THE GLOBAL CHAMPION OF ECOLOGICAL TRANSFORMATION

OUR REFERENCES
CENTRAL & EASTERN EUROPE ZONE
2021 - 2022

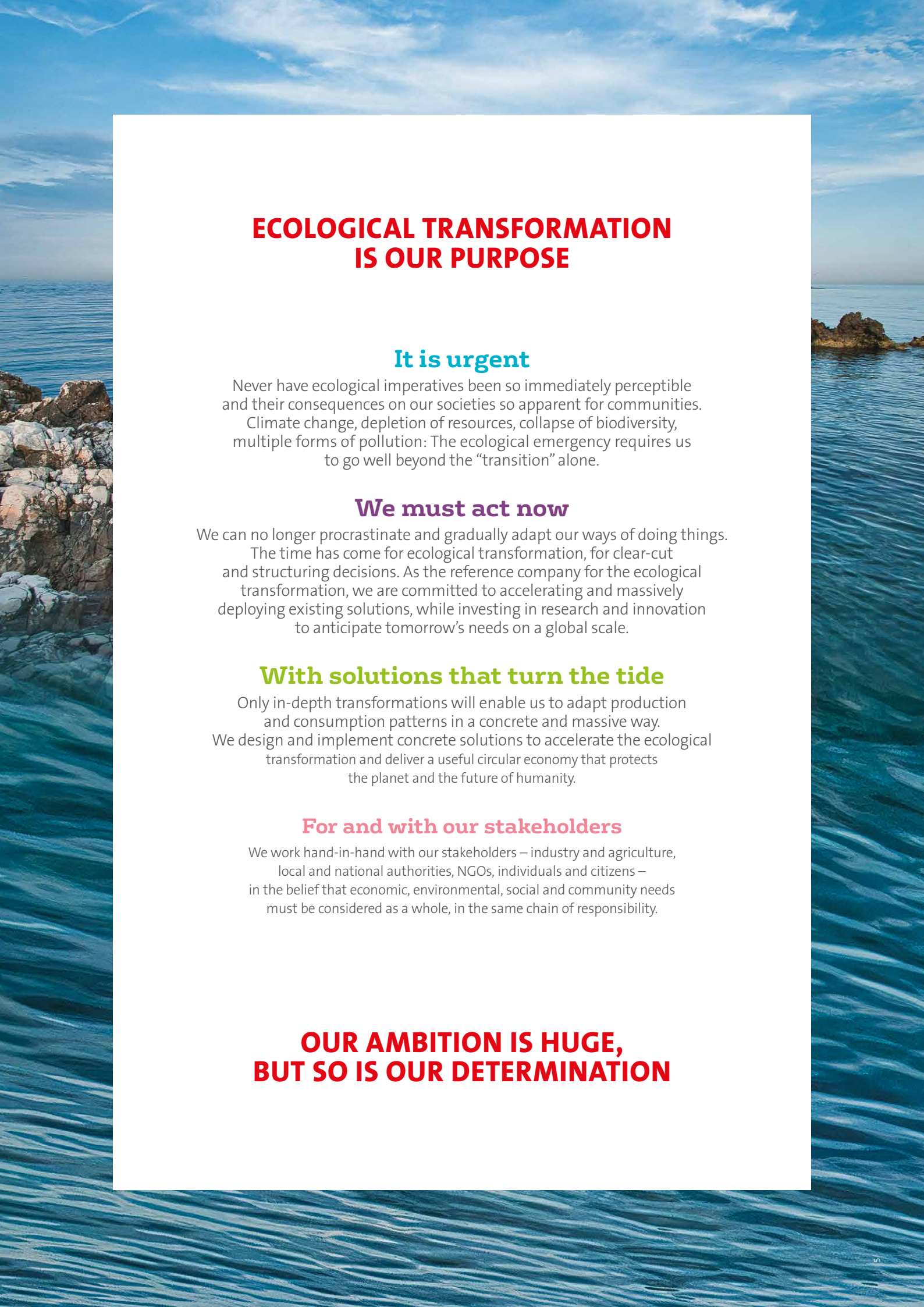
VEOLIA

September 2022

ECOLOGICAL TRANSFORMATION IS OUR PURPOSE

VEOLIA CENTRAL & EASTERN EUROPE

SOLUTIONS DRIVING THE ECOLOGICAL TRANSFORMATION



ECOLOGICAL TRANSFORMATION IS OUR PURPOSE

It is urgent

Never have ecological imperatives been so immediately perceptible and their consequences on our societies so apparent for communities. Climate change, depletion of resources, collapse of biodiversity, multiple forms of pollution: The ecological emergency requires us to go well beyond the "transition" alone.

We must act now

We can no longer procrastinate and gradually adapt our ways of doing things. The time has come for ecological transformation, for clear-cut and structuring decisions. As the reference company for the ecological transformation, we are committed to accelerating and massively deploying existing solutions, while investing in research and innovation to anticipate tomorrow's needs on a global scale.

With solutions that turn the tide

Only in-depth transformations will enable us to adapt production and consumption patterns in a concrete and massive way. We design and implement concrete solutions to accelerate the ecological transformation and deliver a useful circular economy that protects the planet and the future of humanity.

For and with our stakeholders

We work hand-in-hand with our stakeholders – industry and agriculture, local and national authorities, NGOs, individuals and citizens – in the belief that economic, environmental, social and community needs must be considered as a whole, in the same chain of responsibility.

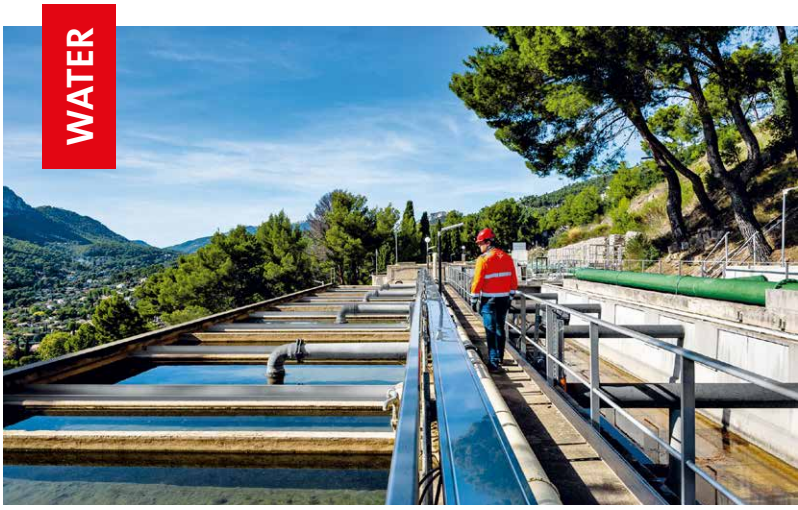
OUR AMBITION IS HUGE, BUT SO IS OUR DETERMINATION

OUR

3 BUSINESSES

Veolia designs and deploys solutions for **water**, **waste** and **energy** management, participating in the sustainable development of cities and industries.

WATER



Management of the global water cycle, from the production and distribution of drinking water to the collection, treatment and recycling of wastewater.

79

MILLION PEOPLE
SUPPLIED WITH SAFE DRINKING WATER

61

MILLION PEOPLE
CONNECTED TO WASTEWATER SYSTEMS

3,367

DRINKING WATER PRODUCTION
PLANTS MANAGED

2,750

WASTEWATER TREATMENT
PLANTS MANAGED

NOW 220,000 EMPLOYEES THROUGHOUT THE WORLD WITH COLLEAGUES FROM SUEZ

WASTE

Liquid and solid non-hazardous and hazardous waste management. Our expertise covers the entire waste life cycle from collection to recycling, leading to the final recovery of waste as materials or energy.

40
MILLION PEOPLE
PROVIDED WITH COLLECTION SERVICES ON BEHALF OF MUNICIPALITIES

48
MILLION METRIC TONS
OF TREATED WASTE

435,861
BUSINESS
CLIENTS

691
WASTE PROCESSING
FACILITIES OPERATED

ENERGY

Energy efficiency, efficient management of heating and cooling networks, green energy production.

48
MILLION MWH
PRODUCED

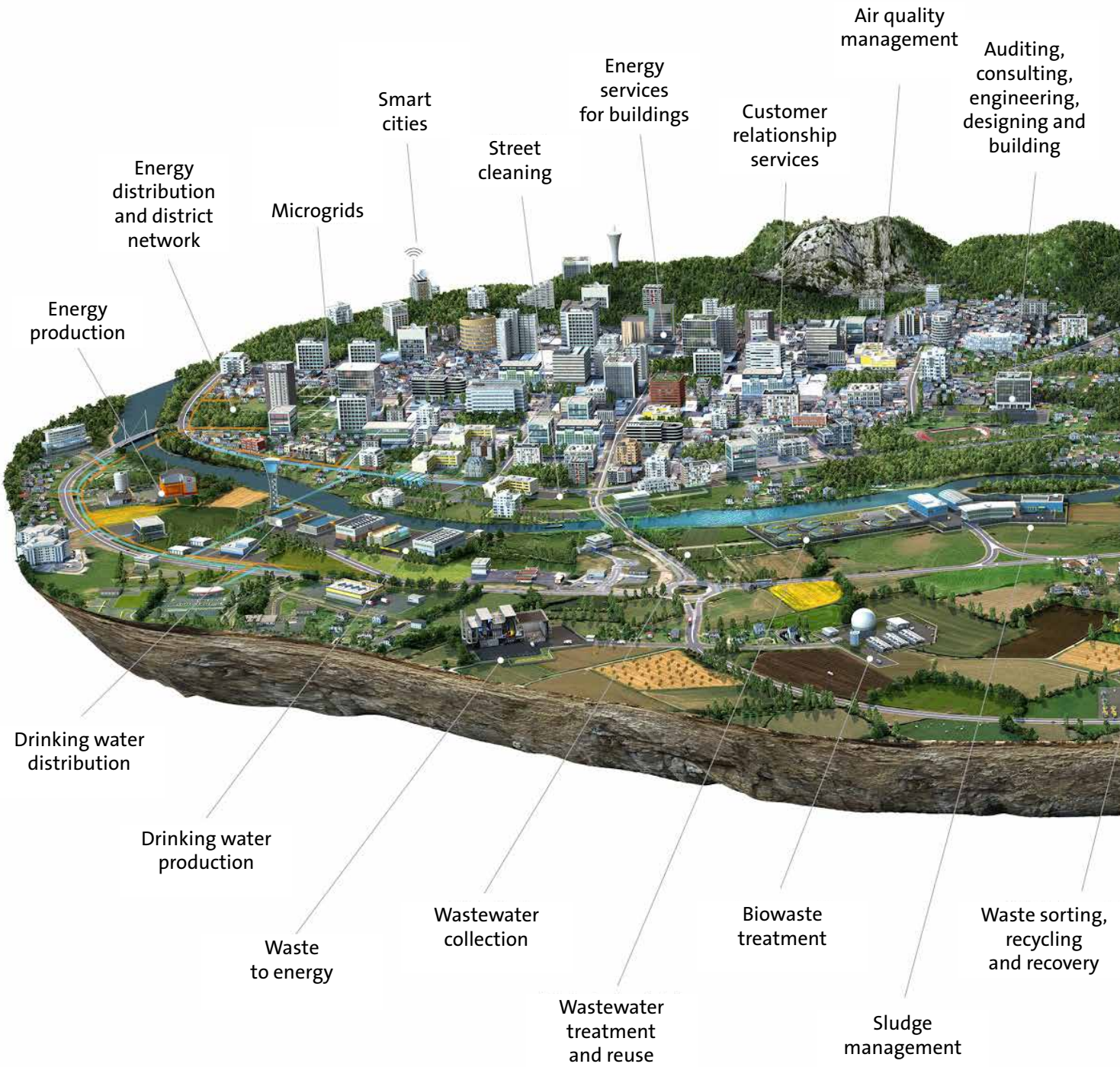
46,058
THERMAL INSTALLATIONS
MANAGED

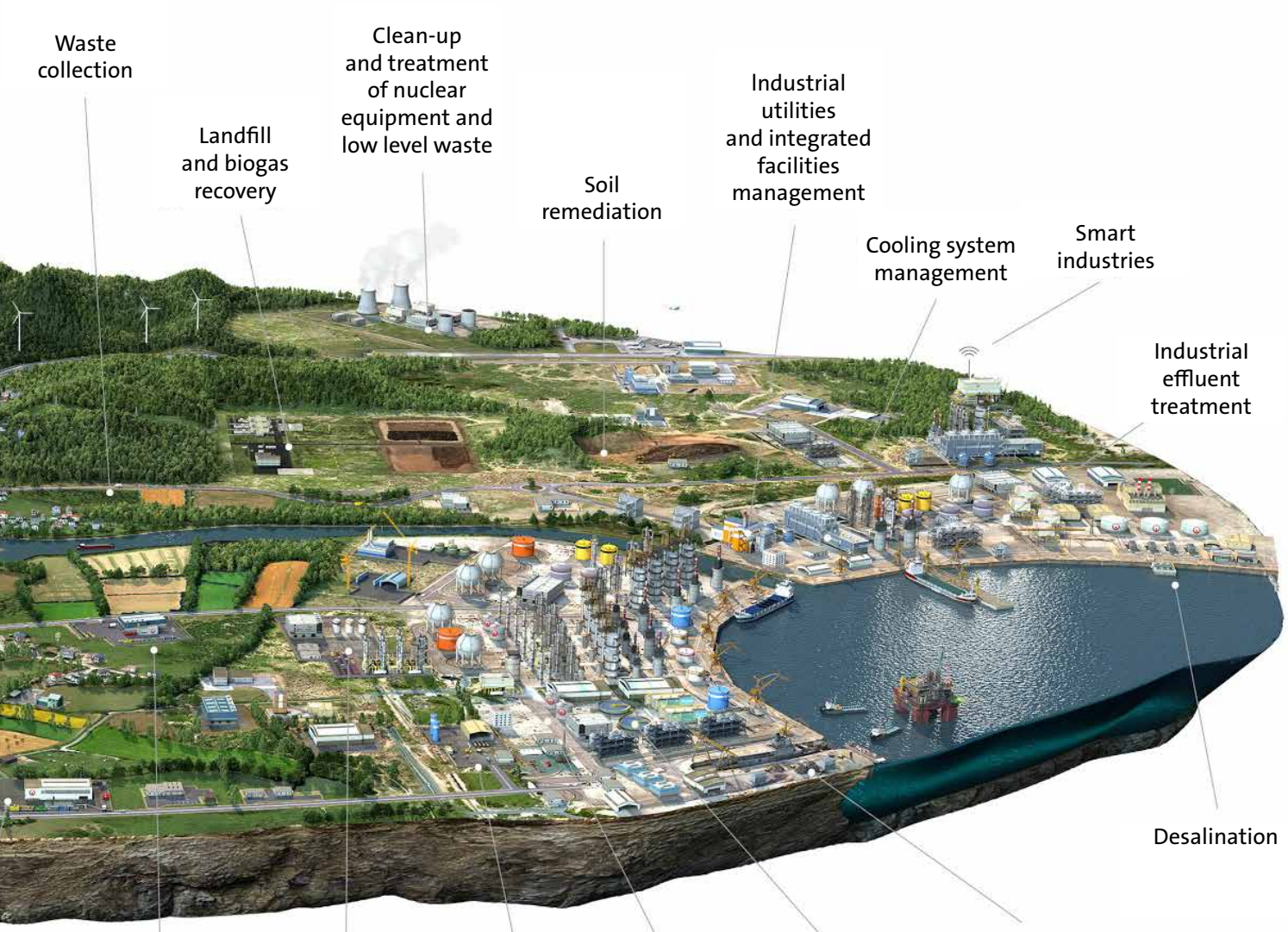
2,211
INDUSTRIAL SITES
MANAGED

583
HEATING AND COOLING
NETWORKS MANAGED

OUR SOLUTIONS FOR

MUNICIPALITIES AND INDUSTRIES





Discover our solutions on our Technomap:
activities.veolia.com

VEOLIA

CENTRAL & EASTERN EUROPE

OUR

3 BUSINESSES

Veolia designs and deploys solutions for **water**, **waste** and **energy** management, participating in the sustainable development of cities and industries.

Management of the global water cycle, from the production and distribution of drinking water to the collection, treatment and recycling of wastewater.

12.1

MILLION PEOPLE
SUPPLIED WITH SAFE DRINKING WATER

11.1

MILLION PEOPLE
CONNECTED TO WASTEWATER SYSTEMS

732

DRINKING WATER PRODUCTION
PLANTS MANAGED

333

WASTEWATER TREATMENT
PLANTS MANAGED

WASTE

ENERGY

Liquid and solid non-hazardous and hazardous waste management. Our expertise covers the entire waste life cycle from collection to recycling, leading to the final recovery of waste as materials or energy.

10.2

MILLION PEOPLE
PROVIDED WITH COLLECTION SERVICES ON BEHALF OF MUNICIPALITIES

7.6

MILLION METRIC TONS
OF TREATED WASTE

114,688

BUSINESS
CLIENTS

83

WASTE PROCESSING
FACILITIES OPERATED

Energy efficiency, efficient management of heating and cooling networks, green energy production.

28.8

MILLION MWH
PRODUCED

2,778

THERMAL INSTALLATIONS
MANAGED

1,272

INDUSTRIAL SITES
MANAGED

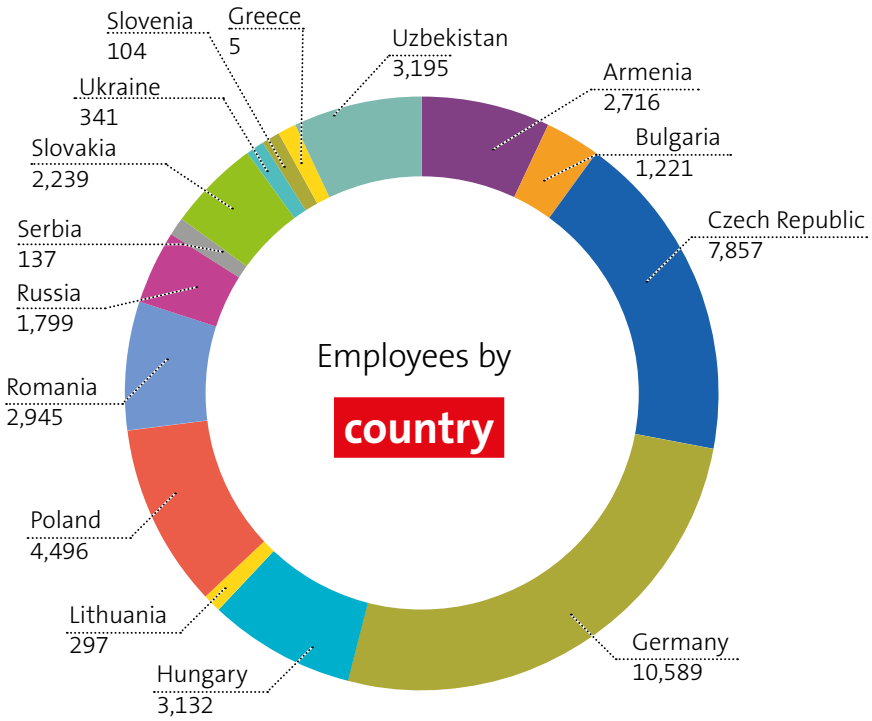
593

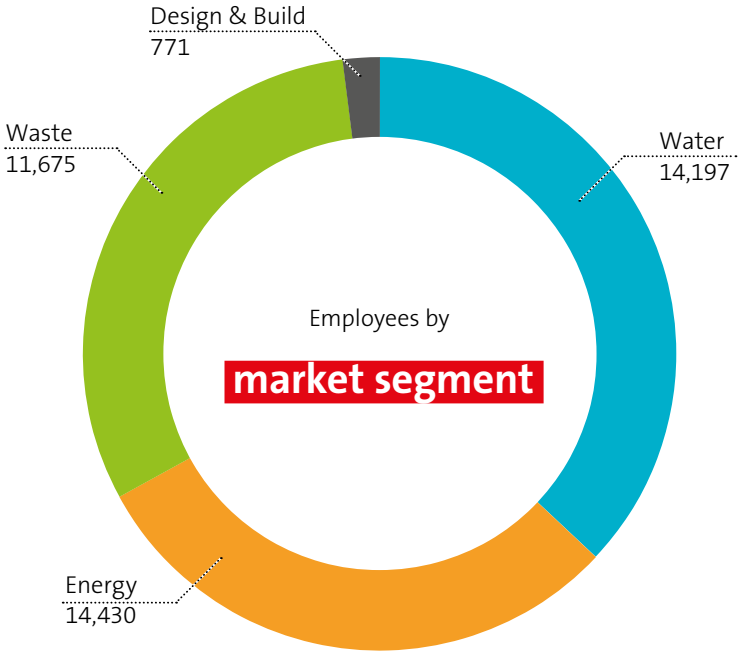
HEATING AND COOLING
NETWORKS MANAGED

HUMAN RESOURCES

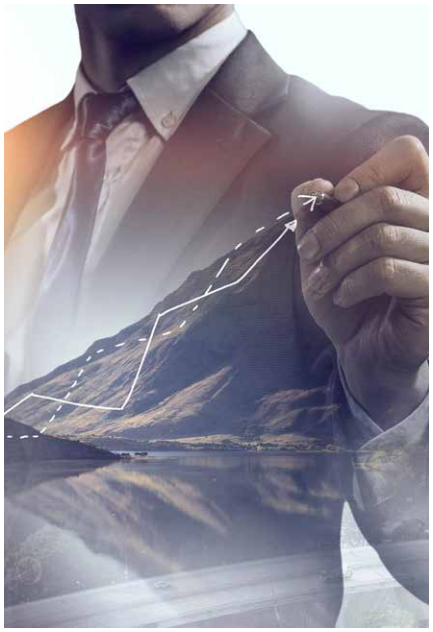
41,073

Employees
As of July 31, 2022



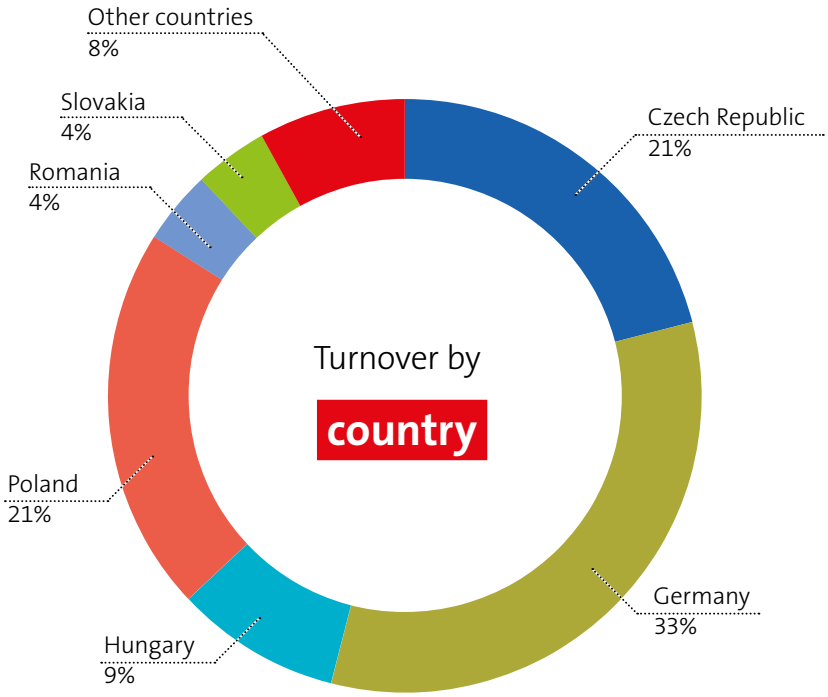


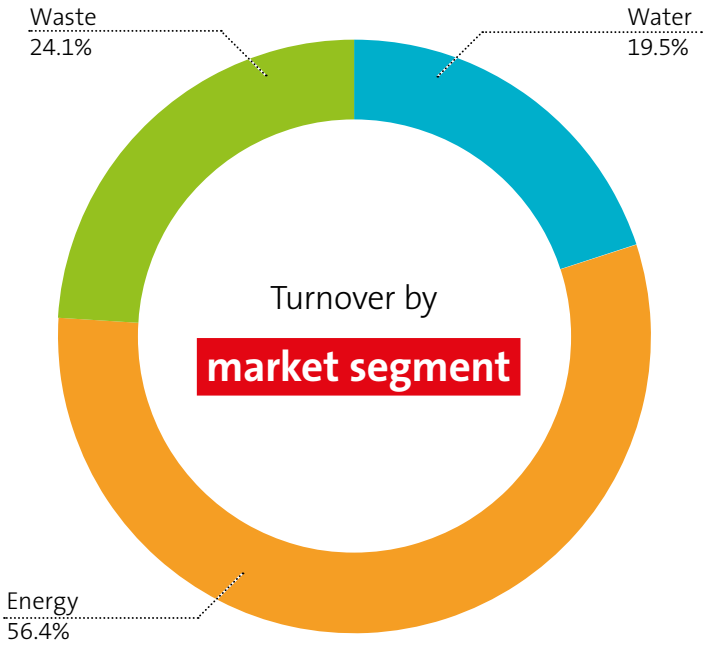
FINANCIAL DATA



€7,015.3M

Budget turnover 2022





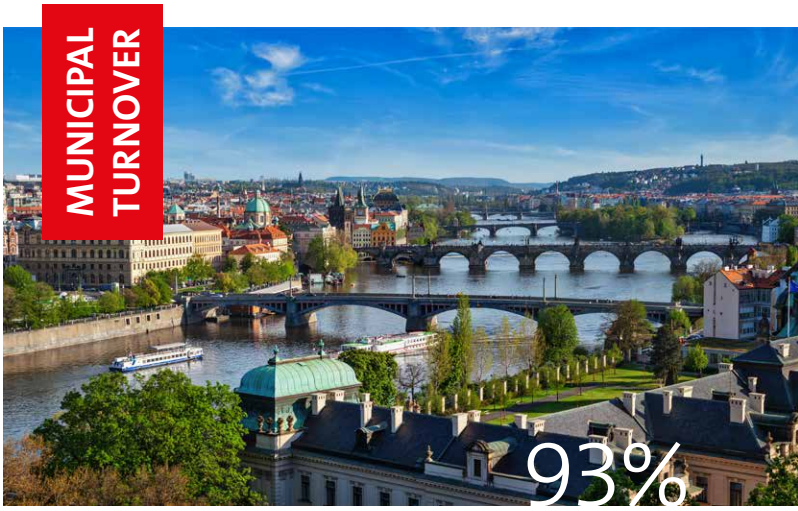
CENTRAL & EASTERN EUROPE

TURNOVER BY MARKET SEGMENTS

€7,015.3

Turnover B2022

Mostly municipal market
with valuable references
in all market segments

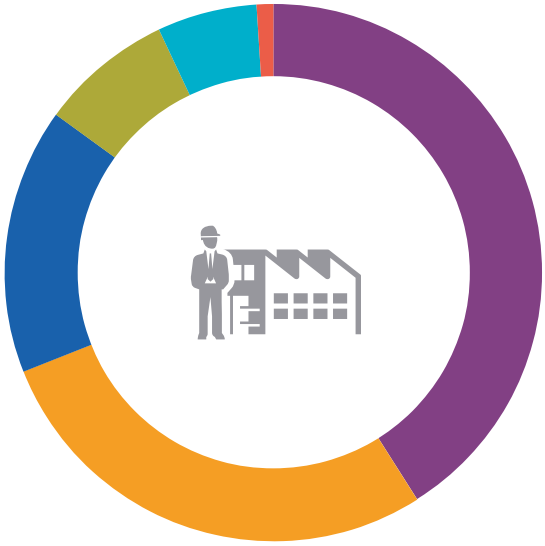


€6,529.0M

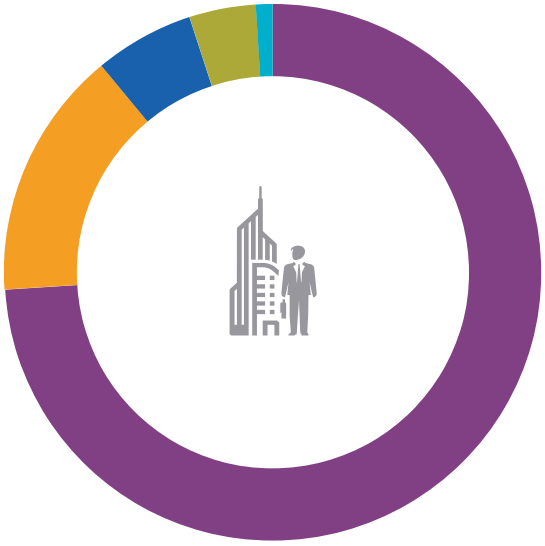
Germany	34%
Poland	22%
Czech Republic	19%
Hungary	9%
Romania	4%
Slovakia	4%
Uzbekistan	3%
Other Countries	5%

€380.8M

€105.6M



Czech Republic	41%
Germany	28%
Poland	16%
Slovakia	8%
Hungary	6%
Other countries	1%



Czech Republic	74%
Hungary	15%
Bulgaria	6%
Slovakia	4%
Romania	1%
Other Countries	0%

CENTRAL & EASTERN EUROPE

COUNTRIES


KAZKAHSTA
UZBEKISTAN
GEORGIA
ARMENIA
AZERBAIJAN
TURKMENISTAN
AFGHANISTAN

COUNTRIES

WITHIN CEE ZONE

Czech Republic

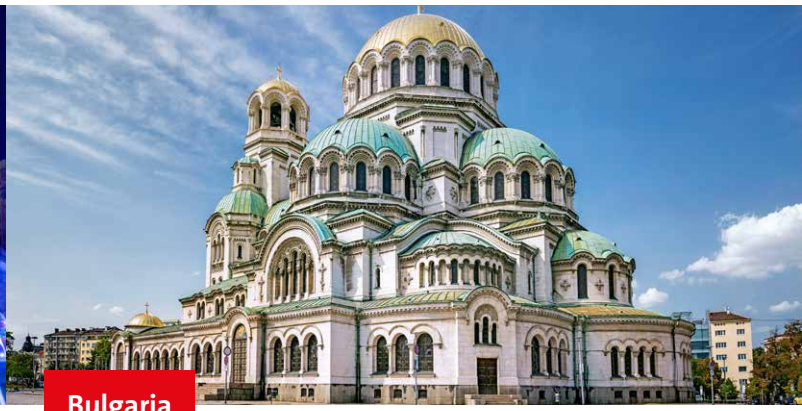
2.7m	People served
300,774	Clients
4,291	Employees
586.7m	Turnover
570,000	Households served
16,000	Clients
2,407	Employees
760.6m	Turnover
31	Industrial plants served
1,159	Employees (with Suez)
0.3m	Turnover

Slovakia

0.96m	People served
170,681	Clients
1,547	Employees
85.4m	Turnover
91,174m	Households served
2,407	Clients
692	Employees
200.3m	Turnover

Romania

2m	People served
170,402	Clients
2,916	Employees
257.2m	Turnover
115,724	People served
54,845	Customers
29	Employees
120.2m	Turnover



Bulgaria

1.5m	People served
697,758	Clients
1,048	Employees
117.7m	Turnover
0.01m	People served
86	Clients
173	Employees
16.1m	Turnover

VARIOUS CONTRACT MODELS • LONG TERM AGREEMENTS

Poland

0.075m People served
15,940 Clients
148 Employees
10.6m Turnover

2.9m People served
30,498 Clients
4,253 Employees
1,286.3m Turnover

95 Employees
23.9m Turnover

Germany

1m People served
200 Municipalities as customers
582 Employees
103.6m Turnover

250,000 People served
800 customers (energy efficiency projects implemented)
1,673 Employees
755.6m Turnover

12m People served
110,000 Clients served
8,334 Employees (with Suez)
1,160.5m Turnover

Hungary

2.2m People served
898,724 Clients
1,666 Employees
54.9 Turnover

0.6m People served
24,170 Clients
1,429 Employees
565.7m Turnover

3 Industrial clients served
11 Buyers
37 Employees
10.5m Turnover

Armenia

1.9m People served
757,777 Clients
2,716 Employees
34.7m Turnover

Data 2021/2022

COUNTRIES

WITHIN CEE ZONE

Serbia

33 Employees
3.3m Turnover

104 Employees

Lithuania

0.07m People served
31,700 Households heated
297 Employees
22.9m Turnover

Ukraine

0.65M People served
49,131 Clients
341 Employees
9.4M Turnover

Uzbekistan

1. 7. 2022 Contract starting
1.2M People supplied
3195 Employees
13,177 Buildings served

VARIOUS CONTRACT MODELS • LONG TERM AGREEMENTS

Slovenia

16 Employees

88 Employees
8.6m Turnover

Russia

0.05m People served
28,000 Contracts
282 Employees
10.8m Turnover

1.5M People served
70,000 Contracts
1,517 Employees
54.7m Turnover

Greece

5 Employees

Data 2021/2022

SOLUTIONS DRIVING THE

ECOLOGICAL TRANSFORMATION

BOTTLE-TO-BOTTLE RECYCLING

Closed-loop recycling is the key to an environmentally friendly and responsible use of plastics.

In particular, the recycling of PET beverage bottles has distinguished itself as a role model in recent years. 94 percent of all PET beverage bottles are now recycled in Germany, and the recycling rate is even almost 100 percent. Furthermore, there is a clear trend towards the use of recycled material: a PET bottle already consists of 30 to 50 per cent recyclate.

Veolia's solution

We produce high-quality PET recyclate in the form of free-flowing „flakes". This material, obtained from PET bottles, is suitable, for example, for the production of beverage bottles and films that come into direct contact with food. The recyclate produced using the URRC process allows, for example, mass production of beverage bottles with high-performance injection moulding machines.

4 countries

Germany, Norway, Sweden and Switzerland

4,485,192,102

PET Bottles are recycled annually

278,102 litres

of crude oil equivalent

Germany

Rostock

Every year, more than one billion PET bottles find their way via the deposit system for dingle-use bottles to the PET recycling plant in Rostock, which was opened in 2002. The 12,000m² recycling plant with an annual capacity of approx. 32,000 t produces food-grade recyclate primarily for bottle production and high-quality recyclate for use in e.g. film and thermoforming production.

Norway

Fetsund

The recycling plant in Fetsund, 30 kilometres north-east of the capital Oslo, has an annual capacity of over 20,000 tonnes of washed flake recyclate and captures over 80 per cent of all deposit bottles returned in Norway.
Of this, about 13,000 tonnes of „food-grade“ granulate can be produced per year. Pre-sorting takes place in the immediate vicinity by our partner Infinitum on the Heia site.

Sweden

Norrköping

The input material is supplied by the Swedish collection organisation AB Svenska Returpack, which has its central PET sorting facility in the immediate vicinity of our plant. Veolia uses the recovered PET bottles to produce high-quality PET recyclate in the form of free-flowing „flakes“. The material is suitable for the production of beverage bottles and films that come into direct contact with food, for example.

Switzerland

Frauenfeld

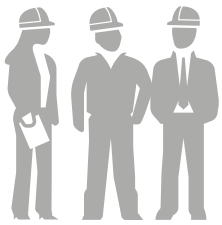
RecyPET AG is part of the Veolia PET Germany GmbH and, thanks to its many years of experience, one of the leading companies in all areas of the PET recycling market in Europe. As part of Veolia Environnement, the world leader in environmental services, the goal is to constantly develop new ideas - such as bottle-to-bottle recycling - for a better environment and higher quality of life.

REGIONS & CITIES

4.485.192.102 PET Bottles are recycled annually at our operations sites in Germany, Norway, Sweden and Switzerland.

PLANET

278,102 litres of crude oil equivalent are saved annually compared to the production of virgin material.



WOMEN & MEN

158 employees work within the PET Germany GmbH and its subsidiaries in Norway, Sweden and Switzerland.

Brunswick - Germany

E2030
COAL PHASE-OUT

With a flexible and sustainable power plant concept, BS|ENERGY is phasing out energy generation with the fossil fuel hard coal and thus taking an important step towards decarbonisation.

The future, modernised power plant park will consist of a gas turbine combined heat and power plant and biomass combined heat and power plant with waste wood as the main fuel, replacing the previous coal-fired combined heat and power plant. The third important pillar, in addition to the two new plants, remains the existing flexible gas and steam turbine plant, which, together with the heat storage facilities there and the closely meshed and efficient district heating network, forms an ideal starting point for the modern generation.

The challenge

The search for alternative generation methods of heat and power supply for the city of Braunschweig.

Veolia's solution

- Ensuring heat and power supply with a climate-neutral energy source
- Conversion from coal combustion to biomass (main fuel waste wood) and gas combustion (by building new plants)
- Modernisation of further existing plant components
- Exploitation of subsidies within the framework of the CHP Act
- The biomass CHP plant covers the base load and runs all year round.

2016 - 2023

duration

€ 250M

largest investment
in the company's history

Performance

Biomass CHP plant
Thermal: 53 MWth
Electrical: 22MWel

Gas turbine CHP plant

Biomass CHP plant
Thermal: 53 MWth
Electrical: 22MWel

- Energetically sensible use of different regionally accruing quantities of waste wood
- Fuel is cheap and climate-friendly
- Sufficient quantities of waste wood are available in the short, medium and long term
- Significant improvement of the primary energy factor
- Burning wood does not release more greenhouse gas than wood absorbed and stored during its growth

The benefits

With the new plants, we are making a significant contribution to improving air quality and reducing the emission of air pollutants for Braunschweig.

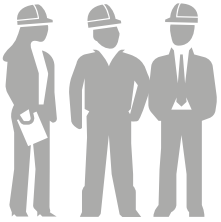
> With the planned phase-out of energy generation from coal, we are pioneering a flexible, ecological and affordable energy supply.
>
> **Jens-Uwe Freitag,** Chairman of the Board of BS|ENERGY

REGIONS & CITIES

The city of Braunschweig has around 250,000 inhabitants, whom BS|ENERGY supplies with water, electricity, gas and heat it also takes care of the environmentally friendly handling of wastewater.

PLANET

- Improving the climate balance
- Careful use of resources
- Protection of the environment and nature
- Contribution to the quality of life



WOMEN & MEN

~1,300 employees work within the BS|ENERGY Group

THE TREATMENT OF BERLIN'S SEWAGE SLUDGE

Veolia a professional partner in sewage sludge recycling

Berliner Wasserbetriebe is Germany's largest water supply and wastewater disposal company. Veolia Klärschlammverwertung Deutschland GmbH (VKD) won the Europe-wide tender of the Berliner Wasserbetriebe for the transport and environmentally-friendly disposal of the total sewage sludge of Berlin.

The challenge

At Berliner Wasserbetriebe (BWB), approximately 135,000 tons of sewage sludge pellets from 5 sewage plants have to be disposed of annually. For the treatment of sewage sludge in the BWB owned mono incineration plant, transport operations of 35,000 tons of sewage sludge are also necessary between the sewage plants of the capital. In order to reach this goal, Veolia Klärschlammverwertung Deutschland GmbH (VKD), a Veolia Group company, offers its customer a wide range of disposal and other services.

Veolia's solution

Veolia signed a new contract in 2017 to respond to these challenges and offered the following solutions:

- Overall scheduling of operations at the sewage plants and the customer's own treatment plant
- Provision of alternative storage and disposal solutions
- Making available 25 different treatment and recycling services and channels throughout Germany

2017 - 2025

duration
(with an optional extension of 2 years)

170,000

tons
sewage sludge p.a.

5

sewage plants
> 100.000 PE

25

different methods and channels of treatment / recycling

The benefits

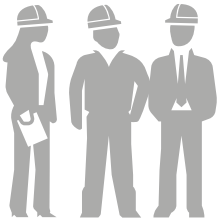
- Disposal and other services from a single source
- Certified specialist operations with many years of experience in the waste management industry
- Safe long-term recycling services and channels for the sludge and waste generated by the wastewater sector
- Drawing up of documentary proof
- Implementation of analyses and monitoring of limit values
- Assumption of disposal risk by VKD
- Consulting

REGIONS & CITIES

Stable fees that can be planned for the long term

PLANET

Pollutant reduction in soils



WOMEN & MEN

Employer of 56 people at three locations

BOMAG GmbH

Mechanical Engineering/Automotive, Boppard, Germany

The challenge

BOMAG is the world market leader in the field of compactor technology, and manufactures machines for earth, asphalt and waste compaction, stabilisers/recyclers, as well as milling machines and pavers. BOMAG was looking for a future-oriented waste management concept, a suitable solution for the management of the empties yard and a partner who could provide bundled infrastructural facility management services from a single source. At the same time, cost transparency and control were to be maintained and potential savings exploited. It was also important for BOMAG to have a central contact partner.

Veolia's solution for recyclables and management

- Creation of a customer-specific waste management concept
- Standardised container system for single-variety collection and the set-up of waste collection points
- Provision and use of industrial trucks for cyclical and acyclical collection of waste at the points where it occurs
- Automatic recording and evaluation of waste streams via the web-based software solution DAVIG developed by Veolia
- Management of the waste disposal site
- Repackaging of incorrect packaging in storage bins

Unlimited
contract period

Multiservices
contract content

approx. € 3.6 mil. /p.a.
turnover

approx. 30
employees

approx. 80
waste collection points

More than 200
large waste containers in storage plus technical vehicles

Veolia's solution for Infrastructural Facility Management:

- Various cleaning tasks
- Maintenance of outdoor facilities (green service, winter service, cleaning of roads and traffic routes)
- Taking over the complete industrial cleaning of all production machines as well as industrial traffic areas
- Total fluid management including documentation and software use

The benefit for our customer

Veolia offers BOMAG smooth, efficient and sustainable waste management. Continuous optimisations help to reduce costs. In addition, cost centre-specific quantity and cost evaluation with the central waste management software DAVIG developed by Veolia increases transparency. Compliance with current legal requirements is ensured by DAVIG, as is the quick and easy preparation of the annual waste balance. The customer also benefits from Veolia's expertise in the implementation and handling of secondary processes around its own production process - here primarily in facility management - and can concentrate fully on its core business.

Thanks to Veolia's customer support and the entire team on site, reaction times for processes such as the preparation of quotations, short-term requests for services, medium- and long-term planning of special orders or coordination on operational issues are significantly reduced. Thus, BOMAG enjoys excellent support for all commissioned services and Veolia is permanently informed about the current and future requirements on the part of the customer.

"Great trust on both sides and Veolia's tailor-made solutions for the client's concerns have been the supporting pillars of this multiservices contract since the beginning of the partnership. The mutual business relationship is symbolically rounded off, among other things, by the purchase of waste compaction vehicles in several countries."

Jeremy Müller, Managing Director Veolia Industrie Deutschland GmbH

WASTE MANAGEMENT FOR TOP PLAYER IN THE FOOD RETAIL SECTOR IN GERMANY

Industrial, Retail

The client is one of Europe's leading trade groups with different business lines – from supermarkets and discounters to DIY stores and gardening supplies. With over 3,000 branches in Germany alone, our customer offers a nationwide network. Quality and sustainability have been an important part of the corporate identity and business strategy.

The challenge

Our client was in search of a reliable and efficient partner for waste management recycling services, who can ensure comprehensive waste management services for various types of waste for their main warehouses and branches and offer sustainable recycling solutions. In addition, the partner was required to manage the disposal ramps incl. staffing at the client's central warehouses.

Veolia's solution

Veolia will provide the waste management for all organic waste occurring at the client's branch network within Northern Germany for the coming 2 years. Veolia's subsidiary BioCycling will collect the approx. 20,000 t of organic waste and then feed it into our biogas plants to ensure the waste is recycled in a sustainable manner.

All packaging waste of the food retailer are being redirected to their main warehouses. At 13 of these sites Veolia employs a total of approx. 300 staff working in 3 shifts tasked with bundling cardboard waste, foils, PET as well as refuse for incineration and preparing it for further treatment. The total volume of these waste types is well above 250,000 t.

2 or 5 years

duration of contract

holistic waste management and services

< 250,000 t

cardboard p.a.

< 8,000 t

foil waste p.a.

The benefits

Veolia ensures that all waste is efficiently recycled and thus guarantees a holistic waste management approach for the client.

Veolia's subsidiary BioCycling recycles all packaged and unpackaged organic waste from the food retailer's stores. The waste is then fed into our own biogas plants and converted into electricity and heat through a multi-stage treatment process.

Cardboard is directly transported to German paper mills to be reused in the production of new paper. Veolia has established numerous partnerships within the paper industry and is able to transport the material cost effectively and reduce CO_2 emissions efficiently through our smart state-of-the-art logistics management system.

The foils are treated and regranulated. That way they can be reused in the production of new products. Veolia chooses to only trade foils within the European Union.

Veolia processes the plastic from PET bottles into recyclates using the patented URRC procedure. The material can then be reused for the production of new food-safe products.

Mixed industrial refuse is collected and then pretreated and sorted in state-of-the-art plants. Recyclables are fed back into the material cycle. Any waste that cannot be sorted or recycled is fed into incineration plants and processed as RDF.

LOAD MANAGEMENT REFRIGERATION SYSTEMS

Mechanical Engineering/Automotive, Boppard, Germany

The German distribution hub of Irish dairy products Cooperative has been using EnEffCo® since 2016. The company improved operations and cost savings thanks to an integrated energy monitoring and load management solution.

The challenge

Ornua Deutschland GmbH is a fully owned subsidiary of the Irish agri food cooperative Ornua (which is most well known for Kerrygold Butter). At the company's German distribution hub just north of Düsseldorf, refrigeration systems ensure dairy products are stored at legally required temperatures. Ambient weather conditions are a major driver of refrigeration energy demand; during hot days demand spikes previously led to considerable declines in system efficiency. Ornua selected EnEffCo® to address this problem while simultaneously introducing an ISO 50001 energy monitoring solution.

Veolia's solution

The implementation of the EnEffCo® energy monitoring solution included the development of demand forecasts in 15 min intervals and an associated load shedding strategy.

- Two stage control signals shut down expansion valves in cold storage evaporators.
- Monitoring of current and target temperatures in cold storage rooms.
- Needs based management of deep freezing and normal refrigeration
- Repackaging of incorrect packaging in storage bins

since 2016
contract

EnEffCo®
contract type

250
employees

1961
founded

72,000 t
butter and cheese

EnEffCo

The benefits

Cost savings: Lower electricity expenses

Intelligent load management: Refrigeration systems can be individually managed and configured according to needs (e.g. based on high demand windows).

Integrated systems control: Automated control of several cooling systems (via expansion valves) in accordance with targeted time strategies.

Quality assurance: Monitoring of cooling systems and operational requirements (e.g. legally mandated temperatures), including the possibility of manual override and alternative operational procedures.

Transparency: Reporting system provides visualization of site operations

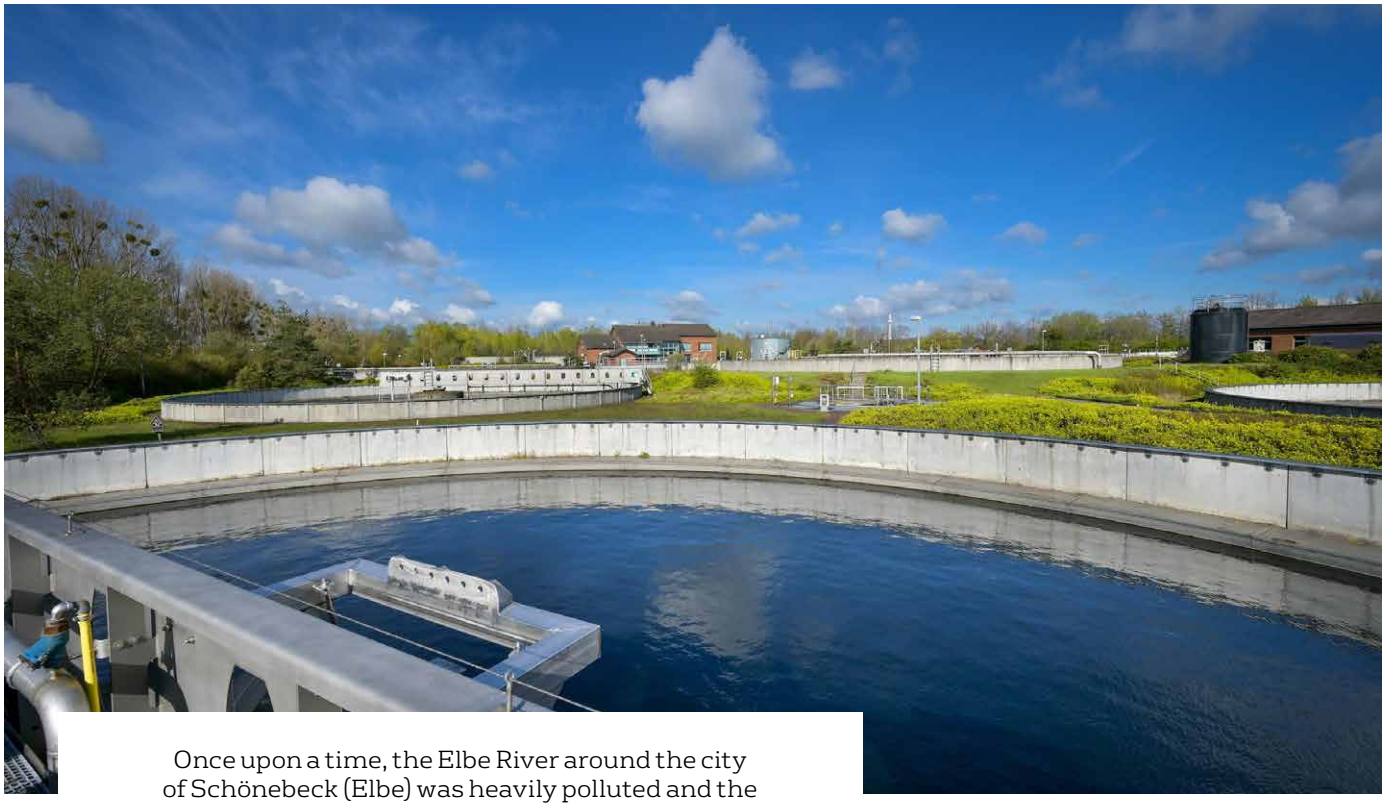
> Thanks to ÖKOTEC's expertise and the EnEffCo® solution, our refrigeration systems are now flexibly managed based on actual needs, saving us money in the process.
>
> **Falco Labrenz,** Engineering Coordinator/EnMB

PLANET

Transparent KPIs related to energy use and precise data for reports.

WASTEWATER DISPOSAL IN SCHÖNEBECK (ELBE)

Improvement of the environmental balance through efficient plant operation



Once upon a time, the Elbe River around the city of Schönebeck (Elbe) was heavily polluted and the wastewater treatment plant was one of the biggest energy consumers. Thanks to Veolia, wastewater treatment is now environmentally friendly and energy self-sufficient. This reduces the costs for the plant operation and the citizens and improves the water quality of the Elbe.

The challenge

In 1996, the city of Schönebeck was looking for a partner for the technical and commercial management of the wastewater system within a Europe-wide tendering process. The central sewage treatment plant of the city of Schönebeck has an expansion size of 90,000 population equivalents. The wastewater from around 53,300 residents plus industrial customers from the town of Schönebeck, Plötzky, Pretzien, the "Abwasserzweckverband Saalemündung", "Trink- und Abwasserverband Börde" and the "Eigenbetrieb Wasser und Abwasser Gommern" are treated here.
In addition, there are about 230 kilometres of sewers and about 60 wastewater pumping stations that have to be operated.

Veolia's solution

Veolia Wasser Deutschland GmbH has been reliably operating the wastewater facilities of the city of Schönebeck since 1996. For this purpose, both partners founded a public-private partnership model with Abwasserentsorgung Schönebeck GmbH (AbS) in 1993. The city holds 51 percent of the shares in AbS, Veolia has a 49 percent stake.
Veolia is responsible for:

- Technical management
- Commercial services
- Engineering services
- Fee collection and customer service

1996 - 2030
duration

€5.2M
annual turnover

90,000
population equivalents

230 km
sewer

53,300
residents served with wastewater

The benefits

By operating the wastewater systems in an environmentally friendly manner, Veolia ensures wastewater disposal at all times for the city of Schönebeck and the surrounding associations. Veolia guarantees that all limit values and thus the official requirements that are placed on wastewater treatment are complied with and that the Elbe is protected.

An innovative energy management system reduces energy consumption and operating costs. The sewage sludge from the sewage treatment plant is recycled and used to generate electricity and heat for the sewage treatment plant's own use. Thanks to a targeted co-fermentation with used fats, the sewage treatment plant can now be operated self-sufficiently and even generates an electricity surplus.

» www.abs-schoenebeck.de

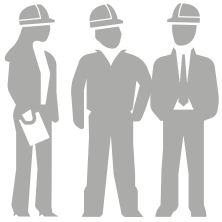
> "Wastewater is full of energy. In Schönebeck, Veolia ensures that this valuable energy is not lost. We turn sewage sludge into biogas and generate electricity and heat; we turn wastewater into clear water. In this way, we make a significant contribution to protecting the water, the environment and improving the quality of life of the people in the Schönebeck region."
>
> **Sebastian Lösch**, Veolia branch manager

REGIONS & CITIES

Stadt Schönebeck, Plötzky, Pretzien, Abwasserzweckverband Saalemündung, Trink- und Abwasserverband Börde, Eigenbetrieb Wasser und Abwasser Gommern

PLANET

- Improvement of the CO_2 balance
- Reduction of energy consumption
- Protection of water and resources



WOMEN & MEN

15 employees

Heinsberg, Düren-Niederau - Germany

ENEFFCO®
SYSTEM MONITORING

Industrial on-site services

We deployed our services
in two industrial parks

The challenge

At its industrial parks in Heinsberg and Düren-Niederau, Veolia provides numerous companies with various building services, including process water, cooling water, steam, and pressurized air. Veolia needed a software solution that would enable it to analyze the efficiency of its systems, to quickly recognize increased consumption based on live data, and to generate status reports in conformance with ISO 50001.

Veolia's solution

The implementation of the EnEffCo® energy monitoring solution included:

- The development of real-time monitoring of systems and the automatic generation of reports, including balance sheets.
- Access to transparent data for tracking energy consumption and billing customers.

EnEffCo® system monitoring provides for energy and cost savings, including notification in the event of irregularities (malfunction, leaks, etc.)

The solution allows Veolia to identify energy saving measures and monitor the savings achieved through their implementation.

since 2016
duration

EnEffCo®
contract type

420
employees

112 ha
area

EnEffCo

The benefits

Cost savings: Lower electricity expenses

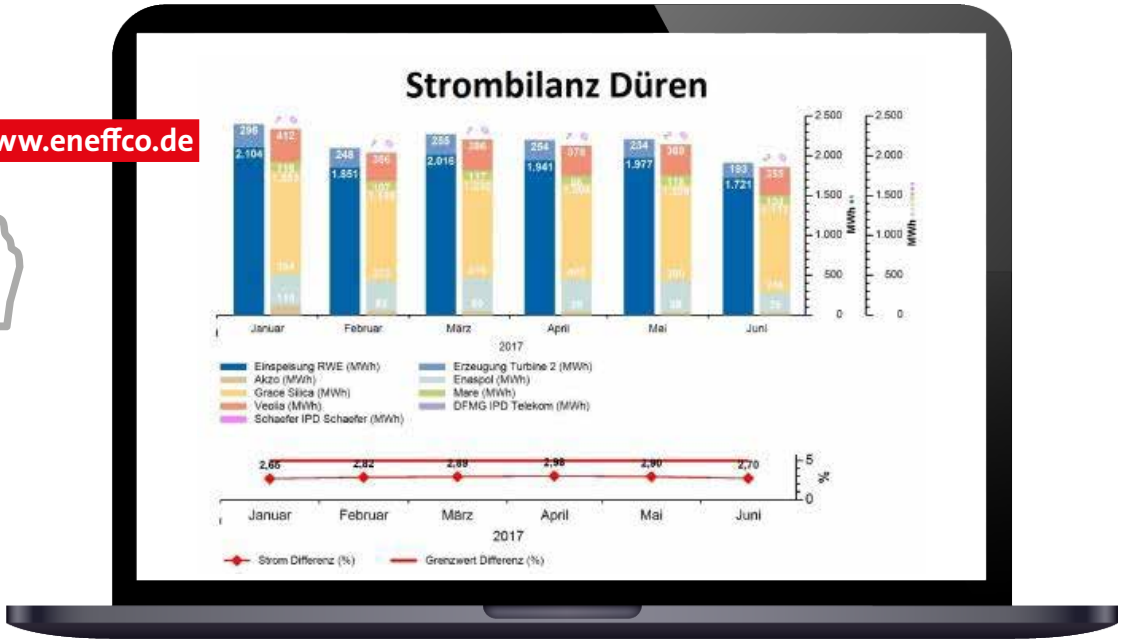
Intelligent load management: Refrigeration systems can be individually managed and configured according to needs (e.g. based on high demand windows).

Integrated systems control: Automated control of several cooling systems (via expansion valves) in accordance with targeted time strategies.

Quality assurance: Monitoring of cooling systems and operational requirements (e.g. legally mandated temperatures), including the possibility of manual override and alternative operational procedures.

Transparency: The reporting system provides a visualization of the sites operations

» www.eneffco.de



> “Thanks to ÖKOTEC’s expertise and the EnEffCo® solution, our refrigeration systems are now flexibly managed based on actual needs, saving us money in the process.”
>
> **Falco Labrenz,** Engineering Coordinator/EnMB

PLANET

Transparent KPIs related to energy use and precise data for reports.

Prague - Czech Republic

BIOCNG TRANSFORMATION

green fuel for the city's fleet

Prague´s wastewater treatment plant transforms the produced biogas into bioCNG, which then serves as fuel for Veolia and the city's fleet.

The challenge

Wastewater has already been used to produce electrical energy at Veolia´s major wastewater treatment plants across the Czech Republic. The goal was to go even further:

- Reduce our dependence on non-renewable resources
- Reduce our carbon footprint and greenhouse gas production
- Make more financial savings
- Contribute to the ecological transformation of the city and promote environmental responsibility.

Veolia's solution

In Prague, Veolia built a station to produce BioCNG at its wastewater treatment plant.

The bioCNG pilot unit produces up to 1 252 000 m³ bioCNG / year. Our fleet consumes around 1 million m³ bioCNG / year.

600 tons

greenhouse gases reduction / year

€570,000

savings in 2022

1,252,000 m³

BioCNG produced /p.a.

The produced BioCNG serves as fuel for Veolia and the city fleet:

- BioCNG/CNG vehicles have a reduced toll rate
- BioCNG/CNG vehicles can operate even in exceptional situations, such as when a smog calamity is declared and also in locations where only ecological vehicles are allowed
- Easier maintenance (absence of solid particles filter and additives)
- Cars designed to use bioCNG/CNG are quieter, more ecological and overall more efficient
- CNG vehicles have zero particulate emissions

The benefits

A positive impact on the urban environment and wellbeing of its citizens and circular economy promotion: BioCNG is a 100% renewable resource obtained from wastewater:

- Reduction in greenhouse gas production of 600 tons per year.
- Savings of €570,000 in 2022.
- Profit of €169,000 per year from the sale of unused bioCNG.
- Contributing to the commitment of the October 2018 UN Intergovernmental Panel on Climate Change to reduce global CO_2 emissions by 45% by 2030 and achieving zero CO_2 emissions by 2050.
- Cooperation with the municipality on eco-friendly city transport and reduction of smog in the city.
- Creation of 3 new jobs related to the operation of the bioCNG unit.

REGIONS & CITIES

Significant reduction of greenhouse gas emissions

PLANET

Positive impact on urban environment and the wellbeing of its citizens

WOMEN & MEN

Creation of new jobs related to the operation of the BioCNG unit

COAL EXIT STRATEGY CZECH REPUBLIC 2021-2030

heating industry ecological transformation

Veolia is committed to transforming its coal-fired activities in Europe by 2030, replacing coal with other, less polluting and, in most cases, renewable energy sources. In the Czech Republic the coal exit strategy is well ahead of this commitment.

The challenge

Moving to carbon neutrality is a universal goal and a fixture on the international political agenda since the 2015 Paris Agreement. The Agreement sets a goal of keeping the increase in global temperature below 2°C above pre-industrial levels. Achieving this goal will not be possible without exiting coal. The challenge for Veolia is high in a country, whose energy is historically based on coal.

Veolia's solution

Veolia in the Czech Republic will completely exit coal by 2030, with the majority of sites exiting coal by 2025. Currently, there is a limited number of options for replacing coal. New technologies may emerge in the future, but so far the main available sources are biomass, waste and natural gas.

- Biomass is used for smaller heating plants: in Mariánské Lázně, a spa town in Western Bohemia, for example, biomass has been used since 2014 and covers about 70% of the town's consumption.
- Waste is an option for medium-sized heating plants: Přerov in Northern Moravia, starts to use solid recovered fuels in 2022, with other towns in the region to follow soon.
- Natural gas will be temporarily used for bigger heating plants, such as Prague or Ostrava.
- Veolia also begins with hydrogen projects in the Czech Republic, that may play an important role in the years to come

Energy, coal exit

type

€506 M

total expected investment 2021-2027

2025

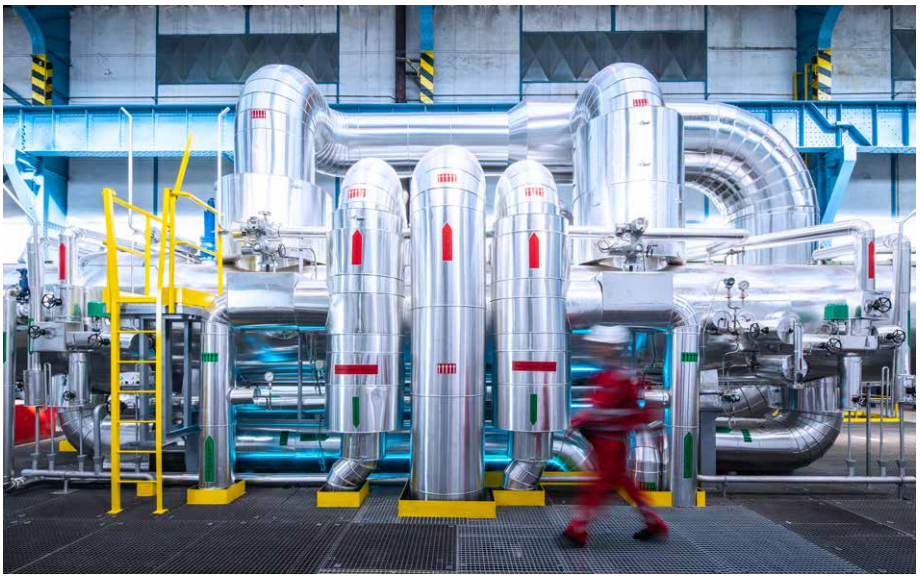
majority of sites without coal

50%

CO_2 emissions reduction between 2016 and 2030

The benefits

- Deal with high carbon allowances prices
- Reduce CO_2 emissions by 50% by 2030, as well as tens of percent lower emissions of sulphur dioxide, nitrogen oxides and dust
- Lessen our overall environmental impact
- Help municipalities to solve the problem with the low utilization of residual municipal waste
- Implement new technologies and encourage innovation



REGIONS & CITIES

Significant CO_2 emissions reduction

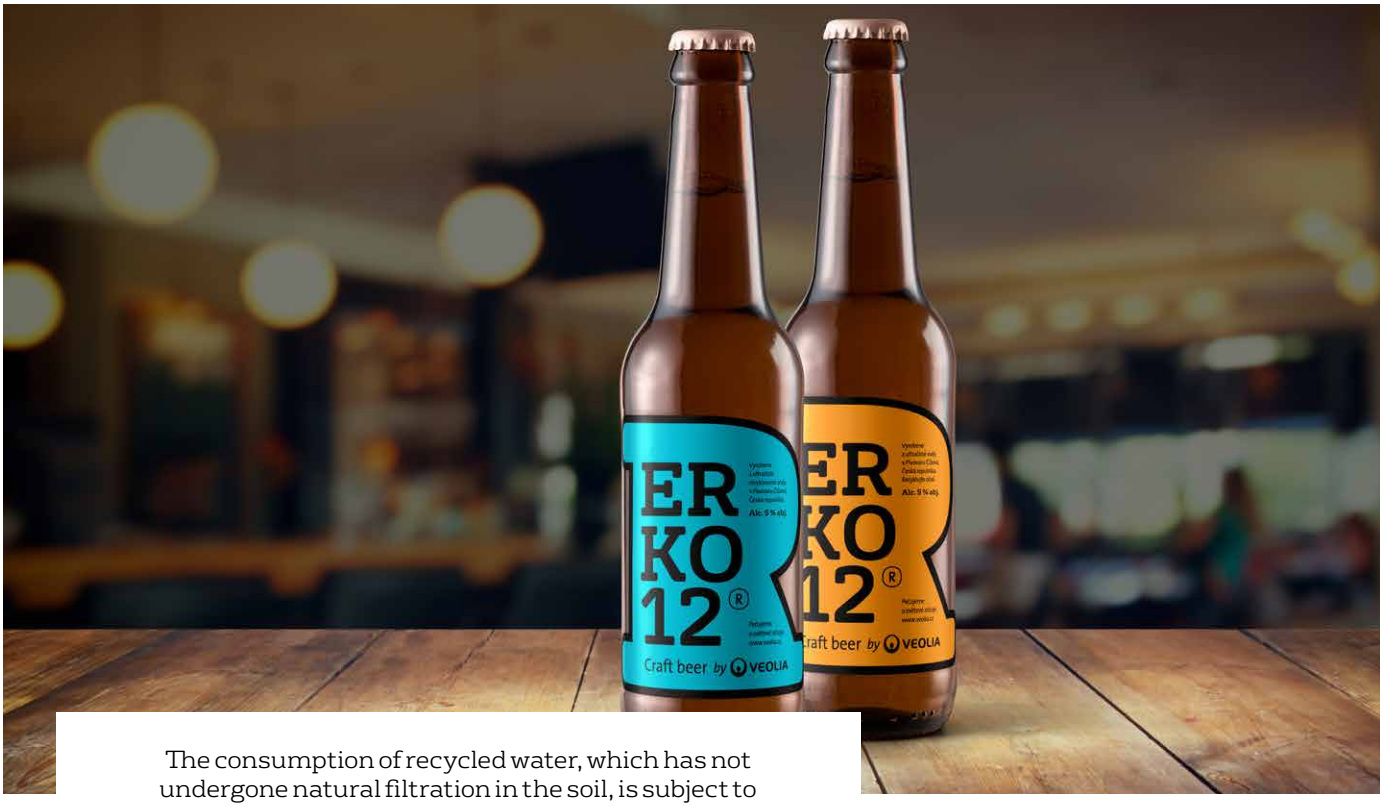
PLANET

Contribution to the development of the region

South Bohemia (Čížová) - Czech Republic

ERKO: THE FIRST CZECH BEER FROM RECYCLED WATER

circular economy in practice



The consumption of recycled water, which has not undergone natural filtration in the soil, is subject to an age-old psychological barrier. In an IBRS survey for Veolia, only 14% of respondents would definitely taste recycled water (41% rather yes). But barriers are gradually disappearing, hand in hand with technological progress.

The challenge

To help dismantle those barriers, to raise the general public's awareness of the importance of preserving water resources and to popularise circular economy principles, Veolia and Čížová microbrewery have developed one of the first beers in the world brewed using recycled wastewater, named ERKO

Veolia's solution

Veolia recovers wastewater in the central treatment plant in Prague and then treats it using its proprietary mobile membrane water reclamation unit.

The principle? The treatment train comprises classical coagulation, followed by ultrafiltration and reverse osmosis, where ultra-fine synthetic membranes serve as a filter that lets water pass through and retains suspended solids and other substances such as micro-organisms and viruses. The water is then filtered through granulated activated carbon and disinfected.

The advantage of membrane technology is that the filtration does not need added chemicals and new types of membranes have low energy consumption.

Since May 2019

duration

Water, circular economy

type

30 hl

produced since May 2019

1st

a first for the CEE zone

750 MM m³

annually treated wastewater without further use in the CZ

The benefits

Not only is the result of the treatment process using Veolia´s own technologies recycled water that meets the legal requirements for drinking water quality, but even the biggest beer connoisseurs do not see any taste difference in comparison with beers brewed with “normal” water.

Using the beer example in the Czech Republic, which is one of the top beer-consuming countries in the world, led to the intended goals:

- Presentation of Veolia´s technologies and expertise in the field of water treatment
- Raising public awareness on the importance of preserving water resources
- Popularise circular economy principles

PLANET

raising awareness of the need to protect resources

A PARTNERSHIP TO REDUCE THE ENVIRONMENTAL FOOTPRINT OF BEER

water and energy management

In the Czech Republic, Veolia and Heineken have signed a 10-year contract to provide energy and water management services for the Royal Brewery in Krušovice.

The challenge

Beer has been brewed at the Royal Brewery of Krušovice since 1581, making it one of the oldest Czech beer brands. Since 2007 it has been part of the Heineken Group. For a number of years Veolia and Heineken have been working together to reduce water consumption in its breweries. In 2019, the two partners went a step further by signing a major contract to provide not only water and wastewater services, but also energy management services for the Royal Brewery in Krušovice that Heineken acquired in 2007. The challenge for Veolia is to modernize the equipment and the processes in one of the oldest breweries in the Czech Republic – but without disrupting normal operations.

Veolia's solution

In addition to supplying heat, cold and compressed air, Veolia is responsible for operating the brewery's energy system and team management. The Group is committed to active energy management, and to continuous improvements in energy performance and cost reduction.
It is reflected in the creation of an energy specialist role, regular assessments and investments in new equipment.

10 years
duration for Energy operations

ONE VEOLIA
type

66%
lower electricity consumption

€ 115,000
saved on lighting

8%
reduction of raw water consumption

Veolia is also supervising and modernizing the existing wastewater treatment plant in Krušovice and has provided several state-of-the-art technologies to reduce the brewery's water footprint.
To enable planned extension of the facility, smart pumping and treatment optimization measures will be deployed to preserve the capacity of the current precious underground water resources.

The benefits

Upgrading the energy and water management equipment and processes in the Krušovice brewery has already reduced the environmental impacts of beer production and produced substantial savings too. It is in line with Heineken's sustainability strategy, particularly with regard to saving drinking water resources and reducing CO_2 emissions.

For example, in several of the plant buildings, Veolia has made savings by replacing hundreds of old lightbulbs with energy-saving LED bulbs. The result is 66% lower electricity consumption and a saving of more than CZK 3 million (about €115,000) over a period of 10 years for Heineken.

Reverse osmosis and ultrafiltration (a membrane separation method that increases the volume of treated, and therefore reusable, water) systems were installed, reducing raw water consumption by more than 8%.

PLANET

reducing water and ecological footprint

TECHNOLOGY FROM MARS AT THE SERVICE OF WATER SUPPLY AND SANITATION

efficient management of the city's infrastructure

Veolia controls the water supply and sanitation network in Prague, capital city of the Czech Republic, with the help of satellites. The same technology was used in the search of water on planet Mars.

The challenge

Losses of water in the distribution network can reach high percentages of the volume introduced and are still significant in many urban areas. Leakage constitutes not only a financial problem but is an important issue regarding the protection of natural resources and dealing with water scarcity.

Veolia's solution

Prague´s Water Company from the Veolia Group works with a technology developed by the Israeli company Utilis. It uses a Synthetic Aperture Radar carried by a satellite from the Japanese space agency JAXA.

The sensor on the satellite captures transmitted radar pulses, which can distinguish whether it is surface, waste or drinking water.

The system is functional in all weathers and radar reflections can penetrate the ground to a depth of up to three metres depending on the type of ground surface. Image evaluation takes several days.

The satellite identifies places with potential leakage. Subsequently, search teams are sent and, if the leakage is confirmed, they proceed repair the pipeline.

< 13%

water losses in Prague

50

leakages discovered in 2021

1,000 km

of pipelines already checked in 2021 out of 3,549 km in total in Prague

The benefits

Rapid monitoring of a large area without the necessity for lengthy preparations and possibility of targeting subsequent search activities to only about ten percent of the original area.

Effective method of finding leakages with quick ROI of four or five months.

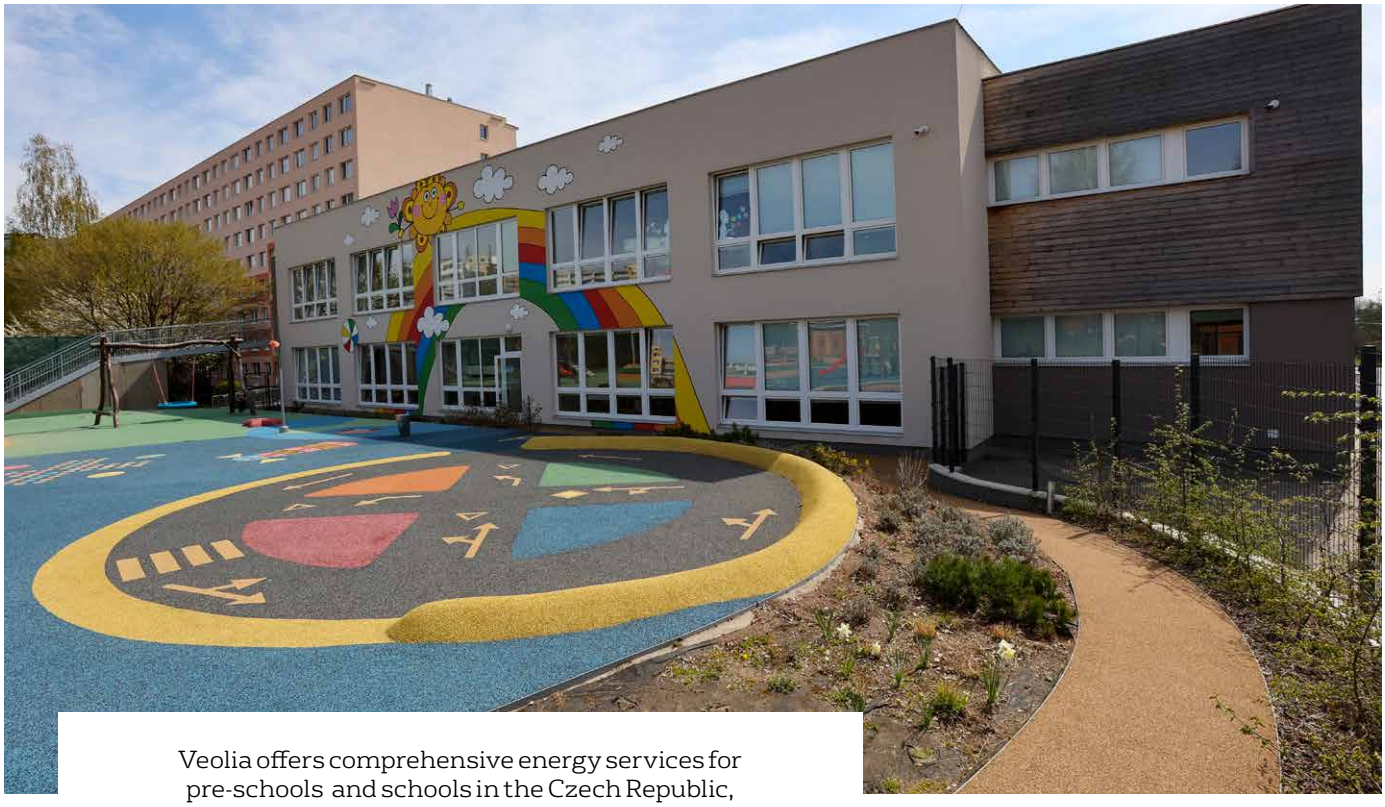
Water losses in Prague have been lower than 13% off the total water supply in Prague since 2019. Back in 2005, they reached more than 25% and in 1996 water losses amounted for more than 43%.

PLANET

reducing water losses and preserving water resources

PRE-SCHOOLS OF THE THIRD MILLENNIUM

energy services for municipal buildings



Veolia offers comprehensive energy services for pre-schools and schools in the Czech Republic, including biodynamic lighting, heat recovery systems and photovoltaic power plants.

The challenge

As an energy supplier, Veolia´s aim is not only to provide city buildings with a good quality and reliable heat supply. The aim is to provide comprehensive energy services with a demonstrated positive impact on energy savings, on the environmental footprint and on the comfort of the people inside these buildings.

In pre-schools and schools, the main challenge is to ensure energy efficiency of the buildings together with a healthy environment for children, both in terms of air quality and lighting.

Veolia's solution

In Mladá Boleslav, Central Bohemia, Veolia has replaced the lighting system with its biodynamic range including:

- Circular luminaires with a diameter of 4 meters with two-way light emission and biodynamic lighting function
- Possibility to change the chromaticity temperature (colour) according to the time of day from 2,700 to 6,500K
- LED panels with prismatic diffuser
- Solar lights on the driveway

67%

electricity savings with biodynamic lightning

1,500 ppm CO_2

indoor environment compliance

up to 80%

of annual electricity consumption covered with photovoltaics

In Olomouc, Central Moravia, Veolia´s solution also includes a photovoltaic system on the pre-school roof.

Pre-schools and schools can also be equipped with a heat recovery system:

- During winter, warm exhaled air is extracted from the room and supplied with fresh air from outside. Dirt from outside air is removed and the air is warmed using waste heat
- During summer a fan can also help cool the air

The benefits

Energy savings and overall environmental footprint reduction:

- Biodynamic lighting:
  - » annual electricity savings of up to 67%, lifespan of 50,000 hours and ROI of five years
- Photovoltaics:
  - » Savings on distribution fees, Significantly shorter ROI, up to 80% of annual consumption can be covered by electricity from the sun

Healthy indoor environment:

- Biodynamic lighting:
  - » increases people's concentration, their productivity, and has a positive effect on their overall health and well-being
- Heat recovery unit:
  - » effectively removes dust particles, viruses and bacteria or volatile organic compounds (such as formaldehyde, benzene)
  - » compliance with the limit for a healthy indoor environment of 1,500 ppm CO_2
  - » healthy cool air - ensures optimal difference between outdoor and indoor temperature
  - » reduction of morbidity, respiratory problems, allergies, but also fatigue and headaches

PLANET

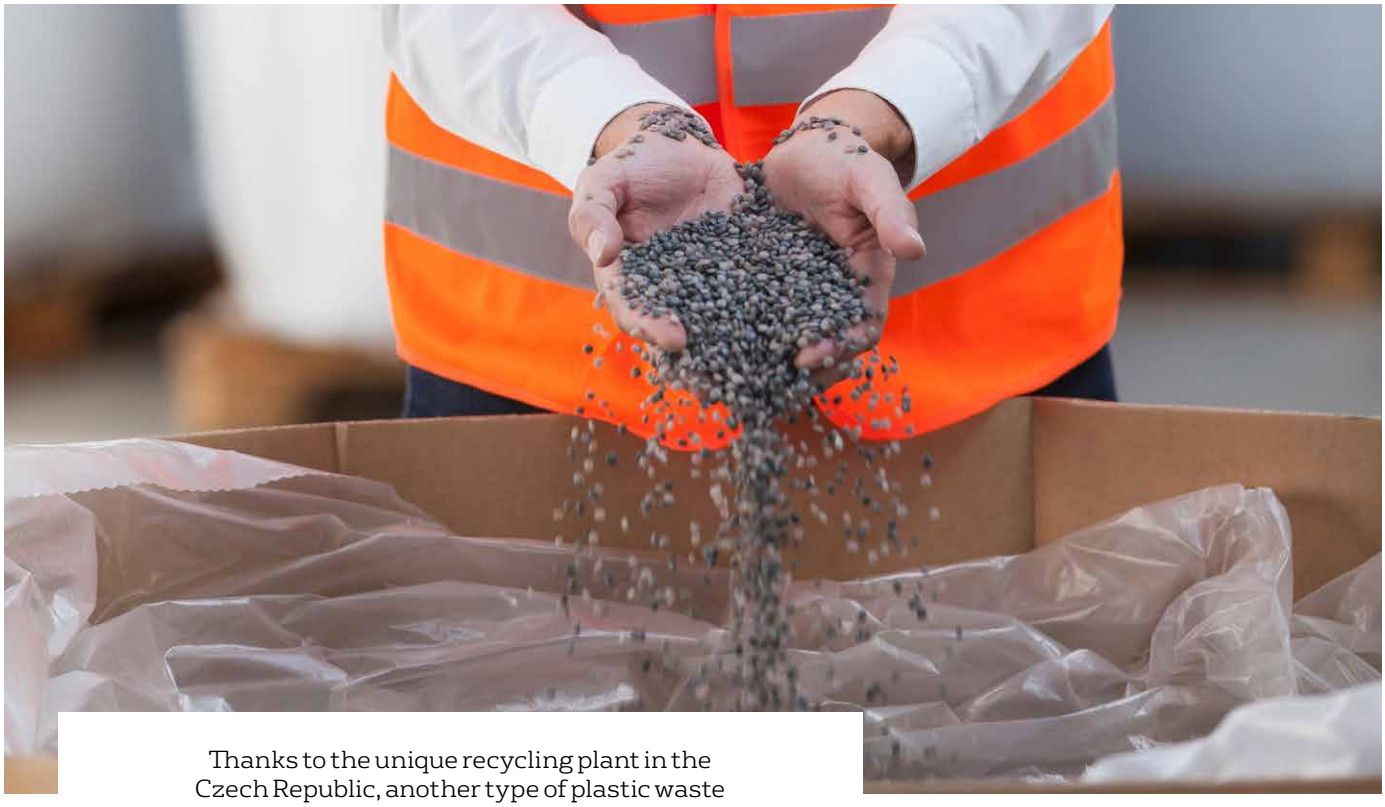
ecological footprint reduction

WOMEN & MEN

healthy and comfortable indoor environment

PLASTIC RECYCLING

Plastic LDPE films are not a waste anymore. We recover resources for the future.



Thanks to the unique recycling plant in the Czech Republic, another type of plastic waste is transformed into a new raw material.

The challenge

In the Czech Republic, we co-founded the Czech Circular Economy Association. We clearly prefer waste recovery to landfilling. That is also why the construction of the plant for LDPE plastic films recycling was started in 2016.

Veolia's solution

- A recycling plant with an annual capacity of 5,000 metric tons for LDPE film, which is almost half of Recovera's total capacity for plastic wastes recycling in the Czech Republic.
- The plant is comprehensive and includes everything from the feeding of film to the loading of recycled pallets into big expedition bags.
- It also includes its own wastewater treatment plant, which allows us to recycle the water several times.
- A photovoltaic powerplant is to be installed on the roof of the process building in 2023 to increase energy self suffuciency.
- 6,750 metric tons of CO_2 cutting emissions per year thanks to using recycled plastics
- 22,000 barrels/p.a. of oil that Europe does not need to import
- cost efficiency thanks to using energy from landfill gas cogeneration

5,000

metric tons of plastic waste recycled per year (capacity)

water

saving technology

energy

saving technology

6,750

metric tons of CO_2 cutting emissions

unique

technology in the Czech Republic

The benefits

- New approach to treat a plastic waste
- Landfill waste reduction
- High added value for both industrial and municipal customers – plastic waste producers
- Important project in a circular approach and raising a secondary raw materials vs virgin materials

> Plastic recycling in Němčice nad Hanou was launched seven years ago. It was a bold investment at the time, and now, when energy security and raw material supply are showing its importancy, we can see how right the move was.
>
> **Michal Stieber**, CEO company

REGIONS & CITIES

Great cooperation with the city in the development of the original waste treatment site towards a super-modern circular economy.

PLANET

An improvement in the CO2 balance and saving natural resources/virgin material by producing a high quality secondary raw material.

WOMEN & MEN

20 employees

BRATISLAVA: PARTNERSHIP WITH A STRATEGIC MUNICIPALITY

Municipal, Industrial

Electricity and heat cogeneration, ancillary services.

The challenge

Veolia has been present on the Bratislava market since its creation in 1993. Since the new DHN contracts were signed with the municipal districts of Petržalka, Dubravka and Podunajske Biskupice. In 2013 the major contract with Petržalka was prolonged by 20 years with the installation of 18 cogeneration engines in existing boiler rooms and a total capacity of 15.3 MWe. With an annual turnover of more than €37M and heat sales of almost 400 GWh/p. a. Veolia, along with state owned BAT and Engie services, was already one of the biggest players on the district heating market in Bratislava.

Veolia's solution

Veolia acquired PPC Group, which owns and operates a combined cycle gas turbine (CCGT) plant in the Slovak capital, Bratislava. The transaction was finalised in July 2018. PPC Group has operated a CCGT plant in Bratislava since 1998 and is currently among the leading producers of power and heat in Slovakia. The heat produced heat is exclusively supplied to state owned Bratislavská teplárenská (BAT) which then distributes the heat to households and other customers in Bratislava. The electricity produced is supplied to the distribution grid through the guaranteed Feed in tariff scheme. In addition, PPC Group provides ancillary services to the national Transition operator SEPS. The gas fired power plant produces clean energy for sustainable growth and strengthens the position of Veolia on Bratislava's heat market.

ownership

of the CHP

15 years

guaranteed electricity feed in tariff

15 years

heat sales contract with BAT

360 GWh/p.a.

heat supplies to BAT

277 MWe

installed capacity

1,000 GWh/p.a.

purchase of natural gas

The benefits

Strategic fit for the group

The acquisition of PPC group strengthens the position of Veolia on the Slovak market and allows Veolia to become the key player on the heat market in the capital city as well as an important player in high efficiency electricity generation.
In the project, Veolia can benefit from its local know-how and expertise in heat and electricity production and sales to customers, as well as from its know-how of doing profitable business in a complex regulatory environment.
The acquired assets are key for the current heat distributor and producer in Bratislava, state-owned BAT company, as it ensures on the basis of a longterm contract nearly 40% of the heat production needed in Bratislava Eastern district heating network.
The PPC business is secured by a long term contract for heat (10+5 years), feed in tariff guarantee (15 years) and stable and promising ancillary services business for the future. Thanks to these contracts the heat deliveries can be realised at very competitive price conditions.

Currently, several common working groups with BAT were created in order to assess specific cooperation projects in areas such as joint investments into the connection of new clients, heat to cold offer to clients and the interconnection of existing networks of Veolia and BAT.

Our strong position in Bratislava gives us an advantageous position in case of the possible future privatisation of BAT and opens new possibilities to develop other businesses of Veolia such as, the connection of the municipal incineration plant to the BAT network or investigating potential activities in water management (Bratislavska Vodarenska Spolocnost).

REGIONS & CITIES

Promoting clean energy for sustainable growth.

LEVICE: LOCAL ENERGY LOOPS MANAGEMENT

Municipal, Industrial

Electricity and heat cogeneration and ancillary services; Veolia provides heating, air conditioning, gas supply and distribution to customers in the industrial park. Heat is also delivered to the city via DHN.

The challenge

The acquisition of Levice Energy Group (LEG) – a gas fired CCGT CHP plant - with the aim to strengthen Veolia´s position on the energy market as one of the leading companies – energy services providers in Slovakia. By acquiring the asset, the share of Veolia on the total installed capacity (MW) of all CCGTs on the Slovak market has now reached 36%.

Veolia's solution

A strategic and structured market approach through carefully selected strategic acquisition to gain strength and market position.
Gaining a leading position in the Levice region in these areas:

- Energy services provision for industrial clients in the Levice Industrial Park (heat and cooling),
- Gas distribution and supply to industrial clients,
- Heat supply for industries, households and the municipality of Levice.

Development of the newly acquired business through synergies and internal know-how, replicability of the Levice CCGT specificities internally.
Veolia as a strong, international, reputable and strategic partner for Levice customers.

since 2019

Duration

ownership

of the CHP, 15 years guaranteed electricity feed in tariff

87 MWe, 32 MWt

installed capacity

245 GWh

annual electricity production

180 GWh

annual heat production

The benefits

The acquisition of the LEG group strengthens the position of Veolia on the Slovak market and allows Veolia to become an important player in high efficiency electricity generation.

Levice Energy Group consists of 5 companies whose main business consists of:

- Electricity production in high efficiency combined heat and power mode from natural gas (CCGT plant),
- ancillary services provision for balancing the national grid,
- heat production for the adjacent industrial park and the city of Levice,
- heat distribution through the DHN in the city,
- production of cold by absorption and sale of cold to industrial customers,
- operation of an ORC cycle,
- operation and distribution of natural gas through the local distribution gas network for industrial customers.

Due to the high efficiency of the equipment, co-generation of electricity and heat and 15-y long feed-in-tariff support, our heat customers can benefit from a highly competitive price of heat sold through our own heating distribution network.

Heat is used as well to produce cold in an absorption unit of 10MW supplying cooling energy to industrial customers at a competitive price.

The national grid operator (SEPS) uses our plant to balance the grid through a rather deficient type of service on the Slovak market – aFRR+/- and thus the CCGT plant is a vital part of the grid balance.

The plant's flexibility is ensured through 2 gas-fired turbines, with a combustion boiler and a steam turbine complemented with 6 gas engines and an electrical boiler.

Waste heat is used in an ORC cycle to produce additional electricity.

On top of that, Veolia operates gas and heat distribution networks, thus ensuring quality direct supplies to our final customers according to their needs.

REGIONS & CITIES

Long-term support
to help our clients - territories
and industrialists - to improve
their environmental footprint.

END OF COAL OPERATION AND INSTALLATION OF A BACKUP SOURCE ON HEAT PRODUCTION

heating industry ecological transformation

The project plan of Veolia Energia Slovensko, a.s., which consists in the production of renewable and low-carbon gases - biomethane and hydrogen, is based exclusively on the use of local raw material resources. Biomethane will cover the energy needs of the industrial park and the town of Žiar nad Hronom, while hydrogen has an application in the concept of urban hydrogen transport.

The challenge

The project in the field of circular economy has the ambition to become an example of sectoral integration of electricity, gas and heat markets, which creates good preconditions for solving the challenges posed by the forthcoming significant energy transformation. The project consists of a combination of facilities for the production of clean synthesis gas based on biomass and non-recyclable municipal waste (RDF) and facilities for the extraction of biomethane and hydrogen from these synthesis gases.

Veolia's solution

The input raw material for the production of renewable and low-emission gases is from exclusively local sources - waste from the wood processing industry and sorted and non-recyclable municipal waste (RDF), which today ends up in landfills. The amount of biomethane produced will ensure the annual consumption of the local power plant with highly efficient combined heat and power generation and will cover the needs of heat and cold supply for the industrial park and households of the town of Žiar nad Hronom. The annual content of hydrogen produced can fully cover the 30 million kilometres of hydrogen-powered bus transport.

120,000 MWh/p.a.
Renewable heat supply

85,000 MWh/p.a.
Green electricity production

5,250t/p.a.
Hydrogen production for public transport

100%
GHS Emission reduction from electricity and heat production

100%
Replacing hydrogen as a fuel for public transport

Veolia's solution

The project has the ambition to contribute to building Slovak leadership in the field of hydrogen technologies and achieving carbon neutrality in the Žiar nad Hronom region. The project was supported by the Ministry of the Environment of the Slovak Republic, the city of Žiar nad Hronom, Slovak Bus Transport Zvolen, Slovak University of Technology, future partners (Slovnaft, SPP-Distribution) and professional organisations Slovak Heat Producers Association, National Hydrogen Association of Slovakia and Slovak Gas and Oil Association. The partners are also scientific research institutions, Slovak and foreign companies providing progressive and highly innovative technologies and solutions in the field of recovery of primary raw materials and production of renewable gases.

The Benefits

The project contributes to achieving climate goals at national and EU level - reducing greenhouse gas emissions and decarbonising energy production. It contributes to the protection of the environment, in particular in the areas of natural resource management, combating climate change, reducing landfilling, protecting biodiversity and improving the health and quality of life of people in the region.

Project funding and financing

160 mil. EUR
CAPEX

45%
VEOLIA

55%
Innovation fund

REGIONS & CITIES

reducing landfilling, protecting biodiversity and improving the health and quality of life of people in the region

PLANET

reducing greenhouse gas emissions and decarbonising energy production

PRODUCTION OF RENEWABLE AND LOW CARBON GASES

Veolia plants to produce hydrogen in Žiar nad Hronom

Veolia Utilities Žiar nad Hronom, a.s. started preparatory work on an investment project for the decommissioning of coal operations and for the installation of a backup source for heat production. This investment will ensure the production of green energy for the industrial park and the inhabitants and thus contribute to improving the environment and the quality of life in the city.

The challenge

This installation ends the era of coal combustion in heat production in the ZSNP industrial area in Žiar nad Hronom. Coal has been used in heat production since the construction of the first boiler in 1956 and was the main fuel for the production of steam, heat and electricity.

Veolia's solution

This will close a chapter that has been going on for several decades. At the same time, horizons for new and green energy are opening up. A project is being prepared for the production of synthesis gas and its combustion in conventional combustion plants producing heat for heating. The project plan focuses on the production of renewable and low-carbon gases, biomethane and hydrogen and, is based exclusively on the use of local raw material resources. Biomethane will cover the energy needs of the industrial park and the town of Žiar nad Hronom, while hydrogen has an application in the concept of urban hydrogen transport.

Energy, coal exit

Type

€1,36M

total expected investment

2020 - 2022

Duration

230

collection points in Žiar nad Hronom

127

contracted industrial customers

The benefits

- Reduction of CO_2 emissions by 50% by 2030, as well as tens of percent lower emissions of sulphur dioxide, nitrogen oxides and dust
- Reduction of our overall environmental impact
- Implement new technologies and encourage innovation
- Achive climate neutrality by 2050 through European climate regulation

REGIONS & CITIES

Significant CO_2 emissions reduction

PLANET

Contribution to the development of the region

Kozienice, Połaniec, Białystok, Łódź, Poznań, POLAND

EKO ZEC, POLAND
MANAGING COMBUSTION BY-PRODUCTS FROM ENEA AND VEOLIA INSTALLATIONS

Circular Economy

SCOPE: management of coal combustion products (CCPs) from ENEA and Veolia Installations

The challenge

For any industrial client, waste generated in production processes can significantly impact profitability. Optimising the cost of waste treatment becomes a challenge. For an Energy producer based on coal, like ENEA (the 3rd largest energy producer in Poland), handling coal combustion products and optimising the associated cost is one of the major challenges they face.

Veolia's solution

EKO-ZEC, Veolia's subsidiary is specialised in the treatment of coal combustion products and provides its clients with a solution to transform their waste into a resource. Thanks to its know-how and experience, EKO ZEC is able to recycle this waste into products for the construction industry (cement plants), preventing its clients from the need to bear the cost of disposing ash in landfills.

As the quantity of waste collected has overgrown the capacity of the Polish market to reuse it, EKO ZEC extended its portfolio of fly ash purchasers with businesses from Western Europe.

2016 - 2022

duration

2.8 million

tons per year
of by-products reused

30%

market share
in 2020

850,000 tons

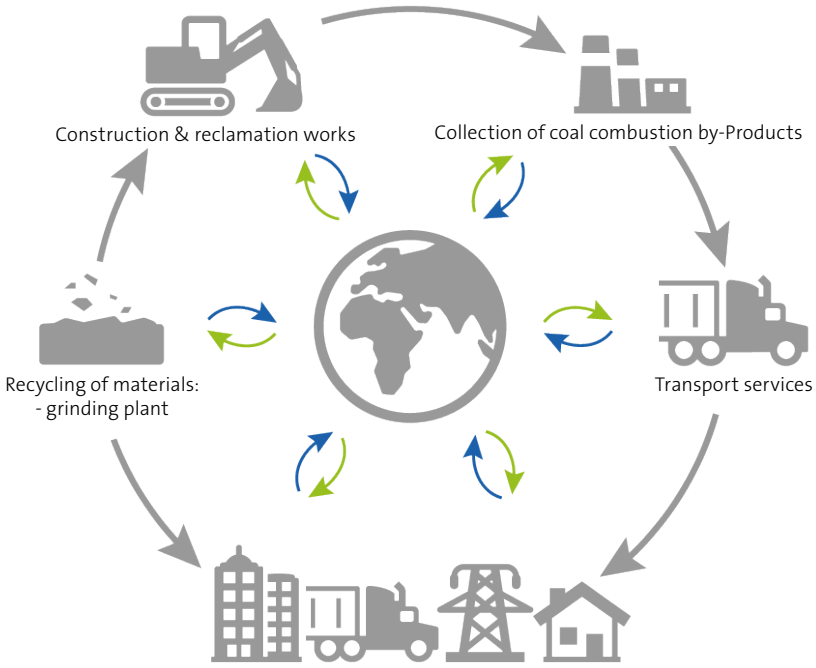
of fly ash and REA-gypsum
to be shipped
in 2017 – 2022

Benefits for our Clients

Reusing coal ash and REA-gypsum can bring multiple environmental, economic, and product-related benefits, including:

- environmental benefits, such as reduced greenhouse gas emissions, reduced need for landfill disposal, and reduced use of other materials,
- Economic benefits, such as reduced costs associated with fly ash disposal, increased revenue from the sales of fly ash, and savings from using fly ash and REA-gypsum in place of other, more expensive materials.

» https://eko-zec.com.pl/



Treatment of coal combustion by-Products:
- concrete production
- road stabilization materials production
- stabilisers

REGIONS & CITIES

27%-1.3 million tons
Quality ash market 4.9 million tons/p.a.
21%-1.5 milion tons
Market - UPS remaining
7.1 million tons/p.a.

PLANET

Utilisation of CCPs as an element of the implementation of the circular economy in the Polish and European power industry. CCPs become full-value products, rather than hazardous waste.

Poznań - Poland

OPTIMISATION OF THE HEAT DISTRIBUTION SYSTEM IN POZNAŃ

Construction of a heat storage tank at the Karolin CHP Plant in Poznań

The challenge

Heat surplus generated during CHP production.
Uneven load on CHP plant equipment, risk of higher failure rates.

Veolia's solution

Heat storage tank – connects two parts of the district heating system, increases flexibility of supply, allows for the optimisation of the heat distribution system in the city, ensures even load on CHP plant equipment and reduces the failure rates in the plant.

Benefits

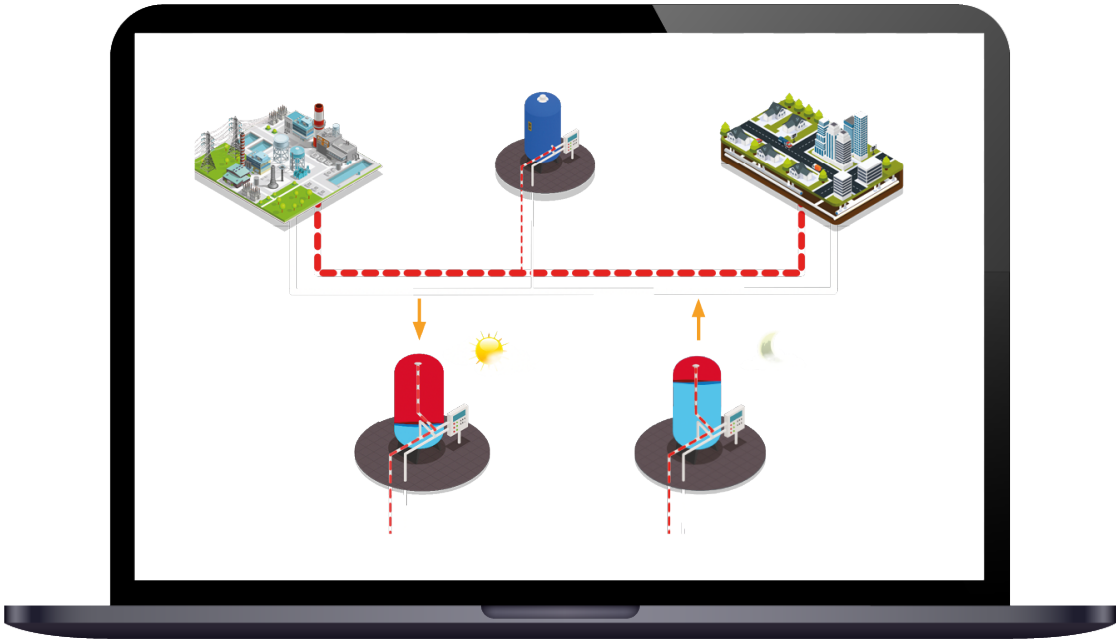
- Improved security of supply
- Increased efficiency of the heat distribution system
- Reduced system failure rates
- Another step towards the decarbonization of heat supply:
  - » reduction in CO_2 emissions – **24,000 tons/p.a.**
  - » savings of coal resources - **11,500 tons/p.a.**

11,500 tons/p.a.
savings of coal resources

24,000 tons/p.a.
reduction in CO_2 emissions

Diagram

Optimisation of the heat distribution in Poznań



» https://www.youtube.com/watch?v=FpcIrdcA3Os

“Our heat tank will contribute to reducing the carbon footprint of the distribution system in Poznan.”

Jan Pic, Vicepresident of Veolia Energia Poznań

PLANET

By storing the surplus of produced heat and using it in times of higher demand, we reduce coal consumption and CO_2 emissions.

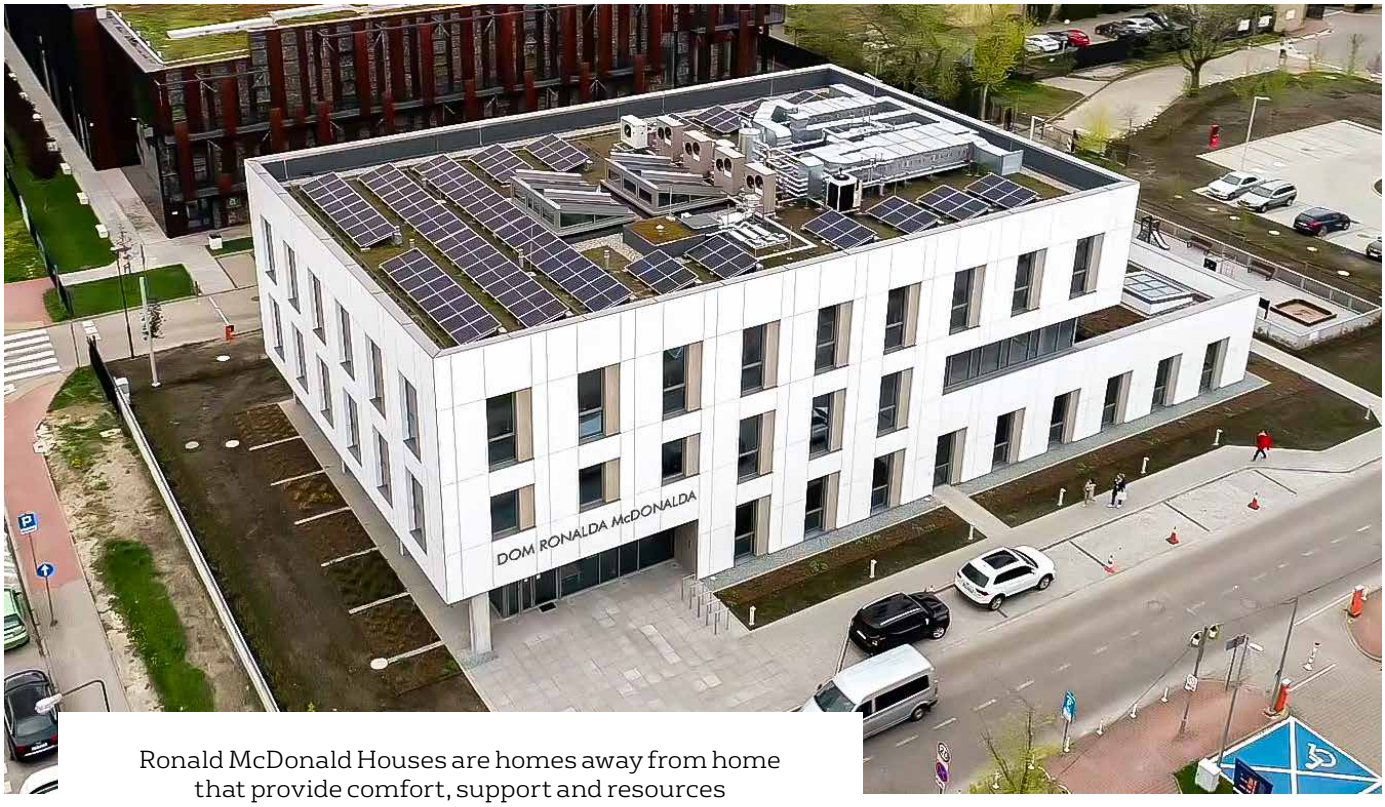
PEOPLE

Optimising the operation of the heat distribution system brings benefits for the environment and the local community.

Warsaw - Poland

GREEN ENERGY IN WARSAW CITY CENTER. RONALD MCDONALDS' FOUNDATION HOUSE

TRI-GENERATION & CSR COMPREHENSIVE ENERGY SOLUTION



Ronald McDonald Houses are homes away from home that provide comfort, support and resources to families who travel far from home seeking medical care their children needs.

42 countries	**361** Houses in the world	**97** Houses in Europe	**2** Houses in Poland

Veolia equipment provides electricity as well as cooling and heating for the building. **52% of the energy consumed** by the House will be clean, renewable energy.

The challenge

The main goal was to carry out an environmental and social project based on distributed energy sources and the so-called off-grid systems.
The reference tri-generation plant will provide the Ronald McDonald House with heating, cooling and electricity.

Veolia's solution

- On the roof: PV – 150 m² Heat pumps
- Source of heating, cooling and electricity
- 52% of the energy comes from renewable sources
- EV charger in the parking area

2070
duration

environmental
type

150 m2
PV panels on the roof

one solution
heating, cooling and electricity from Veolia

2 x 22 kW
EV charger

The benefits

- Veolia managed to apply a number of clean, green solutions in the building.
- We get involved by supporting the city and residents in building the Green Capital.
- We have proved that it is possible to produce green energy in the center of Warsaw.

Cooling, heating and electricity for the building - all in one Application!

» https://www.youtube.com/watch?v=b1nTb2AjE8E

Veolia's first electric car charger in Warsaw!

The location of the electric car charger complements the modern concept of the Ronald McDonald House.

- The 2 x 22 kW device charges a car's batteries within 4 hours

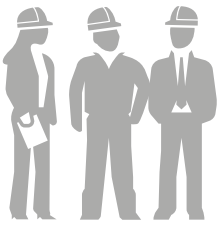
> "Renewable energy sources comprise the photovoltaic system and heat pumps that provide both heating and cooling. The Ronald McDonald House is virtually maintenance-free."
>
> **Bartosz Krysta**, Commercial Director

REGIONS & CITIES

This project shows how to effectively support the city and its inhabitants in building a Green Capital.

PLANET

52% of the energy comes from renewable energy sources.

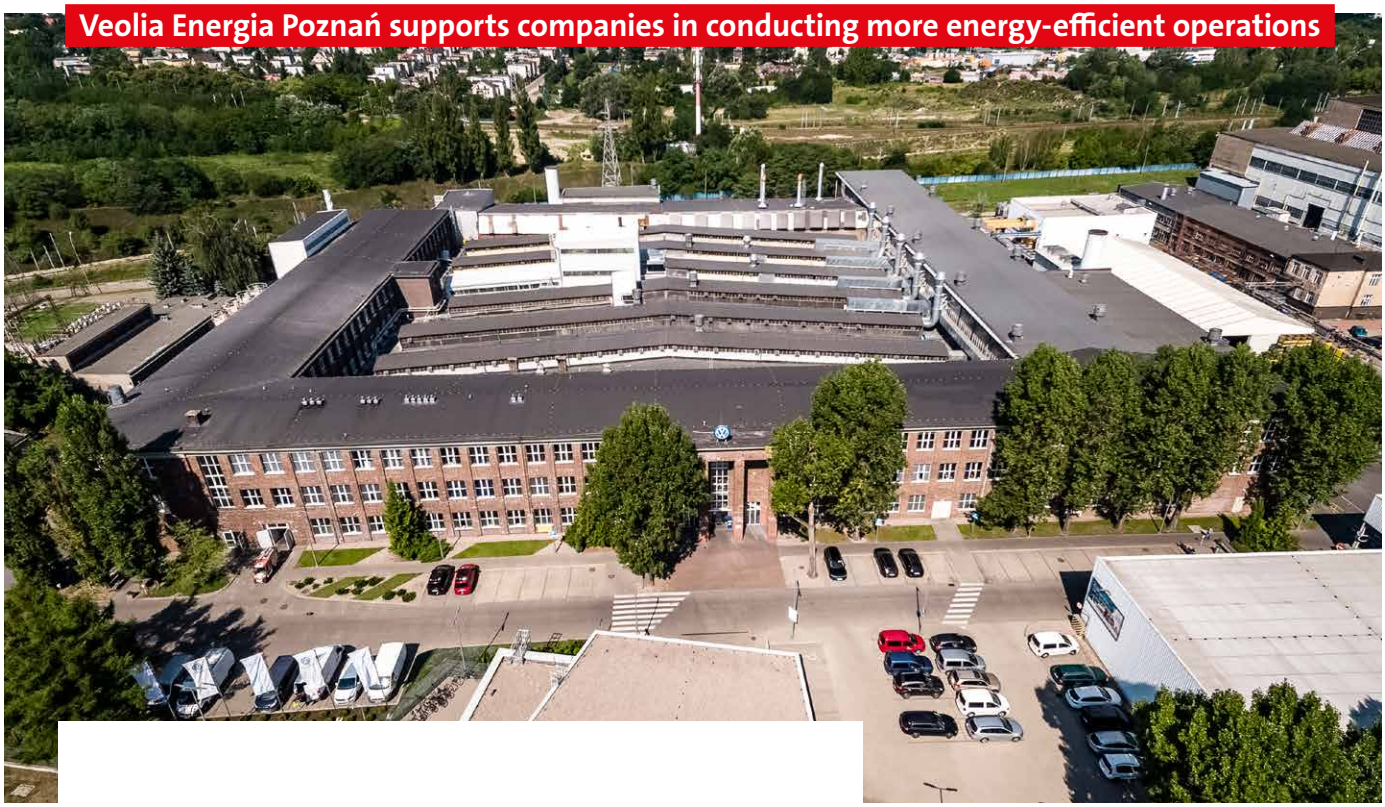


WOMEN & MEN

Veolia helped the Ronald McDonald Foundation to build a "home away from home" for families of children in need of medical care.

HEAT RECOVERED FROM VOLKSWAGEN FOUNDRY FURNACES SUPPLIED TO POZNAŃ INHABITANTS

Veolia Energia Poznań supports companies in conducting more energy-efficient operations



The challenge

In the Volkswagen Foundry in Poznań, 4 foundry furnaces emit very high amounts of heat, which the factory is not able to use on site. Based on a previous joint project, Volkswagen and Veolia decided to implement another heat recovery solution for the municipal heating network.

Veolia's solution

The new solution brings significant benefits for the environment as well as financial benefits for both partners.

Volkswagen is responsible for the design and implementation of the technical solution. Veolia creates technological and economic conditions favorable for the implementation of this project.

To transfer waste heat, Veolia will use the existing district heating substation, built during the implementation of the first heat recovery project in 2017.

» https://energiadlapoznania.pl/

5 years
duration

56,000 GJ
of reused heat

45
residential buildings heated

3,200 t
coal use reduction

2,440 t CO_2
emissions reduction

The benefits

In July 2021, the companies signed a contract under which Veolia will purchase and introduce to the network approx. 56,000 GJ of heat per year – starting from July 2022. This heat will be used for heating some 45 multi-family residential buildings.
The project is a great example of the circular economy, contributing to the reduction of the environmental impact of VW plants.

It will also reduce Veolia's fossil fuel combustion and the related CO_2 emissions.
This is yet another important step on the way to reducing the carbon footprint and decarbonisation – both for Volkswagen and for Veolia Poznań.

> "The search for waste heat should be a strategy of all heating systems. With protection of the world's resources in mind, we should make the maximum use of the energy that is wasted today."
>
> **Bartłomiej Pawluk**, Sales Director

REGIONS & CITIES

The project shows how the cooperation of an industrial plant with a district heating company provides access to green energy.

PLANET

The circular economy project allows for reductions in CO_2 emissions and coal combustion.

INNOVATIVE PRODUCTION OF GREEN HEAT FOR BOLECHOWO AND MUROWANA GOŚLINA

Supply of green heat to Veolia customers: Solaris and the "Zielone Wzgórza" Housing Cooperative

The challenge

Waste heat recovery from the Aquanet wastewater treatment plant in Szlachęcin:

- Supply of heat from a renewable energy source
- Reduction of heat production from coal
- Use of local resources – wastewater as a source of cheap heat

Veolia's solution

Veolia has designed a system for heat recovery from the wastewater treatment process, supported by a high-performance cogeneration installation. The heat is obtained simultaneously from two sources:

- Heat pumps, with wastewater as a low temperature heat source, powered by high-efficiency cogeneration
- On-premise cogeneration system in a wastewater treatment plant– surplus energy transferred to the national power grid

» www.youtube.com/watch?v=bwenB8S8eKo

3,400 tons/p.a.

savings of coal resources

2,000 tons/p.a.

reduction of CO_2 emissions

62%

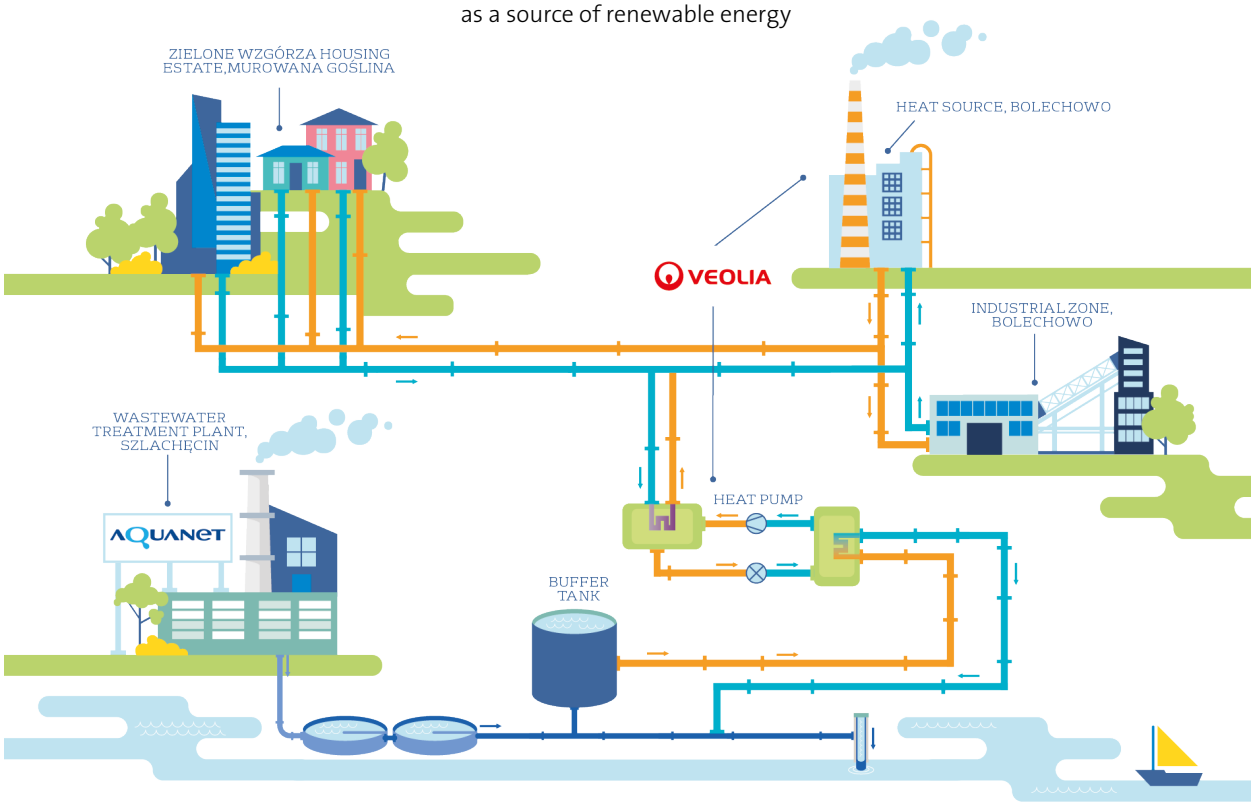
of renewable energy produced in the system

The benefits

- Green heat – heat production from local RES resources
- Energy efficiency– use of waste heat
- Improvement of air quality – reduction of atmospheric emissions by 74%
- Decarbonization– the first significant step to decarbonize heat supply
  - » reduction of CO2 emissions: **2,000 tons** per year
  - » savings of coal resources: **3,000 tons** per year

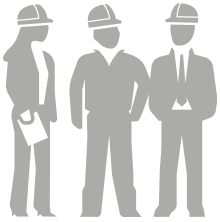
Diagram

Production of heat from wastewater as a source of renewable energy



PLANET

By recovering heat from wastewater through a heat pump, we increase the amount of heat energy obtained by over 2.5 times in relation to the electricity consumed. Therefore, we obtain an additional source of RES in the heating system, based on local resources.

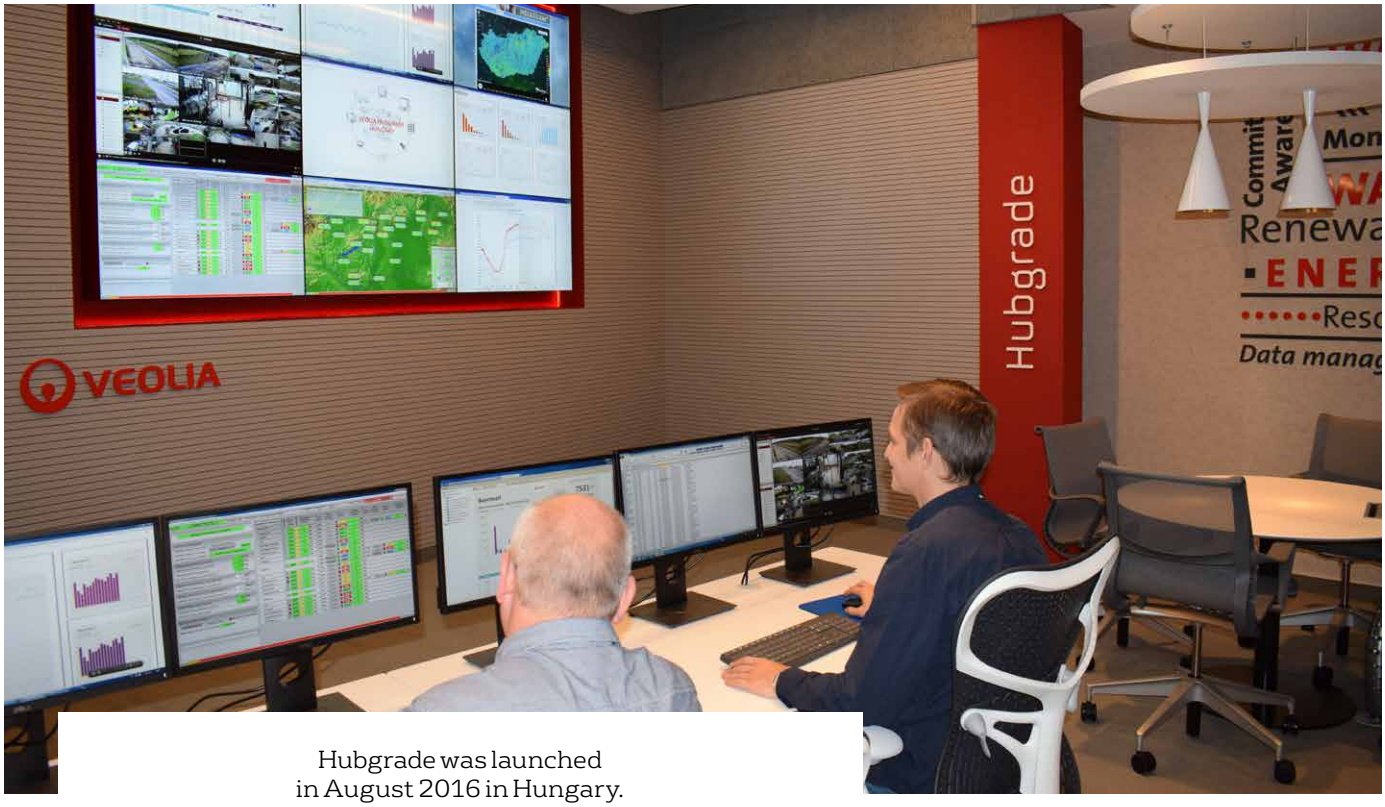


WOMEN & MEN

The cooperation between Veolia and Aquanet is an example of synergy between a water company and a district heating operator for the benefit of the environment and local community, including the customers - industrial customers in Bolechowo and municipal customers in Murowana Goślina.

HUBGRADE AND OPERATIONAL EFFICIENCY

ENERGY MANAGEMENT, EFFICIENCY



Hubgrade was launched in August 2016 in Hungary.

The challenge

Today, smart solutions play a leading role. The customers are aware of their environmental impact and want to operate their systems more efficiently to protect the environment. Their customers need a system to follow their consumption.

Veolia's solution

- Real time production monitoring
- Providing data for power plants and gas engines
- Daily monitoring of gas consumption and monthly gas consumption prognosis
- Technical information for controlling
- Smart metering customer service website developing and maintenance
- Energy efficiency services for individual clients

We have our own developing and maintenance team with ~90% added value.

energy

management

Ability

Data collection **Data processing**

Service

Development **Operation**

Customer

Operators **Clients**

Monitoring and data publication systems of Hubgrade

SCADA showroom

- The SCADA showroom is the monitoring and data collection system of power plants and gas engine sites.

Remote metering of heat centres

- Hubgrade's internally developed systems collect, process and publish the data of remote metered heat centers

Internal techical reports

- Designed to analyse, and publish the data gathered and processed by the automatised data collection systems. Contains electricity, heat production, natural gas consumption and efficiency analysis.

Schedule tracking application

- Traded electricity performance monitoring and short term free market sale monitoring, price forecast system

Meteorological forecast

- Short and middle term meteorological system. The measured values are registered using the official data of OMSZ (Hungarian Meteorological Service)

Energy efficiency analysis program

- Energy efficiency reports made for our contracted customers. Contains electricity, natural gas, heat consumption and the energy used during transportation.

SCADA >
Remote reading >
Manual data collection >

HUBGRADE DATABASE

The benefits

Operation, optimisation and upgrade of the systems

- Optimisation of the contact with the clients
- Data collection, data procession, data centre
- Integrated customers into Hubgrade:

8 power plants (80%)

25 gas engine plants (90%) / 134 natural gas

trading client (100%)

130 heat center

- Services:
  - » Research and development;
  - » Innovation;
  - » Startup activities;
  - » Digital workflow;
  - » Cyber security and data protection;

- Clients and data providing platforms currently in Hubgrade:
  - » 7 internal webpages (Hubgrade operative service, power plants / IT/ meteorology / gas engine sites / technical reports / regulation centres
  - » for 7 clients we provide energy efficiency service
  - » 2 smart metering customer sites, 130 heat centres (1,050 flats)

EUROPE'S LARGEST BIOMASS ONLY PLANT AND 100% GREEN DISTRICT HEATING NETWORK IN PÉCS

ENERGY, MUNICIPAL CONTRACT

The challenge

Veolia´s biomass cogeneration plant in Pécs supplies the city´s heating network and delivers electricity to the national grid. Its particularity lies in that the power plant is fed by straw and wood chips; it produces 85 MW of electric energy and 188 MW of thermal energy by burning 160,000 tons of straw in bales and 50,000 tons of agricultural by-products each year.

Bottom ash (18,000 tons) and fly ash (3,000 tons) are then used as fertiliser for the soil thanks to their potassium, phosphorus, micronutrient content, and their pH. Since 2019, a new ash storage building has made it possible to avoid the use of big bags (42 tons of plastic packaging waste avoided per year) and save the water from the ash (3,000 m^3 of water).

Challenge = switching from a linear consumption pattern (take, make, consume, dispose of) to a circular consumption model.

Veolia's solution

Veolia has achieved a circular straw economy: the straw purchased from farmers is used to produce 100% heat and green electricity, and the ash generated is returned to local farmers to fertilise their fields.

82,000
people heated with biomass

483
public institutions heated with biomass

400,000 t of CO_2
are avoided every year

100%
renewable energy

710
jobs created in the region

211 million m^3
of import gas saved

Long term contracts signed with 50 farmers, forest and sawmill operators in south west Hungary secure the supply for the power plant. 710 jobs were created in the region.

With a predominantly agricultural and forested territory, Hungary has a large number of resources from which to produce biomass energy and secure its food supply at the same time.

The district heating network supplied by Veolia has contributed to the city´s low carbon development: the energy supply of Pécs (heat and electricity) is 100% renewable.

Oroszlány - Hungary

VÉRTES BIOMASS CHP PLANT

Acquisition of assets and design, build, own and operate a biomass CHP plant

We will restart an old power plant with a capacity of 2 x 50 MWe based on biomass and RDF firing. The project is based on the recent technology development already implemented in the existing biomass power plants of the Hungarian BU.

The challenge

Until 2015 the power plant had been operated with coal fuel, since then it has been out of operation.

Veolia's solution

The capacity of the separate units of Vértes Power Plant is identical with the 2002 capacity of Unit VI of the Pécs Power Plant before its conversion into a biomass unit, the dimensions of the 3 steam turbines are identical with the steam turbine of the Pécs Power Plant (Láng [GE] make).

- After the conversion, the power plant will be suitable for carbon neutral operation with a capacity of 2 x 50 MWe using biomass and RDF fuels.
- With the help of Veolia's know-how, the same technological modifications can be applied here as the ones already implemented in the power plants of Pécs and Ajka.

2024-2044

20-year electricity production based on renewable energy

660 GWh/p.a.

Electricity sold

€83.9M/p.a.

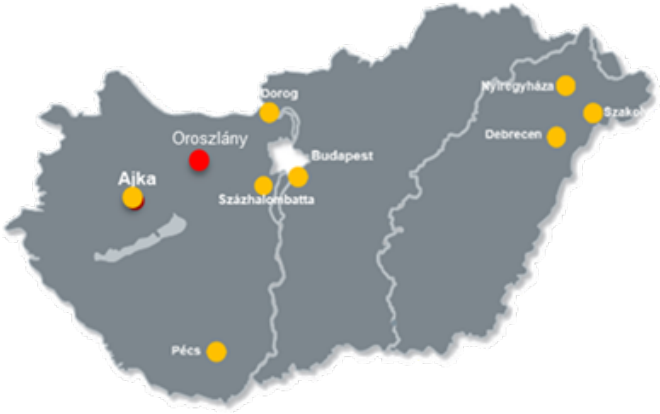
Average revenue

4,300

District heated flats

The benefits

- Hungary's fuel imports can be significantly reduced;
- The end product of waste management (RDF), which cannot be recycled as raw material, can be utilised for the production of heat and electricity;
- Significant CO_2 savings can be achieved: the energy production of the region can be made carbon neutral (see Pécs);
- The district heating of Oroszlány and Bokod can again be based on combined heat and power production (instead of direct natural gas-based heat production) from biomass and RDF fuel, providing district heat to 4,300 flats;
- As a result, the circular economic model will be implemented in the region;
- Unlike PV power plants, which are widespread in Hungary, this power plant will be able to produce renewable electricity in a controllable way;
- Significant employment growth can be achieved in the region (300 jobs + fuel supply).



"Climate change is unstoppable without the use of renewable energy."

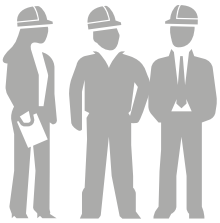
György PALKÓ, CEO of Veolia Hungary

REGIONS & CITIES

Hungary's fuel imports can be significantly reduced. The district heating of Oroszlány and Bokod can again be based on combined heat and power production.

PLANET

Renewable energy using biomass and RDF instead of coal. Significant CO_2 savings can be achieved

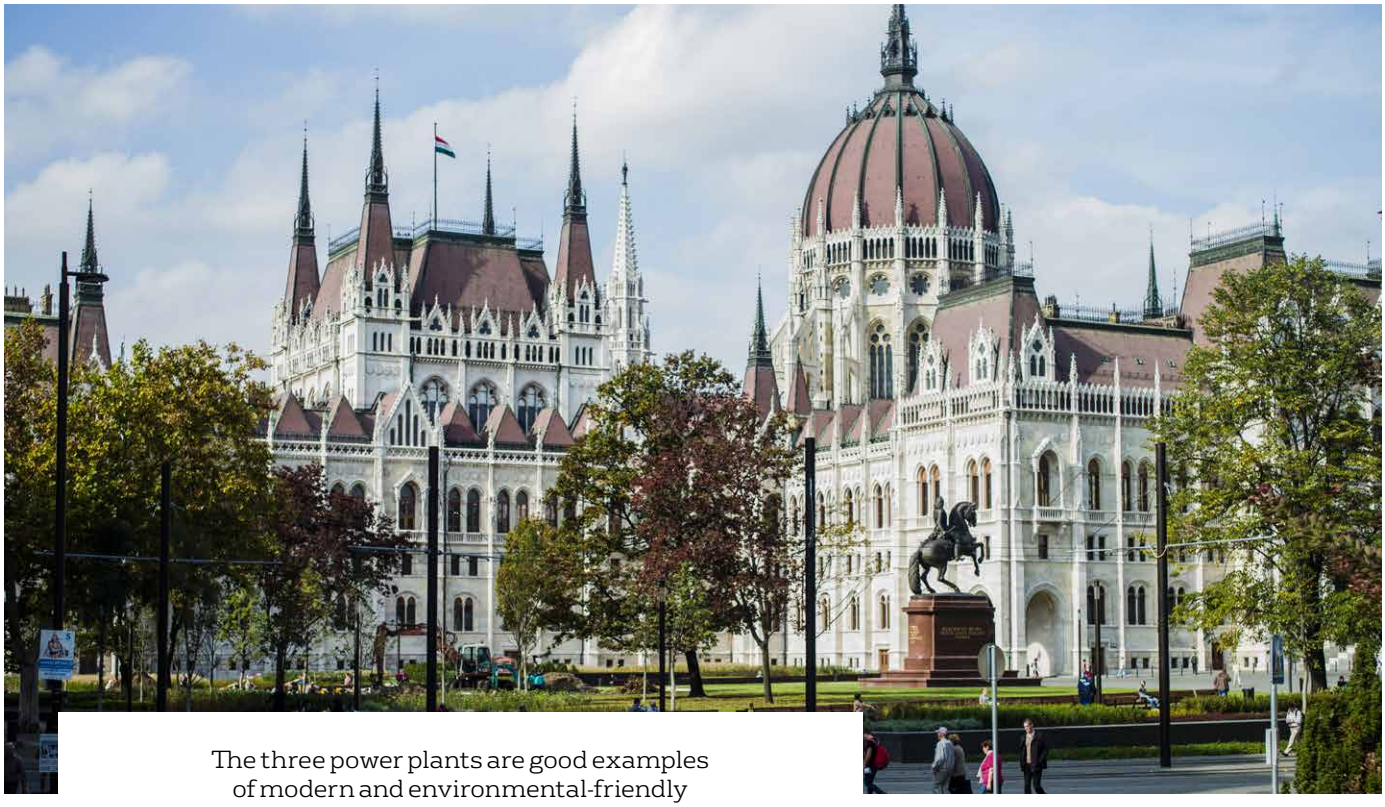


WOMEN & MEN

300 jobs + fuel supply

BUDAPEST: VEOLIA ACQUIRED BUDAPESTI ERŐMŰ ZRT.

MUNICIPAL



The three power plants are good examples of modern and environmental-friendly energy production.

The challenge

After several changes in ownership over the last decade, CHP Energia Zrt. has acquired Budapesti Erőmű Zrt. (BERT) from the Czech EP Energy Group. The company operating three modern power plants in the capital produces 55% of the heat demand of Budapest. Veolia thus strengthened its position in the market of traditional municipal services in the Hungarian capital.

BERT, with a history of more than 100 years, is the most important energy generating company in the capital of Hungary, which operates three modern, combined-cycle gas turbine (CCGT) power plants. The company is also the largest district heating supplier of FŐTÁV Zrt., as it produces 55% of the heat demand of Budapest, supplying around half a million people in 144 thousand households. The share of electricity generated by the 396 MW installed electrical capacity exceeds 3% in the national market.

Veolia's solution

The three gas-fired CHP plants belonging to Budapesti Erőmű are good examples of modern and environmentally friendly energy production. Due to the technological improvements of recent years, the company managed to further decrease the use of natural gas as well as the amount of CO_2.

since 2020
duration

ownership
type

1,143 MWth
heat capacity

396 MWe
electrical capacity

supply 140,000
households, which corresponds to about 350,000 people supplied

55%
of the heat demand of Budapest

220
employees

The three power plant units fit well into the current portfolio of the company and allow a more competitive presence on the district heating and electricity markets. This acquisition also supports the efforts to strengthen the role of the Veolia Group on the energy regulation market. The gas turbines of BERT with their large power range and flexible regulatory capacities can largely contribute to the regulation of the national electricity network.

The benefits

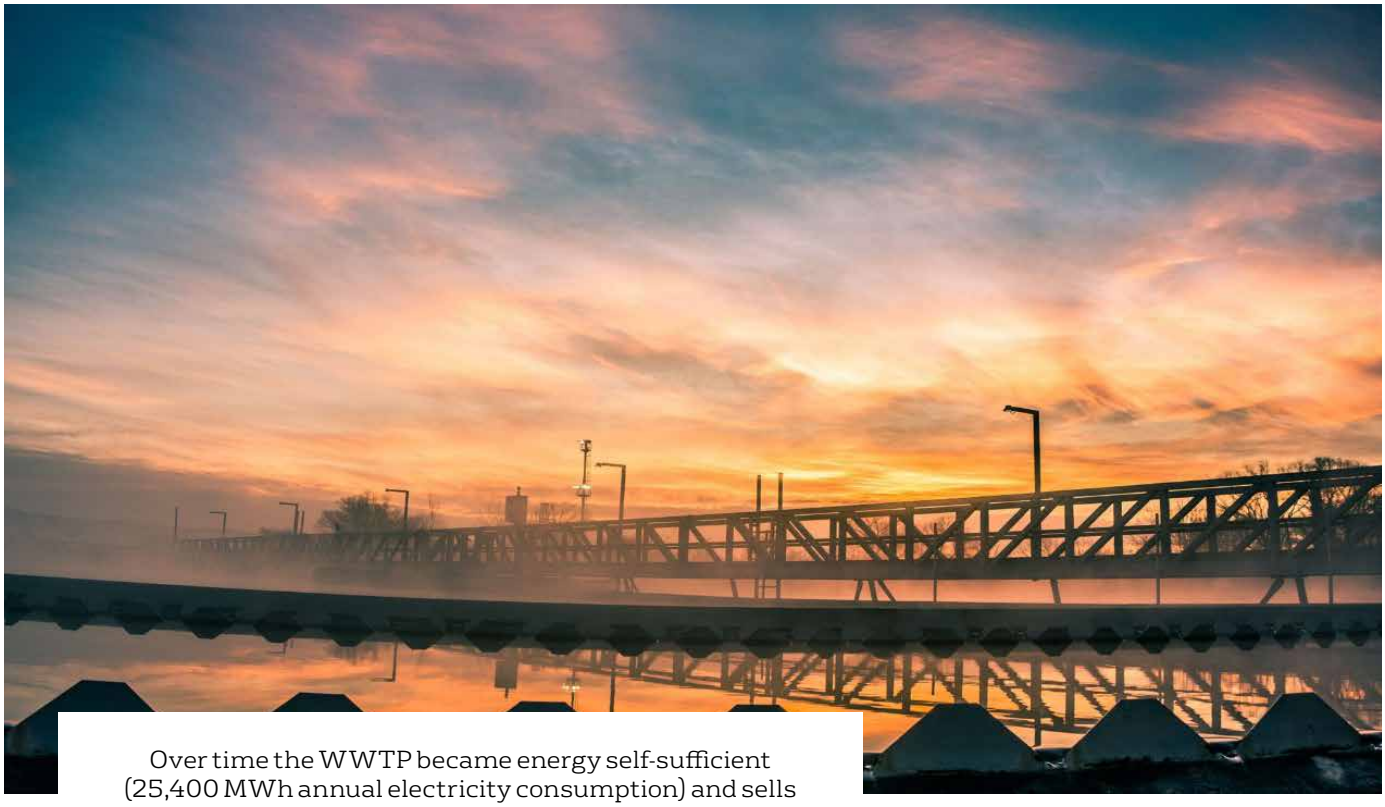
The acquisition is in line with Veolia´s strategy in Hungary, centered on green energies (cogeneration from gas or biomass) and energy efficiency. As a professional investor, committed to the Hungarian market, the company sees good opportunities in building a cutting-edge and sustainable district heating infrastructure.

REGIONS & CITIES

Build a state-of-the-art, sustainable district heating infrastructure

WWTP KUBRATOVO – OUR BENCHMARK FOR ECOLOGICAL TRANSFORMATION

Improvement of the environmental balance through efficient plant operation



Over time the WWTP became energy self-sufficient (25,400 MWh annual electricity consumption) and sells circa 16% to the grid on top of its own consumption

The challenge

The main challenge before the team of Sofia WWTP was to treat the wastewater of Sofia and return it back to nature clean.
The second challenge was to make Sofia WWTP fully energy self-sufficient.
Last but not least, the sludge produced from the treatment of the wastewater was to be successfully utilised as a fertiliser in agriculture.

Veolia's solution

Sofia WWTP treats wastewater from domestic and industrial users as well as rainwater from the combined sewerage network of Sofia. It has a design capacity of 1.4 million people and treats more than 480,000 m³ of domestic and industrial wastewater daily in line with the most stringent EU requirements (including nitrogen and phosphorus removal).

After the successful implementation of a cogeneration installation in 2010, the Kubratovo WWTP is constantly improving its energy independence achieving the status of a net electricity exporter.

Sofiyska voda saw potential in the market for voluntary emissions reductions (certified by Gold standard for the Global goals in 2014)

2000 - 2025

duration

>126 M m³ p.a.

of treated wastewater discharged in the Iskar river

116%

Energy self-sufficient (2021)

The benefits

Key figures since the commissioning of the cogeneration installation in 2010 until the end of 2021:

- Thanks to the continuous work of Sofia WWTP, each year over 126 million m^3 of treated wastewater are discharged into the Iskar river
- 233 million kWh generated green energy
- 720,000 tons of reduced CO_2 emissions
- 928,000 tons of sludge utilised in agriculture (2013 – 2021)
- The production of green energy fully covers the energy needs of the facility.
- Saving over 70,000 tons of CO_2 emissions per annum

Implementation of the project contributes to the UN SDGs and Veolia Purpose. It is also a flagship project for both Sofia Municipality and Veolia.

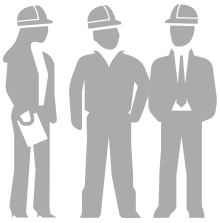
> In Sofia, we turn the sludge of the WWTP Kubratovo into green energy covering 85% of Sofiyska Voda's energy needs. We are determined to reach 100% by 2025 and sustainably produce sustainably the energy we need for the whole water cycle. This will contribute directly to the reduction of Sofia City's environmental footprint.
>
> **Francois Debergh**, Country Director for Bulgaria

REGIONS & CITIES

Greener city
Cost efficiency

PLANET

Over 126M m^3 treated wastewater returned to nature
Reduced carbon emissions
Protecting the environment by sludge waste

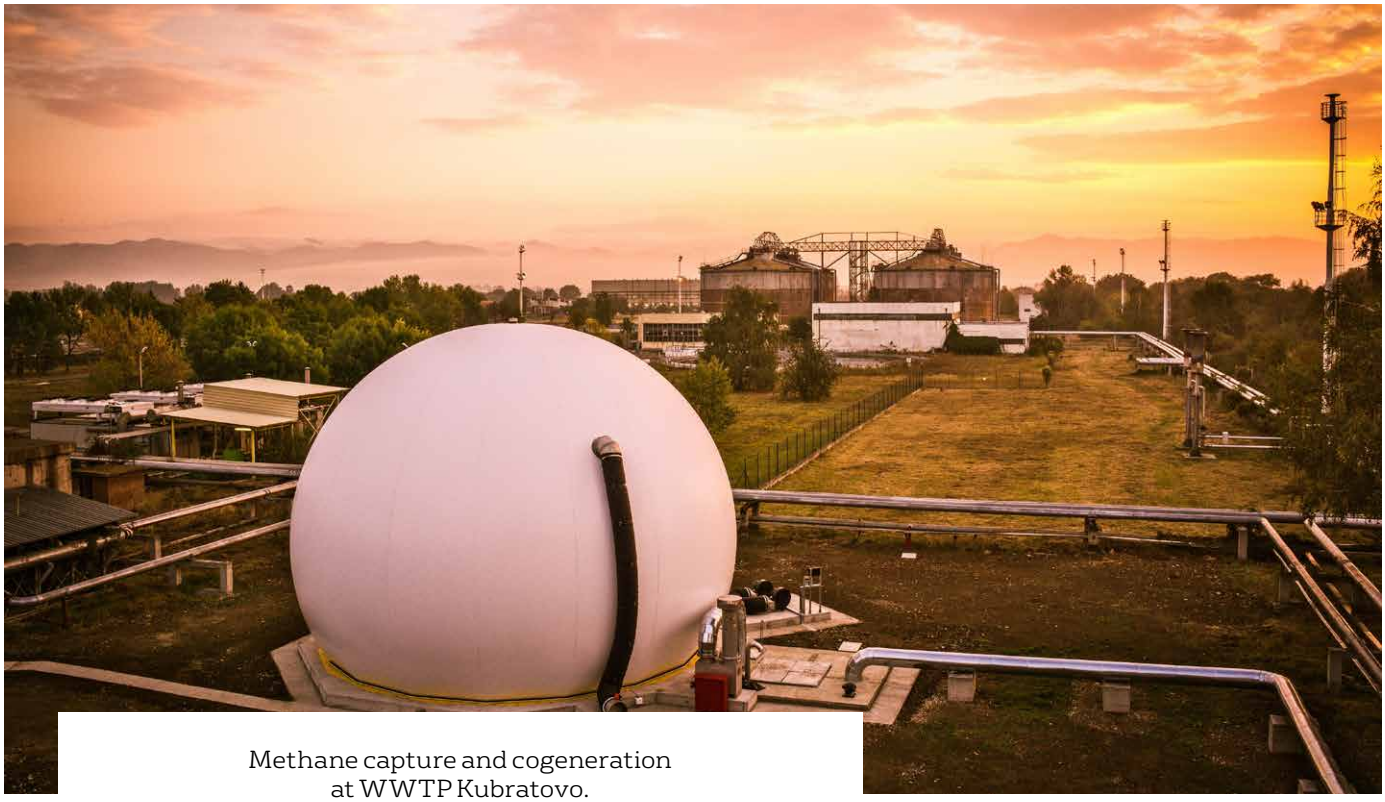


WOMEN & MEN

Provides on-the-job training ground for young engineers

SOFIA: GOLD STANDARD VOLUNTARY EMISSIONS REDUCTIONS

Municipal



Methane capture and cogeneration at WWTP Kubratovo.

The challenge

The wastewater plant of Sofia used to be a large consumer of electricity with annual intake of 17,000 – 18,000 MWh.

After the successful implementation of a cogeneration system, the plant has gradually increased its energy self-sufficiency to reach a status of net exporter of electricity. In 2018 the WWTP of Sofiyska voda managed to sell more than 15% on top of its own consumption.

After the end of the Kyoto protocol mechanism, Sofiyska voda looked for options to monetize emissions reductions from the project and boost its image as an environmental company.

Veolia's solution

Sofiyska voda saw potential in the market for voluntary emissions reductions.

It embarked on a journey to certify the emissions reductions reached as a result of the project through the most stringent of voluntary emissions reductions mechanism – Gold Standard.

After a lengthy procedure for registration, the entity is able to certify emissions reductions for up to 21 years with an annual volume of 61,769 tCO_2e.

25 years
duration
since 2000

Concession
contract type

30,000 tCO_2e
already verified

at least €40,000
EBITDA annually

up to 21 years
project span

The benefits

- Thanks to the continuous work of Sofia WWTP, each year over 119 million m^3 of treated wastewater are discharged into the Iskar river.
- The production of green energy fully covers the energy needs of the facility.
- Saving over 75,000 tons of carbon emissions per annum.

PLANET

Saving resources, reducing carbon emissions and developing the circular economy.

Varna, Burgas - Bulgaria

FRAPORT
O&M OF BULGARIAN AIRPORTS

Commercial, airports & transportation hubs

Planned and emergency technical services.

The challenge

Fraport AG is among the leading international airport operators by providing the full range of services in the airport management field. Fraport Twin Star Airport Management AD is the German-Bulgarian concessionaire who was awarded a 35-year concession in 2006 for Burgas and Varna airports - the air gateway to the popular Bulgarian Black Sea tourist region.

In 2014, Fraport inaugurated 2 new passenger terminals at Burgas and Varna airports. Within this context of implementing its ambitious investment program (> €80 million), Fraport was looking for a professional partner capable of covering a wide scope of O&M services while guaranteeing service quality at a European standard level.

Veolia's solution

In order to meet the high expectations of its client, Veolia proposed preventive and emergency maintenance of all HVAC facilities, as well as a number of additional technical services, guaranteed 24/7 monitoring, automation of the boilers and high quality reporting with KPIs, all year round.

As an additional benefit to its customer, Veolia carried out a detailed energy audit giving a number of recommendations for energy optimisation, most of which have already been implemented.

6 years (3+3)
duration

O&M
Contract type

over 4.9M/p.a.
passengers in 2019

24/7
presence on site
& remote monitoring

energy
savings solutions

The benefits

Thanks to this contract, Fraport can focus on its extensive investment programme by letting its HVAC facilities be managed by a leader in the technical and energy services field.

PLANET

Energy saving

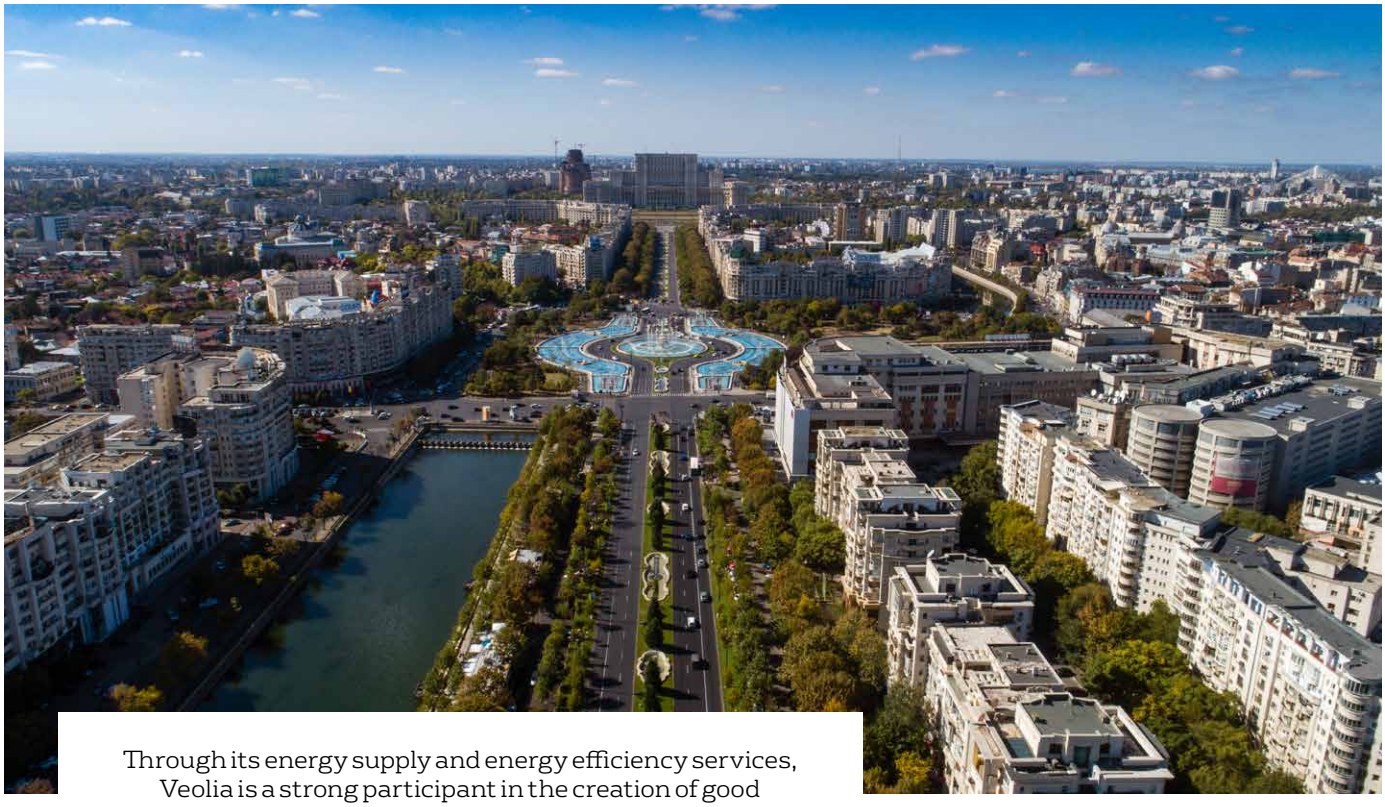
WOMEN & MEN

HR plan to develop employees' professional skills

Bucharest - Romania

HUBGRADE ROMANIA

providing SMART and DIGITAL services



Through its energy supply and energy efficiency services, Veolia is a strong participant in the creation of good conditions for the lives and well-being of millions of people. In cooperation with the city council, Veolia offers easy, but also environmentally friendly solutions, and enables its customers to control their energy costs.

The challenge

- **Enhancing** attractiveness to customers and tenants;
- **Optimising** costs without compromising quality and comfort;
- **Reducing** carbon footprint and ensuring regulatory compliance;
- **Increasing** property value and sustainability;

Veolia's solution

We offer comfortable and environmentally friendly solutions for individuals and industries, bringing experience and innovation to our customers.

Certified Solution for Energy Efficiency – EnEffCo is especially designed for the complex demands of industrial and commercial clients.

Using EnEffCo - the most suitable solution for energy efficiency Veolia can provide:

- Integration of all media and condition data
- A variety of functions and areas of application
- Complemented by experience and expertise of analysts and consultants

since **2021**

duration

Smart solutions

type

5%

energy savings guaranteed

3

major clients

24/7

energy and water monitoring

EnEffCo

The benefits

Monitoring & Alerting

Visualisation of current values and equipment mode (in SCADA). Real-time dashboards. Consumption monitoring for defined thresholds. Statistical models and baseline for Dynamic real-time monitoring for significant energy user.

Reporting

Intuitive creation of reports using, e.g. charts, dashboards, text, pictures. Free time interval (daily, weekly, monthly, yearly). Automated email transfer to any mailing list. Software storage of reports. Reports for defined user groups, e.g. utility, production, energy management. Corporate Reports and reports for individual locations.

Benchmarking, Measures

Internal Benchmarking of systems on-site based on dynamic system monitoring by consideration of influencing parameters. Benchmarking of specific equipment against systems on other sites or best available technologies.

Direct Benefits for clients

- More savings guaranteed;
- Optimized reliability;
- Smarter buildings;
- Sustainability commitment for environment.

> We can't save the world by playing by the rules, because the rules have to be changed. Everything needs to change – and it has to start today.
>
> **Greta Thunberg**, environmental activist

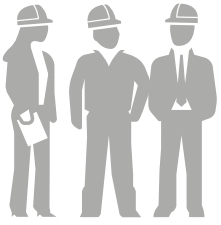
REGIONS & CITIES

Efficient local buildings and services – these are the improvements that we bring to the State administration and local government authorities, thereby contributing to the positive development of the relations with the citizens

PLANET

Main rules that Veolia Energy follows in environmental protection

- Environmental pollution prevention: energy savings, developing district heating networks, etc.
- Constant improvement, upgrade and innovation of energy facilities



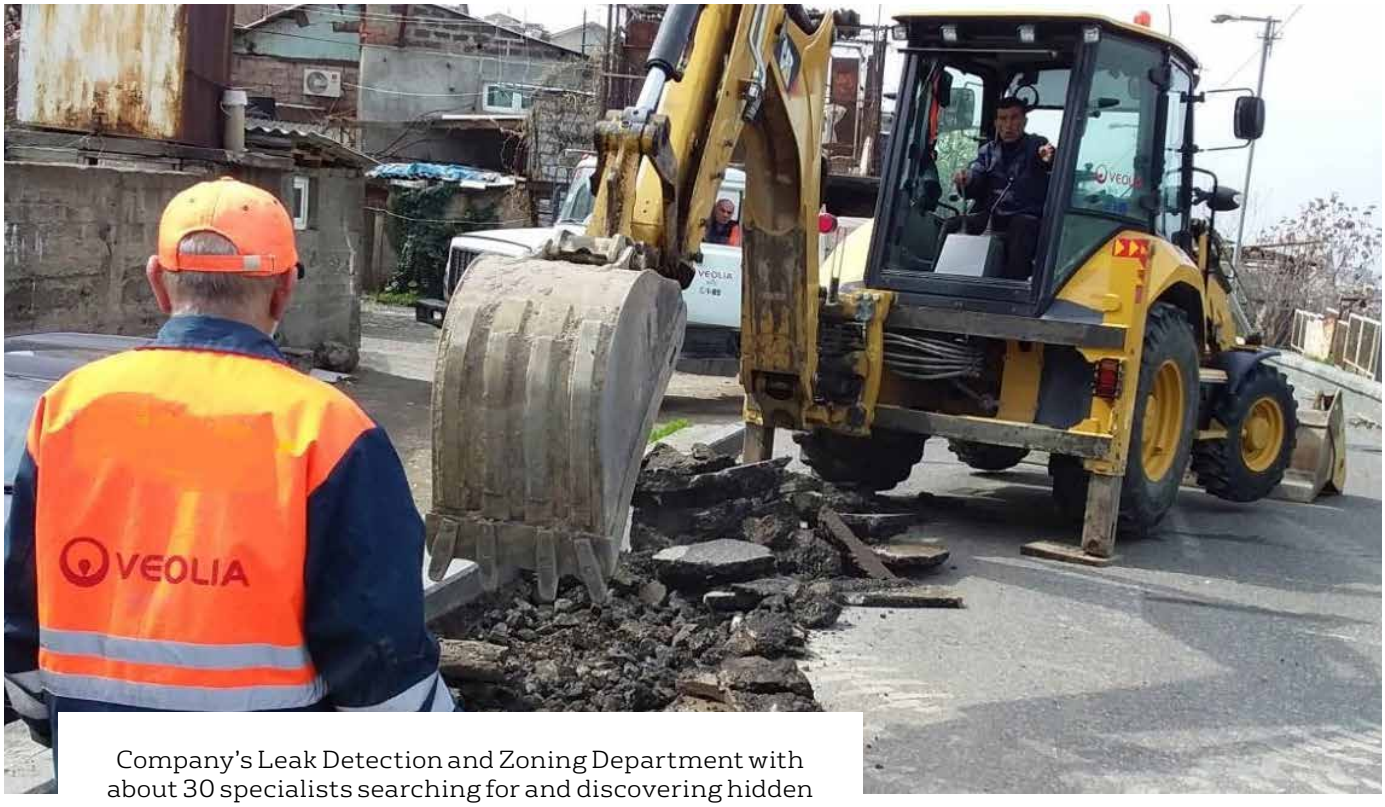
WOMEN & MEN

Heating, ventilation and air conditioning represent Veolia's task to provide top quality services emphasising comfort, safety and efficiency to extensive complexes for the general public such as cultural, sports and leisure centres and university buildings

Yerevan - Armenia

HIDDEN LEAKS DETECTION WITH THE HELP OF SPECIAL DEVICES

Access to water and sanitation



Company's Leak Detection and Zoning Department with about 30 specialists searching for and discovering hidden water line leaks in the water supply system.

The challenge

Prior to the establishment of Veolia Djur CJSC, the detection of hidden water line leaks was a problem for 5 water companies operating in Armenia. Thus, we have a significant technical water loss and violations of the water supply regime related to the latter.

Veolia's solution

The problems still existed in the early days of Veolia Djur company operation as well. With this aim, special groups of specialists were set up, but they were few and were not technically well equipped. Besides they operated separately as a part of the operation services, which was inefficient.

Currently, the Technical Directorate is in charge of the issues, including the production of water, so the elimination of hidden leaks is in their high interest.

2017 - 2031

duration

183 l/s

reduction

1.6M m³

reduction of losses

The Leak Detection and Zoning Department with about 30 specialists was created. It is divided into working groups providing service in Yerevan and in different regions. These groups are provided with vehicles, have very high mobility and all the necessary sonographic equipment including:

- flowmeter,
- pipe finder,
- aquaphone,
- correlator,
- pressure gauge.

With this equipment they can find the hidden leaks of water lines, when water flows into the subsoil and goes unnoticed for years.

The latest acquisition is the modern “mobile laboratory” from the UK - special search device. As a result, specialists can now inspect up to 120 metres of pipeline. The portable suitcase contains a display, a 120-metre rope and a camera with its own lighting system.

The operator, by inserting the camera into the test pipe with a rope, not only examines its technical condition, but also records the results of his research and remarks in order to fully assess the technical condition of the pipe.

The benefits

Leak detection groups operate as follows: After receiving an order from the Exploitation Service, they go to the mentioned area or settlement, using the equipment to determine the probable location of the accident. Then the operation site starts to work and the accident is eliminated. The problem is considered solved when the control check proves the absence of leakage.

This year the specialists of Veolia Djur Company have discovered about 500 hidden leaks, thanks to which 800 litres of water per second were saved.

3 towns near Kyiv - Ukraine

NESTLÉ
SEPARATE WASTE COLLECTION

Food & beverage

Separate Collection and Processing of Recyclables

The challenge

Supporting the target of developing a circular economy for Nestle Ukraine, the main goal was to develop an industrial standard for the collection and processing of recyclables as early as possible.

Veolia's solution

In September 2020 — Veolia and Nestlé launched a project for the separate collection of recyclables in three towns near Kyiv, Ukraine – Makariv, Novi Petrivtsi and Stari Petrivtsi, with a total population of about 28 thousand people. The companies joined forces to build an infrastructure for the collection and processing of over 40 tons of recyclables per month.

This project marks a very important change of behaviour requiring the collaboration of all stakeholders. This is why Veolia and Nestlé with the support of local authorities are creating an infrastructure and a system for the collection, sorting and processing of packaging waste.

As a part of the initiative and the preparation of the towns' infrastructure for project launch, over 200 specialised containers for collecting paper, metal, glass, and plastic were established, that will allow collecting about 20 tons of glass and 25 tons of other types of recyclables per month.

5 years

contract duration
since September 2020

€1.8M

Veolia-Nestle investment
for 5 years

> 40 T/month

recyclables

The benefits

Recycling of the collected waste in order to reduce waste generation at local communities.

The partnership between Veolia and Nestle on this project is part of creating a shared values initiative, aimed at minimising the impact on the environment and creating shared value for society and the company.

It also demonstrated that the separate collection of packaging waste is possible even without existing relevant legislation and without an EPR (take back system) in place.
The project will pave the way towards the principle of Extended Producer Responsibility (EPR) – which is so far not implemented in the Ukraine - taking into account the “polluter pays principle” and placing the responsibility for returning and recycling of packaging waste on the producer.

PLANET

Waste generation reduction by the recycling of separate collected waste.

PUSHKINSKIYE GORY
FROM HEAVY FUEL OIL TO BIOMASS

Municipal

Operation and maintenance of the district heating network.

The challenge

In 2017, Neva Energia S.A., an operational subsidiary of Veolia in Russia, began to operate the district heating system of the urban settlement of Pushkinskiye Gory, a district administrative centre in Pskov region (4,600 people, 9.6 km of network).

Pushkinskiye Gory is a nationally protected cultural heritage area, containing a series of cultural monuments of federal significance, grouped in and around a large museum complex devoted to Alexander Pushkin, a Russian 19th century national poet.

At the start point of the contract, the major problems of the project were:
- high heat energy production cost (from heavy fuel oil)
- worn-out state of the main assets
- insufficient energy efficiency of the then applied heating technologies.

Veolia's solution

During the first contract year, Veolia constructed and put into operation a biomass boiler plant, using only local wood chips as fuel.

The next step is the reconstruction of heat substations and the modification of the network topology.

12 years
duration

O&M
type

24/7
sustainable district heating

66%
of heavy fuel oil replaced with biomass

30%
reduction of CO_2 and SO_2 emission

The benefits

The new boiler plant operation:

- replaced 66% of heavy fuel oil with biomass;
- contributed to a significant decrease of environmental footprint in an important cultural and historical area;
- respects stringent health and safety standards.

Further steps will still further improve energy efficiency and the unfailing performance of the district heating system.

REGIONS & CITIES

Providing unfailing performance and improving energy efficiency of the district heating

PLANET

Decreasing the environmental impact of the district heating system and saving natural resources through the circular economy

NOTES

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Resourcing the world

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