

Developments in the global water sector: trends, technologies and financing

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In this interview, we speak to **Apricum Senior Advisor Ulf Leonhard** to find out some facts about the water industry, in terms of growth areas for technology and investment, innovation trends as well as landmark M&A transactions, fundraising and key considerations for the financing of water projects.

WHICH ARE THE MEGA TRENDS IN THE WATER SECTOR IN TERMS OF MARKET SIZE, GROWTH AND ITS DRIVERS?

The global water industry is valued at about USD 800B in 2020 with a water demand of 4,500 billion cubic metres, which is nearly on par with the existing water supply. On average, agriculture accounts for about 70% of global water demand, followed by 20% for industrial and 10% for household demand. Exacerbated by an increasing population and the subsequent domino effect on agriculture and industry, water demand is expected to rise to 7,000 billion cubic metres in 2030. This demand distribution is disproportionate, with Africa facing an 800% and Asia a 250% demand increase in industrial water alone. Factors such as climate change, urbanization and aging water infrastructure have pushed the water industry to the verge of disruption.

The water sector can be divided into supply-side management, water quality management and demand-side management. So far, most of the technology trends can be found in water quality management with a focus on pollution abatement and wastewater treatment. Today new technologies in demand side management for efficient water distribution based on sophisticated irrigation techniques and digital water solutions such as smart metering, real-time monitoring (like a smart grid) have emerged. There is also some activity in supply-side management led by innovations in desalination and water extraction techniques. Together innovations in demand-side and supply-side management have bolstered the flexibility and efficiency in water utilization. These sectors are the focus of many water startups and also of this discussion.

In demand-side management, digital water is one of the fastest growing spaces in the water sector. Digital water relates to the use of sensors to gather data, IoT devices for

communication, and robust AI algorithms to enable efficient utilization and real-time monitoring of water. For the end-user, there is also the emergence of new water utilization applications in the field of irrigation, aquaculture, and algae cultivation. Bluefield, a water research specialist, estimates market growth from USD 8.7B in 2021 to USD 20.2B in 2030. Another estimate by Emergen research estimates growth for smart water management from USD 7.4B in 2020 to USD 18.9B in 2028. Both estimates represent a 100% increase by 2030. These digital water start-ups provide water as a service platform with innovative offerings and pricing models.

Desalination techniques and water extraction from humidity are some noteworthy areas of innovation in the supply side of water sector. For example, in the desalination water space, new membrane technologies are expected to lower the technology barrier. However, some adverse implications of these techniques such as environmental impact (discharge of brine, drop in humidity level) and intensive energy consumption still need to be addressed.

IN WHICH SEGMENTS OR COUNTRIES DO YOU EXPECT THE HIGHEST GROWTH RATES?

Currently the USA and the MENA region are the most water stressed regions in the world. MENA is home to seven of the top 11 most severely water stressed countries in the world, according to the World Research Institute (WRI).

Driven by population growth and industrial demand, Asian countries spearheaded by India and China are also expected to face severe water stress by the end of this decade. This will compel governments and water companies to take actions related to water management that are currently overlooked. For example, only 30% of wastewater is treated in India and 75% of freshwater lakes are currently polluted in China. By comparison, 95% of sewage is treated in Germany, and the EU average stands at 70%. The need for water management in emerging markets represents a growth opportunity for water innovators.

On the innovation front, global patents filed in the water sector between 2000–2016, increased by 250% [\[1\]](#) and are expected to further increase. Patents for water quality management represent 70% of the filed patent applications. However, the increase came from demand-side management innovations, which grew from 15% to 25%. Supply-side patent filings remained at a constant 5%.

These trends are in-line with Apricum’s observations of the water sector, where a growing number of starts-ups in digital water is forecasted. Based on Apricum’s research, innovators in this space are mainly based in the USA, followed by Israel, Germany, Scandinavia and the UK.

The USA and Israel are current leaders in demand-side and supply-side water management innovations. Here the water market is driven by a strong synergy between technology innovation and water stress levels. However, in this decade we expect innovations in demand-side management coming from the water-stressed regions of India and China. This is an area where innovators like Germany, Scandinavia, and other developed countries can form strategic partnerships with the countries of water stressed regions and leverage their technology know-how.

WHICH WATER TECHNOLOGIES WILL HAVE THE HIGHEST IMPACT ON THE SECTOR?

Technologies that resolve the water scarcity challenge will have the greatest impact. These technologies are based upon water conservation through innovative irrigation techniques that enhance water re-usage rate post water treatment, digitalize water infrastructure to monitor leakages and enhance plant operating performance and water quality. These technologies are spread across water quality management and demand-side management. Digital solutions are most popular amongst startups followed by technology innovations (physical, chemical and biotechnology) to address the scarcity challenge. Built on a digital platform, digital water startups can deploy quicker go-to-market strategies and adapt their innovations specific to a market. More than serving the agricultural and industrial customers, these digital water startups position themselves to offer their products and services to municipal and household customers.

HOW DO YOU SEE FUNDRAISING ACTIVITY IN THE WATER START UP SCENE? HAVE THERE BEEN ANY LANDMARK CAPITAL RAISES?

Start-ups in the water sector are mainly from Israel and the USA. Approximately 1,500 start-ups were founded in the past three years on water conservation techniques for end-user cases of aquaculture, blue biotech, and algae cultivation. Recently, Gradient, a US-based water management service provider offering water treatment and digital water solutions, raised USD 100 million in their Series C fundraise. An Irish-based start-up, Klir offering a water software platform in the USA, Canada, and Australia raised USD 16M in its Series A fundraise. Israel-based water intelligence and data company, Kando raised USD 16M in its Series B fundraise.

MIT, Harvard, Columbia, Yale, and Princeton and Wageningen University in Europe have a dedicated water research faculty. VC firms exist there such as Insight partners and about 15- water focused VC investors such as Emerald Technology Ventures, XPV water partners, Elemental Excelsior USA, Aliaxis Ventures (corporate VC), Bentley's Digital Twin Fund (corporate VC), Cycle Capital /BleuImpact (Canada), Aqua Lateral (USA) and Burnt Island

Ventures (founded by former Imagine H2O CEO Tom Ferguson). There are also global incubators such as Mekorot, Imagine H2O, BREW Milwaukee – The Water Council, PUB Singapore, Aqua Hacking Quebec and Wetsus. The number of investors and incubators is expected to rise. Large multinational companies such as Veolia, Suez, Dupont, Evoqua, Xylem and food, beverage, agriculture corporates are also investing in water startups. Utility associations such as Isle utilities in the UK/USA and not-for-profit organizations such as Water Environment Foundation in the USA are increasingly playing a role in the water startup space.

HOW DO YOU SEE M&A ACTIVITY AMONG THE PLAYERS? HAVE THERE BEEN ANY LANDMARK TRANSACTIONS?

Overall, there is certainly an increase in M&A activity in 2020–21 in comparison to previous years. One reason for vertical M&A is the preference of some startups to form strategic partnerships or be acquired by incumbents as an alternative to fundraises. Besides that, there are also landmark horizontal M&A deals that consolidate the market position of incumbents. The acquisition of INGE AC and Memcor by American giant DuPont is a familiar example in the water purification business. This deal consolidates DuPont’s position as a leading supplier of Ultrafiltration membranes. SKion water, led by the Klatten and Quandt families, recently acquired the remaining shares of Dutch company Paques. Through its subsidiaries, SKion water actively invests in innovative water companies. In the atmospheric water extraction phase, Indian start-up Maithri Aquatech signed MoUs for over USD 200 million with Contec global to expand their services along Contec’s global market footprint in Africa and the Middle East.

One of the landmark transactions in the digital water space is the acquisition of Innovyze Inc by Autodesk for USD 1B. As part of its digital twin strategy, Autodesk intends to provide end-to-end water infrastructure solutions. Acquisition of the UK-based Inflowmatix by Suez for an undisclosed amount is another example. Using Inflowmatix’s technologies and analytics, Suez intends to consolidate its position in the digital water space. In the coming weeks, the expected acquisition of Suez by Veolia for USD 15B would be one the biggest deals in the water sector.

HOW DO YOU SEE PROJECT FINANCE IN THE WATER INFRASTRUCTURE SECTOR? WHICH LANDMARK PROJECTS OBTAINED FINANCING?

OECD estimates that an annual investment of USD 1 trillion is required to reach the goal of sustainable water and sanitation for all by 2030. This represents a shortfall of USD 700B based on present levels of USD 300B. To successfully raise such large amounts for greenfield water projects, we need to address two key factors: bankability and liquidity.

The bankability of any project is determined by the risk profile and the return that debt investors are expected to generate by accepting this risk profile. A well-structured deal ensures an optimum risk allocation between all stakeholders.

The two main risks that lenders face are construction/technology risk and revenue risk. Unlike startup investors, project finance lenders will only finance commercially viable and proven technologies. This unfortunately creates a limitation for the financing of new innovative technologies, which are dependent on the risk that capital investors intend to take as mentioned earlier. Construction risk, i.e., the risk of a project not being completed in time and within the original budget, can be mitigated via fixed-price certain-date (so-called lump-sum turn-key) contracts with reputable contractor, who would absorb any interface risks between engineering, procurement and construction of a project.

Project finance lenders are also hesitant to accept any price or volume risk affecting the long-term revenues of the project. Utility projects, including water projects are successfully solving this problem by offering long-term offtake agreements that provide a firm obligation of one client to purchase the entire output at a price that ensures a fixed profit margin for the project. Constraints concerning the available liquidity for larger projects present another challenge in project finance. In OECD countries, the traditionally dominant source of finance is commercial bank loans. In emerging economies, comparable debt financing is sourced from Development Finance Institutions (DFIs) as commercial banks are hesitant to finance projects in countries with a sub-investment grade sovereign credit rating. Export Credit Agencies (ECAs) – provide another means to obtain liquidity for larger water projects globally. ECAs have a mandate to support the export of equipment and services of suppliers and contractor in home country with financing tied to the procurement of such equipment. As water projects contain a high level of equipment, they are well suited for ECA support.

Today there is also the emergence of new trends to mobilize more liquidity for these water projects – blended finance and blue bonds. Blended finance rests on partnerships formed by governments, scientific research institutions, policymakers, financial institutions, and engineering companies. Governments and DFI provide the much-needed financing for early-stage feasibility and other work through concessional finance and grants. Specialized impact investors can absorb startup risks and provide first-loss guarantees to protect commercial financiers. Civil engineering companies and engineering consultants such as Dornier, Dorsch along with experts from research institutions provide their expertise in technical know-how. Institutions like WWF also have a finance lab that has a database of investment opportunities with potential investors. Government, Nonprofit institutions, and Philanthropic organizations like Rockefeller Foundation, Bill and Melinda Gates Foundation, and Walton Family

Foundation provide seed finance at early stages. Blue bonds, a subset of green bonds, are another means to provide liquidity to water finance projects and are used by governments and development banks to finance ocean-friendly initiatives. Some examples of these bonds include Nordic-Baltic Blue Bond (USD 234M) and Miami Forever Bond (USD 400M). For tracking these investment products, various water-focused indexes such as Dow Jones U.S. Water Index and Bloomberg World Water Index exists.

[\[1\] 2020 OECD report by Xavier Et al](#)

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