

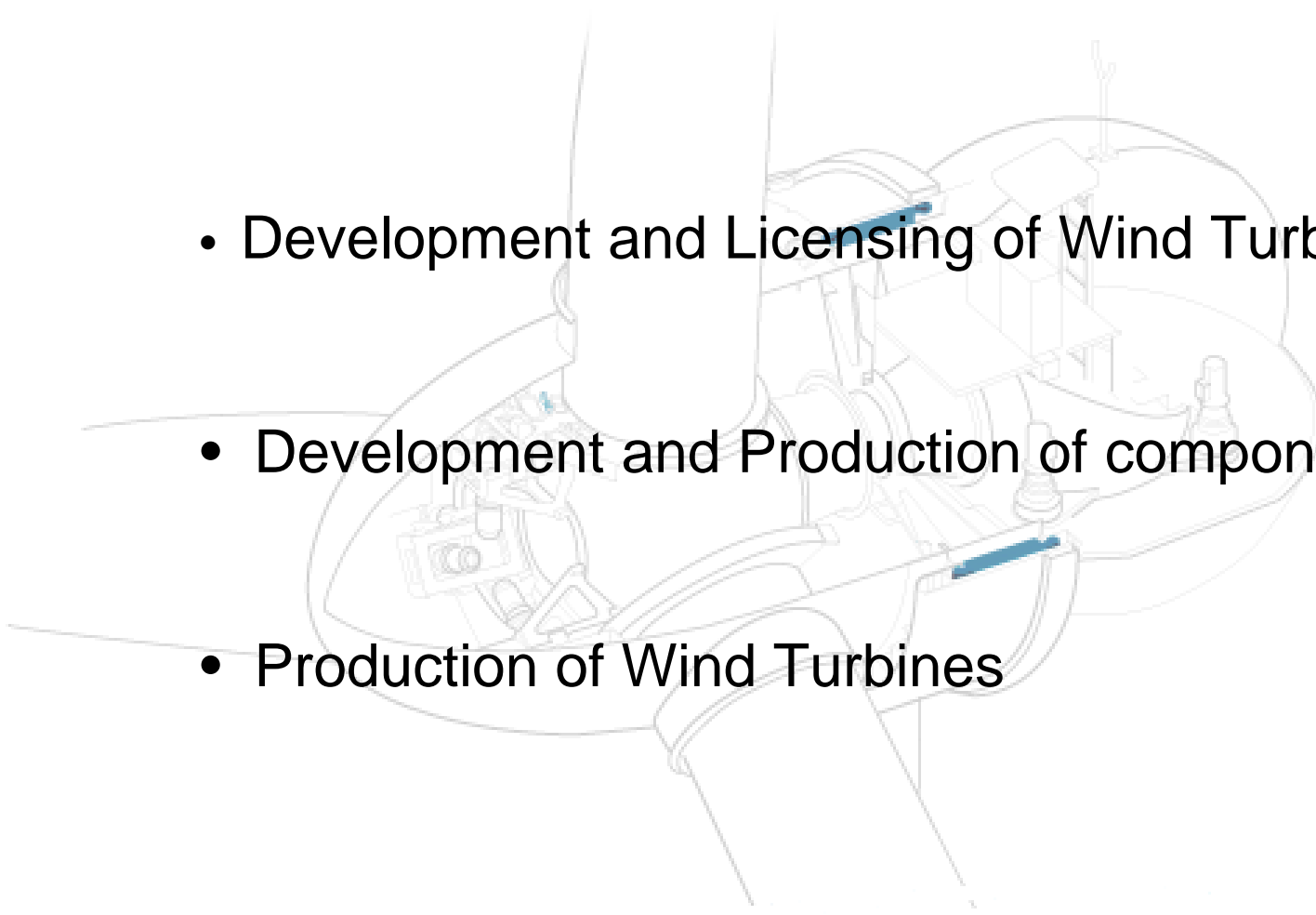
A technical cutaway drawing of a VENSYS engine, showing internal components like the cylinder, piston, and valves. The drawing is rendered in a light grey line-art style with some blue highlights on specific parts.

– VENSYS 70 / 77 and 90 /100 –
High Energy Production plus Built-in Reliability

May, 2009

VENSYS Energy AG
Im Langental 6,
66539 Neunkirchen, Germany
Theodor Peters

 **VENSYS**

- 
- Development and Licensing of Wind Turbines
 - Development and Production of components
 - Production of Wind Turbines

It looks the same from the distance!



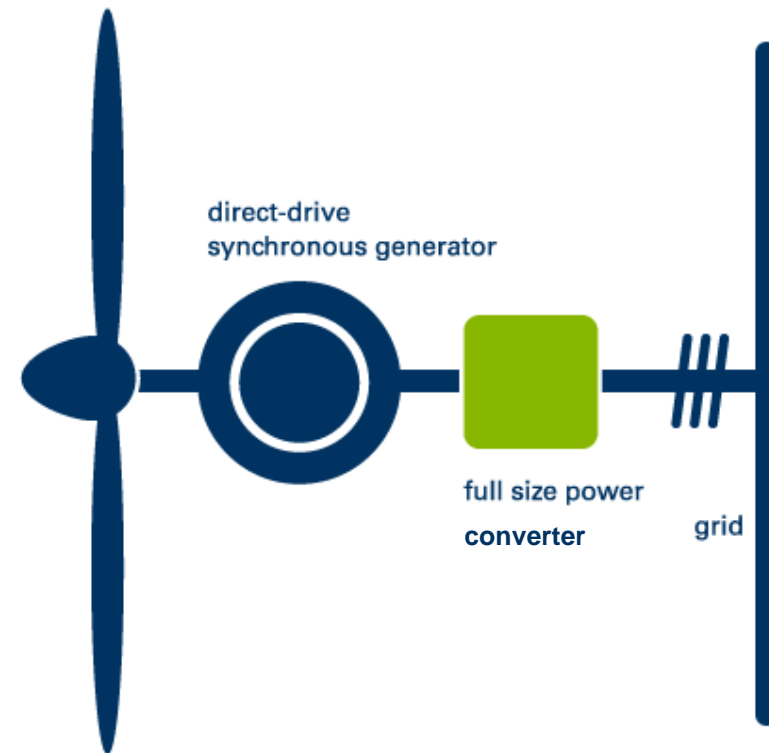
Permanent Magnet Direct Drive Synchronous Generator



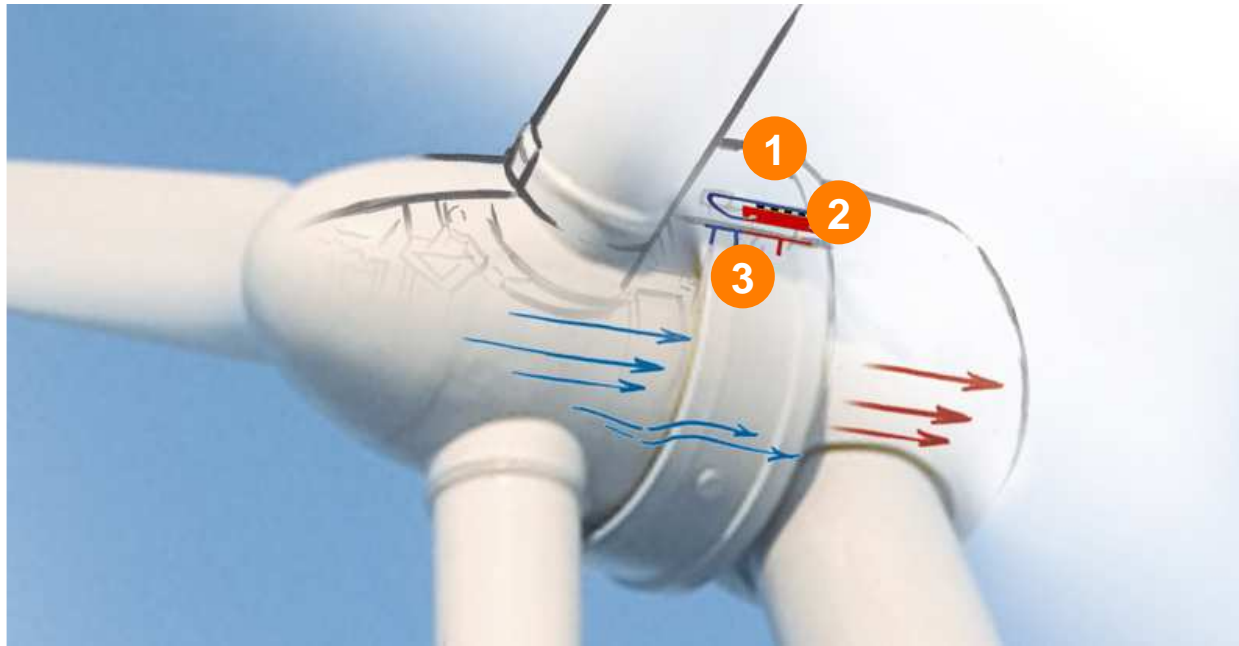
“DAS GENIALE IST IMMER EINFACH” Johann Wolfgang Goethe

Direct-drive synchronous generator – Advantages:

- Fewer components, higher reliability
- No gearbox (less losses, maintenance, noise)
- Higher partial load efficiency (2 – 5% higher energy production for permanent-magnet excitation)
- No generator slip rings and brushes (lower maintenance cost)
- Low voltage, low speed, reliable generator rotor



VENSYS Gearless Technology – Passive Generator Cooling



- 1 External rotor with permanent magnets
- 2 Internal stator
- 3 Cooling duct

➔ Passive cooling system

- Totally enclosed generator, stack cooling with backside cooling fins
- Perfectly cooled magnets, high flux, no demagnetisation
- Outstanding cooling performance: max. temperature rise 30° K

VENSYS Gearless Technology – The Pitch System

Ultra Caps instead of lead-acid batteries

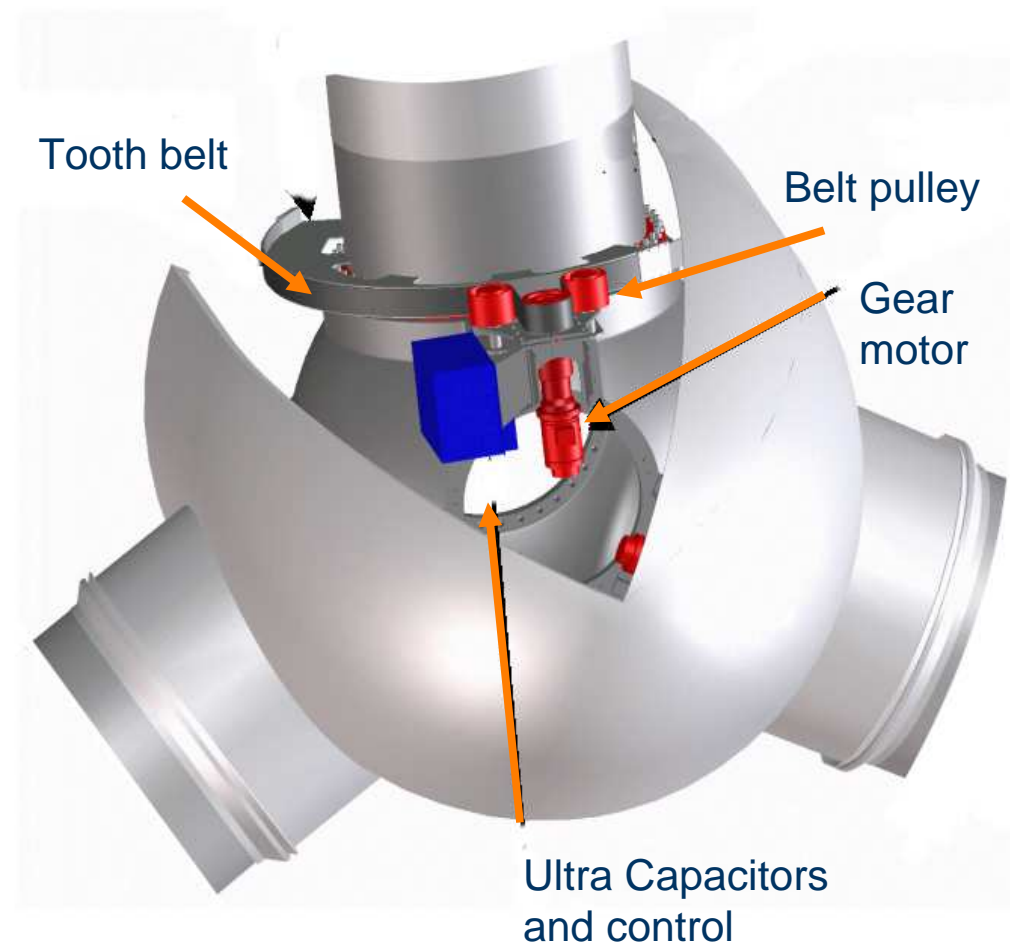
> **No maintenance!**

AC drives instead of DC motors

> **No maintenance!**

Tooth belt instead of spur gear

> **No maintenance!**

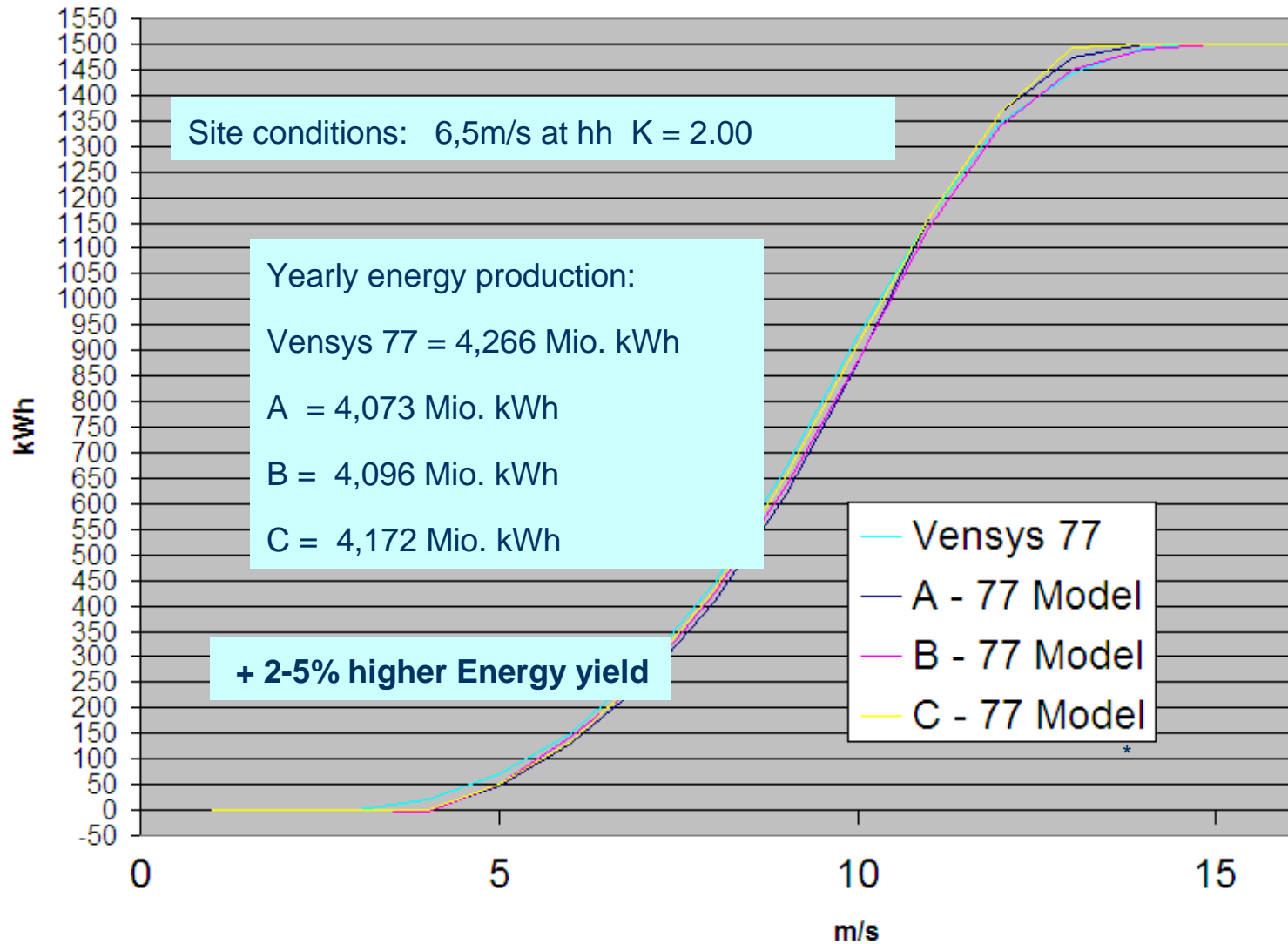


➔ **Reliable pitch system
with certified safety performance under lightning conditions!**

VENSYS Gearless Technology – The Generator



Higher Efficiency → Higher Energy Yield



* measured / guaranteed power curves / German projects

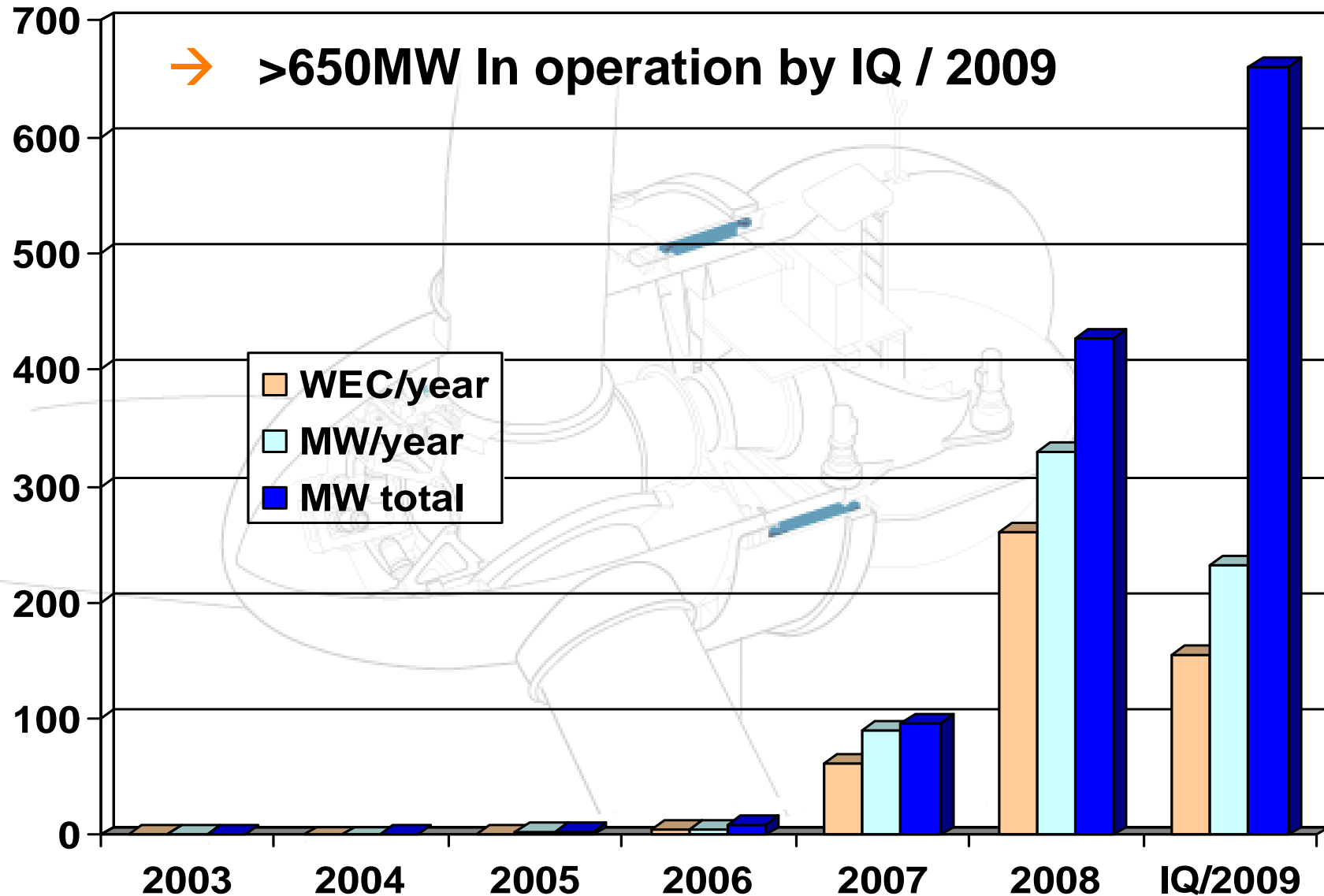
VENSYS 70/77/82 – 1.5MW

Turbine type	VENSYS 70	VENSYS 77	VENSYS 82
Rated power / kW	1500	1500	1500
Rotor diameter / m	70.5	77.0	82.0
Hub heights / m	65.0 / 85.0	61.5 / 85.0 / 100.0	85.0 / 100.0
Speed range / rpm	9.0 – 19.0	9.0 – 17.3	9.0 – 16
Tower top mass / t	82	84	86
Wind speeds / m/s	3.0 – 13.5 – 25.0	3.0 – 13.0 – 22.0	3.0 – 13.0 – 22.0
Wind classes	DIBt WZ 3 IEC IIa	DIBt WZ 2 IEC IIIa IIa*	DIBt WZ 2 IEC IIIa*

* Middle of 2009



Installed VENSYS/Goldwind/ReGen/Impsa/Eozen/CKD turbines



The next Generation: VENSYS 90/100 – 2.5MW

Turbine type	VENSYS 90	VENSYS 100
Rated power / kW	2500	2500
Rotor diameter / m	90	100
Hub heights / m	80	100
Speed range / rpm	7 – 16	6 – 14.5
Tower top mass / t	130	130
Wind speeds / m/s	3.0 – 13.5 – 25	3.0 – 13.0 – 22.0
Wind classes	DIBt WZ 3 IEC IIa	DIBt WZ 2 IEC IIIa

Based on the 1.5MW concepts

→ higher energy yield then gear box technologies

→ Low maintenance

Prototype IVQ 2009

Our licensees



Goldwind



Eozen



ReGen Powertech



Imspa / Enerwind

International Production – Our Licensee Goldwind / China



VENSYS Energy AG in Neunkirchen, Germany



Employees: 56 Vensys Energy AG + 45 Vensys Elektrotechnik GmbH (April 2009)

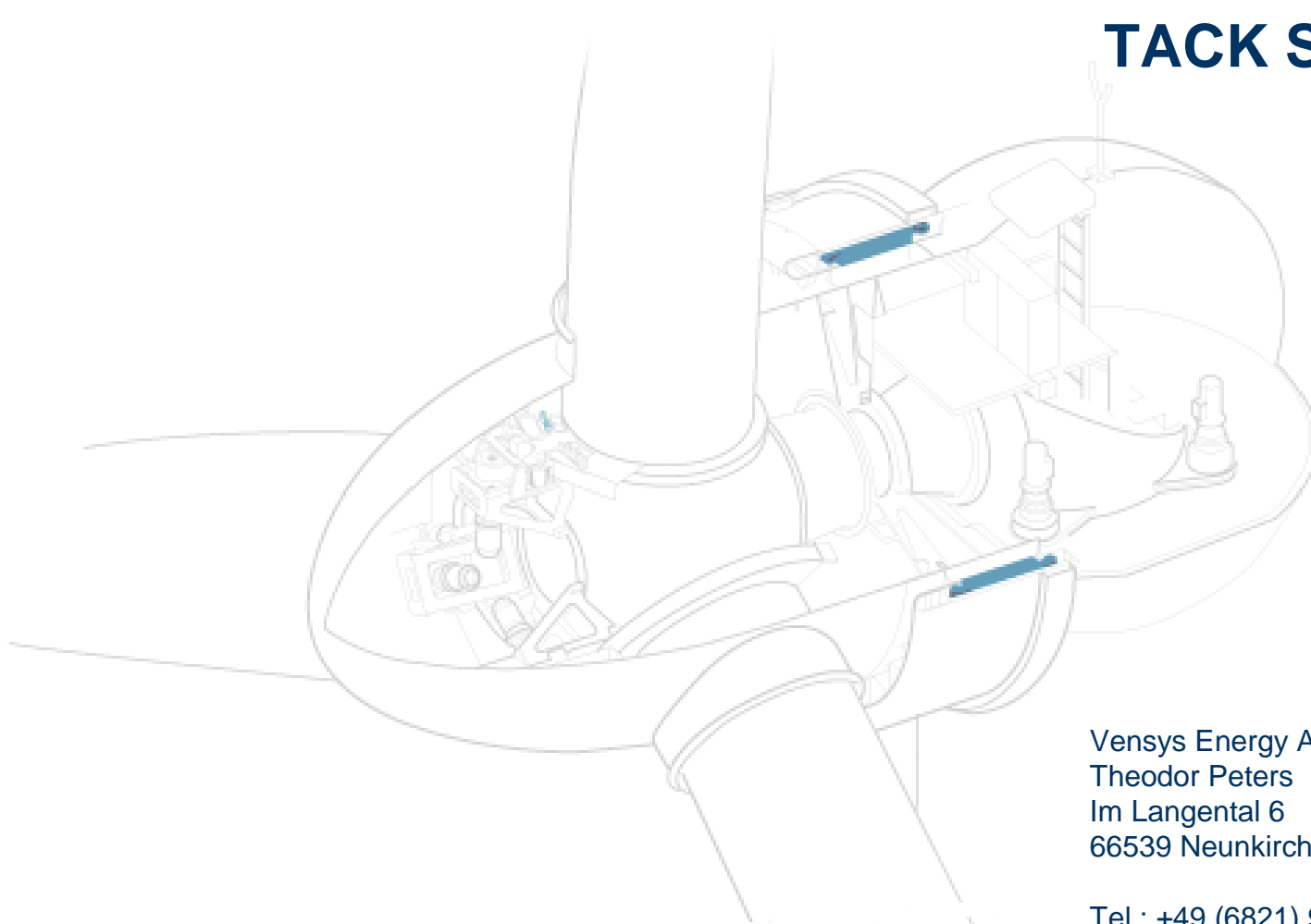
Production facility: 5.000m² Vensys Energy AG + 2.000 m² Vensys Elektrotechnik GmbH

What makes the VENSYS technology different?

- gearless
- permanent magnet technology
- passive air colling system
- full power converter system
- pitch system

→ higher energy yield and low maintenance

TACK SÅ MUCKET



Vensys Energy AG
Theodor Peters
Im Langental 6
66539 Neunkirchen, Germany

Tel.: +49 (6821) 95170 Fax: +49 (6821) 9517-411
t.peters@vensys.de www.vensys.de