



PIONEERS

SINCE 1853

Veolia's historic role at the heart
of environmental issues

How to decarbonise, decontaminate or regenerate resources: such ecological challenges are the most critical tests that mankind has ever needed to confront to ensure its future. Reviewing our past enables us to reply to certain vital issues in order the better to approach these challenges. How has it been possible to forge within a single company, by resolving the sanitation problems of different regions, the very concept of the environment, combining the management of water with that of waste and energy?

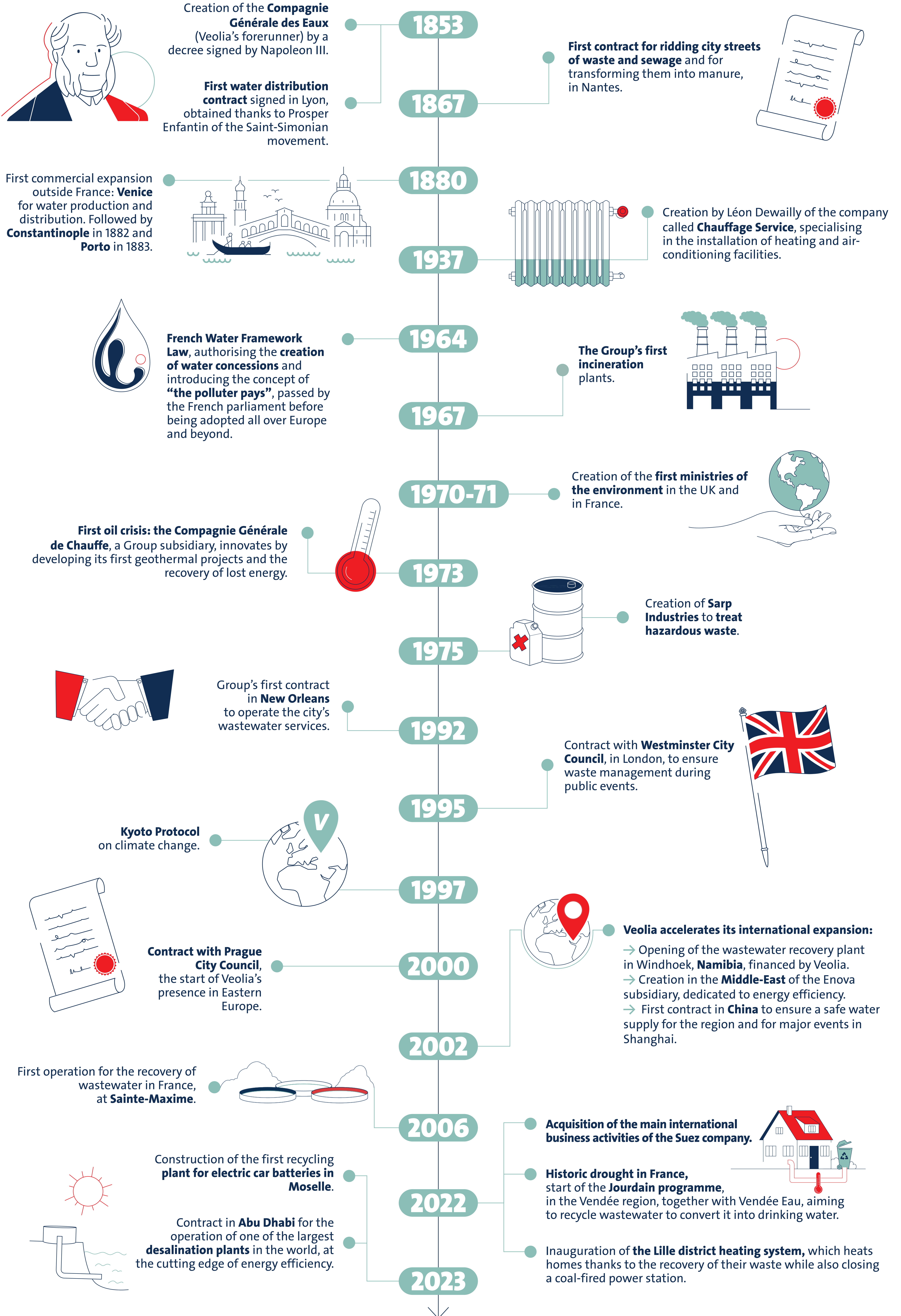
Over these last 170 years, how have cultural evolution, political aspirations, scientific and technical progress all changed our conception of what is vital and have they thus contributed to the transformation of our societies?

This is what we propose to explore here, by plunging into the history of Veolia, founded under the name of the Compagnie Générale des Eaux on 14 December 1853, thanks to a decree signed by the French Emperor Napoleon III.



170 YEARS OF HISTORY

SOME KEY DATES



WATER

#1

FROM WATER-BEARERS TO THE BUILDING OF MODERN NETWORKS

The mid-19th century's major health problem

In 1832 a cholera epidemic caused 30,000 deaths in Paris and a total of 100,000 all over France. This episode highlighted the vital importance of hygienic drinking water and wastewater networks. In the early 19th century, public fountains and private wells constituted the main methods of water distribution in Paris and other large

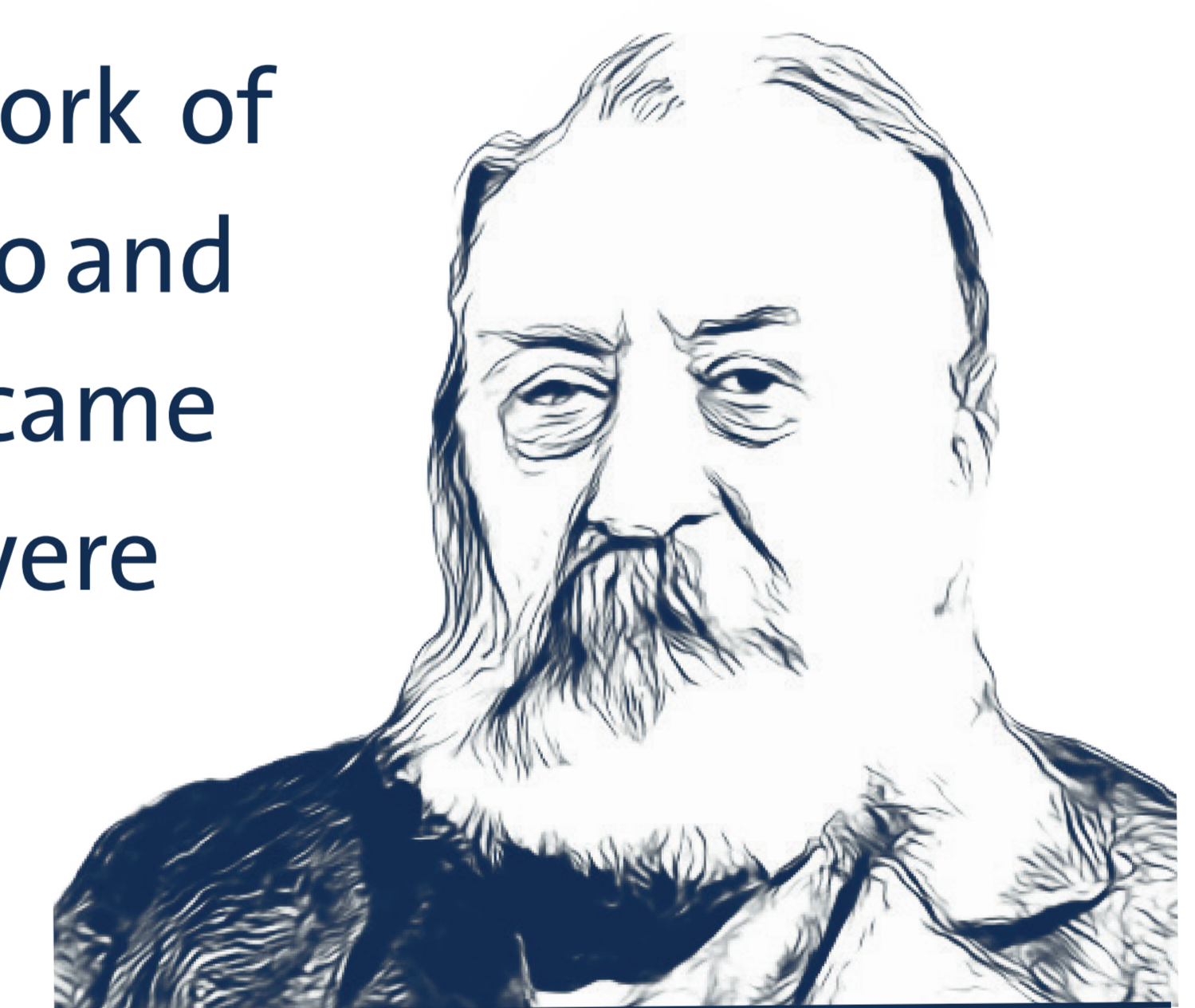
French cities. Since the Revolution in 1789, water needs had continued to rise as a result of the large numbers of people deserting the countryside to live in the cities. This had created an urgent need to revise the French water distribution system.

Veolia's place in history

On 14 December 1853, **Napoleon III**, who during his exile in Britain had witnessed that country's superiority over France in terms of water distribution, signed an imperial decree authorising the creation of the **Compagnie Générale des Eaux** (CGE). Its mission was to build effective water distribution networks in the towns and villages of France, long before the development of the germ theory of disease by the likes of John Snow and Louis Pasteur.

Prosper Enfantin: an entrepreneur at the service of the public good.

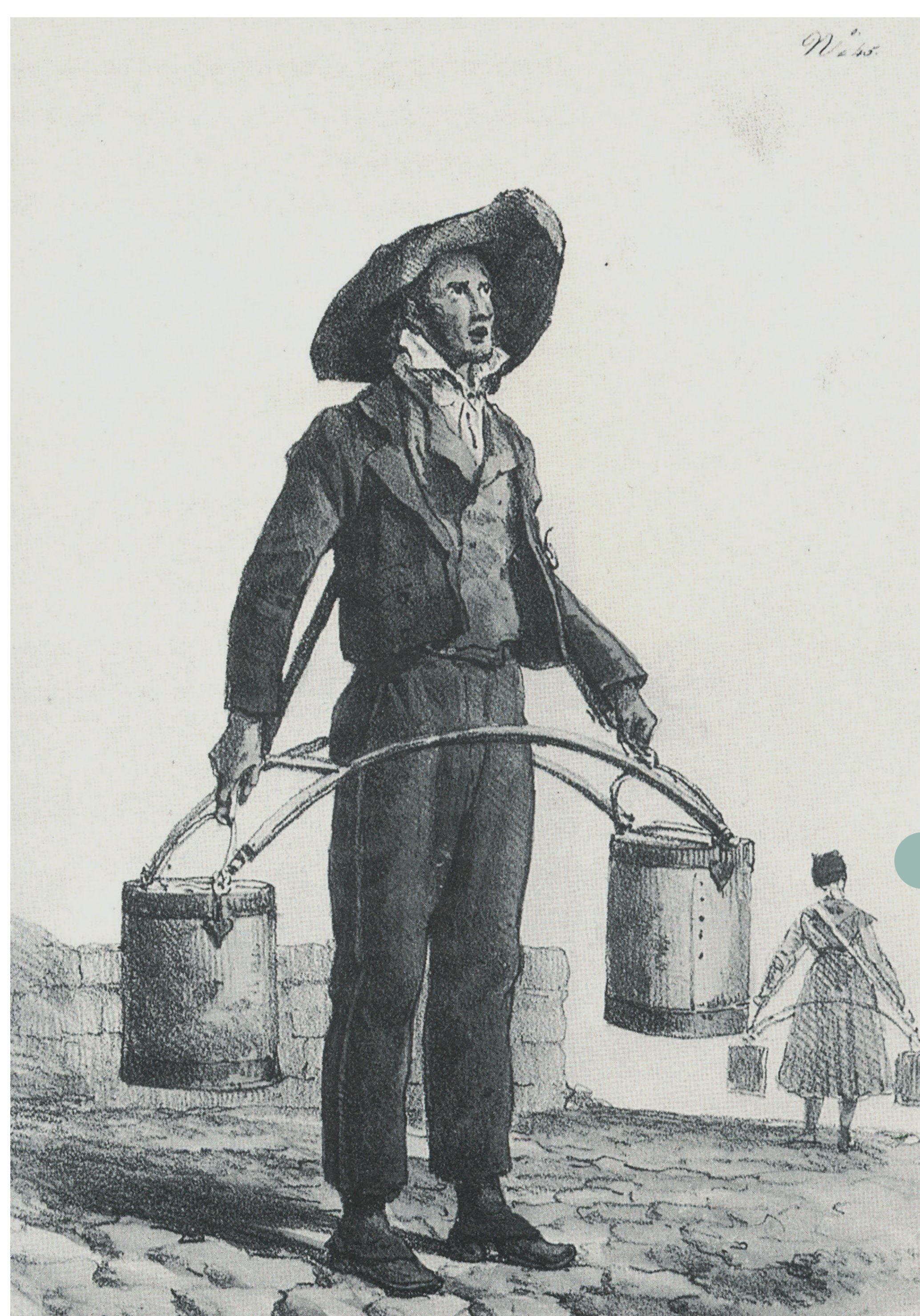
Born in Paris on 8 February 1796, Prosper Enfantin was one of the first directors of the Compagnie Générale des Eaux and played a decisive role at its origins, particularly by obtaining its first contract in the city of Lyon. He was one of the founders of the political theory known as Saint-Simonianism. With an approach favouring both mysticism and industrial development, this doctrine—widely shared by many 19th-century French industrialists—maintained that networks such as canals and railways helped create links between individuals, thus contributing to universal peace. In order to conclude his negotiations with Lyon City Council, which had made water distribution one of its priorities, “Father Enfantin” and his philanthropic activities were backed by an extensive network of admirers, including Victor Hugo and Lamartine. His ambitions thus came to fruition, and networks were set up to contribute to the progress of human society.



LYON: LEADING THE MODERNISATION OF FRANCE

It was in Lyon, the historic capital of Roman Gaul, that the CGE signed in 1853 the world's first public water service concession. In four short years the CGE's engineers built the city's first ever water distribution network. To celebrate the sudden availability of this plentiful supply of water, monumental fountains were inaugurated to embellish the city's main squares, from the Place des Terreaux and the Place Bellecour to the Place des Célestins.

These new infrastructures changed overnight the face of the water supply system in this great regional capital, which thus freed itself from “the secondary status and subservient role imposed upon it by Paris,” to employ the formula used by Fernand Braudel in *The Identity of France**.



In the mid-19th century, water bearers delivered water from public fountains directly to the homes of the Parisian nobility and bourgeoisie.

Water bearer © Association La Pompe de Cornouailles.



BARCELONA: WATER AT THE HEART OF THE CITY'S METAMORPHOSIS

The remodelling of Barcelona at the end of the 19th century is more usually associated with the Sagrada Família basilica and Antoni Gaudí than with the concept of water. Nevertheless, the aspiration to ensure adequate sanitary conditions played an important role in the urban development policy pursued under the Cerdà Plan, as was also the case in many other European cities at the time. The Compagnie des Eaux de Barcelone (later the Sociedad General de Aguas de Barcelona) was thus created in 1867.

A sign of the vital importance given to water supply in the development of the Catalan capital, the company was to take part in the two Barcelona International Expositions of 1888 and 1929, giving pride of place to fountains such as the Magic Fountain of Montjuïc.

Almost 100 years later, the Agbar company—integrated into Veolia in 2022—continues to innovate. Faced with the serious droughts afflicting Catalonia, it has developed new solutions in terms of sobriety of water use, the effectiveness of its networks and of its solutions for supplying alternative water sources.

* 1986 - Fernand Braudel, *The Identity of France*, Vol.2: History and Environment, p.298.

WASTE

#2

FROM RAGMEN TO WASTE DISPOSAL SYSTEMS

The advent of waste collection in the late 19th century

The emergence of a private system for the collection and reprocessing of waste represented a major change in social habits that took place in the industrialised countries from the last years of the 19th century onwards. Up to that time, the products of human activity had been constantly reused, collected by ragmen or dustmen in

order to make paper or to produce manure, suddenly there were huge amounts of waste material to be collected. The concept of waste disposal arose just at the time when man-made rubbish ceased to be seen as a resource that formed part of the great cycle of urban existence.

Veolia's place in history

From the second half of the 19th century onwards, street cleaning and the collection of sewage were undertaken by numerous **small family firms**. Some won public contracts that were renewed for several decades, as was the case of the **Grandjouan company** in Nantes. This firm



obtained its **first contract for sewage and waste collection** with the city council in 1867, and took care of cleaning its streets and transporting its sewage until 1947! The company finally became part of the **CGE** during the 1980s. Today, its history forms an integral part of that of Veolia.



LONDON: A WASTE COLLECTION SERVICE FIT FOR A KING!

Big Ben, the Palace of Westminster—the seat of the British government—, Buckingham Palace—the home of the country's monarchy—, the Tate Britain art gallery: all these iconic sites are located in the same prestigious district in the heart of London, the City of Westminster. To ensure that this district meets the expectations of the millions of people who pass through it every day, Veolia has been responsible for its waste management on a 24/7 basis since 1995. Some 200,000 tonnes of waste are processed and 8,400 kilometres of streets are swept clean every week. The most intensely used thoroughfares, such as Oxford Street and the area around Piccadilly Circus, are cleaned two or three times per day and also during the night, in order to meet the very strictest standards of waste management. To take the municipal waste management service to a whole new level, Veolia is currently helping Westminster City Council to become a “net zero emissions” local authority by 2030 thanks to an electrified vehicle fleet and innovative waste collection methods.



©Adobe Stock

“
Nothing was thrown away, everything was reprocessed. Animals' excrement became “manure” for horticulture, all their meat was eaten, their skins were used to make leather, their grease was converted into the tallow used to make soap and candles, while their bones were ground into powder to be reused as glue for industrial processes.
”

MARC CONESA AND NICOLAS POIRIER
Editors of: “Fumiers! Ordures!” [“The management and use of waste in the countryside in medieval and modern Western societies”]



© Musée Carnavalet / City of Paris.

A rag merchant's hut in Paris in 1928. The rag merchant sorts the material into categories, separating out the various raw materials from the sale of which he earned his salary.

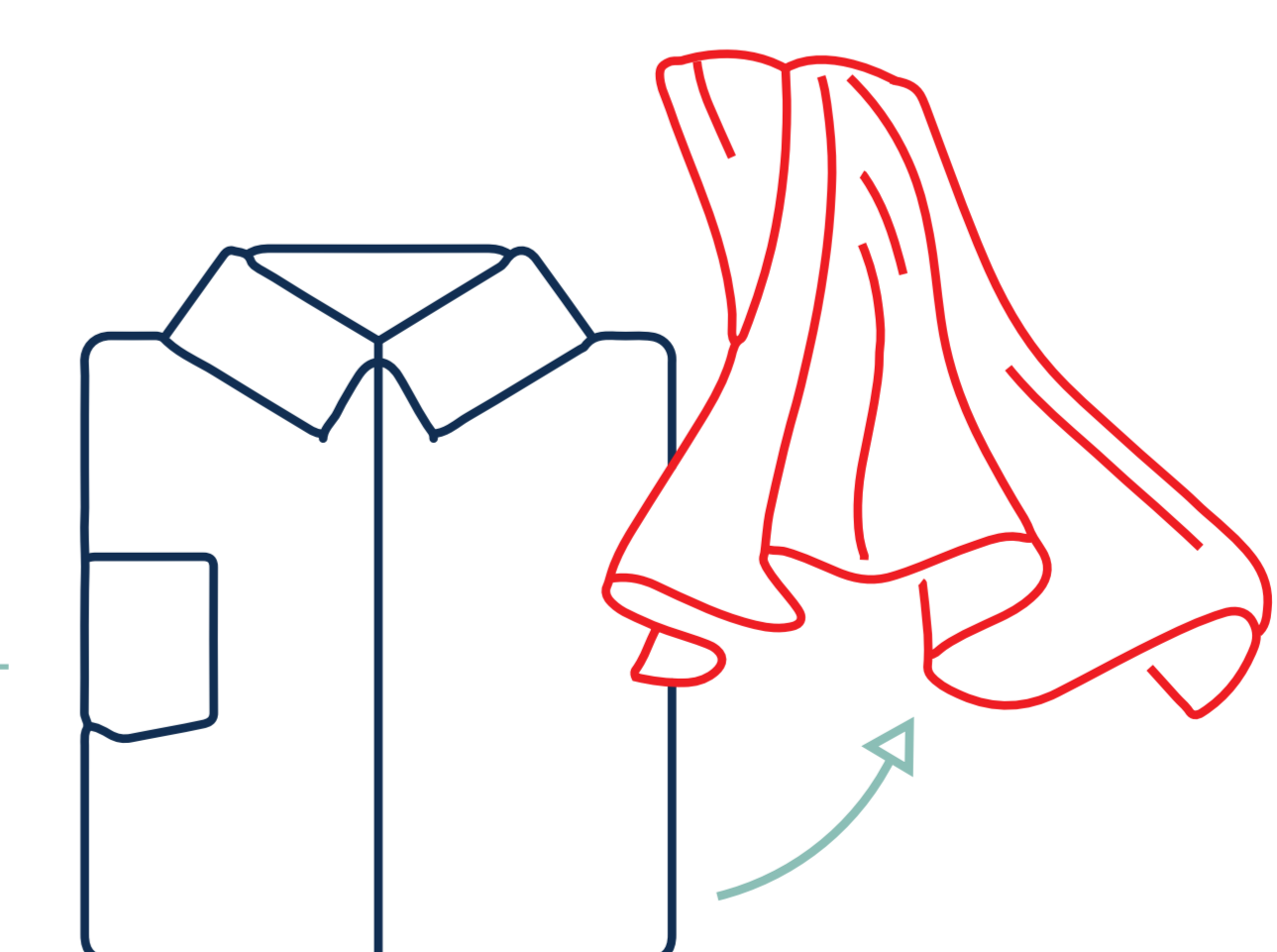
Key figure

1884

The rag merchants' trade association represented up to

200,000

rag merchants in the Paris region!



ENERGY

#3

FROM ENERGY SUPPLY TO ENERGY SAFETY

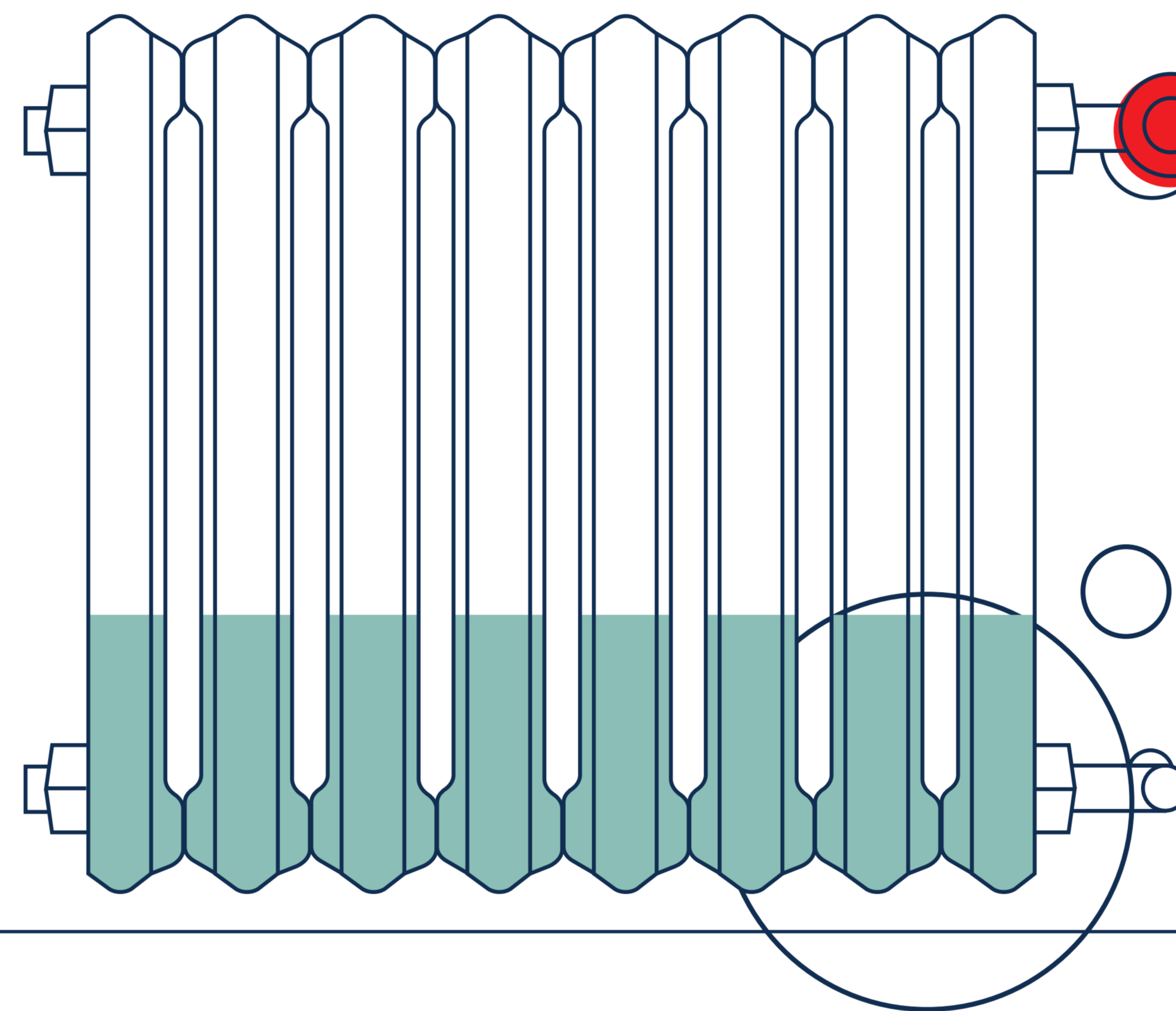
Ever-increasing energy needs and a new way of dealing with the cold

Historically the experience of cold weather was difficult for all levels of society, even the wealthy elite. It was only with the generalized onset of multi-family housing units during the boom years after the Second World War that heating came to be considered as a vital necessity for comfortable living. Whereas in the past many people had relied on a single coal-fired stove in the living-room, the rallying call of French cleric Abbé

Pierre's crusade against insanitary living conditions turned domestic heating into a major social issue. If a home had no heating, it should be declared unfit for habitation. More generally, as a result of the first industrial revolution the level of energy consumption had increased enormously, and with it a new need to ensure the safety of the supply.

Veolia's place in history

In 1937 Léon Dewailly had founded a company called **Chauffage Service**, specialising in the installation of heating and air-conditioning facilities. Chauffage Service merged in 1960 with the **Compagnie Générale de Chauffage** ("General Heating Company", CGC), created in 1944, which itself merged with the CGE in 1967. These companies were at the



origins of much of **Veolia's subsequent energy expertise**, developed initially through the **Dalkia** company, and later expanding internationally, particularly in Eastern Europe, where since the fall of the Berlin Wall energy policy had come to be perceived as a key issue in terms of safety and national sovereignty.



THE HOSPITAL OF VILLIERS-SAINT-DENIS: THE FIRST EVER CONTRACT GUARANTEEING ENERGY SUPPLY

On Christmas Eve in 1937, Léon Dewailly received a phone call from the Hospital of Villiers-Saint-Denis in northern France. The coal-fired boiler had broken down and the building found itself defenceless against the cold. Léon jumped into his car and soon got the heating working again, while local staff had been unable to repair it. Delighted with this emergency service, the director immediately asked him to look after the operation and maintenance of the hospital's installations in the form of a contract guaranteeing a fixed minimum temperature. This led to the signing of the first ever energy performance contract, which would later become a model of its kind.

The Société Générale de Chauffage at work.



Mr Hubert Gamelin, a delivery driver © Veolia Archives.



SIRAM: A PIONEERING COMPANY THAT LEADS THE WAY IN ITALY

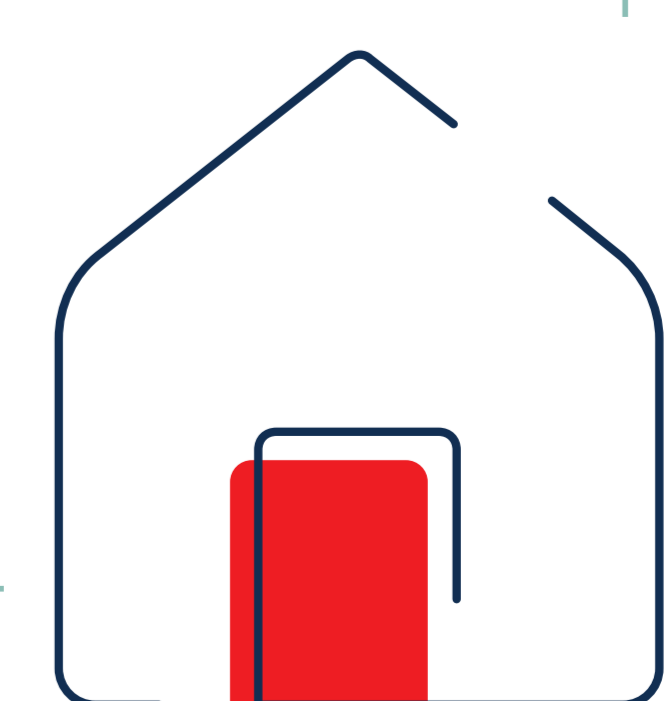
SIRAM (Società Italiana Riscaldamento Appalti Milano), an Italian company formed in Milan in 1927, merged in 2002 with the Dalkia Group, a Veolia subsidiary combining firms specialising in wastewater and sanitation services, thus developing its expertise in the energy field. The company had founded its reputation on quality performance and safety in energy provision, having managed over several decades the smooth operation of boilers for private individuals, companies and institutions, while also distributing wood, coal and fuel oil. The company went on to specialise increasingly in energy performance, building design and the maintenance of all kinds of technical, heating and electrical systems. This expertise enabled it to ensure safe energy provision for such vital institutions as the Hospital of Parma, to which it has provided its services since 1951. Today this hospital produces 47% of its own needs in electricity, and 100% of its own heating requirements. To this can be added a marked reduction of the carbon footprint of the building, which has been emitting 3,825 tonnes of CO₂ less each year since the renovation work undertaken by SIRAM.

Key figure

1960

60%

of French multi-family housing units still had no collective heating system.



WATER

#4

A RESOURCE AND ITS CONSUMPTION

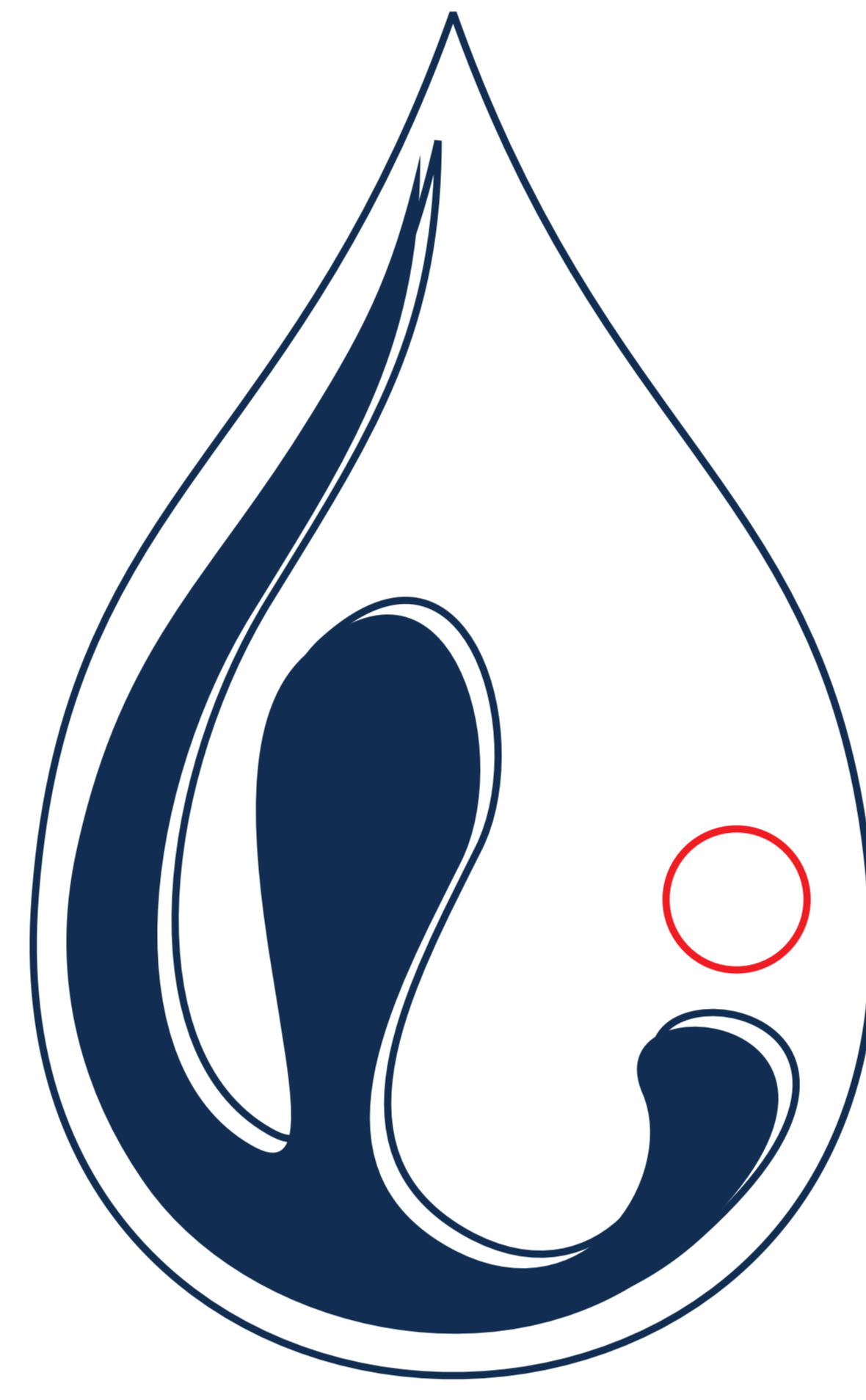
The road to achieving modern standards of convenience

During the course of the 20th century, water in every home became a vital *symbol* of modern convenience. “Water and gas on every floor” proudly announced a famous notice in the hallways of well-heeled apartment buildings at a time when the CGE was equipping all large

French cities with its networks, before such luxuries were available to all. Water would soon bring all the benefits of good sanitation and convenience, enabling each household to wash and drink at will, in addition to washing their clothes and dishes.

Veolia’s place in history

After installing a reliable water supply in the large cities in the years up to the start of the 20th century, the CGE turned to developing the same facilities in the new residential suburbs that were constantly attracting new inhabitants. Municipal councils often joined forces to form local public utility concessions to **entrust their water service to a private company** under the approving eye of the French government, keen to ensure that the water service so vital for public hygiene was provided as safely as possible. Both in the suburbs and in the countryside, the CGE played its role in extending the “**magic of running water**” all over France.



“
The use of communal public spaces underwent a radical change. Thanks to the new networks supplying water and electricity, the appearance of refrigerators and washing-machines followed by that of television sets, it suddenly became feasible and convenient to spend much more of our time in our own homes. People no longer needed to go to a shared communal area to do their washing, for example.
”

CLÉMENT RIVIÈRE
Le Monde, “Where have all the city children gone?”,
14 September 2022



THE 1881 PARIS HEATWAVE LEADS TO A USEFUL REFORM

In July 1881 an extreme heatwave led many Parisians to leave their water-taps running practically non-stop, leading to a water shortage in the city. As a result, the generalised use of water meters soon came to be seen not only as the most practical solution for preventing such excesses, but also as the ideal way to ensure equal conditions for all users at a time when different rates for different contracts were considered as totally unfair. The water meter has since become an essential tool for controlling consumption and dealing with periods of drought.



COLLABORATING IN TANGIERS WITH NOBEL PRIZE-WINNER ESTHER DUFLO

Esther Duflo has joined hands with the Moroccan government and Veolia to reassert the right to water in Tangiers. Realising that the existing procedure was too complex, “we designed an experiment whereby one inhabitant in every two received a visit to their homes to offer them the chance of getting connected to the public water system,” says Esther Duflo, an economist at the Collège de France. “Demand shot up from under 10% to 69%. Being connected to the public water system has freed up a lot of time for families, leading to an improvement in mental health and well-being and a reduction in family tensions”.

Key figures

1946

37% of French homes had running water

1975

97% thirty years later



An old advertisement for a model of bath-tub (Dupont & Compagnie)



© Association Pompe de Cornouailles.

#5

WASTE

WASTE TREATMENT

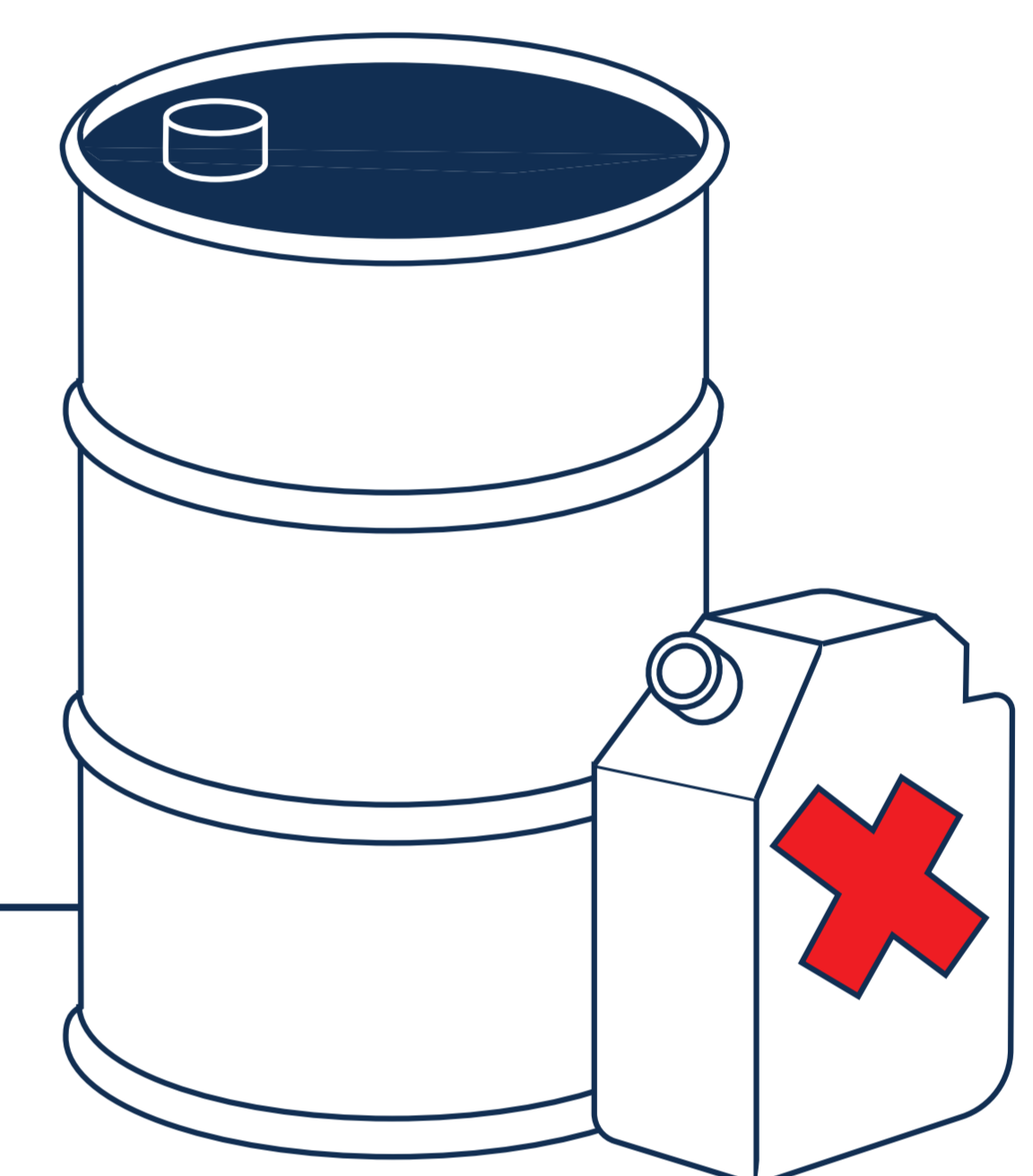
Reacting to the consequences of the consumer society

The urbanisation of society gradually turned waste into something that was “inconvenient”. Waste was transported outside towns, initially by horse-drawn cart and later by lorry. However, with the explosion of consumerism, cities finished up by reaching their limits. Each region could only absorb a limited amount of waste, so that ways of processing the waste had to be

found, with the responsibility for this unseen side of our cities once again being passed to other actors. With new industrial and agricultural developments, new types of waste and of pollution emerged in the second half of the 20th century, requiring the development of more specific methods of processing.

Veolia’s place in history

It was through a desire to protect water that Veolia was led to develop the **treatment of dangerous waste** in the middle of the 1970s. It all began when **Bertrand Gontard**, the director of the Méry-sur-Oise water purification plant near Paris, realised that the **industrial effluents** discharged into the River Oise constituted a threat to the **treatment of this natural resource**. In order to make the water fit for drinking, he would need to use even more **activated carbon**, and since there risked being a shortage of this material, this would mean the **suspension of the supply of drinking water to local inhabitants**. So as to solve this problem, he proposed that the industrial manufacturers concerned should treat their effluents directly rather than waiting for their discharges to pollute the river. It was thus that **Sarp Industries** was created in 1975.



HOW THE MONTCHANIN SCANDAL ACCELERATED THE PROFESSIONALISATION OF THE WASTE TREATMENT SECTOR

The 1980s were marked by environmental scandals in France, including that of the Montchanin landfill site in Burgundy. Over a 10-year period, hundreds of thousands of tonnes of industrial and hazardous waste were landfilled there by trucks from all over Europe free of any real controls. During this time, the living conditions and health of the local inhabitants continued to deteriorate. Several doctors in the town noticed an increase in respiratory problems. The French government finally suspended the landfill activity in 1987, before definitively closing the site in 1989. The media reverberations of the scandal had a strong influence on the passing of new French legislation in 1992 concerning waste disposal, which accelerated the professionalisation of the sector.

Dustbin collection in Paris, 1928.



© Veolia Archives.



A TRULY EXEMPLARY EUROPEAN WASTE FACILITY IN ISTANBUL

In 2023, Veolia was entrusted with the operation of the waste-to-energy recovery unit in Istanbul, designed to function in accordance with the strict environmental standards of the European Union. The aim is to expand this facility, the largest of its kind in Europe, to its maximum capacity, thus avoiding the need to use landfill sites and economising nearly 1.5 million tonnes of carbon emissions per year.

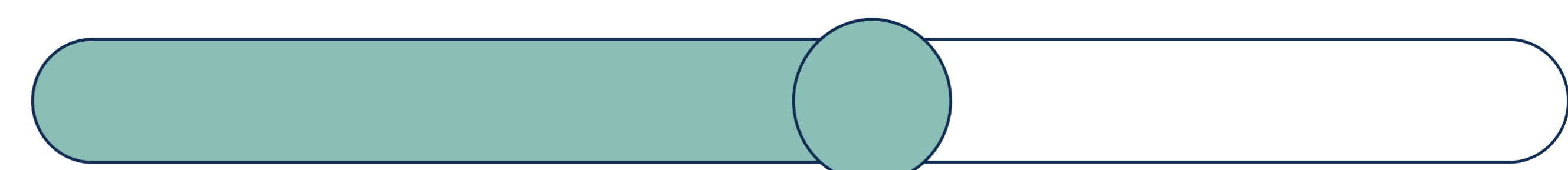
Key figures*

1947

100% of soft drinks are sold in reusable bottles.



58% of beers are sold in reusable bottles.



1971

The percentage had fallen to only

25%



#6

ENERGY

ENERGY SAVING

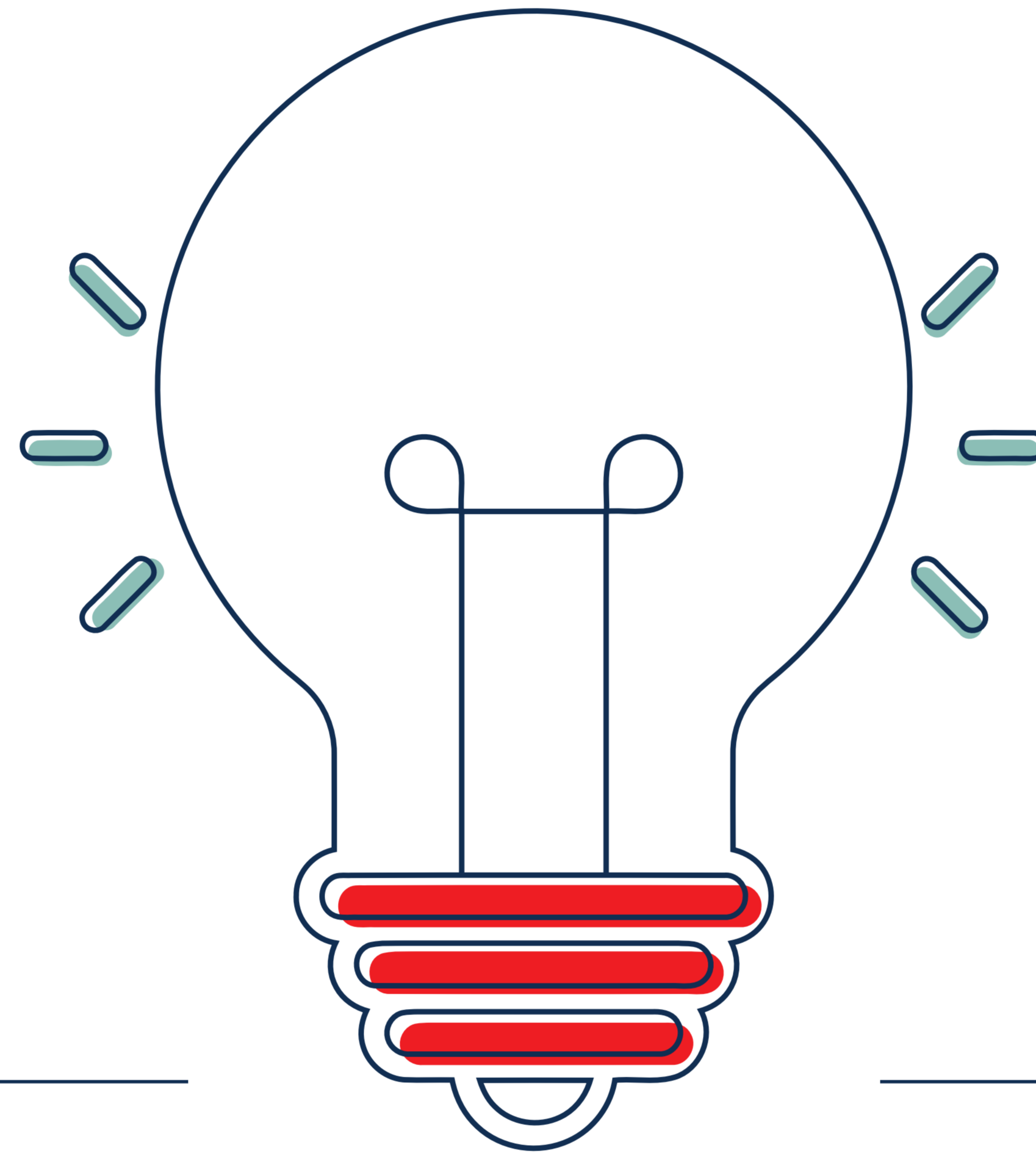
From the oil crises of the past to the world of today

In 2022 Western countries again found themselves in a similar situation to the one they had faced during the oil crises of the 1970s: a major threat to the security of their energy supplies. At the time, the concept of “energy conservation” had already entered popular parlance: “It is now vitally important that energy conservation should no longer merely constitute the adoption of

a responsible attitude on the part of consumers, but should be physically integrated into all the devices they use,” as Pierre Amouyel remarked to the Commission for the French National Plan, adding that it should be introduced even “in the factories that produce the goods they consume”.

Veolia’s place in history

Oil crises destabilise companies involved in energy operation and distribution when the latter are not allowed to pass on oil price rises to their own consumer rates, and the **Compagnie Générale de Chauffe** was no exception to the rule. On the other hand, such crises also offer a golden opportunity to **encourage their customers to make energy savings**. At the time, it was decided to draw up contractual provisions that were to have



a lasting impact in terms of progressively standardising and structuring the industry. Contracts for energy supply and operation, for the upkeep and maintenance of equipment, and for the updating of existing equipment (P1, P2 and P3 respectively), already essential features of the business activity created by Léon Dewailly, were now joined by a P4 provision for financing renovation.



THE UNITED ARAB EMIRATES, A DRIVING FORCE IN TERMS OF ENERGY SAVING

In 1998 Veolia created the first control centres, which make it possible to coordinate from the head office the energy performance of the buildings and facilities of the Group’s customers through the under-road operation records (DESC). Subsequently referred to as “Hubgrades”, it was in the United Arab Emirates that improved versions of these services were later developed. Majid al Futtaim, who developed his business activities in these services, became convinced of the need for his country to opt for sustainability, and in 2002 he entered into a partnership with the Group that would later become Enova. Today Enova applies its know-how in the reduction of energy costs to the benefit of hospitals, airports or shopping malls in various countries throughout the region.

Key figure

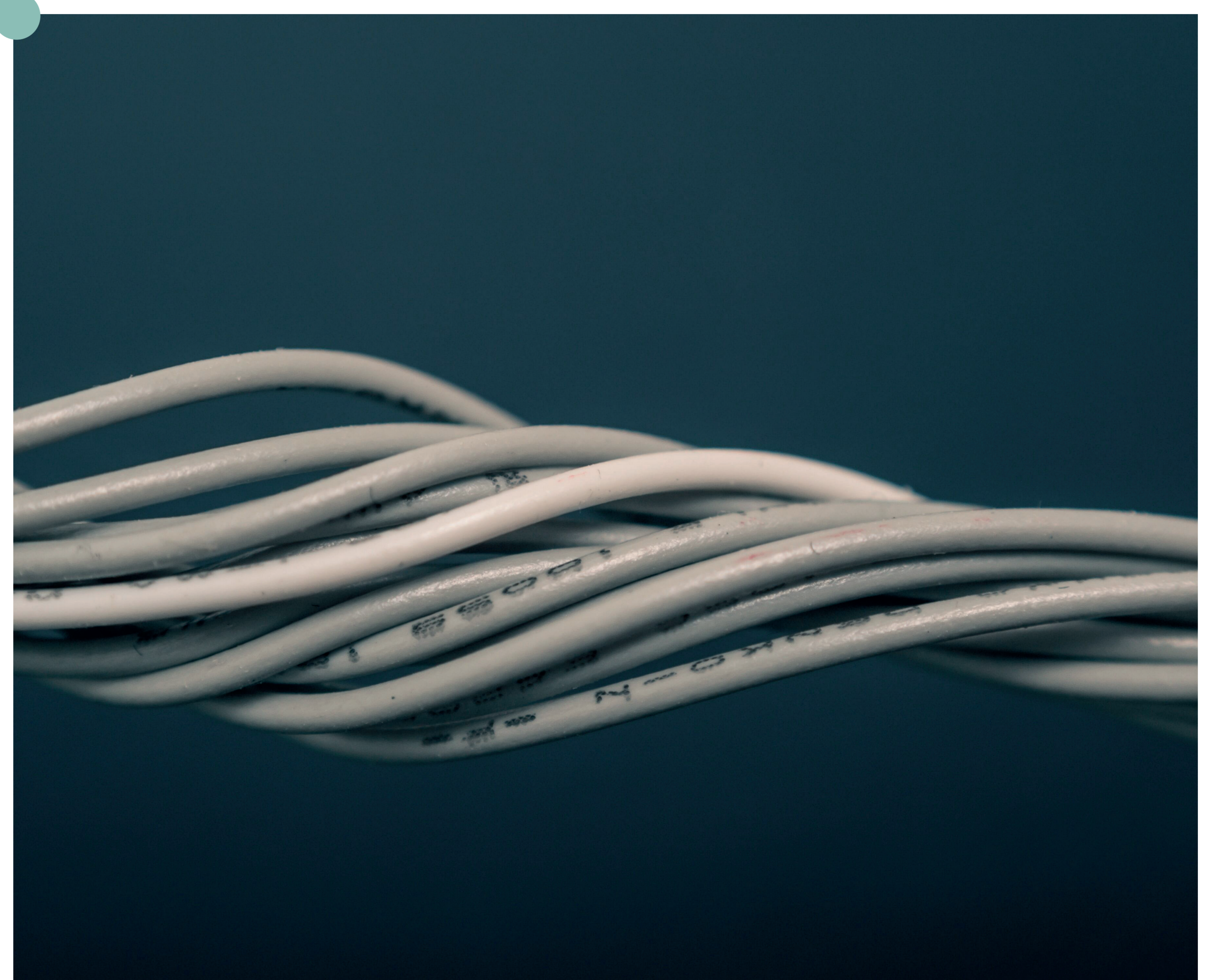
35% to 40%

of global emissions of CO₂ throughout the world are linked to the energy consumption of buildings.



FLEXIBILITY: AN ADDITIONAL BOOST TO ENERGY SAVINGS

Given that renewable energy is often intermittent by nature, the question of “when” we consume becomes almost as important as “how much” we consume. This explains the growing importance of flexible consumption. In terms of an individual building, this means planning the recharging of electric vehicles for times of low consumption, operating equipment on alternating time schedules, turning on the heating earlier in the morning, etc. Such practices need to be automated via the smart grids in which Veolia has developed a particular expertise.



© Steve Johnson.



WATER



PROTECTING RESOURCES

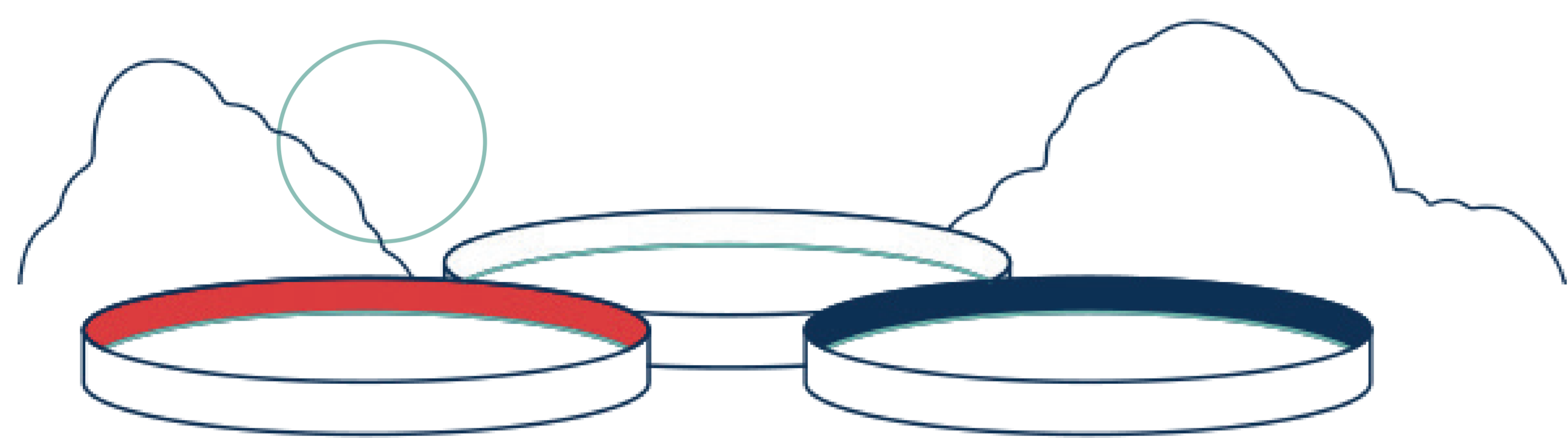
The emergence of environmental concerns

When running water was introduced into cities in the mid-19th century, nobody—not even Louis Pasteur!—was concerned about the possible effects of what was discharged directly into the world’s rivers. The need to protect our resources has arisen due to the vast explosion of the volume of consumption. Since the 1960s, conflicts linked to the pollution of natural resources have multiplied. The quality of our surface water, particularly that of our rivers, has seriously deteriorated, mainly due to the huge volume of industrial and agricultural activity.

The French Water Framework Law of 1964 authorised the creation of water authorities and the organisation of water resources for each watershed, introducing the concept of “the polluter pays”. The European Framework Directive of 2000 adopted and developed further the model of the French Law of 1964, with a view to improving the quality of Europe’s water courses. These principles have thus been more widely propagated all over the world.

Veolia’s place in history

The **CGE** gave its active support to the **1964 Water Law**, even if this aroused the opposition of various other industrial groups. The company often forged alliances with **fishermen’s associations** in order to preserve French water courses. It also helped to contribute solutions after **natural catastrophes** which won it widespread support. Starting with the **Erika oil-spill** in 1999, the most serious cases of pollution would come to be treated by **Sarp Industries, a Veolia subsidiary**.



“The 1960s was a totally different world! There was a huge volume of industrial, agricultural and urban development, and all those concerned took all the water they needed whenever they needed it, and discharged all the effluents they liked. The French parliament therefore passed the new law to try to put a stop to all this.”

– IVAN CHÉRET

*The mastermind behind the French Water Law of 1964:
Régime et répartition des eaux et lutte contre la pollution
("The governance and distribution of water resources and the fight against pollution").*



SHELLFISH AND CRUSTACEANS AT CAPE SICIÉ

In the 1990s, water quality and the survival of ecosystems start to become major concerns. The restoration of the underwater eco-system at Cape Sicié, near Toulon in the south of France, came to symbolise this struggle. For decades, wastewater from the local sewers had been directly discharged into the sea, causing a serious deterioration of the marine environment. To combat this situation, a wastewater treatment plant was built by Veolia at the Cape. This made it possible to quickly restore the quality of the local water, but did not contribute to the return of the local fauna and flora. With this aim in mind, the Remora Project was launched in 2011. Artificial reefs were installed in the sea, capable of adapting to the maritime swell and designed to act as a habitat for the local micro-fauna and micro-flora. In 2016, the return of marine life was at long last confirmed. The presence of colonies of squid, cuttlefish and wrasse, together with young crustaceans, octopus and fish was confirmed by researchers.



During the French presidential election in 1974, René Dumont, the first ecologist candidate ever to participate in a presidential election, chose for his television interview to drink a symbolic glass of water. “I am now drinking a glass of very precious water, since by the end of the century, if we continue with our current excesses, there will be a shortage of water,” he explained to astonished French viewers, who found his comments to be grossly exaggerated.

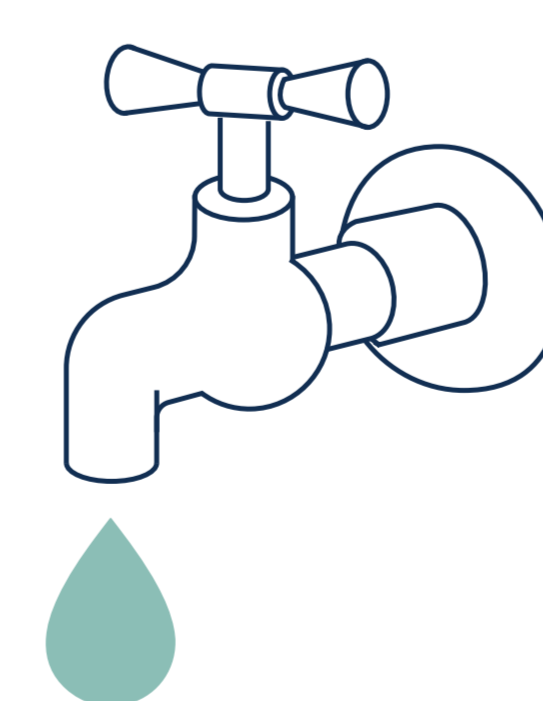


TROUT RETURN TO THE RIVERS IN THE CZECH REPUBLIC

During the course of the last twenty years, the water quality of Czech rivers has seriously improved. This progress has been particularly linked to the development of wastewater treatment. Veolia has contributed to this long-term campaign, initiating together with enthusiastic local fishermen the “Trout Way” project in 2011 to assist the return of trout into the River Střela. This initiative has even inspired the reintroduction of sturgeon into the River Danube.

Key figures

According to the Elabe Veolia ecological transformation barometer, published in 2022:



71%

of persons questioned admitted to feelings of ecological and climatic vulnerability.



74%

confess to feeling exposed by the deterioration of the ecosystem and of biodiversity in their country.

#8

WASTE

WASTE RECYCLING

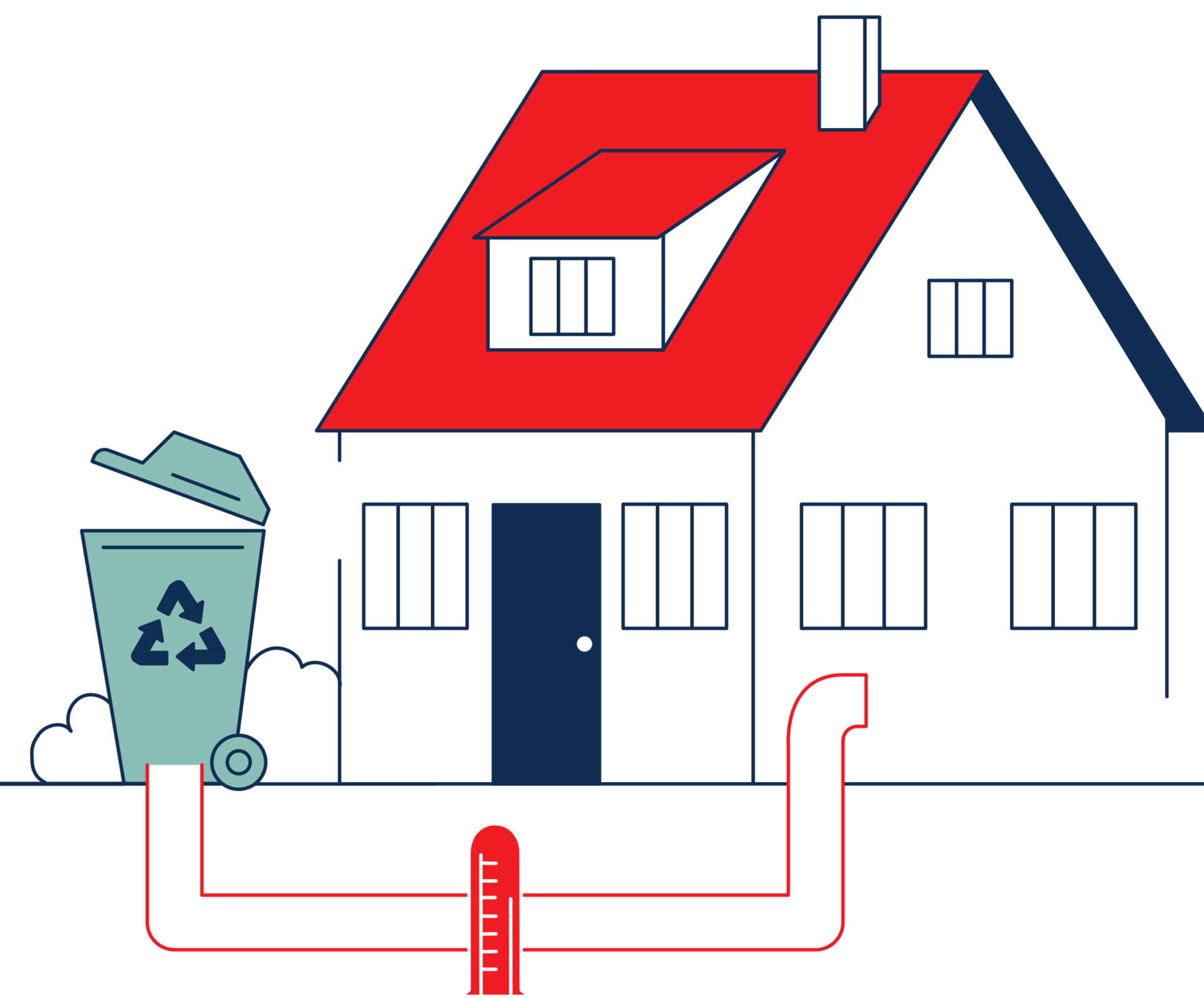
The gradual reinvention of the circular economy

The advent of the consumer society resulted in an explosion in the volume of production of lost, i.e., non-returnable, bottles. In France, the volume of waste produced by each citizen per year rose from 220 kg in the 1960s to 360 kg in 1990. For many years the only initiatives taken to reverse this trend through recycling

remained strictly localised. It was only from the 1980s onwards that there was a change of heart, in which Veolia participated in a very pragmatic fashion, depending on the presence of mineral deposits, of paper and of plastic, to gradually recover the volume to reinvent the circularity of materials that existed in the 19th century.

Veolia's place in history

In the early 1990s **selective sorting** was introduced in Germany more quickly than in other countries. The Germans were also quick to pioneer the **creation of eco-organisms**. Veolia contributed to this pioneering initiative in Saarland, a region with one million inhabitants, and through the **development of the Green Dot** (Der Grüne Punkt), a circular logo representing two interlocking arrows and which indicates that the company concerned contributes to the **processing of its packaging**. The waste collected by Veolia (including aluminium cans, yoghurt pots, Tetra Pak containers, plastic bottles and clingfilm) was initially recovered by the **DSD** (Duales System Deutschland), the **first ever eco-organism** created in Europe. By coordinating these flows, Veolia succeeded in just a few years in **creating circular economy loops**, particularly with Mercedes for the automotive sector, and even in the case of plastics.



IN MARSEILLE: FERTILIZERS PRODUCED FROM FOOD WASTE

In Marseille, up to 6,000 tonnes of biowaste from school canteens, private companies and local authorities are treated at the Écopole de l'Étoile facility in the suburb of Septèmes-les-Vallons. Once sorted and separated out, this waste is recycled by composting. The waste is first placed into piles, then aerated and moistened to initiate the fermentation process. After eight months of this treatment, the waste is converted into high-value compost, rich in bacteria that will stimulate the bacterial life of the soil treated. Local authorities, green space managers and farmers all benefit from this process.

Der Grüne Punkt - a circular logo representing two interlocking arrows that indicates that the company concerned contributes to the treatment of its packaging.



© Lara Jameson.



IN MILWAUKEE: FERTILIZERS MADE FROM WASTEWATER SLUDGE

Milwaukee's first wastewater treatment plant, at Jones Island, was inaugurated in 1925. This was the first activated-sludge treatment plant in the United States, using micro-organisms in its process. The process for the production of milorganite, a high quality fertilizer, has been in operation since 1926, and is proposed for the fertilization of the region's agricultural land, offering back-up marketing, distribution and commercial strategy support. This plant currently produces 50,000 tonnes of fertilizer every year.

Key figures

In the 1950s

5 million tonnes of plastic were produced per year.



Nowadays

over 350 million tonnes are produced every year.

ENERGY

#9

DECARBONISING ENERGY

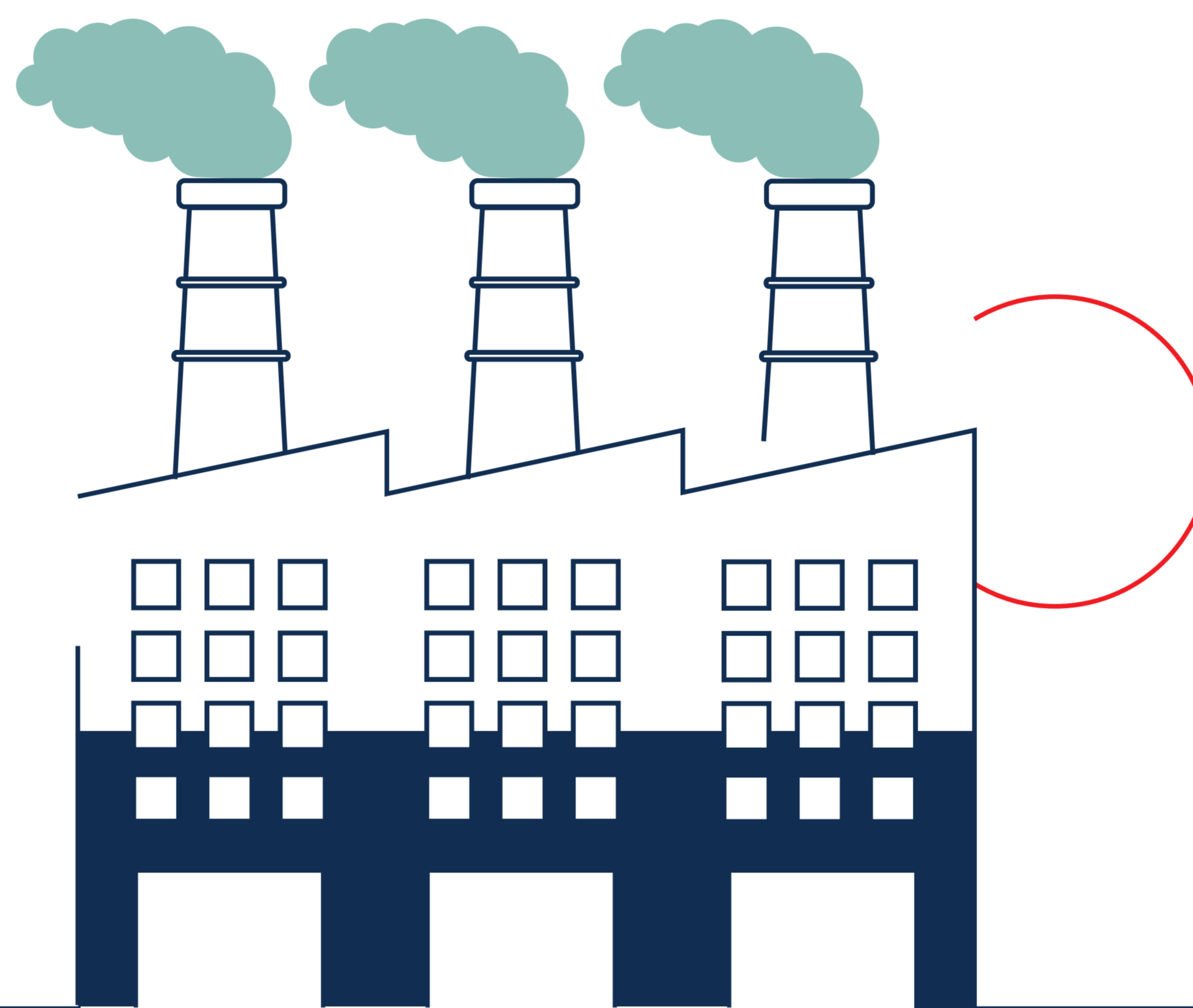
Local solutions for a global problem

The sixth report of the Intergovernmental Panel on Climate Change (IPCC), published in March 2023, confirms that the temperature of the planet has increased by 1.5°C compared with the pre-industrial era, whatever efforts may be made for the immediate reduction of worldwide CO₂ emissions. In view of this conclusion, clean and recovered energies constitute the most effective potential methods for reducing greenhouse gas emissions in the

short term. Recovered energy, produced through the waste-to-energy process involving the incineration of non-recyclable waste and biomass, was at one time little used because of the low cost of fossil fuels. It can now be considered, however, as a viable response to today's challenges and is attracting considerable investment on the part of Veolia.

Veolia's place in history

Over the last few decades, Veolia has developed solutions to enable regions to cease to use coal and other fossil fuels. Since the late 1960s, the Compagnie Générale de Chauffage had operated an incineration plant that provided heating to certain districts of the city of Rennes. The Arc-en-Ciel waste recovery plant, operated by Veolia



since 1993, was built in the vicinity of the Arcelor Mittal steelworks to enable it to use the energy produced there. The Group's expansion into Eastern Europe immediately after the year 2000 accelerated the development of its expertise in the operation of heating networks and in their greening.



THE CLOSURE OF COAL-FIRED POWER STATIONS IN FRANCE, IN GERMANY AND IN HUNGARY

Veolia's historical expertise and know-how in terms of networks enables local heating networks to be set up in order to supply heating derived from recovered energy. An example of the above is the district heating system operating between the towns of Lille and Roubaix in northern France, which is the longest of its kind in Europe. The Veolia plant in Halluin, which undertakes energy recovery from all the non-recyclable household waste in the metropolitan area of Lille, delivers 270 thermal Gwh per year, equivalent to the consumption of 35,000 homes, plus 91 electric Gwh, sufficient to meet the demand from 20,000 homes. This new heating network has made it possible to close the last coal-fired power station in northern France. Dust emissions have been considerably reduced and 50,000 tonnes of CO₂ are now avoided, equivalent to 50 million high-speed train return journeys between Paris and Lille. The Group contributes to this type of dynamic in numerous regions, such as Pecs in Hungary and Brunswick in Germany.



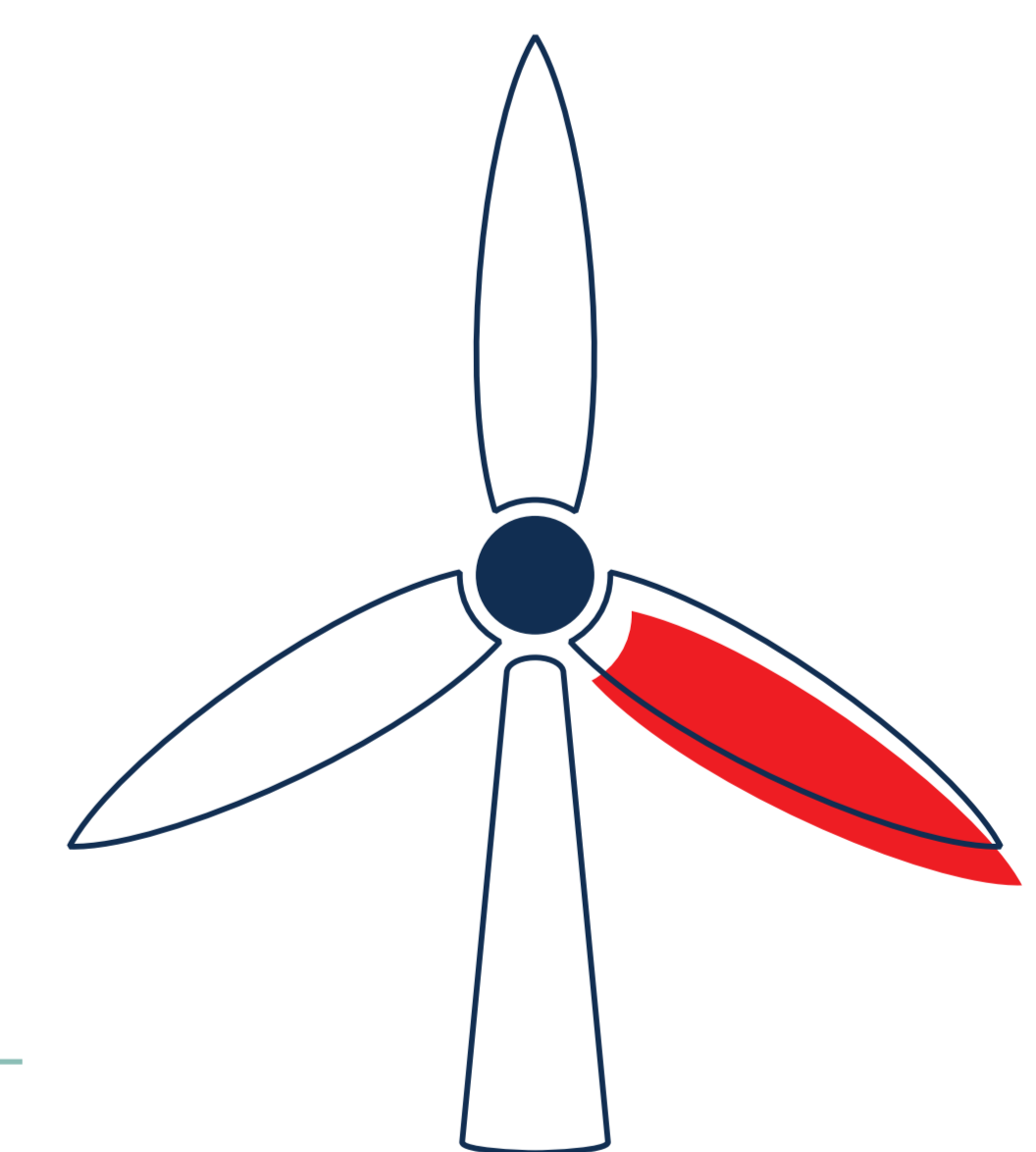
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Shin Takahashi.

The biomass co-generation power station at Hirakawa, Japan, powered by waste wood.



THE DEVELOPMENT OF SOLAR ENERGY, FROM NANTES TO THE SULTANATE OF OMAN

With a subtle regional approach, Veolia mobilises its available land to establish solar energy production sites, especially its post-operational storage sites, etc. In 2019, Veolia was thus able to install at the former landfill site at Tougas, near Nantes, 10 hectares of solar panels, contributing to Veolia's objective of making all its services in France self-sufficient in energy. In the city of Sur in Oman, the desalination plant, which consumes large amounts of energy, has, by contrast, launched the installation of 32,000 solar panels to cover over one third of its energy consumption and thus reduce its carbon footprint.



Key figure

77%

Of the world's energy needs could be covered by biomass, solar power, wind power, hydroelectricity, geothermal power and sea-borne energy, according to the IPCC.

