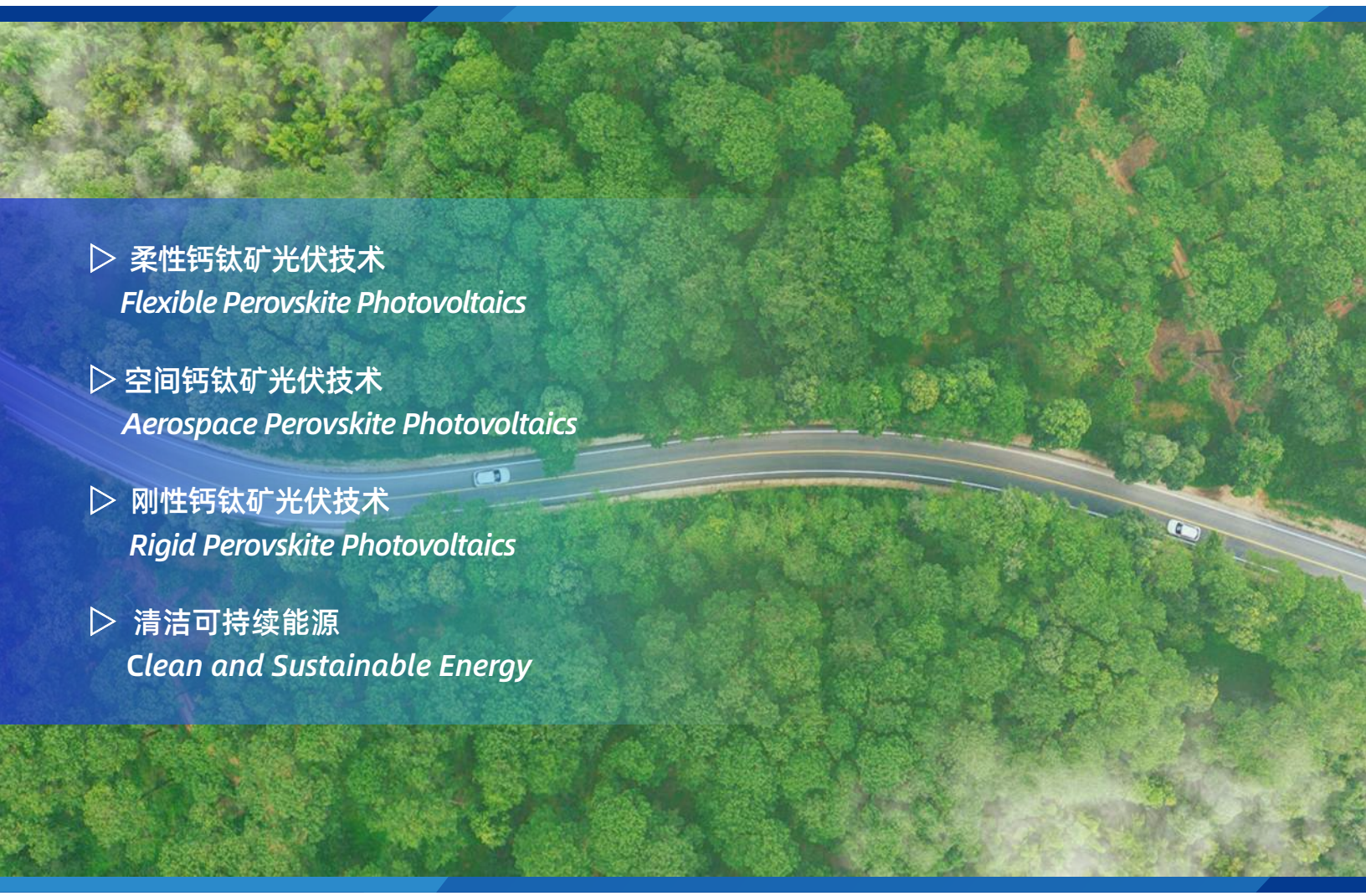
ZN ENERGY 众能光储



- 柔性钙钛矿光伏技术
  Flexible Perovskite Photovoltaics
- 空间钙钛矿光伏技术
  Aerospace Perovskite Photovoltaics
- 刚性钙钛矿光伏技术
  Rigid Perovskite Photovoltaics
- 清洁可持续能源
  Clean and Sustainable Energy

2025

让清洁可持续能源惠及世界每个角落

Bring clean and sustainable energy everywhere.

About Us

2021年 Founded

40%+ R&D %

100+ SCI papers

11000㎡+ R&D and Production Area

Founded in December 2021, Wuxi Zhongneng Energy (ZN Energy) is engaged in research and development, manufacturing of large-area modules**(rigid and flexible)**for perovskite solar cells. Driven by our vision **"bring clean and sustainable energy everywhere"** ,we strategically develop technologies and industrial deployment across four key segments:**flexible perovskite photovoltaics, aerospace perovskite photovoltaics, rigid perovskite photovoltaics, clean and sustainable energy solutions**. ZN Energy occupies over 11,000 sqm of facilities, including office spaces, advanced optoelectronic laboratory, and a high-standard perovskite MW production line. Over 40% of employees dedicated to R&D innovation. ZN Energy has been awarded" Top 50 Innovators and Entrepreneurs" and "Excellent Enterprise Award" of the 12th China Innovation and Entrepreneurship Competition (The only one in the perovskite industry and Top1 in Wuxi City).

Rigid perovskite cell (1.2m*0.6m -large size) obtained VDE certification with an efficiency of 18.04%,while our square-meter-scale ultra-long and ultra-flexible perovskite modules demonstrate industry-leading performance.

Gigawatt-scale perovskite manufacturing facility (Chongqing): Groundbreaking in October 2024, slated for completion by late 2025.Additionally, ZN Energy offers integrated services for the solar & energy storage system.

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Team&Achievements

ZN Energy's core R&D team consists of experts from renowned institutions such as Tsinghua University, Dalian University of Technology, and Dalian Institute of Chemical Physics, Chinese Academy of Sciences. The team has been deeply engaged in the perovskite field for over 10 years led by Professor Shi Yantao and Dong Qingshun. It is one of the earliest and largest teams focused on perovskite research in China with significant academic influence. Since 2012, the team has made critical breakthroughs in both foundational and technological research on perovskite solar cells, publishing over 100 SCI papers in top international journals.

2012年
Begins

THU
Studied

DUT
Rooted

DICP
Multidisciplinary

The team has made a series of original scientific achievements in the development of high-performance perovskite devices, functional materials, advanced manufacturing technologies, and device structure design. Currently, (1) The team's highest efficiency for rigid perovskite solar cells has exceeded 26%. (2) The highest efficiency for flexible perovskite solar cells has exceeded 24%, leading the field.(3) The team has shattered the efficiency record four times for carbon-based perovskite solar cells, achieving certified performance surpassing 24%, unequivocally positioning our technology at the global forefront.

26%
Rigid efficiency

24%
Flexible efficiency

24%
Carbon-based efficiency

The company is establishing a new model of "in-depth research in basic science + cross-disciplinary application of multidisciplinary technologies + industrialization and commercialization of innovative achievements" to achieve new breakthroughs in high-performance and high added-value perovskite technology.

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Industry Influence

The "10th Young Scholars Forum on Perovskite Materials and Devices" (Organized by the Chinese Optical Society, Committee of Fundamental Optics, and co-hosted by DUT & DICP,CAS) was the largest and highest-level global perovskite industry event in 2024. This forum surpassed all predecessors in attendance, institutional participation,Participating enterprises, financial support, and reports.

229
Universities & National Laboratories

1300+
Attendees

300+
Reports

67
Participating Enterprises

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GW-Manufacturing Facility

Gigawatt-scale perovskite manufacturing facility (Chongqing): Groundbreaking in October 2024, slated for completion by late 2025.

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Product Portfolio & Application Scenarios

We offers three major product series:

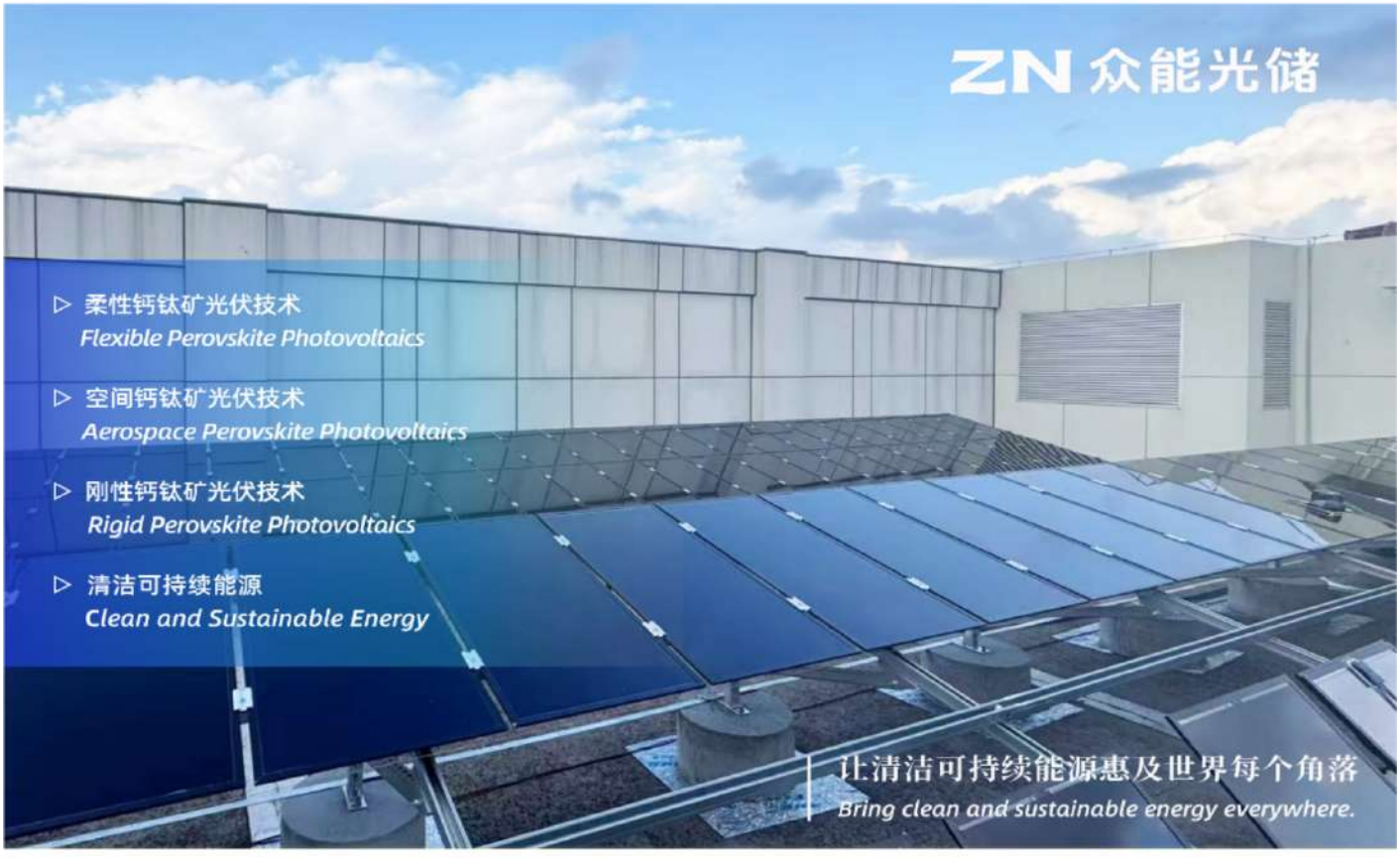
(1) The “Smart Energy Series”: Perovskite Rigid Products(standard modules/semitransparent modules/colorful texture modules).

(2) The “Flex Sparking Series”: Perovskite flexible Products (flexible standard modules).

(3) The “All Galaxy Series”: Ultra-light & Ultra-flexible customized Products (“All Things + X”), providing global customers with clean energy solutions featuring diverse needs, rich scenarios, and wide applications.

Perovskite flexible solar cells offer multiple advantages including lightness, thinness, high flexibility, low-light power generation, and diverse appearances, with wide-ranging application scenarios and easy installation. They can be used in buildings (BIPV), mobile energy & outdoor applications, consumer electronics & smart IoT, aerospace (UAVs, satellites, airships, light detectors, space stations), public transportation (logistics vehicles & cold chain vehicles), and other scenarios.

The “Smart Energy Series” Rigid Products



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The “Smart Energy Series”

Rigid Products-（1）Standard Modules

STC参数 Electrical Performance Parameters（STC）			
最大额定功率 Pmax(W)	110	120	130
组件效率 Efficiency （%)	15.3%	16.7%	18.1%
最大功率点工作电压 Vmppt(V)	68.52	70.17	72.63
最大功率点工作电流 Imppt(A)	1.61	1.71	1.79
开路电压 VOC(V)	87.11	88.62	90.15
短路电流 ISC(A)	1.84	1.90	1.96
标准测试条件（大气质量AM1.5，辐照度1000W/ m²，电池温度25℃）下的测量值.Measured under Standard Test Conditions (STC): Air Mass 1.5 (AM1.5), Irradiance of 1000 W/m², and Cell Temperature of 25°C.			
工作参数 Operating Parameters			
最大系统电压 Max. S Voltage	1500V		
工作温度 Operating Temperature	-40℃~85℃		
二极管数量 Bypass Diode	1 PCS		
组件防护等级 Protection Class	IP67		
最大保险丝电流 Max.Fusing Current	4.8A		
安全等级 Safety Level	Class Ⅱ		
防火等级 Fire Rating	Class C		
温度系数 Temperature Coefficient			
模块工作温度(NMOT)	47℃(±5)		
最大功率点温度系数(Pmax)	-0.017%/℃		
开路电压温度系数(Voc)	-0.006%/℃		
短路电流温度系数(Isc)	-0.003%/℃		
机械参数 Mechanical Parameters			
组件尺寸 Module Dimension	1200*600*7 mm(±0.5)（Customize）		
组件重量 Weight	12 kg(±0.5)		
电池片类型 Type	钙钛矿电池 Perovskite		
面积 Area	0.72 m²		
前板 Front Panel	3.2mmTCO Glass		
封装 Encapsulated	PIB+POE		
背板 Back Panel	3.2mm Glass		
电缆 Wire	Φ4/2.5/1.5 mm²，650 mm（Customize）		
最大机械载荷 Max. Mech Load	±2400 Pa		
连接器接头 Connector Type	MC4或兼容MC4 MC4 or compatible with MC4		

The “Smart Energy Series”

Rigid Products-（2）Semitransparent Modules

产品 Product Model				
透光率 % Transmittance %	20% 	30% 	40% 	50% 
STC参数 Electrical Performance Parameters（STC）				
最大额定功率 Pmax(W)	85	75	65	50
最大功率点工作电压 Vmppt(V)	71.18	74.26	77.38	78.13
最大功率点工作电流 Imppt(A)	1.19	1.01	0.84	0.64
开路电压 VOC(V)	87.52	87.37	87.37	87.46
短路电流 ISC(A)	1.34	1.17	0.99	0.78
标准测试条件（大气质量AM1.5，辐照度1000W/ m²，电池温度25℃）下的测量值.Measured under Standard Test Conditions (STC): Air Mass 1.5 (AM1.5), Irradiance of 1000 W/m², and Cell Temperature of 25°C.				

工作参数 Operating Parameters	
最大系统电压 Max.S Voltage	1500V
工作温度 Operating Temperature	-40℃~85℃
二极管数量 Bypass Diode	1 PCS
组件防护等级 Protection Class	IP67
最大保险丝电流 Max.Fusing Current	4.8A
安全等级 Safety Level	Class Ⅱ
防火等级 Fire Rating	Class C
温度系数 Temperature Coefficient	
模块工作温度(NMOT)	47℃(±5)
最大功率点温度系数(Pmax)	-0.017%/℃
开路电压温度系数(Voc)	-0.006%/℃
短路电流温度系数(Isc)	-0.003%/℃
机械参数 Mechanical Parameters	
组件尺寸 Module Dimension	1200*600*7 mm(±0.5)（Customize）
组件重量 Weight	12 kg(±0.5)
电池片类型 Type	钙钛矿电池 Perovskite
面积 Area	0.72 m²
前板 Front Panel	3.2mmTCO Glass
封装 Encapsulated	PIB+POE
背板 Back Panel	3.2mm Glass
电缆 Wire	Φ4/2.5/1.5 mm²，350-650 mm（Customize）
最大机械载荷 Max. Mech Load	±2400 Pa
连接器接头 Connector Type	MC4或兼容MC4 MC4 or compatible with MC4

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The “Smart Energy Series”

Rigid Products-（3）Colorful Texture Modules

产品				
色系 Color (Red/Stone-like/Medium gray/ Dark brown)				
STC参数 Electrical Performance Parameters（STC）				
最大额定功率 Pmax(W)	75	65	100	90
最大功率点工作电压 Vmppt(V)	75.26	77.38	76.92	76.45
最大功率点工作电流 Imppt(A)	1.00	0.84	1.30	1.18
开路电压 VOC(V)	87.40	87.37	87.26	87.48
短路电流 ISC(A)	1.17	0.99	1.56	1.32
标准测试条件（大气质量AM1.5，辐照度1000W/ m²，电池温度25℃）下的测量值.Measured under Standard Test Conditions (STC): Air Mass 1.5 (AM1.5), Irradiance of 1000 W/m², and Cell Temperature of 25°C.				
工作参数 Operating Parameters				
最大系统电压 Max.S Voltage	1000V			
工作温度 Operating Temperature	-40℃~85℃			
二极管数量 Bypass Diode	1 PCS			
组件防护等级 Protection Class	IP67			
最大保险丝电流Max.Fusing Current	4.8A			
安全等级 Safety Level	Class Ⅱ			
防火等级 Fire Rating	Class C			
温度系数 Temperature Coefficient				
模块工作温度(NMOT)	47℃(±5)			
最大功率点温度系数(Pmax)	-0.017%/℃			
开路电压温度系数(Voc)	-0.006%/℃			
短路电流温度系数(Isc)	-0.003%/℃			
机械参数 Mechanical Parameters				
组件尺寸 Module Dimension	1200*600 mm(±0.5)（Customize）			
组件厚度 Thickness	11/22 mm(±0.5)			
组件重量 Weight	12 kg(±0.5)			
电池片类型 Type	钙钛矿电池 Perovskite			
面积 Area	0.72 m²			
前板 Front Panel	3.2mmTCO Glass			
封装 Encapsulated	PIB封边+PVB填充（Customize）			
背板 Back Panel	3.2mm Glass			
电缆 Wire	Φ4/2.5/1.5 mm²，350-650 mm（Customize）			
最大机械载荷 Max. Mech Load	±2400 Pa			
连接器接头 Connector Type	MC4或兼容MC4 MC4 or compatible with MC4			

The “Flex Sparking Series”

Flexible Products (Flexible Standard Modules)

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The “Flex Sparking Series”

Flexible Products (Flexible Standard Modules)

STC参数 Electrical Performance Parameters（STC）				
最大额定功率 Pmax(W)	90	100	110	115
组件效率 Efficiency（%）	12.5%	13.9%	15.3%	16.0%
最大功率点工作电压 Vmppt(V)	67.16	68.97	71.43	71.88
最大功率点工作电流 Imppt(A)	1.34	1.45	1.54	1.60
开路电压 VOC(V)	86.83	88.25	89.67	90.36
短路电流 ISC(A)	1.50	1.62	1.73	1.78
标准测试条件（大气质量AM1.5，辐照度1000W/ m²，电池温度25℃）下的测量值.Measured under Standard Test Conditions (STC): Air Mass 1.5 (AM1.5), Irradiance of 1000 W/m², and Cell Temperature of 25°C.				

工作参数 Operating Parameters	
最大系统电压 Max.S Voltage	1000V
工作温度 Operating Temperature	-40℃~85℃
二极管数量 Bypass Diode	1 PCS
组件防护等级 Protection Class	IP67
最大保险丝电流Max.Fusing Current	4.8A
安全等级 Safety Level	Class Ⅱ
防火等级 Fire Rating	Class C

温度系数 Temperature Coefficient	
模块工作温度(NMOT)	47℃(±5)
最大功率点温度系数(Pmax)	-0.017%/℃
开路电压温度系数(Voc)	-0.006%/℃
短路电流温度系数(Isc)	-0.003%/℃

机械参数 Mechanical Parameters	
组件尺寸 Module Dimension	1200*600*2 mm(±0.5) （Customize）
组件重量 Weight	1.5 kg(±0.5)
电池片类型 Type	钙钛矿电池 Perovskite
面积 Area	0.72 m²
前板 Front Panel	PET-ITO
封装 Encapsulated	PIB封边+POE/PVB填充（Customize）
背板 Back Panel	柔性水氧阻隔膜 Barrier Film
电缆 Wire	Φ4/2.5/1.5 mm²，350-650 mm（Customize）
最大机械载荷 Max. Mech Load	±5400 Pa
连接器接头 Connector Type	MC4或兼容MC4 MC4 or compatible with MC4

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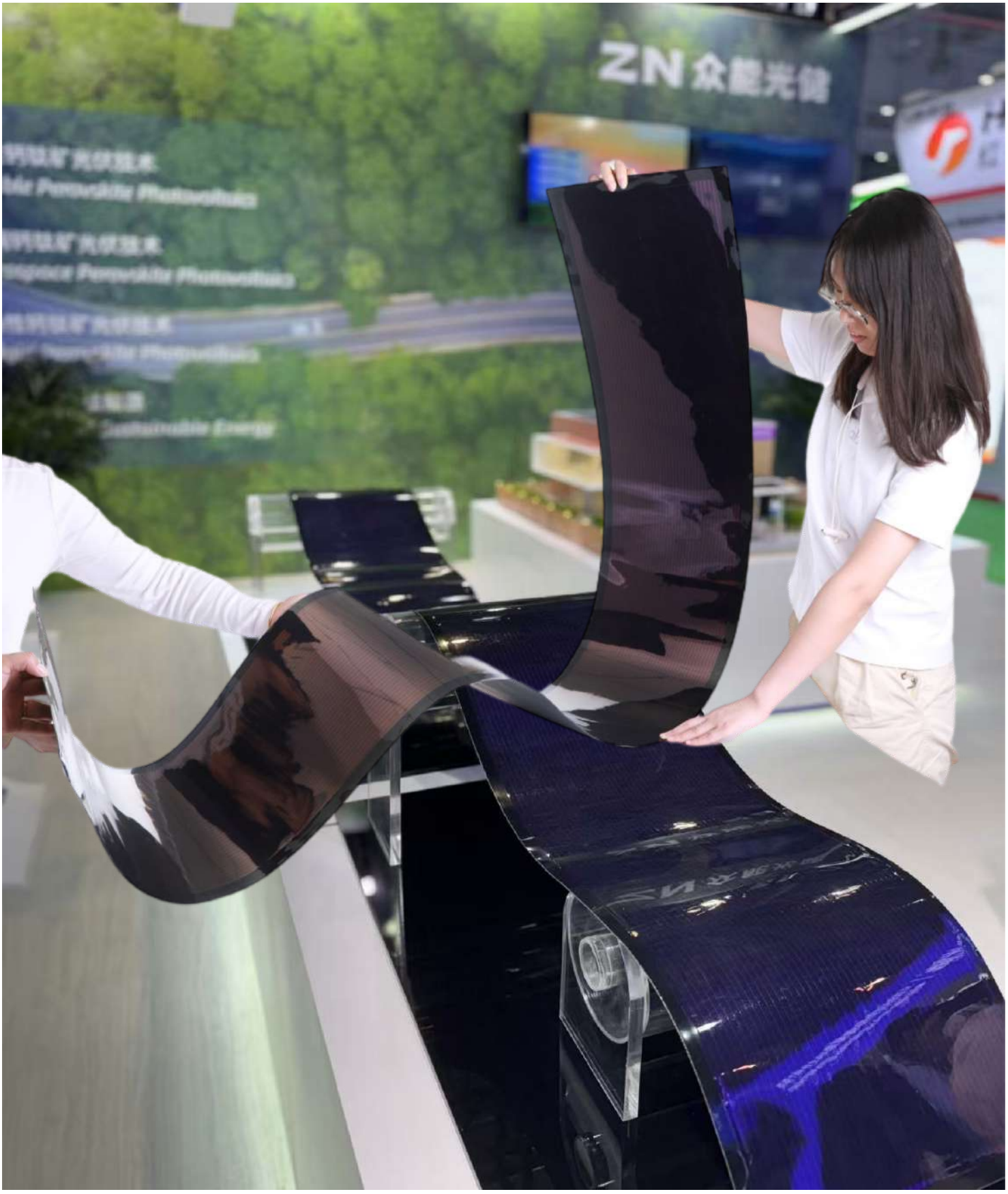
The “All Galaxy Series”

Ultra-light & Ultra-flexible Customized Products



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Integrated Clean Energy Services

The Chongqing Jiangjin 240MWh Energy Storage Project was successfully connected to the grid and commenced operations on August 7, 2024. As one of Chongqing major power supply security projects in 2024, it further advances the company's strategy of integrating clean and sustainable energy and implementing the "source-grid-load-storage" integration strategy, establishing a smart multi-source energy supply system.

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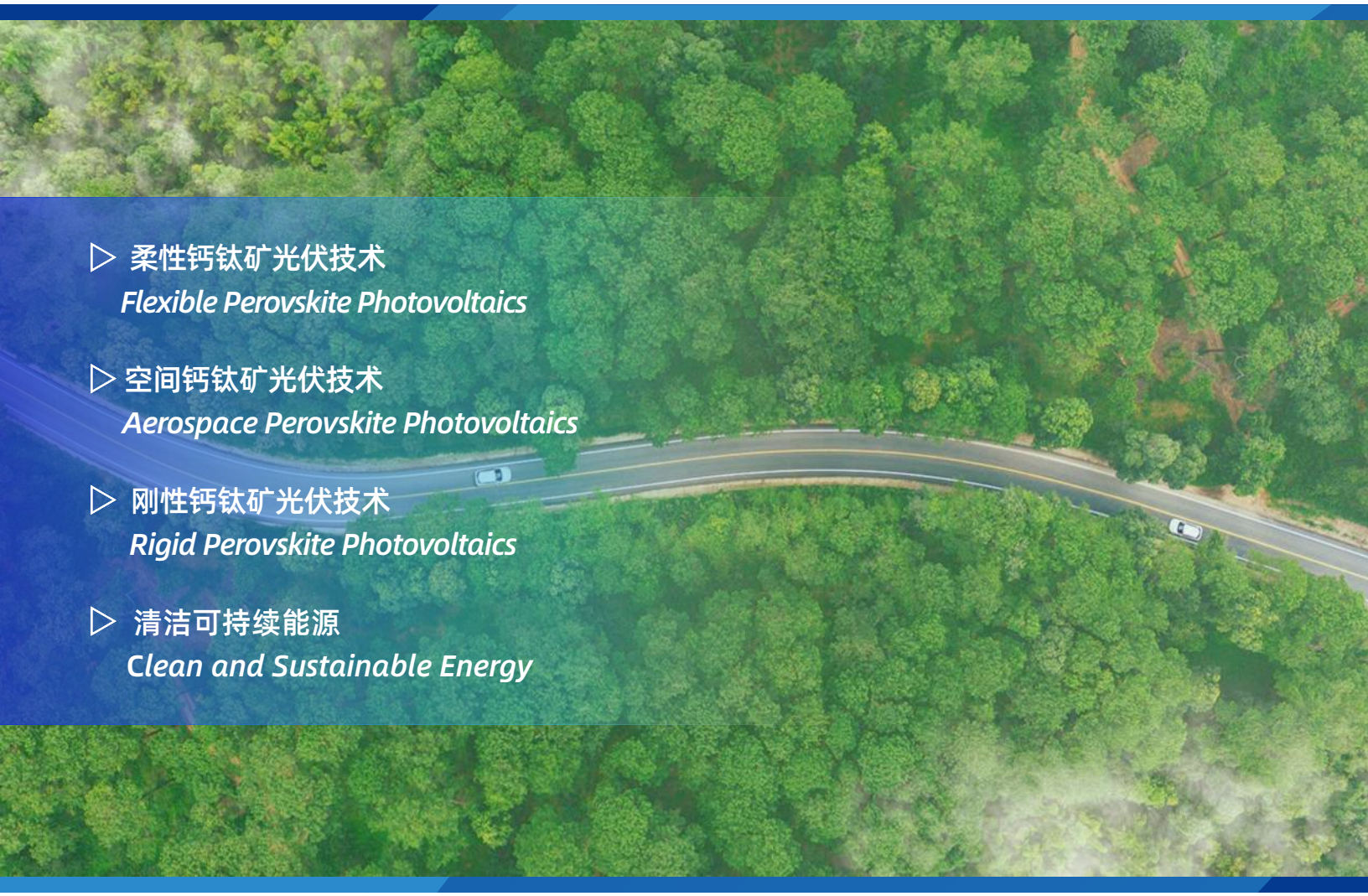

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