



**ZERO BRINE**

## **D10.6 Final conference proceedings**

FEBRUARY 2022

FINAL



The ZERO BRINE project ([www.zerobrine.eu](http://www.zerobrine.eu)) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730390.

Deliverable 10.7	Report on capacity building events
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<b>Deliverable lead</b>	REVOLVE
<b>Author(s)</b>	Danielle Kutka (REVOLVE) Diana Keijzer (TU Delft)
<b>Contact</b>	danielle@revolve.media
<b>Reviewer</b>	Roelof Moll, TU Delft
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<sup>1</sup> **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other

<sup>2</sup> **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified

## Executive Summary

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Task 10.7 on the concluding ZERO BRINE conference was organised within the context of the Amsterdam International Water Week (AIWW), allowing three subsequent days of activities that culminated with the project's final forum in Delft on 4 November 2021.

This document outlines these final project activities, which was led by TU Delft with the support of REVOLVE and all ZERO BRINE partners to disseminate the final project results.

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## 1. Overview of the project

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The ZERO BRINE project aims to facilitate the implementation of the Circular Economy package and the SPIRE roadmap in various process industries by developing necessary concepts, technological solutions and business models to redesign the value and supply chains of minerals and water while dealing with present organic compounds in a way that allows their subsequent recovery.

Minerals and water will be recovered from saline impaired effluents (brines) generated by the process industry while eliminating wastewater discharges and minimising the environmental impacts of industrial operations through brines. ZERO BRINE brings together and integrates several existing and innovative technologies to recover products of high quality and sufficient purity to represent good market value.

A large-scale demonstration plant was tested in the Energy Port and Petrochemical cluster of Rotterdam Port from residual heat from one of the factories in the port. The quality of the recovered products is aimed to meet local market specifications. Additionally, three large-scale pilot plants have been developed in other process industries in Poland, Spain, and Turkey, providing the potential for immediate replication and uptake of the project results.

## 2. Scope of Deliverable

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This deliverable outlines the ZERO BRINE final project activities led by TU Delft with the support of REVOLVE and all partners. This includes the organisation of a digital expert panel as part of AIWW (2 November), participation to AIWW's live opening session on Recover, Reuse, and Recycle, (3 November) and the ZERO BRINE Final Forum (4 November).

## 3. AIWW collaboration

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With the aim to maximise the potential dissemination of ZERO BRINE results to water industry professionals, a strategic collaboration was arranged with the organisers of Amsterdam International Water Week that allowed ZERO BRINE to play a key role in the event programme.

The first point of collaboration was AIWW allowing ZERO BRINE to host a digital expert panel entitled 'Recovering Resources from Industrial Wastewater' on 2 November 2021. The event was coordinated

in close collaboration with TU Delft and REVOLVE, two days before the final conference. The second point of collaboration was ZERO BRINE's contribution to the in-person AIWW plenary on 3 November on 'Recycle, reuse, and recover,' represented by ZERO BRINE's Scientific Coordinator, Luuk Rietveld and ZERO BRINE's Innovation Manager, Dimitris Xevgenos. Luuk Rietveld also served as a moderator for two different AIWW sessions, representing ZERO BRINE.

In terms of communications and promotion surrounding the final conference activities, both the digital panel and final conference were featured on the project's event calendar and promoted to subscribed stakeholders via the project newsletter, while the digital panel was also promoted on social media in a [series of sharables](#).

The event description and speakers were as follows:

**Title:** [Recovering Resources from Industrial Wastewater, Expert Panel at AIWW \(Digital\)](#)

**Date:** 2 November 2021 – 14:00-15:00 CET

**Description:** Learn the latest technological innovations in industrial wastewater circularity as our panellists discuss projects at the forefront of recovering valuable resources from industry brines. Will 'mining' resources from industrial brine be key for Europe's economic competitiveness? Join us to gain a new perspective of how opportunities in brine management a contender for building climate resilience could also be more globally.

**Speakers:**

***ZERO BRINE: A circular economy approach*** - Roelof Moll - Executive Coordinator of the ZERO BRINE project, and Manager of the Hydraulic Structures & Flood Risk section at TU Delft (The Netherlands).

***Circularity and industrial wastewater*** - Chrysi Laspidou - Professor at the Civil Engineering Department, University of Thessaly (Greece) and Vice-President of Research and Technology, Water Europe (Belgium).

***Building a water-smart economy & society in the context of circular economy*** - Dimitris Xevgenos - Executive Coordinator of the WATER-MINING project and Innovation Manager of the ZERO BRINE project, both of which are funded by Horizon 2020.

***NEOM*** - Noura Chehab - Water Research and Innovation Manager for the Water sector at NEOM (Saudi Arabia) where she is responsible for global business development.

Moderation: Stuart Reigeluth - Founder of REVOLVE

An estimated 50 attendants participated to the expert panel. The event presentations are available on the [ZERO BRINE website](#).

The planning of the Final Conference in cooperation with the Amsterdam International Water Week was coordinated with the planning of the AQUATEC exhibition in Amsterdam.

Conference participants were offered the possibility to visit this large and attractive event for water industry professionals.

## 4. Final Forum

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The [ZERO BRINE Final Forum](#) was organised as an in-person event at De Oude Bibliotheek in Delft, the Netherlands, on 4 November 2021. The decision was made by TU Delft to have a physical event, which, due to COVID-19 restrictions, meant that a limited number of participants were permitted to the venue if in compliance with vaccination or negative test result. Due to this, all registrations were reviewed, but impacted the total amount of participants that could attend, as the GA had previously communicated 500 participants. Consortium partner attendees were prioritised, as well as industry partners with close connections or keen interest in the project. In some instances, project partners could not attend due to travel restrictions.

The event gathered 46 participants, 6 participants outside the ZERO BRINE consortium representing industry professionals. TU Delft chose to prioritise the event as an in-person event, thereby making livestreaming only available for those that were giving virtual presentations. REVOLVE managed the live Twitter feed during the conference, ensuring representation of each presentation. Following the event, the final presentations were made available on the [ZERO BRINE website](#) and included in the final newsletter which compiled all final deliverables and project outputs.

The programme (See Annex) was structured to first present the key results of the project, focused on the research findings, and ended with the impacts of ZERO BRINE. The morning session included an overview of the project objectives, then showcased the respective pilot project videos which contextualised the issue of industrial brine releases, explained the technology schemes employed per pilot, and the final results in terms of environmental and economic impacts. The following presentations included highlights on the tools that were developed from ZERO BRINE, including the Brine Excellence Centres, simulation suites, and a demonstration of the Online Brine Platform.

The afternoon session on research included two-part presentations of the research articles accepted to the ZERO BRINE Special Issue. The presenters and topics were: Mechanisms controlling ion rejection in membrane filtration in presence of saline multiionic mixtures – Dionysia Diamantidou, Process and R&D Engineer, Lenntech; Valorization of Coal Mine Effluents – Challenges and Economic Opportunities – Nikhil Pawar, PhD candidate, DLR; Using life cycle assessment at an early stage of design and development of zero discharge brine treatment and recovery – Nilay Elginöz, Senior researcher, Swedish Environmental Institute (IVL); High silica concentration in RO concentrate – Amir Haidari Manager of Process Technology and Innovation, Hatenboer-Water; Benthic biodiversity and environmental gradients of the Port of Rotterdam: A unique estuarine system with strong human impact – Frithjof Kuepper, Professor, University of Aberdeen; Physicochemical model for simulating the chemical processes during the crystallization of minerals from spent Ion Exchange Regenerant – Dr. Marc Arpad Boncz, Associate Professor UFMS (Brazil); Pilot studies on circular economy solution for the coal mining sector – Dr. Krzysztof Mitko, Assistant Professor, SUT.

Lastly, the final afternoon slides focused on the impacts of ZERO BRINE integrating sustainability, policy, and industry perspectives, and included a debate with Loic Charpentier (Water Europe), Corinne van Voorden (Advisory Board Member) and Gijsbert Korevaar (TU Delft). Finally, the closing wrapped up the key achievements of the project with the presentation the white paper ‘Towards a ZERO BRINE Circular Economy’ where highlights on the key contributions of ZERO BRINE on advancements to circular economy in policy, technology, and business in Europe and beyond were featured.





Figure 1 Final Forum Participants

## References

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NA

## Annex

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[KEY RESULTS – MORNING SESSION \(LINK\)](#)

[ZERO BRINE RESEARCH – AFTERNOON SESSION \(LINK\)](#)

[IMPACT OF ZERO BRINE – CLOSING SESSION \(LINK\)](#)

FINAL FORUM PROGRAMME

SIGNED PARTICIPANT LIST

# ZERO BRINE FINAL FORUM

DE OUDE BIBILOTHEEK, DELFT, THE NETHERLANDS  
4 NOVEMBER 2021 (10:00-16:30 CET)



## PROGRAMME

### Key ZERO BRINE Results – Morning Session

- 10:00** Opening and welcome *Ir. Roelof Moll, Executive Project Coordinator, ZERO BRINE*
- 10:10** Presentation of ZERO BRINE *Prof.Dr.Ir. Luuk Rietveld, Chair of Department of Water Management, Technical University of Delft*
- 10:30** ZERO BRINE Pilot Plants: Spain, Poland, The Netherlands and Turkey *Dr. Xavier Martinez, Director of Water, Air and Soil Unit, Eurecat | Dr. Krzysztof Mitko, Assistant Professor, Silesian University of Technology | Dr.Ir. Henri Spanjers, Associate Professor and Industry Water Group Lead, Technical University of Delft | Dr. Ahmet Baban, Associate Professor and Senior Research Scientist, TÜBITAK*
- 11:00** Demonstration of Brine Excellence Centres: Technologies and Simulation suites *Dr.Ir. Henri Spanjers, Associate Professor and Industry Water Group Lead, Technical University of Delft*
- 11:15** Demonstration of the Online Brine Platform *Maria Kyriazi, Senior Researcher, National Technical University of Athens | Kees Roest, Programme Director, Institute for Sustainable Process Technology*
- 11:30** Coffee Break

### ZERO BRINE Research – Afternoon Session

#### **11:45** ZERO BRINE Special Issue – Part I

Mechanisms controlling ion rejection in membrane filtration in presence of saline multi-ionic mixtures *Dionysia Diamantidou, Process and R&D Engineer, Lenntech*

Valorization of Coal Mine Effluents – Challenges and Economic Opportunities *Nikhil Pawar, PhD candidate, DLR*

Using life cycle assessment at an early stage of design and development of zero discharge brine treatment and recovery *Nilay Elginöz, Senior researcher, Swedish Environmental Institute (IVL)*

**12:45** Lunch Break

**13:45** ZERO BRINE Special Issue – Part II

High silica concentration in RO concentrate *Amir Haidari Manager of Process Technology and Innovation, Hatenboer-Water*

Benthic biodiversity and environmental gradients of the Port of Rotterdam: A unique estuarine system with strong human impact *Frithjof Kuepper, Professor, University of Aberdeen*

Physicochemical model for simulating the chemical processes during the crystallization of minerals from spent Ion Exchange Regenerant *Dr. Marc Arpad Boncz, Associate Professor UFMS (Brazil)*

Pilot studies on circular economy solution for the coal mining sector *Dr. Krzysztof Mitko, Assistant Professor, SUT*

**14:45** Coffee Break

## Impact of ZERO BRINE – Closing Session

**15:00** Business cases and Circular Economy - Interactive Session *Dr. Dimitris Xevgenos, Innovation Manager and Managing Director, ZERO BRINE*

**15:30** ZERO BRINE and EU Policy Panel Discussion: ‘How can ZERO BRINE results support the development of circular economy within Europe through EU Policies?’ *Maria Kyriazi (Chair) | Loïc Charpentier, Water Innovation Policy Officer, Water Europe | Corinne van Voorden, Dutch Ministry of Economic Affairs, Netherlands Enterprise Agency and Member of Advisory Board, ZERO BRINE | Dr. Gijsbert Korevaar, Assistant Professor Policy Management Studies, TU Delft*

**16:00** Stakeholder Perspectives and Follow-up projects

Perspectives for desalination as regards Polish saline coal mine waters *PhD Eng. Grzegorz Gzyl Assistant Professor at Główny Instytut Górnictwa (GIG)*

Words from the Advisory Board *Michiel van Haersma Buma, Chairman of the Advisory Board, ZERO BRINE*

**16:30** Closure

*Conference Dinner + Cocktails*



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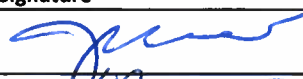



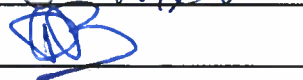


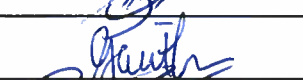




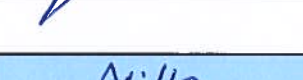
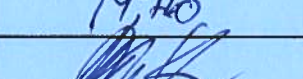



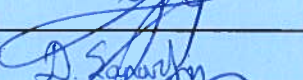
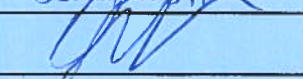


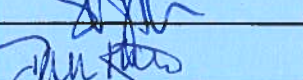
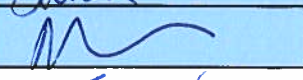





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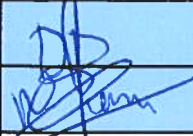
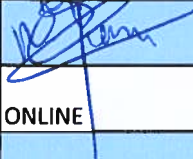
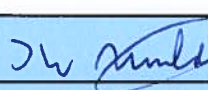
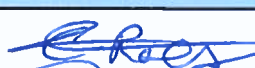
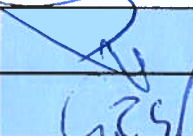
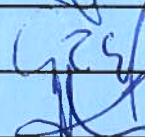
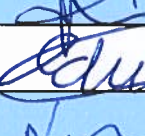


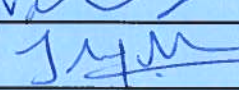
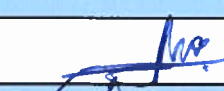


@zero\_brine\_

## PARTICIPATION LIST ZEROBRINE FINAL FORUM DELFT 4 NOVEMBER 2021

	Organisation	First Name	Last Name	Signature
1.	TU Delft	Roelof	Moll	
	TU Delft	Luuk	Rietveld	
	TU Delft	Henri	Spanjers	
	TU Delft	Gijsbert	Korevaar	
	TU Delft	Dunja	Swierstra	
	TU Delft	Diana	Keijzer	
	TU Delft	George	Tsalidis	
	TU Delft	Brian	Baldassarre	
	TU Delft	Hamed	Rastegarian	
	TU Delft	Naga Gautham	Pathi	
	TU Delft	Rogelio	Peschard Navarrete	
2.	NTUA	Maria	Kyriazi	
3.	EURECAT	Xavier	Martinez Lladó	
	EURECAT	Edxon	Licon	
4.	WITTEVEEN EN BOS	Jochem	Schut	
5.	UNIPA			
6.	SUT	Krzysztof	Mitko	
	SUT	Marian	Turek	
7.	FASCA	Elena	Zuriaga Agustí	
	FASCA	Ana	Bengochea Escribano	
	FASCA	Núria	Zamorano-López	
8.	SEALEAU	Dimitris	Xevgenos	
	SEALEAU	Despoina	Sapoutzi	
		Faidon	Petropoulos	
	SEALEAU	Kallirroï	Panteleaki Tourkodimitri	
9.	WATER EUROPE	Loïc	Charpentier	
10.	REVOLVE	Stuart	Reigeluth	
	REVOLVE	Danielle	Kutka	
	REVOLVE	Joshua	Franklin-Mann	
11.	UNIABDN	Frithjof	Kuepper	



# PARTICIPATION LIST ZEROBRINE FINAL FORUM DELFT 4 NOVEMBER 2021

	Organisation	First Name	Last Name	Signature
12.	LENNTech	Dionysia	Diamantidou	
	LENNTech	Niels	van Linden	
13.	IVL	Nilay	Elginov Kanat	ONLINE
14	TYP SA			
15.	IQE			
16.	EVIDES	Jan Willem	Mulder	
	EVIDES	Ioanna	Gkoutzamani	
17.	TUBITAK	Ahmet	Baban	ONLINE
19.	DLR	Nikhil	Pawar	ONLINE
20.	EUROPIREN			
21.	ARVIA			
22.	ISPT	Kees	Roest	
	ADVISORY BOARD	Michiel	van Haersma Buma	
	ADVISORY BOARD	Grzegorz	Gzyl	
	ADVISORY BOARD	Corinne	van Voorden	
	KWR	Luuk	de Waal	
X	NEOM	Noura	Chehab	
X	NEOM	Saifuddin	Mohamed	
	NEOM	Aouatif	Lotfi	
	NEOM	Robert	Garner	
X	Hatenboer-Water	Amir	Haidari	
	De Watergroep	Vincent	Dunon	
	Aquaminerals BV	Helmuth	Lenting	
X	Klaren International B	Amol	Palve	
	Universidade Fedral de Mato Grosso do	Marc	Boncz	ONLINE
	KLAREN	Eric	Veen	
X	Grey	Welch		