GP TECH
INNOVATIVE SOLUTIONS TECHNOLOGY

Waste Water Treatment (WWT)

Industry Report

Prepared by

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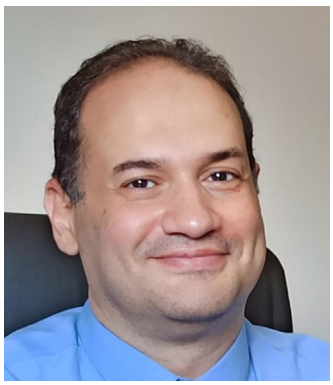
Contents

Key Takeaways

» Climate change will aggravate the situation of currently water-stressed regions and generate new water stresses in regions where water resources are currently abundant. Furthermore, to date, the willingness to pay for wastewater collection, treatment and monitoring is generally relatively low compared with drinking water services, especially in countries with low health and environmental standards.



Prof. Dr. Walid H. Soufi

» To better safeguard drinking water supplies and aquatic habitats, and contribute to sustainable development and climate change mitigation and adaptation, a fundamental paradigm shift in wastewater management is required.

» GP TECH has realized the importance of WWT technology and allocated resources to develop a new generation of domestic and industrial water treatment technological solutions through a partnership with a global prestigious research center. The objectives of the R&D project are aligned with UN Sustainable Development Goals.

Prof. Dr. Pinar Sevim

Background

» Wastewater treatment (sometimes called the sewage treatment) is the treatment of water used by homes, industries, and businesses before it is released back to the environment. Nature would be overwhelmed and severely damaged if we don't treat the billions of gallons of wastewater and sewage produced every day before releasing it back to the environment. Wastewater impacts can include harm to fish and wildlife populations, oxygen depletion, beach closures and other restrictions on recreational water use, restrictions on fish and shellfish harvesting and contamination of drinking water.

» Global water withdrawals have increased almost two times faster than the world's population over the last century[1] . Furthermore, from food to fashion, oil to chemicals, and mining to pharmaceuticals, businesses are failing to stem the flow of dirty water into our natural environments[2] , as a result, it is generally considered that over 80 percent of wastewater is released into the environment without adequate treatment[3].

» The World Economic Forum's Global Risks Report has listed water crises among the top five risks in terms of impact for eight consecutive years[4]. Combined with a more erratic and uncertain supply, climate change will aggravate the situation of currently water-stressed regions and generate new water stresses in regions where water resources are currently abundant[5].

» Water stress already affects every region, especially the Middle East, considered as the most water scarce in the world. Furthermore, about two-thirds of the global population live under conditions of severe water scarcity for at least one month per year. Increasing water-use efficiencies will therefore be key to reducing the threat posed by water scarcity on biodiversity and human welfare[6].

Source:
[1]http://www.fao.org/aquastat/en/ overview/methodology/water-use

[2]https://6fefcbb86e61af1b2fc4- c70d8ead6ced550b4d987d7c03fcdd1d. ssl.cf3.rackcdn.com/cms/reports/ documents/000/005/165/original/CDP_Global_ Water_Report_2019.pdf?1591106445

[3]World Water Assessment Programme (2017). The United Nations World Water Development Report 2017. Wastewater: The Untapped Resource. Paris: United Nations Educational, Scientific and Cultural Organization (UNESCO)

[4]World Economic Forum (2019). The Global Risks Report 2019. 14th edition. Geneva

[5]https://unesdoc.unesco.org/ark:/48223/pf0000372876.locale=en

[6]Mekonnen, Mesfin M. and Hoekstra, Arjen Y. (2016). Four billion people facing severe water scarcity. Science Advances, vol. 2, No. 2, e1500323

Wastewater Treatment (WWT) Solution

» Improving wastewater monitoring and management should become recognized as part of the sustainable solution to the quantitative and qualitative aspects of the ongoing water crisis. To date, the willingness to pay for wastewater collection, treatment and monitoring is generally relatively low compared with drinking water services, especially in countries with low health and environmental standards. Furthermore, treated wastewater is generally not sufficiently recognized as a manageable and renewable resource which can be used in agriculture, industry and energy generation.

» As illustrated in figure 1, three general stages define the wastewater treatment process: Collect, Treat, and discharge. Collect is taking the sewage water away from its different sources, which is divided into two categories according to UN Water:

- Non-point sources: mainly comes from rain or stormwater and sometimes contain pollutants.
- Point sources: wastewater generated from the domestic and industrial sectors. "Domestic Wastewater" is the combination of wastewater produced by services (schools, hotels, offices, etc.) and by households – which were paired due to the relative similarity of the composition of their wastewater. "Industrial Wastewater" is a by-product of industrial activities and the manufacturing of commercial products.

» Treatment of wastewater goes through several phases of treatment. For example, domestic treatment starts with a screening process to remove large objects or items that should never have been put down in the drain, which may block or damage equipment and pollute oceans, seas, or rivers. Afterward, it goes to a "Primary Treatment," which separates solid organic matter and human waste and suspends around 60 percent of wastewater solids, then the "Secondary Treatment," which focuses on small and invisible organic waste and ultimately suspends around 90 percent of wastewater solids.

» After the treatment process is finished, the clean is either discharged back to the environment or reused for other purposes such as agriculture. On the other hand, the sludge generated from the treatment process can be recycled for other purposes such as generating power or farming activities.

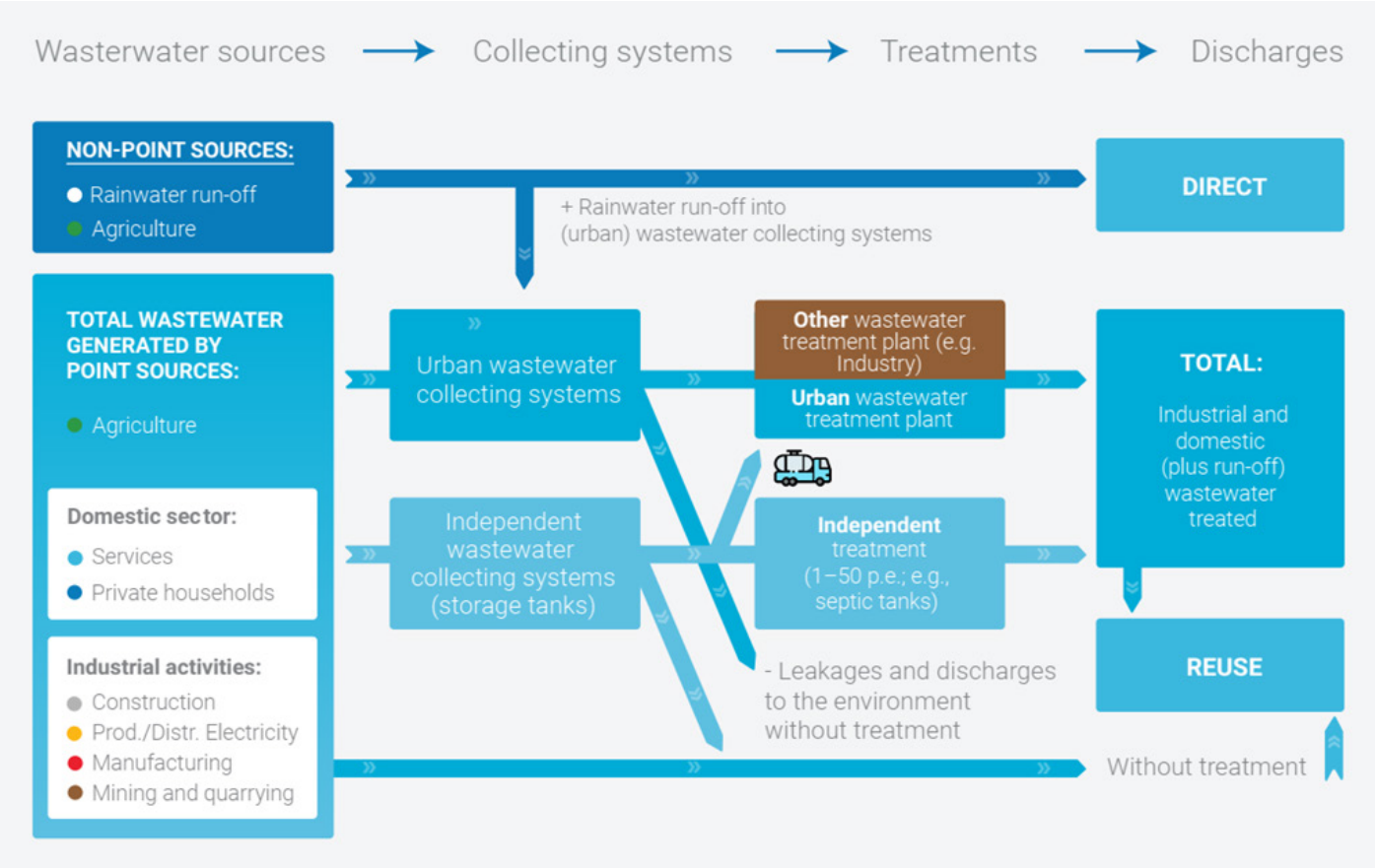


Figure 1: Schematic representation of wastewater sources, collecting, systems, and treatment

Wastewater Treatment (WWT) Solution

» As shown in figure 2, among the 42 countries reporting on both total wastewater generation and total wastewater treatment variables in 2015 (Figure 14), only 32 percent of total wastewater flows received at least some treatment (36,732 million m3 of wastewater treated out of the 113,178 million m3 of wastewater generated). In contrast, the proportion of the total safely treated wastewater accounts for 17 percent, based on the 15 countries reporting treatment levels (i.e. at least secondary treatment) to UNSD (4,115 million m3 of wastewater treated out of the 24,102 million m3 of wastewater generated).

» To better safeguard drinking water supplies and aquatic habitats, and contribute to sustainable development and climate change mitigation and adaptation, a fundamental paradigm shift in wastewater management is required. Because sanitation and wastewater systems contribute to greenhouse-gas emissions, both directly through the breakdown of excreta discharged into the environment or during treatment processes, and indirectly through the energy required for treatment steps, safe wastewater management and reuse can help mitigate climate change impacts[8].

Source:

[7]https://www.unwater.org/publications/progress-on-wastewater-treatment-631-2021-update/

[8](Dickin, Sarah, and others (2020). Sustainable sanitation and gaps in global climate policy and financing. npj Clean Water, vol. 3, No. 24.)

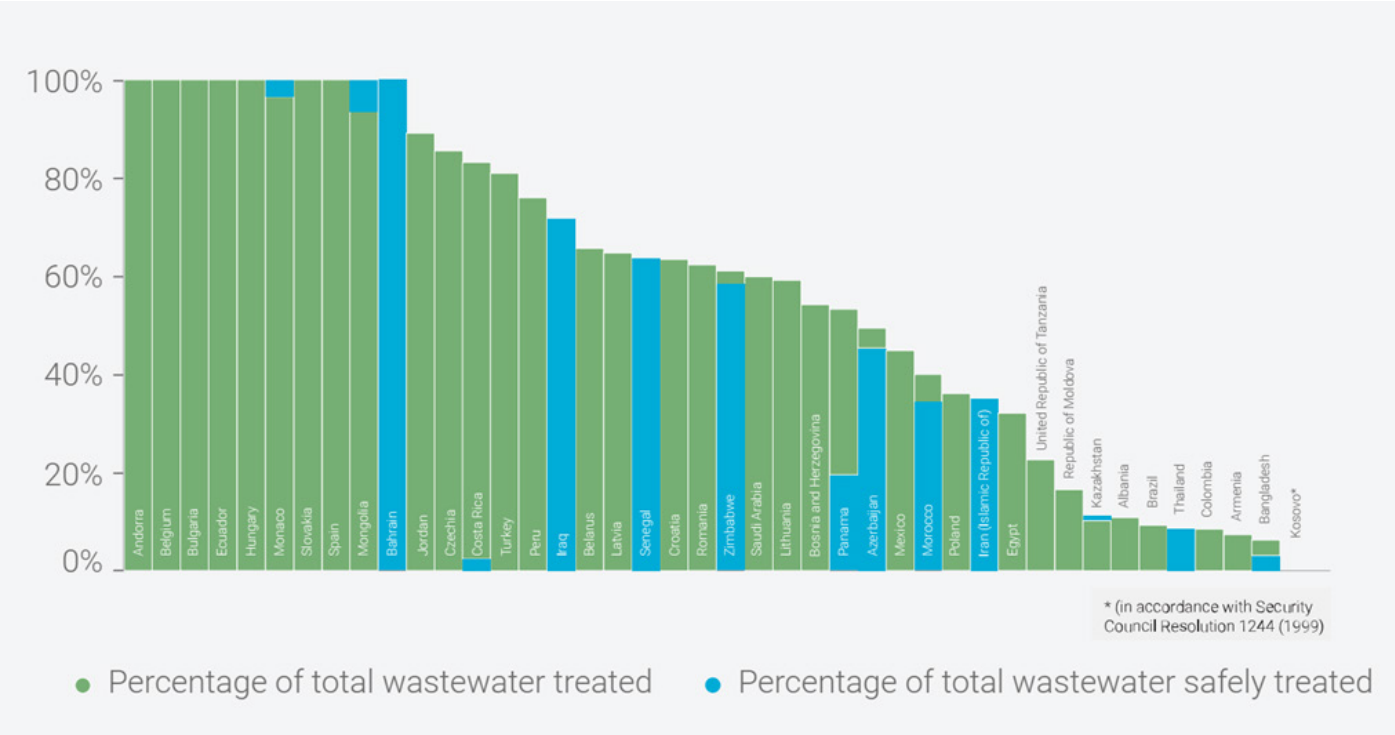


Figure 2: Countries' proportions of the total flow of wastewater treated versus the total flow of wastewater generated (per cent) in 2015, including safely treated wastewater (i.e. receiving at least secondary treatment). Stats from UN Water's Progress on WWT Report[7]

Wastewater Treatment Market Size[9]

» As shown in figure 3, in 2020, the worldwide water and wastewater market was estimated at 263.07 billion US dollars. The market is expected to reach almost 500 billion US dollars by 2028, with a CAGR of 7.3 percent from 2021 to 2028. This expansion is projected when the market returns to pre-pandemic levels following the outbreak of COVID-19.

» The worldwide water and wastewater treatment market is expected to increase at a CAGR of 7.3 percent, from $283.48 billion in 2021 to $465.23 billion in 2028. CAGR increase is due to this market's demand and growth, which will revert to pre-pandemic levels once the pandemic is gone.

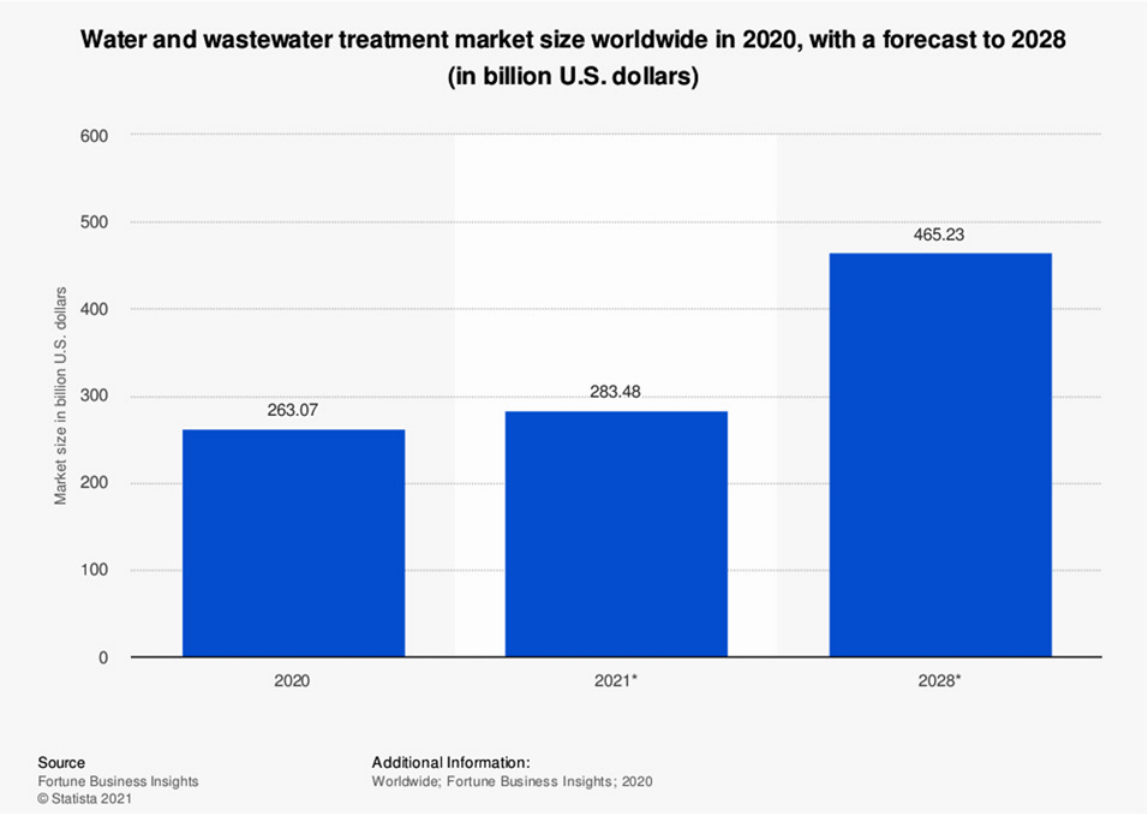


Figure 3

Source:

[9]https://www.fortunebusinessinsights.com/water-and-wastewater-treatment-market-102632

» Figure 4 shows the size of the sustainable water management market in 2013 and a projection for 2025, broken down by segment. In 2025, the market for the global sustainable water management market is expected to be worth around 982 billion euros.

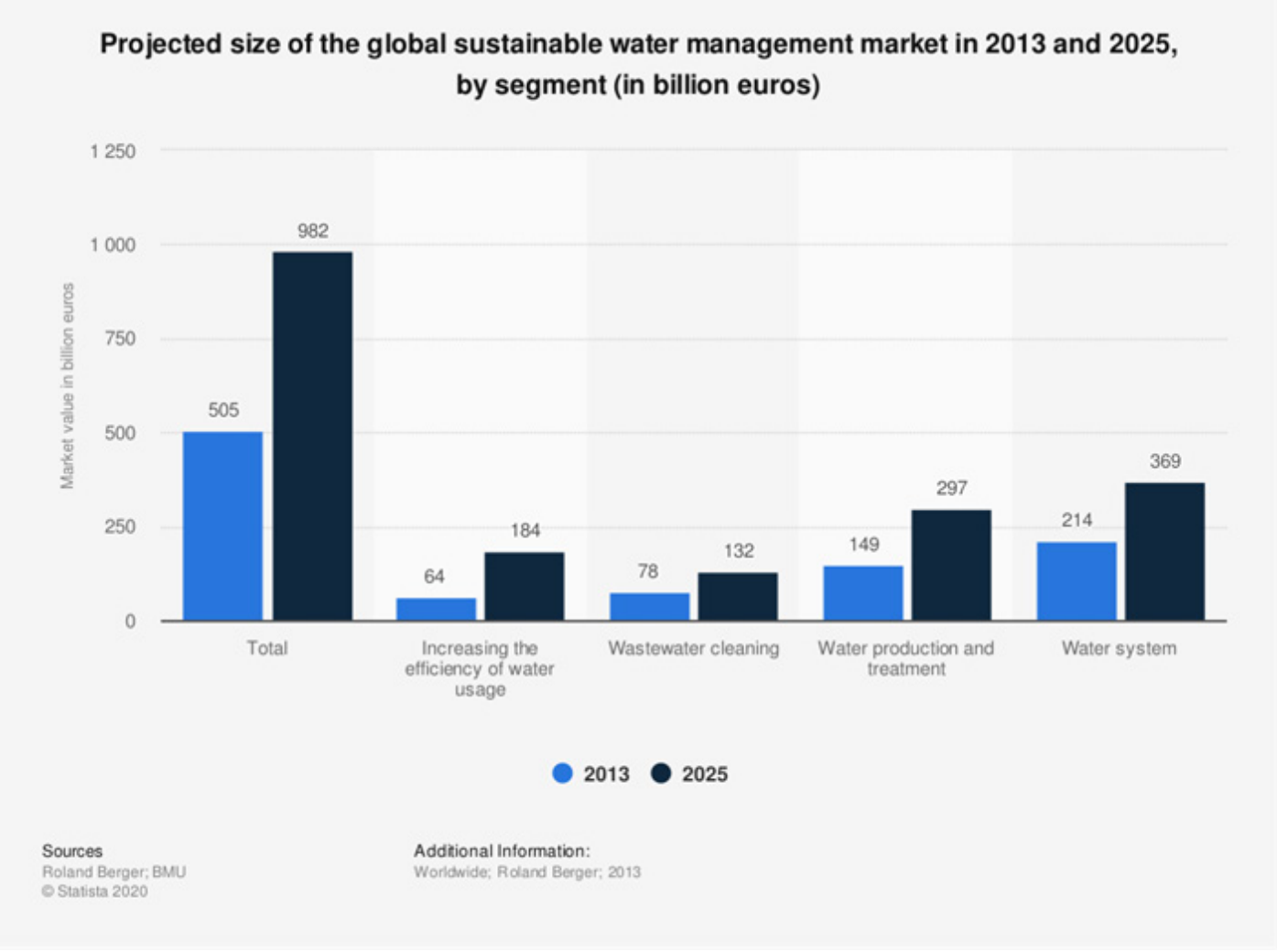


Figure 4

GP TECH's Role in WWT

» At GP TECH, we have realized the importance of WWT technology and allocated our resources to develop a new generation of domestic and industrial water treatment technological solutions through a partnership with a global prestigious research center.

Since the beginning of the R&D project, we have focused on the following objectives which are aligned with UN Sustainable Development Goals:

- Produce mobile and portable treatment plants with a high production capacity to deliver WWT services, reuse wastewater in deprived areas, and help the neediest.
- Develop, increase the efficiency, and enhance the production capacity of old WWT stations to ensure a sufficient production capacity, whether for agriculture purposes or human consumption.
- Supply prefabricated plants with a massive production capacity.
- Provide tailor-made solutions to our clients' problems.
- Build huge, cost-effective, and efficient WWT plants in a short time and a small area.

» We have managed to address our objectives by building a new generation of WWT plants in both domestic and industrial sectors and include the following key features:

- The highest international standards and quality of WWT to ensure sufficient water reuse.
- Cost efficiency, lower energy consumption, and minimum space.
- Environmental-friendly production and no emissions of odors or bad smells from the plants.
- The ability to integrate with the circular economy process.

Our Solutions

» Domestic Wastewater Treatment:

- A new Generation of mobile plants which enables local authorities to apply water or wastewater treatment with any capacity using only 10% of the land & achieve all the advantages of the technology with international treatment standards.
- Domestic Pre Fabricated plants which are compact designed, plug and play durable and highly efficient domestic wastewater treatment plants that use an innovative treatment process and nanotechnology. With flexible capacities from 50 to 5000 m3/day wastewater treatment.

» Industrial Wastewater Treatment:

- A new Generation of industrial WWT plants that use the Innovative Oxidation Degradation Process (ODP) and available in flexible capacities and configurations that can be tailored for the client's needs.
- Portable wastewater treatment system designed specifically for the Gas & Oil industry that can efficiently and stably treat the oily wastewater and overcome the disadvantages of typical treatment methods.

GP TECH Innovative Solutions Technology

In cooperation with DU University in Turkey, we strengthen the modern research infrastructure on campus, facilitating access and cooperation with the concerned authorities and government institutions. We also have many partnerships in the field of well-equipped research laboratories in many places around the world in Saudi Arabia, India and Canada, with extensive research facilities and capabilities.

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