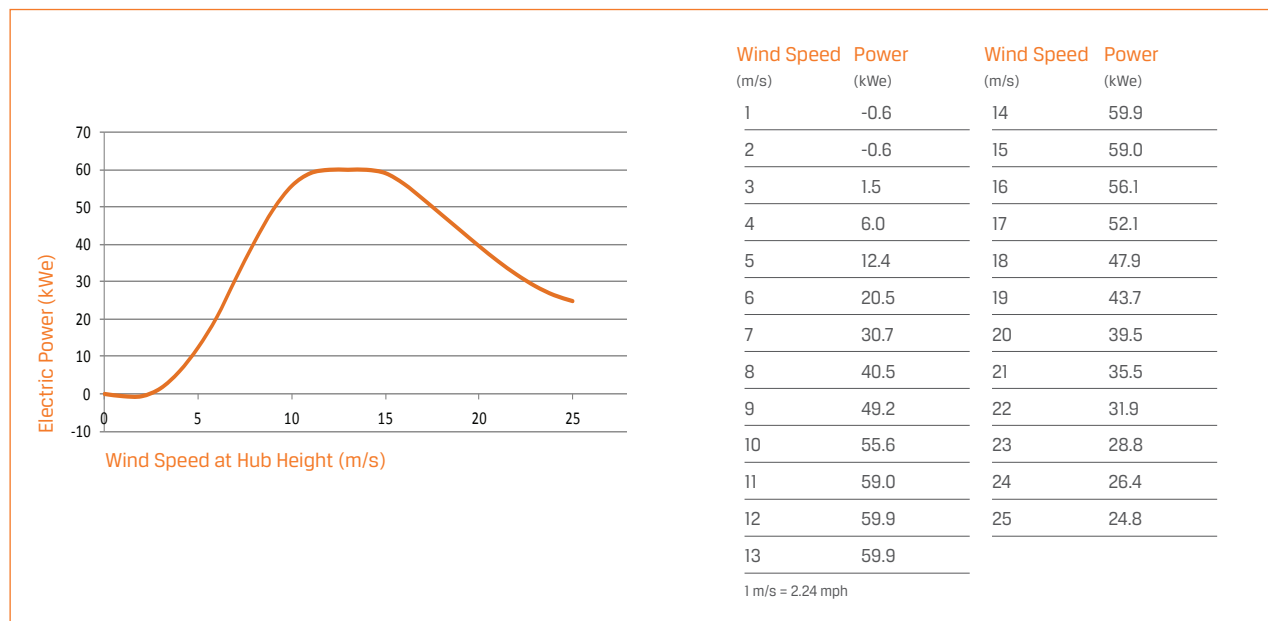


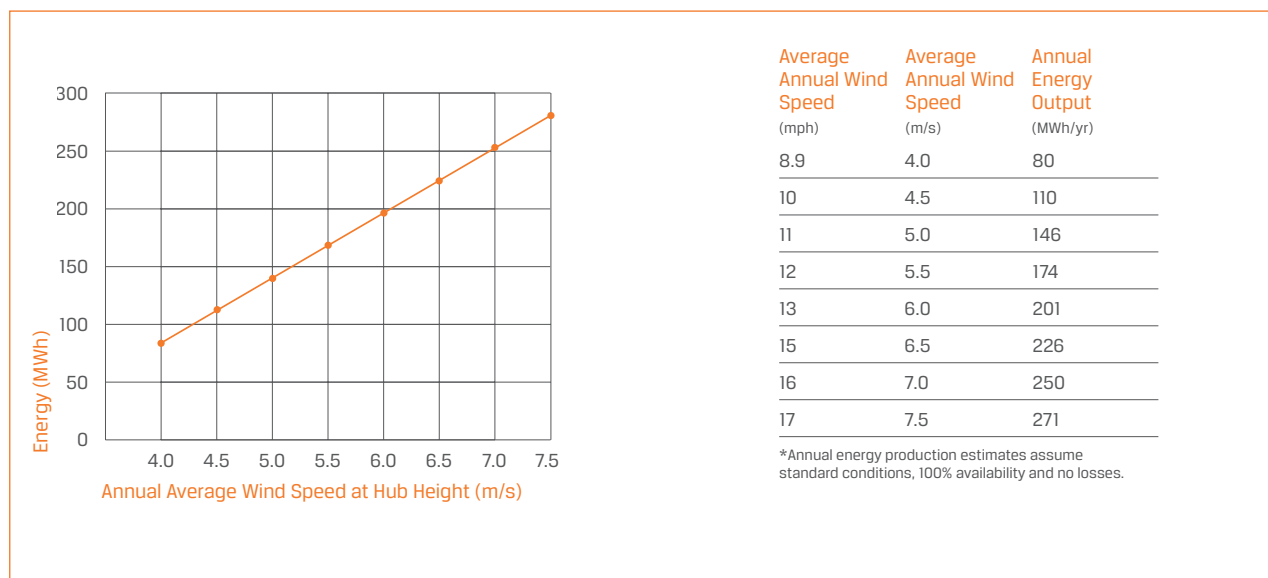
# Northern Power® 60-23

IEC Class III/S

Power Curve: 23-Meter Rotor Standard Air Density (1.225 kg/m<sup>3</sup>)



Annual Energy Production\*: 23-Meter Rotor Standard Air Density, Rayleigh Wind Speed Distribution



## Specifications



GENERAL CONFIGURATION	DESCRIPTION
Model	Northern Power® 60-23
Design Class	IEC WTGS III/S (air density 1.225 kg/m³, average annual wind below 7.5 m/s, 50-yr peak gust below 54 m/s)
Design Life	20 years
Rotor Diameter	23 m (69 ft)
Tower Types	Tubular steel monopole or lattice
Hub Height Options	37 m (121 ft) / 30 m (98 ft) / 23 m (75 ft) on tubular monopole; or 48 m (157 ft) on lattice
Orientation	Upwind, 3 blade
Yaw System	Active yaw drive with wind direction/speed sensors and automatic cable unwind
Power Regulation	Variable speed, stall control
Certifications	CE compliant, CEI 0-21
PERFORMANCE	DESCRIPTION
Rated Wind Speed	14.0 m/s (31 mph)
Cut-In Wind Speed	3.0 m/s (7 mph)
Cut-Out Wind Speed	25.0 m/s (56 mph)
Extreme Wind Speed	54 m/s (120 mph)
WEIGHT	DESCRIPTION
Rotor (23-meter) & Nacelle (standard)	7,800 kg (17,160 lbs)
Tower (37-meter)	14,000 kg (30,800 lbs)
DRIVE TRAIN	DESCRIPTION
Gearbox Type	No gearbox (direct drive)
Generator Type	Permanent magnet
BRAKING SYSTEM	DESCRIPTION
Redundant Braking System (per IEC 61400-1)	Generator dynamic brake and multiple spring-applied calipers
CONTROL SYSTEM	DESCRIPTION
Controller Type	DSP-based multiprocessor embedded platform
Converter Type	Pulse-width modulated IGBT frequency converter
Monitoring System	SmartView® remote monitoring system, ModBus TCP over ethernet
ELECTRICAL SYSTEM	DESCRIPTION
Rated Electrical Power	59.9 kW, 3 Phase, 400 VAC, 50 Hz (standard conditions: air density of 1.225 kg/m³, equivalent to 15°C (59°F) at sea level)
Power Factor	Set point adjustable between 0.9 lagging and 0.9 leading
Reactive Power	+/- 30 kVAR
Grid Interconnect	Utility approved protective relay included
NOISE	DESCRIPTION
Apparent Noise Level	55 dBA at 40 meters from nacelle (131 ft)
ENVIRONMENTAL SPECIFICATIONS	DESCRIPTION
Temperature Range: Operational	-10°C to 50°C (14°F to 122°F)
Temperature Range: Storage	-30°C to 55°C (-22°F to 131°F)
Lightning Protection	Receptors in blades, nacelle lightning rod and electrical surge protection

All Specifications subject to change without notice.



29 Pitman Road  
Barre, VT, USA 05641  
+1.802.461.2955

281 Winter Street, Suite 120  
Waltham, MA, USA 02451  
+1.617.871.6065

Thurgauerstrasse 40  
8050 Zurich, Switzerland  
+41.44.307.3733