Floating offshore solar photovoltaic systems: modelling and techno-economic assessment

Thesis proposal at the Marine Offshore Renewable Energy Lab

Department of Mechanical and Aerospace Engineering, Politecnico di Torino

Recommended profile:
Mechanical engineering, Mechatronic engineering, Electric engineering, Electronic engineering, Energy engineering

Topics involved:
Mathematical modelling; Multi-body system dynamics; Solar energy conversion

Skills required or suggested:
Matlab and/or Python

Proposal description

Solar Photovoltaic (PV) has become one of the cheapest technology to produce renewable energy. However, among the challenges to a pervasive implementation there are the use of land, subtracted to other stakeholders. Floating PV systems are an interesting alternative, with additional benefits of water cooling and higher efficiency. While already advanced for small enclosed water basins, more innovative ambitious applications are offshore at sea.

Within activities related to a project funded by the European Commission, this thesis aims at:

- Implement a numerical model for the dynamics, structural integrity, and performance of floating offshore solar PV systems
- Embed an appropriate parametrization to evaluate design alternatives for different installation sites
- Define and evaluate techno-economic metrics related to the productivity, costs, and consequent livelised cost of energy

The starting point of the present thesis is the following paper: link

Contact references:
Dr. Giuseppe Giorgi (giuseppe.giorgi@polito.it)
PhD Student Alberto Ghigo (alberto.ghigo@polito.it)