Gunnar Groebler
Head of Business Area Wind
FACTS AND FIGURES – BA WIND

Business Area Wind, which is responsible for Vattenfall’s wind power operations, will be a leading developer and operator of wind power in Northwestern Europe

Key figures

<table>
<thead>
<tr>
<th>Key figures</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>External net sales (MSEK)</td>
<td>4,267</td>
</tr>
<tr>
<td>EBIT (MSEK)</td>
<td>931</td>
</tr>
<tr>
<td>Underlying EBIT (MSEK)</td>
<td>1,469</td>
</tr>
<tr>
<td>Investments (MSEK)</td>
<td>8,855</td>
</tr>
<tr>
<td>Number of employees (FTE)</td>
<td>~600</td>
</tr>
</tbody>
</table>

Total operating capacity 2015: ~2,200 MW*

* Out of which, Vattenfall owned capacity of ~1,800 MW according to the Annual and Sustainability report 2015
GROW WIND OPERATING PORTFOLIO FROM 1.8 GW TO 4 GW IN 2020

Vattenfall continues to invest more than EUR 5bn within the next few years, 500 MW FID taken 2016

Investing in renewables is the way forward for Vattenfall ...

- Number two in offshore wind in Northwestern Europe plus strong onshore pipeline
- Strong platform and track record to build on

... and by 2020 Vattenfall will operate 4 GW and will be leader in LEC*...

*Levelised Energy Cost
OFFSHORE INDUSTRY TREND

Vattenfall’s competitive advantage is based on three pillars: fast adaptation to the tender landscape, ability to decrease O&M costs applying latest business standards, lean and agile organisation set-up.

Turbine size development has the most significant impact on reduction of LEC

- Winning bid levels of 475 DKK/MWh (Vattenfall – Danish Nearshore) and 72.7 EUR/MWh (Dong – Borssele 1/2) considered new industry benchmarks
- Overall, tremendous decrease in subsidies in a competitive tender environment over 2-3 years
- Figures are only considering revenue streams and are not scope-adjusted, e.g., UK OFTO and grid charges. This might lead to 5-15% correction factor, which does not question the trend as such
PARTNERING IS A CORNERSTONE FOR FUTURE GROWTH STRATEGY

1. Enabling
   - Enable capital recycling to finance further growth of the wind portfolio
   - Giving cash available for the strong wind build out

2. Leveraging
   - Early capitalization of the Construction and Generation capability
   - Leverage the strong capabilities in Construction and Generation to manage the project and operational risk
   - Ensure economies of scale in Construction and Generation to secure the market leading position

3. Competing
   - Competitiveness in both Levelised Cost of Energy and attracting lower cost of capital
   - A strong track record in Construction and Generation will reduce the perceived risk of Wind, and thereby the needed risk premium for investors
   - Partnership as a mean to create a competitive advantage by attracting low cost of capital in the changing competitive tendering, with financial investors entering the market directly
**BUSINESS DEVELOPMENT**

Vattenfall continues to build new business with focus on PV technology and battery storage for integration of renewables

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**Achievements 2016**

**PV@Wind** (Pendine, Pen y Cymoedd): 5 MW taken into operation

**Battery@Wind**: tender won in UK for 22 MW enhanced frequency response battery

**2nd Life** (used batteries): close to the launch

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**Further actions Battery Storage**

**Battery@Wind**: scouting new locations

**Battery@Hamburg Harbour**

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**Further actions PV**

**PV@Site** (Powerplants, Renaturation Area)

**PV@customer**: develop offers together with BA Customer & Solutions for industry customers

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**Market drivers and challenges**

- RES subsidies decreasing
- Battery costs declining
- Disruptive start-ups emerging
- Solar PV costs decreasing faster than wind costs

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**Entrepreneurial Culture**

- Idea Funnel & Innovation Radar
- Disrupt Workshops
- Set-up platform to cooperate with Start-Ups

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Vattenfall Capital Markets Day, 19 September 2016
### OUR LARGEST WIND FARMS IN OPERATION

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Type</th>
<th>No Turbines</th>
<th>Installed capacity (MW)</th>
<th>Owner-ship (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>Thanet</td>
<td>Offshore</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>DE</td>
<td>DanTysk</td>
<td>Offshore</td>
<td>80</td>
<td>288</td>
<td>51</td>
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<tr>
<td>DK</td>
<td>Horns Rev</td>
<td>Offshore</td>
<td>79</td>
<td>158</td>
<td>60</td>
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<tr>
<td>UK</td>
<td>Ormonde</td>
<td>Offshore</td>
<td>30</td>
<td>150</td>
<td>51</td>
</tr>
<tr>
<td>NL</td>
<td>Princess Alexia</td>
<td>Onshore</td>
<td>36</td>
<td>121</td>
<td>100</td>
</tr>
<tr>
<td>SE</td>
<td>Lillgrund</td>
<td>Offshore</td>
<td>48</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>NL</td>
<td>Egmond aan Zee</td>
<td>Offshore</td>
<td>36</td>
<td>108</td>
<td>50</td>
</tr>
<tr>
<td>UK</td>
<td>Kentish Flats</td>
<td>Offshore</td>
<td>30</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>SE</td>
<td>Stor-Rotliden</td>
<td>Onshore</td>
<td>40</td>
<td>78</td>
<td>100</td>
</tr>
</tbody>
</table>
## MAJOR PROJECTS IN DEVELOPMENT & CONSTRUCTION

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Type</th>
<th>Installed capacity (MW)</th>
<th>Ownership (%)</th>
<th>Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>Horns Rev 3</td>
<td>Offshore</td>
<td>400</td>
<td>100</td>
<td>2019</td>
</tr>
<tr>
<td>DE</td>
<td>Sandbank</td>
<td>Offshore</td>
<td>288</td>
<td>51</td>
<td>2016</td>
</tr>
<tr>
<td>UK</td>
<td>Pen y Cymoedd</td>
<td>Onshore</td>
<td>228</td>
<td>100</td>
<td>2017</td>
</tr>
<tr>
<td>UK</td>
<td>Aberdeen</td>
<td>Offshore</td>
<td>91</td>
<td>100</td>
<td>2018</td>
</tr>
<tr>
<td>DK</td>
<td>Klim (repowering)</td>
<td>Onshore</td>
<td>67</td>
<td>100</td>
<td>2016</td>
</tr>
<tr>
<td>UK</td>
<td>Ray</td>
<td>Onshore</td>
<td>49</td>
<td>100</td>
<td>2016</td>
</tr>
</tbody>
</table>
CHANGING REGULATORY ENVIRONMENT

**Post-Brexit:** New Department for Business, Energy and Industrial Strategy (DBEIS). Contracts for Difference and Capacity Market auctions still expected in Q4 2016

- Onshore: Tory government cut onshore subsidies. Major impairments in several projects
- Offshore: Offshore support announced to continue (10GW before 2020 + 10 GW after 2020)

- Onshore: Stable subsidy regime with capacity additions required to reach the Dutch renewable target of 14% for 2020
- Offshore: 4x700 MW until 2023

- Onshore: New auction scheme to be introduced; 2.8 GW/year capacity addition
- Offshore: New auction scheme to be introduced; transition (2x1,46 GW) to centralised auction system (0.73 GW annually)

*New renewables target: 100% Renewables in 2040 without Nuclear*

- Onshore: Revenues fully exposed to market prices; uncertainty about continuation post 2020
- Offshore: No offshore-specific subsidy

- Onshore: Discussion about energy law ongoing
- Offshore: Kriegers Flak tender upcoming in centralised system; first round DK Near Shore; discussion around energy law ongoing

**New Markets**

- PL & NO: Market entry assessed; put on hold due to unfavourable regulatory regimes
- FR: New central auction system to be introduced

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IMPROVED TECHNOLOGIES AND PROCESSES LEAD TO LOWER COSTS

Larger turbines and increased performance in terms of higher availability and production imply cost savings of 10-30% and reduces the maintenance cost per MWh.