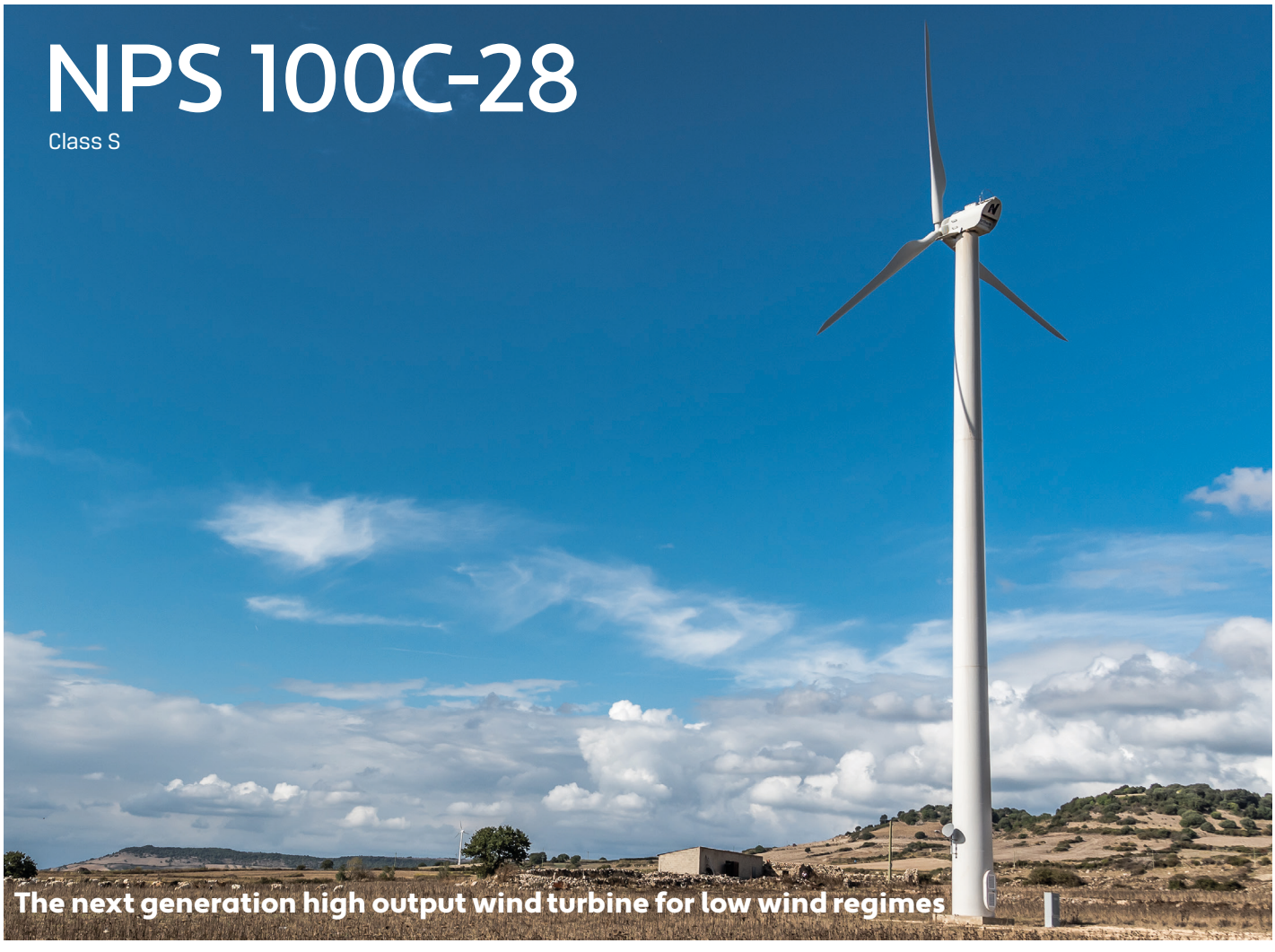
NPS 100C-28

Class S



NPS 100C-28

» The NPS 100C-28, with its large 28 meter rotor diameter, is designed to provide high amounts of energy throughout the year. It offers long-term benefits at low operational costs during its entire life cycle.

» The NPS 100C-28 fully satisfies market demand both in terms of authorization and maximized return on investment under low wind conditions, even in case of moderate incentives.

» The turbine is optimized to generate high outputs at low wind speeds at simultaneous low noise level. 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 wind regimes**
The NPS 100C-28 is specifically designed for the Italian markets, suitable for low wind sites with an average annual wind speed of 4.5 - 6 m/sec.

» **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.

7 Year Warranty

» Our Warranty options cover up to 7 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® 100C-28
Design Class	IEC WTGS S (air density 1.225 kg/m3, average annual wind speed lower than 6.0 m/s, wind gusts with peaks lower than 50.6 m/s)
Design Lifetime	20 years
Rotor Diameter	28 m
Tower Types	Steel tubular tower
Hub Height	37 m, 30 m
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	12 m/s
Cut-in Wind Speed	2.5 m/s
Cut-out Wind Speed	20 m/s
Extreme Wind Speed	50.6 m/s

Weight

Nacelle & Rotor (28 m)	8,000 kg
Tower (37 m)	11,500 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

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	90 kW, 3-phase, 400 VAC, 50 Hz
Power factor range	Adjustable set point between 0.9 lagging and 0.9 leading
Reactive power	+/- 45 kVAR
Grid connection	Protective relay and isolation transformer included

Noise

Apparent Noise Level	Approx. 50 dBa at 50 meters from nacelle

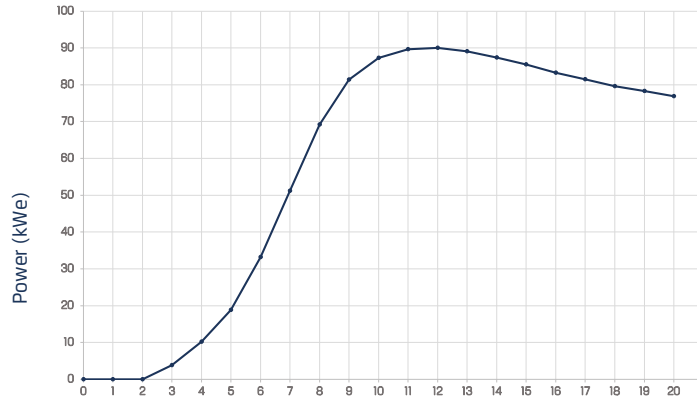
Environmental specifications

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

Power Curves

NPS 100C-28 Class S Power Curve

28m Rotor, Standard Conditions*

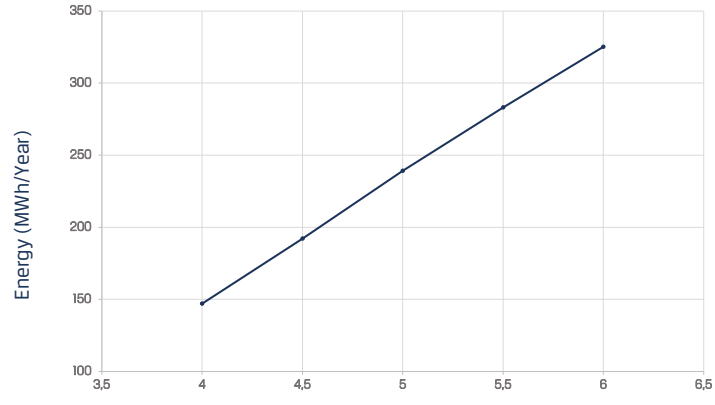


Wind Speed (m/s)	1	2	3	4	5	6	7	8	9	10
Power (kWe)	-0.6	-0.6	3.8	10.2	18.8	33.2	51.2	69.2	81.4	87.3

11	12	13	14	15	16	17	18	19	20
89.6	90.0	89.1	87.4	85.5	83.3	81.5	79.6	78.3	76.9

Annual Energy Production: 28m Rotor

Standard Conditions*, Rayleigh Wind Distribution



Average Annual Wind Speed	(m/s)	4.0	4.5	5.0	5.5	6.0
Energy	(MWh/Year)	147	192	239	283	325

* Standard conditions: air density 1.225 kg/m³, equivalent to 15°C at sea level.

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