



On and Offshore WTG Differences : Infrastructure Needed for Offshore Wind



Robert Slettenhaar
Executive CPO
Advisor of the Board at Metyx
Founder Dutch export Organisation HHWE

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Robert Slettenhaar

Background

- **Global Commodity Leader GE Wind Energy Blades (2000-2005)**
- **CPO Siemens Wind - Aalborg Blade facility and other GCL rolls (2005-2010)**
- **CPO Areva Wind Bremerhaven (2010-2012)**
- **CPO LM Wind Power (till sales to GE) (2012-2018)**
- **CPO MHIV (Vestas Offshore Wind) V236 WTG (2019-2021)**
- **Board of METYX (2021 - Present)**
- **Founder of Dutch Wind Export organisation HHWE**
 - **Holland Home of Wind Energy**



SLETTENHAAR
Business Associates



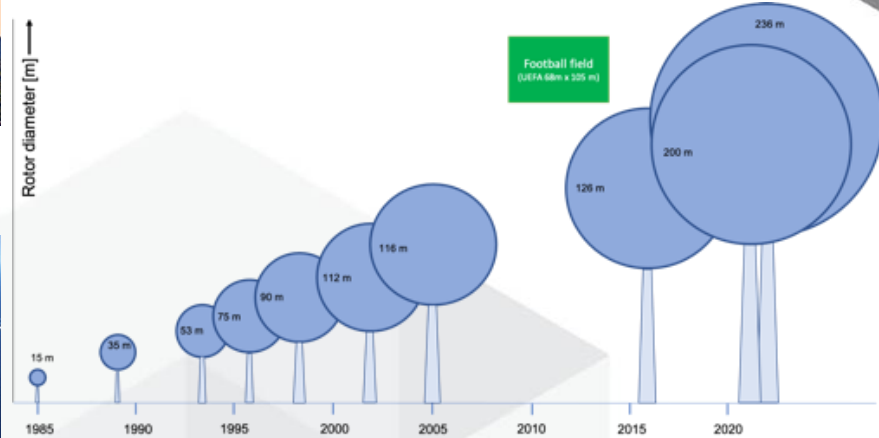
OEMs Onshore

- Vestas
- SGRE
- GE Vernova
- Nordex
- Enercon
- Asian OEMs



OEMs Offshore

- Vestas 280m
- SGRE 260m
- GE Vernova
- Nordex
- Enercon
- Asian OEMs 264m



Soon we will be higher than the Eiffel tower of 300m....
But will the race stop...??

NACELLE Vestas V236



Offshore Size Nacelle
15MW

Technological Differences Between Onshore and Offshore WTGs

Component Weights:

- Blades: >115m
- Towers
- Drive Train
- Converters
- Electrical Components

Corrosion Resistance:

- Essential for offshore applications.

Nacelle Pressurization:

- Offshore nacelles are typically over-pressurized to prevent corrosion and system intrusion.

Installation and Maintenance:

- Access to Wind Turbine Generators (WTGs) on water requires specialized installation and maintenance services.

Supplier Standards:

- Reliability and unwavering quality are demanded from suppliers.

Contractual Obligations:

- Suppliers face significant liabilities for non-compliance with extreme conditions.

Technology Reliability:

- WTG functionality relies on proven technology to ensure continuous operation.

Risk Management:

- Serial failures could lead to substantial Liquidated Damages (LDs), posing a risk to the company.

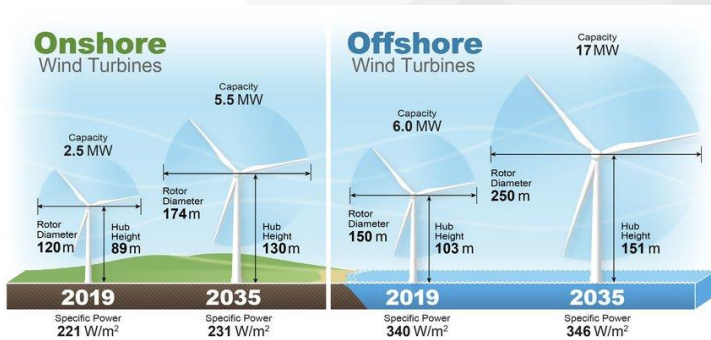


Image Source: Wiser, Ryan & Rand, Joseph & Seel, Joachim & Beiter, Philipp & Baker, Erin & Lantz, Eric & Gilman, Patrick. (2021). Expert elicitation survey predicts 37% to 49% declines in wind energy costs by 2050. Nature Energy. 2021. 10.1038/s41560-021-00810-z.

Infrastructure Needed for Offshore WTGs



For Turkey

Question 1 Regarding Offshore:

Local content requirements or not?

Will this result in significant job creation??

Or will the Original Equipment Manufacturers (OEMs) **struggle to localize**, considering their limited time and resources for this cost-increasing requirement? As a result, **the cost of electricity** could be higher for the end-consumer.

Components such as **blades, steel structures** (including towers, transition pieces, and monopiles) and **composite parts** are well-suited for localization, particularly near harbors, due to transportation constraints.



North Sea Harbors Dominating Offshore Installation

Esbjerg,
 Cuxhaven,
 Rostock,
 Eemshaven, Le
 Havre, Dieppe,
 Bilbao,
 Vlissingen, etc.



For Turkey:
 Question 2 Regarding Offshore:
**Will Turkey impose a limitation
 on the size of offshore wind
 turbines?**

This could become a strategic factor
 in making port development
 decisions.

It involves politics and strategic
 choices.



The BOREAS Van Oord: Designed till 20MW Offshore Wind WTG

175 meters long vessel

Lift of 3.000 tons

70 meters deep water

© Stiesdal A/S 2021

Turkey may consider limiting the expansion of smaller offshore WTGs to maintain a higher degree of local manufacturing and facilitate easier servicing.

wind &
water
works

For Turkey

Question 3 Regarding Offshore:

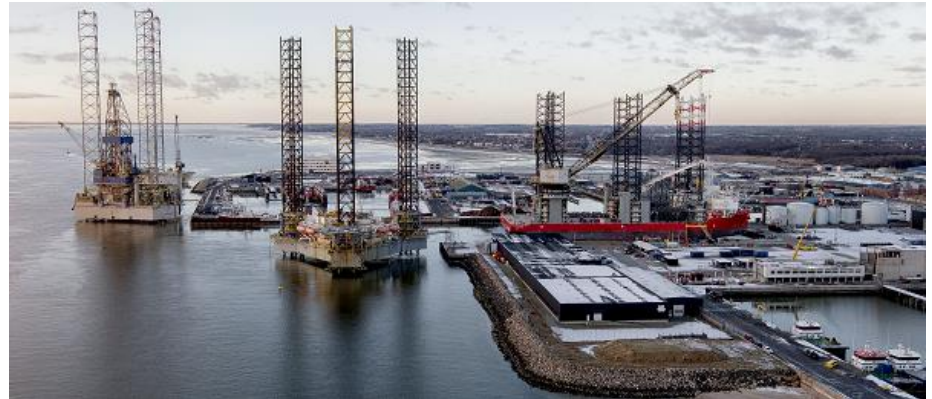
Will the harbors in Turkey will be capable to facilitate Offshore Wind?

Examples from the EU, such as Esbjerg and Eemshaven, illustrate different harbor types:

- **For collection**
- **For assembly**
- **For installation**
- **Or a combination of these!**

Political decisions should determine which harbors are designated and receive funding for transformation.

And will THE choice for for Infrastructure Development



For Turkey
Question 4 Regarding Offshore:
**Will SOVs (Service Operation Vessels) and
CTVs (Crew Transport Vessels) maybe a
focus area to support Offshore wind
localization in TR.**



Picture Atlantic Wind TRANSFERS

Offshore WIND is GREAT....!!!!



HOWEVER...

There is something wrong in the wind industry...!!

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water
works

Thank you for your attention.

Question time:

Any questions?



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