CEDILOR. In our laboratory, it undergoes hydrometallurgical chemical treatment to separate and purify the lithium, nickel and cobalt.”

Work is ongoing to improve this hydrometallurgical process so that recycled cobalt and nickel salts — the by-products from the hydrometallurgical units — can be used to produce new batteries. This is where teamwork and collective intelligence make all the difference, especially when tackling the pitfalls that regularly crop up and where the solution is not immediately apparent. “We’ve got the optimism and perseverance we need to eventually come up with a reliable and robust process.” ▶

Listen to Fatima tell her story



1. Industrial depollution center in Lorraine (France)

“Reusing wastewater avoids depleting water resources!”

Marta

Head of a wastewater treatment plant on the banks of the Llobregat

“Water has played a big part in my life since I was very young. In Barcelona, water is everywhere! I see it as the most important element we need to protect for future generations,” are Marta’s first words. “If you take a closer look at it, its composition is spectacular. Taking care of water came naturally to me. After studying environmental sciences, it was only logical to focus my career on wastewater treatment.”

At the helm of a wastewater treatment plant on the banks of the Llobregat River, Marta agrees that there is nothing ordinary about her job: “You give back the best possible water quality to the environment.” For her and her teams, water quality really is a constant challenge. The vast Prat de Llobregat wastewater plant, which treats the wastewater from Barcelona and surrounding areas, houses one of the largest water regeneration systems in the world, using ultrafiltration and osmosis.

“This type of plant doesn’t just treat water. It’s not a conventional wastewater treatment plant but an ecological plant in the real sense of the term. We produce more than just water. For example, we generate

green energy, such as biogas, from the wastewater.” Moreover, the quality obtained is so high that the water can be reinjected directly into the Llobregat aquifer. This increases water resources and helps maintain the river’s flow. “By reusing wastewater, Barcelona draws less from the aquifer and recycles the high-quality water from our plant for agricultural, urban and industrial purposes.”

At home, the mother of two is proud to explain her job to her daughter: “The water that flows from the tap in the bathroom goes to the wastewater treatment plant where Mom works. We clean it so that it can go back into the rivers so that the fish can live there.” Marta remains unfailingly optimistic, as she knows that she can count on her colleagues, all just as determined as she is to take action on a daily basis to ensure that water remains a resource accessible to all. “What motivates me the most is knowing that I’m not working just for myself, but for everyone and for the environment.”

Listen to Marta tell her story



MARTA

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“Our ambition? To help towns and cities make their energy mix greener.”

Viktor

Project coordinator at Veolia subsidiary BS|ENERGY's site

“We have to act quickly on ecology if we don't want the future to be bleak,” says Viktor. For him, as for many young people in the generation marked by *Energiewende* — Germany's energy transition in the 2000s — the 2015 Paris Agreement was the turning point. For the first time in history, the world set itself a clear and binding target to limit global warming to 1.5°C. “In my own small way, I'm helping improve our carbon footprint here in Braunschweig.”

‘Here’ is the BS|ENERGY plant of the future where they are working on the green and renewable energy of tomorrow. As the concession operator for the city's electricity and gas networks, the company — a Veolia subsidiary — has set itself the target of pioneering a more flexible, ecological and affordable energy supply. “The city of Braunschweig used to mainly use coal for heating. Now we are helping it make the transition to low-carbon energy.” One of these more sustainable energies is biomass.

Viktor and his team head up the biggest project in the history of BS|ENERGY: replacing the coal-fired heat and power plant with a biomass cogeneration plant that will produce 22 MW of electricity and 60 MW of heat. That is equivalent to the heating needs of about 50,000 households. The plant has been in operation since 2023.

While innovations often spring from the minds of young creatives, Viktor is one of those endlessly inquisitive people, never short of ideas, a Resourcer always ready to experiment and find colleagues with out-of-the-box solutions when it comes to making the energy transition a reality. “This switch to a biomass power plant really makes sense because it reflects the desire to end coal-fired energy production.” Aware that his job makes him a ‘climate protector,’ Viktor definitely feels in tune with the ecological ambitions of his generation. ▶

Listen to Viktor tell his story

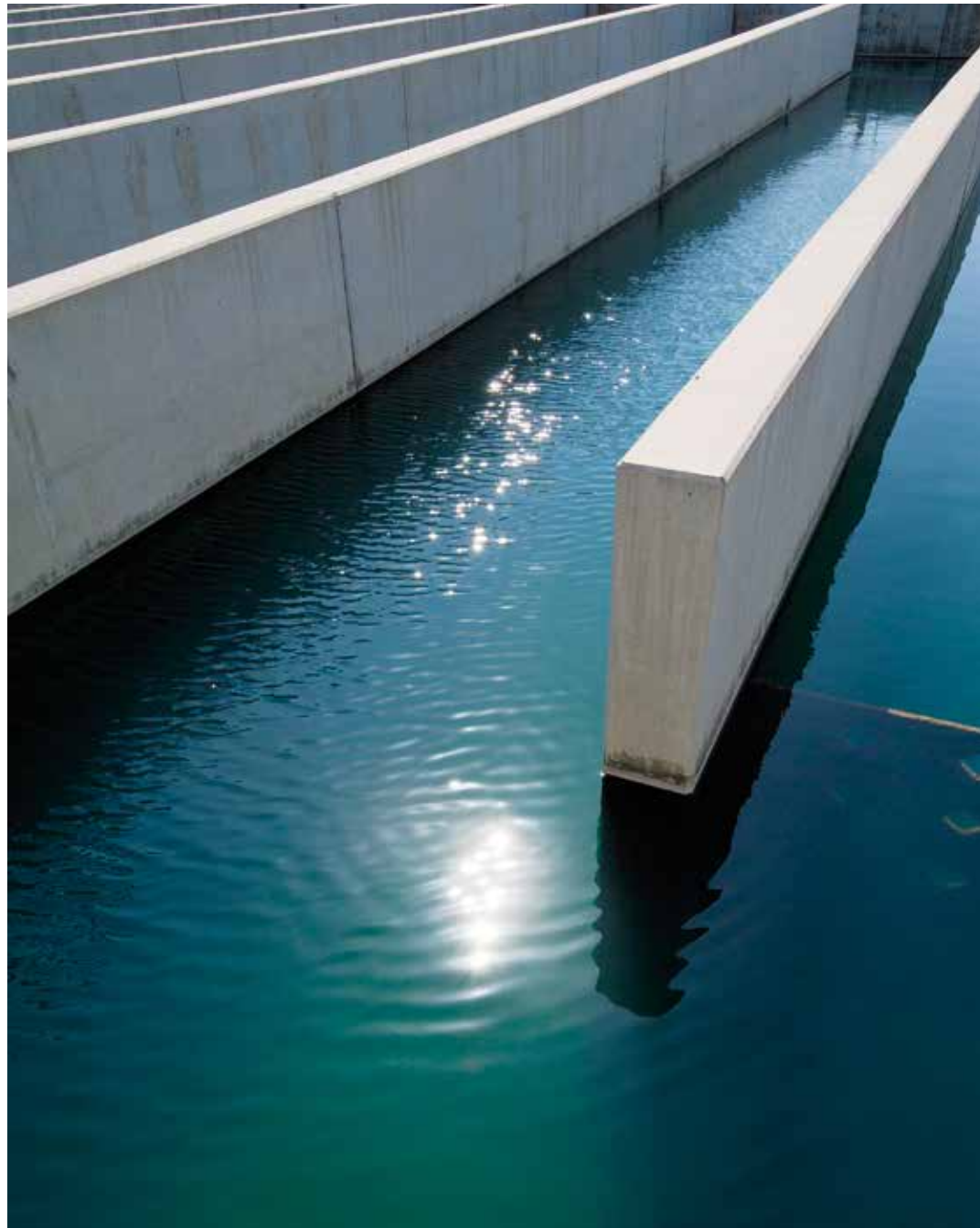


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energy
transition

SOLUTIONS



TOM- Energy-positive wastewater

The question of carbon neutrality is central to every industrial challenge, particularly when it comes to wastewater treatment. And this is why Veolia is ramping up efforts to design sustainable solutions for cutting energy use and carbon emissions at its wastewater treatment plants (WWTPs).

OPER-
OW'S
WWTP

© VEOLIA

Key figures

1 to 3%

Share of global energy consumption of wastewater treatment plants (IWA - International Water Association estimate)

7^{TWh}

Veolia's annual energy consumption, 70% of which is for water treatment and wastewater services

28 to 34

Global warming potential (GWP) of methane over 100 years compared to carbon dioxide. This reaches 84 to 86 over 20 years (source: UN)

25%

Amount of Russian gas used in France that could be replaced by energy from organic waste (green waste and sewage sludge)

Issue at stake

High energy costs for wastewater treatment plants

Objective

Make plants self-sufficient and reduce climate emissions

Veolia's solution

Introduce energy efficiency, microgrids and use of self-produced biogas on the WWTPs operated by the Group



3 questions for Jean-François Nogrette

Senior Executive Vice President, France and Special Waste Europe at Veolia

You have announced that Veolia's services in France will be energy-independent by 2027. How are you going to meet this target?

Jean-François Nogrette: By leveraging every margin for maneuver that our expertise and business lines can generate. First of all, we will increase our own energy production of 100% local energy, 80% from the circular economy, 20% from solar.

We will fit photovoltaic panels at sites where this is possible, increase production of biogas from organic waste and sludge from wastewater treatment plants, and boost energy production from solid recovered fuels sourced from non-recyclable waste. In this way, we will produce over two terawatt-hours (TWh) of energy, equivalent to the amount of power needed to fully cover the energy use of our services at present.

We then intend to pool all our in-country waste and energy streams, meaning that we will be the first to use the energy we produce. This will

therefore lock in our energy supplies and costs, which will then be very largely immune to price volatility in the energy market. Lastly, we will cut our energy use, by replacing all our most power-hungry equipment, using the digital tools that Hubgrade offers and, of course, placing our faith in the insights and operational experience of our teams in the field. This is the mindset behind our commitment to the EcoWatt energy forecasting program designed by RTE and the ADEME.

What are the benefits of exploiting biogas from wastewater treatment plants, and to what extent has this been developed in France?

J-Fr. N.: It is estimated that France could reduce its reliance on Russian gas by 25% — the country currently imports around 17% of its gas from Russia — if we produced biomethane from all our organic agricultural waste and local water resources. Veolia is working hard to increase the amount

of biogas produced in France, particularly for injection into the gas grid. We have developed a membrane-based technology to purify the biomethane extracted from biogas.

What more can be done to develop infrastructure in France?

J-Fr. N.: Much remains to be done. The gas distribution network is slowly becoming a biomethane collection network, a process that still has a lot of untapped potential. In France, no more than 15% of our major wastewater treatment plants are fitted with digesters for producing biogas, compared to 100% in Switzerland. French regulations prevent us from mixing sludge from WWTPs with food and green waste, a practice permitted in other European countries. Lifting this ban would allow us to double the quantity of biogas produced by existing digesters. We need to pick up the pace if we are going to meet the government's target of biogas independence in 2050. ▶

A scientific and industrial partnership for CO₂ recovery

SIAAP is the Greater Paris Inter-departmental Sanitation Authority and the largest public sanitation service in Europe. CEA is France's Alternative Energies and Atomic Energy Commission. Collège de France is a scientific institute.

Veolia, SIAPP, CEA and Collège de France are working together on a research project to capture CO₂, particularly from the biogas from WWTPs, and convert it into formic acid, methanol and methane. Formic acid can be used to treat nitrogen

in WWTPs and make energy generation even more efficient. When biomethane is burned to generate electricity, the nitrogen acts as an inhibitor reducing its combustion properties. By removing this nitrogen, it is therefore possible to extract more energy from pure CO₂.

It is hoped that within three years a pilot facility will be up and running to test this technology, which can potentially be used in WWTPs, as well as anaerobic digestion and waste incineration facilities. ▶

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natural resources in the area. The wastewater treatment plant is located near an environmentally sensitive waterway that supports a population of endangered Santa Ana sucker fish.”

GREEN ENERGY FROM SLUDGE IN KUBRATOVO

Near Sofia, Bulgaria's capital city, Veolia operates one of the largest WWTPs in the Balkan region. Historically, it has consumed between 16,000 and 24,000 MWh of electricity per annum. In 2009, combined heat and power (CHP) units were installed, which used the biogas produced by anaerobic digestors to generate 23,600 MWh in 2021. When combined with measures introduced in 2017 to reduce the facility's energy consumption, a 16% green energy surplus was produced over and above operational needs. “In Central Europe, the historic way to get energy resources was using coal and gas,” says Veolia's Senior Executive Vice President in Central and Eastern Europe, Philippe Guitard. “Now with the war in Ukraine, the price of energy has soared. By being self-sufficient, we aren't facing these higher costs but are able to sell excess electricity to the grid and provide biofuel for our vehicle fleets. Methane is around 30 times more climate-damaging than CO₂, so treating water in this way and turning it into biogas to generate electricity is a very clever solution that helps mitigate climate change.”

WASTEWATER PLANTS GENERATE BIOMETHANE

Strategically, Veolia recognizes that it needs to reduce both the cost and climate impact of the WWTPs that it operates, as well as looking at whether it might be more efficient to provide clean biogas from the methane produced that can be injected into gas grids. According to Geneviève Leboucher, Veolia Senior Vice President in charge of Access to Water and Sanitation, Veolia's electricity consumption is 7 TWh per year at a cost of €750 million. 70% of it comes from providing water and wastewater treatment. “All the areas where Veolia works are facing the same economic issues with the cost of energy, and more and more of them are concerned about climate change,” she says. “The energy crisis pushed us to

speed up our energy reduction, as we had to manage our costs. But it is also a business opportunity for us, as there is potential to develop biomethane capacity and find other sources of feedstock for our existing treatment capacity to enable us to maximize biomethane production. Very often, this is used on site to produce energy and heat, but if we look at the bigger picture, it might be more efficient to clean the gas and inject it into gas networks for other local uses, such as residential.”

By taking this approach, more WWTPs operated by Veolia will be able to produce local, affordable and sustainable gas that can be used for home heating and cooking. ▶

hat if wastewater treatment plants were part of the solution for increasing energy efficiency and limiting impacts on the climate? These energy-intensive plants, which use between 1% and 3% of global energy production according to the International Water Association, are seeing their roles changing, with some now acting as biorefineries.

IN RIALTO, A SOLAR MICROGRID ON A WASTEWATER PLANT

In California, Veolia employees have come up with an innovative microgrid solution that uses a unique combination of biogas cogeneration, solar power and backup battery storage. The city of Rialto is situated just east of Los Angeles and Rialto Water Services provides water and wastewater treatment to 100,000 people. In 2013, a 30-year concession agreement was signed between the City of Rialto and Veolia. Last year, as part of this contract, the microgrid solution was announced. “Veolia is working with its clients to invest and think boldly and creatively to protect our resources,” says Veolia's Senior Executive Vice President in North America, Frédéric Van Heems. “The WWTP in Rialto, California, is a good example of how municipalities can take positive steps toward a greener future by being more energy efficient and using a microgrid power source.” This project is designed to absorb upfront costs by reducing energy costs over time. It is therefore possible to invest in infrastructure without raising local community taxes.

It will include a 360-kw reciprocating engine that will run on the biogas generated from treating the wastewater using anaerobic digestion technology. Additionally, there will be a 1.6-MW solar photovoltaic system and a 2.5-MWh lithium-ion battery that can run for four hours before needing to be recharged. The plant can therefore run self-sufficiently and operate during power outages. Any excess energy produced can also be sold on the grid to raise additional revenue. No natural gas will be used and 600 metric tonnes of CO₂ emissions will be saved every year.

There are other environmental benefits, says Frédéric Van Heems: “Besides the positive impact the project will have on energy efficiency and resilience, it will also significantly contribute to protecting crucial

“The energy crisis is also a business opportunity for us as there is potential to develop biomethane capacity.”

Geneviève Leboucher

“The WWTP in Rialto, California, is a good example of how municipalities can take positive steps toward a greener future by being more energy efficient and using a microgrid power source.”

Frédéric Van Heems





LANDFILL- ILL GAS TO THE RGY

Landfill biogas: pollution becomes a solution

Once a vicious circle, now a virtuous pathway? In every corner of the world, the expertise and commitment of Veolia's teams deliver constant opportunities for discovering and implementing new alternatives that ensure waste streams are at last becoming bywords for resources. From Ivory Coast to Brazil to Australia, we take a look at pioneering actions that have already proved their worth.

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Key figures

65 to 70%
Methane content of landfill biogas

20,093 metric tons
Volume of methane emissions avoided per year in Brazil (i.e., more than 562,000 metric tons CO₂e) by capturing biogas at waste-to-energy centers operated by Veolia

18 million metric tons
Volume of waste in the Akouédo landfill before it was closed

75%
Percentage of Australian voters in New South Wales who consider waste management issues to be a concern (Veolia survey in Australia, 2022)

Issue at stake

Improve waste processing to strip out sources of pollution that may be a hazard to human health and the environment

Objective

Act for energy transition around the world

Veolia's solution

Multiply solutions for transforming waste into clean energy



3 questions for José Manuel Ribeiro

Chairman of the Board of Directors of LIPOR¹

What are LIPOR's innovation targets in terms of managing municipal waste in Greater Porto?

José Manuel Ribeiro: LIPOR will cease to be a waste manager in the near future, shifting to providing products and services aligned with the circular economy concept. The areas we will focus on? Agriculture, slag recovery from our waste-to-energy center, the recovery and reuse of polymers. This is why we have set up a dedicated department aiming to strengthen our vision of a changing model, and why we make such strenuous efforts to

promote innovation within our organization.

This is the same expertise that will soon be showcased at your own energy recovery facility.

J.M.R.: True. The expertise gained over 22 years as manager and operator is today paving the way for installing a third line at our plant. The idea behind this innovative concept is to capture CO₂ and combine it with hydrogen to, ultimately, produce a synthetic green fuel to help the aviation industry become more sustainable.

And what about the furnace slag you mentioned?

J.M.R.: This will be used as a secondary raw material to produce construction materials. Here again, we are counting on Veolia, our partner for nearly 25 years, to continue to give us the confidence we need to carry out our mission successfully. ▶

¹LIPOR is the organization in charge of managing, recovering and processing around 500,000 metric tons of urban waste every year produced by the 1 million residents of the Greater Porto region in Portugal.

Become a renewable energy supplier by leveraging sites that we already own

Marc-Olivier Houel, CEO of France Waste Recycling & Recovery Solutions Zone

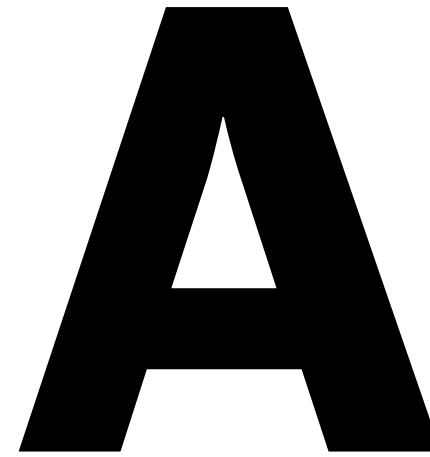
We are determined to leverage the 300 or so hectares of land that we already own to massively develop local production of renewable energy in compliance with France's Renewable Energy Acceleration Bill and with the support of local authorities. Our goal

is clear: ratchet up the number of photovoltaic farms, so that by 2027 there are 10 times more than just the 23,000 modules currently installed at Grand'Landes, a former landfill site, which generate 7,000 MW and avoid the emission of 3,618 metric tons of CO₂ each

year. In the future, we want to be able to either use what we produce ourselves or feed it into the grid for a client. It is precisely this dual role as producer and supplier that our teams on the ground are actively developing across France. This involves acquiring new skills, for

which we can rely on Veolia France's Energy Hub. This is a challenge we can meet! Inside the business, there is a real desire to decarbonize our activities, and in the years ahead we may well see the worldwide rollout of solutions first adopted in France. ▶

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Akouédo lies a dozen or so kilometers east of Abidjan, Ivory Coast's capital. In 2018, the national government decided to close the 90-hectare landfill site that had been operating here for the past 43 years. The number of people living nearby had quadrupled over the years, meaning that the once-isolated site had become part of a peri-urban zone with housing worryingly close to stored industrial, household and medical waste. PFO Africa, the country's leading civil engineering company, was tasked with rehabilitating the site and turned to Veolia for specialist expertise. "A parallel economy had grown up around the site. Rag-pickers, often just kids, would rummage through the waste with all the risks that brings," recalls Philippe Bourdeaux, Veolia's Director of the Africa - Near & Middle East delegated Zone. He goes on to explain how Akouédo, where a million metric tons of waste used to be dumped every year, "is a perfect illustration of the lack of infrastructure on the African continent for sustainably managing the waste streams that are growing in volume very quickly, driven by massive urban growth."

FROM LANDFILL SITE TO A PLACE FULL OF LIFE THAT ALSO PRODUCES BIOGAS

After several studies raised the alarm about health risks to local people and ecosystems, including the pollution of groundwater and the neighboring Ebrié Lagoon, the decision was taken four years ago to carry out a major rehabilitation of the Akouédo site. Addressing the issue of water infiltration was the first task to tackle, before work started on the future urban park with its modular installations and walking trails. The goal is to prevent groundwater becoming contaminated by leachate when rainwater comes into contact with buried waste. "Back in 2018, as soon as the landfill site closed, our teams moved quickly to begin work on a project that in many ways symbolizes the country's ecological transition," recalls Philippe Bourdeaux. Initially, their role was to support PFO Africa during the installation of a layer of semi-permeable material on top of the waste mountain, followed by a geotextile membrane, topped off with a layer of soil. They then turned their attention to scaling and building installations to recover and treat leachate, and to recover biogas extracted via a waste fermentation process. With 80,000 cubic meters of leachate treated every year, the site will be capable of generating no less than 2 MWh of electricity from biogas. This means that the Akouédo site will avoid the emission of

76,000 metric tons of CO₂ every year. Interest in the project format and growing awareness of the importance of these issues have led to further examples in Africa, with Veolia currently looking into the rehabilitation of landfill sites in Morocco and South Africa.

THE POTENTIAL OFFERED BY ORGANIC WASTE

The specifics may differ on other continents, but the concerns and risks are the same. Covering 8.5 million square kilometers and with a population of 214 million, Brazil generates 80 million metric tons of waste every year. Half of all this waste ends up in one of the 3,000 uncontrolled illegal landfill sites dotted across the southern hemisphere's largest country. This ecological crisis is something that Veolia's employees are constantly facing and fighting against. Their most recent response, in 2021, involves the operation of four new electricity plants in Iperó, Biguaçu (Santa Catarina) and São Paulo. "Together, these plants generate more than 12,400 kW of renewable electricity using biogas produced from organic waste in landfill sites, which accounts for a very high percentage of waste in Brazil," says Gustavo Miguez, CEO of Latin America Zone at Veolia. This is enough to supply power to a town with a population of around 42,000. Further south, the 2021 partnership with agrifood company Camil Alimentos offers another illustration of this ability to deliver innovative solutions. "Working at their site, we will manage, operate and maintain a cogeneration plant that will use 95,000 metric tons of rice husks per year to fire boilers that generate electricity and steam." Gustavo Miguez is certain that Camil Alimentos' model for energy independence could also work in other industries or with other types of waste, such as sugar cane bagasse. Such opportunities will require considerable research and development efforts.

A TURNING POINT FOR AUSTRALIA

Australia relies on coal for its energy, for reasons that are as much historical as natural, but the country now stands at a crossroads. "Leaving aside the fact that many coal mines are reaching the end of their life cycles, we are also seeing widespread opposition to any plans for new mining. Recent elections also highlighted the fact that most Australians understand the need to pivot toward renewables and a broader-based energy mix," notes Richard Kirkman, CEO of Australia / New Zealand

Zone at Veolia. This new-found realism has been quickly reflected at the highest levels of government, with a proposal presented to parliament in July 2022 to give legal force to the country's greenhouse gas targets: a 43% reduction in 2005 emission levels by 2030, and zero net by 2050. "We are ideally placed to play a central role in the national conversation and

"The rehabilitation of the Akouédo site is a project that in many ways symbolizes the Ivory Coast's ecological transition."

Philippe Bourdeaux

support this shift," says Richard Kirkman, who also points out that Veolia is currently developing the country's first energy recovery facilities. Biomethane may well occupy an important place in the Australian energy mix of tomorrow, alongside carbon capture and hydrogen reforming. And although he predicts that it will take a dozen years or more before fossil fuels' share of local energy production shrinks to tiny levels, he also believes that considerably increasing the use of renewable energy sources will take just three to five years, with Veolia again at the forefront. ▶



“The plants in Iperó, Biguaçu and São Paulo already generate 12,400 kW of renewable electricity using biogas produced from organic waste in landfill sites, which accounts for a very high percentage of waste in Brazil.”

Gustavo Miguez



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SOBRIE- TY AND SOVEREIGN- GNTY

Energy efficiency tested by the crisis

Reduced gas supplies from Russia, the threat of shortages, inflation: Europe is facing a major economic and energy crisis. The response to these challenges is to implement an energy-efficiency strategy. Attractive and competitive, Veolia's energy-efficiency solutions are a tremendous opportunity to establish the European Union's energy independence.

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Key figures

140 bcm

Volume of Russian gas imported by the EU through pipelines in 2021 (source: IEA)

60,000

Number of measurement points centralizing energy, water and waste data in the Hubgrade control center in Dubai (UAE)

44%

Share of energy consumed in France by the building sector (source: French Ministry of Ecological Transition)

26.6%

Share of electricity used in mainland France generated from renewable energy sources in Q3 2021 (source: RTE)

Issue at stake

Help buildings and industrial facilities — major consumers of heat, cold, lighting and hot water — make energy efficiency an asset for their attractiveness and competitiveness

Objective

Roll out energy services that reconcile energy and environmental performance

Veolia's solution

Offer smart technologies to optimize energy consumption and renewable solutions to reduce greenhouse gas emissions



4 questions for Adrien Doré

Country Director France, Flexcity, the Veolia subsidiary specializing in the aggregation of electrical flexibility

What is the principle behind electrical flexibility and how does it work?

Adrien Doré: It responds to the need to balance electricity network supply and demand at any given time. With the rise of renewables in the energy mix — and their intermittency problem — electrical flexibility makes perfect sense, since we are able to intelligently control the demand for electricity while we cannot influence production.

How does electrical flexibility meet the expectations or demands of industrial and service sector customers in terms of energy efficiency?

A. D.: It is the first pillar of energy efficiency. Electrical flexibility allows

our partners to either consume less or consume at the best time in order to provide the same service to their users while guaranteeing an appropriate service to the French public transmission system operator (RTE).

In the current sensitive context, how is industry preparing for the impact of energy tension?

A. D.: Today, we are witnessing a very strong paradigm shift among our customers. They are adapting their operational processes to the price of electricity. Our partners are primarily looking for new ways to offset their rising bills and generate additional revenue to lower them.

What are the main qualities of a Flexcity Resourcer?

A. D.: At Flexcity, our employees are passionate about participating in the electricity system's transition. In addition to the technological and digital solutions that we provide as part of our R&D, we support our partners in their thinking and in changing their production methods. The success of this type of project depends on listening, discussing and understanding our customers' needs and expectations. That is our strength. ▶



EcoEnergies creates an LNG cold recovery unit in the port of Barcelona

By Xavier Gil Mañero, Director of EcoEnergies, a joint venture between Veolia and Barcelona

“Currently, LNG (Liquefied Natural Gas) transported by ship to the ENAGÁS terminal in Barcelona arrives at a temperature of -160°C before undergoing regasification. The LNG heated with seawater is converted from a liquid to a gas, with a significant loss of residual cold to the sea. Thanks to the project led by Veolia and its partners, this residual cold — up to 18 MW — formerly considered as ‘lost,’ will now be recovered and reused at the ENAGÁS plant as early as 2023. Equipped with specialized exchangers, it will

supply liquid cold at -20°C to our cooling network. Our customers will be able to use it thanks to exchange substations and then it will return to the ENAGÁS plant to be cooled to the same negative temperature. In the midst of the energy crisis, this project has the advantage of reducing dependence on gas imports, thanks to a local, closed-loop energy source that will benefit the main customers at the Mercabarna wholesale market, as well as industrial and tertiary sector players. The 150,000 or so people spread

across 1,500 hectares who use the EcoEnergies Barcelona district cooling network will also benefit from the green-sourced cold for air conditioning. At a national and European level, this scalable project can be replicated at all LNG regasification plants. In addition to its replicability, the total CO₂ emission savings are estimated at 32,205 metric tons, with cooling consumption expected to reach 131 GWh per year (56% of the Mercabarna food city).” ▶



ervice sector buildings and industrial facilities consume a considerable amount of energy for heating, cooling, lighting and hot water. This is where Enova's energy efficiency and operational solutions come into their own, as demonstrated by the optimized energy management of Dubai's Mall of the Emirates.

“The energy performance contract concluded with the Mall of the Emirates is a national and international example of optimized and proactive systems management,” explains Philippe Bourdeaux, Veolia's Director of the Africa - Near & Middle East delegated Zone. “Thanks to the Group's international expertise and an increased capacity for innovation, we are able to reduce the carbon emissions of one of the largest shopping centers in the world by saving up to 34,000 metric tons of CO₂. A challenge met with flying colors by Enova, a joint venture between

Veolia and Majid Al Futtaim, which guarantees the energy performance of the Mall of the Emirates while ensuring its 45 million annual visitors enjoy the comfort necessary for their well-being.” This contract has three phases: the audit to identify the building's energy behavior, the implementation of recommended

measures, and the operation and maintenance of the site using a Hubgrade² control center. It is designed to meet the Emirates' goal of achieving carbon neutrality by 2050. These are considerable advantages, offering energy and economic benefits alike, which the Group has also been able to export to Europe.

In Italy, the Veolia Siram teams have implemented an exemplary energy efficiency model on the University of Parma's campus, which hosts over 32,000 people annually. This innovative system allows the university to achieve 20% energy savings yearly, while curtailing its ecological footprint and enhancing its energy consumption autonomy.

“This is a big plus in the drive to help free the EU from its dependency on Russian oil and gas, and an additional argument for our stakeholders, who can experience how Veolia sustainably supports its customers and partners in their carbon neutrality objectives,” explains Laurent Obadia, Veolia's Senior Executive Vice President, Stakeholders and Communications, Advisor to the Chairman.

OPPORTUNITY FROM CRISIS

These words echo those of Francisco Silvério Marques, Veolia's Senior Vice President of Energy Services for Buildings: “The EU has two major challenges to meet: reducing energy consumption and promoting the local production of renewable energy.” These challenges are reflected in the targets set out in Veolia's ReSource plan for 2023, namely a 5% increase in the Group's local energy production and a 5% decrease in consumption for its own needs. On top of the subsidies available to meet these challenges, he reminds us that Veolia is making funds available “so that our countries and teams can invest in these various projects.” In addition, since energy services for buildings are strongly linked to gas supply, the securement aspect is paramount: “Despite the context, we must continue to supply our customers with heat and electricity. We need to secure sufficient flows and limit the impact of market volatility and the return of inflation.” Energy efficiency solutions provide an answer to this complex situation and contribute significantly to the EU's goal of energy sovereignty. “At Veolia, we are actively contributing to the first objective of the REPowerEU³ plan, which is aiming for a 30% reduction in gas consumption by 2030, and we are aligned with the International Energy Agency's action plan.”⁴ In particular, he highlights the IEA's recommendation related to lowering the temperature of heating in buildings, representing a potential saving of 14 billion cubic meters of gas, or 10% of Russian gas imports by pipeline.

MANAGEMENT AND ENERGY PERFORMANCE: ECONOMIC SAVINGS

Flexcity, a Veolia subsidiary specializing in the aggregation of electrical flexibility (see box), is proving to be a tremendous asset in this period of tension over energy resources. As it is not possible to control solar or wind production — by definition intermittent — the Flexcity solution focuses on managing electricity consumption. This smart electricity management system has many advantages for industrial and service sector players who wish to consume less electricity or choose the best time to use it. Hubgrade's energy

“Veolia is actively contributing to the first objective of the REPowerEU³ plan.”

Francisco Silvério Marques

management centers represent a remarkable lever for reducing energy consumption. Thanks to their exhaustive, remote and real-time vision of equipment behavior and performance, Hubgrade centers identify possible anomalies or savings opportunities, triggering de facto action on the ground. For Francisco Silvério Marques, their importance for building management and their excellent fit with on-site teams need no further proof: “When a discrepancy is identified by a Hubgrade center, our on-site operators intervene immediately, for example to replace a filter, lubricate moving parts, or check the tightness of a control valve. None of these elements is very visible, but they have a strong impact on the building's energy consumption. These actions are a concrete addition to the analyses provided by the Hubgrade centers.”

1. Created in 2002, Enova is a joint venture between Veolia and Majid Al Futtaim, a pioneer in shopping malls and retail facilities in the Middle East, Africa and Asia.
2. A Hubgrade is a platform for monitoring and optimizing the energy performance of buildings.
3. REPowerEU is the European Commission's plan to make Europe independent of Russian fossil fuels.
4. IEA's 10-point plan to reduce the European Union's dependence on Russian natural gas.

PEOPLE-DRIVEN

People are the driving force behind all these smart monitoring solutions. Without operators' know-how, the data collected would be underexploited. Technology, expertise and investment are the three closely linked aspects. "Together, they have a multiplier effect on economic performance and energy efficiency," concludes Francisco Silvério Marques. A sustainable energy transition implies a paradigm shift, a profound overhaul of the energy system's framework, and an unprecedented change in values and growth for all parties involved. But in the end, it is people who make the difference. ▶



“The Mall of the Emirates in Dubai leverages Veolia Group's expertise through a Hubgrade smart control center, supporting the country's goal of achieving carbon neutrality by 2050.”

Philippe Bourdeaux

Innovative solutions and collective strength

As a new chapter in its story begins, a Group famed for its expertise in water, waste and energy is embracing the resources and determination needed to be the benchmark for ecological transformation, driven by a vision of a solutions-based ecology. The climate crisis, environmental emergency, uncertain energy supplies, increasing scarcity of raw materials and food resources, rising inequalities, pollution, etc.: however many obstacles lie in the way of this challenge, in the years to come they may well turn out to be opportunities for Veolia and true alternatives for our planet. What will the next decade hold?



And tomorrow?

P

resent in 44 countries, with 213,000 employees and a revenue of 42.9 billion euros, Veolia is writing its own history as the global champion of ecological transformation. With an extended geographical footprint ranging from municipal water services in Spain to waste management in Australia, where it has acquired a leadership position, the Group has the capacity and resources needed to accelerate the speed of technological, financial, commercial and social innovation. The roots of this ability to invent tomorrow's solutions can largely be found in the engagement and close relationships between the Group and its employees and stakeholders. This collective is the mainstay, the people-centered foundation underpinning innovation and transformation. It is also the cornerstone that allows it to weather crises. This was certainly the case in 2020 during the COVID-19 pandemic and it remains true today, in a time of global uncertainty. But this collective power must also be nurtured so that it can adapt to the challenges of today's world. "We do this by keeping a close eye on today's trends while also looking ahead to plan for changes down the line. Innovation finds its source in the collective and helps deliver the Group's strategic goals. It's our job to work together to turn the tide and meet the ecological challenges that lie ahead," explains Catherine Ricou, Director of Innovation. This new chapter in Veolia's story will be collective, organizational and historic, written through the innovations that will allow Veolia to continue its long tale of service to human progress.

FOCUS ON AN ECOLOGY OF SOLUTIONS

Although less commonly associated with the energy industry, looking ahead, Veolia is determined to make a difference in a field where the Group already generates a revenue of 7 billion euros. How? To start with, by ramping up its products and services for energy efficiency in buildings and developing heating, cooling and biomethane networks. There are market opportunities in France initially, where connecting all the sewage and waste-processing plants to existing networks will deliver major energy savings. With Veolia accounting for 10% of

“We would rather have 5 innovations we can replicate 20 times than 100 projects that don't align with market realities.”

Catherine Ricou

French production, biomethane is also in our sights. Veolia is clear in its determination to focus its core business on solutions that turn the tide, no matter whether they are tried and tested, not yet sufficiently deployed, still to be imagined, and/or ready for immediate rollout. "Veolia is also driven by a desire to make a difference, with solutions where it clearly has something unique to offer, market opportunities that cut across several business units (BUs) and backed by wide-ranging expertise," adds Catherine Ricou. "This means that deploying these solutions will involve identifying the right partners, improving our grasp of likely changes in the regulatory landscapes in France, Europe and around the world, and supporting our customers in rolling out these innovations while also working to build greater public awareness. Again, this is the direction of travel for Veolia's strategy, aligned with our commitments to multi-faceted performance that creates impacts in the market that provide benefits to our customers."

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“Adaptation and innovation in the face of the unexpected are part of our colleagues’ working culture.”

Séverine Dinghem



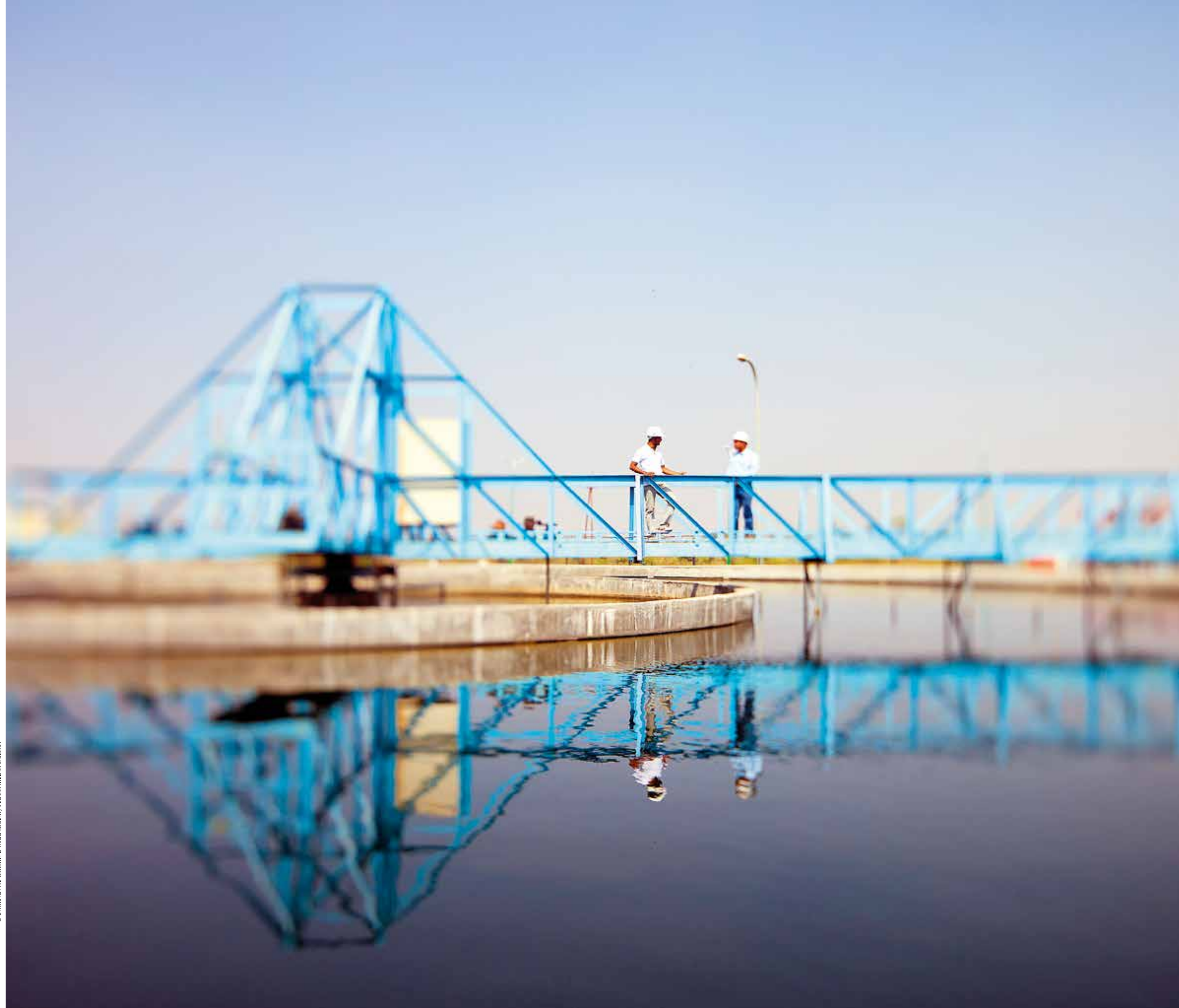
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And tomorrow?

COLLECTIVE COMMITMENT AND PILOT PROJECTS

As Director of Business Support and Performance (BS&P), Séverine Dinghem is perfectly placed to gauge the level of support that colleagues, Resourcers, need to help them continue to innovate in traditional business lines. “BS&P and the Innovation department work together in tandem to support BUs with priority issues identified in the Group’s strategy. This can take the form of technical assistance, direct support for pilot projects in strategic business line segments, or help to scale up innovations so they take their place among other commercial offers from BUs. We are facilitators, helping identify priorities and making sure that feedback is shared.” Veolia focuses on three forms of innovation to help it redraw the lines. Incremental innovation is the first of these. This is driven by BUs in the field and helps improve performance in our business lines; it makes a difference when tendering for contracts and improves working conditions for operators. The second form is scientific and technological innovations. These facilitate enhanced cooperation between research centers. Finally, innovation through diversification lays the groundwork for business seeds and new business activities, working with startups and other emerging new partners. The Group has also defined six strategic priorities in its Impact 2023 program: climate, new energy services, food chain, new loops of materials, health, including air quality and treating new pollutants, and new digital services. Catherine Ricou explains that “we will be setting out innovation roadmaps for each priority, which will help identify markets and projects to roll out, such as battery recycling and bioconversion, which have now reached industrial maturity and can be replicated through 'Copy & Adapt.' As of 2023, other topics require pilots to prove our ability to make seeds sprout.” She states that these include carbon capture, new uses for biogas, and producing hydrogen. To design these roadmaps, the Strategy and Innovation department, with inputs from zones via the innovation HUBs, coordinates an analysis of customer requirements and market prospects and reviews business model opportunities and solutions that are suitable for incubation. This collaborative process is critical to ensuring that teams are fully engaged with projects that, in the future, will need support from BS&P so that solutions can be assessed and BUs assisted in areas identified for priority action. “The pandemic showed, once again, that we have the ability to adapt and innovate at any time,” says Séverine Dinghem, referring to the handful of weeks that it took to develop the Vigie COVID-19 solution in response to a critical public health challenge, “by leaning into our role as an operator of essential services, working under the guidance of Veolia’s Water activities in France. Another good example is the ReSource plan recently launched by Veolia’s executive management team in response to the energy crisis caused by the Russian invasion of Ukraine. The plan includes a focus on accelerating our emerging activities such as electrical flexibility and photovoltaics.” Acting immediately, staying open-minded and tuned in to a world of uncertainty and accelerating change: Veolia will remain future-focused, providing deliverable solutions for tomorrow. The coming decade will be decisive for the Group. The countdown starts now. ▶

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+1: a tool that supports Veolia's purpose to accelerate the rollout of ecological transformation

Ecological transformation requires businesses to make a profound change so that they can implement the changes that society demands. They are expected to innovate: to create new interfaces with society, new mechanisms to monitor and listen to their environments, new ways to relate and contribute to their environment. Determined to rise to these challenges, Veolia has designed and developed a prototype consultation process: “+1, the ecology turned into action.”

“A business is successful because it is useful and not the other way around,” says Antoine Frérot, Chairman of the Board of Directors of Veolia. It is this idea of usefulness for society that was behind the 2019 French law PACTE, encouraging companies to adopt a statement of purpose. Veolia has taken the idea a stage further, using multi-faceted performance to embed it directly into its corporate strategy. The Group continues to examine mechanisms to open up its governance in ways that will decompartmentalize interactions with its stakeholders: employees, customers, shareholders, society and the planet. Through its purpose, Veolia seeks to reconcile economic, financial, commercial, environmental and social dimensions to create an impact that is both positive and sustainable.

Launched by Veolia in 2021, in partnership with the magazine Usbek & Rica, La REcyclerie and with support from Comité 21, “+1, the ecology turned into action” marks an inventive approach to fostering

Over 150 stakeholders were consulted using the +1 method to develop Veolia's 2024-2027 strategic program

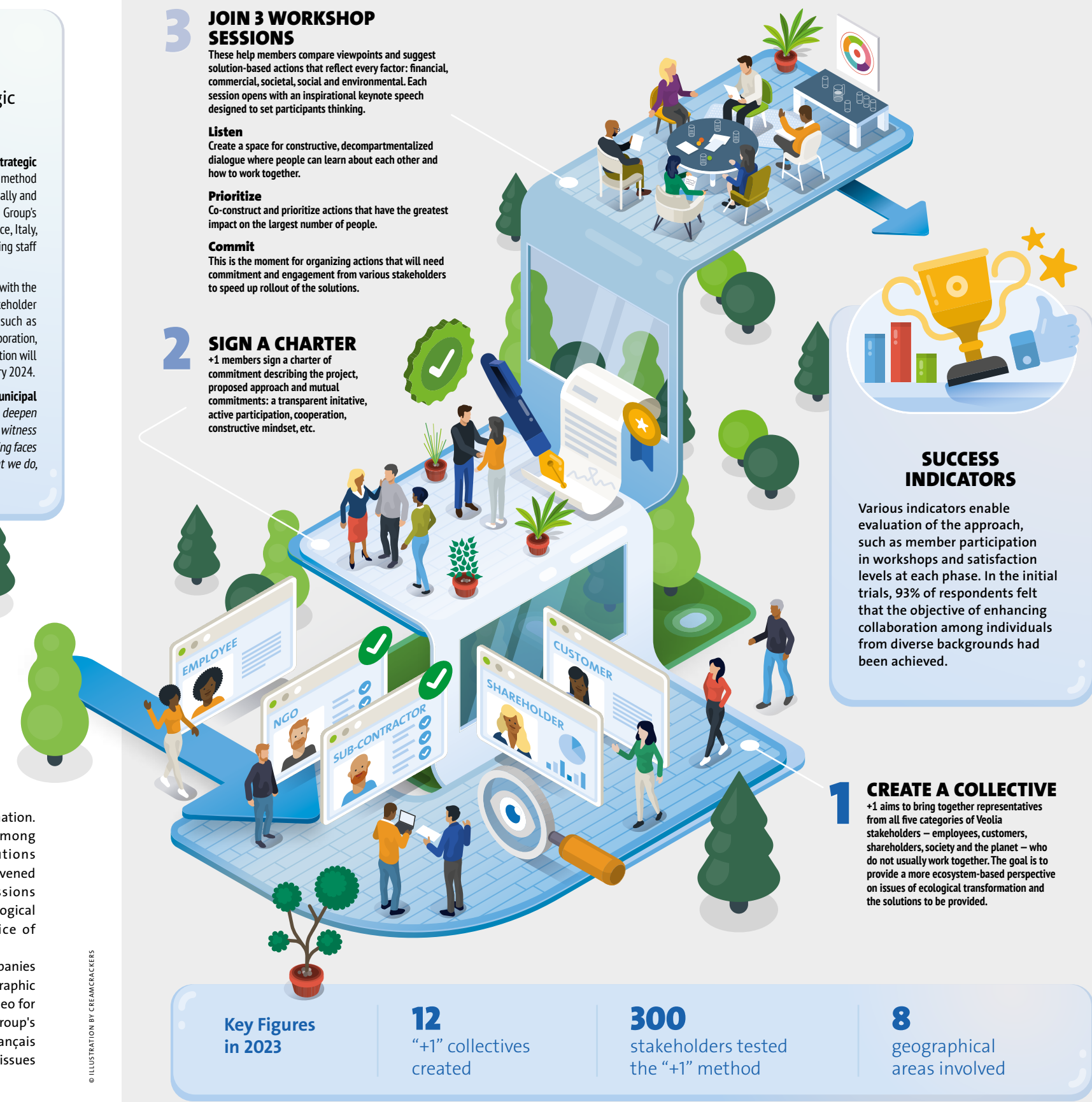
As part of the development of its forthcoming 2024-2027 strategic program, Veolia engaged with stakeholders following the +1 method from March to September 2023. The consultation occurred locally and in-person across eight pilot business units representing all the Group's Zones (Australia/New Zealand, Colombia, United States, France, Italy, Japan, Czech Republic, United Kingdom), simultaneously involving staff representatives from the Group's France and Europe offices.

During three working sessions, 150 stakeholders participated with the aim of consolidating the priority expectations of the five stakeholder categories. These categories encompassed priority themes such as regulation and economic models, territorial anchoring and collaboration, as well as awareness and training. The outcome of this consultation will be unveiled in the strategic program to be presented in February 2024.

Elodie Lagrange, Veolia's Director of Strategic Initiatives, Municipal Water, in the United States, highlights, “+1 has enabled us to deepen our alliances in the pursuit of ecological transformation and witness spontaneous connections forming among our stakeholders. Putting faces to these connections allows us to become more aware of what we do, why, and for whom we do it.”

dialogue among stakeholders concerning ecological transformation. The aim? Facilitating open exchange and contemplation among diverse stakeholders to collaboratively implement solutions beneficial to a broad audience. In 2023, two Masterclasses convened experts and approximately fifty stakeholders. These sessions centered on “cooperation and innovation, accelerators of ecological transformation” and “stakeholder dialogue in the service of sustainable finance.”

Shared as open source, the +1 method can be used by other companies and organizations. Its adaptability spans various contexts, geographic areas, and subjects. Implemented in a contract by Veolia (Arianeo for the Nice-Côte d'Azur Metropolis), it plays a role in shaping the Group's forthcoming 2024-2027 strategic program. Soon, the Cercle Français de l'Eau will also incorporate it to address water management issues within a specific area. ▶



3 JOIN 3 WORKSHOP SESSIONS
These help members compare viewpoints and suggest solution-based actions that reflect every factor: financial, commercial, societal, social and environmental. Each session opens with an inspirational keynote speech designed to set participants thinking.

Listen
Create a space for constructive, decompartmentalized dialogue where people can learn about each other and how to work together.

Prioritize
Co-construct and prioritize actions that have the greatest impact on the largest number of people.

Commit
This is the moment for organizing actions that will need commitment and engagement from various stakeholders to speed up rollout of the solutions.

2 SIGN A CHARTER
+1 members sign a charter of commitment describing the project, proposed approach and mutual commitments: a transparent initiative, active participation, cooperation, constructive mindset, etc.

SUCCESS INDICATORS
Various indicators enable evaluation of the approach, such as member participation in workshops and satisfaction levels at each phase. In the initial trials, 93% of respondents felt that the objective of enhancing collaboration among individuals from diverse backgrounds had been achieved.

1 CREATE A COLLECTIVE
+1 aims to bring together representatives from all five categories of Veolia stakeholders – employees, customers, shareholders, society and the planet – who do not usually work together. The goal is to provide a more ecosystem-based perspective on issues of ecological transformation and the solutions to be provided.

Key Figures in 2023

- 12 “+1” collectives created
- 300 stakeholders tested the “+1” method
- 8 geographical areas involved

GreenPath Zero Carbon: 100 solutions for a sustainable model

GreenPath Zero Carbon is a new initiative that represents the best of Veolia's expertise from across its three business activities. It provides a cornerstone to support customers in their efforts to decarbonize, delivering cuts of up to 80% in greenhouse gas emissions.

Carbon neutrality is non-negotiable for every economic and social actor and stakeholder engaged in fighting the climate crisis. The European Union has set itself the target of becoming carbon neutral by 2050. Veolia has designed its new GreenPath Zero Carbon approach to help its municipal, industrial and service industry customers accelerate decarbonization. Its key benefit is the reduction of as much as 80% in direct and indirect emissions across customers' entire upstream and downstream value chains. How? By rolling out and combining 100 solutions that capitalize on Veolia's expertise. Three quarters of these solutions are fully tried and tested, such as the introduction of boilers that use solid recovered fuels to replace previous gas- or coal-fired facilities. The other 25% of the solutions are the fruit of Veolia's innovation efforts in fields such as carbon capture, utilization and storage (CCUS), high-temperature heat pumps, and green hydrogen.



Custom responses to adapt business models to climate challenges

There are two primary components that set GreenPath Zero Carbon apart from other industrial ecology solutions. First, the ability to capitalize on synergies between Veolia's areas of expertise, at the intersection between energy, water and waste management. For example, energy recovered from waste is used to supply low-carbon energy to a district heating network, giving people living in multi-occupancy units better control over heating costs. In another example, a council building or swimming pool can be heated using calories recovered from wastewater. Just two illustrations of the vast range of synergies that Veolia is ideally positioned to exploit.

The other standout feature is the ability to highlight the climate impact of the solutions offered to customers. A diagnosis established with a digital tool is used to set out a decarbonization pathway based on a specific roadmap and incorporating intermediate and final decarbonization targets. It can also include a commitment to reducing emission volumes by specified amounts. In the future, the same approach will be able to be applied to assess impacts on biodiversity or water footprint. ▶

IN AUSTRIA, A SHOWCASE FOR ACHIEVING "NET ZERO BY 2030"

As the manager of water and energy services for a major pharmaceutical group, Veolia also leads an extensive decarbonization effort across the customer's operations. By implementing a showcase decarbonization process, the client transitioned from emitting +66 kt CO₂/year to achieving carbon

neutrality. This journey began with an emphasis on energy efficiency (15%), then embraced heat recovery (22%) and renewable energy sources and methanization (45%), including the fitting of a sustainably fueled biomass boiler. Finally, a voluntary offset program (18%) completed the strategy.

Reusing wastewater: a second life for a resource vital to human life

Urbanization and increasingly frequent droughts are just two of the growing threats to freshwater resources. The European Commission warns that half the river basins in the EU will be under threat by 2030. Reusing treated wastewater is therefore emerging as a key challenge for the future.

Reusing wastewater is an alternative to groundwater abstraction and an effective solution for securing access to water. But the technique is very little used in Europe, with less than 1% of wastewater recycled in France, 8% in Italy and 14% in Spain. This is far behind the 80%-90% achieved by the world's leading wastewater recyclers: Japan, Singapore, Kuwait, Qatar and Israel.



Faced with the critical importance of saving drinking water, Veolia is determined to ramp up wastewater recycling, or even make it systematic, at all wastewater treatment plants it operates. This will start in France, where around a hundred sites meet the necessary criteria, primarily centering on the amount of clean water used (over 2,000 cubic meters) and/or abstracted directly from the environment (5,000 m³). At these 100 eligible plants alone, this initiative could save around 3 million cubic meters of drinking water annually, equivalent to the average consumption of a city of 180,000 people.

With a small footprint to make it easy to locate and install, the system uses powerful two-stage filtration to produce high quality water from wastewater. This allows Veolia to create tailored wastewater reuse systems that meet each customer's objectives and comply with all regulations applicable to each type of use. "We believe in this solution

and are already actively involved in pioneering initiatives, such as the Jourdain project for Vendée Eau in the Vendée department," says Pierre Ribaute, CEO of France Water Zone at Veolia. "We have now decided to roll out this ground-breaking approach at plants we operate, to encourage greater uptake at scale of this highly promising solution."

The Jourdain project is the first European trial of a system to produce very high-quality water for domestic uses from wastewater. France's Vendée department on the Atlantic coast has no groundwater reserves and relies on surface water for 90% of its supplies. The refining plant recently inaugurated will return treated water to nearby waterways, securing water supplies for 200,000 local people.

Perhaps we should look to the stars for inspiration? Astronauts on the international space station, where 100% of wastewater is recycled, have successfully popularized the idea of drinking wastewater. ▶



#Key figures

× 6
volume of wastewater recycled
Target set by the European Commission in new EU regulations which came into force in June 2023

0.6%
(only)
of wastewater is reused in France

100
number of wastewater treatment plants in France operated by Veolia that meet the criteria for installing wastewater reuse technology in 2023

3
million cubic meters
Estimated volume of drinking water savings once 100 treatment plants are equipped, equivalent to the average annual consumption of a city of 180,000 people



Less
Russian
gas

More
green
gas

If we unlock the potential of our biomethane resources in France, we can cut demand for Russian gas imports by 25%. Methanation of wastewater and waste helps to address both the challenge of the ecological transformation and achieve energy independence. **Learn more about our solutions at [veolia.com](https://www.veolia.com)**

Resourcing the world

