

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2022-21
Project Title:	Environment and Conservation Fund - Development of a non-contact solar-thermal converter material for sustainable solar desalination
Principal Investigator:	Dr Shen Xi, Department of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University
Total Approved Grant:	\$499,400
Duration:	1/1/2024 to 31/12/2025
Project Status/Remarks:	To be commenced
Project Scope:	<p>Climate change and water scarcity have become two imminent threats to humans, calling for a sustainable solution to diversify freshwater resources with minimum impact on the environment. Desalination is a promising technology to produce freshwater thanks to the abundant seawater. The current reverse osmosis (RO)-based desalination is a viable technology but suffers from energy-intensive operations and waste brine discharge, exacerbating greenhouse gas emissions and environmental pollution.</p> <p>This project aims to develop a sustainable desalination technology by utilising solar energy as the sole energy source to achieve zero carbon emission and zero liquid discharge (ZLD). A novel solar-thermal converter with double-side spectra-selective absorption properties will be designed and inserted between the sun and water surface to improve the solar-thermal conversion while a low-cost polymer foam will be used to suppress the heat loss, collectively achieving high energy efficiency. In addition, a non-contact design of the converter and water surface will be adopted to reduce salt fouling on the converter, resulting in ZLD of waste brine. The successful execution of this project will impart more efficient use of renewable solar energy for diversifying the water resources with minimum impact on carbon emission and the environment in Hong Kong.</p>
Summary of the Findings/ Outcomes:	To be available upon completion of the project