

## Low-energy electrochemical water treatment: Study on the flow-electrode capacitive deionization system

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### ABSTRACT

In accordance with the recent global trends of carbon neutralization and the expansion of renewable energy, the current representative water treatment technology (reverse osmosis; RO) has been critiqued for its high energy consumption. Likewise, it has become necessary for the introduction of more opportune processes in the field of water treatment, and electro-based systems have been receiving spotlight for their advantages of low carbon/ energy, and ease of coupling with renewable energy sources. One such process is the flow-electrode capacitive deionization (FCDI), a hybrid form of the conventional capacitive deionization (CDI) technology. Attaining deionization via capacitive and electro-dialytic mechanisms, FCDI boasts both high performance and energy efficiency, and thus is broadly researched for various purposes such as desalination, water softening, and ultrapure water production. Accordingly, this work has extensively reviewed the potential of FCDI as a contemporary water treatment process.

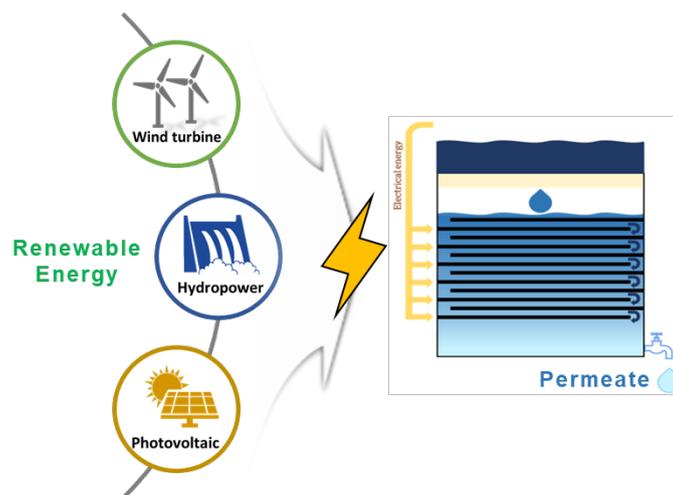


Fig. 1 Renewable energy coupled flow-electrode capacitive deionization (FCDI) system