Capital Markets Day 2019

Hamburg, 16 October 2019
Today’s topics

Thomas Kusterer, CFO: Corporate and Financial Strategy

Dirk Güsewell, SVP Generation Portfolio Development: EnBW Renewables – Highlights 2019, market trends and progress

Dr. Hannah König, Head of Wind and Maritime Technology: From bottom fixed to floating wind projects
Thomas Kusterer, CFO
Corporate and Financial Strategy
Strategy 2020: Successful transformation process-earnings target likely to be achieved in 2019

Adjusted EBITDA in € bn

Generation and Trading
- 2012: 1.2
- 2020: 0.3
- Change: -80%

Renewable Energies
- 2012: 0.2
- 2020: 0.7
- Change: +250%

Grids
- 2012: 0.8
- 2020: 1.0
- Change: +25%

Sales
- 2012: 0.2
- 2020: 0.4
- Change: +100%

Adjusted EBITDA in € m

Outlook 2019:
- 2,350 to 2,500
- 350 to 425
- 425 to 500
- 1,300 to 1,400
- 225 to 300
Strategy 2025: From transformation to growth, acquiring two attractive assets in 2019 already

Target of increasing the adjusted EBITDA in € bn

<table>
<thead>
<tr>
<th>Year</th>
<th>Target of € bn</th>
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</thead>
<tbody>
<tr>
<td>2020</td>
<td>2.4</td>
</tr>
<tr>
<td>2025</td>
<td>&gt;3.0</td>
</tr>
</tbody>
</table>

Acquisitions support EnBW’s strategic development

- **Wind & Solar**
  - Valeco
    - Purchase price: ~€600 m
- **Telecom**
  - Plusnet
    - Purchase price: ~€230 m

EnBW is transforming itself into a sustainable and innovative infrastructure partner

- Balanced business portfolio
- High proportion of stable regulated business
- Attractive risk-return profile
Valeco’s pipeline enables further diversification of wind and solar plants

The Valeco wind and solar asset portfolio 2019

- Develops, owns and operates
  - onshore wind
  - solar and
  - small hydro projects
- Main focus on the French Market
- 133 employees
- Generation portfolio as of 30.9.2019:
  - 344 MW wind
    (100 MW fully consolidated)
  - 60 MW solar
    (28 MW fully consolidated)
- Valeco develops and enhances a wind onshore and solar PV pipeline of approx. 1.7 GW with promising market potential (esp. Hauts-de-France, Bourgogne-Franche-Comté, Nouvelle-Aquitaine)
Valeco acquisition contributes to EnBW’s strategy 2025 – expansion of sustainable generation infrastructure

- Increase in production capacity by 100 MW (at least 35 MW fully consolidated) in 2020
- EBITDA contribution of approx. €15 to 20 m in 2020¹

- Significant move towards achieving the strategic target of 1,000 MW onshore wind capacity by 2020

- Ideal platform for synergies and development of business model

- Solid growth and business model with a high market potential based on a favourable regulatory framework in France

- Portfolio diversification:
  - Experienced management and operational team
  - Project pipeline and strong brand

- Medium term target:
  One of the top five wind and solar players in France

¹May be higher depending on further full consolidation
Plusnet well positioned as a nationwide B2B telecom operator with an attractive product portfolio

Key highlights

Customers
› Overall ~25,000 business customers
› No cluster risk – customer base well diversified

Sales Organisation
› Significant experience in B2B sales with long-term employees
› Strong direct sales channel
› Indirect sales network with more than 300 partners

Network
› Fully invested, state-of-the-art redundant 100 Gbit/s backbone
› Business (DSL)‐markets: 3rd largest copper-based access network with 1,445 central offices
› Largest independent B2B WLL network in Germany: ~150 base stations and ~1,050 customer links

Municipal utility companies in Germany
› Well positioned to be the go-to provider of
›   network services
›   white label
›   open access solutions

Central offices network

MSC location
CO location

Largest CO network besides Deutsche Telekom and Vodafone
Plusnet acquisition contributes to EnBW’s strategy 2025—
developing EnBW into a nationwide infrastructure provider

- **Complements NetCom’s** highest-capacity fibre-optic networks in BaWü serving >40% of the state’s municipalities

- Sale of **higher value products** (higher bandwidth) to existing B2B customers

- **Low-risk business model:** Capex mainly customer driven – no strategic network investments necessary over the next years

- Plusnet will submit offers to several hundred German **municipal utilities** to plan and operate their networks

- **Large projects** with well-known large retailers in negotiation or even implementation phase

- **Consolidating** smaller and regional DSL-networks of other market players
Due to acquisitions of Valeco and Plusnet
› In 2019 below 100%
› 2017–2020 on average <100%

Higher investments of ~ €2 bn p.a., mainly in grids
› Suedlink
   › ~ €10 bn transmission grid project together with TenneT
   › Intended commercial operation date: 2025
› Renewables e.g. selective internationalisation
Cash flow-based ALM model expresses EnBW’s high financial discipline despite current interest rate environment

EnBW’s cash flow-based model

- Provisions
- Financial assets

Max. €300 m\(^1\) p.a. impact on OCF

100% Coverage projected 2031

No impact on OCF

<table>
<thead>
<tr>
<th>Year</th>
<th>OCF contribution</th>
<th>Asset contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>2020</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>2025</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>2031</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

OCF: Operating cash flow

\(^1\) Adjusted for inflation
Hybrid capital supports senior debt holders

1. First call date: hybrid maturing in 2076
2. First call date: hybrid maturing in 2077; includes USD 300 million (swap in €), coupon before swap 5.125%
3. CHF 100 million, converted as of the reporting date of 5.8.2019
4. First call date: hybrid maturing in 2079
5. First call date: hybrid maturing in 2079
6. JPY 20 billion (swap in €), coupon before swap 5.460%
7. Includes USD 300 million, converted as of 5.10.2016
In phase of growth high financial discipline will be maintained

Allocation of investment spending 2021-2025, thereof 80% in growth

- During growth phase rating target remains a solid investment grade rating
- Further liquidity requirements for managed growth
- Having a wide variety of funding options, EnBW is likely to become a more frequent issuer in the coming years
- Support with hybrid capital and partnership models where necessary

1 Rounded figure
Strategy 2025: EnBW – a sustainable and innovative infrastructure partner

Development of earnings
Adjusted EBITDA in € bn

- **Generation and Trading**
  - 2020: 2.4
  - 2025: >3.0

- **Renewable Energies**
  - 2020: 2.4
  - 2025: >3.0

- **Grids**
  - 2020: 2.4
  - 2025: >3.0

- **Sales**
  - 2020: 2.4
  - 2025: >3.0

**Sustainable power infrastructure**
- Expansion of renewable energies:
  - Offshore wind
  - Onshore wind and photovoltaics
  - Selective international business activities
  - Active design of decarbonization

**System-critical infrastructure**
- Profitable growth in the distribution grid
- Significant expansion of electricity transmission grid: Suedlink together with TenneT
- Growth of network-related service

**Smart infrastructure for customers**
- Reorganisation and digitisation of B2C sales as well as transformation to customer infrastructure business
- Expansion of the solution portfolio: Contracting
- New infrastructure-related business areas beyond energy
Dirk Güsewell, SVP
Generation Portfolio Development
EnBW Renewables – Highlights 2019, market trends and progress
Agenda

1. EnBW renewables: 2019 highlights at a glance
2. Market trends and progress of EnBW’s strategy
3. Deep dive: Offshore windfarm projects EnBW Hohe See, EnBW Albatros (in construction) and EnBW He Dreih (planned)
4. Offshore wind: Floating offshore technology outlook
1. **EnBW renewables: 2019 highlights at a glance**

2. **Market trends and progress of EnBW’s strategy**

3. **Deep dive: Offshore windfarm projects EnBW Hohe See, EnBW Albatros (in construction) and EnBW He Dreihit (planned)**

4. **Offshore wind: Floating offshore technology outlook**
Renewable Energies at EnBW: Highlights 2019 so far at a glance

- H1 2019: Adjusted EBITDA €204.9 m (up €40.1 m/24.9% on H1 2018); with €425 m - €500 m full year significant increase (up 43%-67%) expected compared to 2018
- Installation of EnBW Hohe See and EnBW Albatros OWPs\(^1\) on track – €415 m EBITDA/year fully consolidated from first full year of operation onwards
- Progress of planning for next OWP EnBW He Dreihü on schedule
- Acquisition of French renewables developer and operator Valeco closed in June
- FID\(^3\) in JV Borusan EnBW Enerji for Turkish onshore wind farms Saros (146 MW) and Kiriköy (72 MW) (YEKDEM feed-in tariff, US$-based)
- FID for Weesow-Wilmersdorf open-space solar project (184 MW\(_p\)) – first non-feed-in-tariff solar project in Germany

But:
- Threat of low new builds and new permit approvals for onshore wind in Germany with challenging mid-term outlook

\(^1\) Offshore wind farm project
\(^2\) Commercial operations date
\(^3\) Final investing decision
Agenda

1. EnBW renewables: 2019 highlights at a glance
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3. Deep dive: Offshore windfarm projects EnBW Hohe See, EnBW Albatros (in construction) and EnBW He Dreiht (planned)
4. Offshore wind: Floating offshore technology outlook
Market trends:
Onshore wind (1/4): Sharp decline in new installations in Germany ...

New installations, Germany
in MW

- Full Year -

2016 4,625
2017 5,334
2018 2,402

Statutory target: 2,800 MW p.a.

-1,339/
-82%

2018 1,626
2019 287

New installations, Europe
in MW

2018

F 605
SWE 523
GER 429
IT 125
UKR 287

2019

F 287
SWE 141
GER 1,626
IT 286
UKR 262

H1

EnBW Capital Markets Day 2019

Source: Deutsche WindGuard; WindEurope
Market trends: Onshore wind (2/4): …with low participation in feed-in tariff auctions …

Feed-in tariff auctions, Germany in MW

<table>
<thead>
<tr>
<th>Offered volume (MW)</th>
<th>Awarded volume (MW)</th>
<th>Offered volume cum (MW)</th>
<th>Awarded volume cum (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>1,313</td>
<td>2,040</td>
<td>2,343</td>
</tr>
<tr>
<td>1,370</td>
<td>2,040</td>
<td>2,710</td>
<td>3,410</td>
</tr>
<tr>
<td>1,980</td>
<td>2,710</td>
<td>3,410</td>
<td>4,060</td>
</tr>
<tr>
<td>2,343</td>
<td>3,410</td>
<td>4,710</td>
<td>5,210</td>
</tr>
</tbody>
</table>

Cum. gap 1,737 MW (33%)

Explanation

- Decreasing auction participation quota since 2018.
- Example: September 2019:
  - Offered volume: 500 MW
  - Awarded bids: 176 MW (35%)
  - Offer surplus: 324 MW
- Offer surplus is growing, cumulative gap by September 2019: 1,737 MW/33% of total volume offered – foreseeable gap for new installations in 2020
- Due to lack of competition in the auctions, successful bids close to maximum permissible bid (6.2 cents/kWh)
- Main precondition for participation: obtained licence

Source: Bundesnetzagentur
Market trends: Onshore wind (3/4):
... caused by low new licences;
→ no prospects of major change in mid-term ...

Newly issued licences (BImSchG)
in MW

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Year</td>
<td>9,449</td>
<td>1,421</td>
<td>1,595</td>
</tr>
</tbody>
</table>

Statutory target: 2,800 MW p.a.

2018 | 2019
718   | 760

Explanation

› New permits alarmingly low due to ...

› Tremendous delays in public zoning procedures ("Landesentwicklungsplan", "Regionalpläne", "Flächennutzungspläne");
→ No BImSchG permit without zoning

› Tremendous delays and extraordinary effort involved in all permit procedures (e.g. environmental impact studies);
→ Increasing developing costs and risks

› Only few new areas being made additionally available for wind energy use

› Ongoing discussion on public acceptance

› As new permits remain low, we expect no recovery of the market in the mid-term

Source: Bundesnetzagentur, BImSchG (Bundes-Immissions-Schutz-Gesetz / German Pollution Control Act)
Market trends: Onshore wind (4/4): ... and EnBW suffers with the market

New installations EnBW
in MW

<table>
<thead>
<tr>
<th>Year</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>89</td>
</tr>
<tr>
<td>2017</td>
<td>204</td>
</tr>
<tr>
<td>2018</td>
<td>178</td>
</tr>
<tr>
<td>2019</td>
<td>+20</td>
</tr>
</tbody>
</table>

EnBW AG project pipeline
by stages; in MW

- Project areas under negotiation (2,900 MW)
- Project areas secured at least for turbine sites (699 MW)
- First (positive) results on environmental impact studies (669 MW)
- Projects in licensing procedure (529 MW)
- Feed-in tariff secured (auction, 32 MW)
- FID, project in construction (29 MW)
- COD, project in operation (11 MW)

Source: EnBW (including inorganic growth)
Market trends:
Offshore wind (1/2): Germany with low-ambition targets ...

New installations ... 2009-2020:
German Renewable Energy Sources Act (EEG)

- State target by 2020 [6.5 GW in operation] likely to be exceeded

... 2021-2025:
‘Transition phase’ (WSeeG1)

- Projects already tendered in two auctions [2017 and 2018], ∑ 3,100 MW
- Unsuccessful bidders lost their project licence and had to hand over project documentation to authority
- EnBW successful with EnBW He Dreiht and non-subsidy bid; market share 29%

... 2026 - :
‘Central target system’ (WSeeG1)

- State target by 2030: 15 GW in operation
- State evaluates areas and brings them to auction (starting in 2021)
- Detailed regulation still under development
- “Last-call privilege” to be considered (unsuccessful bidders/projects from transition phase)

Source: Ministry of Economic and Energy
1 Wind-auf-See-Gesetz (WSeeG), EnBW market research (2019 and 2020)

Market trends: Offshore wind (2/2): ... while Asia and US are ramping up

**In operation, world**
in MW; as of 31.12.2018

<table>
<thead>
<tr>
<th>Country</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>7,963</td>
</tr>
<tr>
<td>GER</td>
<td>6,380</td>
</tr>
<tr>
<td>China (PR)</td>
<td>4,588</td>
</tr>
<tr>
<td>DK</td>
<td>1,329</td>
</tr>
<tr>
<td>BEL</td>
<td>1,186</td>
</tr>
<tr>
<td>NL</td>
<td>1,118</td>
</tr>
<tr>
<td>Others</td>
<td>576</td>
</tr>
</tbody>
</table>

**New installations, world**
in MW

**2016-2018**
- Total: 23%
- Europe: 42%
- US: 24%
- PR China: 10%

**2028-2030**
- Total: 36%
- Europe: 63%
- US: 23%
- PR China: 10%

Average growth:
- 3.3 GW p.a. (2016-2018)
- 12.8 GW p.a. (2028-2030)

Source: GWEC (Global Wind Energy Council), Bloomberg New Energy Finance
Market trends: Solar: Recovering after four hard years

New installations, Germany
in MW

- New installations back on track
- LCOE increasing (higher efficiency due to lower capex and higher output)
- New sites feasible due to “Öffnungsklausel” (zoning option for German states)
- EnBW successful in auctions (16 successful bids, No. 6 in Germany)
- Rapid increase in LCOE: solar will be first to reach market price in Germany
- EnBW decided to integrate solar as third technology in renewable portfolio

Explanation

Source: Ministry of Economic and Energy
Market trends:
Solar – Weesow-Willmersdorf: FID for first industrially optimise and scaled solar project in Germany

Explanation

- Project area: 209 ha (owned by EnBW)
- Capacity to be installed: 184 MW (DC)
- Project designed and optimised for 40 years of operation (e.g. public zoning plan (“Bebauungsplan”) allows operation until 2060)
- Technical design, prequalification and testing of modules with support from Fraunhofer ISE (Fraunhofer Institute for Solar Energy Systems)
- Project will not have German feed-in tariff, but will benefit from other important renewable privileges (e.g. preferential grid connection and power offtake, compensation in event of interrupted or reduced grid connection ...); options for power sales under development (e.g. PPA with industrial offtaker)
- FID, start of construction on site in early 2020, COD by 2020 year end
- Two additional areas secured and under advanced development
“Selective” internationalisation of EnBW’s renewables business: Rationale

- **Strategic goal attainment and growth**
  - Limited growth opportunities in Germany
  - Potential to compensate with growth abroad

- **Pipeline and capacity utilisation**
  - Ensure productivity and value creation in established teams

- **Risk diversification**
  - Reduce strong dependence on German market environment (market development, regulation, weather conditions, etc.)

- **Economies of scale/competition**
  - Ensure sufficient size/economies of scale for EnBW to hold its own against competitors in the long term

- **Monetarisation of expertise**
  - Commercialise accumulated experience and expertise

- **Positive feedback to home market**
  - Positive feedback to German business
  - Opportunities/impetus for development of EnBW’s culture as a whole
“Selective” internationalisation of EnBW’s renewables business: Status in Taiwan

Market environment

- Good wind conditions and long-term pipeline under challenging conditions (geology, typhoons, etc.)
- Still a young market; political and regulatory uncertainties in view of upcoming elections but cross-party commitment to renewables
- Very strong competition in capacity allocation, high pressure on feed-in tariffs combined with extensive, cost-driving local content requirements

Activities to date and subsequent steps

- 2017/18 Partnership with Macquarie, auction bid unsuccessful
- 2019/20 Preparation for and bidding in second auction (expected Q1 2020)
- 2026/27 Planned COD

Market growth

<table>
<thead>
<tr>
<th>Onshore wind new builds in GW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

- Offshore wind relatively new on policy agenda
- 5.7 GW of projects with IBN by 2025
- In long term, up to 10 GW planned by 2020 (8.2 GW assumed)

Attractive growth market with challenges due to intensive competition among developers, volatile regulatory environment and demanding local content requirements

- Cooperation with Macquarie and Swancor to develop up to 2 GW (“Formosa 3”)
- Launch of EnBW Asia Pacific to build local presence and for active stakeholder management
- Development of further EnBW project opportunities independently of project partners
“Selective” internationalisation of EnBW’s renewables business: Status in United States

Market environment

- Ambitious targets for renewables both in East Coast states and California; limited capacity for expansion of onshore wind and PV
- Very good wind and land conditions in North-East USA (comparable with North Sea) with prospects of long-term PPAs (20-25 yrs.), already intensive competition for limited number of state-auctioned marine leases for offshore wind farms
- Project development in California more demanding due to water depths, competition there so far moderate

Market growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Onshore wind new builds in GW</th>
<th>Growth</th>
<th>Market entry: Launch of EnBW North America Inc. Joint venture with Trident Winds, California</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>11.6</td>
<td>+173%</td>
<td>Market entry: Launch of EnBW North America Inc. Joint venture with Trident Winds, California</td>
</tr>
<tr>
<td>2025</td>
<td>4.2</td>
<td></td>
<td>Offices opened in Boston and Jersey City; design for floating foundations (Trident Winds JV)</td>
</tr>
<tr>
<td>2030</td>
<td>0</td>
<td></td>
<td>Site auction in New York Bight Site auction in central California (precise timing not yet set)</td>
</tr>
</tbody>
</table>

Activities to date and subsequent steps

- Parallel market entry in East Coast and California taking account of local conditions
- Cultivation of East Coast market stepped up with team expansion in 2019 and lessons learned from 12/2018 Massachusetts marine lease auction an advantage for bidding in New York Bight Lease auction (Q1 2020); potentially further opportunities
- JV in California to make use of local expertise and networks; development of floating foundations expertise - good basis for lease auction (expected 2020)

Market still in early stages but very good growth prospects and scope for large-scale projects and new technologies; competition intensifying
"Selective" internationalisation of EnBW’s renewables business: Status in Sweden

Market environment

- **Very good wind conditions** [2,500-3,000 Vbh/a] and good land availability, **market prices lower than Central Europe** due to proximity to Norwegian hydro power
- End of subsidy regime means large proportion of long-term market-based PPAs; **opportunities for market players with trading expertise**
- Looking ahead: **growth in repowering activity** in industrialised south of Sweden

Market growth

- **Onshore wind new builds** in GW

<table>
<thead>
<tr>
<th>Year</th>
<th>7.1</th>
<th>14.4</th>
<th>15.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Growing proportion of large projects (e.g. Markbygden with approx. 10 TWh output p.a.)

Activities to date and subsequent steps

- **2016**
  - Market entry by acquisition of Connected Wind Services (CWS)
- **2018**
  - Launch of local subsidiary EnBW Sverige AB; purchase of existing portfolio [105 MW] and development project [10 MW, planned IBN 2020]
- **2019**
  - Establishment of local team; exploration of further growth projects

- Able to **leverage market presence of CWS** [Swedish market leader for producer-independent system maintenance]
- Start as **projects consolidator**; subsequently establish **own project development** activities
- Able to **leverage EnBW expertise in trading and financing** for large-scale projects/transactions

Very good growth prospects from relatively low base; EnBW is well placed with experience in large-scale projects and market knowledge
“Selective” internationalisation of EnBW’s renewables business: Status in France

Market environment

- One of the largest European onshore markets with significant growth
- Tendering outcomes and market premium tariffs so far relatively high (€65 to €74/MWh)
- Currently two parallel subsidy regimes: Tenders and feed-in premium (FIP); transition to competitive tendering from 2020

Market growth

Onshore wind new builds in GW

- Expansion targets 2023/28 under French energy mix plans (PPE)
- New tendering design from mid-2020 with two rounds of 1 GW p.a. each

Activities to date and subsequent steps

- Acquisition of Valeco secured 320 MW (gross) in operation and entry into project development business throughout France [current pipeline approx. 1,700 MW at various stages]
- New builds of 100 MW wind and PV (gross) planned in 2019
- Operation of own wind farms and for third parties

Challenging, but attractive market with relatively large volume and good operating environment; market entry with established, reputable partner makes it possible to grow in future “with the market”
France: Rationale for the acquisition of Valeco

- Upscaled **platform in one of the biggest markets for renewable energy** in Europe
- **Immediate effect on profits** given the existing operational asset portfolio, **big step ahead in reaching EnBW’s operational renewable target in 2020 ("1,000 MW wind onshore operational")**
- Well founded growth option for the future through **existing project pipeline**
- Active along the **entire value chain**: developer, constructor and operator
- **Technology fit**: Wind and solar
- **Well established** and **long-term experienced, proven track record** in the market
- **Good market penetration** with the regional offices, **complementary fit with EnBW activities**
  (EnBW’s development team will be integrated to cover central region of France for Valeco)
- **Ideal platform for synergies** (purchasing and position towards main suppliers, O&M, financing ...) and development of business model (e.g. wind offshore in France)
New management and organisation in place

Supervisory Board
(3 members)

Daumard
(Président/CEO)

- Engineering
- Construction
- O&M
- Purchasing
- HR
- IT

Vignal
(DG/CDO)

- Prospection
- Development
- Legal
- Communication

Dompietrini
(CFO)

- Accounting
- Controlling
- Finance
- M&A

François Daumard (Président, Chief Executive Officer)
- Born in 1966, French citizen
- Master degree in Engineering (ENSMM)
- With Valeco since 2009 (Managing Director at Valeco Ingénierie and Valeco O&M)

Philippe Vignal (DG, Chief Development Officer)
- Born in 1971, French citizen
- Master degree in Law (LL.M.)
- With EnBW since 2018 (Managing Director of EnBW Energies Renouvables)
- Before: Managing Director at WPD France (since 2004)

Christel Dompietrini-Parisot (Chief Financial Officer)
- Born in 1972, French citizen
- Master degree in Internal Auditing and Corporate Finance (IAE and ESLSCA)
- With Valeco since 2019
Post Merger Integration process ongoing

**Valeco PMI:** eight workstreams, lead bilaterally

<table>
<thead>
<tr>
<th>Workstream</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Legal &amp; HR</td>
<td>Legal shaping of the group incl. governance codex</td>
</tr>
<tr>
<td>2 Commercial Functions</td>
<td>Establish financial reporting and reevaluate financing</td>
</tr>
<tr>
<td>3 Operations</td>
<td>Migrate O&amp;M tools and processes and exchange on best practise</td>
</tr>
<tr>
<td>4 Project Development</td>
<td>Exchange on tools and best practise for development</td>
</tr>
<tr>
<td>5 Trading</td>
<td>Implement energy sale process (e.g. aggregation) via EnBW trading</td>
</tr>
<tr>
<td>6 Purchasing</td>
<td>Supplier strategy and harmonisation of purchasing instruments</td>
</tr>
<tr>
<td>7 IT</td>
<td>Harmonise on IT infrastructure (hardware and software)</td>
</tr>
<tr>
<td>8 Valeco / EER¹ Matters</td>
<td>Integrate EnBW’s project development in France into Valeco</td>
</tr>
</tbody>
</table>

**PMI-Approach**

- Temporarily installed project organisation **to prepare interfaces as well as support and accompany management** during the integration of Valeco in the EnBW Group
- At the same time **focus on strengths and powers of Valeco** as a flexible and market oriented “speedboat”
- Define **further actions to develop Valeco into a Top 5 player** in the French market until 2025
- **Bilateral approach:** All workstreams and work-packages are lead together by key persons of both companies
- **Scope**
  - Implement **guiding principles and interfaces**
  - Clarify and solve **DD findings**
  - Implement basis for **synergies**
  - Finalize **Group structure**

¹ EnBW Energies Renouvelables SAS
Summary

- **Operations and project portfolio in renewables on track in 2019**
- **Market development in solar bringing new opportunities in Germany, but limited growth prospects in wind** for the mid-term future
- **Germany will remain the main market** for EnBW’s renewables strategy...
  - **Onshore**: focus on pipeline projects and thus growth on an organic basis
  - **Offshore**: following COD of EnBW Hohe See and EnBW Albatros OWPs, ongoing planning for EnBW He Dreih
  - **Solar**: third technology in EnBW renewables portfolio, ramp up growth especially with industrially scaled and optimised projects in the market
- **“Selective internationalisation” launched in 2018 is nonetheless beginning to pay off**; we will focus on the selected markets (onshore wind: France, Sweden; offshore wind: Taiwan, US) and examine technological cross-selling opportunities; enables EnBW to **compensate impacts** of challenging marketing situation and thus limited growth potential in Germany and to **strengthen global competitiveness**
- **Development of costs (LCOE) in renewables is encouraging**; we are preparing to seize the opportunity starting with solar; being among the **best-in-class in efficiency** and **capable of acting** in this new market situation **across the entire value chain** (including trading and market sales) will be even more important then before
Dr. Hannah König, Head of Wind and Maritime Technology
From bottom fixed to floating wind projects
Agenda

1. EnBW renewables: 2019 highlights at a glance
2. Market trends and progress of EnBW’s strategy
3. Deep dive: Offshore windfarm projects EnBW Hohe See, EnBW Albatros (in construction) and EnBW He Dreih (planned)
4. Offshore wind: Floating offshore technology outlook
Chilehaus – unique, prestigious, iconic
› Symbol of Hamburg’s economic recovery after World War I and one of the city’s flagship buildings
› Located in Hamburg’s Kontorhaus district, a commercial quarter with a long history and protected as UNESCO World Heritage

EnBW’s Offshore Wind Competence Centre
› All competences under one roof: Project Management, Engineering, Procurement, Controlling, Operation & Maintenance
› 160 employees, most of which work in Offshore Wind
› Short ways ensure direct communication and avoid loss of time

Construction Office EnBW Hohe See & EnBW Albatros
› Established in the Chilehaus, on the same floor as general EnBW office
› Direct access to the colleagues from design and fabrication phase, no loss of information
### Offshore wind portfolio and project pipeline in Germany

- **Installed capacity end of 2019:** 945 MW
- **Secured pipeline:** 900 MW

#### EnBW Hohe See: 497 MW
- **EnBW Albatros:** 112 MW
  - 71+16 = 87 x Siemens SWT 7.0-154 on monopile foundations
  - Commissioning ongoing
  - Shareholders: EnBW (~50.1%) & Enbridge Inc./CPPIB (~49.9%)

#### EnBW Baltic 1: 48.3 MW
- **EnBW Baltic 2: 288 MW**
  - 21 x Siemens SWT 2.3-93
  - Commissioned in 2011
  - Shareholders: EnBW (~50.1%) & 19 municipal utilities (~49.9%)

1 Planned commercial operation date (COD) - end of 2019
## Completing EnBW Hohe See & EnBW Albatros

<table>
<thead>
<tr>
<th><strong>Hohe See</strong></th>
<th><strong>Albatros</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grid connection</strong></td>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>August 2(^{nd}) 2019</td>
<td>German North Sea</td>
</tr>
<tr>
<td><strong>Turbines installed</strong></td>
<td><strong>Gross output</strong></td>
</tr>
<tr>
<td>71/71</td>
<td>87 x 7.0 MW = 609 MW</td>
</tr>
<tr>
<td><strong>Turbines commissioned</strong></td>
<td><strong>Wind turbines</strong></td>
</tr>
<tr>
<td>71/71</td>
<td>Siemens SWT-7.0-154</td>
</tr>
<tr>
<td><strong>Completion</strong></td>
<td><strong>Foundation Structure</strong></td>
</tr>
<tr>
<td>Planned for end of year 2019</td>
<td>Monopile</td>
</tr>
<tr>
<td><strong>Contribution to EBITDA</strong></td>
<td><strong>Operations Life</strong></td>
</tr>
<tr>
<td>€415 m per year</td>
<td>25 years</td>
</tr>
</tbody>
</table>

### Additional Details:

- **Turbines installed**
  - Hohe See: 71/71
  - Albatros: 16/16

- **Turbines commissioned**
  - Hohe See: 71/71
  - Albatros: 0/16

- **Completion**
  - Planned for end of year 2019

- **Contribution to EBITDA**
  - €415 m per year

### Others:

- **Location**: German North Sea
- **Gross output**: 87 x 7.0 MW = 609 MW
- **Wind turbines**: Siemens SWT-7.0-154
- **Foundation Structure**: Monopile
- **Operations Life**: 25 years
- **Water Depth**: 40 m
- **Coastal Distance**: 105 km
- **Annual Average Wind Speed**: \(\bar{\omega} 10.1\) m/s
- **Annual Full Load Hours**: \(\bar{\omega} 4,000\)
- **Compensation**:
  - EEG – Compression Model
  - 18.4 ct/kWh for 8 years
  - 14.9 ct/kWh for 4.5 years

\(^1\) As of 4 October 2019
First time combination of these packages in the German offshore market

Siemens Gamesa Renewable Energy as general EPCI contractor with GEOSEA NV as subcontractor for the foundations

Gearless Wind Turbine (Direct Drive): fewer components, low weight relative to geared turbines; based on 6 MW predecessor (direct development)

**Wind turbine:** 87 x SWT-7.0-154

- Rotor Diameter: 154 m
- Rotor Swept Area: 18,626 m² (~2.6 football fields)
- Hub Height: 105 m
- Tower/Nacelle Weights: 395 t/360 t

**Monopile:**

- Length: 72 m
- Diameter: 8 m
- Weight: 1,100 t

**Transition Piece:**

- Length: 28 m
- Diameter: 6 m
- Weight: 440 t

Total weight wind turbine and foundation ~2,300 t (Eiffel Tower steel weighs ~7,300 t)
EnBW Hohe See & Albatros: Inner Array Cables

- EPCI contractor: VBMS GmbH (with TKF and JDR as cable sub-contractors)

- Installation of 130 km of 33 kV cable segments is done in two steps:
  - Step 1: Lay the cables
  - Step 2: Bury the cables
EnBW Hohe See: Offshore Substation

- EPCI agreement with a joint venture between ENGIE Fabricom (BE), Iemants NV (BE) and Crompton Greaves Holdings Belgium NV (BE)
- Closed topside steel structure on jacket foundation with 8 rammed piles
- Foundation weight (including piles): 2,900 t
- Topside weight (equipped): 4,200 t
- Diesel emergency power supply for the WTGs in case of power failure
- Designed for unmanned operation (emergency shelter only)
- Access by ship or helicopter landing platform
EnBW Albatros: Offshore Transformer Module

- EPCI contractor is Siemens Gamesa Renewable Energy
- Open Deck Structure - 2 decks (main and cable deck)
- Low environmental impact through oil-free platform, ester instead of oil and cooling
- Monopile foundation – same design as wind turbine foundation
- Foundation weight (including piles) is 1,600 t and topside is 1,200 t
- Central emergency power supply with batteries
Update on EnBW He Dreiht

Technical aspects

- Size: 63 km²
- Water depth: 39-40 m
- Distance to shore: 85 km
- Wind speed: \( \mu 10.1 \text{ m/s} \)
- Years of operation: 25 [EEG 2017]
- Maximum of 900 MW generation capacity

Timeline

- WTG tender in 2020
- FID until mid-2023
- Grid connection: Borwin 5 (NOR-7-1) in accordance with Offshore Network Development Plan (O-NEP 2025)
- Commissioning and start of operation in 2025

1 Grid connection capacity of 900 MW
1. **Project development, realisation and operation by a company** with profound experience and existing portfolio

2. **Size:** 900 MW – by far the largest single project in the auction
   - In the meantime, Ørsted combined individual projects to one of 900 MW

3. **Synergies:** EnBW He Dreih is located in the direct vicinity of EnBW Hohe See and EnBW Albatros
   - considerable synergies during operation

4. **Time of commissioning:** Due to grid connection in 2025, EnBW He Dreih will:
   - benefit from cost reduction, innovation and technological progress within the offshore industry in the coming years
   - fully operate in a more favorable market environment (e.g. phasing out of nuclear power in Germany completed)
Agreement with TenneT on direct connection at 66 kV

- No offshore substation needed, CAPEX reduction by €70 to 100 m
Closely monitor wind turbine development, 2017 predictions confirmed!

- GE announced 12 MW-220 turbine, type certificated expected in 2020
- Other OEMs follow, new platforms in development
Next steps EnBW He Dreihl

- **Q1 2020**: BSH – submission application Plan Approval & 1st Release
- **Q2 2021**: WTG (EPC) – dispatch ITT
- **Q4 2022**: FID – Notice to proceed
- **Q3 2025**: Grid Connection date (provisional)

**Gantt Chart:***

- **Q1 2023**: BSH – issue Plan Approval
- **Q2 2021**: WTG (EPC) – conclusion of contract

Note: Dates for each milestone, including Q1 2020 and Q4 2022, are marked with stars.
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From bottom-fixed to floating foundations

**Bottom Fixed**

Suitable water depths

<40 m (monopiles) and <60 m (jackets) resp.

**Floating**

Suitable water depths

>40 m (spar buoy: >100 m)

Illustration by NREL
Floating Wind Potential

Offshore Wind resource in >60 m waters:\n
- 80% of Europe’s offshore wind resources (~4000 GW)
- 60% of US’ offshore wind resources (~2400 GW)

LCOE:\n
- Pre-commercial projects (today): €230/MWh
- First commercial projects (2026 onwards): €100/MWh
- Maturing industry (2030 onwards, 4 GW deployed): ~€60/MWh

Figure 5. Estimated cumulative installed floating capacity - low & high scenarios - to end-2030, including compound annual growth rates (CAGR)
Project Castle Wind

Development of a commercial floating Offshore Wind Project in USA

<table>
<thead>
<tr>
<th><strong>Capacity</strong></th>
<th>up to 1,000 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WTG</strong></td>
<td>10+ MW</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Morro Bay (County of San Luis Obispo)</td>
</tr>
<tr>
<td><strong>Water depth</strong></td>
<td>~800-1,000 m (Floating FOU)</td>
</tr>
<tr>
<td><strong>Wind speed</strong></td>
<td>~8.5 m/s</td>
</tr>
<tr>
<td><strong>Distance to shore</strong></td>
<td>~48 km</td>
</tr>
<tr>
<td><strong>Grid connection</strong></td>
<td>~560 MW (from shut down gas power plant)</td>
</tr>
<tr>
<td><strong>Timeline</strong></td>
<td>COD 2027-2030</td>
</tr>
</tbody>
</table>

In 2017 EnBW decided to expand its long-term offshore wind presence in prospective international markets, including the US and Taiwan.

California gives EnBW the opportunity to enter the well advancing floating offshore wind market in an early development stage.
EnBW’s activities

› Participation in the Joint Industry Project Floating
  › Currently, projects on topics like turbine scaling, heavy lift offshore operations, export cable development, monitoring & inspections

› Several internal studies, e.g. on dynamic cables

› Investigation of potential participation in pilot projects (currently two MoUs in negotiation)
Questions & Answers
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