

Desalination for the Environment – Clean Water and Energy

Alfândega Congress Centre, Porto, Portugal

Conference Programme

Sunday 27 April 2025

- 8.30–17.30 Registration**
- 9.00–18.00 Exhibition set-up**
- 9.00–13.00 Workshop on Greener Desalination: Case Studies from Large-Scale SWRO for Sustainable Water Supply to Brine Valorisation for a Circular Economy**
Moderator Daniel Frank, Senior Adviser at DECHEMA
- 9.00 Part I. Large-Scale SWRO**
- 9.00 Introduction. *Daniel Frank, DECHEMA*
- 9.10 **184** Desalination technology conversion: GCC case study. Part I: Overview and key drive
Sergio Casimiro (ACWA Power), Hugo Costa, Hassan Almsaeed, Justin Robert
- 9.20 **185** Desalination technology conversion: GCC case study. Part II: Offshore design and environmental impact reduction
Hugo Costa (HR Wallingford), Sergio Casimiro, Hassan Almsaeed, Justin Robert
- 9.35 Case studies from large-scale SWRO for sustainable water supply, *Domingo Zarzo Martinez, SACYR*
- 9.55 **279** Seawater desalination plant in the Algarve: enhancing water resilience and security
Adriana Espanha, Claudia Dimas, Marisa Viriato, Pedro Ramos, Ricardo Estigarribia, Rui Sancho (Aguas do Algarve)
- 10.15 Brief overview on progress toward sustainability in Spain's desalination plants, *Domingo Zarzo Martinez, AEDyR President*
- 10.20 Panel Discussion**
- 10.50–11.10 Coffee break**
- 11.10 Part II. Brine Valorisation**
- 11.10 Key challenges and opportunities for sustainable brine valorization in chemical industry
Yuliya Schießer
- 11.30 **254** Advancing industrial brine concentration: pilot demonstration and evaluation of a novel high pressure process with energy recovery
Christine Kleffner, Yuliya Schiesser, Jochen Henkel, Eric Kada, Angel Abajas, Gerd Braun
- 11.50 **42** Maven brine mining plant – 1st commercial OARO project in the world
Ilker Akbas, Georg Herborg, Francisco Jimenez-Castellanos
- 12.10 **51** Innovative testbed for desalination brine valorisation: circular economy and NF-OARO synergies from Desal+ Living Lab
Ángel Rivero Falcón, Yanira López López, Baltasar Peñate Suárez, Noemi Melián Martel
- 12.30 Building the business case for industrial brine valorization
Christos Charisiadis, Brine Consulting
- 12.40 Panel Discussion**
- 13.10–14.00 Lunch**
- 14.00–17.00 Workshop on Brine Valorization by NEOM, Moderators Dr. Noura Chehab and Dr. Nikolay Voutchkov**
- 14.00 Introduction, *Noura Chehab and Nikolay Voutchkov, NEOM*
- 14.20 Nanofiltration System – Alternative Configurations and Performance, *Salman Arab, NEOM and Craig Bartels, Hydranautics*
- 14.40 Bivalent Mineral Processing System, *Christopher East, Neom WIC*
- 15.00–15.20 Coffee break**
- 15.20 Reverse Osmosis and Brine Concentration, *Craig Bartels, Hydranautics, Keith Lampi, FTS*
- 15.40 Membrane and Thermal Crystallization, *Keith Lampi, FTS, Page Davies, Aquatech*
- 16.00 Next Steps in Brine Valorization System Testing
- 16.20 Questions, Answers and Discussions**
- 17.00 Workshop Adjourned**
- 18.30–20.00 Welcome reception – Noble Room, Alfândega Congress Centre. Sponsored by Águas e Energia do Porto**
- 20.00 Young Professionals Networking Evening – departing the Alfândega Congress Centre at 20:00 for the Rua das Flores district.**



نيوم NEOM



Monday 28 April 2025

8.00–09.00 Registration

9.00–10.20 Official opening of the conference and exhibition

Guests of Honour will be confirmed shortly

Sydney Loeb Award

Is seawater desalination a sustainable solution to global water scarcity? *Menachem Elimelech, Rice University USA*

10.50–12.30 Panel session “Best Practices of PPP in the Water Sector”. Organised in collaboration with the Saudi Water Partnership Company and the Portuguese Water Partnership

Moderators: *Mr. Sulaiman Rafat Turki*, Chief Strategy & Development Officer of SWPC, and *Professor José Saldanha Matos*, President of Portuguese Water Partnership

Panellists: *Mr. Ramzi S. Azar*, Chief Strategy Officer of Alkhorayef Company; *Ahmad AlAsam*, VP, KSA Water Projects at ACWA Power; *Eng. Adnan Buhuligah*, Deputy CEO of Aljomaih Energy & Water; *Pedro Bastos*, O&M Performance Director at TAWZEA

12.30–13.30 Lunch

13.30–17.30 Technical sessions

17.30–19.00 Poster session with drinks in the Exhibition Area.

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Monday afternoon 28 April 2025

	Session 1 INFANTE HALL Electromembrane Technologies	Session 2 D. MARIA Brine Valorisation I	Session 3 D. LUIS Modelling and Simulation	Session 4 MIRAGAIA Biofouling Control I	Session 5 S. JOAO Intake and Outfall Marine Systems	Session 6 PORTO Wastewater Treatment and Water Reuse I
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15.10–15.30 Coffee break

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17.10 Poster session with drinks in the Exhibition area

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- 10 Techno-economic analysis and optimization of hybrid renewable energy systems for electricity generation and desalination
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Tuesday morning 29 April 2025

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9.50	187 Towards sustainable desalination: weighing environmental and economic outcomes of a hybrid CSP/PV membrane distillation system Varinia Felix, Jeb Shingler, Reema Shinh, Kerri Hickenbottom	252 Brine concentration – design and operation of two ultra-high-pressure RO plants with over 10 years of operation Ralf Krüger, Jürgen Müller	69 Sustainable approach towards SWRO pre-treatment Carmen Carbonell, Caroline Barbé	9 String-driven rectifier for power take-off systems for harvesting energy from oscillatory forces Mahmood Khaja Muhieitheen, Mohammed Khair Al-Solihat	188 Impact of fouling on the performance of solar-driven multi-effect desalination systems Jawaher Hajaji, Patricia Palenzuela, Mohamed Abdelkarim Antar	230 Fighting water scarcity through the urban reuse of wastewater – Porto case study Mónica Read, Cecilia Santos, Ruben Fernandes

10.10–10.30 Coffee break

10.30–11.50 Panel session “Water Value Chain for Green Hydrogen Production”

Moderator: *Abraham Negaresh* CPEng, Associate Director – Desalination and Reuse Lead WRc

10.30 Welcome and introductions, *Dr. Abraham Negaresh*

10.35 Green Hydrogen 2.0: Turning hype and sea water desalination synergies into reality, *Lionel Rabin, Haliqa*

10.50 Water treatment solutions for sustainable green hydrogen production, *Dr. Abraham Negaresh*

11.00 Integrating desalination into green hydrogen production: challenges and opportunities offshore and onshore, *Dr. Heike Glade*, Head of Research Group, University of Bremen

11.15 Green hydrogen production in water-scarce regions – a necessity or utter catastrophe? *Dr. Daniel Frank*, Project Advisor, DECHEMA

11.30 Panel discussion

	Session 19 INFANTE HALL Membrane Distillation II	Session 20 D. MARIA Brine Valorisation IV	Session 21 D. LUIS Enhancing Desalination Performance	Session 22 MIRAGAIA Renewable Energy Desalina- tion II	Session 23 S. JOAO Solar Desalination	Session 24 PORTO Salinity Gradient Energy
11.50	96 A model for batch operation in vacuum-assisted air gap membrane distillation <i>Isabel Requena, Juan Antonio Andrés-Mañas, Guillermo Zaragoza</i>	150 Integrated production of Mg(OH) ₂ powders and high valuable salts from seawater desalination brines through evaporative ponds <i>Giuseppe Battaglia, Lorenzo Ventimiglia, Fabrizio Vicari, Alessandro Tamburini, Andrea Cipollina, Giorgio Micale</i>	181 Retrofitting assessment of reverse osmosis desalination plants based on energy diagnosis <i>Juan I. Pinaglia-Villalón, María Gutiérrez-Valcarce, Rolando Bosleman, Lourdes García-Rodríguez</i>	189 The 100% RES Islands Initiative - the Energy Water nexus <i>Gianni Chianetta</i>	191 Optimization of a hybrid PV/T-driven desalination system for sustainable freshwater production <i>Ahmed Abdelhalim, Shehab Mansour, Omar Khalil</i>	88 3D printing of profiled cation-exchange membranes for harvesting salinity gradient energy from membrane distillation brines <i>Mekhna Venu, Cláudia Galinha, João Crespo, Sylwin Pawlowski</i>
12.10	91 Enhancing productivity and energy efficiency in vacuum assisted air gap multistage membrane desalination <i>Ahmed Omera, Mohammed Antar</i>	123 Concentrating high-salinity brines using low salt rejection reverse osmosis membranes <i>Guillem Gilabert Oriol, David Arias, Claudia Niewersch, Tirtha Chatterjee, Brittany Fisher, Caleb Funk, Harith Alomar</i>	71 Using satellite data to improve seawater characterization and optimize plant designs <i>Rémy Caball, Olivier Raillard, Sébastien Smet, Delia Pastorelli</i>	277 Desalination using renewable energy integrating solar energy into SWPC’s projects <i>Faisal Alhelal</i>	216 Dynamic control of the back-pressure in a photovoltaic-powered desalination system for enhanced system performance <i>Emmanuel Ogunniyi, Bryce S. Richards</i>	163 Blue energy: renewable energy production from desalination brine <i>Patricia Terrero Rodriguez</i>
12.30	55 Sustainable solutions to concentrate management: a novel solar-driven membrane crystallizer for zero-liquid discharge <i>Kerri Hickenbottom, Jeb Shingler, Minna Allouzi, Varinia Felix, Shelbi Jenkins, Wei Pan, Robert Norwood</i>	202 Brine valorization system with internal reuse of brine minerals <i>Christopher East, Noura Chehab, Ahmed Al-Amoudi, Nikolay Voutchkov</i>	84 Optimization of forward osmosis (FO) modules arrangement for high-efficiency feed concentration in single-pass operation <i>Rajashree Yalamanchili, Pere Olives Cegarra, Albert Galizia, Gaëtan Blandin</i>	208 Dakhla desalination plant using renewable energy <i>Lahcen Hasnaoui, Mohamed Ouhssain</i>	145 Optimization of time-variant, solar-powered electro dialysis desalination architectures <i>Melissa Brei, Jimmy Tran, Amos Winter</i>	178 Assessment of the performance of a pilot scale reverse electro dialysis stack equipped with segmented electrodes <i>Francesco Volpe, Emanuela Mangiaracina, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale, Alessandro Tamburini</i>
12.50	271 VMEMD and related separation processes from lab-scale to industrial size by module technology of EvCon <i>Markus Wenzel</i>	259 Exploring the circularity of brine valorisation through neural network modelling of an electro dialysis with bipolar membranes pilot <i>Giovanni Virruso, Andrea Cipollina, Alessandro Tamburini, Giorgio Micale</i>	37 The influence of water permeability, solute resistance and mass transfer coefficient on water flux behavior in forward osmosis <i>Abdulrahman Alalawi, Ibrahim Al-Mutaz, Nawaf Bin Darwish</i>			274 Novel thin-film nanocomposite (TFN) membranes by incorporation of halloysite nanoclay for pressure retarded osmosis applications <i>Akif Nihal, Syed Javaid Zaidi</i>

13.10–14.10 Lunch

Tuesday afternoon 29 April 2025

	Session 25 INFANTE HALL Membrane Distillation / Thermal Desalination	Session 26 D. MARIA Membranes for Water Treatment I	Session 27 D. LUIS Fouling Control	Session 28 MIRAGAIA Novel Processes and Applications	Session 29 S. JOAO Remineralisation	Session 30 XPRIZE session PORTO
14.10	172 Sustainable membrane distillation desalination for hydrogen production <i>Alba Ruiz-Aguirre, Alejandro Bueso, Antonio Atienza-Márquez, Guillermo Zaragoza</i>	245 Functionalized Li ⁺ /H ⁺ separation membranes for pH sensing <i>João Teixeira, Ricardo Campos, Magda Barros, Ana Moreira, Daniela Campanhã, José Gonçalves</i>	115 Desalination without chemicals: Bonaire's modular plant and the application of direct osmosis cleaning <i>Iris Sutzkover Gutman, Irina Zaslavski</i>	233 "Mar Menor" – a combined technical solution proposal based on desalination techniques and other water treatment methods <i>Rafael Buendía Candel, Domingo Zarzo, Alberto Morales, Elena Campos</i>	237 Magnesium remineralization: Impact on microbial water quality of reverse osmosis produced drinking water during distribution <i>Nadia Farhat, Ratna Putri, Alejandra Ibarra Felix, Johannes Vrouwenvelder</i>	XPRIZE water scarcity: a call for revolutionizing desalination <i>Hossein Atoufi</i> <i>Join us for an engaging 2-hour session on the \$119M XPRIZE Water Scarcity competition. We'll spotlight Track B - Desalination: Novel Materials and Methods, which seeks groundbreaking approaches to cost-effective, sustainable seawater desalination. Learn how to participate as a competitor, hear from industry experts, connect with teams developing cutting-edge solutions, and explore the future of water innovation. All are welcome!</i>
14.30	45 Exploring the effects of feed and permeate temperatures on fouling and wetting of PTFE membranes within membrane distillation <i>Atefeh Tizchang, Itzel Alcaraz Bernades, Wolfgang Gernjak, Morgan Abily</i>	234 Going forward with RO for PFAS removal: experience with TFN RO membranes from lab to pilot and to a full-scale plant <i>Eugene Rozenbaum, Young Ju Lee, Wansuk Choi, Jung Soo Kim, Roy Daly</i>	203 Identifying membrane foulants and the role diagnosis plays in optimized performance to reduce chemicals and maximize membrane life <i>Doug Eisberg, Ken Robinson, Stuart Leak</i>	81 Eutectic solvent (ES)-based flow electrodes for water desalination <i>Elena Gabirondo, Hafiz Saif, Vitor Alves, João Crespo, Liliana Tomé, Sylwin Pawlowski</i>	266 Engineered carbonates for enhanced remineralization processes <i>Vega Bierwolf, Heidrun Vedder, Victor Wasmuth, Assiyeh Tabatabai, Christopher Pust</i>	
14.50	136 Thermal driven ultrapure water production for water electrolysis with membrane distillation <i>Rebecca Schwantes, Yair Morales, Eric Pomp, Jan Singer, Kirtiraj Chavan, Florencia Saravia</i>	144 Membrane cascades for enhanced rejection of organic pollutants in RO of brackish and sea water <i>Fatima Zohra Charik, Saad Alami Younssi, Murielle Rabiller-Baudry</i>	179 A novel numerical modelling tool for the study of colloidal fouling in electrodialysis units <i>Francesco Volpe, Giuseppe Battaglia, Andrea Cipollina, Giorgio Domenico Maria Micale, Alessandro Tamburini</i>	256 Innovative marine work on the first desalination plant in Portugal <i>Ana Fernandez, Jose Maria Colubi</i>	54 Production of remineralization chemicals from RO brines: Pilot platform development <i>Antonino Campione, Giuseppe Lo Burgio, Fabrizio Vicari, Alessandro Tamburini, Lorenzo Ventimiglia, Fabrizio Vassallo, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale</i>	
15.10	97 Thermal parameters distribution and heat transfer deterioration in a horizontal tube falling film evaporator <i>Chao Li, Dayuan Yuan, Liuyang Zhang, Qiang Meng, Shengqiang Shen</i>	27 Valorizing EC-sludge for MF kaolinite membrane fabrication: a sustainable approach for seawater pretreatment for RO desalination <i>Abdessamad Belgada, Raowia Lamhar, Fatima Zohra Charik, Ibrahim Ounouss, Adil Dani, Saad Alami Younssi</i>	16 The selection of nanofiltration membrane characteristics to purify landfill leachate and reduce concentrate <i>Alexei Pervov, Viacheslav Dzyubenko</i>	255 Innovative monitoring solutions for reverse osmosis plants by Pyxis Lab® <i>Diana Cruz, Dario Alonso</i>	56 A pilot plant scale circular approach for the CO ₂ extraction from RO brines <i>Giuseppe Lo Burgio, Antonino Campione, Fabrizio Vicari, Alessandro Tamburini, Lorenzo Ventimiglia, Fabrizio Vassallo, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale</i>	
15.30	129 Electrothermal-based hanging type evaporator for effective seawater desalination <i>Younghoon Suh, Sangjoon Lee</i>	38 Unidirectional porous membrane prepared by combined crystallization and diffusion method for desalination <i>M. Asipi Qostolani, Mohammed Abdul Azeem, Turki Nabieh Baroud</i>	210 Optimizing coagulation dose, pH and rapid mixing with MFI-UF to reduce particulate/colloidal fouling in RO/NF <i>Yiman Liu, Abrar Adema, Afrasiab Yameen, Nirajan Dhakal, Peter Volgaard, Rinnert Schurer, Begüm Tanis, Jan Schippers, Maria Kennedy</i>	283 Eco-friendly deep-sea desalination combining reverse osmosis and oil and gas solutions <i>Antoine Vuillermet</i>	21 Dual benefits of immobilized carbonic anhydrase: Enhancing water quality and reducing carbon footprint in desalination processes <i>Veerle Vandeginste, Philippe Tob, Jacob Rubel, Dharmjeet Madhav</i>	
15.50	107 Analysis of crystallization fouling growth and heat transfer on horizontal tube surfaces under constant heat flux <i>Boyu Wang, Shengqiang Shen, Xingsen Mu</i>	196 Lowering OPEX and feed pressure requirements for municipal water production and reuse using Aquaporin Inside BWRO <i>Jan Benecke, Xuan Tung Nguyen, Xin Hui Lim, Wanting Wang, Weng Hong Ho, Guofei Sun, Khung Hanh Le, Joerg Vogel, Liyun Tai, Na Peng, Victor Monsalvo Garcia, Juan Arévalo Vilches</i>		293 Clean water for the future – Plastics solutions for the entire value chain <i>Daniel Fechtig</i>		

16.10 Coffee break

	Session 31 INFANTE HALL Membrane Distillation (Membranes)	Session 32 D. MARIA Membranes for Water Treatment II	Session 33 D. LUIS Pretreatment	Session 34 MIRAGAIA Energy Efficiency and Performance Enhancement	Session 35 S. JOAO Environmental Impacts of Desalination
16.30	257 Development of PVDF distillation membranes for brine treatment using triethyl phosphate as green solvent <i>Matilde Traverso, Marcello Pagliero, Camilla Costa, Ilaria Rizzardi, Antonio Comite</i>	98 Testing polymeric membrane resistance to ozone to extend membrane lifetime or promote their recycling <i>Bianca Zappulla Sabio, Gaetan Blandin, Wolfgang Gernjak, Lide Jaurrieta</i>	70 Decoupling dual-media filter into combined flotation step and high velocity sand monolayer: Results from demo plant <i>Rémy Caball, Caroline Barbé, Delia Pastorelli</i>	99 Optimising energy efficiency of seawater desalination plants with high-recovery by coupling OARO and RO processes <i>Jesús Montes-Sánchez, David Sánchez, Lourdes García-Rodríguez</i>	104 Steps for optimizing energy and water consumption in the operation of reverse osmosis systems with a focus on chemical treatment <i>Dan Freeman, Liana Kunzler, Rodrigo Cadihna, Marck Solla, Leonardo Kuhn, Fiona Finlayson, Raul Gonzalez</i>
16.50	41 Biomass-derived carbon and carbon nanofibers integrated electrospun Janus membranes: a new frontier in membrane distillation <i>Md. Emdad Hossain, Turki N. Baroud, Md. Abdul Aziz</i>	201 Enhanced CO ₂ /CH ₄ separation using amine-modified ZIF-8 mixed matrix membranes <i>Imran Ullah Khan, Mohd Hafiz Dzarfan Othman, Mukhlis A. Raman, Musawira Iftikhar</i>	72 Enhancing water production capacity: the role of filtration velocity in multi-media filters for desalination <i>Ofir Yamin</i>	46 Maximize energy efficiency: parallel axial piston pumps and active energy recovery devices <i>Francisco Jimenez-Castellanos</i>	127 Antiscalants in seawater desalination: impacts on microbial growth and environmental fate <i>Graciela Gonzalez Gil, Marian Castrillon Tobon, Camila Albarracin Ruiz, Johannes Vrouwenvelder</i>
17.10	173 Hydrophobic PVDF flat sheet membrane modified using hybrid structure nanomaterial of (TiO ₂ /GO) for air gap membrane distillation <i>Hamad Alromaih, Patricia Gorgojo, Krishnaprasad Manoj, Maria Perez-Page</i>	244 Evaluation of reverse osmosis membrane performance for the treatment of oil sands process-affected water (OSPW) <i>Seoyeon Lee, Sanghlee Lee, Song Lee, Yusik Kim, Hyeongrak Cho, Yongjun Choi</i>	143 Optimizing pretreatment for reverse osmosis desalination through simultaneous media filter monitoring <i>Yasmeen Nadreen, Graciela Gonzalez-Gil, Johannes Vrouwenvelder, Ratul Das, Thomas Altmann</i>	288 Sorek 2 - Be'er Miriam Desalination Plant: Leading the way in sustainable desalination <i>Dotan Gur, Gregory Shtelman, Irina Zaslavski, Naaman Cohen</i>	217 Desalination brine matters: Impacts of antiscalants on seagrass and its corresponding bacterial epiphytes <i>Ryan Sirota, Gidon Winters, Gilad Antler, Eyal Rahav, Edo Bar-Zeev</i>
17.30	175 Advancing circular desalination: photothermal membranes to overcome membrane distillation limits for brine valorization <i>Sergio Santoro, Roviél Berhane Zegeye, Tsothe Dadiani, Efrem Curcio, Marco Aquino, Antonio Politano</i>	209 Addressing water scarcity in the Canary Islands: SWRO membranes with TFN technology as a proven solution for irrigation <i>Beatriz Calderon, Alvaro Lagartos, Silvia Gallego</i>	226 Optimization of membrane filtration processes using the design of experiments in different whey solutions <i>Hadid Sukmana, József Csanádi, Cecilia Hodúr, Zsuzsanna László, Gábor Veréb, Sándor Beszédes, Imre Ábrahám, Nóra Garabné Ábrahám, Andrea Süveges-Gruber, Szabolcs Kertész</i>	224 Energy recovery device retrofit of an existing BWRO plant in Spain <i>Rolando Bosleman, Juan Cifuentes</i>	193 Carbon footprint of desalination and mitigation strategies <i>Salman Arab, Nikolay Voutchkov, Noura Chehab</i>
17.50			278 Current situation of physical pretreatment systems used in seawater reverse osmosis desalination plants in the Canary Islands <i>Sigrid Arenas Urrea, Baltasar Peñate Suarez, Noemi Melián Martel</i>		

19.30–23.00 Gala Evening at the Casa Ferreirinha, Porto. Pick up outside Alfândega Congress Hall at 19.00

Wednesday morning 30 April 2025

	Session 36 INFANTE HALL Drinking Water/Operational Efficiency/Water Treatment Market	Session 37 D. MARIA Innovations in Reverse Osmosis	Session 38 D. LUIS Modelling, Prediction and Optimisation	Session 39 PORTO Energy Recovery Systems
8.30	138 Mg ²⁺ and Ca ²⁺ enrichment to drinking water originated from the water source (seawater, ground water) without extra chemicals <i>Elad Barak</i>	60 Enhanced energy efficiency strategies in desalination technologies <i>Guillem Gilabert Oriol, Harith Alomar, Maria Perez Macia, Santhosh Ramalingan, Mahesh Kulkarni</i>	106 Three-dimensional model of ion transport in composite membranes: effect of the internal structure and equivalent thickness <i>Fernan David Martinez Jimenez, Bastiaan Blankert, Cristian Picioreanu</i>	223 Europe leading the way to reduce energy use in water reuse and brackish desalination projects: a tale of two plants <i>Angel Abajas, Rolando Bosleman, Erik Desormeaux</i>
8.50	82 Dolomite for magnesium supplementation of desalinated drinking water in Saudi Arabia <i>Christopher Fellows, Ali Alhamzha</i>	111 A new approach to reverse osmosis pressure vessel design <i>Mike Sinfield, David Jiménez, Amit Sankhe, Daniela Vidal, Paul Choules</i>	30 Modeling of mass transfer dynamics in spacer-filled channels in membrane processes using direct numerical simulations <i>Santiago Cespedes, Bastiaan Blankert, Cristian Picioreanu</i>	79 Optimization and design of energy recovery systems <i>Hussain Basamh, Muhammad Ridwan, Thomas Altmann, Ratul Das</i>
9.10	63 Evaluation of the operational efficiency and performance of a combined desalination and salt (NaCl) production plant in Indonesia <i>Ersan Ozdemir, Pablo Canada Garcia, Nélio Moreira</i>	151 Membrane deformation in reverse osmosis: In-situ quantification and impacts on pressure drop in permeate channel <i>Luigi Ranieri, Luca Fortunato, Johannes Vrouwenvelder, Cristian Picioreanu, Bastiaan Blankert</i>	167 Multiscale modeling of ion transport in IEMs and polyamides: bridging microscale and macroscale insights <i>Nasser Al-Hamdani, Giorgio Purpura, Giorgio De Luca, Giuseppe Costanzo, Javier Luque Di Salvo, Andrea Cipollina, Giorgio Micale</i>	35 On-site demonstration of a robust rotary energy recovery device <i>Francesco Giuseppe Ladisa, Victor Ruiz, Juan De Salas</i>
9.30	249 Reducing non-revenue water: the first step toward addressing water scarcity and enhancing efficiency <i>Flávio Oliveira, Sara Cunha</i>	206 OPEX optimization in RO systems for challenging water: a new revolutionary 36 mil membrane feed spacer design <i>Alvaro Lagartos</i>	149 Numerical assessment of membrane intrusion in permeate channels of reverse osmosis units <i>Giuseppe Battaglia, Andrea Sireci, Luigi Ranieri, Bastiaan Blankert, Giorgio Micale, Cristian Picioreanu</i>	273 Maximizing water production with minimal footprint for containerized systems <i>Eli Oklejas</i>
9.50	285 Transforming the water treatment market <i>Daniele Strongone</i>	157 Waterfountain: Sub-sea desalination with easy maintenance <i>Paul Buijs, Kyle Hopkins, Rolf Bendiksen, Per Olsen</i>	103 Accurate bench scale measurement of mass transfer in RO <i>Bastiaan Blankert, Santiago Cespedes, Ratul Das, Thomas Altmann, Johannes Vrouwenvelder, Cristian Picioreanu</i>	225 PX Q400 impact in demonstration plant achieving less than 2 kWh/m ³ in energy consumption <i>Rolando Bosleman, Juan Cifuentes</i>

10.10–10.30 Coffee break

10.30–10.40 XPRIZE

10.40–11.40 Miriam Balaban Innovation Award Session Award finalists presentations

Moderator: *Corrado Sommariva*

10.40 *Qianhong She. Semi-closed reverse osmosis (SCRO) for low-energy, low-fouling, and highly adaptive seawater desalination. Nanyang Technical University, Singapore.*

10.45 *Lucie Ries. Pressure Free Reverse Osmosis solution. Ilion Water Technology, France.*

10.50 *Erik Hoek. Ultra-high pressure (and temperature) compaction resistant reverse osmosis membrane. UCLA, USA.*

10.55 *Arian Edalat. Smart electro-active anti-scaling/anti-fouling desalination membrane. Active Membranes, Inc. USA*

11.00 *David Jimenez. Mega Vessel Piedmont Pacific. Spain*

11.05 *Sander ten Cate. Biodegradable water treatment. Termanox B.V, The Netherlands*

11.10 *Questions & Answers*

	Session 40 INFANTE HALL Ultrafiltration	Session 41 D. MARIA Regional/Case Studies	Session 42 D. LUIS Novel Technologies	Session 43 PORTO Zero Liquid Discharge
11.40	124 Robust ultrafiltration-based pretreatment to secure long term sustainable operation <i>Guillem Gilabert Oriol, Blanca Salgado, Gerard Massons, Harith Alomar, Oliver Neumann, Jan Radel</i>	67 Desalination in Algeria: a lifeline against water scarcity <i>Nadjib Drouiche, Ahmed Kettab</i>	270 Natural adsorbents for sustainable recovery of key components from mining wastewater and seawater: preliminary experimental result <i>Hugo Sánchez-Moreno, Lourdes García-Rodríguez, Celso Recalde-Moreno, Abel Rianza-Frutos</i>	73 Evaluating the impact of closed-loop RO systems on ZLD in textile industry: case study from Tirupur, India <i>Vinay Narayan Hegde, Joachim Went, Joachim Koschikowski, Harald Schönberger, Werner Platzer</i>
12.00	118 Assessment of an ultrafiltration module with an integrated pre-filter as seawater desalination pre-treatment <i>Daniel García-Huertas, Michael Hoffmann, Christian Staaks, Jan Rädels, Harith Alomar, Guillem Gilabert-Oriol, Martin Heijnen, Olga Ferrer Mallén, Jorge J. Malfeito</i>	39 Desalination for decarbonized fertilizer production: a comparative analysis of seawaters in the MENA region using MLD strategies <i>Nikhil Dilip Pawar, Thomas Pregger, Patrick Jochem</i>	282 Semi-closed reverse osmosis (SCRO) for low-energy, high-resilience desalination <i>Qianhong She</i>	241 Near zero liquid discharge with seeded membrane distillation crystallization <i>Stefanie Flatscher, Mark Hlawitschka</i>
12.20	218 Synergistic effects of 3D-printed spacers and modular vibration towards membrane fouling mitigation <i>Aws Al-Tayawi, Imre Vajk Fazekas, Szabolcs Kertész</i>	286 Sustainable water management: innovations in alternative water sources — Case studies <i>Ajay Popat</i>	276 Towards net zero through the PPP route <i>Nabil Aljohani</i>	66 Development of a membrane-based zero liquid discharge treatment train for a bio-chemical industry <i>Sara Salvador Cob</i>
12.40			169 Selection of pre-RO cartridge filters <i>Oren Heymans</i>	180 Optimised preliminary design of seawater desalination with zero liquid discharge driven by solar micro-gas turbines <i>Rafael González-Almenara, Agustín Delgado-Torres, Jesús Montes-Sánchez, Néstor Santana-Hernández, David Sánchez, Lourdes García-Rodríguez</i>

13.00–14.00 Lunch

14.00 Closing

Miriam Balaban Innovation and the Sydney Loeb Awards will be announced.

14.00–18.00 Sol2H2O Water-Energy Transition Symposium: Portuguese National Day. In Portuguese only.