凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Power Glass Empowers Buildings

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1

背景介绍

Background Introduction

Background Introduction

Triumph Glass Holdings Co.,Ltd.“3+1” Strategy

Triumph Glass Holdings Co.,Ltd. has established the strategic layout of "3+1" for glass new materials, under the guidance of China Building Materials Group's "4335" principles.

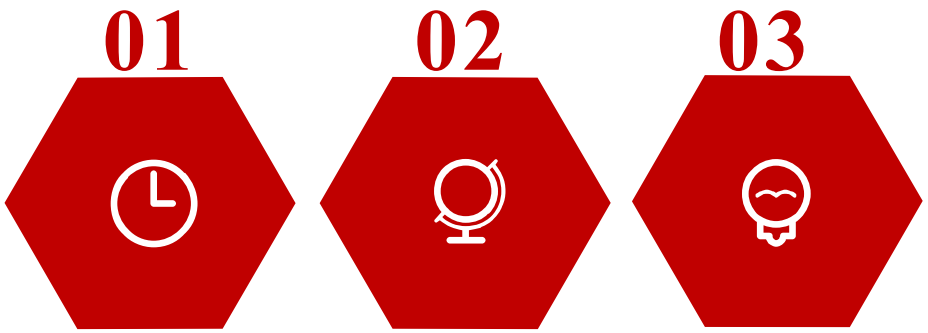
- Display Materials and Applied Materials Platform Company
- New Energy Materials Platform Company
- High-quality Float Glass and Specialty Glass Platform Company

\+

Central Research Institute of Applied Sciences
+
China Building Materials Engineering

Background Introduction

"Power Glass" is one of the core businesses in the field of new energy materials for Triumph Science & Technology Group Co.,Ltd.

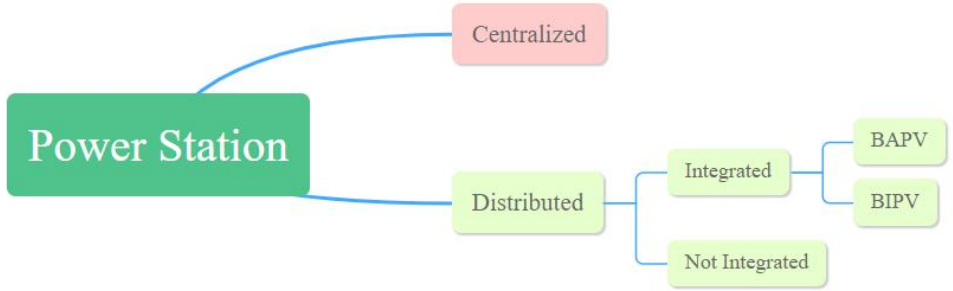


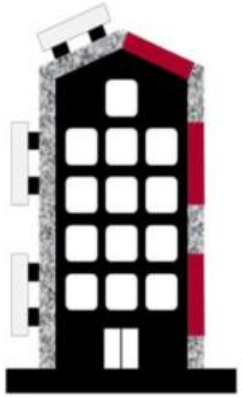
- **Triumph Glass Holdings Co.,Ltd. a management platform for the development of Power Glass business**
- **In 2022, Chengdu China Building Materials, Ruichang China Building Materials, and Triumph Photovoltaics were transferred to Triumph Glass Holdings Co.,Ltd.**
- **In 2023, Q4,Handan China Building Materials, Zhuzhou China Building Materials, and Jiamusi China Building Materials completed the transfer to Triumph Glass Holdings Co.,Ltd.**

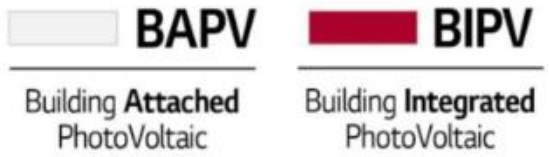
Background Introduction

BIPV will become a new market blue ocean for solar energy, and countries around the world attach great importance to the development of BIPV. Solar energy is one of the preferred new energy sources for the future, and by 2050, global solar installed capacity is projected to reach 8519 GW. In 2021, the installed capacity of BIPV surpassed that of centralized photovoltaic power stations for the first time.

- **China**：3060 peak carbon dioxide emissions and carbon neutrality
- **American**：Million Roofs Initiative、Photovoltaic Building Opportunity Program
- **European Union**：Renewable Energy White Paper.Planning
- **Japan**：70,000 Roofs Initiative、New Sunlight Plan
- **German**：Renewable Energy Law、Photovoltaic Building Roof Plan



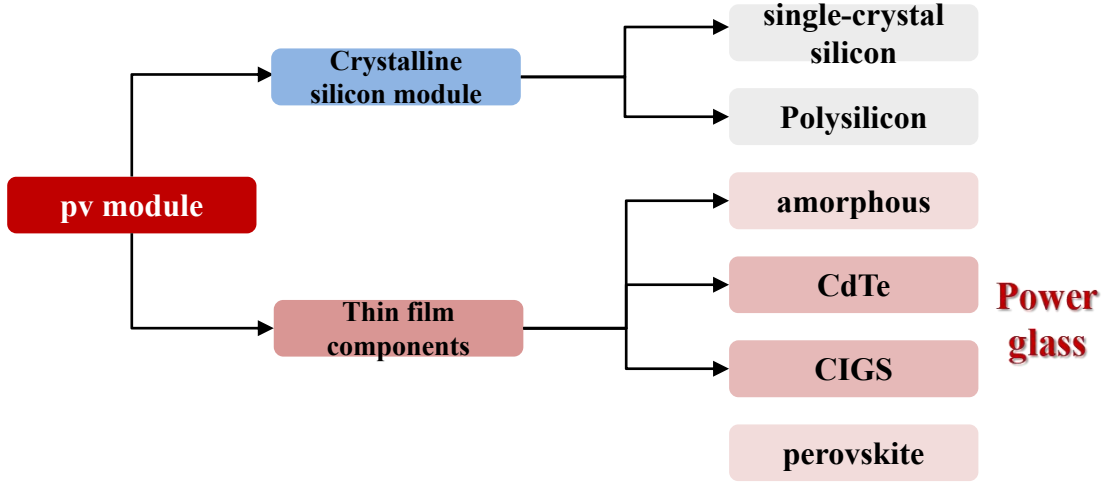




Background Introduction

Creative Materials: photovoltaic power generation

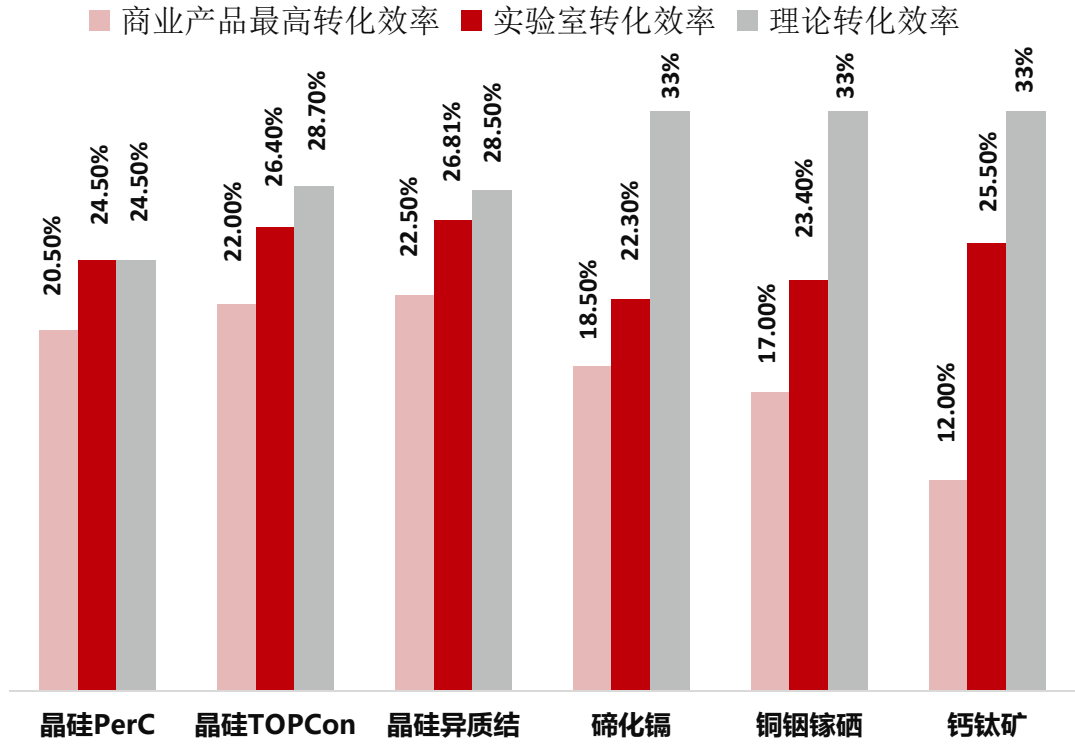
Classification of photovoltaic modules



Classification of thin film components

Type	Character
Amorphous	Low efficiency and high photo induced attenuation
CdTe	Low production cost and stable performance
CIGS	Easy to form BIPV components and stable performance
Perovskite	Poor stability and difficulty in preparing large-sized materials

Different battery conversion efficiencies



数据来源：CPIA光伏协会2022年发展路线图

2 产品介绍

- Research and Development Status
- Industrial Layout
- Product Advantages
- Installation Structure

Product Introduction

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Research and Development Status

Triumph Glass Holdings Co.,Ltd. possesses comprehensive technical capabilities in the research, manufacturing, and application of power glass throughout the entire process. It is the only research center in the world that simultaneously holds the core technologies of two technical routes for power glass (CdTe and CIGS).

Domestic R&D platforms

——State Key Laboratory of Advanced Glass Materials

——National Glass New Materials Innovation Center

Foreign R&D platforms

——CTF Technical Center Dresden, Germany

——AVANCIS Research Center Munich, Germany

——Materials Laboratory, New Jersey Institute of Technology, USA

CdTe Power Glass 20.84%, CIGS Power Glass 20.3%*

Note:
As of the third quarter of 2023, the laboratory has the highest conversion efficiency on record.

Product Introduction

Industrial Layout

Triumph Glass Holdings Co., Ltd., has spent over a decade to establish a complete industry chain that integrates research and development, product lines, and engineering construction.

The AVANCIS Research Center in Munich, Germany, focuses on CIGS technology, while the Thor Industrial Pilot Line serves as a testing ground.

The CdTe Laboratory in Dresden, Germany, and the collaborative research center at the New Jersey Institute of Technology in the United States (NJIT) are dedicated to CdTe research.
Triumph Glass Holdings Co., Ltd.'s CIGS industrialization technology is uniquely benchmarked against Solar Frontier from Japan, while its CdTe industrialization technology is uniquely benchmarked against First Solar from the United States.

Product Introduction

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

■Industrial Layout

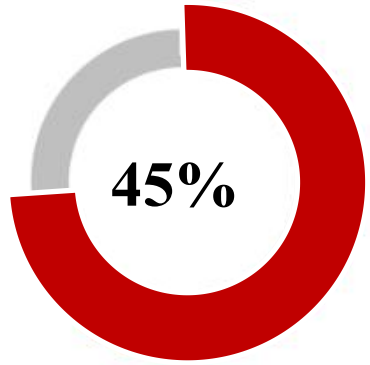
➢**CdTe:** Established bases in Chengdu (Sichuan), Ruichang (Jiangxi), Handan (Hebei), Jiamusi (Heilongjiang), and Zhuzhou (Hunan)

➢**CIGS:** Established bases in Germany, Korea, and Bengbu (Anhui), with additional bases under construction in Xuzhou (Jiangsu) and Meishan (Sichuan)

Thin-Film Module Capacity

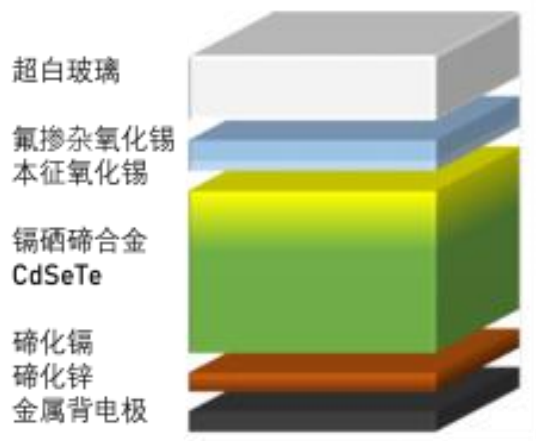
✓0.8GW Already Built

☐2.2GW Upon Full Completion



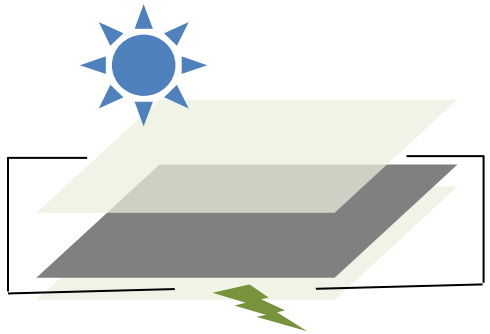
Product Introduction

Photovoltaic glass is a new material that generates electricity through the photovoltaic effect of semiconductor thin films grown on glass.
Currently commercialized products include: CdTe photovoltaic glass, CIGS photovoltaic glass.



- Grown downward from the light-receiving glass
- The key absorber layer is CdTe
- High production technology maturity

Structural Diagram of CdTe Photovoltaic Glass



Key Features of Photovoltaic Glass

- High theoretical conversion efficiency, significant development potential
- Excellent physical properties, high safety
- Technology-intensive, with high technical barriers
- Short industrial chain, low carbon footprint
- Mature industrialization, high market acceptance

Product Introduction

Product Advantages

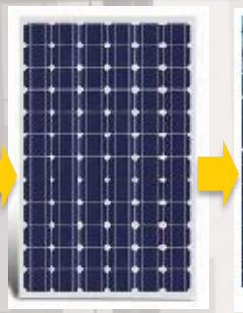
Crystalline silicon photovol-taic

Quartz resources → Industrial silicon → High purity silicon → Silicon rod (ingot) → Silicon wafer → Cell → Assembly → Photovoltaic power station










Power glass




SM → High-purity material → Power glass → Photovoltaic power station

Product Introduction

Product Advantages

Carbon footprint

Single-crystal photovaltaic

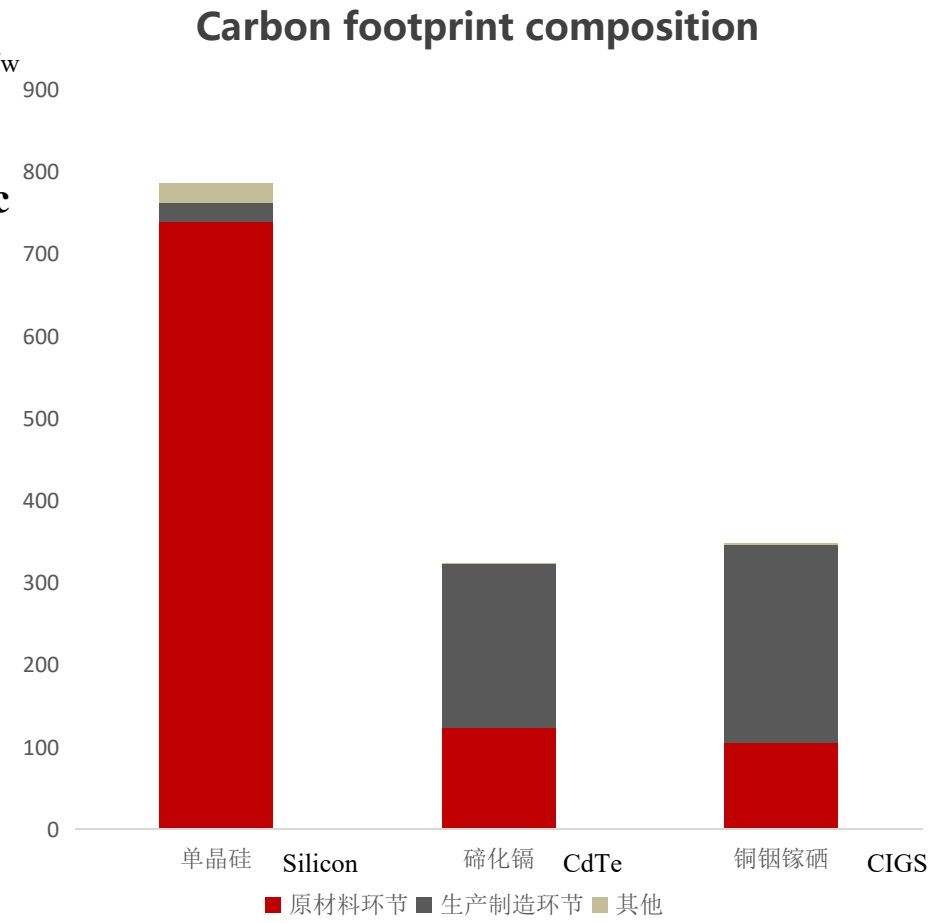
785gCO_2/W

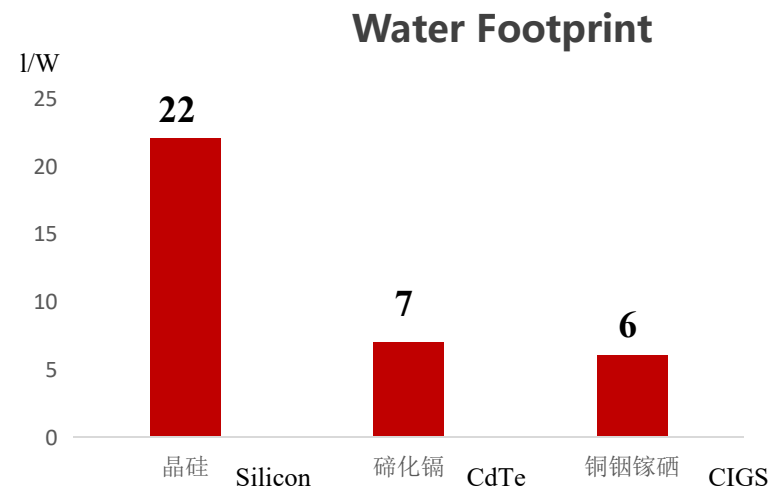
CdTe

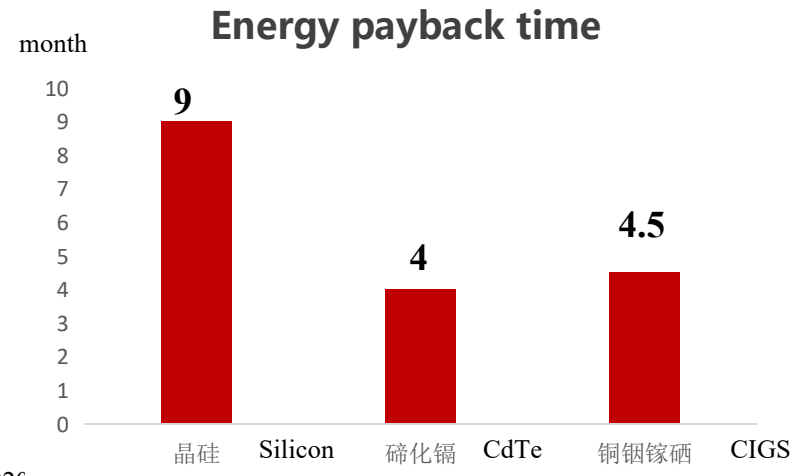
323gCO_2/W

CIGS

347gCO_2/W







Source:
Life Cycle Inventories and Life Cycle Assessment of Photovoltaic Systems. International Energy Agency (IEA) PVPS Task 12, Report T12-19:2020.
The carbon footprint data for cadmium telluride is sourced from the Carbon Footprint Report of Chengdu Zhongjian Building Materials for Cadmium Telluride Power-Generating Glass.
The carbon footprint data for copper indium gallium selenide is calculated using carbon emission factors obtained through the carbon data platform, following the carbon footprint accounting method

Product Introduction

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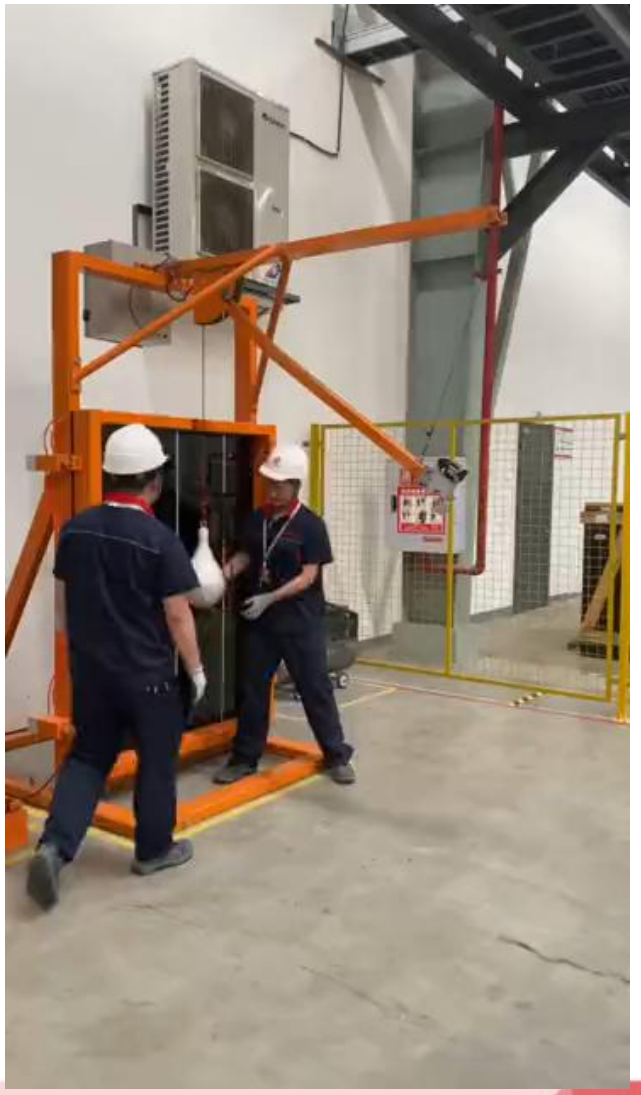
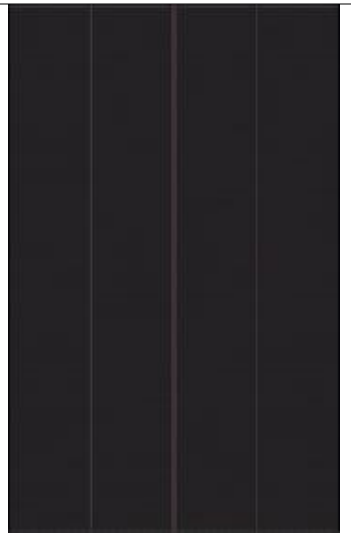
Triumph Glass Holdings Co.,Ltd.

Product Avantages

2.6kg steel ball dropped freely from a height of 4m

45kg shotgun slug impact





Before impact

After impact

According to the comparison test based on GB29551 "Building-integrated Photovoltaic Laminated Glass," CdTe power glass and crystalline silicon products were subjected to shotgun impact testing. The CdTe internal structure showed no hidden cracks, and there was no degradation in electrical performance as a result.

Explanation: CdTe is directly grown on the FTO (Fluorine-doped tin oxide) surface through co-evaporation, providing it with impact resistance. On the other hand, traditional photovoltaic products are prone to hidden cracks and the formation of ineffective areas after impact, which can affect product lifespan and electricity generation capacity.

Product Introduction

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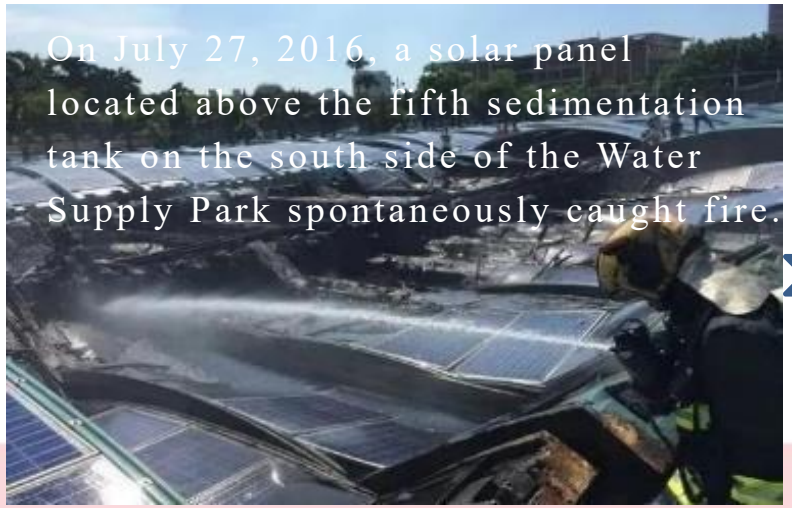
Product Advantages

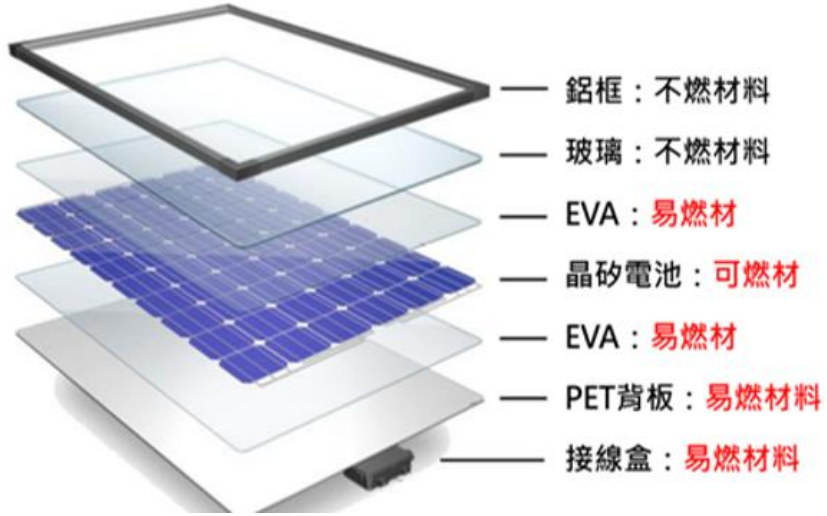
Incomplete statistics show that there have been 45 photovoltaic fire accidents in recent years.



Product Introduction

Product Advantages

Crystal silicon module structure:



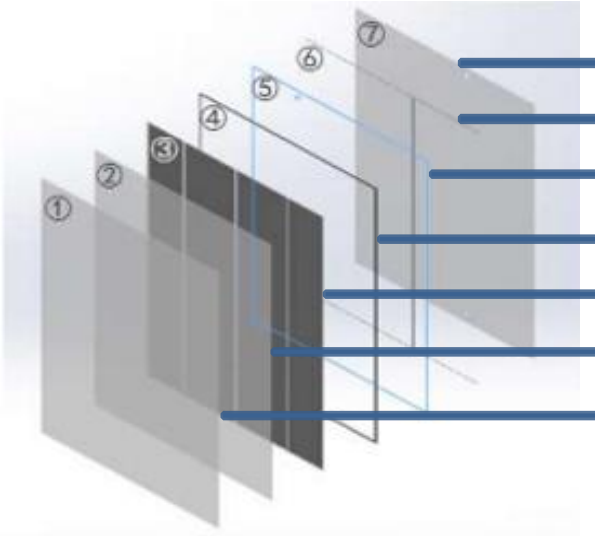
Aluminum frame: non combustible material

Glass: Non combustible material
EVA: Flammable materials
Crystal sand battery: combustible material
EVA: Flammable material

PET backboard: flammable material
Junction box: flammable material

- Crystal silicon single glass components are prone to damage and are prone to delamination/hidden cracks when subjected to impact, causing flammable materials such as EVA inside to come into contact with air and cause a fire.
- The PET film on the back panel of the crystalline silicon module is a flammable material;
- The high thermal effect of high current results in high heat generated by cables and connectors.
- Crystal silicon components are prone to hot spots, increasing the likelihood of ignition;

CdTe Power glass structure



Tempered glass: fire-resistant material
Conductive tape
PVB adhesive film
Butyl adhesive edge sealing
CdTe power generation membrane layer
TCO layer
Glass: Fireproof material

- The CdTe Power glass is made of glass before and after, with a sturdy battery structure. The glass itself is a fire-resistant material and has passed the highest level of fire resistance testing.
- Adopting a double glass structure and butyl adhesive edge sealing - currently the strongest waterproof performance and best insulation performance of mass-produced photovoltaic modules;
- The low thermal effect of low current; Low DC line loss.
- Thin film components, natural without hot spot effect;

Product Introduction

Product Advantages

Anti-hotspoteffect:
Compared to traditional battery products, thin-film solar glass does not generate hot-spot effects or burn when it is shaded.

Weak light advantage
In low-light conditions such as poor incident angles, haze, or rainy weather, thin-film solar glass generates a higher power output compared to traditional products.

Low temperature coefficient In high-temperature environments, thin-film solar glass exhibits stable and superior power generation efficiency.

Uniform color distribution
Exquisite appearance with delicate texture and no borders

Flexible customization
Color, appearance, and transparency can be customized to meet the aesthetic needs of buildings

Isolate harmful light
Can effectively isolate ultraviolet rays, save energy and reduce consumption with some infrared rays

Improve comfort

According to tests conducted by authoritative organizations across various industries worldwide, thin-film solar glass exhibits a comprehensive annual power generation capacity that is approximately 8% to 10% higher than that of crystalline silicon.

Obtaining 3C certification in the Chinese construction industry is more suitable for building applications

Product Introduction

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Product Advantages

Test time: April 2021

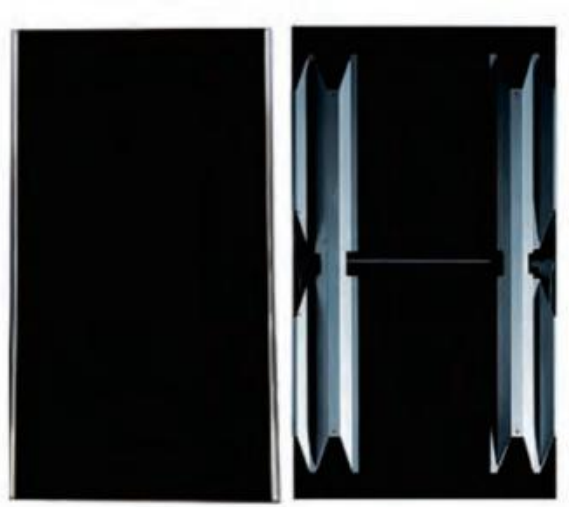
Testing location: Ding'an County, Hainan Province

Product	CdTe	single-crystal silicon
Producer	China National Building Materials Corporation	-
Type	Standard components	Single glass single-sided Ga doped p-type silicon 72p (half piece)
Label power(W)	240	450
Installed capacity(KW)	2.16	3.6
Installation method	3 series and 3 parallel	Full series connection
Accumulated power generation in April(KWH)	264.78	424.71
Power generation per unit installed capacity(KWh/KW)	122.58	117.98
Relative power generation	103.91%	100%

Installation location	Ding'an County, Hainan Province, latitude 19 ° 13 ′-19 ° 44 N′
Statistical date	2021/4/1～4/30
Tilt angle	15.5°

Product Introduction

Standard series: Stable and dignified, optimal for power generation

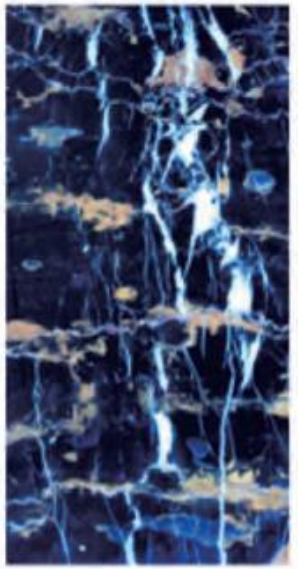


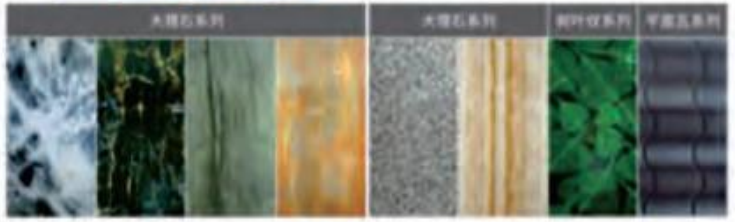
Product Introduction

Colored series: Rich in colors, customizable

Product Introduction

Stone series: Freedom in texture, let your heart wander





Product Introduction

Transparent Series: dynamic, rich, and highly expressive

Product Introduction

Media Coverage

In December 2020, CCTV-7, the Defense and Military Channel, aired a program titled "New Camp Equipment for High-Altitude Troops Above 5000 Meters."

CCTV-1 aired a program titled "Innovation and Development Boost Logistics Equipment Support Capability for High-Altitude Troops." Cadmium telluride power-generating glass is applied in the new insulated cabins, providing essential power for daily life support.

In an article published in the July 2021 issue of "Wenhui Daily," the application of power-generating glass in engineering projects was reported.

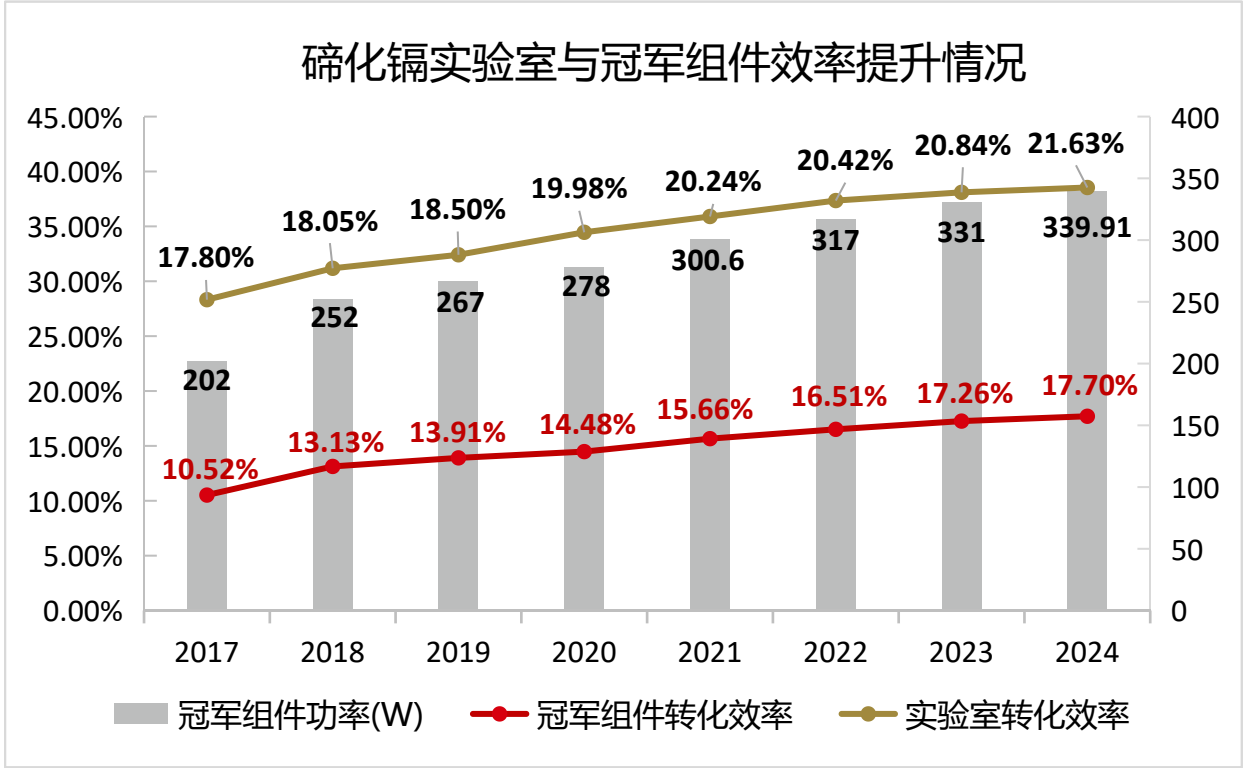
CCTV's six-episode documentary series "Building Materials of Excellence" The new generation of energy-efficient green building materials.

Product Introduction

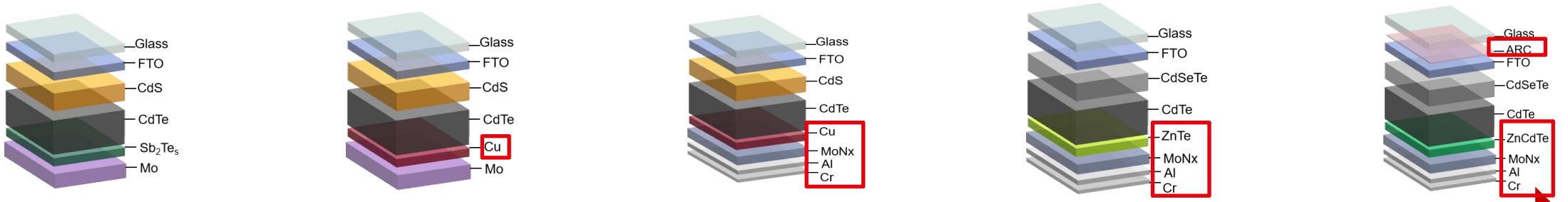
凯盛玻璃控股有限公司 Triumph Glass Holdings Co.,Ltd.

■R&D Advantages

- Independently developed a complete set of production line process routes for Cadmium Telluride (CdTe)
- Key technological achievements: Wet copper doping technology, Selenium-doped absorber layer technology, Zinc Telluride back contact technology, Etching technology
- CdTe lab conversion efficiency exceeds 20.84%
- Conversion efficiency of 30cm*30cm small modules exceeds 18.50%
- Conversion efficiency of 1.92m² modules reaches 17.7%



Technological iterations of CdTe photovoltaic glass



Product Introduction

■ Innovation Advantages

➢**The single piece power of large area (1.92 square meters) power generation glass has exceeded 331W, and the conversion efficiency of the champion module has reached 17.25%.**

The latest record of CdTe power generation glass conversion efficiency has been certified by a third-party authoritative testing organization TUV NORD.

The large-scale power generation glass project has won the recognition award of the 7th China Industrial Award and the first prize of Sichuan Province Science and Technology Progress Award.

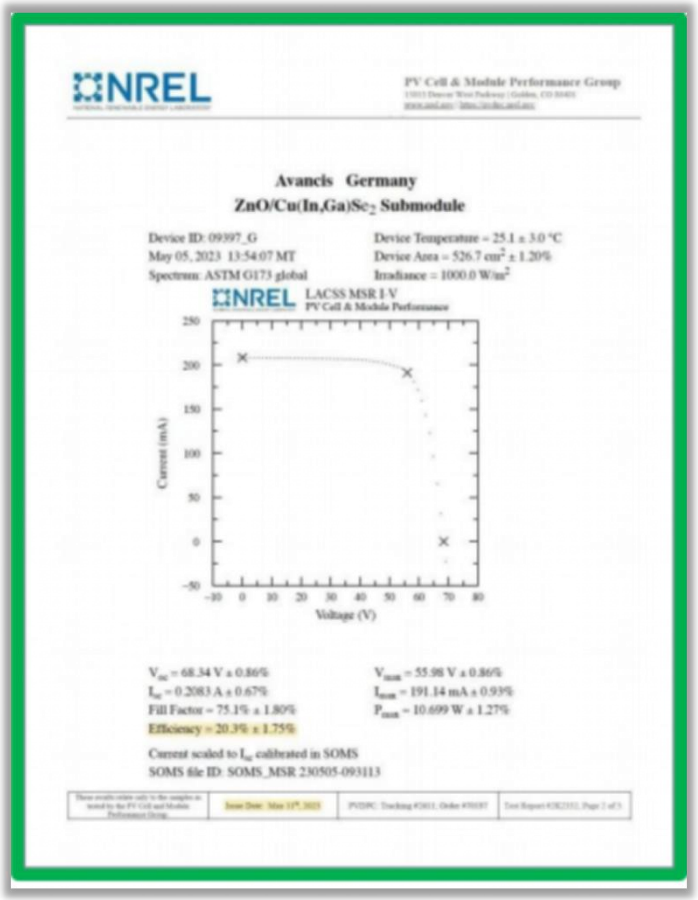
Product Introduction

Innovation Advantages

➢ The photoelectric conversion efficiency of the 30x30 square centimeter CIGS solar module has reached 20.3%, once again breaking the world record.

➢ The product has successfully passed the certification review for green building materials and obtained a three-star "Green Building Materials Certification."

➢ The product has been honored with the Second Prize of Anhui Provincial Science and Technology Progress Award.


NREL

PV Cell & Module Performance Group

Avancis Germany

ZnO/Cu(In,Ga)Se_2 Submodule

Device ID: 09397_G
May 05, 2023 13:54:07 MT
Spectrum: ASTM G173 global

Device Temperature = 25.1 ± 3.0 °C
Device Area = 526.7 cm^2 ± 1.20%
Irradiance = 1000.0 W/m^2

NREL LACSS MSR LV
PV Cell & Module Performance

Current (mA)
Voltage (V)

V_{oc} = 68.34 V ± 0.86%
I_{sc} = 0.2083 A ± 0.67%
Fill Factor = 75.1% ± 1.80%
Efficiency = 20.3% ± 1.75%

V_{mpp} = 55.98 V ± 0.86%
I_{mpp} = 191.14 mA ± 0.93%
P_{mpp} = 10.699 W ± 1.27%

Current scaled to I_{sc} calibrated in SOMS
SOMS file ID: SOMS_MSR 230505-093113


中国绿色建材产品认证证书

证书编号：CABR-01(02)-(2023)-CGP-108

附 件　　第 1 页，共 1 页

序号	认证单元	产品名称	规格型号	获得等级
1	铜铟镓硒组件	铜铟镓硒组件	电池片数量 104（115W～140W，每 5W 递增）	三星级
			电池片数量 105（115W～145W，每 5W 递增）	
			电池片数量 137（115W～155W，每 5W 递增）	

证书附件是本证书的组成部分。

发证机构：中国建筑科[illegible]

发证日期：2023 年 05 月 [illegible] 日　有效期至：2028 年 05 月 08 日

认证专用

Product Introduction

Innovation Advantages

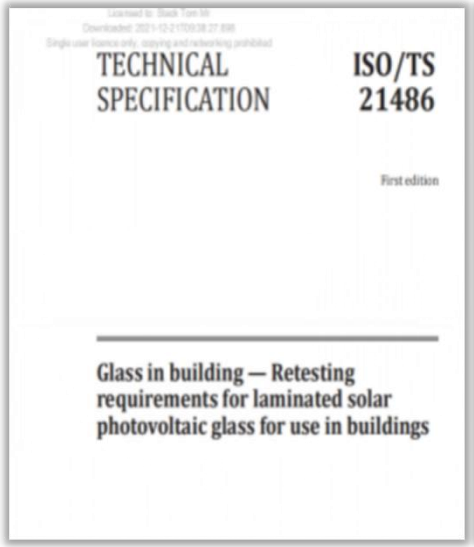
Multi directional chief editor and co editor of photovoltaic building integration related standards:

1 international standard, 6 national standards (including 3 published), 3 industry standards, and 16 group standards

Two first prizes and three second prizes of the National Science and Technology Progress Award

Obtained over 1200 national authorized patents, including 552 invention patents and 165 international patents

Undertake and complete 6 national major scientific and technological projects


TECHNICAL SPECIFICATION

ISO/TS 21486

First edition

Glass in building — Retesting requirements for laminated solar photovoltaic glass for use in buildings


GB

中华人民共和国国家标准

GB/T 38785—2020

建筑用薄膜太阳能电池组件回收再利用通用技术要求

General technical requirements of thin-film photovoltaic module recycling and reusing for use in building


为表彰在全国建筑材料行业科学研究、技术创新、成果推广、高新技术产业化等方面做出突出贡献的个人和组织，经中华人民共和国科学技术部批准，设立中国建筑材料联合会·中国硅酸盐学会建筑材料科学技术奖（国科奖社字0055号）。

建筑材料科学技术奖

证 书

项目名称：碲化镉发电玻璃工业化制备关键技术与研究

奖励等级：一等（技术发明类）

获奖单位：成都中建材光电材料有限公司

证书编号：2019-F-1-01-D01

中国建筑材料联合会 中国硅酸盐学会

二〇二〇年四月


国家科学技术进步奖

证 书

为表彰国家科学技术进步奖获得者，特颁发此证书。

项目名称：太阳能电池用微铁高透过率玻璃成套技术及产业化开发

奖励等级：二等

获 奖 者：蚌埠玻璃工业设计研究院

证书号：2011-J-214-2-02-001

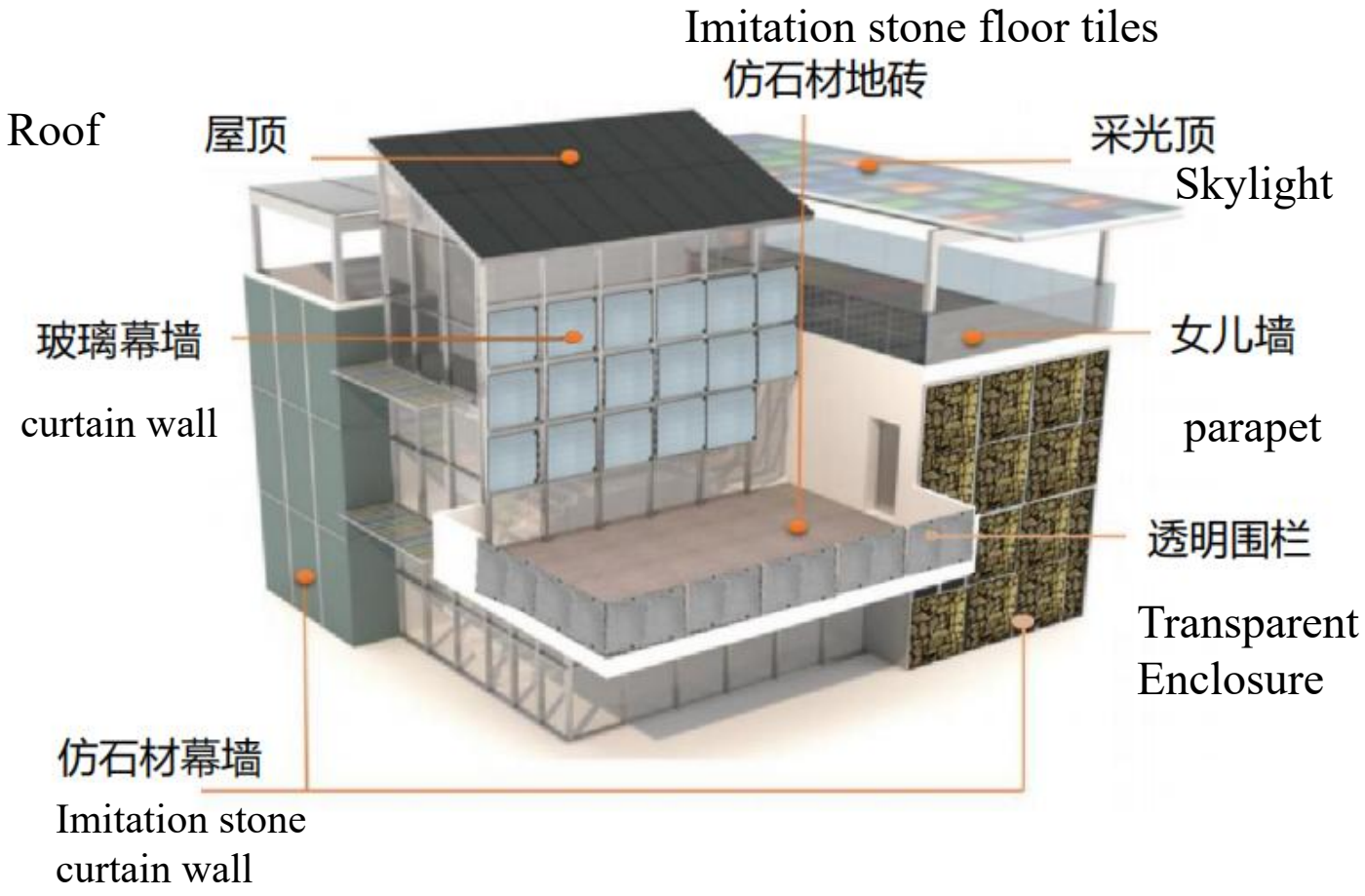
3 经营模式

| Application Scenarios | BIPV Scenario Investment Calculation

Business Model

凯盛玻璃控股有限公司 Triumph Glass Holdings Co.,Ltd.

Application Scenarios



某地建筑各部位辐照量对比（%）
（国内不同地区南立面辐照量范围50-75%）

Comparison of irradiation levels in various parts of a building in a certain area

	黑色标准产品	彩色/透光产品
Top surface kWh/㎡/ Year	About 150	About70~120
South facade kWh/㎡/ Year	About110	About50~90
East West Facade kWh/㎡/ Year	About80	About30~70

Estimated annual power generation of glass per square meter

Business Model

■Application scenarios - "Photovoltaic+".

Smart lighting.

Photovoltaic sound barriers.

Photovoltaic carports.

Photovoltaic sunshades.

Photovoltaic canopies.

Mobile energy stations.

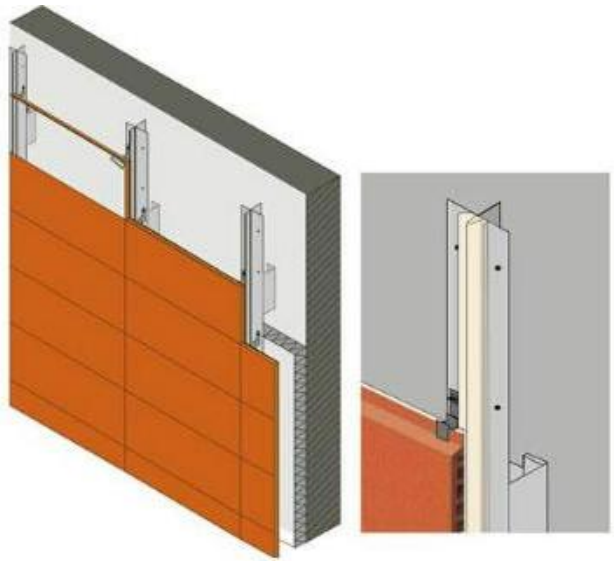
Business Model

BIPV Scenario Investment Calculation

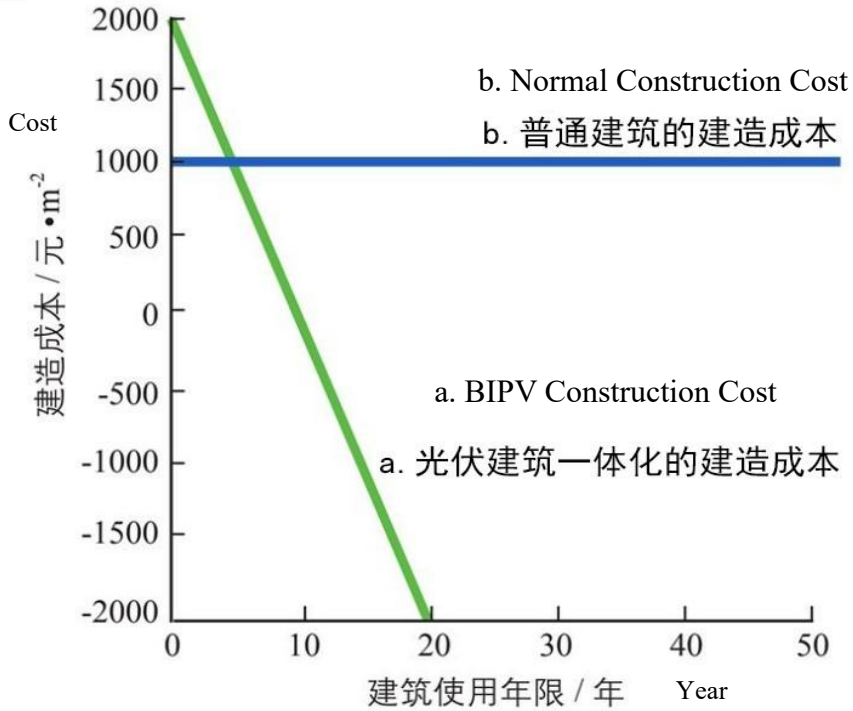
The cost of BIPV is dynamic and reduces over time, as the income from electricity generation exceeds the initial investment. Eventually, it can even reach zero or become profitable throughout the entire lifecycle of the building, whereas conventional buildings can only rely on depreciation to recover costs.

BIPV photovoltaic power generation performance, building material properties, renewable energy supply, and diverse application scenarios

Glass curtain wall - added



Dry hanging curtain wall - replacement



Business Model

Multidimensional Benefit Logic In BIPV Scenarios

Adapt to Architectural Style

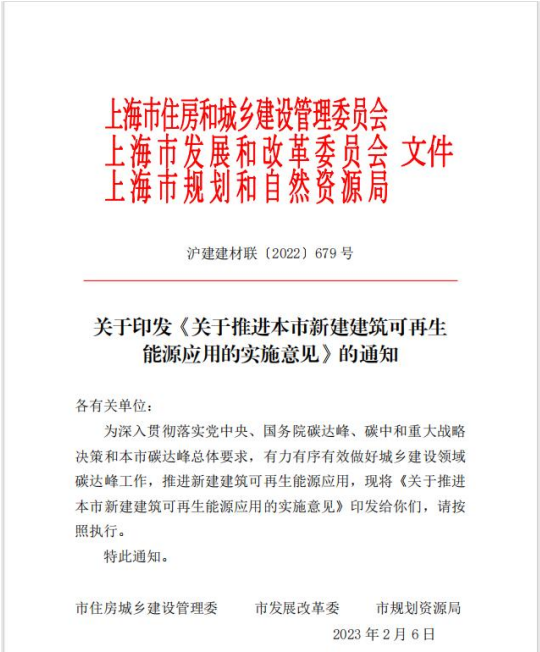
Offers flexible shaping and custom transparency, enabling it to perfectly integrate with the design and appearance of buildings.

Add Installable Parts

has strong flexibility and can be installed in various parts of a building, thereby increasing the area available for installing photovoltaic materials.

Meet Fire Safety Requirements

reduce the risk of hidden cracks and fire hazards, ensuring the long-term stable operation of the system



上海市住房和城乡建设管理委员会
上海市发展和改革委员会 文件
上海市规划和自然资源局

沪建建材联〔2022〕679号

关于印发《关于推进本市新建建筑可再生能源应用的实施意见》的通知

各有关单位：

为深入贯彻落实党中央、国务院碳达峰、碳中和重大战略决策和本市碳达峰总体要求，有力有序有效做好城乡建设领域碳达峰工作，推进新建建筑可再生能源应用，现将《关于推进本市新建建筑可再生能源应用的实施意见》印发给你们，请按照执行。

特此通知。

市住房城乡建设管理委　市发展改革委　市规划资源局

2023年2月6日

二、主要目标

新建公共建筑、居住建筑和工业厂房应按要求使用一种或多种可再生能源。到2025年，建筑用能结构持续优化，城镇新建建筑可再生能源替代率达到10%。到2030年，城镇新建建筑可再生能源替代率达到15%。

4 项目展示

Domestic Application Cases

International Application Cases

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Energy-saving Renovation of the Ministry of Science and Technology Building

Project Location: Beijing
Installed Capacity: 167.2 kW
Project Type: Roof + Curtain Wall BIPV
Grid Connection Time: 2024

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

BIPV Project at Bengbu China Optoelectronic Technology 8.5th Generation TFT-LCD Glass Substrate Production Park

The World's Largest Single BIPV Application Demonstration Project with a Capacity of 10 MW (Reported by International Solar Photovoltaic Network)

Project Location: Bengbu, Anhui
Installed Capacity: 10 MW
Installation Area: 120,000 m²
Project Type: Roof + Curtain Wall BIPV
Grid Connection Time: December 2019
•Fully Green Power for Office and Living

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Roof of Panzhihua Graphite Industrial Park
"Sky Mirror"

Project Location: Panzhihua, Sichuan
Installed Capacity: 1.25 MW
Project Type: Roof + Curtain Wall BIPV
Grid Connection Time: September 2019

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co. Ltd

Aviation Museum Technology Incubation Park and Military-Civilian Integration Training Center

Project Location: Pengzhou, Sichuan
Installed Capacity: 50.07 kW
Project Type: Curtain Wall and Roof BIPV
Completion Time: July 2021


Top Exterior View


Top Interior View


Center

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Shenzhen North Railway Station Near-Zero Carbon Demonstration Project

Project Location: Longhua, Shenzhen
Project Type: Roof BIPV
Installation Area: 30,000 m²
Installed Capacity: 3,550 kW
Annual Power Generation: 3.27 million kWh

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Bengbu Olympic Sports Center

Awarded the Luban Prize

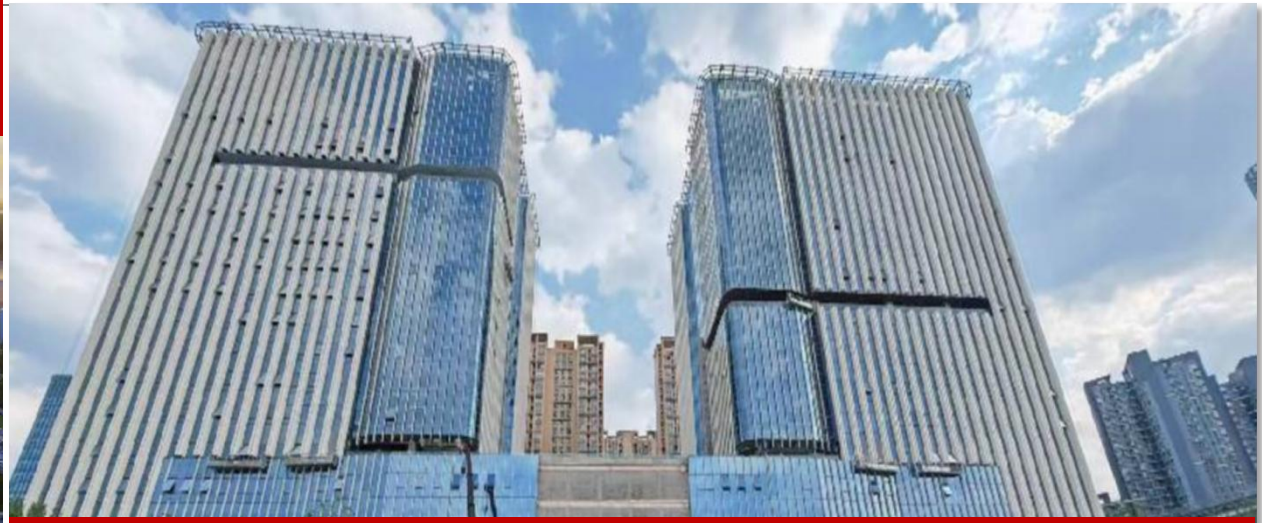
Chengdu Park City Education Practice Base

Project Location: Guangshui, Hubei
Project Type: Curtain Wall BIPV
Grid Connection Time: 2022

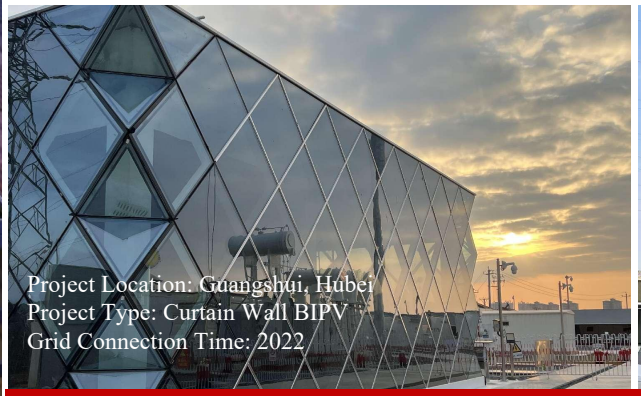
IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Xiamen Airport Demonstration Project



Wuliangye Business Building Demonstration Project



State Grid's 100% Renewable Energy New Power System BIPV Building

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Wanhua Chemical Yantai Industrial Park Warehouse No. 2

Project Location: Yantai, Shandong
Installed Capacity: 754 kW
Project Type: BIPV Curtain Wall

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

China Western Science and Technology Innovation Port

Project Location: Xi'an, Shaanxi
Installed Capacity: 226 kW
Project Type: Hollow Transparent Curtain Wall
Grid Connection Time: 2022

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

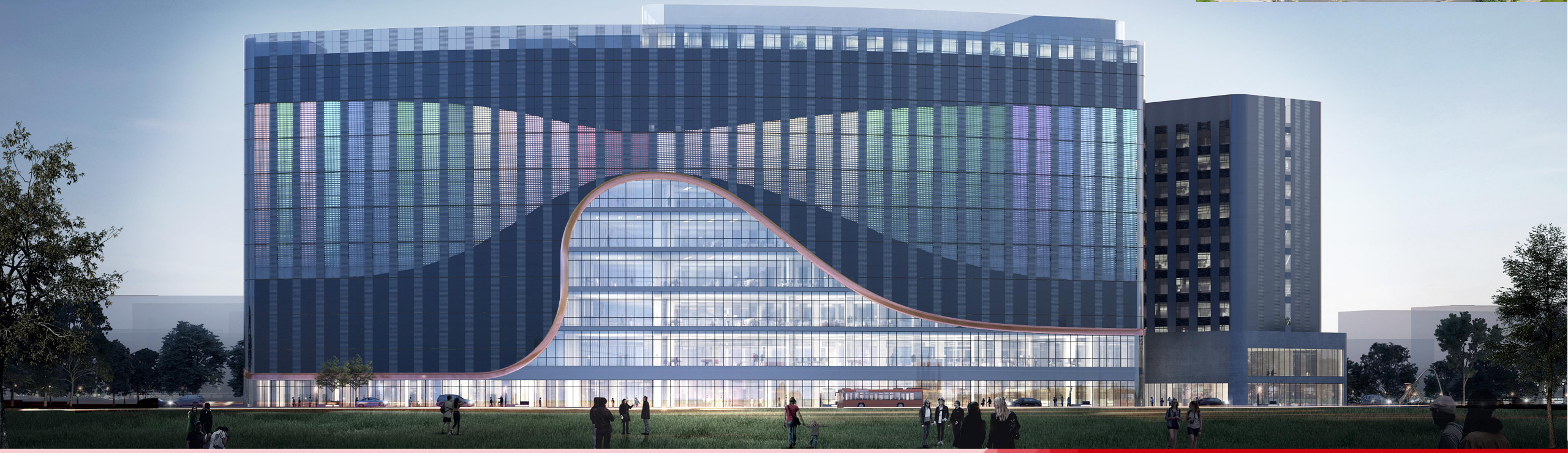
National Key Laboratory's Power-generating Glass Building (New Float Glass Technology)

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Shenzhen Guoxian Technology Building Project

Project Location: Longgang, Shenzhen
Application Area: Wall BIPV
Installation Area: 12,000 m²
Installed Capacity: 1,285 kW
Annual Power Generation: 900,000 kWh



IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Shanghai Kaisheng Robot R&D Center

Project Location: Songjiang District, Shanghai

Installation Area: 3,200 m²

Components Used: 1,600 pieces

Installed Capacity: 320 kW
Project Type: Curtain Wall
•The project has passed expert reviews by the Shanghai Housing and Urban-Rural Development Commission and the Urban Construction Science and Technology Committee of Pudong New Area, Shanghai, as well as construction drawing reviews by the "Songjiang District Construction Engineering Document Review Center".

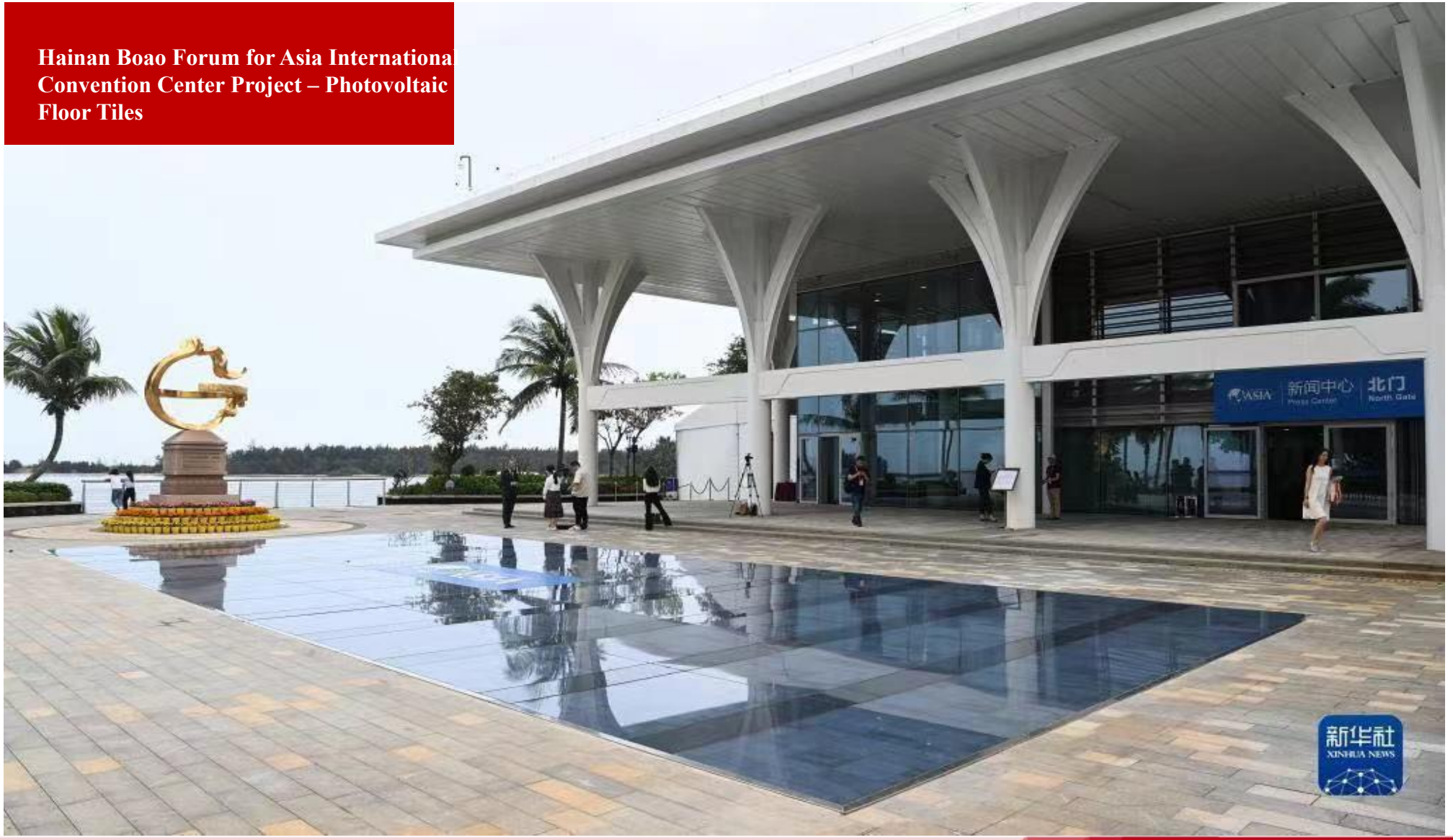
IV. Project Showcase: BIPV Project Presentation

Hainan Boao Forum for Asia International Convention Center Project – Photovoltaic Balustrades

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

Hainan Boao Forum for Asia International Convention Center Project – Photovoltaic Floor Tiles



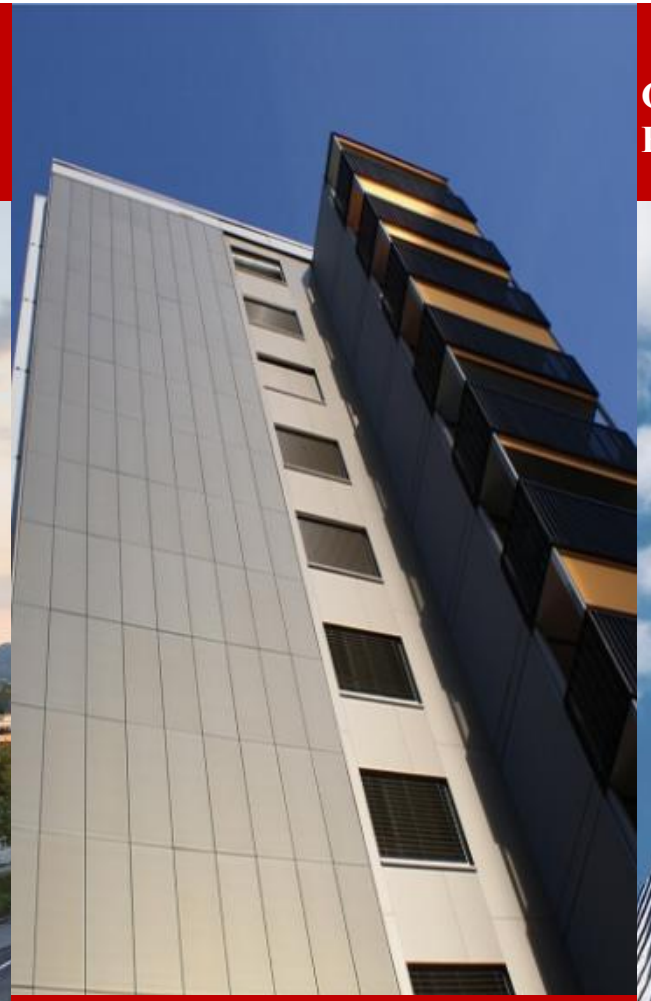
Tianfu Software Park Block C Smart Microgrid Demonstration Project for Photovoltaic Storage, Charging, and Discharging

Project Location: Chengdu, Sichuan
Installed Capacity: 52 kW
Project Type: Integrated Photovoltaic, Storage, Charging, and Discharging Parking Lot

IV. Project Showcase: BIPV Project Presentation

Swiss Volg Company Logistics Distribution Center

German Office Building



Switzerland Bern (SKALA Brown Group) CIGS (Copper Indium Gallium Selenide) Building Integrated Photovoltaic (BIPV)

German Power-generating Glass Building Integrated Photovoltaic (BIPV)

IV. Project Showcase: BIPV Project Presentation

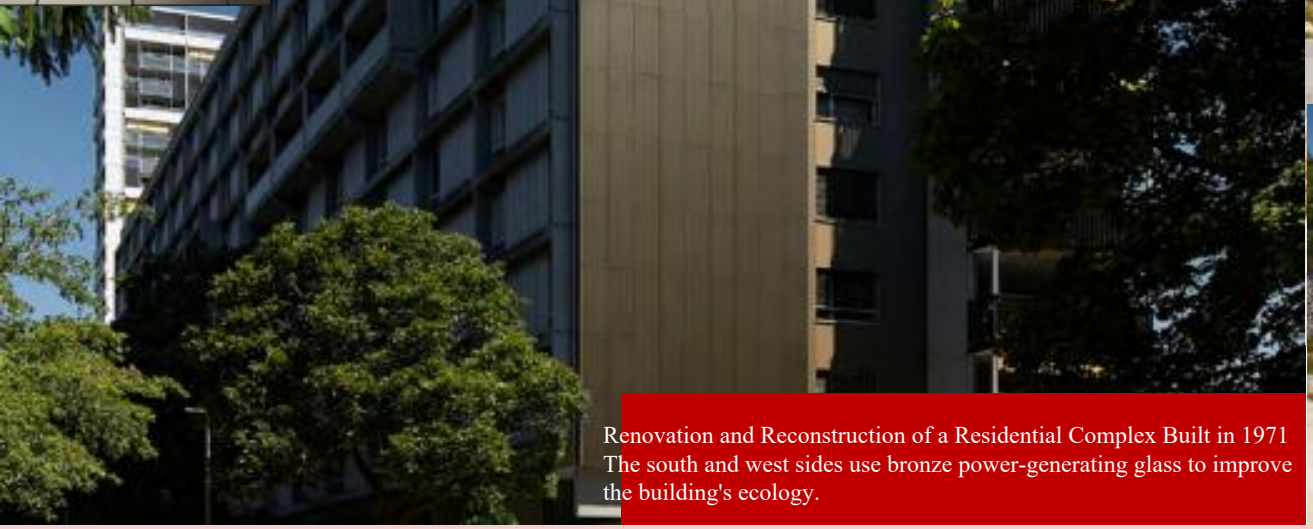
凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

German Yihua Campus Water Treatment Station

The building facade uses green SKALA modules,
Meeting 70% of the building's energy consumption

IV. Project Showcase: BIPV Project Presentation

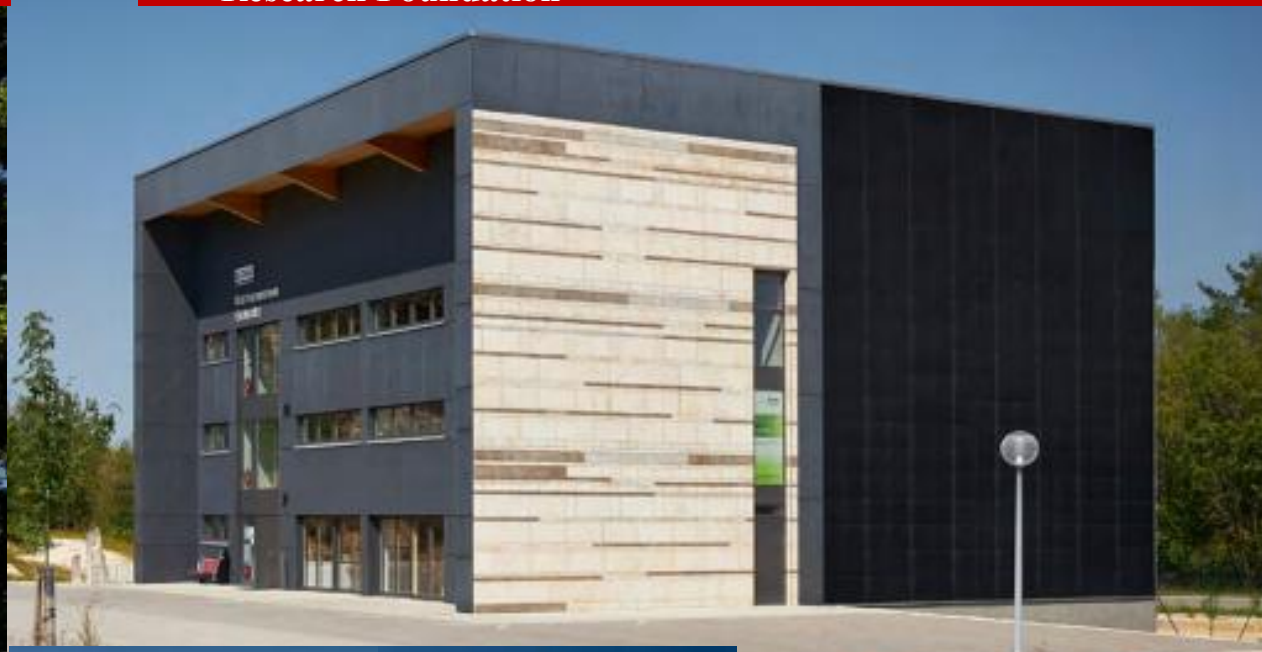
凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.



Bernstein U.S. Research Foundation

Renovation and Reconstruction of a Residential Complex Built in 1971
The south and west sides use bronze power-generating glass to improve the building's ecology.

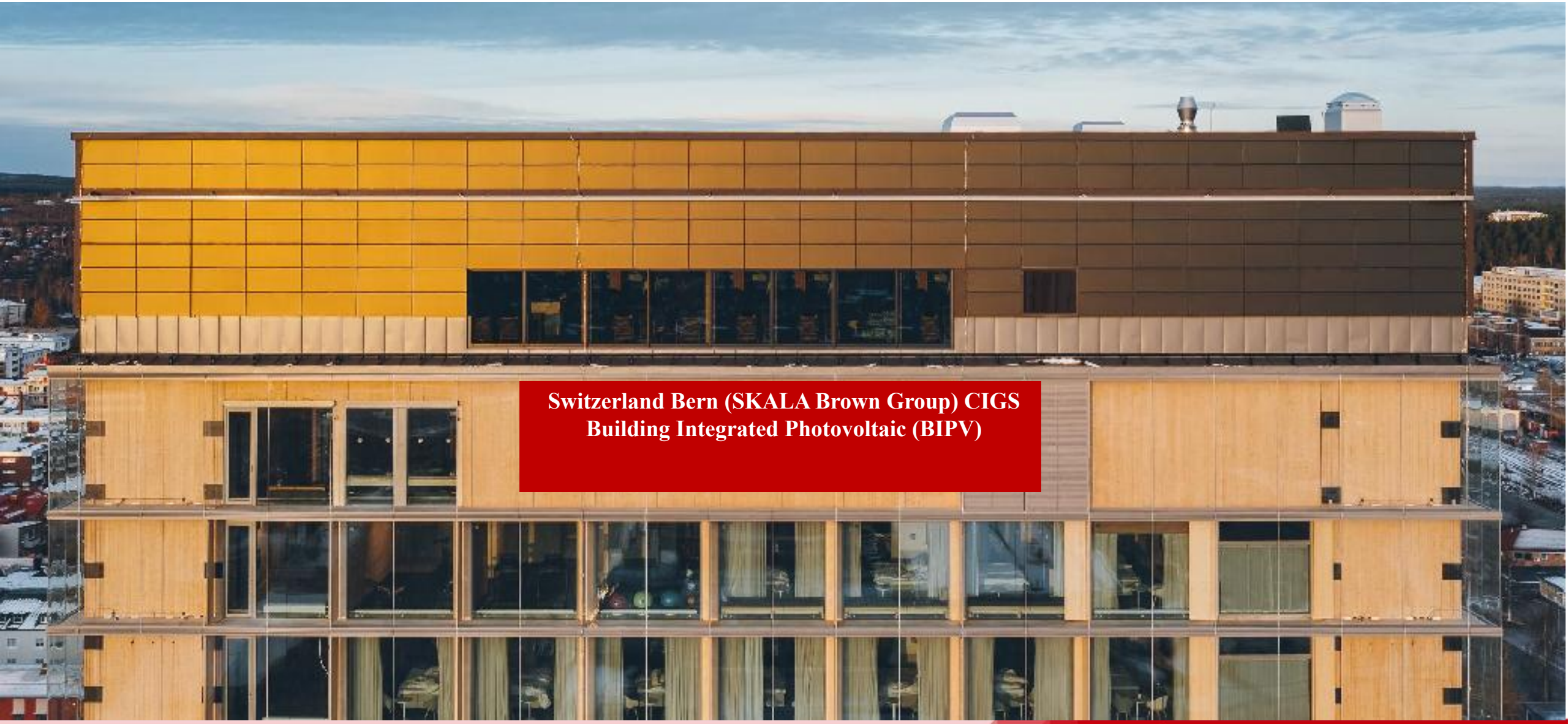
New Office Building/Residential Complex Bernstein U.S. Research Foundation



New energy-efficient residential and commercial buildings on the southeast side.
The facade uses black power-generating glass.

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.



Switzerland Bern (SKALA Brown Group) CIGS Building Integrated Photovoltaic (BIPV)

IV. Project Showcase: BIPV Project Presentation

凯盛玻璃控股有限公司
Triumph Glass Holdings Co.,Ltd.

New Warehouse of the Amsterdam City Archives in the Netherlands

Standard power-generating glass modules are installed on the roof, and gray Skala modules are used on the south and west exterior walls.

Poland CIGS Building Integrated Photovoltaic (BIPV)

Germany Liegenschaftstadt Building Integrated Photovoltaic (BIPV)

Thanks

Materials Creating a Brand New World