Desalination for the Environment — Clean Water and Energy

Alfândega Congress Centre, Porto, Portugal

Provisional 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-ScaleSWRO

9.00 Introduction. *Daniel Frank, DECHEMA*

9.10 185 Desalination technology conversion: GCC case study. Offshore design and environmental impact reduction
Hugo Costa *(HR Wallingford)****,*** *Sergio Casimiro, Hassan Almsaeed, Justin Robert*

9.30 Case studies from large-scale SWRO for sustainable water supply, *Domingo Zarzo Martinez, SACYR*

9.50 279 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)*

10.10 Brief overview on progress toward sustainability in Spain's desalination plants, *Domingo Zarzo Martinez, AEDyR Presiden*t

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 Kadaj, Angel Abajas, Gerd Braun

11.50 42 Maven brine mining plant – 1st commercial OARO project in the world
İlker 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 Panel Discussion

13.00–14.00 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.

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 Turk*i, 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 Electromembrane Technologies	Session 2 Brine Valorisation I	Session 3 Modelling and Simulation	Session 4 Biofouling Control I	Session 5 Intake and Outfall Marine Systems	Session 6 Wastewater Treatment and Water Reuse I
13.30	**197** Performance of a containerized multistage variable power electrodialysis desalination system ***Jonathan Bessette,*** *Shane Pratt, Benjamin Judge, Amos Winter*	**121** Cutting-edge technology for the selective separation of monovalent salts from seawater brine ***Noura Chehab****, Nikolay Voutchkov, Mohammed AlSindi*	**19** PROTON®: A tool for modeling and simulation of membrane technology performance *Gabriele Brummer*	**134** NADES as green cleaning agent for control of biofouling in RO membrane systems ***Andreia Farinha****, Kees Theo Huisman, Lamya Al Fuhaid, Caroline Crisel, Geert-jan Witkamp, Johannes Vrouwenvelder, Bastiaan Blankert*	**160** Resilient marine works: survey and marine modeling strategies for successful coastal desalination ***Mario Valente****, Filipe Vieira*	**131** Wastewater treatment membranes: main issues and failures ***Nuria Peña Garcia****, Javier Rodriguez, Mike Sinfield, Fernando Del Vigo Pisano, Daniela Vidal*
13.50	**112** Flow electrode capacitive deionization: a path toward scalable and sustainable desalination solution ***Hafiz Muhammad Saif Saleem****, Joao Crespo, Sylwin Pawlowski*	**159** Operation and maintenance considerations of an innovative 1200 m3/d brine valorization system ***Stasinos Chiotakis****, Nikolay Voutchkov, Noura Chehab*	**31** Optimization of complex RO system design using AquaGRID ***Harish Warsono,*** *Yoshiyuki Kawashima*	**119** Biofouling monitoring in SWRO systems through microbial loading quantification ***Núria Zamorano-López****, Raquel Escorihuela, Olga Ferrer Mallén, Jorge J. Malfeito*	**170** Hydraulic design of marine intake systems: optimizing performance and reliability ***Mario Valente,*** *Hugo Costa*	**211** Sustainable carbonaceous materials-based catalytic membranes for organic wastewater treatment: Progress and prospects ***Yongtao Xue****, Jia Wei Chew*
14.10	**116** Advanced ion-exchange membranes for enhanced performance in membrane capacitive deionization (MCDI) technology ***Othman Thayfi****, Yassine Koumya, Rachid Benhida, Khaoula Khaless*	**192** Front-end and back-end nanofiltration for brine mining ***Salman Arab****, Nikolay Voutchkov, Noura Chehab*	**100** Simulation and modelling of a small-scale barometric desalination unit ***Sami Own****, Adel Nasser, Hector Iacovides*	**221** Environmentally friendly biofouling control in seawater intakes using UVC-LED: a new non-chemical approach ***Harry Polman,*** *Meno Remmelts, Kaveh Samimi-Namin*	**171** Intake and outfall systems – Middle East experience and lessons learned ***Hugo Costa****, Ian Willoughby*	**287** Desalination of high-salinity organic wastewaters by membrane dialysis *Menachem Elimelech*
14.30	**258** Multi-stage optimisation of electrodialysis with bipolar membranes for chemicals production ***Giovanni Virruso****, Andrea Culcasi, Alessandro Tamburini, Andrea Cipollina, Giorgio Micale*	**141** Waste to Value – A pilot demonstration and economic analysis of vaterite calcium carbonate production using brine, CKD, and CO_2 ***Seungwon Ihm****, Abdallatif Abdalrhman, Mohammed Al-Talibi, Omar Al-Raqibah, Eslam Alwaznani, Youngho Lee, Kichul Park, Jinuk Heo, Won Jo, Sehun Kim, Myoung-Jin Kim*	**122** Cost optimization of ultrafiltration and reverse osmosis systems using the Operations Advisor software ***Guillem Gilabert Oriol****, Gerard Massons, Leaelaf Hailemariam, Zach Jensen, Joey Liao, Sylvia Insogna*	**269** Trends in RO/NF membrane biofouling control *Markus Busch*	**174** Modular GRP intake towers for desalination plants *Gregory Gleetus*	**102** Utilization of a pilot-scale electrochemical unit for the treatment of spent caustic and oil-based produced water streams ***Bassam Tawabini****, Abdullah Basaleh, Saleh Al-Aqeel*
14.50	**40** MOFs based membranes for industrial wastewater (IWW) treatment by electrodialysis (ED) technologies ***Eugenia Pilar Quirós-Díez****, Alberto Maimone, Xuefei Yang, David Carvajal, Cristina Martínez*	**165** Green desalination project for resource recovery from brine ***June-Seok Choi****, Linitho Suu, Jonghun Lee, Joowan Lim, Youngkwon Choi, Hojung Rho, Saeromi Lee*	**212** Computational chemistry methods for unveiling high recovery reverse osmosis scaling ***Victor Yangali Quintanilla****, Loren Ramsay, Torben Lund Skovhus, Ditte Andreasen Søborg*	**68** Five ways to prevent biofilm on membranes *Fernando Del Vigo, Nuria Peña, Javier Rodriguez, Daniela Vidal,* ***Mike Sinfield***	**33** Tunnelling solutions for water intakes and brine outlets in desalination plant construction *Gerhard Lang*	**229** Pilot-scale advanced wastewater treatment for direct potable reuse: achieving safe water for the beverage industry ***Rui M.C. Viegas****, David Figueiredo, Elsa Mesquita, Sofia Charrua, Carla Costa, Rita Lourinho, Maria João Rosa*

15.10–15.30 Coffee break

	Session 7 Green Hydrogen	Session 8 Brine Valorisation II	Session 9 Modelling, Prediction and Machine Learning	Session 10 Biofouling Control II	Session 11 Solar Thermal Desalination I	Session 12 Wastewater Treatment and Water Reuse II
15.30	**1** Desalination as a strategic enabler for green hydrogen production in Algeria: Opportunities and challenges *Nadjib Drouiche*	**177** Integration of Mg(OH)2 production in a real industrial scale reverse osmosis desalination plant ***Lorenzo Ventimiglia**, Fabrizio Vassallo, Giuseppe Lo Burgio, Antonino Campione, Fabrizio Vicari, Alessandro Tamburini, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale*	**263** Machine learning frameworks for intelligent decision-making and enhanced desalination efficiency ***Najat A. Amin**, Adnan Qamar, Henry Tanudjaja, Ratul Das, Thomas Altmann, Noreddine Ghaffour*	**105** Use of concentration polarization (CP) to predict and control membrane biofouling potential ***Harvey Winters**, Eli Oklejas*	**120** Harnessing membrane distillation for sustainable water supply in concentrated solar power plants ***Bartolomé Ortega Delgado**, Juan Antonio Andrés-Mañas, Patricia Palenzuela, Jesús Montes Sánchez, Rafael González Almenara, Lourdes García-Rodríguez, Guillermo Zaragoza*	**250** Bachwash wastewater treatment with advanced ceramic membranes: maximizing water reuse and ZLD solutions ***Patrick Buchta**, Julis Gloeckner*
15.50	**62** Analysis of green hydrogen production using seawater desalination at different locations in Europe ***Tom Ruiter,** Heike Glade*	**198** “Alma de Mar”, a pioneer initiative to extract the real value from brine SWRO plants to table ***Naiara Hernández Ibáñez,** Juan Arévalo, Javier Hernández, Víctor Monsalvo, Frank Rogalla*	**28** Predicting specific flux of ultrafiltration membranes using machine learning methods ***Izzy Medeiros,** James Malley, Irina Zaikina*	**166** Control biofouling through membrane flux balance by interstage boosting ***Haytham Abdelfatah**, Eli Oklejas*	**133** Preliminary design of a novel CSP+ORC desalination system equipped with a ZLD unit based on direct contact evaporation ***Néstor M. Santana-Hernández**, Agustín M. Delgado-Torres*	**232** Closed-loop reverse osmosis with VUV photolysis for the removal of pharmaceuticals and PFAS from water systems ***Domenico Santoro**, Ehsan Nazloo, Andrew Safulko, Erin Mackey*
16.10	**183** Symbiosis of water electrolysis and membrane distillation *Markus Wenzel*	**236** Revolutionizing 3D printing with brine valorization ***Mohammed Alsindi**, Noura Chehab, Salman Arab, Nikolay Voutchkov*	**61** Deep learning models for predicting normalized operational parameters for reverse osmosis membranes *Jover Erreyes Pilozo, Laura Haya,* ***Cosmin Koch***	**154** Novel insights into biofouling growth on reverse osmosis membranes through in-situ microscopic visualization ***Noshin Karim**, Louise Ratel, Nitish Sarker, Catherine Charcosset, Amy Bilton*	**155** Effect of increasing top brine temperature on the performance of a solar powered MED system ***Patricia Palenzuela**, M.A. Antar, Juan Miguel Serrano, Lidia Roca, Guillermo Zaragoza*	**76** Creating an alternative sustainable water source - reusing MW-WTP effluent to produce demineralized water for a power station ***Amir Ziv**, Harel Rauch, Miriam Faigon Frisi*
16.30	**280** Seawater desalination circular schemes for green hydrogen production *Simona M. Asaro, Giovanni Campisi, Alessandro Tamburini, Andrea Culcasi, Giorgio Micale,* ***Andrea Cipollina***	**260** Online analysis of brines for valorization using a solution cathode glow discharge analyzer ***Christopher East**, Connor Fogal, Anders Palmgren, Anthea Sargeaunt, Nikolay Voutchkov*	**176** Reference class forecasting as a tool for planning RO desalination mega-projects *Mohammed Haroon Siyech*	**52** Sustainable cleaning procedures for fouling removal in reverse osmosis plants *Núria Adroer,* ***Alex Pascual-Esco**, Jordi Aumatell, Paula Sagué, J. Ignacio Ramos, João Lourenço, Hugo Pereira, Aurélie Biurrarena*	**140** First evaluation of a concentrated solar power and desalination system using a double-stage organic Rankine cycle configuration *Néstor M. Santana-Hernández, Agustín M. Delgado-Torres, Lourdes García-Rodríguez*	**164** Challenges and opportunities for the use of non conventional water resources for agriculture *Patricia Terrero Rodriguez*
16.50	**264** Membrane distillation-proton exchange membrane electrolysis integrated system for hydrogen production ***Aamer Ali,** Wenyu Zhao, Vincenzo Liso, Cejna Anna Quist-Jensen*	**262** Utilizing desalination brine to simultaneously produce high-purity magnesium carbonate and vaterite-type calcium carbonate ***Abdallatif Abdalrhman**, Seungwon Ihm, Eslam Alwaznani, Mohammad Talibi, Myoung-Jin Kim*	**92** The distribution and prediction of liquid column velocity between horizontal tubes ***Yiming Zhao**, Xingsen Mu, Shun Hu, Caixue Yang, Wenxu Qu, Shengqiang Shen, Zhe Tang*	**148** Harnessing inspection technology and AI in order to understand and predict pipeline cleaning frequency of sea water intake pipes *Pilar Vera-Rodriguez, Simon Bell, Barry Ritchie,* ***Paul Newbury***	**20** Performance evaluation of a 14-effect distillation system driven by solar heat ***Behzad Shahzamanian Sichani**, Szabolcs Varga, Diego Alarcón-Padilla*	**253** Regeneration of haemodialysis spent dialysate by mixed matrix membranes of cellulose acetate / silica/metal organic framework (MOF) ***Maria Norberta de Pinho**, José Francisco Guerreiro, Miguel Pereira da Silva, Marta Bordonhos, Miguel Minhalma, Moisés Luzia Pinto*

17.10 Poster session with drinks in the Exhibition area

POSTERS

6 Valorization of research: Perspectives and case studies on membrane application
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10 Techno-economic analysis and optimization of hybrid renewable energy systems for electricity generation and desalination
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12 Membrane-based recovery and utilization of HF/HNO rinse water in photovoltaic cell manufacturing for circular economy and green hydrogen
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24 Determining the origin of Faradaic yield values greater than unity during treatment industrial wastewater by electrocoagulation
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29 Microwave-synthesized 3D manganese oxide monoliths for efficient lithium extraction from geothermal brine
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44 Polysulfone support modifications for high-flux nanofiltration: applications in desalination and micropollutant control
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47 Chlorine-resistant membrane phosphate zeolite nanofiltration for sustainable water treatment
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48 Recovery of interest chemicals and industrial water reuse by means of bipolar electrodialysis
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53 CFD application for operational analysis of self cleaning filters
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59 Water management on a large LNG project: closing the loops
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85 Optimizing solar and wind energy for reverse osmosis desalination in water-stressed regions
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86 Innovative RO membrane for enhanced boron rejection and cost-effective desalination
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87 Selective recovery of magnesium hydroxide from reverse osmosis reject brine via reactive crystallization
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90 Pre-treatment of mine water for reverse osmosis by means of manganese dioxide filtration
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93 LIFE ELEKTRA – Circular economy applied to nitrate removal, hydrogen generation and waste recovery in drinking water
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95 Synthesis of low-cost, high-performance ceramic membranes for efficient water treatment
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101 Commissioning a solar-powered zero liquid discharge desalination pilot: Sol2H2O joint research
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162 Raising awareness of air-related issues in seawater pipelines: a practical review
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281 Energy recovery from waste(water) streams in the chemical industry by anerobic treatment and adapted pre-/post-treatment
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Tuesday morning 29 April 2025

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8.30	**110** Liquid gap membrane distillation: optimal use of residual heat ***Paul Buijs**, Radjesh Nidhansing, Tijmen van Heukelingen*	**77** Recovery of lithium from brines by flow electrode capacitive deionisation *Hafiz Saif, João Crespo, **Sylwin Pawlowski***	**43** Optimizing SWRO: single vs. new innovative multiple stages designs ***Francisco Jimenez-Castellanos**, Georg Herborg*	**3** PRE-1900 solar distillation in present-day Namibia *Jim Birkett*	**265** Identification and quantification of contaminants of emerging concern and microplastics in different aquatic compartments ***Maria Augusta Dionísio de Sousa**, Romeu Ventura Martinho de Avó, Maria Adelaide Ferreira da Silva Rocha*
8.50	**268** Membrane distillation for the treatment of industrial wastewaters ***Aamer Ali**, Hussein Fairousha Sulaiman, Cejna Anna Quist-Jensen*	**142** Selective recovery of lithium from geothermal brines by means of a membrane-based electrochemical system ***Clara Roggerone**, Asnakech Lass-Seyoum, Fabio La Mantia, Julia Kowal*	**205** Kick back with multi-stage SWRO systems, less hassles and more output – a membrane manufacturer's experience ***Alvaro Lagartos**, Jose Luis Nuno*	**130** Evaluating combined cooling technologies for inland solar MED systems *Juan Miguel Serrano, **Patricia Palenzuela,** Bartolomé Ortega-Delgado, Lidia Roca*	**251** Smart monitoring of contaminants of emerging concern in wastewater treatment ***Rui M.C. Viegas**, Catarina Silva, Célia M. Manaia, Gabriela Faria, Cláudio Costa, Maria João Rosa*
9.10	**219** Novel 4-channel membrane distillation spiral wound module with heat integration ***Bart Nelemans**, Kirtiraj Chavan*	**168** Sustainable production of lithium compounds: a key element towards the energetic transition ***Ana Beatriz Teixeira**, Lícinio Ferreira, Sylwin Pawlowski, Marisa Rodrigues*	**26** Optimization of seawater reverse osmosis: innovations in pretreatment systems ***Ratul Das**, Thomas Altmann, Yasmeen Nadreen, Graciela Gonzalez Gil, Johannes Vrouwenvelder*	**128** Solar-driven evaporation system for high-salinity wastewater desalination using 3D chitosan-based interfacial evaporators ***Hyeong Woo Lim**, Sang Joon Lee*	**109** Advanced integrated water treatment system for ultra-pure water production in refineries ***Irina Zaslavschi**, Amit Rainer*
9.30	**57** Air-cooled dehumidifier for efficient water desalination using membrane distillation ***Atia Khalifa**, Mohamed Kotb, Suhaib Alawad*	**190** Lithium recovery from LIB wastewater using monovalent selective capacitive deionization and bipolar membrane electrodialysis ***Minji Je**, Seoyeon Lee, Yongjun Choi, Jae-Wuk Koo, Sangho Lee*	**22** Low-energy SWRO and ultra-high recovery inland desalination with true batch processes: Singapore and Texas pilot demonstrations *Quantum Wei, **Christine Kleffner**, Jenny Smythe*	**65** Pilot scale solar-assisted adsorption desalination and cooling system: Thermodynamic analysis and performance evaluation ***Alberto Tiraferri**, Ali Naeimi Tabasian, Alberto Saija, Matteo Morciano, Matteo Fasano, Eliodoro Chiavazzo*	**199** Membranes for water reclamation in industrial application: a feasible and proven opportunity ***Naiara Hernández Ibáñez**, Juan Arévalo Vilches, Antonio Giménez Lorang, Irene Fernández Fernández, Marc Sauchelli, Víctor Monsalvo, Frank Rogalla*
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*	**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, Haltiqa*

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 18 **Membrane Distillation II**	**Session 19** **Brine Valorisation IV**	**Session 20** **Enhancing Desalination Performance**	**Session 21** **Solar Desalination**	**Session 22** **Salinity Gradient Energy**	**Session 23** **Environmental Impacts of Desalination**
11.50	**96** A model for batch operation in vacuum-assisted air gap membrane distillation *Isabel Requena, Juan Antonio Andrés-Mañas,* ***Guillermo Zaragoza***	**150** Integrated production of Mg(OH)2 powders and high valuable salts from seawater desalination brines through evaporative ponds ***Giuseppe Battaglia****, Lorenzo Ventimiglia, Fabrizio Vicari, Alessandro Tamburini, Andrea Cipollina, Giorgio Micale*	**181** Retrofitting assessment of reverse osmosis desalination plants based on energy diagnosis ***Juan I. Pinaglia-Villalón****, María Gutiérrez-Valcarce, Rolando Bosleman, Lourdes García-Rodríguez*	**191** Optimization of a hybrid PV/T-driven desalination system for sustainable freshwater production ***Ahmed Abdelhalim****, Shehab Mansour, Omar Khalil*	**88** 3D printing of profiled cation-exchange membranes for harvesting salinity gradient energy from membrane distillation brines ***Mekhna Venu****, Cláudia Galinha, João Crespo, Sylwin Pawlowski*	**104** Steps for optimizing energy and water consumption in the operation of reverse osmosis systems with a focus on chemical treatment ***Dan Freeman****, Liana Kunzler, Rodrigo Cadihna, Marck Solla, Leonardo Kuhn, Fiona Finlayson, Raul Gonzalez*
12.10	**91** Enhancing productivity and energy efficiency in vacuum assisted air gap multistage membrane desalination ***Ahmed Omera****, Mohammed Antar*	**123** Concentrating high-salinity brines using low salt rejection reverse osmosis membranes ***Guillem Gilabert Oriol****, David Arias, Claudia Niewersch, Tirtha Chatterjee, Brittany Fisher, Caleb Funk, Harith Alomar*	**71** Using satellite data to improve seawater characterization and optimize plant designs ***Rémy Caball****, Olivier Raillard, Sébastien Smet, Delia Pastorelli*	**216** Dynamic control of the back-pressure in a photovoltaic-powered desalination system for enhanced system performance ***Emmanuel Ogunniyi****, Bryce S. Richards*	**163** Blue energy: renewable energy production from desalination brine *Patricia Terrero Rodriguez*	**127** Antiscalants in seawater desalination: impacts on microbial growth and environmental fate ***Graciela Gonzalez Gil****, Marian Castrillon Tobon, Camila Albarracin Ruiz, Johannes Vrouwenvelder*
12.30	**55** Sustainable solutions to concentrate management: a novel solar-driven membrane crystallizer for zero-liquid discharge ***Kerri Hickenbottom****, Jeb Shingler, Minna Allouzi, Varinia Felix, Shelbi Jenkins, Wei Pan, Robert Norwood*	**202** Brine valorization system with internal reuse of brine minerals ***Christopher East****, Noura Chehab, Ahmed Al-Amoudi, Nikolay Voutchkov*	**84** Optimization of forward osmosis (FO) modules arrangement for high-efficiency feed concentration in single-pass operation *Rajashree Yalamanchili, Pere Olives Cegarra, Albert Galizia,* ***Gaëtan Blandin***	**275** Evaluating the performance of a flat sheet reverse osmosis membrane under variable and intermittent operation of a PV driven desalination system: A comprehensive experimental study *Evangelos Dimitriou, Dimitrios Loukatos, Konstantinos G. Arvanitis, George Papadakis*	**178** Assessment of the performance of a pilot scale reverse electrodialysis stack equipped with segmented electrodes ***Francesco Volpe****, Emanuela Mangiaracina, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale, Alessandro Tamburini*	**217** Desalination brine matters: Impacts of antiscalants on seagrass and its corresponding bacterial epiphytes ***Ryan Sirota****, Gidon Winters, Gilad Antler, Eyal Rahav, Edo Bar-Zeev*
12.50	**271** VMEMD and related separation processes from lab-scale to industrial size by module technology of EvCon *Markus Wenzel*	**259** Exploring the circularity of brine valorisation through neural network modelling of an electrodialysis with bipolar membranes pilo ***Giovanni Virruso****, Andrea Cipollina, Alessandro Tamburini, Giorgio Micale*	**37** The influence of water permeability, solute resistance and mass transfer coefficient on water flux behavior in forward osmosis ***Abdulrahman Alalawi****, Ibrahim Al-Mutaz, Nawaf Bin Darwish*	**145** Optimization of time-variant, solar-powered electrodialysis desalination architectures ***Melissa Brei,*** *Jimmy Tran, Amos Winter*	**274** Novel thin-film nanocomposite (TFN) membranes by incorporation of halloysite nanoclay for pressure retarded osmosis applications *Akif Nihal,* ***Syed Javaid Zaid****i*	**193** Carbon footprint of desalination and mitigation strategies ***Salman Arab****, Nikolay Voutchkov, Noura Chehab*

13.10–14.10 Lunch

Tuesday afternoon 29 April 2025

	Session 24 Membrane Distillation / Thermal Desalination	Session 25 Membranes for Water Treatment I	Session 26 Fouling Control	Session 27 Novel Processes and Applications	Session 28 XPRIZE session
14.10	**172** Sustainable membrane distillation desalination for hydrogen production *Alba Ruiz-Aguirre, Alejandro Bueso, Antonio Atienza-Márquez,* ***Guillermo Zaragoza***	**245** Functionalized Li^+/H^+ separation membranes for pH sensing ***João Teixeira****, Ricardo Campos, Magda Barros, Ana Moreira, Daniela Campanhã, José Gonçalves*	**115** Desalination without chemicals: Bonaire's modular plant and the application of direct osmosis cleaning ***Iris Sutzkover Gutman****, Irina Zaslavschi*	**233** "Mar Menor"— a combined technical solution proposal based on desal techniques and other water treatment methods ***Rafael Buendía Candel****, Domingo Zarzo, Alberto Morales, Elena Campos*	**XPRIZE water scarcity: a call for revolutionizing desalination** *Hossein Atoufi*
14.30	**45** Exploring the effects of feed and permeate temperatures on fouling and wetting of PTFE membranes within membrane distillation ***Atefeh Tizchang****, Itzel Alcaraz Bernades, Wolfgang Gernjak, Morgan Abily*	**234** Going forward with RO for PFAS removal: experience with TFN RO membranes from lab to pilot and to a full-scale plant ***Eugene Rozenbaoum****, Young Ju Lee, Wansuk Choi, Jung Soo Kim, Roy Daly*	**203** Identifying membrane foulants and the role diagnosis plays in optimized performance to reduce chemicals and maximize membrane life ***Doug Eisberg****, Ken Robinson, Stuart Leak*	**81** Eutectic solvent (ES)-based flow electrodes for water desalination *Elena Gabirondo, Hafiz Saif, Vitor Alves, João Crespo, Liliana Tomé,* ***Sylwin Pawlowski***	
14.50	**136** Thermal driven ultrapure water production for water electrolysis with membrane distillation ***Rebecca Schwantes****, Yair Morales, Eric Pomp, Jan Singer, Kirtiraj Chavan, Florencia Saravia*	**144** Membrane cascades for enhaced rejection of organic pollutants in RO of brackish and sea water ***Fatima Zohra Charik****, Saad Alami Younssi, Murielle Rabiller-Baudry*	**179** A novel numerical modelling tool for the study of colloidal fouling in electrodialysis units ***Francesco Volpe****, Giuseppe Battaglia, Andrea Cipollina, Giorgio Domenico Maria Micale, Alessandro Tamburini*	**256** Innovative marine work on the first desalination plant in Portugal *Ana Fernandez,* ***Jose Maria Colubi***	
15.10	**97** Thermal parameters distribution and heat transfer deterioration in a horizontal tube falling film evaporator ***Chao Li,*** *Dayuan Yuan, Liuyang Zhang, Qiang Meng, Shengqiang Shen*	**27** Valorizing EC-sludge for MF kaolinite membrane fabrication: a sustainable approach for seawater pretreatment for RO desalination ***Abdessamad Belgada****, Raowia Lamhar, Fatima Zohra Charik, Ibrahim Ounouss, Adil Dani, Saad Alami Younssi*	**16** The selection of nanofiltration membrane characteristics to purify landfill leachate and reduce concentrate ***Alexei Pervov,*** *Viacheslav Dzyubenko*	**272** Feasibility study of innovative, low-energy integrated system for desalination and cooling ***Hassan Abdulrahim****, Mansour Ahmed*	
15.30	**129** Electrothermal-based hanging type evaporator for effective seawater desalination ***Younghoon Suh****, Sangjoon Lee*	**38** Unidirectional porous membrane prepared by combined crystallization and diffusion method for desalination ***M. Asipi Qostolani****, Mohammed Abdul Azeem, Turki Nabieh Baroud*	**210** Optimizing coagulation dose, pH and rapid mixing with MFI-UF to reduce particulate/colloidal fouling in RO/NF ***Yiman Liu****, Abrar Adema, Afrasiab Yameen, Nirajan Dhakal, Peter Vollaard, Rinnert Schurer, Begüm Tanis, Jan Schippers, Maria Kennedy*	**255** Innovative monitoring solutions for reverse osmosis plants by Pyxis Lab® ***Diana Cruz,*** *Dario Alonso*	
15.50	**107** Analysis of crystallization fouling growth and heat transfer on horizontal tube surfaces under constant heat flux ***Boyu Wang,*** *Shengqiang Shen, Xingsen Mu*	**196** Lowering OPEX and feed pressure requirements for municipal water production and reuse using Aquaporin Inside BWRO ***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*		**283** Eco-friendly deep-sea desalination combining reverse osmosis and oil and gas solutions *Antoine Vuillermet*	

16.10–16.30 Coffee break

	Session 29 Membrane Distillation (Membranes)	Session 30 Remineralisation	Session 31 Pretreatment	Session 32 Energy Efficiency and Performance Enhancement	Session 33 Membranes
16.30	**257** Development of PVDF distillation membranes for brine treatment using triethyl phosphate as green solvent *Matilde Traverso,* ***Marcello Pagliero,*** *Camilla Costa, Ilaria Rizzardi, Antonio Comite*	**237** Magnesium remineralization: Impact on microbial water quality of reverse osmosis produced drinking water during distribution ***Nadia Farhat,*** *Ratna Putri, Alejandra Ibarra Felix, Johannes Vrouwenvelder*	**70** Decoupling dual-media filter into combined flotation step and high velocity sand monolayer: Results from demo plant ***Rémy Caball,*** *Caroline Barbé, Delia Pastorelli*	**99** Optimising energy efficiency of seawater desalination plants with high-recovery by coupling OARO and RO processes ***Jesús Montes-Sánchez****, David Sánchez, Lourdes García-Rodríguez*	**98** Testing polymeric membrane resistance to ozone to extend membrane lifetime or promote their recycling ***Bianca Zappulla Sabio****, Gaetan Blandin, Wolfgang Gernjak, Lide Jaurrieta*
16.50	**41** Biomass-derived carbon and carbon nanofibers integrated electrospun Janus membranes: a new frontier in membrane distillation ***Md. Emdad Hossain,*** *Turki N. Baroud, Md. Abdul Aziz*	**266** Engineered carbonates for enhanced remineralization processes ***Vega Bierwolf,*** *Heidrun Vedder, Victor Wasmuth, Assiyeh Tabatabai, Christopher Pust*	**72** Enhancing water production capacity: the role of filtration velocity in multi-media filters for desalination *Ofir Yamin*	**261** Reducing SEC and fouling potential using TFN technology in the South of Portugal ***Alvaro Lagartos****, Beatriz Calderon, Silvia Gallego*	**201** Enhanced CO_2/CH_4 separation using amine-modified ZIF-8 mixed matrix membranes ***Imran Ullah Khan,*** *Mohd Hafiz Dzarfan Othman, Mukhlis A. Raman, Musawira Iftikhar*
17.10	**173** Hydrophobic PVDF flat sheet membrane modified using hybrid structure nanomaterial of (TiO2/GO) for air gap membrane distillation ***Hamad Alromaih****, Patricia Gorgojo, Krishnaprasad Manoj, Maria Perez-Page*	**54** Production of remineralization chemicals from RO brines: Pilot platform development ***Antonino Campione****, Giuseppe Lo Burgio, Fabrizio Vicari, Alessandro Tamburini, Lorenzo Ventimiglia, Fabrizio Vassallo, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale*	**143** Optimizing pretreatment for reverse osmosis desalination through simultaneous media filter monitoring ***Yasmeen Nadreen****, Graciela Gonzalez-Gil, Johannes Vrouwenvelder, Ratul Das, Thomas Altmann*	**46** Maximize energy efficiency: parallel axial piston pumps and active energy recovery devices *Francisco Jimenez-Castellanos*	**17** Designing mechanically robust ceramic membrane support for high pressure water desalination ***Hongxia Li,*** *Zishan Akhter, Ahmed Shaaban, Navya Thomas, Jiun Hui Low, Santhana Raghuraman, Chakravarthy Gudipati*
17.30	**175** Advancing circular desalination: photothermal membranes to overcome membrane distillation limits for brine valorization ***Sergio Santoro****, Roviel Berhane Zegeye, Tsotne Dadiani, Efrem Curcio, Marco Aquino, Antonio Politano*	**56** A pilot plant scale circular approach for the CO_2 extraction from RO brines ***Giuseppe Lo Burgio****, Antonino Campione, Fabrizio Vicari, Alessandro Tamburini, Lorenzo Ventimiglia, Fabrizio Vassallo, Giuseppe Battaglia, Andrea Cipollina, Giorgio Micale*	**226** Optimization of membrane filtration processes using the design of experiments in different whey solutions ***Hadid Sukmana****, József Csanádi, Cecilia Hodúr, Zsuzsanna László, Gábor Veréb, Sándor Beszédes, Imre Ábrahám, Nóra Garabné Ábrahám, Andrea Süveges-Gruber, Szabolcs Kertész*	**288** Sorek 2 - Be'er Miriam Desalination Plant: Leading the way in sustainable desalination ***Dotan Gur****, Gregory Shtelman, Irina Zaslavschi, Naaman Cohen*	**244** Evaluation of reverse osmosis membrane performance for the treatment of oil sands process-affected water (OSPW) ***Seoyeon Lee,*** *Sanghlee Lee, Song Lee, Yusik Kim, Hyeongrak Cho, Yongjun Choi*
17.50		**21** Dual benefits of immobilized carbonic anhydrase: Enhancing water quality and reducing carbon footprint in desalination processes *Veerle Vandeginste,* ***Philippe Tob****, Jacob Rubel, Dharmjeet Madhav*	**278** Current situation of physical pretreatment systems used in seawater reverse osmosis desalination plants in the Canary Islands ***Sigrid Arenas Urrea****, Baltasar Peñate Suarez, Noemi Melián Martel*	**224** Energy recovery device retrofit of an existing BWRO plant in Spain *Rolando Bosleman,* ***Juan Cifuentes***	**209** Addressing water scarcity in the Canary Islands: SWRO membranes with TFN technology as a proven solution for irrigation ***Beatriz Calderon,*** *Alvaro Lagartos, Silvia Gallego*

Wednesday morning 30 April 2025

	Session 34 Drinking Water/Operational Efficiency/Water Treatment Market	Session 35 Innovations in Reverse Osmosis	Session 36 Modelling, Prediction and Optimisation	Session 37 Energy Recovery Systems	Session 38 Renewable Energy Desalination I
8.30	**138** Mg^{2+} and Ca^{2+} enrichment to drinking water originated from the water source (seawater, ground water) without extra chemichals *Elad Barak*	**60** Enhanced energy efficiency strategies in desalination technologies *Guillem Gilabert Oriol, Harith Alomar,* ***Maria Perez Macia****, Santhosh Ramalingan, Mahesh Kulkarni*	**106** Three-dimensional model of ion transport in composite membranes: effect of the internal structure and equivalent thickness ***Fernan David Martinez Jimenez****, Bastiaan Blankert, Cristian Picioreanu*	**223** Europe leading the way to reduce energy use in water reuse and brackish desalination projects: a tale of two plants ***Angel Abajas,*** *Rolando Bosleman, Erik Desormeaux*	**58** Wave to energy and water ***Michael Henriksen,*** *Emiel Schut*
8.50	**82** Dolomite for magnesium supplementation of desalinated drinking water in Saudi Arabia ***Christopher Fellows****, Ali Alhamzha*	**111** A new approach to reverse osmosis pressure vessel design ***Mike Sinfield,*** *David Jiménez, Amit Sankhe, Daniela Vidal, Paul Choules*	**30** Modeling of mass transfer dynamics in spacer-filled channels in membrane processes using direct numerical simulations ***Santiago Cespedes****, Bastiaan Blankert, Cristian Picioreanu*	**79** Optimization and design of energy recovery systems ***Hussain Basamh****, Muhammad Ridwan, Thomas Altmann, Ratul Das*	**9** String-driven rectifier for power take-off systems for harvesting energy from oscillatory forces ***Mahmood Khaja Muhieitheen****, Mohammed Khair Al-Solihat*
9.10	**63** Evaluation of the operational efficiency and performance of a combined desalination and salt (NaCl) production plant in Indonesia *Ersan Ozdemir,* ***Pablo Canada Garcia***	**151** Membrane deformation in reverse osmosis: In-situ quantification and impacts on pressure drop in permeate channel ***Luigi Ranieri,*** *Luca Fortunato, Johannes Vrouwenvelder, Cristian Picioreanu, Bastiaan Blankert*	**167** Multiscale modeling of ion transport in IEMs and polyamides: bridging microscale and macroscale insights *Nasser Al-Hamdani, Giorgio Purpura,* ***Giorgio De Luca****, Giuseppe Costanzo, Javier Luque Di Salvo, Andrea Cipollina, Giorgio Micale*	**35** On-site demonstration of a robust rotary energy recovery device ***Francesco Giuseppe Ladisa****, Victor Ruiz, Juan De Salas*	**114** Development of reverse os- mosis technology and opportuni- ties for renewable energy integra- tion in the Greek islands ***Eftihia Tzen****, E. Rikos, I. Karga, P. Papadopoulos, N. Stefanatos, D. Theofiloyiannakos*
9.30	**249** Reducing non-revenue water: the first step toward addressing water scarcity and enhancing efficiency ***Flávio Oliveira****, Sara Cunha*	**206** OPEX optimization in RO systems for challenging water: a new revolutionary 36 mil membrane feed spacer design *Alvaro Lagartos*	**149** Numerical assessment of membrane intrusion in permeate channels of reverse osmosis units ***Giuseppe Battaglia****, Andrea Sireci, Luigi Ranieri, Bastiaan Blankert, Giorgio Micale, Cristian Picioreanu*	**273** Maximizing water production with minimal footprint for containerized systems *Eli Oklejas*	**7** Techno-economic analysis of solar and wind powered desalination to meet the water needs of hundred homes in Karachi, Pakistan ***Qamar Abbas****, Hafiz Muhammad Ali*
9.50	**285** Transforming the water treatment market *Daniele Strongone*	**157** Waterfountain: Sub-sea desalination with easy maintenance ***Paul Buijs****, Kyle Hopkins, Rolf Bendiksen, Per Olsen*	**103** Accurate bench scale measurement of mass transfer in RO ***Bastiaan Blankert,*** *Santiago Cespedes, Ratul Das, Thomas Altmann, Johannes Vrouwenvelder, Cristian Picioreanu*	**225** PX Q400 impact in demonstration plant achieving less than 2 kWh/m^3 in energy consumption *Rolando Bosleman,* ***Juan Cifuentes***	**277** Desalination using renewable energy integrating solar energy into SWPC's projects *Faisal Alhelal*

10.10–10.30 Coffee break

10.30–10.40 XPRIZE

10.40–11.40 Miriam Balaban Innovation Award Session

Moderator: *Corrado Sommariva*

Award finalists presentations

	Session 39 Ultrafiltration	Session 40 Regional/Case Studies	Session 41 Novel Technologies	Session 42 Zero Liquid Discharge	Session 43 Renewable Energy Desalination II
11.40	**124** Robust ultrafiltration-based pretreatment to secure long term sustainable operation *Guillem Gilabert Oriol, Blanca Salgado, Gerard Massons, Harith Alomar,* ***Oliver Neumann****, Jan Radel*	**67** Desalination in Algeria: a lifeline against water scarcity ***Nadjib Drouiche****, Ahmed Kettab*	**270** Natural adsorbents for sustainable recovery of key components from mining wastewater and seawater: preliminary experimental result *Hugo Sánchez-Moreno,* ***Lourdes García-Rodríguez,*** *Celso Recalde-Moreno, Abel Riaza-Frutos*	**73** Evaluating the impact of closed-loop RO systems on ZLD in textile industry: case study from Tirupur, India ***Vinay Narayan Hegde,*** *Joachim Went, Joachim Koschikowski, Harald Schönberger, Werner Platzer*	**189** The 100% RES Islands Initiative - the Energy Water nexus *Gianni Chianetta*
12.00	**118** Assessment of an ultrafiltration module with an integrated pre-filter as seawater desalination pre-treatment *Daniel García-Huertas, Michael Hoffmann, Christian Staaks, Jan Rädel, Harith Alomar, Guillem Gilabert-Oriol, Martin Heijnen,* ***Olga Ferrer Mallén****, Jorge J. Malfeito*	**39** Desalination for decarbonized fertilizer production: a comparative analysis of seawaters in the MENA region using MLD strategies ***Nikhil Dilip Pawar****, Thomas Pregger, Patrick Jochem*	**282** Semi-closed reverse osmosis (SCRO) for low-energy, high-resilience desalination *Qianhong She*	**241** Near zero liquid discharge with seeded membrane distillation crystallization ***Stefanie Flatscher,*** *Mark Hlawitschka*	**78** Desalination plant fed with 100% renewable energy and process optimization for compactness: case study of Amaala *Ruth Mota,* ***Rémy Caball***
12.20	**218** Synergistic effects of 3D-printed spacers and modular vibration towards membrane fouling mitigation ***Aws Al-Tayawi,*** *Imre Vajk Fazekas, Szabolcs Kertész*	**286** Sustainable water management: innovations in alternative water sources — Case studies *Ajay Popat*	**276** Towards net zero through the PPP route *Nabil Aljohani*	**66** Development of a membrane-based zero liquid discharge treatment train for a bio-chemical industry *Sara Salvador Cob*	**208** Dakhla desalination plant using renewable energy ***Lahcen Hasnaoui,*** *Mohamed Ouhssain*
12.40		**184** Desalination technology conversion: GCC case study. Overview and key drive ***Sergio Casimiro****, Hassan Almsaeed, Justin Robert*	**169** Selection of pre-RO cartridge filters *Oren Heymans*	**180** Optimised preliminary design of seawater desalination with zero liquid discharge driven by solar micro-gas turbines ***Rafael González-Almenara,*** *Agustín Delgado-Torres, Jesús Montes-Sánchez, Néstor Santana-Hernández, David Sánchez, Lourdes García-Rodríguez*	

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.