



**SOLARPLAZA SUMMIT**  
**FLOATING PV**

# How To Maintain A Floating PV Plant For 25+ Years

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Insights from a leading FPV specialist



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# Introduction

Much has changed since the world's first floating solar power plant was built in 2007 in the Aichi Prefecture in Central Honshu, Japan. Within the space of a decade, floating photovoltaics transformed from a buzzworthy concept to a widely adopted and space-efficient PV solution, to the point where they pose a cost-competitive challenge to conventional ground-mounted solar plants. Their spike in popularity was like nothing else in the industry; by 2018, numerous floating solar power plants with installed capacities surpassing 100 MW had emerged, and, by 2021, 3.4 GW of floating PV capacity had been installed globally. Researchers have predicted that floating PV demand will skyrocket to 14 GW by 2026 worldwide, with an overwhelming number of these emerging in the Asia-Pacific region (driven by favorable policies and installation targets). The trend will likely continue ticking upward.

Compared to countries such as Japan, South Korea, and the UK, solar giant China arrived relatively late to the floating game. However, it has seen rapid progress. Currently, more countries are following suit, and choosing to hop on the floating wave sooner rather than later. These are mostly markets in the Asian, European, American, and Middle Eastern regions. Still, Asian countries continue to dominate the market. The landscape is ever-changing, however; South Korea, for instance, has recently experienced contraction due to changes in national policies and relatively scarce water resources. In Indonesia, the market has remained stable, due to good leveraging of local large-scale reservoir projects. In Europe, the combination of ambitious renewable energy targets set by different countries, along with limited land resources and high land costs, has ignited a competitive push towards floating solutions, with capacity expected to reach 3.5 GW by 2031. Currently, the Netherlands, France, and Italy lead the way. Finally, in the case of the US, only certain areas with high land prices - such as California and Florida - are privy to floating investments, with most regions lagging behind.

With the clear indication that floating solutions are more than just a passing solar trend, it becomes imperative to ensure the long-term viability of these plants. In this **White Paper**, with insights kindly provided by our lead partner **Sungrow FPV**, we explore the strategies and considerations involved in effectively maintaining a floating PV plant for a lifespan of 25 years and beyond. If you are interested in diving deeper into this subject and floating PV in general, join us at the **Solarplaza Summit Floating PV**, taking place in **Rome** on **5 October 2023**.

# Trending Floating Opportunities and Challenges

Floating installations have experienced a remarkable surge in popularity within the solar industry ever since their initial emergence in the mid-aughts, captivating widespread attention, and interest among developers and others working in the PV industry. As such, enough time has passed for us to outline several technological trends over the years.

## These are:

**Scale Growth.** As more and more countries and regions have invested in floating PV, technologies have matured and costs have decreased, the plants have become more numerous and bigger.

**Power Density Improvement.** The power density of floating plants has also grown, given technological advances such as next-generation PV modules, optimized component layouts, and tracking systems. Gradually, these plants have been able to generate more electricity, even with limited space.

**Technological Innovations.** Engineers are also flocking to floating, and have been dedicated to developing more durable and stable structures to adapt to all kinds of environments. Simultaneously, innovative technologies have been explored, such as integrated energy storage and seawater desalination, and incorporated into the systems.

**Environmental Consciousness.** There is a growing trend toward designing and constructing plants with a focus on the ecological environment that surrounds them. Increasing efforts are being made to minimize the impact of these plants on their surroundings through the utilization of environmentally friendly materials, conducting monitoring, and implementing effective conservation measures.

**Comprehensive Utilization.** Increasingly so, floating plants are being seen as a means of integrating water resources. Besides electricity generation, these power plants can be combined with other industries such as aquaculture, wastewater treatment, and photovoltaic hydrogen production.

Despite their popularity, floating solar plants have encountered their fair share of challenges.

### **These include:**

**Assuring Safety.** Practice has shown that it isn't always easy to ensure the reliable operations of key equipment and core components under complex environmental conditions such as UV exposure, shifting temperatures, high humidity, and complex hydrological conditions. These particular plants must withstand extreme weather conditions, and, as such, their safety is often compromised.

**Controlling Costs.** Floating plants are not always cost-effective. This is why enhancing power generation efficiency and reducing the overall cost of the power plant are top of mind for developers. Thankfully, innovative solutions are being sought out to mitigate this tendency.

**Combining Electrical Systems and Grid Integration.** Floating plants require establishing reliable electrical systems, including interconnection between components, cable layout, and configuration of electrical equipment - which doesn't come easy. Grid integration, oftentimes, presents another challenge, as it is necessary to prioritize the assurance of power transmission reliability and safety, along with meeting the standards of the power system.

**Promoting Technology-Environment Synergy.** Fostering a symbiotic relationship between technology and the environment can be tricky, and, when it comes to floating, it is no exception. Undoubtedly, the construction and operation of floating solar plants will impact the water ecosystem and biodiversity; therefore, comprehensive environmental assessments are vital for maximizing aquatic organisms and ecosystem protection.

**And, finally - ensuring resilience and longevity.** This will be addressed further next.



# A Comprehensive Guide to Floating PV Development: An All-Angle Approach

As noted in the preceding section of this White Paper, a significant obstacle that the floating PV industry presently confronts revolves around ensuring the durability and longevity of this particular novel type of plant. In this chapter, we outline the most important steps to follow in order to develop successful and long-lasting floating PV plants. This process encompasses all aspects of development, beginning with the initial plant design, and continuing through the stages of engineering, procurement, and construction, operations, and maintenance. Below, you may find our guide on how to approach each of these phases.

## Site Condition Analysis: Key Considerations

### A. Wind Pressure.

When it comes to wind pressure, understanding a potential site's meteorological conditions is key for evaluating wind loads on the floating PV system. Design standards and specifications for wind pressure must be established as well. In order to further prevent future damage, evaluating the system's structure for stability and strength is essential. For this, wind tunnel tests or numerical simulations are especially useful, as they can enhance safety and stability.

### B. Site Specifications.

Regarding the site, it is important to, first of all, understand the relevant laws, regulations, and environmental protection requirements of the location. Equally important are safety standards, with which floating PV systems must comply with. These include equipment safety, operational safety, and emergency response. And, as these systems involve electrical equipment and power connections, they must comply with applicable electrical standards and regulations to mitigate risks like fire and electric shock. An environmental impact assessment and approval process should be also carried out, in order to grasp the project's impact on the water ecosystem, while implementing environmental protection measures.

### C. Soil Composition.

When it comes to the soil at the bottom of the water body, its stability should be attentively studied to determine if it is suitable for supporting the anchoring systems of a floating PV station. Special attention should be paid to factors such as soil bearing capacity, shear strength, and liquefaction potential which guarantee the soil can bear the weight of the equipment and survive natural disasters. The chemical composition of the soil has to be also assessed - particularly its acidity or organic content. This helps to understand the potential risks of corrosion to the electrical equipment or infrastructure of the floating solar PV system. Moisture is another factor that should be kept in mind. Soil that is too wet can lead to stability problems or foundation settlement, while excessively dry soil can result in shrinkage and uneven settlement. In the end, understanding the geological characteristics of the site is crucial for evaluating soil composition. Gaining data on rock types, stratigraphic structures, groundwater levels, and other factors can help to understand soil composition.

## **D. Choice of Components.**

### **Panels**

Determining the electricity demand is crucial for the floating power station. This guides the calculation of required panels and total power capacity, shaping the size and layout of the floating PV plant. In areas with enough sunlight, smaller panels can improve energy density, while darker areas may require larger panels to capture more sunlight. Water conditions also influence panel selection, with greater water depths needing longer panels and support structures, and areas with strong water flow requiring stable and robust panels. Designing the panel size for easy installation and maintenance ensures efficient operation and upkeep.

### **Inverters**

Selecting the inverter for the floating power station involves determining its output power and capacity based on generation capacity and demand. Ensuring compatibility between the inverter's input and solar PV cell array output parameters is crucial. Opting for an efficient inverter maximizes energy conversion and minimizes losses. Inverter quality, environmental performance, and reliability for cost-effective maintenance are all considerations to keep in mind. Some inverters offer network connection and monitoring capabilities for real-time performance tracking and timely interventions. Additionally, compliance with national or regional safety standards and certifications is essential for the chosen inverter.

### **Electrical Equipment**

It is important to choose an appropriate location for the necessary electrical equipment, safeguarding it from water, moisture, and adverse weather conditions. It is also crucial to prioritize convenience for operation and maintenance, ensuring easy access for inspection, repair, and troubleshooting. Opting for a location near the power transmission system will ensure a reliable power supply, and keeping the equipment away from potential sources of interference, such as navigation channels and work areas will help to avoid risks. One should consider the impact on the surrounding environment, and maintain spacing between equipment for operation, maintenance, and heat dissipation to prolong their lifespan.

### **Ecological Impact**

When it comes to the plant's ecological impact, it is fundamental to understand the surrounding aquatic environment, which includes plants, fish, plankton, and other aquatic organisms, and the effects of the construction and operation of the floating PV system on them and the water quality (as it may affect temperature, enrichment of nutrients, and release of pollutants). In order to assess these, developing an environmental monitoring and management plan to track the impact of floating solar PV systems on the ecosystem is useful; this can be done through regular monitoring of water quality, for instance.

### **Analyzing Specific Customer Requirements**

Last but not least, the customer's specific requirements, such as power generation requirements (including the desired power capacity, output, and generation efficiency); technical requirements, concerns for environmental protection, demands for economic feasibility (including considerations such as investment payback period, cost-effectiveness, and investment risk assessment), and reliability and safety requirements, must be analyzed.



# Comparing Floating PV Design in Traditional and Complex Areas

When developing floating PV plants, developers must pick between traditional areas (ponds or coal-mining areas) or complex areas, such as offshore projects. In this section of our White Paper, we outline the considerations for designing floating PV plants in each of these scenarios, and what developers should consider when making a choice between the two.

## Floating PV Design in Traditional Areas

### A. Ponds.

While building aquatic photovoltaic power generation projects in ponds may offer many benefits, it is essential to consider, while designing these, that ponds are often important fish farming centers. As such, it is necessary to ensure that the project won't have a negative impact on these animals' ecology. This includes reducing underwater noise, avoiding interference with fish migration and breeding areas, and eliminating water quality pollution concerns. Plus, appropriate water quality management measures also need to be considered, such as water quality monitoring, water quality treatment, and discharge control. Finally, when designing projects on ponds, the local community should be taken into account.

### B. Coal Mining.

Floating PV plants in coal-mining areas provide advantages such as water resource protection, coal resource conservation, ecological environment improvement in sinking areas, and increased comprehensive income for specific communities. When contemplating the establishment of floating PV plants in coal-mining areas, factors such as geological conditions and safety, coal mine water management, and disaster prevention must be taken into account by developers. Geological surveys and engineering assessments, along with drainage systems, sewage treatment facilities, compliance with safety management regulations, and disaster risk prevention measures, ensure assurance of these aspects.

Besides these, there are other traditional water bodies that can be considered, such as rivers, lakes, and pools. When designing floating PV projects in such conditions, a few additional guidelines must be considered, such as shadow obstruction, smart location choice, and flood avoidance. This last point can be assured by selecting water bodies in functional sections such as flood storage and detention areas to prevent damage in the case of harsh hydrological environments.



## **Floating PV Design in Complex Areas**

### **A. Offshore floating PV.**

Offshore floating PV projects face far more severe environmental conditions when compared to those on closed waters, given their more vulnerable location in open ocean waters. As such, special considerations must be taken when designing such projects, with key points including the assessment of marine environmental factors on the structure, stability, and operation of the power station (and corresponding mitigation measures), anti-corrosion protection and material selection (such as seawater resistant steel or composite materials), and operation and maintenance requirements. O&M considerations, in these cases, are particularly complex, as these projects require consideration of safe loading and unloading, ship support, as well as corresponding personnel training and material supply. As such, during the design phase, full consideration should be given to the accessibility and maintenance needs of the power stations, and detailed operational and emergency plans should be developed.

### **B. Hydropower stations.**

Hydropower stations are comprehensive facilities converting water energy to electricity, including reservoirs, diversion systems, power plants, and mechanical/electrical equipment. The generated electricity is fed to the grid via transformers, switchyards, and transmission lines. Several points should be taken into consideration when designing floating PV projects in these areas, namely whether the water source is sufficient and reliable, what the water flow characteristics are, and if the platform is strong, stable, durable, and cost-effective. A major advantage, however, is that the floating PV might join in on the existing grid connection point of the hydropower station.

### **C. Areas with extreme weather conditions.**

In regions facing extreme cold/weather conditions, aquatic photovoltaic power generation offers a solution to address energy challenges. Key considerations for these areas include the structure's cold resistance, the stability of frozen water surfaces - and ensuing anti-icing measures -, and high wind speed resistance from the floating power station's part.

Site selection and construction of floating power stations in complex waters encompass coastlines, coastal areas, and dense shipping zones. Coastal regions may be influenced by terrain and landforms, such as tides, waves, dunes, estuaries, and shallow beaches. Factors like water depth, submarine landforms, coastal protection areas, and port channels must be considered during station construction. Areas like busy shipping zones require attention to large ships, channels, and ship traffic regulations to prevent conflicts or hazards to shipping.

# Four Key Factors for a Solid Plant Design

As previously mentioned in this White Paper, the foundation of a long-lasting floating PV plant lies in its design. In the following section, we present four key considerations crucial for creating a sustainable floating PV plant - **fatigue, aging, costs, and simulations**. Concluding this section, we will address anchoring and mooring system designs as well.

## Fatigue

Fatigue is material damage and failure caused by a long-term repeated loading and stress cycle. In the equipment design of the floating PV plant, fatigue is a main consideration. In terms of load prediction, an accurate evaluation of the equipment load in the water is key. The loads in the equipment mainly include external environmental factors such as wind, water flow, waves, and snow loads, as well as vibrations in the weight and operation of the equipment itself. Utilizing dependable weather and hydrological data, along with numerical simulations and measurements, helps predict the frequency and amplitude of the load.

Another key to reducing the risk of fatigue failure is the selection of the right materials. Materials with durability and corrosion resistance should be selected based on the stress conditions and working environment of the equipment. The monitoring of the equipment is another relevant point to avoid fatigue. All the equipment in the plant should be accompanied by sensors and monitoring systems to monitor stress and deformation status in real time. This helps to promptly identify potential cracks, signs of fatigue damage, or abnormal changes, and take appropriate maintenance and repair measures to avoid fatigue failure.

## Aging

With the usage of equipment and the passage of time, materials, and components will undergo an aging process, leading to performance degradation, reduced reliability, and potential safety hazards. In order to reduce the impact of aging on the long-term use of floating PV projects, it is important to select materials with anti-aging properties to extend the service life of equipment. When setting up an equipment design, appropriate isolation measures should be considered to prevent interaction and conduction between different materials. Factors such as humidity and temperature control are also crucial for slowing down the aging process. High temperature, humidity, and corrosive environments can all accelerate the aging process. All of these aging elements can be prevented with a smart maintenance plan that regularly checks the status and performance of equipment. This helps to identify aging issues early and take maintenance and repair measures to extend the lifespan and performance of the equipment. It is also important to update and improve equipment.

## Costs

Designing and building a lifetime-lasting floating PV plant can be costly. Choosing the appropriate materials is one of the key factors in equipment design, but the cost of materials varies greatly, so it is necessary to balance the performance and cost of materials during the design process. Other costs such as transportation and installation, maintenance and service, and life cycle should be taken into account when designing the floating PV plant.

## Simulations

Simulation is a key tool and method in the design process of floating PV plants. It can evaluate the performance, reliability, and effectiveness of different design choices, and help design teams make better decisions. Floating power plants need to resist the forces of wind, waves, and the ocean environment. Mechanical simulation can simulate the impact of these external forces on equipment, and evaluate the strength and stability of the structure. The plant also needs to operate stably in water and generate enough buoyancy to support the entire structure and equipment. Fluid-dynamic simulation can simulate the impact of water flow and vortex on equipment, and guide the buoyancy distribution, drag reduction design, and optimization of hydrodynamic performance in equipment design. Other types include coupled simulation (looks at the overall synergy between components, subsystems, floating bodies, platforms, etc); reliability simulation (evaluates the reliability and failure probability of equipment by simulating its operation and failure under various conditions), and energy efficiency simulation (simulates energy output and efficiency). They all can help optimize the





layout and design of the energy system, ensuring a longer-lasting plant.

## **A Note on Anchoring and Mooring Systems Design**

The anchoring and mooring technology follows the ‘from the whole to the local’ design principle, considering environmental and terrain conditions to determine optimal anchor size and spacing for smooth operations. The finalized layout incorporates engineering requirements and past experiences, ensuring a well-structured anchoring system. Floating water photovoltaic arrays use a “roly-poly toy” design, allowing movement within a range and returning to the original position if it reaches the boundary. This ensures stability and safety under multiple loads, reducing power generation losses. Its design basic principles are:

- It can effectively resist environmental loads, and has good overall stability;
- It is economical, reliable, corrosion-resistant, and ensures the station’s safety;
- Avoids stress concentration and protects the integrity of the floating body’s ear grip.

Regarding the “local” design, anchor ropes, brackets, and trusses meeting strength requirements are designed based on anchoring system force conditions. Factors like strength, corrosion, and aging are considered when selecting anchor rope type; options include anchor chain, steel wire rope, and synthetic fiber rope. Two main anchor methods are used: shore anchor and underwater anchor. Underwater anchoring methods include underwater pile anchors, underwater anchoring using ship anchors, concrete anchor blocks, and other specialized anchor forms. The anchoring bracket groups multiple floating body ears together, evenly distributing forces from the anchoring system. This optimizes mooring force utilization, prevents stress concentration, and preserves the floating body’s integrity. Additionally, the bracket serves various functions, such as preventing nearby floating objects from flipping and arranging electrical grounding wires. Their design should take into account:

- Minimizing the force on the floating body as much as possible;
- Utilizing the design characteristics of the floating body;

Finally, it is important to consider that, in its natural state, the anchor bracket maintains a gap from the upper surface of the floating body to prevent friction that could ultimately damage it.



# Developing The Perfect EPC Plan

A fundamental step for developing long-lasting floating PV plants is to assure the best EPC (engineering, procurement, and construction) plan for the project at hand. The EPC plan is flexible and can be best tailored to suit specific project needs and time constraints. In this section of our White Paper, we delve into the stages the EPC plan must go through, and cover effective communication with stakeholders and workforce management for developers.

## The Six Components of the EPC Plan

The six components of the EPC plan for aquatic photovoltaic stations are as follows:

**Project preparation stage (2-6 months):** During the initial phase of project preparation, the first essential step involves conducting a feasibility study analysis for the project and conducting a scientific evaluation of the environmental conditions at the project site. Additionally, it is crucial to analyze the customer's requirements, pre-plan, and deploy the technologies required for the project implementation beforehand. Furthermore, obtaining the necessary permits and approvals from relevant authorities is an essential part of the process.

**Project design stage (6-12 months):** The project design stage primarily encompasses management, civil engineering, and electrical design aspects. It also involves designing water-related equipment and facilities, preparing system layouts and drawings, and determining the required suppliers for equipment and materials.

**Project procurement and logistics stage (3-6 months):** During this stage, it is essential to develop a comprehensive procurement plan and material list. Additionally, it involves releasing bidding documents to select suitable suppliers, managing supplier contracts, and coordinating delivery arrangements. Creating a logistics and transport plan is also a crucial part of this phase.

**Construction and installation stage (6-18 months):** During this stage, the primary focus is on on-site preparation and infrastructure construction. It involves the installation and debugging of solar photovoltaic modules, and electrical equipment such as inverters and transformers. Additionally, the power distribution system, monitoring system, and communication network are set up. Finally, the system connection and joint debugging testing are conducted to ensure proper functionality.

**Trial operation and commissioning stage (1-3 months):** At this time, it is the moment to test the performance and reliability of the power generation system. The focus lies on debugging and optimizing the power transmission and control systems to ensure their efficiency. Additionally, the emphasis is on system operation and troubleshooting to identify and address any potential issues that may arise.

**Completion and delivery stage (1-2 months):** Ultimately, the final stage involves completing all project documents and reports. It also entails conducting the final acceptance and quality evaluation processes. Moreover, handover procedures are carried out with local regulatory authorities to ensure a smooth transition. Additionally, all compliance requirements for the project are fulfilled during this phase.

The schedule above applies to general conventional projects, but the actual plan may vary based on factors like project scale, technical complexity, and geographical conditions. Detailed planning according to specific project requirements, along with collaboration with a professional project management team, ensures timely and high-quality project delivery.

## **Plus: How to Communicate With Stakeholders**

Cultivating a strong and positive working relationship with stakeholders is vital for the successful establishment and longevity of a floating PV plant. This mainly includes:

### **Government and regulatory agencies;**

In this case, it is crucial to understand relevant regulations, policies, and procedures, as well as providing them with detailed information on the project, which may include environmental impact assessment, sustainability measures, and social benefits.

### **Project investors and partners;**

This may include providing said stakeholders with project progress updates and milestones, answering any questions regarding project management, financial conditions, and risk management, and verifying alongside them planning and budgeting goals.

### **Media and the public;**

Communication with these particular stakeholders may mean releasing press releases and announcements to introduce relevant milestones and progress of the project to the media and the public, as well as contacting personnel who provide interviews and release information. It is important to be proactive when it comes to responding to media reports.

### **Environmental protection organizations and interest representatives;**

Ensuring a working relationship with these stakeholders is of the utmost importance, and said relationship may imply understanding these organizations' concerns, providing them with the necessary information on sustainability measures, and discussing with them potential cooperation opportunities, such as environmental protection projects, ecological restoration and community development plans.

### **Local communities and residents;**

Speaking of community, local communities and residents are also important stakeholders developers should take into consideration, and work to establish a relationship with too. As a result, they should establish appropriate communication channels with local residents, organizations, and local leaders, such as public meetings, workshops, and more. In these settings, they can introduce the purpose, impact, and benefits of the project, as well as answer residents' questions, concerns, and suggestions.

## A Note on Workforce

The workforce plays a crucial role during the construction of water photovoltaic power stations, and, as such, should not go unaddressed. Here are a few final considerations pertaining to the construction labor of water photovoltaic power stations:

**1. Requirement Evaluation.** The initial step involves assessing the labor quantity and skill requirements, which depend on the project scale, construction timeline, and scope of work. Actual needs can be determined through consultations with construction contractors, engineers, and project managers.

**2. Recruitment of Human Resources.** Securing appropriate labor resources is of utmost importance. Labor can be sourced through various channels, such as posting recruitment advertisements, partnering with local labor agencies, and establishing collaborations with relevant enterprises. Additionally, it is essential to consider employment opportunities for local residents and communities to foster economic growth and social development.

**3. Skills Training.** To ensure construction is of high quality and safety standards, labor may require relevant skill training. This training encompasses areas such as engineering technology, power systems, safety measures, and other essential aspects. Developers should collaborate with professional training institutions, industry associations, or consultants to provide the necessary training and certification for the workforce.

**4. Safety and Workforce Protection.** During the construction process, ensuring the safety and health of labor is paramount. This involves providing necessary personal protective equipment and adhering to construction safety guidelines and regulations. Additionally, it is crucial to establish emergency rescue plans and crisis management measures to effectively respond to any unforeseen events that may occur.

**5. Workforce Management.** The management and supervision of work force is the key to ensuring the smooth progress of construction. This can include developing work plans and schedules, assigning tasks, monitoring work progress and quality, and providing necessary support and training.

**6. Salaries and Benefits.** Providing competitive wages and benefits is an important factor in attracting and retaining an excellent labor force. Assessing the local labor market, formulating reasonable salary policies, and providing additional benefits to improve worker morale and satisfaction is key.

**7. Community Participation.** Developers should foster collaborations with local communities and stakeholders, building strong relationships and effective communication channels. By addressing the employment needs of the local communities, offering training opportunities and career development paths, and increasing community participation and benefits, positive labor relations can be established.



## Operations & Maintenance: Three Key Considerations

Guaranteeing the smooth operations and maintenance of a floating PV plant is crucial not only for its short-term success but also to ensure its long-term sustainability. Below are our three suggestions for the operation and maintenance of a floating solar photovoltaic (PV) power plant in the long-run. Note that these may vary based on the specific project type.

1. **Regular Inspection and Maintenance.** This involves inspecting the cleanliness of solar panels, ensuring the connectivity of components, checking the integrity of cables and junction boxes, and assessing the stability of floaters and anchoring systems to prevent leaks or mechanical damage. Regular inspection and maintenance are essential to identify potential issues, minimize the risk of failures, and optimize the performance and lifespan of the system.
2. **Safety Management and Monitoring.** Safety management and monitoring are crucial for the safe operation of a floating solar PV power plant. This includes monitoring equipment status, voltage, and current outputs, as well as grounding system effectiveness. Complying with electrical safety regulations and standards, deploying safety equipment and warning signs around the project perimeter, and conducting regular safety training enhance staff awareness of risks and emergency response, ensuring the project's safe operation.
3. **Ecological Conservation.** A floating solar PV power plant should prioritize environmental protection. Minimizing its impact on the water ecosystem, controlling pollutant emissions, reducing disturbances to aquatic life, and regularly monitoring water quality are vital considerations. Implementing measures to shield PV modules and equipment from pollutants is essential to uphold their performance and lifespan.







## ■ Conclusion

Since 2007, floating solar power plants have made significant progress. As we continue to develop these unique PV projects for the long term, additional considerations need to be taken into account. In this **White Paper**, we hope to have given you a thorough understanding of the many factors to be considered not only when first developing a floating PV project, but also when preparing it for the long haul. These considerations are varied, and accompany all phases of the project - from designing to operations and maintenance.

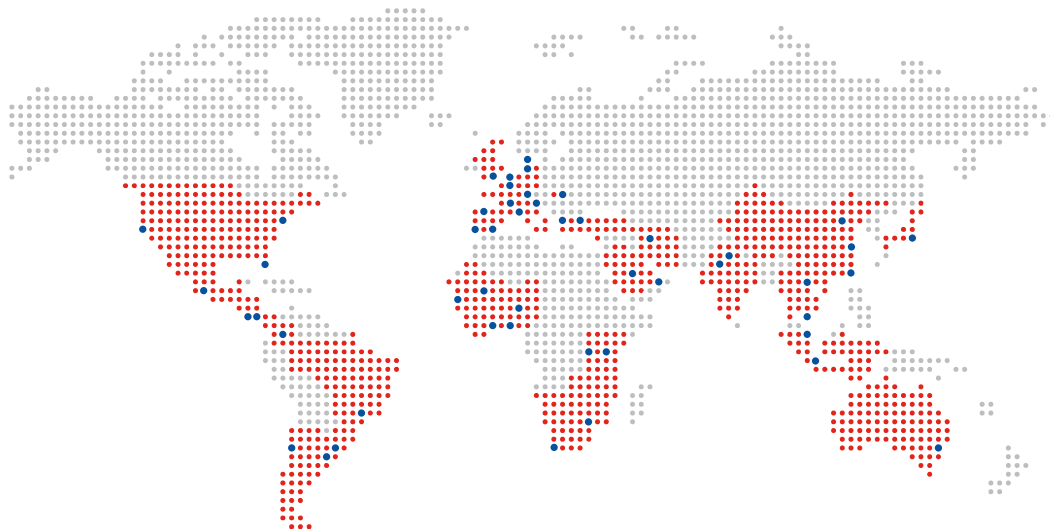
As researchers predict the technology to keep gaining traction in the energy transition and anticipate numerous projects to be developed and maintained in the coming years, it has become crucial for developers to comprehend the scope and implications of their ventures, and, most of all, to make sure that their projects have the conditions to withstand the test of time. Therefore, the advice offered by our lead partner, **Sungrow FPV**, should be regarded as a significant reference for developers interested in harnessing floating PV technology in both current and future projects - now and later too. As more and more developers jump on the floating wave, only time will tell which ones will stand the test of time; we hope our partners' recommendations help you find your way among them.

There are even more factors to take into account when developing a long-lasting, resilient floating PV plant - namely, certain considerations need to be made about equipment selection, protective measures, monitoring and repairing, and more. If you wish to continue learning more about these, and staying informed about on-the-ground updates regarding the floating PV industry as a whole, join our lead partner, **Sungrow FPV**, and many more experts at the **Solarplaza Summit Floating PV**, held in Rome on **5 October 2023**.





## **SOLARPLAZA SUMMIT** **FLOATING PV**



More than 60.000 solar PV professionals and businesses from all over the world rely on Solarplaza's work every day. Our newsletters, articles, interviews, market and industry reports, combined with our world-class solar events, empower the global transition towards a sustainable energy future, where photovoltaic energy plays a key role.

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