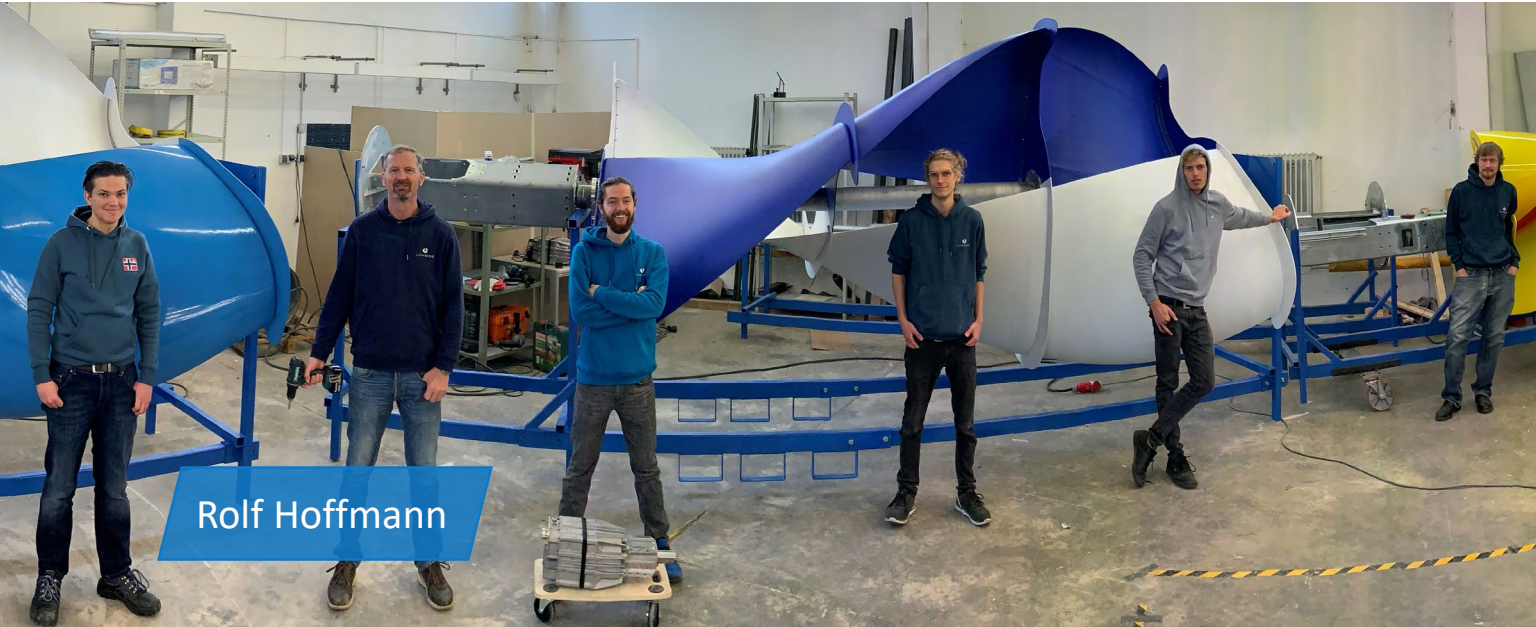




LUVSIDE

LuvSide wind energy –  
“The powerful turn”



Rolf Hoffmann

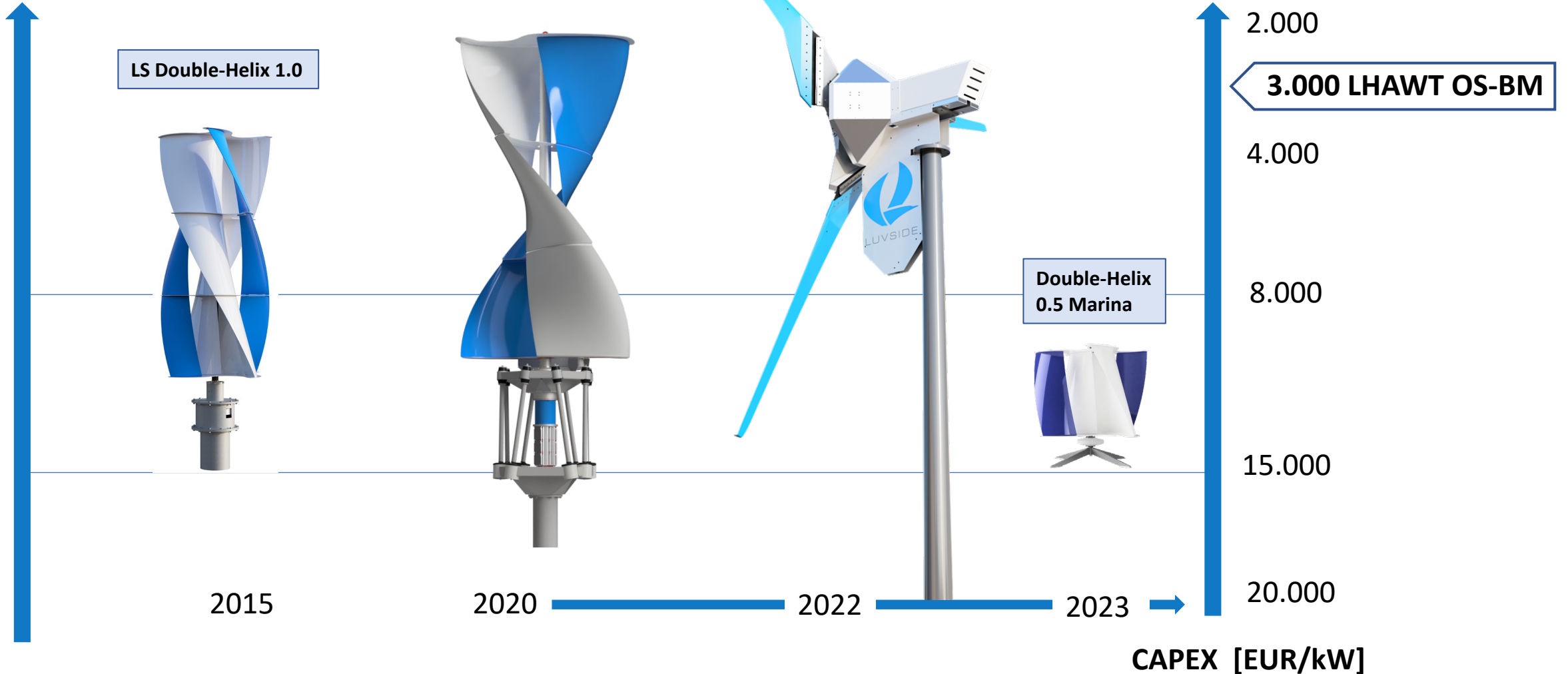


- founded in 2014
- Founder & Managing Director
  - Rolf Hoffmann
  - Mechanical Engineer (FH Munich)
  - Shareholder
- Vision: “The powerful turn”
- Development and production of vertical and horizontal wind turbines from 1 up to 10 kW
- R&D, prototyping, production: Ottobrunn/Munich, Germany
- Offices: Singapore / Brisbane (AUS)

# Consistent development & performance improvement

Roadmap

Effizienz



## 1 Savonius Double Helix

- robust rotor
- quiet operation
- powerful torque



## 2 Bearing housing

- Robust twin roller bearing design

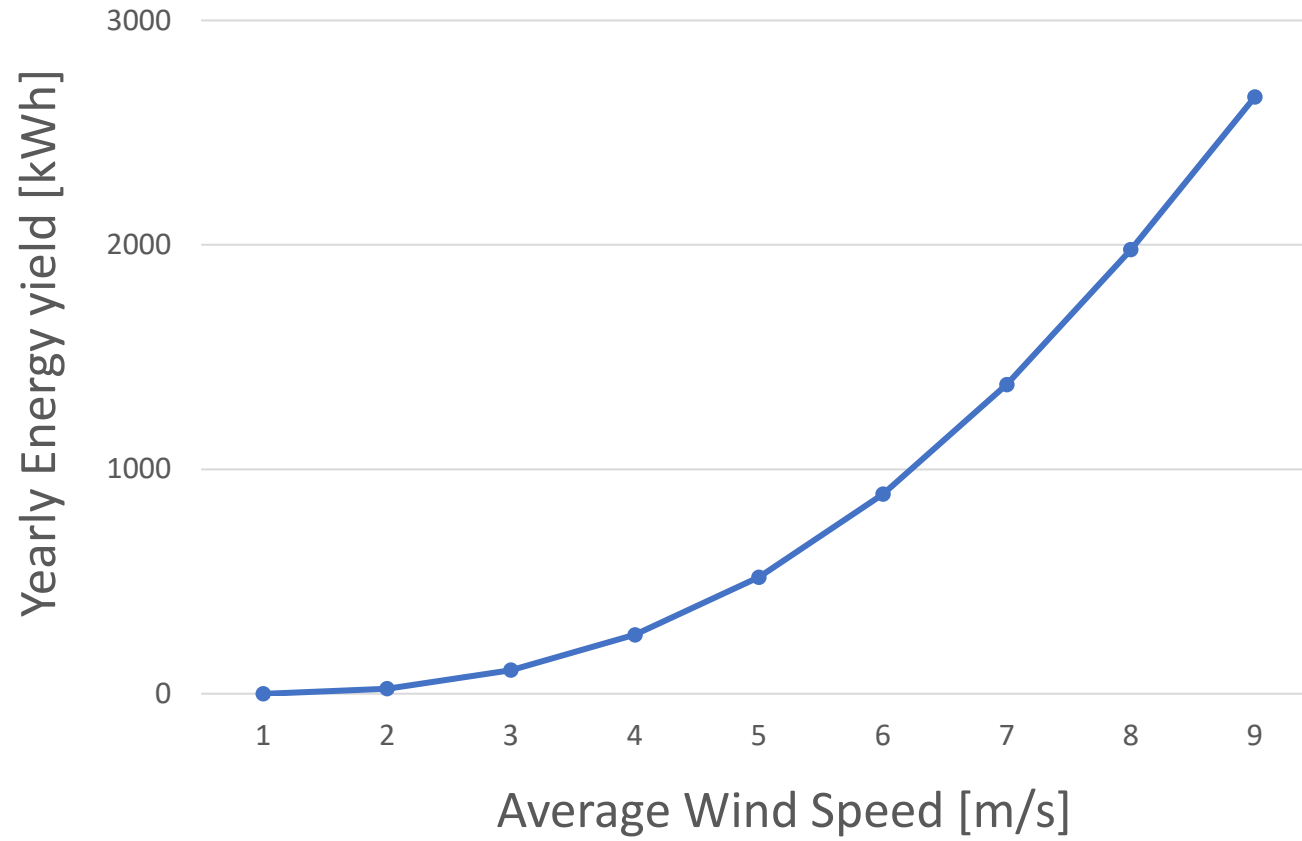
## 3 Generator PMSG

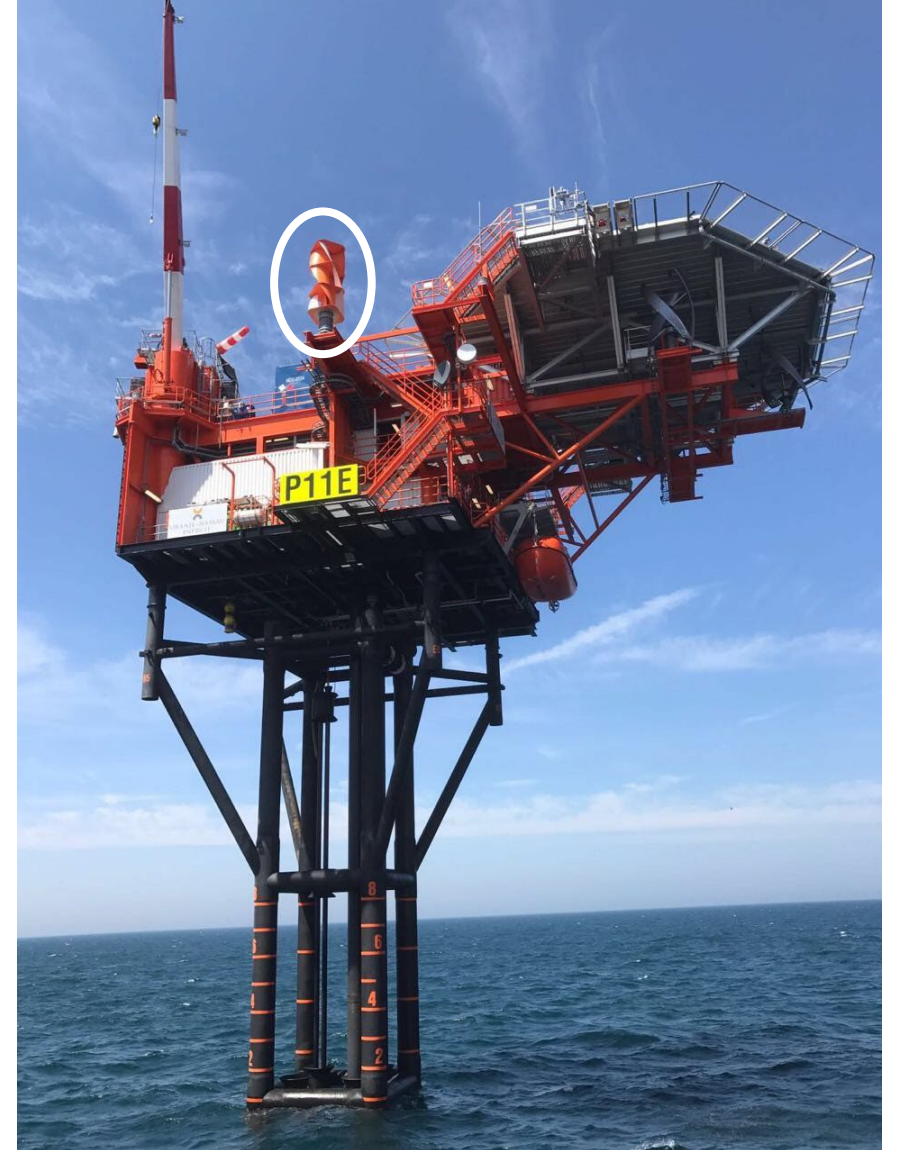
- Direct drive
- IP68

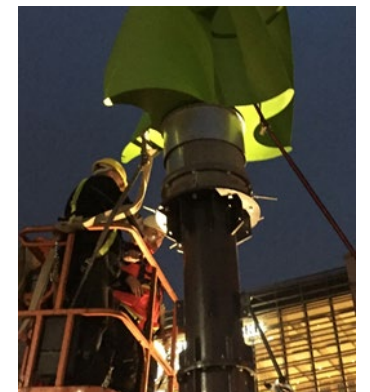
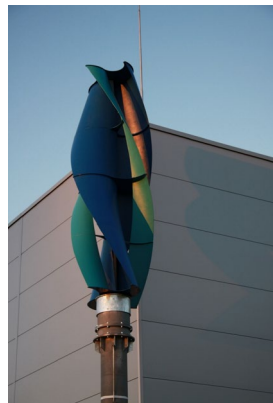
### The smallest model in the serial LuvSide family

Maximum performance	1,5 kW
Start-up speed	2 m/s
Rotor height	3 m
Rotor diameter	1,45 m
Number of rotor blades	4
Weight	305 kg
Rated speed	140 rpm

## Possible annual yield per turbine with increasing average wind speed









## Customers







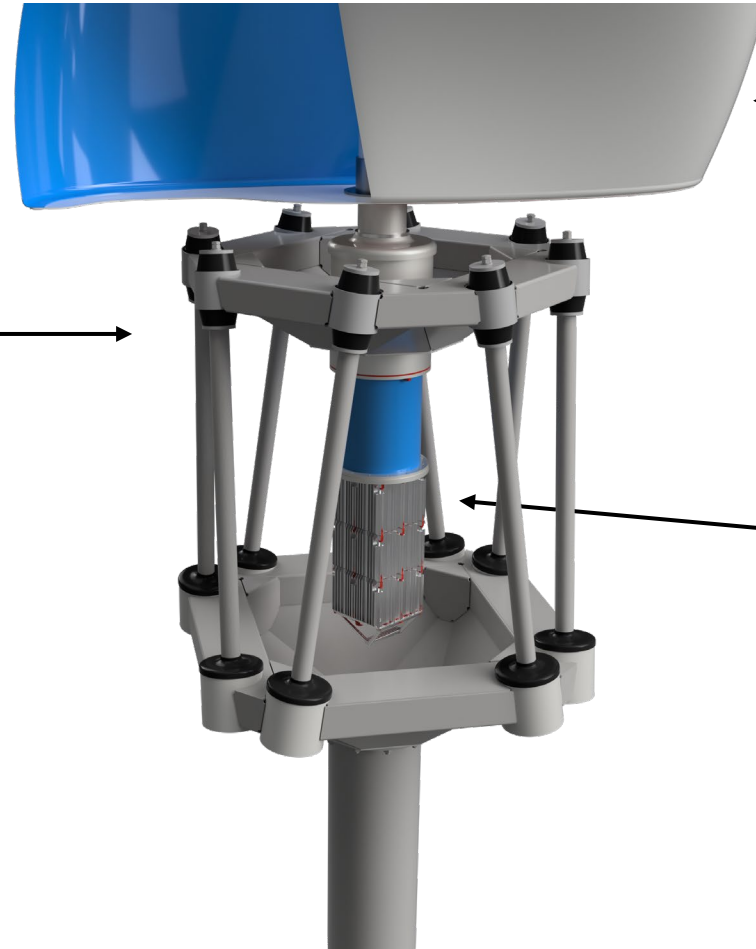
- **Close to nature**  
Friendly to people, birds and bats
- **Decoupling of possible vibrations**  
Patented decoupler for roof installations
- **Robust and stormproof**  
up to 180 km/h (112 mph)
- **Efficient energy generation**
- **Perfect addition to solar energy (hybrid)**  
Anti-cyclical behavior to all weather and PV systems
- **Symbol for the energy transition (hotels, malls)**  
Powerful design, wind from all directions 360°
- **Sound emission below 50 db at 10 m/s windspeed**  
Quiet operation
- **Scalable installation on roofs**  
Small wind farms, shopping malls, parking lots, etc.



**1**

**Vibration decoupler**

- Decoupling of all possible vibrations in the rotor towards the roof/pole



**2**

**Savonius wing design**

- Robust rotor with quiet but powerful torque

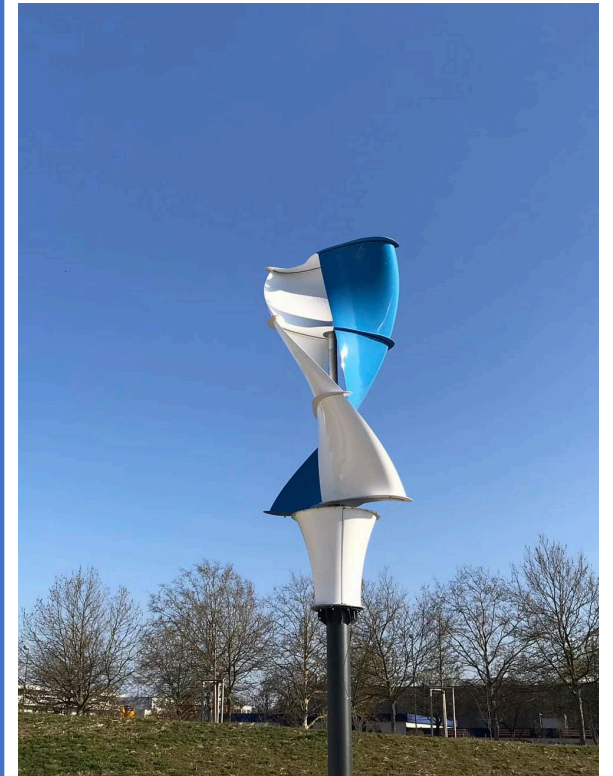


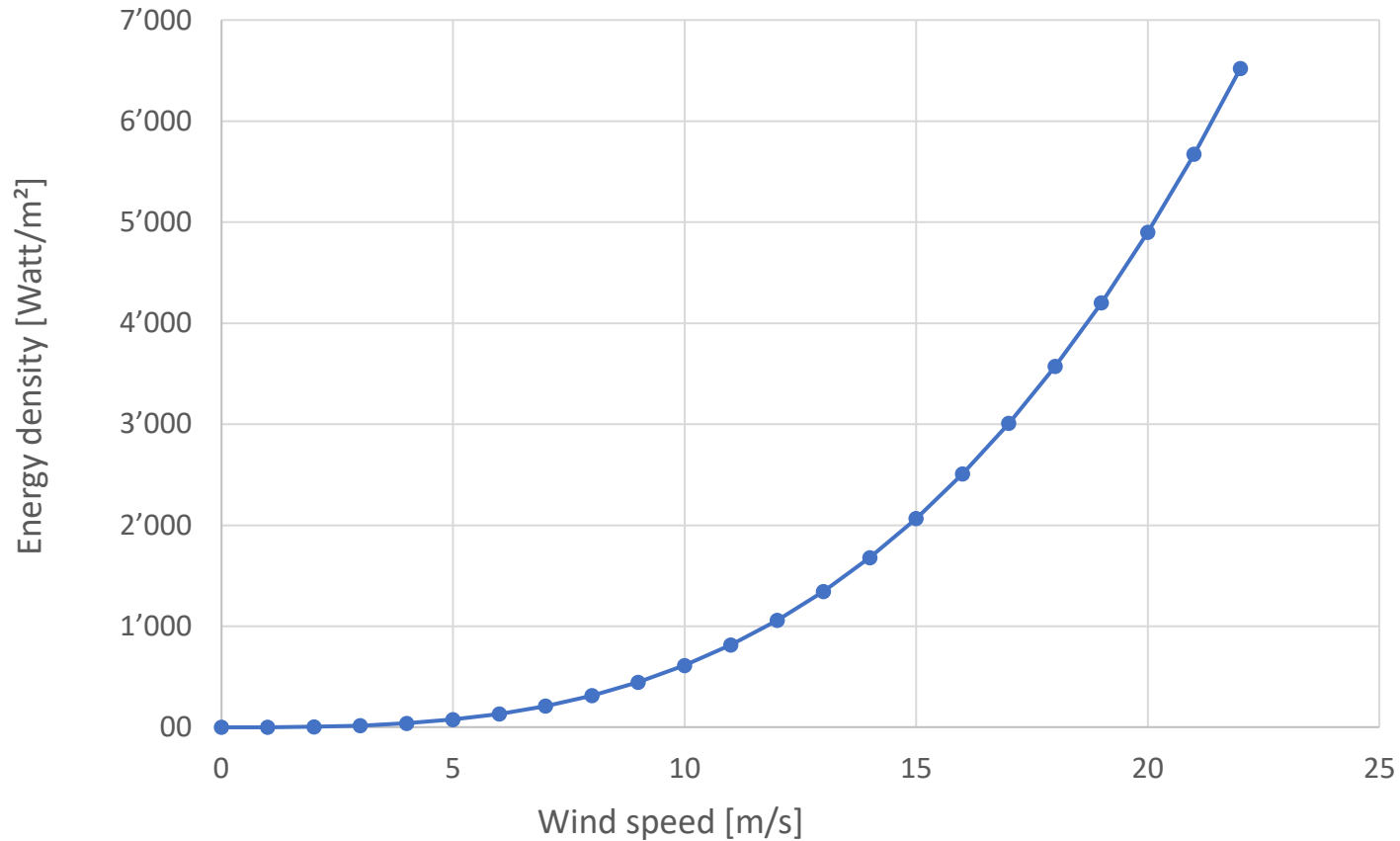
**3**

**Generator**

- Integrated controller
- Sealing IP68
- Constant DC output voltage for charging a battery, or with an AC inverter to feed into the grid

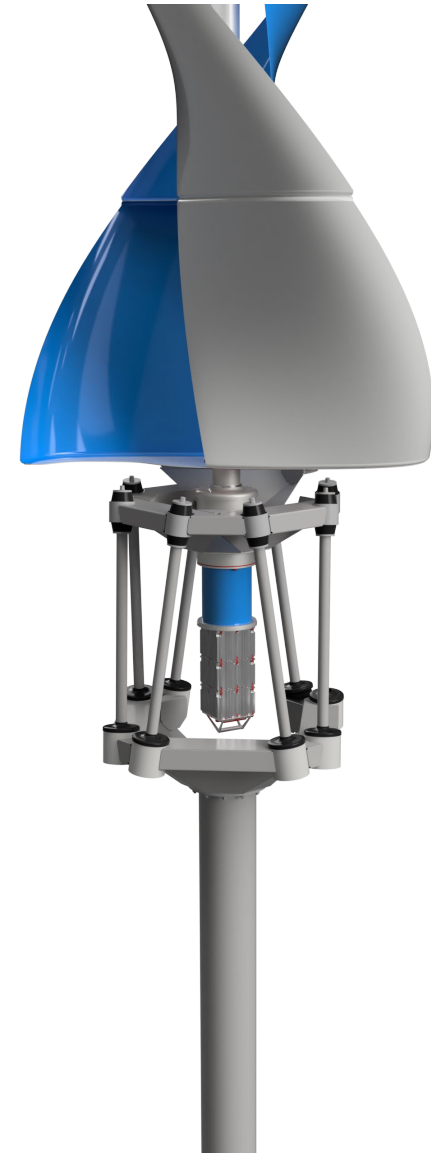
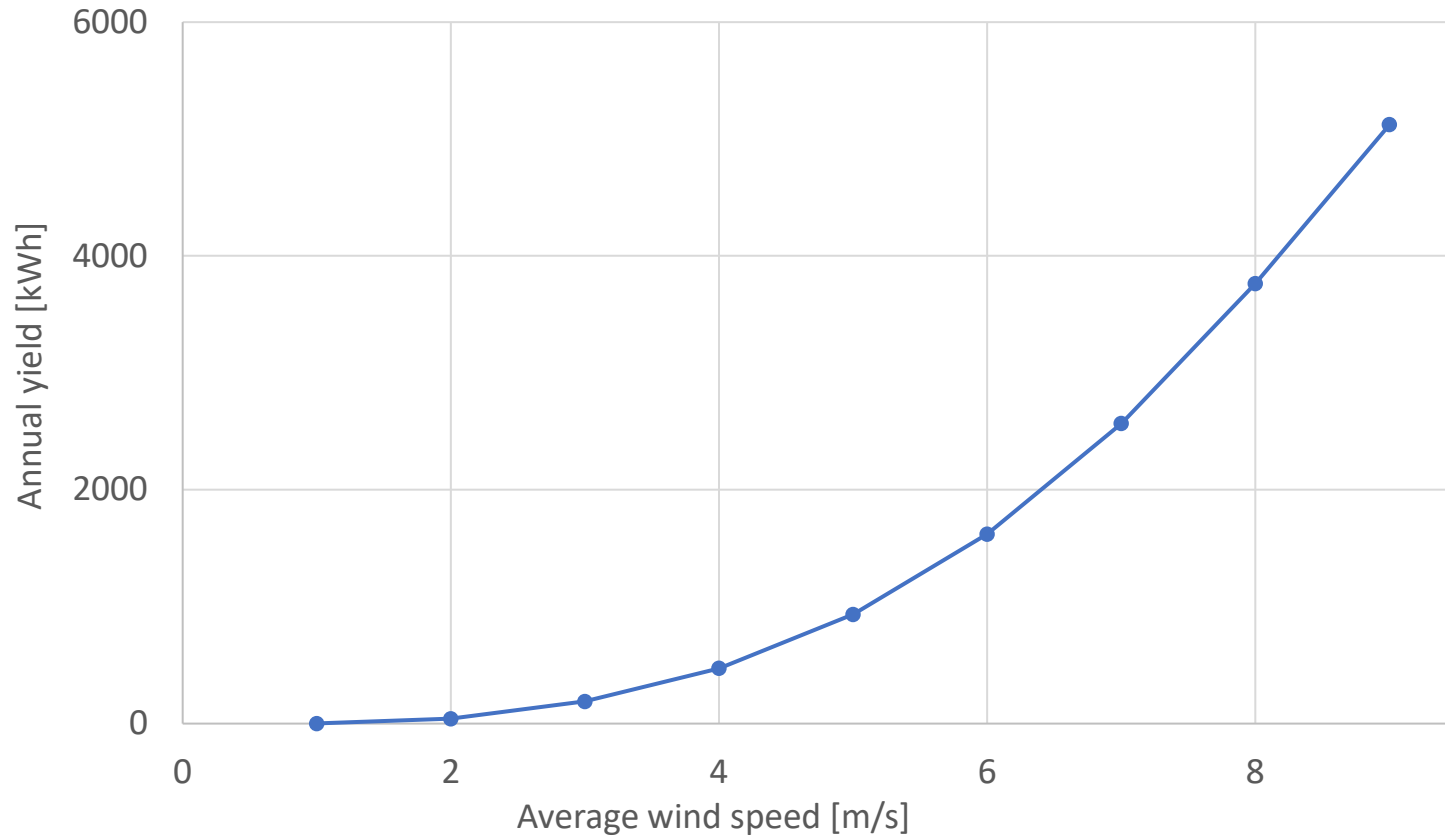






- The wind speed affects the result of the energy density to the third potential.
- $P_{wind} = \frac{1}{2} * \rho_{Luft} * v^3 * A$ 
  - $\rho_{Luft}$  : specific weight of air
  - $v$  : wind speed
  - $A$ : area considered

Possible annual yield per turbine with increasing average wind speed





Prototype installation of a wind turbine at an ASFiNAG rest area (rest area "Schäffern Ost" (47.486220, 16.099684))



Obstacle evaluation rest area "Schäffern Ost"



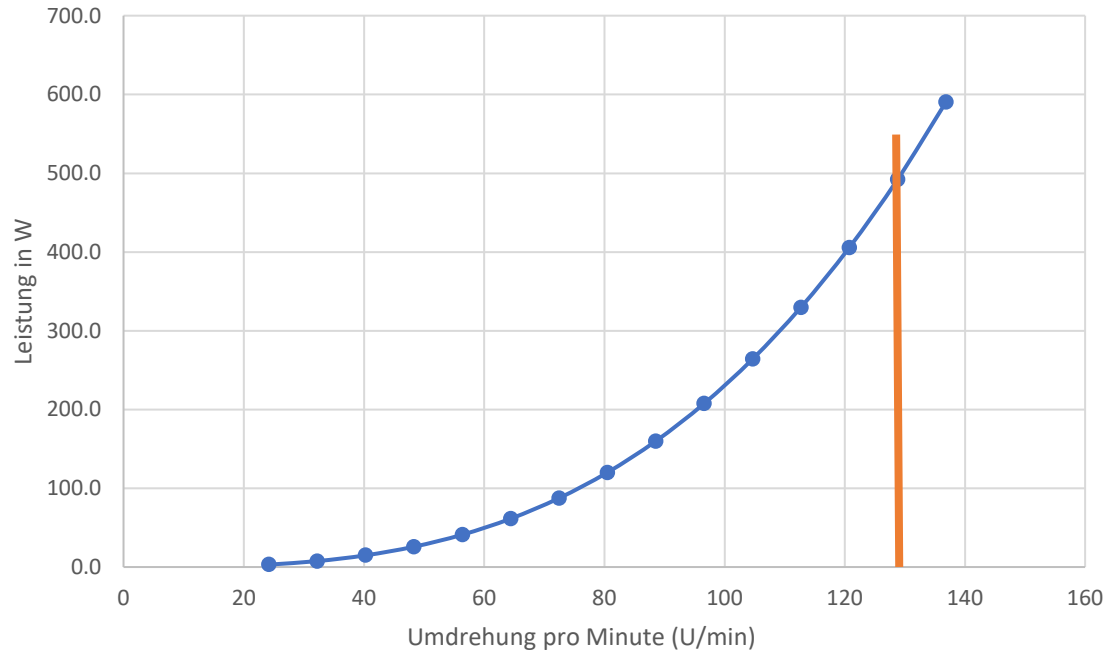




## Key Features

- Early start-up at 3m/s wind speed
- Storm-proof up to 50m/s wind speed
- Unique foundation design and material selection for Houseboat applications.
- Four-blade turbine based on the Savonius principle





Nominal Power	500 W (Rated voltage = 48V at 130 RPM)
Cut in Wind Speed	3 m/s (10km/h)
Dump Load	20 m/s
Surviving Wind Speed	50 m/s (180km/h)
Height of the rotor	1 m
Rotor diameter	1.4 m
Rotor surface area	1.4 m <sup>2</sup>
Number of rotor blades	4
Rotation speed	20-130 rpm
Material	Glass-fiber reinforced Plastic (GFRP)
Total weight	80 kg



## Main features

- Rated Power 8 kW at 11 m/s Windspeed (Generator from EMF Motors)
- Net Inverter AC, III Phase, 10 kW
- Controller from ABB
- Storm-resistant to 200 km/h (50 m/s) of wind speed
- Back-wind principle, with passive wind tracking
- Quiet operation
- High efficiency (40 - 45 %)
- Full-Power production during storms
- Mechanical pitch control through patented foldable blades





**1**

## Back-wind principle

- Space for movable blades
- Independent wind tracking



**2**

## Flexible wing suspension

- Control of the angle of attack (pitch adjustment along the wind speed)

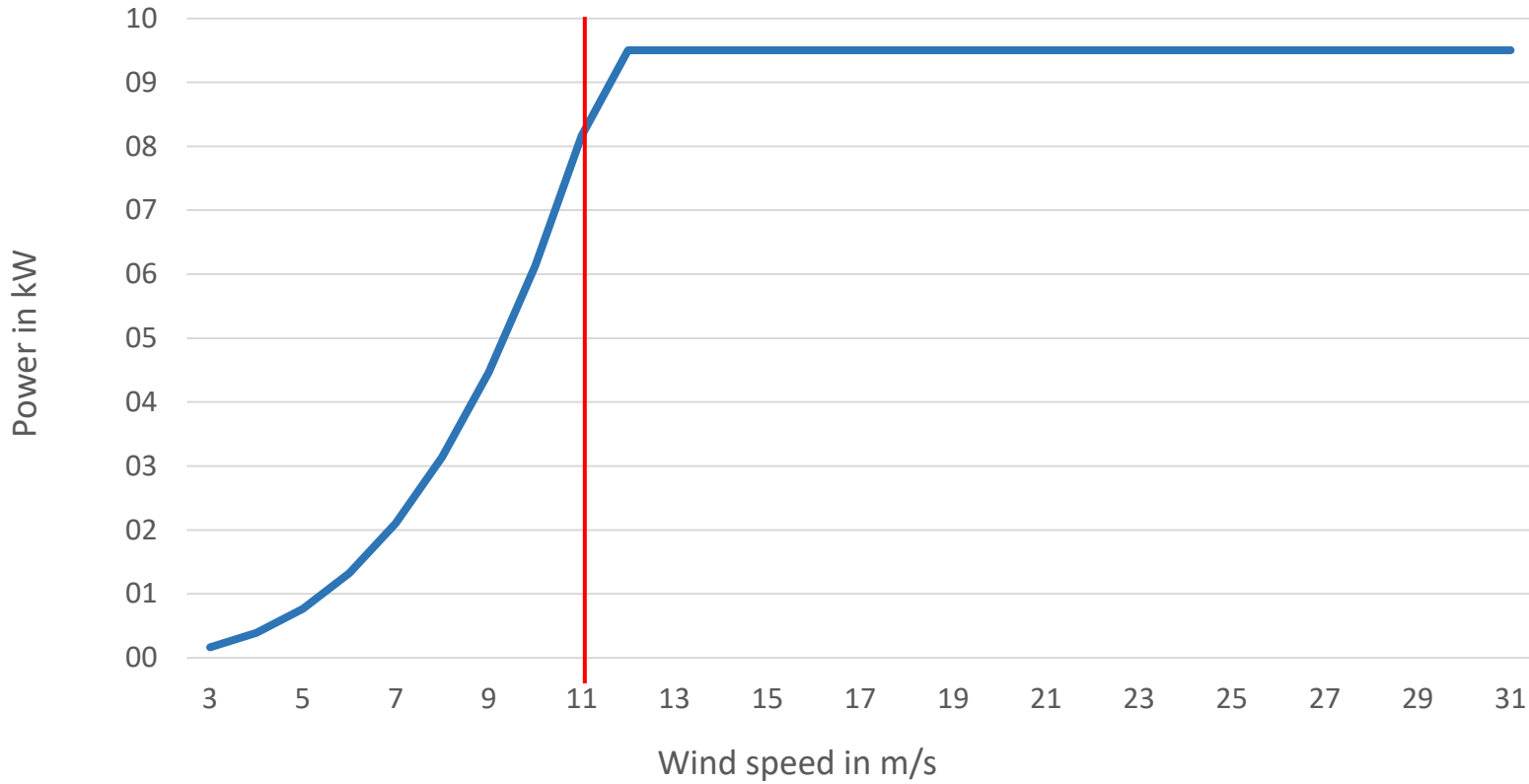


**3**

## Gas pressure spring damper

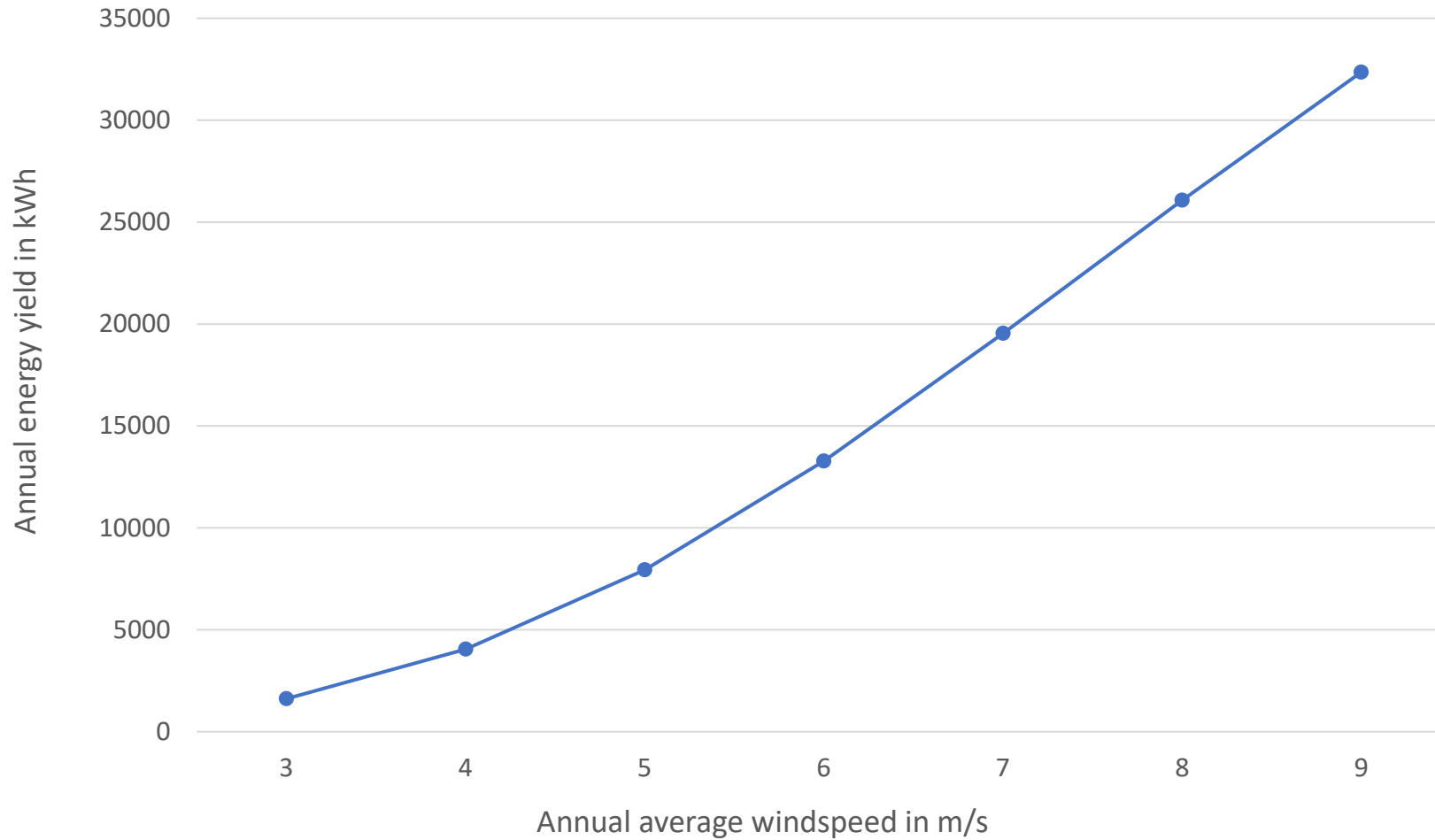
- Control of the folding function Protection against spin-out

## HuraKan 8.0: Power of the turbine at rising windspeed



Rated Power (11 m/s)	8 kW
Cut-In Windspeed	3 m/s
Recommended minimum tower height	12 m
Rotor Diameter	6 m
Number of blades	3
Maximum rotational speed	250 RPM

## Possible annual energy yield with changing average windspeed



## Installation with Steelroot Foundation



1 Delivery



2 Installation



3 Final Steelroot



4 Digging the hole



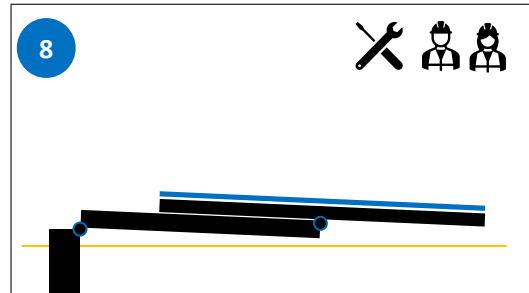
5 Lifting into the hole with the excavator and arrange



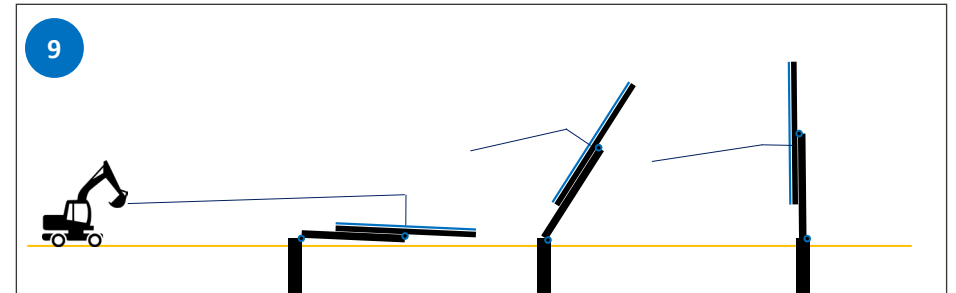
6 Bring in the excavated material and compact in layers



7 Finished foundation



8 Installation of the tracker lying



9 Erecting and bolting

## Contact

Rolf Hoffmann

Managing Director / CEO

Office +49 89 189 283 54

[www.luvside.de](http://www.luvside.de)

[r.hoffmann@luvside.de](mailto:r.hoffmann@luvside.de)

LuvSide GmbH, Krankenhausstrasse 18, D-86911 Diessen am Ammersee