ECO GREEN ENERGY EU

The Future is Now

ECO GREEN ENERGY EU
Mounting Systems

Win-Win

Innovate

Our partner company Is located at Suzhou, the center of Yangtze River Delta Demonstration Center. Foner is a high-tech enterprise dedicated to providing floating solar system, energy storage & rooftop solar mounting system. The main businesses are solar system design, system production and solar project development. Our solar mounting system annual capacity can reach over 200MW.

The founding team members have more than 10 years of experience in system R&D, design, production and marketing of solar mounting system development. Relying on continuous technological innovation and management changes, Foner cooperate closely with upstream and downstream enterprises in the solar industry chain to provide better solutions and continuous innovation impetus for the whole solar industry.

Foner has obtained a number of pioneering technology patents and has industry-leading technical advantages. She has established vast technical and business contacts with solar companies and EPC companies all over the world.

Reference patents

1.
Floating solar system

Floating solar advantages

Type	Floating solar power plant	Ground solar power plant
Output efficiency	Good cooling effect on solar modules, thus it has abt 5%~10% higher yield rate, long time advantages	Comparatively less
EPC cost	Usually 5% higher than ground solar power plant	Comparatively less
Installation	Less civil engineering, short time installation, do no harm to environment and surroundings	Much more civil engineering usually long time installation
Maintenance	Strong anti-disaster capability easy maintenance and cleaning	weak anti-disaster capability Usually hard to clean
Ecological influence	No pollution, reduce the evaporation of water , inhibit algae reproduction and protect water resources.	Much pollution during the engineering work
Less land occupation	About 8000-9000 square meters/1MW	Over 16000 square meters/1MW
Site requirement	On water surface, water depth ≥1m wind speed less than 200km/h	Higher requirement on site

Equipments



Crushing & Mixing → Blow Moulding



Why HDPE?

1. High quality raw materials, resistant to UV radiation & corrosion, strict aging test passed.

2. Extreme wind resistant capability: HDPE floating system can withstand up to maximum 200km/h* wind in some extreme conditions.(*basing on design)

3.Safe mounting & easy maintenance: the single floaters is module design, the whole system has been designed to be easily and quickly deployed. Easier access to the solar modules for maintenance and cleaning for O&M.

4. Drinking water compliant: the used HDPE materials are ROHS &REACH certificated. They are absolutely safe and drinking water compliance tested approved and food grade guarantee.

5. Cost-effective: Cost is less per module compared to zinc coated stainless steel structures.

6. HDPE structures are easy to install, easy to adapt to any electrical configuration,

7. Very Scalable design for low to high power generation.

8. No need of heavy equipment for installation of floating structures at project site.

9. Recycling is possible and applicable for HDPE materials.

System advantages

1. Being design with professional simulation in software and strict test.

2. Using modular design, convenient installation and dismantle, stable and durable.

3 .Made of high density HDPE materials with experienced production process, 25 years lifetime.

4. Optimized connection, installation is secured, overall structure is more stable, durable and reliable.

5. Established on water surface, No land resources, reduce the cost of land acquisition.

6. Water natural cooling reduces the temperature rise of the solar modules to obtain higher power generation.

7. Floating system can reduce the amount of evaporation on the water surface for dry seasons.

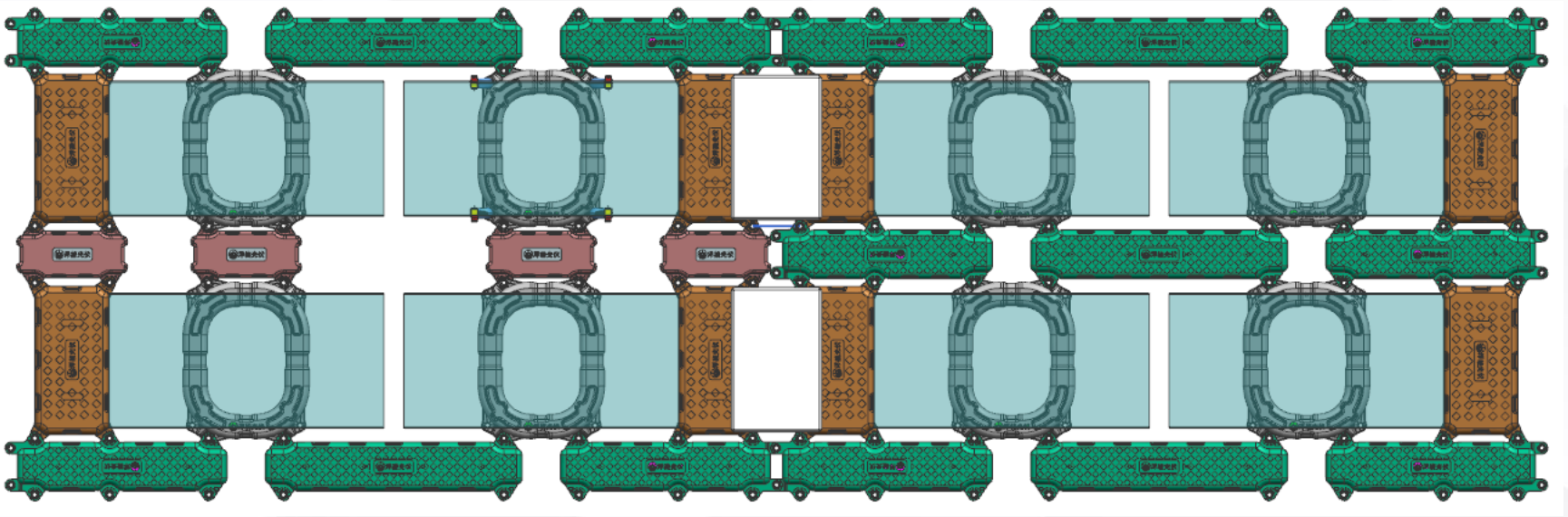
8. RoHS & REACH certificated, hygiene materials ,especially suitable for drinking water resources at reservoirs.

9. Inhibiting the propagation of algae in the water, and facilitate the protection of water resources.

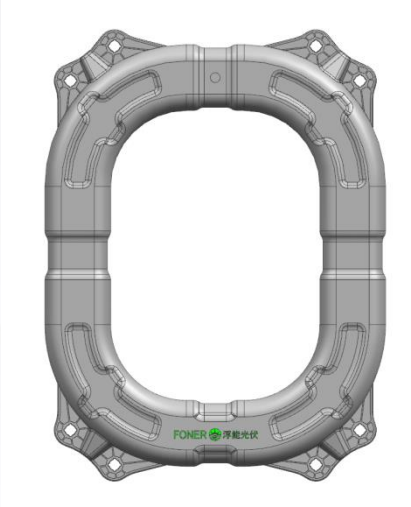
10. Reliable system design with professional anchor design for various small and higher water level variation.

11. Durable and stable structure design， suitable for ponds, lakes ,hydro pump stations and especially suitable for wind, wave and hydrology conditions at reservoir and hydro pump stations.

System Layout



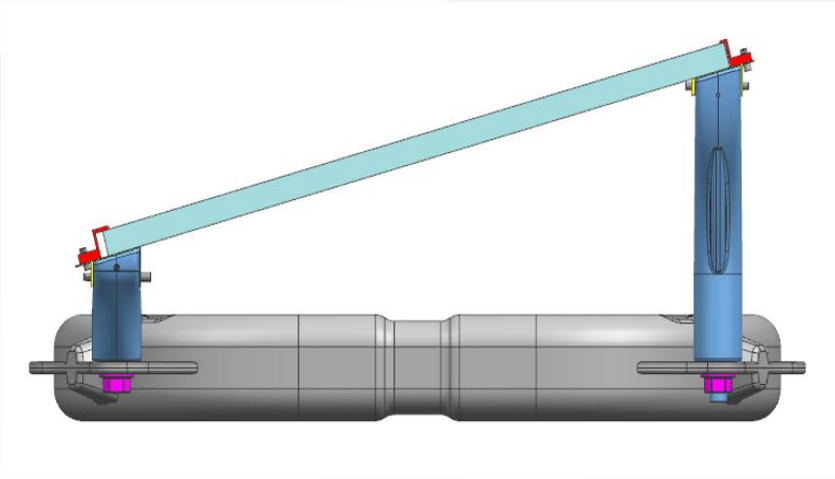
Components

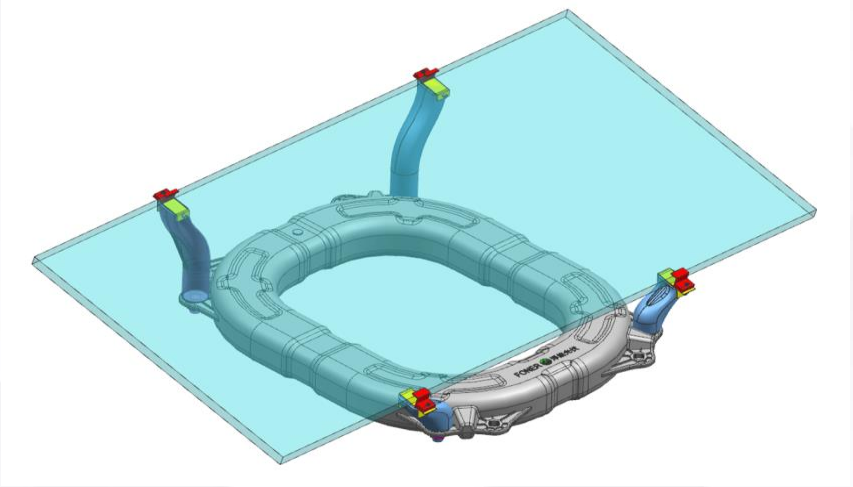


FLOATER Technical parameters

Part name	Material	Wall thickness	Funition	Buoyancy(N/kg)	Dimension
Solar module floater	HDPE	2~5mm	Solar module mounting buoyancy	980/100	1036*1370
Walkway floater	HDPE	2~5mm	O&M, buoyancy	1196/122	2106*400
Equipment floater	HDPE	2~5mm	O&M, buoyancy	1078/110	1211*608
Connection floater	HDPE	2~5mm	System connection, buoyancy	921/94	1720*400
D floater	HDPE	2~5mm	System connection, buoyancy	431/44	855*382
Module bracket	HDPE	/	Solar module mounting	/	/
Bolts & nuts	HDPE	/	Parts connection	/	/

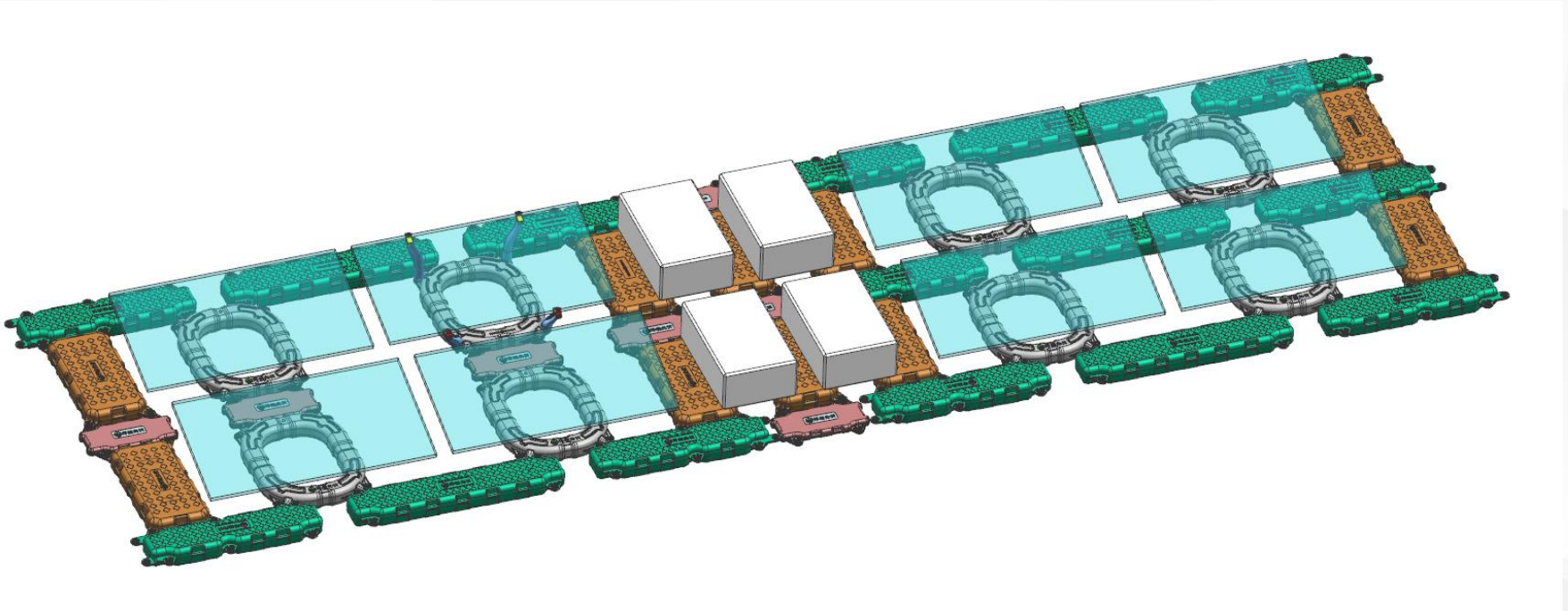
Solar module mounting





Remarks：the wire length on junction box must be 60cm min.

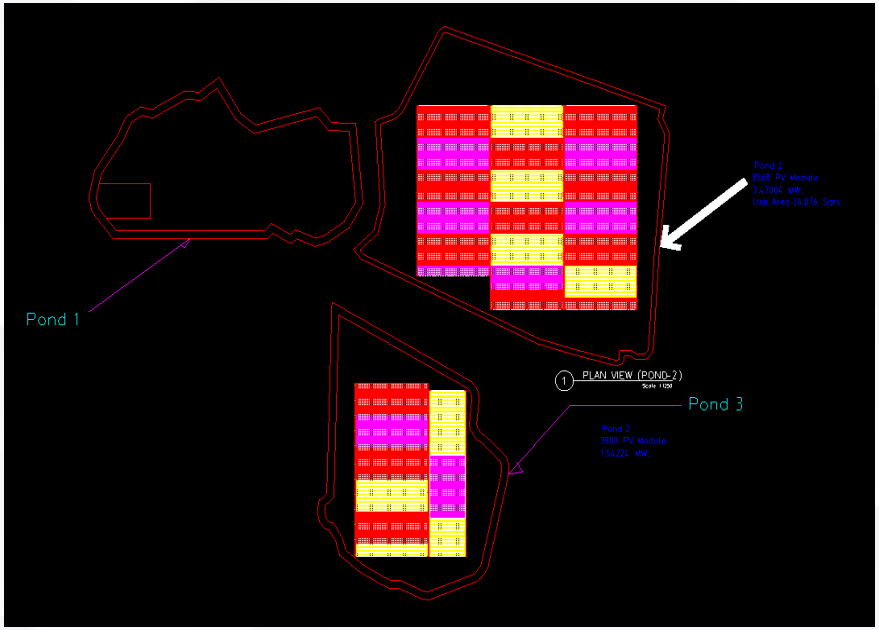
Layout design



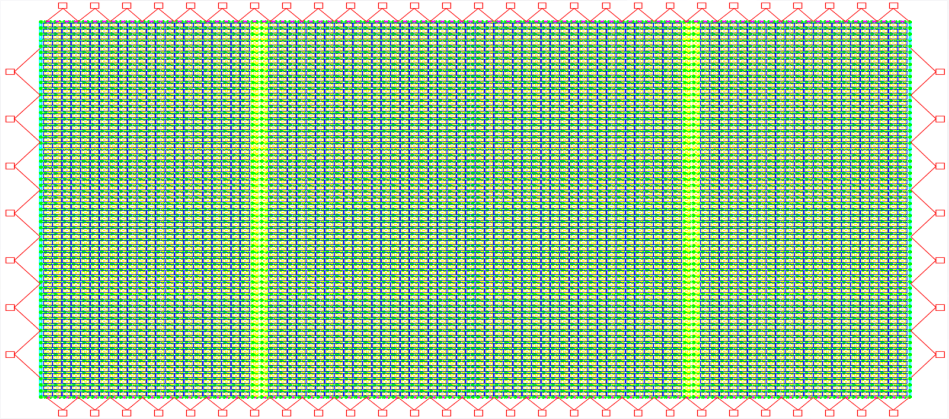
Layout design

The floating solar system design musts consider the water surface dimension, percentage and ship channel.

Once string inverter is installed on the floating system, the power/inverter ratio must be considered.



Anchor design



Features:

***Prevent overturning**

***Prevent collision**

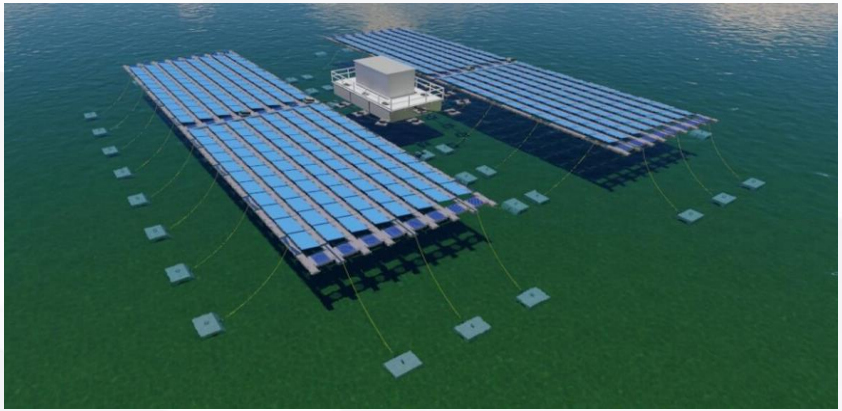
***Prevent deflection**

***Adapt to site water level variation**

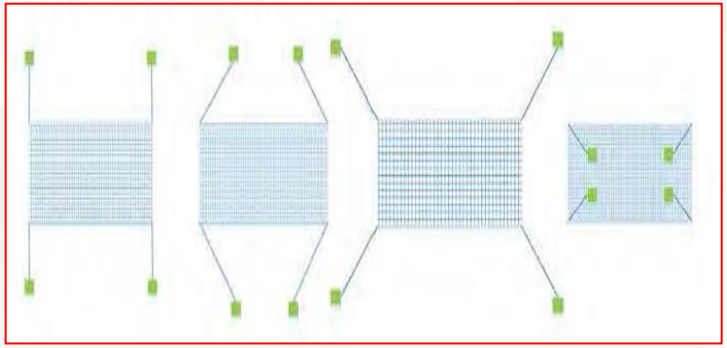
***Strong wind and waves resistance**

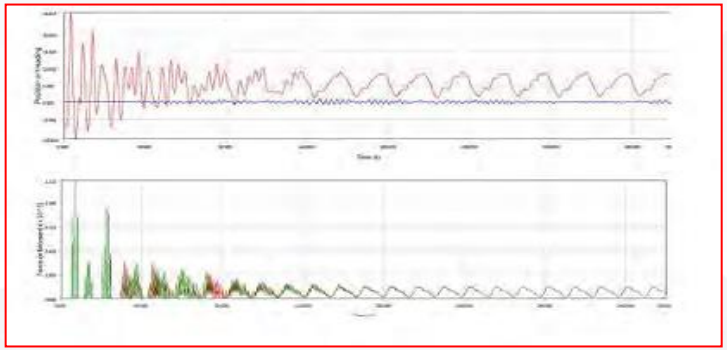
***Structural strenght check**

***Extreme condition check**

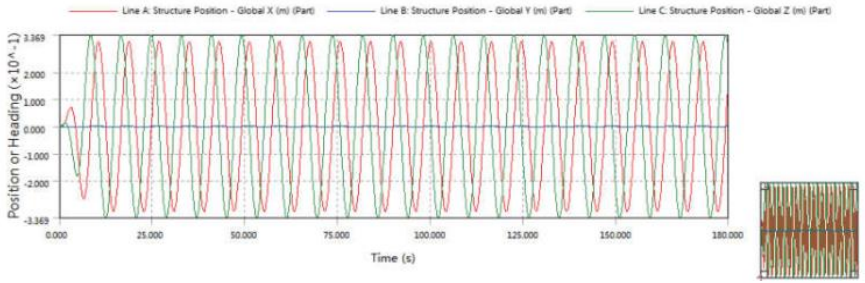


Anchor design





Maximum offset angle of the platform: The X-axis offset is small, the Y-axis is up to 13°, and the Z-axis is 0.3°.



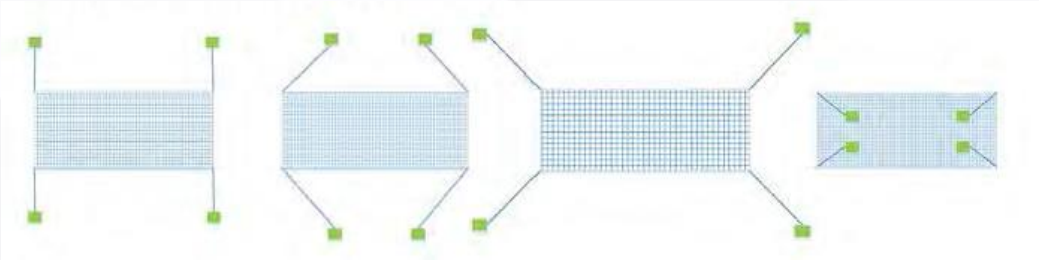
Platform displacement

The maximum offset of the platform position: the positional offset of the X-axis direction is 0.3m, and the positional offset of the Y-axis direction is 0.33m, Z

The positional offset in the axial direction is small, so the platform floats up and down in the range of -0.3m to 0.3m.

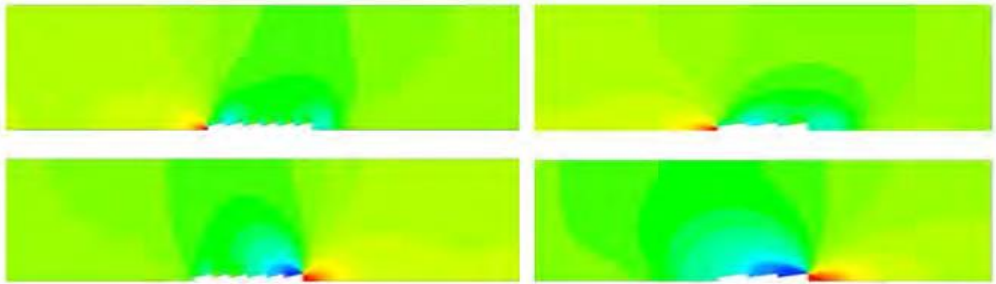
Anchor design

Optimum inclination angle of anchor rope

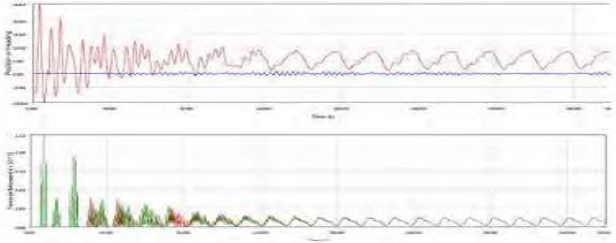


Stress calculation of steel supporter

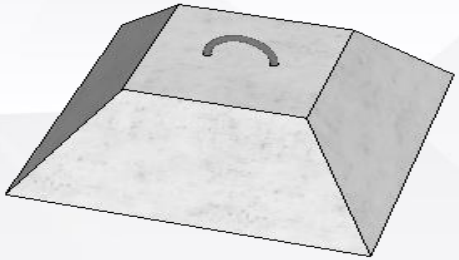
Wind pressure design

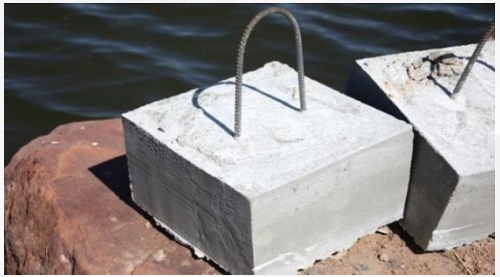


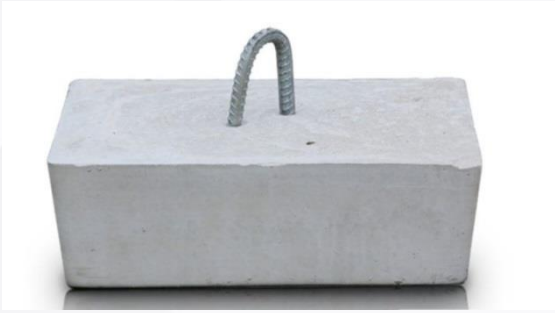
Hydrodynamic design



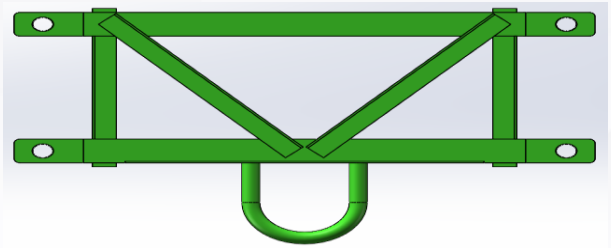
Anchor design



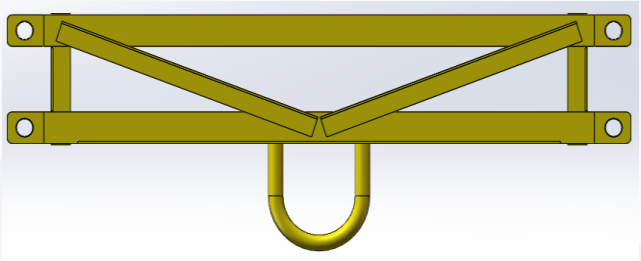




1. These concrete anchor blocks are prefabricated on site basing on the site conditions.



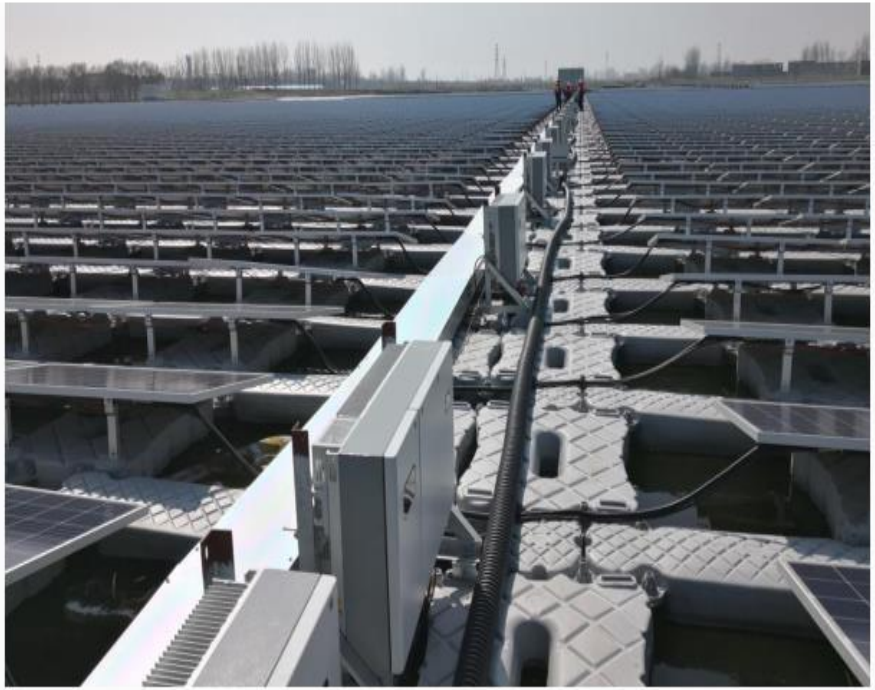
2: Anchor metallic parts in the north-south direction



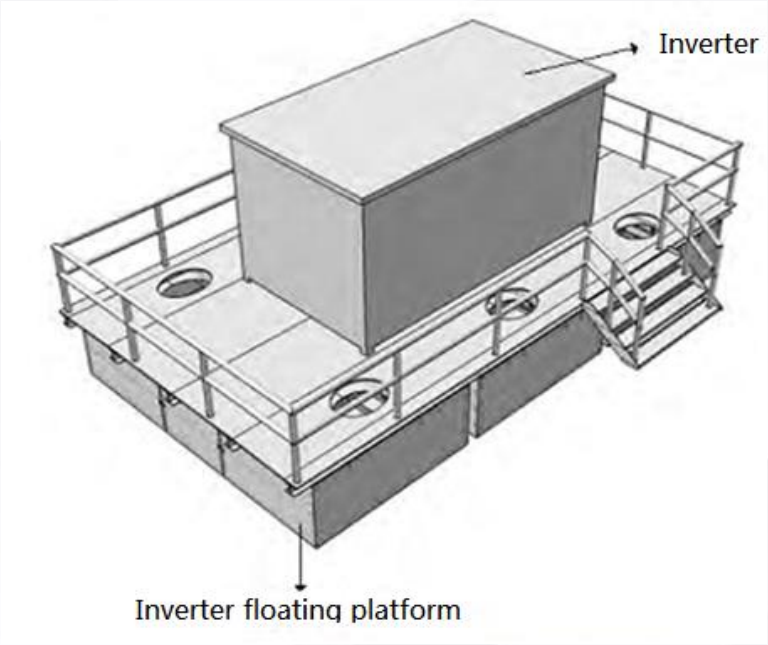
3: Anchor metallic parts in the east-west direction

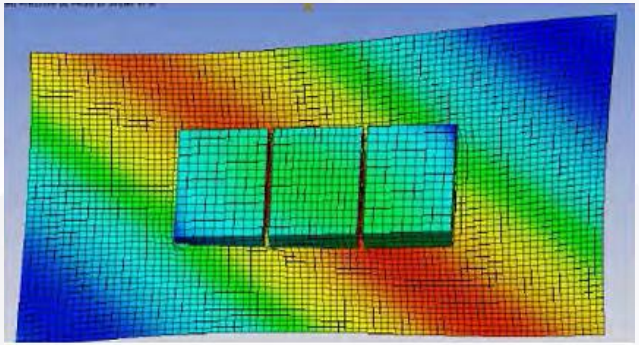
The metallic parts is consisted of two ear plates and one connector, which can be welded at project site.

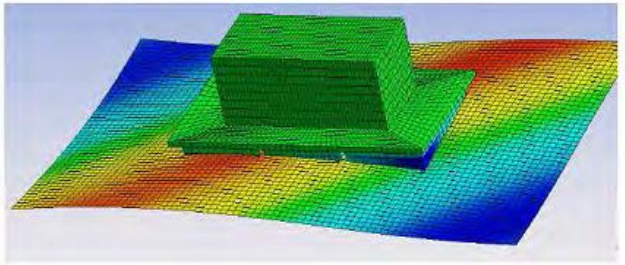
String Inverter platform



Floating platform







Advanced floating platform design, ensuring long service life and easy maintenance

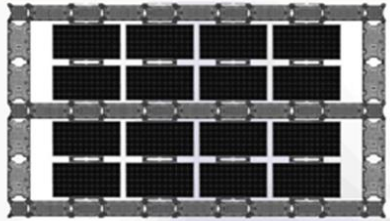
Application scenario

COSTAL & OFFSHORE

SEWAGE TREATMENT TANK

EXTREME ARCTIC AREA

FISHING POND

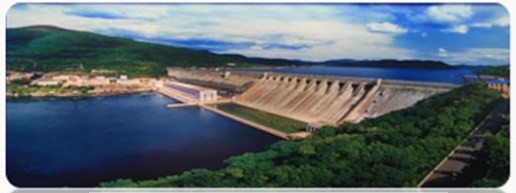


FLOTAING SOLAR SYSTEM

FRESH WATER LAKE

SMALL WATER AREA

MINING SUBSIDENCE AREA

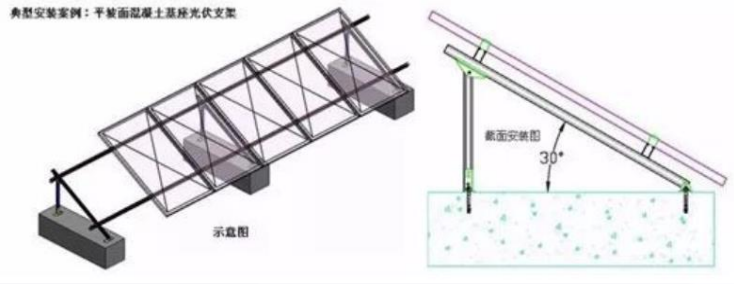


HYDRO POWER+FPV

2.
HDPE solar mounting System for flat roof

Traditional mounting system

The concrete material is usually used for counterweight for rooftop PV projects at flat concrete rooftop. The bottom of the counterweight is padded with waterproof material and fixed and leveled with cement mortar on the rooftop. The weight of the counterweights will balance the solar module arrays. As the counterweights are directly placed on the roof without drilling holes, they will not damage the original structure of the roof. In the installation , counterweights have various forms, such as strip counterweight, square counterweight, reinforced concrete counterweight ,engineering plastic, etc..



Strip counterweight

Square counterweight

Reinforced concrete + Engineering plastic

In the installation of PV systems on flat concrete rooftops, concrete counterweights are often used. However, the concrete counterweights have the following shortcomings in actual installation :

1.Complicated installation and inconvenient transportation: When making concrete counterweights, it is necessary to use machinery to mix cement, gravel, sand, water and other raw materials. The machinery and materials are relatively bulky and inconvenient for storage and transportation

2.Large site requirements: a relatively wide ground is required for equipment, material placement, storage and counterweight making.

3.Long installation duration: the concrete counterweights need to be made firstly and maintained for some time to become solidified and get sufficient strength before installation can be carried out. The installation period is long and need very careful maintenance

4.Not environment friendly: the operation of machinery will produce noise and wastewater pollution. Due to concrete mixing and the use of sand and gravel materials, a large amount of dust is easily generated during the installation period, which pollutes the environment and easily causes occupational hazards

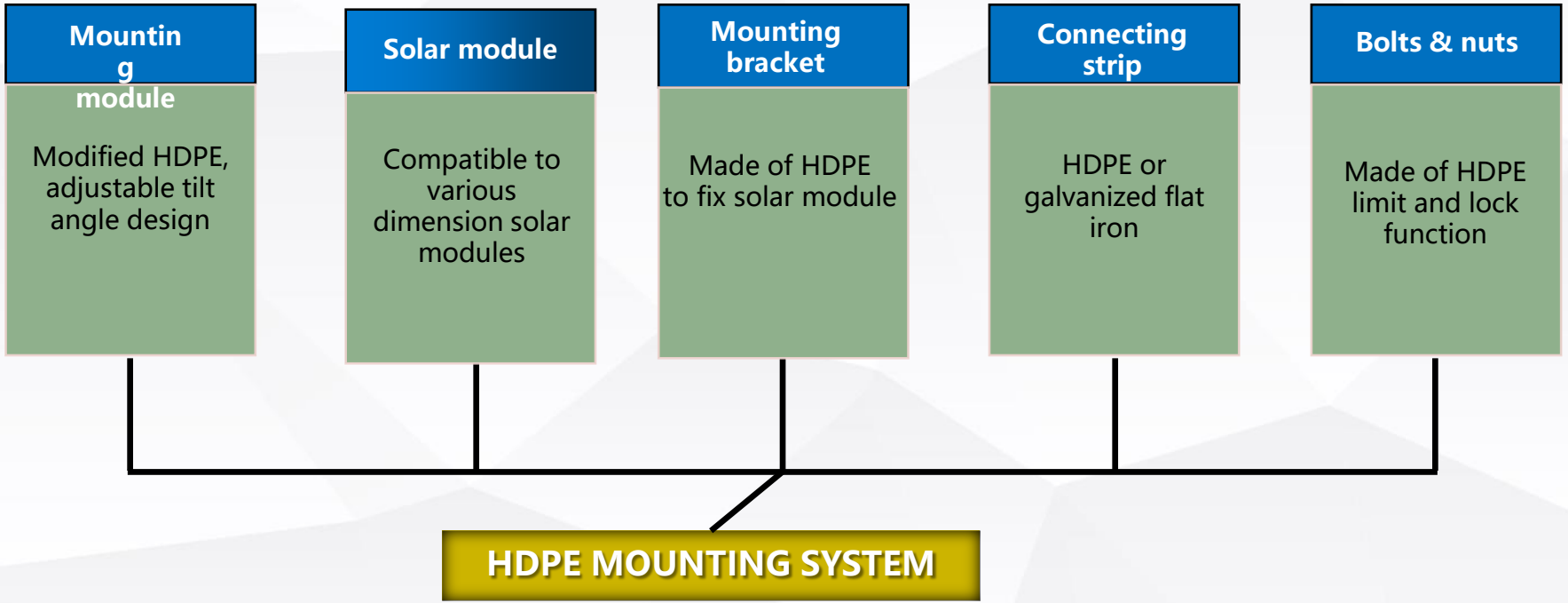
5.Higher labor cost: a lot of installation personnel need to be deployed on the installation site, and the salary is rising according to the larger amount of work and the longer installation period, thus the labor cost is higher

6.High layout requirements: Due to the inconvenient movement of the counterweight , the design accuracy of the layout of the counterweight is required to be higher

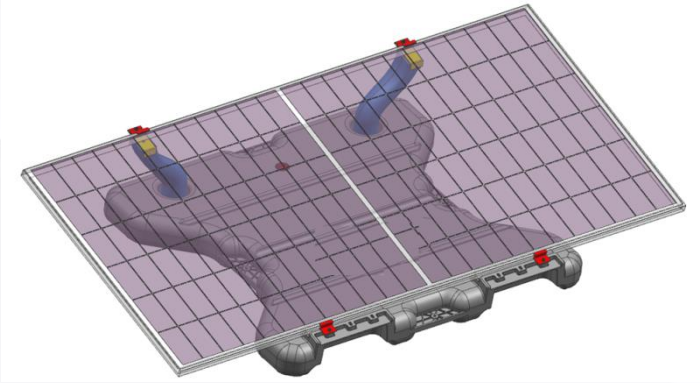
7.Remains pollution is large: after the installation and the life cycle of the rooftop PV project, the concrete materials has no recycling value, resulting in a lot of waste of resources and pollution.

8.Inconvenient disassembly and transportation: If the rooftop PV project needs to be adjusted or moved, the disassembly and transportation are extremely inconvenient, and the transportation of the counterweight is almost impossible.

New Mobile HDPE mounting system



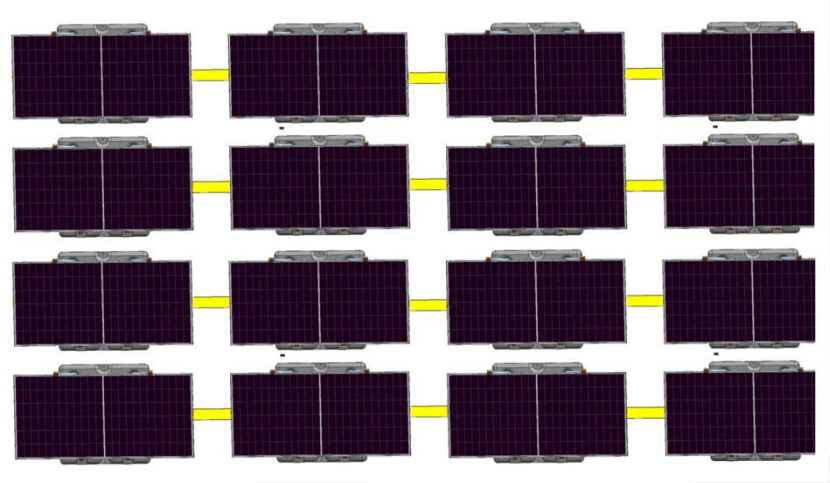
Mobile HDPE mounting system



Raw material	Made of modified anti-aging HDPE material in line with Hunt water absorption test
Wall thickness	2～4mm(adjustable)
Dimension(cm)	**Model S**: 1180 X 1260 X 140mm **Model E:**1100 X 950 X 130mm
Counterweight (water filled)	**Model S**: 160kg min **Model E:** 120kg min

The water filled mounting module is made of modified high quality HDPE material, which is same to the mounting modules used for floating solar system with same 25 years' design service life with stable operation
The water filled HDPE mounting module is made of integrated blow molding process with excellent performance, high wear resistance and pressure resistance
Portable structure design, easy to be transported and carried， easy to assemble, hoisting, and be installed
Plane slotted design, increase the friction between the bottom and ground to improve the stability of mounting system After the water filling, the unit pressure of the mounting module on the rooftop is much lower than that of the concrete counterweight, this can obviously reduce the potential damage to the rooftop
The counterweight can be adjusted by changing the type and filling ratio of the medium filled into cavity of the module, thus the modules layout is more flexible.

Mobile HDPE mounting system



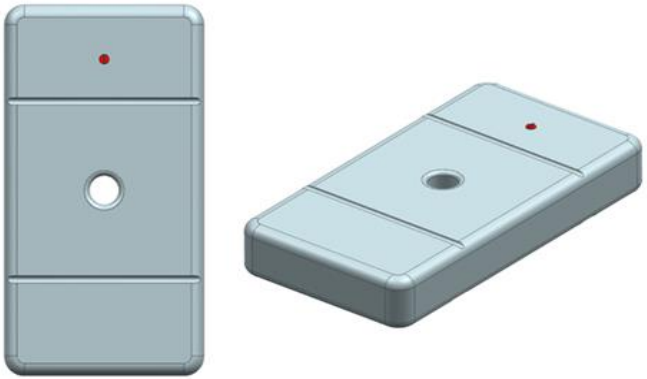
This mobile distributed PV HDPE mounting system is inspired by the floating solar system. It uses the HDPE mounting modules cavity as a water filled module. After the modules is filled with water, its own weight is used as the counterweight, and the "chained connection" conception is used for this HDPE mounting system layout design. After the water filling, the mounting modules are interconnected with each other to form an integrated modules array on rooftop. With the same function of the concrete counterweights, this integrated overall modules array have many advantages such as higher stability, convenient installation, low cost and easy storage and transportation.

The anchoring concept is adopted to stabilize the array if needed, which will bring good system stability and wind resistance.

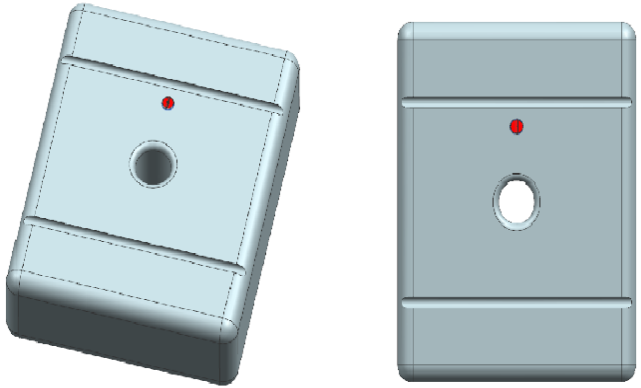
Comparative advantages

1. **Long system life** : The modified HDPE material has many advantages such as a wide working temperature range, corrosion resistance, and excellent performance, which can meet the 25-year service life requirement of the PV industry
2. **Fast production: The integrated filling molding process is fast and the delivery is timely**
3. **Convenient transportation: The module adopts lightweight design, which is convenient for storage and transportation**
4. **Lower cost: Thanks to the improvement and optimization of system design, this HDPE system cost and installation cost are s lower than traditional system**
5. **Easier and faster installation: only water filling is required to complete the installation of a single counterweight module, so the installation time is at least 30% less than that of the traditional concrete counterweight mounting system**
6. **Saving manpower cost: the installation process is much easier and faster the manpower cost is much lower**
7. **Environmental protection and energy saving: only water, sand or other media are required to be filled into module during the installation process, and no extra pollution and noise are generated during installation, little power consumption**
8. **Easier adjustment: the system layout adjustment is more flexible and convenient**
9. **Low pressure: the flat wider bottom surface design is used to avoid possible potential damage to rooftop.**
10. **Mobile and reusable: If the finished PV project needs to be relocated , it can be disassembled and discharged quickly, and it can be quickly assembled and reused in a new project site**
11. **Recyclable: HDPE materials can be recycled after a 25-year life cycle to reduce environmental pollution.**

HDPE Counterweight module



Water filling counterweight
Dimension:1500*800*280mm
Weight after water filled: 320KG



Sand filling counterweight
Dimension:1000*800*280mm
Weight after sand filled: 320KG

This HDPE counterweight modules design is inspired by the floating solar system. It uses the HDPE modules cavity as a water filled module. After it is filled with water, its own weight is used as the counterweight with the same function of the concrete counterweights, this design has many advantages such as higher stability, easier mobility , convenient installation, low cost and easy storage and transportation.
It can use water or sands as filling materials, the cost varies basing on the fill materials.

Application scenario

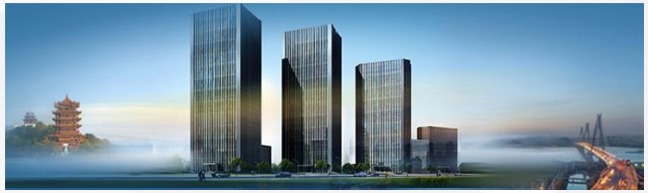
This HDPE counterweight modules design is inspired by the floating solar system. It uses the HDPE modules cavity as a water filled module. After it is filled with water, its own weight is used as the counterweight with the same function of the concrete counterweights, this design has many advantages such as higher stability, easier mobility , convenient installation, low cost and easy storage and transportation.
It can use water or sands as filling materials, the cost varies basing on the fill materials.

Technical partners

Changjiang Institute of Survey, Planning, Design and Research (CISPDR) rendering its services covering survey, planning, design, scientific research, consultancy, installation supervision and EPC. With a complete quality management system, CISPDR remains committed to provide high-quality products, advanced technology and sincerity service by scientific management and continuous improvement, in a way that exceeds the needs of customers.

CISPDR has prepared master plans for large rivers and lakes, and has performed survey and design for hundreds of projects in 45 countries and regions, represented by the Master Plan of the Yangtze River Basin, , Three Gorges Project and the Middle Route of South-to-North Water Transfer Project. CISPDR also design and EPC for over hundreds MW floating solar project. CISPDR possesses 330 national patents and has been awarded more than 400 national awards and has been successively granted international awards from FIDIC, ICOLD and other world-renowned organizations in the past several years

Relying on CISPDR abundant experience in floating solar projects and structural design, we have developed B series, Stacka series floating solar system and Solarf rooftop solar mounting systems.



Our partner si one of the five largest state-owned sole proprietorship power generation corporations organized at the end of 2002 according to national reform for electricity system. Its major business includes power generation, heat production and supply, development of primary energy related with electricity such as coal and relevant technical service. It has grown from a electric power generator to a comprehensive energy group with rising position in the industry. It was ranked 397th on Fortune Global 500 in 2018.

Our Partner was founded in 2006. It is a subsidiary of Jiangsu Hengtong Optoelectronics Co., Ltd. (stock code: 600487) dedicated to the whole process of energy engineering planning, design, investment and installation. It is recognized as a national high-tech enterprise, a leading enterprise of small science and technology giants in Fujian Province, and an intellectual property advantage enterprise in Fujian Province.

The company has the power industry (power transmission engineering, substation engineering) professional level A, power industry (new energy power generation, wind power generation) professional level B, engineering survey (engineering survey, geotechnical engineering) professional level B, installation industry (installation engineering)) Professional C-level qualifications. The main business content mainly includes: grid system planning, power engineering design (transmission and transformation design, distribution network design), new energy business development (charging piles, photovoltaic, hydropower, wind power), power user engineering general contracting, etc.

HDPE material enterprises

We use HDPE base materials and modified materials from Saudi Basic Industries Corporation (SABIC), Yanshan Petrochemical, Thai Petroleum, Hangzhou Hefu New Material Co., Ltd., Hefei Yuanran New Material Co., Ltd. and other HDPE material production and R&D units and have established close cooperation with them. The HDPE raw materials and modified materials used in our rooftop solar module mounting systems have passed REACH, RoHS and other certifications with stable performance and strong consistency. The HDPE mounting modules and solar module mounting structures made of the above materials have stable performance, wide working range and good weather resistance.

Mold manufacturer

Anhui Seagul Technology Co., Ltd. is also a technology-orientated enterprise specializing in the design and manufacture of plastic molds and HDPE solar system development. Its main business scope is the design and manufacture of plastic molds, precision parts, research and development of the floating solar system. Seagul has rich experience in floating solar system mold design, processing and assembly team. The technical team and mold team sincerely cooperated to develop blow molding mold for HDPE rooftop solar module mounting system and injection molding molds for floating solar system , which has many advantages such as uniform wall thickness, fast production cycle, stable performance and so on.

Third party testing agency

According to the floating solar system relevant tests of professional PV testing, the test results are fed back to product design and process control, which effectively guarantees the continuous improvement of our products.

Reference projects

Reference projects

Reference projects

Reference projects