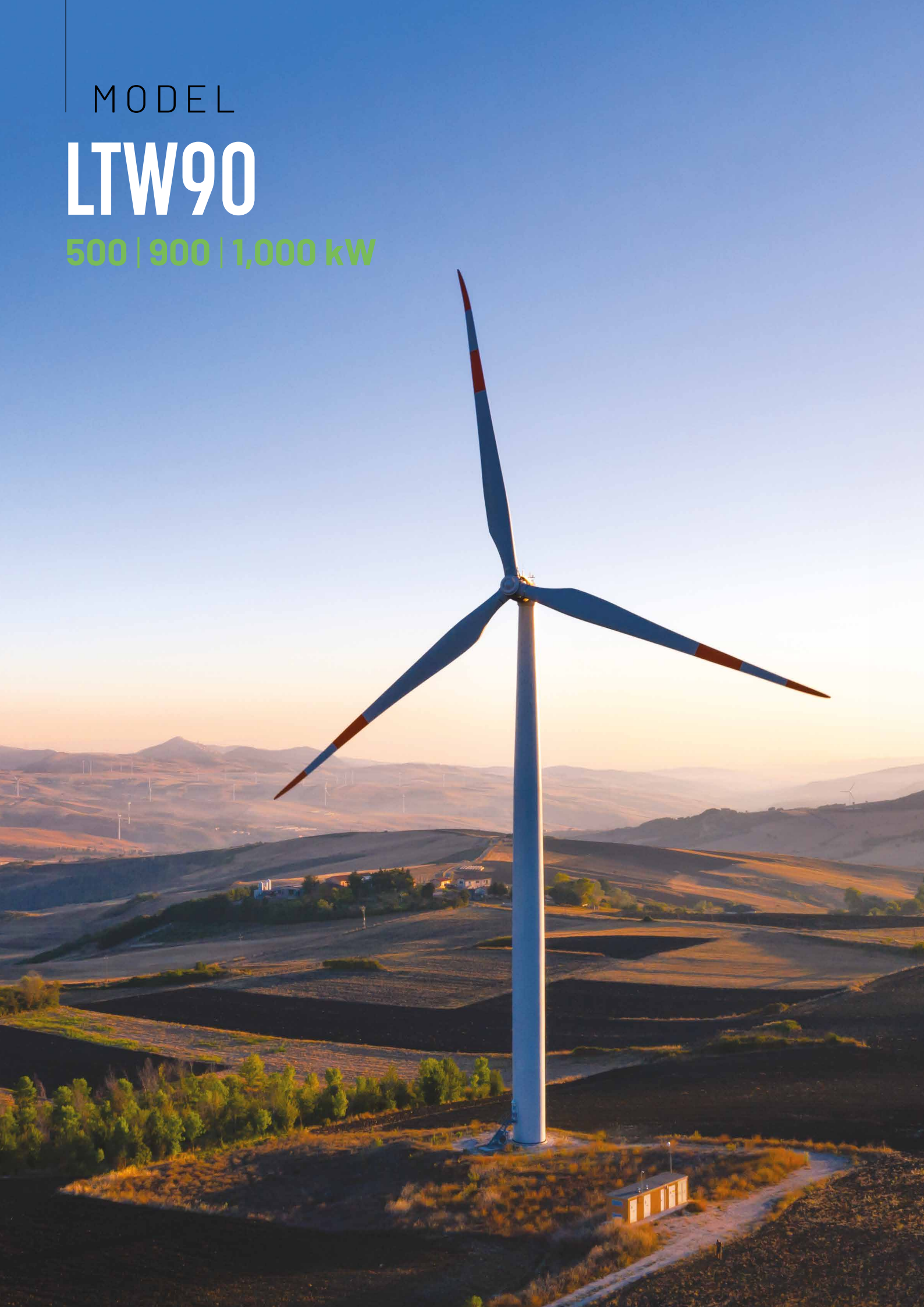


MODEL

LTW90

500 | 900 | 1,000 kW



LTW90 500 | 900 | 1,000 kW

DESIGN DATA

Rated power	500 900 1,000 kW
Hub height	60 / 65 / 80 / 97.5* m
Tip height max (upper end)	105 / 110 / 125 / 142 m
Wind class	IIIA / S
Cut-in wind speed	3 m/s
Cut-out wind speed	25 m/s
Concept	Direct Drive 3-bladed upwind turbine with horizontal axis, variable speed and automatic pitch and yaw regulation

TOWER

	Segmented tubular steel tower
	Transformer and converter station in tower bottom

ROTOR

Rotor diameter	90 m
Swept area	6,404 m ²
Rotational speed	15 rpm
Tip speed	71 m/s
Blade material	GFRP-EP
Power and rotor speed control	Active pitch control

GENERATOR Direct Drive

Type	Permanent Magnet Direct Drive Synchronous Machine
Stator Winding	Modular coils with tooth concentrated winding, exchangeable
Rotor Topology	Modular Permanent Magnets with flux concentration, exchangeable
Cooling	Air cooled rotor and water cooled stator
Speed Range	Variable Low Speed Machine

CONTROL & SAFETY SYSTEM

Pitch and yaw control	Active electrical LeitPitch system and active electrical yaw system
Remote control	Leitwind integrated SCADA
Safety system	Hardwired safety loop
Main brake	Aerodynamic, independent pitch control
Service brake	Electrical
Rotor lock	Hydraulic

POWER ELECTRONIC LeitDrive

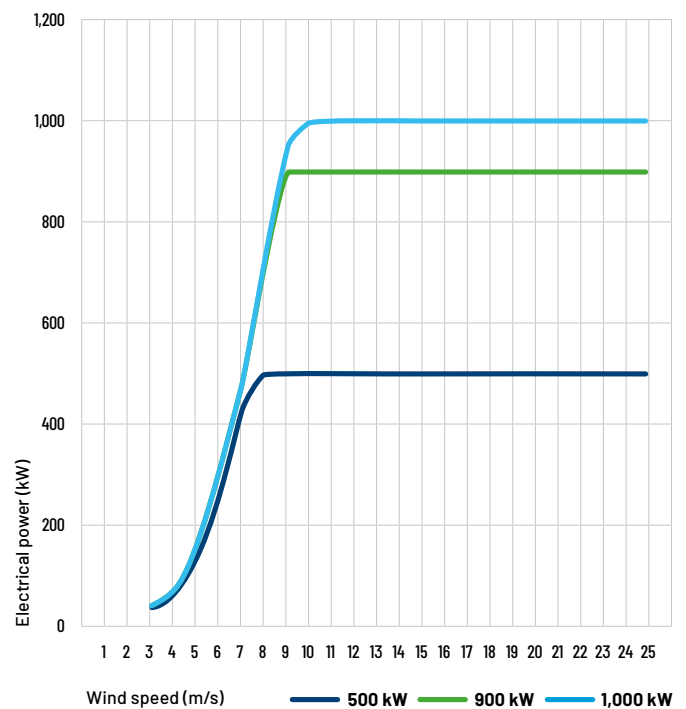
Converter type	4Q full power - 3 phase IGBT
Arrangement	Multiple modular LeitDrive converter - increase of technical availability - partial load operation
Converter rated voltage and frequency (grid-side)	690 V ±10%, 50-60 Hz ±5%
Converter power factor (grid-side)	0.95 ind - 1 - 0.95 cap for reactive power compensation control, grid voltage control capability
Power quality and Grid codes	High quality output power in accordance with major grid code requirements. Integration into various grid systems worldwide - Grid code compliance e.g. CEI 0-16, TERNA (incl. LVRT) and many other countries - Power quality according to IEC 61400-21 - Emission limits according to IEC 61800-3

* LTW90 500 kW is not available with this hub height

AEP - ESTIMATED ANNUAL ELECTRICAL PRODUCTION

	LTW90 500 kW	LTW90 900 kW	LTW90 1,000 kW
m/s	MWh/y	MWh/y	MWh/y
4.5	1,608	2,141	2,194
5.0	1,920	2,660	2,749
5.5	2,195	3,150	3,283
6.0	2,437	3,601	3,781
6.5	2,646	4,007	4,238
7.0	2,827	4,365	4,650
7.5	2,980	4,670	5,020

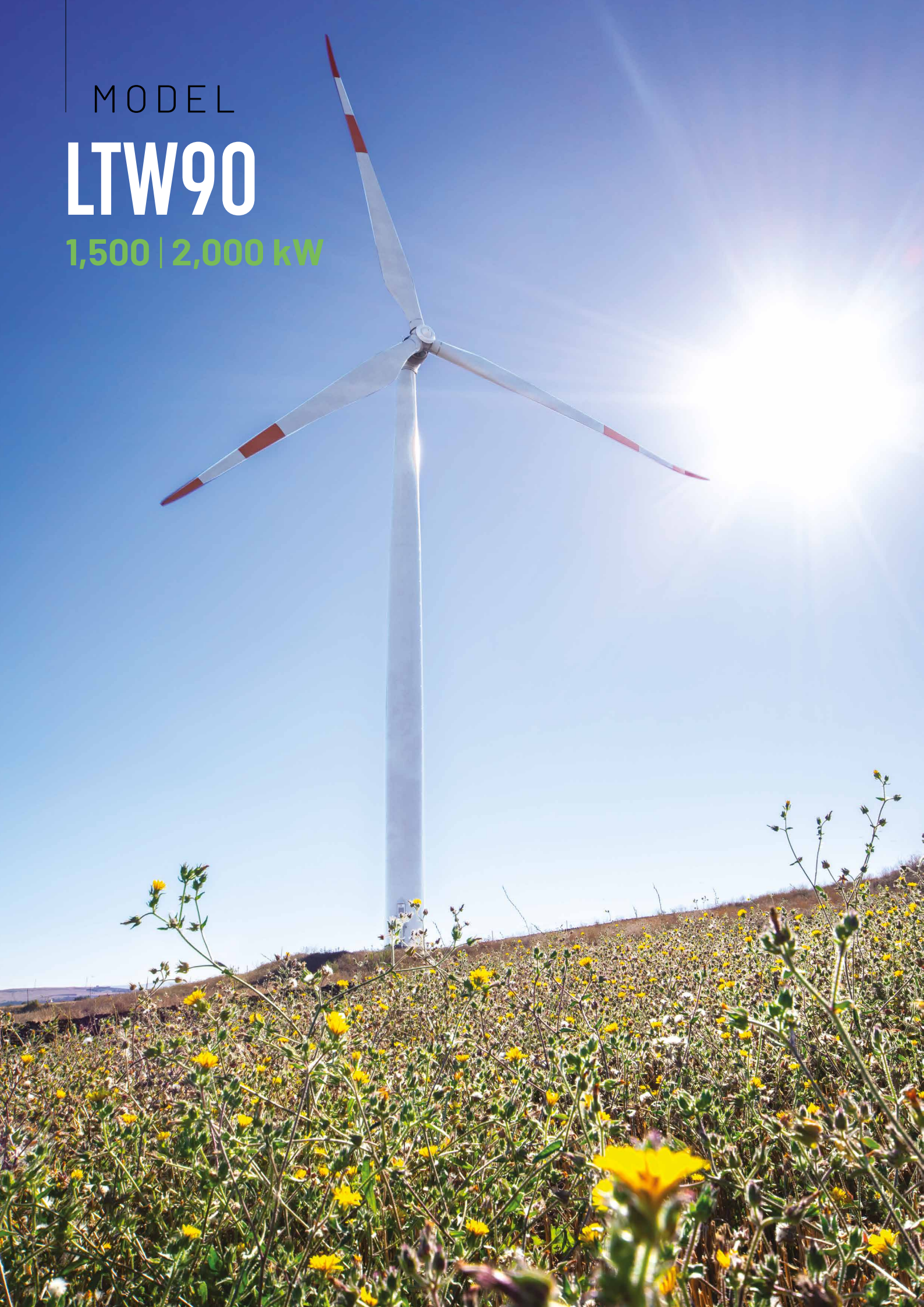
POWER CURVE



	LTW90 500 kW	LTW90 900 kW	LTW90 1,000 kW
Wind speed (m/s)	Electrical power (kW)	Electrical power (kW)	Electrical power (kW)
3.0	35	39	39
4.0	93	107	107
5.0	203	216	216
6.0	350	379	379
7.0	485	602	602
8.0	500	869	869
9.0	500	900	994
10.0	500	900	1,000
11.0	500	900	1,000
12.0	500	900	1,000
13.0	500	900	1,000
14.0	500	900	1,000
15.0	500	900	1,000
16.0 - 25.0	500	900	1,000

MODEL
LTW90

1,500 | 2,000 kW



LTW90 1,500 | 2,000 kW

DESIGN DATA

Rated power	1,500 2,000 kW
Hub height	80 / 97.5 / 100 m
Tip height max (upper end)	125 / 142 / 145 m
Wind class	IIIA / S
Cut-in wind speed	3 m/s
Cut-out wind speed	25 m/s
Concept	Direct Drive 3-bladed upwind turbine with horizontal axis, variable speed and automatic pitch and yaw regulation

TOWER

	Segmented tubular steel tower
	Transformer and converter station in tower bottom

ROTOR

Rotor diameter	90 m
Swept area	6,404 m ²
Rotational speed	15 rpm
Tip speed	71 m/s
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GENERATOR Direct Drive

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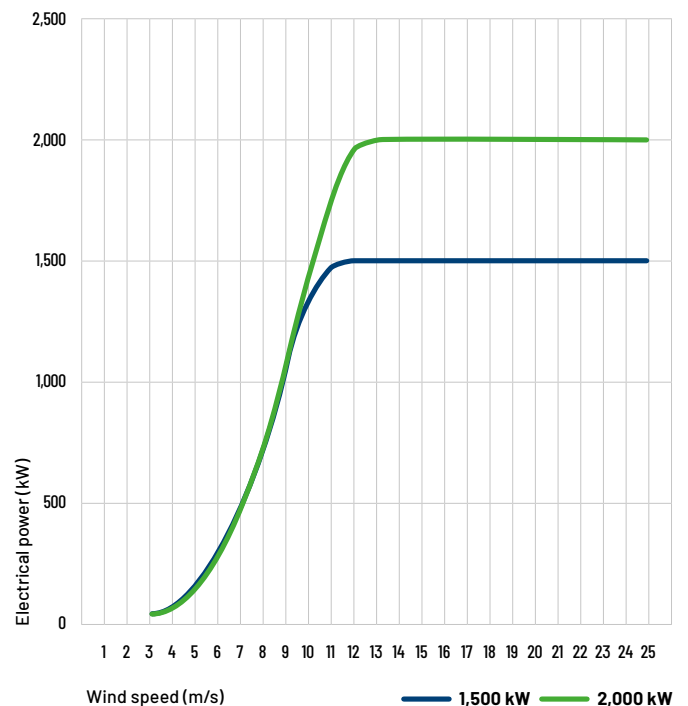
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AEP - ESTIMATED ANNUAL ELECTRICAL PRODUCTION

	LTW90 1,500 kW	LTW90 2,000 kW
m/s	MWh/y	MWh/y
4.5	2,383	2,383
5.0	3,087	3,171
5.5	3,804	4,011
6.0	4,507	4,870
6.5	5,175	5,721
7.0	5,792	6,542
7.5	6,348	7,321

POWER CURVE



	LTW90 1,500 kW	LTW90 2,000 kW
Wind speed (m/s)	Electrical power (kW)	Electrical power (kW)
3.0	39	39
4.0	107	90
5.0	216	196
6.0	379	356
7.0	602	579
8.0	888	874
9.0	1,221	1,223
10.0	1,431	1,619
11.0	1,499	1,893
12.0	1,500	1,993
13.0	1,500	2,000
14.0	1,500	2,000
16.0 - 25.0	1,500	2,000