

PROJECT TITLE: Impact of water on floating PV power enhancement.

Project Supervisor: Dr Aritra Ghosh, Renewable Energy, University of Exeter Penryn campus, Cornwall

Project Enquiries: a.ghosh@exeter.ac.uk

Project keywords: FPV, temperature, microclimate, power, I-V curve

Proposed start date: 3rd June

Project description:

UK has a target to produce 70GW of energy from PV systems by 2035. Current PV systems are mostly on the ground or land mounted which has various disadvantages. The significant one is the high land cost increases the overall CAPEX of the project while the second one is the enhanced cell temperature reduces the PV efficiency. These two factors can easily be dealt if PV systems are installed on the water body. Floating PV systems are thus gaining significant interest which can be installed on the static or ocean water. However, this kind of installation can decrease the light penetration through the water which can have an impact on the underwater ecosystem.

To understand the impact of the water-created microclimate on the performance of the bifacial PV system will be investigated in this work. One bi-facial PV will be installed on the large-scale water tank, and various temperatures and power from PV will be measured. PVSYST tool will also be used to explore the validation of PV power generation while collected data will be used for data analysis.

The experiment facility will be developed in the REEF laboratory at the University of Exeter Penryn campus.

Candidate requirements: Interested in doing experiments and theoretical work using software tools and interested to write academic journal papers (Solar energy, Renewable energy, etc.)

Background reading: Floating PV, experimental methods for PV system, Understanding of solar direct and diffuse radiation, microclimate due to water body (<https://doi.org/10.1016/j.oceaneng.2023.115044>)

Approximate Work Schedule in weeks (desk based/lab/report writing)

Task	Timeline	Task details
Task 1	3 rd June-7 th June	Purchase of PV, thermal sensors, and Tank material and fill up the risk assessment form
Task 2	10 th June-14 th June & 17 th June to 21 st June	Material fabrication, literature review to understand the experiment
Task 3	24 th June – 28 th June	Measuring the various temperatures and PV power data
Task 4	8 th July to 12 th July	PVSyst modelling
Task 5	15 th July to 22 nd July	Writing the report