IoT for SDGs

How IoT can transform Offshore Wind Energy business in the next 20 years

AITOR ALZAGA
Industry 4.0 Coordinator
AARHUS, JUNE THE 19TH 2019
Evolution of wind turbine heights and output

Sources: Various; Bloomberg New Energy Finance
PROJECTED INSTALLED OFFSHORE CAPACITY

Wind

GW

<table>
<thead>
<tr>
<th>Year</th>
<th>Europe</th>
<th>Asia Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>2030</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>2040</td>
<td>140</td>
<td>20</td>
</tr>
</tbody>
</table>
PROJECTED GLOBAL AVERAGE LCOE OF OFFSHORE WIND

Dollars per MWh (2016)

- Historical
- Basis for NPS projections
- Accelerated gains
- Auctions in Europe

Year:
- 2010
- 2020
- 2030
- 2040
HOW TO REDUCE DRAMATICALLY THE OPERATION & MAINTENANCE COSTS

GEARBOX COST
250K€

TOTAL COST
TO REPLACE IT
1,000 K€
ONLINE LUBRICANT OIL CONDITION MONITORING
Virtual C/SHM Wind Farm Controller

Remaining useful life (RUL)
Power and yaw set points
Oportunistic Maintenance

Market signals

Condition Monitor Signals

Power
STRUCTURAL HEALTH MONITORING
ULTRATHIN IMPEDIMETRIC SENSOR