

XANT

WIND POWER MADE EASY



- State-of-the-art midsize (50 to 500 kW) wind turbines reducing your energy cost.
- Designed for industries, farms schools, villages, resorts and remote off-grid locations.

VYNCKE

Global engineering & construction company for industrial biomass energy plants.



Global consultancy and software company focused on increasing renewable energy installation performance and optimising energy consumption



Independent investment company which invest in the economic fabric of Flanders

Jo VERSAVEL

The XANT development started with R&D on innovation drive-train concepts and aero-elastic tailoring for mid-size turbines.

The XANT-21 design was initiated in Feb. 2009

Nov 2009: Selection downwind concept with RISOE: Danish Research Centre.

2010 Blade design with TU Delft & NREL

Dec 2011 this first design has undergone Germanischer Lloyd Type-D Certification.



A working prototype in February 2014

Type-A certification of XANT-21 by Q4-2014.

2008

2009

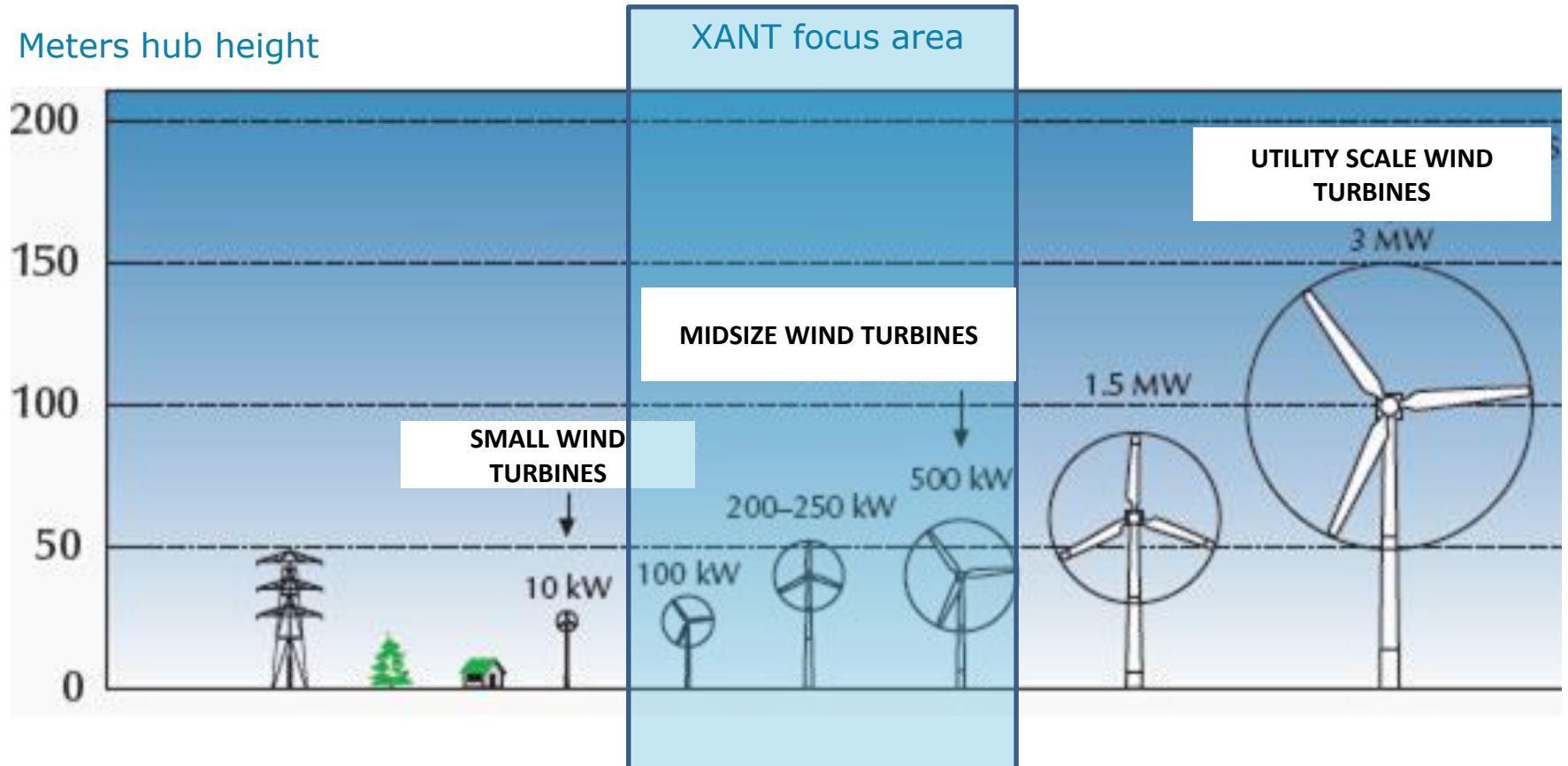
2010

2011

2012

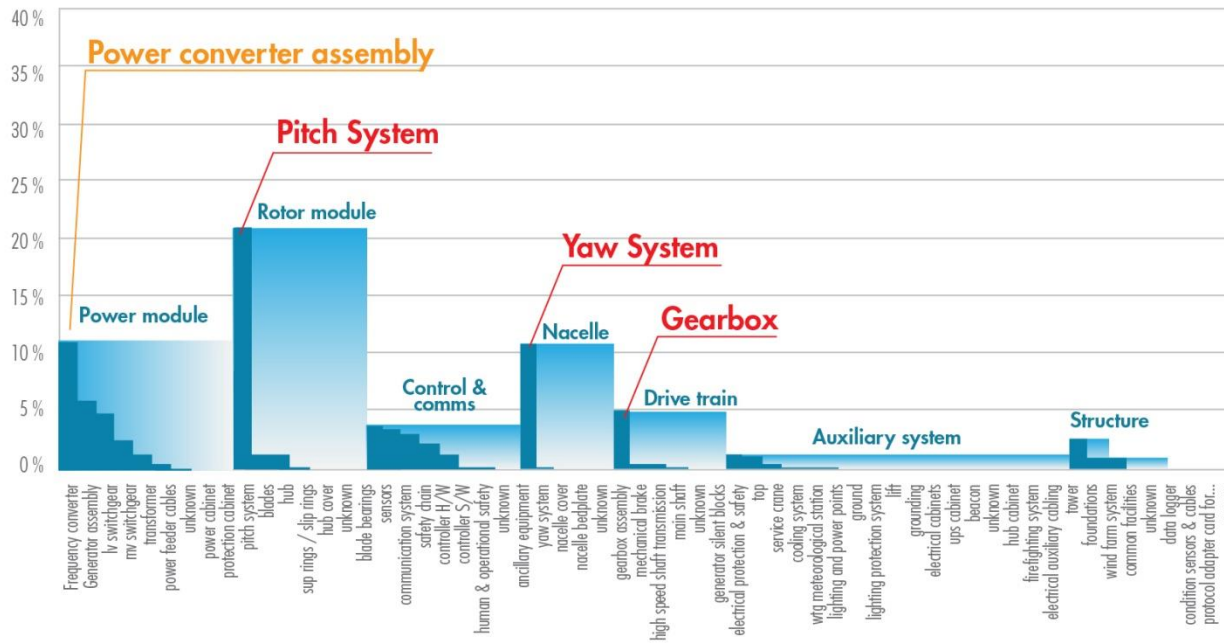
2014

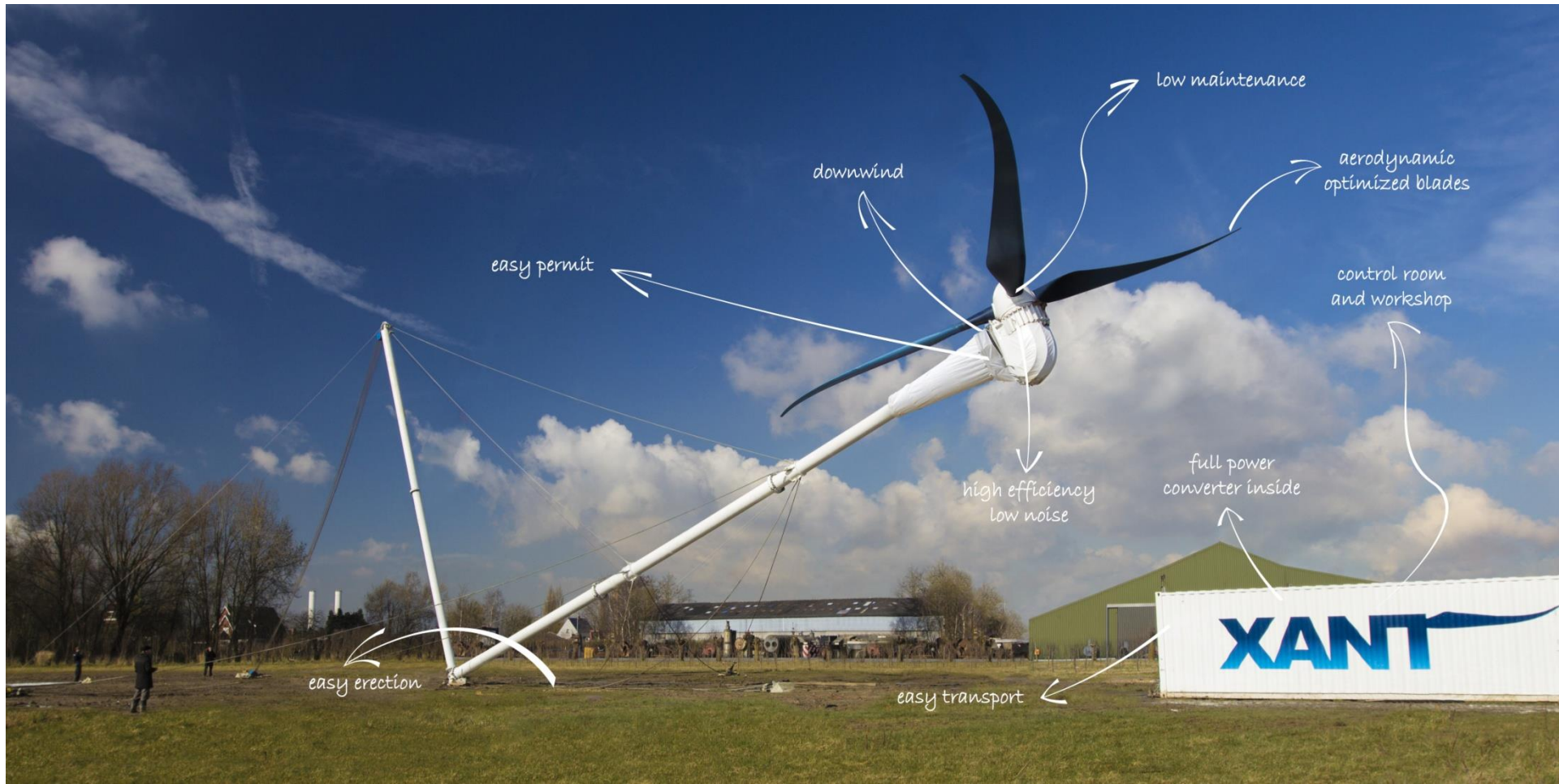
2014

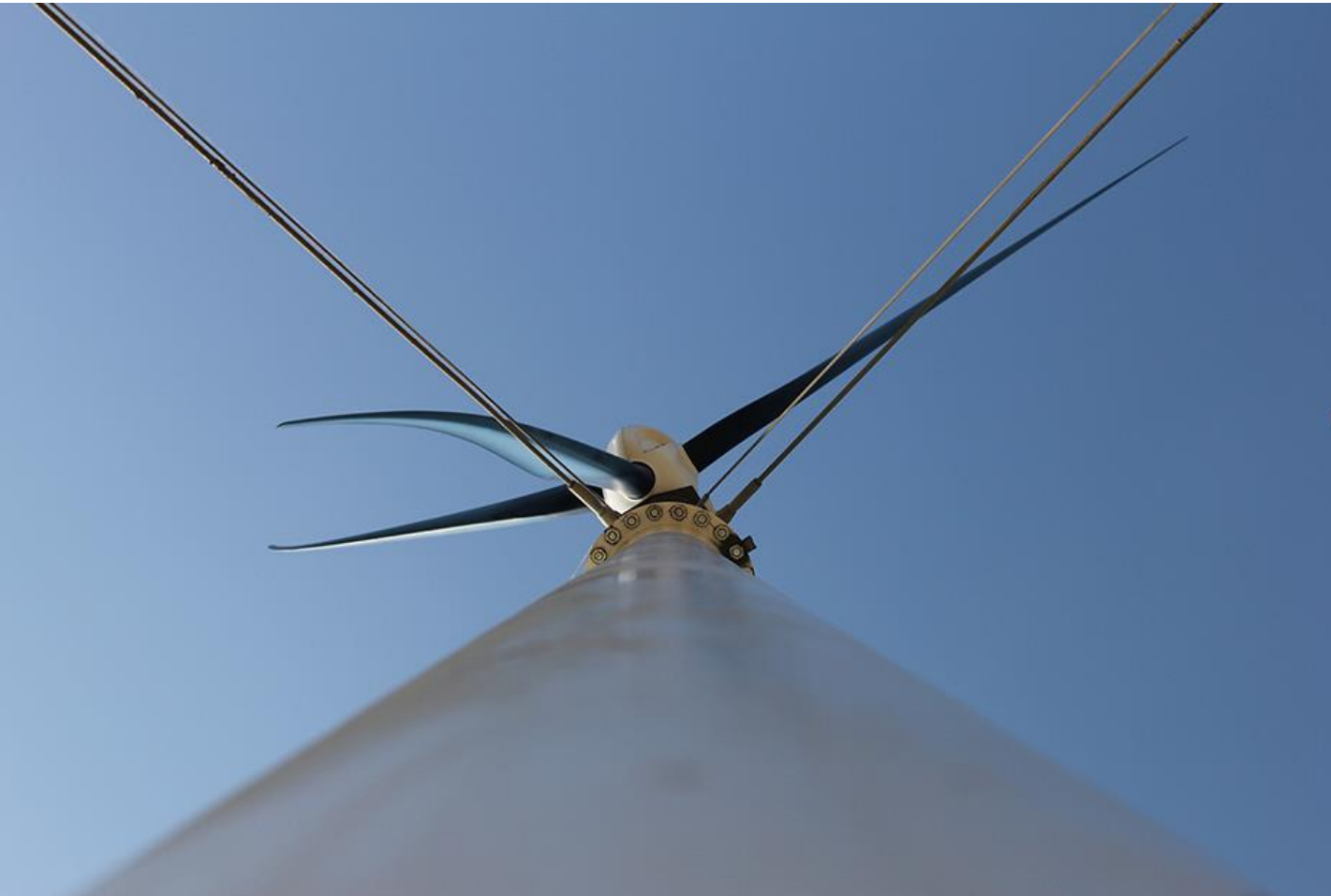


Results - Failure Rate (all downtime events)

Percentage contribution to overall failure rate







- No pitch control : less failure prone parts
- Blade shape : optimal flow at low-to-medium wind speeds
- Aero-elastic blade tip : optimization of efficiency and reduction of peak loads

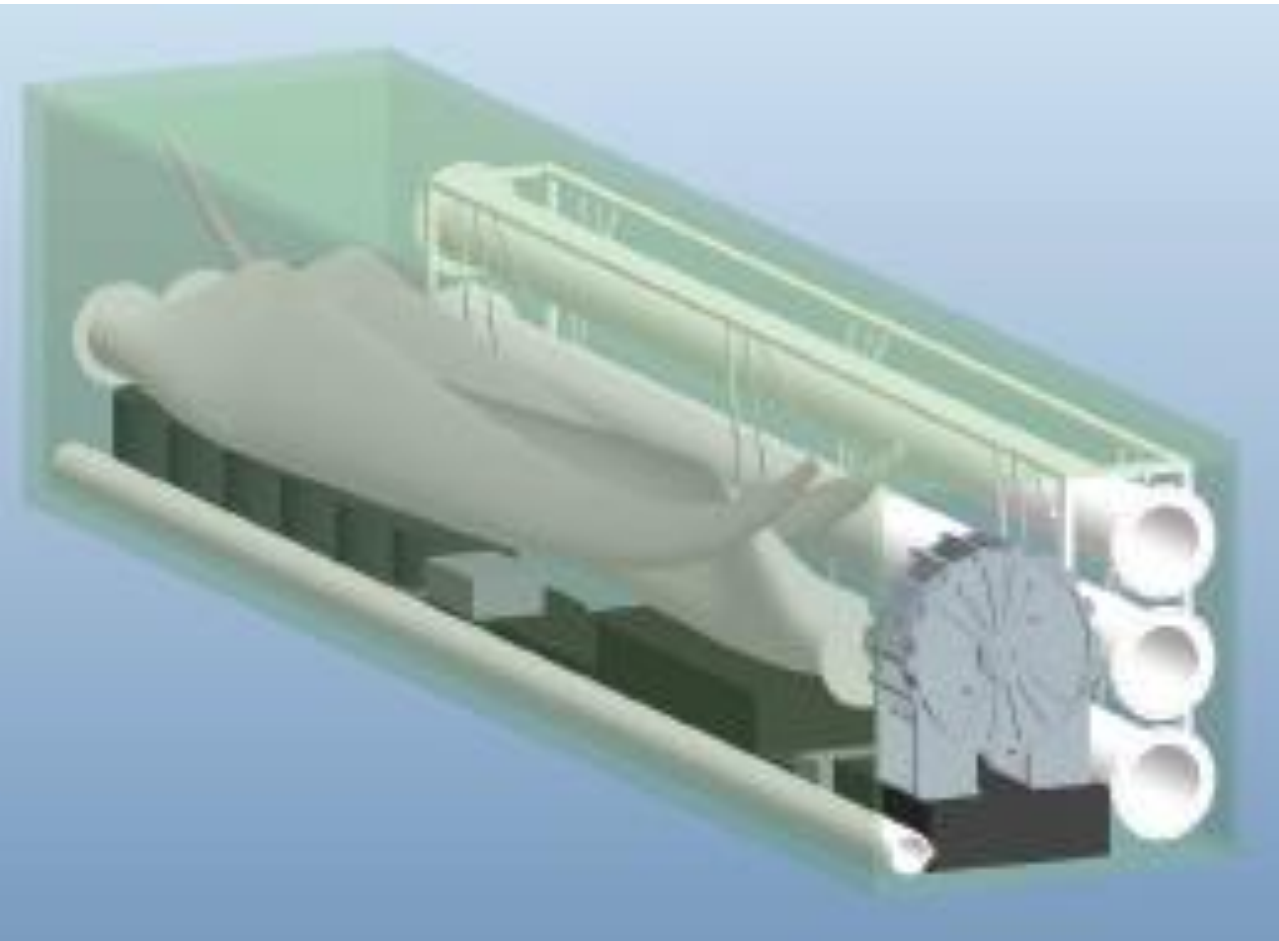
DIRECT DRIVE GENERATOR



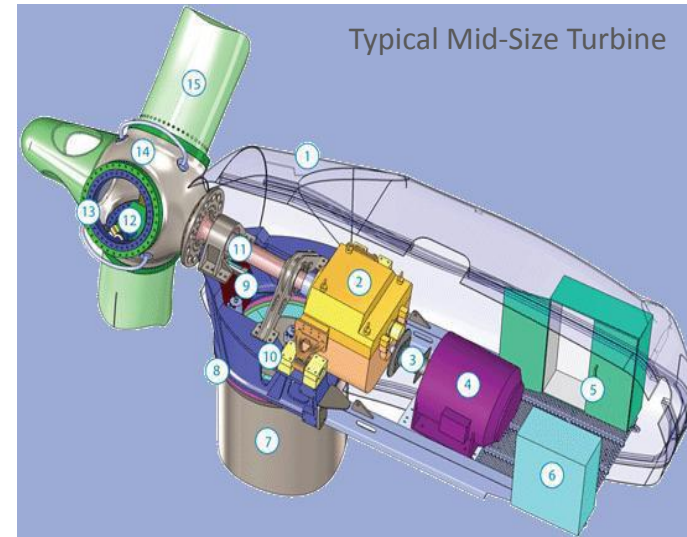
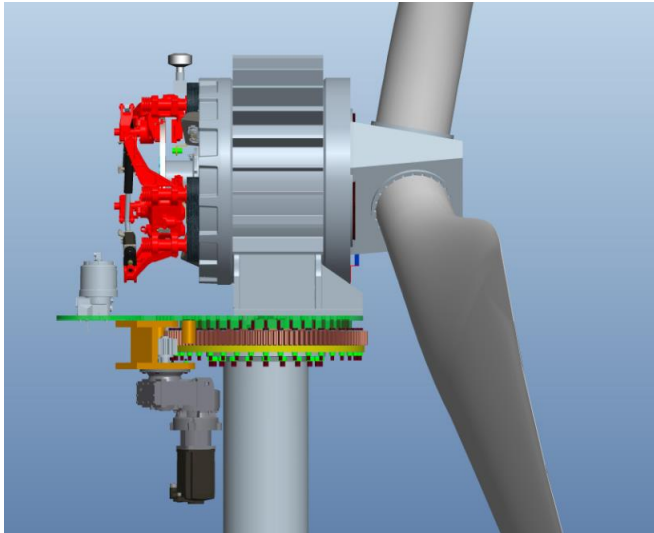
- No gear box: less failure prone parts
- Permanent-magnet synchronous generator : higher efficiency
- Full power electronic converter: ready for grid support



- Gin pole with reeving systems :
no cranes required
- Low erection cost
- Possibility to erect on remote locations

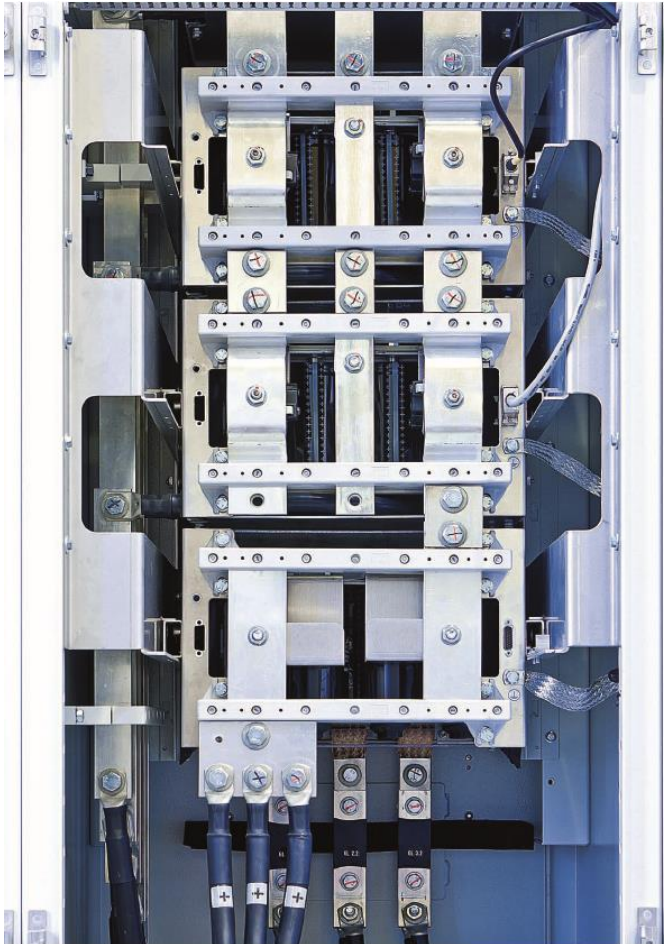


- All parts fit in a 40' container
- Low transport cost
- Possibility to deliver to remote locations

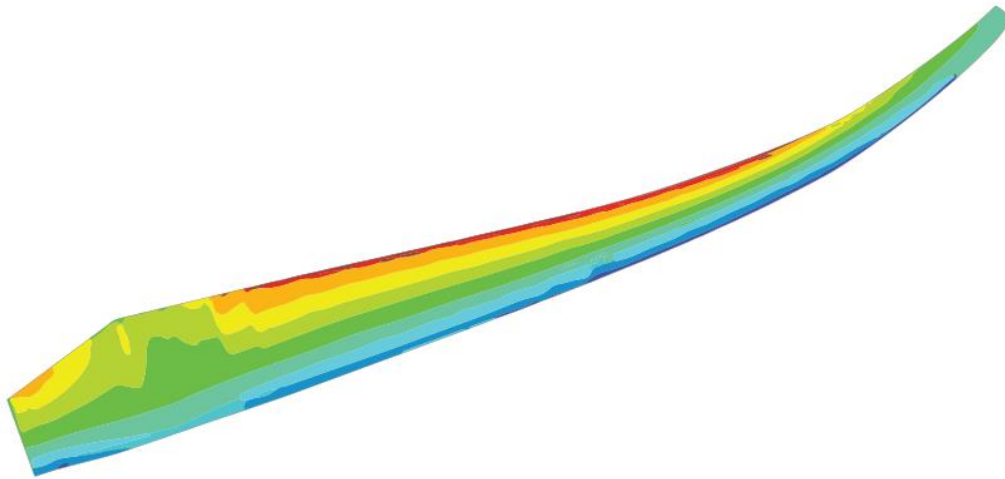


Typical Mid-Size Turbine

- Designed according to JEEP (Just Enough Essential Parts mechanism) : less failure prone parts
- Direct drive : higher efficiency, less noise
- Stall regulated rotor : less failure prone parts
- Permanent magnet synchronous motor : high energy conversion efficiency = higher yield
- NO hydraulics : less shutdowns



- Full power electronic converter
- Power Quality according to local grid :
connection to local grid via circuit breaker panel
- Ready for off-grid use



- Designed according to IEC 61400-1
- Design approval by Germanischer Lloyd
- Electrical braking system
- Electro-mechanical safety brake

Distributed
Generation
(grid-connected)



Off-grid
Generation



XANT-21

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WIND TURBINE RATING

Rated electrical power	100 kW
Power factor	0.9 inductive - 0.9 capacitive
Cut-in wind speed	3 m/s
Survival wind speed	70 m/s
Rated rotor speed	58 rpm
Electrical output	400 VAC, 50 - 60 Hz

GENERAL CONFIGURATION

Rotation axis	Horizontal
Rotor Orientation	Downwind
Rotor Diameter	21 m
Number of blades	3
Drive train	Direct-drive permanent-magnet generator
Converter	Full-power electronic converter

SAFETY & CONTROL SYSTEMS

Power regulation	Variable speed, stall with aeroelastically-tailored blades
Braking systems	Electrical brake and electromechanical brake
Monitoring system	Webbased HMI
Controller	Industrial PLC

PRODUCT MASS & FOOTPRINT

Tower top mass	7.5 tons
Total mass	14 tons (freestanding tower)
Footprint	+/- 15 m ² (freestanding tower)
Concrete volume	80 m ³

APPROVALS, CERTIFICATES AND DESIGN CODES

Turbine Class	IEC 61400-1 (Ed.2) Class I ^A
Certification	Design-approval by Germanischer Lloyd

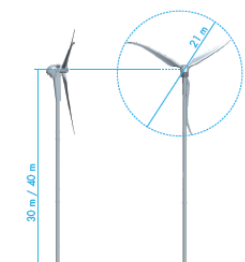
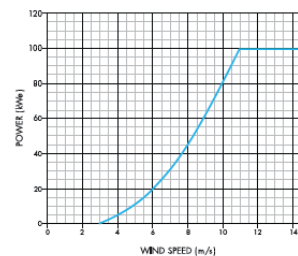
TOWER

Type	Tubular freestanding or tubular guyed tower
Hub height	30 m & 40 m

TRANSPORT AND INSTALLATION

Transport	40feet high-cube ISO container
Erection	Gin pole with reeving systems or crane

POWER CURVE



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MM00VV







- 100kW rated power
 - MV grid-connection not an issues
 - LV-grid connection: upgrade to MV connection is usually required

- AREI
 - SYNERGRID
 - Specific guidelines of DSO: e.g. EANDIS
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- *C10/11: Specifieke technische aansluitingsvoorschriften voor gedecentraliseerde productie-installaties die in parallel werken met het distributienet. (versie 06-2012)*
 - *C10/11 FAQ: FAQ betreffende de toepassing van de C10/11. (versie 07-2011)*
 - *C10/17: Power Quality voorschriften voor netgebruikers aangesloten op hoogspanningsnetten. (versie 05-2009)*
 - *C10/19: Aansluiten van storende belastingen in laagspanning. (versie 09-2006)*
 - *C2/112: Technische voorschriften voor aansluiting op het HS-distributienet. (versie 04-2004)*
 - *C2/116: Interpretatienota van het document C2/112. (versie 03-2011)*
 - *C1/107: Algemene technische voorschriften voor de aansluiting van een gebruiker op het LS-distributienet. (versie 08-2006)*
 - *TRDE: Technisch Reglement Distributie Elektriciteit. (versie 04-12-2009)*
 - *AREI: Algemeen reglement op de elektrische installaties. (versie 17-11-2011)*
 - *NBN EN50160: Voltage Characteristics of Electricity supplied by public electricity networks. (versie juli 2010)*

- Similar to procedure for PV systems > 10kW
 - Request building – permit: usually about 3 months
 - Request grid-connection study: positive or negative outcome (usually after 2-3 months)
 - If outcome positive, approval of electrical schematics & definition of grid-connection relay
 - Construction of installation with all components: tower, nacelle, rotor, inverter, grid connection, Green-Energy Certificate kWh meter
 - MV infrastructure has to be inspected & approved by independent inspection body (AIB-Vyncotte, OCB..). For a 100kW wind turbine only AREI-compliance is checked, no need for Green Energy Certificate inspection.
 - The 4Q kWh meter is calibrated, after this the GEC counter can be initiated and the installation is on-line.

- Clients preferably use 100% of the energy generated for best pay-back.
- Energy yield has seasonal variation
- Flanders is densely populated area: noise is an issues, shadow due to blade passing usually not.



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