



AWEA Windpower 2011

MV Wind Converter Products Top 10 Reasons

In booth theater presentations

MV Wind Converter Products – Top 10 Reasons

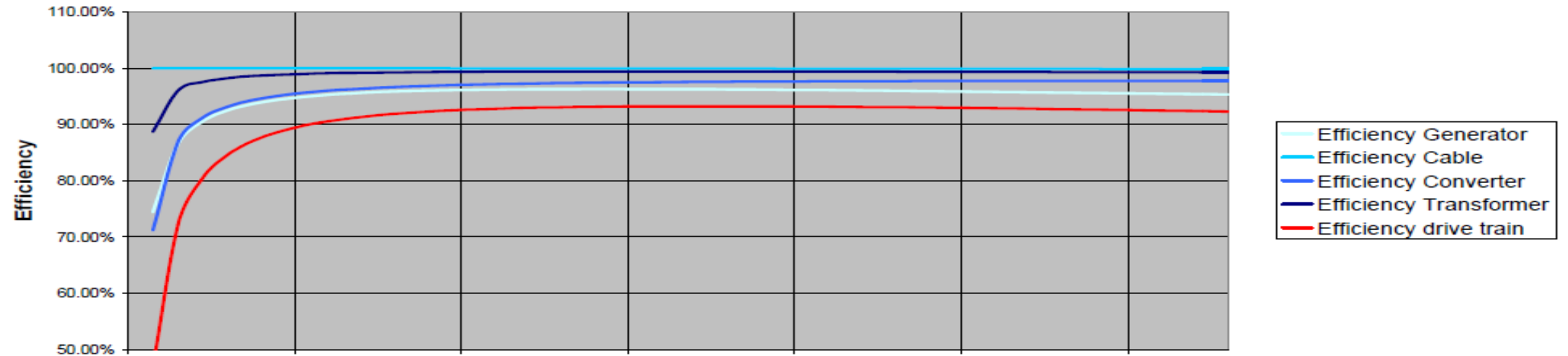
- Speaker name: Arnd Becker
- Speaker title: Business Development Manager
- Company name: ABB Inc.

MV Wind Converter Products



Top Reasons for MV Wind

- Maximum Energy to the Grid

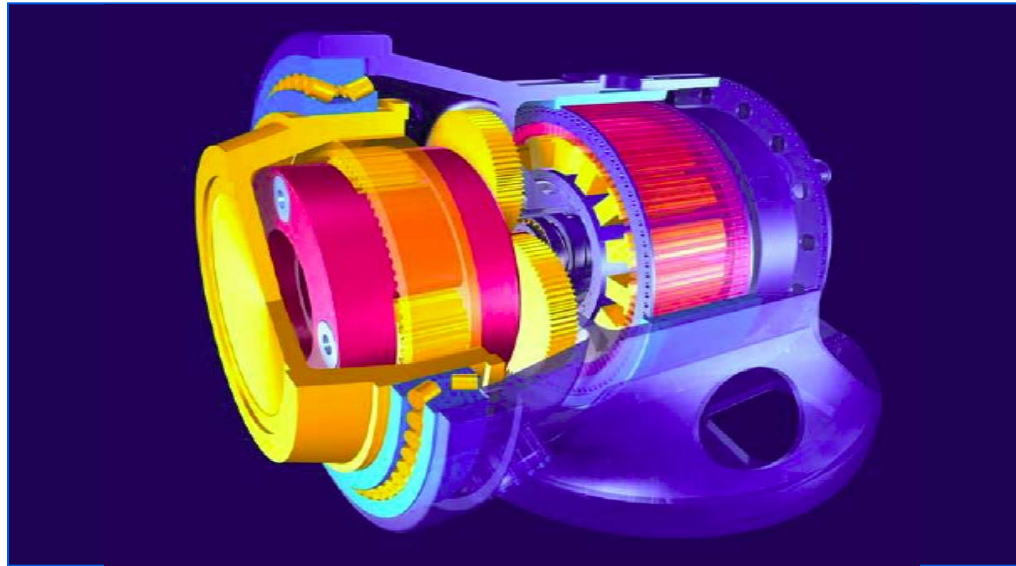


Typical efficiency for whole electrical drive train (DD with PMSG)

- ~98% converter efficiency incl. all auxiliaries & filters
partial load efficiency >95% already at 10% of rated power
- Best MTTR by remote access and special repair concept

Top Reasons for MV Wind

- Maximum Generator Control



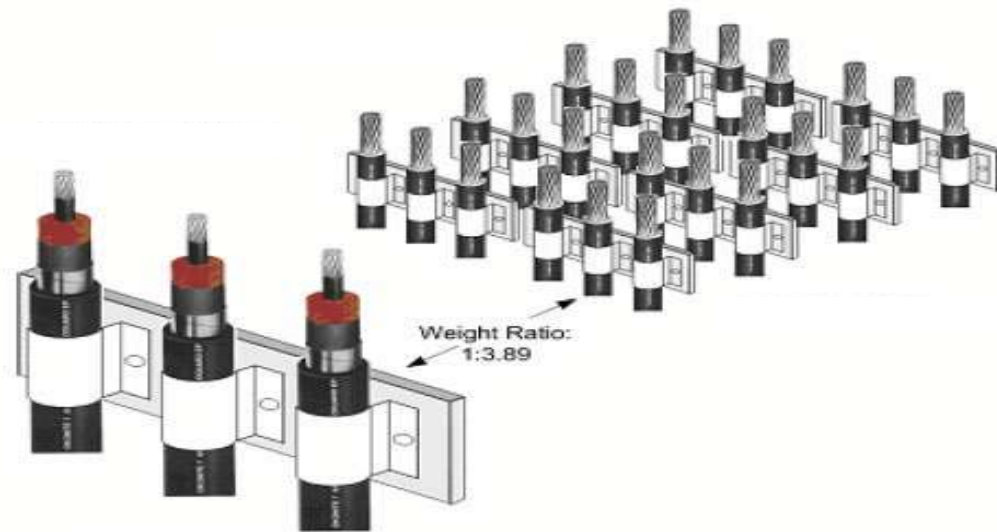
- Generator operation at optimum active and reactive power
- Rotor positioning mode (on-site needed for service)
- Generator test run (hall test needed for pre-heating, over-speed)
- Total over-speed voltage suppression (field weakening)
- Active drive train damping leads to lean design of mechanical drive train components

Top Reasons for MV Wind

- Easy cabling and lowest losses



- Easy and quick cabling by the Pfisterer© P3 MV PLUG System
- I²R losses significantly lower (>factor 20) compared to 690V system
→ **maximum system efficiency**



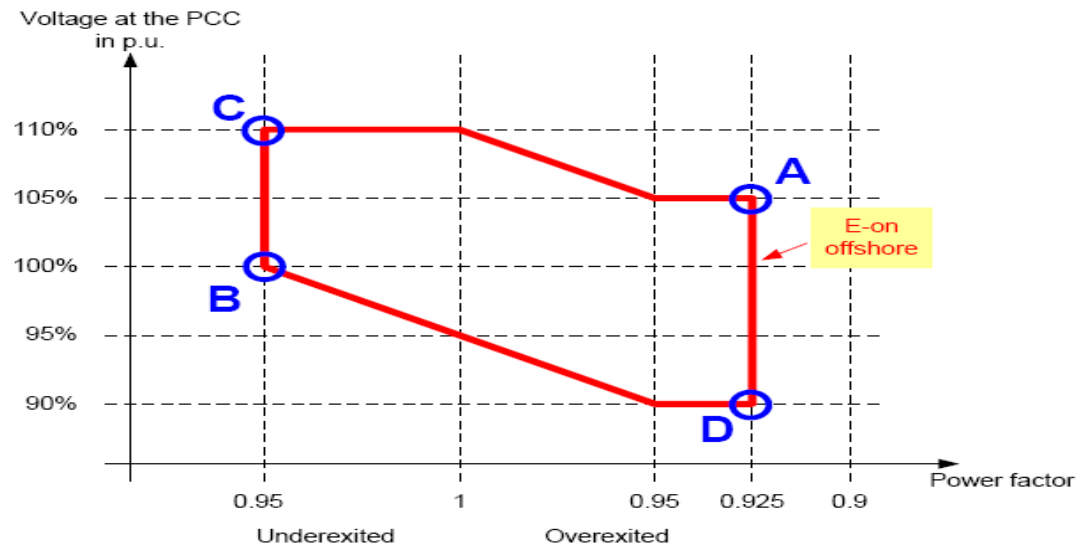
Top Reasons for MV Wind

- Full Drive Train Decoupling

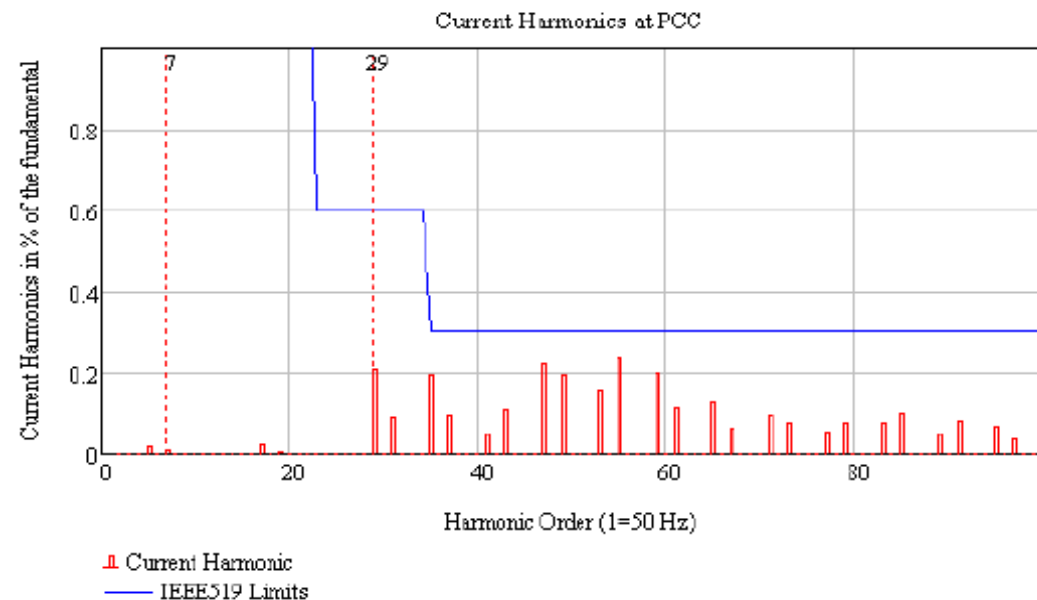


- Full decoupling of mechanical turbine from the electrical grid
- Power dissipation resistors for smooth FRT
- Active drive train damping
→ lean design of mechanical components

Top Reasons for MV Wind - Full Grid Code Compliance

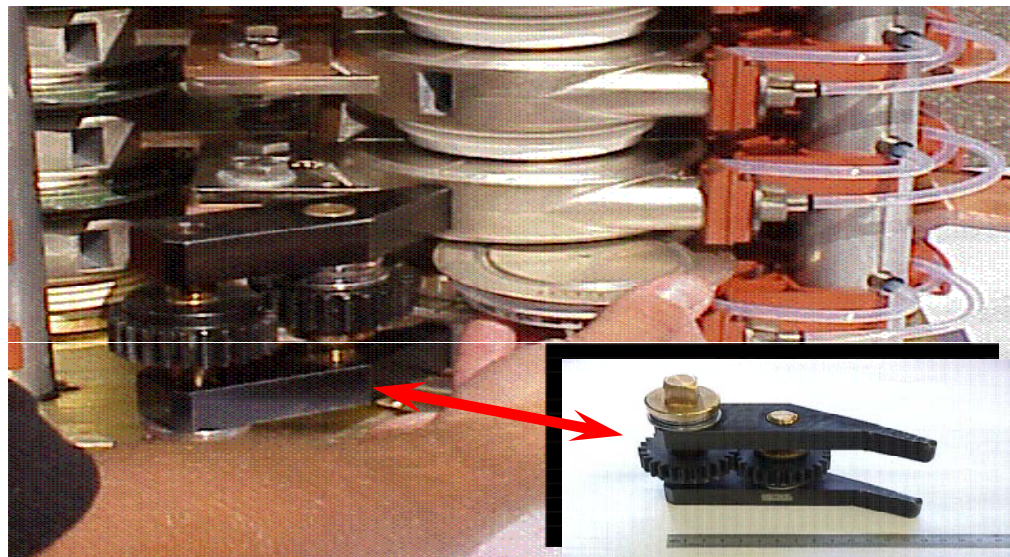
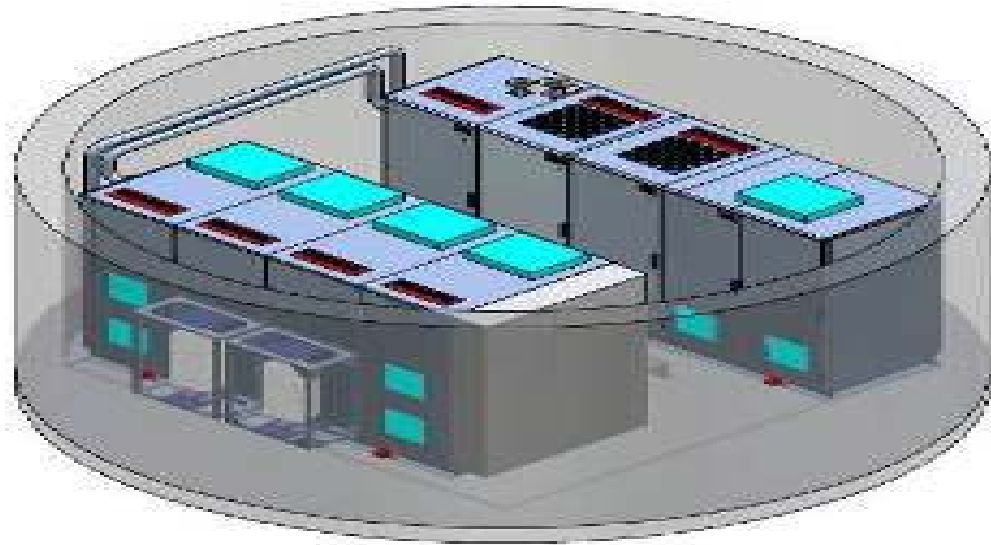


- Integrated Statcom functionality
- Three-level switching topology
- Control algorithm harmonic elimination
- Start & stop at zero breaker current
- Immediate restart after grid failures



Top Reasons for MV Wind

- Advanced Safety and Repair Concept



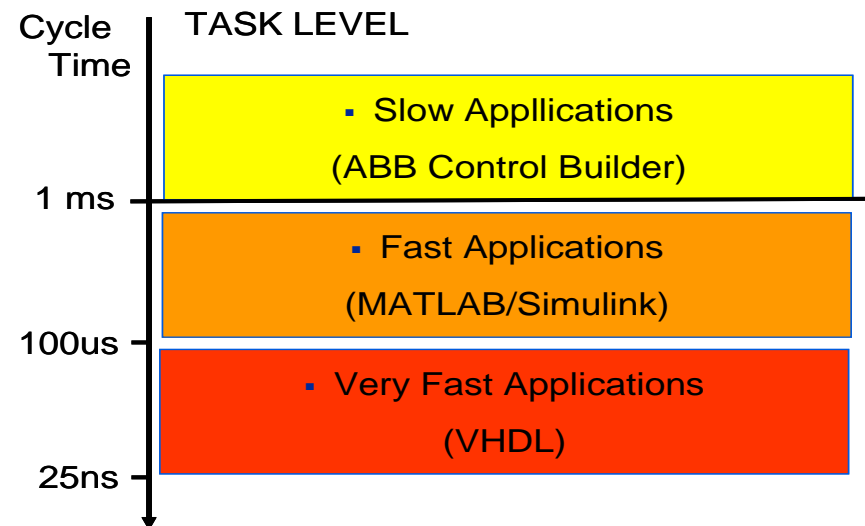
- Door interlock system connected to DC-link voltage
- Remote operated generator breaker incl. manually operated grounding switch
- Fuseless design for minimized replacement even after severe component failures → firing through concept
- Controlled short circuit current distribution incl. transformer design

Top Reasons for MV Wind

- AC 800PEC High End Controller

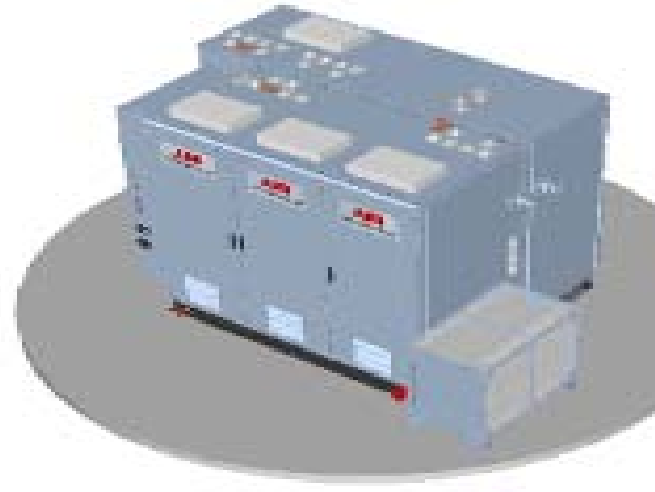


- 3-level control strategy
- Integrated monitoring & diagnostic tools event-recorder
- Operational flexibility by implemented thermal model of main components
- Full remote access (to go on-site only once!)
- Immediate restart after grid failure black start capability



Top Reasons for MV Wind

- Modular Design - All on one Level



- Power modules, Cooling Unit, all filters, brake chopper (incl. resistor), generator breaker
- Various layouts available: face-2-face, back-2-back, I-shape, T-shape
- Electrical section in tower → less tower head weight / smaller foundation

Top Reasons for MV Wind

- System Know-how and Global Footprint of ABB



- Advanced protection concept includes transformer, switch gear and whole drive train concept
- Inclusion of further components into scope of supply
- Maximum customer support due to world-wide presence



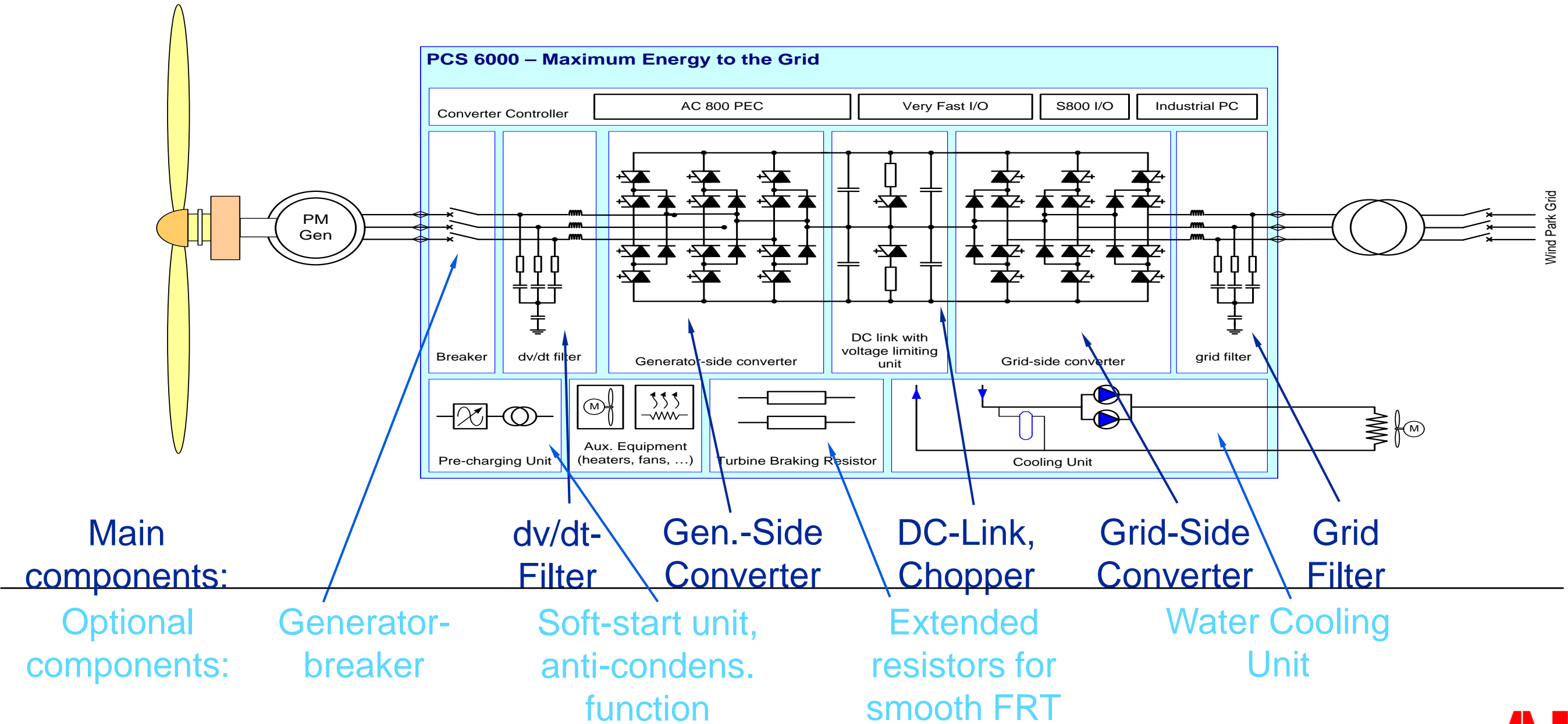
Top Reasons for MV Wind - Strong Service Organization



- ABB Commissioner[©]: Remote access tool with advanced monitoring and component lifetime calculation assures that your service people know what happens on-site, at all times
- Maximum serviceability by customer training concept, lifecycle management, and installed base management

PCS 6000 MV Full-Power Converter

Principle single line diagram



Power and productivity
for a better world™

