

Where Is the Water Treatment Industry Heading ? A Strategic Perspective

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Summary: The following report summarizes a strategic look at the future of water treatment with an emphasis on emerging ways of thinking, trends, and technologies.

1. The future will see more and more water recycling just like any other resource. Therefore waste water treatment and ZLD technology is going to become more and more big especially in water scarce regions. In regions where water is plentiful, pollution standards are going to become more and more strict and resource protection will be more strictly enforced. Ofcourse needless to mention the constant thrust to improve RO desalination technology for the GCC and similar regions around the Mediterranean.
2. Upgrade of existing STPs to treat for micro pollutants (pharmaceuticals, POP's, CEC's and EDCs): therefore will need AOP equipment/chemicals such as UV/Ozone or Fe/H₂O₂ (Fentons Reagent) or GAC filtration. These technologies will experience growth in the municipal sector.
3. Environmental and Social stewardship is the fad and will become more and more. You need ECO Labels for your company Brand otherwise you are considered old school and not popular with the new generation. In Switzerland I was amazed to learn of clothing brands that certify their clothing to Fair Trade Cotton, Environmentally Friendly Dying Technology, Low-CO₂ impact and other interesting ECO standards.
4. Disinfection will always be needed especially with the emergence of Drug Resistant Microbes (MRSA's in hospitals). Good to partner with hospitals they are a recession proof industry. Learn from the Dutch and their "Search and Destroy" strategy in combating MRSA infections in hospitals.

5. Power stations/EfW is a large sector with the potential for good contracts. Need expert chemistry including Legionella and waste water treatment and monitoring. Nuclear Power is rising with the drive for Net-Zero. China is building 20 nuclear power stations with 30 more in the pipeline.
6. There are always corrosion problems for O&G and Power Sector. Good to join NACE and have NACE certified engineers. Training opportunities for consultancy firms.
7. Technology to improve water efficiency and minimize losses for example smart metering and pipe leak detection. TaKaDu from Israel is one such company making waves.
8. WWTPs will become Resource Recovery plants therefore look for AD technology to extract energy from sludge and possibly extract P and N from digestate supernatant. Nature Based Solutions will be on the rise such as simple Reed Beds/Swamps Eco Systems.
9. Waste to energy or EfW is a necessary technology therefore any chemistry related technologies to help this industry will meet with much success. The UK market is witnessing a steady growth of W2E power stations.
10. RO is here to stay. Therefore Antiscalants and RO CIP cleaning know how is important and a good niche market. Good to have a lab capable of performing RO membrane dissections/autopsies. Innovations in RO technology are very important.
11. Soil remediation is a necessary corollary to industrialization. Good to have a stake in this sector.
12. Oily waste water is a common problem therefore need to have a reliable OWS and Oil and Grease Trap technology.
13. Need to have a good lab to know what you are dealing with. Chemistry and Microbiology technicians needed. Water quality analysis is a good business.
14. On the technical skills level, the water treatment industry in the UK is large (> 200 companies) and the universities are not producing the personnel needed with the knowledge and skills to manage this sector. Therefore there will be a need for L&D/CIPD companies. Outsourcing is one strategy that could work. In my visit to Israel in May 2023, I realized that Chinese EPC contractors are handling many of the infrastructure projects.
15. Companies with a strong demand for water as part of their production process will need water management policies, and strategies that will translate into technologies: for example food industries that need water as well as the beverage industry for which good water is an existential requirement.
16. Mastering the quality of water for good coffee is a niche market and Coffee is a HUGE market. There is some research that high Mg water is better for extracting the flavor of some coffees.
17. Successful water treatment companies need to keep their hand on the Pulse of the Best R&D that is being conducted in the best labs around the world. Research centers such as the TU Delft, MIT, Ben Gurion University in Israel, Penn State, and others. Need to establish partnerships with these centers.
18. Environmental Protection must go hand in hand with a good PR strategy and raising public awareness of the impact of human, industrial and agricultural activities on the Environment. A good

hand or better say partnership with Government Legislation bodies is a must. WT companies must be the leaders in identifying emerging pollution issues and delivering the technology and sometimes the lifestyle changes needed to solve those problems. Of course, there might seem to be a conflict of interest in this, which is why independent research is needed. For this reason, Environmental Medicine is an emerging field in the Medical Sciences that I learned about in my sojourn at UCLA in California.

19. Renewable Energy and Energy Efficiency is the future therefore as WT companies/professionals we must think about how to incorporate renewable energy and energy efficiency into our designs.

20. Monitoring industry is very important it is good to have access to good instruments to quantify pollution and monitor flow accurately. Some companies like SUEZ are trying to sell AI software to the municipalities I personally think it is a marketing fad.

21. Odor problems for STPs is a huge issue. You can either mask the problem or treat it with Biofilters/Oxidation Filters.

22. Monitoring pollutants in rivers and water sources is also important but more for the MOE however companies could benefit from working with them and partnering.

23. Chemical-Free Swimming pools are an emerging fad. They use biofilters to remove N and P from water to prevent Algae from growing and they use UV instead of harsh chemicals to control the TVC counts of bacteria in the water.

24. For countries that are reliant on the Mining industry, huge amounts of waste water are generated that can be contaminated with heavy metals and sometimes even radioactive pollutants. Expert knowledge of waste water treatment and ground water monitoring is needed in these sites.

25. Microplastics are a huge issue for the issues and rivers and technologies to remove these micro pollutants at Point of Entry and in the receiving water bodies will be needed.

26. Chinese water treatment and chemical companies are reaching out to clients in the West with inexpensive products and chemicals. Partnerships will be beneficial to both parties. The Dutch and the Chinese have formed a partnership to test innovative technologies at scale.

27. A lot of waste is still diverted to landfills which generate leachates that can be toxic as they are high in Ammonia, COD, PFAS and heavy metals. These effluents are difficult to treat.

28. Seawater flushing could be a future trend. 90% of toilets in Hong Kong are flushed with seawater which saves millions of gallons of fresh water. Royal Haskoning are testing their NEREA aerobic granules on sea water in a pilot in Gibraltar.

29. Chemical Free Cooling Systems is an emerging practice in the UK in which demin water is used in cooling systems with minimal chemical interventions for pH, corrosion, scale and microbiology control.

The above report was developed by Rami E. Kremesti M.Sc., CWEM, CSci, CEnv the MD of Kremesti Environmental Consulting Ltd. which is based out of High Wycombe, UK. Rami is a water treatment specialist with over 25 years of international experience in water treatment and chemistry consulting.

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Acronyms: ZLD = Zero Liquid Discharge, EDCs = Endocrine Disrupting Chemicals, O&G = Oil and Gas, WWTW = Waste Water Treatment Works, STPs = Sewage Treatment Plants, CIP = Clean In Place, MOE = Ministry of the Environment, TVC = Total Viable Count, NACE = National Association of Corrosion Engineers, AD = Anaerobic Digestion, MRSA = *Methicillin-Resistant Staphylococcus Aureus* is a strain of Staphylococcus aureus which is resistant to methicillin and other antibiotics. GAC = Granular Activated Carbon. CEC = Contaminants of Emerging Concern, POP's = Persistent Organic Pollutants,

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