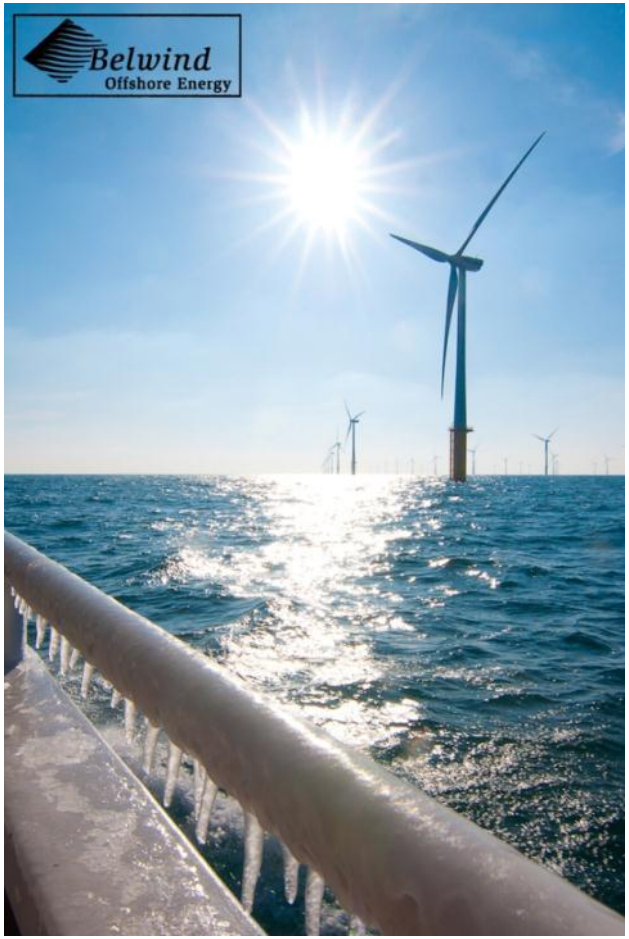
Future contract guarantees and yield based guarantees:

Methodologies and who benefits?

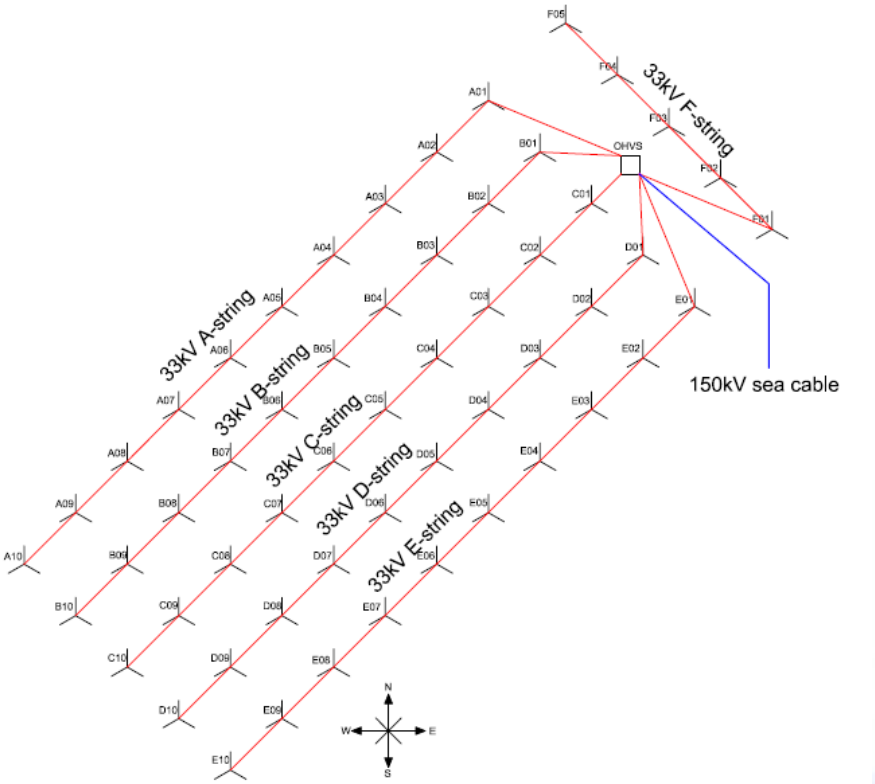


Kasper Van Lombeek
Belwind / Northwind
WTG package manager

21 June 2012, EWEA, Lyon

Belwind
Offshore Energy

Belwind site layout – O&M strategy



55 Vestas V90 turbines, 165MW
Distance to shore around 50km

↓

Hotel concept for daily maintenance on turbines

Project- versus corperate finance

Project financed

- Banks provide loans
- Nonrecourse debt
- Cash flow must be guaranteed

↓

- Long term service and availability agreements are a must.

Corporate financed

- Eventual loans are secured by general assets of the sponsor.

↓

- Availability guarantee is a nice to have.
- MIY (manage it yourself) maintenance strategy

Project- versus corperate finance

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Home: News: Vestas wins 216MW Northwind offshore deal

Vestas wins 216MW Northwind offshore deal

Paul Garrett, Windpower Monthly, 16 January 2012, 10:08am

BELGIUM: Developer Northwind NV has signed a contract with Vestas to supply 72 V112 3MW turbines for the Northwind offshore wind farm planned for construction on the Bank Zonder Naam off the coast of Zeebrugge in Belgium.

Vestas V112 turbine will be used on the project

Vestas V112 turbine will be used on the project

The contract will include a 15-year service contract and installation is expected to begin next year.

Availability: time or energy based?

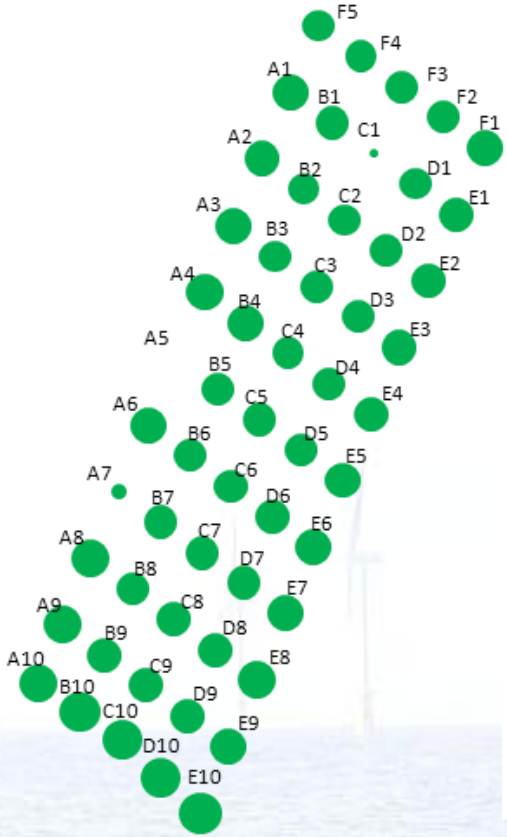
Availability is expressed as a percentage:

$$\frac{\text{Available time of the WTG}}{\text{Total calendar time}} \quad \text{versus} \quad \frac{\text{Total production of the WTG}}{\text{Total possible production}}$$

Important factors in the calculations:

- Total calendar time minus excluded times?
- Wind turbine level versus park level?

Availability: complexity of yield based



Total production of the WTG (%)
Total possible production

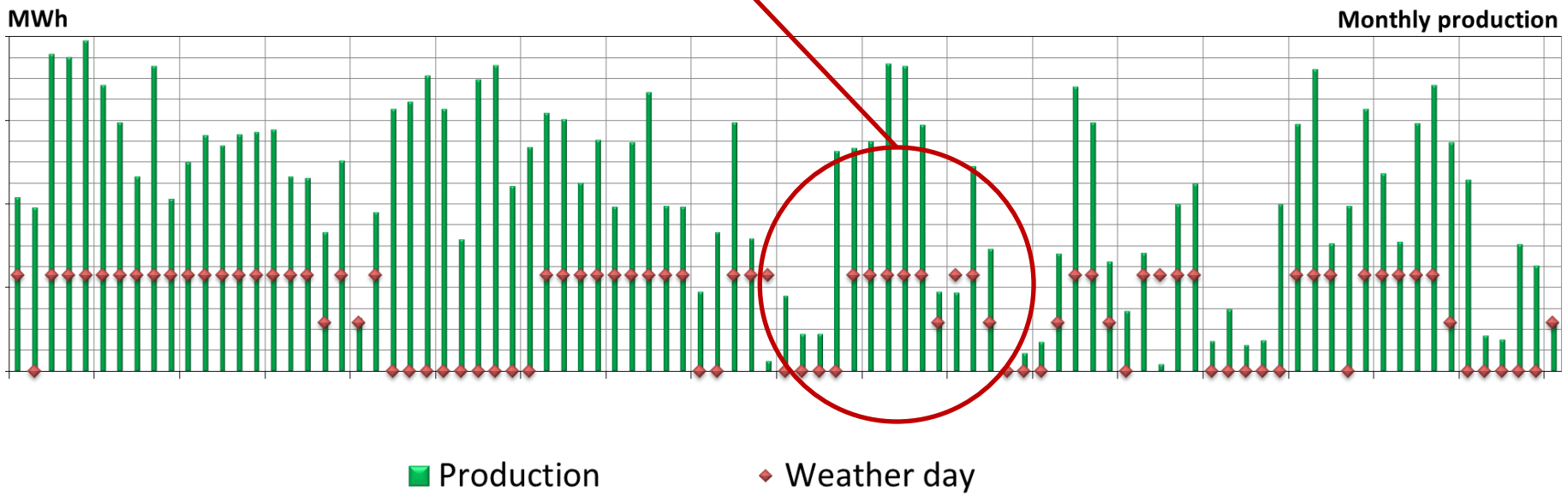
How much production is lost?
(possible gain on other turbines?)

Short downtimes and weather days

Short downtimes

Non production day: fast fix, technicians are already on site (hotel vessel) → Time neither production is lost

Production day = weather day: technicians have no access, turbine down several days → Energy based availability is lower than time based

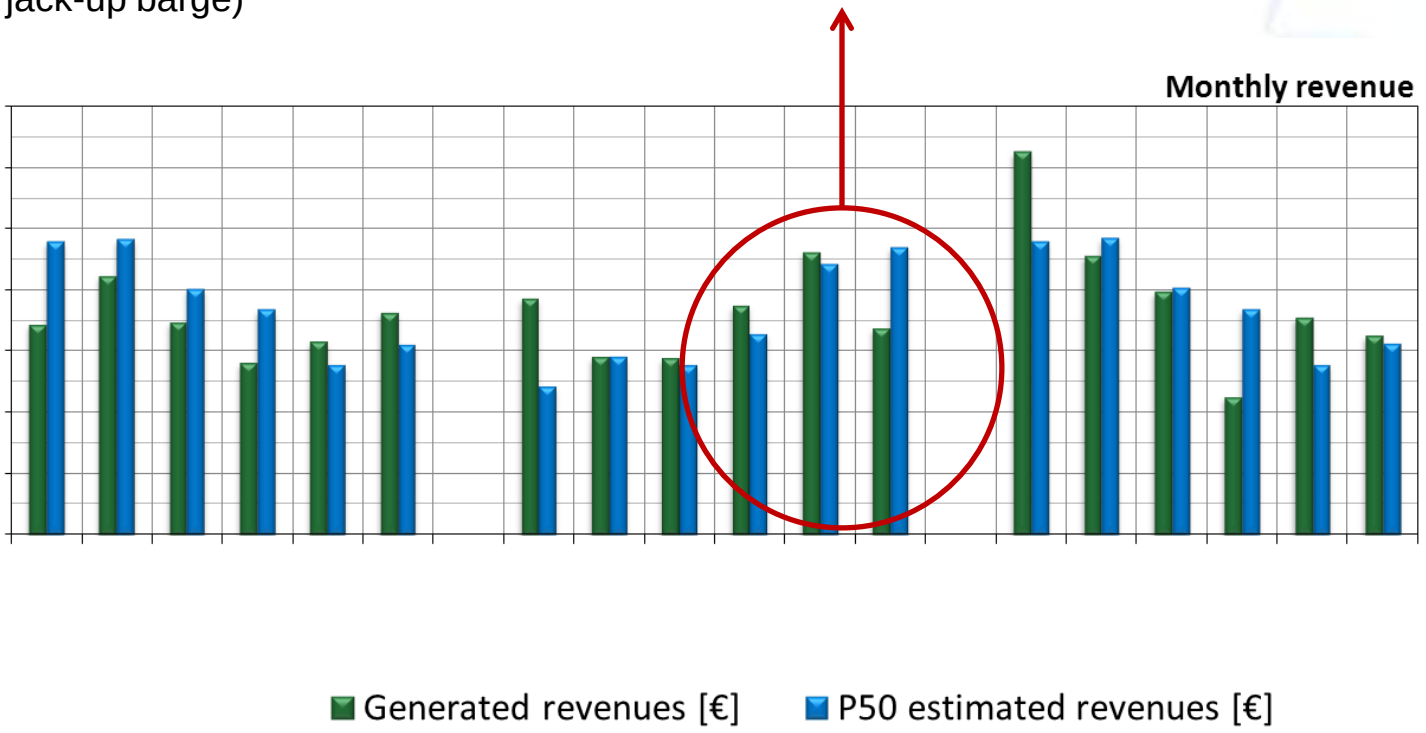


Long downtimes and seasonality

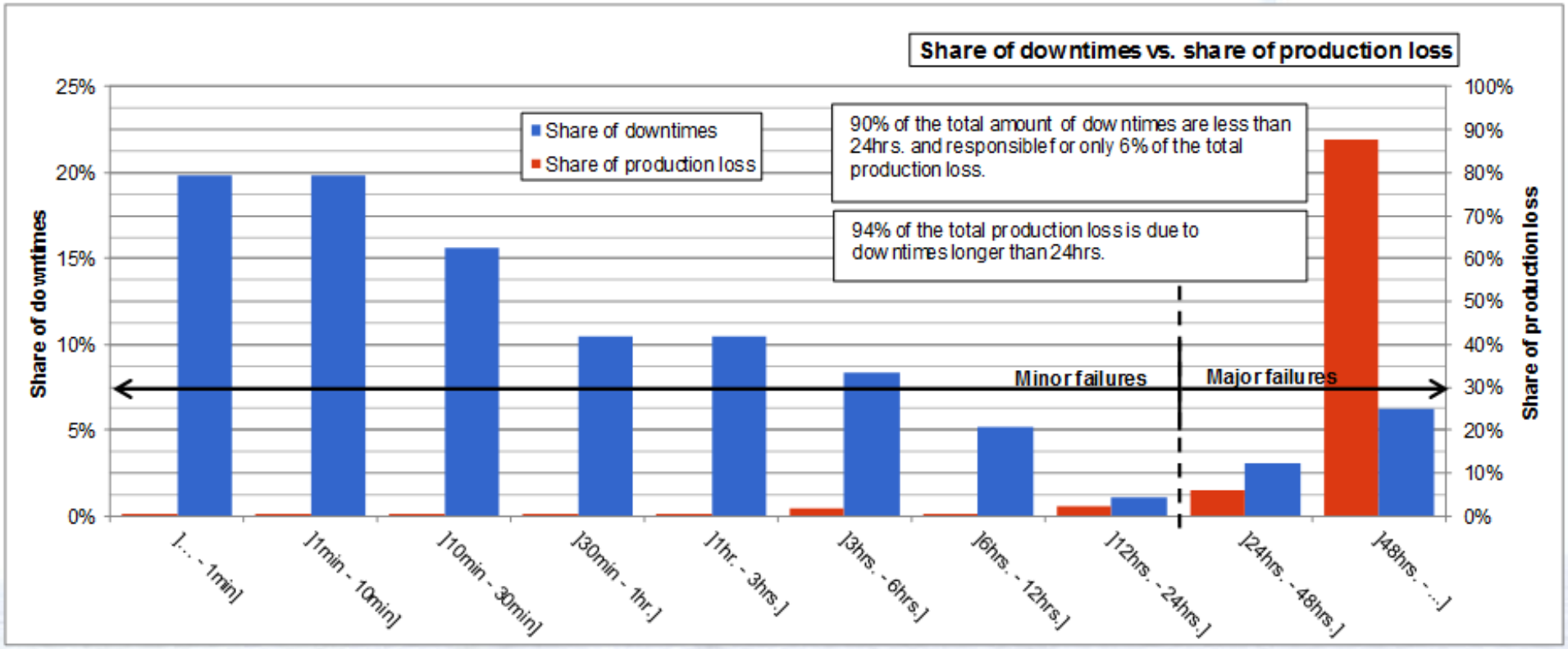
Long downtimes

(i.e. awaiting spares, awaiting for jack-up barge)

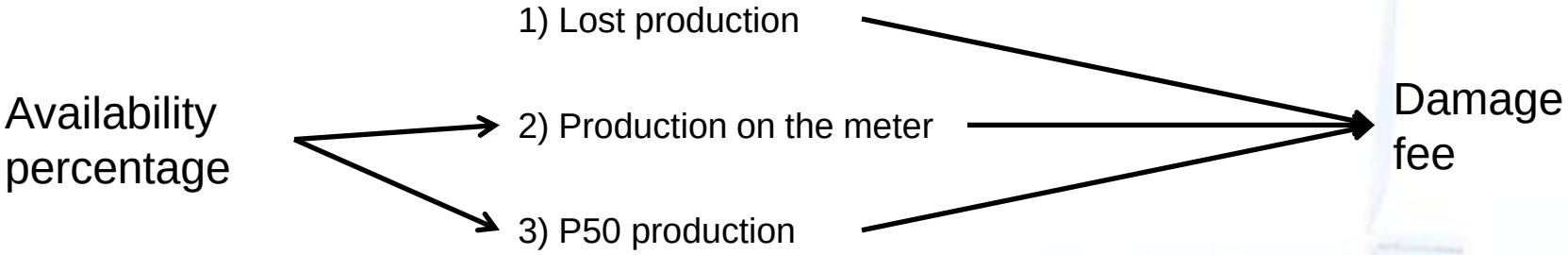
Difference between time based and energy based due to seasonality



Short versus long downtimes



Availability guarantee: damage fee



Flaws in calculation:

2) Turbine is down in a high wind period, less production on the meter, less damage fee?

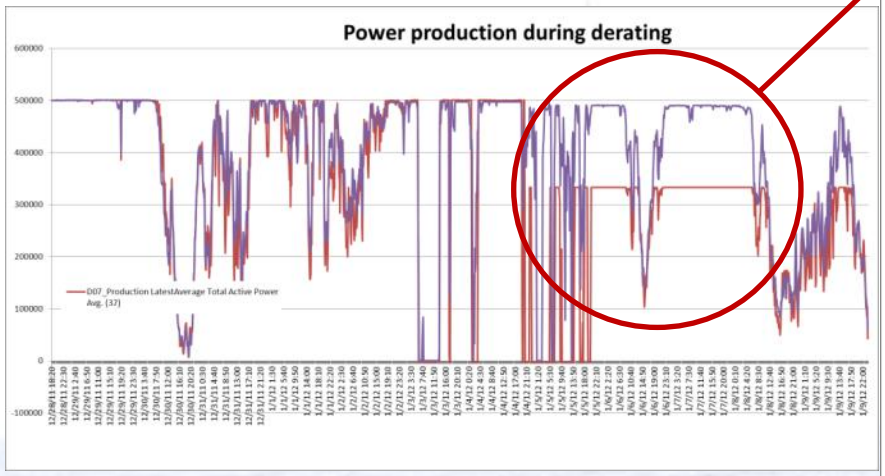
→ Difference between 55 turbines offshore versus 3 turbines on land

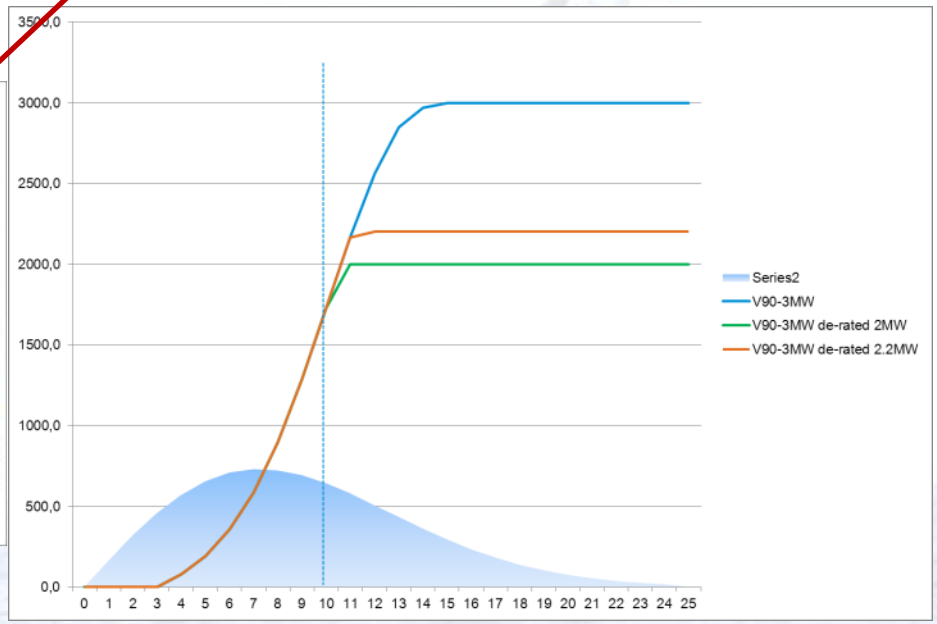
3) Turbine is down in a low wind period, and damage fee is based on P90, over compensation?

Example of difficult calculations

Derating of turbines

163MWh was lost, how to calculate damage fee with time based availability?





Availability guarantee: damage fee

The third industrial revolution
The economist, April 21st of 2012

The Economist

The digitization of manufacturing will transform the way goods are made—and change the politics of jobs too

Consumers will have little difficulty adapting to the new age of better products, swiftly delivered. **Governments**, however, may find it harder. Their instinct is to protect industries and companies that already exist, not the upstarts that would destroy them. They shower old factories with subsidies and bully bosses who want to move production abroad. They spend billions backing the new technologies which they, in their wisdom, think will prevail. And they **cling to a romantic belief that manufacturing is superior to services**, let alone finance.

None of this makes sense. **The lines between manufacturing and services are blurring. Rolls-Royce no longer sells jet engines; it sells the hours that each engine is actually thrusting an aeroplane through the sky**. Governments have always been lousy at picking winners, and they are likely to become more so, as legions of entrepreneurs and tinkerers swap designs online, turn them into products at home and market them globally from a garage. As the revolution rages, governments should stick to the basics: better schools for a skilled workforce, clear rules and a level playing field for enterprises of all kinds. Leave the rest to the revolutionaries.

OEM should guarantee a maximum of possible production

Service contracts: who benefits?

Vestas®
No. 1 in Modern Energy

Business development

New products and services

Knowledge of and the ability to plan, build, operate and service complete wind power plants for its customers is becoming increasingly important for Vestas as a supplement to developing new turbines. Customers are demanding individual solutions that provide maximum output and involve minimum risk: Vestas must deliver value to its customers, before, during and after the customer has invested in a wind power plant. As the service business comes to represent an ever-growing share of Vestas' combined revenue, its earnings will become more robust to short-term fluctuations in wind turbine sales.

As part of the reorganisation, on 1 February 2012 Vestas launched a Global Solutions and Services (GSS) unit for developing and supporting advanced pre-sales and after-market services, SCADA systems, wind & site services and spare parts. Also, Global Solutions and Services is to develop new solutions and offerings supporting further integration of wind power with the grid.

Services already form a significant part of Vestas' business. Based on recently signed 10 to 15-year service agreements with leading, global wind power operators, Vestas has taken a significant step to further consolidate the company's position in services.

Source: Annual report 2011

Service business:

↓

Robust revenue

Turbine manufacturing:

↓

Volatile revenue due to regulatory affairs for future wind farms

Service contracts: who benefits?

Service

- Sheduled service
  % of total activities ?
- Corrective maintenance
  % of total activities ?

MIY approach versus high price for availability warranty?

Bloomberg

Vestas said it was earmarking an additional 40 million euros to pay for extra maintenance, repair or replacement of malfunctioning bearings in the gearboxes of 376 of its V90 turbines, including 36 offshore machines.

Summary

Financing and importance of availability guarantee

↓

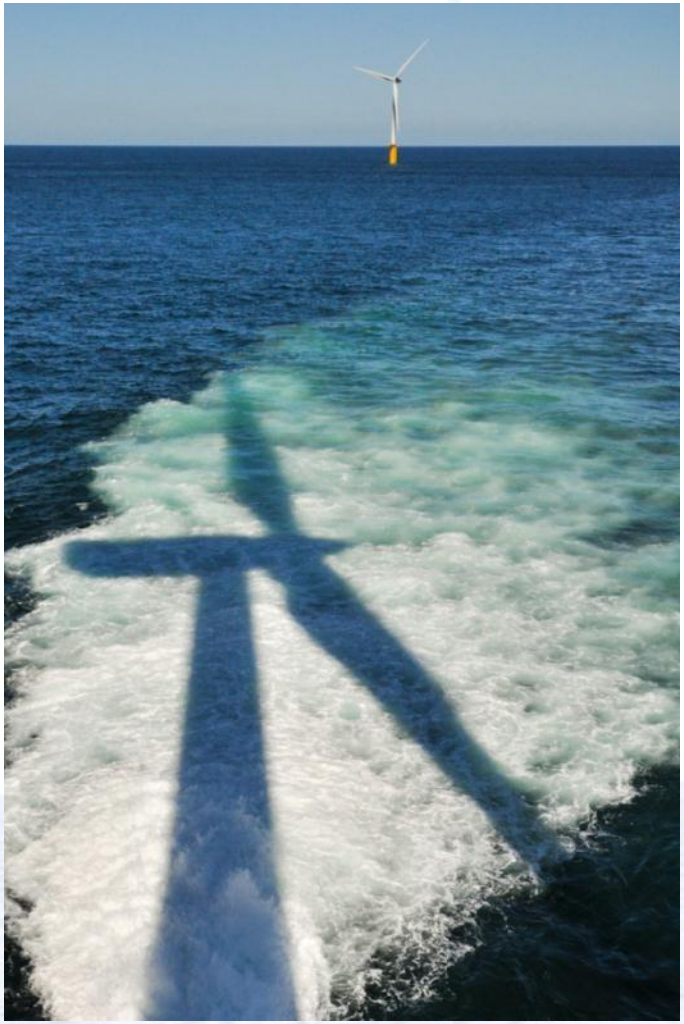
Time based versus energy based

↓

Damagee fee calculation and flaws

↓

Future of service contracts



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Thank you for your attention!