



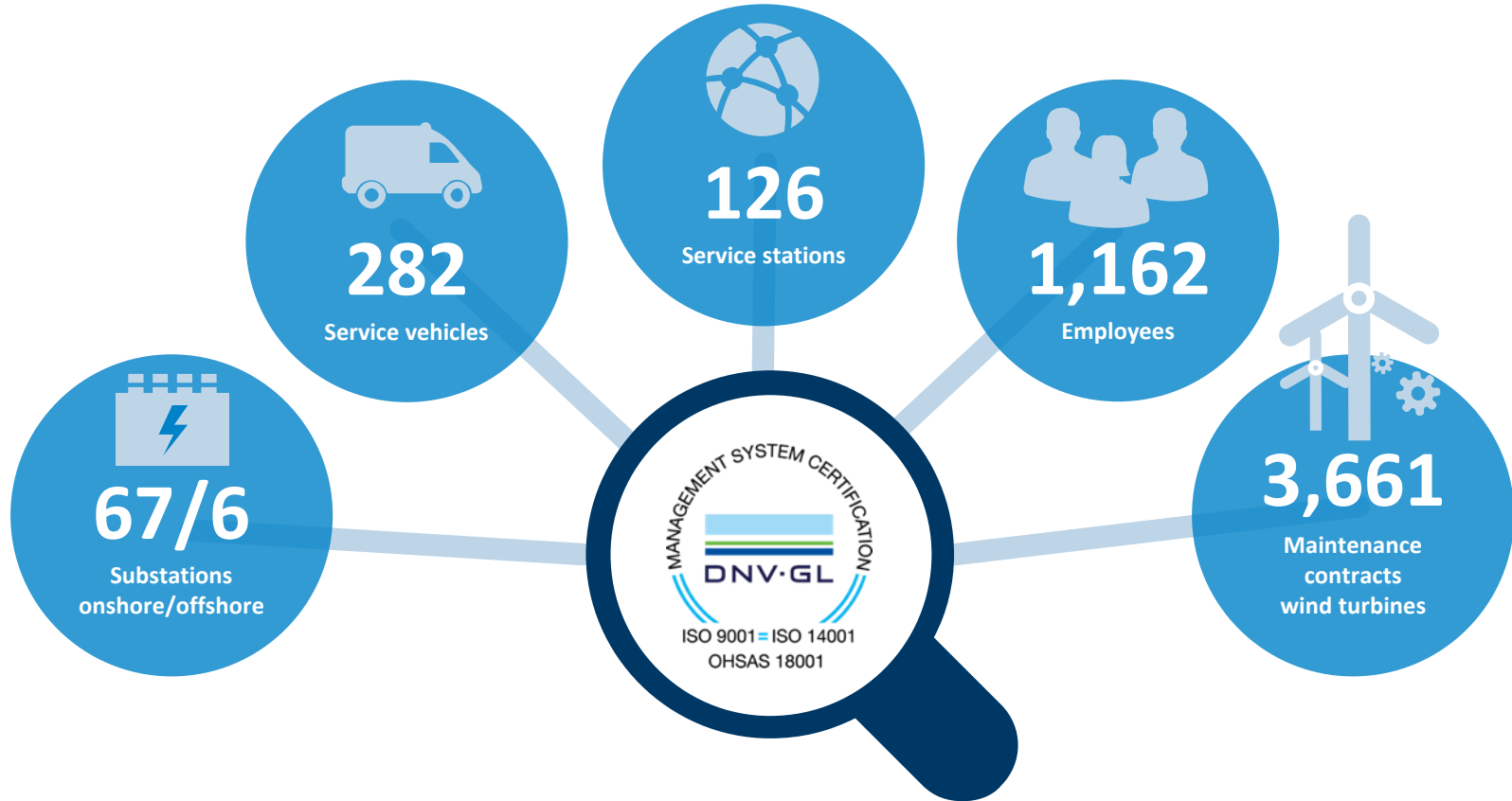
Innovations in wind farm O&M

Deutsche Windtechnik
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13-03-2019



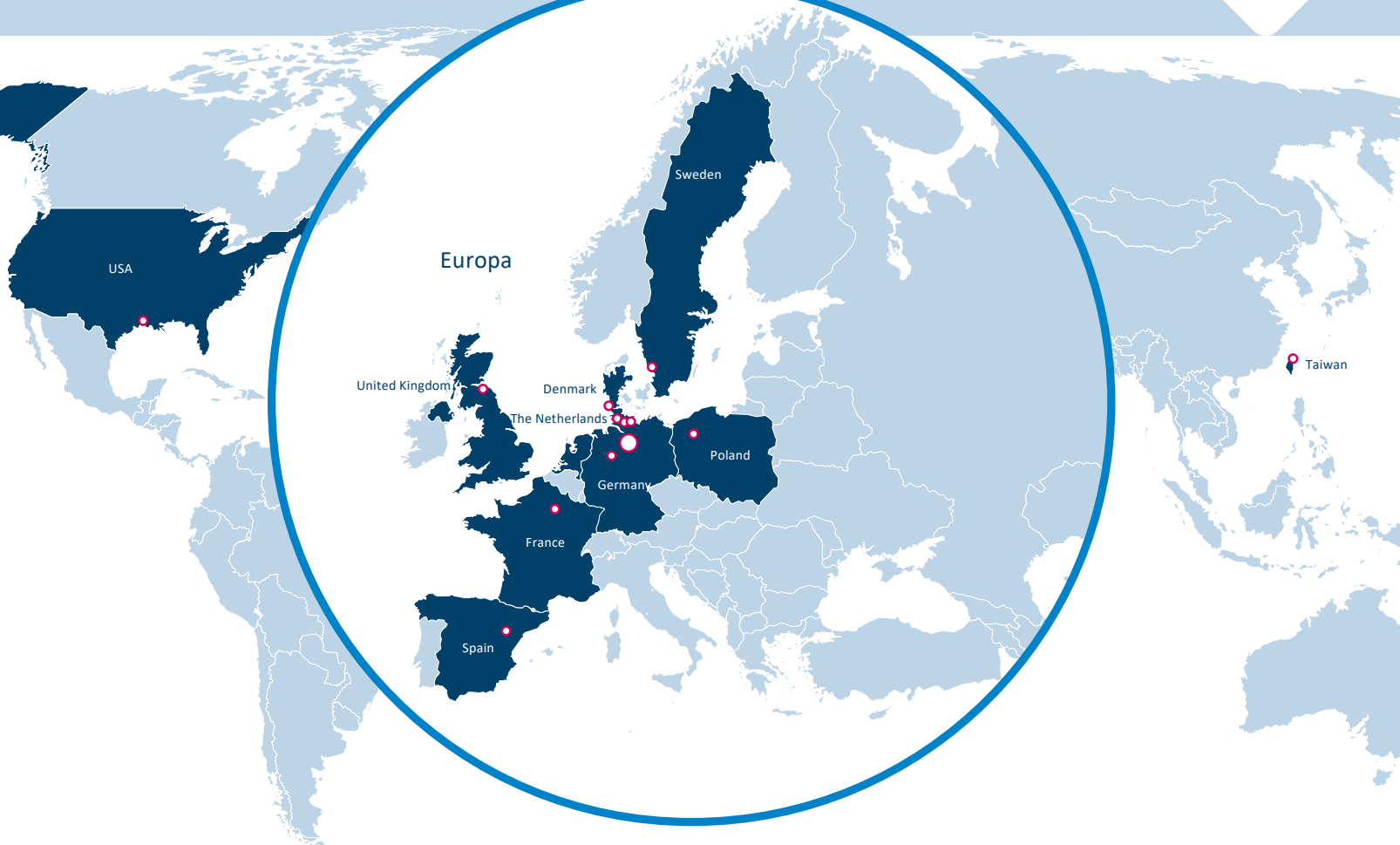
Company Figures



Further locations

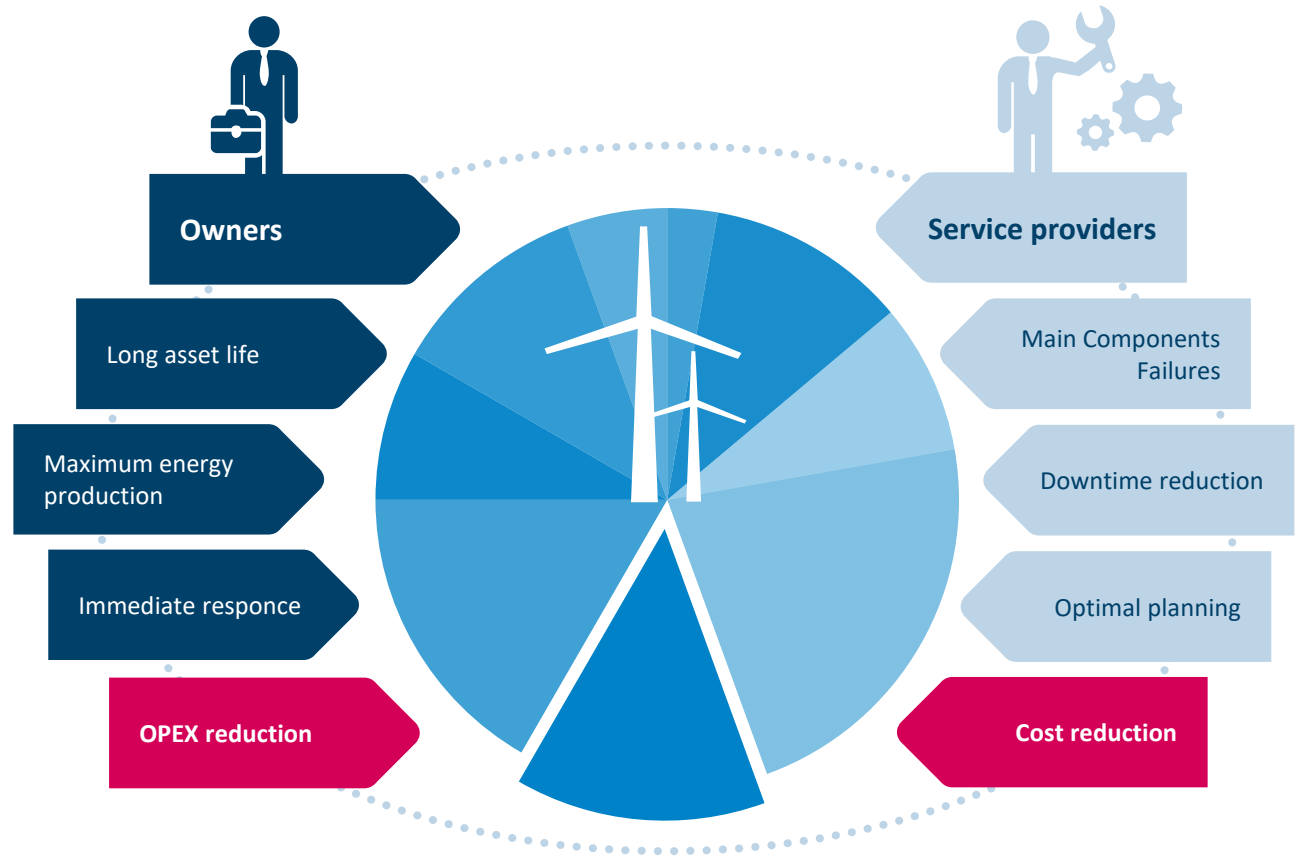
Expertise
for multibrand
WTG technologies

Vestas®
NEG Micon®
Siemens®
Gamesa®
AN Bonus®
Senvion®
Repower®
Nordex®
Fuhrländer®
Enercon®



The myth:

“Different” perspectives on “a good wind turbine O&M”



The question:

What is an Innovation?

- The process of translating an idea or invention into a good or service that creates value or for which customers will pay.
- Application of better solutions that meet new requirements, unarticulated needs, or existing market needs



Our objective:

Turning an idea into a solution that adds value from a customer's perspective

The solution?

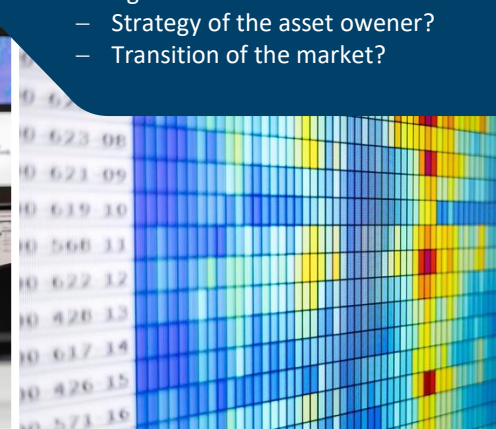
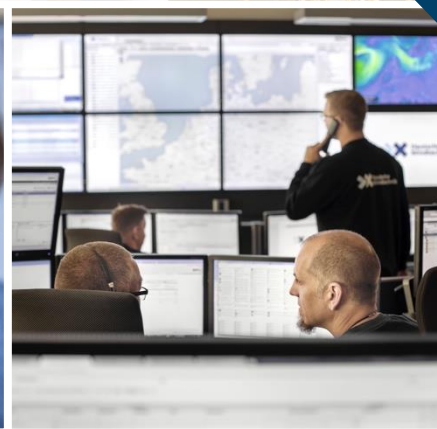
Key drivers of innovations

What are the key drivers?

- Digitisation?
- Big Data?
- AI?

What about ...

- Age of asset?
- Strategy of the asset owner?
- Transition of the market?



Digital World – Daily Work



Remote data monitoring



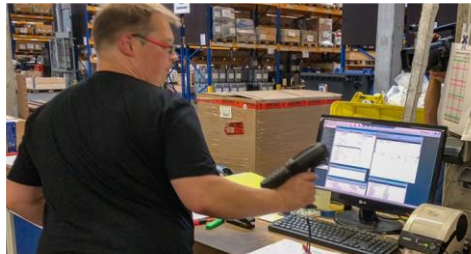
Software and mobile devices in field service



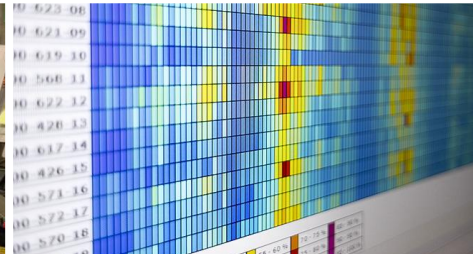
Operation management software

Digitalisation in O&M

- Transparency
- Real-time information
- Reliable data
- Unification, simplification and shortening of processes
- Improvement of service quality
- Storage of data for future analyses
- Minimise errors in a rough environment



Materials management – ERP



Knowledge and data base



Customer and employee portal



E-Learning for employees



Online recruiting tool

The "hands-on-approach"

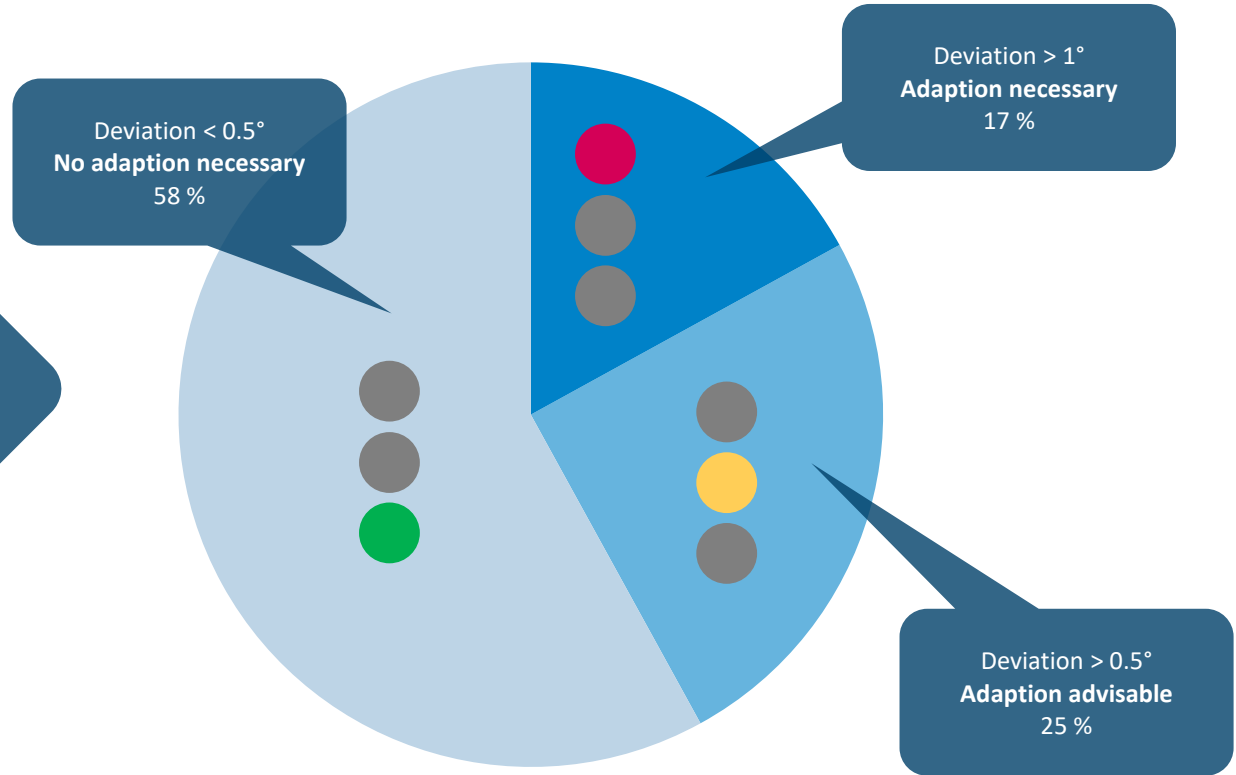
Blade Angel Measurement



Blade Angel Measurement



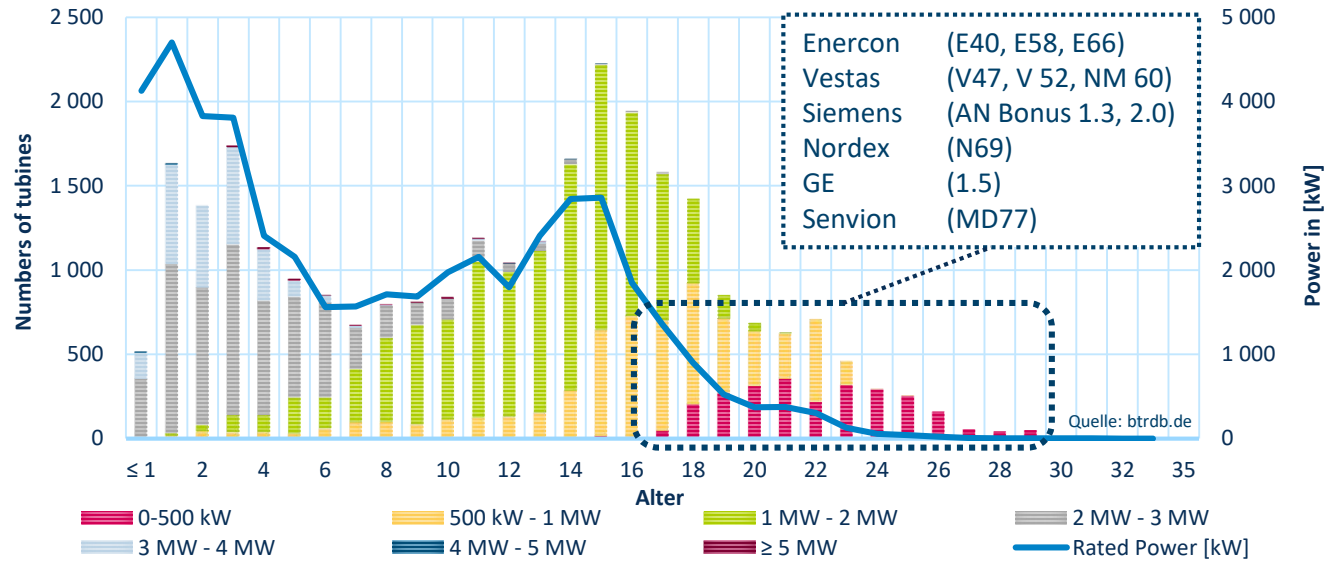
The measurement of **780 WTG** has shown that for **42 %** of the turbines an adaption would be advisable or even necessary.*



*Measurement and analysis realized before 2018 by Deutsche Windtechnik Service

The „new era“ after FIT

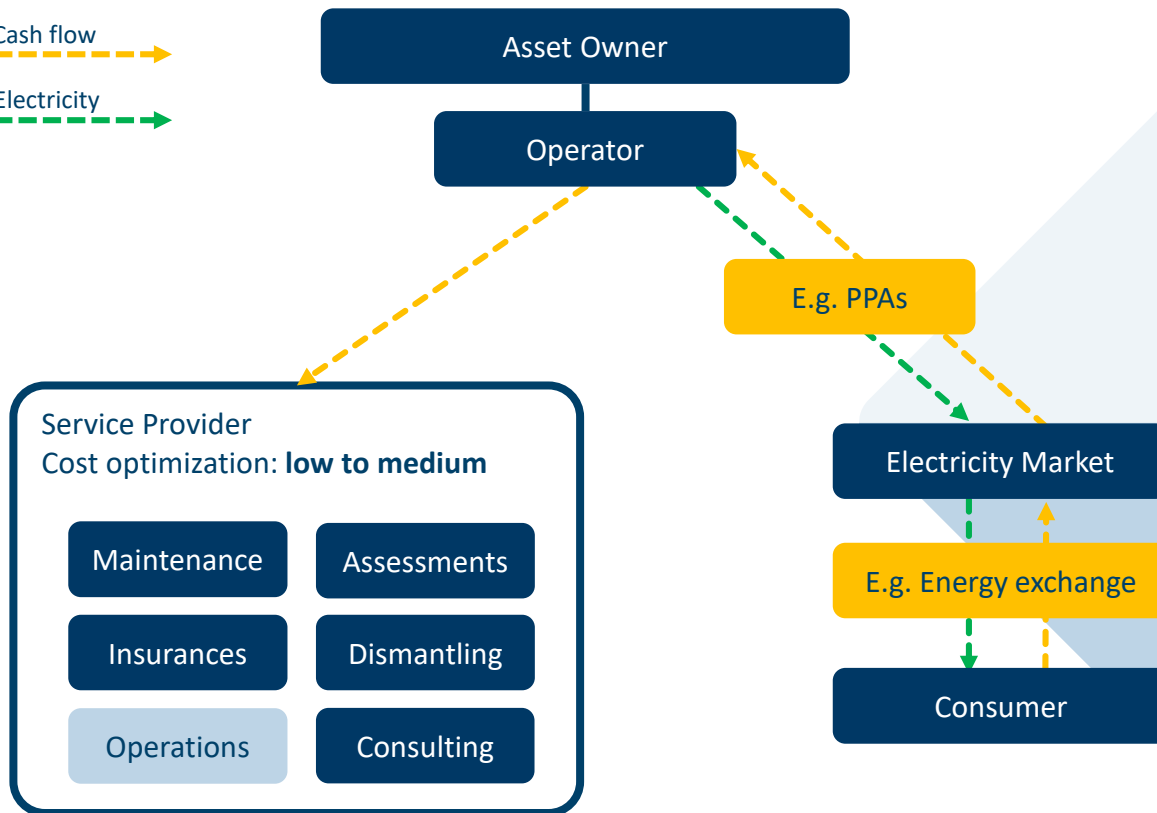
Status Quo



LTE Concept 1: Fix Cost Optimized Operations

Cash flow
→

Electricity
→



**Service provider
takes over more tasks**

Pros (for owner)

- Generate synergies
- Reduce fix costs
- Availability guarantee
- Flexibility

Cons (for owner)

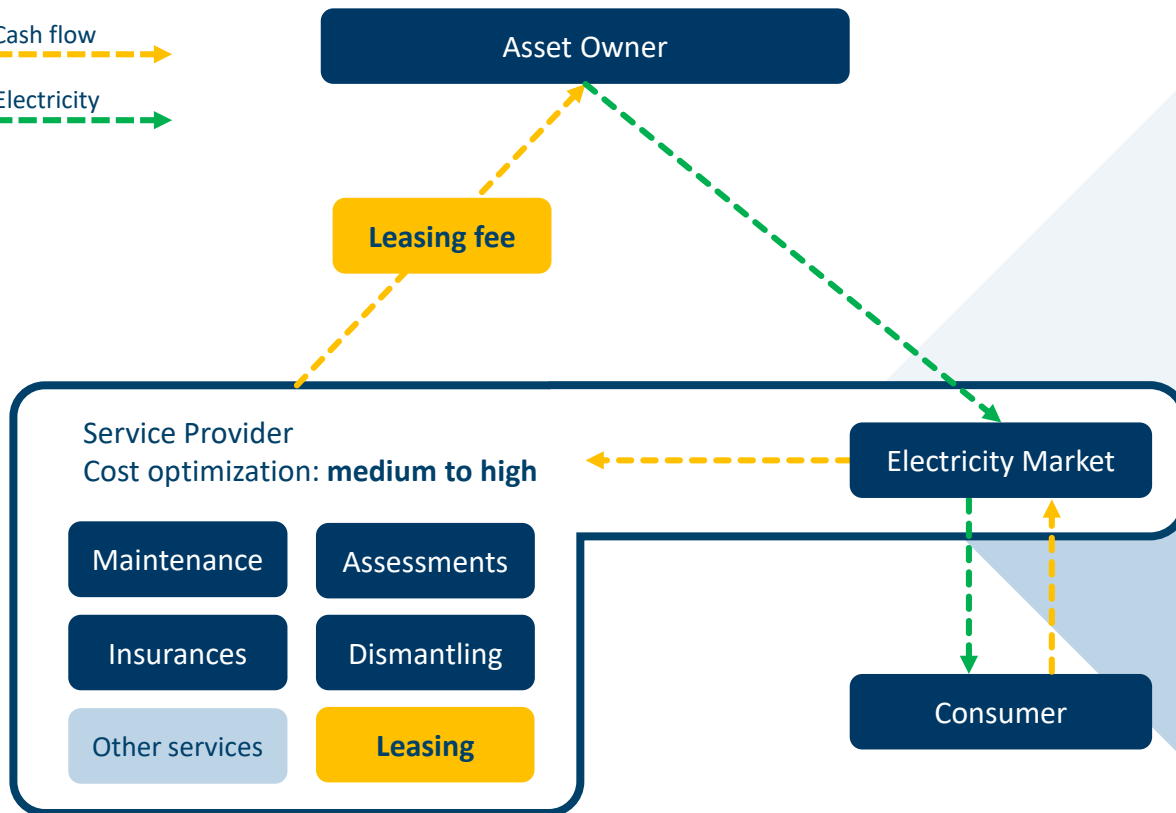
Owner / Operator covers

- Technical risk (depending on type of contract)
- Financial risk
- Environmental risk

LTE Concept 2: Leasing

Cash flow
→

Electricity
→



Service provider offers
„fix“ leasing fee to asset owner

Pros (for owner)

- No technical risks
- No financial risks
- No environmental risks
- Flexibility

Cons (for owner)

- Benefit for owner is „fix“

Training Center Viöl – Focus on system engineering



Multi-brand practical training inside of the nacelle

Vestas
NEG Micon
Siemens
Enercon
Senvion (starting in 2019)

Basic and refresher trainings

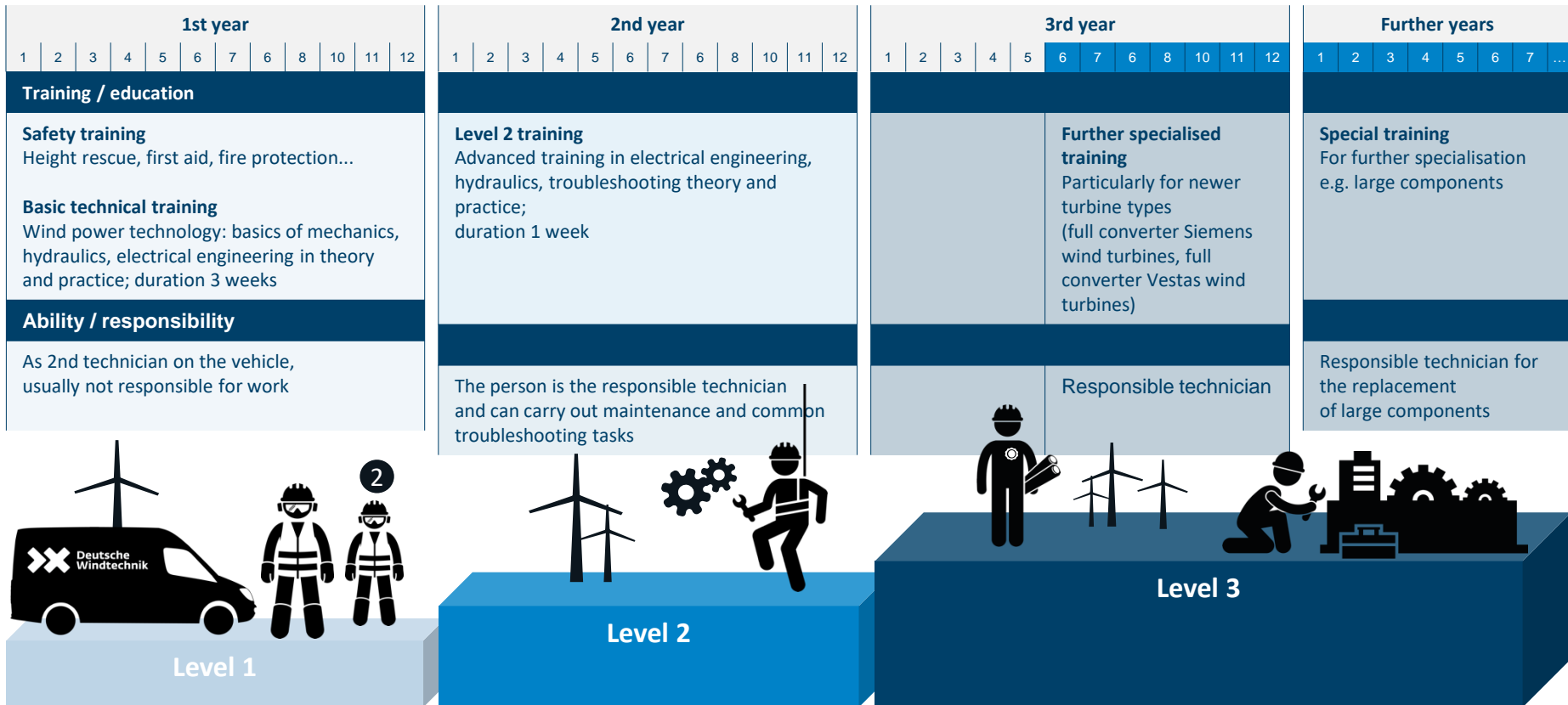
Standardised and individual customer training

Manufacturer-independent

Sustainable learning

Training on the job
Follow-up on-site
External specialists
State-of-the-Art-Media

Qualification of service technicians



The proficiency levels are achieved for specific wind turbine manufacturers (Vestas, NEG Micon, Siemens...)



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