

## OAPID: BMED On-site Acid Production for In-line Descaling in the Whole PW Treatment-Injection Process (On-site acid production)

### **Abstract**

The oil industry is facing massive challenges in the coming years with achieving a green-transition to meet the zero-harmful-discharge from oil production. The re-injection of produced water (PW) for reducing the consumption of sea water and avoid harmful pollutants in the effluent is one way to go about it. Acid injection with the re-injected PW both hinders the growth of sulphate reducing bacteria in the oil reservoir and scaling inside the system and production pipelines. Since acid consumption can be a massive part of the expenses for producing oil, on-site production of acid can and will lower the expenses. One way to go about this is with the bipolar membrane electrodialysis (BMED) for simultaneously acid and base production, by separating salts and dissociate water into protons and hydroxyls.

As of now, the BMED setup has been shown to produce acid concentrations of 0.1M hydrochloric acid with flow rates of 12 L per hour, with a power consumption of (320Wh). A system measuring all the important parameters (conductivity, flow, pH) with online controlling of the system pumps has already been established. Further studies on the BMED setup will investigate; (I) the optimization strategies for the current bipolar membranes for achieving faster and more acid production; (II) development of new bipolar membranes for improved water dissociation; (III) acid production on simulated sea water for “real world” simulation; (IV) testing the BMED acid production on an simulated descaling system, to demonstrate its efficiency and robustness for descaling; (V) Upscaling of lab-bench-setup for simulation of “real world” implementation.