



Desalination for the Environment Clean Water and Energy

22–26 May 2023, Parklane Hotel
Limassol, Cyprus

P R O G R A M M E



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Cyprus Water Association
Κυπριακός Υδατικός Σύνδεσμος



Water Development Department



International Desalination Association



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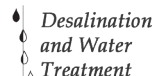


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By William Edelman



Desalination
and Water
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International Conference on Desalination for the Green Hydrogen Economy

12 - 14 February 2024
Frankfurt am Main, Germany

WEBSITE
**Desalination
for the Green
Hydrogen
Economy and
Call For Papers**



Conference Topics:

- Economics of desalination and hydrogen production
- Overcoming the water challenge of green hydrogen production
- Policy & Market development
- Specific regional aspects of desalination and hydrogen production
- Storage and infrastructure
- Water, energy and emissions management
- Energy and food nexus

**The conference provides an excellent opportunity
for sharing and networking through numerous
presentations, workshops and panel discussions**

PROGRAMME OUTLINE

Monday May 22

9.30 Registration opens

10.30–16.00 **Pre-conference Workshop on Circular Desalination: Value Chains and Stability**

Organised by Professor Dimitris Xevgenos, TU-Delft
(see page 33)

18.30–20.00 **Reception at Park Lane Hotel, outside the Park Room**

Tuesday May 23

8.00 Registration

9.00 **OPENING CEREMONY (Park Room)**

Ursula Annunziata, EDS President

Lia Georgiou, Acting Director of the Water Development Department

Chrystalla Stylianou, Department of the Environment

Thomas Altmann, ACWA Power, Executive Vice President Innovation & New Technology

Carmit Ram and Menahem Priel, Mekorot

Tariq Al Ghaffari, Saline Water Conversion Corporation, Acting President DTRI

Arnoldas Milukas, EU Project. European Research Executive Agency, Head of Unit

Dimitris Xevgenos, Delft University of Technology

Stavros G.Caramondani, Chairman of Caramondani

Petros Xenophonos, Minister of Agriculture, Rural Development and Environment

Ursula Annunziata to introduce Miriam Balaban and Iris Suztkover-Gutman.
Remembrance of the esteemed and inspirational Professor David Hasson

11.00 **EXHIBITION OPENING**

Coffee break

11.30 **Panel session *Shining a light on Health and Safety Challenges in Desalination Plants***

Moderator: Doug Eisberg, Avista

Special guest of honour: Ms Evangelitsa Tsoulofta,
Ministry of Labour and Social Insurance

Panellists: Tom Pankratz, GWI
Atul Kakkar, Pentair
David Jimenez, H₂O Innovation
Jorge Juan Malfeito Sanchez, SWCC
Olga Sallangos, Caramondani
Ahmed Abdalhamid Ahmad Aldwimr, SWCC

13.00 Lunch

14.00–17.40 **Technical sessions**

16.00–17.40 **Poster session (Park Room)**

PROGRAMME OUTLINE

Wednesday May 24

8.30 Technical sessions

9.50 Coffee break

10.10 Utilities panel session *Keeping It Safe and Security and Sources*

Moderator: Emilio Gabbrielli

Panellists : Menahem Priel, Mekorot Development and Enterprise, Ltd.

Ahmad Gamal, Holding Company for Water and Wastewater

Robert Garner, NEOM

Nicos Neocleous, CWA

11.30 Coffee break

12.00 Technical sessions

13.40 Lunch

14.40 Technical sessions

19.00 Gala dinner at Ayia Napa Marina.

Coaches will be available for pick up at 17.45 outside the Park Lane Hotel.

Thursday May 25

9.00 Innovation Workshop for the Seven Finalists for the Miriam Balaban Innovation Award and Round Table discussion

Moderated by Domingo Zarzo Martinez and Nikolay Voutchkov. The seven finalists — **Juan Buceta**, Pronoe Earth, **Angel Rivero Falcon**, ITC, **Eli Oklejas**, FEDCO, **Carmelo Morgante**, Unipa Italy, Francisco Jimenez-Castellanos, Danfoss, Jan Radel, Dupont, **Jonathan Bessette**, MIT — will give 5 minute presentations on their innovations. This will be followed by a round table discussion on the finalist's innovations and a wrap presentation by Nickolay Voutchkov on innovation and focusing on presentations from the finalists.

10.10 Coffee break

10.30 Technical sessions

13.50 Lunch

15.00 Closing Ceremony at Park Room

Miriam Balaban Outstanding Technical Published Paper and Miriam Balaban Innovation Award. Sponsored by ACWA Power Loeb Award

Best poster award

Global Prize For Innovation in Desalination (GPID)

Corrado Panzeri, Partner, The European House-Ambrosetti

Esmeralda Leyva, GPID-Director, The European House-Ambrosetti

Friday May 26

9.00–15.30 Desalination Site Visit (maximum 50 people)

8.30–16.30 Workshop on Solar-powered high-recovery groundwater desalination with salt-tolerant crop cultivation for integrated brine management

Lecturers: Guillermo Zaragoza, Plataforma Solar Almería, CIEMAT, Spain

Philip Davies, University of Birmingham, UK

Moshe Sagi, Ben Gurion University, Israel

PROGRAMME OUTLINE – TECHNICAL SESSIONS

Tuesday afternoon May 23

Room	CITRUS	AMPHORA	JASMINE	ROSE
14.00–15.40	1 SWRO plants operation	2 Sustainability: Economic, social and environmental issues	3 Thermal systems and cogeneration/ultrapure water production	4 Brine mining and valorization
15.40–16.00 Coffee break				
16.00–17.40	5 Pretreatment/Filtration	6 Electrodialysis/Electrodialysis reversal	7 Renewable energy powered desalination/desalination technologies	8 Brine valorization/brine concentration
16.00	Poster session at Park room			

Wednesday May 24

Room	CITRUS	AMPHORA	JASMINE	ROSE
8.30–9.50	9 Membrane distillation I	10 Biofouling	11 Novel materials, processes and applications I	12 Energy recovery/ Energy consumption
9.50–10.10 Coffee break				
10:10–11:30 Utilities panel session “Keeping It Safe” and “Security and Sources” (Park Room)				
11.30–12.00 Coffee break				
12.00–13.40	13 Membrane distillation II	14 Biofouling and intake	15 Novel materials, processes and applications II	16 Energy efficiency
13.40–14.40 Lunch				
14.40–16.00	17 SWRO plants operation/performance	18 Forward osmosis	19 Membrane processes/membranes for water treatment	20 Wastewater treatment
16.00–16.20 Coffee break				
16.20–17.20	21 Brine management and recovery	22 Pretreatment	23 Membranes for water treatment	24 Membrane fouling

Thursday May 25

9:00–10:10 Innovation Workshop

10:10–10:30 Coffee break

Room	CITRUS	AMPHORA	JASMINE	ROSE
10.30–11.50	25 Membrane fouling/ Reverse osmosis	26 Contaminant removal	27 Offshore desalination and hydrogen production	28 Machine learning and digitization
11.50–12.10 Coffee break				
12.10–13.50	29 SWRO desalination	30 Post treatment / pretreatment	31 Modelling/simulation	32 Mineral recovery/ brine concentration
13.50 Lunch				
15.00 Closing Ceremony				

TUESDAY AFTERNOON
23 MAY 2023

CITRUS ROOM

1 SWRO plants operation

- 14.00 16** Monitoring and assessing fouling potential along the pre-treatment of an SWRO desalination plant in the Middle East
Almotasembellah Abushaban, Sergio G. Salinas-Rodriguez, Delia Pastorelli, Jan C. Schippers, Maria D. Kennedy
- 14.20 151** Ten years operation of UF and RO Limassol Desalination Plant in Cyprus – challenges and performance
Maria Angeles Perez Macia, Lorena Barbera Campos, Erineos Koutsakos, Menahem Priel, Carmit Ram
- 14.40 159** Renovating and re-operating a 12-year-old SWRO desalination plant – the Larnaca plant experience
Erineos Koutsakos, Menahem Priel, Vasilis Panagi
- 15.00 160** Maintain SWRO desalination plants for prolonged periods in stand by mode – the Limassol plant experience
Erineos Koutsakos, Carmit Cram, Menahem Priel, Kypros Michai
- 15.20 111** Evaluation of second generation TFN SWRO membranes with industry's highest salt rejection at Dhekhelia SWRO pilot study in Cyprus
Alvaro Lagartos, Olga Sallangos, Christodoulos Christodoulos

15.40–16.00 Coffee break

5 Pretreatment/Filtration

- 16.00 8** Validation of different filtration media for pretreatment of the RO process in Alicante desalination plant
Rafael Buendía-Candel, Helena Montero-Madrid, Jochen Kallenberg, Sofia Pastor Gonzalez, Elena Campos-Pozuelo, Patricia Terrero-Rodríguez, Domingo Zarzo-Martínez
- 16.20 144** Ultrafiltration as pre-treatment for seawater RO desalination – SUEZ experience
Emmanuelle Filloux, I. Le Moigne, A. Brehant, Delia Pastorelli
- 16.40 75** Biological oxygen-dosed activated carbon (BODAC) filtration: a promising technology for fouling prevention in RO membranes
Sara Ribeiro Pinela, Amanda Larasati, Roel J.W. Meulepas, Maria Cristina Gagliano, Robbert Kleerebezem, Harry Bruning, Huub H.M. Rijnaarts
- 17.00 56** Suitability of clayey soils from Jalore and Jodhpur, Rajasthan, India, for the production of 3-litre ceramic water filters
S. Duhan, S.K. Adari, N. Kanwar, S. Gupta, A.K. Nighojkar, M. Ahmad, P.K. Dammala, M. Chhabra, A.K. Plappally
- 17.20 42** Long-term reliability assessment of ceramic water filters: strength and electro-kinetic parameter studies
Meraj Ahmad, Sunil Duhan, Raj Kumar Satankar, Usha K Aravind, Anand Plappally

TUESDAY AFTERNOON
23 MAY 2023

AMPHORA ROOM

2 Sustainability: Economic, social and environmental issues

- 14.00 **19** Reverse osmosis plants environmental performance index
Amr Mohamed Seoudy, Hatem Mohamed Seoudy
- 14.20 **190** Desalination biomonitoring using biological responses of transplants of the seagrass *Posidonia oceanica*
Fabio Blanco-Murillo, Lázaro Marín-Guirao, Jose Luis Sánchez-Lizaso, Claudio A. Sáez
- 14.40 **34** Case study: Directly comparing OPEX and CO₂ emissions associated with phosphonate and dendrimer antiscalants at Ashkelon SWRO plant
Mike Sinfield, Daniela Vidal, Stephen P. Chesters, Shai Dreizin
- 15.00 **115** Expansion of the first integrated UF-RO plant after more than 25 years of successful operation
Herman Smit, Irina Zaikina, Bram Martijn, Almohanad Abusultan
- 15.20 **95** Cost-based optimization of a forward osmosis/crystallization/reverse osmosis hybrid process with high-temperature operation
Jeongwoo Moon, Joon Ha Kim, Kiho Park

15.40–16.00 Coffee break

6 Electrodialysis/Electrodialysis reversal

- 16.00 **46** Semi-batch electrodialysis reversal: a simplified architecture and control method for flexible, low-cost, off-grid desalination
Jonathan T. Bessette, S.R. Pratt, J. Tran, A.G. Winter
- 16.20 **195** Electrodialysis with bipolar membranes for the sustainable production of chemicals from seawater brines at pilot plant scale
C. Cassaro, G. VIRRUSO, A. Culcasí, A. Cipollina, A. Tamburini, G. Micale
- 16.40 **196** An experimental investigation of ion transport properties and membrane selectivity using multi-ionic solution in electrodialysis with bipolar membrane
Antonia Filingerí, Julio Lopez, Andrea Culcasí, Andrea Cipollina, José Luis Cortina, Alessandro Tamburini, Giorgio Micale
- 17.00 **112** LIFE INDESAL: Improving efficiency and circularity of seawater desalination with a novel integrated process
Luca Sbardella, German Santos, Inmaculada Ortiz, Simon Grasman, Olga Ferrer, Jorge Malfeito
- 17.20 **70** Enhanced oil recovery – polymer flooding produced water desalination by high temperature electrodialysis
Lukas Václavík, Richard Kondáš

TUESDAY AFTERNOON
23 MAY 2023

JASMINE ROOM

3 Thermal systems and cogeneration/ultrapure water production

- 14.00 **182** Cogeneration of water and electricity by combining advanced membrane distillation with concentrated solar power
B. Ortega-Delgado, J.A. Andrés-Mañas, P. Palenzuela, G. Zaragoza
- 14.20 **169** Enhancing of efficiency in CSP-MED desalination system
Amr Mohamed Mahmoud, Ahmad Saeed Abdrahim Al Ghamdi
- 14.40 **124** Experimental evaluation of MED at high top brine temperatures with no divalent ions in feed water
Juan Miguel Serrano, Lidia Roca, Diego-César Alarcón-Padilla, Patricia Palenzuela
- 15.00 **9** Retrofit in an ultrapure water treatment plant for a thermosolar power plant in the south of Spain
Rafael Buendía-Candel, Patricia Terrero-Rodríguez, Alfonso Angel Pozo-Redondo, Elena Campos-Pozuelo, Raúl Lemes-de León, Domingo Zarzo-Martínez
- 15.20 **109** A study on pressure loss and contamination analysis ultrapure water supply piping using computational fluid dynamics
Hyeongrak Cho, Song Lee, Yongjun Choi, Sangho Lee

15.40–16.00 Coffee break

7 Renewable energy powered desalination/desalination technologies

- 16.00 **11** Membrane thermal systems for affordable renewable desalination
John Webley, Michael Greene, Igor Kiryakin
- 16.20 **168** Zero carbon/environmental champion: conversion of thermal desalination plant to seawater reverse osmosis plant
Khaled Almedbel, Fawzi Al Saidi, Tariq Nada, Sami Al Harbi, Mohsen Alsalmi, Wael Mamon Khaldi, Abdulraheem Al Thobiti, Majed Khaldi, Amir Hasdi
- 16.40 **89** Combination of pressure retarded osmosis (PRO) with capacitive deionization (CDI) driven by solar power: effect of feed water properties
Seoyeon Lee, Hyeongrhak Jo, Sangho Lee
- 17.00 **47** A comparison of hybrid batch-operated membrane distillation and osmotically-assisted reverse osmosis for solar-powered zero-liquid-discharge applications
V. Fthenakis, Z. Zhang, A.A. Atia, J.A. Andrés-Mañas, G. Zaragoza
- 17.20 **215** Desalination technologies, design and enhancement
Saline Water Conversion Corporation

TUESDAY AFTERNOON
23 MAY 2023

ROSE ROOM

4 Brine mining and valorization

- 14.00 **22** Integrated system for creating value of discharge brine
Ammar A. Alnumani, Eslam Alwaznani
- 14.20 **68** Sea4Value. Moving lab design and construction for seawater brine valorization
N. Hernández, M. Sauchelli, J. Arévalo, V. Monsalvo, F. Rogalla
- 14.40 **146** Towards brine valorisation and internal chemicals production in seawater desalination plants
A. Campione, D. Pastorelli, F. Vicari, A. Tamburini, A. Cipollina, G. Micale
- 15.00 **145** Reducing climate change impacts by chemicals production through brine valorisation in seawater desalination plants
R. Serra, F. Vicari, E. Judenne, E. Victor
- 15.20 **212** NEOM's innovative solution to brine management: creating 3D printable concrete
Noura Chelab

15.40–16.00 Coffee break

8 Brine valorization/brine concentration

- 16.00 **17** SWRO brine characterization in the Canary Islands (Spain) and open testbed brine valorization platform (DESAL+ LIVING LAB)
Ángel Rivero-Falcón, Baltasar Peñate Suárez
- 16.20 **134** Designing for the future: a value-sensitive approach to integrated desalination and brine treatment
Rodoula Ktori, Mar Palmeros Parada, Mark van Loosdrecht, Dimitris Xevgenos
- 16.40 **200** Corrosion-resistant polymer-based evaporator for brine concentration
Jan-Hendrik Imholze, Heike Glade
- 17.00 **210** Influence of bicarbonate/carbonate removal on magnesium hydroxide slurry: A pilot study
F. Vassallo, C. Morgante, F. Vicari, A. Cipollina, A. Tamburini, G. Micale
- 17.20 **214** NEOM integrated selective desalination and brine processing
Robert Garner

TUESDAY AFTERNOON
23 MAY 2023

PARK ROOM

16.00 POSTER SESSION

37 The microbial growth potential of antiscalants used in seawater desalination

*Ghadeer Hasanin, Ana Maria Mosquera, Abdul-Hamid Emwas, Thomas Altmann, Ratul Das, Paulus J. Buijs, Johannes S. Vrouwenvelder, **Graciela Gonzalez-Gil***

39 Integrated oxy-combustion power generation with carbon capture and humidification dehumidification desalination cycle

Binash Imteyaz, Furqan Tahir

45 Co-design of an off-grid community desalination system in the Navajo Nation

Melissa Brei, Jimmy Tran, Jeffrey Costello, Amos G. Winter V

74 Near-ZLD BWRO recovery based on monovalent selective ED

J. Gilron, M. Elimelech

78 Water reuse in the textile industry with integrated treatments: membranes and advanced oxidation processes

*K. Ayedi, V. Innocenzi, **M. Prisciandaro***

85 Effect of the modification of polyphenylsulfone substrate membrane with Pluronic block copolymers on the performance of thin film composite membranes for nanofiltration

T.V. Plisko, K.S. Burts, A.V. Penkova, A.V. Bilyukevich

128 A numerical analysis of the electromagnetic field effect on direct contact membrane distillation performance

*Kabbir Ali, Ahmad A. Alwan, Emad Alhseinat, **Mohamed Ibrahim Hassan Ali***

LOCATION

Limassol is the second-largest city in Cyprus. The city is located on the island's southern coast just under an hour from the airport in Larnaca. As a result, Limassol is one of the busiest ports Mediterranean transit trade.

It is also renowned for its long cultural tradition, and is home to the Cyprus University of Technology. A wide spectrum of activities and a number of museums and archaeological sites are available.

Situated between two key archaeological sites, the ancient kingdoms of Amathous to the east and Kourion to the west, it is also the centre of the wine industry.

Today Limassol is an excellent sea resort, with a ten-mile coastline; a busy shopping center, countless taverns and restaurants nightlife to suit tastes ranging from modest to sophisticate and it's an important seaport, industrial, tourist, offshore and port of registry center.



WEDNESDAY MORNING
24 MAY 2023

CITRUS ROOM

9 Membrane distillation I

- 8.30 **57** Air gap membrane distillation (AGMD) unit with an internal gap circulating fan for water desalination
Dahiru U. Lawal
- 8.50 **131** A detailed numerical analysis of the performance of air gap membrane distillation using PVDF and PTFE membranes
Kabbir Ali, Mohamed Ibrahim Hassan Ali, Hassan A. Arafat
- 9.10 **58** Early wetting detection in membrane distillation based on electrically-conductive membrane spacers
A. Alpatova, A. Qamar, M. Alhaddad, S. Kerdj, H.S. Son, N. Amin, N. Ghaffour
- 9.30 **105** Photothermal membrane distillation for seawater desalination
Marcello Pagliero, Antonio Comité, Camilla Costa, Ilaria Rizzard

9.50–10.10 Coffee break

10.10–11.30 Utilities panel session “Keeping It Safe” and “Security and Source

11.30–12.00 Coffee break

13 Membrane distillation II

- 12.00 **102** Treatment of concentrated brines using sweeping gas membrane distillation
Marco Tagliabue, Filomena Castaldo, Marcello Pagliero, Andrea Iebolo, Antonio Comité
- 12.20 **126** Minimizing brine discharge by membrane distillation: challenges and opportunities
Abdul-Kareem Turaani, Avner Ronen, Edo Bar-Zeev
- 12.40 **93** Ammonia recovery from wastewater by membrane distillation crystallization using reverse osmosis brine
Hyungho Park, Juyoung Lee, Yongjun Choi, Sangho Lee
- 13.00 **187** Preliminary results for batch operation with membrane distillation modules in V-AGMD for brine concentration
I. Requena, J.A. Andrés-Mañas, G. Zaragoza
- 13.20 **65** Hierarchical superhydrophobic composite membrane for enhanced distillation with excellent fouling resistance
Prexa Shah, Youmin Hou, Michael Kappl, Hans-Jürgen Butt

13.40–14.40 Lunch

WEDNESDAY MORNING 24 MAY 2023

AMPHORA ROOM

10 Biofouling

- 8.30 **36** BioPhree: next generation solution to remove and re-use phosphate; no more biofouling in membrane systems?
Pim de Jager, Raimonda Busiauskaitė, Koos Baas
- 8.50 **38** Pretreatment selection to control membrane desalination biofouling: method development
Yasmeen M. Nadreen, Ratul Das, Thomas Altmann, Johannes S. Vrouwenvelder, Graciela Gonzalez-Gil
- 9.10 **132** The link between concentration polarization in seawater reverse osmosis and membrane biofouling — how to control membrane biofouling
Harvey Winters, Jared Fulton, Marisol Garcia
- 9.30 **165** Functions of multispecies sessile bacteria on reverse osmosis membrane dictates biofilm characteristics rather than microbial community structure
Noya Ran, Gil Sorek, Revital Sharon-Gojman, Moshe Herzberg, Osnat Gillor

9.50–10.10 Coffee break

es” (Park Room)

11.30–12.00 Coffee break

14 Biofouling and intakes

- 12.00 **152** RO membrane protection facilitated by direct, accurate, and automatic measurement of ultra-low range chlorine residual
B.J. Verdonk, V.B. Malkov
- 12.20 **183** FilmTec™ SW30XFR-400/34 – A case study showing biofouling reduction achieved in a Desalination installation
Guillem Gilabert-Oriol, Hardik Pandya, Maria Pérez, Antonio Casañas
- 12.40 **154** Testing of DuPont™ B-Free™ technology in Arabic Gulf water at Sharjah Electricity and Water Authority (SEWA) Hamriyah Desalination Plant
Gerard Massons, Guillem Gilabert-Oriol, Marc Slagt, Rajesh Balakrishnan, Hardik Pandya, Alaa Elsayed, Harith Al-Omar, Josef Wunram
- 13.00 **44** Cleaning of seawater inlet pipelines based on both pigging and chemical dosing
Simon Bell, Paul Newbury
- 13.30 **214** Future directions for desalination membranes biofouling research
Johannes Vrouwenvelder, Graciela Gonzalez Gil, Bastiaan Blankert, Nadia Farhat, Ratul Das, Paul Buijs, Thomas Altmann

13.40–14.40 Lunch

WEDNESDAY MORNING
24 MAY 2023

JASMINE ROOM

11 Novel materials, processes and applications I

- 8.30 **96** Novel feed spacer designs for efficient spiral wound modules
S. Kerdi, A. Qamar, J.S. Vrouwenvelder, N. Ghaffour
- 8.50 **23** Novel ultrafiltration polyether sulfone membranes incorporated with graphene oxide and acacia gum: preparation and antifouling properties
Ahmad Najjar, Viktor Kochkodan
- 9.10 **186** New high rejection reverse osmosis elements:
Experimental study showing improved rejection
Maria Pérez Macia, Guillem Gilibert Oriol, Claudia Niewersch, Mireia Font, Javier Dewisme, Guillem Navarro, Daniel Algar, Harith Al-Omar
- 9.30 **127** Innovation beyond product specifications: the advantage of superior membrane durability in reverse osmosis installations worldwide
Guillem Gilibert-Oriol, Harith Al-Omar, Maria Angeles Perez Macia, Daniela Drössler

9.50–10.10 Coffee break

10.10–11.30 Utilities panel session “Keeping It Safe” and “Security and Source

11.30–12.00 Coffee break

15 Novel materials, processes and applications II

- 12.00 **148** Innovative remineralization process for desalinated water: one year of operation at Al Hondoq Desalination Plant, Gozo
Nicholas Charles Nelson, Antonella De Luca
- 12.20 **79** A novel semi-empirical model for lifetime prediction of gravity based ceramic filter and permeability estimation
S. Gupta, S. Duhan, S. Sarkar, P. Munsif, A.K. Plappally
- 12.40 **5** Operating experience of a new generation of reverse osmosis spiral-wound membrane elements by Membranium at power industry facilities
V.G. Dzyubenko, A.K. Borodastov
- 13.00 **51** Hydraulic injection desalination – a breakthrough for this millennia
Thomas Altmann, Eusebi Nomen, Alex Hanganu, Justin Robert, Ratul Das
- 13.20 **122** Metal plating wastewater treatment using hybrid semi batch-batch reverse osmosis (HSBRO)
S. Karimi, R. Engstler, E. Hosseinipour, S. Barbe, P.A. Davies

13.40–14.40 Lunch

WEDNESDAY MORNING
24 MAY 2023

ROSE ROOM

12 Energy recovery/Energy consumption

- 8.30 **14 Industrial applications of high-pressure membrane processes – Demonstration and evaluation of energy recovery at 120 bar**
Christine Kleffner, Gerd Braun, Eric Kadaj, Angel Abajas Errasti
- 8.50 **55 Danfoss MPE 70 active ERD – field installations and operation results**
Francisco Jiménez-Castellanos, Francisco Javier Lorenzo Moral
- 9.10 **129 Energy recovery system: long-term assessment, improvement and evolution to next generation ERD**
Rolando A. Bosleman, David Kim-Hak
- 9.30 **156 DWEER energy recovery system – Larnaca operation experience and optimization**
Beat Schneider, Erineos Koutsakos, Menahem Priel, Antonis Kydonakis

9.50–10.10 Coffee break

es” (Park Room)

11.30–12.00 Coffee break

16 Energy efficiency

- 12.00 **40 High-pressure pumps for maximum energy efficiency**
Francisco Javier Lorenzo Moral, Georg Herborg, Francisco Jiménez-Castellanos
- 12.20 **83 Condition monitoring for axial piston pumps**
Georg Herborg, Francisco Jiménez-Castellanos
- 12.40 **120 Performance of a high-pressure, high recovery batch RO system**
Ebrahim Hosseinipour, Somayeh Karimi, Philip Davies
- 13.00 **118 From energy storage devices to electrochemical water desalination**
J.J. Lado, E. García-Quismondo, N. Hernández, J. Arévalo, V. Monsalvo, F. Rogalla
- 13.20 **143 A fresh look at mega-scale SWRO: using brine-staged reverse osmosis to optimize energy efficiency and membrane performance**
Eli Oklejas, Juan de Beristain, Rory Weaver

13.40–14.40 Lunch

WEDNESDAY AFTERNOON
24 MAY 2023

CITRUS ROOM

17 SWRO plants operation/performance

- 14.40 175** Process optimization for ion-exchangers system as a pre-treatment to 2nd pass at Via-Marís (Palmachim) desalination plant
Elad Barak
- 15.00 50** RO-TRACK: Data driven predictive analytics for seawater reverse osmosis desalination plants
Muhammad Ghifari Ridwan, Thomas Altmann, Ahmed Yosri, Ratul Das
- 15.20 103** Sustainable antiscalant for municipal reverse osmosis plants
M.C. Royo, N. Adroer, J. Aumatell, E. Cortada, A. Vega, O. Villanueva, P. Rodrigo, D. Gutiérrez, I. Marian
- 15.40 180** Multi-criteria analysis for sustainable development of desalination plants in Chile
Iván Sola, José Luis Sánchez-Lizaso, Domingo Zarzo, Claudio Sáez

16.00–16.30 Coffee break

21 Brine management and recovery

- 16.30 6** Treatment of mining discharges with RO with concentrate utilization and heavy metals harvesting
A.G. Pervov, Htet Zaw Aung, D.V. Spitsov
- 16.50 80** Natural treatment based on willows for concentrate of reverse osmosis
Emmanuel Van Houtte, Thomas Rogier, Jonas Van Eeghem, Vincent Winnock de Grave, Johan Verbauwheide
- 17.10 92** Analysis and control of silica fouling in high recovery semi-batch RO process
Juyoung Yun, Song Lee, Hyeonrak Cho, Yongjun Choi, Sangho Lee

19.00 GALA DINNER Leaving the venue at 17.45

WEDNESDAY AFTERNOON
24 MAY 2023

AMPHORA ROOM

18 Forward osmosis

- 14.40 101** Development of the commercial-sized hollow fiber forward osmosis (FO) membrane module and its commercial applications
Joomi Han, Yuki Miura, Takahito Nakao, Shohei Goda, Masahiro Yasukawa
- 15.00 43** Feasibility of poly (vinyl alcohol)/poly (diallyldimethylammonium chloride) polymeric network hydrogel as draw solute for forward osmosis process
Ali Altaee, Senthilmurugan Subbiah, Ananya Bardhan
- 15.20 179** Graphene quantum dots-embedded thin-film composite forward osmosis membrane with advanced nanofiber substrate for desalination
Haleema Saleem, Syed Javaid Zaidi, Pei Sean Goh, Ahmad Fauzi Ismail

16.00–16.30 Coffee break

22 Pretreatment

- 16.30 147** Dissolved air flotation systems: advantages for RO pre-treatment and recent improvements
R. Caball, D. Pastorelli, C. Barbe
- 16.50 52** Effectiveness of ceramic ultrafiltration membranes as pre-treatment for SWRO
Ratul Das, Aatman Shah, Ali Ben Haj Hamida, Thomas Altmann
- 17.10 209** A novel air saturator and nozzle with 3D printed parts for dissolved air flotation (DAF) as pretreatment for reverse osmosis systems
Morteza Solhi Anari, Abolfazl Akhlaghi, Mohammadali Bidari, Alireza Bazargan

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WEDNESDAY AFTERNOON
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19 Membrane processes/ membranes for water treatment

- 14.40 **13** Identification and quantification of membrane material deformation occurring at high-pressure operation of spiral-wound elements
Christine Kleffner, Gerd Braun
- 15.00 **26** Development of hollow fiber membranes with highly enhanced compaction resistance for osmotically assisted reverse osmosis and its commercial applications
Takahito Nakao, Shohei Goda, Yuki Miura, Masahiro Yasukawa
- 15.20 **110** Fundamental troubleshooting practices for BWRO systems across various industries in Europe with TFN membranes
Alvaro Lagartos, Raul Santos
- 15.40 **125** Biomimetic reverse osmosis membrane for brackish water desalination
J. Arevalo, L. Mendes, J. Benecke, K. Hanh, V. Monsalvo, F. Rogalla, Marc Sauchelli

16.00–16.30 Coffee break

23 Membranes for water treatment

- 16.30 **64** Hydrogel membrane for wastewater treatment
Ali Altaee, Ibrar Ibrar, Lillian Alsaka, Alaa H. Hawari
- 16.50 **117** The next generation of multi-capillary PES in-out ultrafiltration membrane
Jan Rädcl, Christian Staaks, Pedro Cortes Reyes, Khalid Suleiman M. Al Ameen, Michael Hoffmann, Michaela Krug, Guillem Gillibert Oriol, Harith Alomar, Martin Heijnen
- 17.10 **15** Treatment of groundwater characterized with elevated molybdenum level by adsorption using carbide-derived carbon
Yehia Manawi, Simjo Simson, Jenny Lawler, Viktor Kochkodan

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- 14.40 **153** Nanofiltration innovation: performance of new FilmTec™ NF270-440 element in municipal wastewater operation
Gerard Massons, Guillem Gilabert-Oriol, Claudia Niewersch, Zoe Zhou
- 15.00 **106** Ultra-tight capillary UF in fit-for-purpose water treatment systems in the bio-chemical industry
L. Vredenburg, L. Rodenkam Melchiorson, J. Jaehrig, M. Lesscher
- 15.20 **53** Performance model for reverse osmosis
Ahmed Yousry, Muhammad Chiari Ridwan, Sarika Patil, Ratul Das, Thomas Altmann
- 15.40 **121** Multi-stage NF for use in greenhouse cooling and irrigation: experimental results and prospects
Paris Pasqualin, Philip Davies

16.00–16.30 Coffee break

24 Membrane fouling

- 16.30 **7** Reversing severe membrane fouling, the methodology of developing an ideal CIP protocol when nothing seems to work
Joshua Utter, Daniele Strongone
- 16.50 **91** Effect of the main hardness cations (calcium and magnesium) on formation of colloidal silica and silica-rich nanoparticles, as well as membrane fouling during reverse osmosis treating brackish water
Esmail Sarabian, Greg Birkett, Steven Prat
- 17.10 **113** Application of LG NanoH₂O™ second generation thin-film nanocomposite membranes for wastewater treatment in a steel plant
Lihua Wang, Younghoon Ko, Tayu Wu, Yasushi Maeda, Beatriz Calderon

19.00 **GALA DINNER** Leaving the venue at 17.45

THURSDAY MORNING
25 MAY 2023

CITRUS ROOM

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10:10–10:30 Coffee break

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- 10.30 166 Unraveling pH effects on UF membrane fouling by extracellular polymeric substances: Adsorption and conformation analyzed with localized surface plasmon resonance**
Noya Ran, Revital Sharon-Gojman, Sara Larsson, Osnat Gillor, Meagan S. Mauter, Moshe Herzberg
- 10.50 181 Fouling of reverse osmosis membrane with effluent organic matter: componential role of hydrophobicity**
N. Stein, R. Sharon-Gojman, M.S. Mauter, R. Bernstein, M. Herzberg
- 11.10 69 Analysis of fouling potential in capacitive deionization (CDI) in the presence of organic matters and hardness ions**
Yesol Kim, Hyeonrak Cho, Yongjun Choi, Jaewuk Koo, Sangho Lee
- 11.30 49 Fuel cell combined with turbine and then integrated with reverse osmosis (RO)**
Abdulrahman Alharbi

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29 SWRO desalination

- 12.10 157 Microbiological monitoring of SWRO desalination plants during prolonged standby periods - the Cyprus challenge and experience gained during the past 10 years**
Erineos Koutsakos, Aristos Loucaides, Louisa Christodoulou, C. Stylianou, K. Michail
- 12.30 158 SWRO desalination as the sole contributor to drinking water sustainability in Cyprus – 25 years of experience**
Aristos Loucaides, Erineos Koutsakos, Christie Stylianou, Louisa Christodoulou
- 12.50 25 From dams to water distribution systems: requirements and suitable solutions**
Elisa Reggiani
- 13.10 213 Innovation for sustainable desalination and water reuse**
Nikolay Voutchkov

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26 Contaminant removal

10.30 72 Experiences of desalination for agriculture in Spain: technology, economics and innovation

Patricia Terrero, Domingo Zarzo

10.50 3 Boron removal through water softening in presence of ettringite

M. Tagliabue, M. Baric, N. Zubin, G. Marra, S. Perucchini, C. Mazzara, E. Lagrotta

11.10 164 Boron rejection with RO facilitated by direct, accurate, and automatic measurement of boron

B.J. Verdonk, L. Navarro

11.30 208 Blending desalinated water and treated surface water: a case study at Cyprus's Tersefanou Water Treatment Plant

J. Philippou

11.50–12.10 Coffee break

30 Post treatment / pretreatment

12.10 30 Magnesium supplementation of drinking water

Christopher Michael Fellows, Seungwon Ihm

12.30 149 Retrofit of lime dosing systems in Europe for post-treatment of desalinated water

Nicholas Charles Nelson, Antonella De Luca

12.50 163 Remineralization of desalinated water with calcium carbonate: a comparative study for a 281 MLD SWRO plant

A. De Luca, J. Martin, N. Nelson, D. Pastorelli

13.10 211 Assessment to improve remineralization in Porto Santo desalination plant

S. Arenas Urrea, Juan A. de la Fuente Bencomo, B. Peñate Suárez, N. Escórcio Pereira, J. Heliodoro Xavier de Fritas Viera

13.30 172 Sustainable desalination showcasing the submerged UF membranes pre-treatment at the Adelaide desalination plant

H.A. Lazaredes, J. Artal González, Rimon Gergawy, Guillem Gilabert-Oriol, Jan Radel

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Borja Blanco, Beatriz Garcia, Jo Jernsletten, Guillem Gilabert-Oriol, Verónica García-Molina

10.50 82 Subsea desalination — significant energy savings and greatly reduced environmental impact

Christian Abellsson, Alexander Fuglesang

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Tom Ruiter, Heike Glade

11.30 170 Utilize hydrogen from electrochlorination

Ahmad Al Ghamdi, Amr Mahmoud, Basil Al-Rajhi

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Fernan David Martinez Jimenez, Bastiaan Blankert, Cristian Picioreanu

12.30 35 Three-dimensional concentration-polarization modelling of trace-ions in reverse osmosis membrane processes

Santiago Cespedes, Fernan Martinez-Jimenez, Felipe Salto-Quintana, Bastiaan Blankert, Cristian Picioreanu

12.50 48 SDE-A model to predict salt rejection by weakly charged RO/BWRO membranes

B. Blankert, F.D. Martinez, J.S. Vrouwenvelder, C. Picioreanu

13.10 174 Improvement in brine recovery application thanks to FilmTec™ SWBR-100 element and FilmTec™ SWBR-200 element modelling

David Arias Peña, Guillem Gilabert-Oriol, Maria Pérez Macia, Harith Al-Omar, Claudia Niewersch, Gerard Massons

13.30 73 Integrated modelling of future energy-water systems using minimum liquid discharge (MLD) strategies

Nikhil Dilip Pawar, Manuel Wetze

13:50–15:00 Lunch

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10:10–10:30 Coffee break

28 Machine learning and digitization

10.30 63 Machine learning framework for efficient and predictive reverse osmosis desalination

Najat Amin, Adnan Qamar, Sarah Kerdi, Ratul Das, Thomas Altmann, Johannes S. Vrouwenvelder, Noredine Ghaffour

10.50 88 A machine learning deployment to a large seawater reverse osmosis plant to save energy

Mike Dixon, Nick Herold, Miller Truby, Katie Higgins, Sandro Hansen

11.10 54 Intelligent framework for coagulant dosing optimization in industrial-scale desalination

Muhammad Ghifari Ridwan, Ratul Das, Thomas Altmann

11.30 150 DuPont Water App: Transforming the digital space of desalination

María Ángeles Pérez-Maciá, Guillem Gilabert-Oriol, Javier Suárez, Laura Galindo, Veronica Garcia-Molina, Rafael Buendia Candel

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32 Mineral recovery/brine concentration

12.10 201 Minimum liquid discharge desalination: a pilot study in Lampedusa island
F. Vassallo, C. Morgante, C. Cassaro, G. Virruso, D. Diamantidou, N. Van Linden, G. Scelfo, A. Tamburini, S. Randazzo, A. Trezzi, A. Cipollina, G. Micale, D. Xevgenos

12.30 202 Ultra-high recovery multi-effect distillation for nearly-liquid discharge desalination

Giuseppe Scelfo, Alessandro Trezzi, Fabrizio Vassallo, Andrea Cipollina, Vittorio Landi, Christina Xenogianni, Alessandro Tamburini, Dimitris Xevgenos, Giorgio Micale

12.50 203 Metal-organic-framework-based nanofiltration membranes for selective multi-cationic recovery from desalination brines

C. Morgante, V. Boffa, X. Ma, J. Lopez, J. Cortina, A. Cipollina, A. Tamburini, G. Micale

13.10 204 Pilot scale production of highly pure $Mg(OH)_2$ compound from real saltworks bittern

G. Battaglia, L. Ventimiglia, F.P.M. Viggiano, A. Cipollina, A. Tamburini, G. Micale

13.30 206 Advanced adaptable desalination evaporator design with polymer-based heat exchanger for brine concentration and optimized evaporator performance

Panagiotis Pappas, Dimitrios Xevgenos

13:50–15:00 Lunch

THURSDAY
25 MAY 2023

PARK ROOM

15:00 CLOSING CEREMONY

**Miriam Balaban Outstanding Technical Published Paper and
Miriam Balaban Innovation Award. Sponsored by ACWA Power**

Loeb Award

Best poster award

Global Prize for Innovation in Desalination (GPID)

Corrado Panzeri, Partner, The European House-Ambrosetti
Esmeralda Leyva, GPID-Director, The European House-Ambrosetti

FRIDAY
26 MAY 2023

9.00–15.30 Desalination Site Visit (maximum 50 people)

8.30–16.30 Workshop

Solar-powered high-recovery groundwater desalination with salt-tolerant crop cultivation for integrated brine management

Lecturers: *Guillermo Zaragoza, Plataforma Solar Almería, CIEMAT, Spain*
Philip Davies, University of Birmingham, UK
Moshe Sagi, Ben Gurion University, Israel

This one-day workshop is organised by the INDIA H₂O* team in partnership with the European Desalination Society. It is intended for PhD students, Early Career Researchers, established researchers, or desalination professionals with interest in learning more about the design, installation and troubleshooting of decentralised inland desalination plants that avoid the problems of high energy costs and unmanaged brine discharge. Participants will learn about how to design a solar-powered desalination plant using batch reverse osmosis principles. They will also learn about how to couple the design with cultivation of salt-tolerant edible crops (halophytes) such as *Salicornia* that are ideal for growing in desert climates. Examples will be provided from desalination systems developed in the INDIA H₂O project. The workshop will include presentations by experts and hands-on design activities in groups. Key resources will be provided for the participants to take away.

Attendance is free.

* *INDIA H₂O stands for 'bio-mimetic and phyto-techNologies Deslgned for low-cost purficcAtion and recycling of water'. It is bilateral project funded by the European Union Horizon 2020 programme and by the Department of Biotechnology, India. More information may be found at: <https://www.india-h2o.eu/>*



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Amr Mohamed Seoudy, Hossam Kamal
- 24** **Removal of atrazine from water by micellar enhanced ultrafiltration with nonionic-cationic surfactant mixtures**
Olga Kochkodan, Viktor Kochkodan
- 37** **The microbial growth potential of antiscalants used in seawater desalination**
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Binash Imteyaz, Furqan Tahir
- 45** **Co-design of an off-grid community desalination system in the Navajo Nation**
Melissa Brei, Jimmy Tran, Jeffrey Costello, Amos G. Winter V
- 59** **Can 1D modeling approach sufficiently describe the membrane performance?**
Felipe Salto Quintana, Fernan David Martinez Jimenez, Bastiaan Blankert, Cristian Picioreanu
- 60** **The pH influence in concentration-polarization model on RO membranes**
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Mustapha Adjadj, Nadjib Drouiche, Saliha Fortas, Wahid Zanndouche, Rafika Khacheba, Abbes Hamani, Naima Benmouhoub
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J. Gilron, M. Elimelech
- 76** **Optimized ultrafiltration membranes as pretreatment for seawater reverse osmosis desalination**
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- 77** **Digitalization of reverse osmosis water vending machines**
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- 78** **Water reuse in the textile industry with integrated treatments: membranes and advanced oxidation processes**
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- 98** **Effect of active control of tightening forces on the behavior of electro dialyzers**
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Ibrahim O. Althobaiti
- 193** **New methodology for calculating the production of biogas in livestock wastewater treatment systems**
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- 197** **Implementation and design of an electrical characterization system for membrane capacitive deionization units in water treatment, with teaching purpose**
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- 198** **Design, research, and development of surface tension equipment with teaching purpose**
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Circular Desalination: Value Chains & Sustainability

Monday 22 May 2023, 10.30–16.00

Parklane Hotel

Meeting Room: Park Room

This workshop aims at structuring the problems arising from the transition of existing linear desalination sociotechnical systems into circular & carbon neutral ones. Building upon the results of a novel technical demonstration of WATER-MINING project (budget: 19 million EUR) we explore the social embedding of the Circular Desalination solution within the context of Cyprus, co-creating together with key stakeholders the emerging value chains in a sustainable fashion. The end goal is to build a master plan for Cyprus to be widely accepted through consensus building. The plan is intended to act as the basis for establishing the first of its kind implementation to be replicated in the wider region of the EU-Mediterranean region.

9.30 Registration

10.30–13.00 Part I : Sustainable Desalination: EU developments and WATER-MINING project (landscape and niche levels)

10.30 Opening. **Dimitris Xevgenos**, Assistant Professor in Circular Water Value Chains and Sustainability, Technology, Policy and Management faculty, Delft University of Technology

10.35 Arnoldas Milukas, Head of Unit “Biodiversity, circular economy and environment”, European Research Executive Agency

10.45 Setting the scene: Desalination, Circularity & Sustainability and the WATER-MINING project

Dimitris Xevgenos, Executive Project coordinator WATER-MINING, Delft University of Technology

Presentations and panel discussions

This session includes four thematics each starting with one presentation and then a panel discussion, including the presenters and the following panelists:

Violeta Kuzmickaite, Project Adviser, European Research Executive Agency

Panagiotis Balabanis, Head of Sector Water, B1 – Circular Economy and Biobased Systems, DG Research and Innovation

Marilena Papastavrou, National Contact Point for LIFE Programme, Ministry of Agriculture, Rural Development and Environment

Thomas Track, Head of Water Management Division, DECHEMA





Frithjof Kuepper, Professor, University of Aberdeen
Makis Ketonis, President, Cyprus Hydrogen Association

11.00 Value Chains and (secondary) raw materials

Ángel Prior, Project Officer — Critical materials and strategic value chains for the Energy transition, Joint Research Center

European Commission fundings

Francesco Matteucci, Program Manager in Green Technologies, EIC Accelerator
Joao Serrano Gomes, Policy Officer, Low Carbon Solutions Research and Low Carbon Technology Deployment, DG CLIMA

11.50 Short Q&A

12.00 Environmental pressures and regulations

Erol Cavus, Programme Management Officer at UN Environment Programme

Desalination and energy nexus

Guillermo Zaragoza, Head of Solar Thermal Applications R&D at Plataforma Solar de Almería (CIEMAT)

12.50 Short Q&A

13.00 Lunch break

13.30–16.00 Part II: Sustainable Desalination in Cyprus (mainstream regime transformation)

13.30 Circular and Decarbonized Desalination: the case of Cyprus

Dimitris Xevgenos, Exec. Project coordinator WATER-MINING. TU Delft, the Netherlands and **Giorgio Micale**, Professor University of Palermo

Presentations and panel discussions

This session includes four thematics each starting with one presentation and then a panel discussion, including the presenters and the following panelists:

Dimitris Petrides, Industrials Extensions Officer, Ministry of Energy, Cyprus Government
Gianni Chianetta, Founder and Director, Greening the Islands
Johnson Roussety Gosk, Chief Commissioner of Rodrigues
Jean Nicholas Volbert, Commissioner for Health of Rodrigues
Stavros Caramodanis, CEO, Caramodani Desalination Plants Ltd.
Olga Salangos, Plant manager of Dhekelia Desalination plant
Andreas Gregoriou, Permanent Secretary, Ministry of Agriculture, Rural Development and the Environment, Cyprus Government
Effie Attikouri, Water Development Department, Ministry of Agriculture, Rural Develop-





ment and the Environment, Cyprus Government

Evrripides Kyriakides, Senior Electrical/Mechanical Engineer, Water Development Department, Ministry of Agriculture, Rural Development and the Environment, Cyprus Government

Chrystalla Stylianou, Department of the Environment, Ministry of Agriculture, Rural Development and the Environment, Cyprus Government

Angelos Hadjiharalambous, General Manager, Larnaca Sewerage and Drainage Board

Constantinos Antoniadis, Department of Fisheries and Marine Research, Ministry of Agriculture, Rural Development and the Environment, Cyprus Government

Andri Demetriadou, Director of Energy and Environment Department, Cyprus Employers and Industrialists Federation

13.45 Renewables and hydrogen plans in Cyprus

Marios Georgiou, Head of Proteas, Energy, Environment and Water Research Center, Cyprus Institute

Desalination: current regime and challenges

Michael Michael, Manager, Non regulated services, Electricity Authority of Cyprus

14.35 Short Q&A

14.45 Replicability potential, business models and other case studies

Konstantinos Stroutzas, R.E.S Manager, ITA Group

Manuel Sapiano, CEO, Water and Energy Agency, Government of Malta

15.35 Short break

15.45 Wrap up and Closure

Key learnings from the workshop:

Conclusions by the moderator

Main take-aways and recommendations from panelists

Follow-up actions



FRIDAY
26 MAY 2023

VISIT

Visit to Desalination Plants

We are leaving from the Park Lane Hotel on May 26th at 9 am heading to the Paphos Desalination plant. We will arrive at about 10 am and will stay there for about one hour having the opportunity to see a plant operating with piston high pressure pumps at very low energy consumption. From the Paphos plant we will move to the Proteas solar Research institute, arriving at about 12:30 pm, where seawater desalination (FO and MED) is 100% operated from CSP in the forms of solar panels, heliostats and windmills. Our last stop will be at the Vasilicos Desalination Plant, where we will arrive by 2 pm and will have the opportunity to see a desalination plant operating with the cascade method to remove boron from the permeate water. We will be back to the Park Lane Hotel by about 3:30 pm.



Kindly note that we will stay at the Paphos and Vasilicos Desalination Plants for 1 h and 15 min and we would appreciate if coffee/tea/water + some finger food can be offered. At the Proteas center, the visit will be only for one hour. We need to be very strict with the timing as people need to be back at 3:30 pm as some of them are traveling back to their countries and need to be on time at the airport.



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The Saline Water Conversion Corporation (SWCC), the Saudi agency responsible for seawater desali-

nation, is the world's largest producer of desalinated water, producing 5.9 million m³/d and is on track to increase capacity to 8m m³/d by 2030, in addition to adding nearly 3 million m³/d capacity of dam-reservoir-well water. It holds the Guinness Book of World Records title for lowest energy consumption in desalination with 2.27 KW/h/m³. It operates 32 plants, with over 8,400 km of transmission lines throughout Saudi Arabia. Its commitment to sustainability and energy reduction in desalination under Saudi Vision 2030 is helping drive innovation across the industry. As a leader in desalination, SWCC greatly values its stakeholders and partners who share in its success.

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Contact: Martin You, Senior Global Marketing
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LG Chem manufactures NanoH₂O™ seawater and brackish water reverse osmosis (RO) membranes based on the innovative Thin-Film Nanocomposite (TFN) technology. TFN technology increases membrane flux by up to 20% without compromising salt rejection. Seawater RO membranes deliver industry-leading 99.89% salt rejection, delivering superior water quality.

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Contact: Elena Reyna,
Marketing & Communications Director

The company leads the water treatment sector through its design, construction and operation of drinking water treatment plants, wastewater treatment plants, reverse osmosis desalination plants and tertiary treatments for water reuse and has reinforced its focus on services for cities.

At ACCIONA, we work to help create a better planet through the mechanisms which make us leaders and pioneers in the sustainable desalination sector.

We only carry out water desalination by reverse osmosis — the best desalination technology for providing fresh water in water stressed areas and for promoting a decarbonized economy.

We have built desalination plants capable of treating more than 5 million m³/day, sufficient to supply a population of about 25 million people.

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Caramondani Desalination Plants Ltd.

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Caramondani Desalination Plants Ltd specialize in design, construction, installation, commissioning, start-up and operation of reverse osmosis plants, ultrafiltration, microfiltration units. The company offers BOOR, BOOT, BOO facilities in accordance with the client's needs.

GOLD SPONSOR

Danfoss High Pressure Pumps

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Contact: Claudio Giancotti



Danfoss High Pressure Pumps is a global leading supplier of energy-efficient high-pressure pumps and energy recovery devices (ERD) for the sea-water reverse osmosis market. We offer an extensive range of both pumps and ERDs, which are suitable for small to large SWRO plants.

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Contact: Rachele Sanders, Marketing Manager

Energy Recovery creates technologies that solve complex challenges for industrial fluid-flow markets worldwide. Building on our Pressure Exchanger (PX) technology platform, we design and manufacture solutions that make industrial processes more efficient and sustainable.

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TEMAK S.A.

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Contact: Stathis Matos, Dsales Director



TEMAK S.A. is a leading Greek company that designs and manufactures water treatment systems for a wide range of applications such as sea and

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brackish water desalination plants, water treatment systems for potable use, renal dialysis units, boilers, etc. TEMAK systems can be provided in mobile units, containerized or onboard vehicles. TEMAK is certified to ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, CE Medical and ISO 13485:2016. With over 40 years of experience and continuous growth TEMAK attends the future with optimism and targets to further expand its activity in the international market.

SILVER SPONSOR

Electricity Authority of Cyprus

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Contact: Michalis Michael,
Manager of Non-Regulated Activities



Electricity
Authority
of Cyprus

The Electricity Authority of Cyprus is a vertically integrated public utility. It has four core regulated activities – the monopoly activities of transmission and distribution and the competitive activities of generation and supply.

Furthermore, a Non-Regulated Activities Unit has been set up to deal with additional activities, such as services to third parties, e-charge service, desalination, etc.

SILVER SPONSOR

ENOWA

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Marketing Snr. Specialist – Water

ENOWA.
NEOM

ENOWA is a world-class Energy, Water, and Hydrogen company founded in NEOM, Saudi Arabia. ENOWA produces and delivers clean and sustainable resources for industrial and commercial ap-

plications using a customer-centric smart and connected system designed to be circular and takes advantage of NEOM's optimal solar and wind energy profile. ENOWA benefits from NEOM's greenfield site, which has no legacy infrastructure, to advance energy, water, and hydrogen innovation. ENOWA will act as a catalyst and incubator for developing new, sustainable energy and water businesses while creating a robust economic sector regionally. Through its commitment to renewable energy and efficient water management, ENOWA seeks to become a global reference for industry leaders and setting a benchmark for sustainable economic circular systems around the world.

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(Fluid Equipment Development Company)

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Contact: Giovanni Boschetti,
Regional Sales Manager – Europe

FEDCO's commitment to the world's water resources and natural environment drives our highly efficient pumps and energy recovery devices, as well as our cutting-edge reverse osmosis research. With over 20,000 pumps and ERDs shipped globally, including to some of the world's largest desalination facilities, we partner with our clients to deliver optimized RO to suit their needs.

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SYCHEM is a Greek group of companies with an international presence. Founded in 2001, it is a diversified, design and manufacturing company in water and wastewater treatment, corrosion, engineering, biogas, and energy saving. The headquarters of the group are in Athens and industrial facilities/offices in Heraklion and Limassol.

AGRU XXL Piping Systems/BMC Gulf AGRU Kunststofftechnik GmbH



BMC Gulf

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Contact: Markus Ebster, Business Unit Manager

AGRU supplies thermoplastic technology for sea-water desalination plants. Seawater intake and discharge lines, particle settlement tanks, filter feed pumps, pre-treatment filters, RO modules, potable water storage tanks/supply pipes, process chemical tank farm, brine discharge tanks, etc. are just a few of AGRU's range of solutions.

Pipes, concrete protective liners and semi-finished products made from various high quality plastic materials.

BMC Gulf is a leading thermoplastic fabrication company with over 25 years' experience. In the field of desalination, we manufacture permeate header piping, ERD piping and DAF systems made of HDPE or PP, chemical dosing systems made of PVDF and ECTFE as well as custom-specific manifolds, spools and tanks.

American Water Chemicals

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Contact: Daniele Strongone,
Business Manager - EMEA

American Water Chemicals (AWC) manufactures specialty chemicals for pretreatment and maintenance of membrane systems and is ISO 9001:2015 certified. We improve membrane system performance and optimize cost of operation by diagnosing and solving complex problems using advanced analytical methods. AWC is a pioneer in advanced membrane autopsy techniques and investigative services. For more information visit www.membranechemicals.com



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Contact: Hannes Schweighart
Sales Manager Pumps EMEA

International technology group ANDRITZ offers a broad portfolio of innovative plants, equipment, systems and services. The publicly listed group has more than 280 locations in 40 countries.

ANDRITZ provides the complete pump portfolio and technical support for efficient and economic desalination as well as for all necessary production steps.

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Aquamatch is a water treatment company located in Istanbul, Turkey. Aquamatch aims to find solutions to periphery country's critical water challenge through infrastructure projects and technical assistance. Aquamatch manufactures its water treatment systems from highest quality equipment. Aquamatch works with industrial clients to tailor cost-efficient systems and delivers everywhere in Europe, Asia and Africa.

BEL Composite Iberica SL

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Contact: : Nadav Shachaf, Manager

BEL is a world specialist European manufacturer and vendor of Pressure Vessels for Reverse Osmosis Systems, offers worldwide sales and support services from its state-of-the-art certified manufacturing plant in Spain.

BEL produces the full range of 8" and 4" vessels, as well as 4.6", 9" and 16" vessels.



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Contact: Felix Broens - CTO

DEMCON Convergence is a specialist in producing custom made lab-scale pilot and test equip-

ment for various membrane applications. This includes reverse osmosis, forward osmosis, membrane distillation and many other filtration processes.

Dryden Aqua Distribution AG

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Contact: Jochen Kallenberg,
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AFM® Activated Filter Media is a direct replacement for sand, doubling the performance of sand filters.

AFM® reduces feed to filtrate SDI by up to 70% thereby optimizing reverse osmosis pre-treatment performance and operating cost.

AFM® is a sustainable highly engineered filter media with optimum particle size and shape to acquire superior filtration properties and comes with a biofouling resistant surface.

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DÜCHTING PUMPEN is a 3rd generation privately owned company based in Germany with more than 80 years of experience in the field of advanced centrifugal pumps for use in the desalination reverse osmosis industry, flue gas desulfurization industry, mining industry and chemical pigment industry.

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DuPont Water Solutions is a global leader in sustainable separation and purification technology, helping customers across industries and countries make real progress in ways that not only improve productivity, efficiency, and profitability, but also reduce waste, energy consumption and environmental impact.

DuPont Water Solutions helps make water safer and more accessible, food taste better, pharmaceuticals more effective and industries more efficient. DuPont Water Solutions offers a broad portfolio on ion exchange (IX), reverse osmosis and nanofiltration (RO & NF), ultrafiltration (UF), Membrane bioreactor (MBR), Membrane Aerated Biofilm Reactor (MABR), Degasification, Closed Circuit Reverse Osmosis (CCRO), B-Free and electro-deionization (EDI) technologies, with strong positions in a number of major application areas or market segments, including municipal and potable water, industrial water, industrial wastewater reuse and specialty solutions.

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Flowserv manufactures and services fluid motion control solutions for the world's toughest, most critical applications. With over 200 years of diversified industrial manufacturing expertise and sustainable solution development under our belts,



Flowserv proudly moves, controls, and protects the flow of materials in the world's most critical applications.

Since the founding of our first legacy brand, Simpson & Thompson, in London in 1790, Flowserv has continued to innovate and leverage the strength of our people to create solutions that help customers to keep the lights on, provide energy for transportation services, material for consumer needs and more.

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www.innovatedesal.org

Rewarding Great Minds & Great Innovators in creating Next-Generation Desalination

Addressing global water security and building a sustainable world, the Global Prize for Innovation in Desalination (GPID) supports the work and achievement of individuals, NGOs, companies, private and publicly funded research centres around the world that are developing breakthrough technologies and processes in desalination and water treatment to make water abundant, affordable and accessible while being sustainable.

GPID prize winners are awarded a monetary prize and, most importantly, access to commercial-scale piloting and business incubation opportunities in the world's largest and most technologically advanced desalination installations located in Saudi Arabia.

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Eligible applicants are evaluated by an international jury of experts, and winners will be announced at the GWI-SWCC Future of Desalination Riyadh Conference, 25–27 September 2023
Submission deadline: 30 June 2023

For questions and info: www.innovatedesal.org

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iNPIPE PRODUCTS™ has been designing, manufacturing, testing and operating integrated pigging systems for almost 4 decades. Based upon our extensive experience we offer solutions tailored for the cleaning of water intake pipes, a mechanical and environmentally friendly method to systematically remove problematic marine deposits from the pipeline to maintain optimum flow rate and consequently ensure full investment return without interruption.



International Desalination Association

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The International Desalination Association is the point of connection for the global desalination and water reuse community. A non-profit association, IDA serves more than 2,600 core members in 60 countries and reaches an additional 4,000 affiliate members. Its membership comprises scientists, end-users, engineers, consultants and researchers from governments, corporations and academia. IDA is associated with the United Nations as part of a growing international network of non-governmental organizations (NGOs).

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Protec Arisawa is the Global Leader for the design and the manufacturing of Fibre Reinforced Plastic Pressure Vessels for membrane Filtration Systems.



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Production of valves: gate, butterfly, globe, air, fixed cone, plunger valves.

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Fields of application: hydropower, water supply systems, water and wastewater treatment plants, reverse osmosis, sewage systems, industrial plants, pumping stations and firefighting systems. Established 1976.

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