

<p>1.8 GREENHOUSE GAS EMISSIONS IN DENMARK</p> <p>Chairs: Eveline Volcke, <i>Belgium</i> and Haoran Duan, <i>Australia</i></p> <p>Reduction of greenhouse gas emissions in the water sector — a Danish perspective, Jacob Kragh Andersen, <i>EnviDan, Denmark</i></p> <p>Quantification and assessment of greenhouse gas emissions from wastewater treatment plants, Charlotte Scheutz, <i>Technical University of Denmark, Denmark</i></p> <p>Direct effect of activated sludge concentration on N₂O emission and CO₂-eqv accounting at full-scale, Mikkel Andersen, <i>Unisense, Denmark</i></p> <p>N₂O abatement from WWTPs by catalytic treatment, Britta Lauritzen, <i>Hillerød Forsyning, Denmark</i></p> <p>--- POSTERS ---</p> <p>Emissions of nitrous oxide from danish WWTPs and their effect on global warming — a nationwide study, Anna Katrine Vangsgaard, <i>EnviDan, Denmark</i></p> <p>Predicting N₂O production in activated sludge process using data-driven modelling, Laura Hansen, <i>Krøger, Denmark</i></p>	<p>Room B3 g Technical</p>	<p>Tuesday 15:45-17:15 GHGs</p> <p>16:05-16:25</p> <p>16:25-16:45</p> <p>17:10-17:15</p>
<p>1.4 DEVELOPING CONSENSUS AND GOOD PRACTICES FOR DIGITAL TWIN APPLICATIONS — B</p> <p>Chairs: Elena Torfs, <i>Belgium</i> and Borja Valverde-Pérez, <i>Denmark</i></p> <p>The workshop brings together water professionals from different backgrounds (academics, utilities, etc.) and sectors (wastewater, urban drainage, drinking water, etc.) to build consensus on the state-of-the art, challenges, and good practises in the application of digital twins. Discussions will be built around real cases of successful digital twin projects in different water domains for design, control, and decision-making.</p> <p>Speakers: Elena Torfs, <i>Ghent University (BE)</i>, Borja Valverde-Pérez, <i>Technical University of Denmark (DK)</i>, Peter Mikkelsen, <i>Technical University of Denmark (DK)</i>, Niels Nicolaï, <i>Gigi Karmous-Edwards</i>, <i>Agnethe Nedergaard Pedersen</i>, <i>VCS Denmark (DK)</i>, Saba Daneshgar, <i>Ghent University (BE)</i>, Andrew Smith, <i>Anglian Water Services (UK)</i>, Peter Alexander Stentoft, <i>Krøger (DK)</i> & Bruce Johnson, <i>Jacobs, (US)</i></p>	<p>Room C2 Workshop</p>	<p>Tuesday 15:45-17:15 Digital Twins</p>
<p>3.8 NONREVENUE WATER, LEAKAGE MANAGEMENT AND INTERMITTENT WATER SUPPLY</p> <p>Chairs: Mohammad Abdullah, <i>Bangladesh</i> and Titilola Bright-Oridami, <i>Nigeria</i></p> <p>Integration of predictive models in a drinking water quality index for managing a distribution network, Hector Monclus, <i>Universitat de Girona, Spain</i></p> <p>Pressure management based leakage reduction of water distribution networks, Tamás Huzsvár, <i>Budapest University of Technology and Economics, Hungary</i></p> <p>Leakage prevention measures using various types of leak survey equipment in Tokyo, Takahiro Matsuo, <i>Bureau of Waterworks, Tokyo Metropolitan Government, Japan</i></p> <p>Zonal storage with hydraulic isolation structure for equitable water supply, Pardip Kalbar, <i>Indian Institute of Technology Bombay, India</i></p> <p>--- POSTERS ---</p> <p>Leak localization with the dual model on a real-world water distribution system, Erik Nordahl, <i>Norwegian University of Science and Technology, Norway</i></p> <p>A Hybrid modelling approach for leak localization with input from sensors, customers and multi-model output, Pieter Haest, <i>De Watergroep, Belgium</i></p>	<p>Room B5 b Technical</p>	<p>Tuesday 15:45-17:15 Nonrevenue water</p> <p>15:45-16:05</p> <p>17:05-17:10</p> <p>17:10-17:15</p>

<p>2.1.3 A ACTIVATED SLUDGE PROCESSES: MICROBIAL COMMUNITY DYNAMICS</p> <p>Room C3 Technical</p> <p>Chairs: Andreas Schmid, <i>Germany</i> and Dorottya Sarolta Wágner-Zafirov, <i>Denmark</i></p> <p>Mitigation of N₂O in WWTPs by controlling the nitrifier activity using DNA sequencing in combination with online sensors, Mikkel Stokholm-Bjerregaard, <i>Krøger A/S, Denmark</i></p> <p>A new approach to advanced treatment for modified activated sludge process by multiple-input single-output extremum seeking control, Osamu Yamanaka, <i>Toshiba Infrastructure Systems and Solutions Corporation, Japan</i></p> <p>Microbiological aspects of controlling the Prague waste water treatment plant, Martin Srb, <i>Pražské Vodovody a Kanalizace, a.s, Czech Republic</i></p> <p>Know your activated sludge community dynamics through time series: ready for on-site and fast monitoring and control, Susan Hansen, <i>Aalborg University, Denmark</i></p> <p>---- POSTERS ----</p> <p>Potential estimation of advanced wastewater treatment by operational control for conventional activated sludge process, Onishi Yuuta, <i>Toshiba Infrastructure Systems & Solutions Corporation, Japan</i></p> <p>Determination of species-level seasonal dynamics shows recurrent patterns in full-scale activated sludge plants, Miriam Peces Gomez, <i>Aalborg University, Denmark</i></p>	<p>Tuesday 15:45-17:15 Microbial dynamics</p> <p>16:10-16:25</p> <p>17:05-17:10</p>
<p>4.4.9 POLLUTION OF URBAN WATER: MONITORING, MODELLING, AND CONTROLLING</p> <p>Room B3 b Technical</p> <p>Chairs: Neil Armitage, <i>South Africa</i> and Ramkumar D., <i>India</i></p> <p>Microplastics in tunnel wash and road runoff water, Subhash Rathnaweera, <i>Aquateam COWI, Norway</i></p> <p>Traffic stormwater BMPs for micropollutant reduction in the city of Gothenburg, Helen Galfi, <i>Kretslopp och vatten, Göteborgs Stad, Sweden</i></p> <p>Impact of de-icing salt on the performance of bioretention in cold climate: water quantity and quality, Henry Beral, <i>University of Montreal, Canada</i></p> <p>Resilient cities - citizen data and scenario modelling for understanding the interactions between groundwater, sewer system and watercourse, Anja Ziegler, <i>Aalborg Utility, Denmark</i></p> <p>---- POSTERS ----</p> <p>Full scale study - usage of existing sand filter for polishing phosphorus to meet stricter effluent requirements, Sofia Bramstedt, <i>Käppala Association, Sweden</i></p> <p>Constructed wetlands for the treatment of harmful algal blooms: a multidisciplinary approach, Alba Martinez i Quer, <i>Aarhus University, Denmark</i></p>	<p>Tuesday 15:45-17:15 Pollution</p> <p>16:45-17:05</p>
<p>1.11 ASSET MANAGEMENT AND OPTIMISATION CASE STUDIES</p> <p>Room B4 d Technical</p> <p>Chairs: Matt Rolls, <i>United States</i> and Helena Alegre, <i>Portugal</i></p> <p>Improving inflow & infiltration control in wastewater systems — a methodology applied to a real case study, Joana Cassidy, <i>AGS, Portugal</i></p> <p>Asset management maturity level - a self-check to verify the quality of the management of assets, Maxim Juschak, <i>IWW Water Centre, Germany</i></p> <p>Including odour and corrosion in asset management of sewer system, Søren Højmark Rasmussen, <i>EnviDan, Denmark</i></p> <p>National rehabilitation guidelines to boost rehabilitation of the pipe networks, Annika Malm, <i>Kungsbacka municipality, Sweden</i></p> <p>---- POSTERS ----</p> <p>Cost-benefit analysis as decision support for legal requirements for leakage control, Johanna Merisalu, <i>Chalmers University of Technology, Sweden</i></p>	<p>Tuesday 15:45-17:15 Optimisation</p> <p>17:05-17:10</p>

<p>UTILITY LEADERS FORUM III — EVOLVING WITH CLIMATE CHANGE</p> <p>Chair: Shaunna Berendsen, <i>Head of Innovation Engagement, Anglian Water</i></p> <p>Igniting talks:</p> <p>Simon Parsons, <i>Director, Scottish Water, United Kingdom</i>, Pat McCafferty, <i>MD, Yarra Valley Water, Australia</i>, Dan Naidoo, <i>Regional Manager of Umgeni Waterboard, Kwazulu Natal, South Africa and chair of WISA Water Institute of Southern Africa</i>, Brian Hansen, <i>Head of Planning, Utility of Greater Copenhagen, Denmark</i>, Matt Collings, <i>Assistant GM, Moulton Niguel Water District, California, United States</i>, Gari Villa-Landa Sokolova, <i>Head of International Affairs, AEAS, Spain</i>,</p> <p>Roundtables and panel discussion facilitator: Miriam Feilberg, <i>Head of Climate, DANVA</i></p>	<p>Room A2 Forum</p>	<p>Tuesday 15:45-17:15 Climate change</p>
<p>FORUM FOR INDUSTRIAL WATER USERS III — TABLE-TOP GROUP DISCUSSIONS OF ISSUES PERTAINING TO AND ASSOCIATED WITH THE PANELS EARLIER IN THE DAY</p> <p>Through better water management, many industries can not only reduce their environmental impact and meet societal demands for clean water, but also improve process performance and ultimately reduce costs. The Forum for Industrial Water Users was formed to exchange ideas and approaches for industries to mitigate and overcome water-related challenges in a sustainable manner.</p>	<p>Room A3 Forum</p>	<p>Tuesday 15:45-17:15 Industrial water</p>
<p>WATER SAFE CITIES</p> <p>Chair: Lykke Leonardsen, <i>Denmark</i></p> <p>The purpose of this session is to present the results and work of the global partnership between C40 Cities and Grundfos and to introduce the participants to how active partnerships can lead to focused action that can accelerate the work in cities. It will also discuss the complexity of water management in cities and the importance of involving all stakeholders in policy planning, implementation, and financing. The session will: 1. Present the results from Water Safe Cities and 2. Introduce Water Safe Cities II</p> <p>Speakers: Lykke Leonardsen, <i>Resilient and Sustainable City Solutions (DK)</i>, Daniela Bemfica, <i>IWA (UK)</i>, Kin Nøhr Skibsted, <i>Kevin Austin, C40 (UK)</i>, Rohit Aggarwala & Daryl Johnston</p>	<p>Room C0 Forum</p>	<p>Tuesday 15:45-17:15 Water safe cities</p>

<p>ADVANCEMENTS IN NON-SEWERED SANITATION</p> <p>Chair: Sudhir Pillay, <i>South Africa</i></p> <p>Series of presentation on the workshop topic followed by panel discussion with all presenters.</p> <p>Speakers: Sudhir Pillay, <i>Water Research Commission (ZA)</i>, Jay Bhagwan, <i>Water Research Commission (ZA)</i>, Kartik Chandran, <i>Columbia University (US)</i>, Stanley Sam, <i>Eawag (SZ)</i>, Damir Brdanovic, <i>IHE Delft Institute for Water Education (NL)</i>, Konstantina Velkushonova, Najib Lukooya & Marianela Sanders</p>	<p>Room C1 Sanitation</p>	<p>Tuesday 15:45-17:15 Non-sewered sanitation</p>
<p>2.4.3-4 MICROPLASTICS AS EMERGING CONTAMINANTS OF CONCERN</p> <p>Chairs: Innocent Nhapi, <i>Zimbabwe</i> and Linda Li, <i>Canada</i></p> <p>Microplastics as hubs enriching antibiotic-resistant bacteria and pathogens in municipal activated sludge, Mengyan Li, <i>New Jersey Institute of Technology, United States</i></p> <p>Threat of microplastic release due to COVID-19 Generated plastic waste, Chihhao Fan, <i>National Taiwan University, Chinese Taipei</i></p> <p>Microplastics in Toulon Area: Occurrence and efficiency of wastewater treatment plants (MEDITPLasT Project), Marie-Pierre Denieul, <i>Veolia Research & Innovation, France</i></p> <p>Microplastics & organics — a comparative study of sorption of triclosan & malachite green onto polyethylene, Gökçe Çiftçi, <i>Middle East Technical University, Turkey</i></p> <p>--- POSTERS ---</p> <p>Microplastics removal from wastewater with coagulants, Outi Grönfors, <i>Kemira Oyj, Finland</i></p> <p>Microplastics from textile industry: facts and solutions, Johann van Aartsen, <i>Ramboll, Singapore</i></p>	<p>Room B5 a Technical</p>	<p>Tuesday 15:45-17:15 Microplastics</p>
<p>3.2 ALLEVIATING WATER SCARCITY USING GROUNDWATER: THE ROLE OF KNOWLEDGE EXCHANGE THROUGH INTERNATIONAL COOPERATION</p> <p>Chairs: Ryle Gejl, <i>Denmark</i></p> <p>The session aims at sharing experiences and understanding good practises in terms of international cooperation between public authorities. Denmark is cooperating with a number of partners (South Africa, India, and the State of California) to alleviate water scarcity, which is key to obtaining liveable cities. Three different projects with groundwater challenges and strategies for alleviating groundwater stress will be presented. In South Africa, "Day Zero" initiated new solutions/cooperations and practises in and around Cape Town. In California, the management of groundwater use has changed due to overexploitation. In India, the need for Increased knowledge of aquifers and the possibilities of recharge is key. Finally, a Danish partner will present the reciprocal benefits of bilateral cooperation – the benefits go both ways.</p> <p>Speakers: Ryle Gejl, <i>Danish Environmental Protection Agency (DK)</i>, Candice Lasher Scheepers, <i>City of Cape Town (ZA)</i>, John Sibanyoni, <i>Breede-Gouritz Catchment Management Agency (ZA)</i>, Bjørn Kaare Jensen, <i>Danish Water Forum (DK)</i> & Saxena</p>	<p>Room B4 a Workshop</p>	<p>Tuesday 15:45-17:15 Knowledge exchange</p>

<p>5.2 TOWARDS CLIMATE SMART UTILITIES</p> <p>Chairs: Jabulile Mashwama, <i>Eswatini</i> and Joao Feliciano, <i>Portugal</i></p> <p>The impacts of climate change on urban water management threaten the capacity of utilities to deliver safe water, protect rivers and oceans, as well as protect people and assets from flooding. While water, sanitation, and urban drainage utilities are the cornerstone of cities' climate adaptation strategies, they can also contribute up to 15% of their cities' greenhouse gas (GHG) emissions. This workshop will discuss actions taken by utilities on the following three interconnected topics:</p> <ul style="list-style-type: none"> • Measuring and reducing GHG emissions, through reducing consumption, producing resources, and making strategic decisions • Planning for resilient adaptive infrastructure that combines centralised and decentralised approaches, as well as natural and built infrastructure • Leadership: engaging citizens, industries, and planning stakeholders to embrace the change needed for resilient and low-carbon water and wastewater utilities; engaging regulators; and inspiring other utilities at a national and international level. <p>Speakers: Jabulile Mashwama, <i>Eswatini Water Services (SZ)</i>, Joao Feliciano, <i>AGS (PT)</i>, Rune Holmstad, <i>Veas (NO)</i>, Eva Martinez Diaz, <i>FCC AQUALIA SA (ES)</i>, Charlie Littlefair, <i>South East Water (AU)</i>, Marcio Da Silva Jose, <i>Aquapolo Ambiental S.A. (BR)</i>, Rose Kagwa, <i>NWSC (UG)</i>, Ms. Gresikova (CZ) & Dan Lert / Benjamin Gestin, <i>Eau de Paris (FR)</i></p>	<p>Room B4 b Workshop</p>	<p>Tuesday 15:45-17:15 Climate smart utilities</p>
<p>6.7 WATER STRESS, DROUGHTS AND FLOODS, INCLUDING IMPACT OF CLIMATE CHANGE</p> <p>Chairs: Jotham Sempewo, <i>Uganda</i> and Meg Cummins, <i>Australia</i></p> <p>Industry water scarcity assessment and mitigation, Mads Terkelsen, <i>Ramboll, Denmark</i></p> <p>The Importance of water in the emergence of the hydrogen rainbow, Rod Naylor, <i>GHD, Australia</i></p> <p>An environmental-economic view on the climate change induced trade-off between drinking water availability from reservoirs and downstream water flow, Clemens Strehl, <i>IWW Water Centre, Germany</i></p> <p>Life cycle assessment, water efficiency, water footprint, virtual water: asset condition assessment, Pedro Pina, <i>Xylem inc, United Arab Emirates</i></p> <p>---- POSTERS ----</p> <p>A Key component of the sustainable urban water cycle: water resource gardens, Attila Bodnar, <i>Organica Water, Hungary</i></p> <p>Mainstream microaerobic nitrogen removal: carbon redirection, anammox contribution and aeration optimization, Mohammad Azari, <i>Karlsruhe Institute of Technology (KIT), Germany</i></p>	<p>Room B4 c Technical</p>	<p>Tuesday 15:45-17:15 Water stress</p>
<p>1.2 ON-SITE REUSE OF WATER ACROSS THE WORLD</p> <p>Chairs: Pia Jacobsen, <i>Denmark</i> and Krishna Pagilla, <i>United States</i></p> <p>On-site reuse of water is becoming more widespread around the world for different reasons and purposes. There are opportunities for the water sector to develop sustainable water reuse solutions to address the SDGs. Each water supplier gathers experience with different solutions, including structural, organizational, and technical ones. The speakers will give inspiration to discuss different experiences and the value (business-case) of water reuse systems. This workshop will share cases from around the world and provide knowledge from one another in an interactive setting.</p> <p>Speakers: Pia Jacobsen, <i>Aarhus Vand (DK)</i>, Krishna Pagilla, <i>University of Nevada (US)</i>, Steve Muir, <i>South East Water (AU)</i>, Paula Kehoe, <i>San Francisco Public Utilities Commission (US)</i>, Nonhlanhla Kalebaila, <i>Water Research Commission (ZA)</i>, Carsten Fjorback, <i>Cowi (DK)</i>, Nuno Brôco, <i>Águas de Portugal (PT)</i> & Martin Rygaard, <i>The Technical University of Denmark (DK)</i></p>	<p>Room B3 a Workshop</p>	<p>Tuesday 15:45-17:15 On-site reuse</p>

<p>4.9 GROUNDWATER MANAGEMENT FOR CLIMATE CHANGE ADAPTATION CONSIDERING THE INTERACTION BETWEEN INFRASTRUCTURE AND GROUNDWATER</p> <p>Chairs: Constantin Radu Gogu, <i>Romania</i> and Stephen Foster, <i>United Kingdom</i></p> <p>The resilience of cities depends greatly on efficiently used and sustainably managed groundwater. Urban groundwater is a critical dataset for the development of resilient cities, and the needs of a wide range of urban groundwater stakeholders have to be addressed. Several mechanisms for involving these stakeholders in supporting groundwater monitoring networks and knowledge have been identified. These include warning and informing local and regional authorities, improving legislation (including EU law), applying properly open data and information regulations, counselling utilities companies, and increased attractiveness for civil engineering and geotechnical companies. A set of mid-term actions supporting city planning will be drawn up for discussion. The workshop will strengthen the cities' capacity to reduce the impact of climate change (UN-SDGs 11 & 13).</p> <p>Speakers: Constantin Radu Gogu, <i>IWA Groundwater Management Specialist Group; Technical University Civil Engineering, Bucharest (RO)</i>, Stephen Foster, <i>IWA Groundwater Management Specialist Group; University College London (UK)</i>, Susie Mielby, <i>GEUS (DK)</i>, Michael Eichholz, <i>BGR (DE)</i>, Ricardo Hirata, <i>University of São Paulo (BR)</i>, Valentin Zaharia, <i>VEOLIA (RO)</i> & Jane Dottridge, <i>International Association of Hydrogeologists (IAH) (UK)</i></p>	<p>Room B3 c Workshop</p>	<p>Tuesday 15:45-17:15 Groundwater</p>
<p>2.4.3-3 PHARMACEUTICALS AS EMERGING CONTAMINANTS OF CONCERN</p> <p>Chairs: Sarah Hendry, <i>United Kingdom</i> and Jan Ruppelt, <i>Germany</i></p> <p>Relevant pharmaceutical contaminants in water, soil, and crops in the HYDROUSA Project: prioritization and upgrade of analytical methodologies, Marc Castaño-Trias, <i>ICRA, Spain</i></p> <p>Sustainable wastewater treatment of pharmaceuticals at the sunset WWTP Växjö, Anneli Chan, <i>Ramboll, Sweden</i></p> <p>Constructed wetlands for safeguarding antibiotics emission into aquatic systems, Pedro Carvalho, <i>Aarhus University, Department of Environmental Science, Denmark</i></p> <p>Micropollutant and antibiotic-resistant germs removal using PAC & membrane technology, Alexander Merz, <i>Hochschule Darmstadt, Germany</i></p> <p>--- POSTERS ---</p> <p>Comparison of Ibuprofen Removal from water using activated carbon and immobilized bacteria onto chars derived from agriculture waste, Yves Andres, <i>IMT Atlantique / GEPEA, France</i></p>	<p>Room B3 d Technical</p>	<p>Tuesday 15:45-17:15 Pharmaceuticals</p>
<p>2.3 HIGH VALUE PRODUCTS BASED ON CARBON IN WASTEWATER — HOW DO WE SELECT AND IS IT SUSTAINABLE?</p> <p>Chairs: Mark van Loosdrecht, <i>Netherlands</i> and Jeanette Agertved Madsen, <i>Denmark</i></p> <p>Discussion of new processes as well as R & D within the production of high-value products based on carbon in wastewater. Upscaling, value chain development, handling requirements from end users and regulatory.</p> <p>Speakers: Irini Angledaki, <i>Prof., Technical University of Denmark (DK)</i>, Franseco Fatone, <i>Prof., University Politecnica delle Marche (IT)</i>, Olaf van der Kolk, <i>CEO Aquaminerals, Co-chair Cluster Resource Recovery IWA (NL)</i>, Frank Rogalla, <i>Director of Innovation and Technology, Aqualia (ES)</i> & Alan Werker, <i>Co-owner, Promiko AB (SE)</i></p>	<p>Room B3 e Workshop</p>	<p>Tuesday 15:45-17:15 Carbon-based products</p>

6.3 | GROUNDWATER — RESILIENCE APPROACHES

Chairs: [Gabriel Racoviteanu](#), *Romania* and [Craig Tinashe Tanyanyiwa](#), *South Africa*

Comparative analysis of regulation, definition and classification of relevant and non-relevant metabolites in the EU and Denmark, France and Germany — status and outlook, [Steffen Foss Hansen](#), *Technical University of Denmark, Denmark*

Innovative real-time sensing of flow dynamics in groundwater and sediments to map anthropogenic & climate change impact, [Goedele Verreydt](#), *iFLUX - Universiteit Antwerpen, Belgium*

Groundwater data and decision support tools at local to Pan-European scale for sustainable and integrated management of water resources in support of EU, [Klaus Hinsby](#), *Geological Survey of Denmark and Greenland (GEUS), Denmark*

Applying SkyTEM to improve sustainable management of groundwater systems in a built-up area — the Hawke's Bay 3D aquifer mapping project in New Zealand, [Steven Johnson](#), *SkyTEM Australia Pty Ltd, Australia*

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Airborne electromagnetic mapping of shallow depth to bedrock supports land management in northeast Wisconsin, [Flemming Effersø](#), *SkyTEM, United States*

Assessing risks to shallow groundwater wells in cold climate conditions using real-time online monitoring, Stable Water Isotopes, and 16S Amplicon Sequencing, [Kevin Lyons](#), *University of Oulu, Finland*

Room B3 f
Technical

Tuesday
15:45-17:15
Groundwater