

Impacts of floating solar panels on aquatic greenhouse gas emissions

Level: Master
Start: January/February 2025
Duration: 6 months
Project form/methods: Field work, data analysis
Departments: Ecology & Environmental Science
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Background

The Netherlands aims to reduce greenhouse gas (GHG) emissions by 95% by 2050 relative to 1990 levels¹. To mitigate the current electricity mix' GHG emissions, water-floating solar photovoltaics (FPV) can add to renewable energy capacity-building while reducing land use and enhancing energy efficiency due to the cooling effect of water². Core knowledge gaps limiting sustainable upscaling of FPV include the environmental impacts and in particular the local aquatic GHG emission changes at the site of installation. Biogenic aquatic GHG emissions contribute significantly to overall global GHG emissions³. To predict and prevent potentially problematic changes in aquatic GHG emissions, field data at FPV sites are urgently needed.

Project description

The overall objective of this project is to evaluate to what degree the biogenic aquatic GHG emissions are influenced by the presence of FPV. You will help monitor, measure and evaluate water quality parameters in water bodies where floating solar panels are installed or commissioned. We will install and maintain sensors to continuously measure dissolved oxygen and temperature. In the field, you will also help collect profiles of temperature, dissolved oxygen and light underneath FPV panels and in a control location. You will analyse measured data and evaluate the potential impacts of FPV panels on water quality in general and for aquatic greenhouse gas emissions in particular by comparing water quality underneath floating solar panels and in the control locations. With a measurement campaign from winter into spring you can help clarify if there are any potential effects to be expected during the cold months when primary production is at a yearly minimum.

Bibliography

1. Rijksoverheid. Climate policy. *Government.nl* <https://www.government.nl/topics/climate-change/climate-policy> (2019).
2. Cazzaniga, R. *et al.* Floating photovoltaic plants: Performance analysis and design solutions. *Renewable and Sustainable Energy Reviews* vol. 81 1730–1741 Preprint at <https://doi.org/10.1016/j.rser.2017.05.269> (2018).
3. DelSontro, T., Beaulieu, J. J. & Downing, J. A. Greenhouse gas emissions from lakes and impoundments: Upscaling in the face of global change. *Limnol Oceanogr Lett* **3**, 64–75 (2018).