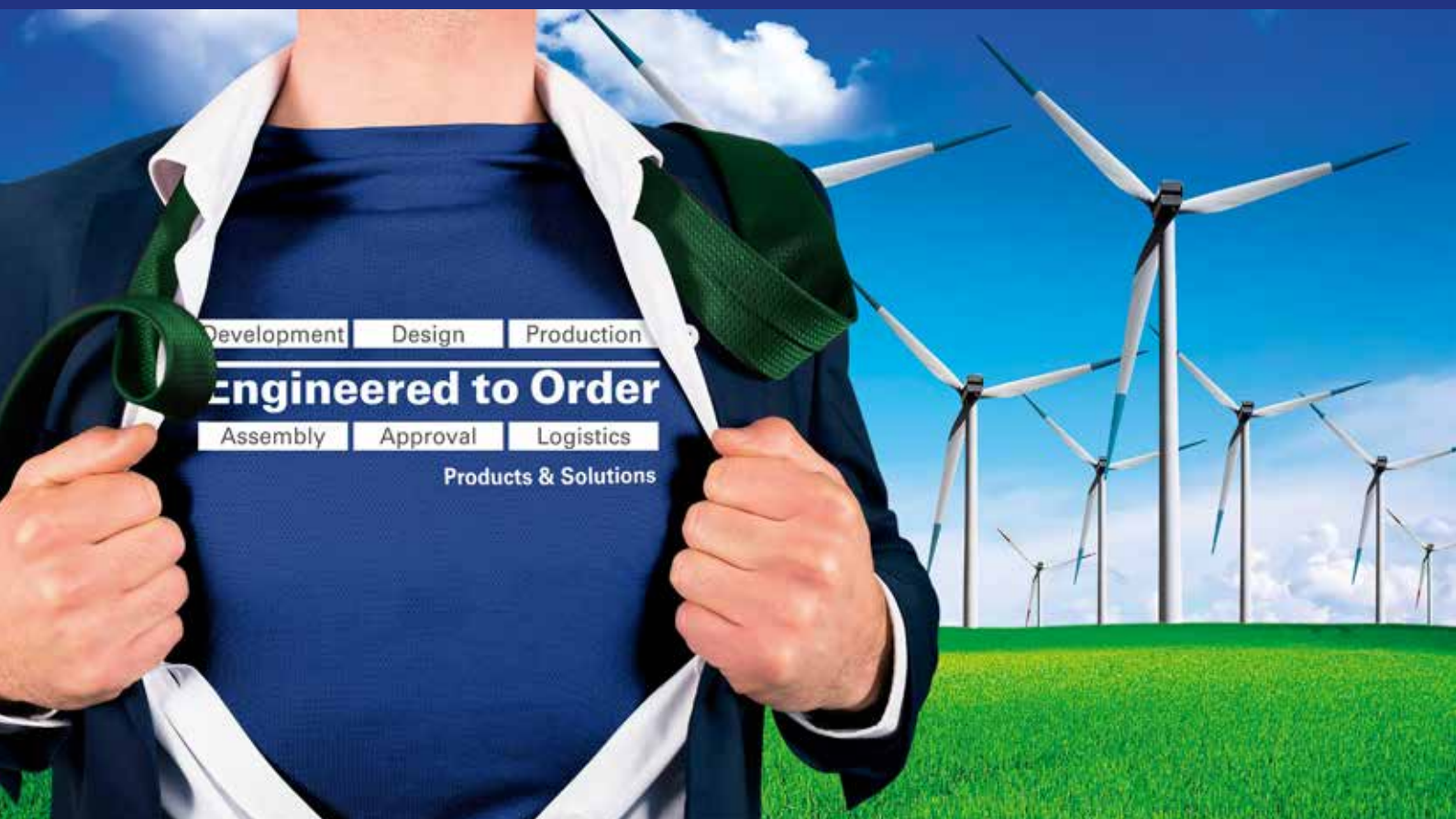


Signal and energy transmission cables for wind turbines



Test facility for torsionable cables and lines in wind turbines

The 16-meter test facility is used to test energy and data connecting lines in a life cycle test of up to 15,000 torsion cycles. The cables, which feature maximum dynamic strength and flexibility at low temperatures, are developed, manufactured and tested on the basis of the customer-specific requirements of the wind turbine manufacturer.

Test facility details	Values
Max. test height	up to 12 meters
Max. test capacity	32 cables in the practical test (with or without spacers, as desired)
Speed of rotation	Test speed in the range of 0–20°/sec. (variable)
Torsion angle	Angle range +/- 1080° (variable)
Loop simulation	Real – as specified by the wind turbine manufacturer
Conductor connections	Ring cable lug, cable grips or according to customer requirements
Tests	<ul style="list-style-type: none"> - Video surveillance test - Voltage tests (low/medium voltage) in the voltage lab - Fiber optic conductor tests - Visual detail analysis on complete test lengths
Customer-specific test options	Tests are set up and carried out according to customer specifications

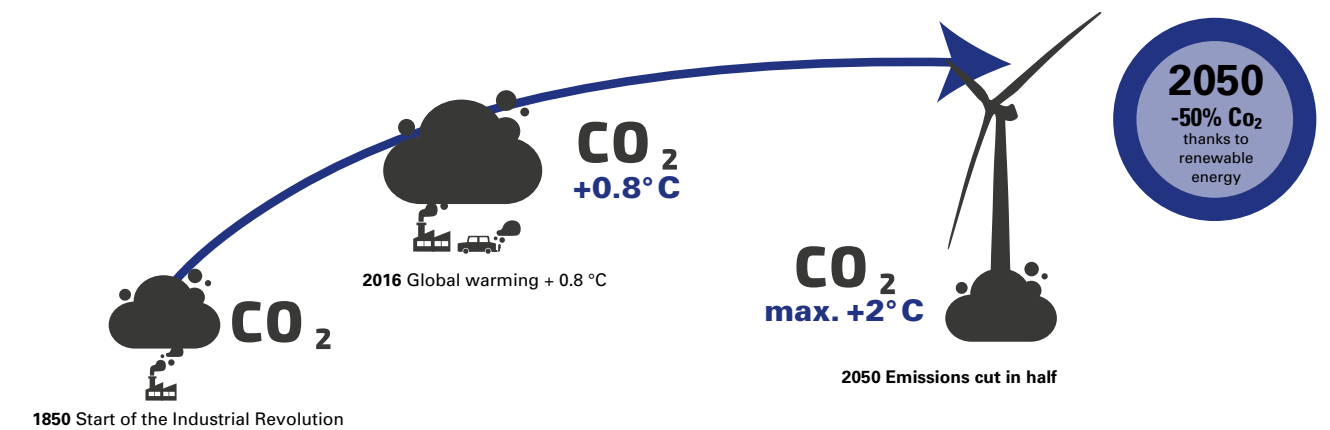


The wind is blowing in the right direction

The move from fossil-based power generation to renewable energy is underway. The new agreement reached at the UN COP21 climate conference on limiting global warming to 2°C and cutting CO₂ emissions in half by 2050 is speeding up this process and giving the renewable energy market fresh momentum. According to trend calculations, the wind energy sector is growing approximately 5 percent each year and will continue to grow by the same amount. This growth is greater or more sluggish in different countries, depending on the amount of government support. It is reflected in an annual increase of 50 gigawatts worldwide, 25 percent of which is in Europe. This growth is equal to 7,000 to 8,000 new wind turbines in Europe. Offshore installations account for an increasing share of 13 percent (2010 – 2015 figures).

To accommodate this rapid expansion, wind turbine manufacturers need expert, reliable component suppliers who can grow along with the market. As a renowned and well-established cable manufacturer, BRUGG eConnect offers complete cable solutions as well as related services. We are your ideal partner, from development and testing to delivery at the construction site. We deliver outstanding quality with an optimum price/performance ratio.

More renewable energy lowers CO₂ emissions



BRUGG eConnect : specializing in high-end cables

BRUGG eConnect specializes in high-end cables and has extensive expertise in the engineered-to-order (ETO) segment. The individual parts are designed and manufactured on the basis of developments according to defined customer requirements. BRUGG eConnect applies its entire specialized knowledge and experience to this work, and supports projects in all phases, from development, design, purchasing, production, testing and logistics based on customer-specific requirements to on-site installation.



**Rotor blades:
Lightning conductors,
energy and data cables**

For protecting the rotor blade against lightning strikes. Lightning arrestors and sensor cables for detecting ice.

	Lighting arrestor	Sensor cable (lightning-proof)
Conductor	Cu/Alu, Kl.2	Cu, Kl.5
Insulation	EPR	EPR
Shield/protection	—	PET film
Jacket	—	TPU
Temp. range	-40 °C ... + 90 °C	-40 °C ... + 90 °C

**Nacelle:
Power and control cables,
flexible, fixed installation**

For wiring within the nacelle, switchgear cabinets and tower controller

	Single conductor, ground wire	Multi-wire, PURWIL	Multi-wire, shielded, PURWIL EMV
Conductor	Cu, Kl.5	Cu, Kl.5	Cu, Kl.5
Insulation	EPR	EPR	EPR
Shield/protection	—	—	Cu braiding
Jacket	—	PUR	PUR
Temp. range	- 40 °C ... + 90 °C	- 40 °C ... + 90 °C	- 40 °C ... + 90 °C

**Torsionable tower (loop):
power cable,
torsionable, flexible**

Developed specifically for deployment between the nacelle and tower in wind turbines with matched EPR/PUR single conductors.

WILBAwind	Low voltage 0.6/1 kV		Medium voltage 3.6/6 kV
	Cu, single conductor	Cu, multi conductors	Cu
Conductor	Kl.5, torsionable	Kl.5, torsionable	Kl.5, torsionable
Insulation	EPR	EPR	EPR
Sheath	—	—	Cu sheath
Jacket	XLPO	XLPO	XLPO
Temp. range	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C

**Fixed tower:
Grid connection, control
and power cables**

Developed specifically for fixed installation in wind turbine towers with matched FRNC cable

WILBAwind	Low voltage 0.6/1 kV		Medium voltage 3.6/6 kV	
Conductor	Cu, Kl.2	Alu, Kl.2 (annealed)	Cu, Kl.2	Alu, Kl.2 (annealed)
Insulation	EPR	EPR	EPR	EPR
Sheath	—	—	Cu braiding	Cu braiding
Jacket	XLPO	XLPO	XLPO	XLPO
Temp. range	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C

**Base, grid connection,
control**

Medium-voltage cable for installation in the tower base and ground

Medium-voltage cable according to HD 620:

- XKDT and XD-ALT 12/20 kV, Al, Kl.2.
- 1- and 3-conductor

Tower cabling:

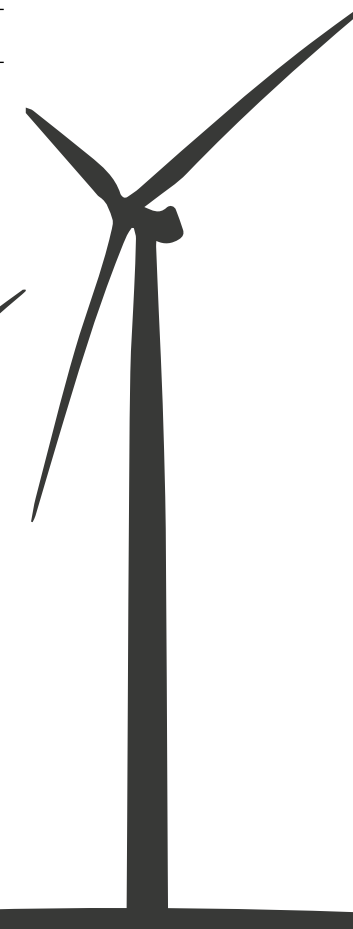
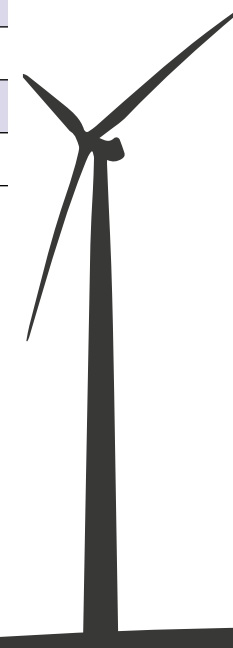
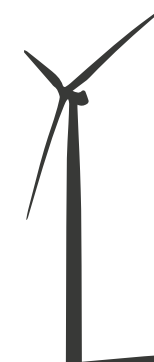
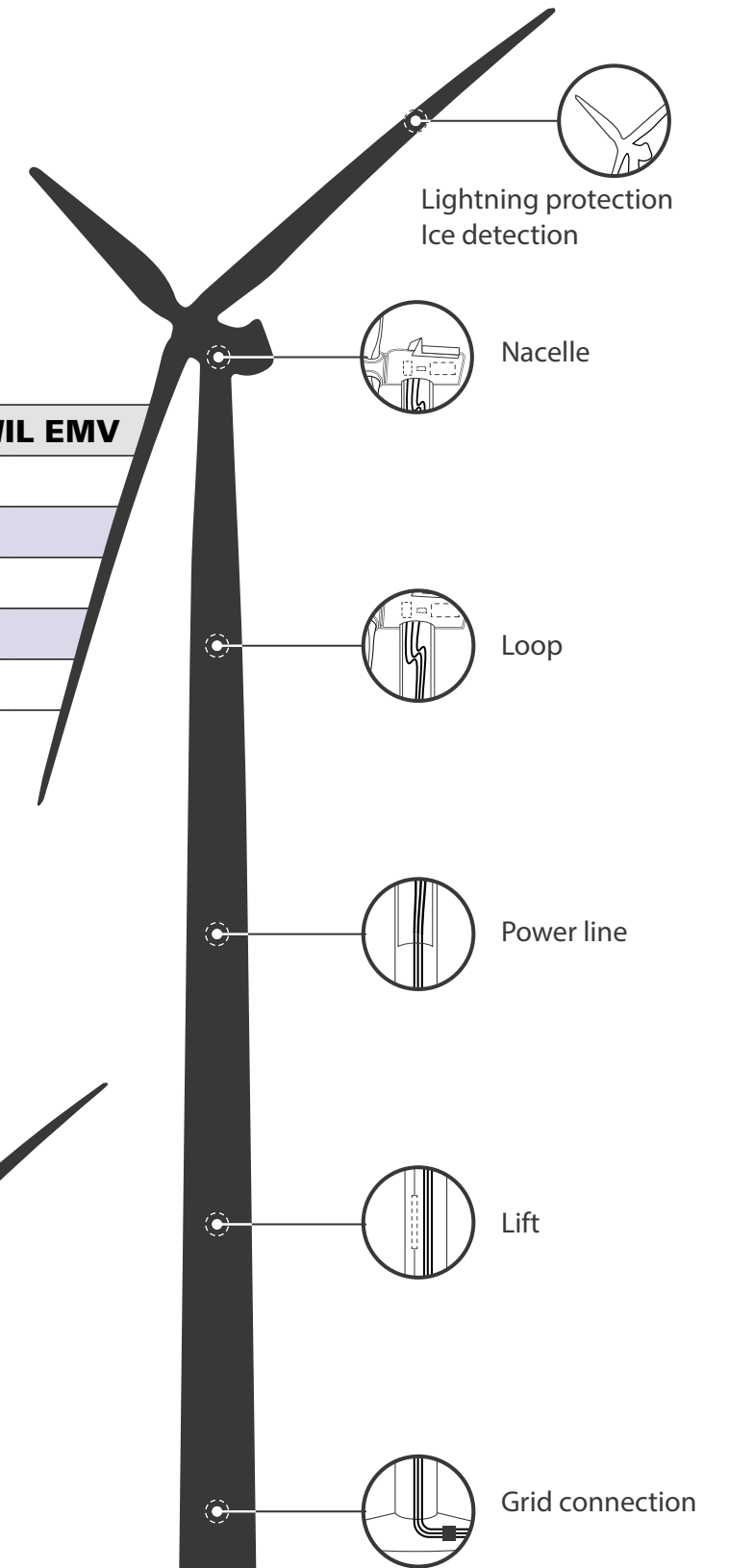
- PURWIL EPR/PUR and PURWIL EMV EPR/PUR (for tower cabling and connections in the base area)

Control cables:

- BRUsteel and BRUclean, extremely robust fiber optic cable for self-supporting applications and deployment indoors and outdoors

- Standards:
- IEC 60332-1 Flame retardant
 - IEC 60332-3 Fire retardant (partial)
 - IEC 60754-1 Halogen-free
 - IEC 60754-2 No corrosive gases
 - IEC 61034 Low smoke emissions
 - EN 50396 Ozone resistance
 - IEC 68811-2-1 Resistance to oil
 - ISO 4982-2 UV resistance

Accessories: Press-fit and screw cable lugs, Al/Cu



Switzerland (Head office)

BRUGG eConnect AG
Industriestrasse 19
CH-5200 Brugg
Tel. +41 56 460 33 33
info.econnect@brugg.com
www.bruggeconnect.com

Poland

BRUGG eConnect Poland Sp. z o.o.
ul. Rokitniańska 4
PL-66-300 Międzyrzecz
Tel. +48 691 222 537
info.pl@brugg.com