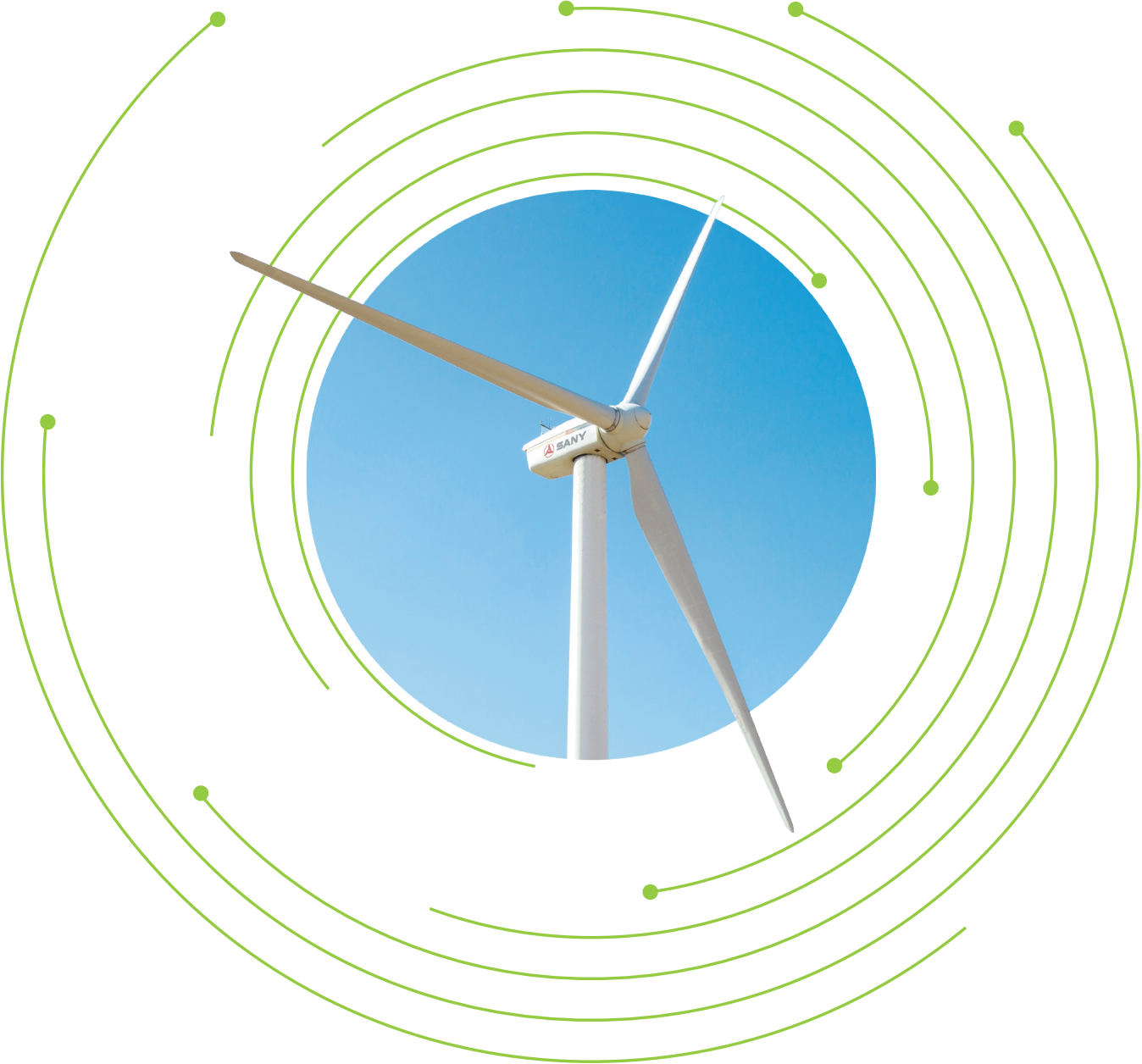


SANY RENEWABLE ENERGY





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SANY Renewable
Energy Website



SANY Renewable
Energy linkedin



SANY Renewable
Energy WeChat



01 Who We Are



About SANY Group

Founded in 1989, SANY Group has become a multi-national company that is pursuing the vision of “building first-class enterprises, fostering first-class talents, and making first-class contributions to society”. Since its establishment, SANY is striving to build a global brand and become an industry leading equipment manufacturer.

SANY's core businesses are design, manufacturing, sales, and support of heavy-duty engineering equipment, covering a full spectrum of products including concrete machinery (pump trucks, mixer trucks, trailer pumps, batching plants), earthmoving machinery (excavators, loaders), hoisting machinery (wheel cranes, crawler cranes, tower cranes), road machinery (soil compactors, motor graders, pavers), piling machinery (rotary drilling rigs), port machinery (container gantry cranes, mobile port machines), petroleum drilling machinery, mining machinery (mining trucks, roadheaders), wind harness system, prefabricated equipment and new photovoltaic power station.

Through the acquisition of Putzmeister, a leading German concrete machinery manufacturer, SANY concrete machinery has ranked No. 1 globally for 17 years consecutively. In earthmoving equipment, the sales revenue of SANY excavators exceeded 3 billion USD and continues to grow rapidly. SANY's mining machinery, piling machinery, hoisting machinery, port machinery and dump trucks all lead in export sales in China.

In 2022, SANY's overseas sales set a record-high, exceeding 6 billion USD. At the same time, SANY Heavy Industry was recognized as one of the “50 Smartest Companies” by MIT Technology Review. SANY Group was selected as the “Best Employer” by Forbes and was named one of the “Most Admired Chinese Companies” by Fortune for the twelfth consecutive year. In addition, Mr. Liang Wengen, Chairman of SANY Group, was listed as one of “China's 50 Most Influential Business Leaders” in 2022 by Fortune.

SANY Group operates 13 manufacturing complexes located in China, U.S.A., Germany, India, Brazil and Indonesia. Our sales and service network covers over 150 countries and regions. SANY Group has three listed companies: SANY Heavy Industry and SANY Renewable Energy, listed in Shanghai Stock Exchange, SANY International Development Ltd., listed in Hong Kong Stock Exchange.

Sticking to our mission “Quality Changes the World”, SANY invests about 5% of its annual revenue on R&D. In terms of technology development, SANY has applied for a total of 13,694 patents, in which 10,613 has been awarded. There are three state post-doc research hubs, two national enterprise technical centers, and one state-approved testing center in SANY.

Vision

Build a first-class enterprise
Foster first-class talents
Make first-class contributions

Mission

Quality changes the world





About SANY Renewable Energy

As a member company of SANY Group, SANY Renewable Energy was founded in 2008 and is committed to becoming the global leader in the field of clean energy equipment supply and services. SANY Renewable Energy's market share has increased significantly and was ranked among the TOP 10 global wind power manufacturers in 2022. The main business of SANY Renewable Energy includes:

- * Wind turbine R&D, manufacturing and sales
- * Wind farm design, construction, operation & management

By integrating the world's top research and technology resources, SANY Renewable Energy continues to create wind turbine products with competitive advantages, and has the ability to independently design, construct and operate wind farms. SANY has developed comprehensive wind energy solutions including digital top-level designs, intelligent production and manufacturing, complete integration systems, core components manufacturing, wind farm design, EPC, wind farm operation and maintenance.



02 Global Footprint



Based in China and Expanding to World Markets

SANY Renewable Energy has production bases for blades in: Zhangjiakou in Hebei Province, Tongyu in Jilin Province and Shaoshan in Hunan Province. SANY has established its R&D center in Spain and is one of the pioneers in promoting China's wind power technology to the global market.

With the first 102 units wind turbines exported to Ethiopia in

2013, SANY Renewable Energy has started business in over 20 countries, including Germany, America, India, Vietnam and China. There is a huge focus on the countries that rely on the layout of SANY's overseas system of globalization, such as India, Vietnam, Uzbekistan and etc.



Key Facts and Figures



13 GW

Installed Capacity Globally



2.X-8.X MW

Coverage



68 - 104 m

Blade Length



3,600 Sets

Annual Production Capacity



500+

Professional R&D Personnel



566

Patents



30

Production Lines

03 Development History

2008

The first SE7015 (1.5MW) Wind Turbine was successfully rolled off the assembly line in Shanghai, indicating that SANY can independently develop and manufacture high power-rating wind turbine generator.

2010

SANY Wind Turbines were exported to the United States for the first time which brought the first step in global market.

3 SANY Renewable Energy Industrial Parks in Nankou, Tongyu and Zhangjiakou were completed and put into production, further improved production capacity of assembly line.

2012

SANY won a lawsuit against Obama and CFIUS for being blocked from investing in wind power projects in the United States.

2017

SANY Renewable Energy released the 905 ultra-low wind speed turbine, adopting a new structure, new control strategy, and new drive train to provide customers with smart wind turbines with high reliability and low electricity cost.

SANY Renewable Energy Europe Research Institute was established in Pamplona, Spain.

2019

SANY Renewable Energy's hot-selling model SE14125 with new generation ultra-low wind speed prototype was installed in Donghutang Wind Farm.

2021

The 5MW onshore Wind Turbine of SANY Renewable Energy obtained the certification issued by DNV, the international authoritative certification institution.

The first Wind Turbine of SANY Renewable Energy Tongyu Intelligent Manufacturing Base officially rolled off the assembly line, becoming the first domestic manufacturer of complete machines with all "turbines + blades" in Jilin.

2009

The first SE9320 (2.0MW) onshore Wind Turbine was rolled off the assembly line.

2011

SANY built the first Wind Power Project in a turnkey model for the customer Tongmei Group.

2014

Ten innovative technologies for wind turbines and large components were launched in the field of research and development.

2018

SANY Renewable Energy successfully produced 908 model WTG in Beijing Nankou Industrial Park.

SANY Renewable Energy 71m Wind Power Blades were successfully rolled off the assembly line in Zhangjiakou, Hebei. The blade was the longest onshore 3.XMW low-wind speed one in the world, and it also marked the official entry of China's onshore low-wind speed Wind Turbine blade into the "70 meters era".

2020

SANY obtained the ISO9001 quality system certification for Indian wind power, becoming the second Chinese-funded enterprise approved for Wind Turbine production in India.

SANY Renewable Energy created a miracle in the industry that a single production line "produces 800 Wind Turbines in 100 days".

The largest onshore 5MW Wind Turbine unit with the mounted transformer in China completed the prototype installation and grid-connection.

2022

On June 22nd, SANY Renewable Energy (stock code:688349) was officially listed and traded on STAR Market of Shanghai Stock Exchange with closing market value of 718 billion USD.

SANY Renewable Energy launched its 7.X platform wind turbine on the market marks that China's onshore wind power industry has officially entered the "7.XMW era".



04 Product Portfolio



3.X MW - 8.X MW Platform

SANY Renewable Energy mainly focuses on onshore wind turbines, fully covering onshore wind products ranging from the 3.X MW to 8.X MW. The company's wind turbine product design is characterized by "higher, larger, longer, lighter, and smarter"; namely: high tower, high power, long blades, light-weight, and intelligent control. Our customized offering meets the needs of different customers and enables the wind farms to achieve profitable return on different wind resource conditions.

SANY Renewable Energy adopts differentiated designs for its products according to different geographical and climatic conditions. Based on different environmental conditions, onshore wind turbines series has been developed for high, medium and low wind speeds, for high altitudes, normal and low even freezing temperature environments.

Currently, we have received many orders for 5.X MW model, and have won the bids with 6.X MW model for many large capacity projects. SANY Renewable Energy also has the biggest market share in wind turbine products of 6.X MW and above.



3.X MW - 4.X MW platform wind turbine

3. X MW - 4.X MW platform wind turbine products are suitable for both medium/high wind speed in China northern areas and low wind speed in middle southeast areas. The power covers 3.0 MW - 4.05 MW. The diameter of the rotor can reach 171 meters, and the height of the hub can reach 140 meters.



4.X MW - 8.X MW platform wind turbine

4. X MW - 8.X MW platform wind turbine products focus on the mid-to-high wind speed of the affordable market, with power covering 4.2 MW - 8.X MW, while the diameter of the rotor can reach 172 meters, and the height of the hub can reach 140 meters.



High Reliability

Optimized product design, mature and reliable supply chain, and certificates from third-parties.



High Cost Effectiveness

Advanced control strategy is used to reduce the foundation load and weight of the tower, which helps achieve lower LCOE.



High Energy Production

Larger rotors can capture more wind, which, combining with smart wind farm and control technology, make the power production highly improved.



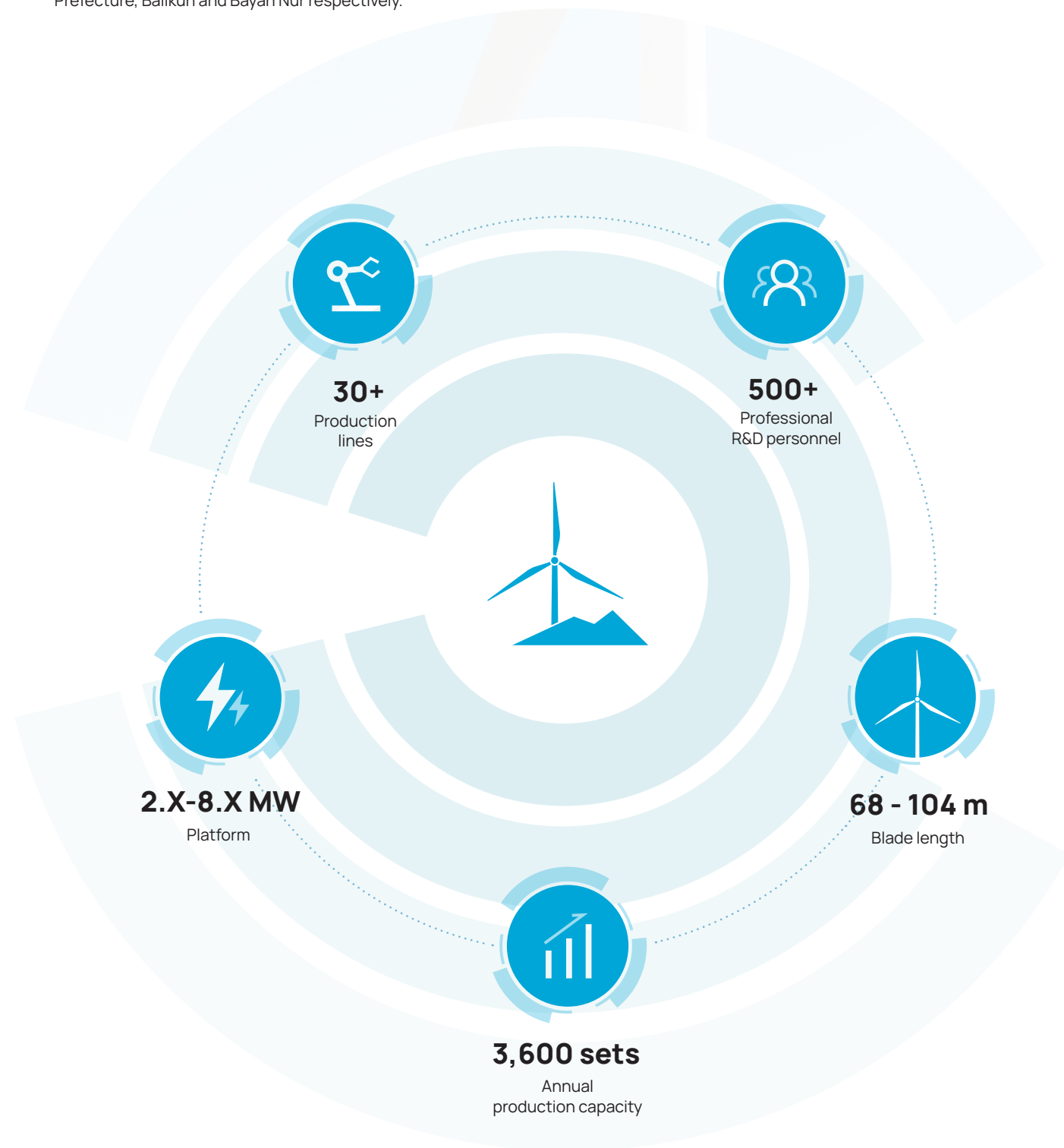
Wide Applicability

Through advanced modularity and platform design, SANY aims to meet customization requirement from low to high wind speed circumstance.



SANY Renewable Energy - Wind Turbine Blades

SANY Renewable Energy has the ability to independently develop and manufacture turbine blades. It has six blade production factories in Zhangjiakou, Tongyu, Shaoshan, Tarbagatay Prefecture, Balikun and Bayan Nur respectively.



Intelligence Leads the Future

Product Features

- 1 The shape-and-structure integrated coupling design enables optimal matching of blades and wind turbine.
- 2 Reduced blade-root size and integrated iteration of blade interface to the hub can effectively lighten the blades.
- 3 Comprehensive inspection and testing procedures for raw materials, components and full-size blades ensures safety and reliability.
- 4 The Family development platform and its strong expansibility enable product customization and rapid design.
- 5 Global development teams and partners collaborate to realize reliable and light-weight design.





Advanced Product Design

The product adopts advanced digital R&D platform and modular design, applying the latest technology to realize first-class output performance of wind turbine.



Upgraded Structure Design

The product has a super dual-circuit cooling system and super strong ability to discharge carbon powder.



Innovative Material

The product adopts leading H-grade less glue epoxy solvent-free insulation system and anti-corona technology.



Stable Process

The product adopts advanced automation technology and refined process control to ensure product consistency.



Generator

Beijing SANY Intelligent Motor Co., Ltd. ("SANY Generator"), a subsidiary of SANY Renewable Energy, has been deeply engaged in the field of doubly-fed induction generators for over ten years. It specializes in R&D, manufacturing and after-sales service for doubly-fed induction generators.

SANY Generator focuses on technological innovation, introduction and training of team members, and has established a first-class R&D team in the industry. Digital project management platforms and simulation technology are applied to develop generators with high reliability and high performance, creating value for the customers.

SANY Generator owns leading automated production equipment in the industry, including robot strapping machinery, automatic rotor bar forming machinery, imported expanding machinery and imported dynamic balance machinery, with an annual production capacity of 3,600 units.

1 Smart Wind Farms

Through continuous transformation and upgrading, SANY Renewable Energy has developed Smart Wind Farms with an innovative, integrated and interactive smart operation mode. With the online to offline, cloud station, intercommunication and mutual trust mode, Sany Smart Wind Farms have realized a leap-forward development in the field of renewable energy.

2 Wind Farm Monitoring Systems

SCADA (Supervisory Control And Data Acquisition)
 PHM (Prognostics and Health Management)
 RDC (Renewable Data Center)
 SWAPP (Smart Wind Farm Mobile Terminal)
 CMS (Condition Monitoring System)
 DOM (Document Object Model)
 MO (Mobile Operation APP)



Supervisory Control
And Data Acquisition



Prognostics and
Health Management



Condition
Monitoring System



Mobile Operation APP



Document Object Model



Centralized Control
Management

3 Wind Turbine Predictive Maintenance

Intelligent operation and maintenance
 WTG life prediction
 Key component failure warning
 WTG safety guard
 Energy production performance improvement

4 Cases

SANY Smart Wind Farm serves 117 customers in 20 provinces in China currently:
 Providing smart monitoring services for 117 stations
 Providing fault diagnosis services for 51 stations
 Providing online monitoring service of transmission chain for 95 stations
 Providing mobile operation and maintenance business support for 12 stations

05 Operation and Maintenance



Digital Maintenance



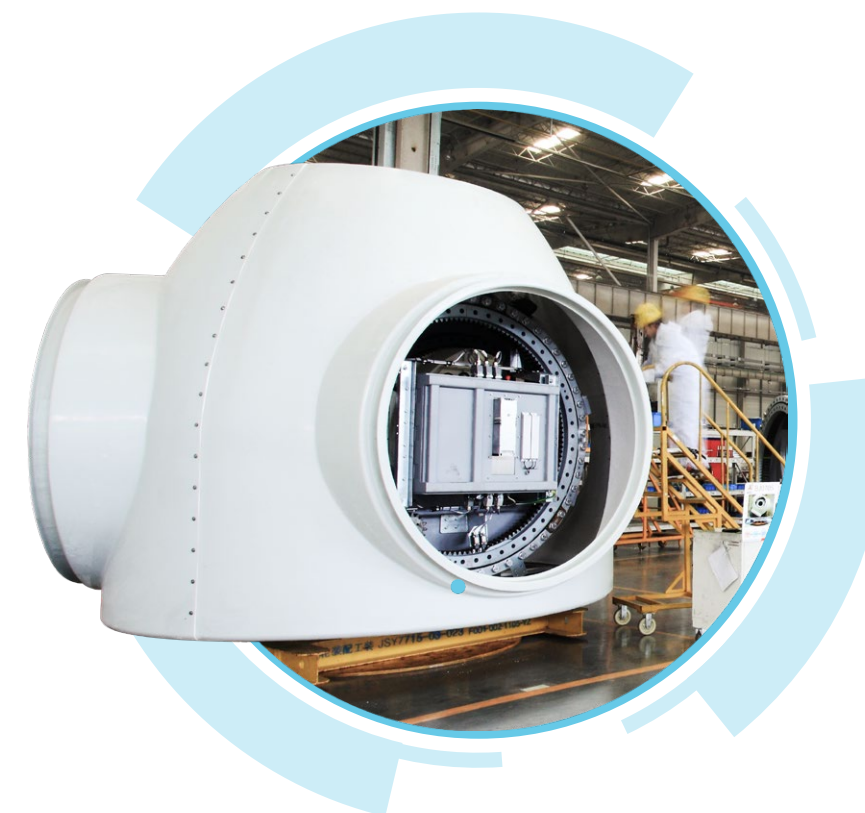
WTG Safety Guard

On-site safety issues are strictly guarded to ensure the safe and stable operation of WTGs.



Operation and Maintenance Support

On-site problems, difficulties and pain points are quickly located by experts, and the perfect working mechanism promotes the rapid correction of on-site problems.



Wind Farm Quality Supervision

Standardize the operation and maintenance process with the help of digital methods to ensure strict quality control of key control points such as on-site hoisting, spot installation and commissioning.



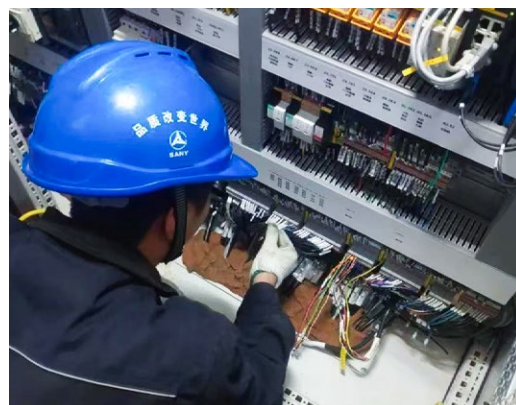
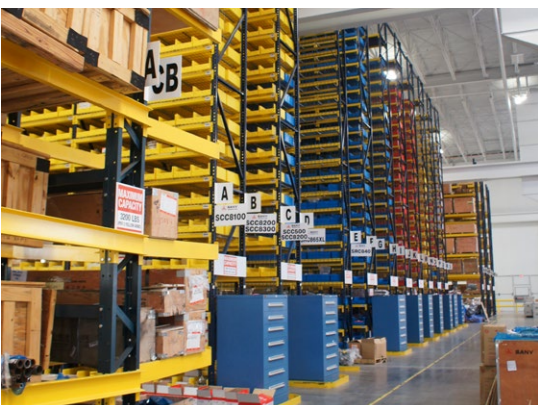
Aftersales Market Reservation

Use efficient operation and maintenance tools and technical means to grasp long-term market development trends.

Operation and maintenance services are one of the essential businesses of SANY Renewable Energy. The main services are as follows:

1 Warranty for Spare Parts

We have one central warehouse, 100 spare parts warehouses, 500 professional service engineers and 80 million spare parts for regular operation and maintenance. Our service outlets in various provinces and cities across the country provide 2,000 types of common factory-made spare parts for wind turbines with ultra-low-cost parts and warranty services for repair, replacement and refunds.



2 Turbine Technology Upgrades

Technology upgrades

Aiming to improve the reliability of wind turbines and energy production, SANY Renewable Energy provides professional services, which include replacing large components and upgrading control systems, converters and pitch.

Localization

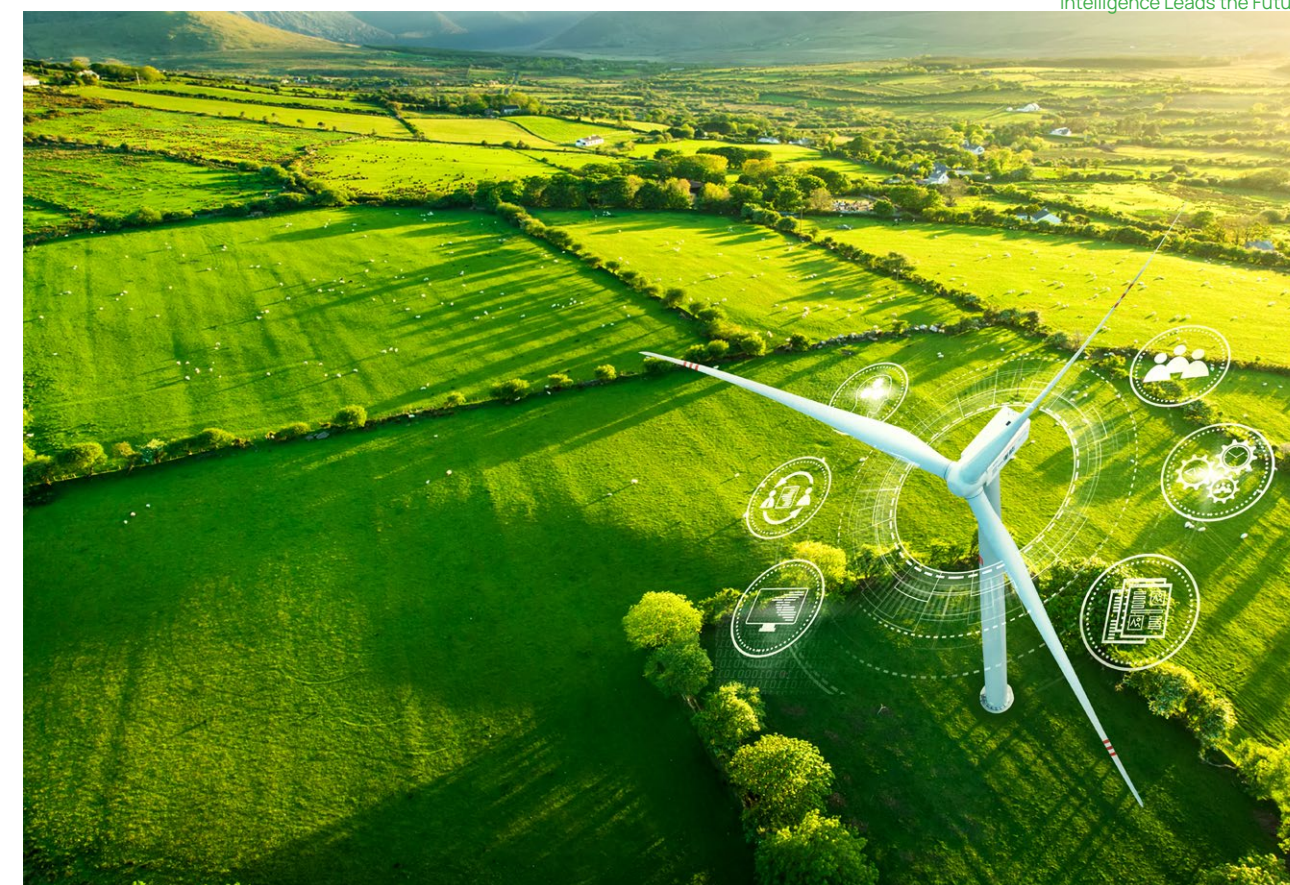
According to the requirements of local power grids, we adopt domestic software and hardware in our monitoring systems and energy management platforms. SANY Renewable Energy provides professional services, which include replacing large components and upgrading control systems, converters and pitch.



3 Digital Wind Farm System

The intelligent monitoring system provides 24/7 monitoring of the entire wind farm. Relying on big data and intelligent functions, it can perform online real-time analyses and predictions of operational data. Through the continual data screening, problematic turbines can be identified and improved. The cycle of monitoring, analysis and prediction techniques can be used to improve the operation of the wind turbines continuously.

Intelligence Leads the Future



4 Wind Turbine Operation Maintenance & Safety Testing

Wind Turbine Operation and Maintenance

SANY Renewable Energy performs operation and maintenance work for customers. We can address the customer's pain point and realize a favorable ecological operation and maintenance environment by employing a strong R&D team and a complete supplier system.

Turbine Performance Testing

We develop effective testing solutions for key items of concern and core components during operation. These solutions can detect aerodynamic balance, gearbox, super capacitor and safety functions to promote safe, long-term turbine operation.

5 Blade Repair

SANY Renewable Energy has three blade production lighthouse factories in Zhangjiakou, Shaoshan and Tongyu, 6 fixed maintenance points across the country, 50 professional generator blade maintenance engineers, 10 sets of professional maintenance tools, and SANY offers a 24-hour response, providing one-stop service in blade inspection, diagnosis and repair.

06 Social Responsibility

Peak Carbon Dioxide Emission and Carbon Neutrality

To build a new power system based on new energy.
Our contribution to carbon neutrality and it will keep improving:



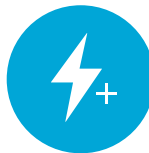
3,364,837 /Ton

Energy Conservation and Carbon Dioxide Emission Reduction



1,566,358 /Ton

Standard Coal Saving



3,372,113 /MWh

Accumulated Electrical Power

The Dream of Net Zero

Green Dream, Net Zero Future

SANY Renewable Energy is committed to "promoting the efficient use of clean energy ", protecting the lucid waters and lush mountains with clean energy, and building a "Net Zero Dream" with green manufacturing.

"Peak carbon dioxide emission and carbon neutrality" is leading a broad energy revolution and industrial transformation in China. An energy and power system with renewable energy as the main body will be established.

The transformation of renewable energy and the "carbon neutrality" reform are reshaping the new pattern of global energy and industry. SANY Renewable Energy will unswervingly develop clean energy, actively contribute to the realization of the "dual carbon" goal, and contribute its wisdom and strength to a Net Zero future!

07 Wind Projects

Shandong Yangxin Wind Farm, Binzhou, China

Capacity	48 MW
Developer	SANY Renewable Energy
Turbine Type	SE-11520
O&M	SANY Renewable Energy



Ethiopia Adama Phase II,
Adama, Ethiopia

Capacity	153 MW
Developer	SANY Renewable Energy
Turbine Type	SE-7715
O&M	SANY Renewable Energy



**Jiangxi Leigongshan Wind Farm,
Ganzhou, China**

Capacity	70 MW
Developer	SANY Renewable Energy
Turbine Type	SE-11520, SE-12120, SE-13125
O&M	SANY Renewable Energy





Hunan Ningxiang Donghutang
Wind Farm, Changsha, China

Capacity	50 MW
Developer	SANY Renewable Energy
Turbine Type	SE-13122, SE-13625, SE-14125
O&M	SANY Renewable Energy



Hunan Longshan Wind Farm, Jishou, China

Capacity	50 MW
Developer	SANY Renewable Energy
Turbine Type	SE-11520
O&M	SANY Renewable Energy





Qinghai UHV Base, Haixi State, China

Capacity	650 MW
Developer	SANY Renewable Energy
Turbine Type	SE-14125
O&M	SANY Renewable Energy





CGNPC Jilin Tongyu C Wind Farm, Baicheng, China

Capacity	50 MW
Developer	SANY Renewable Energy
Turbine Type	SE-14125
O&M	SANY Renewable Energy





Three Gorges Nuomuhong Project, Haixi State, China

Capacity	50 MW
Developer	SANY Renewable Energy
Turbine Type	SE-14125
O&M	SANY Renewable Energy





**Henan Yanjin Wind Farm,
Henan, China**

Capacity	70 MW
Developer	SANY Renewable Energy
Turbine Type	SE-14630, SE-14632
O&M	SANY Renewable Energy



**Inner Mongolia Linxi Wind
Farm, Chifeng, China**

Capacity	22 MW
Developer	SANY Renewable Energy
Turbine Type	SE-10020
O&M	SANY Renewable Energy



The Seventh Wind Farm of
Guazhou North Bridge, Gansu,
China

Capacity	200 MW
Developer	SDIC Power Holdings Co., Ltd.
Turbine Type	SI-172625
O&M	SANY Renewable Energy

Huaneng Hujiawan Wind Farm, Zhongxiang, China

Capacity	150 MW
Developer	SANY Renewable Energy
Turbine Type	SE-11520
O&M	SANY Renewable Energy



**Hunan Ningxiang Shenxianling
Wind Farm, Changsha, China**

Capacity	50 MW
Developer	SANY Renewable Energy
Turbine Type	SE-11520
O&M	SANY Renewable Energy

