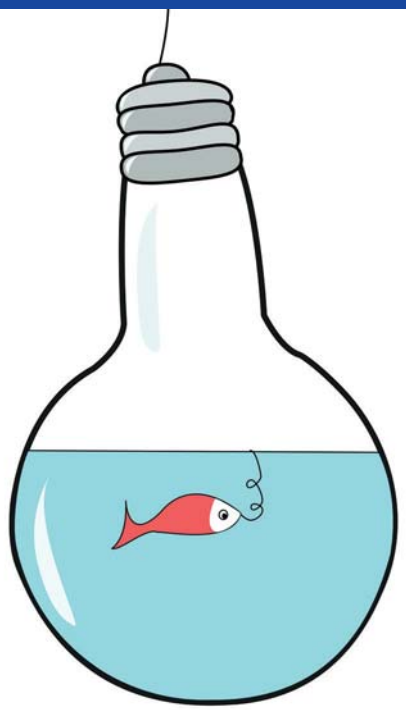
WATER AND INNOVATION

From TAGs to Riches: Technology acceleration through partnerships

While innovation holds the answers to many of South Africa's water and sanitation challenges, there is work to do to accelerate the solutions, says Jo Burgess, senior technology consultant at global technology and innovation consultancy, Isle.



The average time for new technologies to become mainstream is 15-20 years – too long if they are to have the impact that is urgently needed.

The high-profile water scarcity issues that began in 2014 have prompted a huge amount of activity and there are hundreds of people offering water treatment solutions to municipalities and government. It is impossible for the sector to assess all technologies in detail and differentiate the good tech from the repackaged old tech and the low-quality tech.

There is a long-term skills shortage in the water sector and with so much technology out there it is difficult for staff to keep up. We can – and must - move faster by closing the communication gaps between technology developers and technology users and investors.

Isle works closely with the water sector to introduce pre-assessed new technologies. Key to this are Technology Assessment Groups (TAGs), collaborative innovation forums for technology users. We have several TAGs worldwide, each operating on the same principles but tailored carefully to its location, acting as launchpads into different markets.

We have South Africa TAG (SA TAG) for the water sector itself and an industrial TAG (iTAG) for non-water sectors such as power, food and beverage, pulp and paper, mining, and pharmaceuticals. There are other TAGs around the world which

are routes to overseas markets for SA technologies.

Isle has a team of about 60 scientists and engineers scouting for emerging technologies from research centres, universities, backyard inventors – anywhere. The technologies are put through our technical assessment. We look at pilot or trial data, under non-disclosure agreement if necessary, and then put the technologies that pass the assessment into Isle's online innovation portal.

The TAGs meet twice a year. Before each meeting we match the innovation needs of members to the technologies that have emerged since the previous meeting. We then interview those technology companies about their readiness to support business in South Africa, if they are not established there already. At the meetings they give technical presentations followed by a Q&A and collaborative audience review.

The meetings produce opportunities for collaborative trials, which are designed, tracked and progressed by Isle. There are great benefits to be had from streamlining collaborative trials – one company can trial a new product and others be provided with an independent report, for example.

For the technology provider, it means more than one potential client sees the product and saves time and resources by removing the need for repeat trials. For the tech users, it means the cost of a trial is shared and they can be confident of independent, evidence-based analysis.

Trialling products in this way is a direction all industries should be moving in if they are to help pave the way towards much needed progress – but even with this acceleration, bringing new technologies into widespread use is still a long process. However, it can be done, and furthermore it can be done here.

Here are two examples of technologies that went from TAGs to riches.

SMARTSAN

The SMARTSAN is a decentralised domestic wastewater treatment package plant developed by Nano Water Technologies Africa in Randburg. It is scalable to treat effluents from single household systems up to groups of houses and small communities.

The Recycle Reactor model incorporates the recirculation of treated effluent for flushing for conventional flush toilets, in a near closed-loop system. The system consists of three reactor tanks and a fourth elevated cistern-filling tank.

The reactor tanks are configured one inside the other, with flow between the three tanks having to pass through a nanofilter assembly before entering the next tank. This ensures 100% removal of all dissolved contaminants such as nitrates and phosphates.

The process uses bacteria to remove the biological oxygen demand (BOD) load as well as provide nitrification and denitrification. This allows the treated effluent to be either safely discharged to the environment or reused to refill the toilet cistern. A unique cap filter in the ventilation system removes all odour.

The system has a small footprint, making it well suited to rural and peri-urban sites where no sanitation infrastructure is available. It can be totally off-grid and powered by renewable energy, although it can also be connected to the grid.

Sales are strong in South Africa, Namibia, Zambia and Mozambique and licensing has allowed for greater expansion at faster rate, using existing networks. Nano Water Technologies was selected to give a presentation to 16 water utilities at the European Wastewater TAG meeting in Utrecht, The Netherlands, in July 2016, resulting in requests for direct introductions by clients in Europe, and trials.

Dynamic Vapour Recovery (**DyVaR**)

The eMalahleni Water Reclamation Plant (EWRP), in the Nkangala District Municipality in Mpumalanga, has the capacity to treat 50 megalitres of mine water per day. More than 99% of the influent is recovered as potable water through a multistage treatment process and provides drinking water to the local community.

The remaining <1% is recovered as a highly concentrated brine – an environmental liability which requires extensive treatment before it can be disposed of. A trial was hosted by Anglo American at EWRP, with funding from Coaltech, which focuses on cleaning up waste generated by mining, to determine whether Dynamic Vapour Recovery (DyVaR) technology is a viable option for treating the concentrated brine.

DyVaR is engineered by Dutch company, Salttech, and provided in South Africa through Tecroveer Pty. It is an advanced system that recovers salts from concentrated brine through evaporation and crystallisation. Tecroveer presented the DyVar technology to Anglo American, among others, at an industrial TAG meeting in 2018.

Brine is treated in a one-step continuous process, producing fresh water and salt solids. The system is modular and consists of multiple units that each have a capacity to produce 50 litres of clean water per hour.

The pilot trial with the Salttech DyVaR technology successfully treated the reject brine from EWRP and a mixed concentrated brine. Clean water recovery of 88% was achieved. Now that the building of new evaporation ponds for brine storage or treatment is no longer an option, DyVar and technologies like it have become critical to South Africa.

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