

# Reverse osmosis desalination for offshore hydrogen production

**Problem:** The transition into a decarbonized energy supply system goes in hand with the generation of (green) hydrogen and its downstream (Power-to-X) products from renewable energies. Water is an essential input in such facilities and must be supplied with ultra-pure quality to ensure their proper operation. In offshore plants, desalination is implemented for this purpose to take advantage of the direct proximity to seawater. Reverse osmosis is currently one of the most commonly used technologies for desalination and ultra-pure water production. The implementation of desalination systems in offshore operations may pose additional challenges compared to conventional reverse osmosis plants, including intermittent operation, small footprint and limited accessibility for maintenance.

**Tasks:** The aim of this work is the investigation of reverse osmosis (RO) as technique for offshore desalination by means of simulation tools and experimental setups. The study looks into different design concepts of RO desalination plants to address intermittent operation and its potential challenges under fluctuating water demands. Additional operating modes such as batch-RO (i.e. closed-circuit) are to be analyzed as solutions to increase water recovery and reduce energy consumption. Particular focus shall also be given to membrane performance and fouling potential of the studied configurations.

The scope of the assignment can be adapted to a study project or a Master's thesis as desired.

**Suitable for students of the disciplines:** BIW, CIW, VT, WaSE

**More Details:** <https://www.dvgw-ebi.de/themen/forschungsprojekte/h2mare>

**Type of work:** Theoretical and practical

**Beginning:** Summer semester 2025, or immediately by consultation

**Supervision:** Engler-Bunte-Institut, Water Chemistry and Water Technology

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