

PVK in 2016



Pražské vodovody  
a kanalizace

# PVK in 2016

## Pražské vodovody a kanalizace, a.s.

### SNAPSHOT

**COMPANY NAME:**

Pražské vodovody a kanalizace, a.s.

**INCORPORATED:**

1 April 1998

**BACKGROUND:**

Pražské vodovody a kanalizace, a public limited company, is the legal successor to the state-owned enterprises Pražské vodárny and Pražská kanalizace a vodní toky to the extent indicated in the privatisation project.

**LEGAL FORM:**

Public limited company (akciová společnost)

**REGISTERED OFFICE:**

Ke Kablu 971/1, Hostivař, 102 00 Praha 10

**REGISTRATION NUMBER:**

25656635

**SHARE CAPITAL:**

CZK 483,288,000

**SHAREHOLDER:**

VEOLIA CENTRAL & EASTERN EUROPE S.A. 100%

The Company has no organisational units outside the Czech Republic.

## **COMPANY BODIES AS AT 31 DECEMBER 2016**

### **BOARD OF DIRECTORS**

**Philippe Guitard** – Chairman  
**Rostislav Čáp** – Vice-Chairman  
**Eva Kučerová**  
**Miluše Poláková**  
**Milan Kuchař**  
**Petr Mrkos**  
**Martin Bernard**

### **SUPERVISORY BOARD**

**Květoslava Kořínková** – Chairwoman  
**Ivo Sušický** – Vice-Chairman  
**Marcela Dvořáková**  
**Josef Šverma**  
**Marek Dřevo**  
**Alena Březinová**

### **EXECUTIVE MANAGEMENT**

**Petr Mrkos** – CEO  
**Petr Slezák** – Deputy CEO, Chief Personnel Officer  
**Pavel Novotný** – CFO and Sales Director  
**Petr Kocourek** – Chief Operating Officer  
**Radka Hušková** – Chief Technology Officer  
**Marcela Dvořáková** – Chief Communications and Marketing Officer

## KEY FIGURES

Revenue: CZK 6.796 billion

Profit: CZK 525.502 million

Number of persons supplied: 1.28 million in Prague and 200,000 in the Central Bohemian Region

Number of employees: 994

Water supplied to the water supply network: 95,261,000 m<sup>3</sup>

Total wastewater treated: 116,100,000 m<sup>3</sup>

Length of the water supply network operated, including supply pipes: 4,373 km

Length of the sewerage network operated, including drainage pipes: 4,650 km

Number of contract customers: 89,943

## EDITORIAL BY THE CHAIRMAN OF THE BOARD OF DIRECTORS

**Ladies and Gentlemen,**

For our Company, 2016 was a challenging, but successfully year. In our operations, we prioritise respect for the world around us, our employees and our partners.

While our core tasks remain the supply of decent drinking water and the drainage, collection and treatment of wastewater, we also accomplished other projects that we had set ourselves. The direction in which our actions are headed and the nature of our Company determine the values that we pursue. These values are responsibility, solidarity, respect, innovation and a customer focus. We are unflagging in our efforts to improve services for customers. One such example from 2016 is the insurance of emergency situations associated with water leaks beyond water meters.

During the year, we tested our preparedness in various exercises, we practised emergency water supply, and the Podolí waterworks showed that it was a reliable backup facility.

We are the first water company to introduce new methods to test for the microbiological contamination of drinking water. These methods slash the time in which information becomes available about any drinking water contamination. We expanded our packaged drinking water project, and our drinking water in sachets for distribution during emergencies and outages has been heralded as a success. We passed our energy management system certification audit, proving our dedication to improving energy performance, optimising energy management and being environmentally friendly in this area.

PVK is a socially responsible company that also numbers environmental protection among its priorities. We feel responsibility and respect for nature. We not only seek to promote the protection of biodiversity, but also explore new solutions associated with circular economy. We are sparing towards water sources and we reuse wastewater wherever possible. One of our upcoming projects is the irrigation of a golf course in Vnoř with treated and sanitised wastewater from Kbely wastewater treatment plant. We are preparing projects to fit pumps on the water supply or sewerage system that will be used to heat houses. Sewage sludge from wastewater will be put to use in agriculture. Wastewater also serves as a source of energy. The use of sewage treatment plant gas in cogeneration units makes the central wastewater treatment plant 100% self-sufficient in terms of the heat used in its operations and 70% self-sufficient from the perspective of energy consumption.

Another of our priorities is occupational safety and health. We participated for the second time in the International Safety Week held by our shareholder, Veolia. In our employee care, our goal is to achieve an accident rate of zero.

We are also in a strategic partnership with the capital city. I am confident that, by joining forces, we will achieve success and make the people of Prague happy.

I would like to thank the management and employees for their selfless work. I appreciate this and I am grateful that our employees work in teams under what are routinely complex conditions. I am proud that we can handle these situations together.

**Philippe Guitard**

Chairman the Board of Directors

## HIGHLIGHTS OF 2016

### Water quality control accelerates

Pražské vodovody a kanalizace, a.s. (PVK) became the first water company in the Czech Republic to introduce three new methods to test for the microbiological contamination of drinking water. These methods slash the time in which information becomes available about any defects in drinking water. The first method, BACTcontrol, can determine whether the bacteria of faecal contamination are present in water in the space of just three hours. Another method, MicroSnap, can reveal how contaminated water is within 6.5 to 8.5 hours. The third method, SuperSnap, detects overall microbial contamination within half an hour.

### Packaged drinking water extends its reach

The “Packaged Water” project launched by PVK in the second half of 2015 was expanded to further Prague boroughs in 2016. Containers of packaged drinking water were used in response to dozens of water supply network disruptions and a host of planned outages. All containers of packaged water are chipped so that they can be tracked all the way from the production line in Káraný to the point of distribution. The disabled, medical and social facilities, schools, nurseries and others rely on supplies of packaged drinking water.

### PVK is ISO certified for energy management

In February 2016, PVK became the first water company to pass a certification audit for its energy management system in accordance with ČSN EN ISO 50001. ITC Zlín’s auditors found that the system established by PVK at all of its organisational units included in the audit was of a very high standard. The Company has long also maintained a systematic approach to energy performance improvements, energy management optimisation, and environmental friendliness in the realm of efficient energy management.

### Podolí supplies the people of Prague with water from the Vltava

The Podolí waterworks supplied Prague’s residents with drinking water from the River Vltava for four days in September 2016 while the water tunnel from the Želivka water treatment plant was closed, and in doing so showed that it was a reliable backup source of drinking water for the capital.

### PVK is prepared for crisis situations

Various events were held to test emergency preparedness in 2016. The “Attack 2016” exercise simulated a terrorist attack on the Bruska water reservoir, PVK and the Praha 2 borough tested the Company’s preparedness for a large-scale drinking water outage, and PVK presented all means of delivering a replacement drinking water supply. It put the emergency water supply at the Military University Hospital Prague to the test and participated in the WATER 2016 exercise organised by the Ministry of Agriculture.

### Water losses sink to all-time low

In 2016, water losses were reduced to 14.2%, having stood at more than 34% as recently as 2000. These modest losses can be put down to the benign climate and continuous water supply network monitoring, including running evaluations of water losses in supply zones, and regular water system diagnostics.

**As at the date of preparation of the Annual Report, no significant events are known that would affect the 2016 Annual Report.**

## EVENTS EXPECTED DURING 2017

PVK will forge ahead with the development of new projects, including the packaged water project and SWiM (Smart Water integrated Management), which is a modern water service management and control system, while its customer service activity will see the launch of a new customer portal and mobile apps for customers.

In 2017, PVK will negotiate a review of its contractual relations with the City of Prague so it is well placed to adhere to its role as Prague's strategic partner in water management for the full duration of our operator contract, which runs until 2028.

In its financial management, the Company will work towards the adoption of efficient measures and the streamlining of various processes.

## OUR SERVICES

The core business pursued by Pražské vodovody a kanalizace, a.s. (PVK) is the reliable **supply of decent drinking water and the drainage, collection and treatment of wastewater**. PVK also offers numerous other services that are linked to its core business and expand the range of customer services, including online information about water consumption and incidents, the pinpointing of any hidden glitches, official water measurements, measurements of the flow rate and pressure in water pipes, sewerage network surveys, laboratory analyses, post-supply services and a slew of further services for individuals, housing cooperatives, municipalities and industry.

PVK respects the fundamental values of its shareholder, Veolia: a customer focus, responsibility, solidarity, respect and innovation. The Company delivers an all-embracing water service to customers and is committed to the provision of premium customer services. Every year, it comes up with innovations to improve its service. In 2016, for example, it introduced insurance covering emergency leak situations.

**In 2016, PVK earned ISO certification for its energy management.** The Company met the requirements of the certification audit of its energy management system in accordance with ČSN EN ISO 50001, a standard that sets out to improve the energy performance of the buildings and technology in operation efficiently and economically. For the past 11 years, the Company has also held a gold certificate for its integrated management system, encompassing quality, safety and environmental services.

PVK, much like other Veolia Group companies, observes a code of ethics, a code of conduct for managers, an environmental code and an OSH code.

### Drinking water supply and distribution

PVK supplies drinking water to **1.28 million** Prague **residents** and another **200,000** people in the Central Bohemian Region. PVK operates the water infrastructure in Prague and in the town of Radonice. Here, it is responsible for 4,373 km of water supply network, including supply pipes, 51 pumping stations, 68 water reservoirs and 111,225 water meters. Water infrastructure is rented from the owner, the City of Prague.

The Company supplies the Prague water supply network with water produced at the **water treatment plant** the Company operates in **Káraný**. The Company also purchases drinking water from the **water treatment plants in Želivka** (operated by Želivská provozní a.s.) and Sojovice (operated by Vodárna Káraný, a.s.), known as "bought-in water", which it distributes in Prague and to other water company operators, especially those outside of Prague. Places where PVK supplies "transferred water" include: Beroun, the Sázava Water Pipeline, Jesenice, Roztoky, Čelákovice, Říčany, Úvaly and Průhonice.

The **Podolí water treatment plant** is a back-up facility in case of emergency. In September 2016, it contributed to the production of water supplied to consumers during a scheduled shutdown of the water tunnel from the Želivka water treatment plant.

### Water supplied to the water supply network in 2016

	Indicator	Quantity [m <sup>3</sup> ]
Drinking water	Drinking water produced by PVK	18,768,931
	Water bought in from the Želivka and Sojovice plants	88,370,270
	<b>Total drinking water</b>	<b>107,139,201</b>
	Water transferred (drinking water supplied into a public water supply network managed by another entity)	<b>12,990,495</b>
Industrial water	Water produced – industrial water mains	1,112,246
Drinking + industrial	Drinking water and industrial water	108,251,447
	<b>Water for sale supplied to the network</b>	<b>95,260,952</b>

In 2016, PVK delivered 95,261,000 m<sup>3</sup> of water to the water supply network, 1.5% less than in the previous year. However, the quantity of water billed rose, climbing by 2.4% to 1,890,000 m<sup>3</sup>. Average per capita water consumption was 108 litres per day.

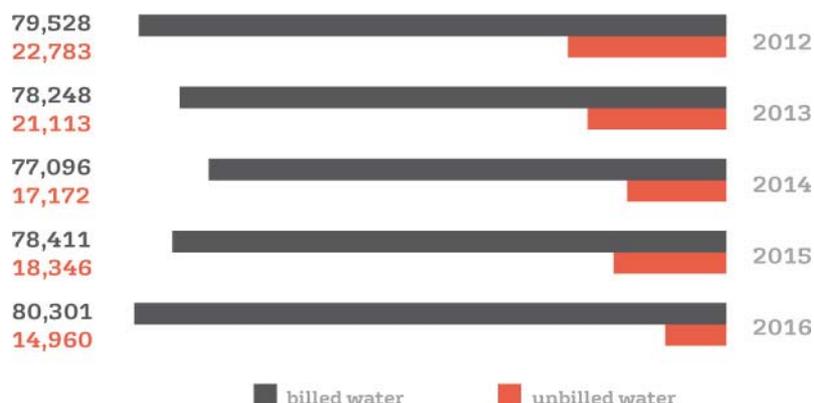
### WATER DELIVERED TO THE WATER SUPPLY NETWORK (IN THOUSANDS OF M<sup>3</sup>)



### WATER LOSSES (%)



### WATER BILLED AND UNBILLED (IN THOUSANDS M<sup>3</sup>)



## Water losses

In 2016, the water loss rate was reduced to 14.2%. Water losses were at an all-time low, having stood at more than 34% as recently as 2000. These modest losses can be put down to the benign climate and continuous water supply network monitoring, including running evaluations of water losses in supply zones, and regular water system diagnostics. In 2016, employees examined 2,905 km of the supply network (163 km more than in the previous year), discovering 335 hidden water leaks in the process (eight more than in 2015).

Length of water supply network	3,521
Length of supply pipes	852
Number of supply pipes	113,605
Number of water meters	111,225
Number of reservoirs	68
Volume of reservoirs	749,554 m <sup>3</sup>
Number of pumping stations	51

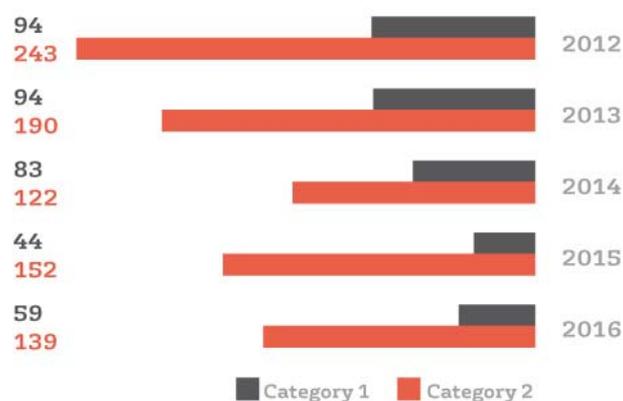
## Water supply network incidents

In 2016, PVK handled 4,500 water supply network incidents, down by 177 incidents, or 3.78%, on the previous year. The number of category 1 incidents, where more than 1,000 inhabitants or important strategic facilities are left without a water supply, went up by 15, although the total of 59 category 1 incidents is equal to just 1.3% of the total number of incidents. There were 13 fewer category 2 incidents. A drop in category 3 incidents was also reported.

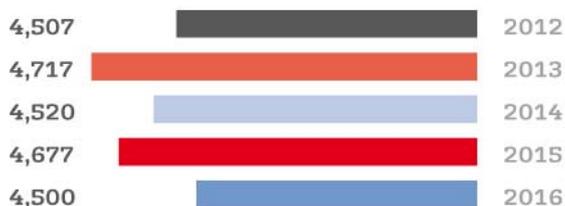
The leading cause of the incidents was corrosion (72.1%), followed by land movement (22.5%) triggered, for example, by frost. It is Company policy to provide maximum information on each incident while minimising the impact on the consumer. Incidents are reported online on the PVK website. This information clarifies whether drinking water supplies are affected at a particular site, where water wagons have been deployed, whether water (including packaged water) has been distributed for emergency supply, and the estimated time it will take to complete the repair and restore normal water supply. All this information is also available via Google Maps.

Prague residents who have registered with the text message service also receive news about outages and incidents on their mobile devices.

### CATEGORY 1 AND 2 INCIDENTS



## NUMBER OF WATER SUPPLY NETWORK INCIDENTS REPAIRED



### Water meters

By the end of 2016, 110,932 water meters had been fitted in Prague and 293 in Radonice to measure drinking water consumption (i.e. there were 111,225 water metres in total). Over the course of the year, 20,130 water meters were replaced by the Company's employees, mostly because their certification had expired. The repair and certification of 8,897 water meters, 1,582 customer-requested official water meter tests and 66 on-the-spot official tests were outsourced to an external supplier.

**Remote reading** is in place for **4,809** water meters. Meter readings are radio-transmitted to a concentrator, from where all data are transmitted directly to end users via the internet. Readings are taken online and the data are stored on a server and immediately presented in the web environment accessible via the Veolia CEM mobile app.

Remote radio-transmitted readings offer greater user convenience and lower costs per reading, as well as the possibility of monitoring water consumption online and promptly detecting malfunctioning meters. They also guarantee accuracy. The number of automatic readings has surged in the past three years in particular.

In these remote readings, PVK works with Pražská teplotárenská a.s., Pražská plynárenská, a.s. and PReměření, a.s.

## REMOTE WATER METER READINGS



### Wastewater collection and treatment

Total length of the sewerage network	<b>3,671 km</b>
Length of drainage pipes	<b>979 km</b>
Number of drainage pipes	<b>120,928</b>
Number of pumping stations	<b>322</b>
Number of wastewater treatment facilities	<b>20 branch WWTPs + central WWTP</b>

Systematic wastewater treatment was introduced in Prague as far back as 110 years ago, with the Bubeneč sewage treatment plant put into operation in 1906. In 2016, almost 1.26 million inhabitants were connected to the sewerage system in Prague.

Including drainage pipes, it runs for a total length of 4,650 km. The central part of the city has a combined sewerage system in place to drain sewage together with rainwater to the Central Wastewater Treatment Plant (CWWTP). The outskirts of Prague are served by separate sewer networks that divert rainwater separately.

In 2016, PVK also operated 20 branch wastewater treatment plants (BWWTPs) in addition to the CWWTP: in Březiněves, Horní Počernice – Čertousy, Dolní Chabry, Holyně, Kbely, Koloděje, Kolovraty, Klánovice, Královice, Lochkov, Miškovice, Nebušice, Nedvězí, Sobín, Svěpravice, Uhřetěves – Dubeč, Újezd nad Lesy, Újezd u Průhonic, Vinoř and Zbraslav.

In 2016, the CWWTP treated 108,304,000 m<sup>3</sup> of wastewater, 2.2% more than in the previous year. While this is more than the statistically lowest level recorded in 2015, it still corroborates forecasts of dry years and the related thicker wastewater flowing into the facility. Despite the greater strain on the inflow, in 2016 the CWWTP and its resolute operators met the qualitative requirements set by the water sector decision on treated wastewater discharged into the Vltava, and chargeable concentration levels were not exceeded.

The treatment of Prague wastewater at the CWWTP produced approximately three tonnes of grit (gravel and sand), four tonnes of screenings, and 75.7 tonnes of dewatered sanitised sludge in 2016. The use of sewage treatment plant gas in cogeneration units made the CWWTP 100% self-sufficient in terms of the heat used in its operations again. Cogeneration units also generated 71.3% of the overall demand for electricity in the operations here.

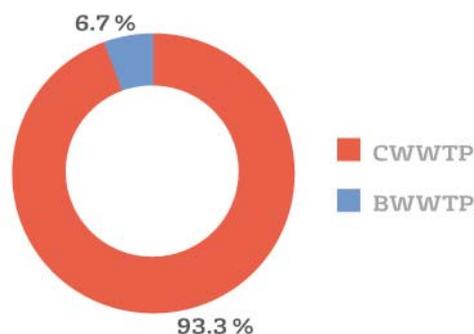
#### Quantity of wastewater treated in 2016 (m<sup>3</sup>)

	m <sup>3</sup>
<b>CWWTP</b>	<b>108,303,508</b>
<b>BWWTP</b>	<b>7,796,018</b>
<b>TOTAL</b>	<b>116,099,526</b>

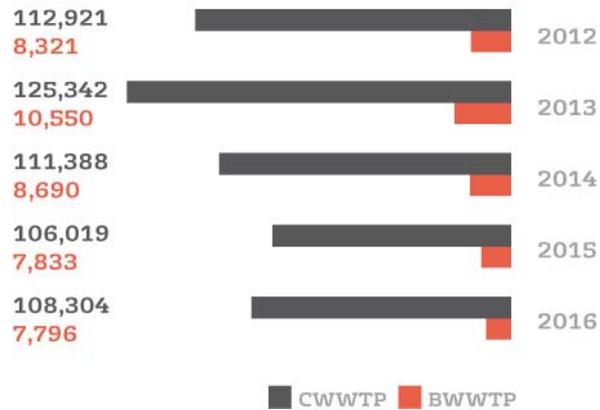
#### TOTAL QUANTITY OF WASTEWATER TREATED (THOUSANDS OF M<sup>3</sup>)



#### SHARE OF WASTEWATER TREATED IN 2016



## QUANTITY OF WASTEWATER TREATED AT THE CWWTP AND BWWTPS (THOUSANDS OF M<sup>3</sup>)



### Incidents in the sewerage network

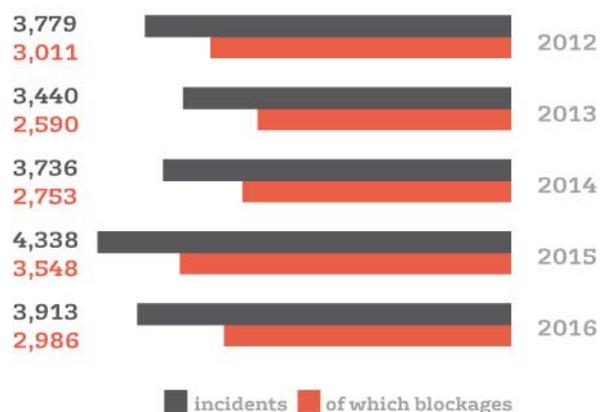
There were 3,913 sewerage network incidents in 2016, down by 425 incidents, or 9.8%, on the previous year. The lion's share of incidents involved drainage pipes. The most common sewerage network incidents, in terms of the type of damage, involved blockages and sediment, accounting for 76.3%, or 2,986, of the incidents. The number of blockage and sediment incidents was down by 562, or 15.8%, year on year.

Other causes included missing manhole covers, damaged restoration liners, surfaces and masonry, and occasionally joint destruction, deformation and faults.

### Number of sewerage network incidents by type of facility in 2016

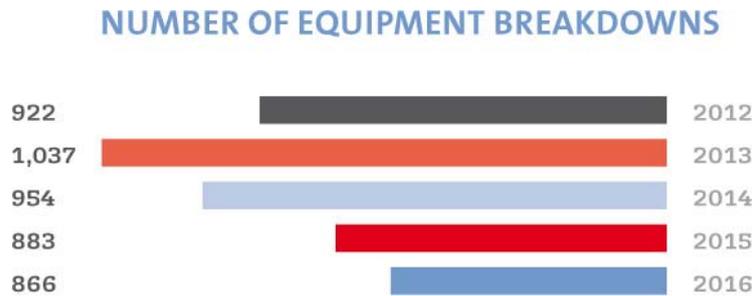
Type of facility	Number of incidents	%
Sewers	1,163	29.7
Drainage pipes	1,613	41.2
Shafts, chambers, reservoirs, spillways	720	18.4
Other	417	10.7
<b>Total</b>	<b>3,913</b>	<b>100.0</b>

### SEWERAGE NETWORK INCIDENTS BETWEEN 2012 AND 2016, SHOWING THE SHARE OF BLOCKAGES



## Equipment breakdowns

PVK tackled 866 equipment breakdowns in 2016, 1.9% less than in the preceding year.



## Sewerage network surveys

Preventive surveying of the sewerage network with cameras and an inspection system helps to check on sewers that cannot be reached physically. In 2016, PVK employees surveyed **141 km of sewers** and inspected **2,854 access shafts** and other installations in the sewerage network. They detected 24 defects in the sewerage system during their inspections. To repair the defects detected in the sewer system, they drew up 146 defect repair proposals and submitted them for inclusion in the repair and investment plan.

Sewerage network surveys continued to include inspections of sewers at risk of high-velocity water drainage. Surveys were also carried out when tramlines or road surfaces were being repaired to check whether foul water was draining into surface water sewers and to reduce the stress placed on branch wastewater treatment plants and pumping stations by ballast water. On the outskirts of Prague, 14.5 km of sewer system were smoke-tested. In 2016, one inspection system was expanded to include a new truck that can be used for inspections of sewer piping with small diameters starting at DN 135.

## Water quality

PVK's accredited laboratories carry out regular checks on drinking water and wastewater quality. The accreditation covers the entire range of the laboratories' activities: sampling and analysis of drinking, hot, packaged, surface, raw, ground and waste water, water from intermediary process stages (inter-stage water) and sludge, and bathing water, including waste sampling and analyses of process chemicals used in water treatment and purification.

## Drinking water

Drinking water throughout Prague is safe. In its physical, chemical, microbiological and biological properties, it complies fully with Czech and European standards. The quality is checked throughout the production and distribution of drinking water, all the way to the consumer's tap.

Drinking water quality is regularly monitored in accordance with Implementing Decree No 252/2004 laying down requirements for drinking and hot water and the scope and frequency of drinking water checks, as amended. EU drinking water requirements are satisfied in this respect. Water quality control also comes into play after water supply network accidents, repairs and other similar works. Under the amended Implementing Decree No 252/2004, the metabolites of pesticides, specifically desphenyl-chloridazon and chloridazon-methyl-desphenyl, in water from the Káraný wastewater treatment plant and metazachlor ESA in water from the Želivka plant are also regularly tracked in the course of water quality monitoring. Other pesticides and their metabolites are also screened to confirm that drinking water is free of extraneous matter.

**In 2016, PVK employees took 6,266 drinking water samples. They took 423 samples for post-incident water quality control. In those samples, they determined 10,410 parameters, 99.1% of**

**which complied with the implementing decree's drinking water requirements. Scheduled repairs were followed by the taking of 501 samples. In those samples, 11,900 parameters were determined, 99.2% of which were found to be compliant.**

## **Wastewater**

The PVK laboratory regularly monitors wastewater quality throughout the wastewater treatment process. Wastewater samples taken from the CWWTP and its process equipment, including sludge and sewage treatment plant gas, and wastewater from BWWTPs, industrial producers, the sewerage network, and the discharge points operated by PVK were analysed. Liquid waste delivered to the CWWTP and BWWTPs by outside entities was also checked.

In 2016, PVK's laboratories paid particular attention to sewerage network monitoring and checks of compliance with the limit values set out in the Sewerage Operating Rules, mainly in terms of the load and influx of contaminants making their way through the sewerage network to the CWWTP, so that plant operability would not be compromised and the wastewater treatment process would not be impaired.

**In 2016, chargeable concentration limits at the Prague CWWTP were not exceeded in any of the indicators. In 2016, 15,474 samples were processed in the PVK wastewater laboratory, and 107,618 parameters were determined, of which – in relation to the CWWTP – 9,329 were samples of wastewater, sludge, liquid effluent and sewage treatment plant gas.**

## OTHER SERVICES

**Besides its core business, PVK offers customers other external services, which accounted for approximately 10% of the Company's total revenues in 2016.**

### Cooperation with ČEZ

In 2016, PVK continued previous years of cooperation as a reliable strategic partner in the care of ČEZ, a. s.'s water facilities. In the year, it also successfully qualified for tendering procedure for 2017-2021 covering servicing work on a water and sludge management logical unit. The outcome of the tendering procedure will be known in the first quarter of 2017.

In 2016, the power station portfolio included the Ledvice, Mělník and Počeradý (coal-fired and combined-cycle units), Tušimice and Prunéřov sites.

In 2016, the contract was worth an aggregate of CZK 40.4 million (including repairs beyond the scope of routine maintenance). Major works beyond the scope of routine maintenance included the reconstruction of a gravity pipe from the intake structure to the Ohře pumping station (work totalling CZK 39.8 million, carried out in 2016-2017) and the delivery of a UV system to ensure the sanitisation of clarified water for the Ledvice power plant (worth CZK 1.65 million).

In this project, PVK is working with a key partner, Česká voda - Czech Water, a.s., which maintains and repairs water and sludge management facilities.

### Official water flow measurements

The main services on offer in the realm of urbanised catchment hydrology and hydraulics include official measurements and assessments of the serviceability of water flow measurement systems. Other services comprise the measurement of hydraulic variables in the sewerage and water supply networks, precipitation measurements and mathematical modelling in order to draw up documentation such as general drainage plans, general water supply plans, and rainfall-runoff studies.

**Measurements of hydraulic and hydrological variables were made in relation to numerous projects in 2016, including:**

GO HMP – Subproject II, detailed stage for Hlubočepy – Holyně, General plan for the sewers of Týn nad Vltavou, the measurement of hydraulic variables and an assessment of the functioning of 24 overflows in the district of Cheb, sewer monitoring for a sewer reconstruction and extension project in Brno, the monitoring of flow conditions in Praha 4, an assessment of the water supply network of Mníšek pod Brdy before and after construction, and surveying of the transverse profiles of selected sections of the sewerage network in Praha 5 – Hlubočepy.

### Technological supervision

In 2016, PVK's wastewater engineers were responsible for the supervision or guidance and incorporation of agendas at the CWWTP, the 20 branch WWTPs operated by PVK, and 72 sewage treatment plants of 1. SčV (which PVK operates or services). They also put their experience to good use under external contracts, including technological consulting for municipal wastewater treatment plants, the handling of treatment plant problems at a campsite, and the servicing of domestic treatment plants. They are paying ever increasing attention to issues surrounding the CWWTP's new water pipeline, currently under construction, and the coordination of this pipeline's operation with that of the existing line.

As for drinking water technology, engineers contributed to the performance and evaluation of model GAC (granular activated carbon) testing at the Želivka water treatment plant. They were also involved in the optimisation and reliability of operation of the CHLORINSITU III system at the Flora pumping station, designed to disinfect water with sodium hypochlorite produced in situ by the membrane electrolysis of brine. They are responsible for quality monitoring and providing follow-up reporting. Cooperation with the technology's manufacturer resulted in the optimisation of settings for the production of sodium hypochlorite so that the production process was continuous in both electrolysis units. The adjustment to the settings delivered the expected positive impact on the quality of the sodium hypochlorite produced.

## Cooperation in remote readings

PVK's metrology-related services include the repair and certification of prescribed metering instruments, and the design and delivery of devices for remote readings of both billing and subsidiary meters. In 2016, the following projects were implemented: Remote readings of water meters used for billing were taken for Vodohospodářská společnost Sokolov, s.r.o., CHEVAK Cheb, a.s., Hradec Králové and Kaufland.

## Testing and repair of flood control pumps

In 2016, maintenance was carried out on mobile pumping technology in accordance with relevant regulations. UPS Technology carried out annual checks on all 11 gensets. Four of the Tessari gensets had the inner surfaces of their fuel tank walls cleaned.

Field tests were also conducted on four permanent pumping stations and 15 mobile pumping stations twice over the year; mobile pumps are tested once a year. PVK is responsible for the performance of pumping tests on mobile pumps at the reservoir in Hostivař.

At the mobile pumping station in Dušní Street, the construction of the outlet gate chamber was completed. This modification will allow water to be pumped during a flood without disrupting traffic on the embankment road. During the year, PVK dealt with five engine defects requiring repair. The control system and relays were replaced and a new clack valve was fitted in the fuel system.

## Laboratory services

The PVK laboratories are responsible for taking and analysing samples both for PVK's internal requirements and for external customers on the basis of contracts or purchase orders. In 2016, they carried out a total of 13,545 drinking water and 2,086 wastewater analyses.

## External samples

	Želivská provozní a.s.	Vodárna Káraný, a.s.	Companies in the Veolia Group	PVS	Other	Total
Drinking water	8,455	1,616	2,296	0	1,178	13,545
Wastewater	884	33	876	458	331	2,582
<b>Total</b>	<b>9,339</b>	<b>1,649</b>	<b>3,172</b>	<b>458</b>	<b>1,509</b>	<b>16,127</b>

## Post-supply services

In 2016, PVK carried out 106 repairs on the internal plumbing of connected structures and fixed 123 incidents involving domestic distribution systems. In cooperation with Česká voda - Czech Water, a.s., a further 1,441 repairs were carried out on the internal water supply fixtures at our customers.

## Pest control

In 2016, 13,475 sewer entry points in Prague were treated, entailing the use of 13,475 kg of rodent control bait.

Besides this blanket approach, disinfestation was carried out at 67 facilities and disinsectisation at 82 structures for external customers.

### **Sewerage network servicing**

PVK provided customers with a range of sewerage network services, including the emptying of grease traps, sewage tanks, sumps and septic tanks, the inspection of sewer pipes with cameras, the creation of new access points for public requirements, the construction of manholes, drainage pipes and technical consulting. In 2016, 432 tanks and 322 grease traps were emptied and 294 sewer access points were built.

### **Hydrant standpipe rentals**

Customers can rent two different-sized hydrant standpipes from PVK to pump water from hydrants. In 2016, 311 small and 193 large hydrant standpipes were borrowed.

### **Domestic wastewater treatment plants**

In cooperation with 1. SČV, a.s., PVK arranges for sales of domestic wastewater treatment plants from the Czech company ENVI-PUR. This is a solution suitable for customers who, for technical or capacity reasons, are unable to connect to the sewerage network to have their wastewater treated at a municipal plant. We are able to offer customers a presale service (the selection of a type of plant, suggestions on where to locate it, assistance with project arrangements, etc.) and an after-sale service, including the sampling and inspection of the treatment plant and other advice. In 2016, four complete domestic plants were set up, and there were numerous other sales of accessories and services. Customers can also contact PVK if they need advice on the operation of other manufacturers' domestic plants.

## CUSTOMERS

PVK provides users and contract customers with a high standard of services and offers them modern, convenient forms of communication. It draws on all channels of communication in its efforts to convey information on water supply and wastewater drainage. The Company's unflagging innovation sets it apart from the competition and yields new smart solutions for partners.

Since 2010, it has adhered to "Customer Service Commitments", which help to improve the services enjoyed by customers. It also seeks to apply the principle of corporate social responsibility, warning customers of any increase in their water consumption and assisting them when they find themselves in difficulty.

Since 2003, our customer services have been certified under the international standard ČSN EN ISO 9001:2001. PVK again retained this certification in the 2016 annual re-audit, testifying to its highly professional, utmost-possible customer care.

In October, the Company ran its traditional **satisfaction survey**. The poll was conducted for PVK over the phone by IBRS - International Business and Research Services s.r.o., the independent research agency. In all, 91% of respondents said they were happy with the services offered by PVK. Over 95% of respondents are satisfied with the professionalism of the Company's frontline employees. Some 96% of respondents are happy with the continuity of drinking water supply; 91% are happy with the quality of the water supplied. The research involved the participation of 700 customers from Prague, comprising a mix of single-family building owners, multi-family building managers, housing cooperatives, industrial customers and corporates.

### Contract customers and invoicing

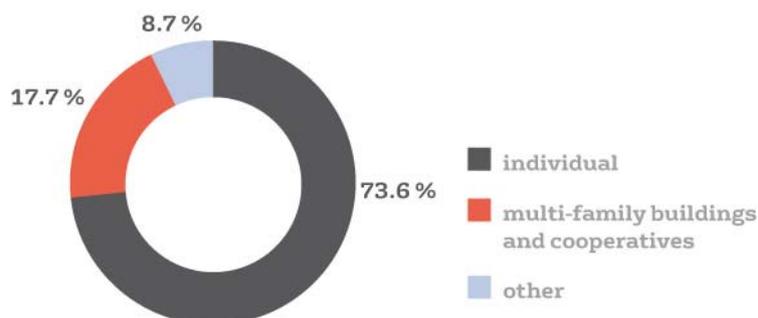
PVK provides services to **89,943 customers**, supplying them with drinking water and draining and treating their wastewater contractually. Contract customers include individual customers (66,210), multi-family buildings and cooperatives (15,950) and corporates (7,783). As certain customers may have more than one contract in place, PVK recorded 113,518 supply points at the end of 2016.

More than 25,000 PVK customers had their bills emailed to them in 2016. PVK also offered to send their receipts via e-mail. This means that legal entities, after paying a deposit, receive a tax document promptly and in advance, so they have problem-free VAT check reports. These customers were also able to make **online payments** via their VISA or MasterCard or, alternatively, a payment button, i.e. a link to internet banking with a pre-filled order. Contract customers who opt for the payment button simply select the bank where they have their online account. Since January 2016, the following financial institutions have been involved in this project: Česká spořitelna, a.s., Komerční banka, a.s., Raiffeisen Bank, a.s., mBank S.A., organizační složka, Era and Československá obchodní banka, a.s. During the year, the online payment option was also extended to businesses.

Customers also paid their bills via the **terminals of SAZKA, a.s.** On the bill, they find a barcode, and the terminal can read the payment information contained in the code and issue a receipt confirming the customer's cash payment. The far-reaching terminal network (at newsagents, petrol stations, convenience stores, etc.) and extended opening hours allow customers to pay their bill as it suits them. A uniform CZK 15 is charged for this service regardless of the amount paid. In 2016, 17,262 customers used Sazka terminals to pay water and sewage bills aggregating CZK 51.69 million.

Since 2013, another cashless avenue open to customers has been **QR-based mobile payments**. This involves a special QR payment code for banking applications on smartphones, printed by PVK on its billing documents. The relevant bank's application installed in a device simply reads the information contained in the QR code shown on the bill and the payment order in the banking application is automatically completed with the correct data. All the customer has to do is confirm the payment. This way, customers avoid the errors that could crop up were they to fill in their bank's payment order manually. Even customers who do not own a smartphone with a banking application can use the QR code. This option is available with Česká spořitelna, a.s. In 2016, customers paid for more than CZK 14 million of services using a QR code, which is twice the amount paid in 2015.

## PVK CONTRACT CUSTOMERS IN 2016



### Contact centres

In 2016, PVK's **customer service line** handled 93,252 calls with a 93.37% service level. Enquiries tended to centre on drinking water supply, rising from 34,544 the year before to 47,491. Billing and claims were the subject of 14,560 enquiries and 12,990 enquiries involved contracts. Customer service line operators also respond to customers' emails. In 2016, they processed 44,573 customer emails (6,948 more than in 2015) and 8,161 active forms. Besides handling customers' calls and emails, operators also help to promote service provision, register customers for the SMS INFO service, and offer email billing, insurance to cover emergency situations, the activation of online customer accounts, the Moje voda mobile app and other services.

As part of its customer service enhancement policy, in 2016 PVK introduced an additional number for the customer service line. **The existing "white" number 840 111 112 was joined by the mobile number 601 274 274.** The new mobile line allows those who have unlimited plans with mobile operators or with their landline to call the new number within their plan at no additional cost.

Call type	Number	Per cent
01. General information	8,496	9.1%
02. Water supply	47,491	50.9%
03. Wastewater drainage and collection	1,342	1.4%
04. Debts	2,905	3.1%
05. Readings	1,571	1.7%
06. Connection pipes	954	1.0%
07. Meters	4,308	4.7%
08. Invoice	11,655	12.5%
09. Contracts	12,990	13.9%
10. Compensation, discount	262	0.3%
11. Services	706	0.8%
not specified	573	0.6%
<b>Total contacts</b>	<b>93,252</b>	<b>100.00%</b>

The PVK contact centre's organisation is in the hands of Solutions and Services, a.s. (the provider of ICT services within the Veolia Group). In addition to its contact centre management, Solutions and Services, a.s. has also taken over the reins of billing and debt recovery.

	2014	2015	2016
Number of calls	79,753	95,674	<b>93,252</b>
Service level	84.6%	93.8%	<b>93.4%</b>
Number of calls on drinking water supply	29,322	34,544	<b>47,491</b>
Number of customer emails handled	30,244	37,625	<b>44,573</b>

### Customer service centre

The customer service centre in Dykova Street, in Prague's Vinohrady district, had **24,509** visitors in 2016, 2,277 fewer than in 2015. In 2016, **16,269** new contracts were made at the centre. At the customer service centre, customers can pay for water and sewage bills and for water analyses, hydrants, etc., over the counter. More than CZK 40 million was paid in this way. At the centre, visitors were able to sort out everything to do with their contractual relations and tackle all of their technical requirements, including technical documentation.

## MODERN CUSTOMER SERVICES

### Home assistance and refunds in case of water leaks – for contract customers

A new feature in 2016 was the assistance service for emergencies associated with post-supply water leaks. This free service has been available to customers since January 2016.

The assistance service is on hand round the clock, 365 days a year. Two hours' professional work is provided free of charge. A PVK customer is entitled to make use of three such assistance services per supply point free of charge every year by calling 212 812 212. These services also include refunds for water leaks. This is partial compensation for any outlay on water supply caused by a water leak stemming from a demonstrable emergency, provided that the customer's share of the water leak is 10 m<sup>3</sup>, which is the minimum limit for refunds; the maximum water leak refund limit is CZK 15,000 per supply point per year. PVK's partner in this project is United Assistance, the reputable assistance service provider.

### New customer portal and mobile app

PVK has worked with the Veolia Group to prepare a new customer portal and a new mobile app. PVK will offer these new services to its customers in the first half of 2017. Besides the more modern look and improved clarity, it will be possible to deal with selected requirements online, such as a change in payment settings or the reporting of self-readings. Customers will also be able to keep track of their water consumption from their billing history. Information on accidents and shutdowns, and the nearest company contact points, will be available to users who are not signed in. The aim of the new portal and app is to increase customer and consumer convenience. The option of making online water-related payments via the portal or app is a premium service. The mobile app will be geared not only towards customers, but also towards consumers, and will be available for download to Android and iOS user interfaces.

### SMS INFO

A full 30% (**28,561**) of PVK customers have signed up for the SMS INFO service to receive text messages about incidents, shutdowns, the estimated downtime, etc. As such, registered customers receive, free of charge, important information about water via text messages transmitted to their handsets. Since the service was launched, **853,000 text messages** have been sent to customer phones.

Number of contract customers	89,943
Number of supply points	113,518
Number of people registered for SMS INFO	28,561
Number of SMS INFO text messages sent	853,000
Number of justified complaints and claims	275

In 2016, PVK received and handled 388 complaints, but only 14.4% of them, i.e., 56, were justified. There were 718 claims, of which 30.5% (219) were upheld.

## Website

The PVK website ([www.pvk.cz](http://www.pvk.cz)) has emerged as one of the Company's main information channels. On average, it attracts around 55,000 visitors per month. The website has been optimised for the whole gamut of devices (mobiles, notebooks, tablets, etc.), enabling customers to find the information they need anywhere, any time. News on incidents and water supply shutdowns generates some of the highest traffic. The people of Prague can find information about water supply disruptions online here. In the "water incidents" section, they can find out about the incident site, the implications for water supply, the availability of substitute water sources and the estimated repair completion time. All of this – along with scheduled shutdowns – is also shown on Google Maps. This is the go-to place for Prague residents who need to know exactly where they can find emergency drinking water supplies. Another subject that is frequently looked up is the quality of water supply. In addition to complete monthly summaries of all water quality parameters, PVK's website offers overviews of certain indicators in supply zones. People can therefore find their street in the map and find the water hardness, the iron, nitrate and chlorine content in the water, and the water pH for this location. The website even serves as a booking station for customers to make appointments at the customer service centre to discuss contractual and technical matters.

Those seeking information about the existence of utilities may submit their request electronically. This service simplifies communication between the person making the request and PVK employees and shortens the time it takes to provide information on the existence of networks. The online request can be found on the PVK website. A person sending a request is emailed an automatically processed document, including a map plotting out the utility networks.

## PVK service promotion

In 2016, PVK published a series of informational materials and brochures for customers and the general public. In June, the magazine *Pomáháme přírodě i lidem (Helping Nature and People)*, on the Company's CSR activities, was published. Towards the end of the year, the **Voda pro Vás (Water for You)** customer magazine was published (450,000 copies) and distributed together with all the major daily newspapers. The Company also produced a desk calendar to be handed out at the customer service centre in Dykova Street. PR and advertising campaigns on the radio, in the printed media and on news servers also helped to promote PVK's services.

## RESPONSIBILITY

### Responsibility towards employees

PVK is a stable company maintaining a responsible approach to customers and employees alike. The Company's strategy incorporates adherence to a code of ethics and a code of conduct for managers, compliance with ISO and OSH standards, and environmental development.

PVK nurtures exceptional working conditions for its employees, provides interesting benefits, and prioritises professional advancement, employee training and occupational safety.

As open social dialogue and cooperation with the trade unions and the team as a whole are essential factors for PVK, collaboration and respect between Company management and the trade unions is crowned by the conclusion of a collective agreement every year.

### Human resources

As at 31 December 2016, 994 employees worked for PVK. The average number of employees (FTE) in 2016 was 972. During the year, a total of 58 employees left and 85 joined. Turnover, then, stood at 6%, 3% down on the previous year.

The number of employees rose again, this time by 27 year on year. This increase was prompted in particular by developments associated with the rollout of new technology (remote readings and other services) as PVK moves forward with its plan to expand activities beyond the framework of its principal business.

**Of the total 994 employees, 731 were men (73%) and 263 were women (27%).**

The Company employed 20 part-timers, 61 temporary staff, 15 persons with disabilities (1.5%) and 75 pensionable staff (7.5%).

Of the total number of employees, 209 were degree-holders (21%), a significant hike by 20 employees, and 379 had attained full secondary education (38%).

The average employee age was **46**, the same as in the previous year. The relative ageing of the workforce is an important aspect for the Company to tackle, in particular in connection with the transfer of operating know-how.

Despite the low inflation rate, average wages went up by 3%, equating to more than CZK 900 per month, in 2016.

Despite the high demand for service provision outside operating hours, the overtime hours of 22,695 remained on a par with the previous year. This implies an average of 23 hours' overtime per employee per year.

### Employee benefits

For PVK, employees have long been a crucial factor in the provision of a high standard of services, as well as in technical and technological development. With this in mind, employee care is a focal point on all management levels.

CZK 30.9 million was spent on both tax deductible and non-deductible social benefits in 2016. This accounted for 4.5% of total personnel costs. Of that, CZK 1.5 million was provided for trade union activities, CZK 1.3 million for sports and cultural activities, and CZK 0.6 million for major personal and professional anniversaries. In addition, funds of CZK 0.18 million were made available for social assistance and CZK 0.7 million for employee loans.

**Personal pension plans and life assurance** are an important part of employee benefits and are used by 88% of employees. The employer's average monthly contribution to these policies amounted to CZK 1,100, with the Company contributing almost CZK 12.6 million altogether. Employees were able to draw on a raft of other benefits, including subsidised meals (meal vouchers).

## Employee training

PVK has long been committed to improving employees' qualifications and training, which it views as a priority. This is integral to corporate culture and a major factor in making the Company stand out from the crowd. A systematic approach to education brings a number of advantages and enhances employees' motivation and stability.

PVK's training costs totalled CZK 6.2 million. The largest share (89%) of these expenses was spent on increasing professional qualifications, 6% was earmarked for mandatory training and special skills training, and 5% was spent on improving employees' language proficiency.

Training for the employees of PVK and other companies of the Veolia in the Czech Republic Group is mainly provided by the Group's own company, **Institut environmentálních služeb, a.s.** (IES), with its broad-ranging courses and training programmes, many of which are accredited by the Ministry of Education (MŠMT): general courses, seminars and practical training, including a number of special periodical training sessions; tertiary and secondary education programmes; and vocational training. IES is an important part of the international network of Veolia Group training centres, known as Veolia Campuses.

## Occupational safety

Occupational safety stands alongside employee training as a strategic element established internationally for the entire Veolia Group, including PVK. The Veolia Group is committed to guaranteeing a healthy and safe working environment. OSH ground rules contained in the Labour Code, applicable legislation and technical standards are also conveyed by the internal Code of Occupational Safety. Above and beyond their mandatory training, all employees take a hands-on **first-aid course** once every two years.

Since January 2007, the Company has held an occupational safety and health management system certificate. In November 2016, as part of the periodic supervisory audit, the Company successfully defended all of its integrated management system certificates, including ČSN OHSAS 18001.

One of the long-term objectives pursued in occupational safety and health is to bring down the number of occupational accidents. The criteria for the prevention of occupational accidents and for the protection of employee health are assessed on a regular basis. This approach has kept the occupational accident rate at an encouraging level. In 2016, there were three minor occupational accidents resulting in 169 working days of incapacity, i.e. one accident fewer than in the preceding year. The occupational accident rate was a mere 0.31%. **Long-term OSH targets are to drive down accidents at work to a minimum and eliminate fatalities altogether.**

In September, PVK – much like other Veolia Group companies – was involved in the International Safety Week, underpinned by the motto “No More”.

**The following materials and measures were prepared in order to safeguard and promote the “No More” rules:**

- Posters propagating the “No More” rules and OSH Week;
- Brochures to be used in training on OSH Rules in five key areas (enclosed spaces, earthworks and excavations, dangerous substances, fire and explosion hazards, traffic safety);
- The IES education portal opened an OSH Library, encompassing all training, brochures, films, etc., on OSH;
- All employees were given reflective items.

## Occupational medicine services

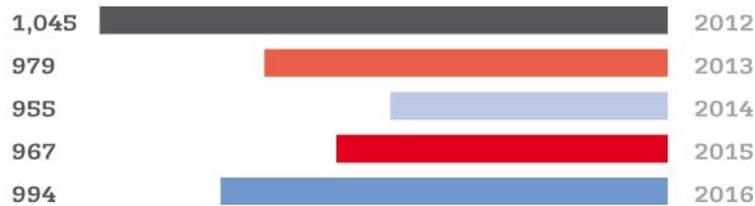
In 2016, the staff sickness rate was maintained at a level of 2.4%.

This was helped by the fact that PVK arranges for employees to undergo periodic medical examinations beyond the scope of mandatory checks. In cooperation with SALUBRA s.r.o., medical examinations were arranged for employees, including the vaccinations set out in the collective

agreement and other statutory examinations. A general practitioner's surgery serves employees and their family members in the Hostivař complex.

Another round of the regular medical surveillance of workplaces was also initiated, primarily to identify potential workplace risks and come up with corrective measures to remedy any unsatisfactory working conditions. Surveillance is carried out within the framework of occupational medicine services by the SALUBRA s.r.o. healthcare facility in the presence of OSH and fire protection specialists and an employee from the organisational unit in question.

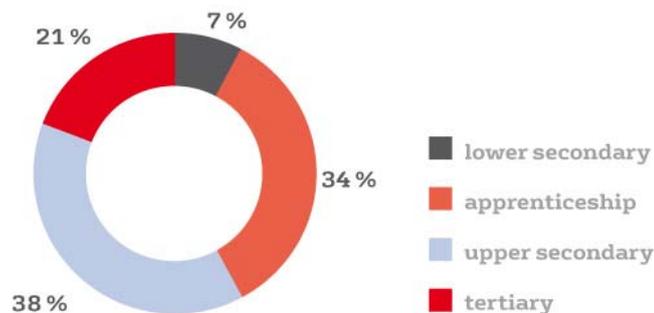
### NUMBER OF EMPLOYEES BY YEAR



### EMPLOYEE STRUCTURE BY AGE



### EMPLOYMENT STRUCTURE BY LEVEL OF EDUCATION



## EMPLOYEE STRUCTURE BY LENGTH OF SERVICE



### Internal communications

Mutual awareness and sound relations in the workplace have a bearing on employees' behaviour and increase the efficiency and intensity of their work. The main internal communication tool continues to be the **intranet**, which disseminates information in real time and allows employees to respond instantly. During 2016, a new Veolia reporting portal was created on the intranet. The pilot project processed technical data and transport, energy, procurement and human resources.

The **Pévákáčko** in-house magazine is published five times a year and includes information on important PVK events for those who have no permanent access to the intranet. The **Naše Veolia ezine and the Planeta magazine** regularly report on the latest news within the Veolia Group.

Good relations within the Company are also fostered by various informal **social gatherings and sports events**. The Old Treatment Plant and Podolí Waterworks hosted meetings between PVK management and supervisors. Several times a year, staff meetings are organised by the trade union. Events are also held for parents and their children. Sports activities have proved a great success among employees. Nearly 180 employees took part in the 19th Sports Games in Želivka, and just shy of a hundred pitted their strength against each other at the Water 50 in Pálava. The Company's teams did extremely well in the Dragon Boat Regatta and in the Gigacup five-a-side football tournament. Tennis players regularly participate in the Jan Vrána Memorial.

PVK also regularly holds **corporate volunteering days** as an opportunity for employees to help the needy during normal working hours. In 2016, in cooperation with the public-benefit company Assistance, PVK arranged a trip for disabled clients to the Water House in Želivka; wheelchair users were accompanied by PVK employees.

In the autumn, seven employees from the ranks of the Company's employees offered their assistance at the Seniors' Sports Games. They helped to organise the sports disciplines and refreshments for athletes. As usual, volunteers were also involved in "Clean Up the Czech Republic". In 2016, rubbish was cleared from the area around Hostivař Dam. In total, PVK employees worked 154 volunteer hours in 2016.

## CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL PROTECTION

**PVK is a member of the Veolia Group** and collaborates with it on all environmental projects and CSR matters. The Veolia Group earned a TOP Responsible Firm award – Project of the Year in the ENVIRONMENTAL LEADER category – for its approach to the promotion of biodiversity at its complexes.

With this award, the jury mainly assesses the quality of the strategy, the innovative nature of the projects, and the systematic approach. The aim of the winning project is to encourage the diversity of species – monitoring and assessments of the impact of operations on local ecosystems and the implementation of measures to conserve biodiversity. Veolia also received a bronze certificate in the TOP Large Company category for its comprehensive strategy in all areas of CSR, encompassing social responsibility and sustainable business.

Awareness-raising, training, support for social projects, lectures in schools, the promotion of tap water, biodiversity conservation, the reuse of wastewater in a circular economy, and cooperation with the Veolia Foundation – this is just a short list of PVK's activities in this area that contribute to sustainable development and are among key values. It is part and parcel of the corporate strategy.

### Awareness-raising

Besides promoting social projects, PVK also sponsors a large number of cultural, social and sports events in the capital (e.g. the Primátorky Regatta and the Ladronkafest leisure festival in Praha 6). Since 2007, it has channelled financial support into the Lighthouse Halfway House in Praha 4. The Lighthouse helps young people who leave children's homes at 18 years. Other social projects include an international tennis tournament for wheelchair-bound players, Tinderbox - a volunteering award organised by the Hestia Centre for Volunteering, and donations to help towards the purchase of social-good cars.

The Company laid on a water bar and fresh drinking water in tanks at dozens of events held in Prague, such as Microclimate, Bike Prague, and music and other festivals, where drinking water from the tap was served to refresh visitors.

### Education

The Company has a long history of working with primary schools. Regular lectures are held in these schools to educate pupils on the water supply cycle and to get them to think about water consumption and various environmental issues.

In 2016, PVK distributed an interactive programme for schools – The Water Cycle in the Water Industry – to Prague's primary schools. This programme enlightens pupils about the process of water and wastewater treatment, and asks them leading questions so that they are motivated to think about water consumption and the environment. The programme for primary schools was presented at a meeting of school representatives hosted by the Prague Waterworks Museum in September 2016. The teachers' responses indicate that the schools are using it.

Last year, PVK became a major partner of the Water House near Švihov Valley Dam. This is a modern visitor centre that acquaints visitors – especially children – with the two faces of water, presenting it as a natural environment of aquatic plants and animals on the one hand, and as a prerequisite for life on the other.

### Water Guardians' Club

Since 2000, PVK has organised a Water Guardians' Club for children aged from 6 to 16 in order to raise awareness of water management. At the end of 2016, the club had 666 members. As is customary, during the year two magazines were published and two gatherings were held – a trip to the

Water House in Želivka, which included a tour of Švihov Dam, and to the Science Show in Podolí Waterworks. News is regularly published on the club website at [www.vodnistrazci.cz](http://www.vodnistrazci.cz), which is managed by PVK.

### Fresh Tap Water?

In 2016, PVK continued its Fresh Tap Water? project. Suffice to say, the aim is to promote the drinking of tap water in restaurants as this reduces the waste caused by plastic bottles and hence cuts down on emissions from the transportation of drinks. Glass carafes are distributed free of charge to those restaurants involved in the project so that they can use them to serve water. A list of participating restaurants and hotels can be found at [www.kohoutkova.cz](http://www.kohoutkova.cz). In addition, there is a mobile app to direct users to the nearest restaurants offering tap water.

In 2016, PVK backed the installation of two drinking fountains in Praha 7. The Company will continue this activity in 2017, when drinking fountains are to be installed in other parts of the city.

### Prague Waterworks Museum

Interest in the museum continues to rise with every passing year. Visitors to the museum can learn about the history of water management and finding out interesting facts about the water supply today. There were open days in the spring and autumn, and the museum also opened its doors during Prague Towers. In 2016, it attracted 12,516 visitors (of whom about 60% were schoolchildren, with soaring interest among secondary-school and university students in 2016) from home and abroad (France, Slovakia, the US, Germany, the UK and Russia). As in previous years, the museum was involved in the “experiential tourism” project, during which 280 participants visited not only the museum, but also Podolí Waterworks.

During the year, the museum was open for various social and educational events, e.g. to mark World Water Day, when the Podolí Waterworks pumping station was the venue for a concert in cooperation with the Water Management Association.

#### MUSEUM VISITOR FIGURES



### Conservation of biodiversity at PVK complexes

PVK has long worked with the Czech Union for Nature Conservation (ČSOP), with whose help it is fostering conditions so that naturally occurring plants and animals can thrive at its complexes. Human activities and changes have robbed cities of deadwood, which is essential for insect life. In response, PVK is setting up insect hotels and loggers at its complexes to attract insects and solitary bees. It is also continuing to put up nest boxes, with 20 already dotted around the PVK complexes.

Cooperation with the ČSOP includes sowing the Company's complexes with mixtures of meadow plants from protected Prague sites. This boosts biodiversity in the area considerably. In 2016, the areas around the Kvestorská, Ovčín and Modřany North II reservoirs were sown.

An audit was conducted at the water treatment plant in Káraný to gauge the possibility of enhancing biodiversity here. On the strength of that assessment, measures were proposed to support biodiversity in the treatment plant complex in different ways. Nesting conditions for birds were encouraged in July

by the installation of boxes for tits and open boxes for redstarts. Two insect hotels were set up in the complex in support of endangered species of insects.

The areas around reservoirs are also ideal for apiaries. These can be found at two PVK complexes – Strážovská Reservoir and Zálesí Reservoir.

Animal diversity was increased in the area above Flora Reservoir. The meadow came alive with a number of animals that would previously have been impossible to find in the middle of Prague. Dragonflies skim over the surface of the pond, there are aquatic insects in the water, and butterflies, bumble bees, and honeybees flit over the rockery and herb garden. The insect houses are teeming with insects.

## **Waste management**

In 2016, PVK produced 169,860 tonnes of waste, 9.85 tonnes of which was hazardous. The share of hazardous waste at the Company has long been negligible.

PVK is not only a producer of waste, but also operates a facility to process selected types of waste. It offers the city and businesses a service where this waste is handled transparently and passed on to them for reuse. The CWWTP processed the largest quantity of waste in 2016 – approximately 12,000 tonnes. In addition to purchasing selected waste, PVK also runs the mobile collection of waste from grease traps at schools and nurseries, hospitals and other institutions.

In previous years, the company set up a reservation system for the acceptance of liquid waste at the CWWTP. Thanks to this system, it knows the quantity and types of discharged waste prior to actual discharge. The application also monitors the validity of the documentation required for waste discharge, corrects the daily waste quantities received at the CWWTP, and helps certain PVK employees in requesting samples of incoming waste. All customers availing themselves of this service at the CWWTP in Prague have successfully switched to this system.

In 2016, successful cooperation within the Veolia Group continued and broadened with Severočeské vodovody a kanalizace, a.s. with respect to the sampling of waste produced by PVK and complete arrangements for the analysis of these samples in line with our requirements, and with 1. SčV, a.s. with respect to the provision of consulting services for waste management at its establishments.

PVK also started to work with Veolia Vedlejší produkty ČR, s.r.o., which arranged for the removal of treated sewage sludge to agricultural land.

Chemicals are part and parcel of the drinking water and wastewater treatment process. PVK has long aspired to reduce levels of chemicals, not only because of the savings in operating costs, but also to mitigate the negative impact on the environment. At selected PVK establishments, the types of chemicals used have been changed, so the emergency response plans have been updated.

## **ISO energy management certification**

As PVK's operations are closely linked to the environment, the Company maintains a responsible approach to environmental issues. It employs a systematic approach to energy performance improvements and energy management optimisation. In this light, PVK was the first water company to pass a ČSN EN ISO 50001 energy management certification audit.

## **Even waste can be a resource**

PVK expresses its respect for nature and resources by seeking out new solutions and reusing wastewater wherever possible. Sparing use of water resources, water recycling, the reuse of wastewater, and the use of the energy or sludge generated by treatment are all part of the Company's sustainable development strategy.

One example of a circular economy is the reuse of wastewater from the Kbely wastewater treatment plant, where treated wastewater is pumped into the main retention tank on a golf course. Prior to discharge into the tank, the water is sanitised with UV lamps to stave off biological risk.

Wastewater is also an important source of energy. In 2016, PVK produced 82,700 tonnes of sludge. Sanitised sludge was spread on farmland (80%) and processed in a composting plant (20%), all in accordance with applicable provisions of the Waste Act.

The use of sewage treatment plant gas in cogeneration units made the CWWTP 100% self-sufficient in terms of the heat used in its operations again. The electricity generated covers 71% of its power consumption. PVK also has other projects on the way that will use water as a source of thermal energy.

### Wastewater discharge limits were not exceeded

One emergency for PVK in 2016 was a sludge management incident at the CWWTP in Prague, making it impossible to process all of the sludge in the digesters for a few months, which meant that some of it had to be sanitised by other means. The water line was not spared its own emergency either. Here, the inflow of a toxic substance evidently made the activated sludge disintegrate. Thanks to the excellent teamwork of engineers, operational staff and academia, the activation process parameters were adapted so as not to exceed the limits of the valid permit to discharge wastewater into surface waters.

### Carbon footprint

The carbon footprint is one of the gauges of the impact of human activity on the environment and the climate.

Most of the carbon footprint comprises electricity consumption (typically 70-80%), followed by the consumption of thermal energy, represented by natural gas, light fuel oil and coal. Energy and heat produced from biogas reduce the carbon footprint because CO<sub>2</sub> emissions released during biogas combustion are not fossil-based and therefore do not contribute to the globally increasing concentration of CO<sub>2</sub> in the atmosphere.

PVK first signed up for an evaluation of the impacts of its operations, in the form of its carbon footprint, in 2010. This is when the first evaluation of the management of Veolia Group companies in the Czech/Slovak zone was carried out by the carbon footprint method for 2010.

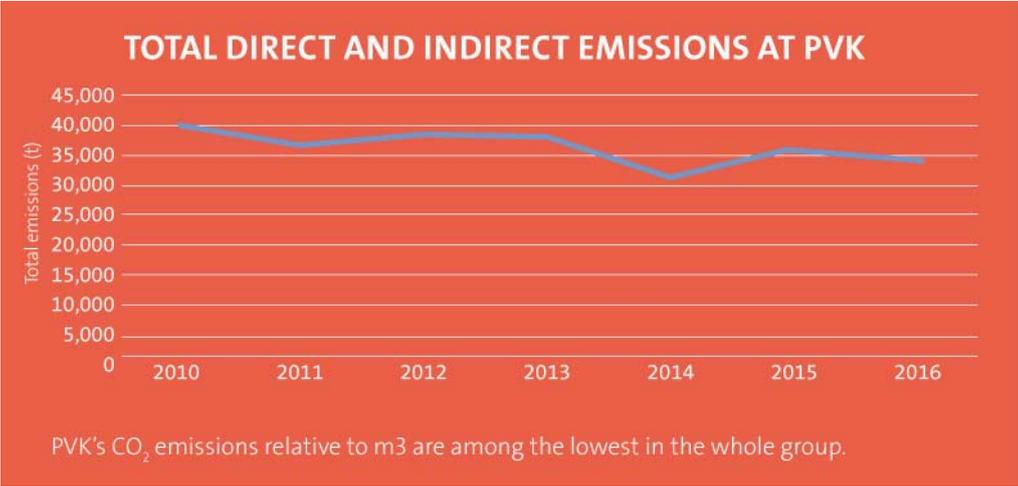
Projects targeting electricity and thermal energy savings, an increase in the generation of energy from renewable sources, greater plant self-sufficiency, and the optimisation of chemical and fuel consumption have triggered a progressive reduction in the overall carbon footprint.

One example of such a project at PVK is the reconstruction of the Flora and Ládví I pumping stations, during which the lighting of the pumping station structures was replaced with more energy-efficient lamps. This saved about 364,000 kWh of electricity at the Flora station and approximately 230,000 kWh of electricity at the Ládví I station, i.e. the aggregate electricity saving was 594,000 kWh.

Another project was a fuel saving scheme, launched in previous years and continued successfully in 2016. A new car sharing system was introduced, along with new car booking arrangements in the internal Helios Green system. Work continued on installing GPS to monitor journeys and automatically import data on vehicle operations. PVK also invested in alternative clean fuel – CNG, resulting in a saving of approximately 10,000 litres of diesel in 2016.

PVK's overall carbon footprint for 2016 was **35,600 tonnes of CO<sub>2</sub>eq**. Total direct and indirect greenhouse gas emissions (electricity and heat) for the collection and treatment of wastewater at PVK amounted to **12,970 tonnes of CO<sub>2</sub>eq**; emissions associated with drinking water production and distribution were **22,060 tonnes of CO<sub>2</sub>eq**. Ratios, potentially carrying greater informative value, indicate that, at PVK, **597.3 g of CO<sub>2</sub>eq** was generated per cubic metre of drinking water produced and **99.8 g of CO<sub>2</sub>eq** was generated per cubic metre of water discharged.

The figure below records how overall emissions have evolved. PVK has successfully kept to a more or less downward trajectory, making consistent reductions in the Company's carbon footprint. It should be borne in mind that the constantly increasing demands placed on the quality of the wastewater treated also necessitate the higher consumption of chemicals and energy, hence the carbon footprint cannot be reduced indefinitely. This makes the enduring situation derived from the graph all the more valuable.



## Cooperation with the Veolia Foundation

**PVK has worked with the Veolia Foundation ever since its establishment back in 2003. PVK is a major donor to the Fund and is involved in many social projects and in environmental activities.**

### **Mini Grants – CZK 700,000 was channelled into employees' projects**

PVK allows its employees to obtain financial support for projects that benefit the community and are carried out in their spare time. It organises the Mini Grants scheme with the Veolia Foundation. In the ninth year of the scheme, almost CZK 700,000 was split among 23 volunteer projects.

As has become the norm, funds targeted the support of the disabled, foster care, leisure activities or the purchase of assistive aids. Awareness programmes were also on the receiving end – witness the “Safe Water” project to shed light on the work done by lifeguards. Beekeepers and the “The School Garden as a Classroom” project were not overlooked either.

### Helping to make life better for seniors

In 2016, the Always with a Smile programme for seniors entered its second year. PVK and the Fund strive to promote positive active ageing, intergenerational cohabitation in the community, and conditions for seniors to live in their home environment. In Prague, the programme supported seniors in Praha 14 – the Neposeda (Figet) organisation, Domov Sue Ryder International CZ, and the Protěž (Edelweiss) senior day care centre, where, thanks to the donation, they expanded their activities to include sports and held a bowling tournament. To mark the International Day of Older Persons, the Fund organised a day trip for the clients of the Social Activation Centre for the Elderly in Praha 9.

### Water for Africa Mk 7

Benefit event proceeds raise money for the Fund to build and repair water sources in Ethiopia. In the Water for Africa project, it cooperates with People in Need (Člověk v tísni).

PVK is actively involved in the project in that it buys items from charity sales as gifts for its clients and contributes to the promotion of these sales. The seventh year raised CZK 770,000. This money will help to secure drinking water for people in the village of Bargo in the district of Aleta Wondo in southern Ethiopia.

Over the past seven years, the Veolia Group and the Veolia Foundation have funnelled almost four million crowns into the repair and construction of new water sources in Ethiopia. This has resulted in the repair and construction of water sources for 33,000 Ethiopians in poverty-stricken rural Ethiopia. At the end of 2016, besides the traditional crystal carafe designed by Daniel Piršč, those who were interested could also buy Thun porcelain cups with an African pattern and genuine Ethiopian Sidamo coffee. The Veolia Foundation has set up its own long-running public collection for this project.

### Helping nature

Since 2011, the Foundation has collaborated with Jakub Vágner on the Trout Way project, which aims to return salmonid fish to Czech rivers. In that time, over 12 tonnes of brown trout have been released into rivers. In 2016, another two tonnes of trout were released, this time into the Elbe at Terezín. Another project to help our countryside is Clean up the World, Clean up the Czech Republic, the main sponsor of which is the Fund. PVK employees helped to clean up around Hostivař Dam in Praha 10. In 2016, there were 2,066 clean-up events in the Czech Republic.

## INNOVATION

### Packaged water expands

Interest in the “Packaged Water” project continues to grow as a method for the alternative supply of water in two-litre sachets. Supplies of packaged water are intended for the disabled, but are also used in response to incidents and outages. In 2016, 250 inhabitants of Prague were registered for this service. Cooperation in the distribution of packaged water began with the borough of Praha 6 and has since spread to include Praha 2 and Praha 15.

In 2016, PVK produced 527 containers of packaged water. These were used in dozens of incidents and outages in the water supply network. All containers are chipped to track their position and gain an overview of container movements from the production line to the point of distribution. In the future, the system will be interconnected so that the public can also see the position of a container on Google Maps in the same way that water wagons are displayed.

A packaging line has been installed at the Káraný water treatment plant. The entire process of packaging water in sachets, including the plastic film used, is consistent with the Public Health Protection Act and related regulations. The requisite details on the quality of the drinking water, including the use-by date, can be found on the sachet. The quality of the water in sachets is checked on an ongoing basis by an accredited laboratory.

### SWiM development

The central integrated system for the control and management of water infrastructure (Smart Water Integrated Management), commissioned in 2014, was expanded once again in 2016. This system integrates ten areas of water management. One innovation has been the hydraulic simulation of water flow on the main supply routes, making it possible to respond online to the occurrence of turbidity (increased iron) in the feeder conduits from the Káraný water treatment plant and to optimise flow conditions. Information on healthcare facilities in Prague is continuously updated in the contingency plan. For the central control room’s needs, the City of Prague’s camera system is also accessible so that large-scale incidents can be monitored online, thereby speeding up the initial measures.

### New microbiological methods in laboratories speed up water quality control

An innovation in the analysis of drinking water has been the introduction of three alternative microbiological methods into laboratory practices. These methods ensure that we receive faster information about any faecal contamination of drinking water, i.e. in a matter of hours.

The BACTcontrol method is based on the fluorescent measurement of the biochemical activity of the bacteria present, and the results of enzyme activity are converted to the equivalent numbers of cells of coliform bacteria and Escherichia coli. The result of a single sample is available in three hours.

Another method is MicroSnap, a semi-quantitative bioluminescence test for an indication of the number of coliform bacteria and Escherichia coli. The advantage is that multiple samples can be processed in a series requiring between 6.5 and 8.5 hours.

The advantage of SuperSnap methodology is that the level of contamination can be estimated after 30 minutes. This method is not directed specifically at a particular type of bacteria present, but detects the overall microbial contamination and the presence of organic material underlying the growth and development of microorganisms, including the biofilm naturally occurring in the drinking water pipe network.

These methods have been put into practice at the Company and are used for the early detection of the faecal contamination of drinking water.

### Digitisation of water meter installation sheets

In 2016, the Installation Sheet Digitisation project was launched. Installation sheet digitisation was analysed as part of the project. High-resistance tablets were tested in order to define the specifications of the mobile device to be used by engineers when replacing, installing and uninstalling water meters.

## Flushing with a new full-flow hydrant standpipe

PVK managed to procure a stainless steel full-flow hydrant standpipe for underground DN100 hydrants, which had not previously been available anywhere in Europe. It was made by Česká voda - Czech Water, a.s. according to the technical specifications we had drawn up.

It is a standpipe for DN100 hydrants that facilitates controlled flushing via such a hydrant. Prior to this a standpipe designed only up to DN80 was used. It is installed on larger-scale water mains from DN400 up. The flow through the hydrant has been shown to be as much as 100 litres per second, which is not possible with ordinary hydrant standpipes. Further to the results of the first standpipes made, more of them will be deployed to and used at other worksites.

## Emergency monitoring of influent wastewater at the CWWTP

The continuous monitoring of the chemical composition of the wastewater flowing into the Central Wastewater Treatment Plant (CWWTP) is crucial for the immediate detection of incidents. The introduction of online monitoring in the main sewers feeding wastewater to the CWWTP has minimised the danger of incidents. A mobile container with a monitoring device is placed at the inlet to an upper-horizon pumping station beyond a flood area and monitors three main sewers: A, C, K.

The monitoring device comprises a control unit, four probes operating on the principle of spectrophotometry, conductivity and potentiometry, two autosamplers and a heavy metal analyser with mineraliser. The station evaluates the following wastewater contamination parameters in real time and transmits them to the central control room: COD (chemical oxygen demand), suspended solids, nitrate nitrogen, dissolved oxygen, conductivity, pH, temperature, and the quantities of heavy metals (Cr, Hg, Cu, As, Cd, Ni).

## Refurbishment of water supply and sewerage installations

In 2016, Ládví I **pumping station** was given a general overhaul and automated. This station provides the **distribution of drinking water** to the Ládví II and Ládví III **reservoirs**, from which the people of Letňany, Bohnice, Kobylisy and Ďáblice obtain their drinking water. The refurbishment encompassed the transformer station and all electrical wiring and piping. New pumps were installed.

The refurbishment of technology at the Uhříněves pumping station was completed. The establishment of a new **reservoir** at the same complex saw the construction of an initial accumulation chamber with gatehouse, and the start of work to build another. Both accumulation chambers at the Prosek reservoir were fully refurbished. To improve drinking water hygiene, a new chlorination station was built in a shaft by Nedokončená Street (for Újezd nad Lesy, Běchovice, Klánovice and Koloděje) and the chlorination station at the Suchdol reservoir was refurbished (for Suchdol, Roztoky and Horoměřice).

Technology was refurbished at the **wastewater pumping stations** in Dolnokřeslická, Lysolaje, Za Kovárnou, Českobrodská, Nad Propustí and Petrovice II.

At the Kolovraty **branch wastewater treatment plant**, the inlet pumping station was refurbished in connection with the construction of a new gravel trap. In the ongoing general overhaul of the Miškovice wastewater treatment plant, new secondary settlement tanks were built and work started on the refurbishment of the biological lines. **At the Kbely wastewater treatment plant, as part of the circular economy a pumping station was built to pump treated wastewater for the irrigation of a new golf course in Vinohř.**

At the **Káraný water treatment plant**, several systematic reconstructions and refurbishments were carried out during the year. At the main pump in the engine room, the engine and liquid starter were refurbished. A new vertical pump was fitted in a dry sump with electric drive to transfer water from the Lower Elbe source. To aerate artesian water, fans in the iron removal facility were fitted with a frequency converter, and a blower with continuous power control was installed to wash high-rate sand filters.

At the **Podolí water treatment plant**, the clarifiers were refurbished. Clarifier components were restored. This included the reconstruction of the concrete structures of the clarifier tanks and the complete replacement of wiring. The refurbishment of Clarifier 3 has been completed and was tested

during the shutdown of the Želivka plant in September 2016. At the beginning of 2017, the refurbishment of Clarifier 4 will be completed and work will start on the refurbishment of the remaining clarifiers.

### Refurbishment and reconstruction of the CWWTP

During 2016, a number of projects will be implemented, including the refurbishment of the energy centre substation, the replacement of the digesters' first-level mixing pumps, the supplementation of the control of small pumps in the upper-horizon station, and the installation of a permanent flow measuring section at the outlet of this station. It was also necessary to replace end-of-life pipe sections and return sludge gauges in old secondary settlement tanks. The replacement was successfully completed during the planned five-day partial shutdown of the biological part of the CWWTP's treatment line. This was the biggest project of this type since the completion of the second stage of intensification in 1997. During 2016, work started on the refurbishment of two digesters and the replacement of regeneration blowers.

Work continued in earnest on the construction of the **CWWTP's new water line**, launched in October 2015. The new line is scheduled for trial operation in the first half of 2018. In January 2016, construction work began on another key facility of the CWWTP's future plant, specifically the main pumping station, which will distribute all wastewater between the existing treatment line and the new water line.

### New information technology

PVK's tried-and-tested cooperation with Solutions and Services, a.s., which provides the Company with a range of information technology services, continued in 2016. The core PVK information systems, Helios Green (economic information system) and ZIS is-USYS®.net (customer information system), underwent routine maintenance and development. A Veolia Czech Republic Group joint project – HERP, a harmonised economic information system – was prepared.

The process **harmonisation project** encompasses accounting, purchasing, controlling and downstream reporting. These changes were introduced on 1 January 2017. In particular, they were reflected in the configuration of the Helios Green corporate information system and downstream controlling system. They also partly affected the routine operation of economic agendas at plants and in departments.

A uniform **Veolia purchasing classification system** (NKV) was prepared, entailing changes primarily in the buying processes. The biggest change has been the introduction of a system of triple-code accounting, where, in addition to the existing local company code, a harmonised company code and a company code for accounting according to IFRS international accounting standards will be introduced.

During the year, PVK also worked on a project to optimise reporting with a view to collecting data from all areas of PVK.

In support of the **Packaged Water project**, an app was launched in Helios Green to facilitate the organisation of packaged water supply in response to incidents and outages.

During the year, the servers for the virtualisation of the Helios Green application were replaced. This made it more stable.

The mobile client of the **Technical System** was launched in a test environment on the Android platform. This makes it possible to record information about devices on the ground.

The **application for engineers** at the Central Wastewater Treatment Plant and branch wastewater treatment plants was replaced. This application improves and accelerates the availability of data when monitoring the quality of wastewater. The capacity of PVK's main data links is also being increased to stabilise data traffic.

## Institut environmentálních služeb – IES (Environmental Services Institute)

### IES shareholder structure:

Campus Veolia France 40%  
Pražské vodovody a kanalizace, a.s. 30%  
Veolia Energie Česká republika, a.s. 30%

### Highlights for 2016

Sales revenue: CZK 33,703,707  
Number of employees: 13, most of them part-time  
Number of educational events held: 1,081  
Number of training sessions: 7,992  
Number of training hours: 132,895  
Number of lessons (of 60 minutes each): 25,529  
Number of participants in educational events: 14,153

In 2016, compared to the previous year IES increased revenues again, this time by 10.7%, and there was an increase in the number of lessons by 15% and in the number of training hours by 14%. The distinctly positive economic performance reported by IES was helped by the fact that it kept a firm lid on costs.

In 2016, eCampus, as a key project of IES e-learning, gained fresh impetus. IES changed provider, which was positively reflected not only in the new graphics, user interface and extended features, but also in the number of new e-learning courses. These included a course on the prevention of cancer and a course on balanced diets (both part of the Veolia Santé project), driver training for Slovakia, training on professional competence in electrical engineering (part 3), an introduction to cybercrime, the security of SCADA control systems, new language courses (6 x General English, 3 x Business English), and initial training for Veolia Energy ČR in new graphics. The OSH electronic library was expanded to include current posters, brochures, internal materials and films. In the eCampus electronic library, documents on ethics and compliance – guarding against criminal liability – were updated and supplemented.

In 2016, under Act No 179/2006 IES acquired authorisation to verify and recognise the results of further education. As an authorised entity, IES is registered in the information system of the National Qualifications Framework (NQF). There are 20 Ministry of Agriculture qualifications: chlorination engineer, water engineer – maintenance of watercourses, operator of a special vehicle for cleaning drains, engineer for the operation of a pumping and transfer station, engineer for the operation of a wastewater treatment plant, engineer for the operation of a drinking water treatment plant, sewerage network diagnosis officer, water supply network diagnosis officer, wastewater sampler, drinking water sampler, telemetry and automation technician, wastewater treatment technician, water treatment technician, drinking water engineer, water meter fitter, water meter reader, sewerage network technician and diagnosis officer, water supply network technician, sewerage network technician, and water management technician and dispatcher.

There are three Ministry of Industry and Trade qualifications: dug-well engineer, drilled-well engineer, and well engineer. In this respect, IES became authorised to test whether applicants for professional qualification certificates have truly acquired all the required competences.

One of IES's highly successful projects in 2016 was the Veolia Santé project, which draws on the Veolia Group's corporate culture. Since 2003, an integral part has been a running project of practical training in first aid, attended by 1,518 members of staff in 2016. IES prepared an original e-learning course aimed at preventing breast cancer, cervical cancer, prostate cancer and colorectal cancer, including instructional videos, a list of risk factors and specific preventive measures. The course, consisting of a series of quizzes and tests, was attended by 2,321 Veolia employees, of whom 127 were from PVK. Veolia won an award and was named a Company for Health on account of this project. Another IES contribution to the health care of Veolia employees is a new e-learning course called Balanced Diet, which appeared on the eCampus educational portal in late 2016.

In May 2016, IES again organised the popular Veolia Induction Programme (VIP), which was attended by 73 selected Veolia employees from the Czech Republic and Slovakia, of whom 13 were from PVK.

IES responded flexibly to the training needs of each company in the Veolia Group. For example, it came up with training for PVK on legislation and the operation of water infrastructure, laws and operational rules and standards, which was attended by 81 employees. In cooperation with the Faculty of Mechanical Engineering of the Czech Technical University, IES ran the "Pumping Technology" course twice. It was successfully completed by 40 employees from KHP and SVAS. The Veolia Trainee Programme continued in collaboration with the College of Construction and the Secondary School of Construction in Vysoké Mýto. In 2016, training related to the implementation of Google Apps continued. There were 43 courses in the Czech Republic and Slovakia, attended by 456 employees, of whom 65 were from PVK.

In 2016, IES was also delivered all aspects of corporate training for Veolia Energia Slovensko.

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