

Blue Energy

To include renewable energy in the energy matrix can be a challenge for many societies. Blue energy is a promising energy source that uses the controlled mixing of the salinity gradient between river and sea water to produce energy. Reverse Electrodialysis (RED) is a process that allows to harvest this energy. It uses a series of alternating anion (AEM) and cation (CEM) exchange membranes to direct ions and convert the membrane potential between the anode and cathode of a cell into electrical current, by the means of a redox reaction.

Technological challenge

Fouling of the ion exchange membranes is known as one of the most severe problems within RED applications, since it decreases the overall power output that can be harvested. Fouling can be present in diverse ways, like organic, inorganic, biofouling and scaling. For a successful RED performance it is believed that a feed water pre-treatment is necessary to inhibit fouling and enable a sustainable energy production. Energetically and environmentally reasonable pre-treatment combinations will be studied. It can consist of different types of filters, like fast sand or activated carbon, or other innovative treatments.

Research goals

- Identify the effect of individual foulants present in natural waters (river and sea) on RED performance
- Propose and test process modifications and new designs, including pre-treatment combinations and membrane cleaning.

Requirements:

- Chemical engineering, materials engineering, environmental engineering or similar background;
- A valid driving license in the Netherlands during the duration of the internship
- Experience with laboratory work;
- Good level of spoken and written English;
- Knowledge (beginner level) of Matlab and Python is highly appreciated;
- Proficiency with MS Office suite.

Benefits:

- Wetsus offers a 175€/month allowance to students (only for applicants who do not receive Erasmus funding).
- If our research results in a publication, your name will be listed as a co-author.

Who can apply:

- EU citizens enrolled in any university;
- non-EU citizens already living in The Netherlands and enrolled in a Dutch university, with a valid driving license in the Netherlands

How to apply: If you are interested in this project, send an email to: barbara.vital@wetsus.nl with CV and motivation letter (max 1 page)

Starting date: flexible, from June 2020 (min. 3 months)