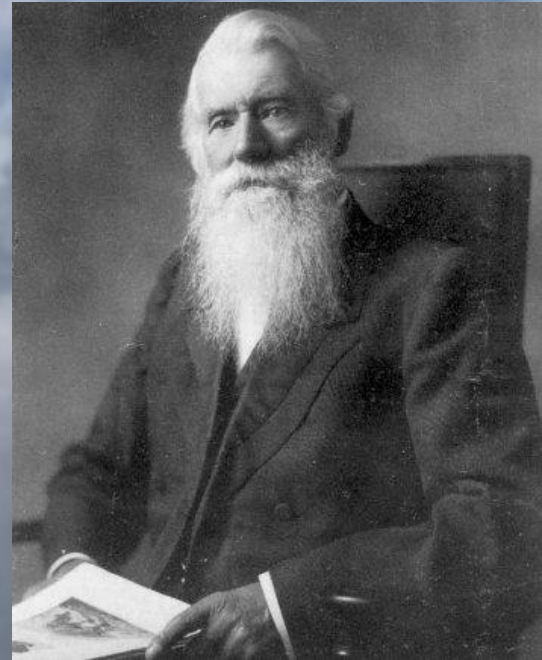


Offshore Wind Farms: can the wind industry deliver (again)?



Bruce Valpy

Joseph Swan Memorial Lecture, 19 October 2010

All the below available online. BVG Associates contactable via info@bvgassociates.co.uk to request use of any material.





Today

- 1. Wind industry introduction**
 - **Facts and figures**
- 2. History lesson**
 - **Meet the ancestors**
 - **Famous battles**
- 3. Anatomy lesson**
- 4. Geography lesson**
- 5. The future: “Can do”**

Today

Purpose: to inspire you
to get involved...







Len Rogers Collection



Len Rogers Collection



Len Rogers Collection



Len Rogers Collection







Len Rogers Collection



Len Rogers Collection







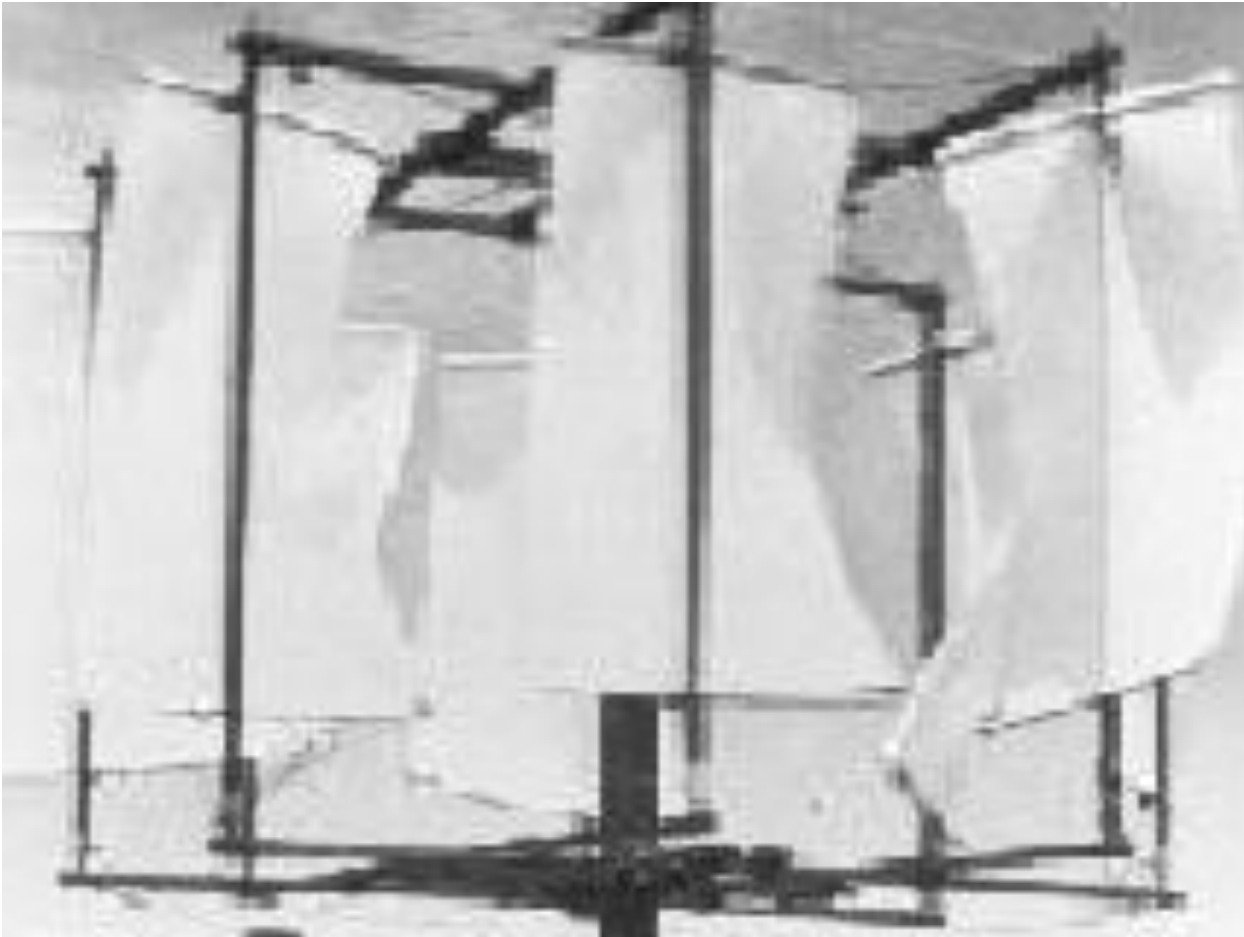
History Lesson 1: meet the ancestors



Nile Delta
First
windmills



Persia
Panemones
common
Pumping
water



500BC

Crete

Pumping water
and grinding



1000AD



First UK windmill
in Weedly, Yorkshire
in 1185

Jack & Jill
in Sussex



1821

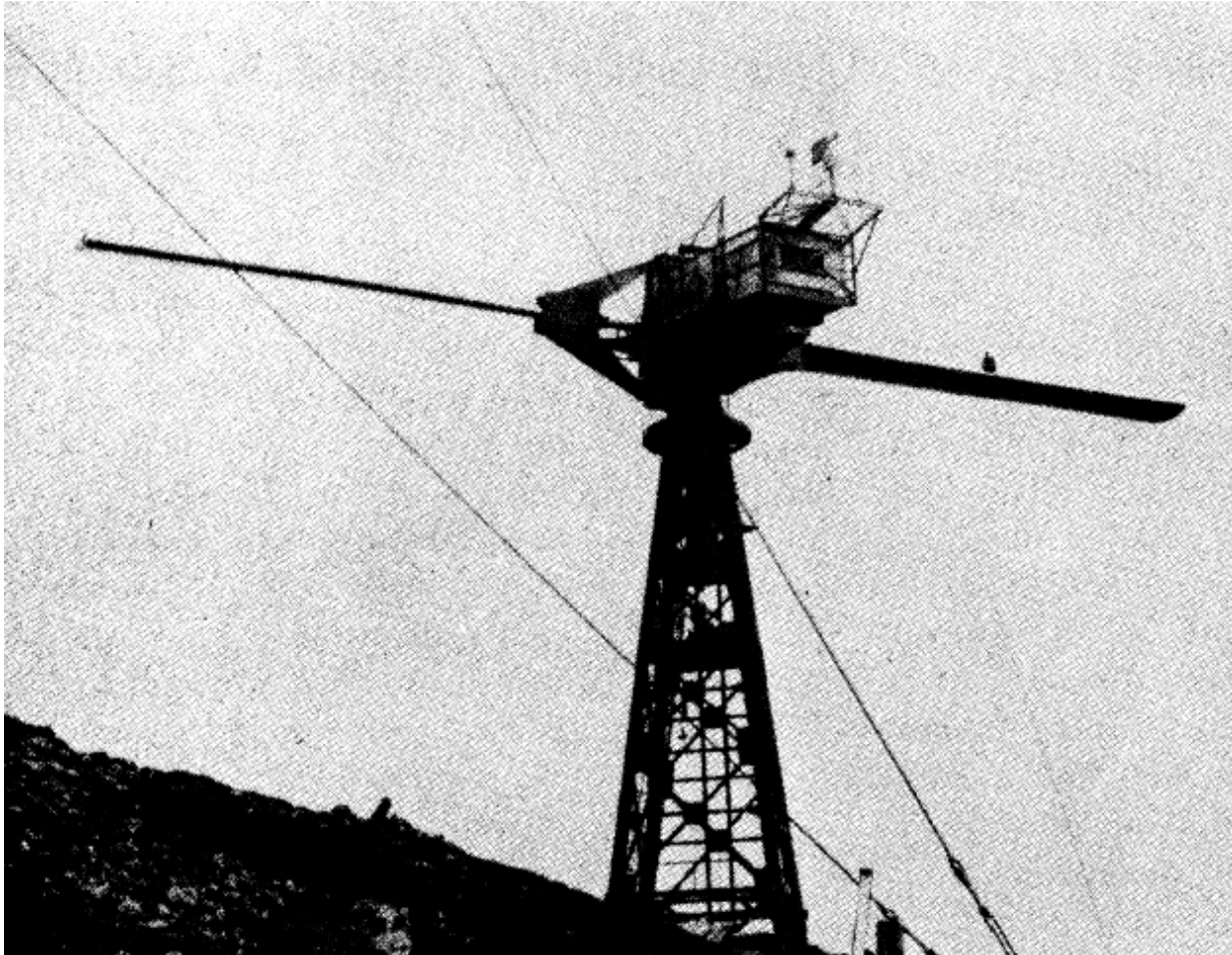
US
Pumping
water



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1800's

US
Grampa's
Knob
1st grid
connection



1941

UK
First
composite
blades



1982

Global

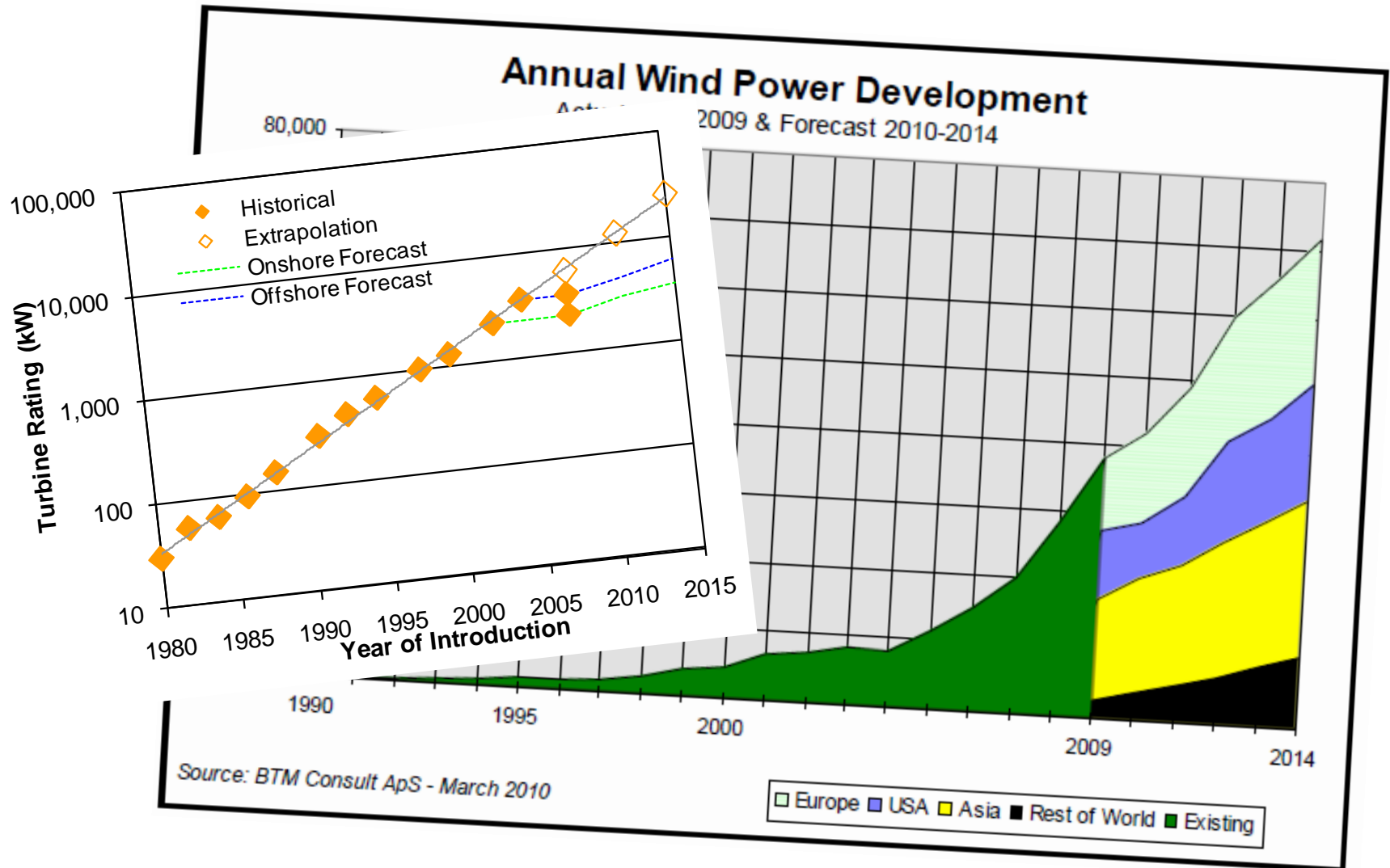
\$80bn
business

Vestas
employs
25,000



2010

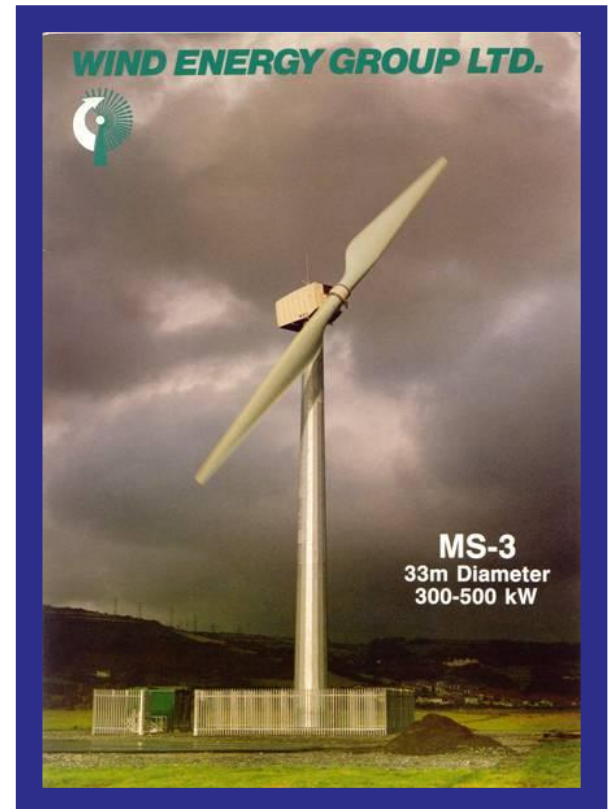
No longer a teenager...



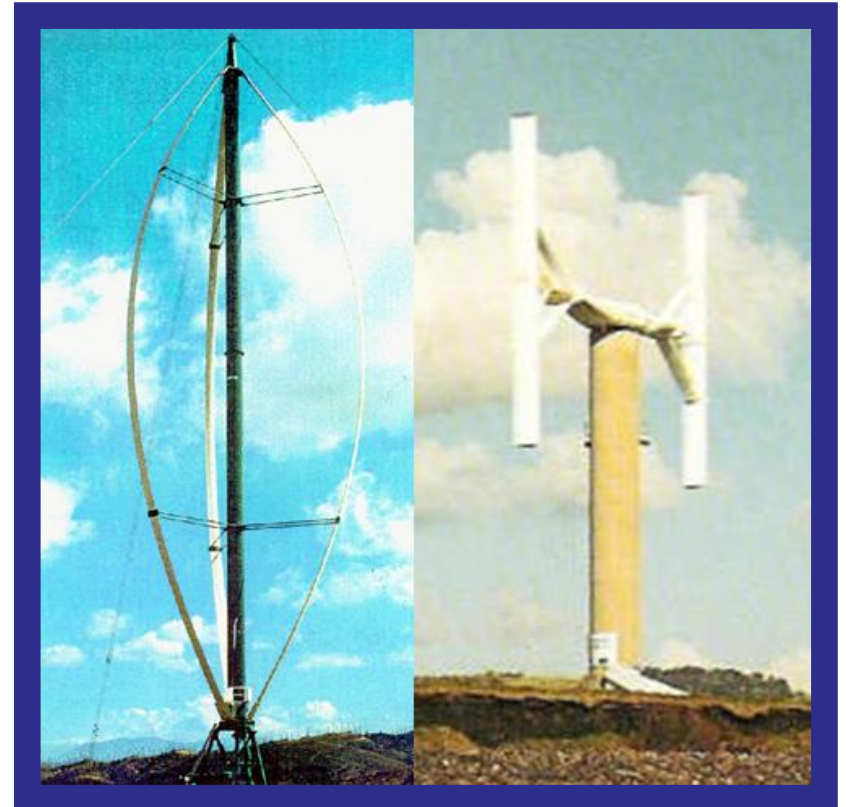
History Lesson 2: Famous battles



1st famous battle: 3 blades vs 2



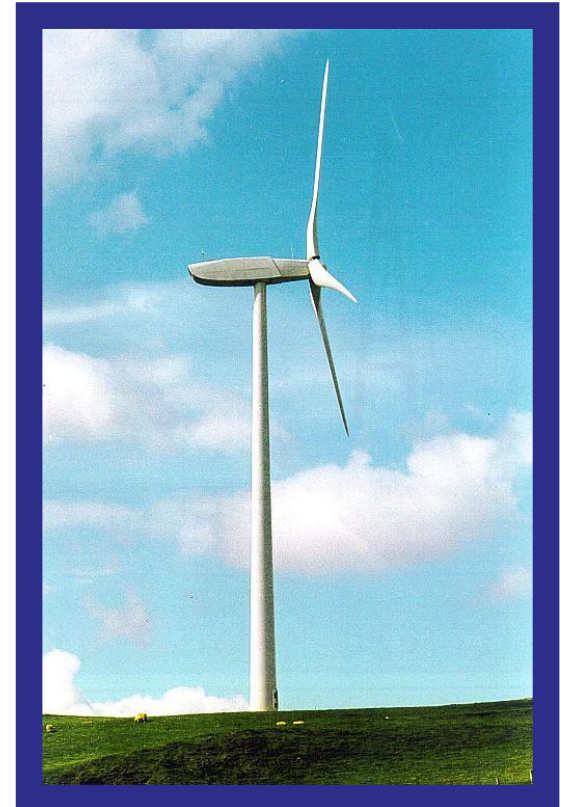
2nd famous battle: horizontal axis vs vertical



3rd famous battle: stall vs pitch control



4th famous battle: upwind vs downwind



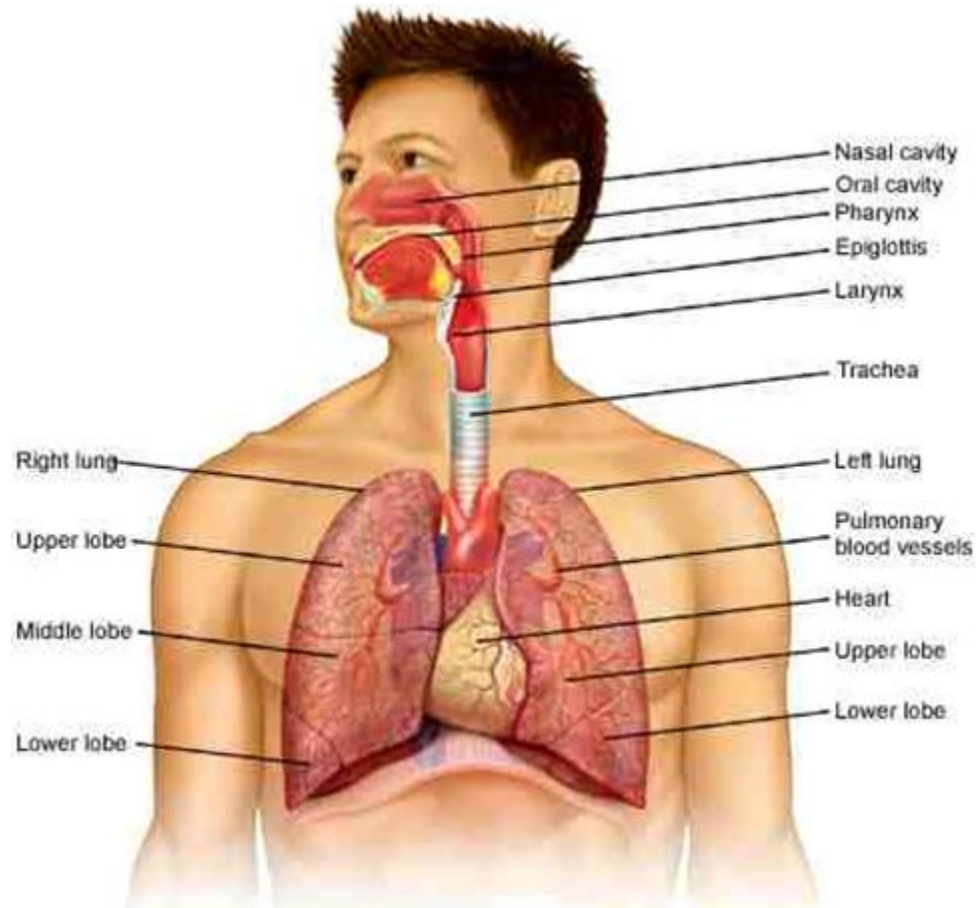
5th famous battle: fixed vs variable speed

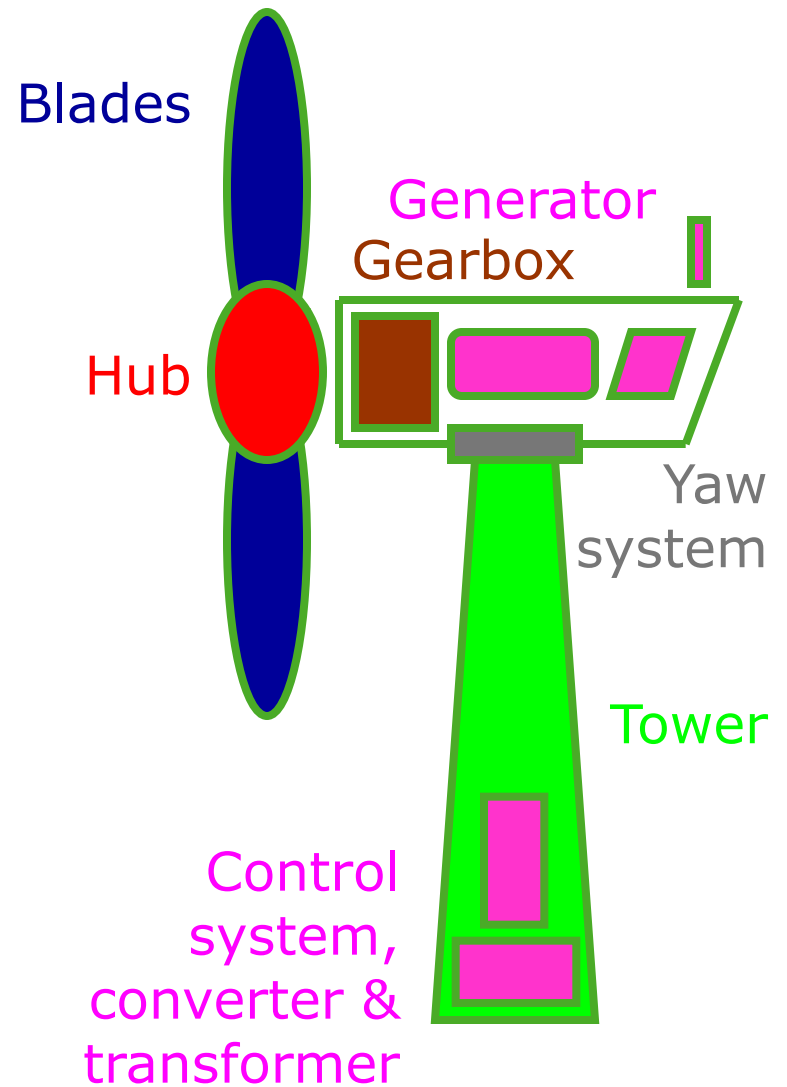


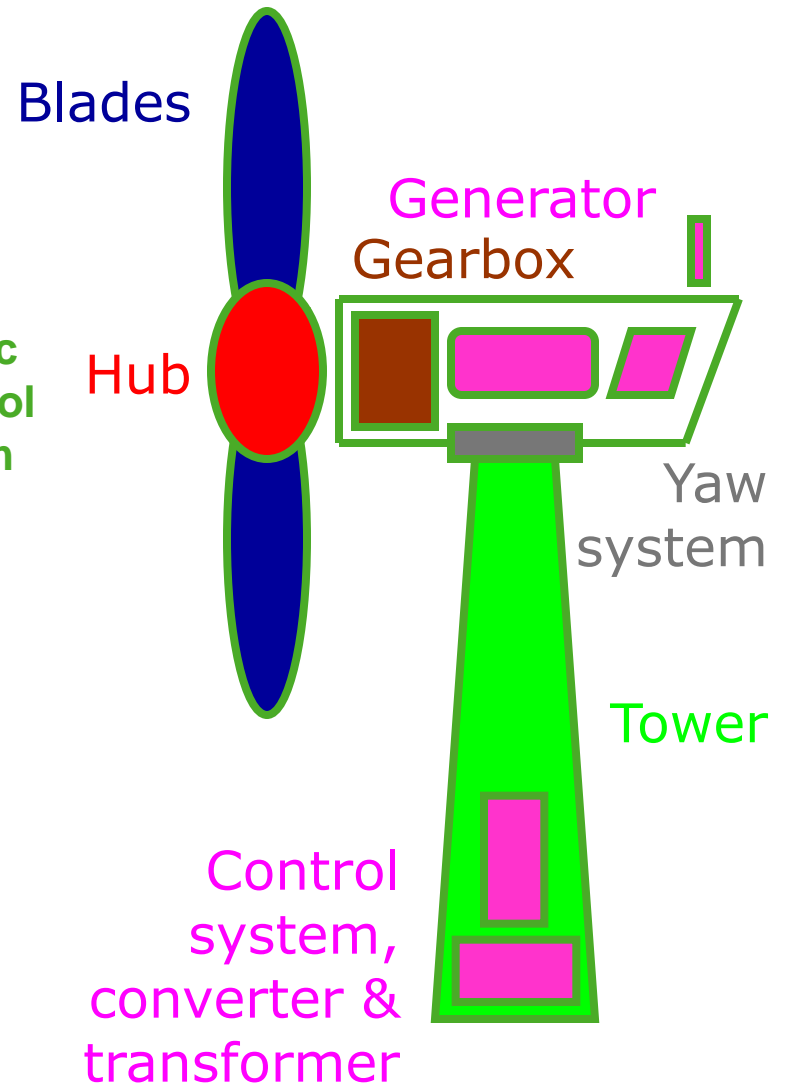
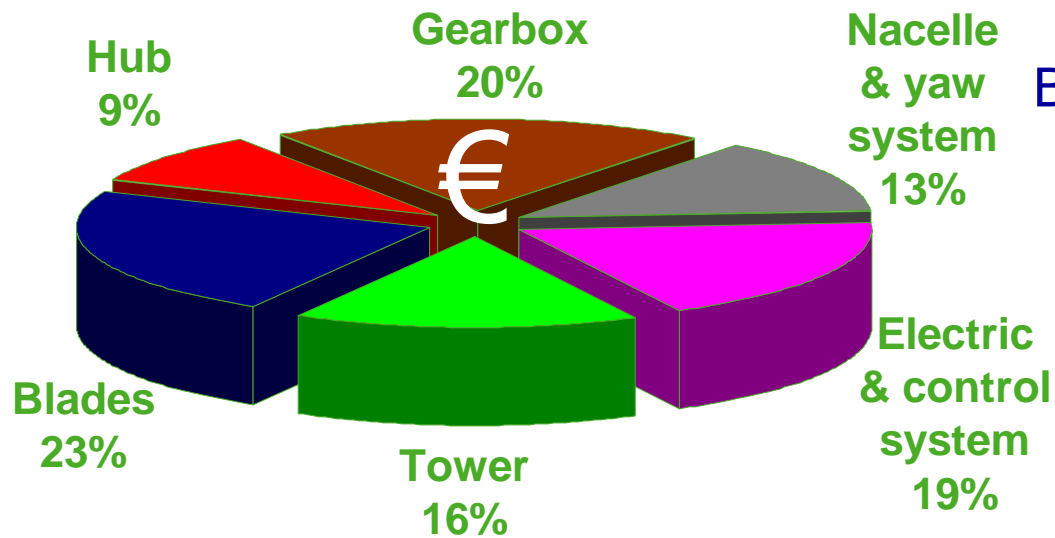
6th famous battle: geared vs direct-drive



Anatomy lesson





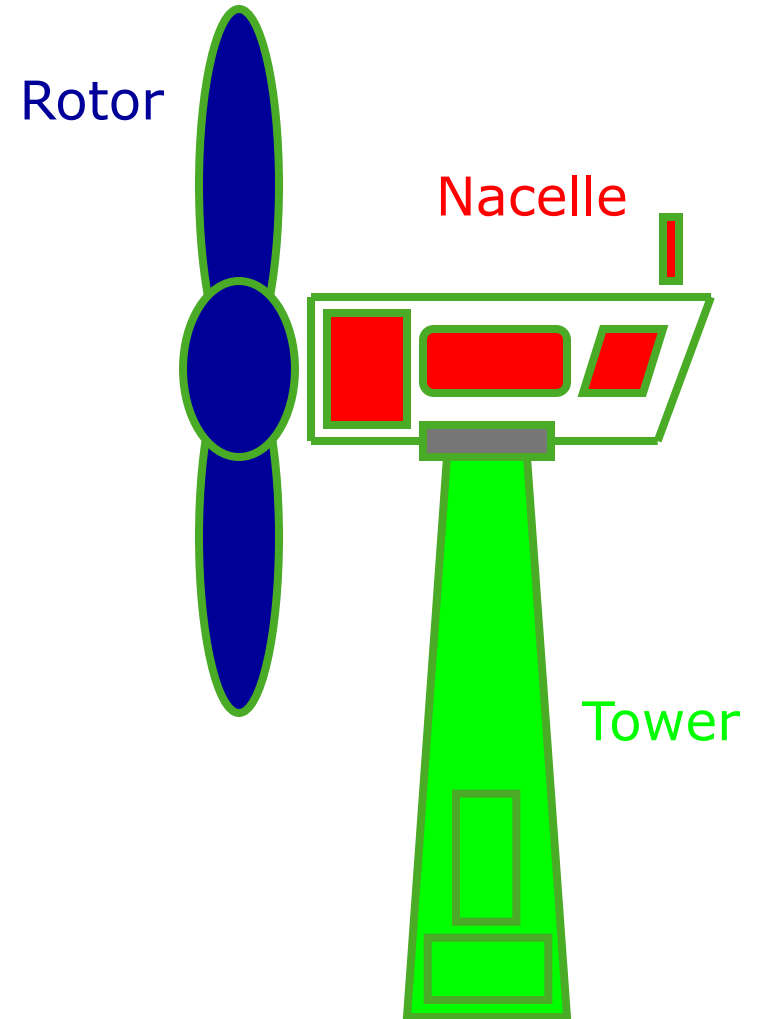


Nacelle
70-330T

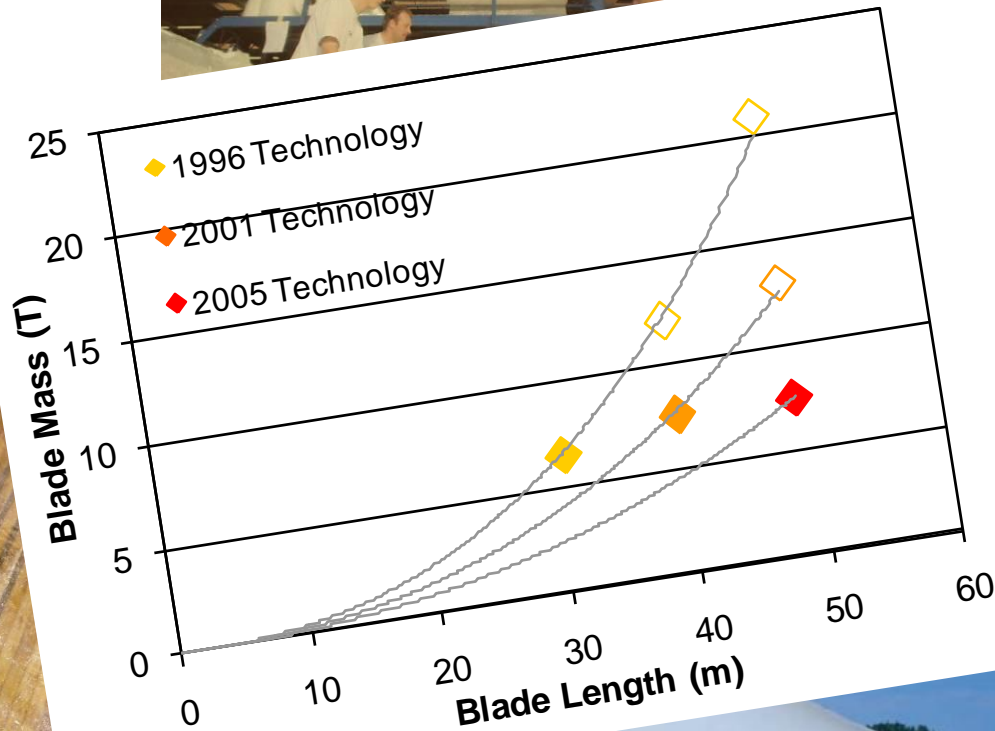
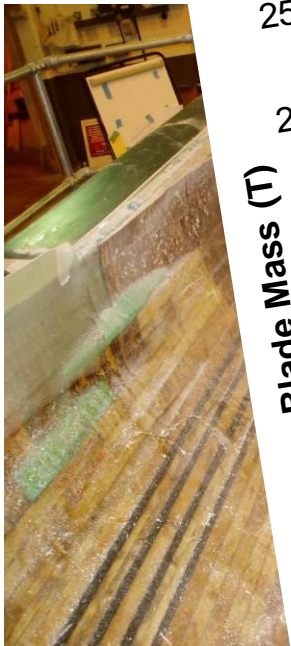
Rotor
40-150T

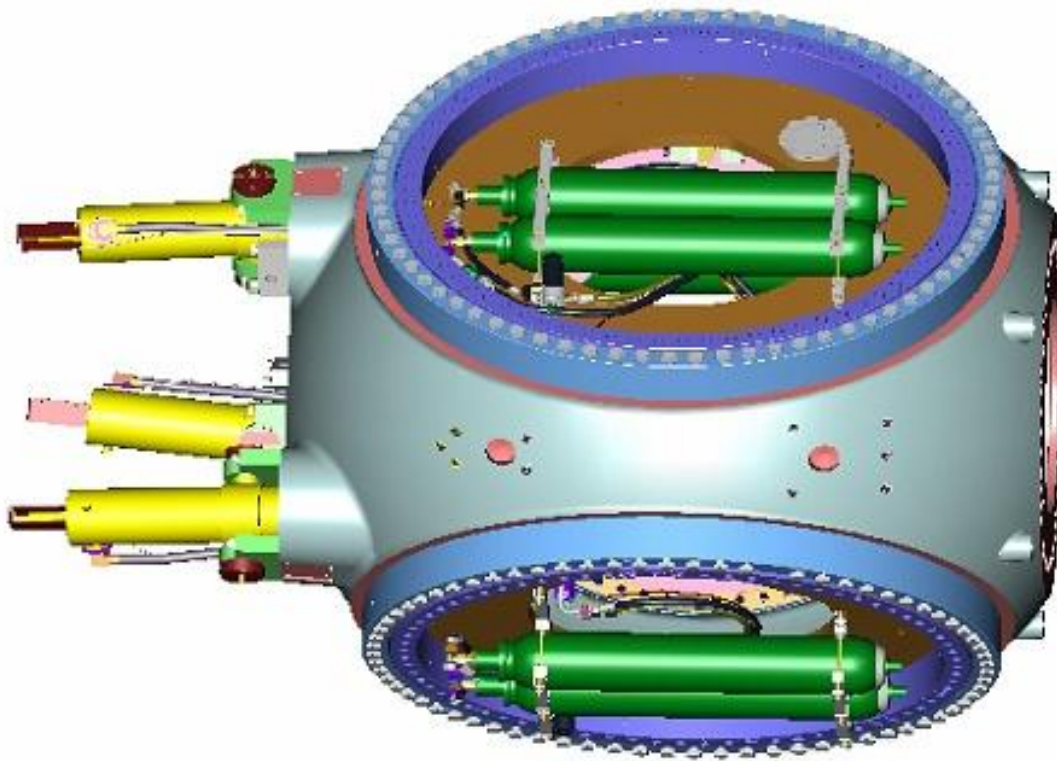
Mass

Tower
200-400T



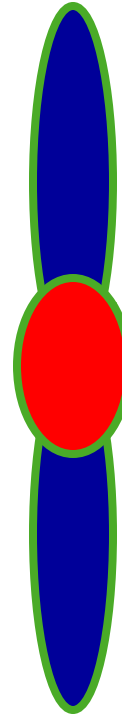
Blades

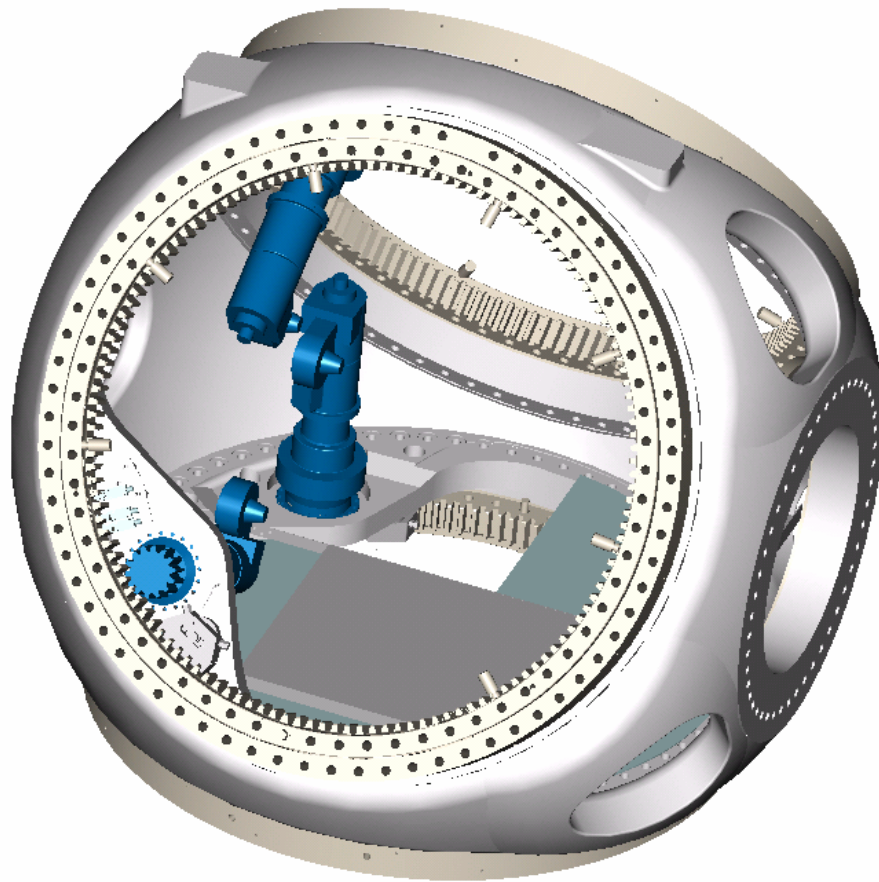




Blades

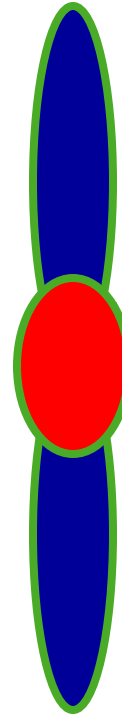
Hub

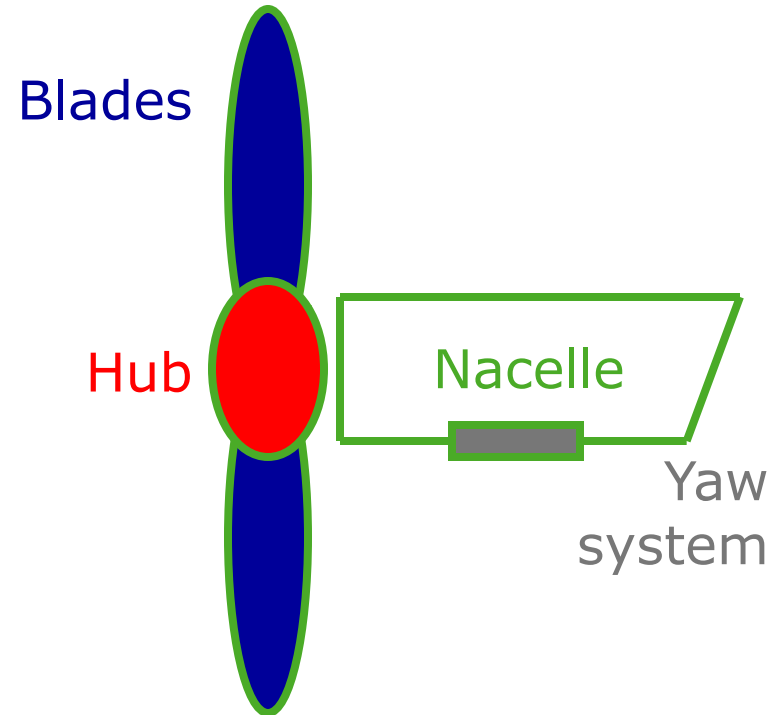


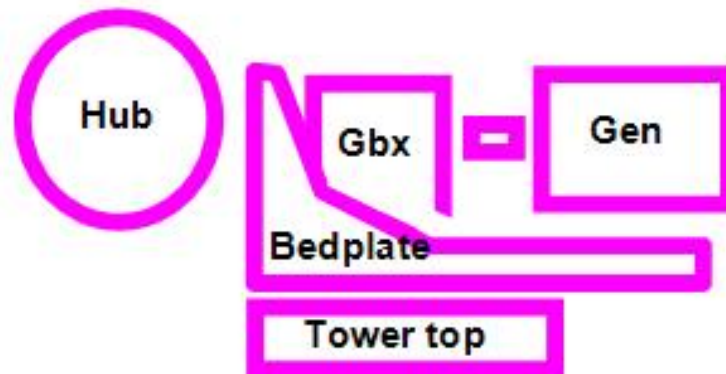
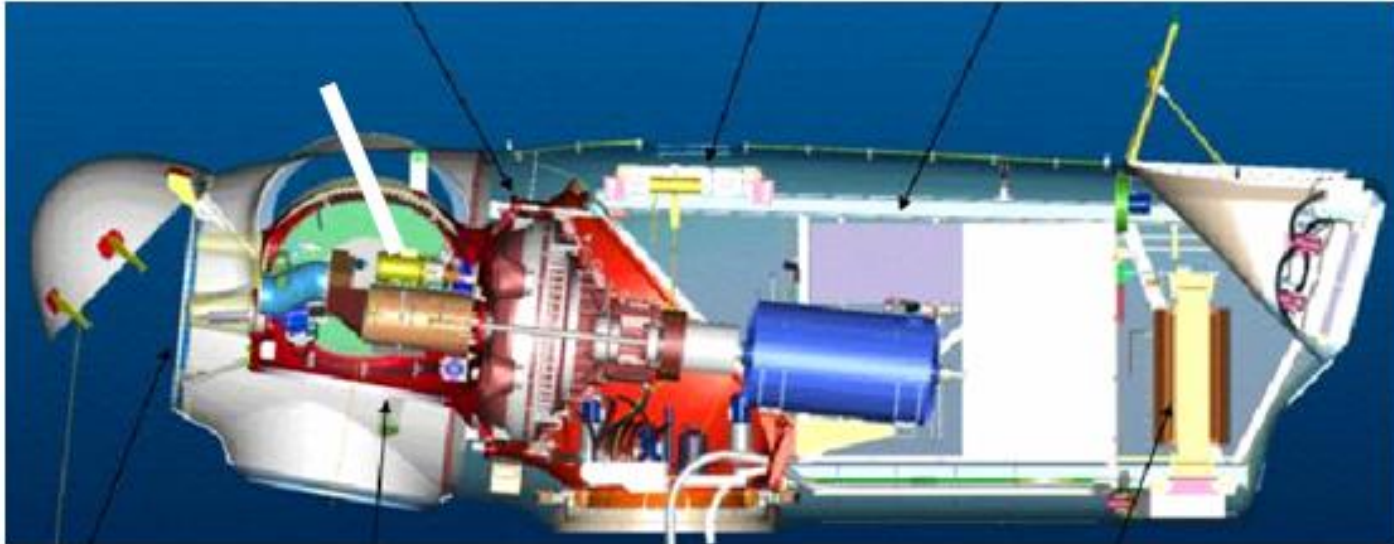


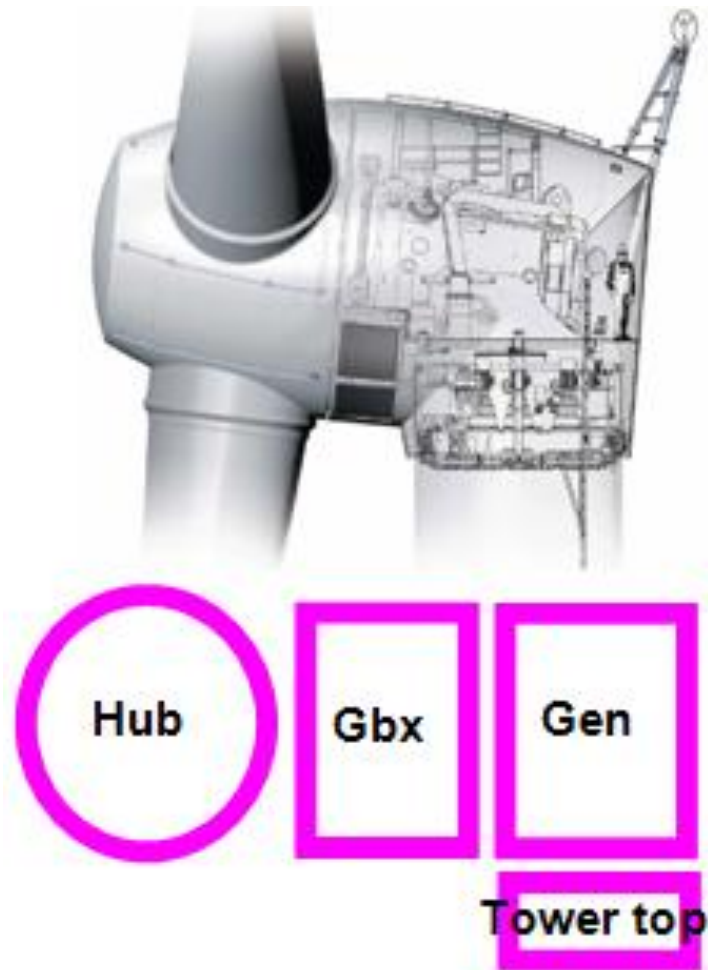
Blades

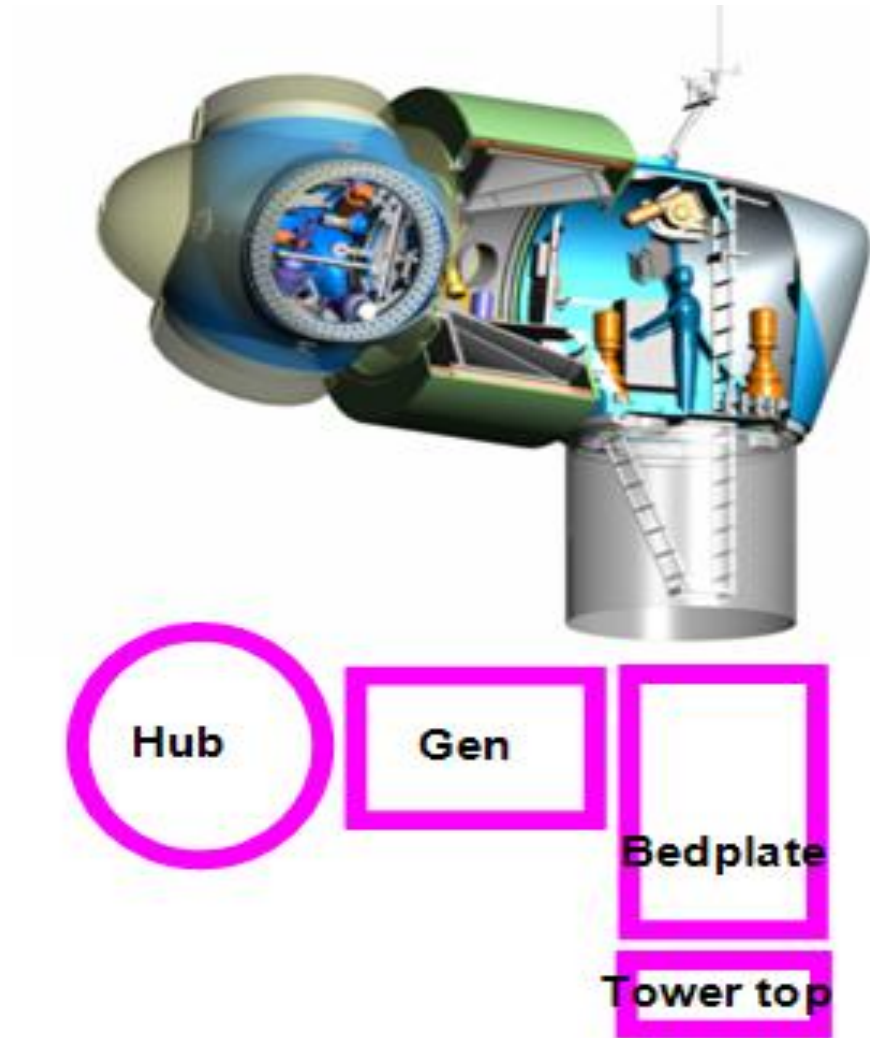
Hub

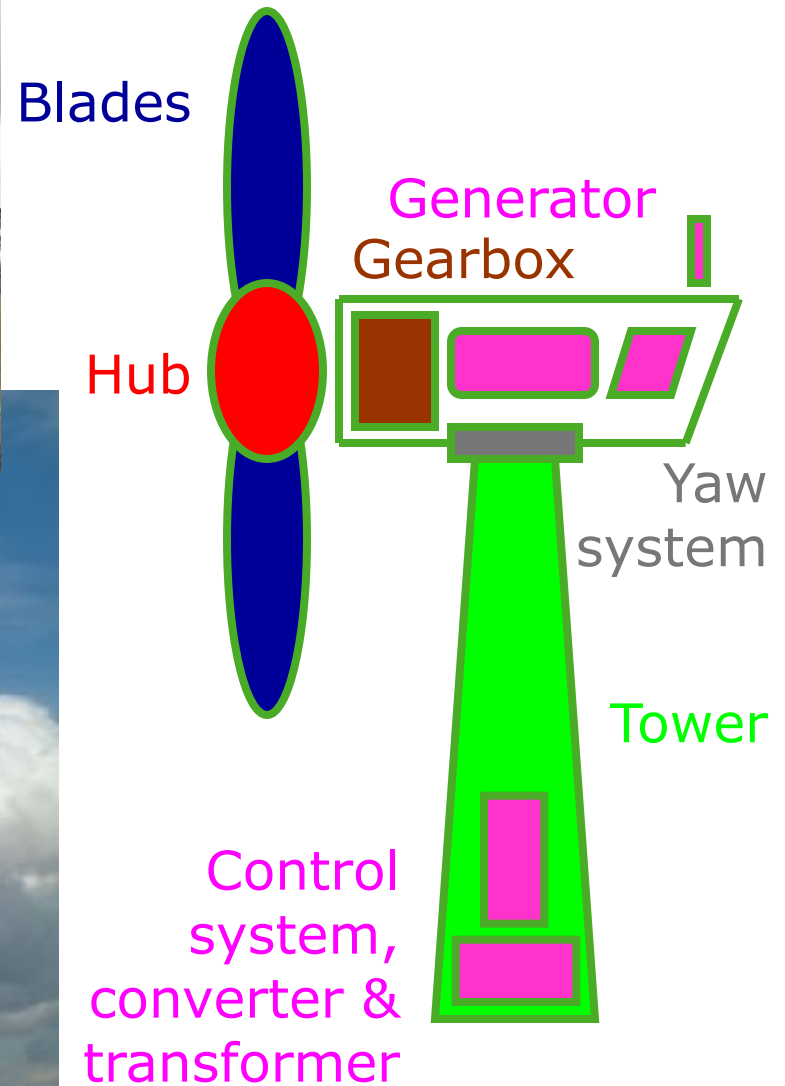






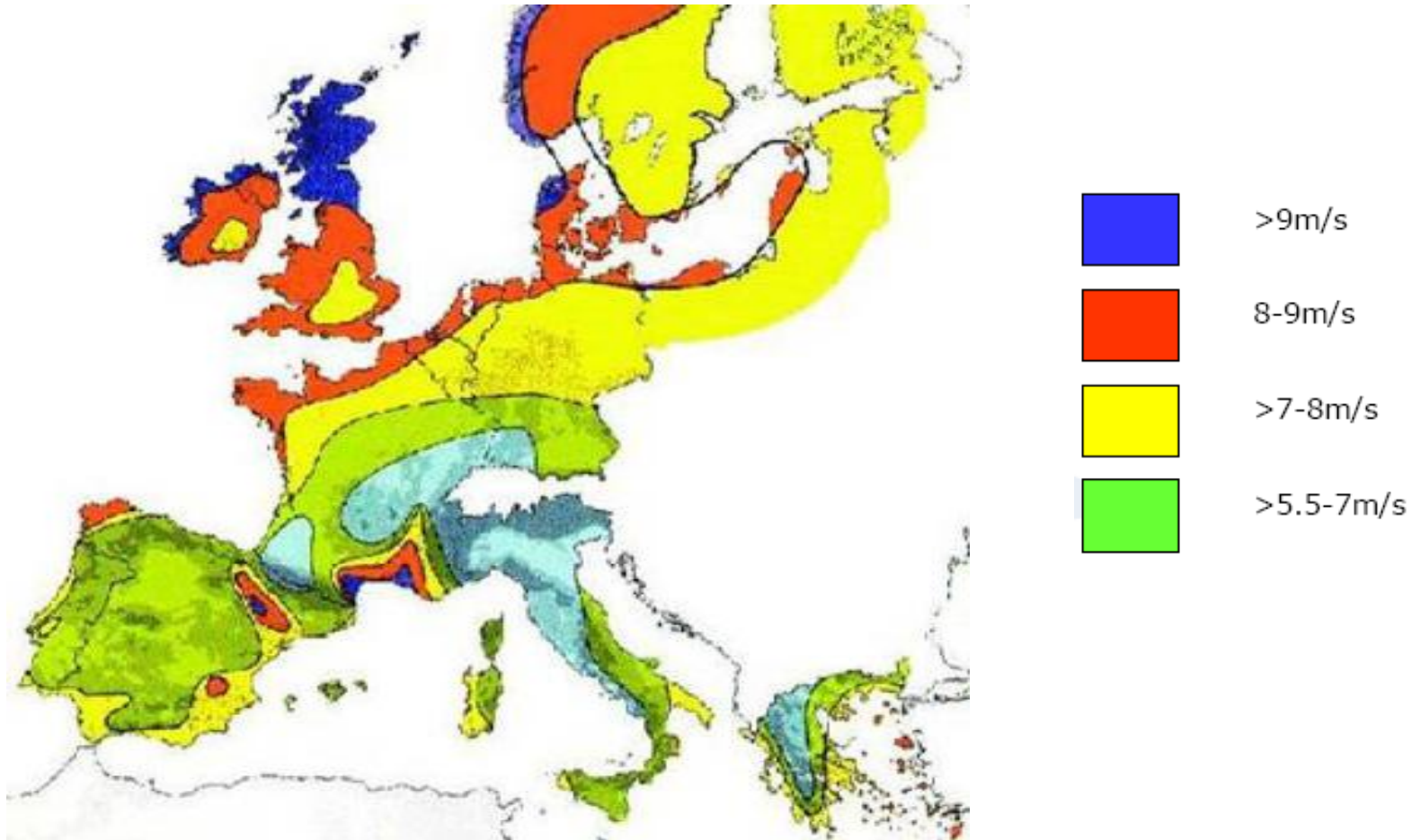


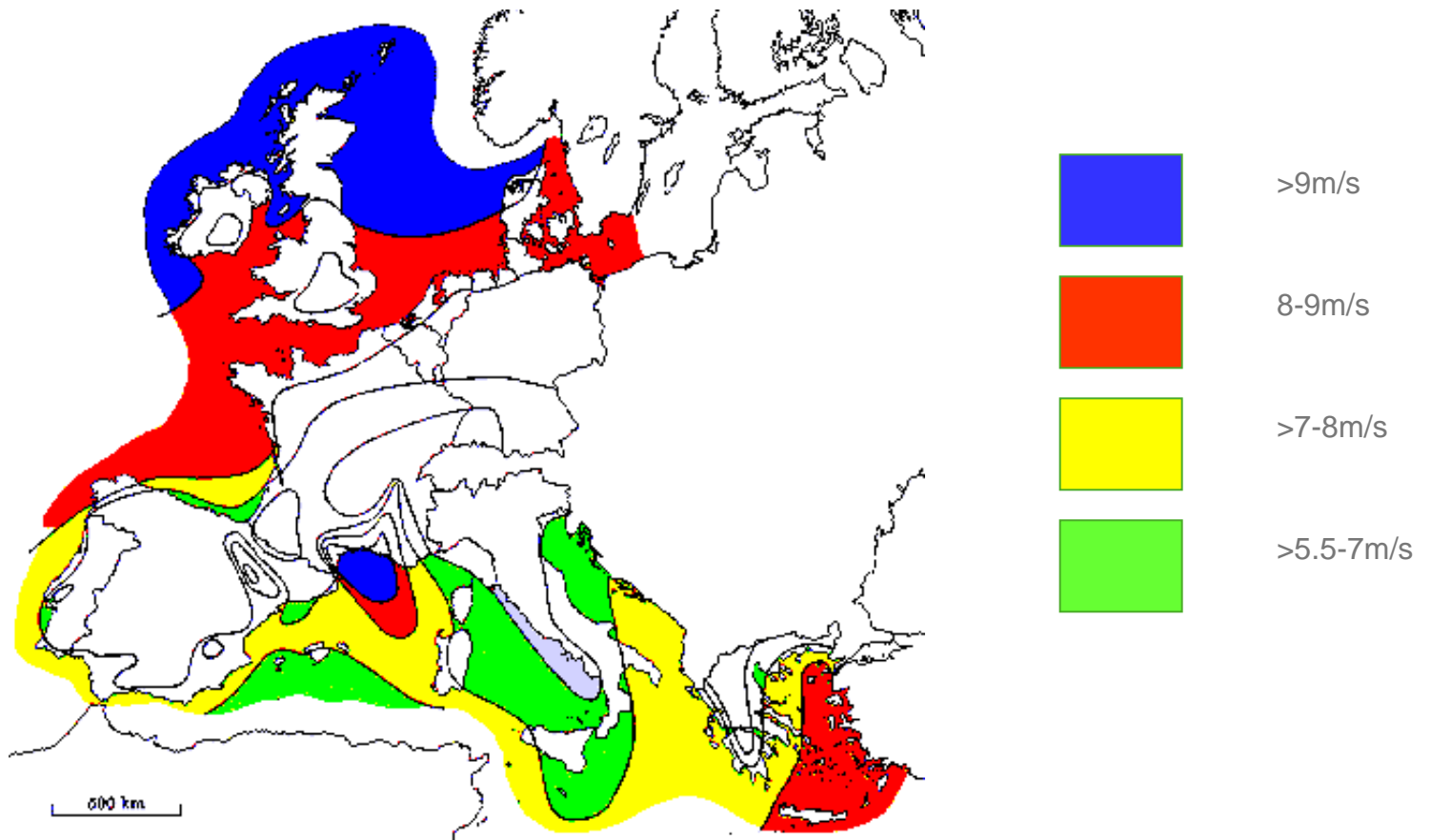




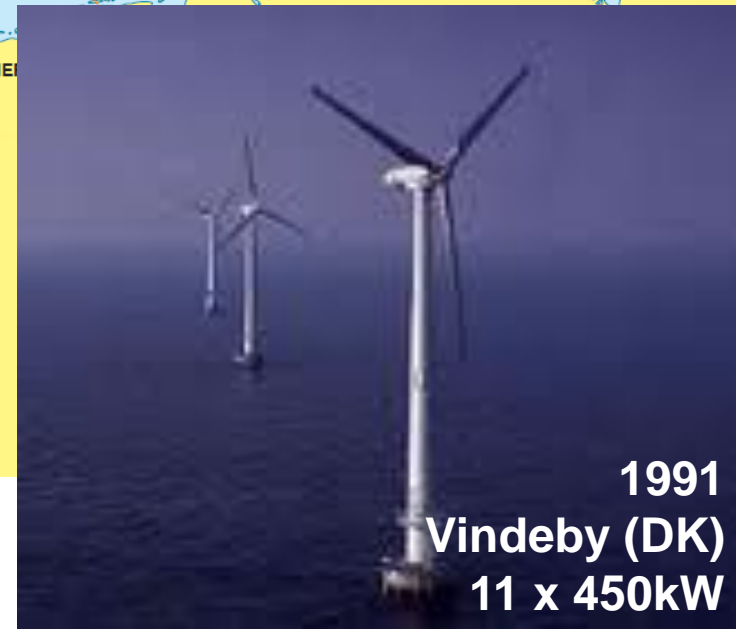
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Geography lesson





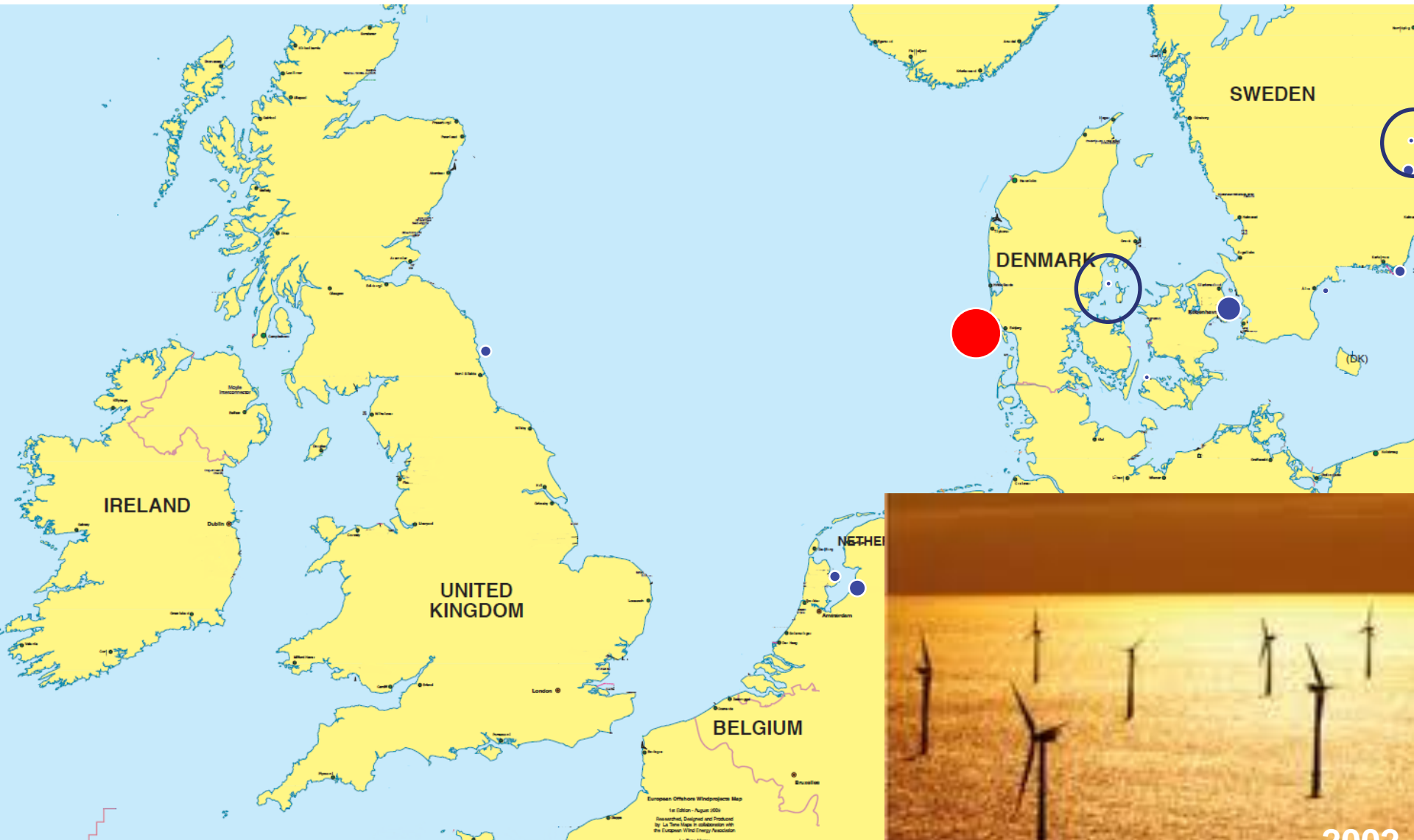




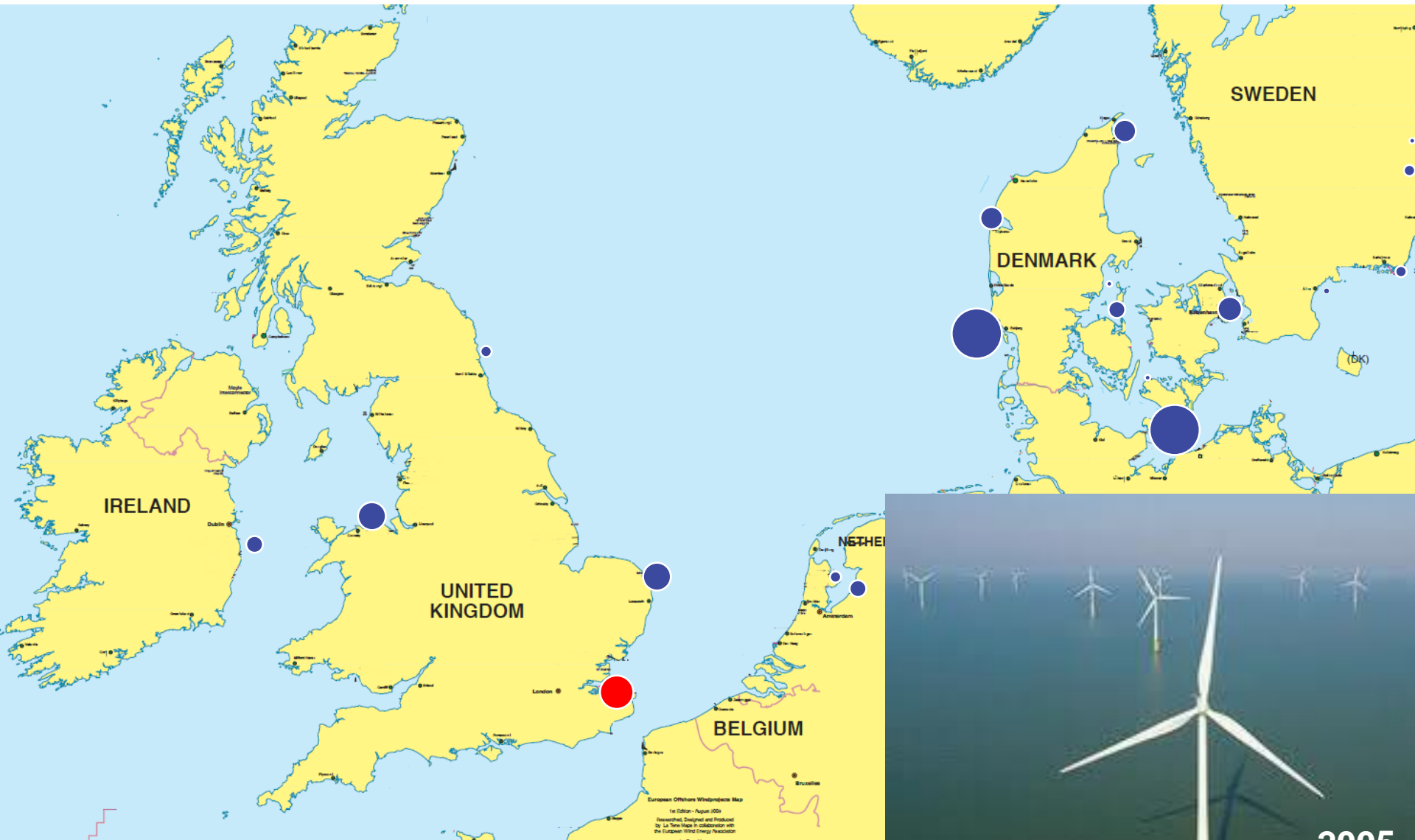
1991
Vindeby (DK)
11 x 450kW



rest of 1990s
4 projects
26MW



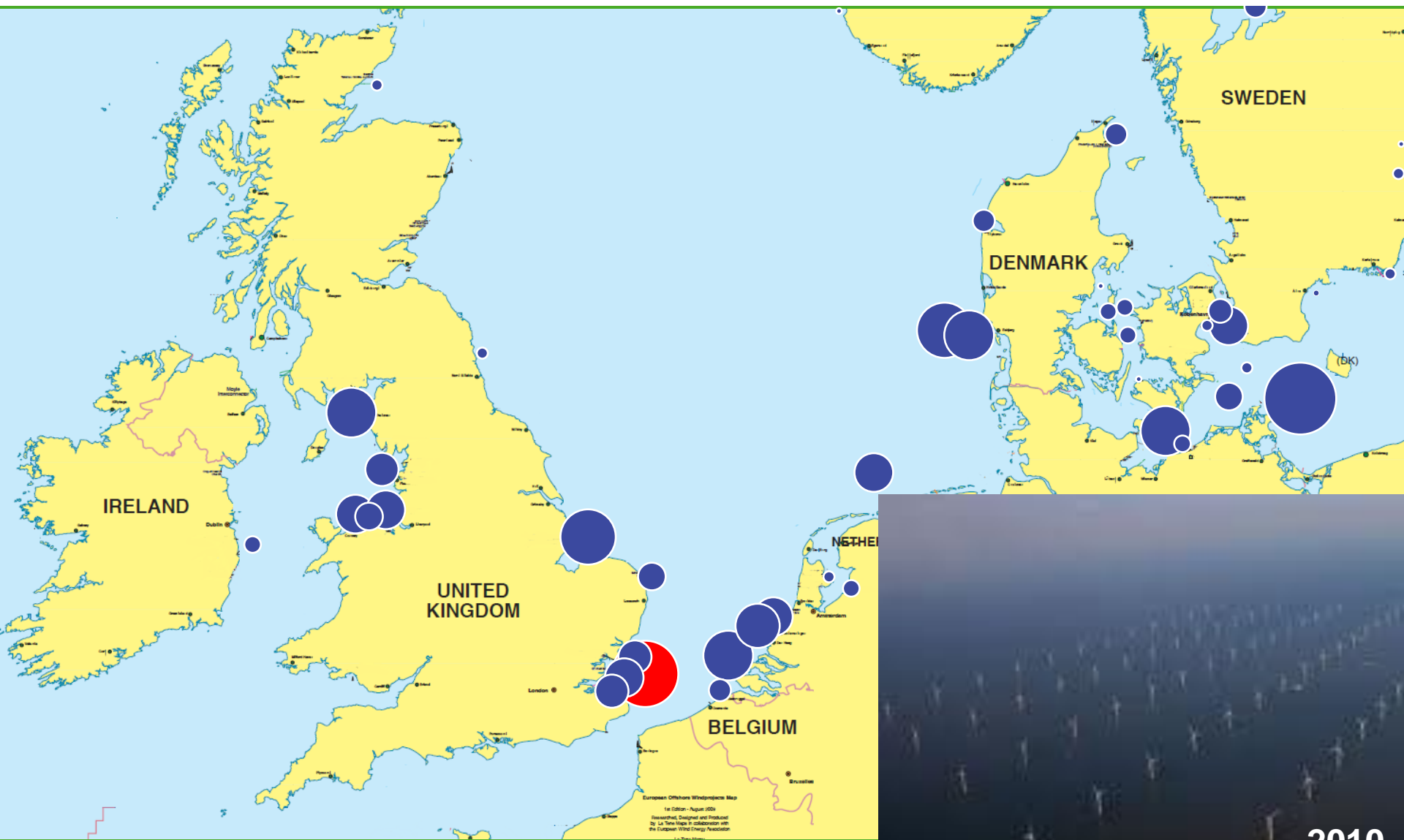
2002
Horns Rev 1
80 x 2MW



2005
Kentish Flats (UK)
30 x 3MW



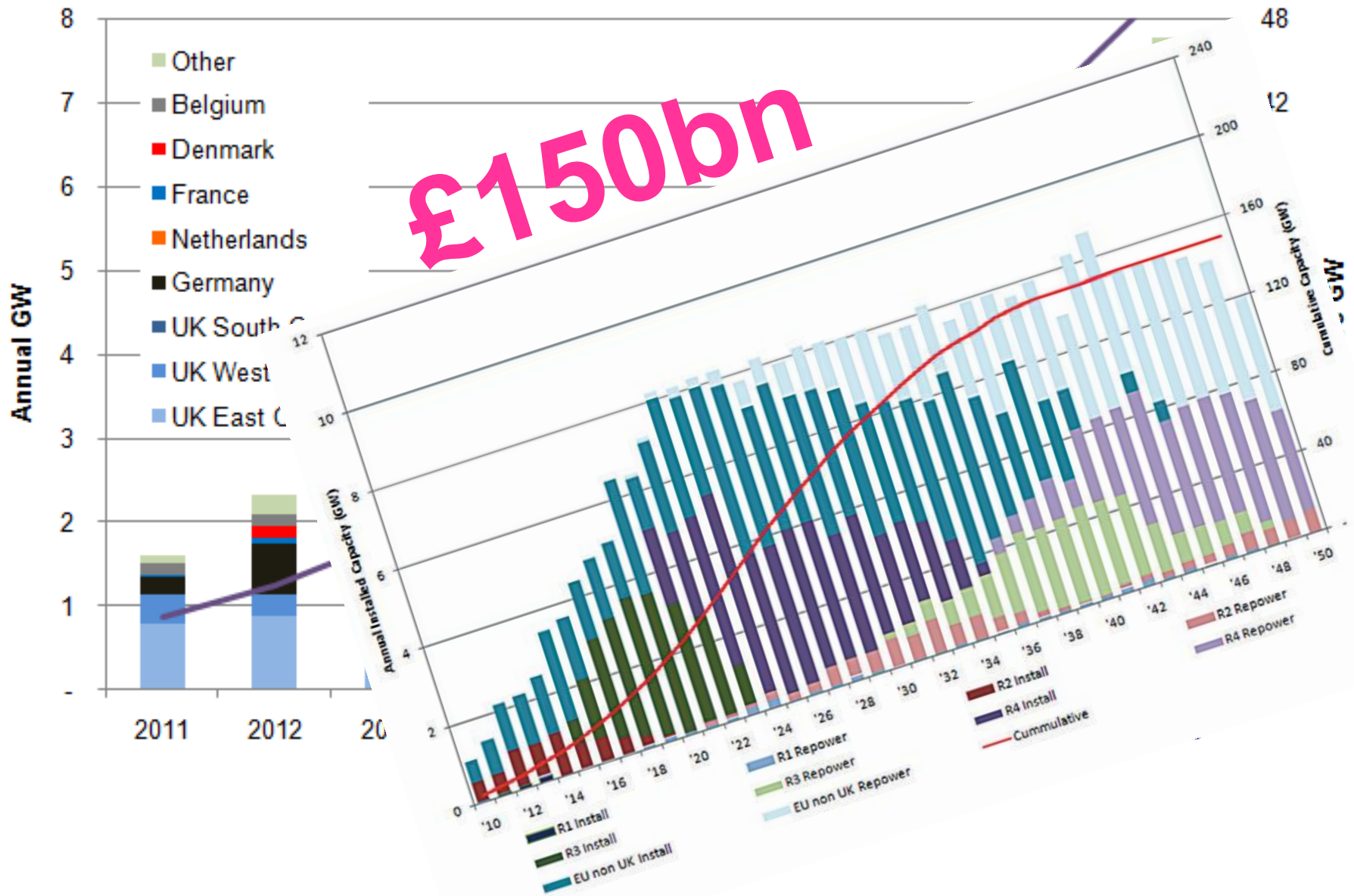
2007
Beatrice Demonstration (UK)
2 x 5MW

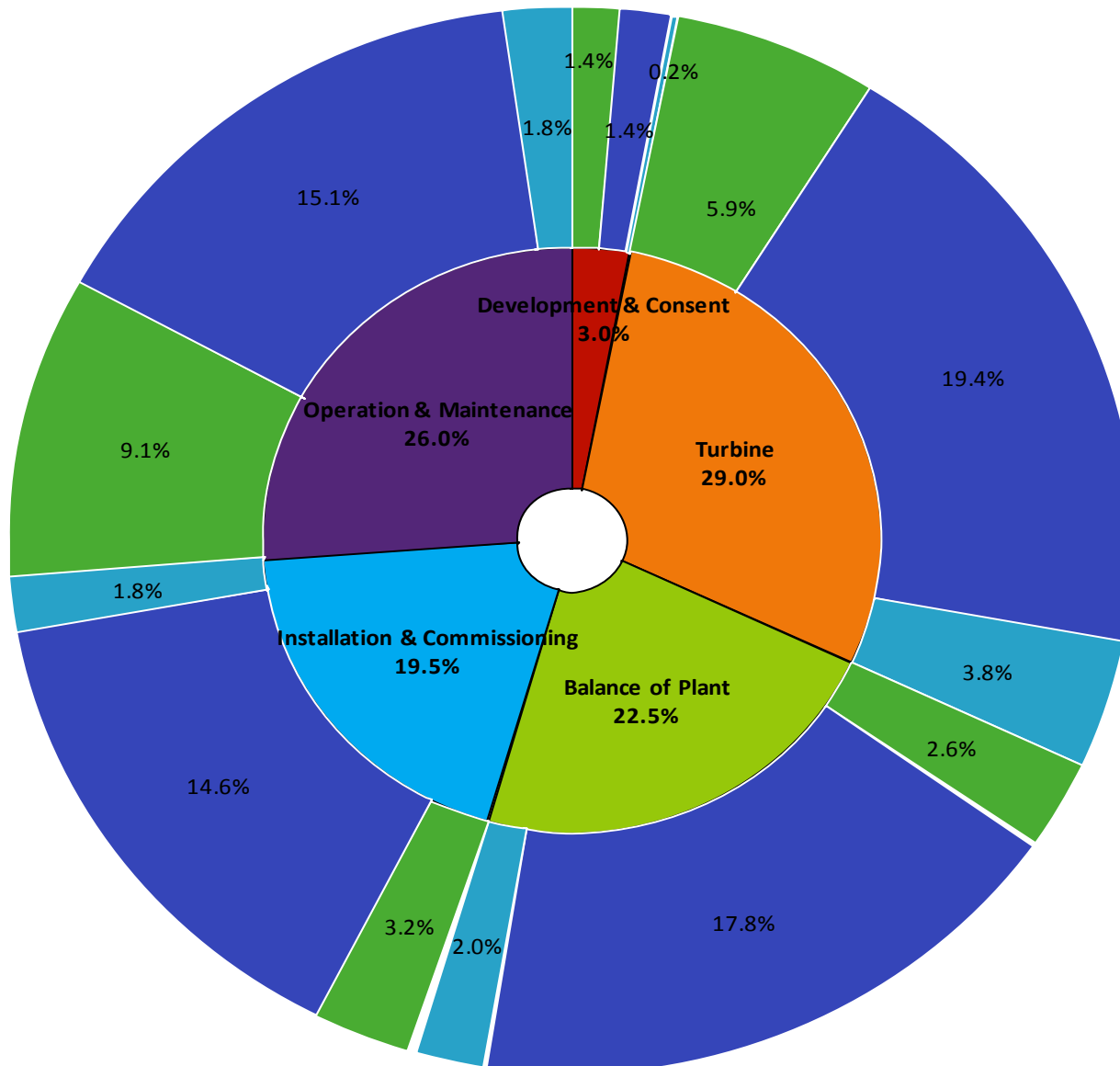


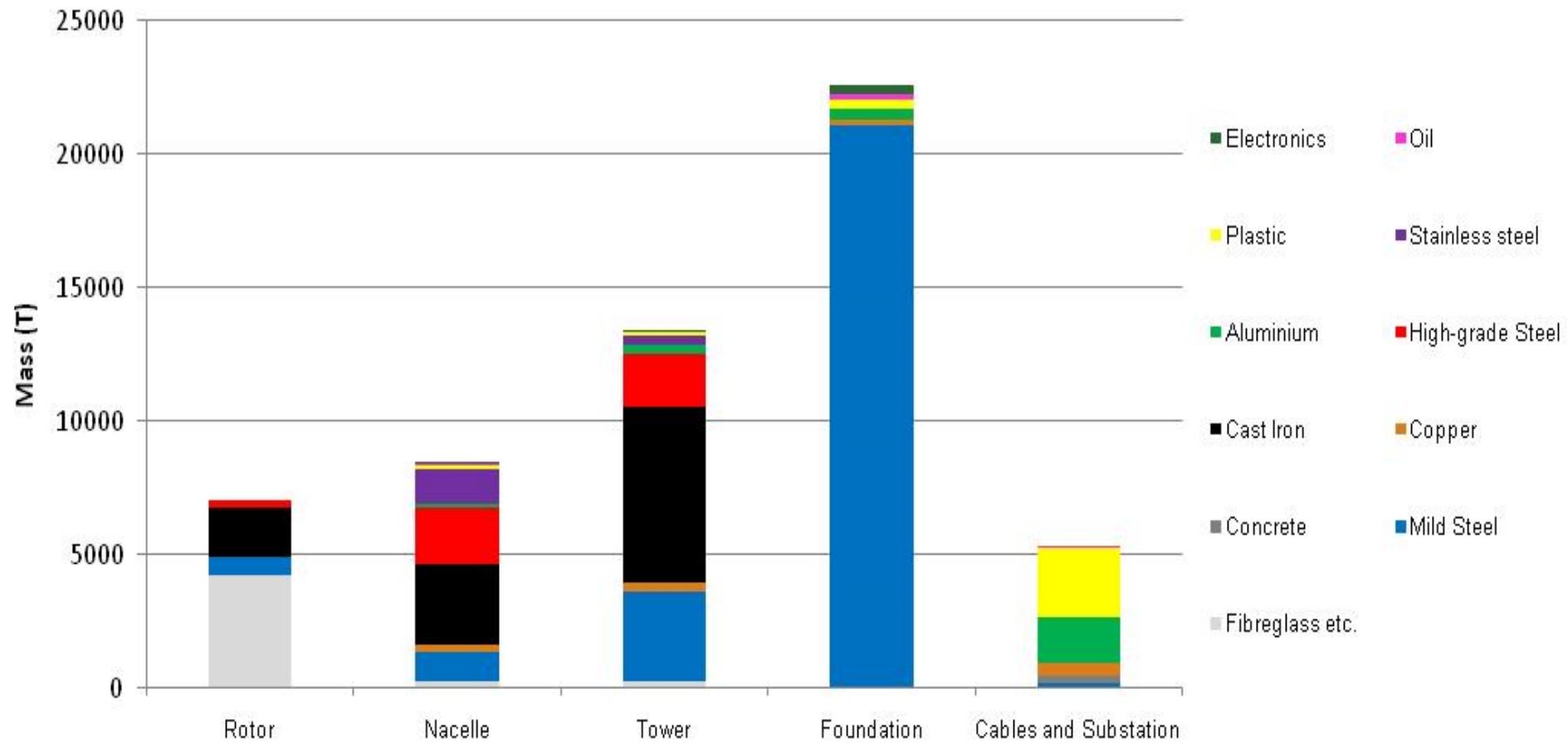
2010
Thanet (UK)
100 x 3MW



£150bn







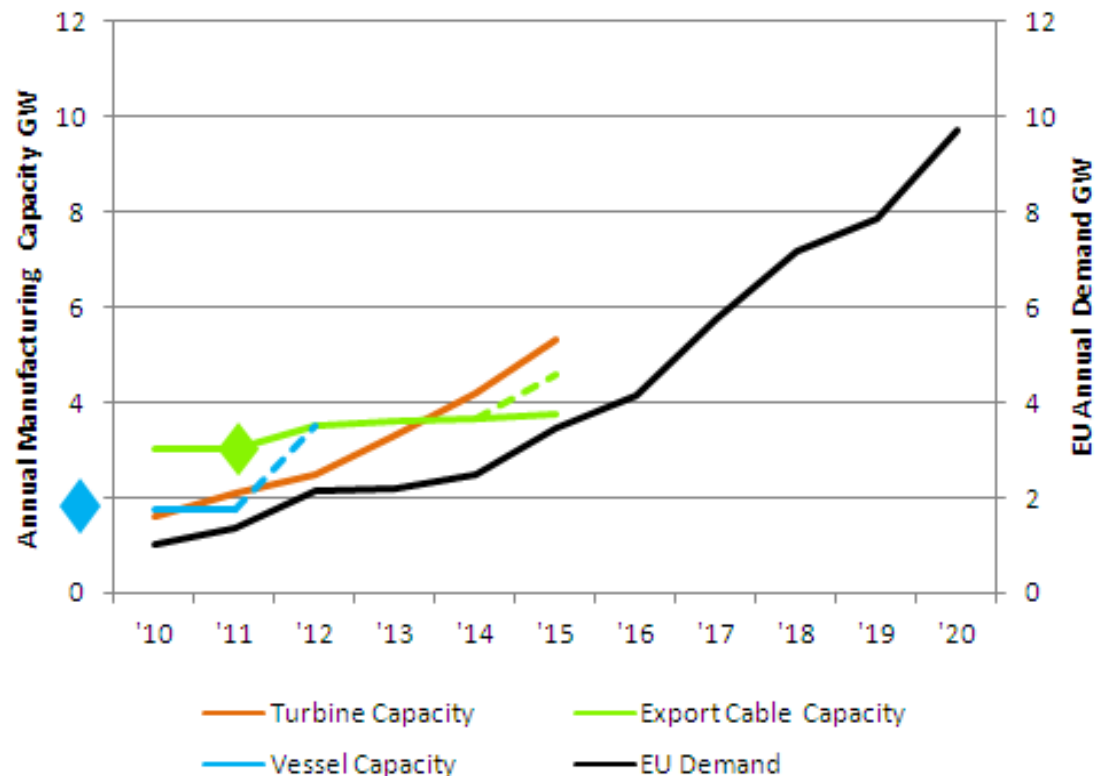
“Can do...” What?

1. Do Health & Safety excellently



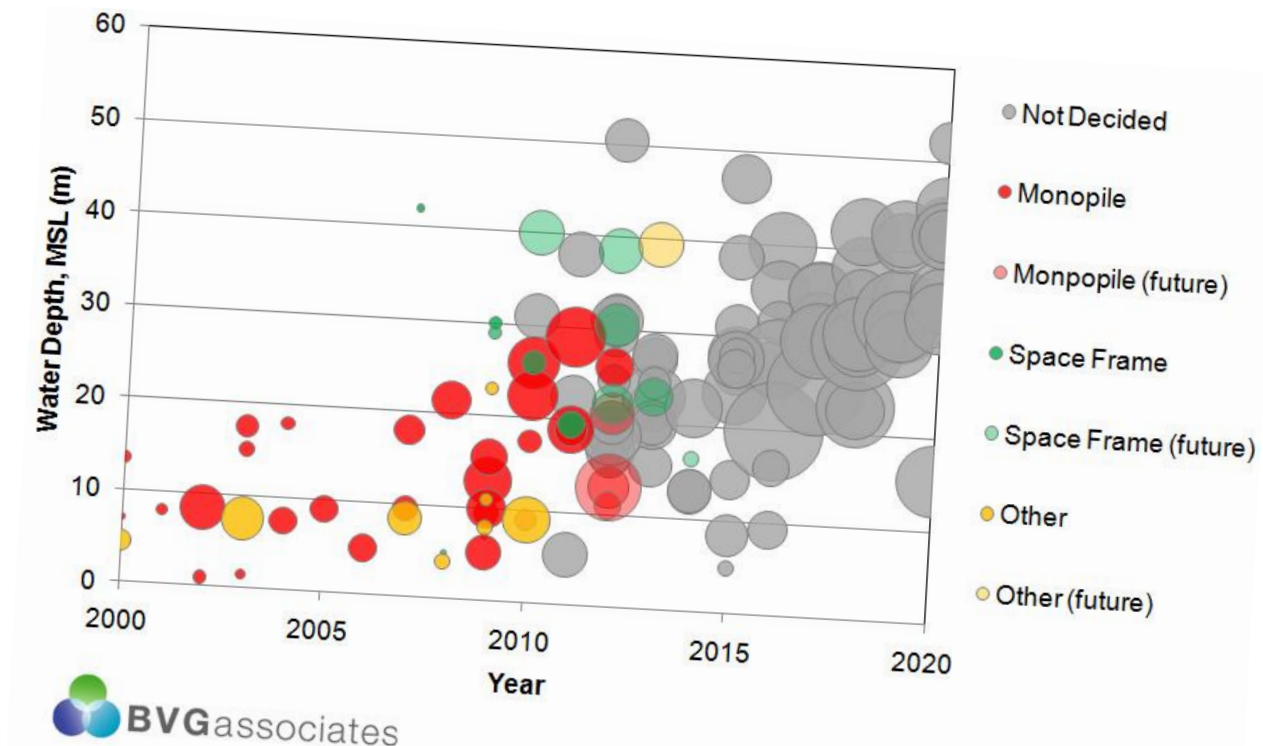
“Can do...” What?

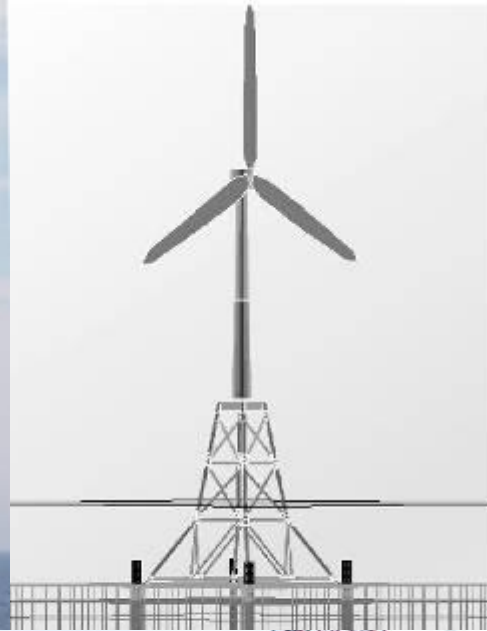
1. Do Health & Safety excellently
2. Massive supply chain growth



“Can do...” What?

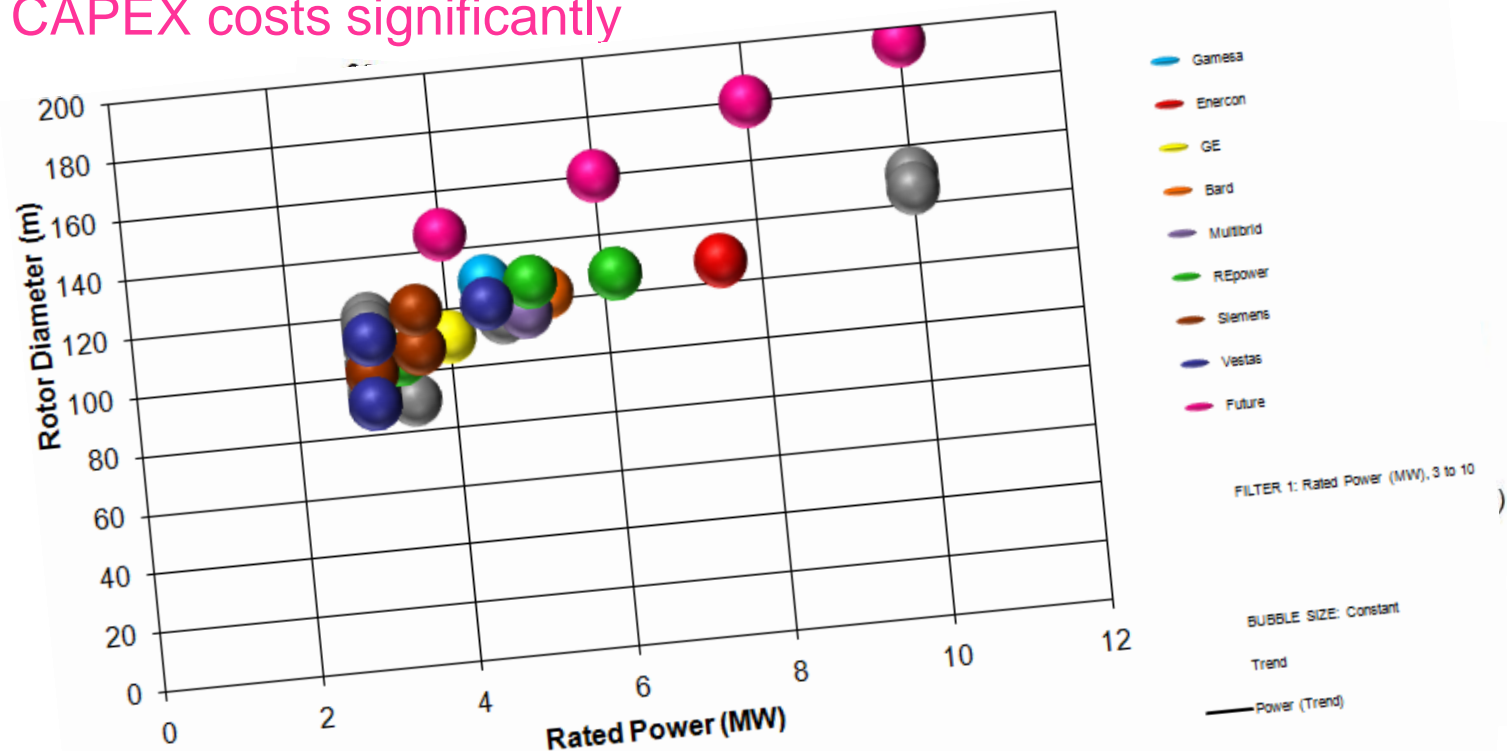
1. Do Health & Safety excellently
2. Massive supply chain growth
3. Improve CAPEX costs significantly





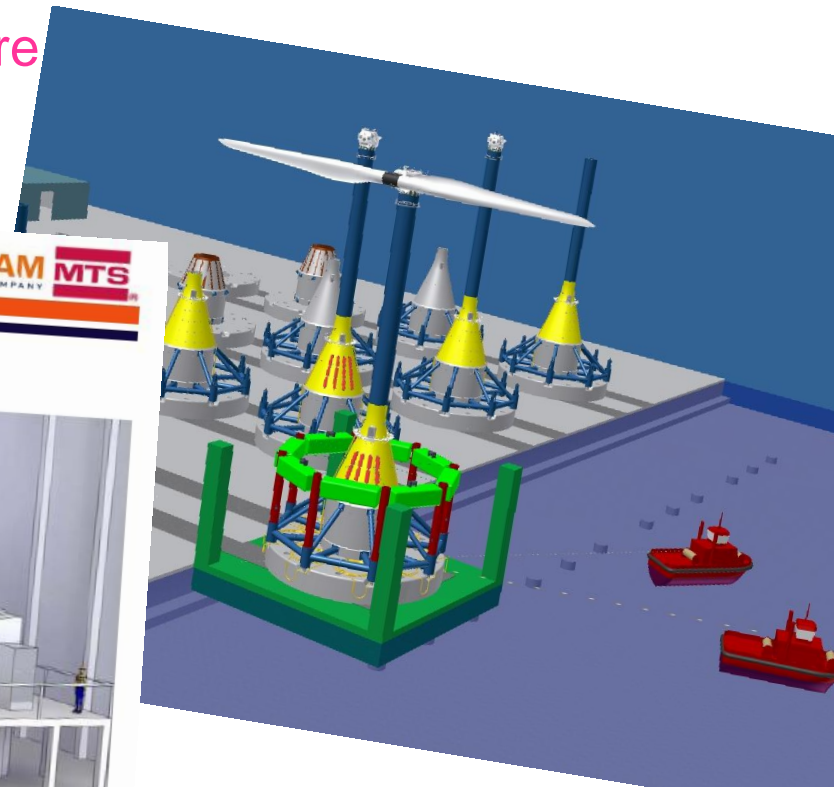
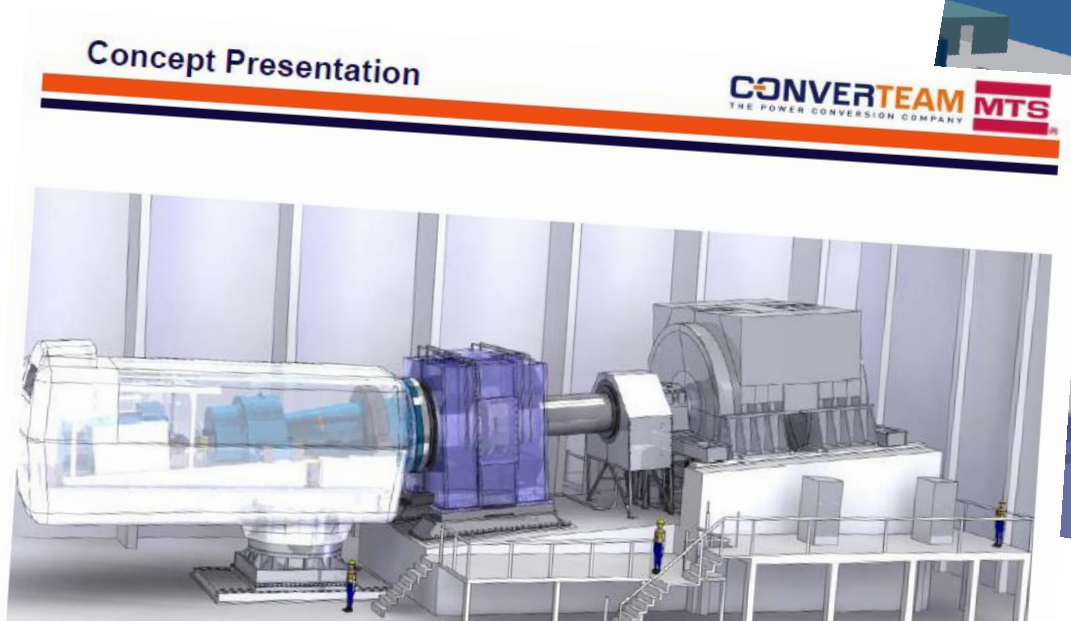
“Can do...” What?

1. Do Health & Safety excellently
2. Massive supply chain growth
3. Improve CAPEX costs significantly



“Can do...” What?

1. Do Health & Safety excellently
2. Massive supply chain growth
3. Improve CAPEX costs significantly
4. Improve Installation & OPEX costs more







Thank you...

