

CLAIMS

1. An offshore photovoltaic power plant comprising a pliable mat (2) configured to be arranged on a surface (33) of a body of water, the mat (2) having a plurality of photovoltaic modules (1) fixed thereon.
- 5 2. An offshore photovoltaic power plant according to claim 1, wherein the mat (2) is made at least partly of a buoyant material.
3. An offshore photovoltaic power plant according to any preceding claim, further comprising floatation elements (3',31) fixed to the mat (2) or incorporated into the mat (2).
- 10 4. An offshore photovoltaic power plant according to any preceding claim, wherein the mat (2) comprises perforations (30).
5. An offshore photovoltaic power plant according to any preceding claim, wherein the mat (2) comprises connectors (9) fixing the modules (1) to the mat (2).
6. An offshore photovoltaic power plant according to any preceding claim, wherein the mat
15 (2) is at least partly made of a polyethylene, polypropylene, polyurethane, EVA, synthetic rubber or copolymer material, or a combination of two or more of these materials.
7. An offshore photovoltaic power plant according to the preceding claim, wherein the mat is made of a woven textile, a net, film, sheet, plate or laminates of these materials.
8. An offshore photovoltaic power plant according to any preceding claim, wherein the mat
20 (2) in a longitudinal direction (34) comprises sections (A,B) having alternating buoyancy and the modules (1) are arranged between the sections (A,B).
9. An offshore photovoltaic power plant according to the preceding claim, wherein the sections (A,B) comprise a first set of sections (A) having a density lower than 1 kg/dm^3 and a second set of sections (B) having a density higher than 1 kg/dm^3 .
- 25 10. An offshore photovoltaic power plant according to any of the two preceding claims in combination with claim 3, wherein the floatation elements (3',31) are arranged in the first set of sections (A).
11. An offshore photovoltaic power plant according to any of claims 8-10, comprising weights (32) arranged in the second set of sections (B).
- 30 12. An offshore photovoltaic power plant according to any preceding claim, wherein the mat (2) has pockets (31) comprising a material which has a density lower than 1 kg/dm^3 .

13. An offshore photovoltaic power plant according to the preceding claim in combination with any of claims 9 or 10, wherein the pockets (31) are arranged in the first set of sections (A).
14. An offshore photovoltaic power plant according to claim 12 or 13, wherein the pockets
5 (31) comprise spacer elements (35), each spacer element (35) configured to define a shape of a respective pocket (31).
15. An offshore photovoltaic power plant according to any preceding claim, wherein each module (1) comprises a frame (8) and a laminate (12) which encapsulates a silicon-based solar cell (13) disposed within the frame (8).
- 10 16. An offshore photovoltaic power plant according to the preceding claim, wherein each module (1) has a stiffening element (6,7,11) arranged to support the laminate (12).
17. An offshore photovoltaic power plant according to any of the two preceding claims, wherein each module (1) has a heat transfer element (6,7,11) arranged within the frame (8).
- 15 18. An offshore photovoltaic power plant according to the preceding claim, wherein the heat transfer element (6,7,11) is arranged between the laminate (12) and a back side (1b) of the module (1).
19. An offshore photovoltaic power plant according to any of the two preceding claims, wherein the heat transfer element (6,7,11) comprises corrugated cooling plates (11).
- 20 20. An offshore photovoltaic power plant according to the preceding claim, wherein the module (1) comprises a first plate (14) fixed to the laminate (12) and a second plate (15) forming a back side (1b) of the module (1), and wherein the corrugated cooling plates (11) are arranged between the first plate (14) and the second plate (15).
21. An offshore photovoltaic power plant according to any of claims 17-20, wherein the heat
25 transfer element (6,7,11) extends through the mat (2).
22. An offshore photovoltaic power plant according to any preceding claim, comprising an anchoring system (4,5) fixed to a seabed.
23. An offshore photovoltaic power plant according to any preceding claim, wherein the mat (2) is fixed to a floatation element (3,3').
- 30 24. An offshore photovoltaic power plant according to the preceding claim, wherein the floatation element (3,3') is an endless, elongated floatation element which surrounds the mat (2).

25. An offshore photovoltaic power plant according to any preceding claim connected to a land-based electricity grid.
26. An offshore photovoltaic power plant according to any preceding claim arranged on a surface (33) of a body of water, wherein the modules (1) are arranged with an inclination when compared to a horizontal axis.
27. A fish farm comprising an offshore photovoltaic power plant according to any preceding claim.
28. An offshore power plant comprising an offshore photovoltaic power plant according to any of claims 1-26 and at least one offshore wind power generator.
29. An offshore power plant according to the preceding claim, wherein the offshore photovoltaic power plant and the offshore wind power generator are connected to a land-based electricity grid via a common electrical transmission line.
30. A method of constructing an offshore photovoltaic power plant, comprising the step of attaching a plurality of photovoltaic modules (1) onto a pliable, buoyant mat (2).
31. A method according to claim 30, further comprising:
increasing the mechanical stiffness of each of the plurality of photovoltaic modules (1) by introducing a stiffening element (6) to the backside of a laminate (12) which encapsulates silicon-based solar cells (13) in each module (1).
32. A method according to claim 30 or 31, further comprising:
in each module (1), providing a heat transfer element (6,7,11).
33. A method according to the preceding claim in combination with claim 31, wherein the heat transfer element (6,7,11) is sandwiched between the laminate (12) and a back side (1b) of the module (1).
34. A method according to any of claims 30-33, wherein the pliable mat (2) is formed to an elongated, module string (2).
35. A method of installing a floating photovoltaic power plant, comprising the step of deploying an offshore photovoltaic power plant according to any of claims 1-26 onto a body of water.
36. A method according to the preceding claim, wherein the step of deploying the offshore photovoltaic power plant is carried out from a vessel.

37. A method according to the preceding claim, further comprising transporting the offshore photovoltaic power plant folded and stacked onboard the vessel.
38. A method according to claim 35, wherein the step of deploying the offshore photovoltaic power plant is carried out from a land-based location.
- 5 39. A method according to any of claims 35-38, further comprising fixing the mat (2) to the seabed (5) via a floatation element (3,3').