



Renewable Energy Base Oostende

The ideal hub for offshore wind &
heavy lift activities in the North Sea



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Emmanuël Timmermans - Business Development Manager

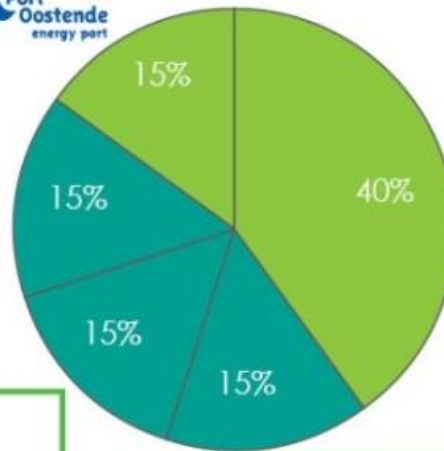
Founded in October 2010

SHAREHOLDERS

Commercial exploitation
Port of Oostende

A flagship organisation in the field of civil engineering, construction, hydraulic engineering and restoration

DEME Blue Energy (DBE) was created to develop wave and tidal energy projects worldwide.



Invest in entrepreneurs, real estate, & infrastructure.



Offshore & Wind Assistance offers a wide range of services including maintenance of offshore installations for wind energy and oil and gas applications, marine logistic services

Public
Private

GOAL

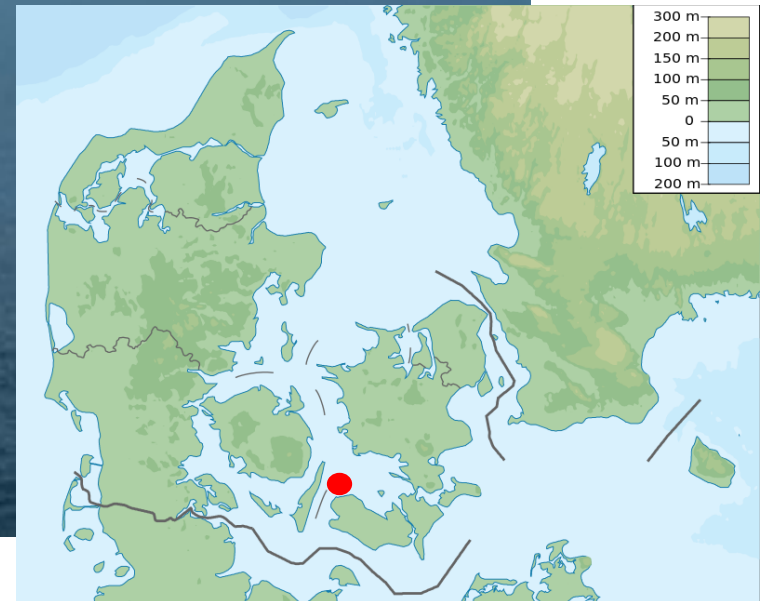
1. Invest in existing and new port infrastructures to attract offshore wind activities.
2. Exploitation of a 15 ha offshore terminal.

REBO offshore wind terminal



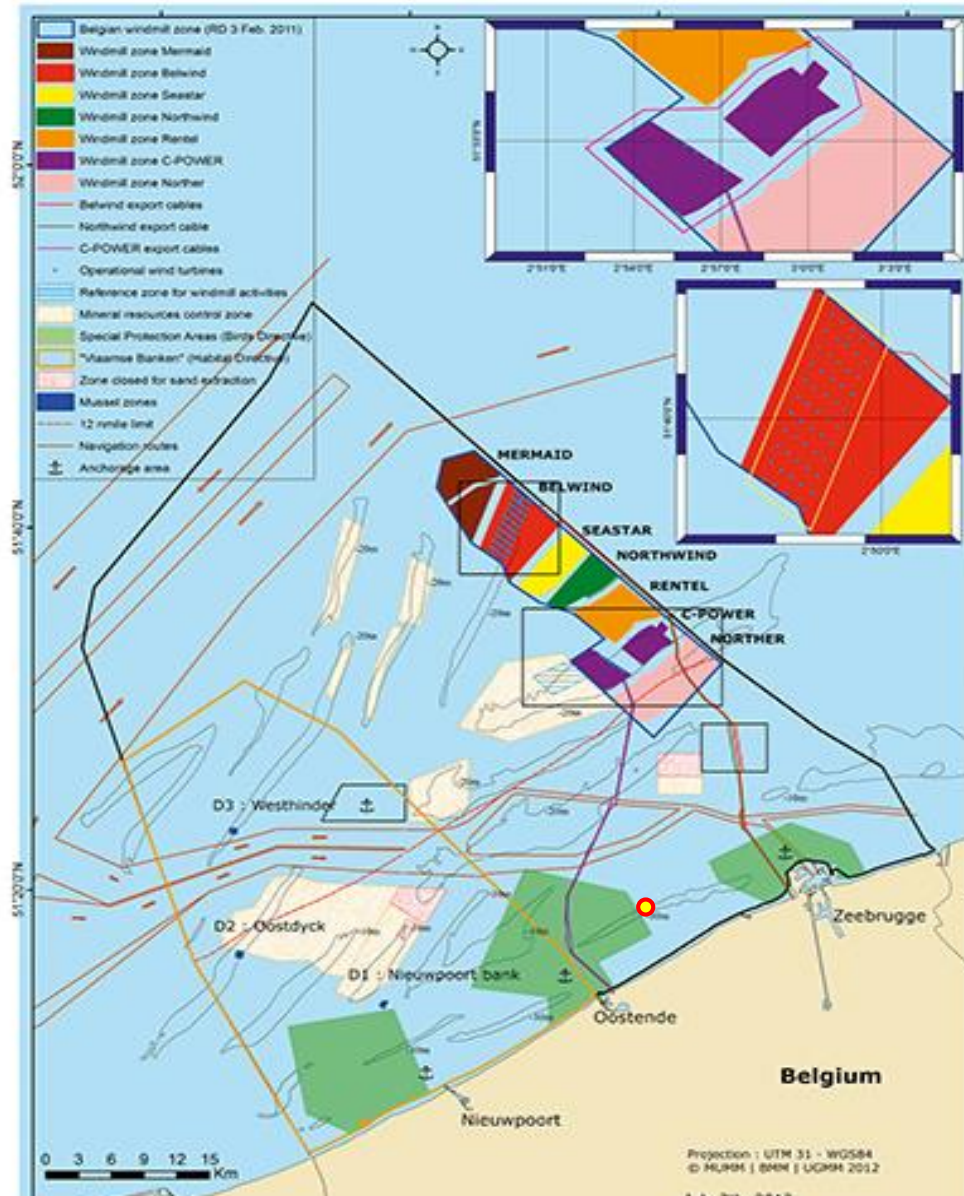


Eerste offshore windturbines
(1991 -DK-Vindeby – 11 x 450 kW)



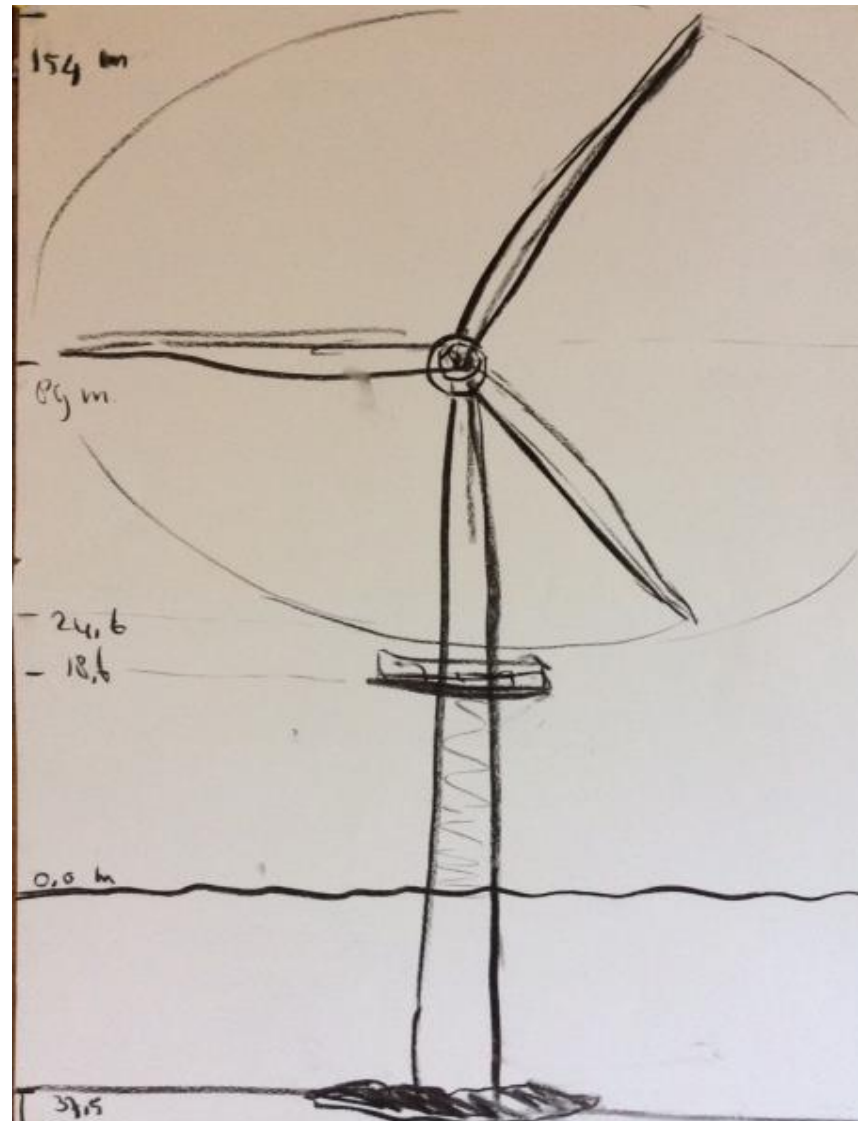
Toegekende Concessies

8 Concessies voor Belgische
offshore wind parken 2003

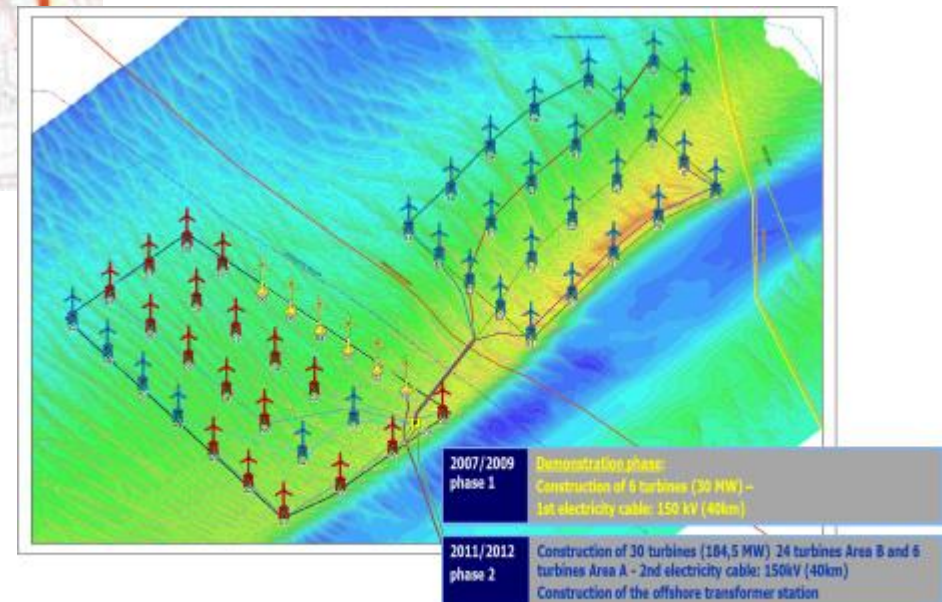


	Distance to shore	Wind farm	MW	Type of turbine	Country	Phase
1	20	Norther	44 x 8 = 352 MW	8 MW MHI Vestas	BE	Under construction
2	30	C-Power	6 x 5 + 48 x 6,15 = 325 MW	6 & 6,15 MW Senvion	BE	Operational since 2014
3	40	Rentel	42 x 7 = 294 MW	7 MW Siemens	BE	Operational since 2018
4	37	Northwind	72 x 3 = 216 MW	3 MW MHI Vestas	BE	Operational since 2014
5		Seastar	246 MW	7 MW Siemens	BE	In preparation
6	50	Nobelwind	50 x 3,3 = 165 MW	3,3 MW MHI Vestas	BE	Operational since 2017
7	46	Belwind	55 x 3 + 1 x 6 = 171 MW	3 MW MHI Vestas	BE	Operational since 2010
8		Northwestern 2	23 x 9,5 = 224 MW	9,5 MW MHI Vestas	BE	Under construction
SUM			2200 MW	10% Belgian energy use	BE	
		Borselle 1&2	752 MW	Siemens	NL	In preparation
		Boselle 3&4	680 MW	MHI Vestas	NL	In preparation

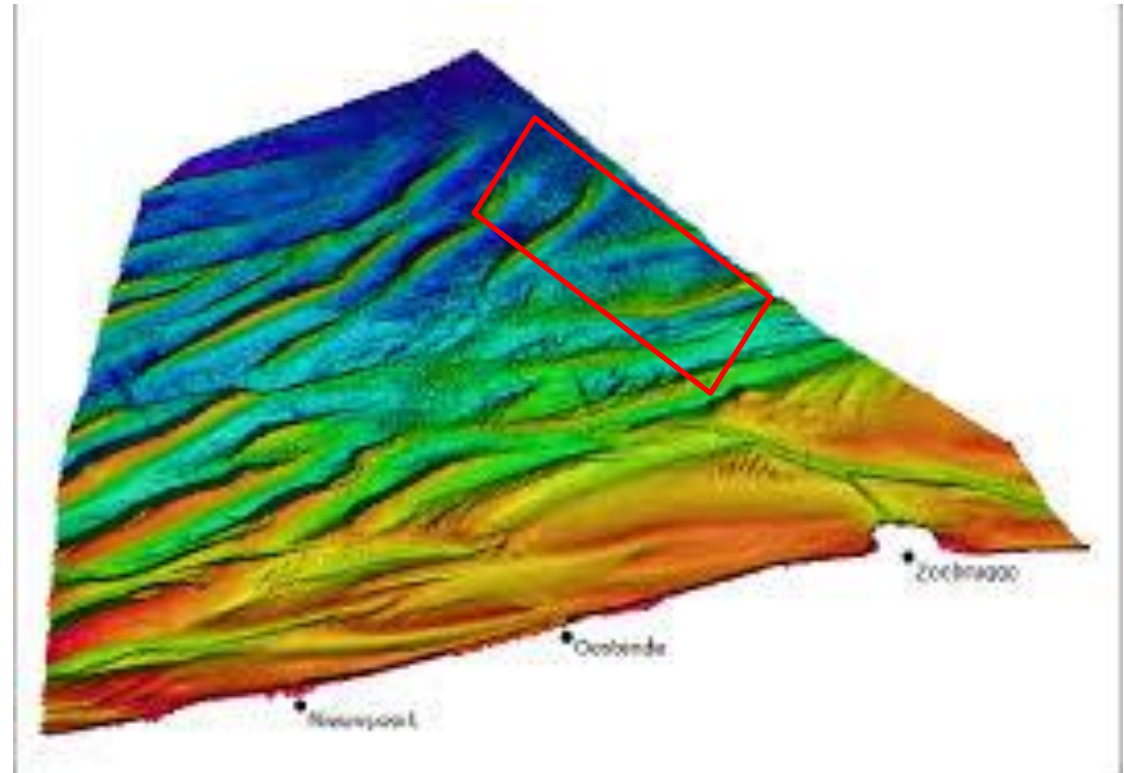
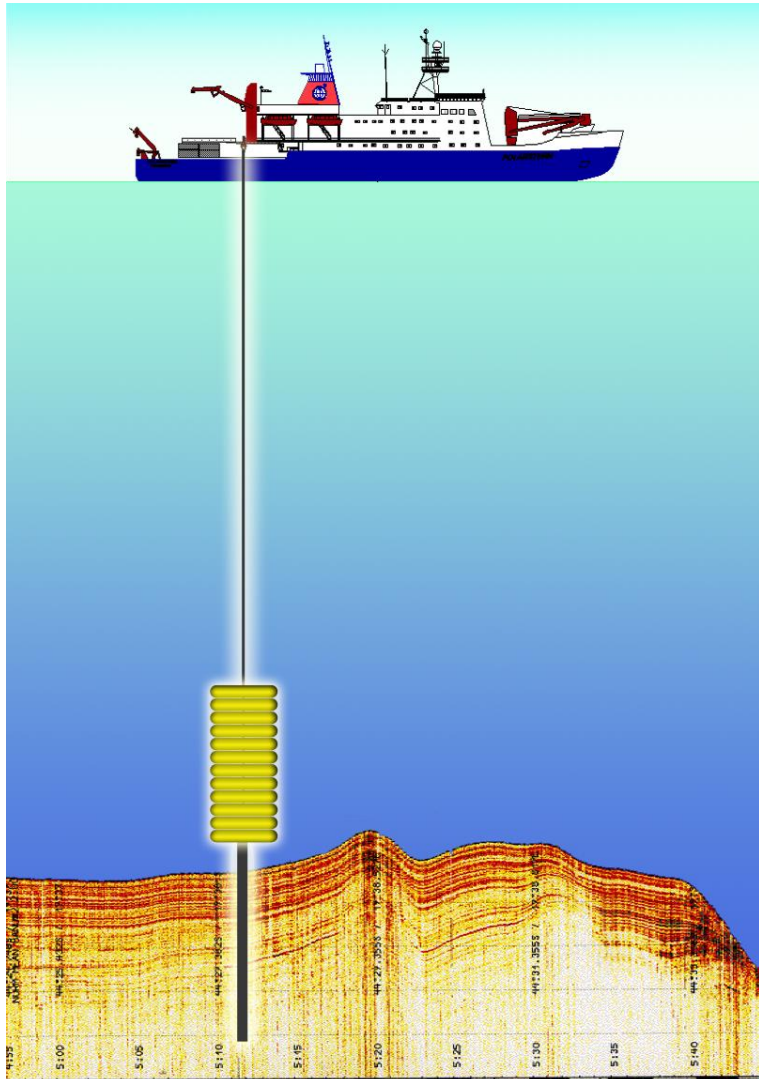
Voorstudies,
keuzes &
contracting



Preliminary layout



Bodemonderzoek



Type Funderingen (1)



Gravity foundation



Jacket foundation

Type Funderingen (2)



Tripod foundation



Monopile



Transition piece

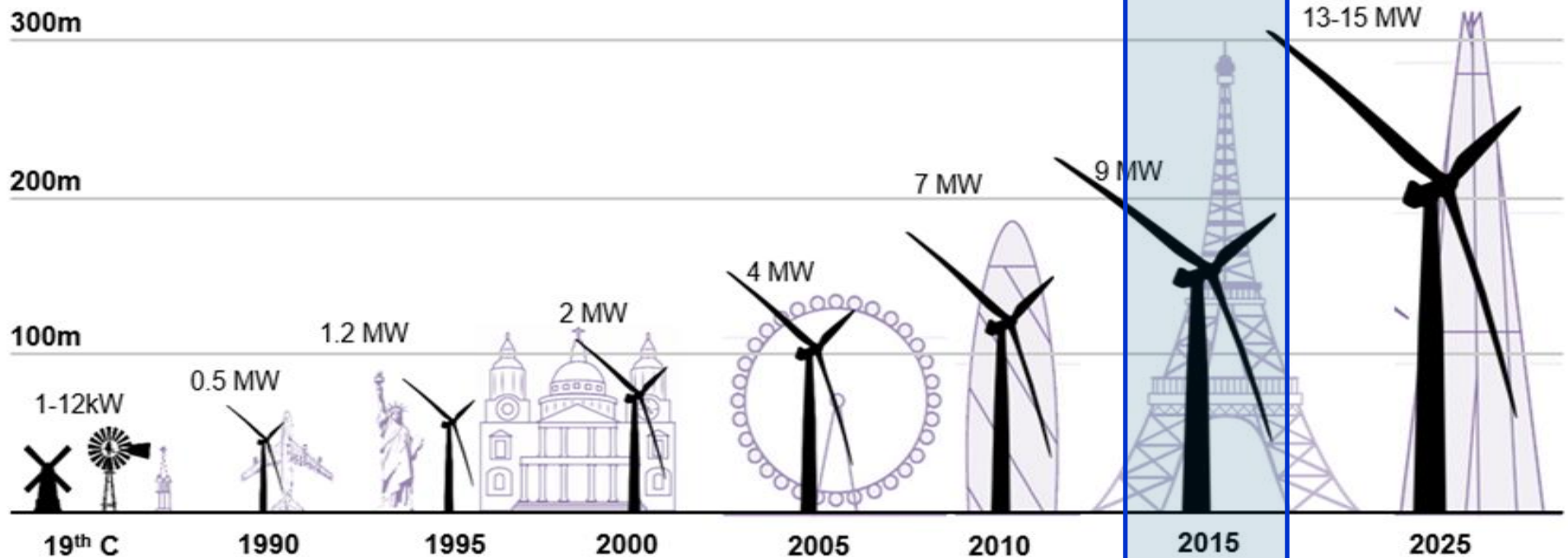


Windturbines [5 MW - 9MW, .. +]



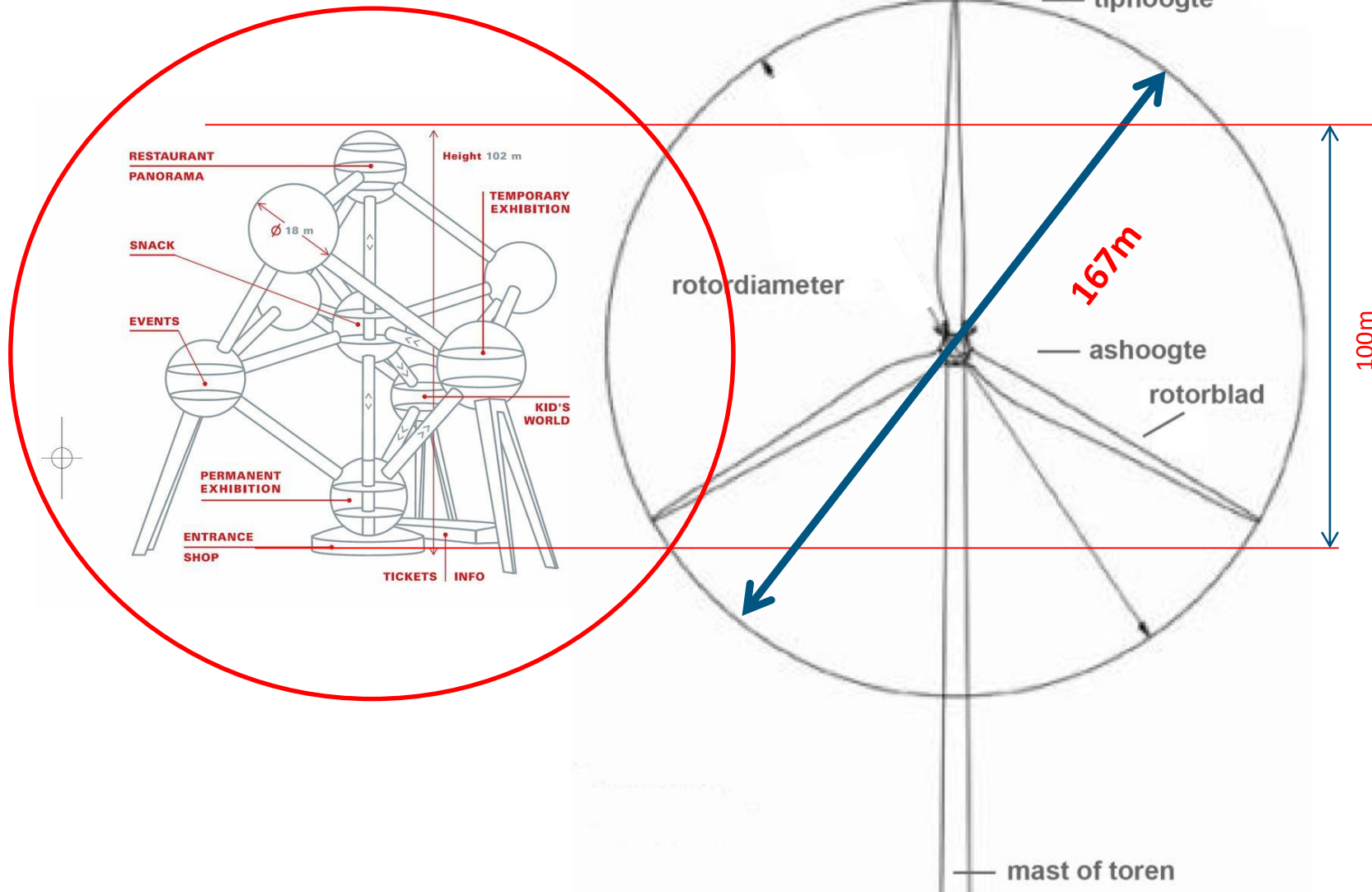
Groote – Windturbines (1)

Evolution of wind turbine heights and output



Sources: Various; Bloomberg New Energy Finance

Groote – Windturbines (2)



Grootte – Windturbines (3)

Gewichten : gondel (7MW) $20\text{m} \times 7\text{m} \times 10\text{m} = 450.000 \text{ kg}$

Wiek = 75 m: $30.000 \text{ kg} \times 3 = 90.000 \text{ kg}$

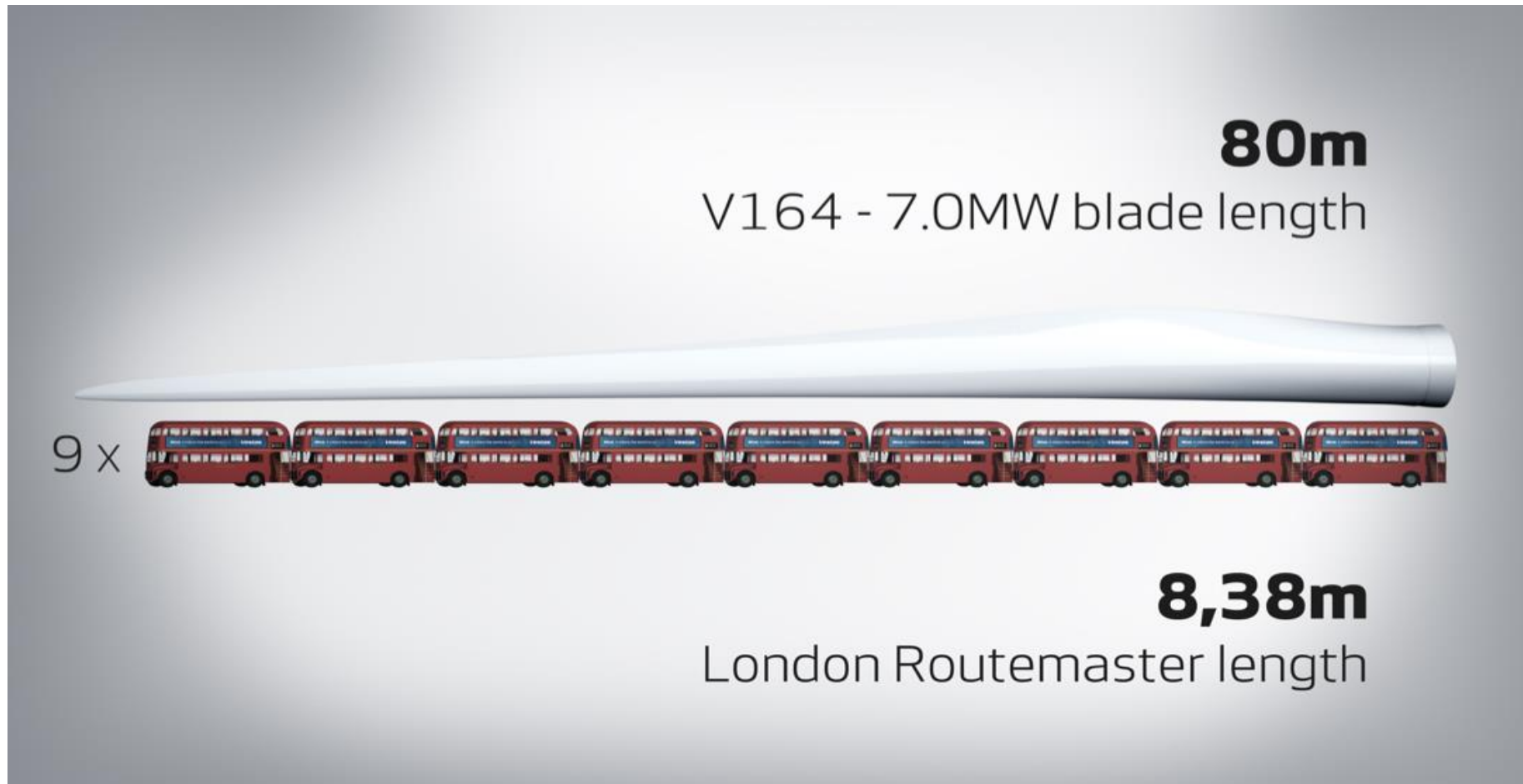
Totaal = 540.000 kg

90 X

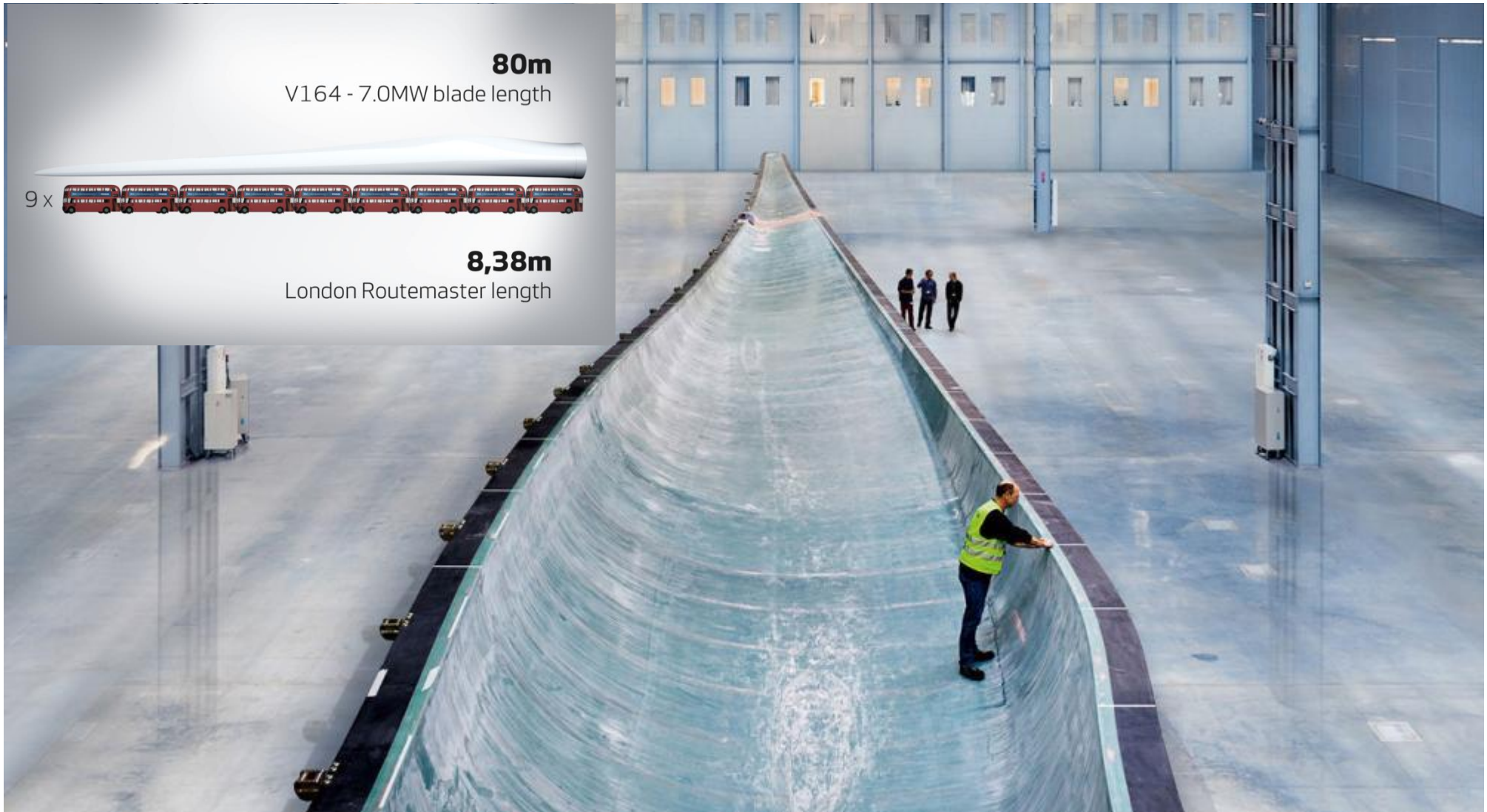


(Olifant = +/- 6.000 kg)

Groote – Windturbines (3)



LM-Wiek (L=80 m)

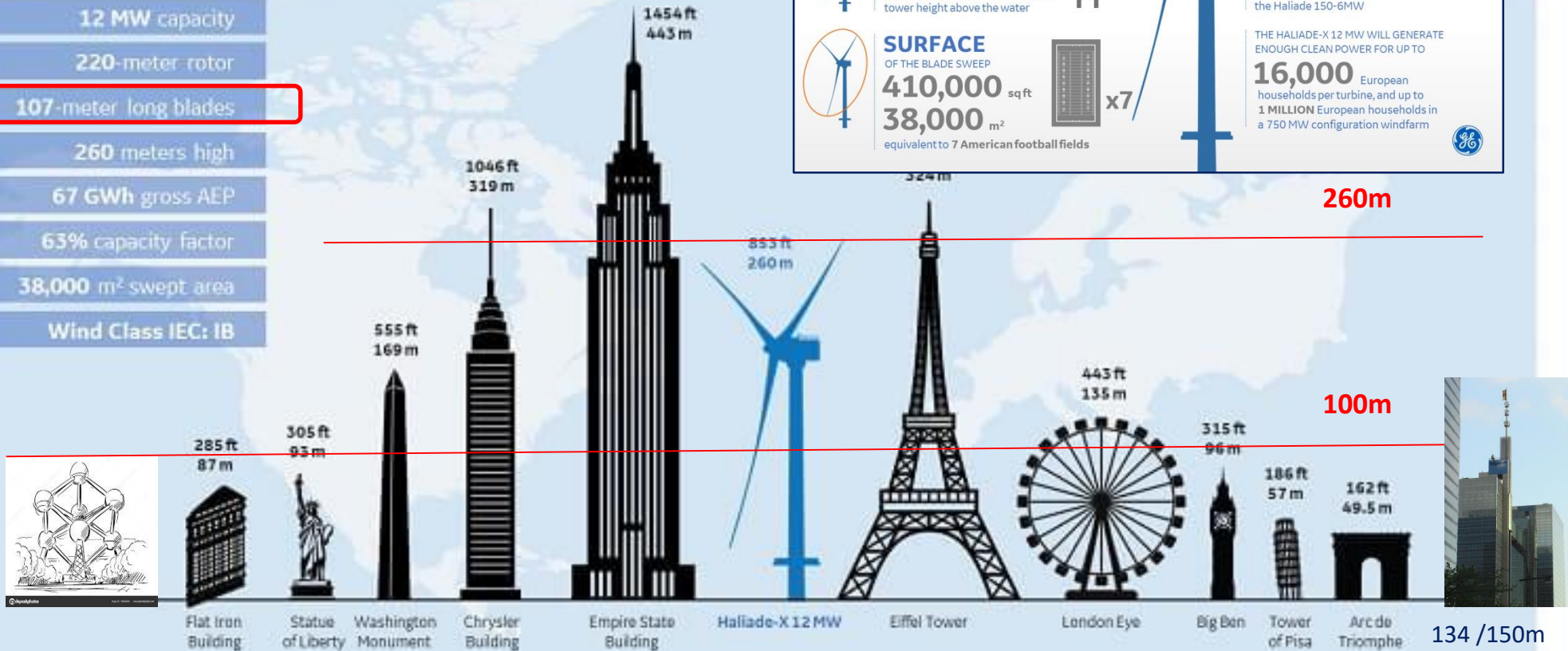
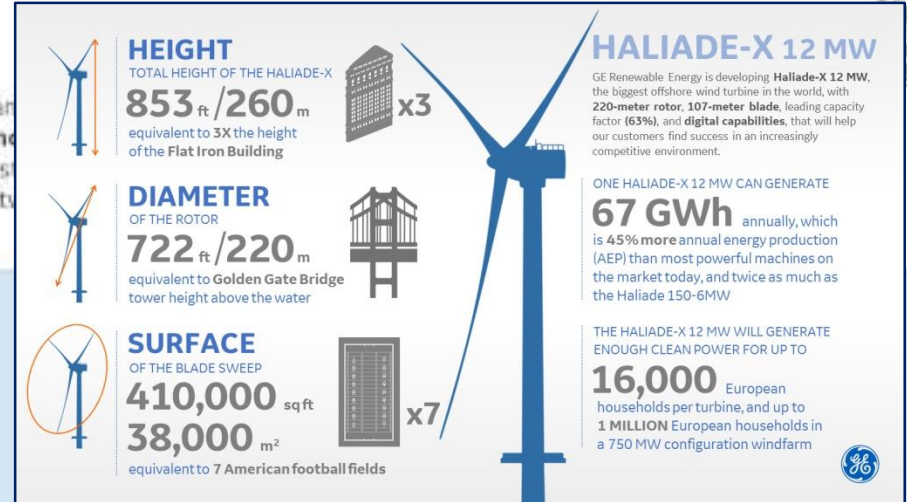


HALIADE-X 12 MW

GE Renewable Energy is developing **Haliade-X 12 MW**, the biggest offshore wind turbine in the world, with **220-meter rotor**, **107-meter blade**, leading capacity factor (**63%**), and **digital capabilities**, that will help our customers find success in an increasingly competitive environment.

One **Haliade-X 12 MW** can **annually**, which is **45% more** production (AEP) than most on the market today, and to **Haliade 150-6MW**.

12 MW capacity
220-meter rotor
107-meter long blades
260 meters high
67 GWh gross AEP
63% capacity factor
38,000 m ² swept area
Wind Class IEC: IB



Aanvoer , stockage van de funderingen aan wal



Laden van de funderingen op het installatieschip



picture: Jan De Nul

Transport naar de offshore-locatie



Heien van de funderingen

Foundations

Hammered up to 35m into the seabed

Time needed: 3 hours

Hammer: max blow energy: 800 kNm

*Raising
monopile*



<https://www.vanoord.com/activities/offshore-wind-equipment>

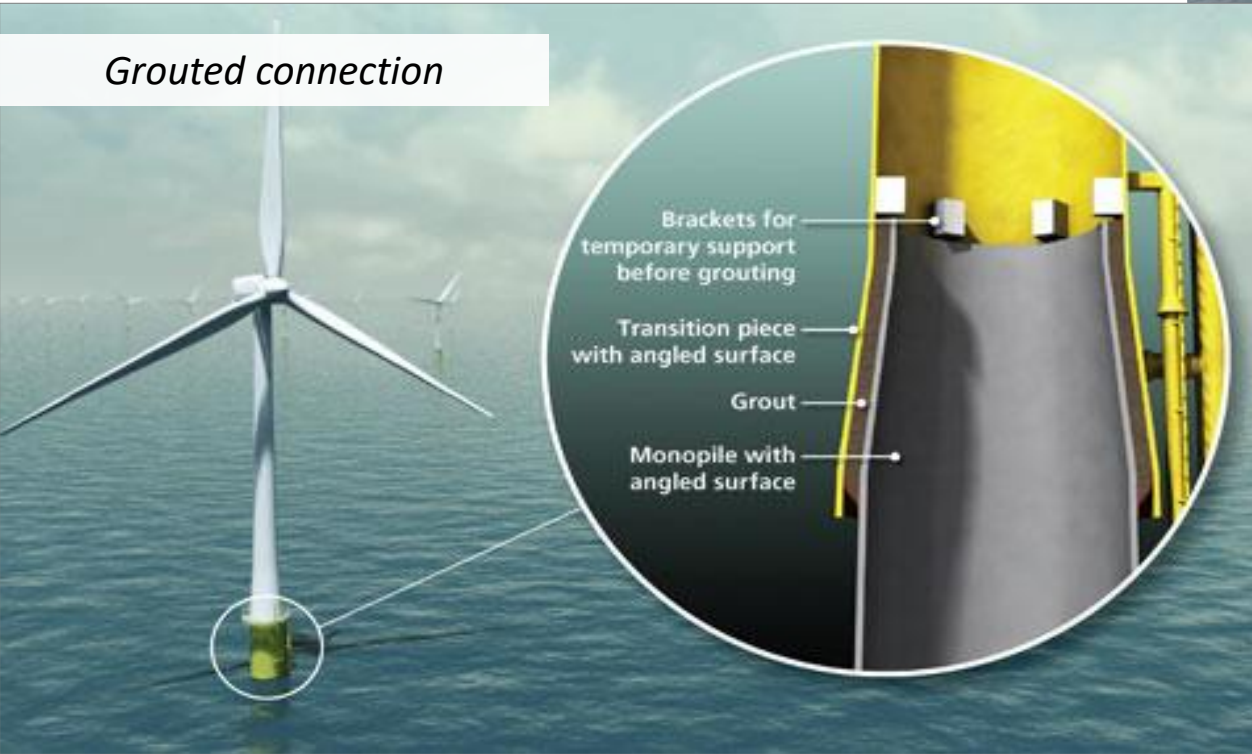
Transition pieces

= platform on which the turbine sits

Fitted over the steel monopile

7 m overlap – connection by grout

Grouted connection



<https://www.vanoord.com/activities/offshore-wind-equipment>

Leggen van kabels tussen de windturbines



Installatie van het transformatieplatform

Offshore transformation station

Turbines are connected to offshore transformatie station (OHVS)
with infield cables

OHVS: transformation from 33 kV to 150 kV



Kabel van zee naar 't land



Aanvoer van gondels en torenelementen via pontons



Aanvoer van WTG-componenten via RORO-schip



Aanvoer van gondels via RORO-schip



WTG-onderdelen

Aanvoer van de wieken via schip



Stockage van wieken op de terminal

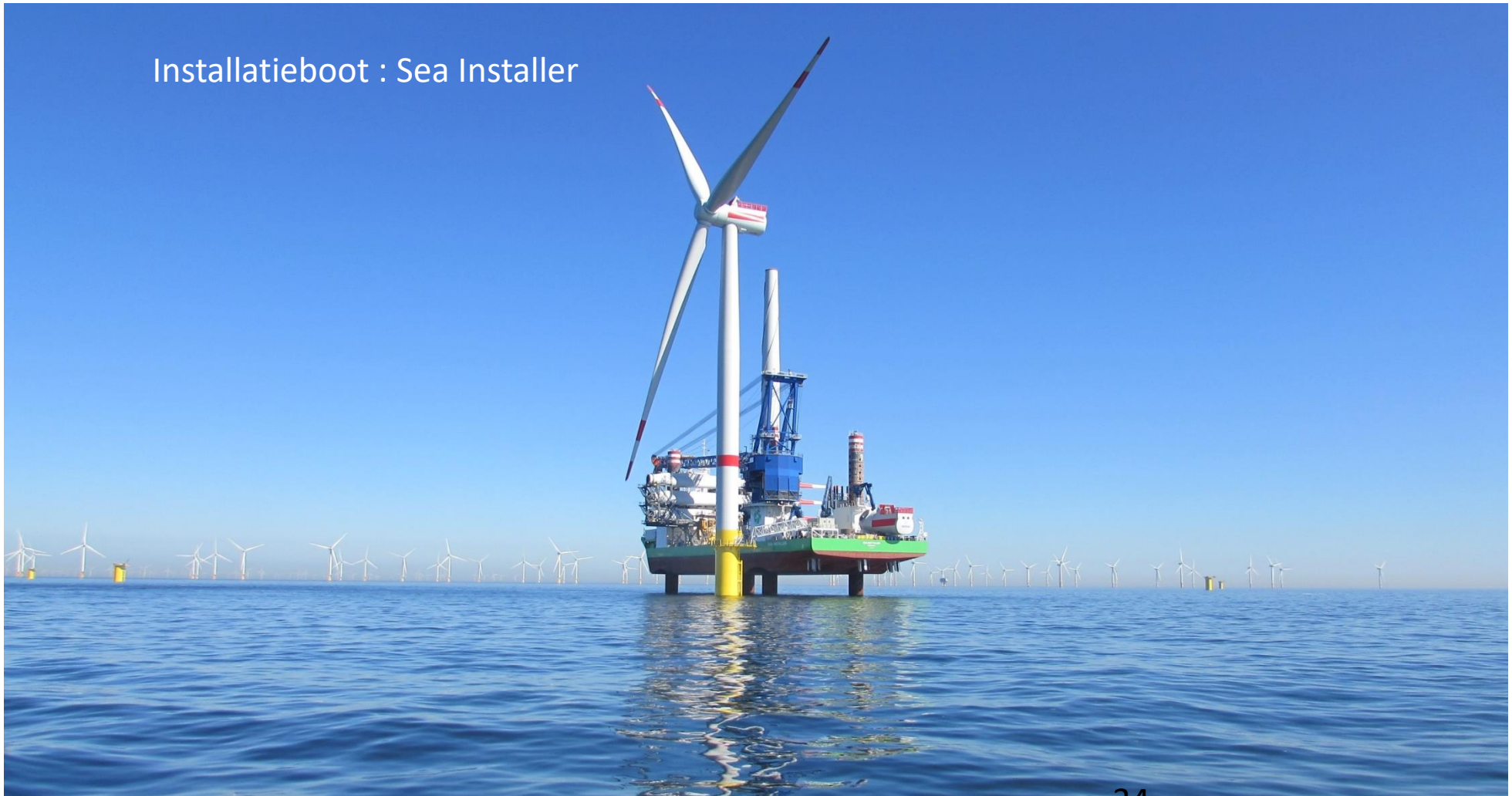


Laden van de WTG-componenten op het installatieschip



Installatie op zee

Installatieboot : Sea Installer





picture: Northwind

Doelstelling BE

Cijfers :

Belgische doelstelling tegen 2020 : **13 % uit AE.** (Wind/zon/biomassa)

Tegen 2020 : Wind -> 2200 MW. -> 10 % van de totale elektriciteitsbehoefte van België
ofwel bijna 50% van de elektriciteitsbehoefte van de Belgische huishoudens.

Aantal windturbines op zee **[België]** = 232 st (877 MW)
Einde van t jaar (2018) = 274 st -> goed voor 1.000.000 gezinnen
Tegen 2020 = **602 st.**

Aantal windturbines op zee **[Europa]** = 3.230 st (11.027 MW)
Verwacht tegen 2020 - > 23.000 MW

Kostprijs project : (300 MW/50 tal turbines) : 1,2 à 1,3 miljard €

Werkgelegenheid

Werkgelegenheid

De bouw (ca. 300 MW) creëert tijdens de ontwikkelings- en bouwfase ca.

-> 1400 directe arbeidsplaatsen

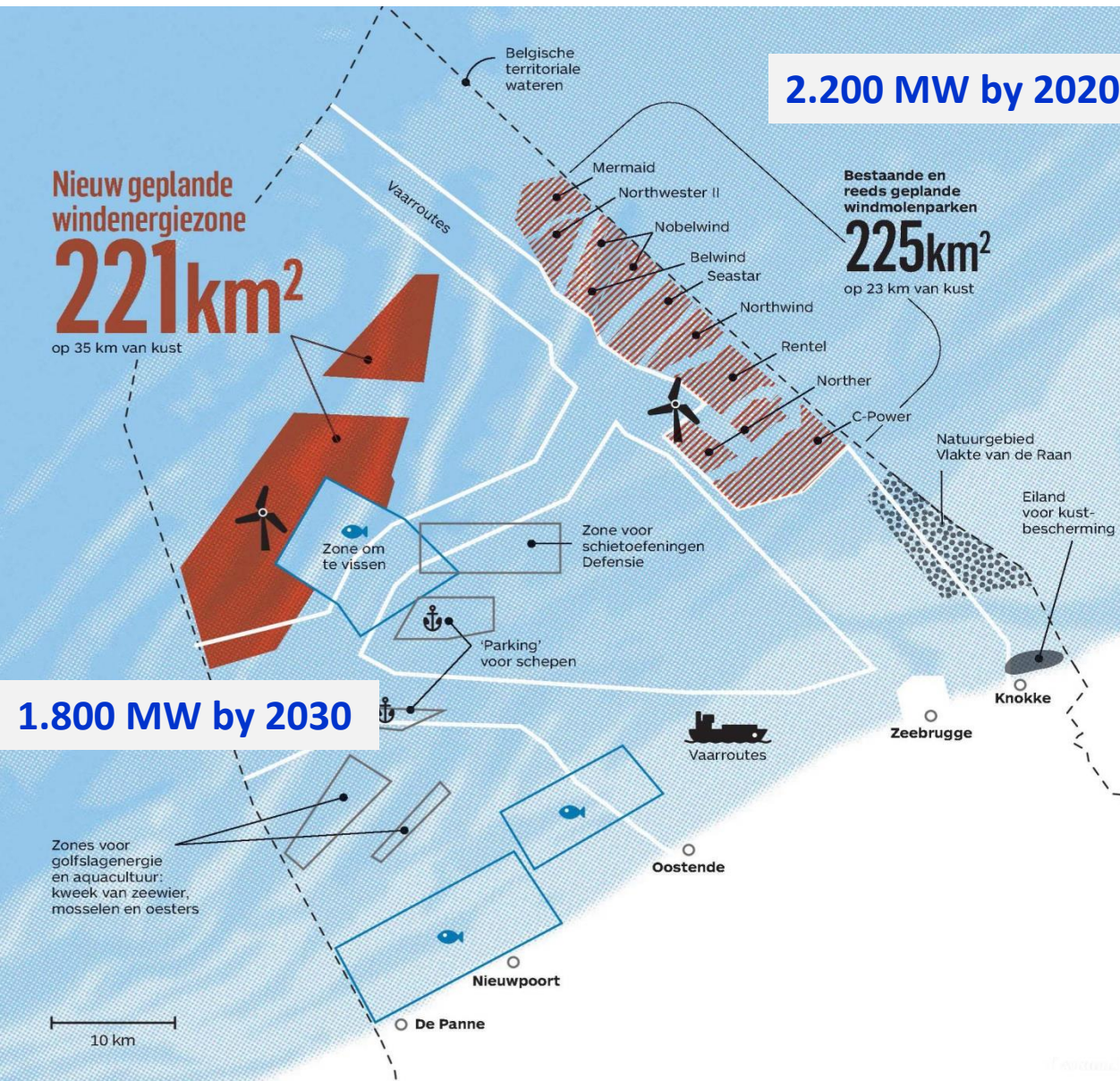
-> en nog eens 1400 indirecte jobs.

-> De exploitatiefase (O&M) creëert gemiddeld 100 nieuwe jobs per windpark.

Concreet betekent dit dat de realisatie (tussen 2007 en 2020) van het totale offshore windpotentieel in **België** (2200 MW) ca. 20.000 arbeidsplaatsen.

Voor O&M = 800 nieuwe, permanente jobs voor de exploitatie (min. 20 jaar).

Aantal jobs in Europa (2017) (engineering, bouw, installatie en onderhoud) :
> 750.000 (50% offshore wind)



Marine Spatial Plan extension

TO BE REALISATED BY THE
FEDERAL BELGIAN GOVERNMENT
by 2030

Thx and have a nice day !

Emmanuël Timmermans

www.reboostende.be

