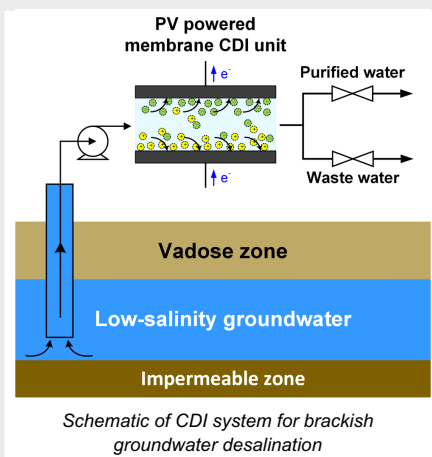


Capacitive deionization (CDI)

When a voltage is applied across two electrodes, cations are attracted to the cathode and anions to the anode, resulting in the salt ions being removed from the solution. During discharging, the electrodes can be regenerated by executing polarity reversal, with the trapped ions released back into the brine stream.



PV powered membrane CDI for brackish water desalination

UNSW Water Research Centre, School of Civil and Environmental Engineering

Competitive advantage

- Energy efficient option for brackish water desalination (coulombic efficiency > 85%) with low operating voltage (~1.2 V);
- Low capital cost and no mains energy consumption when driven by solar energy;
- Ease of maintenance, especially suitable for remote communities.

Recent research projects

- PV powered membrane CDI for irrigation and fresh water production;
- Salt, fluoride and nitrate removal by membrane CDI;
- Energy recovery and reuse in PV powered membrane CDI;
- Durability of carbon electrode (and membrane) in long-term operation and the impacts on desalting performance.

Successful applications

- A PV powered membrane CDI unit installed in a remote community in Xinjiang Province, China;
- Data logging and control via internet; digital twin developed using VR technology facilitating remote control and maintenance.
- Pilot-scale manufacturing facility developed in Yixing, Jiangsu Province, China in collaboration with commercialising partner Goldwind Environment Protection, Ltd.

Facilities and infrastructure

- UNSW has extensive research resources and facilities through both its Water Research Centre and Renewable Energy and Power Engineering group with personnel from both groups involved in development of CDI technologies.



VR assisted design & operation



PV powered membrane CDI unit deployed in Xinjiang

More information

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