FROM INDUSTRIAL WASTEWATER TO CHLORINE

Contact project:
Dimitris Xevgenos, d.xevgenos@tudelft.nl, watermining.eu

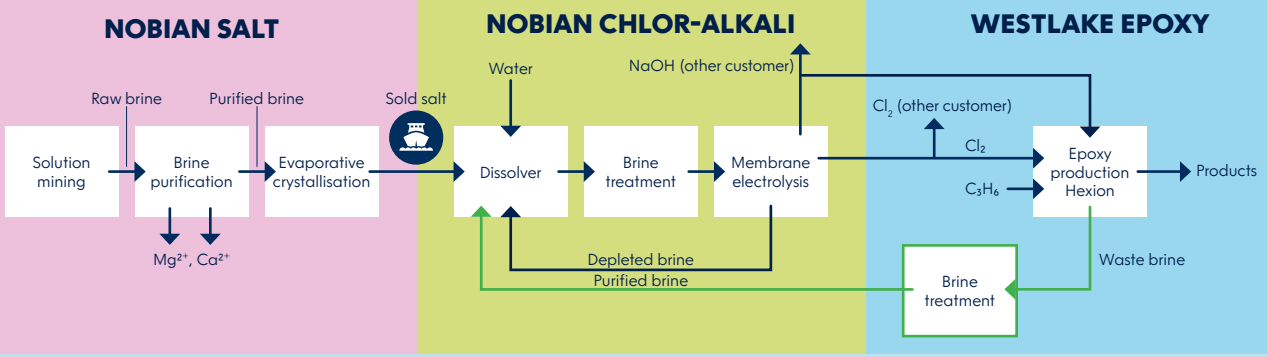
Contact Port of Rotterdam Authority:
Monique de Moel, MPM.Moel@portofrotterdam.com, www.portofrotterdam.com

THE PROJECT

A demonstration project for wastewater circularity is set to take place in the Rotterdam Industrial area. The salt wastewater (or brine) from Westlake Epoxy's plant at Pernis, is treated with the aim to produce high purity brine which can be a source of salt and water for Nobian's nearby Chlor-Alkali plant.
The Water Mining project does not focus only on the technical feasibility. It takes a co-design approach, involving stakeholders through a 'Community of Practice', exploring all aspects relevant to full scale implementation of the technology and the market acceptance of the products. The demo is part of project 'Water Mining', a TU Delft led EU Horizon 2020 project.

TIME LINE

The demonstration is planned between Q2 2022 and Q2 2023 at Westlake Epoxy's site in Pernis, Rotterdam, The Netherlands.



WHY

Water Mining aims to advance technologies, reduce environmental impact and develop novel business models for recovered materials from (waste)water treatment.

EXPECTED RESULTS

The purified brine could partially replace mined salt and freshwater in Chlor-Alkali, reducing the water consumption by 1/3, saving 25 MWh thermic and 6 kilotons of CO_2, at full scale. The process is truly circular as the chlorine produced from the waste brine is in turn used by Westlake Epoxy in its Epoxy production. In this loop, the chlorine molecule can be considered as a chemical lease product.

LESSONS (TO) LEARN(ED)

Learned:
The business model for recycling low cost materials needs a larger (financial) appreciation of the circularity (since low revenues do not warrant large investments).
This can be through either subsidies (e.g. for circularity investments), taxes (CO_2, raw materials) or regulation.

To learn:
How to assess, minimize and deal with the risk to the Chlor-Alkali electrolysis process due to incoming brine from external sources.

INPUT

Salt wastewater (Brine); Industrial wastewater

OUTPUT

Caustic soda, H_2

TECHNOLOGY READINESS LEVEL

1	2	3	4	5	6	7	8	9
Basic principles observed	Technology concept formulated	Experimental proof of concept	Technology validated in lab	Technology validated in relevant environment	Technology demonstrated in relevant environment	System prototype demonstration in operational environment	System complete and qualified	Actual system proven in operational environment
DISCOVERY			DEVELOPMENT			DEMONSTRATION		

CIRCULAR INDICATORS (REDUCTION OF)

CO_2 · Energy · Costs · Raw materials · Water

COOPERATING PARTIES

water mining · TU Delft · NOBIAN · Westlake Epoxy · KVT PROCESS TECHNOLOGY · PROCESSES4PLANET