






Architecture, the art in the sun



The integration of building external envelope structure with photovoltaic power generation function is known as building photovoltaic, BIPV for short

The integration of photovoltaic power generation and building materials is an innovation of traditional building materials and a revolution of photovoltaic industry.

Building **I**ntegrated **P**hotovoltaic

-
-  **Traditional energy-saving mode of architectural glass**
 -  BIPV: New mode of architectural glass
 -  BIPV building curtain wall glass
 -  BIPV project cases
 -  Development obstacles of BIPV glass curtain wall

Old energy-saving mode of architectural glass



For the building energy conservation in China, it is based on the building energy consumption in 1980-1981, and considered as a stage by every 30% improved energy efficiency compared to the previous stage. **The first step of energy conservation is to save 30% energy on the basis of that in 1980-1981, generally known as the standard of 30% energy saving. The second step is to save 30% on the basis of energy in the first step, that is, 50% energy saving. The third step is to save 30% on the basis of that in the second step, that is, 65% energy saving.** Along with the implementation of the fourth step energy saving standard (75% energy saving) in Beijing, Tianjin and other places, East China will also enter the stage of 75% energy-saving.

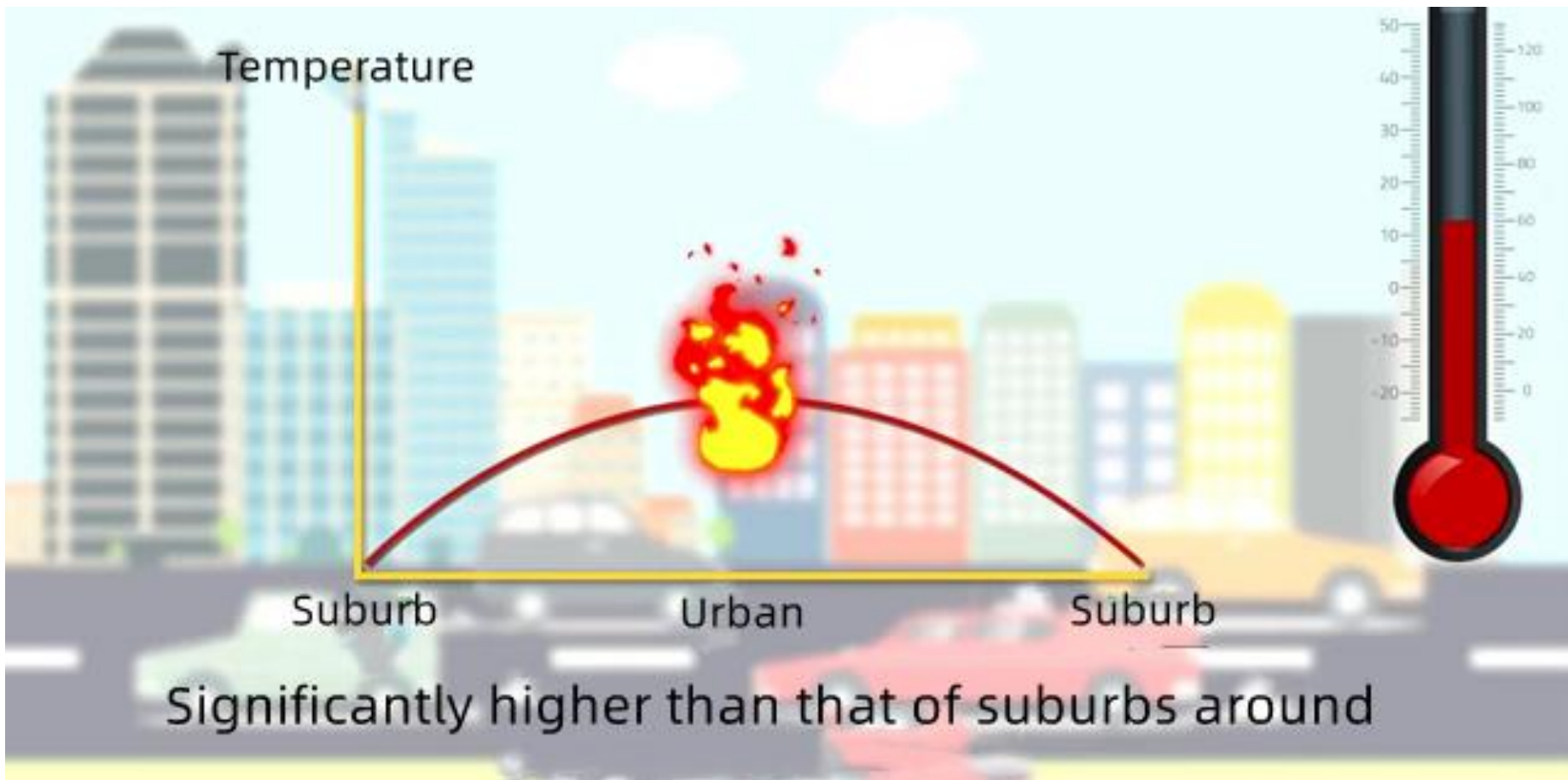
Heat transfer mode: Conduction+convection+radiation

Solar energy RAT equation

Total solar energy = Reflection+Absorption+Transmittance

Most of the previous studies focused on how the curtain wall glass can prevent the transfer of heat, and barely considered how to change the way of heat transfer.

Building energy-saving glass urban heat island effect

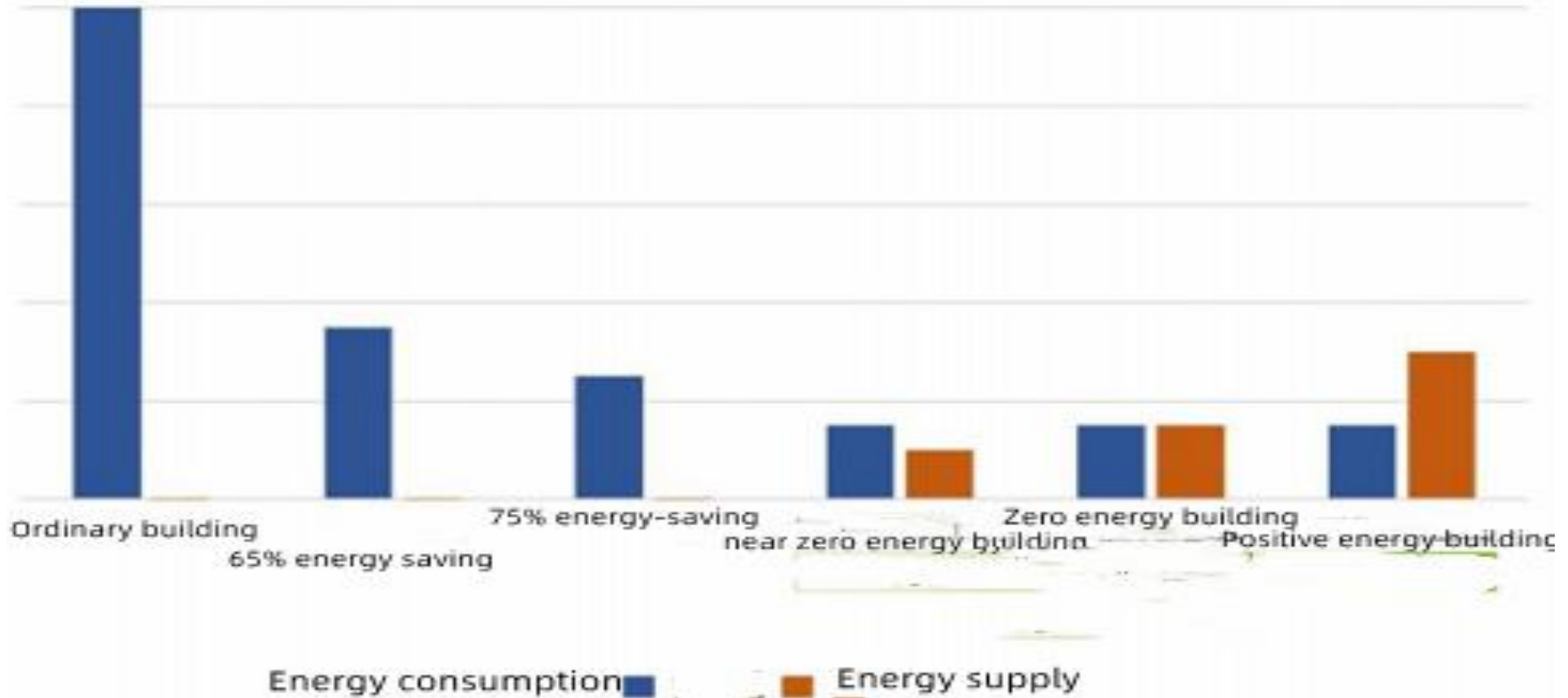


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 - 2 **BIPV: new mode of architectural glass**
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New mode of BIPV architectural glass

New development mode of architectural glass

Comparison chart of building energy consumption and capacity by stages



Energy saving development stage

65% energy-saving → 75% energy-saving → Passive Building → Integrate into BIPV → Zero Energy Consumption Building (ZEB) → Positive energy building

New mode of BIPV architectural glass Selection direction of sustainable development

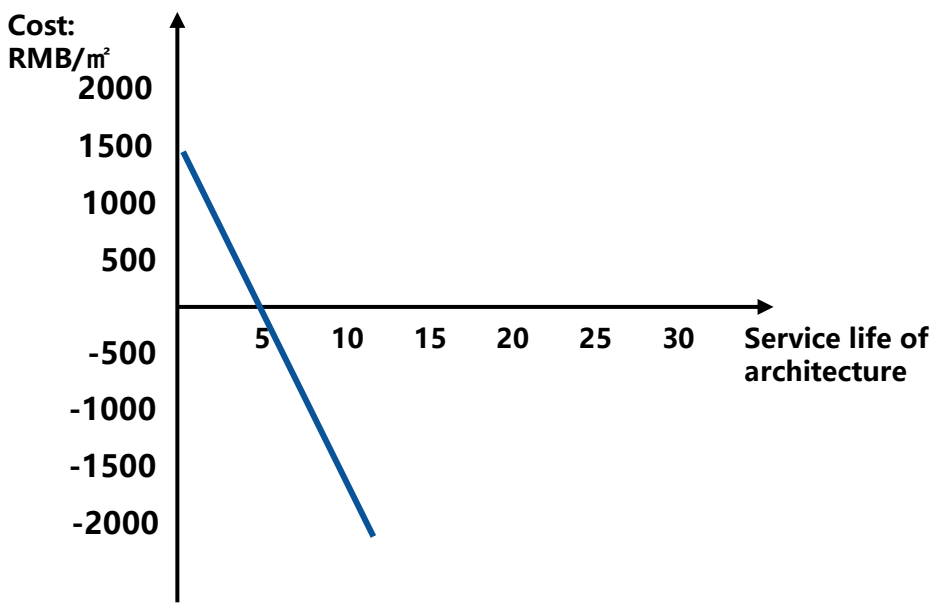
- The energy consumption of the terminal can be divided into three parts: industrial energy, building energy and transportation energy. At present, the building energy consumption accounts for about 20% of the entire energy consumption in our society.
- **In the future, the proportion of building energy consumption will further increase due to the stopless urbanization process in China and more rural people rushing into urban areas, leading to great demand for buildings in urban and rural construction.** Second, with the improvement of people's living standards, residents have a rigid demand on building energy. Third, the demand for self-heating in the south will also lead to the increase of building energy consumption. In the future, the proportion of building energy consumption in China will come near 30% of the whole society's energy consumption. The building energy consumption in developed countries generally accounts for about 40% of the energy consumption of the whole society, there is still great space for increase in energy consumption and demand of buildings in the future.
- To meet the new requirements of energy saving and emission reduction arising from building energy consumption and achieve the goal of carbon peaking and carbon neutrality in the construction field, firstly, pay attention to building energy conservation; **Secondly, enhance the building's ability to generate electricity, and realize the renewable energy of the building to generate electricity.**
- **Photovoltaic building integration is an inevitable trend for the sustainable development of green buildings.**

New mode of BIPV architectural glass

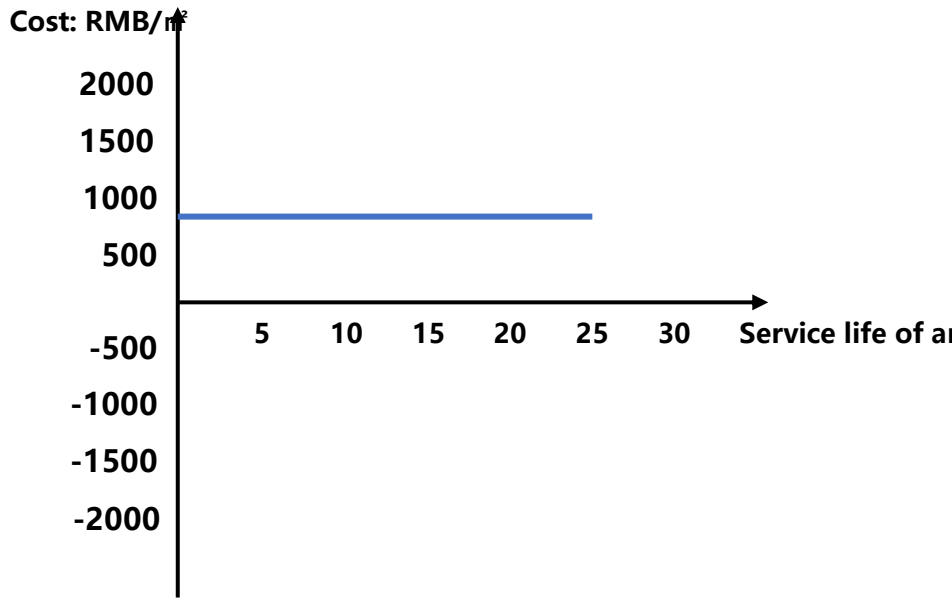
Cost recovery

From the perspective of construction cost, the cost of photovoltaic building can be recovered and will get lower as time goes on. In the whole life cycle of the building, the cost can be recovered and the income can be created. And ordinary buildings are sunk costs.

Photoelectric buildings have high cost performance and good economic benefits.



Power generation curtain wall glass



Conventional curtain wall glass

Ordinary building curtain walls have no possibility of cost recovery
The cost of BIPV building curtain wall can be recovered in 6-10 years

In October, 2021, the State Council released "peak carbon dioxide emissions Action Plan before 2030", proposing that in the integration of photovoltaic power generation and building, a "direct and soft light storage" building integrating photovoltaic power generation, energy storage, DC power distribution and flexible electricity consumption will be built. By 2025, the replacement rate of renewable energy in urban buildings will reach 8%, and the photovoltaic coverage rate of new public institutions and new factories will reach 50%.

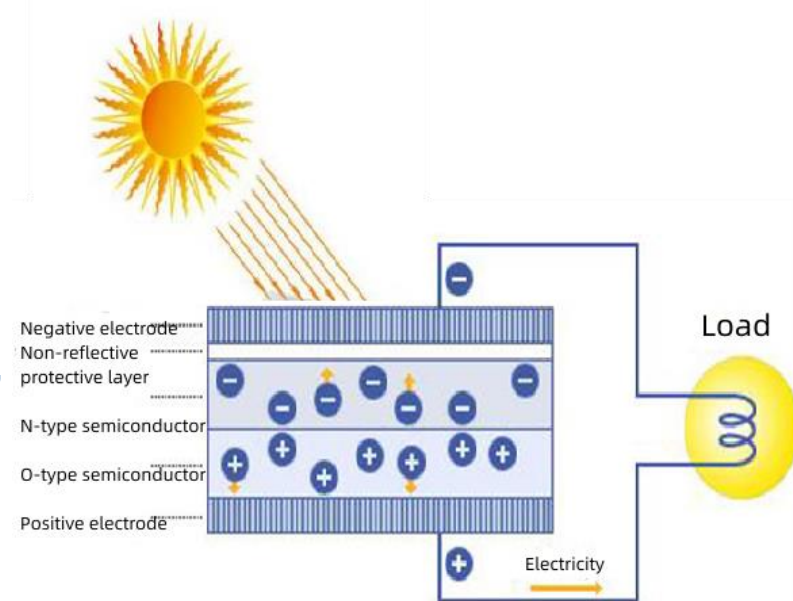
The Ministry of Housing and Urban-Rural Development issued the national standard GB 55015-2021 *"General Code for Energy Efficiency and Renewable Energy Application in Buildings"*, which came into effect on April 1, 2022. This Code is a mandatory engineering construction specification, and all provisions must be strictly implemented, among which carbon emission calculation is a mandatory requirement. The standard is to implement the national laws and regulations on energy conservation, ecological environment protection and climate change response, implement the decision-making and deployment of peak carbon dioxide emissions and carbon neutrality, improve the utilization efficiency of energy resources, promote the utilization of renewable energy, reduce the carbon emission of buildings, create a good indoor environment of buildings, so as to meet the needs of high-quality economic and social development. The standard carries out the spirit of reforming and perfecting the standard system of engineering construction, which plays an important role in improving the quality of buildings and promoting the high-quality development and green development of the construction industry. It highlights the nature of technical regulations, and clarifies the mandatory indicators and basic requirements of design, construction, commissioning, acceptance and operation management are defined from three aspects of energy-saving design of new buildings, energy-saving of existing buildings and utilization of renewable energy.

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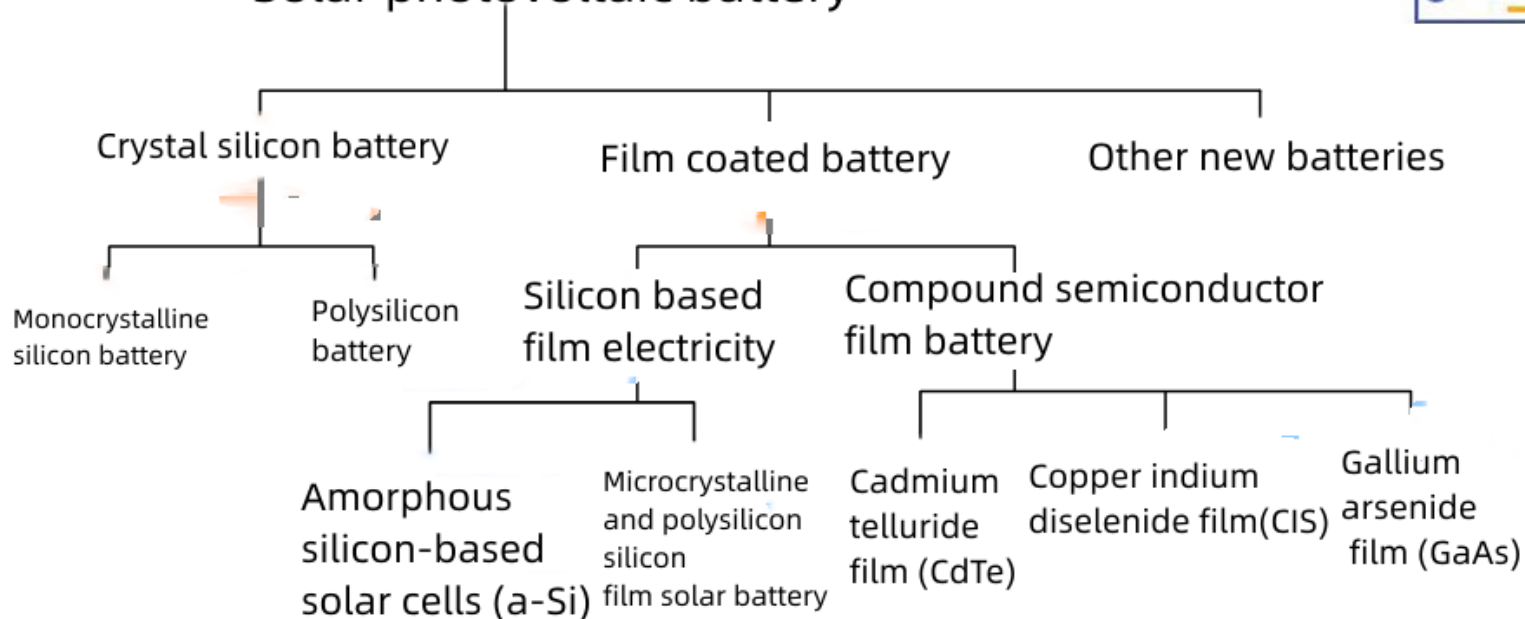
BIPV curtain wall glass Photovoltaic power generation

Working principle of solar cell

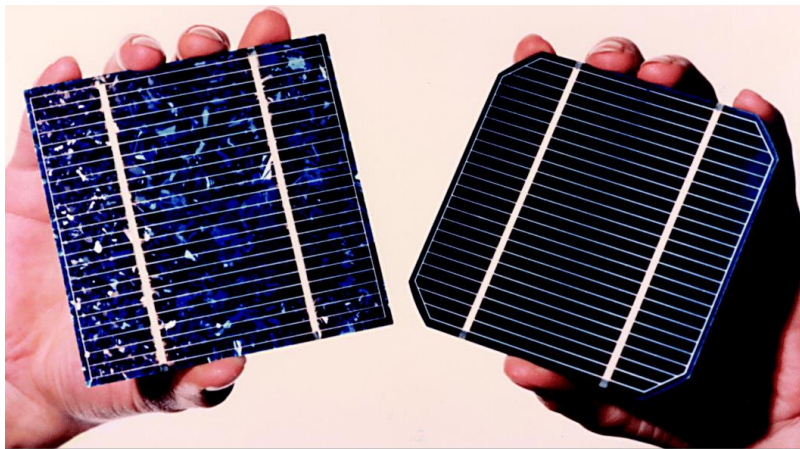
- The sunlight illuminates the semiconductor p-n junction and forms a new hole-electron pair, the hole flows from the n region to the p region under the action of the p-n junction electric field, and the electron flows from the p region to the n region. When the circuit is switched on, the current is formed.
- This is the working principle of photoelectric effect solar cell, which absorbs photons, produces electron-hole pairs, and produces potential at both ends of PN junction. It connects the PN junction with wires to form current.



Solar photovoltaic battery

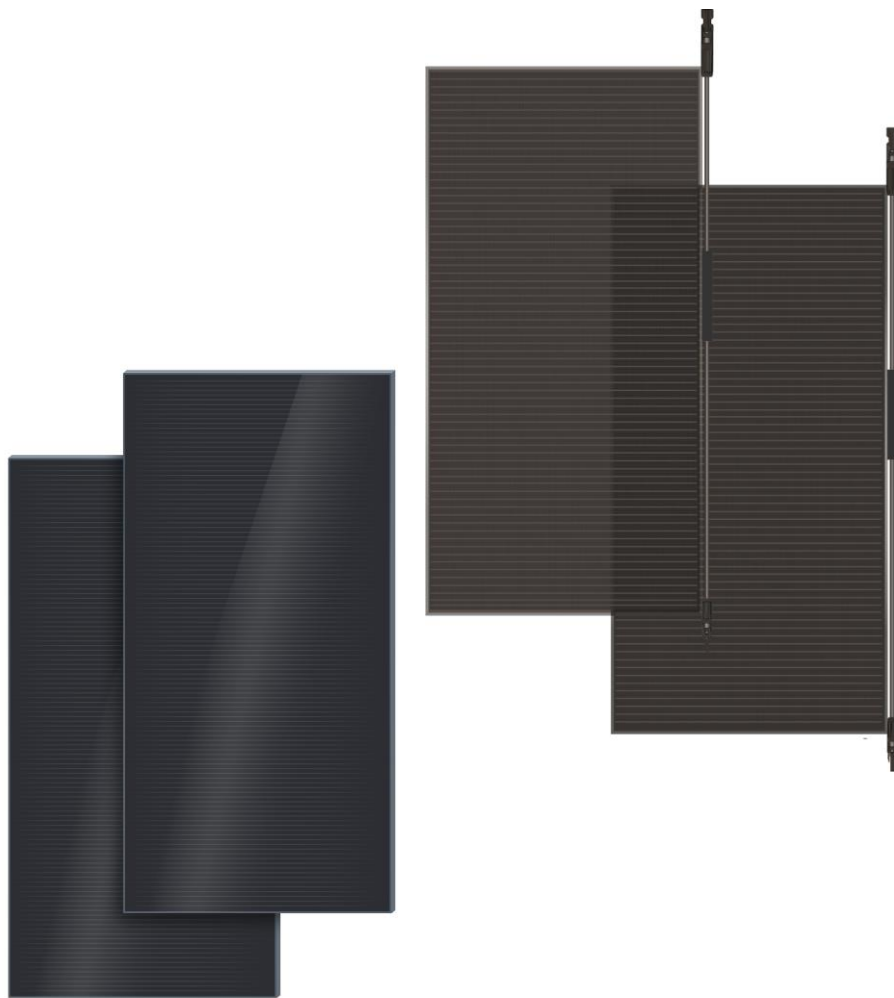


BIPV curtain wall glass Electro-crystalline silicon/film module



Polysilicon
silicon
module

Monocrystalline
silicon
module

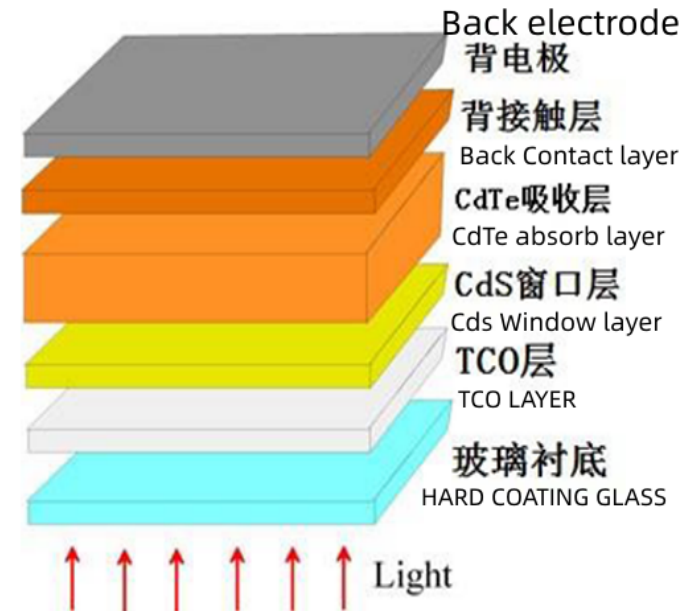


Membrane
module

Cadmium telluride power chip structure

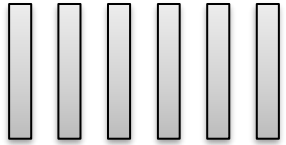
Nano cadmium telluride solar(CdTe)is a kind of thin film solar cell on P type CdTe and N type CdS. The transparent conductive film(FTO)and transparent high resistance(SnO₂)transition film are deposited on the glass substrate,and the cadmium sulfide(N type) and cadmium telluride(P type)films are deposited sequentially by gass phase transport deposition method. Then the crystal structure is improved by CdCl₂ treatment activation,and the PN junction is activated.Then PVD magnetron sputtering was used to gild Mo/Al/Cr electrode to form the structure of CD telluride cell as shown in the figure below:

Glass /FTO /CdS /CdTe/Mo/Al/Cr



Raw glass is 3.2/2.5mm FTO photovoltaic grade hard coating glass,
The main producers at present are Pilkington and AGC

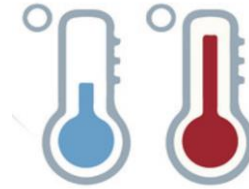
Eight advantages of cadmium telluride (CdTe) in architecture



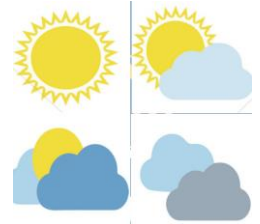
Strong shielding resistance



Safety-small hot spot effect



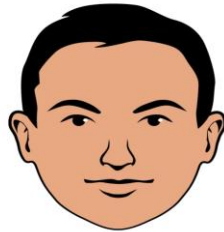
Low temperature coefficient



Good weak light performance



Small orientation dependence



Good appearance consistency



Small annual attenuation



Long service life

Advantages of the product-

Advantage 1 Strong shielding resistance

Polysilicon



Monocrystalline half piece



CdTe



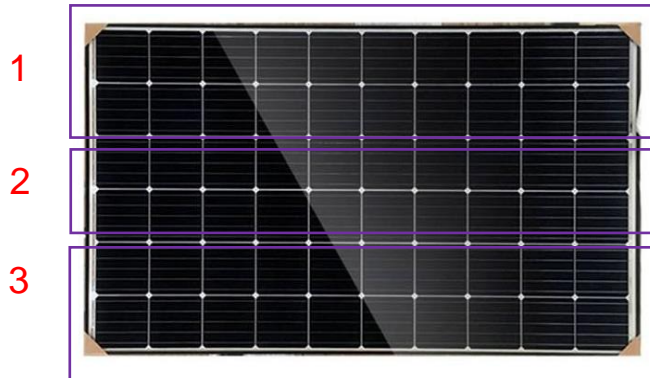
Influence of shielding on output characteristics of different products								
Polysilicon	Shielding mode (c-Si- whole piece)	Method a: 50% of a piece (shielding area 0.8%)	Method b: 1 piece (shielding area 1.7%)	Method c: 50% of two pieces (shielding area 3.3%)	Method d: 6 pieces in a row (shielding area 10%)	Method e: 10 pieces in a row (shielding area 16.7%)	-	-
	Power loss	↓35%	↓35%	↓70%	↓99%	↓35%	Method f: -	-
Monocrystalline half piece	Shielding mode (c-Si- half piece)	Method a: 1 piece (shielding area 0.8%)	Method b: 2 pieces on different sides of the same diode (shielding area 1.7%)	Method c: 2 pieces on the same side of different diodes (shielding area 1.7%)	Method d: 2 pieces on different sides of different diodes (shielding area 1.7%)	Method e: 6 pieces in a row (shielding area 5%)	Method f: 12 pieces in a row on different sides (shielding area 10%)	Method g: 10 pieces in a row (shielding area 16.7%)
	Power loss	↓35%	↓35%	↓44%或69%	↓44%或71%	↓47%或100%	↓99%	↓35%
CdTe	Shielding mode (CdTe)	Method a: 0.8%	Method b: 1.7%	Method c: 1.7%	Method d: 1.7%	Method e: 5% (lateral shielding)	Method f: 10% (lateral shielding)	Method g: in a row (shielding area 16.7%)
	Power loss	↓0.8%	↓1.7%	↓2.5%	↓1.7%	↓48%	↓82%	↓16.7%

备注：以上数据来源于光伏业内公司的代表性实测分析报告

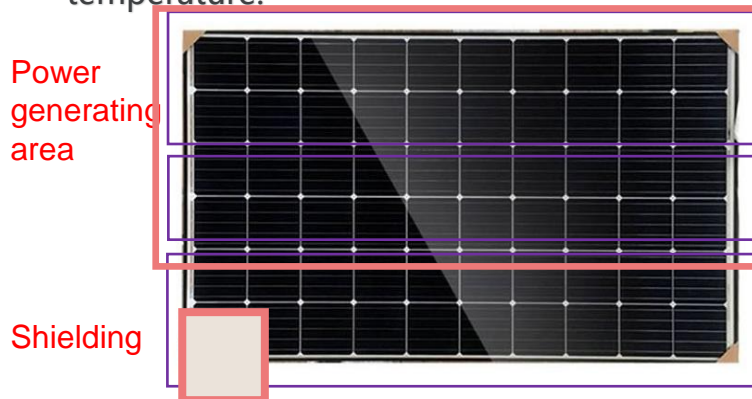
When CdTe is shielded at a point, the power loss is proportional to the shaded area, and only when it is shaded in a large area, and the whole short side is shielded, the power loss is larger

Good anti- shielding

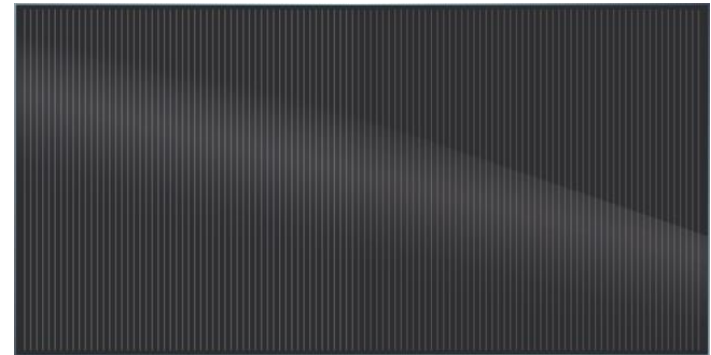
Crystalline silicon



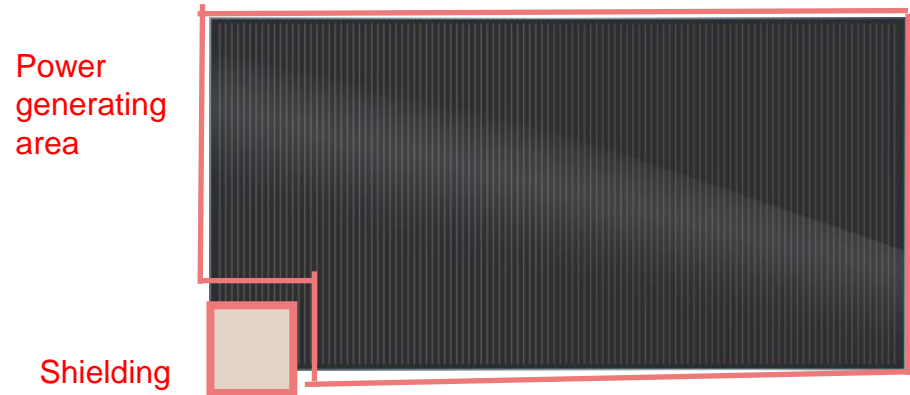
The crystalline silicon module is composed of three regions connected in series, with an anti-reflection diode between each region; When it is partially shielded, the loss of a single area is larger, the power generation amount is seriously affected, and there will be a fire hazard in case of high temperature.



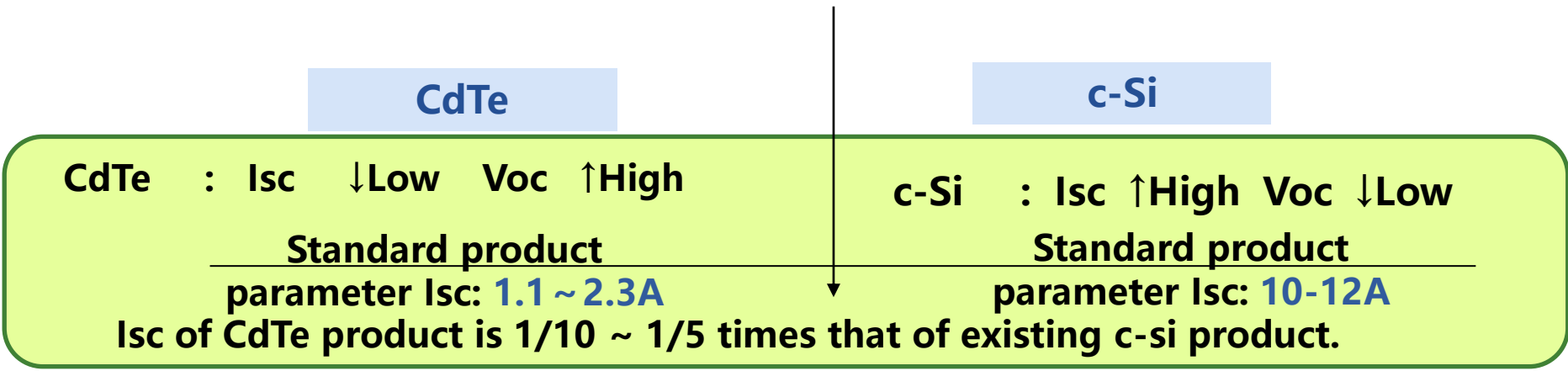
CdTe



The strip-shaped subcell of CdTe solar cell has a small area, and the other subcells can work normally even if it is partially shielded.



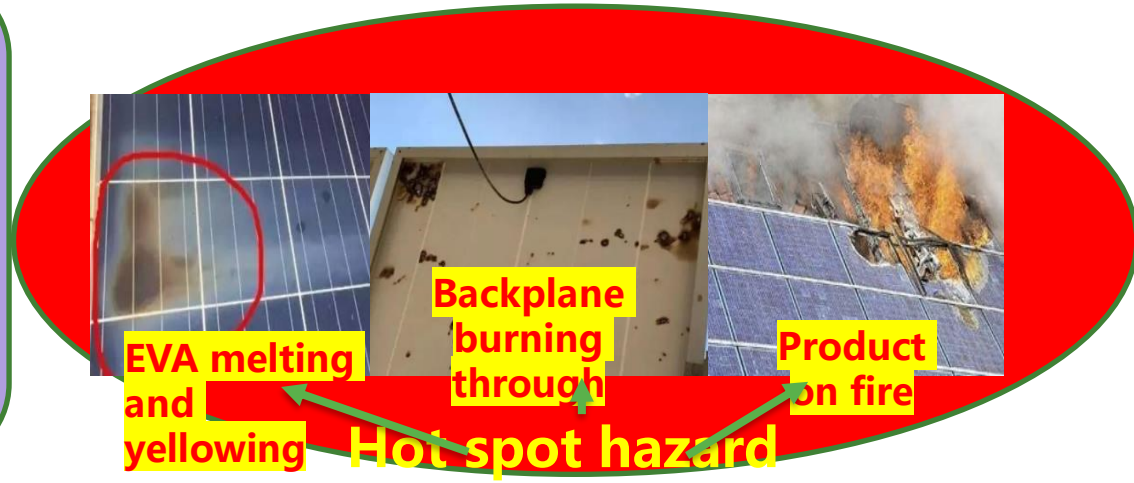
Advantages of the product- Advantage 2: Safety-small hot spot effect



According to Joule's law,
Energy $Q=I^2 \cdot R \cdot t$

Q: Heat, I: Current, R: Resistance, t: Work time

CdTe products have low current, low heat accumulation temperature and its hot spot effect should be not obvious



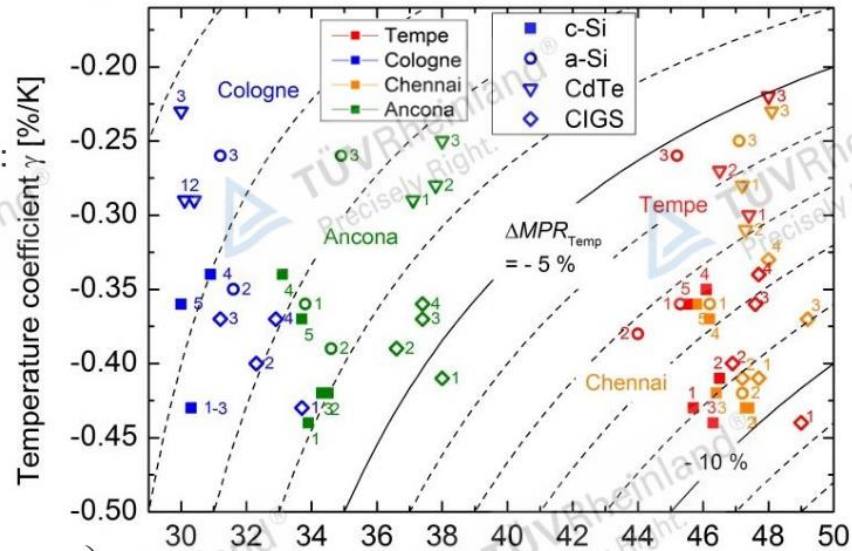
Product Advantages Advantage 3: Low temperature coefficient-higher power generation

Minimum loss of
power generation

Data analysis
Temperature influence

Place	Loss of power generation due to temperature:
Germany	-1.2 % to -3.7 %
Italy	-2.6 % to -5.3 %
India	-5.3 % to -9.6 %
Arizona, United States	-5.1 % to -10.6 %

TUV outdoor empirical data



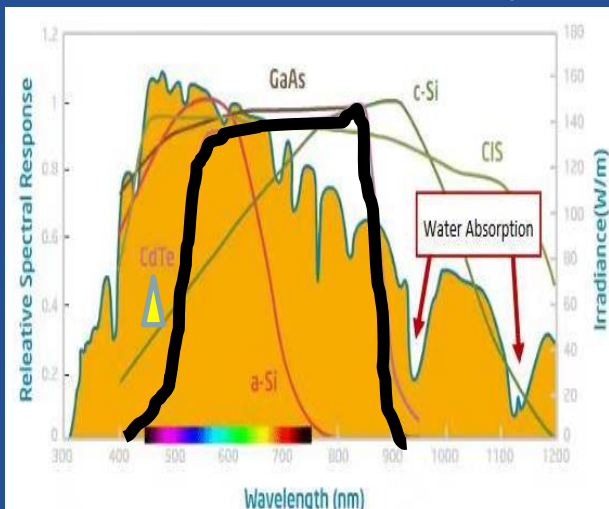
$$\Delta MPR_{TEMP} = \gamma \left(\frac{\int_{T} T_{BoM} G_{PoA} dt}{\int_{T} G_{PoA} dt} - 25^{\circ}C \right)$$

Weighted average module temperature \bar{T}_{BoM} [°C]
In tropical areas, the components are affected by temperature, resulting in great power loss

Compared with the other three modules, cadmium telluride module has the least loss caused by temperature

全光谱吸收能力好

Good full-spectrum absorption capacity



CdTe material has good full spectrum absorption capacity. As it is a direct gap material, it has obvious power generation effect in weak light conditions such as in early morning and evening.

实物实验

Physical experiment



Rain shielding



Snow shielding



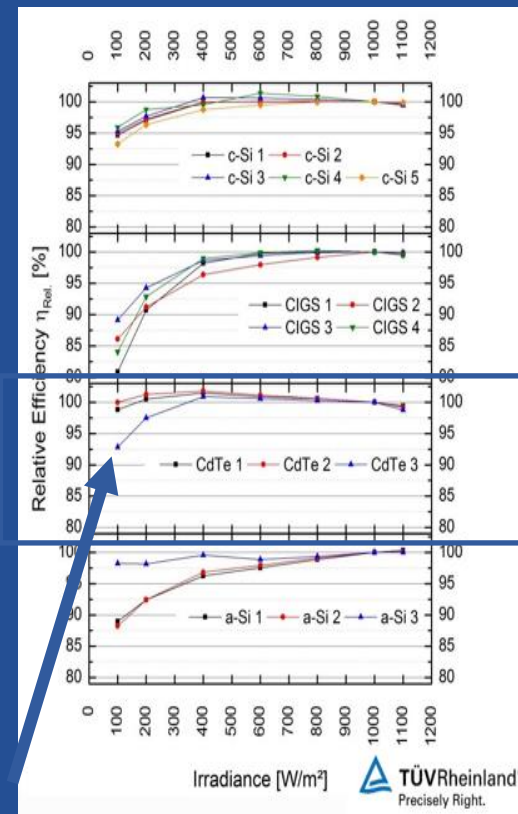
Paper semi-shielding



Paper full-shielding

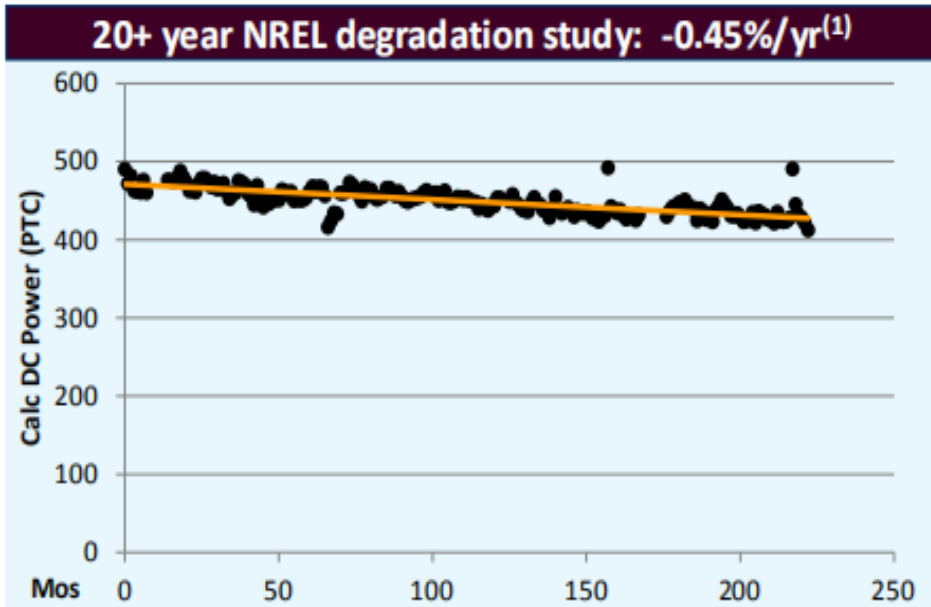
TUV公测数据

TUV public test data



CdTe has the best relative power generation capacity at low irradiance

Product Advantages Advantage 5: Small annual attenuation and long power generation years.



According to DOE NREL's 20-year attenuation research, the cumulative attenuation of CdTe products in 20 years does not exceed 9%, and the average attenuation is only $-0.45\%/yr$, far lower than the average annual attenuation rate of -0.8% for c-Si cells.

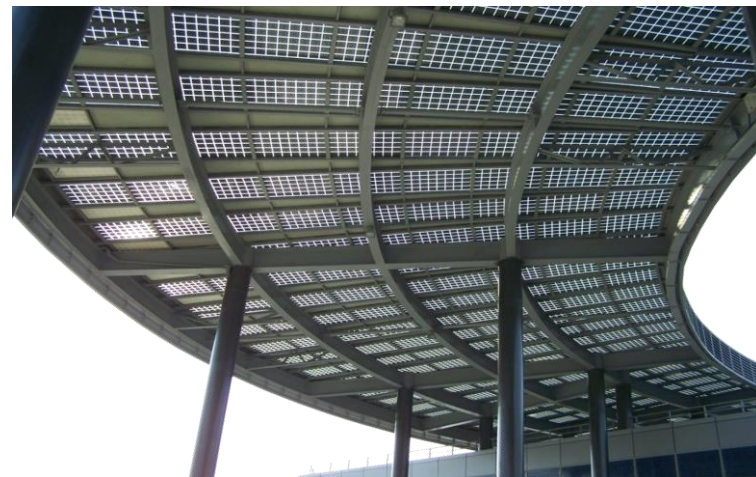
Our company promises in the contract that: our company will provide 5-year warranty for Laminated glass, 10-year warranty for DGU glass, and the product power attenuation within 25 years is not more than 20%

Product Advantages Advantage 6: good coordination and consistency with the architectural appearance

CdTe photovoltaic cell



Traditional solar cell



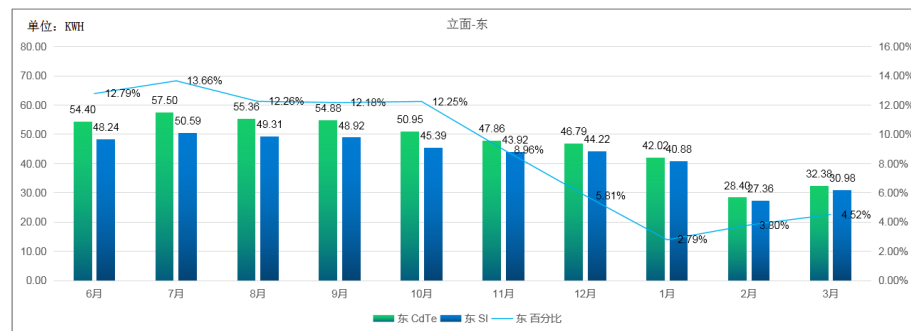
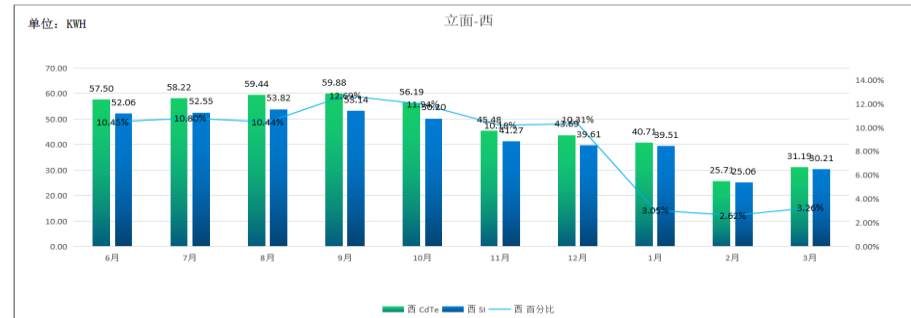
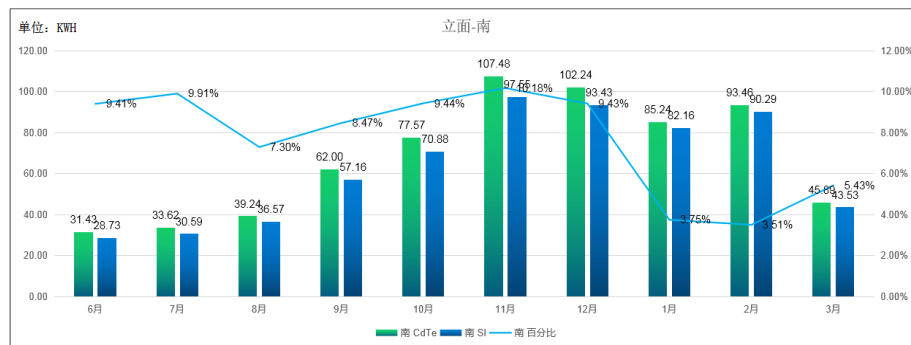
Product Advantages Advantage 7: Low orientation dependence-application scenarios unlimited

- Installation position: Ruike Park, Torch Development Zone, Zhongshan City, Guangdong Province
- Longitude and latitude: North latitude: 22° 33' 40" , east longitude 113° 26' 45"



Test results of cumulative power generation in 10 months of CdTe vs crystalline silicon

**9.4% more on east facade,
7.7% more on south facade
8.5% more on west facade**



Comparison of power generating amount in different directions at 20°

- ❑ Installation position: Ruike Park, Torch Development Zone, Zhongshan City, Guangdong Province
- ❑ Longitude and latitude: North latitude: 22° 33' 40" , east longitude 113° 26' 45"

Can simulate the daylighting roof



Monocrystalline silicon-the best inclination angle is 20°

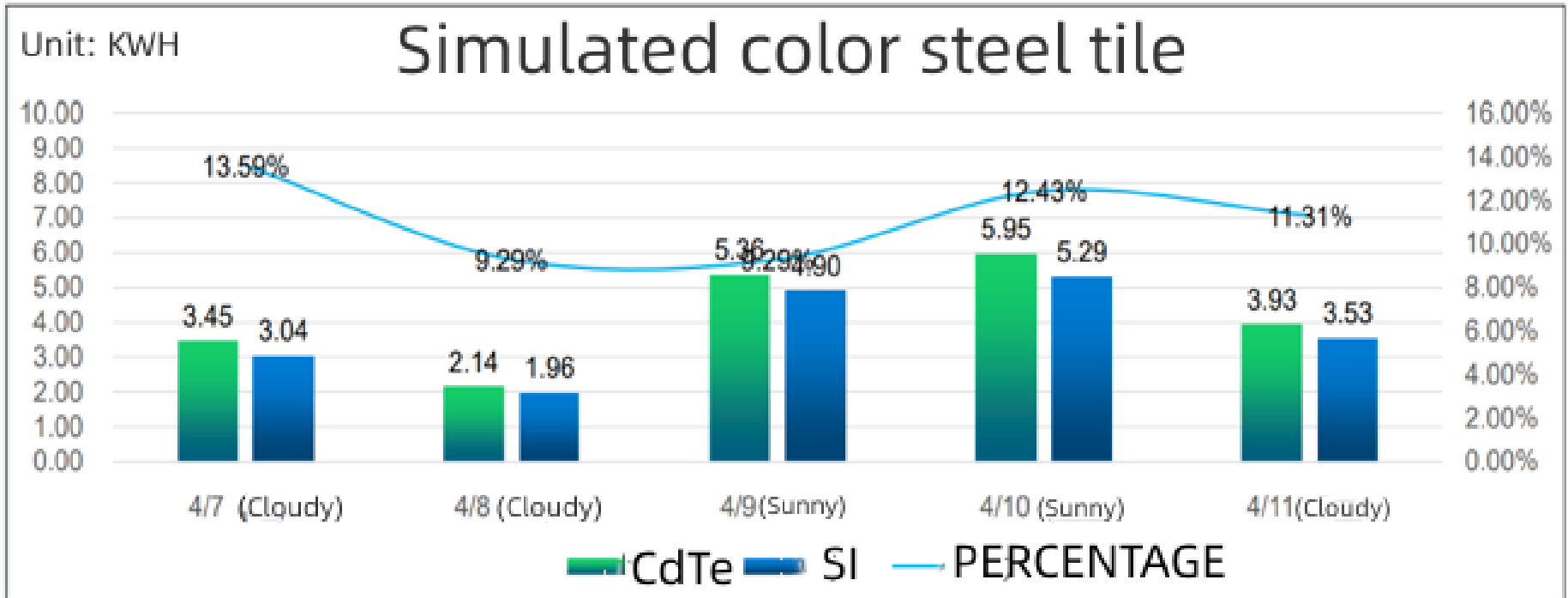
CdTe-the best inclination angle is 20°

CdTe can generate more electricity than crystalline silicon

11%

Measured statistics of top and four facades of simulated buildings

Comparison of power generation by simulating installation of cadmium telluride vs crystalline silicon on color steel tile



Summary: 1. The power generation of cadmium telluride installed on thermal insulation cotton is about 11% more than that of crystalline silicon on average

2. The tracking time is short, further follow-up is needed for the actual power generation.

Follow-up plans: Install the latest PK-115 model components for further comparison.

Product Advantages

Longer service life

Advantage 8:

CdTe is a thin film structure, which is completely attached to the glass and is not easy to be damaged

L*W: 1200*600 mm
L*W: 1600*1200 mm

Thickness: 3.5 mm



L*W: 182/215 mm

Thickness: 120~160
um

The crystalline silicon photovoltaic cell is of thin sheet structure, which is a brittle silicon wafer of 120~170um that is easy to be damaged in years of use

Selection of CdTe photovoltaic power generation glass

The working time of CdTe for power generation under weak light is longer.

Both the upper and lower sides can generate electricity, and the total installation area is large

Strong anti-interference capability and less malfunction in natural operation

Low temperature coefficient in natural operation, especially less impact in summer

Maintenance-free, low attenuation, high efficiency and large power generation amount in a life cycle

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In fact, CdTe photovoltaic cells are the most valuable choice for building photovoltaics

BIPV curtain wall glass

Light transmitting module



10% TRANSMITTING



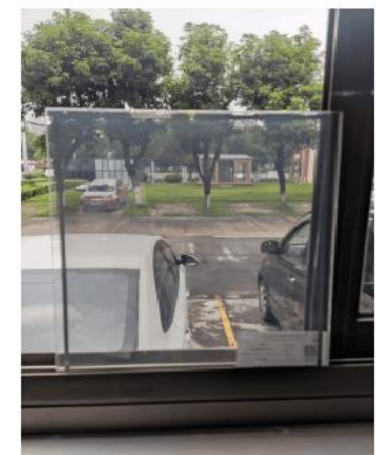
20% TRANSMITTING



30% TRANSMITTING



40% TRANSMITTING



50% TRANSMITTING



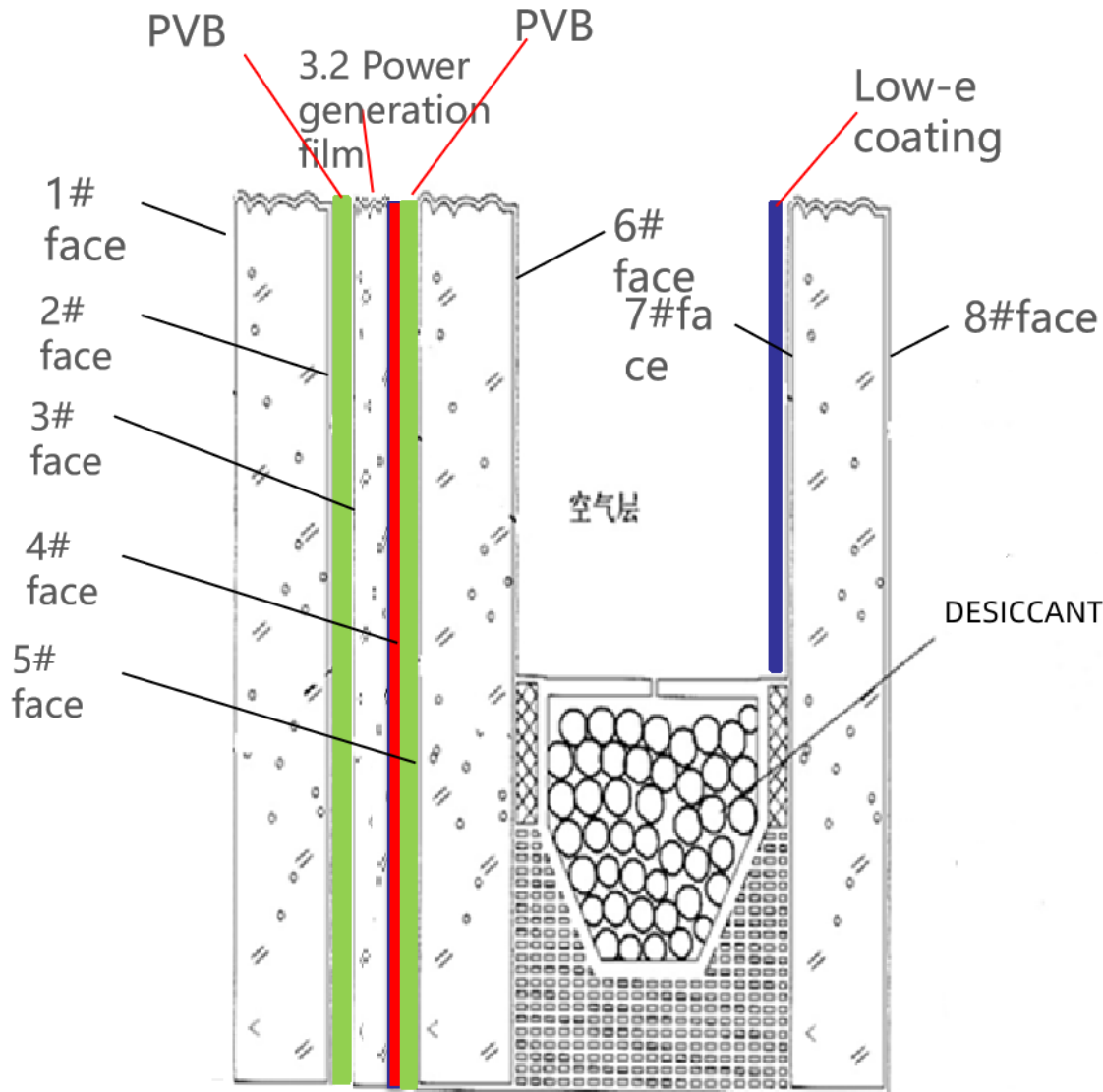
Effect of CdTe power generation glass with façade of 20% light transmittance



Effect of CdTe power generation glass with façade of 50% light transmittance

BIPV curtain wall glass

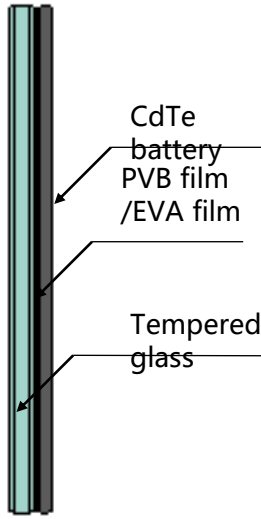
Typical configuration of products



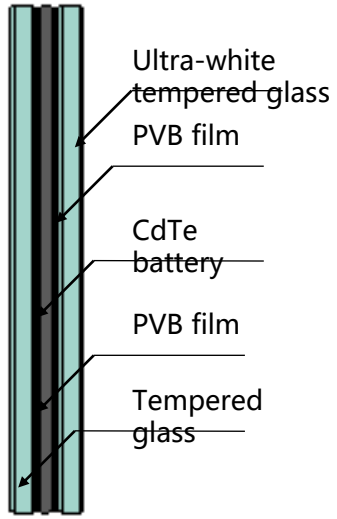
- Power generation function
- Maintenance function: Wind pressure resistance, water tightness and air tightness
- Thermal, heat insulation
- Sound-proof property
- Decorative function

HS6 Low Iron + 1.52PVB+3.2 cdte+1.52PVB+HS6 Low Iron+12A+TP8mm Low Iron Low-E(7#)

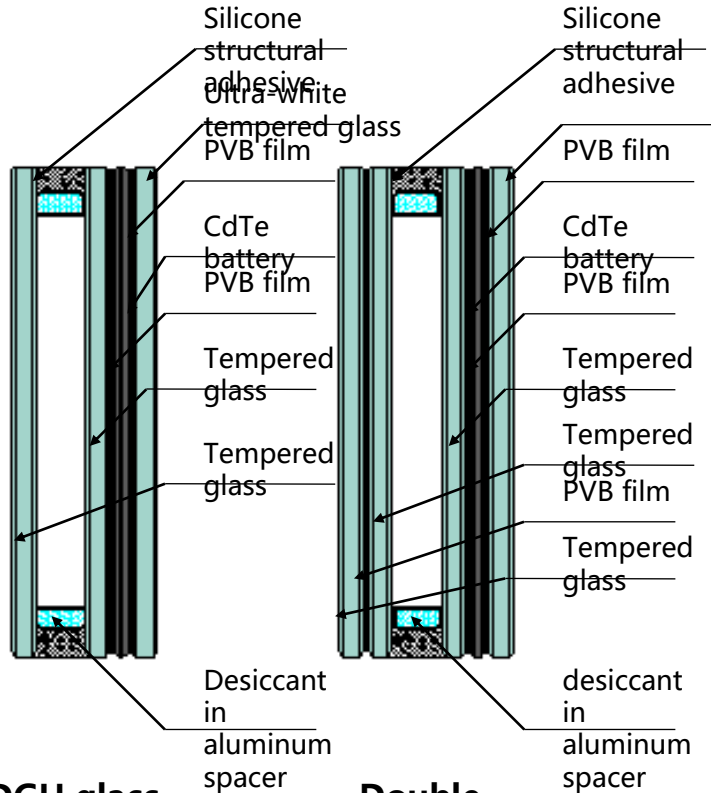
BIPV curtain wall glass Configuration combination



Laminated glass



Laminated glass



DGU glass

Double-laminated DGU

Silicone structural adhesive
Ultra-white tempered glass
PVB film

Silicone structural adhesive
PVB film

Ultra-white tempered glass
PVB film

CdTe battery
PVB film

CdTe battery
PVB film

Tempered glass

Tempered glass

CdTe battery
PVB film

Tempered glass

Tempered glass
PVB film

Tempered glass

Desiccant in aluminum spacer

desiccant in aluminum spacer

BIPV curtain wall glass

Display of large samples



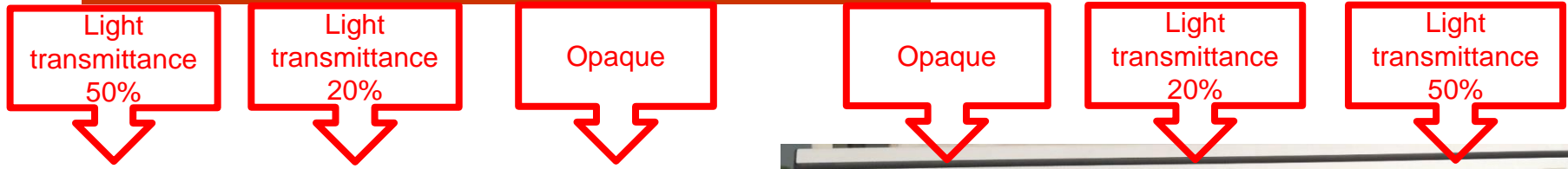
BIPV curtain wall glass

Display of small samples

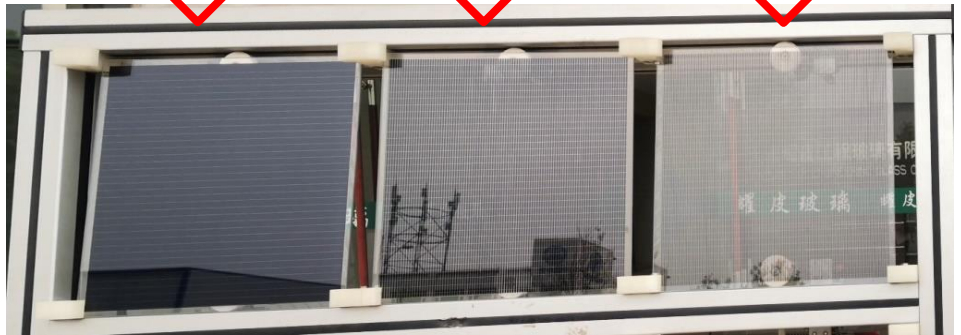


BIPV curtain wall glass

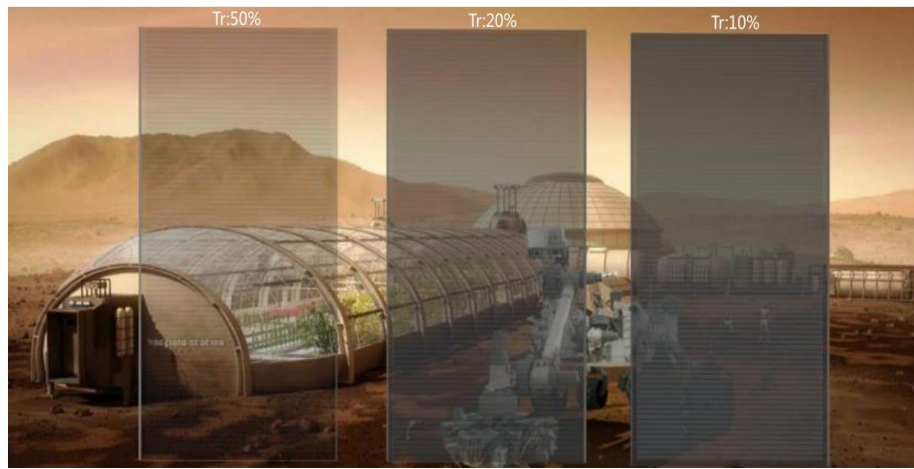
Several options for light transmittance



Back view of photovoltaic power generation glass under illumination conditions



Front view of photovoltaic power generation glass of different light transmittance under transparent background



BIPV curtain wall glass

Several options for appearance



Brown

Grey

Sky blue

Dark blue

White



Item/ light transmittance		50%	40%	30%	20%	10%	0%
Rated power	Pmpp (W)	50	60	70	80	90	100
Peak voltage	Vmpp (V)	90	90	90	90	90	90
Peak current	Impp (A)	0.56	0.66	0.77	0.88	1.00	1.11
Open circuit voltage	Voc (V)	117	117	117	117	117	117
Short circuit current	Isc (A)	0.62	0.74	0.87	0.99	1.13	1.25

The above data are test data under standard conditions (1000W/m², AM1.5, 25°C),
Specifications of modules: 1200mm*600mm

BIPV curtain wall glass

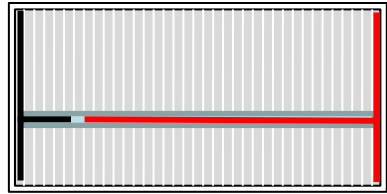
Photothermal energy-saving parameters



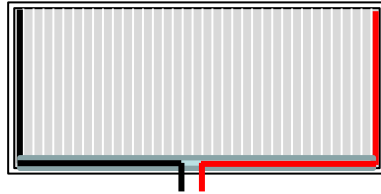
DGU glass (The coating surface is on the 7th surface)	Visible light %	Solar heat gain Coefficient SHGC	Shading coefficient SC	U value of heat transfer coefficient W/(m ² ·K)			
	Transmittance	United States NFRC 100-2010	China JGJ/T 151-2008	China JGJ/T 15 1-2008	United States NFRC 100-2010		Europe EN 673
					Summer Daytime	Winter Nighttime	
6mm LI+1.52PVB+3.2cdte 20% transmittance+1.52PVB+6mm LI +12A+6mm LI YST-0680(7#)	19	0.22	0.26	1.77	1.75	1.76	1.7
6mm LI+1.52PVB+3.2 cdte 30% transmittance+1.52PVB+6mm LI +12A+6mm LI YST-0680(7#)	27	0.25	0.29	1.77	1.75	1.76	1.7
6mm LI+1.52PVB+3.2 cdte 50% transmittance+1.52PVB+6mm LI +12Air+6mm LI YST-0680(7#)	33	0.29	0.33	1.77	1.75	1.76	1.7
6mm LI+1.52PVB+3.2 20% transmittance+1.52PVB+6mm LI +12Air+6mm LI YNE-0675(7#)	18	0.18	0.22	1.66	1.60	1.64	1.6
6mm LI+1.52PVB+3.2 30% transmittance+1.52PVB+6mm LI +12Air+6mm LI YNE-0675(7#)	25	0.22	0.26	1.66	1.60	1.64	1.6
6mm LI+1.52PVB+3.2 50% transmittance+1.52PVB+6mm LI +12Air+6mm LI YNE-0675(7#)	31	0.25	0.29	1.66	1.60	1.65	1.6
6mm LI+1.52PVB+3.2 20% transmittance+1.52PVB+6mm LI +12Air+6mm LI YTE-0670(7#)	16	0.15	0.19	1.64	1.58	1.63	1.6
6mm LI+1.52PVB+3.2 30% transmittance+1.52PVB+6mm LI +12Air+6mm LI YTE-0670(7#)	22	0.19	0.23	1.64	1.58	1.63	1.6
6mm LI+1.52PVB+3.2 50% transmittance+1.52PVB+6mm LI +12Air+6mm LI YTE-0670(7#)	29	0.22	0.26	1.64	1.58	1.63	1.6

BIPV curtain wall glass

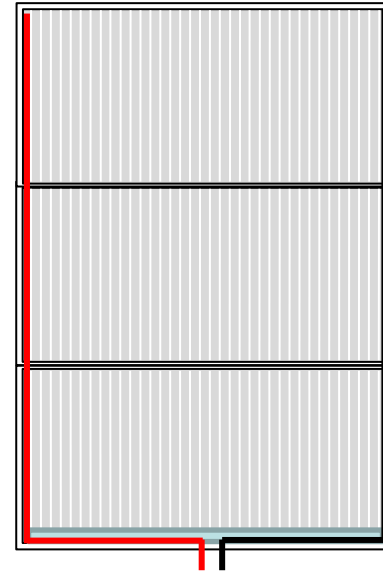
Schematic diagram of chip splicing



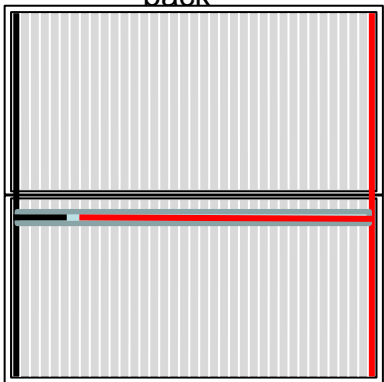
Single piece-on the back



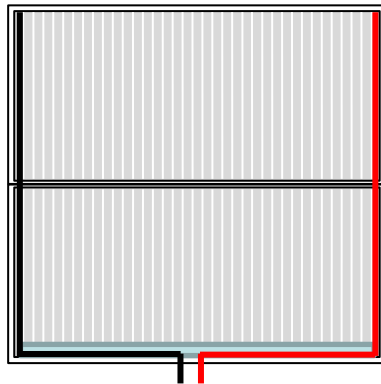
Single piece-on the side



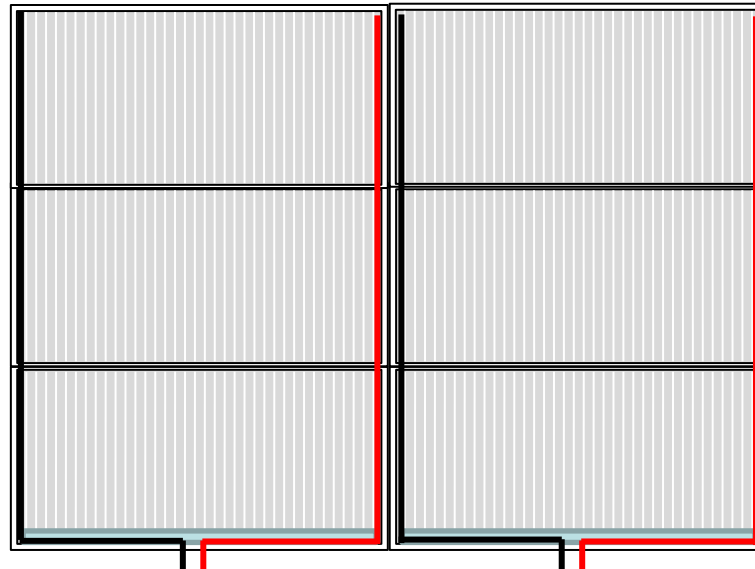
Three-piece splicing-on the side



Double-piece splicing-on the back



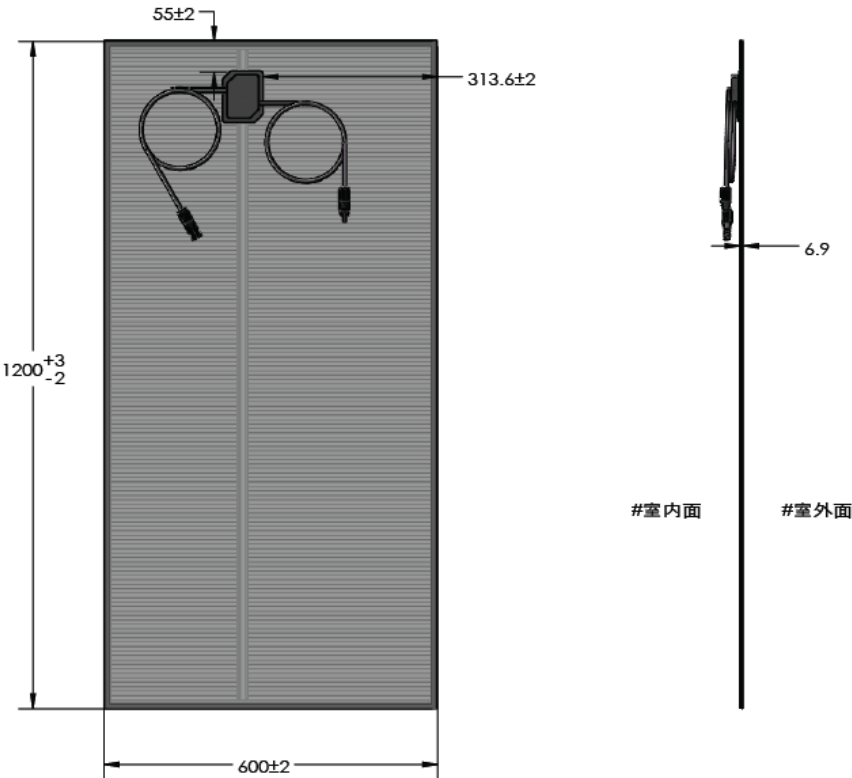
Double-piece splicing-on the side



Six-piece splicing
Double junction
box side connection

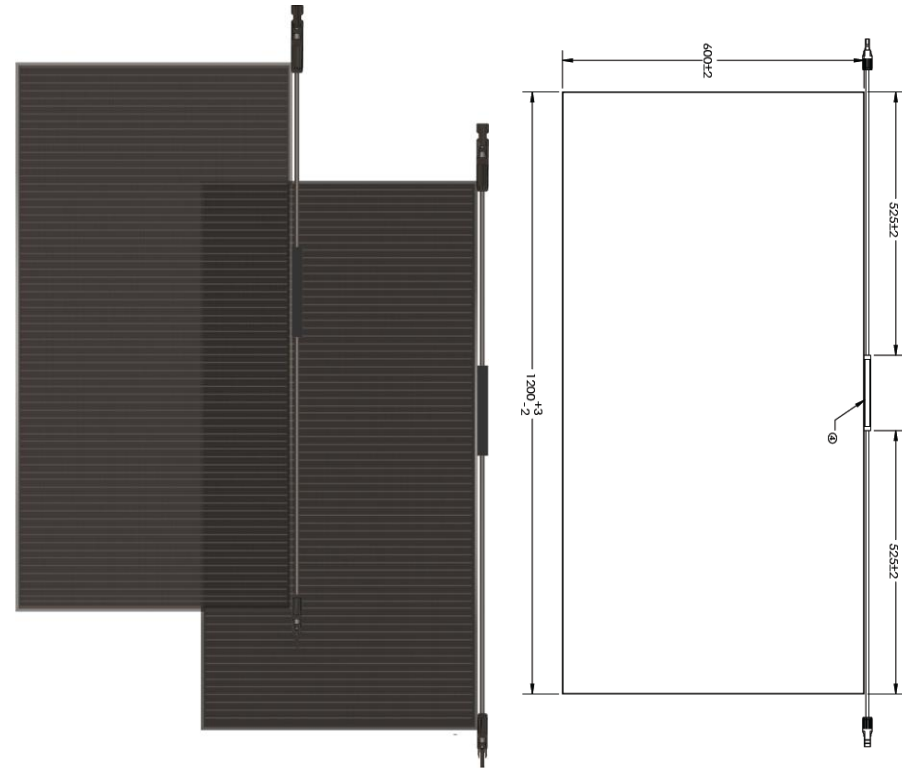
BIPV curtain wall glass

Electric power parameter



Integrated back-connected junction box

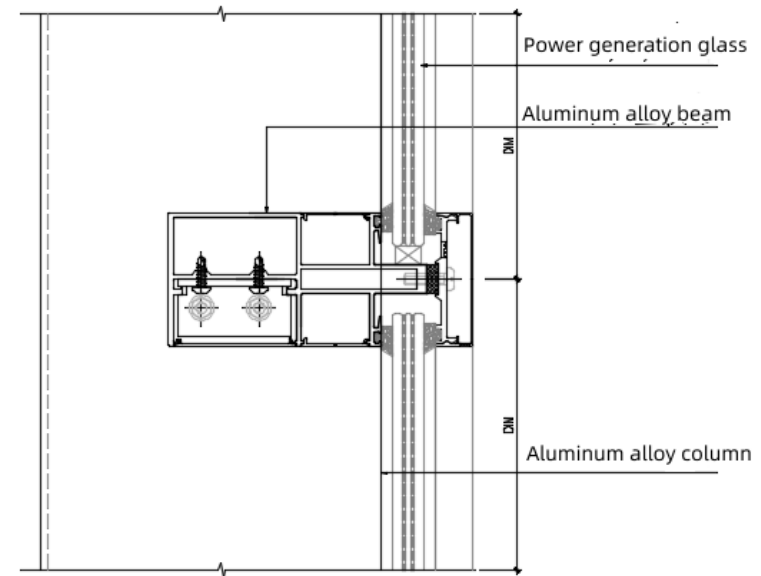
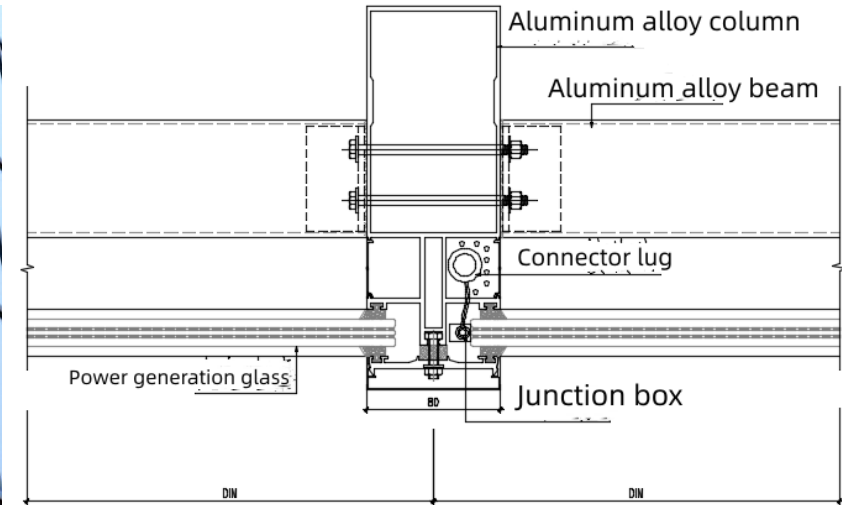
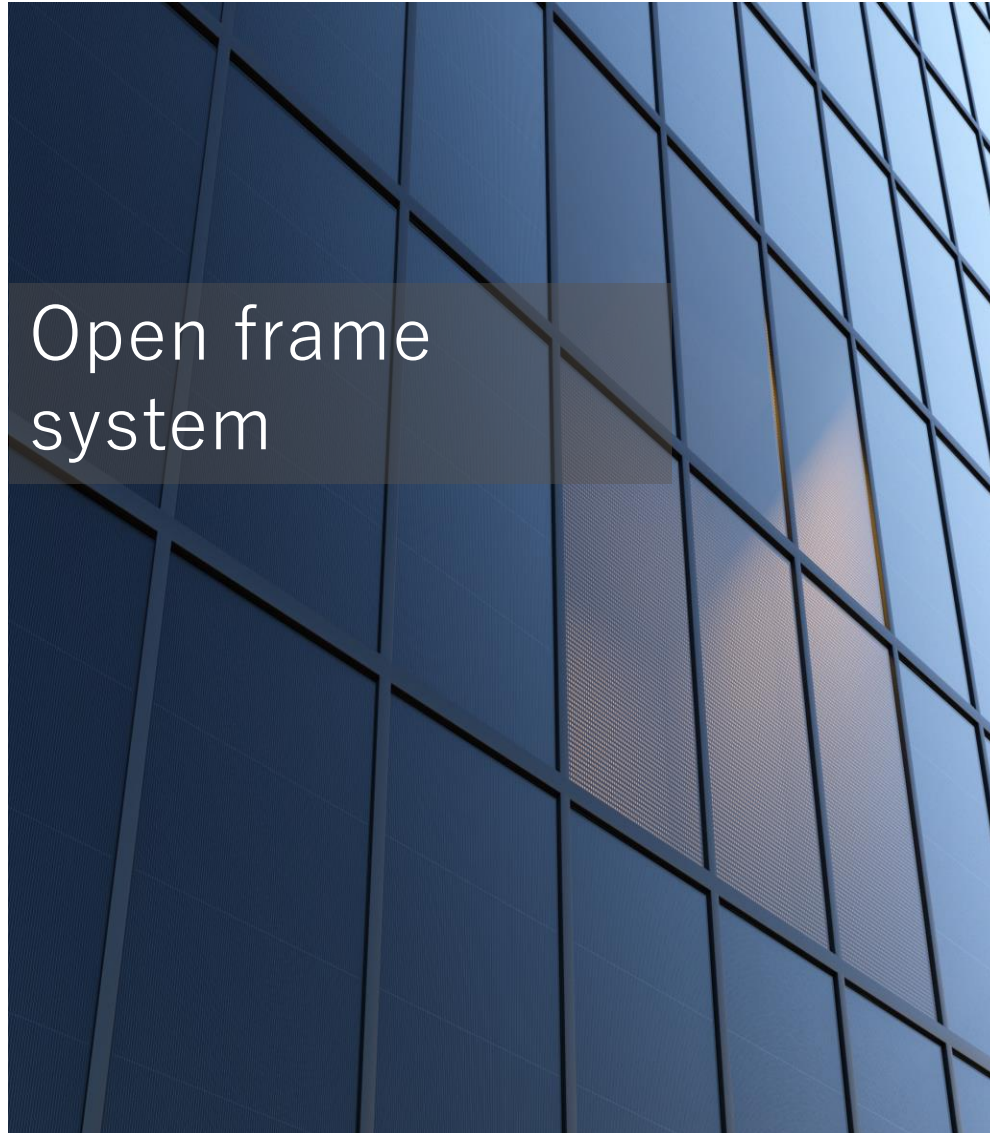
The external dimension of the junction box is 95*75*16mm
 The conventional cable length is (+650mm)/(-650mm)
 For special cable, the length needs to be customized.



Integrated side-connected junction box

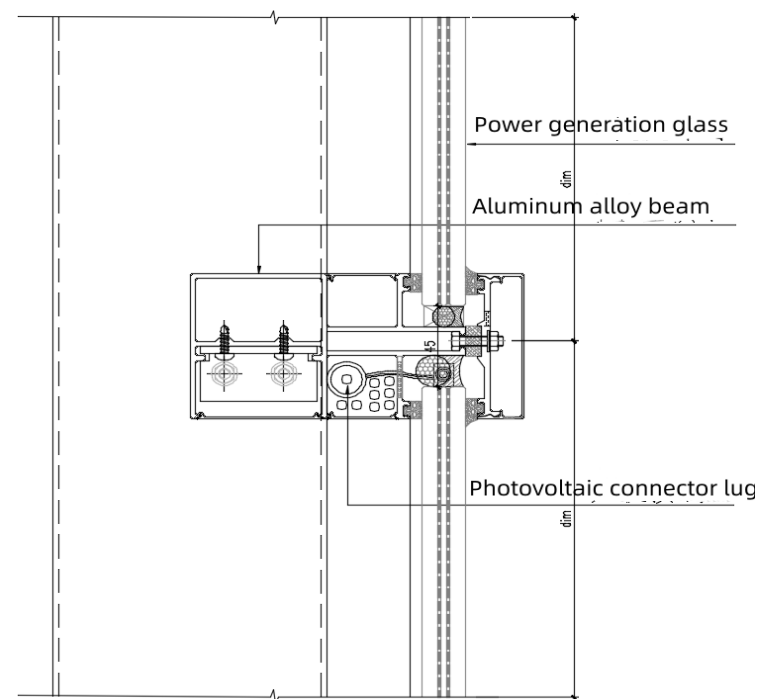
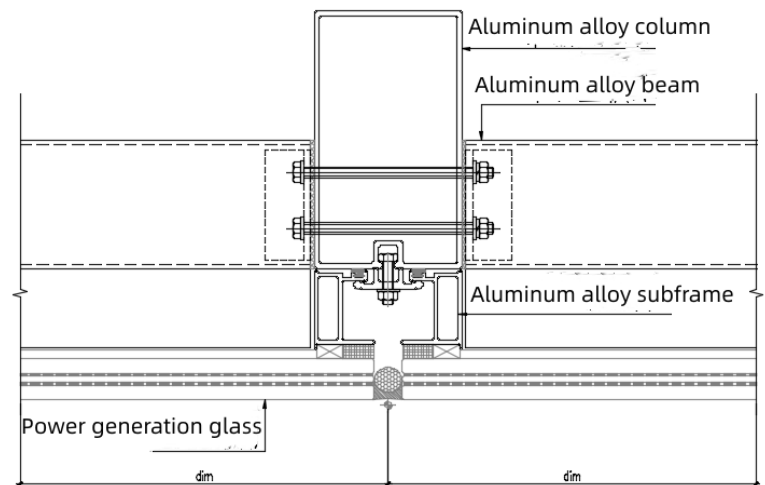
The external dimension of the junction box is 150*13*11mm (11 corresponds to the side of glass)
 The conventional cable length is (+650mm)/(-650mm)
 For special cable, the length needs to be customized.

BIPV curtain wall glass Installation node (1)



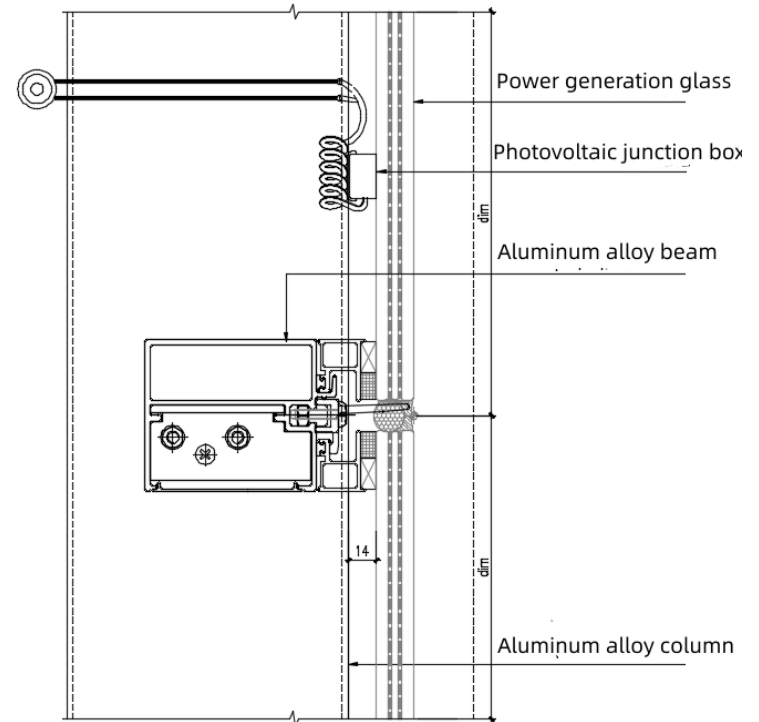
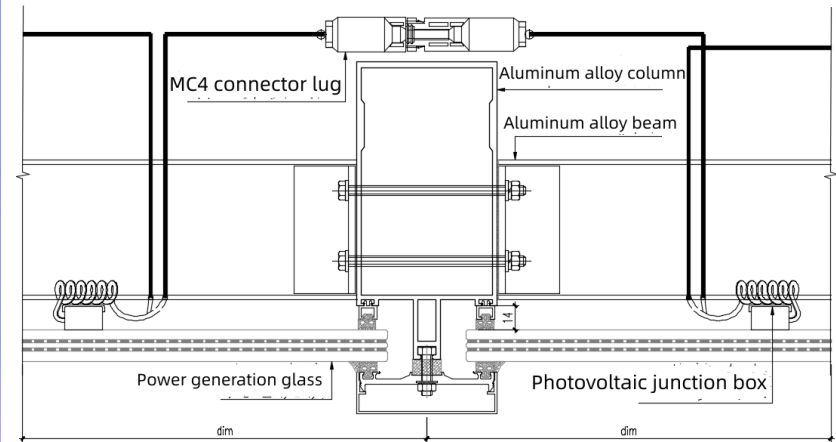
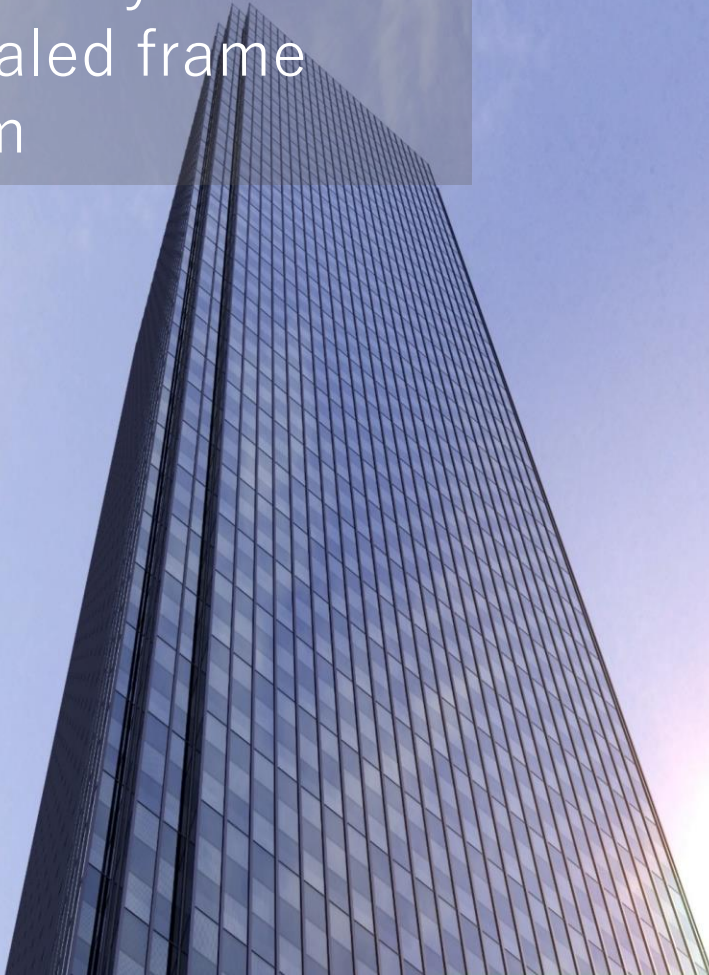
BIPV curtain wall glass Installation node (2)

Horizontally open and
vertically concealed
frame system



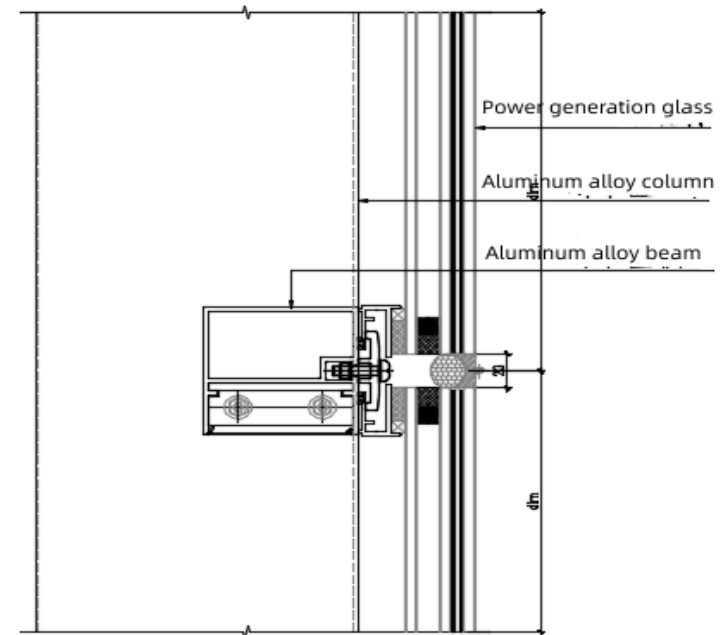
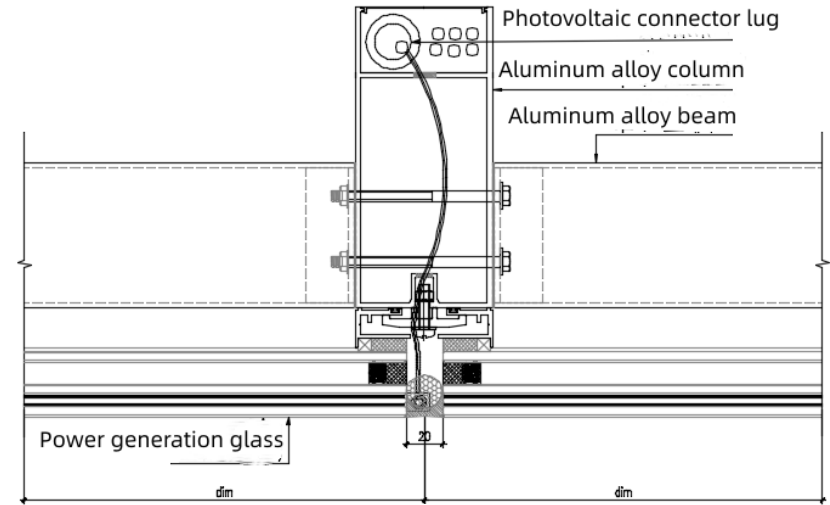
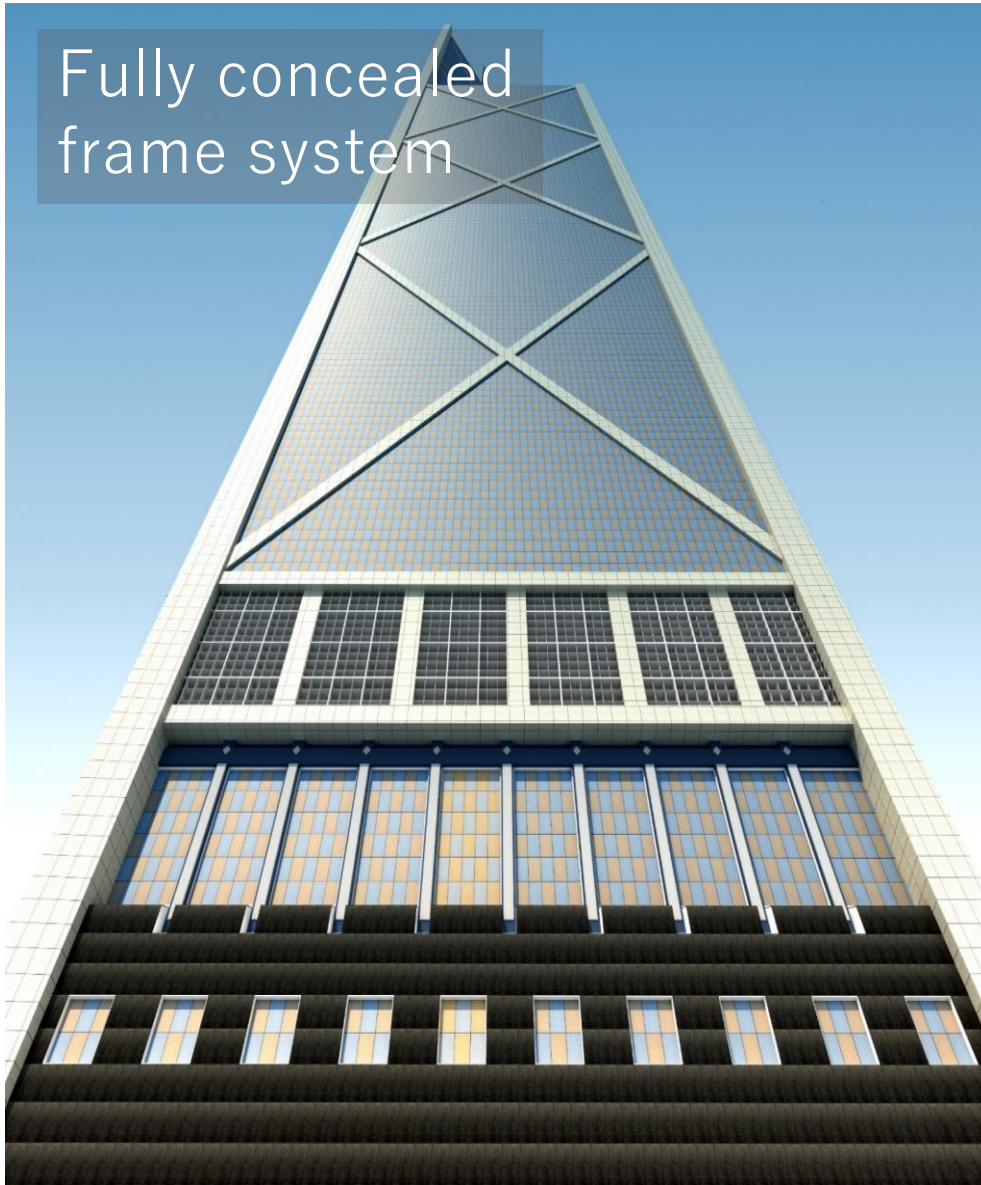
BIPV curtain wall glass Installation node (3)

Vertically open and
horizontally
concealed frame
system



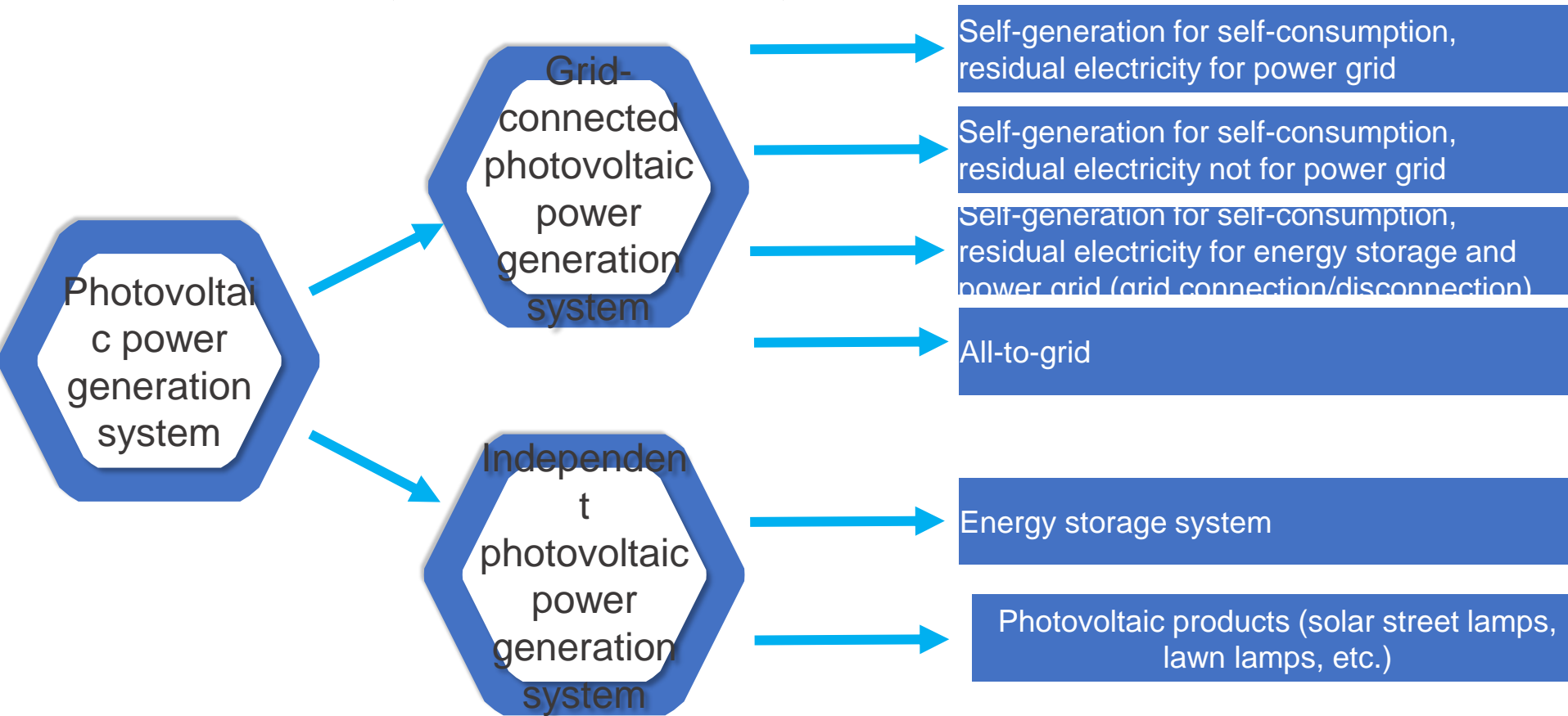
BIPV curtain wall glass Installation node (4)

Fully concealed
frame system





BIPV curtain wall glass

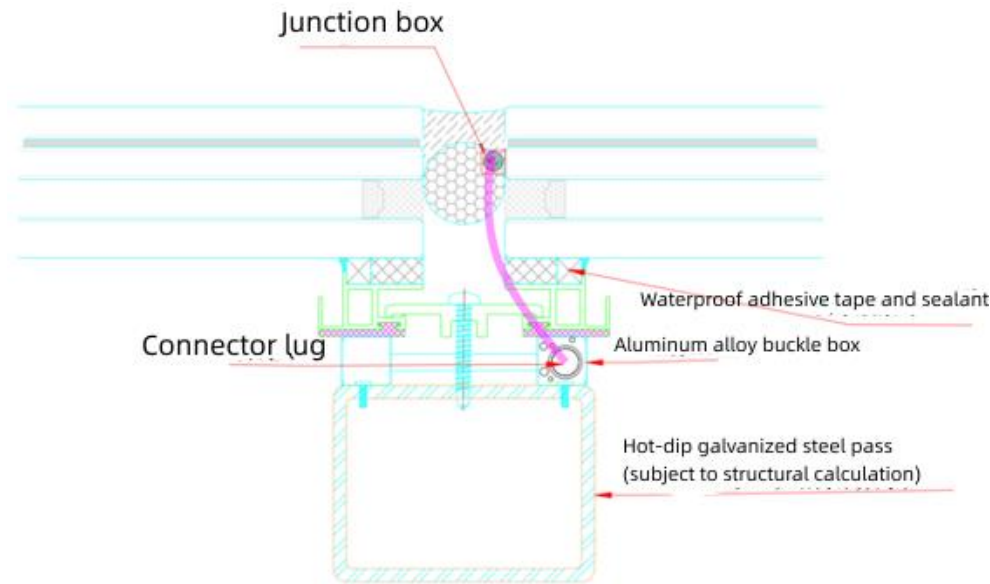
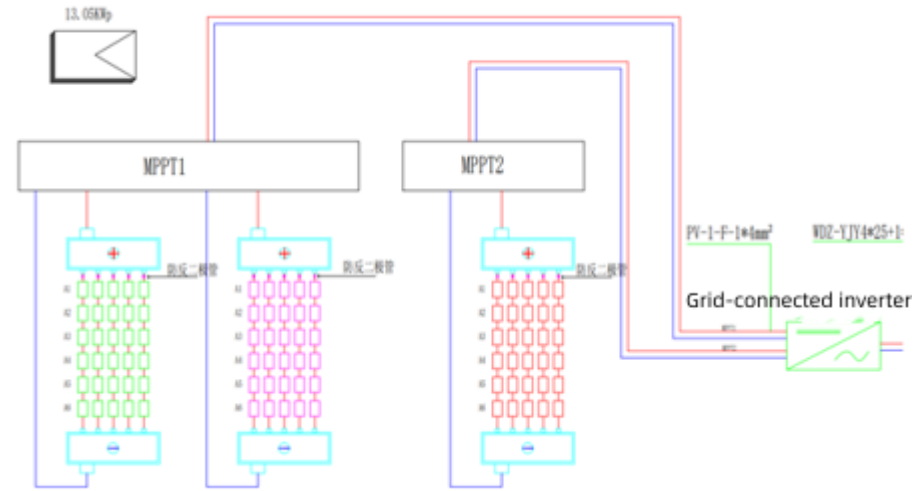
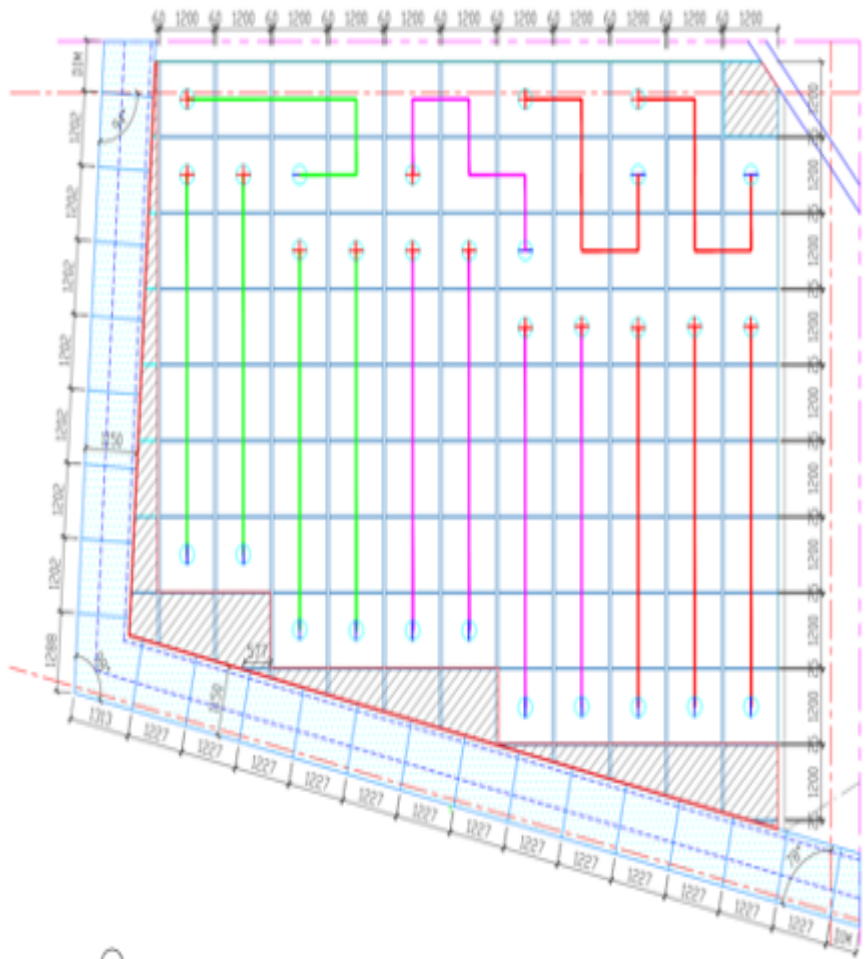
Power consumption mode



BIPV curtain wall glass

Example of grid-connection electrical diagram

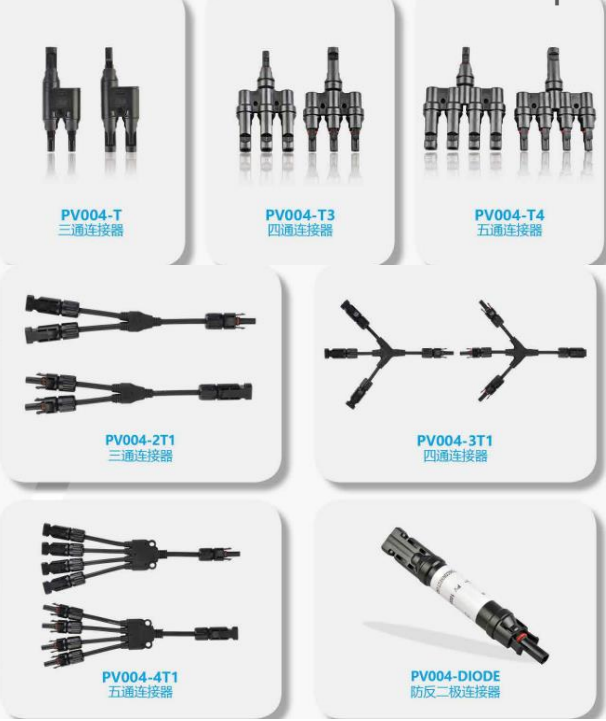
 Imitated power generation module
 Power generation module



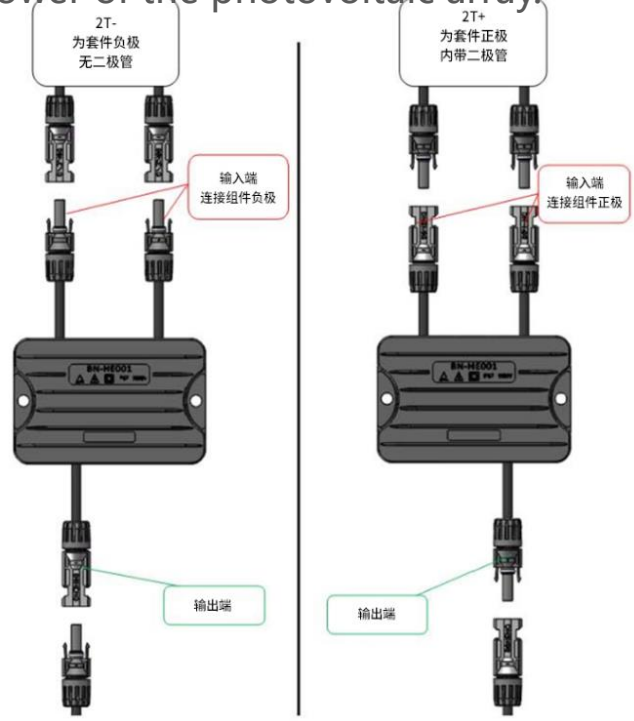
BIPV curtain wall glass

Series combined convergence

The photovoltaic square array changes the voltage and current output by the photovoltaic array through series-parallel connection; When connected in parallel, the following devices are needed, which are selected according to the parameters such as the number of output paths, the maximum working current and the maximum output power of the photovoltaic array.



Convergence device



Convergence device



DC combiner box

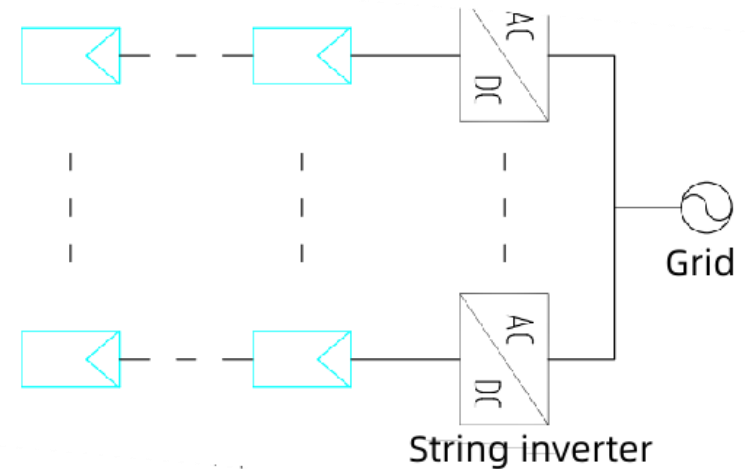
BIPV curtain wall glass Inverter



Multi-unit
installati
on



Single
installatio
n



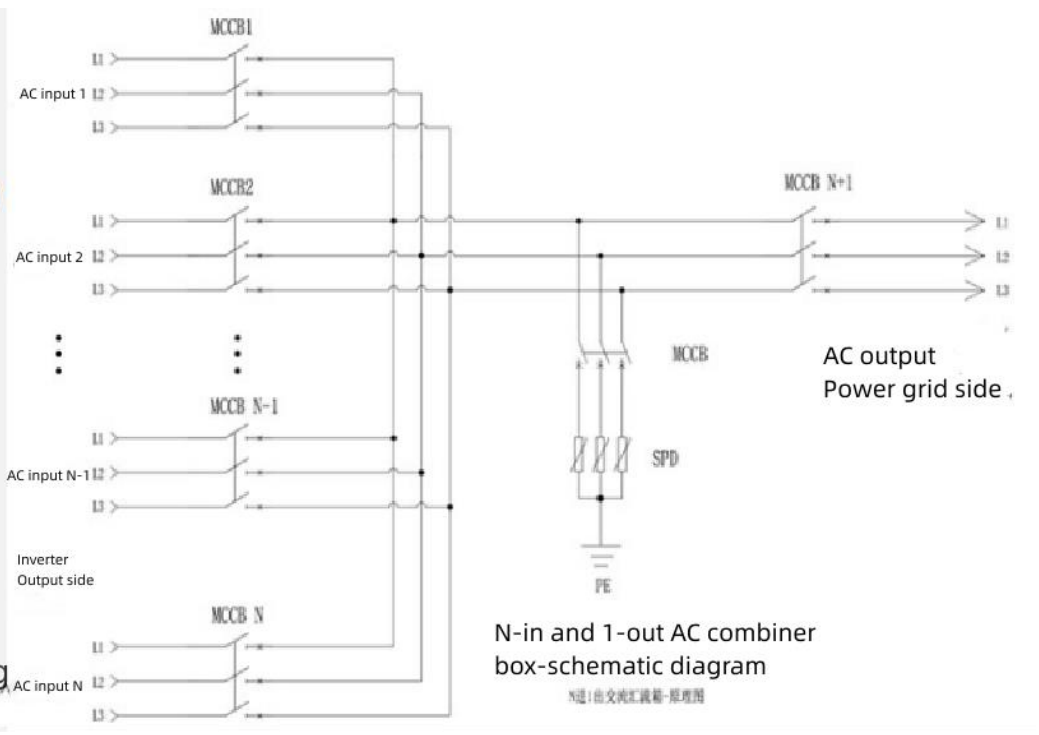
Wiring
principle of
inverter

BIPV curtain wall glass AC combiner box

AC combiner box is applied to photovoltaic power generation system with a large number of inverters, and installed between inverters and grid connection points; **Main functions: to combine the output current from multiple inverters, disconnect the output of inverters, so as to improve the security of the system.**

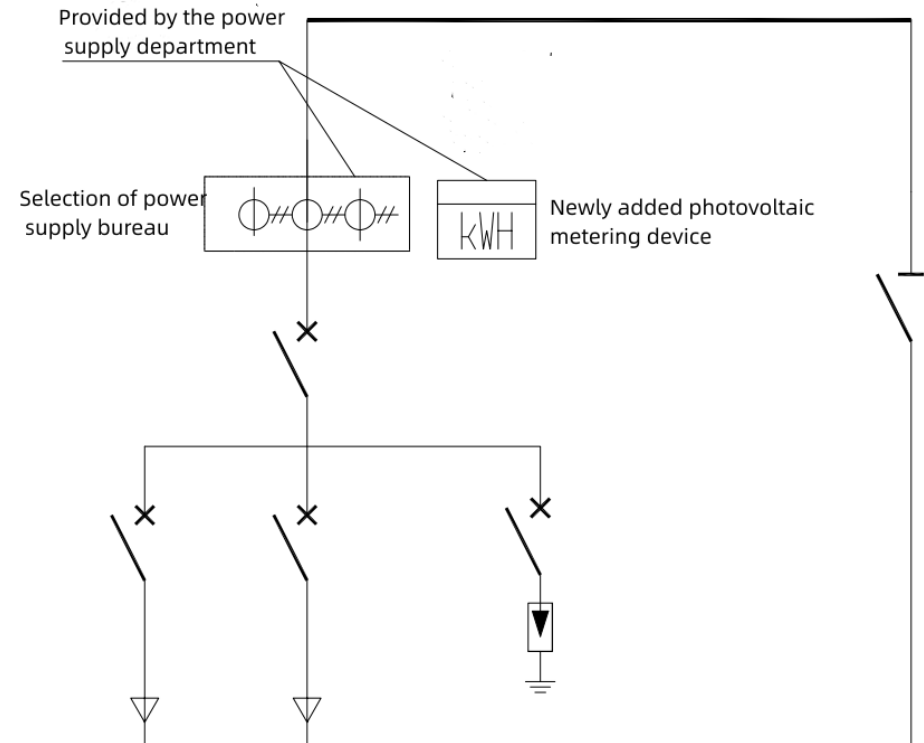
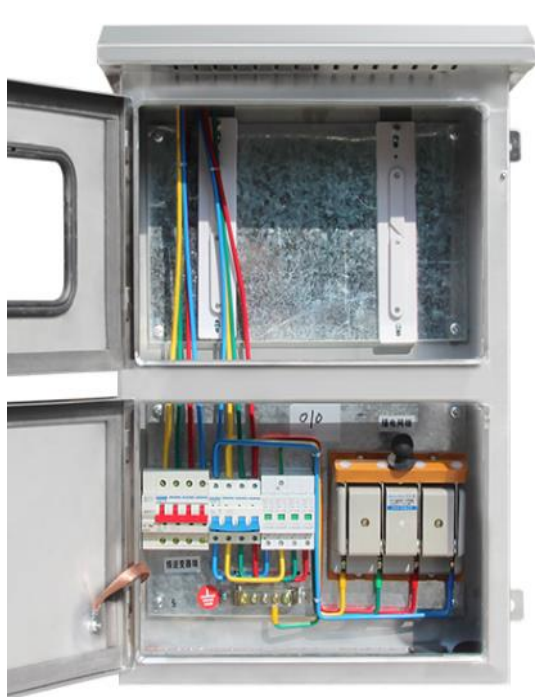


A Circuit-breakers B AC lightning protector C Fuse
 D Ground wire E Triangle lock F Rubber sealing strip



BIPV curtain wall glass Grid-connection box

Photovoltaic grid/cabinet is a power distribution device connecting photovoltaic power station and power grid, which mainly serves as the dividing point between photovoltaic power generation system and power grid.





Traditional energy-saving mode of architectural glass



BIPV: New mode of architectural glass



BIPV building curtain wall glass



BIPV project cases



Development obstacles of BIPV glass curtain wall

3

BIPV

Chenxin Pharmaceutical R&D Center in JiNing, China



- **Glass Configuration: 8+1.52PVB+3.2CdTe+1.52PVB+8 Digital Printing #6**

3

BIPV

Academy of Arts and Crafts in ChangQing, China



- **Glass Configuration: 5mm Low Iron HS+1.52PVB+3.2CdTe+1.52PVB+5mm Low Iron HS+12A+6mm Low Iron Double Low E HS #5**

3

BIPV

Chinese Life Data Center in Beijing, China

- **GLass Configuration: 6mm Low Iron
HS+1.52PVB+3.2Cdte+1.52PVB+6mm Low Iron HS**



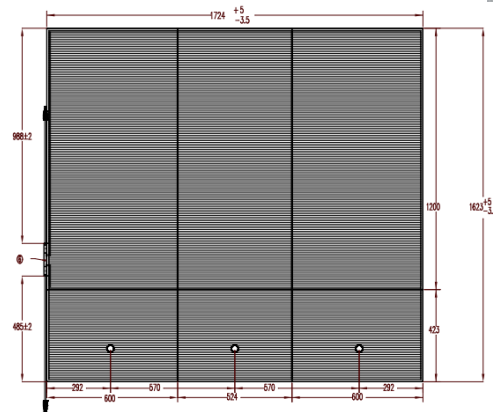
3

BIPV

Yellow Sea Wetland Museum in Yancheng, China

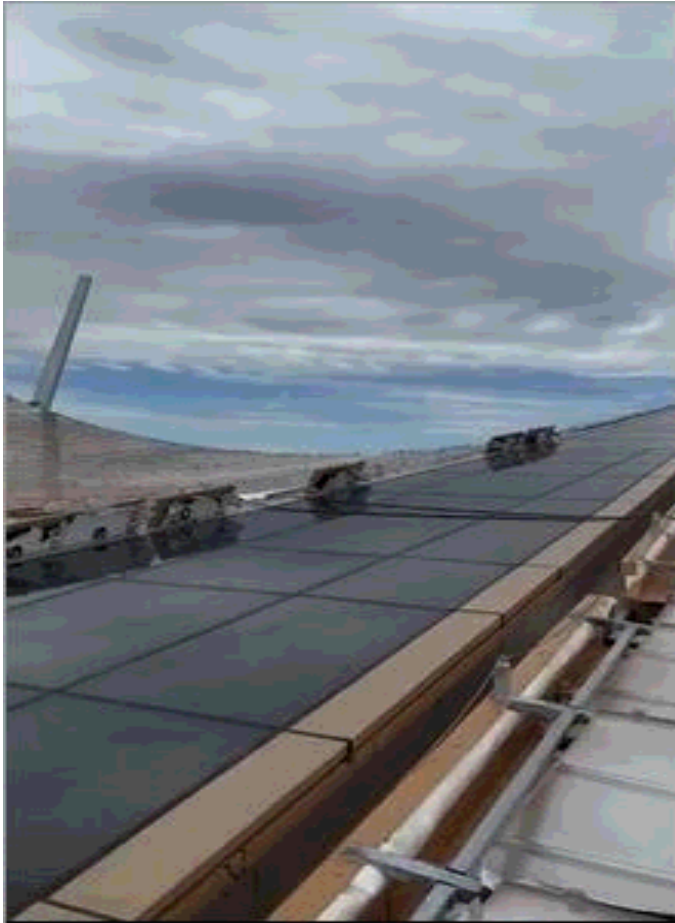


- Glass Configuration: 12mm Low Iron HS+1.52SGP+3.2CdTe+1.52SG P+12mm Low Iron HS



3 BIPV

Grand Canal Museum in Beijing, China

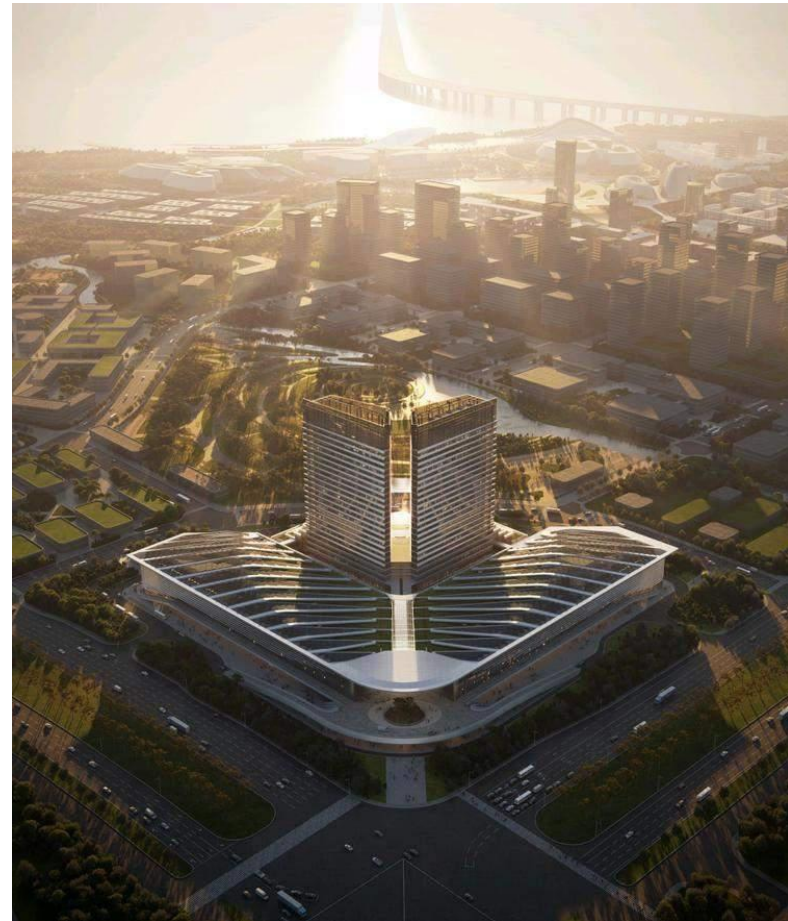


- **Glass Configuration: 6mm Low Iron
HS+1.52PVB+3.2CdTe+1.52PVB+6mm Low Iron HS+12A+6mm
Low Iron Low-E #7+1.52PVB+6mm Low Iron HS**

3 BIPV Top Scientists Exhibition Center in Shanghai, China



- **Glass Configuration: 6mm Low Iron HS+1.52PVB+3.2CdTe 40% Transmittance+1.52PVB+6mm Low Iron HS+12Ar+6mm Low Iron Low-E #7+12Ar+6mm Low Iron HS+1.52PVB+6mm Low Iron**



3

BIPV

Zuojiangzhuang Heting Plant in Beijing, China



- **Glass Configuration: 5mm Low Iron TP+1.52PVB+40% Transittance 3.2mmCdTe+1.52PVB+5mm Low Iron TP+12A+6mm Low Iron LOW-E #7**

3 BIPV

Firehouse in Bengbu, China

项目地点：安徽蚌埠
项目类型：幕墙BIPV
装机容量：100KW
并网时间：2023年

应用场景：光伏幕墙

产品结构：5mm超白钢化+1.14PVB+3.2mmCdTe（20%除膜）
+1.14PVB+5mm超白钢化+12A+5mm超白钢化

尺寸：1800mm*600mm

1570mm*600mm



3 BIPV

Ooredoo in Maldives



- ▶ Glass Configuration: 8mm Low Iron TP+1.52PVB+3.2CdTe (20%)
+1.52PVB+8mm Crystal Grey YSD6840(#4)TP

3

BIPV

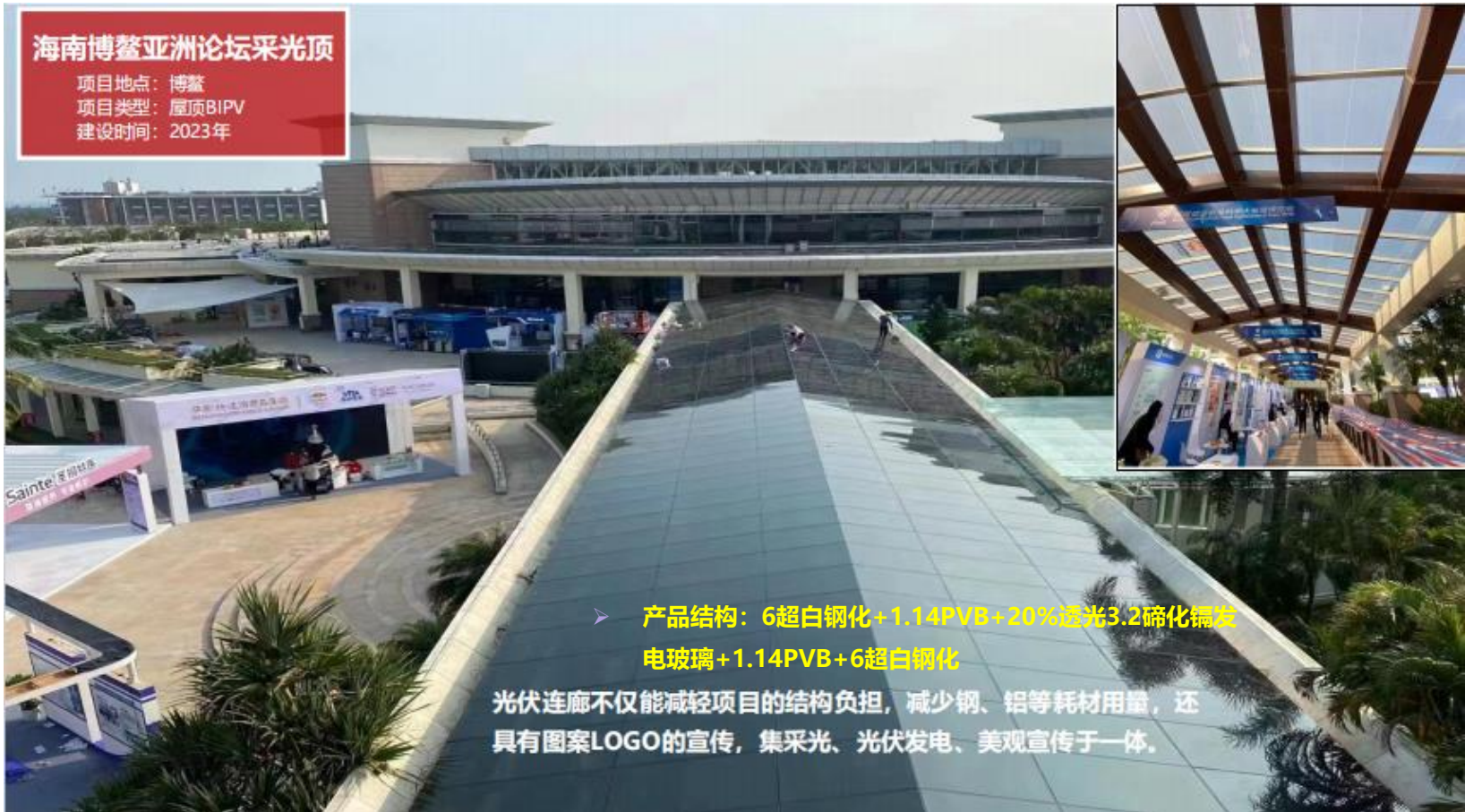
Top Scientists Laboratory in Shanghai, China



- ▶ **Glass Configuration: 6mm Low Iron TP+1.52PVB+40% 3.2Cdte+1.52PVB+6mm Low Iron TP+12Ar+8mm mm Low Iron TP Low-E YNE-0675(7#)+1.52PVB+8mm Low Iron TP**

3 BIPV

Boao Conference Center Corridor in Hainan, China



海南博鳌亚洲论坛采光顶

项目地点: 博鳌
项目类型: 屋顶BIPV
建设时间: 2023年

产品结构: 6超白钢化+1.14PVB+20%透光3.2硝化镭发电玻璃+1.14PVB+6超白钢化

光伏连廊不仅能减轻项目的结构负担, 减少钢、铝等耗材用量, 还具有图案LOGO的宣传, 集采光、光伏发电、美观宣传于一体。

3

BIPV

State Grid in Wuhan, China



3

BIPV

Jinpeng Building in ChuZhou,
China

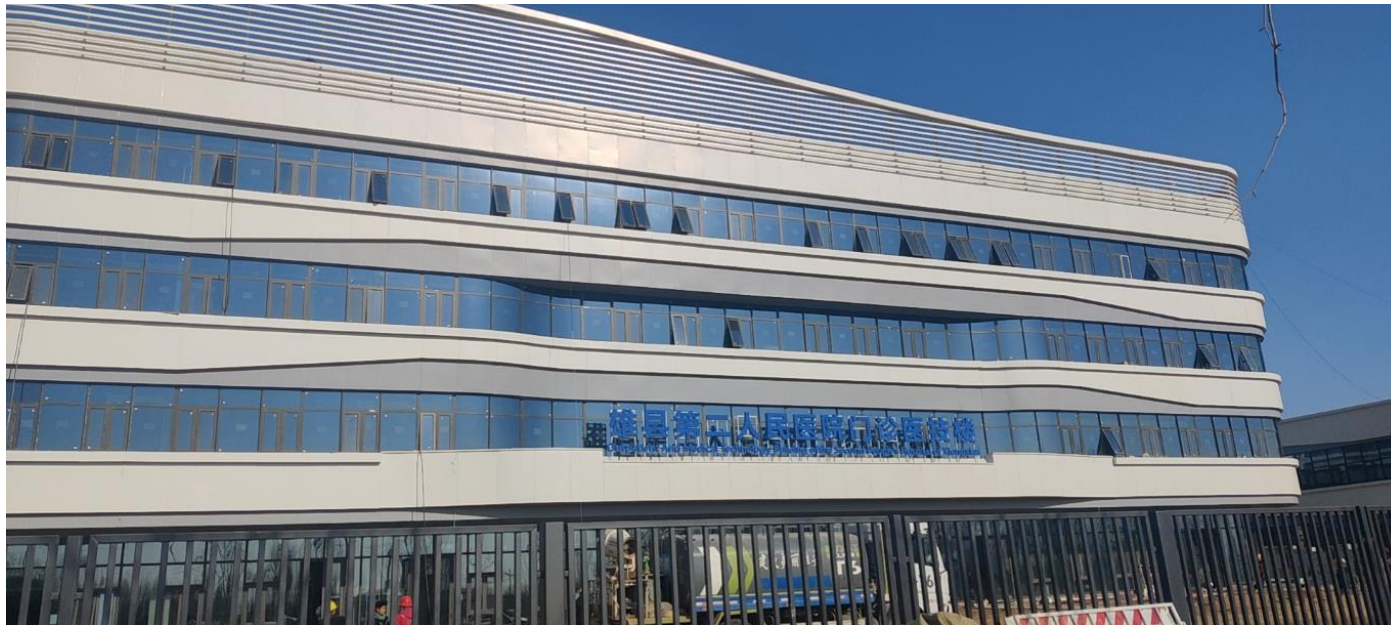


- Glass Configuration: 6mm Low Iron TP+1.14PVB+3.2mmCdTe (40%透光) +1.14PVB+6mm Low Iron TP+12A+6mm Low Iron low-e YP #7

3

BIPV

The Second People's Hospital in Xiongxian, China



- Glass Configuration : 6mm Low IronHS LOW-E #2+16AR+5mm mm Low Iron HS+1.14mmPVB+3.2mmCdt 60% Transmittance +1.14mmPVB +5mm Clear HS

3 BIPV

Luogang Park in Hefei, China



➤ Glass Configuration : 8mm Low Iron Frit #2
HS+1.52PVB+3.2CdTe+1.52PVB+8mm Clear HS

3 BIPV

Ali Pulan Airport in Tibet, China



- **Glass Configuration : 5mm Low Iron
TP+1.14PVB+3.2mmCdTe+1.14PVB+5mm Clear
TP+12AR+5mm Clear TP+1.14PVB+5mm Clear TP**

3

BIPV

Jiaotong University Cafeteria in Xi'an, China



➤ Glass Configuration : 6mm Low Iron TP +2.28mmPVB +3.2mmCde 60% Transmittance +2.28mmPVB+6mm Low Iron TP+12A+6mm Low Iron Low E #7

3

BIPV

Queen Mary Hospital in HK, China



- **Glass Configuration: 10mm Clear TP+1.52PVB+20% Transmittance
3.2CdTe+1.52PVB+10mm Clear TP**

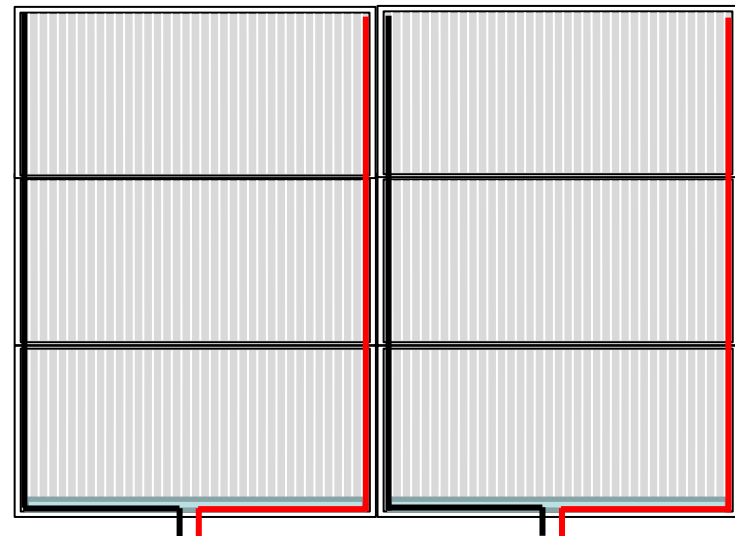
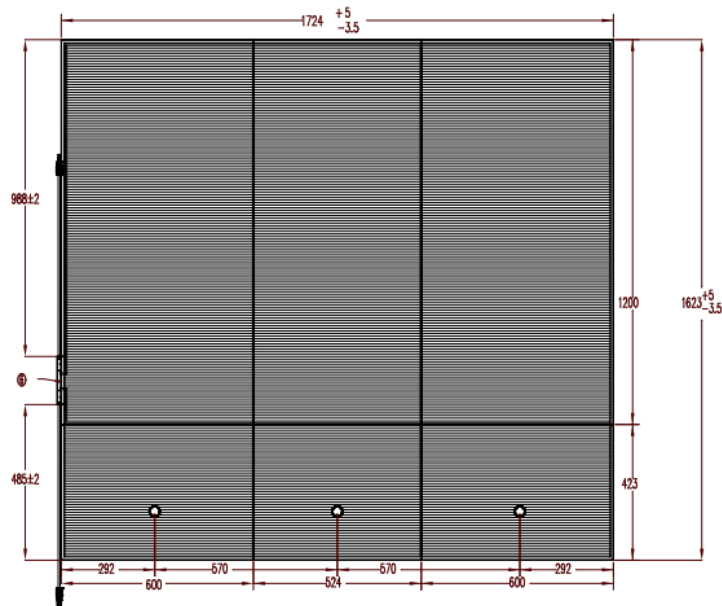
-
- 1 Traditional energy-saving mode of architectural glass
 - 2 BIPV: New mode of architectural glass
 - 3 BIPV building curtain wall glass
 - 4 BIPV project cases
 - 5 **Development obstacles of BIPV glass curtain wall**

Development obstacles of BIPV glass curtain wall

There are still obstacles in the system and mechanism of the integrated development of photovoltaic buildings, which involve different industries and fail to achieve coordinated linkage.

Technical problems in photoelectric building. From the perspective of architecture, the fitting with photovoltaic also involves various types of work and professions in the building.

From the perspective of photovoltaic enterprises, whether photovoltaic products can adapt to buildings, and the structural safety, adaptability and convenience of buildings are not achieved in an action.



Main development direction of BIPV in the future

Improve the conversion efficiency: When applied on curtain wall, the battery components are required to have good temperature coefficient and good weak light performance, as well as good infrared and ultraviolet absorption and conversion effects. The overall power generation efficiency needs to be further improved.

Improve the bonding degree with architectural glass; The size of power generation chip needs to be further enlarged, and the thickness of glass needs to be further thickened, so that it can be combined with architectural glass more conveniently with lower cost and higher efficiency.

Further optimization of light transmittance design: At present, the thin film chips is mainly designed as linear light transmittance, the visual effect at close range is still affected and needs to be improved till there is no visual interference.

DC application: At present, both the power generated and the power stored by photovoltaic cells are DC current, considering this, DC load should be used in application as much as possible to reduce costs and losses.



THANKYOU



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SYP GLASS GROUP