SET PLAN Conference 2015

Research, innovation and competitiveness for the Energy Union

OFFSHORE WIND IN EUROPE- THE ENERGY OF THE FUTURE

Torben Hvid Larsen,
Senior Vice President, MHI Vestas Offshore Wind

SESSION 6

Being the world leader in developing the next generation of renewable energy technologies

Tuesday 22 September 2015

Agenda

1 Introducing MHI Vestas Offshore Wind

2 Offshore wind in Europe - the energy of the future

3 Creating a power hub for offshore wind in the North Sea

4 Reducing cost of energy

5 The future of offshore wind power

MITSUBISHI HEAVY INDUSTRIES, LTD.

+

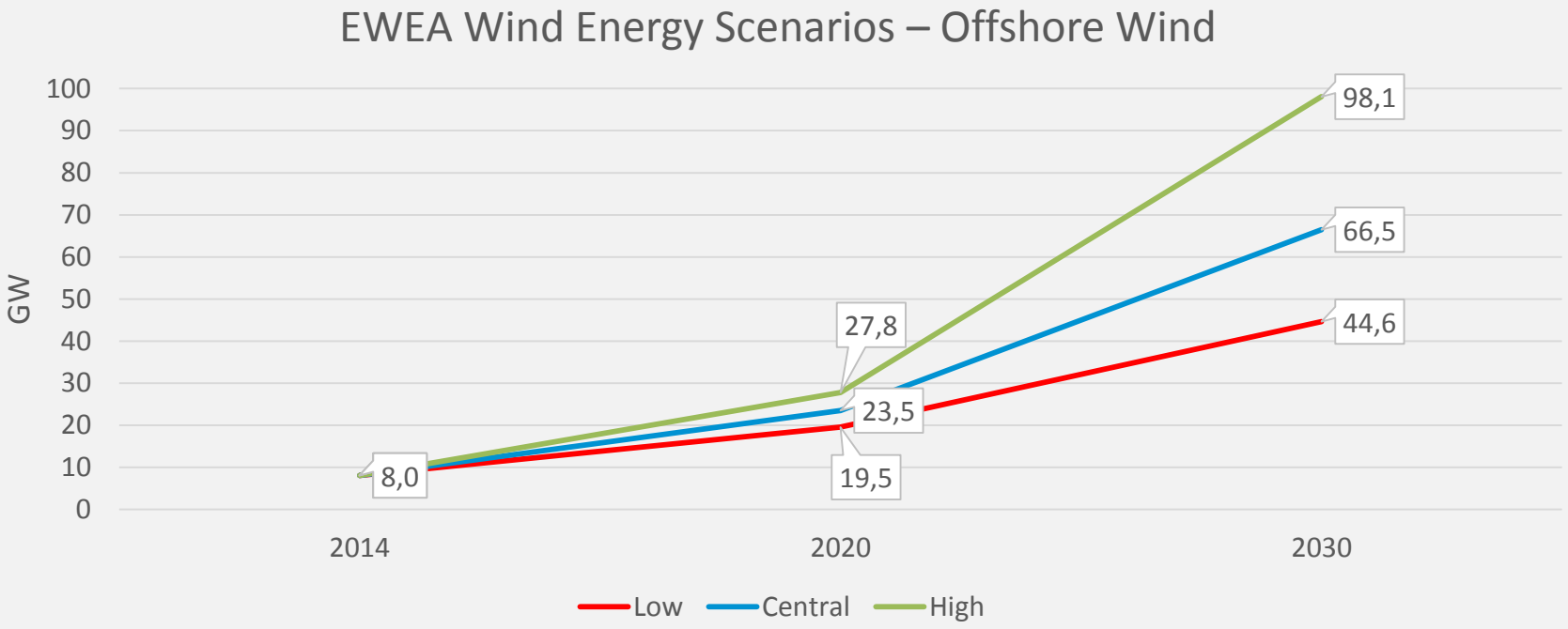
Vestas

=

MHI VESTAS OFFSHORE WIND

Offshore wind in Europe - the energy of the future

- Offshore wind has the potential to meet Europe's energy demand seven times over
- Europe has over 91% of globally installed offshore wind capacity, it is a market and technology leader
- Wind resources offshore are stronger than onshore, generating more energy with fewer turbines
- Offshore wind can provide huge power resources to major cities located close to the coastline and boost energy security


EWEA Wind Energy Scenarios – Offshore Wind
GW
100
90
80
70
60
50
40
30
20
10
0
2014
2020
2030
8,0
27,8
19,5
23,5
98,1
66,5
44,6
Low
Central
High

Creating a power hub for offshore wind in the North Sea

- Ambitious CO_2 reduction targets across EU member states coupled with targets for renewable energy above 30% of power generation will drive the market
- Long term commitments with clear visibility will encourage investment in new technologies
- Interconnection between national grid capacity within the EU to transport energy from the North Sea offshore wind power plants to the major cities
- Continued focus by industry to relentlessly drive down the levelised cost of energy through creation of powerful partnerships between suppliers

Reducing cost of energy:

- More powerful wind turbines
- Faster installation time
- Reduced electrical infrastructure
- Fewer foundations
- Fewer service visits
- Increased focus on reliability
- Steady volume to reduce cost

The V164-8.0 MW- the world's most powerful wind turbine

The future of offshore wind power

When commissioned in 2019 Horns Rev 3 is expected to be 32% cheaper than the Anholt project

Anholt offshore wind power plant
Turbines: 3.6 MW
Power output: 400 MW
Commissioned: 2013
Price/MWh: EUR 151

Horns Rev 3 offshore wind power plant
Turbines: 8 MW
Power output: 400 MW
Expected commissioning: 2019
Price/MWh: EUR 103

Conclusions

- Europe is the world's technology leader in offshore wind
- Europe, especially the North Sea has significant offshore wind resource
- Long term targets will help drive investment
- More interconnectors will ensure the resource secures maximum value
- Costs are falling - offshore wind will help ensure the low carbon transition is affordable
- Offshore wind is a scalable, deliverable source of low carbon power
- Offshore wind has a significant potential in other parts of the world

OFFSHORE WIND AND INTEGRATION IN NORTHWEST EUROPE'S GRID

Torben Hvid Larsen
Senior Vice President
MHI Vestas Offshore Wind

thl@mhivestasoffshore.com

SET PLAN Conference 2015

This conference has received funding from the European Union Horizon 2020 research and innovation programme under the grant agreement No 681163