智 造 创 领 未 来
Intelligence Leads the Future

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SANY RENEWABLE ENERGY

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CONTENTS

PART ONE

INTRODUCTION

About Sany Group

Founded in year 1989, Sany's main business is equipment manufacturing, covering a full range of products including concrete machinery, excavating machinery,hoisting machinery, road construction machinery, piling machinery, wind turbine,port machinery, petroleum equipment, coal equipment, precision machine tools,etc. At present, Sany's excavating machinery, piling machinery, crawler cranes,mobile port machinery, road machinery, coal tunneling machinery, and concrete machinery are all at the world's top level.

Sany Heavy Industry (SH, 600031), the core enterprise of Sany, was listed on July 3, 2003. It is the first enterprise in China to successfully carry out the reform of non-tradable shares and realize full circulation. In July 2011, Sany Heavy Industry was listed in the FT Global Top 500 by market capitalization, which is the only Chinese construction machinery enterprise on the list. Through Sany Heavy Industry, Sany also holds a controlling stake in Putzmeister, the world's first con-crete machinery brand from Germany. In addition, Sany International (HK, 00631) is another listed company of Sany.

Based on the main business of equipment manufacturing, Sany is vigorously developing new businesses in renewable energy, housing industrialization, indus-trial Internet, and environmental protection. At present, Sany has become a mature supplier of industrial equipment for PC construction in China, and its sub-sidiary Sany Renewable Energy has also became domestic provider of comprehensive wind power solutions and renewable clean energy. In addition, its “Root Cloud" platform has become one of the three major industrial Internet platforms in China. In 2020, Sany’ s terminal sales exceeded 130 billion yuan, ushering in a new devel-opment milestone.

To build first-class enterprise

To foster first-class employees

To make first-class contributions

Sany Renewable Energy

Sany Renewable Energy Co.,Ltd (Sany Renewable Energy) was founded in year 2008, the company 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 ranked among the TOP10 global wind power manufacturers in year 2020 (data source: BNEF).

The main business of Sany Renewable Energy includes the R&D, manufacturing and sales of wind turbines, wind farm designing, construction, operation & management, the construction and operation management of photovoltaic power stations. 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 the comprehensive wind energy solutions including digital top-level design, intelligent production and manufacturing, complete integration system, core components manufacturing, wind farm designing, EPC, wind farm operation and maintenance.

Adhering to the concept of "Intelligence Leads the Future" and the vision of " Promote the Efficient Use of Clean Energy ", Sany Renewable Energy is committed to building "Sany Heavy Industry" in the wind power industry, contributing to the realization of "Peak carbon dioxide emission & carbon neutrality" in China and the clean energy transformation in the world .

Vision Promote the efficient use of clean energy

Mission Quality changes the world, Intelligence Leads the Future

PART TWO

INNOVATION

Technology Strength

In recent years, Sany Renewable Energy has continued to increase its investment in technology research and development, and continued to introduce world-class technical talents, therefore its technical strength has been significantly improved. The technology is in the leading position in the industry in terms of **high power and smart wind turbine, transformer assembled in the nacelle, smart operation and maintenance, and long blades.**

A total of 370 patents

112 Invention patents

69 Software copyrights

Industry development, standards first

Sany Renewable Energy actively participates in the formulation of industry standards and jointly leads the high-quality development of China's wind power industry. By the end of year 2020, Sany Renewable Energy had obtained 370 patents, including 112 invention patents; and obtained 69 software copyrights.

R&D Strength

R&D is the core competitive advantage of Sany Renewable Energy. Sany Renewbale Energy has established the first supercomputer center in China's wind power industry, and has wind power R&D institutions in Beijing and Changsha, and established a European research institute in Spain. It brings together the world's top wind power experts, focuses on the cutting-edge technology of the industry, and builds global technology R&D system.

Sany Renewable Energy is able to integrate global R&D platform resources, use cross-border thinking, and establish multiple industry-first test platforms. Grasping the technological trend of “high, large, long, light and smart” , and pursuing product research and development goals with “high reliability, high power generation, and low LCOE” , Sany Renewable Energy has created a variety of industry-competitive wind turbine products. In addition, Sany Renewable Energy has got remarkable achievements in intelligent control of wind turbines, independent pitch, ultra-high towers, and wisdom wind farms.

High Reliability

High Power Generation

Low LCoE

PART THREE

MANUFACTURE

Under the background of the new round of technological revolution and industrial transformation, intelligent manufacturing characterized by automation, digitization, networking, and intelligence has become a future development trend. Combining its own development strategy and business needs, Sany Renewable Energy has actively implemented digital transformation and upgrading, introduced advanced concepts such as artificial intelligence, Internet of Things, cloud data, cloud computing, and comprehensively applied a new generation of intelligent manufacturing technology to create an intelligent manufacturing "Becaon Factory" integrating digitization, automation, integration, lean and visualization in Sany Renewable Energy Bei- jing Nankou Intelligent Manufacturing Base.

Smart Factory

The first domestic pulse & flexible assembly line for wind power is built in the intelligent manufacturing base, equipped with advanced automation equipment such as industrial robots, the "IT+OT" industrial Internet model is adopted, and the construction of an integrated platform for production, sales and inventory centered on manufacturing operations management (MOM) is completed. It realized online management of marketing, materials, and quality, established a full-cycle digital management and control model from planned orders to product delivery, and improved corporate data sharing and lean management capabilities.

On the basis of automated production lines and digital management, Sany Renewable Energy can complete the construction of a big data operation platform through in-depth system integration, data mining and data analysis, and build a "smart brain" to realize the refined display and early warning analysis of various index data such as production, marketing, service, etc., and have the intelligent decision-making ability based on industrial big data, which comprehensively enhances the productivi-ty and competitiveness of enterprise.

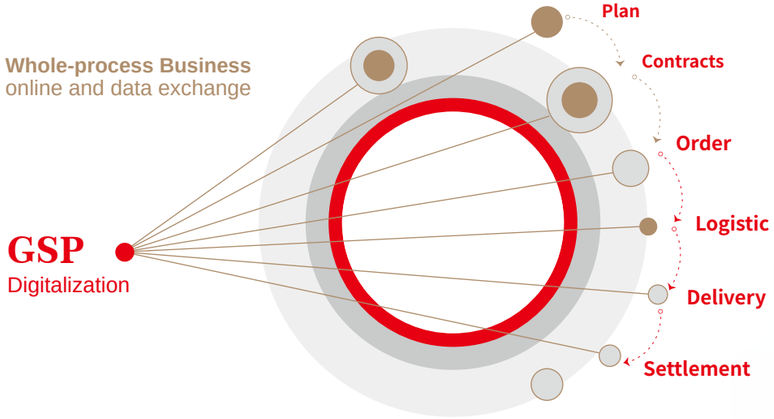
The intelligent manufacturing base can produce wind turbines including 2.X MW, 3.X MW, 4.X MW, 5.X MW, 6.X MW and other wind turbines with high rated power capacity. Benefiting from the pulse flexible assembly line, it created the miracle of “800 wind turbines in 100 days” for a single production line, and the 100% product delivery goal was completed under the background of industry rush installation.

Smart Supply Chain

Guarantee of High-quality supply chain is an important premise for intelligent manufacturing

Sany Renewable Energy focuses on building a smart supply chain control system to provide a guarantee for building a high-quality supply chain.

A The “Digitalization” of Sany Renewable Energy’ s GSP can realize the whole-process business online and data exchange from “plan-contract-order” to “logistics-delivery-settlement”



B Intelligent supply chain control tower connects all platforms and participants in the supply chain ecology, realizing end-to-end real-time visualization;

C Develop a 5-dimensional digital evaluation model, continue to empower partners, and work together to create high-quality wind power products, and ultimately achieve mutual benefit and win-win for global value partners

At present, the important components of Sany Renewable Energy products are selected from the industry's "first echelon" high-quality brands. Sany Renewbale Energy is an important partner of international first-class suppliers such as SKF, Schaeffler, Winergy, and ZF,etc., and at the same time integrates the best domestic supply chain resources to create high-quality wind power products.

Suppliers

ZF · winergy · SKF · SCHAEFFLER AUTOMOTIVE AFTERMARKET · 禾望电气 Hopewind · LYC 洛轴 · 通裕重工 TONGYU HEAVY INDUSTRIES · 国能信控 CHN ENERGY I&C（原华电天仁）

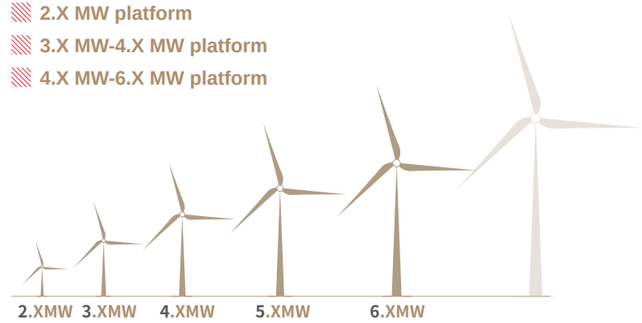
PART FOUR
PRODUCTS

Intelligent Wind Turbines

Sany Renewable Energy' s main wind turbine products are onshore wind turbines, with R&D and production capabilities for the full range of units from 2.X MW to 6.X MW, basically achieving full power coverage of onshore wind. The company's wind turbine product design is characterized by "high, large, long, light, and smart" namely, high tower, high power, long blades, light-weight, and intelligent control. Customized wind turbines are mainstream products to meet the needs of different customers and the objective wind resource conditions.

According to different geographical and climatic conditions, Sany Renewable Energy has differentiated designs for its products. Based on different environmental features, the series of onshore wind turbines are developed for sites with high, medium and low wind speed, freezing, high altitude, and normal low temperature.

- 2.X MW platform
- 3.X MW-4.X MW platform
- 4.X MW-6.X MW platform



At present, multiple contract signings have been achieved for 4.XMW, and tender is awarded with 5.XMW products for large base projects. Sany Renewable Energy has become the manufacturer who has the highest market share in wind turbine products of 5MW and above

The core products of Sany Renewable Energy:

3.XMW~4.XMW platform

3.XMW~4.XMW wind turbines are suitable for medium to high wind sites in North, Northeast and North-west China, and for the low wind sites in Mid, East, and South China, with power rating from 3.0MW to 4.05MW, with rotor diameter till 171 m, and hub height till 140 m.

- Double-fed technology is applied for 3.XMW~4.XMW
- Rigorous product design and third-party certification, as well as mature and reliable supply chain, make the units highly reliable
- Longer blades are applied to capture more wind energy, and combined with control technology of smart wind farm and smart wind turbine, the increased energy production is achieved.
- Adopt advanced control strategy, reduce foundation loads, reduce tower weight, and achieve the goal of low LCOE
- With platform-based design and modular configuration of each component, the wind turbines can be widely installed not only in the market in medium to high wind sites in North, Northeast and Northwest China, but also in low wind sites in central, East, and South.

• 3.XMW~4.XMW wind turbines have the following features compared with similar ones:

Lighter Weight

The weight indicators of 3.XMW~4.XMW products are ahead of domestic competitors. For example, the weight of the nacelle of 3.0MW is about 98 tons, whereas it is basically more than 100 tons among the other domestic lightest models of the same level. Light weight can greatly save costs for lifting and crane rental.

Less Vibration

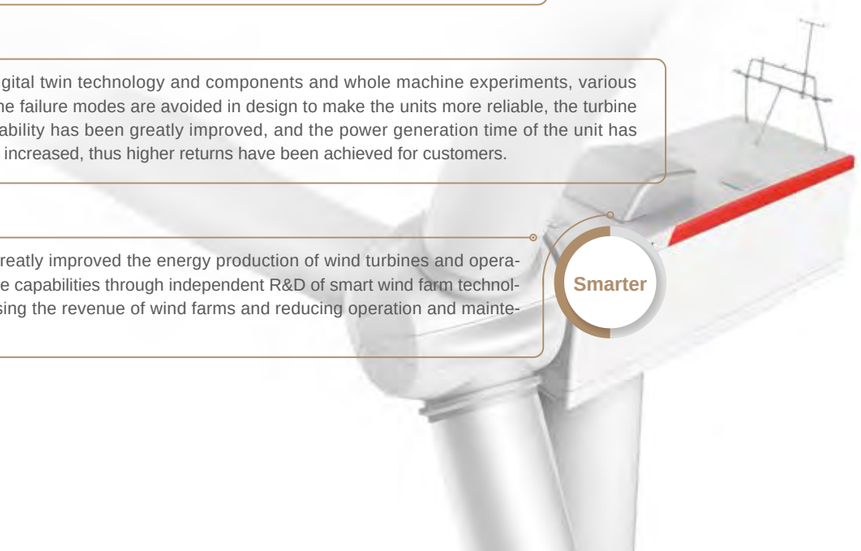
The measured vibration index of the 140m tower designed by Sany Renewable Energy is at the leading domestic level and has been recognized by an authoritative certification body, providing guarantee for the safety of the unit.

Safer

By digital twin technology and components and whole machine experiments, various turbine failure modes are avoided in design to make the units more reliable, the turbine availability has been greatly improved, and the power generation time of the unit has been increased, thus higher returns have been achieved for customers.

Smarter

The company has greatly improved the energy production of wind turbines and operation and maintenance capabilities through independent R&D of smart wind farm technology; thereby increasing the revenue of wind farms and reducing operation and maintenance costs.



4.XMW~6.X MW platform

4. XMW~6.XMW products are designed for middle to high wind sites, with power rating from 4.2MW to 6.XMW, with rotor diameter till 172 m, and hub height till 140m.

- Double-fed technology is applied for 4.XMW~6.X MW platform
- Rigorous product design and third-party certification, as well as mature and reliable supply chain, make the units highly reliable.
- Sany Renewable Energy is the first OEM to assemble the transformer on the nacelle platform in China, effectively reducing the cost of wind farms; Longer blades are applied to capture more wind energy, and combined with control technology of smart wind farm and smart wind turbine, energy production can be significantly increased;
- Advanced control strategies are adopted to lower foundation loads, tower weight, and LCOE.
- With platform-based design and modular configuration of each component, the wind turbines can be widely installed.

• 4.XMW~6.XMW wind turbines have the following features compared with similar ones:

Lighter Weight

With ultra-low load design technology and digital self-optimizing iterative design technology, the load of the wind turbine, together with the weight, is effectively reduced. The weight indicators of the whole series of 4.XMW~6.XMW are ahead of domestic competitors. Modular design can split transportation and lifting, which can greatly save costs for lifting and crane rental.

Economical

Transformer assembled in the nacelle helps to save the cost of cables from box to converter, ground construction of box-transformer is not required. The technology of nacelle-fixed transformer enables cost reduction of land acquisition and land use, effectively help to lower elec-trical losses, shorten construction maintenance period, and reduces wind farm cost.

Safer

By digital twin technology and component and whole machine experiments, various failure modes are avoided in design, and mature supporting chain is used to improve the test and verification system of components, subsystems, and the whole machine, which enables high reliability of the units, turbine availability improvement and hence higher revenue for customers.

Smarter

The company has greatly improved the energy production of wind turbines and operation and maintenance capabilities through independent R&D of smart wind farm technology; thereby increasing the revenue of wind farms and reducing operation and maintenance costs

Wind Turbine Blades

Sany Renewable Energy has the ability to independently develop and manufacture turbine blades.

It has three blade production factories in Zhangjiakou, Hebei, Tongyu, Jilin, and Shaoshan, Hunan, respectively;

18 production lines;

More than 500 professional R&D staff;

Covering 3.XMW-6.XMW platform;

The blade length ranges from 68.5m to 84 m;

Annual production capacity of 3,000 sets.

Features of the blades:

01. With shape and structure integrated coupling design, blades are closely integrated with the whole machine to achieve optimal matching.

02. Family development platform and its strong expansibility enable product customization and rapid design.

03. Reliable and lightweight product design is achieved by international design and development team and partners.

04. The total weight of the blade and the whole machine is designed to be the lightest by dimensional design of small pitch cercle blade root and integrated iteration of blade interface and the whole machinery.

05. Complete inspection and testing system for raw materials, components and full-size blades ensures safety and reliability.

Intelligent Wind-driven Generator

Beijing Sany Intelligent Motor Co., Ltd.(“Sany Generator”),a subsidiary of Sany Renewable Energy, has been deeply engaged in the field of double-fed generators for over ten years, it is specialized in R&D, manufacturing and after-sales service for double-fed generators.

Sany Generator focuses on technological innovation, and introduction and training of talents, and has established a first-class R&D team in the industry.

Digital project management platform and simulation technology is applied to develop generators with high reliability and high performance, contributing to create values for customers.

Sany Generator owns leading automated production equipment in the industry including robot strapping machine, automatic rotor bar forming machine, imported expanding machine, and imported dynamic balance machinery, etc., with an annual production capacity of 3,000 units.

In 2020, the sales of double-fed wind turbines exceeded 1,500 units, entering the first echelon of China’ s double-fed generators.

Sany Generator can currently produce 1.5MW-6.XMW high-speed double-fed generators, which can meet the requirement of mainstream turbine models and customized demands. The product features are as follows:

New upgraded product

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

New Material

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

New configuratio

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

New Craft

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

PART FIVE

CONSTRUCTION

Construction & Operation

Sany Renewable Energy has more than 10 years of successful experience in the field of wind power investment and development. Until March 2021,a total of nearly 2 million kilowatts of approved projects, and nearly 1 million kilowatts of grid-connected projects have been achieved. The invested wind farms, industrial parks and other projects have created a large number of tax income and employment opportunities, promoted the development of the local renewable energy industry chain, and promoted the economic development vigorously.

While developing wind energy, Sany Renewable Energy has always adhered to the concept of win-win cooperation and harmonious development. Based on the development of local real economy, with the green, reasonable and efficient development of resources as the means, and with the improvement of people's livelihood as the goal, the company is actively committed to becoming the leading enterprise of new energy development in the industry.

Sany Renewable Energy is expertized in project planning, exploration, design, EPC, acceptance, wind farm operation and maintenance, investment and financing, and owns strong asset management team to manage wind farms intensively and delicately by means of digitization and model innovation, so as to ensure the excellent operation and excellent profitability of the project.

In recent years, Sany Renewable Energy's investment and development business has achieved good, rapid and stable development. By adjusting and optimizing the industrial layout, a series of development priorities such as industrial investment, joint development, mergers and acquisitions have been established. Sany Renewable Energy will continue to strengthen its investment in strategic areas, not only expanding investment in wind power, photovoltaics, energy storage, hydrogen energy and other fields, but also creating greater cooperation space for partners relying on the Group's world leading high-quality resources such as construction machinery, petroleum equipment, construction engineering and wisdom mining.

Wisdom Wind Farms

Lucid waters and lush mountains are invaluable assets

Sany Renewable Energy actively responds to the major national policies to make each wind farm be an ecologically wisdom wind farm with economic and ecological benefits.

Sany Renewable Energy has introduced advanced European control technology and development methods, integrated intelligent transmission chain technology, cloud visual ransmission chain life monitoring technology, and integrated intelligent control, intellige sensing, predictive control, digitalization and other cutting-edge technologies to create an industry leader wisdom wind farm operation system.

The operation system of Sany Renewable Energy’ s wisdom wind farm is composed of three parts: digital interconnection, intelligent analysis and closed-loop optimization. As an estension of the cluster attributes of wind turbines, it is deeply integrated with the design of wind turbines. The owner’ s revenue is increased by intelligent control technology; and the digital access to data islands enables the improvement of efficiency and reduction of cost of operation and maintenance.

The first ecological wisdom wind farm in China

——Shenxianling Wind Farm in Ningxiang, Changsha City, Hunan Province

- **Develop a project, insert a red flag, build a brand**

Sany Renewable Energy Ningxiang Shenxianling Wind Farm is located at the interchange of Yuelin Expressway in Huaminglou Town and Daolin Town, Ningxiang, Changsha City and Changshaolou Expressway, which is 40 kilometers away from Changsha City, with an average annual wind speed of 5.8-6 m/s. It is a typical inland mountain low wind site, the first wind farm in Changsha City, and the country's first ecological wisdom wind farm. This wind farm perfectly combines wind farm construction with ecological and environmental protection, sightseeing and tourism. It is known as the "most beautiful wind farm" and has become a scenic spot for Internet celebrities.

- **Balance between benefits and ecological, synergy between development and nature**

24 units SANY 2MW and 1 unit of 1.5MW wind turbines were installed in the wind farm, with a total capacity of 49.5MW.

The total construction investment is RMB 500 million n. During the construction period of the project, a total of 30.03 hectares of grass seeds were sown, 1.5 hectares of turf were planted, 3.6 hectares of grass were sowed with guest soil spray seeding technology using galvanized steel wire netting and non-net, and a total of 333,000 trees and shrubs were planted, 49.88 hectares of land area is managed.

PART SIX
SERVICE

All-smart Service

Sany Renewable Energy improves resource efficiency with platform, leads the industry ecology with intelligent operation and maintenance, and creates a new service ecological platform. Through the whole process control of "just-in-time production, professional logistics, efficient installation, 240hs pre-acceptance and on-site warranty and operation and maintenance", zero-defect delivery is achieved

Design and manufacture smart wind turbines that can “perceive, think,self-control, and self diagonse” , implement online monitoring and fault prediction of wind turbines, and build wisdom wind farms with “less people on duty or unattended” .

Establish a "Beijing-Region-Wind Farm" three-level spare parts warehousing system; strengthen the planning management system; strengthen logistics monitoring, and make responsibility traceable.

Relying on intelligence, and big data analysis to achieve wisdom wind farm construction, smart operation and maintenance, and provide customers with end-to-end perfect service.

Operation & Maintenance

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

Warranty for Spare Parts

There are 1 central warehouse, 100 spare parts warehouses, 500 professional service engineers, 80 million conventional operation and maintenance spare parts, service outlets locate in various provinces and cities across the country, providing 2000 kinds of conventional spare parts for wind turbines, which are supplied by the original manufacturing factories with ultra-low profit and warranty services of repair, replacement and refund.

Turbine technology upgrading and retrofit

- **Technology upgrading and retrofit:**
  Aiming to improve the reliability of wind turbines and elevate energy production, Sany Renewable Energy provides services including replacement of large components, upgrade and retrofit of control system, converter, and pitch, and solutions will be provided by professional technical team.
- **Localization:**
  According to the requirements of local power grids, replacement solution of complete equipment of domestic software and hardware is provided to achieve localized monitoring systems and energy management platforms. At present, our company has completed the replacement of complete set of localized systems for multiple wind farms, with stable equipment operation and excellent software functions, which have been unanimously recognized by many customers.

Smart Wind Farm System

The intelligent monitoring system can realize 7*24 monitoring of the entire wind farm. Relying on big data and intelligent functions, it can perform online real-time analysis and prediction of operational data. Through the screening of data, non-excellent turbines can be identified and improved. Finally, the circulation system from monitoring, analysis, prediction and promotion can be realized to continuously improve the operation of the wind turbines.

Wind Turbine Operation and Maintenance and Safety Test

- **Wind farm operation and maintenance:**
  Sany Renewable Energy can perform operation and maintenance work for manufacturers. Relying on the company's strong production R&D system, and complete supplier system, all the pain points during the customers' operation can be addressed, a favorable ecological operation and maintenance environment on site can be realized.
- **Turbine Performance Test:**
  Develop effective test solutions for the key items concerned by the customers and the core components of wind turbines during the operation. These solutions can realize detection of functions for aerodynamic balance, gearbox, super capacitor, and safety protection, and escort long term and safe operation of the wind turbine.

Blade Repair

Sany Renewable Energy has 3 blade production lighthouse factories in Zhangjiakou, Shaoshan, and Tongyu, 6 fixed maintenance points across the country, 50 professional motor blade maintenance engineers, 10 sets of professional main-tenance tools, 24-hour response, providing "one-stop" service in blade inspec-tion, diagnosis, and repair

PART SEVEN

STRATEGY

After more than ten years of cultivation, Sany Renewable Energy continues to improve its technical strength, product competitiveness, and market share year by year, and it is moving towards a leading wind power company in China and the world. Today's Sany Renewable Energy is full of vigor and momentum. Standing at a new crossroads and facing new development opportunities, Sany Renewable Energy will vigorously promote digital transformation in the future, implement oversee strategies, and gather global talents to jointly implement the "Zero Carbon Dream" and become the "Sany Heavy Industry" in China's wind power industry.

Digital Transformation

Digital Sany, intelligence leads the future. Sany Renewable Energy actively promotes the digital transformation and upgrade strategy, establishes a digital professional organization, plans from the top development needs, and vigorously develops the digital capabilities of R&D, manufacturing, marketing, procurement, service, finance, human resources, etc., to form new project-based production and operation mode from order to delivery. The digital capability of Sany Renewable Energy will cover the entire life of wind power products, and further implement the “two-wheel strategy” of digitalization of delivery and operation and digitalization of services, driving Sany to transform into service-oriented manufacturing, enhancing its intelligent decision-making capabilities, and promoting value enhancement throughout the life cycle.

Focusing on integrated, automated, and flexible production and manufacturing, with the goal of building final assembly, generator, and blade Becaon factories, the digital link of R&D, marketing, procurement, and production will be fully connected, and an agile delivery platform will be built. With digital twins, machine learning, 5G and other advanced intelligent manufacturing technologies, focusing on system construction in the directions of digital operations, supply chain control towers, intelligent scheduling and execution, data insights, etc., to gradually realize the digitalization of R&D, intelligent production and lean management, form an intelligent manufacturing and green manufacturing model based on an integrated digital platform to enhance the company's efficient and high-quality delivery capabilities.

Sany Renewable Energy will take customer service as the main object, make full use of digital technologies such as the Internet of Things, big data analysis, and intelligent algorithms to estab-lish a wisdom wind farm operation service system for achieving transparency and agility in the entire process of wind farm transportation, installation, commissioning, and operation and maintenance management, focus on building intelligent logistics monitoring, wind turbine visual monitoring and warning, turbine status detection and diagnosis, service expert knowledge base etc., and create “four-in-one” digital service model covering components, wind turbines, and online monitoring, dynamic early warning system, remote diagnosis, and intelligent operation and maintenance of wind farms, and ultimately achieve a perfect end-to-end service experience for all customers.

Globalization Strategy

Base in China and expand the world markets. Sany Renewable Energy is one of the pioneers in promoting China's wind power to global market. In June 2013, Sany Renewable Energy won the bid for the Ethiopian ADAMA wind power project. 102 units wind turbines set a record for the largest export order of Chinese wind turbines at that time. Sany Renewable Energy will actively implement globalization strategy and promote China's wind power to the world Under the guidance of the national “One Belt, One Road” policy, Sany Renewable Energy will focus on the layout of India, Vietnam, Uzbekistan and other countries rely on the layout of Sany’ s overseas system of globalization, with abundant resource of power generation enterprises, actively explore and occupy overseas markets, and strive to build a world-class brand with a worldwide reputation.

Talent Strategy

Sany Renewable Energy implements the strategy of " Talents to revitalize the enterprise ", adhering to the talent concept of "Taking the Striver as the Core, Helping Employees Success", and implementing the "Three Highs" policy to attract outstanding domestic and foreign talents.

“Three-high” Policy

01. "High-quality", through the introduction and training of talents, to ensure that the talent team has the correct values and possesses high-level knowledge, skills and experience;

02. "High standards", high standards for goals, high standards for evaluation, high standards for speed, and high standards for quality;

03. "High remuneration", through remuneration, benefits and incentive mechanisms, to provide high returns for strivers and high-value contributors

The Dream of Zero-carbon

Green dream, zero-carbon 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 "Zero Carbon Dream" with green manufacture .

"Peak carbon dioxide emission and carbon neutrality" is leading a broad energy revolution and industrial transformation in China, and 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 zero-carbon future!

EXTRACHAPTER

SAMPLE PROJECTS

Sany Renewable Energy pursues high reliability, high power generation, and low LCOE in the entire life time complete wind power solutions. In year 2018, Sany Renewable Energy obtained "Aerospace Quality Certification" approved by Bureau Veritas, a world-renowned testing and certification organization, and became the only company in the industry to obtain this certification. Relying on high-quality wind power products, Sany Renewable Energy helps customers achieve high profits while also creating benchmark wind farms one after another.

Carbon neutral
contribution:

Reduce emissions by about 4,142,000 tons/year

State Power Investment Corporation (SPIC) Qinghai ultra-high voltage (UHV) transmission wind power base

The world's first UHV supporting clean energy project

Qinghai is located in the northeastern part of the Qinghai-Tibet Plateau. The terrain is complex and diverse, with an average altitude of over 3000 m and long sunshine hours. The province has abundant wind resources, with an average wind speed of about 6m/s, which is a low wind speed zone. The Qinghai UHV transmission wind power base includes the Qieji Township Wind Farm in Hainan Prefecture and the Nuomuhong Wind Farm in Haixi Prefecture, with a construction capacity of 2000MW. It is the world's first UHV supporting clean energy project, with 260 units of 2.5MW wind turbines from Sany Renewable Energy with an installed capacity of 650MW.

Qinghai is characterized by high altitude, low air pressure, large temperature difference between day and night, strong radiation, and prone thunderstorm, which bring great challenges to the safe operation of the wind turbine. Sany Renewable Energy has conducted specialized research, design, and verification on the high altitude performance of the unit, and by means of material selection, control strategy optimization, and electrical system adjustment, etc., the turbine suitability for high altitude is guaranteed.

Sany’ s high Altitude series wind turbines have been upgraded in terms of improving heat dissipation effect, enhancing insulation performance, and strengthening anti-radiation performance, so that the turbines can well adapt to the special environment of wind farms in high altitude areas. SANY's high-altitude wind turbines have been highly praised by customers for their stable and reliable operation in Yunnan Haoniuping and Yunnan Liziqing wind farms for many years, which well verifies the suitability of Sany’ s high-altitude wind turbines in high-altitude wind farms.

Carbon neutral
contribution:

Reduce emissions by about 291,700 tons/year

China Huaneng Hubei Hujiawan Wind Farm

Won the "China Power Quality Engineering Award"

Hujiawan Wind Farm is located in Zhongxiang City, Hubei Province, and is China Huaneng 's largest inland wind farm in Hubei. The total installed capacity is 150,000 kilowatts, utilizing 75 units SE11520 wind turbines.

The wind farm officially entered into the warranty period on September 1, 2018, and it took only one month from the completion of commissioning to passing 240h test.

During the Construction period, the service staff of Sany Renewable Energy showed the working concept of “Slow as a grudge” by serving the customers wholeheartedly under the summer heat.

In order to ensure the project schedule, 6 wind turbines were commissioned within 1 day, and the wind turbines were connected to the grid in 5 hours. Sany finally completed the project with high quality in accordance to the schedule required by the customer, and won unanimous praise.

Carbon neutral contribution:

Reduce emissions by about 1146,800 tons/year

China Datang Corporation (CDT) Shanxi Dingbian Wind Farm

Datang Dingbian Youfangzhuang Wind Farm has a total installed capacity of 500,000 kilowatts. Among them, 25 units SE11520 wind turbines are adopted, with an installed capacity of 50,000 kilowatts.

In 2020, the wind farm generated 110 million kWh, which was among the best in terms of power generation by other OEMs and local wind farms.

Carbon neutral contribution:

Reduce emissions by about 90,000 tons/year

Sany Ningxiang Donghutang Wind Farm

Donghutang Wind Farm has a total installed capacity of 50,000 kilowatts, and 25 units of Sany 2MW wind turbines were installed. Construction started on September 8, 2018, and full capacity grid connection was achieved on April 30, 2019, which lasted 7 months and 22 days. The construction speed of the project broke the record of Sany Renewable Energy, far exceeding the construction period record of similar domestic southern wind power projects.

In year 2020, the total power generation of this wind farm is 134 million kwh and the full loading hours are 2678h, which is among the best in Hunan Province.

Carbon neutral contribution:

Reduce emissions by about 98,400 tons/year

State Power Investment Corporation (SPIC) Shanxi Qipanshan Wind Farm

Qipanshan Wind Farm is located at the junction of Jiaokou County and Shilou County in Lvliang City, Shanxi Province. It is the first wind power project of the State Power Investment Corporation in Shanxi. The total installed capacity of the wind farm is 100,000 kilowatts, of which 50,000 kilowatts in the first phase are all wind turbines from Sany Renewable Energy. The wind farm construction was completed in December 2018.

In year 2020, the first phase of the wind farm generated 130 million kWh of power. Compared with other competitors, Sany Renewable Energy's wind turbines have obvious advantages in power generation, especially when the wind speed is 5-6 m/s

Carbon neutral
contribution:

Reduce emissions by about 451,300 tons/year

China Datang Corporation (CDT) Shandong Qingdao Baoshan Wind Farm

Baoshan Wind Farm is invested and constructed by Datang Qingdao Renewable Company and is the largest single wind farm of Datang Shandong Company. The total capacity of the project is 250,000 kilowatts, of which 25 units SANY SE11520 wind turbines are installed, amounting to 50,000 kilowatts.

In the process of commissioning and 240hs pre-acceptance, Sany Renewable Energy's service team created the record of the shortest period of commissioning and grid connection and the shortest time for 240hs passing, and finally the project is completed with high quality and efficiency.

The average wind speed of the wind farm in year 2020 was 4.92m/s, and the annual energy production was 95,283,700 kWh. Compared with the other two brands of wind turbines in Baoshan Wind Farm, the advantages are obvious under the same capacity. Among them, the cumulative energy production of a single wind turbine - No. A123 ranks first among all the wind turbines of Shandong Datang.

Carbon neutral contribution:

Reduce emissions by about 155,300 tons/year

Jiangxi Leishangong Wind Farm

State Power Investment Corporation (SPIC) Jiangxi Leigongshan Wind Farm is located on the ridge of Leigong Mountain in Longnan County, Ganzhou. It has a total installed capacity of 70,000 kilowatts with 35 units SANY SE11520 wind turbines.

The energy production of the wind farm is 216 million kwh in 2020, with turbine availability of 99.79%, thus the annual energy production target was overfulfilled. Compared with the same period in year 2019, the production and operation indicators had increased significantly.

Carbon neutral
contribution:
Reduce emissions by about 105,500tons/year

Wuling Electric Power Hunan Longshan Wind Farm

The Lianyuan Longshan Wind Farm has a total installed capacity of 50,000 kilowatts with 25 units SANY SE11520 wind turbines. As the first wind power benchmarking project of Wuling Hunan Company, Lianyuan Longshan has been included in the key tourism construction project of Lianyuan City in 2019.

In 2020, the annual average wind speed was 5.33 m/s, and the energy production was 110 million kilowatt-hours, showing excellent performance.

Carbon neutral
contribution:

Reduce emissions by about 88,300 tons/year

Shandong Yangxin Wind Farm

Yangxin Wind Farm is located in Yangxin County, Binzhou City, Shandong Province. The wind farm spans Wendian Town, Yanghu Town, Zhaiwang Town, and Liupowu Town. It is a densely populated area and is a plain site. The total capacity is 48MW, and a total of 24 units SANY SE11520 wind turbines are installed.

The wind farm was commissioned and connected to the grid at the end of March 2018, and the cumulative energy production was 91 million kWh. The turbines have been operating continuously without trouble for 250 hours, and the customer unanimously affirmed the performance of the wind farm due to stable operation and high energy production.

The wind farm has good performance with annual energy production of 91,026,800 kwh and 99.92% turbine utilization rate.

Carbon neutral contribution:

Reduce emissions by about 115,600 tons/year

Hunan Shangjiangxu Wind Farm

Shangjiangxu Wind Farm is located in the southwest area of Shangjiangxu Town, Jiangyong County, Yongzhou City, Hunan Province, and is invested and developed by State Power Investment Corporation Wuling Electric Power. The total installed capacity is 70,000 kilowatts with 35 units SANY SE11520 wind turbines. Full-capacity grid connection was achieved in January 2019.

The annual average wind speed was 4.85m/s in 2020, with energy production of 142 million kwh, and the turbine avail-ability is 99.61%.

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