Current Activities on “Floating PV”

“PV2FLOAT” – Technology development for floating PV power plants and their implementation for use on artificial water bodies.
The project is dedicated to the further development of floating PV power plants with a view to:

- cost reduction
- integration into regional planning
- sustainable implementation on a megawatt scale
- economic efficiency and ecological impact
- potential and acceptance of the technology in Germany.

The development and installation of several floating PV plants with different system designs and a capacity of approx. 30 kW_p each form the basis for holistic concepts in terms of practicality, economic viability, environmental compatibility and social acceptance.

Potential analysis for solar power plants on opencast lignite lakes

- technical potential 26 GW_p assuming ecologically acceptable land use efficiencies.
- economic-practical potential smaller, locally dependent on leisure activities and tourism, nature and landscape conservation

Further Information

Project website “PV2FLOAT”

Press release “Potential analyzes”

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Integrated Photovoltaics

Floating Solar Power Plants

9-293-21

R&D for the Energy Transition

Large Potential for Floating Photovoltaics

Depending on the scenario, a photovoltaic expansion of 300 to 450 GW_p is needed in Germany to ensure the success of the energy transition. Due to the limited agricultural land, land-neutral solutions must be developed. Floating PV refers to photovoltaic power plants mounted on floating bodies on standing water or at sea.

Floating photovoltaics have experienced very dynamic growth worldwide in recent years. At the beginning of 2021, the installed capacity worldwide was 2.6 GW_p. In Germany, flooded open-cast mining areas, gravel pits and in some cases dam lakes come into consideration. Floating PV systems can also be installed in maritime environments. For example, brackish water areas in river estuaries or coastal locations are being investigated.

Germany's first floating photovoltaic system has been connected to the grid since the end of May 2019 on a dredging lake near Renchen, Germany with an output of almost 750 kW_p. There are sufficient suitable areas on artificial lakes in Germany. According to a recent study by Fraunhofer ISE, these areas have a technical potential of 44 GW_p.

Measuring devices monitor wind and temperature at the Floating PV plant in Renchen, Germany.

Advantages and Synergies of Floating PV

- availability of large unused areas
- better module efficiency due to the cooling effect of the water
- evaporation rate is reduced and mitigates water loss in dry climates
- lower solar irradiation reduces algae formation and protects the ecosystem from strong solar radiation
- in the case of coupling with hydropower (onshore) or wind power (offshore): dual use of existing infrastructure, coordinated logistics for operation and maintenance as well as damping of feed-in fluctuations

Challenges and the Need for Optimization

Many questions and challenges arise when installing modules on the water surface:

- what is the best way to mount the system?
- how is the floating installation anchored?
- how can pollution be avoided?
- which materials are ecologically safe and harmless to the water?

With our many years of experience in module and plant technology and in power plant monitoring, we have the capability to adapt and implement the requirements for floating photovoltaics. Among other services, our specially developed »Zenit« software is capable of generating yield forecasts for floating PV plants. This takes into account, for example, system design, orientation of the modules and environmental variables such as air temperature.

We offer accompanying studies, consulting and monitoring services for planning offices, EPCs and plant operators.

Our Services for Consultants, EPCs and Plant Operators

- conception of the power plants
- GIS-based potential analyses
- social and environmental impact studies
- feasibility studies
- analysis and optimization of PV yield, light simulations and profitability analysis
- power plant design
- prototypes and implementation
- quality assurance and monitoring
- Digital Twin Models: development of models based on yield models and real-time monitoring data
- Finite Element Method (FEM) for substructure, wind and wave load