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# Editorial: Solar desalination for small-scale decentralized applications in remote areas

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Editorial on the Research Topic
Solar desalination for small-scale decentralized applications in remote areas

Water shortage has become a global concern. It is predicted that the world water deficit will reach 2,700 billion $m^3$/year, with 1.6 billion people suffering severe water stress. Seawater desalination is deemed the most promising source of freshwater supply, while existing desalination technologies are unsuitable for small-scale applications in remote areas due to high energy intensity and cost.

As most arid areas are abundant in solar radiation, solar desalination has great potential for decentralized operation in remote areas. This Research Topic aims to embrace various research aspects of solar desalination technologies. We invited researchers to share their unique experience and views and discuss research solutions relevant to solar desalination. After rigorous review, 4 high-quality articles contributed by 18 authors were finally accepted for their contributions to the Research Topic, covering different aspects of solar desalination.

Solar still is the earliest solar desalination technology, and the efforts to boost its performance has lasted for decades. On-going studies focus on improving the energy efficiency and productivity. Yeang et al. developed a four-stage solar distiller system integrated with the Fresnel lens. The multi-stage configuration enables condensation heat recovery, and the Fresnel lens enhances solar intensity. Yang et al. proposed a novel cone-type solar seawater still, which has the characteristics of film-wise evaporation, short mass transfer distance and enlarged condensation area. Both systems demonstrate improved performance over conventional solar stills.

Integration of solar energy with existing desalination technologies also represents a viable solution. Oh et al. presented a direct contact membrane distillation driven by a 10-kW water-to-water heat pump, and the maximum productivity was found to depend on the operation temperature. Such a system can be integrated directly with solar panels for standalone operation, and the

efficiency of solar panels play a critical role. In view of this, Awoyinka et al. investigated the discrepancies in electrical outputs of mono-crystalline solar panels between Ago-Iwoye weather conditions and the manufacturer's specified ideal conditions. Results revealed a significant reduction in maximum power output compared to the manufacturer's stated values, underscoring the importance of considering local weather conditions during solar projects.

The 4 papers presented in this Research Topic demonstrate the diversity ongoing studies in the area. We believe the results and findings will lead to the development of more energy-efficient and cost-effective solar desalination systems, thus enabling the development of more sustainable solutions to address global water scarcity.

## Author contributions

QC: Formal Analysis, Funding acquisition, Project administration, Writing–original draft, Writing–review and editing. MB: Writing–review and editing. MS: Writing–review and editing. KN: Writing–review and editing. HZ: Writing–review and editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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