

More power is coming
让阳光更清洁



Intelligent PV Cleaning System 光伏智能清扫系统

合肥仁洁智能科技有限公司

地址：中国·合肥市高新区创新大道96号4号楼

电话：+86-551-65327190

邮箱：service@sunpuretech.com

www.sunpuretech.com

SUNPURE TECHNOLOGY CO., LTD.

Add: Building 4,Chuangxin Avenue, Industrial Development Zone, Hefei,P.R.China

Tel: +86-551-65327190

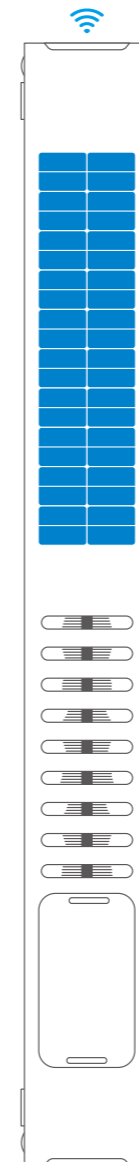
E-mail: service@sunpuretech.com

www.sunpuretech.com



*More
power is
coming*

致力于成为智能清扫技术的领跑者
To be leader of the intelligent cleaning technology



懂电站 高可靠 不趴窝

Power station knowhow, high reliability

仁洁智能，专注于光伏清扫

Sunpure, focusing on PV industry

提供智能化清扫机器人综合解决方案

Providing a comprehensive solution for PV module cleaning

行业首个技术规范起草者

Drafted industry's first technical specification

公司概况 About Sunpure	02
研发与创新 R&D and Innovation	03-06
光伏智能清扫系统 Intelligent PV Cleaning System	07-11
服务 Service	12-13
项目案例 Project Cases	14-17

公司概况 About Sunpure


仁洁智能是一家专业从事光伏智能清扫机器人研发、生产、销售及服务为一体的高科技创新型企业，公司将物联网技术、人工智能及大数据分析技术紧密结合，为光伏电站提供定制化、专业化、智能化的清扫整体解决方案。公司始终坚持科技创新和研发投入，拥有完善的自主研发创新体系，依托智慧能源管理平台、光伏电站检测平台，融合智能四驱、姿态识别控制技术等，专业研发、精益生产，多维度保障产品质量，实现产品的全生命周期管理，产品先后通过TÜV、CE、CGC等多项权威认证机构的认证与测试。


As a high-tech innovative enterprise specializing in the research and development, manufacturing, sales and service of Intelligent PV Cleaning robots, Sunpure is committed to provide a standardized, professional and intelligent cleaning solution for PV power plants. Sunpure has always been focusing on technological innovation and R&D investment. The R&D team is equipped with a team of high professionals including industry experts, high educated personnels with Doctor's degree, etc. Relying on smart energy management platform, photovoltaic power station detection platform, fusion of smart four-wheel drive, posture recognition, etc. Sunpure has an advanced independent research and development innovation system.

 **1st** 首个阳光生态链公司
First eco-chain company of Sungrow

 **4200⁺** 已交付机器人
Robots successfully delivered

 **68%⁺** 技术人员
Technical personnel

 **99.5%⁺** 清扫效率
Cleaning efficiency

 **86⁺** 已申请专利
Patent applications

 **14%⁺** 发电量提升
Increase in power generation



集成产品开发模式 IPD

- 以客户需求为出发点，以产品满足客户需求为结束点。
- 规范、科学的产品开发流程，保障产品开发效率和可靠性。
- 技术和产品并重，不断加强技术积累、构筑新的核心技术优势。
- Start with customer needs and end with customer satisfaction .
- Standardized and proven process to ensure efficient and reliable product development.
- build new core technical advantages through continuous technology accumulation.



生产检测 Production inspection



实证测试 Empirical testing



高低温测试 High and low temperature test



多功能升降测试 Lift test



风沙测试 Sand wind test

通过CSA、TÜV、UL、CNAS、CE等多家权威机构认可。
It has been recognized by CSA, TÜV, UL, CNAS, CE and other authorities.



获得由SGS颁发的ISO 9001、ISO 14001、ISO 45001认证证书，认证范围涵盖了光伏清扫机器人、清扫机器人摆渡车的研发和生产。

Obtained ISO 9001, ISO 14001, ISO 45001 certification issued by SGS, which covers the development and production of photovoltaic cleaning robots and cleaning robot shuttle vehicles.

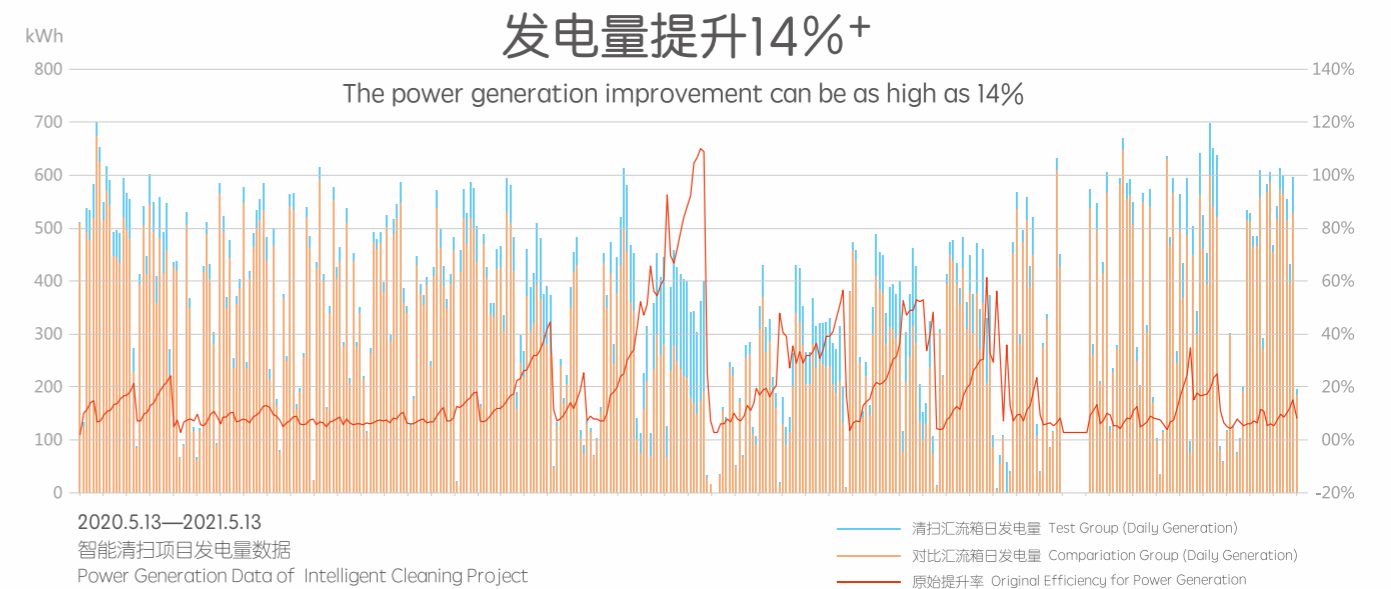
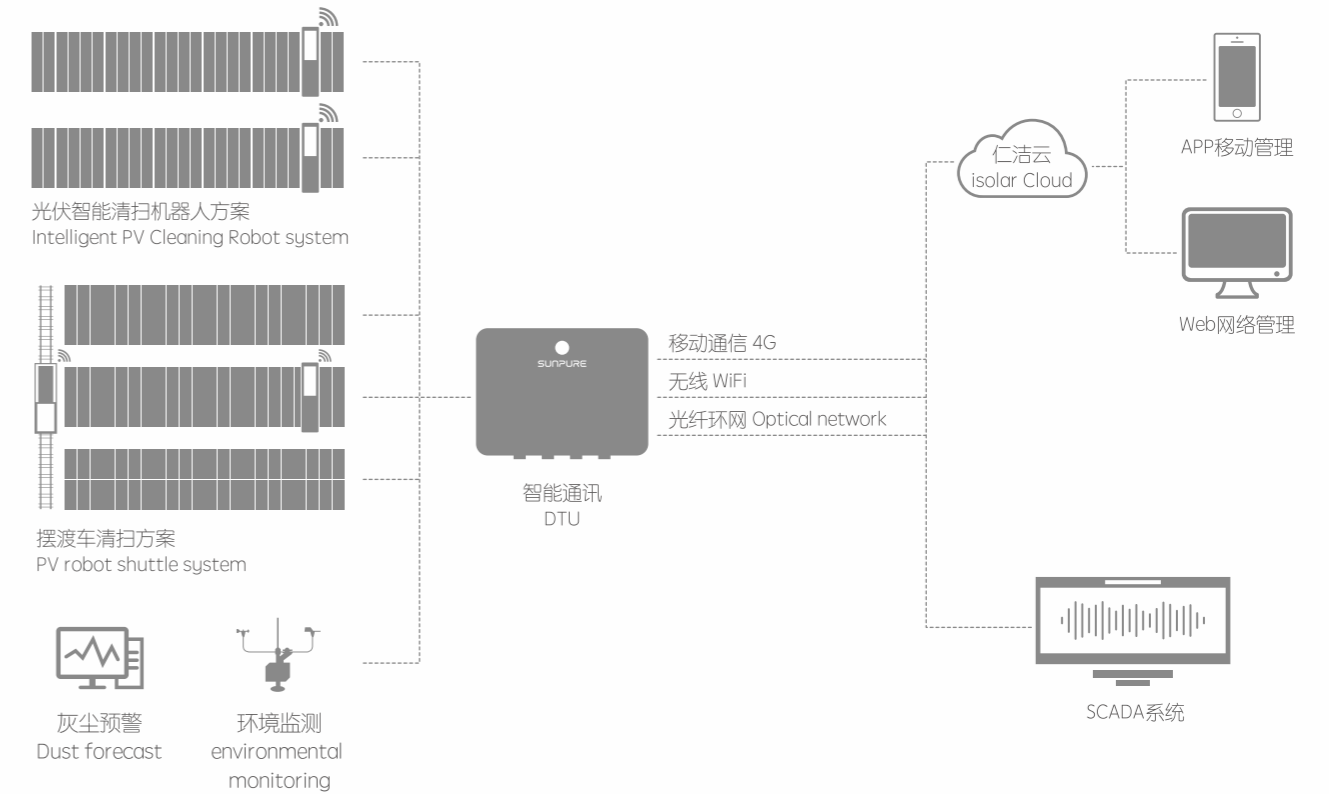


ISO 9001：2015版认证证书

ISO 9001：2018版认证证书

智能清扫解决方案 PV cleaning system

- 利用物联网技术对机器人进行实时管理和控制。
- 利用灰尘预警技术，结合气象信息和电站发电数据，实现智慧决策。
- Real time control and management of cleaning robot using IoT.
- Using dust early warning technology, combining meteorological information and power generation data to realize smart decision-making.



光伏智能清扫机器人 Intelligent PV cleaning robot



技术参数

Technical specifications of PV intelligent cleaning robot

适应能力	Adaptive Capability	
端面越障	Tolerance of module vertical offset	50mm (Customizable)
平面越障	Tolerance of module horizontal offset	50mm (Customizable)
爬坡能力	Tolerance of module gap	20°
组件倾角	Maximum climb angle	0-45°
通讯监控	Communication and monitoring	
网络制式	Interface	RS485, LoRa, LTE, 蓝牙 Bluetooth
数据协议	Protocol	ModBus
监控管理	Monitoring terminal	Web, Bluetooth, 4G
控制方式	Control mode	自动 Auto, 就地 Local, 远程 Remote
一般参数	General data	
供电方式	Power supply mode	自供电 Self powered
运行环境温度	Operating ambient temperature	-20℃ ~ 60℃
待机环境温度	Standby ambient temperature	-25℃ ~ 65℃
工作湿度	Allowable humidity range	0 ~ 95% 无冷凝 Non-condensing
安全运行风速	Safe operation wind speed	15m/s (七级风 10m, 3s gust)
最大耐受风速	Maximum withstand wind speed	55m/s (十六级风 10m, 3s gust)
清扫效率	Cleaning efficiency	99.5%
标准清扫频次	Standard cleaning frequency	1次/日 Once a day
防护等级	Ingress protection level	IP65
生命周期	Life cycle	25年 Years(Customizable)

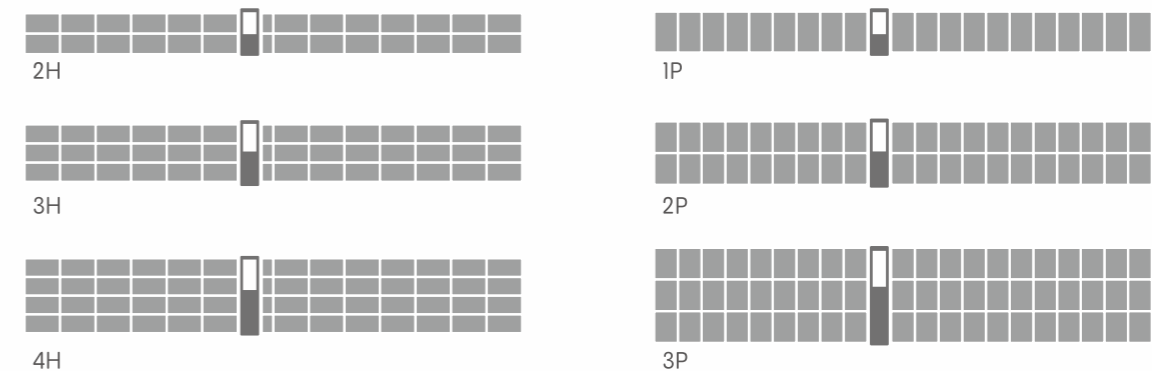


产品亮点 Product features

- 智能四驱 Intelligent four-wheel drive**
 四驱传动系统，具备超强的越障和爬坡能力，适用于复杂运行环境。
 The four-wheel drive system, with superb obstacle crossing and climbing ability, is ideal for complex operation terrain.
- 位置识别 Location identification**
 Web 及 APP 可视化界面，精准定位故障类型及位置，指导精准运维。
 Visual interface through multiple terminals accurately identifies the status of robots, ensures easy operation and maintenance.
- 智慧决策 Intelligent decision making**
 融合多平台数据，实时识别判断机器人状态，根据状态执行运行策略。
 Decision making through data integration from multiple platforms.
- 友好清扫 Friendly cleaning**
 0 用水、不伤组件，轻量化设计，20000 次清扫测试组件无损伤。
 Waterless cleaning, and harmless to solar modules, lightweight design, no damage to components after 20000 cleaning tests.
- 独立自供电 Independent self-power supply**
 24V 高性能自供电系统，无需从电站取电。
 24 V High Performance self-powered system, no need to take power from the power station.
- 多重安全防护 Multi-level safety protection**
 完善的故障检测及处理策略，配备运行防滑落机构及停机防风限位机构。
 Multiple fault detection and response strategy, equipped with anti-skid and windproof mechanism.
- 高防护防腐 High environment resistance level**
 防护等级 IP65，防水防尘密封性好，防腐等级 C4，适应恶劣场景，保障产品使用寿命。
 IP65 water and dust protection and C4 anticorrosion protection, designed for harsh operation environment.
- 便捷运维 Convenient operation and maintenance**
 高性能系统适应性强，模块化设计，降低故障率，易维护。
 High performance system, strong adaptability, modular design, low failure rate and easy maintenance.

应用场景 Main models

型号与组件排布形式 Model arrangement



摆渡车方案 PV robot shuttle system

适用于地势平坦，相邻多排单组串较短场景，摆渡车转运清扫机器人跨排移动，实现跨排清扫。

The PV robot shuttle system is able to transfer the PV robot from one longitudinal row to another. It ensures each robot to cover multiple rows and thus reduce the project CAPEX.



方案亮点 System features

- 跨排清扫，节省成本。
Cross row cleaning, cost saving.
- 数据互联，实时识别。
Data interconnection, real-time identification and positioning.
- 精准定位，往复定位精度±5mm。
Precised positioning, reciprocating positioning accuracy ± 5mm.
- 防腐设计，适应各类环境。
High corrosion resistance, suitable for all types of environments.
- 涡轮减速器，停机锁定，防止移位。
Worm gear reducer, locked to docking station while stationary.
- 独立自供电。
Independent self-power supply.

技术参数 Technical parameter

适应能力	Adaptability	
轨道最大斜度	Maximum rail slope	3°
运行速度	Operation speed	10m/min
单程运行	One path operation	1000m
通讯监控	Communication and monitoring	
网络制式	Interface	RS485, LoRa, LTE, 蓝牙 Bluetooth
数据协议	Protocol	ModBus
监控管理	Monitoring terminal	Web, Bluetooth, 4G
控制方式	Control mode	自动 Auto, 就地 Local, 远程 Remote
一般参数	General data	
供电方式	Power supply mode	自供电 Self powered
运行环境温度	Operating ambient temperature	-20℃ ~ 60℃
待机环境温度	Standby ambient temperature	-25℃ ~ 65℃
工作湿度	Allowable humidity range	0 ~ 95% 无冷凝 Non-condensing
安全运行风速	Safe operation wind speed	15m/s (七级风 10m, 3s gust)
最大耐受风速	Maximum withstand wind speed	55m/s (十六级风 10m, 3s gust)
清扫效率	Cleaning efficiency	99.5%
标准清扫频次	Standard cleaning frequency	1次 / 日 Once a day
防护等级	Ingress protection level	IP65
生命周期	Life cycle	25年 Years(Customizable)

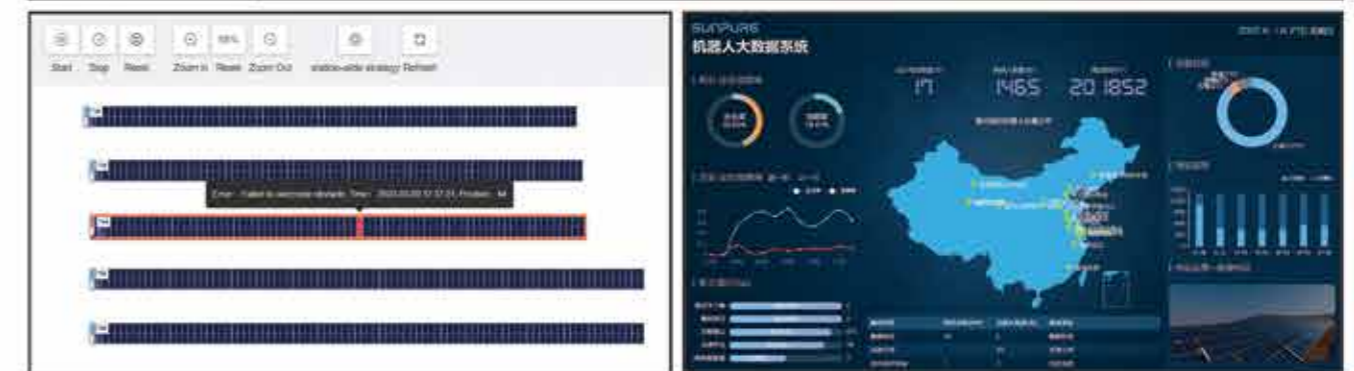
仁洁智能云平台 Robot management system

基于 iSolarCloud 终端应用，轻松实现移动运维，便捷高效。

Based on the terminal application of iSolar cloud, has achieved an more convenient and effective operation and maintenance method.

系统亮点 System features

- 实时监控 Real-time monitoring
- 远程控制 Remote control
- 位置识别 Position recognition
- 告警管理 Alarm management
- 任务策略 Task strategy
- 数据统计分析 Data analysis
- 部件更换策略 Component replacement strategy
- 第三方平台接入 Third-party platform integration



一体化服务 Professional integration services

我们深入了解客户的需求，竭力为客户提供全面而完善的售前、售中、售后服务。

We have a deep understanding of customers' needs and strive to provide customers with comprehensive and satisfactory project pre-sales, execution, and after-sales service.



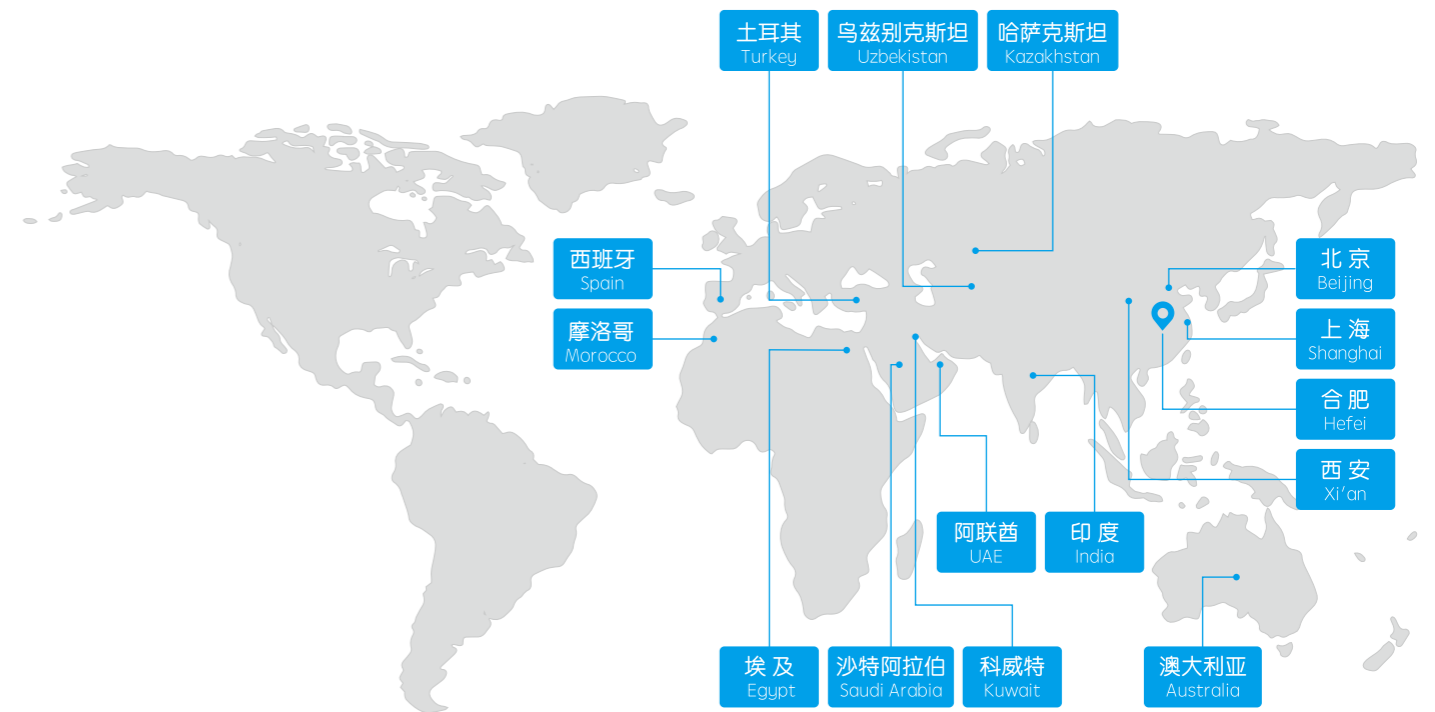
全球分布 Global distribution

国内：合肥、上海、北京、西安

海外：阿联酋、沙特、印度、澳大利亚、西班牙、埃及、摩洛哥、科威特、哈萨克斯坦、乌兹别克斯坦、土耳其

Domestic: Hefei, Shanghai, Beijing, Xi'an

Overseas: UAE, Saudi Arabia, India, Australia, Spain, Egypt, Morocco, Kuwait, Kazakhstan, Uzbekistan, Turkey



项目案例 Project cases

光伏智能清扫系统目前已实现多场景应用，适用于大型地面电站、渔光互补电站、丘陵电站及农光互补电站，现已配备多个大型电站，稳定性和清扫效果都得到客户的充分肯定。

Sunpure intelligent cleaning system has been successfully applied in multiple scenarios and has proven track record for large-scale ground power stations, fishing-light complementary power stations, hilly power stations and agricultural complementary power stations. It is now equipped with multiple large power stations, and its stability and cleaning effect have been fully affirmed by customers.



山地煤矿
Coal mining subsidence
山西交口84MW光伏发电项目
Jiaokou 84MW PV project



沙漠戈壁
Gobi Desert
新疆和田30MW光伏电站项目
Hetian 30MW PV project



渔光互补
Fisheries
江苏泗洪110MW光伏电站项目
Sihong 110MW PV project



安徽金阳100MW光伏电站项目
Jinyang 100MW PV project



农光互补
Agriculture
萧县宜光20MW农光互补光伏发电项目
Xiao county 20MW agricultural PV plant



分布式
Distributed
宿州海螺5.82MW屋顶电站
Suzhou 5.82MW distributed rooftop project



芜湖2MW光伏屋顶项目
Wuhu 2MW rooftop project



海外项目 Overseas projects 以色列屋顶项目 Rooftop project in Israel



海外项目 Overseas projects 印度光伏电站项目 PV project in India



海外项目 Overseas projects 伊拉克光伏电站项目 PV project in Iraq



海外项目 Overseas projects 哈萨克斯坦光伏电站项目 PV project in Kazakhstan

客户及合作伙伴 Customers and cooperative partners

