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# Make Distributed New Energy Within Reach



**01** Company Profile

**02** Solutions

**03** Product Introduction

**04** Global Business

## INTRODUCTION



Reliable small & medium sized WTG supplier



10000+ Wind & Solar hybrid systems



Stock code : 430324;



110+ Patents & Certifications;



Shanghai Ghrepower Green Energy Co., Ltd (Stock abbr.: Shanghai Ghrepower, stock code:430324), founded in 2006, with registered capital of USD 11 million. It successfully went to public in China's National Equities Exchange and Quotations system - NEEQ, then becoming the first renewable company dedicated in the renewable energy application solutions in the Board.

Shanghai Ghrepower is a high-technology enterprise, located in Shanghai, which engages itself in the renewable energy R & D, manufacturing, sales, operations and maintenance, and industrial investment. The company devotes to the power solutions of telecoms, military and civil use, commercial and utilities fields, meanwhile provides application studies of micro grid, intellectual grid and commercial power generation investments.

The company is oriented by the market and persistent with technology innovations, and has achieved 118 items of independent intellectual properties and patents, of which there are 24 inventions, 4 PTC patents and 16 software creations. The company attends to draft multiple national standards, and has obtained CE, ETL, G59, CEI0-21, IEC61400, SWCC, ClassNK, CRES certifications.

Shanghai Ghrepower takes “ Make Distributed New Energy Within Reach” as its enterprise mission. It accelerates the widespread distribution of renewable energy globally, making contribution to distributed new energy become economical and affordable. In the future, Ghrepower will insist in new energy industry, move at a pace of globalization and forge the company to be a renewable energy application leader, and pay its utmost contribution to the beautiful earth village. contribution to the beautiful earth village.

## Milestone

- **2020 - Now**  
**Start to promote carbon neutral domestic and international double cycle strategy.**  
Import foreign distributed experience into China and fully promote carbon neutrality
- **2015-2019**  
**Entered into the Japanese market**  
ClassNK certification with three models, set up a wholly-owned subsidiary
- **2013-2015**  
**Domestic communication base stations entered the period of comprehensive development**  
Domestic communication base station business market share exceeds 50%
- **2013**  
**Publicly Listed in the New Third Board (NEEQ)**  
Stock code:430324, became the first company in the renewable energy application solutions
- **2012**  
**Full access to the North American market**  
The first FD16-30 wind turbine was exported to the United States, America Ghrepower was established
- **2011**  
**Full access to the European market**  
FD21-60 wind turbine customized design for Italy development, successfully connected to the grid, Italy Ghrepower was established
- **2009**  
**Overseas market development**  
The first FD13-50 was exported to U.K., opening up internationalized strategy.
- **2008**  
**Won the bid for China Mobile's centralized procurement**  
Became the successful bidder for China Mobile's centralized procurement of new energy base station power supply systems for the first time and rated “Outstanding Supplier” for many consecutive years.
- **2006**  
**Shanghai Ghrepower established**  
Focusing on research, development, manufacturing, sales, operation and maintenance of small and medium sized WTGS.



**Continuous innovation from user to service**



**Improved operation and maintenance system**

To ensure the ability to provide customers with high quality services, Shanghai Ghrepower has set up a strict service staff certification management system to train, examine and certify them. Their improved skills provide guarantee for customer satisfaction.



**Advanced project investment philosophy**

Shanghai Ghrepower explores overseas markets, and has set up branches in the United States, Italy, Canada, Japan and Taiwan, China to carry out small and medium sized WTGS project investment. The transformation from product sales to industry investment not only brings long-term steady business returns, but also guides industry model innovation.



**First-class production control**

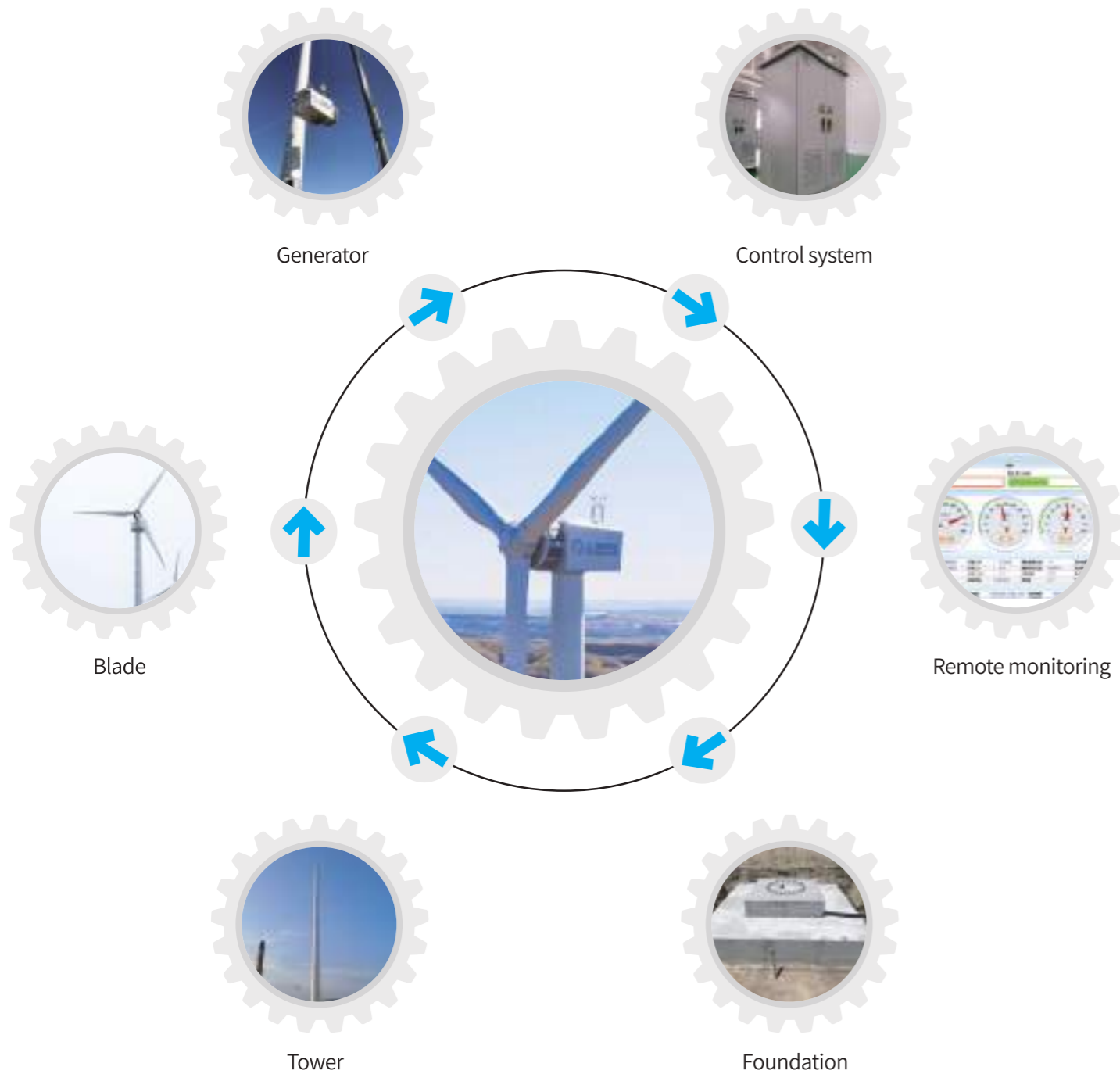
Shanghai Ghrepower manufactures WTGS, controllers, inverters, blades, other ancillary equipment and raw materials in strict accordance with quality control system, to ensure the safety and reliability of the entire system. Excellent R&D strength



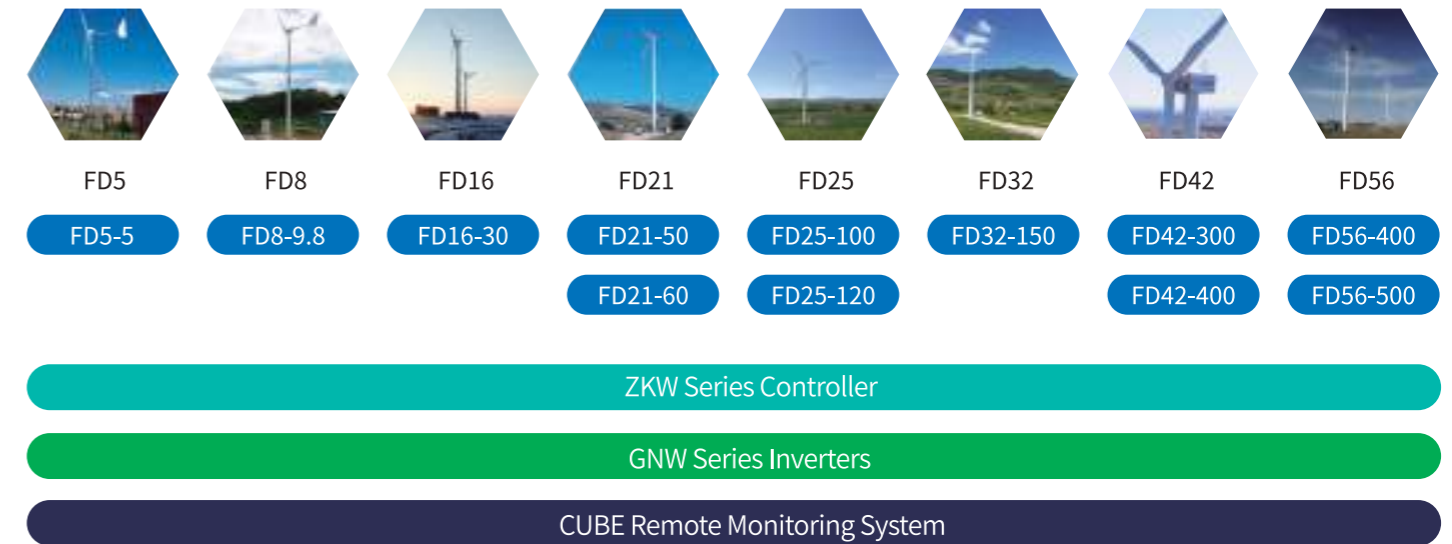
**Excellent R&D strength**

Shanghai Ghrepower has a group of experienced independent R&D team engaged in wind energy application research

## Integrated Designing Concept



## Major Product Line Technical Parameters



SerialCode	FD5	FD8	FD16	FD21		FD25		FD32	FD42		FD56	
<b>RotorDia.(m)</b>	5.1	7.8	15.6	21.5		25		32.2	42		56	
<b>ModelNo.</b>	FD5-5	FD8-9.8	FD16-30	FD21-50	FD21-60	FD25-100	FD25-120	FD32-150	FD42-300	FD42-400	FD56-400	FD56-500
<b>Rated power(kW)</b>	5	9.8	30	50	60	100	120	150	300	400	400	500
<b>Sweep area per kilowatt(m<sup>2</sup>/kW)</b>	4.08	4.87	6.37	7.26	6.05	4.90	4.09	5.41	4.61	3.46	6.15	4.92
<b>Rated wind speed (m/s)</b>	11	11	10	9	10	11	11.5	9.8	11	12	9.5	10.5
<b>AEP(MWh)@5m/s</b>	8.1	19.3	69.3	120	125	205	216	332	591	641	989	1052
<b>AEP(MWh) @5.5m/s</b>	10.3	23.7	84.7	146	153	252	270	405	733	799	1194	1291
<b>Designed grade</b>	IECIII A		IECII A	IECII A		IECIII A		IECS (DIII A)	IECIII A		IECS (DIII A)	
<b>Survival(m/s)</b>	52.5		59.5	59.5		52.5		52.5	52.5		52.5	
<b>Speed Control</b>	Yaw/Stall		Stall	Pitch control								
<b>Brake way</b>	Mechanical/Electromagnetic			Pitch control/Mechanical/Electromagnetic								
<b>Application scenarios</b>	Base station/Border/ Island household			Small wind farms, smart grids, microgrid systems, distributed power generation								

## Distributed wind power solutions

More efficient use of resources and higher returns on business investment



Model: FD16-19.2  
Project location: Hokkaido, Japan  
Run time: 2019



Model: FD25-100  
Project location: Liaoning Province, China  
Run time: 2018



Model: FD42-400  
Project location: Neimenggu Municipality, China  
Run time: 2021



Model: FD21-50  
Project location: Nova Scotia, Canada  
Run time: 2015

**Application background :** Global feed-in tariff subsidy policy, high cost of electricity, wind resources rich region

**System features:** Low voltage grid-connected, close to the user side absorption; Not strictly restricted by the power grid standards, leaving out the standardized equipment supporting the power grid, and increasing the users' independent choice; Make full use of recyclable, pollution-free and cheap wind resources to complement distributed photovoltaic in time and space, and improve the overall utilization rate of distributed clean energy; No need for large-scale and intensive capital investment, and existing resources can be reused with lower initial investment and higher return on asset investment

**Application fields:** Oil and gas industry, village power supply, industrial park and other regions power supply

## Distributed wind power solutions

Complementary new energy power supply, stable and reliable system



Model: FD32-150  
Project location: Yunnan Province, China  
Run time: 2023  
Project description: Project of distributed new energy for rural revitalization



Model: FD21-50  
Project location: Zhejiang Province, China  
Run time: 2023  
Project description: Project of distributed new energy for industrial park



Model: FD21-100  
Project location: Bristol, England  
Run time: 2013



Model: FD25-100  
Project location: Qingdao, Canada  
Run time: 2021

**Application background :** Suitable for unstable power grid, insufficient power grid capacity, and no power grid coverage area

**System features:** Strong matching, with good AC/DC power grid adaptability, can realize a variety of energy complementarity such as wind, PV& diesel; The network is flexible, which can be incorporated into the external power grid or formed into an independent power grid with other equipment. Orderly scheduling, can quickly respond to all kinds of scheduling instructions of the system energy management system; Perfect monitoring, monitoring management system can meet the needs of a variety of applications of power and load management; Environment-friendly, preferential use of wind, PV new energy, saving traditional fossil energy

**Application fields:** Islands, villages, public utilities and other areas of power supply

## Off-grid Solutions

More economical and environmental new energy power supply system than diesel power generation



Model: FD16-50  
 Project location: Dangan Island, Guangdong Province  
 Run time: 2019  
 Project description: The multifunctional complementary micro-grid demonstration project has solved the problem of military household electricity consumption



Model: FD5-5  
 Project location: Hainan Province  
 Run time: 2018  
 Project description: Marine environmental monitoring device power supply



Model: FD5-5  
 Project location: Xizang municipality  
 Run time: 2010  
 Project description: Wind and PV new energy power generation system for one troop in Xizang



Model: FD5-5  
 Project location: Nepal  
 Run time: 2010  
 Project description: Wind, PV, diesel power generation system for village

**Application background :** Solve the basic living electricity in the none electricity area, reducing the problems of high pollution, high cost, loud noise in the living environment, waste gas and so on by diesel power generation

**System features:** Wind, PV complementary new energy, the system is stable and reliable; Power frequency transformer isolation, to ensure the safety of the power end; Kilowatt-hour low cost, economical and practical; High system integration and small footprint

**Application fields:** Barracks, small islands, villages, field workstations, etc

## Communication base station power supply solution

Complementary new energy power supply, stable and reliable system



Model: FD5-5  
 Project location: Nomrog-unitelblinder  
 Run time: 2010  
 Project description: Ghrepower and ZTE jointly built the site, Ghrepower is responsible for providing the wind turbine and control system, set up 13 sites in Mongolia



Model: FD5-5  
 Project location: Heilongjiang Province  
 Run time: 2010  
 Project description: Solved the power supply problem of base station by wind and PV complementary system



Model: FD5-5  
 Project location: Xizang municipality  
 Run time: 2009  
 Project description: The base station is 5600 meters above sea level, and the lowest temperature is -40 Celsius degrees . It used to be driven by diesel generator but it was difficult to start. Adding wind energy solved the problem of power supply for base station



Model: FD5-5  
 Project location: Sichuan Province  
 Run time: 2008  
 Project description: Wind turbine, energy storage communication base station power supply

**Application background :** With the rapid development of the communication industry, power grid cannot cover or power grid is unstable leads to the unreliable power supply of the base station

**System features:** For different working conditions, the system has island, high cold, high altitude, desert options; Multi-energy power supply, the pursuit of stable investment equity ratio; Modular design to meet the requirements of different systems; Remote monitoring, real-time understanding of status, reduce operation and maintenance costs

**Application fields:** Communication base stations with no power, unstable power grid or with energy saving and emission reduction requirements



**Project operation time: 2023**

**Installation location: Jilin Province**

**Power generation equipment capacity: FD42-400**

**Annual electricity generation: about 1 million kWh**

**Carbon dioxide reduction: about 997 tons/year**

**Emission reduction of sulfur dioxide: about 27.28 tons/year**

**Emission reduction of nitrogen oxides: about 13.6 tons/year**

## Distributed wind power makes More efficient usage of resources

### More efficient use of wind resources

Make full use of recyclable, pollution-free and cheap wind resources to complement distributed photovoltaic in time and space, and improve the overall utilization rate of distributed clean energy

### More efficient use of land

Revitalize land resources and save land acquisition costs for projects

### More efficient use of power grid

Low voltage grid-connected, close to the user side absorption; Not strictly restricted by the power grid standards, leaving out the standardized equipment supporting the power grid, and increasing the users' independent choice;

### More efficient use of investment capital

No need for large-scale and intensive capital investment, and existing resources can be reused with lower initial investment and higher return on asset investment

Project operation time: 2021

Installation location: Ordos, Inner Mongolia

Power generation equipment capacity:  
FD42-400+600kWp photovoltaic

Annual electricity generation:  
1.676 million kWh

Equivalent saving standard coal:  
595 tons/year

Carbon dioxide reduction:  
1,670 tons/year

Emission reduction of sulfur dioxide:  
50.2 tons/year

Emission reduction of nitrogen oxides:  
25.1 tons/year

## Distributed wind power features

### Land resources

small area, flexible site selection, intensive use of land

### Wind and scenery complementary

Short-term complementary, seasonal complementary, day and night sustainable power generation

### Grid-connected resources

Resource reuse, group control and group adjustment, effective interface with smart power grid and micro-power grid, flexible operation, independent operation from power grid under appropriate conditions;

### Nearby consumption

Close to the load, on-site consumption

Run time: 2018

Project Location: Hokkaido

Project model FD16-19.8 effective generation hours per year: 4427h

SCADA record maximum wind speed: 49.25m/s(Since the grid connection date)





**Significance of rural distributed wind power**

**Grid-connected flexible nearby consumption**

400V low voltage rural grid connected nearby, local consumption.

**Help rural revitalization**

Using idle rural land resources to provide stable returns for 20 years, increase villagers' income.

**Convert coal to electricity for winter heating**

Winter heating in northern China has shifted from traditional coal to new energy sources which is a more environmentally friendly way.

**Project operation time: 2015**

**Installation location: Russia**

**Power generation equipment capacity: 4\*FD16-50**

**Annual electricity generation: 0.52 million kWh**

**Saving diesel cost: 1.5768million CNY**

**Carbon dioxide reduction: 208 tons/year**

**Expected payoff period: 7 years**

## Significance of distributed wind power in oilfield

### Reduce loss and increase efficiency, improve reliability

Improve the high line loss and poor power supply quality caused by the long line, low power factor of pumping oil unit

### Self supply & self consumption to improve controllability

Solve summer peak electricity consumption in oil producing areas, electricity restriction in time period, affecting production efficiency

### Green energy saving, success in low carbon & economy

Innovate the power supply source of the oilfield, realize the green energy use of the oilfield, low carbon development, save electricity costs

Project operation time: 2017

Installation location: Liaoning Province

Power generation equipment capacity: 1\*FD25-100

Annual electricity generation: 0.2 million kWh

Equivalent saving standard coal: 71 tons/year

Carbon dioxide reduction: 199 tons/year

Emission reduction of sulfur dioxide: 6 tons/year

Emission reduction of nitrogen oxides: 3 tons/year

## Product Features

- Adopt low speed permanent magnet generator, direct-drive gearless transmission design, transmission system is efficient and with reliable long working life
- Variable pitch control technology to ensure stable power output during gust
- Multiple safety protections of intellectual variable pitching, mechanical, braking, electric magnetic braking, and active yawing system
- Highly efficient full power inverter, conforming to multiple countries on-grid standards and suitable for sorts of grid application requirements.

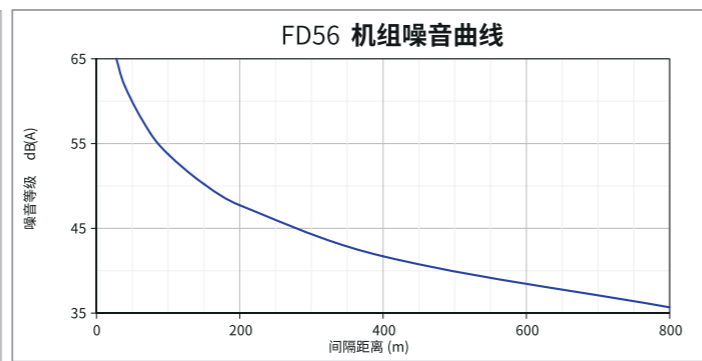
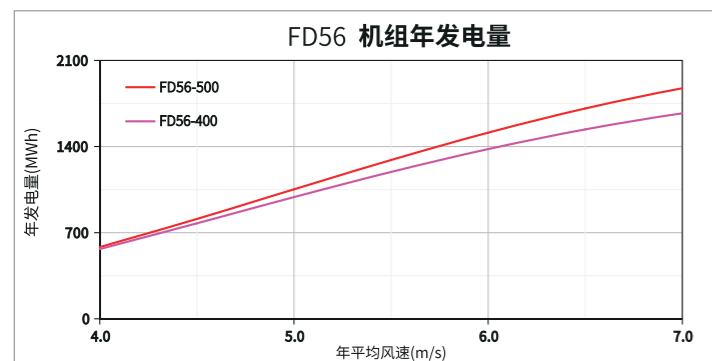
- Directly connect to the Low-Voltage 400V Grid, access the nearby load distribution system, immediately consume the power and transfer surplus power to the grid leads to efficient energy transmission
- SCADA monitoring system with perfect functions can realize real-time monitoring, report statistics, fault diagnosis, operation and maintenance management integration
- Suitable for distributed new energy applications in different scenarios such as industrial parks, ports, oil fields, mines, villages and high-speed service areas



Figure 1 Nacelle structure diagram

- ① Generator
- ② Braking Device
- ③ Control Box
- ④ Yawing Device
- ⑤ Anemometer / Vane

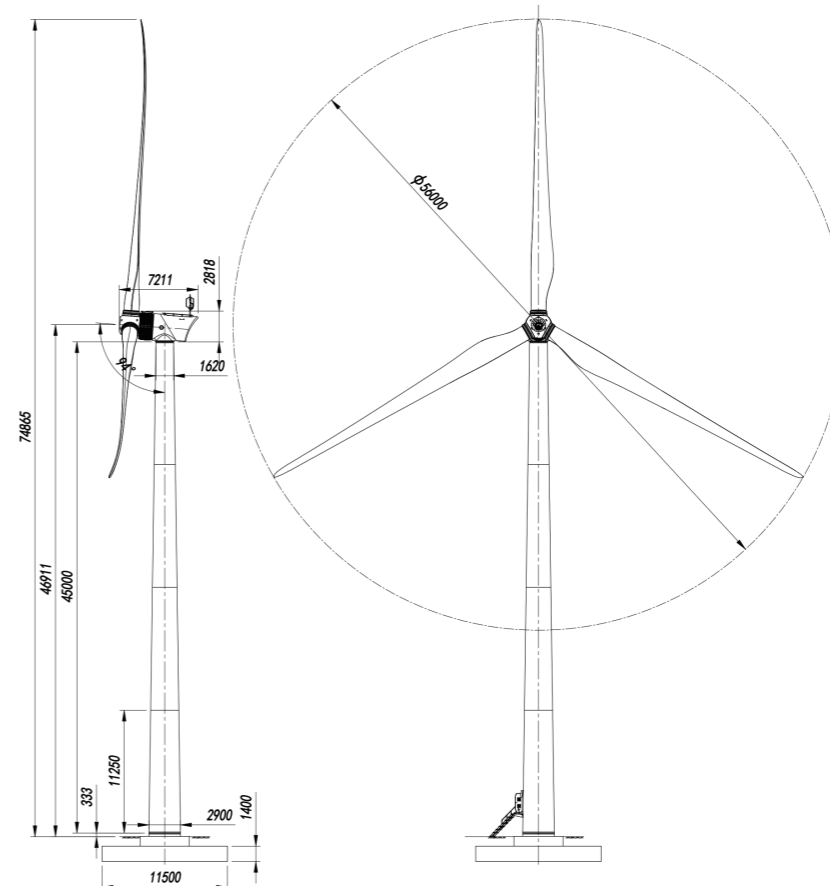
## Annual Energy Production and Noise Level



Annual mean wind speed (m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0
<b>FD56-500 AEP(MWh)</b>	583	812	1052	1291	1513	1709	1874
<b>FD56-400 AEP(MWh)</b>	567	776	989	1194	1379	1539	1670

## Specifications

Model	FD56-400	FD56-500	Tower Height(m)	49
Design Class	IECS (DIIIA)		Nacelle Weight (t)	28
Rated Power (kW)	400	500	Tower Weight(t)	42
Rotor Diameter(m)	56		Brake System	Pitch/Mechanical/Electromagnetic
Rated Wind Speed (m/s)	9.5	10.5	Speed Regulation	Pitch Control
Rated PRM(rpm)	28	29	Lightning Protection	Air Termination
Cut-in Wind Speed (m/s)	3		Surface Anti-corrosion	C5
Cut-out Wind Speed (m/s)	18(10min),22(10s)		Blade Material	FRP
Extreme Wind Speed (m/s)	52.5		Generator Type	Permanent Magnet Direct-drive Generator
Noise Level dB(A)	58		Monitoring System	CUBE
Operating Temperature(°C)	-20~50		Lifespan(year)	20
Grid-connected Access Mode	Lifespan(year)Low-Voltage 400V Grid			



计量单位:mm

## Product Features

- Adopt low speed permanent magnet generator, direct-drive gearless transmission design, transmission system is efficient and with reliable long working life
- Variable pitch control technology to ensure stable power output during gust
- Multiple safety protections of intellectual variable pitching, mechanical, braking, electric magnetic braking, and active yawing system
- Highly efficient full power inverter, conforming to multiple countries on-grid standards and suitable for sorts of grid application requirements.

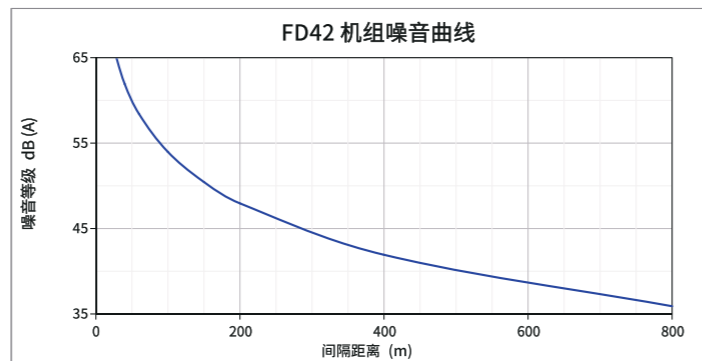
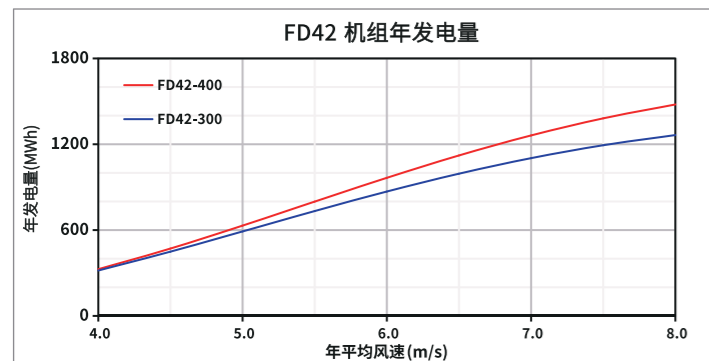
- Directly connect to the Low-Voltage 400V Grid, access the nearby load distribution system, immediately consume the power and transfer surplus power to the grid leads to efficient energy transmission
- SCADA monitoring system with perfect functions can realize real-time monitoring, report statistics, fault diagnosis, operation and maintenance management integration
- Suitable for distributed new energy applications in different scenarios such as industrial parks, ports, oil fields, mines, villages and high-speed service areas



Figure 1 Nacelle structure diagram

- ① Generator
- ② Braking Device
- ③ Control Box
- ④ Yawing Device
- ⑤ Anemometer / Vane

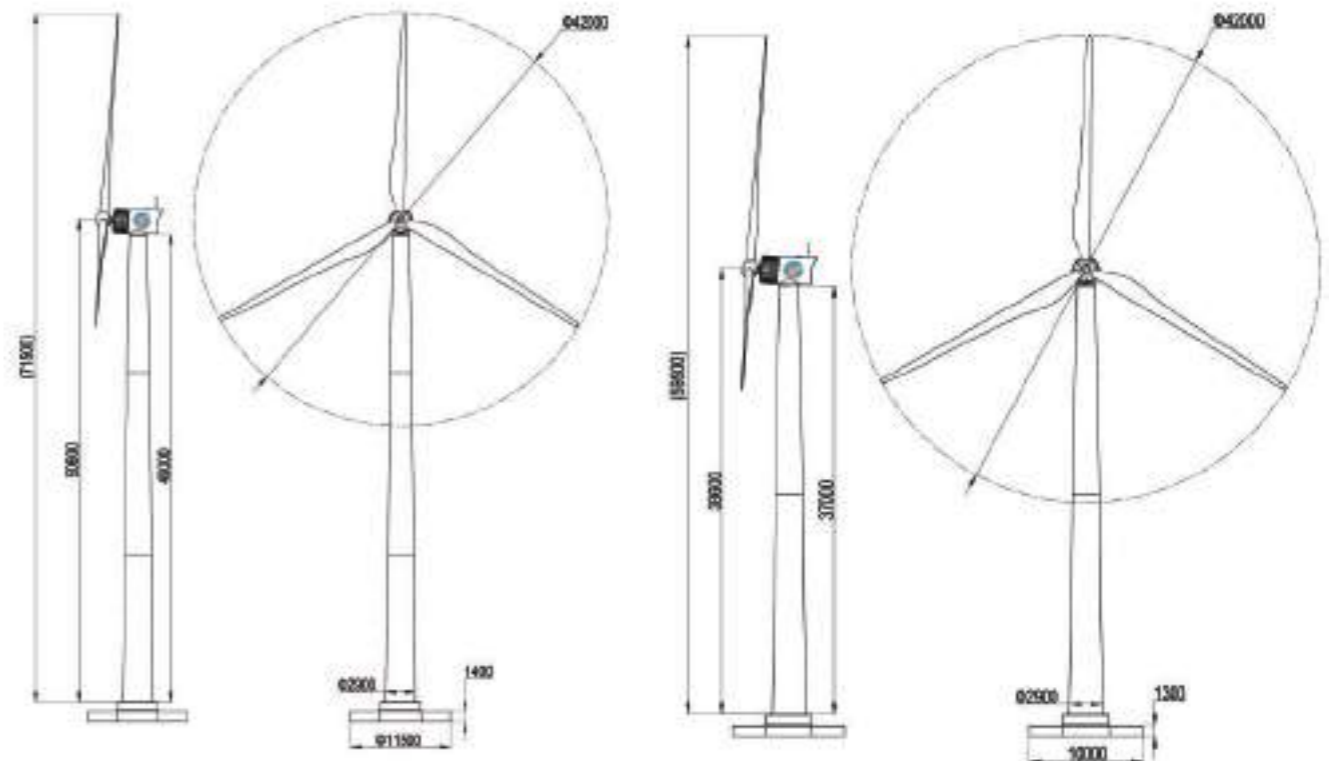
## Annual Energy Production and Noise Level



Annual mean wind speed (m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
<b>FD42-400 AEP(MWh)</b>	326	471	631	799	965	1122	1262	1381	1478
<b>FD42-300 AEP(MWh)</b>	317	449	591	733	870	994	1103	1193	1264

## Specifications

Model	FD42-300	FD42-400	Tower Height(m)	37/49
Design Class	IECIII A		Nacelle Weight (t)	25.0
Rated Power (kW)	300	400	Tower Weight(t)	28.0/38.0
Rotor Diameter(m)	42		Brake System	Pitch/Mechanical /Electromagnetic
Rated Wind Speed (m/s)	11	12	Speed Regulation	Pitch Control
Rated PRM(rpm)	35	36	Lightning Protection	Air Termination
Cut-in Wind Speed (m/s)	3		Surface Anti-corrosion	C5
Cut-out Wind Speed (m/s)	24		Blade Material	FRP
Extreme Wind Speed (m/s)	52.5		Generator Type	Permanent Magnet Direct-drive Generator
Noise Level dB(A)	58		Monitoring System	CUBE
Operating Temperature(°C)	-20~50		Lifespan(year)	20
Grid-connected Access Mode	Low-Voltage 400V Grid			



计量单位:mm

## Product Features

- Adopt low speed permanent magnet generator, direct-drive gearless transmission design, transmission system is efficient and with reliable long working life
- Variable pitch control technology to ensure stable power output during gust
- Multiple safety protection of intellectual variable pitching, mechanical, braking, electric magnetic braking, and active yawing system
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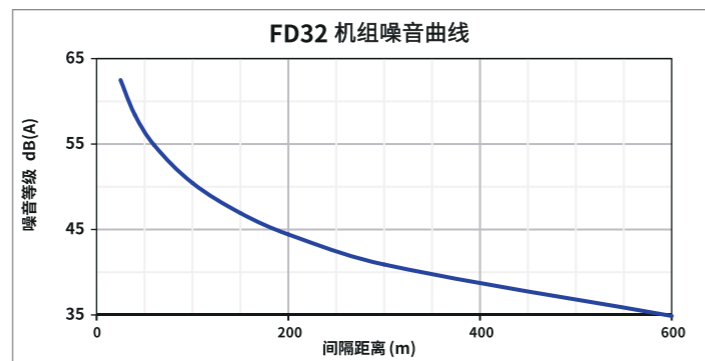
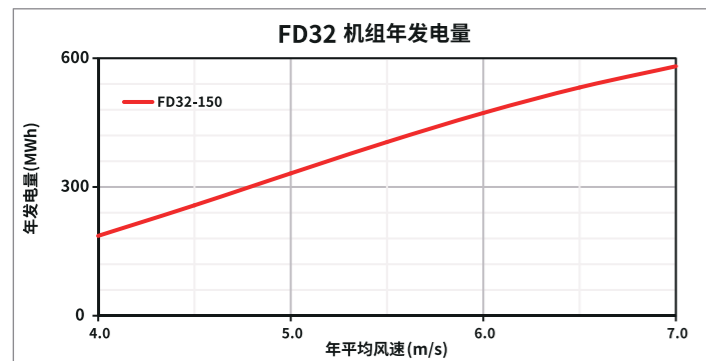
Figure 1 Nacelle structure diagram



Figure 2 Inverter and Controller

- ① Generator      ② Lubrication      ③ Pitch
- ④ Braking Device      ⑤ Control Box      ⑥ Yawing Device
- ⑦ Anemometer/Vane      ⑧ Inverter      ⑨ Controller

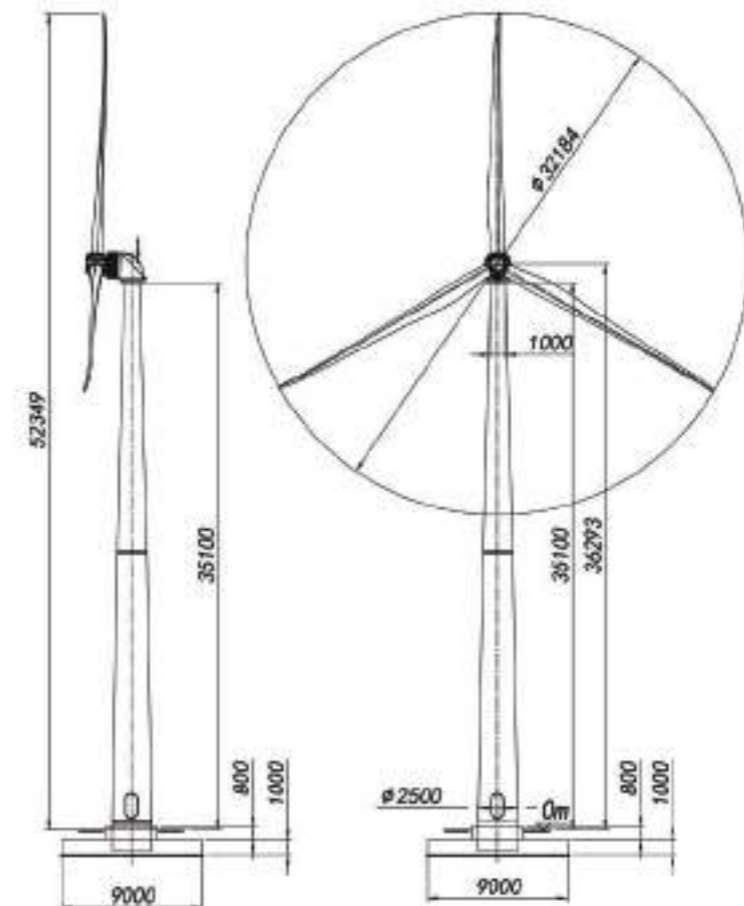
## Annual Energy Production and Noise Level



Annual wind speed (m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0
FD32-150 AEP (MWh)	186	257	332	405	472	532	581

## Specifications

Model	FD32-150	Tower Height (m)	35
Design Class	IECS (DIIIA)	Nacelle Weight (t)	9
Rated Power (kW)	150	Tower Weight (t)	18.2
Rotor Diameter (m)	32.2	Brake System	Pitch/Mechanical/Electromagnetic
Rated Wind Speed (m/s)	9.8	Speed Regulation	Pitch Control
Rated PRM (rpm)	48	Lightning Protection	Air Termination
Cut-in Wind Speed (m/s)	3	Surface Anti-corrosion	C5
Cut-out Wind Speed (m/s)	18 (10min), 22 (10s)	Blade Material	FRP
Extreme Wind Speed (m/s)	52.5	Generator Type	Permanent Magnet Direct-drive Generator
Noise Level dB(A)	58	Monitoring System	CUBE
Operating Temperature (°C)	-20~50	Lifespan (year)	20
Grid-connected Access Mode	Low-Voltage 400V Grid		



计量单位: mm

## Product Features

- Conform to Italy CEI0-21, America UL1741, Canada CSA C22.2 NO.107.1-01, England G59/2;
- CE, IEC61400 certifications
- Permanent magnet direct-drive wind turbine system with active pitch control technology
- Active pitch adjustment under gust wind to ensure power output stability.
- Multiple safety protections of intellectual variable pitch, mechanical braking, electromagnetic braking, and active yawing system.
- Full power inverter isolation technology ensures safety operation of WTG.
- Suitable for small scale wind farm, smart grid, micro grid.

- Low noise: Reduce noise by best practice designing.
- High power generation: Optimize parameters setting by analyzing huge amounts of operation data.
- Lower cost: Reduce initial investment by integrating controller and inverter inside the tower and cutting controller room's installation cost.



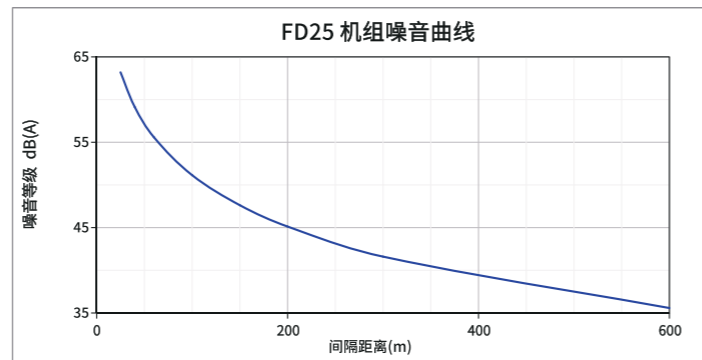
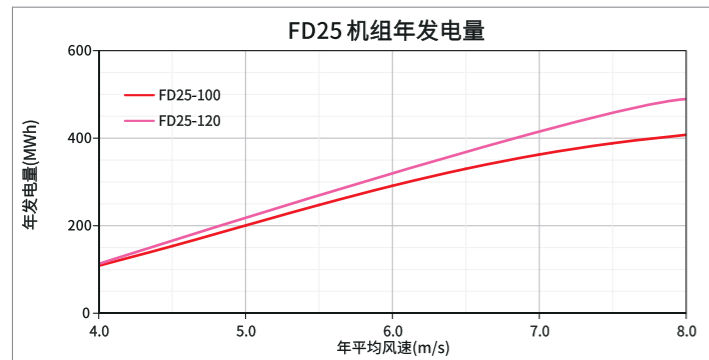
Figure 1 Nacelle structure diagram



Figure 2 Inverter and Controller

- ①Generator      ②Lubrication    ③Pitch
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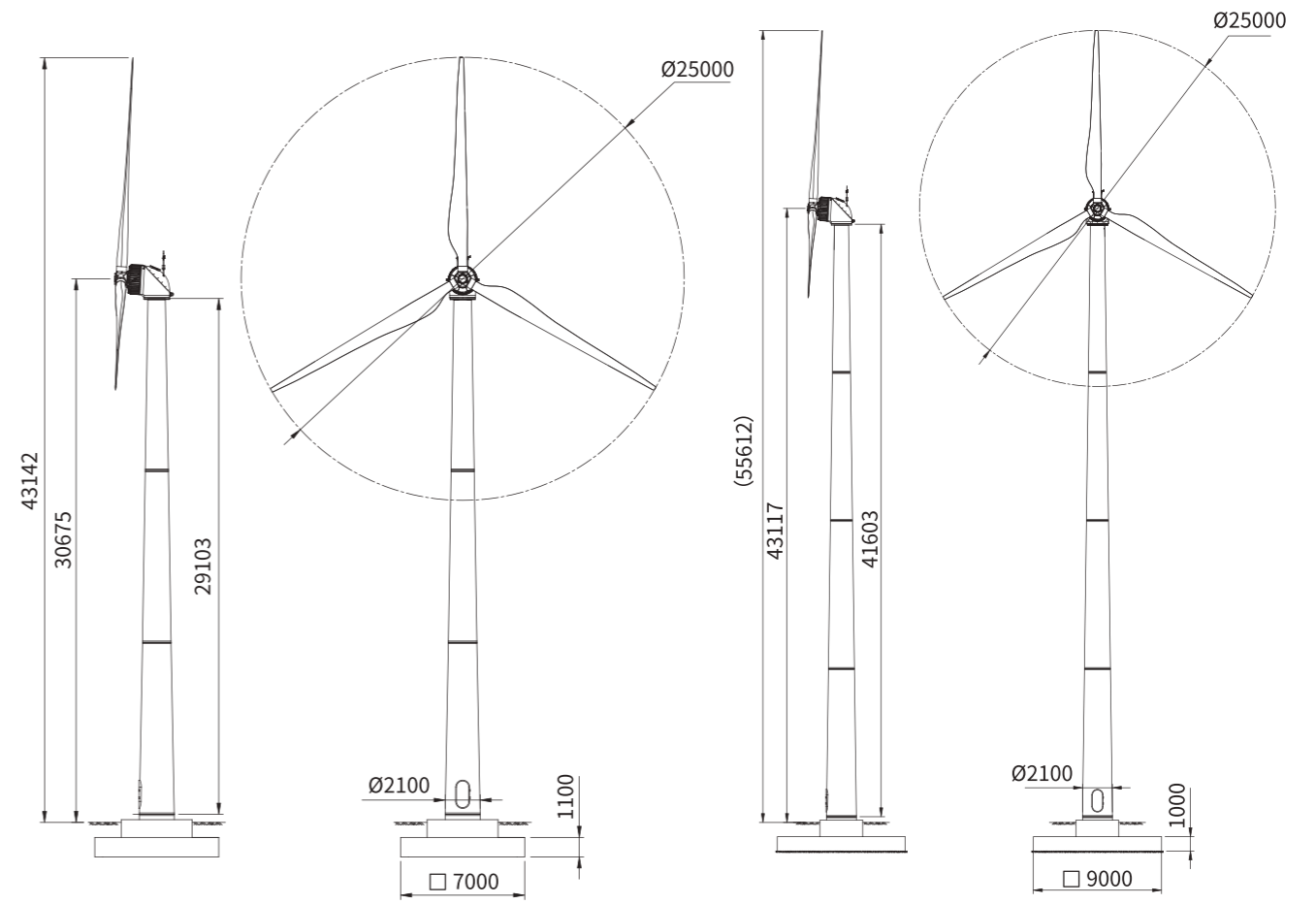
## Annual Energy Production and Noise Level



Annual mean wind speed(m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
<b>FD25-120 AEP(MWh)</b>	115	164	216	270	324	374	420	459	492
<b>FD25-100 AEP(MWh)</b>	113	158	205	252	296	335	367	393	412

## Specifications

Model	FD25-100	FD25-120	Tower Height(m)	30/42
Design Class	IECIII A		Nacelle Weight (t)	9.1
Rated Power (kW)	100	120	Tower Weight(t)	13.8/19.6
Rotor Diameter(m)	25		Brake System	Pitch/Mechanical/Electromagnetic
Rated Wind Speed (m/s)	11	11.5	Speed Regulation	Pitch Control
Rated PRM(rpm)	52	54	Lightning Protection	Air Termination
Cut-in Wind Speed (m/s)	3		Surface Anti-corrosion	C5
Cut-out Wind Speed (m/s)	25		Blade Material	FRP
Extreme Wind Speed (m/s)	52.5		Generator Type	Permanent Magnet Direct-drive Generator
Noise Level dB(A)	58		Monitoring System	CUBE
Operating Temperature(°C)	-20~50		Lifespan(year)	20
Grid-connected Access Mode	Low-Voltage 400V Grid			



计量单位:mm

### Product Features

- Conform to Italy CEI0-21, America UL1741, Canada CSA C22.2 NO.107.1-01, England G59/2;
- SWCC, CE, IEC61400 certifications
- Permanent magnet direct-drive wind turbine system with active pitch control technology
- Active pitch adjustment under gust wind to ensure power output stability.
- Multiple safety protections of intellectual variable pitch, mechanical braking, electromagnetic braking, and active yawing system.
- Full power inverter isolation technology ensures safety operation of WTG.
- Suitable for small scale wind farm, smart grid, micro grid.

- Low noise: Reduce noise by best practice designing.
- High power generation: Optimize parameters setting by analyzing huge amounts of operation data.
- Lower cost: Reduce initial investment by integrating controller and inverter inside the tower and cutting controller room's installation cost.

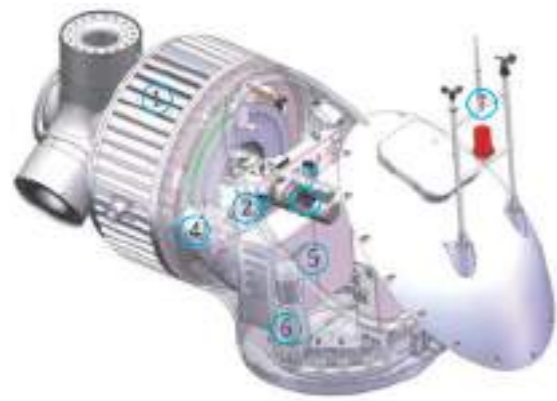


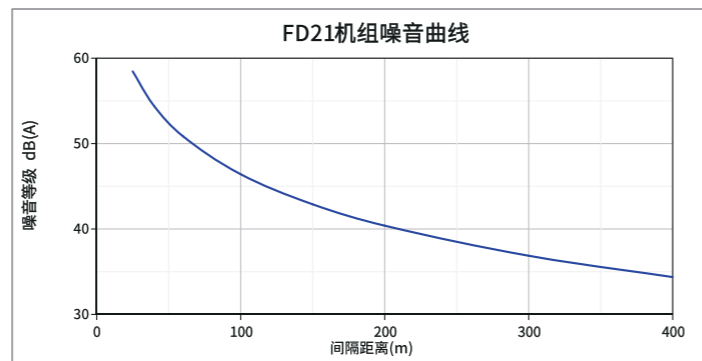
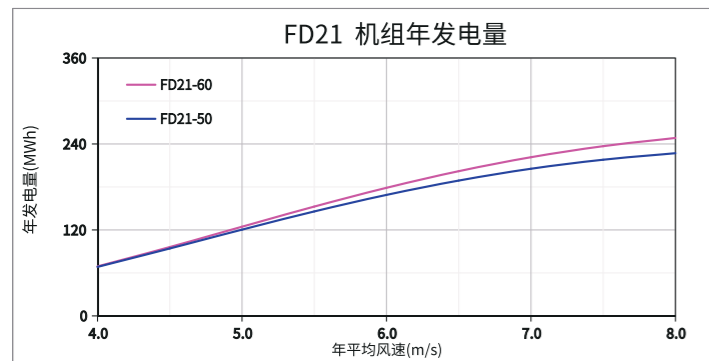
Figure 1 Nacelle structure diagram



Figure 2 Inverter and Controller

- ①Generator      ②Lubrication    ③Pitch
- ④Braking Device    ⑤Control Box    ⑥Yawing Device
- ⑦Anemometer/Vane    ⑧Inverter      ⑨Controller

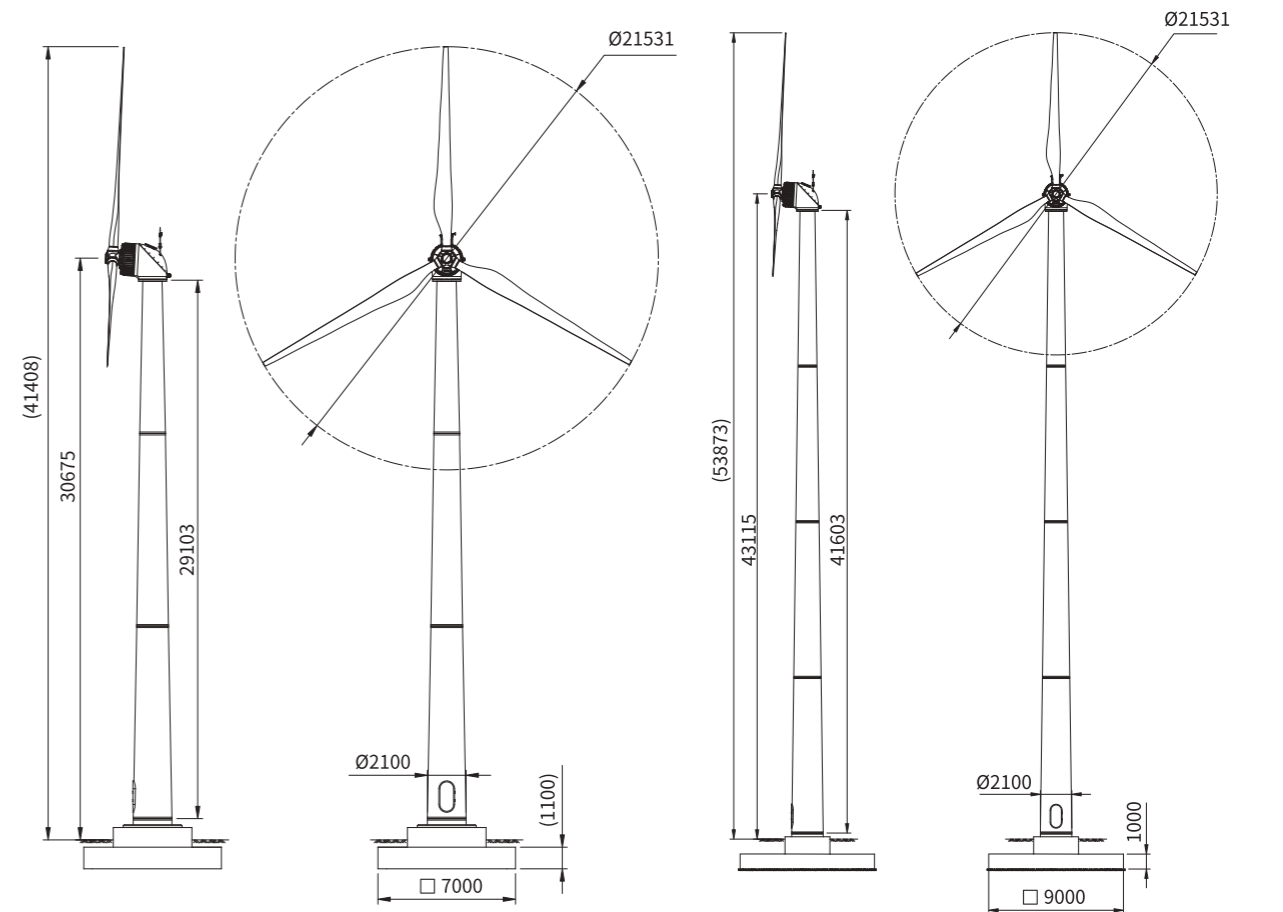
### Annual Energy Production and Noise Level



Annual mean wind speed(m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
<b>FD21-60 AEP(MWh)</b>	69	96	125	153	179	202	222	237	248
<b>FD21-50 AEP(MWh)</b>	68	94	120	146	169	189	205	218	227

### Specifications

Model	FD21-50	FD21-60	Tower Height(m)	30/36	30/36/42
Design Class	IECIIA		Nacelle Weight (t)	9.1	
Rated Power (kW)	50	60	Tower Weight(t)	13.8/16.8/19.6	
Rotor Diameter(m)	21.5		Brake System	Pitch/Mechanical/Electromagnetic	
Rated Wind Speed (m/s)	10		Speed Regulation	Pitch Control	
Rated PRM(rpm)	50	52	Lightning Protection	Air Termination	
Cut-in Wind Speed (m/s)	3		Surface Anti-corrosion	C5	
Cut-out Wind Speed (m/s)	25		Blade Material	FRP	
Extreme Wind Speed (m/s)	59.5		Generator Type	Permanent Magnet Direct-drive Generator	
Noise Level dB(A)	56		Monitoring System	CUBE	
Operating Temperature(°C)	-20~50		Lifespan(year)	20	
Grid-connected Access Mode	Low-Voltage 400V Grid				



计量单位:mm

### Product Features

- Designed according to IEC61400-2 standard, sweep area of 191 square meters
- Conform to Japan CLASSNK, Italy CEI0-21, America UL1741, Canada CSA C22.2 NO.107.1-01, England G59/2;
- SWCC, CE, IEC61400 certifications
- Stall speed adjustment to ensure power output stability.

- Multiple safety protections of mechanical braking, electromagnetic braking, and active yawing system.
- Full power inverter isolation technology ensures safety operation of WTG.
- SCADA remote online monitoring technology can realize real-time monitoring and adjustment of parameters

- High power generation capacity: FD16 series with special characteristics of high efficiency can produce more power under similar wind speed circumstances.
- Lower Noise: FD16 series adopt advanced 9 phase generator technology and low noise bearing designing, which can control noise more effectively and thereby provide silent and friendly operation environment
- Reduce EPC cost: Integrates traditional inverter, controller and dump load together as a complete control cabinet that can be used independently outside, effectively eliminating the construction cost of the machine room
- Simplified operation and maintenance workload: The integrated design of electrical integrated cabinets effectively simplifies the workload of future operation and maintenance

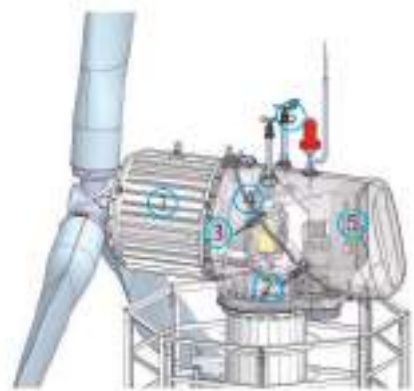


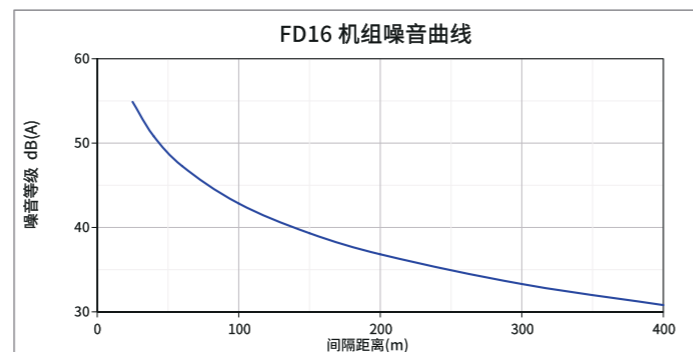
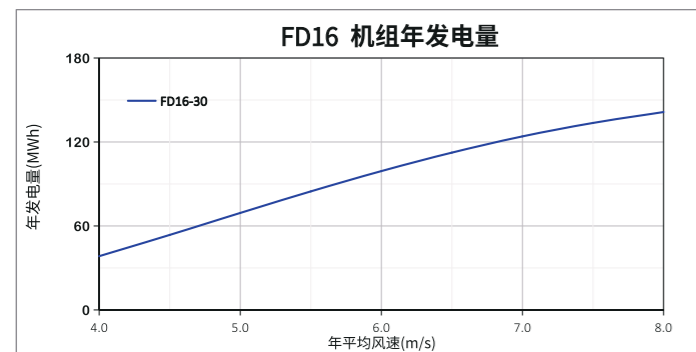
Figure 1 Nacelle structure diagram



Figure 2 Inverter and Controller Integrated Cabinet

- ①Generator    ②Yawing Syetem    ③Main Shaft Braking System
- ④Lubrication    ⑤Signal Collection Box    ⑥Anemometer/Vane
- ⑦Inverter    ⑧Controlle    ⑨Dump load

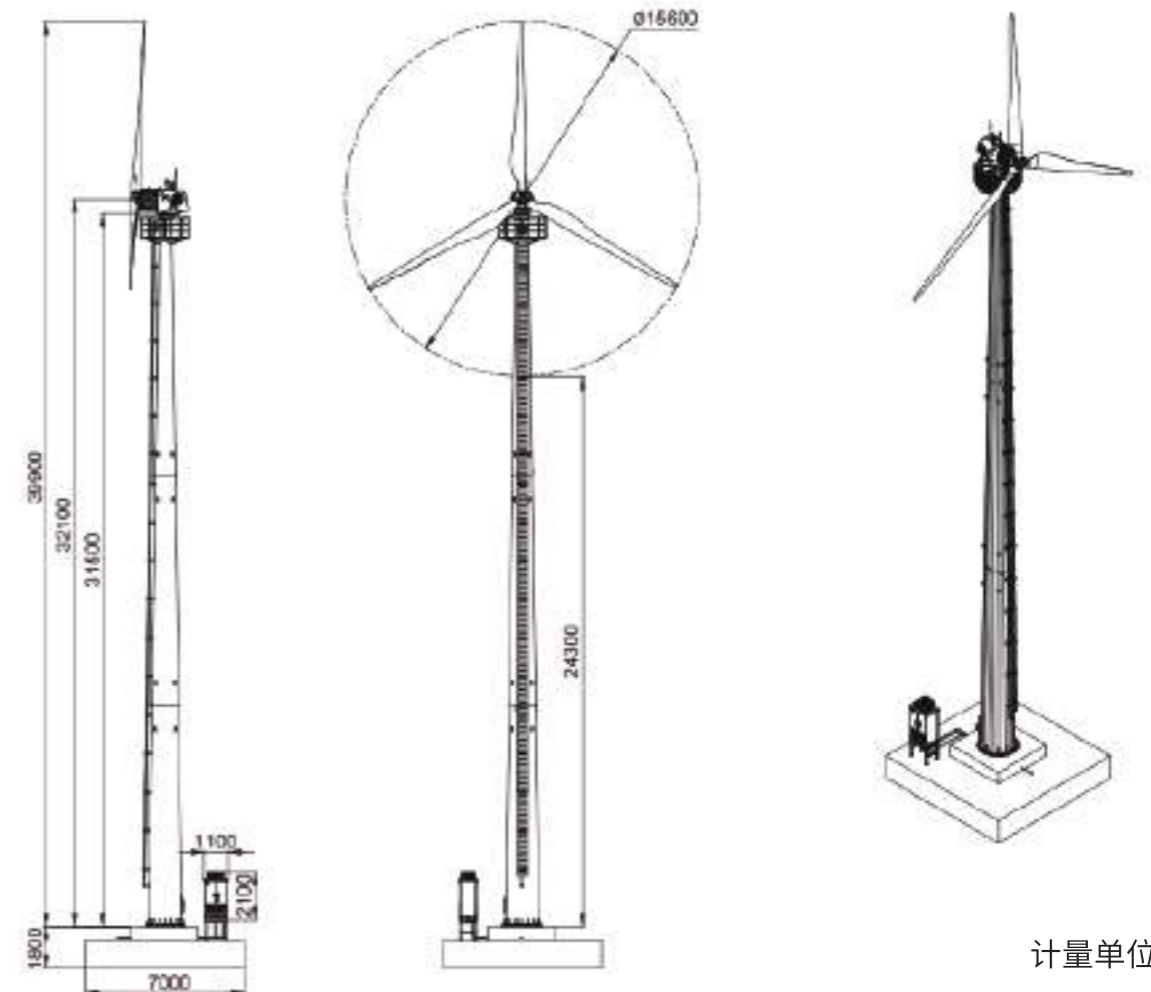
### Annual Energy Production and Noise Level



Annual mean wind speed(m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
<b>FD16-30 AEP(MWh)</b>	38.4	53.6	69.3	84.7	99.2	112.4	124.0	133.6	141.4

### Specifications

Model	FD16-30	Tower Height(m)	32
Design Class	IECIIA	Nacelle Weight (t)	3.0
Rated Power (kW)	30	Tower Weight(t)	9.9
Rotor Diameter(m)	15.6	Brake System	Mechanical/Electromagnetic
Rated Wind Speed (m/s)	10	Speed Regulation	Stall Control
Rated PRM(rpm)	69	Lightning Protection	Air Termination
Cut-in Wind Speed (m/s)	3	Surface Anti-corrosion	C5
Cut-out Wind Speed (m/s)	25	Blade Material	FRP
Extreme Wind Speed (m/s)	59.5	Generator Type	
Noise Level dB(A)	55	Monitoring System	CUBE
Operating Temperature(°C)	-20~50	Lifespan(year)	20
Grid-connected Access Mode	Low-Voltage 400V Grid		



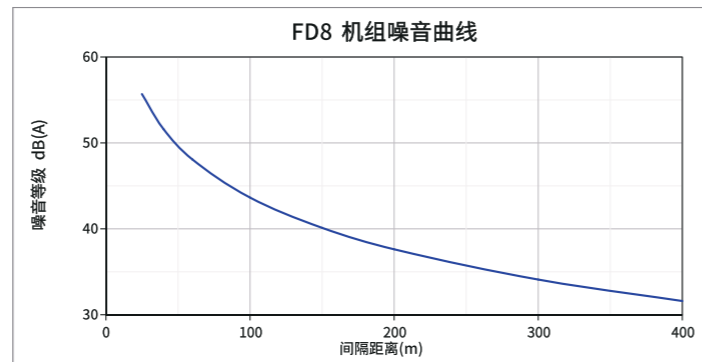
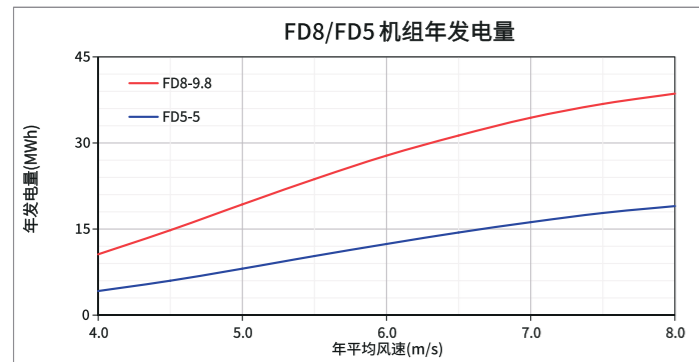
计量单位:mm

## Product Features

- Modularized standard designing for easy extending
- With RS485 communication interface and can be monitored remotely through GPRS
- Sustaining typhoon conditions
- Professional magnetic route designing, lower start torque
- Light spare parts, flexible and convenient for installation
- Over 10,000 sets are in operations all over the globe
- Widely used for communications, frontier islands, utilities, and residential electricity
- Low noise: Reduce noise level by optimizing generator design
- Reduce cost: Integrates traditional inverter, controller and dump load together as a complete control cabinet that can be used independently outside, effectively eliminates the construction cost of the machine room and simplifies the workload of future operation and maintenance



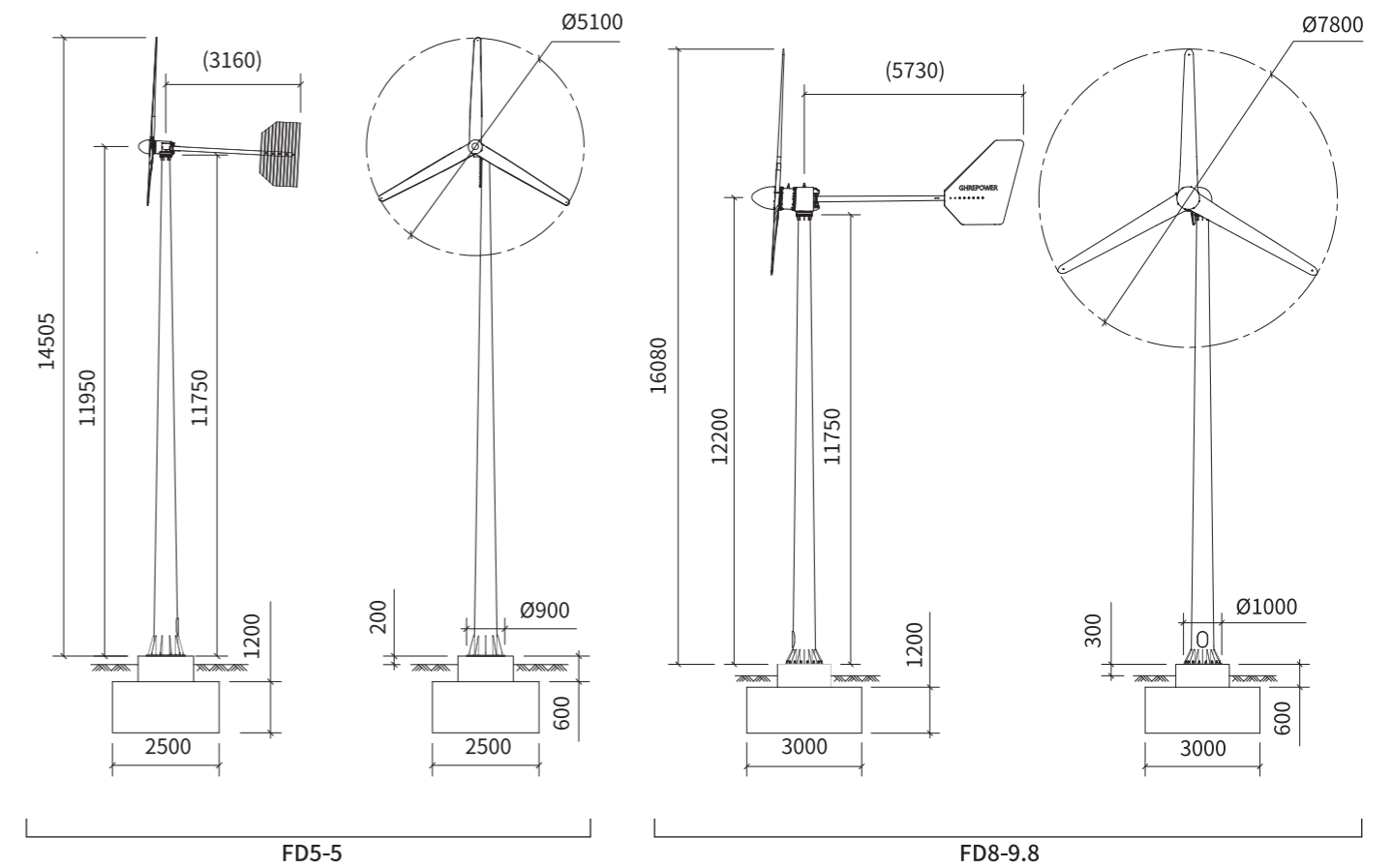
## Annual Energy Production and Noise Level



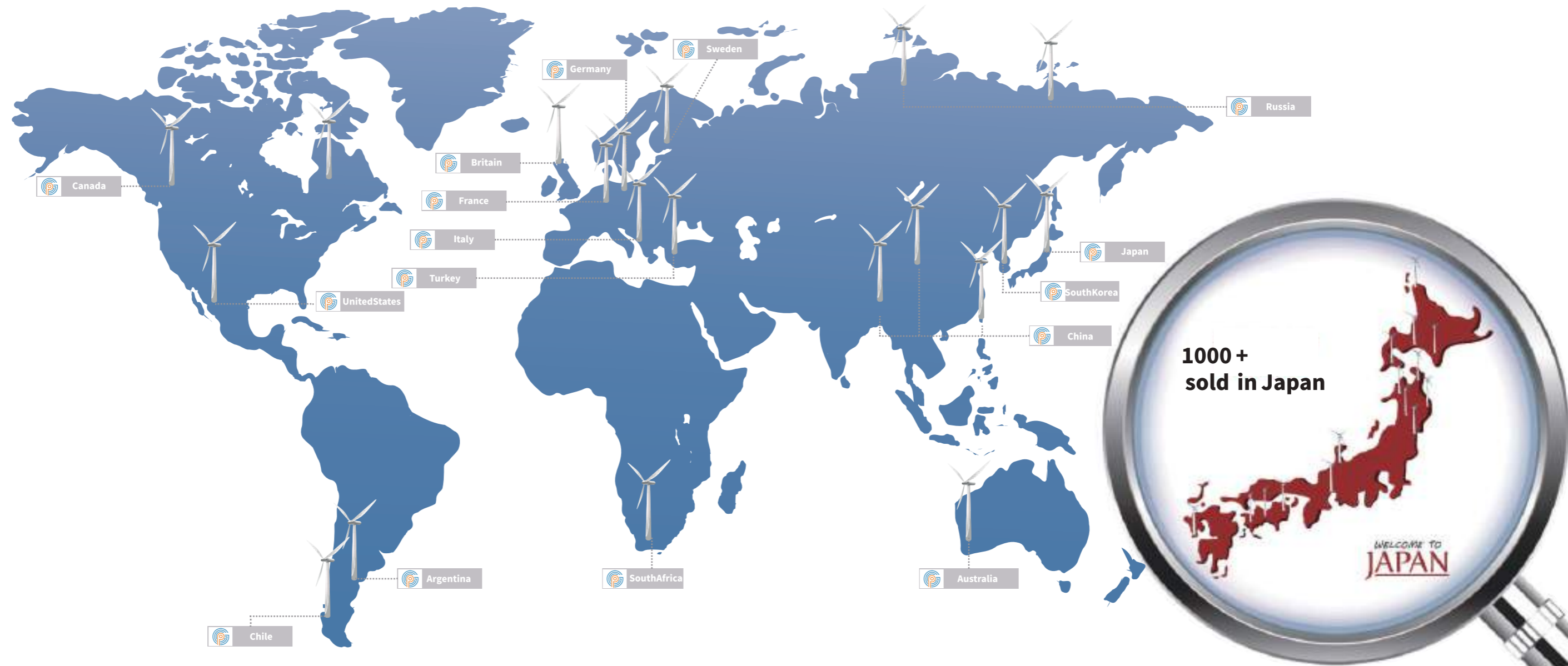
Annual mean wind speed (m/s)	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
<b>FD8-9.8 AEP (MWh)</b>	10.6	14.8	19.3	23.7	27.8	31.3	34.4	36.8	38.6
<b>FD5-5 AEP (MWh)</b>	4.2	6.0	8.1	10.3	12.4	14.4	16.2	17.8	19.0

## Specifications

Model	FD5-5	FD8-9.8	Tower Height (m)	12	12/20
Design Class	IEC IIIA		Nacelle Weight (t)	0.19	0.67
Rated Power (kW)	5	9.8	Tower Weight (t)	1.8	2.1
Rotor Diameter (m)	5.1	7.8	Brake System	Mechanical/Electromagnetic	
Rated Wind Speed (m/s)	11	11	Speed Regulation	Cornering/Stall Control	
Rated PRM (rpm)	270	170	Lightning Protection	Surge/Tower Grounding	
Cut-in Wind Speed (m/s)	3		Surface Anti-corrosion	C5	
Cut-out Wind Speed (m/s)	25		Blade Material	FRP	
Extreme Wind Speed (m/s)	52.5		Generator Type	Permanent Magnet Direct-drive Generator	
Noise Level dB(A)	56		Monitoring System	CUBE	
Operating Temperature (°C)	-20~50		Lifespan (year)	20	
Grid-connected Access Mode	Low-Voltage 400V Grid				



计量单位: mm



## Global Sales Map

\* Data collected internally by Shanghai Ghrepower  
 \* Data collection deadline on this page: March 31, 2023

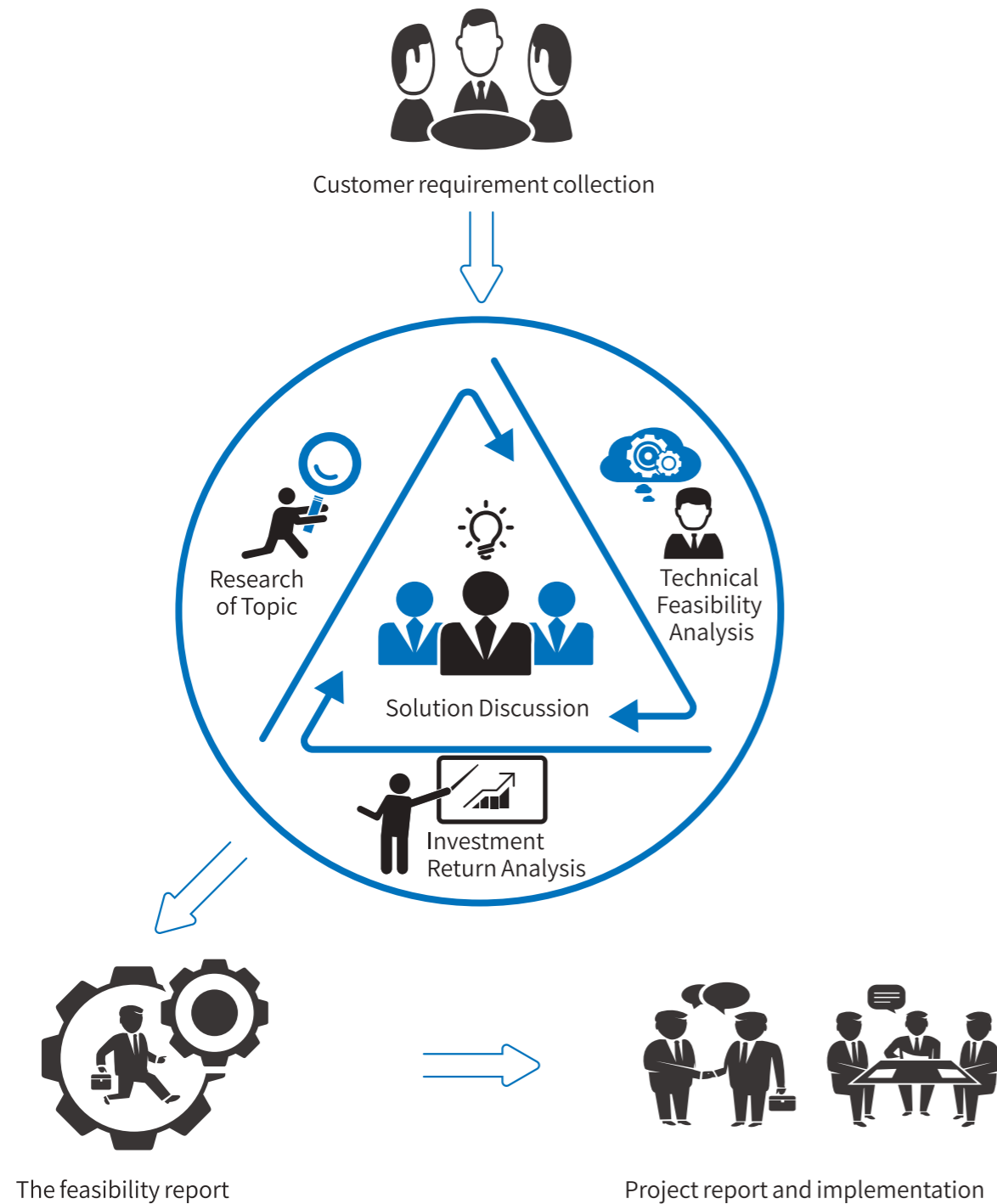
**30+**  
Countries & regions

**50%+**  
Market Share in Japan

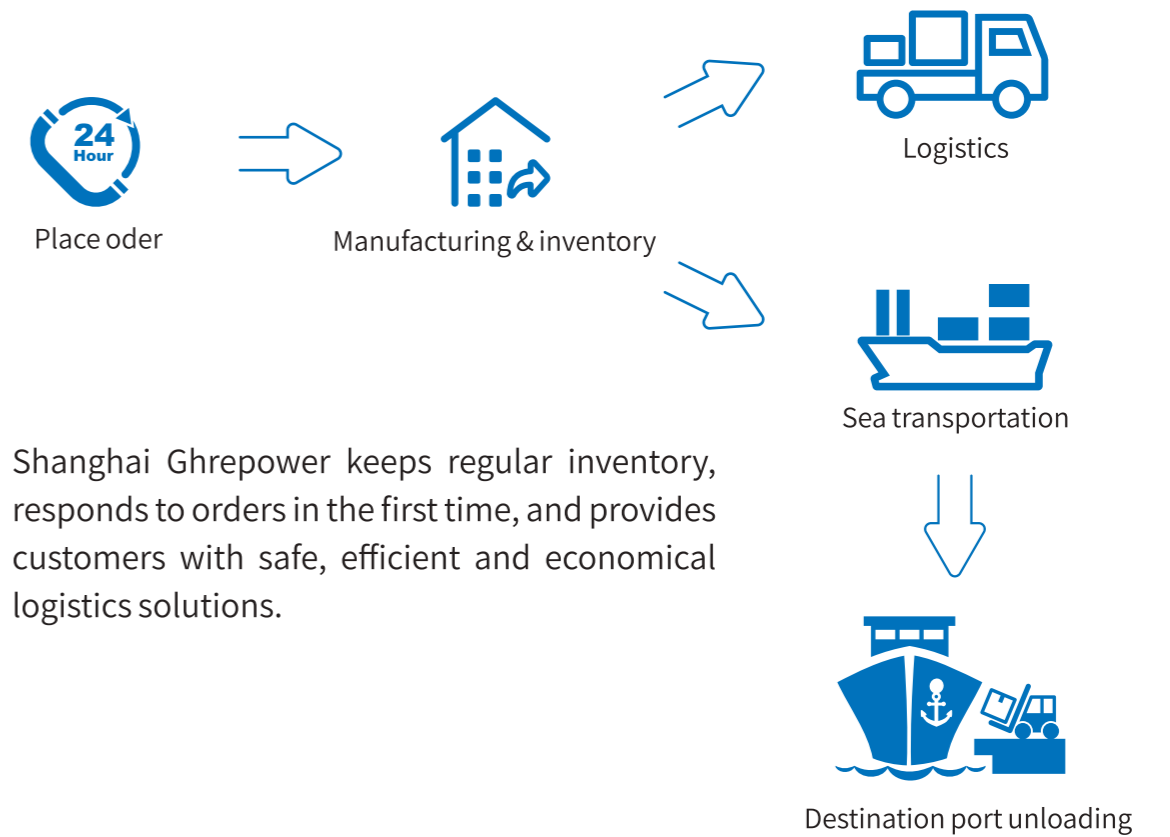
**1Company**  
Jointly Funded in Canada

**1Company**  
Solely Funded in Japan

## Pre-sale service



## After-sale service



Shanghai Ghrepower keeps regular inventory, responds to orders in the first time, and provides customers with safe, efficient and economical logistics solutions.

## After-sale service

● **EPC skills training certification:**

- 1. Wind turbine installation skills training;
- 2. Wind turbine commissioning and grid-connection skills training;
- 3. Skill training for wind turbine troubleshooting;
- 4. Wind turbine operation and maintenance skills training.

**Provide 20 years of product operation and maintenance service, more than 3000+ system operation and maintenance experience.**



Insurance Service



Extended Warranty Service



Spare Parts Storage

