

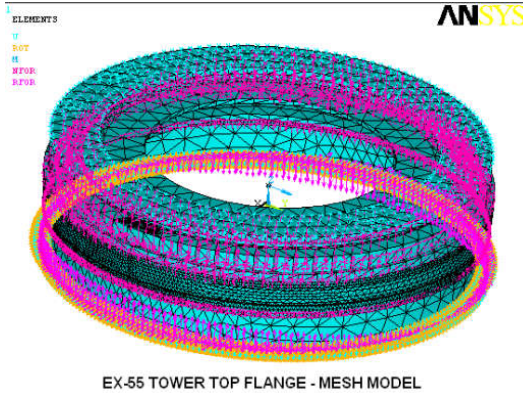


Xyron

Wind of Innovation



Xyron Technologies Ltd in-House Research & Development Mechanical Design

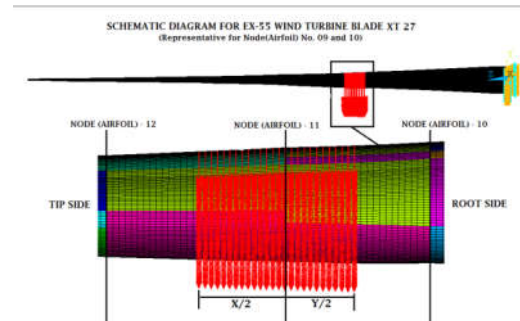
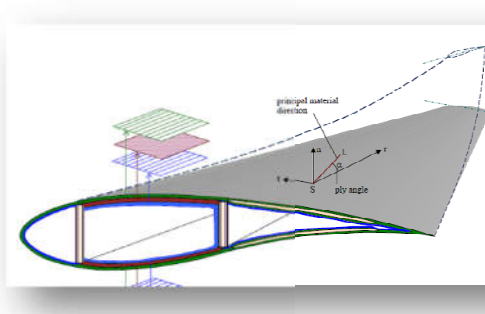


Strong capability in mechanical design and analysis, this has lead to all the components of wind turbine being designed in house

Electrical/Control Design



Blade & Airfoils design

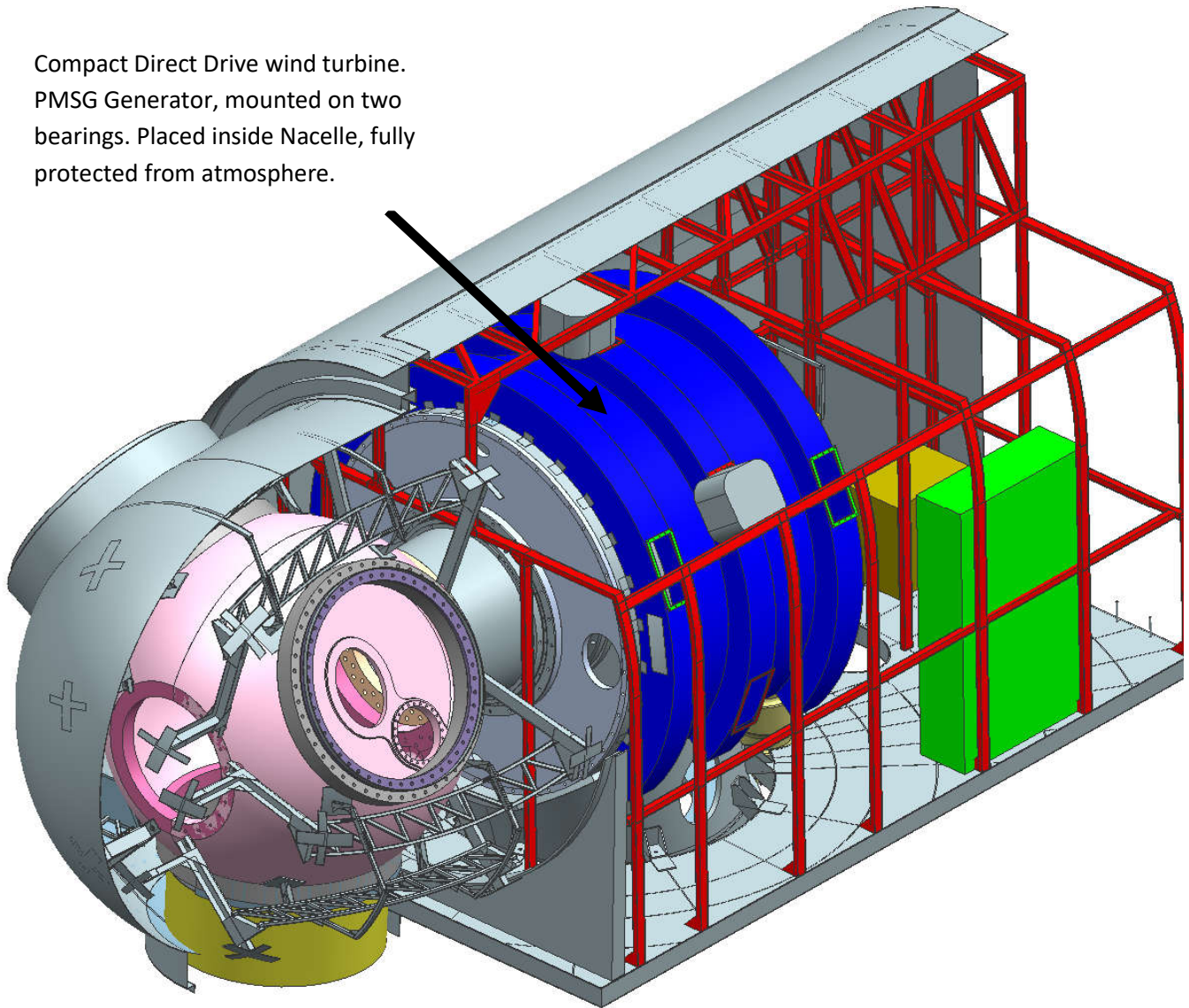




Most wind turbines installed around the world use gearbox to transmit power from rotor to generator. Gearbox are known to be the most common cause of wind turbine's failures and/or major breakdowns. Xyron's design eliminates gearbox and has a gearless drive train. This not only removes a major and expensive component including its gearbox cooling system and accessories but also removes the maintenance costs associated with it.

Wind Turbines with Gearbox are three times more expensive to maintain than gearless wind turbine. The gearless machines with full power inverter system, are proven to be highly efficient machines in the fleet.

Compact Direct Drive wind turbine.
PMSG Generator, mounted on two bearings. Placed inside Nacelle, fully protected from atmosphere.



Minimalistic Technology Platform

Gearless drive technology being very advance technology, is only with less than half a dozen companies worldwide.



Xyron Technologies Ltd.

Main Data

Model	EX-55/60-1000	EX-55/71-1000	EX-55/112-1000	
Rotor diameter	55m	55m	55m	
Hub Height	60 m	71 m	112m	
Rated power	1000 kW	1000 kW	1000 kW	
Drive Train	Direct Drive (Gearless)		Removes expensive gearbox maintenance	
Control Pitch	3 independent pitch control			made by Xyron
Operation Mode	Variable Speed	Variable Speed	Variable Speed	
Design Life	20 years	20 years	20 years	
IEC Wind Class	IIB	IIB /IIIA	IIB /IIIA	

Generator-Convertor System

Generator	Permanent magnet Synchronous Generator (PMSG)			Made by Xyron
Protection Class	IP54 Totally Enclosed within Nacelle			
Nominal Voltage	690 V	690 V	690 V	
Frequency	50 Hz/ 60 Hz	50 Hz/ 60 Hz	50 Hz/ 60 Hz	Programmable
Power Factor	Unity +/- 5%	Unity +/- 5%	Unity +/- 5%	additional power factor correction devices on grid not required
Rated Power	1150 kW	1150 kW	1150 kW	
RPM RANGE	14-30 RPM	14-30 RPM	14-30 RPM	
Cooling System	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	
Convertor	System Full Power Convertor System, IGBT- 4 Quadrant			Ingeteam, SPAIN
Main Bearing				Rothe Erde, GERMANY

Operation Data (Based on 10 min average wind speed)

Cut-in wind speed	3 m/s	3 m/s	3 m/s	
Cut-out wind speed	24 m/s	24 m/s	24 m/s	
Rated wind speed	12 m/s	12 m/s	12 m/s	
Survival wind speed	59.5 m/s (3sec gusts) or 42.5 m/s (10 min avg)			

Yaw System

Type	Active Yaw	Active Yaw	Active Yaw	
Yaw Drives	3 motors with planetary gear boxes			Bonfiglioli, ITALY
Yaw Breaks	Hydraulic caliper Brakes			Svendborg, GERMANY
Yaw Bearing				Rothe Erde, GERMANY
Yaw Motor	3kW TEFC S1 IP55, Class F with DC Brake			Crompton Greaves, INDIA

Rotor

Swept Area	2375.82 m ²	2375.82 m ²	2375.82 m ²	Made by Xyron Using VARIM. Epoxy-Hexion -GERMANY Glass fibre- Saertex, GER Foam – DIAB, GERMANY
No of Blades	3	3	3	
Blade Length	26.5 m	26.5 m	26.5 m	
Blade Material	FRP-Epoxy	FRP-Epoxy	FRP-Epoxy	
Tilt Angle	2.5 deg	2.5 deg	2.5 deg	
Cone Angle	2.5 deg	2.5 deg	2.5 deg	
Brake	3 Independent Aerodynamic Brake			
Blade Bearing				Rothe Erde, GERMANY
Pitch Drives				Bonfiglioli, ITALY
Pitch Motors	5.5kW TEFC S1 IP55, Class F with DC Brake			Crompton Greaves, INDIA



Tower

Tower Height	58 m	69 m	110 m	Made by Xyron
Type	Conical	Conical	Conical	
Segment	3	3	5	
Material	S355 Steel	S355 Steel	S355 Steel	
Climb Assist	Yes	Yes	Yes	

Main control System

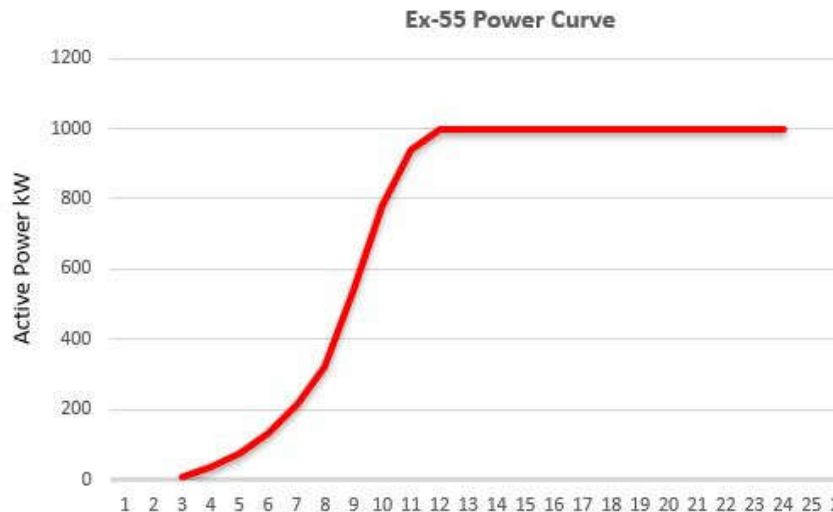
Controller	PLC Control	PLC Control	PLC Control	Bachmann, AUSTRIA
SCADA	available	Available	Available	
Earth Quake protection	Yes	Yes	Yes	
Control Panel	Nacelle + Tower Base	Nacelle + Tower Base	Nacelle + Tower Base	Made by Xyron

Ambient operating conditions

	Cold Climate	Hot Climate	
Operating Condition	-10 deg C	40 deg C (50 deg C with derating)	
Survival	-30 deg C	----	

Other Components made by Xyron:

- I. Nacelle Assembly
- II. Nacelle Cover
- III. Nose Cone
- IV. Hub Assembly
- V. Mainframe
- VI. Main Shaft



GL Wind Class	Annual Mean wind speed [m/s]	Annual energy yield * [kWh]	PLF [%]
	6	17,88000.00	20.5
	6.5	21,42000.00	25.0
	7	24,97000.00	28.9
III	7.5	28,43000.00	32.4
	8	31,76000.00	36.2
II	8.5	34,88000.00	40.0
	9	37,75000.00	43.0
	9.5	40,30000.00	46.0
I	10	Will be given as per site	

*Annual energy yield [kWh] for EX-55 estimated at 95% availability ;Weibull shape factor = 2