



ergo *Wind*



Wind Turbine
EW 60

**WE CANNOT
SOLVE OUR PROBLEMS
WITH THE SAME LEVEL OF THINKING
THAT CREATED THEM.**

Albert Einstein

Ergo Wind srl

Ergo Wind is a leader in offering low environmental impact energy systems for the small wind market. Right from its founding, the company has always invested in research and development of new technologies, cooperating in partnership with the highly qualified team of TCS Energie, a successful company with thirty years of experience in the field of renewable energy sector. Ergo Wind core business is represented by small wind turbines from 20 to 60 kW power, designed and manufactured in its factory located in Pesaro, with the precious partnership of Università Politecnica delle Marche and other influential Italian and European companies.

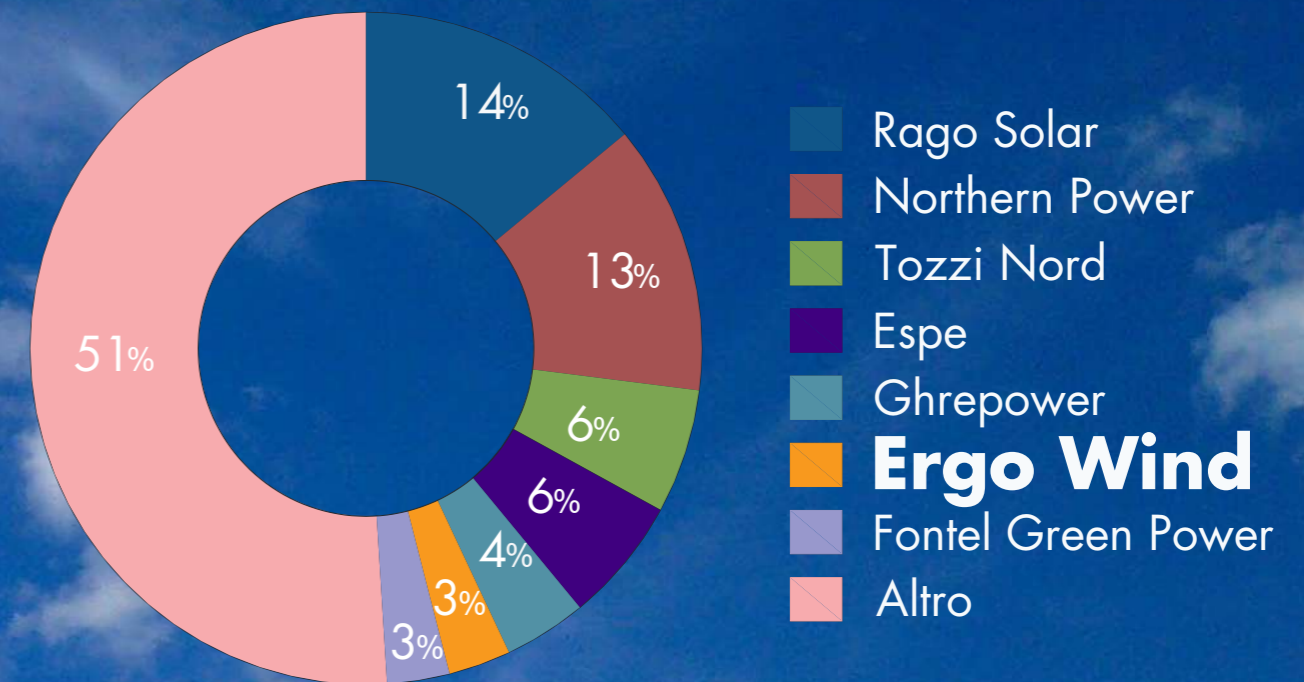
Their strategic technical choices rank Ergo Wind small turbines among small wind products with the best value for money on the market and guarantee maximum reliability, efficiency and durable functioning over time. In order to ensure full transparency, Ergo Wind allows to visit its factory and supplies monitoring system that allow the access to statistical data of wind turbine installed.

Its qualified staff is also able to offer technical support and assistance for siting process and due diligence.

Its after sales and maintenance centers are located throughout the country.

Ergo Wind turbines are designed and manufactured according to IEC 61400-2 regulation. Every mechanical and electromechanical component is realized by qualified European and Italian companies, in order to guarantee maximum reliability, efficiency and durable functioning over time.

Ergo Wind among the top 4 italian companies and among the top 7 global sales companies in Italy



Extract from the market analysis of wind turbine manufacturers from 20 to 60 kW to the plants built in the two-year period June 2015 - June 2016 in Italy.

Source: Il punto sull'eolico, October 2017, GSE - Gestore Servizi Energetici

1

The lowerable/raisable hydraulic tower allows to reduce drastically maintenance costs.



2

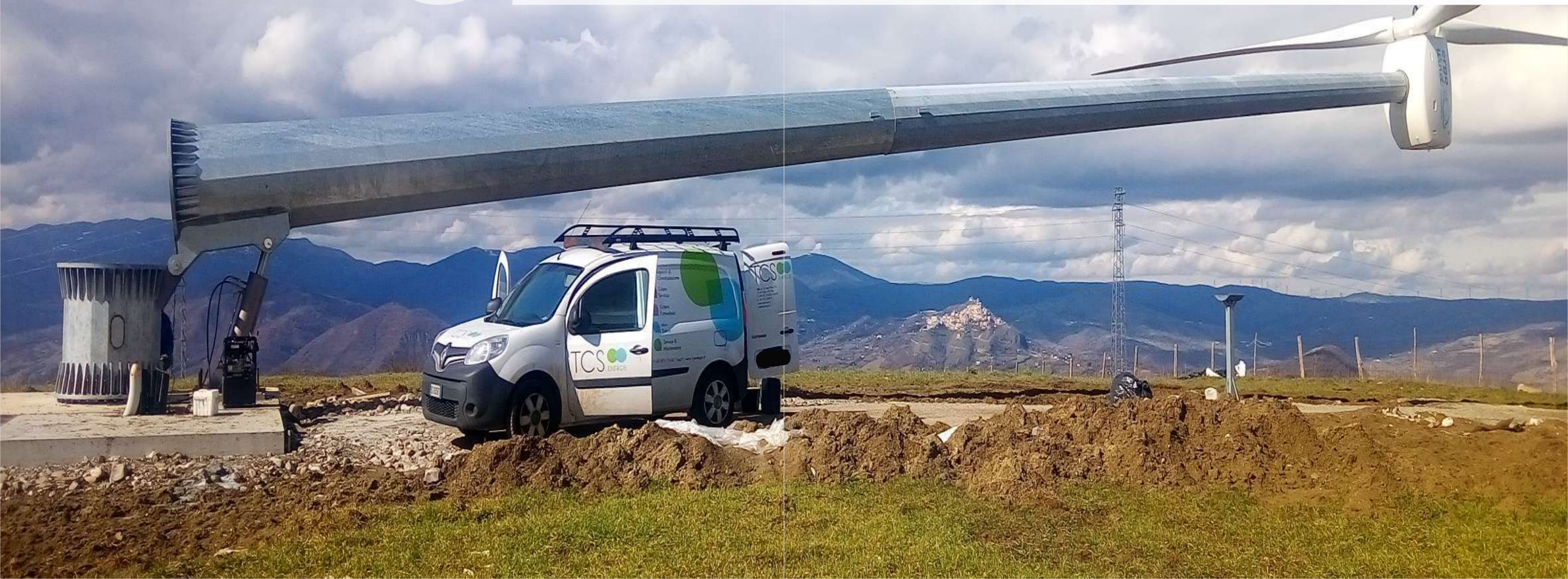
No Inverter.

**"IF IT ISN'T THERE,
IT CAN'T BREAK."**
Henry Ford



3

Our investors can count on the access to objective and demonstrable production data.



**100% .
wind
energy!**



TRUSTWORTHINESS

MONITORING SYSTEM AND REMOTE CONTROL WITH OUR ERGO WIND SOFTWARE

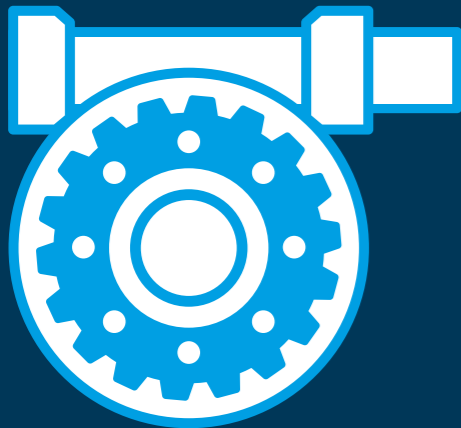
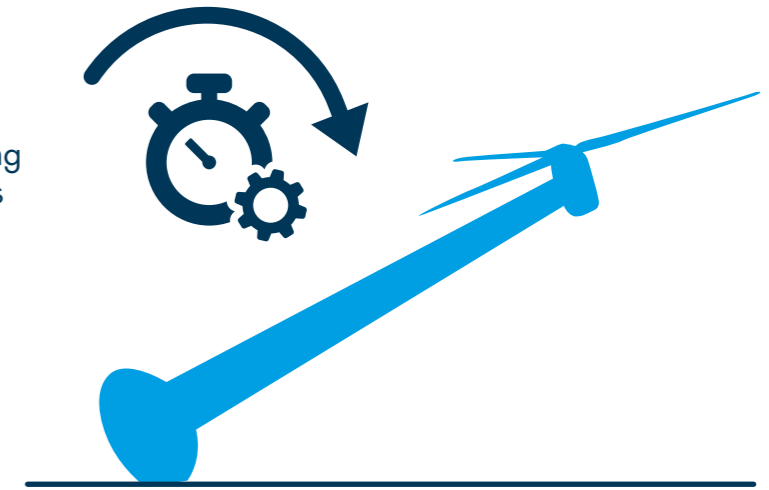
Ergo Wind turbines send operational data to the main server where a dedicated software processes them on 4 different levels: real-time monitoring, report, production statistic, alarm signals. Thanks to this system our team is able to supervise constantly our wind turbines with a comprehensive approach, providing an accurate technical assistance. Furthermore, Ergo Wind web app allows our clients the access to daily/weekly/monthly production data, wind direction and wind speed, percentage of wind turbine operation and estimated profitability.



LOW INSTALLATION AND MAINTENANCE COSTS

HYDRAULIC TOWER

Our wind turbines have a tower provided with an hydraulic system for the lifting and lowering, in order to obtain economic advantages both during installation and maintenance, as all the operations are carried out in the ground and not in altitude. The time required to lower/raise the turbine are approximately 20 minutes, without the utilization of cranes, platforms or operators trained to work in high altitude.



YAW SYSTEM

The yaw system is composed by a slewing drive able to guarantee high rotational coupling and rotor locking during operation. The hydraulic motorization gives profits in terms of trustworthiness, performance, lightness, obstacle and maintenance. The pump of the slewing drive is located inside the technical compartment on the ground. Its special sensors allow to optimize the wind heading thanks to accurate corrections.

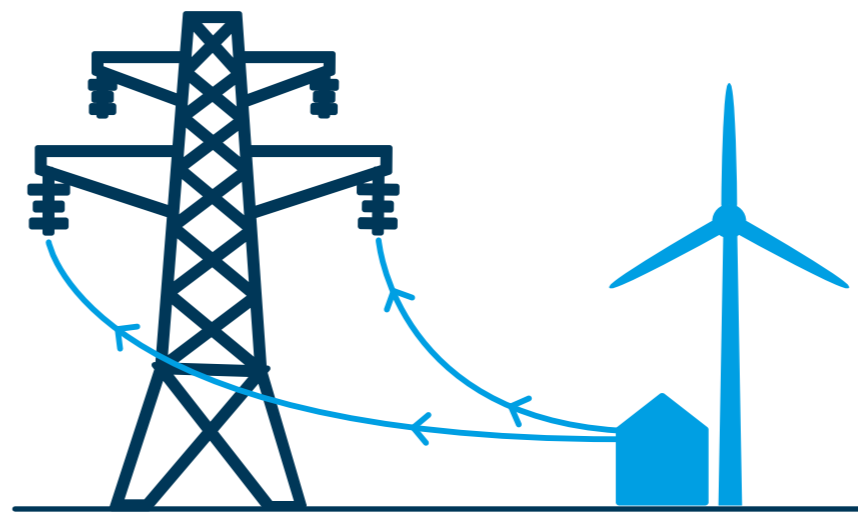
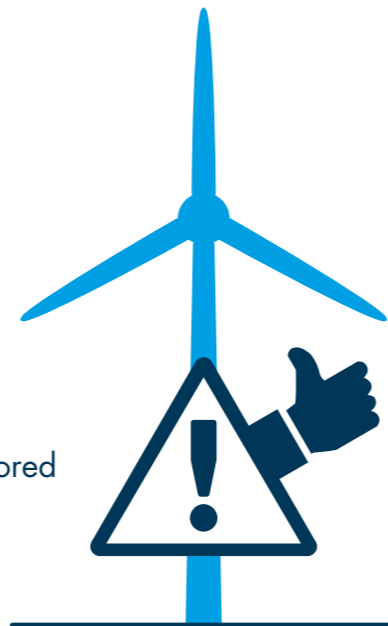
HUB

The hub is made by a single block in high-strength aluminium alloy. Inside there is a cast iron bush for the coupling of turbine shaft. Each hub is x-rayed, connecting the benefit of the lightness and trustworthiness.



REDUNDANT SAFETY

The safety of the wind turbine is guaranteed thanks to the adoption of redundant braking systems. The PLC software controls properly the negative hydraulic braking system and allows to modulate the braking according to operational conditions in order to avoid useless mechanical stress. The aerodynamic brake, installed on each blade, is automated and completely mechanical and acts by limiting the overspeed of the rotor. Furthermore, this system keeps the appendices anchored to the hub through a steel cable inside the blade.



DIRECT CONNECTION TO THE POWER GRID WITHOUT INVERTER

Our wind turbines are connected directly to grid power without inverter (through the interface system required by the electricity service provider), increasing the global efficiency of the system and deleting the odds of damages in electronic devices.

TECHNICAL FEATURES

Wind Turbine

| | |
|---|--------|
| Configuration | Upwind |
| Rated power (kW) | 60 |
| Rated generator speed (Rpm) | 60 |
| SWT Class EC 61400-2 | III |
| Cut-in wind speed (m/s) | 3 |
| Rated wind speed (m/s) | 12 |
| Cut-off wind speed (m/s) | 25 |
| Survival wind speed (m/s) | 52,5 |
| Tower top mass (nacelle and rotor) (kg) | 2600 |

Rotor

| | |
|------------------------------|------------------------|
| Rotor diameter (m) | 15,95 |
| Swept area (m ²) | 199,99 |
| Blade length (m) | 7,5 |
| Blade material | Reinforced fiber glass |
| Power regulation | Yaw |

Generator

| | |
|------------------|-------------------------------|
| Tipology | Asynchronous |
| Configuration | Three phases, 4 poles, 400Vac |
| Rated power (kW) | 60 |
| Multiplier | Two stages parallel axes |

Inverter

No

Braking systems and safety

Negative brake system on the rotor/Aerodynamic brake/Yaw system

Control systems

| | |
|-------------------|---|
| Control systems | PLC + Touch Screen |
| Monitoring system | Web App, Daily/Weekly/Monthly/Annual report |

Torri

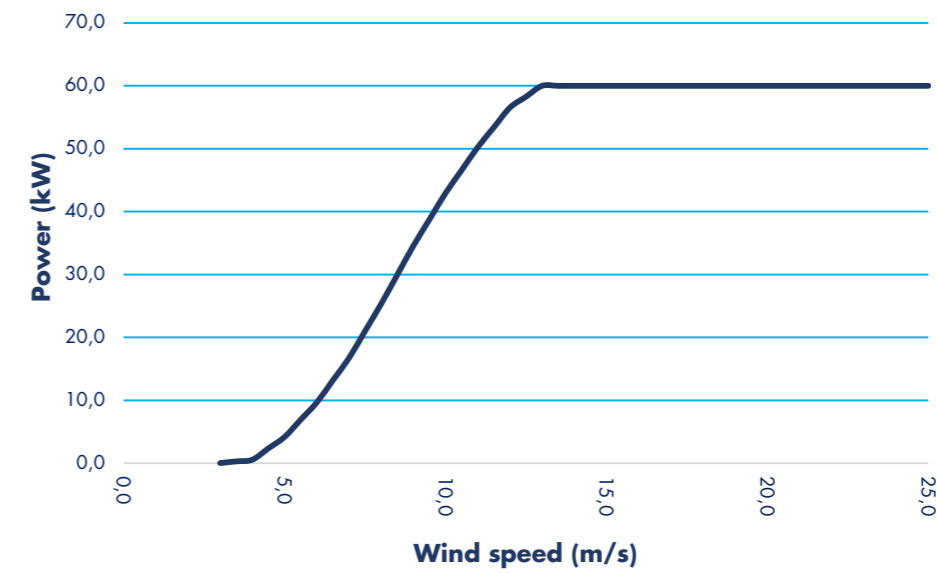
| | |
|---------------------------|--|
| Available hub heights (m) | 24/27 |
| Tower type | Polygonal section tower with lowerable/raisable hydraulic system |

Warranty

2 years subject to possible extension

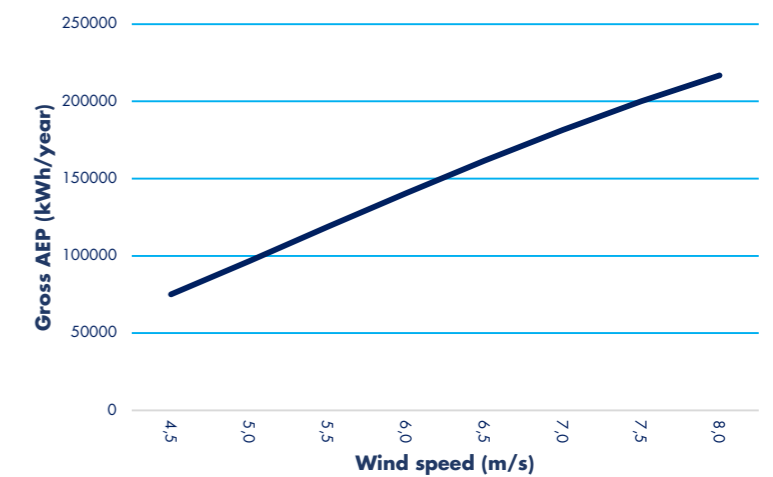


EW60 - Power curve



EW60 - Gross Annual Electricity Production

| Wind speed (m/s) | Gross AEP (kWh/year) |
|------------------|----------------------|
| 4,5 | 75015 |
| 5,0 | 96690 |
| 5,5 | 118760 |
| 6,0 | 140570 |
| 6,5 | 161610 |
| 7,0 | 181510 |
| 7,5 | 199990 |
| 8,0 | 216870 |



*Data shown in graphs are theoretical and based on these conditions using:
 k (shape parameter, Weibull slope) equal to 1,6 and air density in standard conditions (equal to 1,225 Kg/m³).
 **Ergo Wind reserves the right to alter product specifications without prior notice.





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