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WATER'S ROLE IN THE SCRAMBLE FOR NET ZERO

AS CLIMATE ACTION TAKES CENTRE STAGE, THE CARBON FOOTPRINT OF THE WATER SECTOR IS COMING UNDER INCREASING SCRUTINY

TEXAS OILFIELDS EMBRACE WATER RECYCLING

A CHANGE OF TACK ON DISPOSAL REGULATIONS THROWS THE DOOR OPEN FOR MIDSTREAM SPECIALISTS

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AS CONCERNS OVER CONTAMINANTS RISE, IS THE TIME FOR THERMOCHEMICAL TECHNOLOGIES FINALLY HERE?

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CTO OUTLOOK

Creating connections for the digital future

Holistic digital thinking has long been at the heart of Siemens' water strategy. Johannes Koch explains how the company is evolving its solutions to meet the challenges of urbanisation, climate change and integrated operational frameworks.

JOHANNES KOCH

Head of Global Account Development in Water & Wastewater Industries, Siemens

Johannes Koch has been working for over 12 years for Siemens, currently heading Siemens' Digital Industries global water industry business development. His responsibilities contain overall sales and channel management strategy, new business setup and partnerships, all coming along with special focus on digital transformation. Prior to his current role Koch worked as Senior Manager M&A/Corporate Ventures among others with a focus on environmental business.

What market drivers have been most important in shaping the direction of your technology strategy for water applications?

Megatrends such as urbanisation combined with current challenges around changing weather conditions increasingly require a reliable security of water supply. In addition, conservation of knowledge and demand on remote operations is driven by the challenge of ageing workforce just to name some.

What are the key technology areas you are looking at in your R&D activity for water and why?

Overall, it is important for us to have a comprehensive but balanced portfolio from electrification to automation to seamlessly integrated and interoperating digitalisation. In the way of key technology areas, cybersecurity and data protection are key for us, as are Big Data handling, the digital twin technology, and artificial intelligence-backed analytics. Meanwhile, a crucial base for all of this are integrated engineering and operations providing blueprints for water treatment plants, wastewater treatment plants or desalination plants etc. I would call this approach overall a journey to the 'water ontology'.

What gaps do you see in Siemens' water-related technology portfolio that could be strengthened?

We see fields we would like to enhance rather than observing major gaps. We will continue to foster our offering driving seamless integration and interoperability of digital applications and solutions in our water Industry portfolio. In addition, we will be aiming to live up to our open ecosphere thinking with strategic collaborations, wherever it will make sense. Successful examples from the recent past are the collaboration on AI-backed leakage detection with Spanish company BuntPlanet or the acquisition of process simulation experts PSE.

How are you looking to expand Siemens' expertise in digital twins in the future (e.g. new applications, new ways of cooperating etc.)?

From my perspective, there is not the one and only digital twin. It is more like a mosaic built from many individual parts. First, it is necessary to understand how the picture should look like as a result to define the journey. The more parts you will have added and interconnected, the clearer the picture will become in the end. In this way we will continue to build this picture adding more strength to our core and adjacent fields such as building information modelling (BIM), integrated operations and engineering, analytics and IT/OT security.

What do you think is the next big step forward in digital technologies for water?

We already talked a lot about the core challenges. To build a seamless operating big picture from planning to maintenance will be key (remember the 'water ontology'). But smart water is more than the sum of its technology parts. Whoever can provide all of the technology in a very holistic and comprehensive way, with an open architecture and interconnectivity with third parties, will be one of the winners in the digital water market. In addition, managing the changes in organisations to utilise these possibilities best needs to be put into focus and supported by an inclusive technology approach.

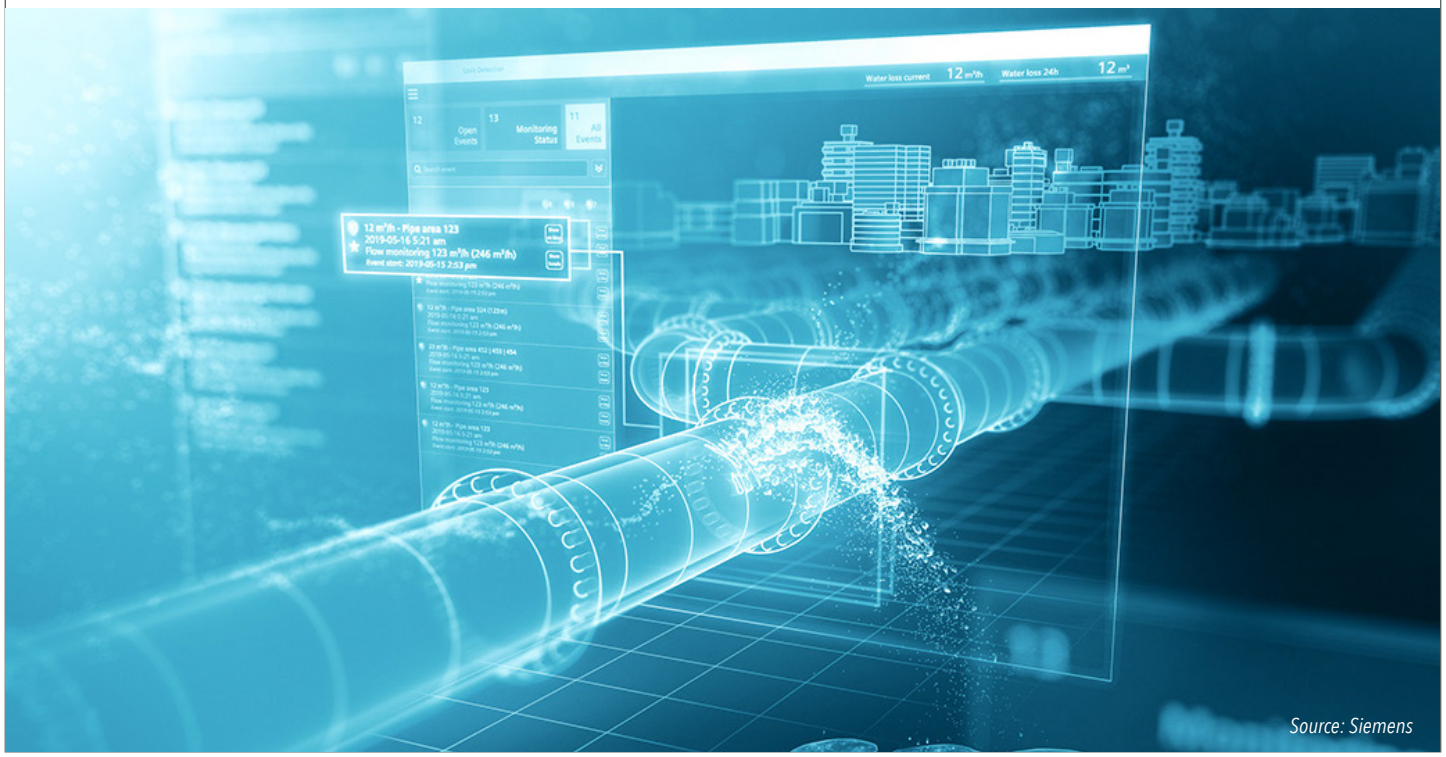
Where do you find the application of artificial intelligence/machine learning is most effective in the water sector currently?

AI has a broad spectrum of applicability. The 'natural' environment of applying this technology of course is analytics in its various characteristics. AI/ML is increasingly crucial for getting the right information out of the data to do the exact analysis for getting intended results. This starts by getting all the data into one applicable data lake where you can then apply analysis and start to build digital twins for process and plant simulations, operator training simulations, pinpointing exact leakages or optimising water and wastewater networks. We are already using AI in several applications for the water industry through our SIWA Blockage Predictor or SIWA LeakPlus products.

Combined sewer overflows (CSOs) are an increasingly significant problem especially in countries such as UK and USA. How is the ►

SMART SOLUTIONS FOR SMALL-SCALE LEAKS

Siemens' artificial intelligence expertise is a vital component of its leak management expertise. SIWA LeakPlus, powered in partnership with BuntPlanet, has detected leaks as small as 0.5 litres per second to help reduce non-revenue water and prevent pipe bursts.



Source: Siemens

SIWA Blockage Predictor being implemented and is it now fully commercialised?
CSO absolutely is quite a challenge for the UK and US among others. Our SIWA Blockage Predictor (SBP) is one example for how to possibly address this problem effectively. We are able to reliably localise blockages in the CSO in good time before overspills can occur through employing latest AI and IoT technology. Early this year we have successfully launched the SBP, which was co-created with our partners Yorkshire Water and the University of Sheffield in the UK. We are now expanding the mature solution globally and see a lot of opportunity in the US.

Where are you looking for new ideas for innovation outside of Siemens?
An integral part of our DNA at Siemens is open ecosphere thinking. Therefore, we do have a broad spectrum of partners from associations, universities (such as Technical University Berlin and RWTH Aachen), research labs to start-ups and Global Fortune 500 companies. We also do various Hackathons to embrace innovation. Anyway, a win-win scenario for all involved stakeholders always remains most important to us.

Wherever applicable we also look over the edge of the plate in terms of learning from other industrial verticals that Siemens serves. The requirement of getting a lot of data streamlined, structured and bringing out effective analytics is common to a lot of industries, and we have taken learnings from other industries we serve like pharmaceuticals or chemicals to adapt to the water sector.

Siemens has a number of partnerships in the digital water sector. Where do you see the greatest opportunity for similar partnerships going forward to continue the digitalisation of the water sector?
All our partnerships are a bit different from scope and objective. Common benefit is an underlying total strategy and a win-win in each specific case. We will continue to successfully engage in partnerships to jointly tackle the challenges impacting our customers the most. The increasing application of AI and digital twin technology in particular in the water industry offers a whole lot of opportunities.

What do you think will be the game changing technologies in the water sector in the next ten years? What is ripe for disruption?
I would expect that the character of automation will be changing to a host that is running numerous applications including water quality and plant efficiency or water demand and weather forecasts, with stronger integration of analytic tools required. The overall trend towards integrative and remote operated systems will increase supported by edge technology. All of that will also drive demands on cybersecurity.

How could the pace or circumstances of the uptake of digital technology in the water sector be improved?
Peter Drucker's 'culture eats strategy for breakfast' is quite suitable: overall, it will clearly require a mindset-change. Politics needs to create a frame embracing innovation. This should, among other things, be focused on supportive measures on the use of digital solutions to drive an overall efficiency and effectiveness increase in the water industry.

Also, sufficient public and private funding will be key to drive sustainable resource management. Currently, about 15% of the water sector's CO_2 footprint could be saved by the application of today's available technology. That is why Siemens claims to provide 'technology with purpose'. ■