WES

WIND ENERGY SOLUTIONS

WES HYBRID

80 & 250 kW

COMPANY

Wind Energy Solutions is a Dutch manufacturer of small to medium-sized wind turbines with generator capacities ranging from 2.5 kW to 250 kW. Our products are the result of 20 years of evolution in wind turbine technology. WES wind turbines have been installed and are operating in many different locations world-wide. They are characterized as being robust, reliable and easy to install in remote places, which enables our mission; "To Bring Renewable Energy Everywhere".

WIND ENERGY

A large share of the world's electricity is produced by diesel generators for those locations where a grid connection is not possible or not economically viable. For many years the industry has sought for the best combination of wind and diesel energy. WES came up with the solution; a unique patent pending off-grid Hybrid (Wind/Diesel) wind turbine system that guarantees a stable power generation. Due to the combination of the WES wind turbine rotor technology, the a-synchronous variable speed generator and the state-of-the-art control cabinet with specially designed system control, a Wind penetration of 100% can be achieved. Wind penetration is the amount of electricity supplied by the wind turbine in the total amount of electricity produced by the whole system.

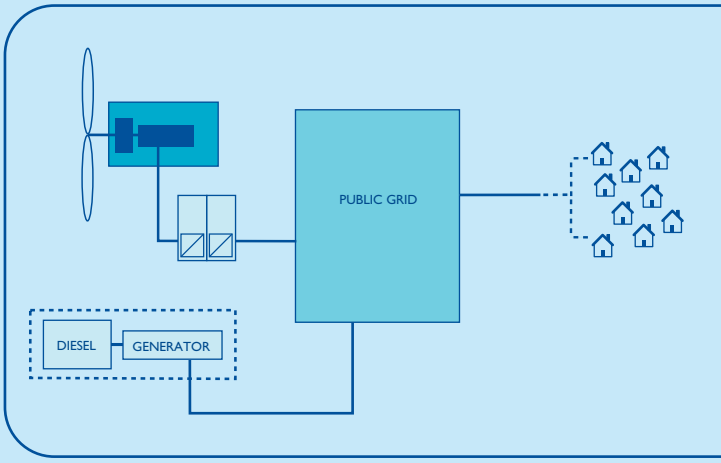
CHALLENGE

Reduce Diesel Consumption with Green Energy

With the WES Hybrid system you can harvest the wind and generate your own green energy, while reducing your diesel fuel consumption to a maximum. Each kWh produced with wind energy can be as little as 5 eurocents cheaper than the lowest diesel generated kWh!

The WES18 Hybrid has a nominal output of 80 kW and the WES30 Hybrid a nominal output of 250 kW. A diesel generator with equal or larger capacity connected to the wind turbine will provide the "grid power" and will act as a back-up in case there is insufficient wind to produce the needed electricity. The wind turbine powers the diesel generator when there is sufficient wind, thus maximizing your diesel fuel savings.

The Hybrid system can also be connected to other energy consumers that are "not time critical". This means that when electricity consumption is low more energy can be generated. This extra energy can be used to recharge battery-banks or to power desalination plants or heating systems. The Hybrid system is designed to be modular, so an unlimited number of diesel generators and wind turbines can be added.



Efficient, Reliable & All-round

The technology and design of the Hybrid system are based on the WES18 mk1 and WES30 mk1 with noticeable differences in its control cabinet. The Hybrid system is commonly used as a solitary wind turbine and it has the reputation of being durable and reliable. The typical Dutch two-bladed rotor has a unique hinge system and a passive blade-angle adjustment. This unique mechanism needs very little maintenance. Its weight and size allow for easy installation in remote locations and installation on a tubular or a lattice tower is possible, making the WES Hybrid system an all-round wind turbine.

KEY POINTS

FEATURE	BENEFIT
100% wind penetration	is maximum diesel fuel saving
New IPC Control Cabinet	can be used with any electronically controlled diesel generator
Reactive Power	no other equipment needed
Frequency Assist Control	Never produce more energy than needed
IPC user interface	fully automatic functions and user-friendly
Hinged blades	low stress loads on the drive train
Low weight and height	easy transport and installation
Mechanical design	low maintenance
Unique mechanical rotor	optimum reliability

TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS	80 kW	250 kW
Supplier / producer	WES BV	
Life expectancy	Minimum 20 years	
Service	maintenance twice a year	
Nominal Power	80 kW	250 kW
Cut in wind speed	< 3 m/s	
Cut out wind speed	25 m/s	
Nominal wind speed	12 m/s	
Survival wind speed	60 m/s	
Yawing	active yawing	
Passive power regulation	Blade angle adjustment	
Active power regulation	Fully variable back-to-back system	
Hub height	18–40 m	31–51 m
Number of blades	2	
Rotor diameter	18 m	30 m
Noise emission at 8 m/s	95 dB(a) at source	
	104 dB(a) at source	
Noise emission at distance	45 dB(a) at 100 m	
	45 dB(a) at 300 m	

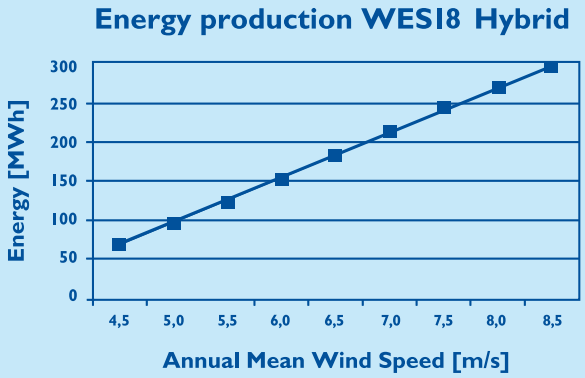
ELECTRICAL SPECIFICATIONS	80 kW	250 kW
Power	80 kW	250 kW
Voltage	400V/50Hz 3 phase or 400V/60Hz 3 phase	
Connection	grid connected	
Converter	back-to-back inverter (IGBT)	

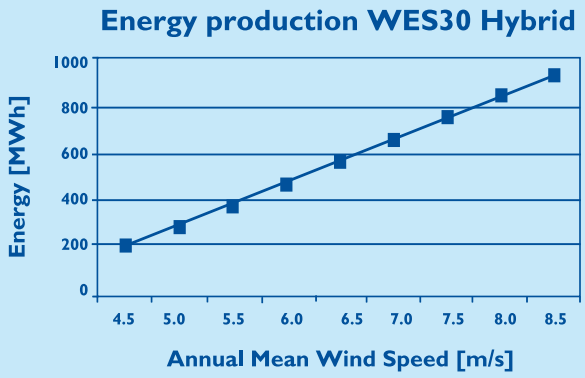
APPLIED STANDARDS	80 kW	250 kW
Degree of Protection	IP55	IP54
According	NEN1010 & NEN6096	
First safety	Passive blade pitch	
Second safety	Yawing out of the wind	

GENERATOR	80 kW	250 kW
Type	a-synchronous	
Number of poles	4	
Frequency variable	40–80 Hz	25–75 Hz

WEIGHTS	80 kW	250 kW
Blade	86 kg	327 kg
Rotor	900 kg	2.500 kg
Nacelle incl. rotor	3.000 kg	7.500 kg
Tower: 30 m.	8.020 kg	13.300 kg
Tower: 50 m.	9.400 kg	24.400 kg

MATERIAL SPECIFICATIONS	80 kW	250 kW
Blades	Carbon fibre reinforced epoxy	
Blade length	7.8 m	13.4 m
Weight of single blade	86 kg	327 kg
Tower	Steel: tubular or lattice	
Foundation	Concrete block with anchor or tube	





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