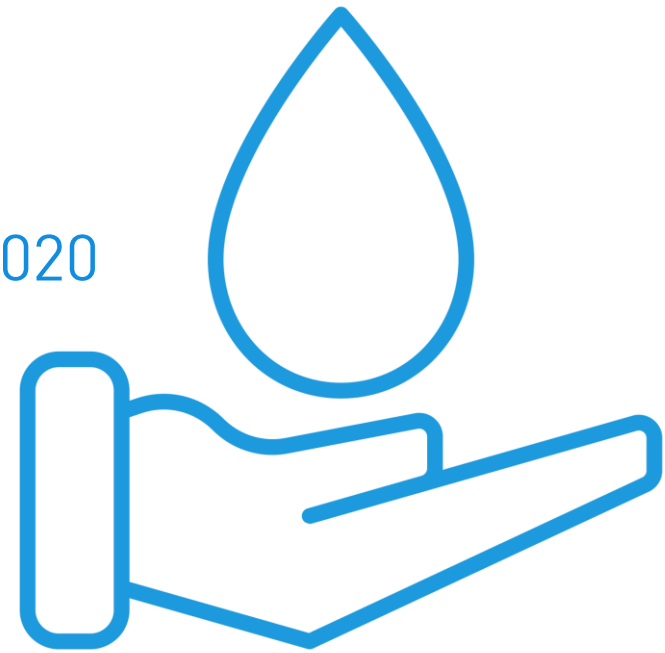
Tallinna Vesi
Loome puhta veega parema elu!

AS Tallinna Vesi

Environmental Report 2020



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Chairman's Statement

2020 was a year with a significant challenge. The COVID-19 pandemic required the Company to make a number of changes in its working arrangements, however, despite the circumstances we managed to continue providing reliable service with high standards to our customers. The Company responded quickly to the changing situation, and challenging objectives have been set for the year ahead, to ensure we continue to deliver an exceptional service to our customers.

We work hard every day to use water as one of the most important natural resources sparingly. We were very proud to achieve further reductions in leakage in 2020, setting another all-time low record for the Company. We consider this a success story, because our leakage performance is comparable with the best performing water companies in Europe. The consistent improvement in leakage rates demonstrates continued appropriate capital investments into the water network as well as effective maintenance regimes.

Our objective is to ensure the availability of high-quality services to our customers, and the results of water quality tests were excellent also in 2020. This is a result of specific investments into the network and enhanced maintenance regimes, which the Company introduced following the introduction of a more sensitive water quality test into Estonia. In 2020, we commenced a number of major network renovation and construction projects that contribute to ensuring efficient operations and providing continued high-quality services as well as preventing disruptions. Besides renovation, we consistently maintain our networks, which was facilitated last year by the warmer winter, allowing additional work.

Environmental awareness is fundamental in everything we do, in ensuring the appropriate management and conservation of our wider catchment area as well as in operating our wastewater treatment plant at Paljassaare. Throughout 2020, the final treated effluent leaving the plant at Paljassaare was fully compliant with all legal requirements. To further ensure the continued effectiveness of our wastewater treatment process, we commenced the reconstruction of the mechanical treatment equipment at the wastewater treatment plant, being one of the largest projects of the Company in the past decade. This major project will continue throughout 2021, with completion expected in the first quarter of 2022. Completion of this project will further enhance the quality and resilience of wastewater treatment process.

Tallinna Vesi has been consistent in growing people's trust in tap water, and environmental awareness: delivering bespoke campaigns, promoting the knowledge in media and working closely with kindergartens, schools and local communities. In early 2020, we ran an advertising campaign "Mythbusters", with the aim of illustrating in a humorous way, how much work it takes to treat drinking water, and why it is important to prevent garbage from entering the sewers. Unfortunately, we had to postpone our traditional open-door days at the treatment plants, due to the spread of coronavirus, but we intend to continue those as and when the virus restrictions are eased.

As a provider of vital services to over one third of Estonia's population, it is crucial that we maintain very high standards in customer service. Each year, an extensive customer satisfaction survey is carried out by the independent research company Kantar Emor. The results of the survey map the current satisfaction level of both our contractual customers, and end consumers, who pay indirectly via housing associations and landlords. According to the survey carried out in 2020, we continue to see very high levels of customer satisfaction. We will continue to make further improvements in making our service smoother for our customers, and we strive to enhance and simplify customer interaction by adopting new and innovative technology where possible.

At the beginning of 2021, Tallinna Vesi acquired a subsidiary ASTV Green Energy, the aim of which is to find new opportunities for creating maximum additional value with the resources, generated as a result of the main activities of the Company, and to protect the environment. In the longer term, the new company intends to supply reusable resources, generated as a result of providing water services, as products in the green energy market.

Finally, I would like to thank my colleagues in Tallinna Vesi, Watercom and United Utilities, and all our customers, suppliers and business partners for their continued support and understanding that helped the Company to adapt fast to the changing environment, and make 2020 a successful year despite the coronavirus.

Karl Heino Brookes
Chairman of the Management Board

TALLINNA VESI IN BRIEF

AS Tallinna Vesi is the largest water utility in Estonia, providing drinking water and wastewater disposal services to nearly one third of Estonian population. We serve 24,555 private customers and businesses and over 470,000 end consumers in Tallinn and its surrounding local governments: City of Maardu, City of Saue and Harku Small Town. As of 31 December 2020, AS Tallinna Vesi employed 264 people.

The Company has two treatment plants: Ülemiste water treatment plant and Paljassaare wastewater treatment plant. AS Tallinna Vesi also has an accredited water laboratory and an accredited wastewater laboratory.

AS Tallinna Vesi was privatised in 2001. Under the Services Agreement signed with the City of Tallinn upon privatisation, the Company is required to fulfil 97 levels of services. The current mandate of AS Tallinna Vesi to provide water supply and wastewater disposal services in Tallinn service area is effective until 2025. The Services Agreement is currently valid until 2022 (with the right to extend). Given that the Company continues to own the water and sewer network in its service area, the administrative agreement between the Company and the City of Tallinn shall be effective or shall be established for future periods as well.

The public water supply system comprises approximately 1,200 km of water pipes, 18 water pumping stations and 46 ground water pumping stations with a total of 93 boreholes. The catchment area in Harju and Järva Counties covers around 1,800 km^2. The public sewer system comprises approximately 1,185 km of wastewater network, 507 km of stormwater network and 177 wastewater and stormwater pumping stations across the service area.

MAIN PRODUCTS AND SERVICES

Collection, treatment and supply of water

Collection, treatment and disposal of sewage and storm water

Design works

Water and wastewater services

Laboratory services

Pipe construction works

OPERATIONAL SITES

- Head Office, customer service and support services are located at Ädala 10, Tallinn.
- Ülemiste water treatment plant, water and microbiological laboratory are located at Järvevana tee 3, Tallinn.
- Paljassaare wastewater treatment plant, composting fields and wastewater laboratory are located at Paljassaare põik 14, Tallinn.
- The catchment area of ca 1,800 km^2 is located in Harju and Järva Counties.

OUR MISSION

We create a better life with pure water.

OUR VISION

Everyone wants to be our customer, employee and partner, because we are the leading water services company in the Baltics.

OUR VALUES

Commitment

We work with passion, doing the maximum to achieve the objectives.

Teamwork

We all form one team, whose success depends on my and my colleagues' contribution.

Customer focus

Our actions help our customers and colleagues to find solutions.

Proactivity

Working today for a better tomorrow.

Creativity

We have the courage and the energy to seek for new opportunities and achieve better solutions.

Environmental Policy

We are the largest water company in Estonia and our activity influences nearly one third of Estonia's population. We acknowledge that by providing the service that is compliant with all requirements. We influence the quality of life of the citizens of Tallinn, neighbouring municipalities as well as inhabitants living by the Baltic Sea. Therefore, we take into account the impact we have on the surrounding natural habitat and living environment and consider our association with the interest of various stakeholders.

- We act responsibly – we take into account our impact on the surrounding natural habitat and on the community.
- We follow and fulfil all legal requirements, but we are constantly dedicated to do more than we are expected.
- We protect and value the natural environment we operate in. For cleaner natural environment we continue our efforts to reduce and avoid pollution.
- We use natural resources, including energy and water, sparingly. We consistently seek new ways to make the processes more environmentally friendly and efficient.
- We act in an environmentally conscious manner, introducing our knowledge and mindset to the community and partners.
- We continue to improve our environmental management system.

Environmental Management System

We have implemented an integrated management system that meets the relevant quality, environmental and occupational safety standards. The Company`s environmental activity complies with the requirements of the international environmental management standard ISO 14001 and the Regulation (EC) No 1221/2009 EMAS (Eco-Management and Audit Scheme) as well as the requirements of amendments thereto enforced by the Commission's Regulations (EU) 2017/1505 and (EU) 2018/2026.

The environmental management system covers all the activities of AS Tallinna Vesi: the extraction and treatment of ground water and surface water to become drinking water, drinking water supply to the service areas in Tallinn and surrounding municipalities, collection and treatment of wastewater and stormwater, and customer service to provide the relevant services.

The environmental management system forms a part of the Company`s management system, as we strive to make the links between the Company and the environment part of our strategy and to take them into account in our everyday operation.

The basis for the environmental management system is the identification of environmental risks, significant environmental aspects and consequent potential environmental impacts, which form the basis for setting the Company`s environmental objectives and tasks to improve the environmental performance. Significant environmental aspects are such activities which, directly or indirectly, influence the nature, quality of services, co-operation with stakeholders, health and quality of life of residents, and our business performance. The assessment is based on the relationship between the activity and legal acts, the frequency of occurrence, the impact on reputation and cooperation with stakeholders, the environmental impact and its extent.

Management of the environmental system has been established in alignment with the company structure. The main responsibility for ensuring and improving the functioning of the environmental management system lies with the senior management and the heads of structural units. Environmental aspects, objectives and targets are prepared at the initiative of the environmental specialist in cooperation with the unit managers, who involve their staff. We measure, monitor and evaluate environmental performance indicators at least quarterly, and based on those results we produce each year our environmental report, which is made available to public.

ENVIRONMENTAL ASPECTS AND OBJECTIVES

Table 1: SIGNIFICANT ENVIRONMENTAL ASPECTS 2020

Activity	Environmental aspect	Direct or indirect impact	Environmental impact of the aspect	Trend of the impact	Further actions
Maintaining of sanitary protection areas	Land use to support biodiversity	Indirect	The sanitary protection area protects drinking water sources and the natural environment, supports the improvement of the biodiversity around Lake Ülemiste and in the lake, and helps to preserve green areas in the city.	+	Maintain the sanitary protection areas, co-operation with the legislator and local governments to retain the areas.
Use of biogas to produce heat energy	Methane emissions	Direct	Heat energy is produced on site from biogas, which is a residue of the sludge digestion process. It reduces methane emissions and dependence on non-renewable sources of heat energy.	+	Maximise the use of biogas produced.
Use of chlorine in water treatment	Risk of an environmental accident	Direct	Improper handling may result in leakage and environmental contamination, chlorine is an explosive chemical.	-	Monitor and analyse the optimal use of chlorine, minimise the risk of possible leaks.
Construction waste	Waste generated during the laying and repairing of pipes	Direct	Construction waste has a low potential of being reused and is bulky, causing soil damage.	-	Maximise the use of no-dig methods. Reduce size of excavations and extend the use of trench support.
Use of electricity	Production of electrical energy from fossil fuels generates exhaust gases	Indirect	Electricity production emits exhaust gases that cause air pollution and greenhouse effect.	-	Analyse electricity consumption, introduce more energy efficient equipment and energy saving modes. Extend the separate sewer system.
Water extraction	Use of water source	Direct	Has an impact on energy and chemical consumption and resulting environmental impacts.	-	Reduce water leakages and process water consumption, apply new technologies, influence population's consumption habits through awareness campaigns, develop smart metering.
Supply of compliant drinking water to consumers	Waste prevention	Indirect	Consumer has the opportunity to prefer tap water to bottled water, thus reducing the impact from the use of disposable plastic bottles. Impact on public health.	+	Constant work in all stages of water treatment and distribution, publish information about water quality, maintain the sanitary protection areas, awareness campaigns.

Sludge handling	Waste prevention	Indirect	Recycling of sewage sludge reduces the amount of waste sent to landfill.	+	Look for contract partners, maximise the amount of sewage sludge reused.
Discharge of untreated wastewater into the environment	Pollutants contained in wastewater	Direct	Causes environmental pollution, negative impact on marine life and environment and the quality of living environment, and smell problem.	-	Reconstruct the treatment process, extend the separate sewer system in cooperation with the Tallinn Urban Environment and Public Works Department, system monitoring.

*Aspect with a positive or a negative impact

Table 2: ENVIRONMENTAL OBJECTIVES AND RESULTS FOR 2020

Objective	Indicator	Result by the end of 2020
Reduce the percentage of clean water losses by reducing the number of leakages.	Level of leakages ≤ 13.75%	12.42%
Increase the efficiency of raw water treatment by choosing raw water based on its qualitative characteristics and thereby reducing the amount of process water.	Alternative water intake is designed, constructed and taken into use.	The project has been postponed at least until 2024
Operations comply with the terms set out in the water permits issued by the Environmental Board.	0 non-compliances	0 non-compliances
Stabilised sewage sludge recycling	0 tons of stabilised sewage sludge landfilled	0 tons of stabilised sewage sludge landfilled
Minimise the evitable sudden discharge of untreated wastewater to the sea.	Reconstruction works complete, amount of untreated wastewater discharged to the sea without dilution (at least 1:4) = 0 m^3	75% of all the works have been completed
Reduce energy consumption at the pumping stations by installing ejectors for water aeration. Energy saving ca 24 MWh/a.	Ejectors are installed and running in 10 pumping stations.	Ejectors are installed and running in 2 pumping stations, works are still ongoing in other pumping stations.
The implementation of the Green Office as a pilot project at the Wastewater Treatment Plant.	The Wastewater Treatment Plant office obtains the Green Office certificate.	Environmental aspects have been assessed and environmental objectives are set.
Improve the various stakeholders' environmental awareness reg. the company's activity to improve and keep the company's good image (reputation).	≥ 1000 people/yr. have participated in the classes.	240 people have participated in the classes
	≥ 2 open-door days/yr.	0 open doors days
	≥ 2 water- and environment related campaigns or participation in an outdoor event	1 water-themed campaign and participation in 1 outdoor event
Reduce the amount of paper used for printing by employing digital alternatives.	Reduce the amount of paper purchased and used by 5%.	15.5% less paper purchased and 28% less printing compared to 2019.

Table 3: ENVIRONMENTAL OBJECTIVES IN 2021

Objective	Task	Indicator	Due date
Reduce the percentage of clean water losses by reducing the number of leakages.	Fast detection and repair of leakages, improving the efficiency of work processes.	Level of leakages ≤ 13%	2021
Operations comply with the terms set out in the water permits issued by the Environmental Board.	The assigned specialists to comply with the obligations arising from the requirements and ensure that they are complied with by their activities.	0 non-compliances	2021
Disposal of stabilised sewage sludge	To recycle the sewage sludge by producing compost soil that can be used in planting green areas, agriculture or re-cultivation. Find potential partners and customers.	0 tons of stabilised sewage sludge landfilled	2021
Reuse of grit removed from the grit traps.	To wash the grit removed from the process and mix with the sewage sludge for the production of compost soil.	0 tons of washed sediments from the grit traps landfilled	2021
Minimise the evitable sudden discharge of untreated wastewater to the sea.	Reconstruction of mechanical treatment at the Wastewater Treatment Plant according to the detailed design.	Reconstruction works are completed, amount of untreated wastewater discharged to the sea = 0 m^3	2022
Reduce energy consumption at the pumping stations by installing ejectors for water aeration. Energy saving ca 24 MWh/a.	Install ejectors in 10 pumping stations to replace compressors that have been used until now.	Ejectors are installed and running in 10 pumping stations.	2021
The implementation of the Green Office as a pilot project at the Wastewater Treatment Plant.	Carry out initial inspections, propose improvements, set environmental objectives, draw up and implement an environmental action plan.	The Wastewater Treatment Plant office adopts the Green Office principles.	2021
Improve the various stakeholders' environmental awareness reg. the company's activity to improve and keep the company's good image (reputation).	Organise environmental education classes for various age groups. Orqanise activities (campaigns, open doors days, events, cooperation etc.) to raise the awareness of consumers and the community.	Prepare a video lecture for kids/young people Draw media attention to environmental issues (≥ 3 media initiatives) ≥ 2 water- and environment related campaigns or participation in an outdoor event	2021
Reduce the amount of paper used for printing by employing digital alternatives.	Assess the amount of paper used for printing and encourage employees to think twice before printing. Create alternatives (e.g. UTG, digital reports and acts) to reduce printing in various departments.	Reduce the amount of paper purchased and used by 5%.	2021
Use 80% recycled printer paper	Analyse potential alternatives to printer paper currently used. Replace the current printer paper with 80% recycled printer paper.	80% of the printer paper used is recycled paper	2021

Compliance with Environmental Requirements

To a large extent, the Company's environmental activities are regulated by requirements arising from the European Union (EU) as well as national legislation and the legal acts issued by local governments.

At the EU level, this means ensuring compliance with the EU Water Framework Directive (2000/60/EC). At the national level, compliance with the Water Act, Public Water Supply and Sewerage Act, Waste Act, Chemicals Act, Ambient Air Protection Act as well as subordinate legal acts must be ensured. Besides these, we are governed also by other environmental legal acts. Pursuant to the Water Act, we must ensure that the effluent discharged from the wastewater treatment plant complies with established limits, and we act in accordance with the requirements of the Public Water Supply and Sewerage Act in our process of service and connection contracts. In organising the recycling of sewage sludge, we rely on the Waste Act. Under the Chemicals Act, AS Tallinna Vesi classifies a Category B major-accident company and is subject to specific requirements. The Atmospheric Air Protection Act specifies the air quality limit values and reporting obligations.

At the local level, we are obliged to comply with different rules and requirements applicable in Tallinn and in the surrounding municipalities, where AS Tallinna Vesi provides services.

We consistently monitor the amendments being made to the requirements and legislation. If changes are made to the legislation that concerns the Company, those are communicated to the managers and specialists responsible for the relevant areas, allowing them to assess the impact of such amendments on the Company and propose their changes, and upon entry into force amend the company processes accordingly if necessary.

In cooperation with the Estonian Waterworks Association, we participate in the drafting and rounds for comments on the draft legal acts pertaining to the water sector and environmental matters, by taking part in the working groups, presenting our opinions and proposing changes to the draft legal acts under discussion. Where necessary, we have also communicated our positions directly to the relevant ministries without doing it via Estonian Waterworks Association.

In 2020, we continued to participate in the debate on the new Drinking Water Directive (within the discussion of the Directive and other issues, our specialists have, as representatives of the Estonian Waterworks Association, been actively participating in working groups and meetings of EurEau). The Company has also contributed to identifying the bottlenecks of current law, for example, at the request of the Estonian Waterworks Association, we expressed our opinion and gave feedback to the Estonian Environment Agency's new requirement to assess and formulate an environmental permit for a wastewater treatment plant on pollutants emitted into the ambient air. Furthermore, in cooperation with the Estonian Waterworks Association and other water companies, we already took part in a phosphorus load study in 2019, with the report completed in 2020. The results of the study could serve as a basis for amending the existing law (limit values for phosphorus).

The procedure of drafting the Law on Amending the Waste Act and Packaging Act continues in the Parliament of Estonia in 2021. In addition, the procedure of drafting the Law on Amending the Chemicals Act, which also concerns the Company, is ongoing in the Parliament. Ministry of the Environment continues the drafting of the Public Water Supply and Sewerage Act.

Environmental permits

We act in accordance with the requirements as well as the terms and conditions set out in the environmental permits issued to the Company. Environmental Board has issued the following environmental permits to us:

- 5 permits for a special use of water (details on page 16);
- 1 integrated environmental permit (details on pages 34 and 38);
- 2 ambient air pollution permits, 1 of which expired in 2020 (details on page 38).

Requirements of the Services Agreement

On 12 January 2001, we concluded the tripartite Services Agreement with the City of Tallinn and investors. Under the Services Agreement, the Company is obliged *inter alia* to comply with 97 Levels of Service, which makes it the most regulated water undertaking in Estonia. Our activities and levels of services are assessed once a year by an independent monitoring unit, Supervisory Foundation for the Water Companies in Tallinn, to whom the Company annually, i.e. by the end of the first quarter of the following year, submits the report on compliance with the levels of service.

In 2020, all of the contractual levels of service, agreed upon by the parties to the Services Agreement, were delivered, and in many cases, outperformed. Water quality at customer taps was 99.71% compliant with the standards in 2020, outperforming the quality level specified in the Services Agreement by 4.71%. Also, the level of leakage continues to be below the 26% limit. In 2020, the leakage rate of 12.42% was achieved, being the best result in the history of the Company, achieved through setting challenging targets and consistent work. The best result ever in the Company was also achieved in reducing the number of sewer blockages. With preventive maintenance and upgrading of the sewer network, we managed to reduce the number of blockages to 463 in 2020.

Requirements for contractual partners

Given the strict requirements applicable to our activities, it is fundamental that our suppliers and contractors meet the environmental and occupational safety requirements as well. Among other things, the contractors must confirm that they comply with occupational safety and environmental protection requirements at our repair and construction sites. We have established several criteria in our procedures allowing us to have control over our partners with regard to our expectations. Our specialists monitor the occupational safety and environmental performance in the activity of suppliers/contractors at sites on a daily basis.

Management system control and audit

In April 2020, AS Metrosert, accredited certifier, carried out the recertification audit of the management system. Due to the emergency situation declared in Estonia, the audit was carried out remotely on the basis of documents provided by the Company, in accordance with the audit objective and the timetable coordinated with the Company. The objective of the audit was to assess the performance and compliance of the Company's quality management system, environmental management system and occupational health & safety system with the requirements of the standards ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018, with the statutory requirements of the industry and the documentation established in the Company.

The audit concluded that the Company's documentation of the quality, environmental and occupational health & safety management systems comply with the requirements of the standards ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018. The audit report also stated that the management system of the Company is able to meet the legislative, regulatory and contractual requirements. Based on the audit results, the certificates on the compliance of management system with the requirements of standards ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 were issued for a term until 29/10/2020. It was agreed that an additional on-site audit would be carried out within 6 months as of the remote audit and no later than 29/10/2020.

The second part of the audit was carried out on site at the Company in September 2020. Based on the audit results, the certificates on compliance of management system with the requirements of standards ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 were issued for a term until 30/06/2023.

The audit to verify the EMAS certificate was also carried out in September 2020. The objective of the audit was to confirm the compliance of Company's environmental management system and environmental report with the requirements of EMAS Regulation (EC) No 1221/2009, amended with the Regulations (EU) 2017/1505 and (EU) 2018/2026. The audit was carried out at the sites of the Company. EMAS verification process relied on the results of ISO 14001:2015 audit. The audit report stated that based on the audit results and after remedying a non-conformity, the Company's environmental management system would comply with the requirements set out in the EMAS Regulation (EC) No 1221/2009, amended with the Regulations (EU) 2017/1505 and (EU) 2018/2026, and the Company may be issued a declaration on the compliance with requirements set out in the EMAS Regulation (EC) No 1221/2009, amended with the Regulations (EU) 2017/1505 and (EU) 2018/2026.

The Company immediately remedied the non-conformity, and the Estonian Environment Agency issued an appropriate certificate of registration for Eco-Management and Audit Scheme to the Company. The certificate of registration will be valid until 29/12/2023. In the course of the audit, a competent auditor of AS Metrosert also verified the 2019 Environmental Report of the Company.

Besides external audits, ordinary internal audits were carried out in the Company as per the internal audit plan to assess the performance of the management system. The internal auditors of the Company did not establish any non-conformities during the internal audits. As a result of the internal audits, our internal auditors put forward 16 improvement proposals, which have been analysed by the responsible managers and corrective actions have been performed.

In 2020, the Estonian Accreditation Centre carried out a surveillance visit to the Company's laboratories to verify the compliance with the requirements of ISO 17025. The surveillance visit did not establish any non-conformities.

Environmental Education and Consumer Awareness

We keep working hard to promote an environmentally-conscious mindset amongst our community members. We encourage people to drink tap water and explain how to contribute to the environmental handling of wastewater. We highlight the stable quality of tap water that meets high standards, and encourage our consumers to prefer tap water at home as well as in a restaurant. In 2020, we supported several community initiatives by providing water tanks at public events. The public water taps are open for all Tallinners from the warmer spring days until the weather gets cold in autumn. Confidence in tap water shows a steady growth. The annual customer satisfaction survey of 2020 indicates that 91% of end consumers drink tap water, which is slightly more than 90.4% in 2019.

- We work consistently to contribute to the environmental education of children whom we want to value the nature around us. Each year, we carry out water-themed conversations in kindergartens and schools, discussing matters relating to water cycle, sustainable water consumption and sewer blockages. In 2020, we were able to hold significantly lower number of group conversations due to the pandemic, with 240 children participating. We intend to continue with our conversations as soon as it becomes possible again and will also be developing audio-visual materials.
- We also continued to support sports and community events, by delivering free drinking water.
- In early 2020, we ran an advertising campaign "Mythbusters" on television, social media and cinemas. The campaign was targeted to illustrate with humor, how much work it takes to treat drinking water, and why it is important to prevent garbage from entering the sewers.
- In May 2020, we organised another environmental education month to improve the environmental awareness of our employees, focusing on the more environmentally friendly choices. Although we could not organise joint activities due to the spread of the coronavirus, we have guided our colleagues to pay attention to recycling around us and review their consumption habits in an attempt to make more environmental choices. We also educated our colleagues by organising an environmental awareness quiz. Care for the environment and behaviour that appreciates nature are very important for us and we intend to further improve environmental awareness among our staff.

- Over the years, we have prepared many educational study materials about water and environmental subjects for children and teachers. These include, for example, a study material series "Blue Classroom" for the teachers in nature studies, supporting the national study program in water-related classes. Furthermore, we have prepared game and puzzle books for kindergartens and primary schools, e.g. Tilgu play cards and a puzzle book „Puzzle with Tilgu". The animation with Tilgu for kindergartens and primary schools is the latest one issued.

- Despite the restrictions established regarding events, we managed to participate in the New World Street Festival in 2020. Public events allow us to discuss with our consumers and customers the subjects related to environmental approach in our water consumption and prevention of sewer blockages.
- We were active in sharing the news related to the environmental education and tap water via social media and press, and made preparations for the launch of our awareness campaign among schoolchildren addressing water-related subjects in 2021.

Besides our main activities, the production of drinking water and treatment of wastewater, our treatment plants are also important for their role in improving environmental awareness. Unfortunately, we had to postpone our traditional open-door days at the treatment plants due to COVID-19. Before the pandemic, we managed to make one guided tour at the water treatment plant, but we intend to continue those as and when the virus restrictions are eased.

Quality and Use of Water Resources

Permits for special use of water

Our activities in using water resources are regulated by the Water Act and its implementing acts. As a water company we must hold a valid permit for a special use of water and pay a fee for the water resource we have used. The permit for a special use of water sets us certain obligations and restrictions. For instance, the permit determines the allowed water extraction volume (m^3), obligation of keeping account over the water quantities used, requirements for sampling, monitoring and analysis as well as the allowed limit values for pollutants in effluent, requirements for monitoring of pollutants and the measures to reduce the impacts arising from special use of water.

All requirements established in the permits for special use of water were met in 2020. The fee for special use of water is paid for the quantity of water taken from Lake Ülemiste into the water treatment plant and for the ground water pumped from the aquifers. In 2020, the fee for special use of water amounted to 4.2% of the costs of products/services sold (2019: 4.1%).

Table 4: VALID ENVIRONMENTAL PERMITS, REGULATING WATER USE, ISSUED TO AS TALLINNA VESI

Number of the permit for special use of water	Valid until	Description of special use of water
L.VV/331954	31/12/2030	**Saue City public water and sewerage service area** Extraction of ground water from boreholes, over 5 m^3/day. Collection of wastewater and conducting wastewater to Paljassaare wastewater treatment plant owned by AS Tallinna Vesi.
KL-506050	indefinite term	**Tallinn public water supply and sewerage main service area, Tallinn surface water catchment system facilities area in Harju and Järva Counties** Regulating surface water resources in water bodies of Ülemiste-Pirita-Jägala surface water system, surface water extraction from Lake Ülemiste, extracting ground water from Ordovician-Cambrian, Cambrian-Vendian and Quaternary aquifers through Tallinn public water supply system boreholes, and for discharging stormwater into the sea, Mustjõe Stream and Pääsküla Bog.
L.VV/328381	31/12/2042	**Harku Municipality** Extraction of ground water from boreholes, over 5 m^3/day.
L.VV/328349	indefinite term	**Maardu City public water supply and sewerage system operating area** Extraction of industrial and drinking water from Cambrian-Vendian aquifers in order to supply water to Maardu City, Kallavere and Muuga area. Since November 2012, all wastewater from those connected to Kallavere and Maardu public sewer system is discharged to Tallinn public sewer system.
L.VV/333205	19/08/2024	**Building of an alternative water intake for Lake Ülemiste** Drowning of solid substances into Lake Ülemiste in order to ensure that water can be taken from other waters of the surface water catchment system, where appropriate.
Integrated environmental permit KKL-509326	indefinite term	**Paljassaare Wastewater Treatment Plant** Regulating the discharge of biologically treated effluent through a deep-sea outlet into Tallinn Bay.

Water catchment

Nearly 90% of our consumers in Tallinn and Maardu get their drinking water from surface water resources. Even though Lake Ülemiste is the main drinking water source for people in Tallinn, the natural catchment of the lake itself is small. To increase the water volume and ensure that the needs of City of Tallinn are met, we have established a water catchment system, which consists of hydropoints constructed on rivers as well as water reservoirs and channels connecting those. Our water catchment system mainly comprises Harju sub-basin and the river basins of Soodla, Jägala and Pirita rivers, with a total area of ca 1,800 km^2. Paunküla water reservoir on the headwaters of the Pirita River (9.9 million m^3) and Soodla water reservoir on the Soodla River (7.4 million m^3) supply additional water reserves for Lake Ülemiste and can also be used if there is the need to improve the raw water quality in Lake Ülemiste.

The volume of water resources in Tallinn surface water catchment system primarily depends on the annual amount of precipitation. Constant information on the flows enables us to use the water resources most efficiently. To regulate the water resources in an optimum and accurate manner we have established water metering units at all hydropoints, which enable us to meter the flows conducted to the channels as well as the sanitary flows in the rivers. We perform metering regularly, as per the requirements of the permit for special use of water.

The year 2020 is characterised by generally higher than average flow rates in the rivers of the catchment area and almost non-existing ice conditions, i.e. there was virtually no permanent ice cover. Between January and late May, the flow rates were higher than usual. Due to little snowmelt, no usual high water occurred in the rivers., Given the low quantities of snow and rain, the flow rates started to drop since the end of May, the summer was medium-dry, remaining so until October. The flows in the rivers of the catchment area started rising from mid-October and reached the balance at the end of November. The water regime during the year can be described as follows: the winter had an unstable temperature (especially the autumn-winter period, being one of the warmest over the decades), extremely little snowfall, ice-cover was short-termed or did not form at all. Water temperature in Lake Ülemiste reached 10 °C in May. The summer period was medium-dry, which, however, significantly influenced the flow rates of rivers in the catchment area. The improvement in water regimes started with the effect of more rainfall in mid-October and continued until the end of 2020.

In order to protect the water resources and the water body used for the extraction of drinking water, a sanitary protection zone has been established around Lake Ülemiste. Sanitary protection zone, comprising Lake Ülemiste, water catchment facilities, bank reinforcements and the land in close vicinity of the lake, needs to be kept in its natural conditions. Such sanitary protection zones have also been formed in the catchment area to protect the dams and other facilities of Soodla, Kaunissaare, Paunküla and Aavoja water reservoirs.

Use and quality of surface water

According to the permit for special use of water No KL-506050, the Company is allowed to extract 47.60 million m^3 of surface water per year from Lake Ülemiste. The actual surface water extraction in 2020 was 25.24 million m^3.

Table 5: USE OF SURFACE WATER FROM LAKE ÜLEMISTE AND COMPLIANCE WITH THE PERMIT FOR SPECIAL USE OF WATER NO KL-506050, million m^3

	2016	2017	2018	2019	2020
Use of surface water from Lake Ülemiste	23.73	23.72	24.31	25.00	25.24

Maximum volume permitted is 47.6 million m^3/year

Water quality in surface water sources is monitored in line with the program determined by the permit for special use of water. We take raw water samples from the intake of our water treatment plant on a daily basis to ensure compliance. Nitrogen and phosphorus compounds and total organic carbon are determined in raw water once a week. Furthermore, an in-depth analysis of raw water is carried out once a month in accordance with the quality monitoring programme established for a drinking water source. We study the results of the analyses to understand the changes and processes in the catchment area and decide upon the necessity to replenish the water stock in the lake.

Table 6: WATER QUALITY IN LAKE ÜLEMISTE IN 2016-2020

Parameter	Unit	Average results				
		2016	2017	2018	2019	2020
Colour	mg/L Pt	34	38	39	31	39
Turbidity	NTU	10.5	10.5	9.6	6,9	6.9
pH	0	8.32	8.27	8.23	8.19	8.43
Permanganate index (COD_{Mn})	mg O2/l	9.9	11.1	11.8	9.8	11.1
Total organic carbon (TOC)	mg C/l	10.0	10.7	11.2	10.1	11.0
Total phosphorus	mg/l	0.028	0.038	0.047	0.048	0.048
Total nitrogen	mg/l	1.58	1.60	1.50	1.30	1.43
Ammonium, $NH4^+$	mg/l	0.085	0.112	0.085	0.074	0.019
Phytoplankton abundance	objects/ml	5771	7168	7500	6300	16804

In 2020, water quality in Lake Ülemiste was similar rather to the quality levels of 2017 and 2018. The phytoplankton and pH levels of raw water were above the average. These indicators was likely to have been influenced by warm winter and low levels of precipitation. In 2020, no permanent ice cover formed on Lake Ülemiste.

Use and quality of ground water

Approximately 10% of consumers in Tallinn are supplied with water extracted from the Cambrian-Vendian and Cambrian-Ordovician aquifers. Ground water is supplied in the City of Saue, districts of Nõmme, Laagri, Merivälja, Pirita and Tiskre in Tallinn. A total of 2,731,749 m^3 of ground water was extracted in 2020.

Table 7: USE OF GROUND WATER AND COMPARISON WITH THE MAXIMUM VOLUMES SET BY PERMITS FOR A SPECIAL USE OF WATER, thousand m^3

Parameter	Maximum volume permitted	Average results				
		2016	2017	2018	2019	2020
Tallinn (Permit no KL-506050)	7,749.8	2,437.4	2,384.2	2,323.8	2,349.1	2,400.4
Saue (Permit no L.VV/331954)	395	278.7	283.9	290.5	309.4	331.2
Harku (Permit no L.VV/328381)	40	46.7	42.3	41.1	21.1	0.11
Maardu (Permit no L.VV/328349)	720	0.3	0.48	0.28	0.39	3.1

According to the EU Water Framework Directive (2000/60/EC), the qualitative or chemical conditions of ground water is regarded to be good if the concentration of pollutants does not indicate any inflow of salty water or other water, nor exceed the relevant quality standards. In 2020, the quality of drinking water at the borehole pumping stations complied with the requirements of the Regulation issued by the Minister of Social Affairs. There were no ground water pollution incidents or potential pollution incidents demanding us to notify the City of Tallinn and the Health Board.

We monitor the ground water quality parameters in accordance with the permits for special use of water, and if necessary, the ground water undergoes a treatment process. On a monthly basis we monitor the treated ground

water quality (content of iron, manganese, and ammonia) in 21 ground water pumping stations, which have filters installed and constantly provide water to the public network. All currently used borewells are equipped with automatic hydrostatic pressure sensors allowing to measure the static and dynamic level of ground water. Those results enable us to assess the recovery of ground water resources, and the last years' trend has been positive, indicating the recovery of resources.

Ground water in Northern Estonia (Cambrian-Vendian aquifer) contains natural radionuclides. The natural radioactivity of Estonian ground water has been thoroughly studied by Eesti Geoloogiakeskus OÜ as well as by Estonian Radiation Centre. To assess the health impacts of radioactivity, the Radiation Centre together with the Health Board carried out a health risk assessment in Tallinn ground water areas in 2010. Based on the results of the risk assessment, any random health damage resulting from the content of radionuclides in the water of Cambrian-Vendian borewells is unlikely. Repeated radiological analyses in all the borewells are carried out every ten years, in accordance with the requirements.

Drinking Water Production and Quality

Last year we supplied 27.03 million m^3 of pure drinking water to our consumers. Drinking water quality is required to comply with the Regulation No 61 "Quality and Control Requirements and Analysis Methods for Drinking Water", issued by the Minister of Social Affairs on 24 September 2019 (hereinafter referred to as the Regulation No 61), originating from the Estonian Water Act and the European Union Drinking Water Directive 98/83/EC. The water quality is monitored in accordance with the monitoring programmes approved by the Health Board's North Department. Samples are taken from the raw water (Lake Ülemiste, its catchment area, and ground water), treatment process, water tanks at the ground water pumping stations as well as the customer taps. The quality indicators of the drinking water supplied from Ülemiste water treatment plant as well as the drinking water supplied from ground water resources in 2020 are attached to the report.

Water analyses are carried out by the Company's water and microbiology laboratory, which is one of the largest water laboratories in Estonia. The quality of analyses is guaranteed by certified samplers and laboratories accredited with the quality management system (EVS-EN ISO/EC 17025 standard), modern equipment and professionals. In 2020, our water and microbiology laboratory performed a total of 108,000 analyses.

As a result of the high quality of drinking water and improved awareness of consumers, the number of people drinking tap water has shown a steady growing trend over the last years.

Surface water treatment process and ground water treatment

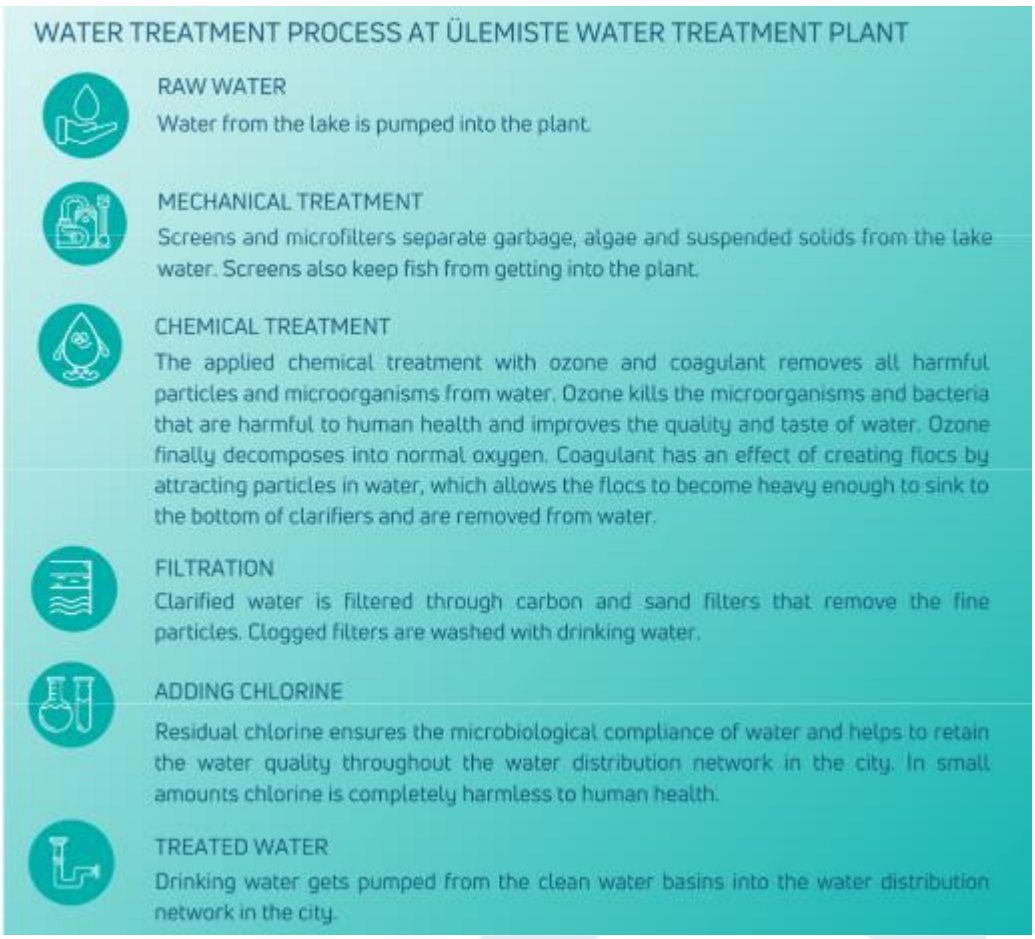


Figure 1: Water treatment process at Ülemiste water treatment plant

At the Ülemiste water treatment plant, the water extracted from the lake is treated with a treatment scheme widely used in the world. Due to the quality of surface water in Lake Ülemiste, the law stipulates that in order to ensure the drinking water quality, the surface water must undergo mechanical and chemical treatments – preliminary ozonation, coagulation, clarification, filtration, and disinfection.

In 2020, investments were made in several major projects at the water treatment plant.

In 2020, the Company replaced all diffusers in the second ozone contact basin. The new diffusers are less porous to ensure better mixing of ozone with water. This will result in greater efficiency of the process and lower losses. In 2020, one of the pipes entering the A-building was reconstructed, significantly improving the reliability of the water treatment plant.

The Water Act requires ground water to be preserved as similar to its natural conditions as possible, therefore, no chemicals are used in treating ground water. To supply compliant drinking water, we treat ground water by filtration and aeration to remove excess iron, manganese, and ammonium from the water. Samples taken after the ground water treatment process indicate a significant decrease in turbidity as well as in the content of iron, manganese and ammonium, an improvement in colour and stability index, also higher oxygen content.

Drinking water quality in the network and at customer premises

The quality of drinking water in Tallinn and Maardu remains excellent. Throughout the year, we took samples at the sampling points (at customer premises), which had been agreed with the Health Board, twice a month.

We took a total of 3,099 samples across the Tallinn service area (besides Tallinn also in Saue and Harku Small Town) in 2020. The quality of drinking water taken from the customer taps was 99.71% compliant with the requirements, which is significantly better in comparison with the same indicator last year. This is a result of further developments in the network and enhanced maintenance regimes, which were introduced following the introduction of a more sensitive water quality test.

99% of the 150 water samples taken in Maardu in 2020 complied with the requirements. Before connecting with Tallinn water network, the compliance of drinking water quality in Maardu was only 33%.

Chart 1: Compliance of drinking water quality with the requirements set out in Regulation no 61 issued by the Minister of Social Affairs – years 2016-2020, %

Water network maintenance and related investments

We are constantly performing maintenance and rehabilitation works on the network to retain and improve the drinking water quality. To guarantee the availability of high-quality drinking water to our consumers we regularly clean and flush the water network. During the cleaning process the sediment build-up is removed from the pipes, which is one of the key methods for improving water quality in distribution networks. In 2020, the Company performed air-scouring works on a total of 136 km of water network. We also continued flushing the network to reduce water retention time in the pipes. Since the end of 2019 and during 2020, our Water Services Team has been using a new more efficient compressor for air-scouring works.

Table 8: CLEANED WATER NETWORK 2016-2020, km

	2016	2017	2018	2019	2020
Cleaned water network	137.0	137.0	135.0	40.0	136

Investments in the replacement of old water pipes have facilitated an improvement in water quality at customer premises and a more efficient use of water resources. Each year, we renovate at least 5 km of wastewater network and 5 km of water network, in line with the Services Agreement signed with the City of Tallinn. Due to the fact that several projects to be performed in collaboration with the City have been postponed, as much as 44,4% of the total amount of reconstruction works were performed using no-dig method.

Leakages and interruptions to water supply

One of our key objectives is to keep the loss of water in the water network at a minimum level. The Services Agreement applying to the service area in Tallinn sets out the obligation for the Company to reduce the level of leakages to 26%. We have managed to keep the leakage at a considerably lower level than required for several consecutive years already, achieving 12.42% in 2020. About ten years ago, the level of leakages exceeded 32%, which means that we are currently saving nearly 27 thousand m^3 of treated water a day compared to ten years ago. The reduction in the level of leakages has been facilitated by our consistent and targeted efforts to use the water resource sustainably and with lower losses.

Table 9: LEAKAGE LEVEL IN 2016-2029, %

	2016	2017	2018	2019	2020
Leakage level	15.07	13.82	13.71	12.97	12.42

The monitoring of daily water loss helps to find leakages as fast as possible and reduce the leakage level. Our specialists use specific equipment for finding leakages which, along with the zoning of network and remote reading system, allow them to detect the leakages in the network faster.

In order to mitigate the inconveniences resulting from an interruption to the service, we notify our customers in advance of any unplanned interruptions. Last year, we gave prior notifications of unplanned water interruptions in approximately 98.9% of the events. As a provider of vital services, we deem it important to provide customers with a temporary water supply with water tanks in case of interruptions.

Water metering

The water meters we install to measure consumption are of high quality. All new water meters comply with the current European standards and European Measuring Instruments Directive along with the relevant accuracy requirements established therein. The expert studies and verification of water meters are performed by AS Metrosert, the national Central Office of Metrology.

We have installed a total of 25,193 water meters to customers' connection points. Verified water meters allow accurate measurement of water consumption.

Under the currently applicable Metrology Act, we are required to organise the verification of the water meters every five years, and the readings of those meters serve as the basis for billing between the water company and customers.

In line with the previously prepared plan, we changed a total of 5,673 water meters in 2020. We will continue our work in 2021 to make sure that all our customers have water meters that are verified on time.

Collection of Wastewater

Wastewater network and collection of wastewater

Wastewater is directed to the wastewater treatment plant through the combined sewer system, collecting both sewage and stormwater. Some parts of our service area are also covered with a separate storm system with stormwater outlets. However, most of the stormwater is collected via the combined sewer system and is led to Paljassaare wastewater treatment plant.

The number of blockages is a good indicator for reflecting the conditions of the wastewater network. Blockages are mainly caused by sediments build-up in the wastewater network or the misuse of wastewater network by consumers. Initially, the pipes were sized for higher flows, so today's lower water consumption has led to reductions in flow rates and flow speed, which in turn increases the risk of blockages. Continued extension of the sewer network is also affecting the total number of blockages.

Table 10: NUMBER OF BLOKAGES IN 2016-2020, pcs

	2016	2017	2018	2019	2020
Number of blockages	706	699	650	573	485

We have been able to achieve a steadily good level of blockages in the recent years due to numerous preventive actions, such as for example preventive jet washing of pipes. Jet washing uses high pressure to generate a fast flow that carries sediments inside pipes into the nearest cesspool. Sediments are then collected by jet-washing trucks and transported to Paljassaare wastewater treatment plant.

Furthermore, the rehabilitation of at least 5 km of problematic sewers by the Company each year also contributes to the effectiveness of wastewater disposal process.

Discharging

To serve the inhabitants whose properties have not been connected to the sewer system, the Company has provided two discharge places in Tallinn where septic trucks bring sewage from septic tanks. The availability of discharge places helps to ensure that the sewage from septic tanks ends up in the wastewater treatment plant and gets treated to the required degree. Consequently, it diminishes the risk of environmental pollution that could, in the absence of a discharge place, result from discharging sewage in a manner and place not intended for such discharge. In 2020, the Company installed sewage meters in discharge places to measure the volumes of discharged sewage more accurately.

The discharge services, allowing the sewage from septic tanks to be delivered through the discharge places to Paljassaare wastewater treatment plant, are provided by our partners in Tallinn. Although the number of inhabitants, whose properties are not connected to the sewer system, remains below 1%, the volume of sewage transported from the septic tanks in Tallinn and neighbouring municipalities to our discharge places amounted to 65,402 m^3 in 2020. Therefore, we continue to cooperate with various local governments in Harju County to find the best solutions for discharge services also outside Tallinn.

Pollution load in wastewater and stormwater

In order to ensure a stable pollution load in the wastewater entering the Paljassaare wastewater treatment plant, we regularly monitor the wastewater led off from sites in Tallinn and Maardu as well as the surrounding areas, and check the compliance of pollution parameters with statutory requirements. In 2020, we took a total of 1,069 wastewater samples to determine the wastewater pollution load at various sites and 513 other samples for monitoring purposes. Over-pollution instances were identified, and over-pollution fees were applied in 703 cases.

In 2020, the level of precipitation in Tallinn was 753.2 mm per area unit on average, being higher than in 2019 (658.3 mm). Consequently, the amount of stormwater and pollutants discharged to the environment through stormwater outlets increased in 2020.

Table 11: STORMWATER VOLUME 2016-2020, million m^3

	2016	2017	2018	2019	2020
Stormwater volume	5.8	6.6	3.8	4.2	4.9

According to the requirements specified in the permits for special use of water, we monitor 29 stormwater outlets, of which Lasnamäe, Rocca-al-Mare and Mustjõe outlets are the largest. To prevent any potential environmental pollution, we have equipped four stormwater outlets (in Olevi, Kaare, Raba and Vabaduse Streets) with regularly maintained sand and oil traps.

Table 12: POLLUTANTS FROM THE MAIN OUTLETS IN 2016-2020, t

	2016	2017	2018	2019	2020
Suspended solids	87.0	130.0	84.3	112.0	139.0
Oil products	0.4	0.6	0.2	0.6	0.4

Since 2015, we have been monitoring the content of hazardous substances in wastewater and treated effluent based on the Regulation No 61 of the Minister of the Environment.

Wastewater Treatment

We treat the wastewater, collected from Tallinn and nearest surrounding areas, at Paljassaare wastewater treatment plant. We are committed to maintaining the high standards and outperforming the standards set for the treated effluent discharged into the Baltic Sea. A total of 52.3 million m^3 of wastewater was treated at Paljassaare wastewater treatment plant in 2020.

Table 13: TREATED WASTEWATER VOLUME IN 2016-2020, million m^3

	2016	2017	2018	2019	2020
Treated wastewater volume	50.22	51.49	43.92	49.67	52.34

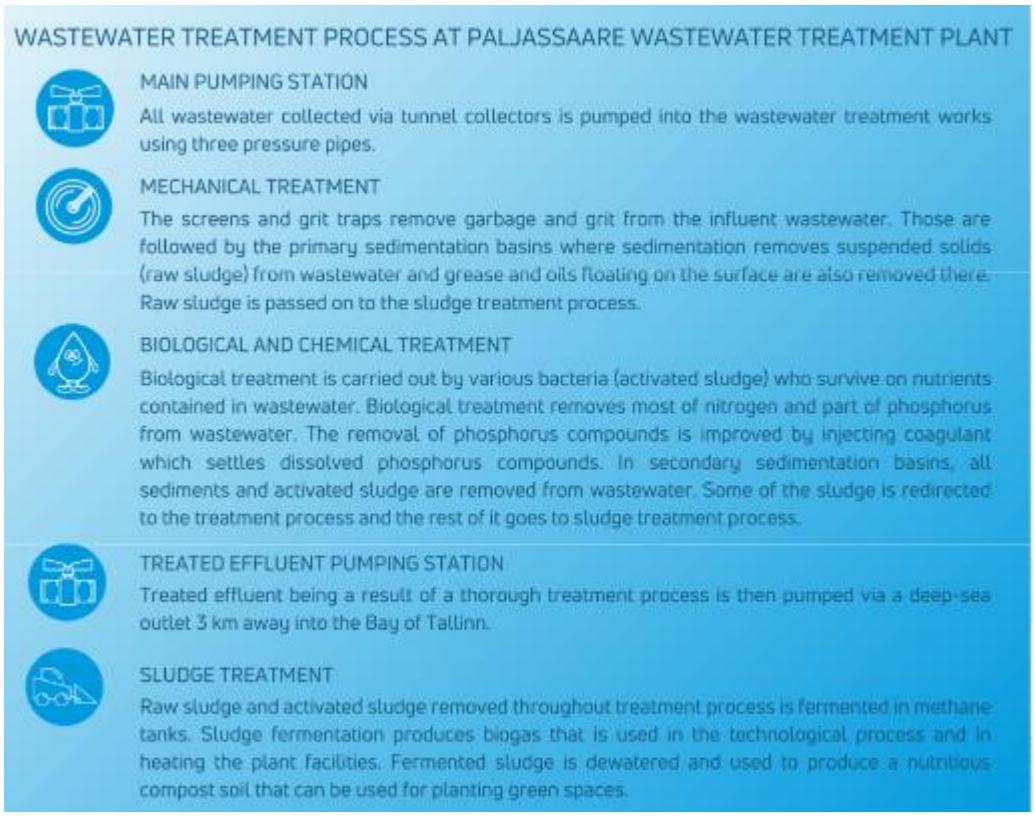
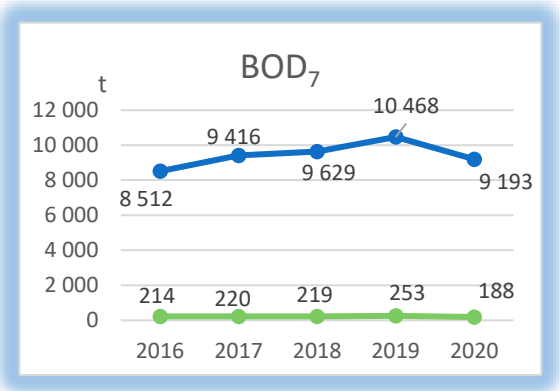


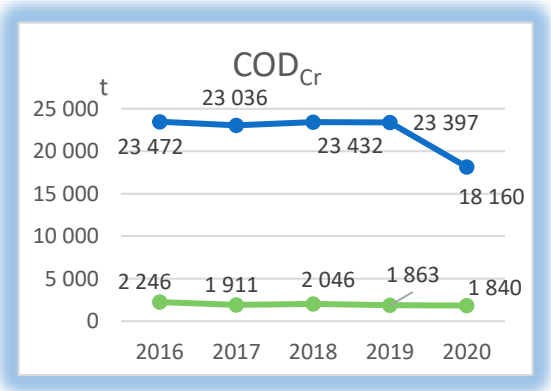
Figure 2: Wastewater treatment process at Paljassaare treatment plant

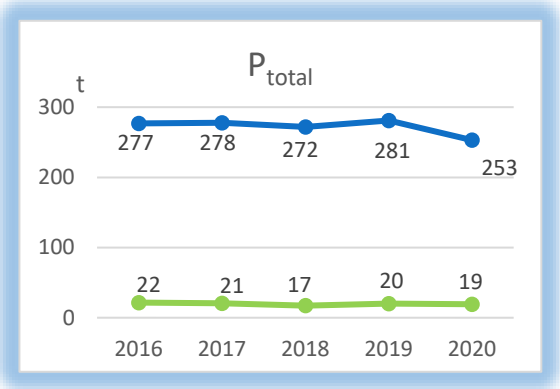
The important pollution parameters for us are as follows:

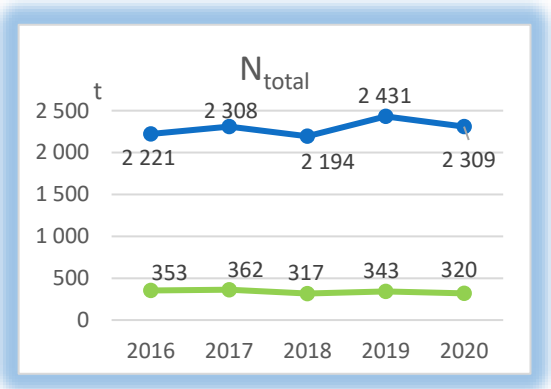
- BOD_7 – biological oxygen demand shows the amount of oxygen it takes to decompose the organic matter in the course of 7 days;
- COD_{Cr} – chemical oxygen demand is an indicator of the decomposition of organic matter, measured as the consumption of oxygen in chemical oxidation of the organic matter in water;
- SS – suspended solids show the volume of solid matter in water which is caught in a filter with a defined mesh size;
- N_{total} and P_{total} – total phosphorus and total nitrogen are nutrient salts, which foster the growth of plankton in water. Nitrogen compounds and phosphorus compounds serve as nutrients, high quantities of which lead to the eutrophication of water bodies;
- oil products – shows the amount of non-volatile oil products in water.

Chart 2: Incoming pollutants (in blue) to the wastewater treatment plant and pollutants discharged from the plant (in green) into the sea in 2016-2020, t/y









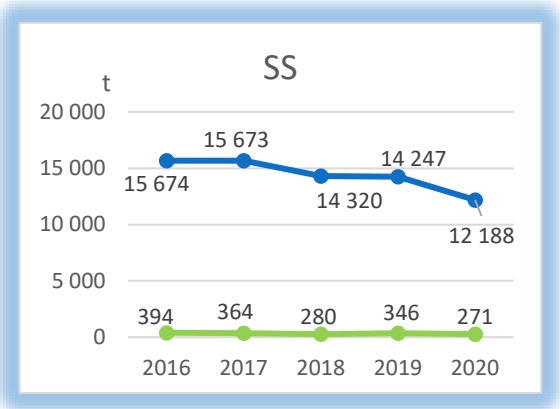
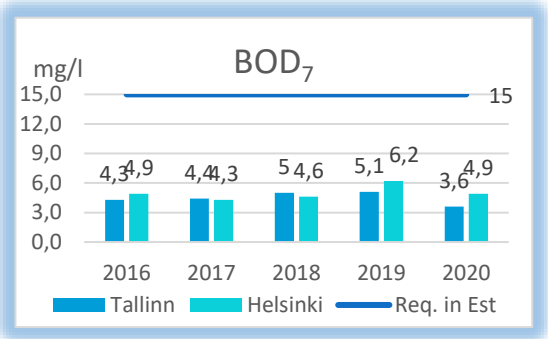
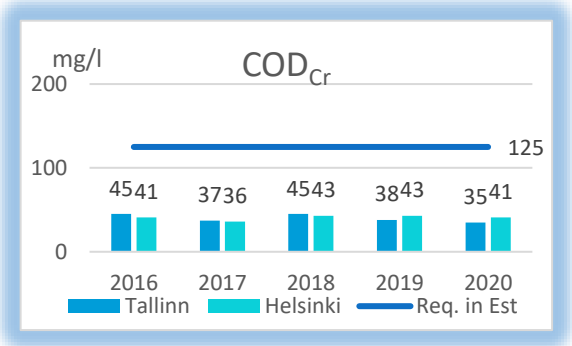
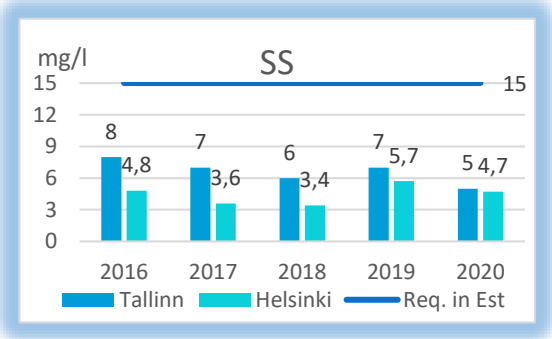
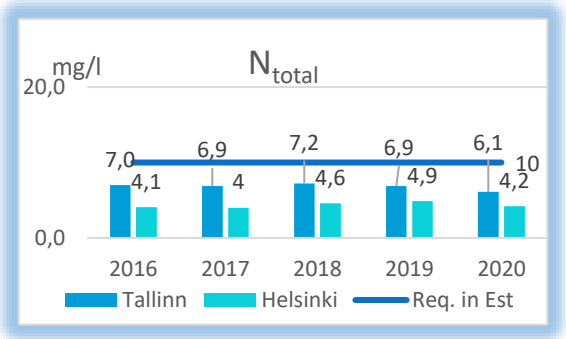


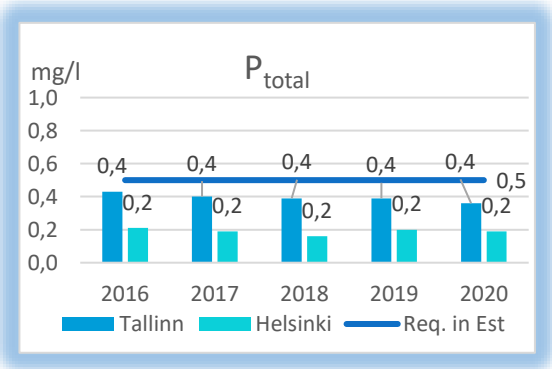
Chart 3: Average pollution concentrations in treated effluent in 2016-2020, compared to regulatory maximum allowable limits and results of Helsinki HSY, mg/l











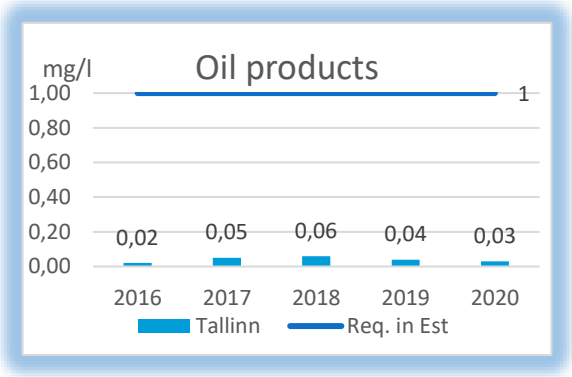
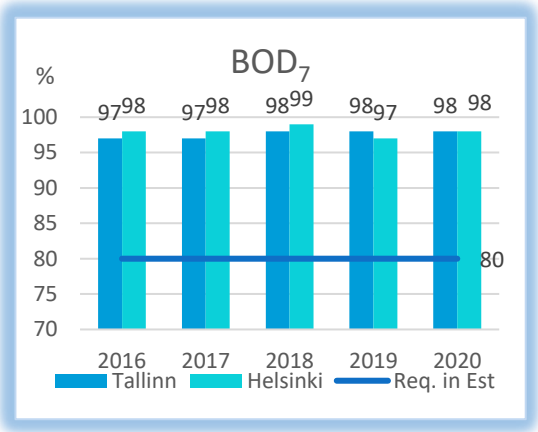
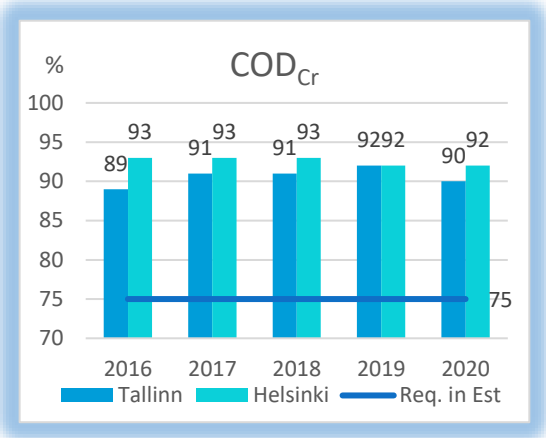
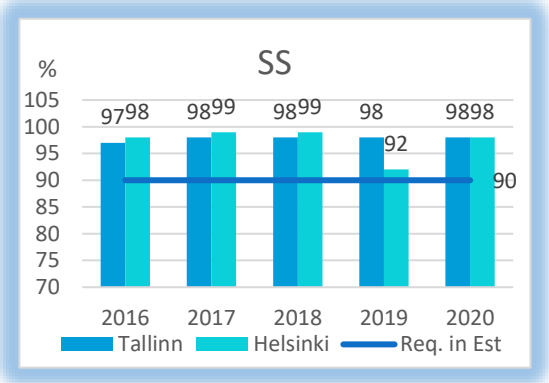
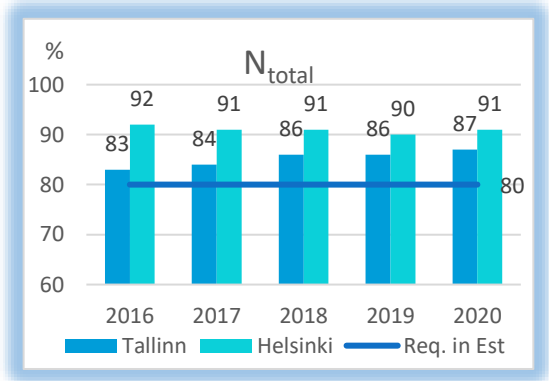


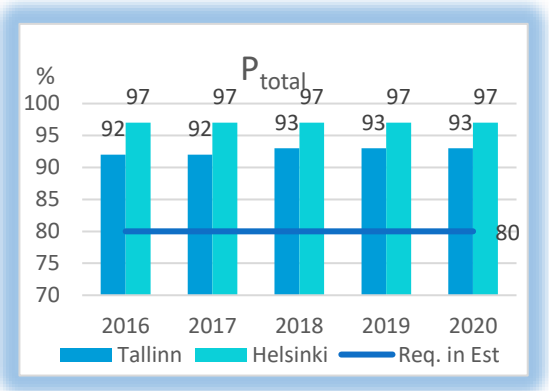
Chart 4: Wastewater treatment plant's treatment efficiency in 2016-2020, compared to minimum regulatory requirements and results of Helsinki HSY, %

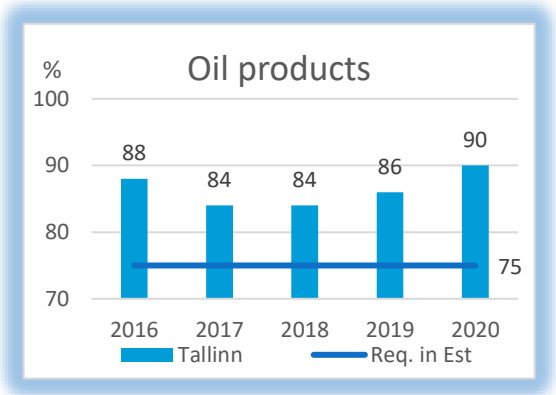












Wastewater outlets to the sea

During 2020, a total of 234,124 m^3 of wastewater diluted by stormwater (minimum dilution 1:4) was conducted directly into the sea. Due to the shock loads which exceeded the biological treatment capacity, we led a total of 1,235,534 m^3 of highly diluted wastewater, which had undergone mechanical treatment, into the sea through the deep-sea outlet in 2020.

Table 14: WASTEWATER TREATMENT PLANT OVERFLOWS IN 2016-2020, thousand m^3/year

	2016	2017	2018	2019	2020
Untreated wastewater discharged into the sea	122.7	111.3	154.7	80.1	234.1
Partly treated wastewater discharged into the sea	584	897	590	928	1236

Pollution charges

As a water company we are required to act in line with the environmental permits and pay pollution charges, the purpose of which is to prevent and reduce the potential damage caused by pollutants or waste released into the environment.

The calculation of pollution charge is established in the permit for special use of water and the Environmental Charges Act, which apply to the pollutants contained in the effluent and stormwater at the particular outlets. Pollution charge calculations take into account both the receiving water coefficient of the specific outlet as well as compliance with the pollutant limit values. In 2020, the pollution charge paid for discharging pollutants into receiving waters formed 3.4% of the cost of services sold (2019: 3.7%).

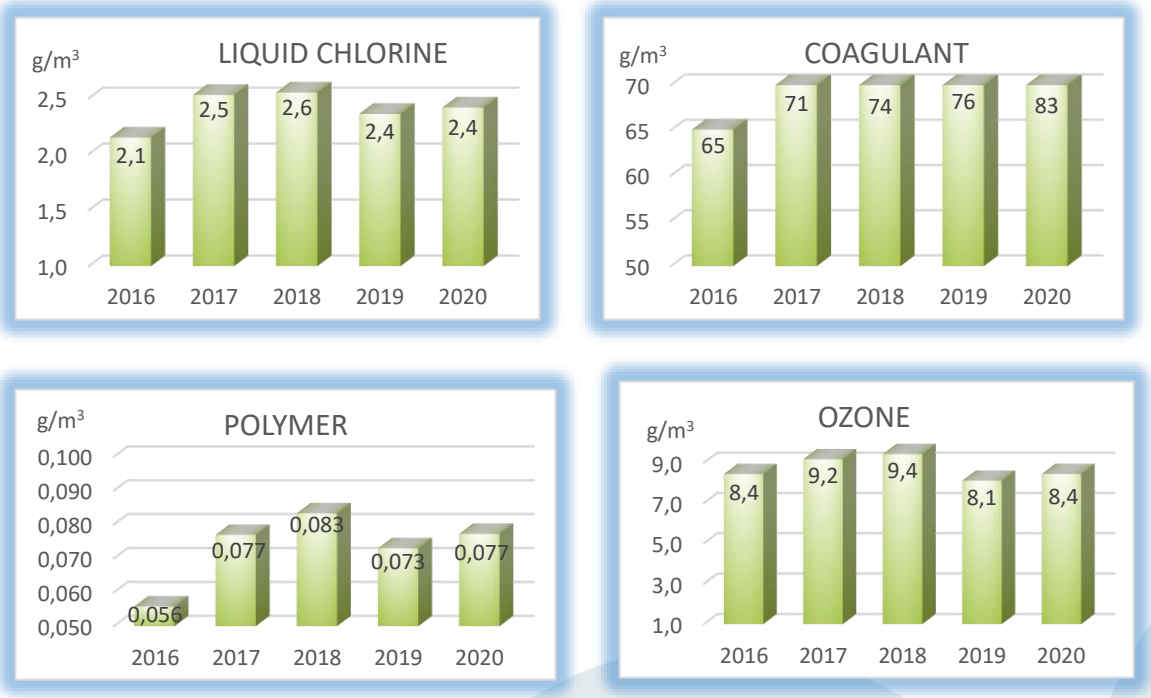
Use of Chemicals

With regard to the health and wellbeing of our employees, safe handling of chemicals at the work site is extremely important for us. Consequently, we have created the conditions necessary for safe storage and use of all chemicals. In 2020, we used a total of 5,812 tons of various chemicals (2019: 5,911 tons) in our operations, but no reported accidents with chemicals occurred, which could have caused harm to people or the environment.

Use of water treatment chemicals

- Chlorine is an effective disinfecting chemical with a long-term aftereffect. The Regulation No 61 ("Drinking Water Quality and Testing Requirements, and Analysis Methods" dated 24/09/2019) issued by the Minister of Social Affairs specifies that the content of free chlorine added to the drinking water, produced out of surface water, can be up to 1.0 mg/l leaving the plant and up to 0.5 mg/l at consumer taps. We add chlorine in the final stage of the water treatment process to ensure the microbiological purity of water and to help maintain the water quality in the city's water distribution network. Chlorine has a strong oxidising effect and is extremely poisonous for aquatic microorganisms. Due to the chlorine stored and used, AS Tallinna Vesi classifies as a company with the risk of category B major accident in Estonia. Applying the necessary safety measures, we have minimised the likelihood of chlorine accidents.
- Ozone is a good and quick oxidiser, which breaks down organic matter and microorganisms effectively in raw water and improves the colour of water. Ozone is produced locally on site from ambient air and only in necessary quantities. With a closed process and absence of stock reserve, the environmental risk is taken to minimum.
- Coagulants and polymers are chemicals we use in the treatment process in significant amounts in liquid form. These chemicals are added within treatment to remove smaller particles (e.g. suspended solids and organic substance) from water. The coagulation process significantly reduces the concentration of organic matter in water.

Chart 5: Average use of water treatment chemicals per unit of production in 2016-2020, g/m³



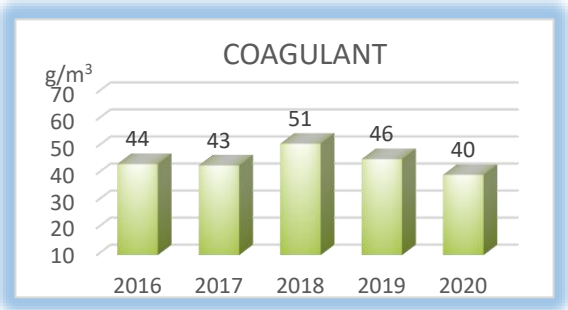
Water quality in Lake Ülemiste is strongly dependent on the weather. However, long-term observations have also indicated periodic changes in water quality over the years. In 2020, the quality of raw water was affected by a warm winter and low levels of precipitation. No permanent ice cover formed on Lake Ülemiste in 2020. Compared to 2019, the overall organic carbon level and phytoplankton levels of raw water were higher, which also led to higher cost of chemicals used in water treatment. The Company has deliberately chosen to apply higher doses of coagulant to minimise permanganate index and organic carbon levels in drinking water.

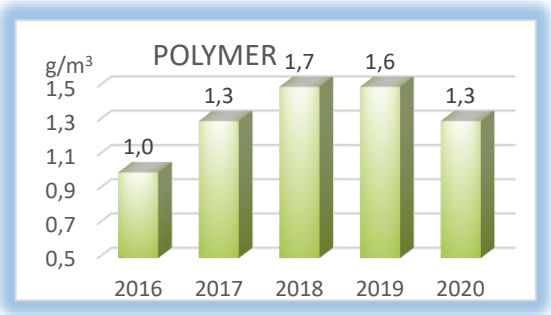
Use of wastewater treatment chemicals

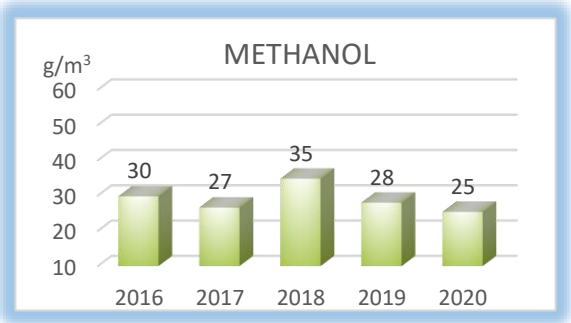
- Methanol is used at the wastewater treatment plant to increase the nitrogen removal efficiency of the bacteria participating in the biological treatment process. Due to the extremely explosive methanol used in the wastewater treatment, AS Tallinna Vesi classifies as a hazardous company in Estonia.
- Coagulants and polymers are used in large amounts in the wastewater treatment process. Coagulants are used for the chemical processing of wastewater to remove phosphorus. Polymers are used to change the qualities of sludge by accelerating the dewatering process.

The amount of chemicals used in the wastewater treatment process is dependent on the pollution levels of incoming wastewater, which in turn are affected by the weather. The higher the concentration of pollutants in incoming wastewater and the lower the regulatory limits for pollutants in the treated effluent, the higher is the amount of chemicals used in the wastewater treatment process.

Chart 6: Average use of wastewater treatment chemicals per unit of production in 2016-2020, g/m³







The use of polymer depends on the quantities of dry matter and sludge to be treated. In 2020, slightly less polymer was used than in 2019, and also, slightly less sludge (37,884 tons) was removed from wastewater than in 2019 (39,802 tons).

Waste Management

Waste generation

A total of 47,376 tons of waste was generated in the Company in 2020. Sludge being the by-product of the wastewater treatment process constitutes the largest part of waste.

Table 15: MAIN TYPES AND AMOUNTS OF WASTE IN 2016-2020, t

Type of waste	2016	2017	2018	2019	2020
Mixed municipal waste	90	110.0	72.0	45.1	62.0
Paper and cardboard *	5	3.3	5.7	4.7	7.3
Packages *	0,7	0.9	0.9	1.2	1.5
Biodegradable waste*	7	6.5	6.4	6.0	7.8
Waste from screens	651	960.5	904.4	893.8	882.2
Wastewater sludge*	31 741	35481.0	40732.0	38940.3	37883.8
Sediments from grit traps	161	141.0	129.0	139.3	178.7
Excavated stones and soil*	11 354	10630.0	4767.0	6148.3	8127.4
Asphalt waste	1 181	812.0	518.0	294.9	179.9
Mixed building waste	81	0.0	25.6	6.8	2.3
Concrete and bricks	77	35.2	6.5	1.8	0.0
Metal scrap*	34	60.6	55.3	29.9	32.7
Hazardous waste	3,6	4.5	9.3	2.9	3.9
Other waste	15	2.2	146.0	6.4	6.3
TOTAL	***45 401***	***48 248***	***47 378***	***46 521***	***47 376***

* - possible to reuse

Since the sludge generated in the wastewater treatment process forms large part of our waste, we continued to recycle it through our sludge treatment process in 2020. Sludge stabilisation process (anaerobic fermentation of sludge in digesters) produces biogas which is used to produce heat for the technological process and for heating buildings. We analyse the samples of greening soil made from our sludge at least four times a year according to the requirements established in the Regulation No 29 dated 31/07/2019 of the Minister of the Environment. All the results of the treated sludge analyses were publicly available on the Company's website during the period of issue of the greening soil.

In addition to sludge, the wastewater treatment process produces significant amounts of other types of waste, such as waste from screens, which we hand over to our waste handling partner. The volume of waste generated within the wastewater treatment process is directly affected by the incoming wastewater flows, the weather, and the efficiency of cleaning the streets and land areas in the city. However, people also have an important role to play here as they can avoid throwing waste and hazardous substances into the wastewater system.

Excavated soil, stones, and asphalt waste account for the majority of waste resulting from the networks maintenance and repair works. The volume of waste from construction and excavation works is again dependent on the amount of works. However, since 2013, we have been performing most of the network reconstruction works using the so-called no-dig method, which allows carrying the works out faster and reduces the inconvenience caused by traffic jams during the road works. 44.4% of reconstructions were performed using no-dig method in 2020.

We collect and sort the other types of waste, which have a smaller share in the total waste volume, and hand them over to waste handlers. We separate paper and cardboard, biodegradable waste, hazardous waste, metal, and mixed municipal waste.

Sludge

The Company has an integrated environmental permit (KKL-509326), issued in 2020, for managing the sludge produced in the wastewater treatment process. The permit establishes technical and environmental requirements for the waste handling process.

Table 16: INTEGRATED ENVIRONMENTAL PERMIT ISSUED TO AS TALLINNA VESI

Number of integrated environmental permit	Valid until	Description
KKL-509326	indefinite term	Issued for recycling waste at Paljassaare composting fields, procedure code R12o - biological treatment preceding the recycling of waste

In 2020, 35,200 tons of stabilised sewage sludge and 2,684 tons of non-stabilised sludge were removed from the wastewater treatment process and composted to produce the greening soil (by mixing with milled peat and implementing aerobic fermentation in windrows). In 2020, we gave away 45,796 tons of sewage sludge that had been stabilised and had undergone aerobic fermentation in composting windrows (hereinafter referred to as „greening soil"). The main users of greening soil were agricultural companies OÜ Tubren Agro and OÜ Oru Agro.

Table 17: AMOUNTS OF SEWAGE SLUDGE AND GREENING SOIL IN 2016-2020, t/y

Type of sludge	Quantities				
	2016	2017	2018	2019	2020
Stabilised and dewatered sewage sludge taken out of the wastewater treatment process	31 741	35 481	40 732	36 789	35 200
Greening soil given away (reuse of sewage sludge)	39 073	32 645	26 944	41 261	45 796

Energy Consumption

Electricity consumption

The majority of electricity is used to run the Company's core processes: operating the water treatment plant, wastewater treatment plant and pumping stations on the network.

Although we have been making significant investments aimed at reducing electricity consumption, the energy consumption is still inevitably and closely connected to the operation of our core processes. Those are in turn affected by changes in consumption and service areas as well as by the natural conditions.

Table 18: ELECTRICITY CONSUMPTION IN 2016-2020, MWh

Unit	2016	2017	2018	2019	2020
Water Treatment	10 721	10 755	11 782	10 599	10 988
Wastewater Treatment	22 516	23 000	21 949	22 539	22 224
Networks pumping stations, incl. Maardu	6 841	7 094	6 709	7 286	7 554
Other	710	693	962	839	613
TOTAL	***40 787***	***41 543***	***41 402***	***41 262***	***41 379***

The total consumption of electricity remained fairly stable in comparison with 2019. The electricity consumption of the water treatment plant is significantly affected by ozone production. In 2020, the water quality in Lake Ülemiste was poorer than in 2019, which also led to higher ozone doses and increased electricity consumption. The production of drinking water continued to grow also in 2020, causing us to use more electricity than in the years before.

Chart 7: Electricity consumption per unit produced at the water treatment plant in 2016-2020, kWh/m³

As mentioned above, in 2020 the quality of surface water was lower compared to the previous year, the levels of plankton and organic matter were higher than in previous years and, in turn, resulted in higher costs of water treatment chemicals, including ozone.

Chart 8: Electricity consumption per unit produced at the wastewater treatment plant in 2016-2020, kWh/m³

Consumption of electricity in the wastewater treatment process depends largely on the weather, as the main areas of consumption are pumping wastewater and producing air i.e. to aerate the activated sludge in the biological treatment stage. During the years 2012-2015, the aeration tanks underwent reconstruction, which was done in stages and resulted in the replacement of membranes of aerators in all aeration tanks and installation of new dissolved oxygen sensors in the aeration tanks. This allows saving electricity in producing the air.

Consumption of heat energy

In addition to heating the premises we need heat energy to run the core processes. The water treatment plant produces heat out of outsourced natural gas in its boiler house. Ädala site uses central heating also produced out of natural gas in our area. The wastewater treatment plant's needs for heat energy are mostly covered by biogas.

Biogas is a by-product from the digestion of sewage sludge in digesters and is used to produce on-site thermal energy, with which we heat the premises at the wastewater treatment plant and keep the processes in operation. Due to the nature of biogas production, we are sometimes bound to burn some of the biogas or use some small volumes of natural gas. In 2020, we used 66% of the total biogas generated (71% in 2019) to produce heat.

Table 19: CONSUMPTION OF HEAT ENERGY IN 2016-2020, MWh

Unit	2016	2017	2018	2019	2020
Water Treatment	3 224	3 022	2 922	2 877	2 685
Wastewater Treatment	9 281	7 299	12 421	13 886	14 311
incl. heat energy from biogas	9 272	7 225	12 400	13 885	14 217
Ädala Offices	1 100	1 044	1 148	1 189	1 215
TOTAL	***13 605***	***11 365***	***16 491***	***17 952***	***18 211***

As of January 2018, the methodology for calculating the volume of heat generated from biogas was changed. In order to calculate the historical amount of thermal energy from biogas used for wastewater treatment as per the updated methodology, the previous amount consumed shall be divided by the coefficient of 0.61.

Chart 9: Biogas production in 2016-2020, thousand m³

The measurable volumes of biogas have been increasing since 2017 when a new biogas meter, allowing more accurate measurement results, was installed at the wastewater treatment plant.

Transportation and fuel consumption

Road transport accounts for the largest part of our need for transportation. The Company has 96 vehicles for carrying out various operational tasks as well as for driving between the company sites and numerous service sites. The largest group of vehicles is cars and operating vehicles, including minivans and team vans. The Company has a total of 81 cars and operating vehicles, and 15 special purpose vehicles (such as tractors, loaders, excavators, etc).

Table 20: NUMBER OF VEHICLES AND FUEL CONSUMPTION IN 2016-2020

	2016	2017	2018	2019	2020
Total number of vehicles, pcs.	95	88	92	93	96
Petrol, l	63 289	56 759	41 265	37 775	36 168
Diesel, l	113 622	104 719	101 377	108 179	123 656
Total fuel, l	**176 911**	**161 478**	**142 642**	**145 954**	**159 824**

We continue to try and keep the fuel consumption under control by the fuel limits set for the car users and GPS-tracking devices. Some of the cars are being shared by employees, i.e. all employees with specific authorisation are allowed to use the cars for working purposes. This enables the Company to cut down the costs and contribute to the saving of natural resources. Furthermore, all new cars we will be using, meet at least the requirements of the EURO5 emissions standard.

The number of business trips made by our staff inside and outside Estonia is relatively low. In planning the travel routes, we follow the principle of always choosing the option that has the best price. The most frequent destinations of business trips outside Estonia are the United Kingdom and Finland, to where our staff usually travels by plane and by boat, respectively. Other means of transport (e.g. bus and train) are used very little.

Air Emissions

AS Tallinna Vesi has been issued one ambient air pollution permit, which sets limits to the pollution sources of Ülemiste water treatment plant and regulates emissions of ozone produced for the treatment of drinking water. An integrated environmental permit no KKL-509326, issued on 02/10/2020, applies to the sources of pollution of Paljassaare wastewater treatment plant, regulating the air emissions from grit traps, primary clarifiers, aeration tanks, secondary clarifiers, as well as from the sludge and composting fields. The company pays a pollution charge for the pollutants discharged into ambient air.

Table 21: PERMITS ISSUED TO AS TALLINNA VESI, REGULATING THE AMBIENT AIR POLLUTION

Number of permit	Valid until	Description
Pollution permit no L.ÕV/319438	indefinite term	Applies to the pollution sources at Ülemiste water treatment plant - the chimney of boiler house, ozonation, diesel generator. Establishes the list of pollutants emitted into ambient air and the annual permitted emissions thereof.
Integrated environmental permit no KKL-509326	indefinite term	Applies to the pollution sources at Paljassaare wastewater treatment plant, e.g. chimneys, ventilation pipes, composting fields, clarifiers, etc. Establishes the list of pollutants emitted into ambient air and the annual permitted emissions thereof.
Pollution permit no L.ÕV.HA 48701	01/10/2020	Applies to the pollution sources at the Paljassaare wastewate treatment plant - the chimney of the boiler house, exhaust pipes the chimney of the combined heat plant. Established the list o pollutants emitted into ambient air and the annual permitte emissions thereof.

Table 22: AMBIENT AIR POLLUTION FROM WATER TREATMENT PLANT'S POLLUTION SOURCES IN 2016-2020, t

Pollutant	Limit	2016	2017	2018	2019	2020
Nitrogen dioxide	1.954	0.829	0.78	0.713	0.763	0,656
Carbon monoxide	1.846	0.761	0.712	0.686	0.688	0,602
Volatile organic compounds	0.125	0.052	0.049	0.046	0.047	0,041
Carbon dioxide	1688	692	647	634	623	548
Sulphur dioxide	0	0.001[1]	0.001	0.001	0	0[1]
Total solid particles	0.004	0.003	0.003	0.001	0.003	0,006

[1] Sulphur dioxide pollution below the threshold limit

Table 23: AMBIENT AIR POLLUTION FROM WASTEWATER TREATMENT PLANT'S POLLUTION SOURCES IN 2016-2020, t

Pollutant	Limit	2016	2017	2018	2019	2020
Nitrogen dioxide	29.81[1]	2.80	4.70	5.23	6.37	6.57[3]
Carbon monoxide	2101.00[1]	2.80	4.70	5.23	6.37	6.21[3]
Volatile organic compounds	141.00[1]	0.20	0.30	0.33	0.39	3.96[3]
Carbon dioxide	44401.00[1]	2523.00	4045.00	3186.00	5293.00	5715.00[3]
Hydrogen sulphide	17.81[1]	17.50	17.50	16.90	17.30	14.13[3]
Ammonia	79.34[2]					19.94[4]
Sulphur dioxide	11.98[2]					3.34[4]
Total solid particles	4.35[2]					0.87[4]

[1] Limits set in the ambient air pollution permit no LÕV. HA-48701. which expired in 2020
[2] Limits set in the integrated environmental permit no KKL-509326. issued in 2020
[3] The first three quarters have been calculated according to the old methodology and the fourth quarter has been calculated according to the new methodology
[4] Data available for the fourth quarter only

The list of sources of pollution and pollutants. the calculation methodology and the emission allowances have been changed in the permit KKL-509326. In order to provide data comparable to previous years in the 2020 Environmental Report. we have partly given here the maximum permitted levels specified in the permit L.A.R. HA-48701. which is currently invalid.

Environmental Performance

In line with the EMAS (Regulation (EU) 2018/2026) requirements. we have outlined below our key indicators of environmental performance regarding energy efficiency. material efficiency. water. waste. biological diversity. and emissions. At least three elements have been presented for each key indicator:

- Figure A stands for the total annual input/impact in the respective field of activity.

- Figure B represents the total volume of pure water sold and wastewater and stormwater treated at the wastewater treatment plant throughout the year (million m^3).

- Figure R stands for the ratio A/B.

Table 24: ENVIRONMENTAL PERFORMANCE IN 2018-2020

Key indicators of environmental performance	Year	Consumption (rounded). i.e. annual input (Figure A)	Annual output of the Company (Figure B)	Ratio R (A/B)
Electricity				
Electric power produced from oil shale. MWh	2020	82 776	70.0	1183
	2019	82 558	67.7	1219
	2018	82 805	63.5	1304
Heat				
Heat produced from natural gas. MWh	2020	3 900	70.0	56
	2019	4 034	67.7	60
	2018	3 942	63.5	62
Thermal energy produced from biogas. MWh	2020	14 224	70.0	203
	2019	13 885	67.7	205
	2018	12 401	63.5	195
Handling of chemicals				
Liquid chlorine. t	2020	61	70.0	0.9
	2019	59	67.7	0.9
	2018	62	63.5	1.0
Coagulant. t	2020	4 187	70.0	60
	2019	4 147	67.7	61
	2018	4 060	63.5	64
Polymer. t	2020	69	70.0	1.0
	2019	82	67.7	1.2
	2018	79	63.5	1.2
Ozone. t	2020	213	70.0	3.0
	2019	203	67.7	3.0
	2018	229	63.5	3.6
Methanol. t	2020	1 330	70.0	19
	2019	1 389	67.7	21
	2018	1 528	63.5	24

Water				
Water for own consumption. thousand m³	2020	2 411	70.0	34
	2019	1 958	67.7	29
	2018	1 590	63.5	25
Surface water. thousand m³	2020	25 242	70.0	361
	2019	25 000	67.7	369
	2018	24 306	63.5	383
Ground water. thousand m³	2020	2 735	70.0	39
	2019	2 680	67.7	40
	2018	2 656	63.5	42
Waste				
Mixed municipal waste. t	2020	62.0	70.0	0.9
	2019	45.1	67.7	0.7
	2018	72.0	63.5	1.1
Recycled paper and cardboard. t	2020	7.3	70.0	0.1
	2019	5.7	67.7	0.1
	2018	5.7	63.5	0.1
Recycled packages. t	2020	1.5	70.0	0.02
	2019	0.9	67.7	0.01
	2018	0.9	63.5	0.01
Recycled biodegradable waste. t	2020	7.8	70.0	0.1
	2019	5.2	67.7	0.1
	2018	6.4	63.5	0.1
Waste from screens. t	2020	882	70.0	13
	2019	894	67.7	13
	2018	904	63.5	14
Recycled sludge. t	2020	37 884	70.0	541
	2019	38 940	67.7	575
	2018	40 732	63.5	642
Sediments from grit traps. t	2020	179	70.0	2.6
	2019	139	67.7	2.1
	2018	129	63.5	2.0
Recycled excavated stones and soil. t	2020	8 127	70.0	116
	2019	6 148	67.7	91
	2018	4 767	63.5	75
Asphalt waste. t	2020	180	70.0	3
	2019	295	67.7	4
	2018	518	63.5	8
Mixed building waste. t	2020	2.3	70.0	0.0
	2019	6.8	67.7	0.1
	2018	25.6	63.5	0.4
Concrete and bricks. t	2020	0.0	70.0	0.0
	2019	1.8	67.7	0.0
	2018	6.5	63.5	0.1
Recycled metal. t	2020	32.7	70.0	0.5
	2019	29.9	67.7	0.4
	2018	55.3	63.5	0.9
Hazardous waste. t	2020	3.9	70.0	0.1
	2019	2.9	67.7	0.0
	2018	9.3	63.5	0.1
Other. t	2020	6.3	70.0	0.1
	2019	6.4	67.7	0.1
	2018	146.0	63.5	2.3

Biological diversity*				
Land use. total size of land owned by the company. ha	2020	355.3	70.0	5
	2019	350.0	67.7	5
	2018	350.0	63.5	6
Non-permeable surface area. ha	2020	118.0	70.0	2
	2019	117.9	67.7	2
	2018	117.8	63.5	2
Air emissions				
Nitrogen dioxide. t	2020	7.2	70.0	0.1
	2019	7.1	67.7	0.1
	2018	5.9	63.5	0.1
Carbon monoxide. t	2020	6.8	70.0	0.1
	2019	7.1	67.7	0.1
	2018	5.9	63.5	0.1
Volatile organic compounds. t	2020	4.0	70.0	0.057
	2019	0.4	67.7	0.006
	2018	0.4	63.5	0.006
Carbon dioxide. t	2020	6 263	70.0	89
	2019	5 916	67.7	87
	2018	3 820	63.5	60
Sulphur dioxide. t	2020	3.300	70.0	0.04715
	2019	0.000	67.7	0.00000
	2018	0.001	63.5	0.00002
Total solid particles. t	2020	0.873	70.0	0.0125
	2019	0.003	67.7	0.0000
	2018	0.001	63.5	0.0000
Hydrogen sulphide. t	2020	14	70.0	0.2
	2019	17	67.7	0.3
	2018	17	63.5	0.3
Ammonia. t	2020	20	70.0	0.3
	2019	-	67.7	0.0
	2018	-	63.5	0.0
Environmental education				
Number of children in group conversations	2020	240	70.0	3
	2019	969	67.7	14
	2018	1243	63.5	20

*The size of the land is estimated by AS Tallinna Vesi's real estate expert

Best Environmental Management Practices and Environmental Performance Indicators

The Environmental Report 2020 takes into account the Commission Decision (EU) 2019/61. which sets out the best environmental management practices and environmental performance indicators for water metering. water leakages. energy-efficient wastewater treatment and the recovery of energy from wastewater treatment that are related to significant environmental aspects.

Deploying water metering

Water meters are installed for all consumers who have signed a relevant contract. The water supply network is constantly monitored to allow quick reaction to the changes in the network. Consumers are invoiced on the basis of water meter readings.

Table 25: ENVIRONMENTAL PERFORMANCE INDICATORS IN DEPLOYING WATER METERING

Environmental performance indicators[1]	Benchmarks of excellence[2]	AS Tallinna Vesi's environmental performance indicators
Level of metered water (% of consumers. % of water consumption that is metered)	The use of water meters at household or end consumer level is 99% or higher	All consumers with a valid contract have water meters installed
Reduction in water use by end consumers after installation of water meters and/or smart meters (l/user)	All new buildings are equipped with water meters (smart meters in water-scarce areas)	All buildings have water meters

Minimising water leakages

In order to minimise water leakages. the water distribution system is constantly monitored:

1) carrying out a detailed water balance monitoring of the water distribution system and managing water pressure. by avoiding high pressure levels: pumping stations are equipped with SCADA control system;

2) analysing the water distribution network and dividing it into adequate district metering areas to detect water leakages: sensors for water zones are being used. which measure pressure. flow rates and noise;

3) responding promptly and adequately to the identified faults and leakages on the network: after detecting and locating a leakage the information is immediately provided to the unit that plans the repairs;

4) establishing a database to list all technical installations. the age and type of pipes. hydraulic data. previous interventions. etc.: Tekla geo-reference system. which collects that data. is being used.

Table 26: ENVIRONMENTAL PERFORMANCE INDICATORS IN MINIMISING WATER LEAKAGES

Environmental performance indicators[3]	AS Tallinna Vesi's environmental performance indicators
Percentage of water loss out of the system input volume (%)	Water loss in the network was 12.42% in 2020

[1] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 35, i97); i99)

[2] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 35, b31); b33)

[3] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 35, i100)

Energy efficient wastewater treatment

According to the best environmental management practices:

1) the average dry weather wastewater flow is 5.000 m^3/t. biological treatment capacity is up to 14.000 m^3/t. which is twice the average dry weather wastewater flow;

2) the biological treatment is performed with nitrification and denitrification processes. chemical phosphorus removal is also used;

3) the incoming wastewater and treated effluent discharged are monitored on a daily basis;

6) the primary and excess sludge are stabilised in anaerobic digesters;

7) the anaerobically stabilised sludge is dewatered;

8) the energy-efficient fine bubble aeration systems in the biological treatment stage and energy-efficient pumps are used.

Table 27: ENVIRONMENTAL PERFORMANCE INDICATORS IN WASTEWATER TREATMENT

Environmental performance indicators[4]	Benchmarks of excellence[5]	AS Tallinna Vesi's environmental performance indicators
Concentrations in the discharged final effluent or removal efficiencies of COD. BOD_5. ammonia. total nitrogen and total phosphorus (mg/l. %)	The removal efficiencies achieved are: at least 98% for BOD_5. at least 90% for COD. at least 90% for ammonia. at least 80% for total organic nitrogen compounds. and at least 90% for total phosphorus	Removal efficiencies achieved in 2020: BOD_5 – 98% COD – 88% Total nitrogen – 89% Total phosphorus – 92%
Electricity use of the wastewater treatment plant per mass of BOD_5 removed (kWh/kg per BOD_5 removed)	-	2.93 kWh/kg*
Electricity use of the wastewater treatment plant per volume treated (kWh/m^3 per wastewater treated)	-	0.43 kWh/m^3
Annual electricity use of the wastewater treatment plant per population equivalent (kWh/PE/year)	Electricity use of the wastewater treatment plant is: 1) lower than 18 kWh/PE/year for large municipal wastewater treatment plants (with a size of more than 10.000 PE) 2) lower than 25 kWh/PE/year for small municipal wastewater treatment plants (with a size of less than 10.000 PE)	44.3 kWh/PE

* This indicator per BOD_5 is calculated as per removed BOD_7 (2.52 kWh/kg)

[4] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 36, i102); i103); i104); i105)

[5] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 36, b35); b36)

Anaerobic digestion of sludge and optimal energy recovery

The primary and excess sludge are stabilised in anaerobic digesters and the biogas produced from sludge is used for heating the buildings and the process.

In the future. we plan to further increase the efficiency of energy recovery by producing electricity from biogas or valorising the biogas.

Table 28: ENVIRONMENTAL PERFORMANCE INDICATORS IN ENERGY RECOVERY

Environmental performance indicators[6]	Benchmarks of excellence[7]	AS Tallinna Vesi's environmental performance indicators
Percentage of electricity and heat needs of the wastewater treatment plant met by own-generated electricity and heat from biogas on an annual basis (%)	Own-generated electricity and heat from biogas cover 100% of the energy use for municipal wastewater treatment plants with a size of more than 100.000 PE without on-site thermal sludge drying. and 50% in the case of plants with on-site thermal sludge drying	100%
Electrical efficiency of the generator fuelled with biogas (%)	-	No generator
Specific biogas production (Nℓ (1)/kg per organic dry matter input)	-	No biogas valorisation

[6] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 37, i108); i109); i110)

[7] Commission Decision (EU) 2019/61, published ELT L 17, 18.1.2019, page 37, b39)

Significant Changes in the Environmental Report

This chapter outlines the major substantive changes made to the Environmental Report 2020 in comparison with the Environmental Report 2019.

In the end of 2020 the Company was issued an integrated environmental permit no KKL-509326 which regulates the air emissions and waste related activities of the wastewater treatment plant in Paljassaare.

Validation of the Environmental Report

AS Metrosert. an accredited verifier EE-V-0001. having inspected the environmental management system and the Environmental Report 2020 of AS Tallinna Vesi. confirms that the information and data in the organisation's environmental report are reliable. credible. and correct and meet the requirements of the Regulation (EC) No 1221/2009. dated 25/11/2009. on the voluntary participation by organisations in a Community eco-management and audit scheme of the European Parliament and of the Council. The Regulation (EU) 2017/1505. dated 28/08/2017. of the European Commission and the Regulation (EU) 2018/2026. dated 19/12/2018. of the European Commission. which amended the annexes I. II. III and IV of the Regulation (EC) No 1221/2009 of the European Parliament and of the Council. have been applied to this report.

The Environmental Report has been validated on 14/05/2021

Janno Semidor

EMAS Verifier

AS Metrosert

www.metrosert.ee

Appendix 1: Drinking Water Quality at Ülemiste Water Treatment Plant in 2020

Parameter	Unit	Min	Max	Average	Minister of Social Affairs' Regulation no 61. 24/09/2019	EU Directive. 98/83/EC
Temperature	°C	1.0	23.0	10.0		
Odour	points	1	1	1	Acceptable to consumer	Acceptable to consumer
Taste	points	1	1	1	Acceptable to consumer	Acceptable to consumer
Turbidity	NTU	< 0.1	0.17	0.10	1	1
Colour	mg/l Pt	< 3	3	< 3	Acceptable to consumer	Acceptable to consumer
Dry residue	mg/l	252	307	268		
pH		7.07	7.36	7.24	≥ 6.5 and ≤ 9.5	≥ 6.5 and ≤ 9.5
Conductivity. 20 °C	µS/cm	374	412	390	2 500	2 500
Alkalinity	mmol/l	2.58	3.06	2.76		
Total hardness	mmol/l	1.86	2.08	1.96		
Permanganate index	mg O_2/l	2.30	3.53	2.98	5	5
Total organic carbon. TOC	mg/l	5.4	6.1	5.7	Without unusual changes	Without unusual changes
Dissolved Oxygen	O_2 mg/l	5.0	14.9	10.4		
Dissolved Oxygen	saturation %	60	109	90		
FreeCO_2	mg/l	14	20	17		
Carbonates. CO_3^{2-}	mg/l	0	0	0		
Bicarbonates. HCO_3^-	mg/l	161	180	169		
Chlorides. Cl^-	mg/l	33	35	34	250	250
Sulphates. SO_4^{2-}	mg/l	20	32	26	250	250
Orthophosphates. PO_4^{3-}	mg/l	< 0.02	< 0.02	< 0.02		
Fluoride. F^-	mg/l	0.07	0.11	0.09	1.5	1.5
Nitrates. NO_3^-	mg/l	< 1	5.5	2.4	50	50
Nitrites. NO_2^-	mg/l	< 0.003	< 0.003	< 0.003	0.5	0.5
Ammonium. NH_4^+	mg/l	< 0.006	0.007	< 0.006	0.5	0.5
Cyanide. CN^-	µg/l	< 2	< 2	< 2	50	50
Calcium. Ca^{2+}	mg/l	60.5	70.9	65.5		
Magnesium. Mg^{2+}	mg/l	7.05	8.16	7.62		
Aluminium. Al	µg/l	33	131	66	200	200
Boron. B	µg/l	10.8	14.5	13.0	1 000	1 000
Beryllium. Be	µg/l	< 0.2	< 0.2	< 0.2		
Sodium. Na	mg/l	7.59	8.48	8.08	200	200
Potassium. K	mg/l	2.36	2.54	2.46		

Vanadium. V	µg/l	0.18	0.38	0.27		
Chromium. Cr	µg/l	< 0.1	< 0.1	< 0.1	50	50
Iron. Fe	µg/l	< 10	< 10	<10	200	200
Manganese. Mn	µg/l	1.3	4.6	2.4	50	50
Cobalt. Co	µg/l	<0.02	0.04	0.03		
Nickel. Ni	µg/l	< 0.2	0.25	< 0.2	20	20
Copper. Cu	µg/l	< 0.5	1.1	< 0.5	2 000	2 000
Zinc. Zn	µg/l	< 0.5	0.82	< 0.5		
Arsenic. As	µg/l	0.32	0.55	0.39	10	10
Selenium. Se	µg/l	< 0.4	< 0.4	< 0.4	10	10
Strontium. Sr	µg/l	84.7	89.8	87.3		
Molybdenum. Mo	µg/l	< 0.05	0.48	0.36		
Cadmium. Cd	µg/l	< 0.02	< 0.02	< 0.02	5	5
Antimony. Sb	µg/l	0.02	0.09	0.07	5	5
Barium. Ba	µg/l	38.1	52.3	43.9		
Mercury. Hg	µg/l	< 0.1	< 0.1	< 0.1	1	1
Thallium. Tl	µg/l	< 0.01	< 0.01	< 0.01		
Lead. Pb	µg/l	< 0.05	0.1	< 0.05		
Uranium. U	µg/l	0.38	0.53	0.43		
Acrylamide	µg/l	0.012	0.020	0.016	0.1	0.1
Chloroform	µg/l	13	49	24		
Bromodichloromethane	µg/l	1.5	6.7	3.8		
Dibromochloromethane	µg/l	0.28	1.1	0.64		
Bromoform	µg/l	< 0.2	< 0.2	< 0.2		
THM	µg/l	15	49	28	100	100
1.2-dichloroetane	µg/l	< 0.2	< 0.2	< 0.2	3	3
Trichloroethene	µg/l	< 0.3	< 0.3	< 0.3		
Tetrachloroethene	µg/l	< 0.2	< 0.2	< 0.2		
Tetrachloroethene and Trichloroethene sum	µg/l	0	0	0	10	10
Benzene	µg/l	< 0.2	< 0.2	< 0.2	1	1
Benzo(a)pyrene	µg/l	< 0.00017	< 0.00017	< 0.00017	0.01	0.01
PAH sum (polycyclic aromatic hydrocarbons)	µg/l	below LOQ	below LOQ	below LOQ	0.1	0.1
Pesticides (sum)	µg/l	below LOQ	below LOQ	below LOQ	0.5	0.5
Enterococci	number/100ml	0	0	0	0	0
No of colony forming units at 22 °C	CFU/ml	0	1	0	Without unusual changes	Without unusual changes
Coliform bacteria	number/100ml	0	0	0	0	0
Escherichia coli	number/100ml	0	0	0	0	0
Clostridium perfringens	number/100ml	0	0	0	0	0
Residual chlorine (free chlorine)	mg/l	0.50	0.97	0.71	≤ 1.0	
Bromate	µg/l	< 2	< 5	< 4	10	10
UV-abs	AU/cm	0.049	0.088	0.066		

Appendix 2: Quality of Drinking Water Produced from Ground Water in 2020

Parameter	Unit	Average results					Minister of Social Affairs' Regulation no 61 and EU Directive 98/83/EC
		Nõmme	Merivälja	Tiskre	Saue	Pillado	
Odour	Points	1	1	1	1	1	Acceptable to consumer
Taste	Points	1	1	1	1	1	Acceptable to consumer
Colour	mg/l Pt	< 3	10	< 3	< 3	< 3	Acceptable to consumer
Turbidity	NTU	0.22	0.39	0.44	0.30	1.6	Acceptable to consumer
Dissolved O_2	mg/l	6.18	7.5	4.95	6.68	3.8	
pH	pH unit	8.14	8.0	7.80	8.07	8.17	≥ 6.5 and ≤ 9.5
Conductivity	µS/cm	506	498	750	510	366	2 500
Alkalinity	mmol/l	2.46	3.88	2.02	2.28	1.94	
Total hardness	mmol/l	1.61	2.28	2.28	1.43	1.21	
Transient hardness	mmol/l	2.45	3.32	2.02	2.27	1.94	
Overall hardness	mmol/l	0.39	0.4	1.27	0.31	0.24	
Permanganate index (COD_{mn})	mgO_2/l	0.58	2.5	< 0.5 [4]	< 0.5 [3]	0.71 [2]	5
Free Carbon dioxide. CO_2	mg/l	2	5	4	3	2	
Total iron. Fe	µg/l	< 20	68	56	30	155	200
Fluoride. F^-	mg/l	0.62	0.41	0.83 [4]	0.69 [3]	0.71 [2]	1.50
Chloride. Cl^-	mg/l	79	59	168 [4]	87 [3]	45 [2]	250
Manganese. Mn	µg/l	< 8	18	15	< 8	44	50
Ammonium. NH_4^+	mg/l	0.097	0.192	0.008	0.120	0.183	0.5
Nitrite. NO_2^-	mg/l	0.008	0.016	< 0.003	0.012	< 0.003	0.5
Nitrate. NO_3^-	mg/l	< 1	1.1	< 1	< 1	< 1	50
Stability index		0.27	0.52	-0.02	0.11	0.05	
Total organic carbon. TOC	mg/l	0.64	3.4	0.3 [4]	0.25 [3]	0.23 [2]	Without unusual changes
Sulphide. S^{2-}	mg/l	0.004	< 0.004	< 0.004	< 0.004	< 0.004	
Sulphate. SO_4^{2-}	mg/l	21	5	27 [4]	0.3 [3]	31 [2]	250
Hydrogen carbonate. HCO_3^-	mg/l	150	236	123	139	118	
Calcium. Ca^{2+}	mg/l	45	69	68	40	30	
Magnesium. Mg^{2+}	mg/l	13	15	14 [4]	11 [3]	11 [2]	
Dry residue	mg/l	304	320	468 [4]	300 [3]	218 [2]	

Sodium. Na^+	mg/l	44.5	23.4	66.8 [4]	52.9 [3]	29.8 [2]	200
Potassium. K^+	mg/l	6.71	5.0	8.44 [4]	7.6 [3]	7.68 [2]	
Boron	µg/l	168	67.4	98.1 [4]	278 [3]	215 [2]	1 000
Aluminium	µg/l	5.21	< 1	< 1 [4]	0.7 [3]	< 0.5 [2]	200
Arsenic	µg/l	< 0.1	< 0.1	< 0.1 [4]	< 0.1 [3]	< 0.1 [2]	10
Cadmium	µg/l	< 0.02	< 0.02	< 0.02 [4]	< 0.02 [3]	< 0.02 [2]	5
Chromium	µg/l	< 0.1	< 0.1	< 0.1 [4]	0.25 [3]	0.44 [2]	50
Copper	µg/l	0.81	< 0.5	0.58 [4]	0.59 [3]	0.80 [2]	2 000
Mercury	µg/l	< 0.1	< 0.1	< 0.1 [4]	< 0.1 [3]	< 0.1 [2]	1
Nickel	µg/l	< 0.2	< 0.2	< 0.2 [4]	< 0.2 [3]	0.31 [2]	20
Lead	µg/l	0.11	0.23	0.27 [4]	0.07 [3]	0.16 [2]	10
Antimony	µg/l	< 0.02	< 0.02	< 0.02 [4]	< 0.02 [3]	< 0.02 [2]	5
Selenium	µg/l	< 0.4	< 0.4	< 0.4 [4]	< 0.4 [3]	< 0.7 [2]	10
Beryllium	µg/l	< 0.02	< 0.02	< 0.02 [4]	< 0.02 [3]	< 0.02 [2]	
Barium	µg/l	219	82.8	172 [4]	195 [3]	44.2 [2]	
Coliform bacteria	CFU/100ml	0	0	0	0	0	0
Escherichia coli	CFU/100ml	0	0	0	0	0	0
Enterococci	CFU/100ml	0	0	0	0	0	0
Number of colony forming units at 22°C	CFU/ml	5	2	1	3	7	Without unusual changes
Effective dose	mSv per year	0.32 [4]	0.27 [3]	0.32 [3]	0.25 [3]	0.04 [2]	0.1

[1] AS Tallinna Vesi does not operate in this city district since 2019. The parameters were analysed in 2019. unless indicated differently
[2] The parameter was analysed in 2017
[3] The parameter was analysed in 2018
[4] The parameter was analysed in 2019