



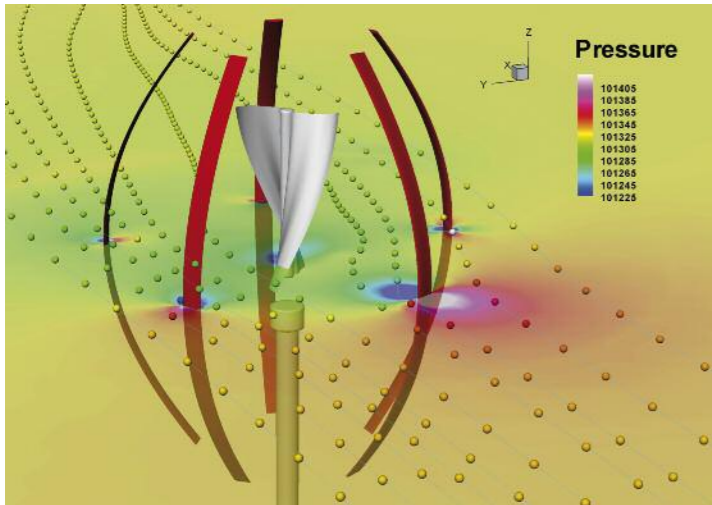
SAVE MONEY. SAVE ENERGY.



 **WindUp**
Your partner in energy technologies

SILENT V

The wind turbine patented by **WindUp s.r.l.** represents a modern interpretation of the secular art of producing energy from the wind. Particular attention has been paid to the aesthetics and, based on the noise absence and maintenance requirements the turbine is suitable for integration in urban environments where the combination of technology, elegance, architectural and environmental sustainability has become an imperative need.



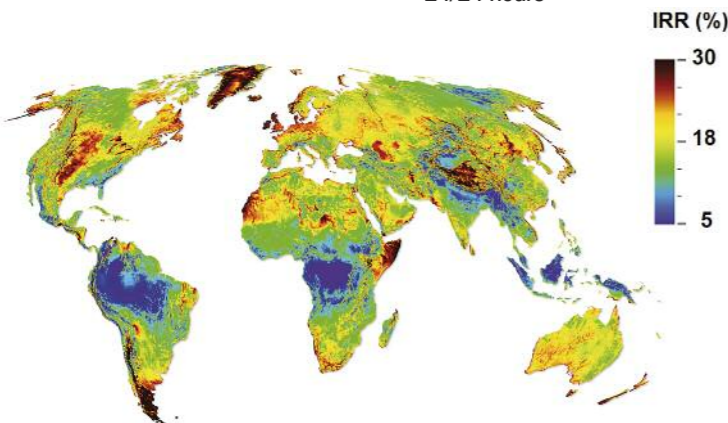
Why the vertical axis?

The installation of horizontal axis turbines is unsuitable and inefficient close to urban center areas, where the development of turbulent flows due to the presence of tall buildings is significant.

The vertical-axis turbines on the contrary, exploit in equal measure the plural directional chaotic flow granting a continuous production of electrical energy; moreover the direct connection on the generator simplifies the structure, minimizing the number of components and the weight and favoring the sensitivity even to the most light wind.

Advantages

- > Less noise
- > Absence of maintenance
- > Minimum ground occupation
- > Reduced payback period
- > Minimal environmental impact
- > Territorial distribution of production
- > High transformation efficiency
- > Production continuously 24/24 hours



5kW Vertical Axis Wind Turbine

SILENT V



Design

The aerodynamic study is the heart of the project, performed with the most sophisticated CFD (Computational fluid dynamics) tools, including several optimization cycles on the airfoils of the profiles. In a virtual wind tunnel the real behavior of the entire rotating part was simulated. The rotor obtained, shows performance at the top of the most efficient wind turbines in the world.

Materials

Excluding the steel shaft structure of the generator, the totality of the aerodynamic surface is made of aluminum alloy treated with specific protection against corrosion and erosion for installation in marine environments or desert in order to ensure a life of for 20 years.

The return of the investment

In many Nation's Renewable Energy Law provides that for small systems, are paid directly through the mechanism of incentives, amount of money for each kWh of electricity produced from wind energy and puts into the grid. This all-inclusive system or "net-metering", combined with the tax deduction for investments in renewable energy sources, provides interesting and rapid economic returns, with high profit for those who choose to invest in "clean energy".

Where?

The system can be integrated in diversified areas:

- > New urban complexes
- > Green & Smart City
- > Farmhouses / Farms
- > Shopping and sports centers
- > Municipal public facilities or private
- > Ports and logistics centers or industrial
- > Mountain huts
- > Integrated solutions in container for standalone application
- > Promenades in tourist places
- > Cooperatives for the production and sale of energy
- > Junctions, fittings, ring roads or highways
- > Coastal areas and breakwaters

Company

Making the renewable wind energy affordable for everyone and make it competitive to photovoltaic energy. This is the vision of **Windup s.r.l.**, a company founded in Lecco on September 2012 after two years of study for a new 5 kW peak power vertical axis wind turbine. In a growing market and in a legislative/environmental framework increasingly incentivating the use of renewable sources for the production of electricity, small wind turbines can be an effective alternative to photovoltaic.

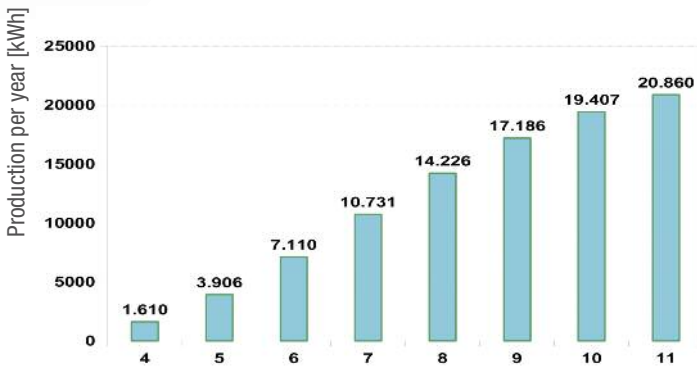
About us

A team of engineers and technicians, with complementary skills acquired after a decades of experience in the field of aerospace, electronics, energy and precision machining, developed an innovative wind turbine with high efficiency of transformation of the wind in electricity.

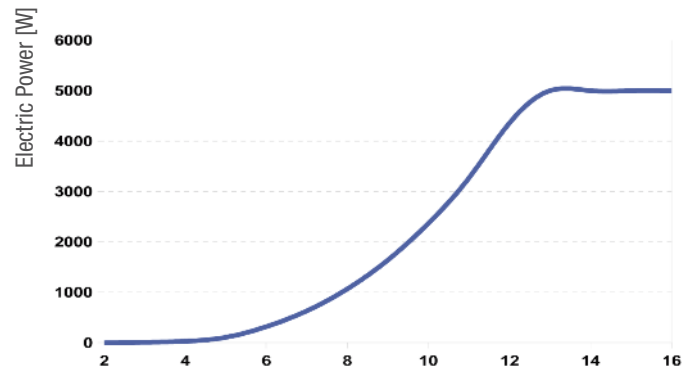
SILENT V

“ No wind is favorable for those who do not know where to go, but for us that we know, even the breeze will be invaluable ”
Rainer Maria Rilke

EFFICIENCY



Annual average wind speed [m/s]



Wind speed [m/s]

The production of energy takes account of a probability of wind calculated by a Rayleigh distribution, determined by the value of the average wind speed and the Weibull shape factor equal to 2.

CHARACTERISTICS

Rotor

External diameter: 4,4 mt
Height: 5mt
Material: Aluminum Alloy

Generator

Type: permanent magnet synchronous
Power: 5,5 kW @ 120RPM
Output: three phase 400V

Inverter

Power: 5 kW
Connection: single-phase 230V
Strategy: MPPT
Certification: CEI 0-21

Safety brake

Type: negative mechanical springs
Drive: hydraulic positive safety

Environmental conditions

Operative temperature: -20 / +50 C
Relative humidity: 0/90%
Resistance in saline environment: excellent
Resistance to sand: excellent

Performances

Cut in wind: 3 m/s
Cut out wind: 25 m/s
Wind rating: 12 m/s
Nominal electrical power: 5 kW
Maximum Wind: 45 m/s
Class: IV IEC 61400-2
Acoustic emission: < 50 dbA

Switchboard

Protection: IP65



Engineering solutions for renewable energy systems

WindUp srl

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