

NPS 60C-24

Class III/A



The next generation high output wind turbine for low to medium wind regimes

NPS 60C-24

» The NPS 60C-24, with 60kW rated power and a rotor of 24.4 meter, provides a high energy yield. It offers long-term benefits at low operational costs during its entire life cycle.

» The NPS 60C-24 fully satisfies market demand both in terms of authorization and maximized return on investment under different wind conditions, even in case of moderate incentives.

» The turbine is optimized for high power outputs at simultaneous low noise levels. It starts producing energy at wind speeds as low as 3 meters per second, offering excellent financial benefits in various wind regimes.

» Our Global fleet of turbines has exceeded 25 million run hours with an average availability in excess of 98% due to our permanent magnet direct drive technology (PMDD).

Key Benefits

» Simple and proven

Our PMDD technology maximizes energy capture, exceeding the performance of geared turbines, eliminating costly repairs and thus reducing operational costs.

» Optimised for low to medium wind regimes

The NPS 60C-24 is specifically designed for central European wind markets, suitable for sites with an average annual wind speed between 5 – 7.5 m/s.

» Plug and play

Our state-of-the-art full four quadrant power converter offers stable energy output, simplifying interconnection and increasing grid stability.

» Reliable

The reinforced blades and stringent design criteria according to IEC 61400-1 provide for extreme reliability that made it withstand several hurricane force winds in the Caribbean.

» Connection

The embedded grid interface cabinet enables for a direct connection to the low voltage grid.

2 Year Warranty

» Our Warranty options cover up to 2 years, with service options that extend up to 20 years. Various levels of service packages are available to meet varying customer needs. The Premium package includes an availability and power curve performance guarantee. Northern Power Systems will remain your service and maintenance provider for the entire duration of the program. With several multi-year options, Northern Power Systems guarantees operational costs, optimized for your specific needs.

Operation and Maintenance

» Our service network guarantees rapid response and swift repairs thanks to our dedicated teams and spare part warehouses distributed across Europe.

» 24/7 monitoring is provided by our L1 technicians in order to minimize turbine downtime.

» Upon request, customized reporting services and integration into third-party plant monitoring systems are available.



Specifications

General configuration

Model	Northern Power® 60C-24
Design Class	IIEC WTGS III/A (air density 1.22 kg/m ³ , average annual wind speed lower than 7.5 m/s, wind gusts with peaks lower than 52.5 m/s)
Design Lifetime	20 years
Rotor Diameter	24.4 m
Tower Types	Steel tubular tower
Hub Height	37m, 29m, 22m
Orientation	Upwind, 3 blades
Yaw System	Active yaw drive, electromechanical controls guided by wind speed and direction sensors; automatic cable unwind.
Power Regulation	Variable speed, stall control
Certification	CE compliant, CEI 0-21

Performance

Rated Wind Speed	11 m/s
Cut-in Wind Speed	3 m/s
Cut-out Wind Speed	25 m/s
Extreme Wind Speed	52.5 m/s

Weight

Nacelle & Rotor (27 m)	7,800 kg
Tower (37 m)	12,000 kg
Tower (30m)	11,000 kg

Drive train

Gearbox	No gearbox (direct drive)
Generator Type	Permanent magnet

Braking system

Redundant Braking System (IEC 61400-1ed3)	Dynamic generator brake and multiple hydraulic calipers
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Control system

Controller Type	DSP-based multiprocessor embedded platform
Converter Type	IGBT frequency converter with PWM (pulse-width modulated) technology
Monitoring System	SmartView® remote monitoring system; ModBus TCP via ethernet

Electrical System

Rated electrical power	59.9 kW, 3-phase, 400 VAC, 50 Hz
Power factor range	Adjustable set point between 0.9 lagging and 0.9 leading
Reactive power	+/- 30 kVAR
Grid connection	Protective relay and isolation transformer included

Noise

Apparent Noise Level	50 dBA at 50 metres from nacelle
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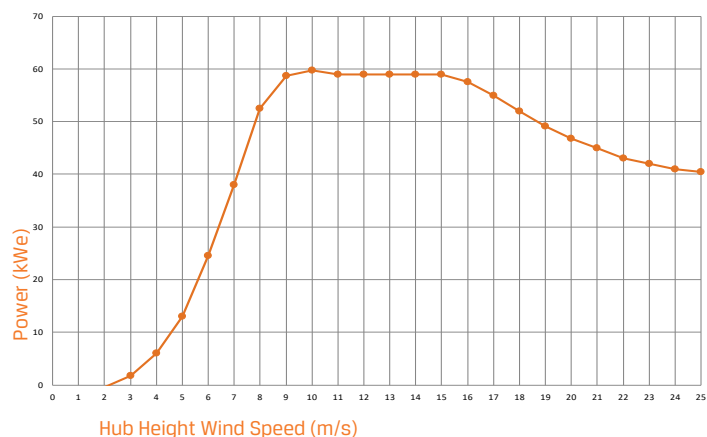
Environmental specifications

Operating Temperature Range	-10°C to 40°C
Temperature Range in Storage	-20°C to 50°C
Lightning Protection	Receptors in blades, nacelle lightning rod and electrical surge protection

Power Curves

NPS 60C-24 Class III/A Power Curve

24.4m Rotor, Standard Conditions*

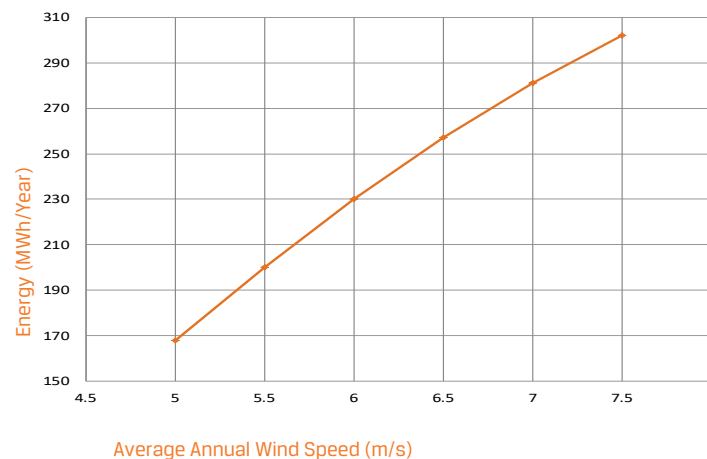


Wind Speed (m/s)	1	2	3	4	5	6	7	8	9	10
Power (kWe)	-0.5	-0.5	1.7	6.0	13.0	24.5	38.0	52.5	58.7	59.7

	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Power (kWe)	59.9	59.9	59.9	59.9	59.9	57.5	55.0	52.0	49.1	46.8	45.0	43.0	42.0	41.0	40.5

Annual Energy Production: 24.4m Rotor

Standard Conditions*, Rayleigh Wind Distribution



Average Annual Wind Speed (m/s)	5.0	5.5	6.0	6.5	7.0	7.5
Energy (MWh/Year)	168	200	230	257	281	302

* Standard conditions: air density 1.225 kg/m³, equivalent to 15°C at sea level. NPS, Northern Power, SmartView & Hurricane Resistant are trademarks of Northern Power Systems.

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