

Load monitoring



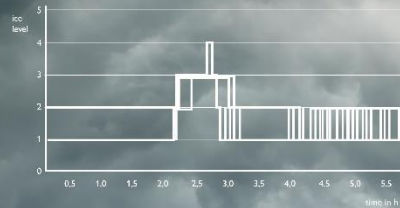
Lightning monitoring



Structural health monitoring



Ice detection

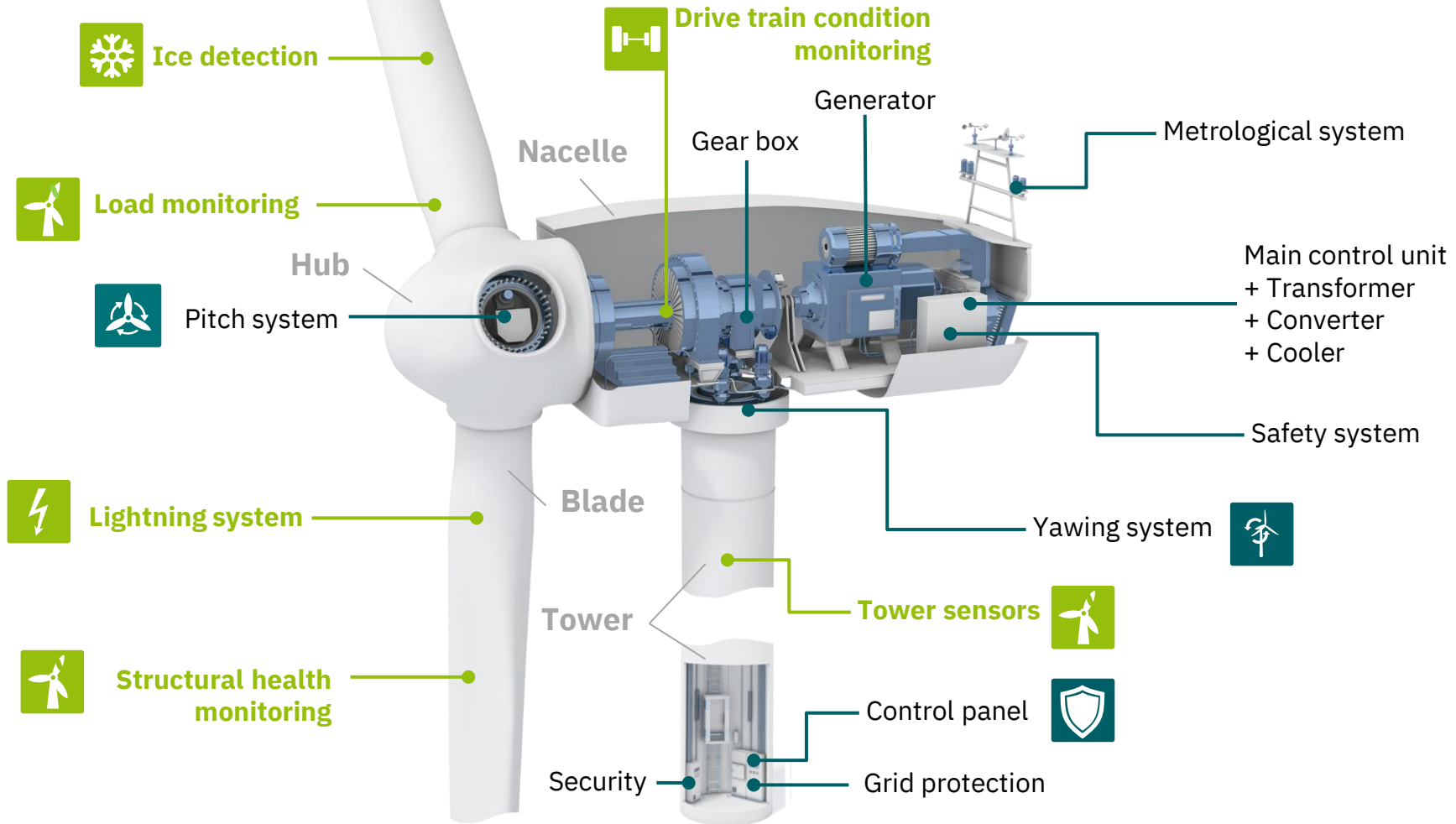


Welcome

Simplify operation in cold climate

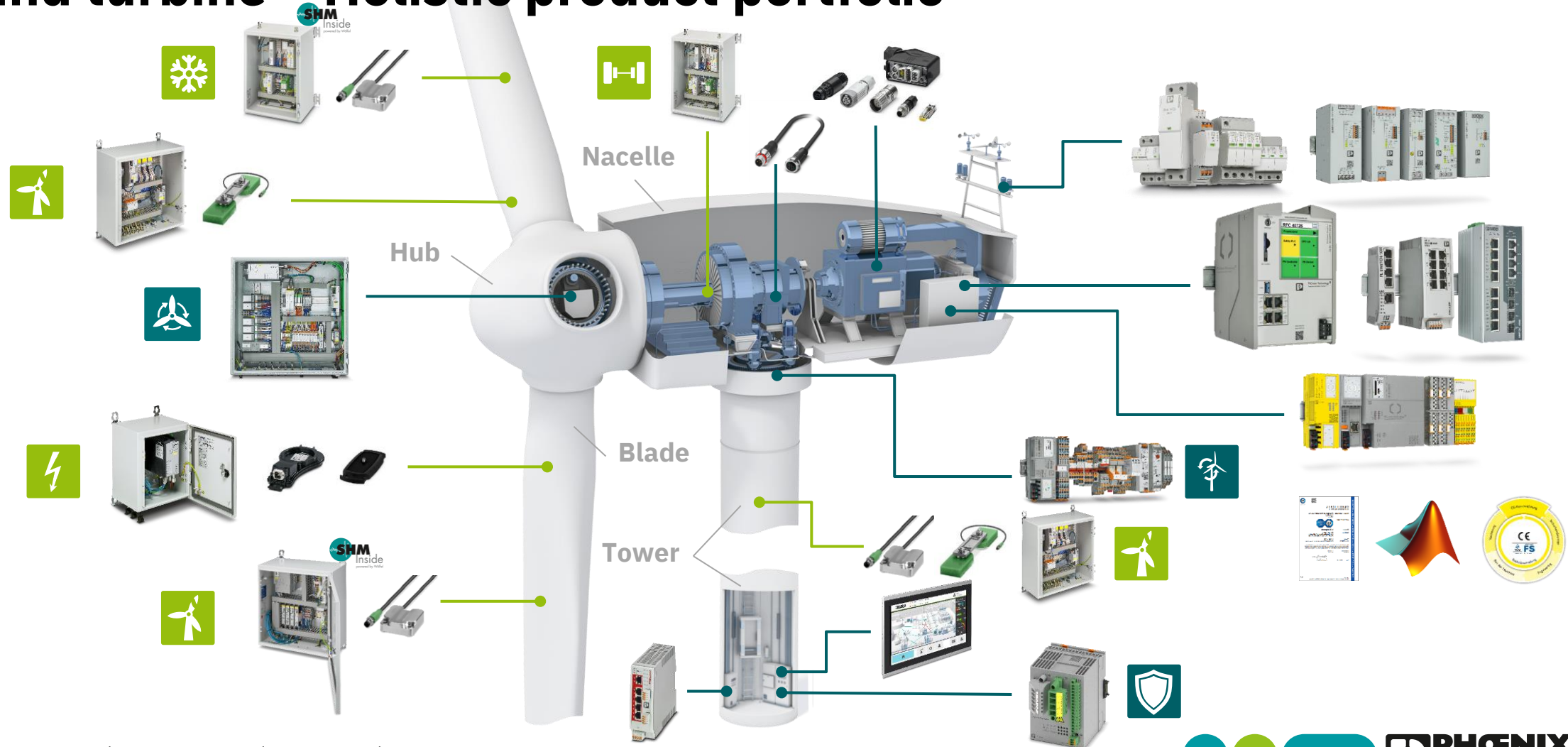
Simplify operation in cold climate

Wind turbine – Subsystems



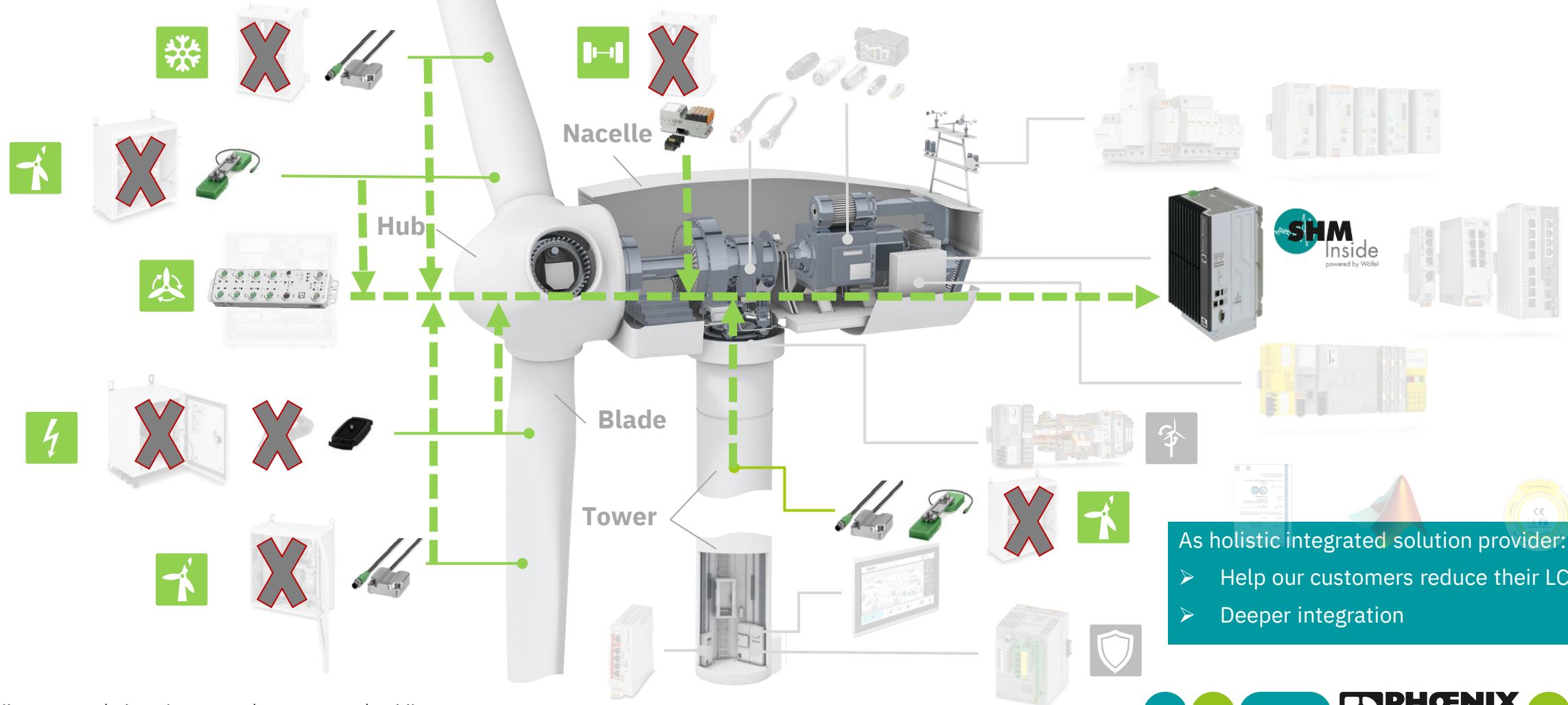
Simplify operation in cold climate

Wind turbine – Holistic product portfolio



Simplify operation in cold climate

Wind turbine – Integrated solution approach



As holistic integrated solution provider:
➤ Help our customers reduce their LCoE
➤ Deeper integration

Simplify operation in cold climate


Wind turbine – Integrated solution approach Ice Detection

Wölfel | WÖLFEL APPLICATION IS A MODULE IN THE NEW PLATFORM INTEGRATED CONTROL SYSTEM OF ENERCON

System architecture of the new ice detection device includes

- the **standard components**
- and **additional components for ice detection with IDD.Blade**

→ This is the conceptual design to detect reliably ice accretion



IO Link


IDD Blade

Prototype E-138 EP3 E3
© Klaas Eissens AV producties


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Simplify operation in cold climate


Wind turbine – Integrated solution approach Ice Detection

 | COST OPTIMIZATION COMPARED TO TODAY'S ICE DETECTION

- Substantial drop in costs for the ice detection system
- Plus additional savings due to
 - reduced maintenance costs
 - less hardware-related costs
 - reduced costs for device and patch management (software updates)
 - increased revenues "after sales" (simpler retrofit solution)

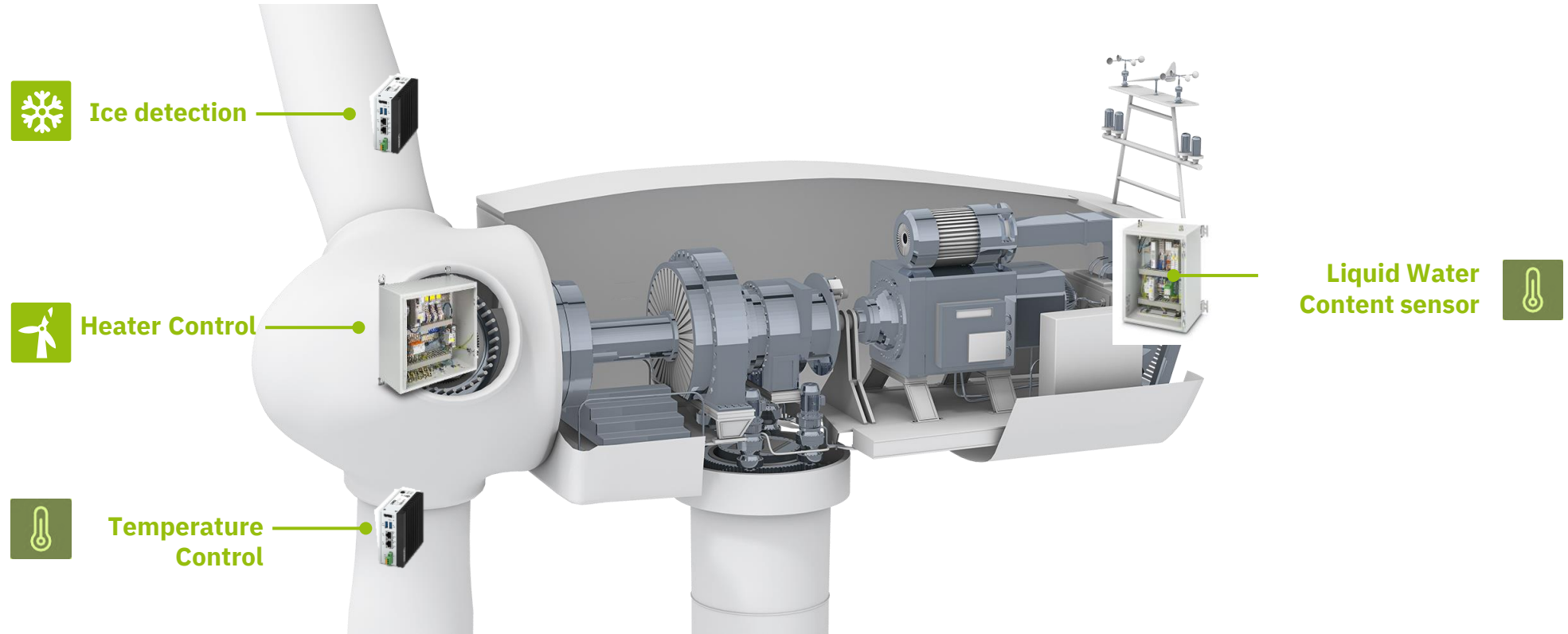

40 – 50 %

Classical ice detection system → Next generation ice detection system

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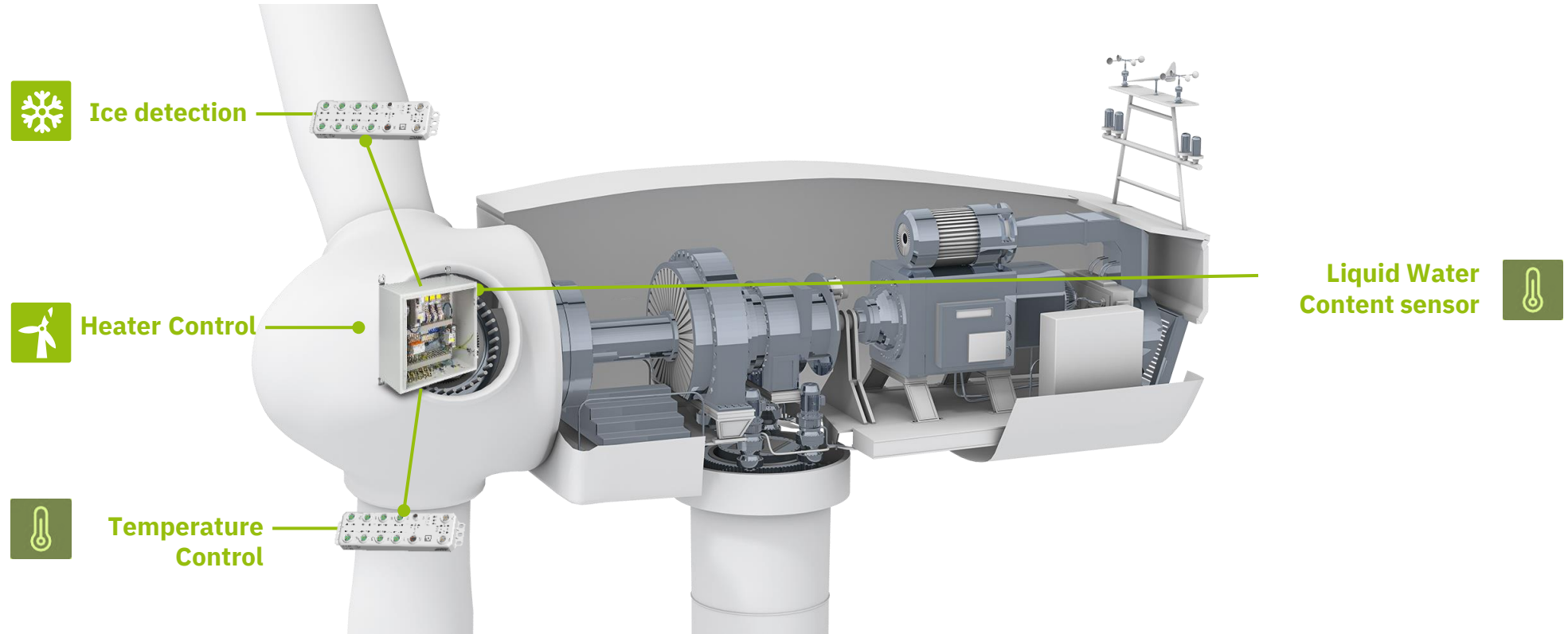
Simplify operation in cold climate

Wind turbine – Integrated solution approach heating system



Simplify operation in cold climate

Wind turbine – Integrated solution approach heating system



Simplify operation in cold climate

Conclusion

Hollistic Approach for control and monitoring

- Reduces vomplexity
- Simplyfies system set up
- Reduces cost

