RWE Innogy as trusted partner for a sustainable future

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RWE
The energy to lead
Strong European and also global trend towards more sustainability in energy mix

Security of supply

Balanced energy mix

Sustainability

Affordability
More sustainability in Europe: Renewables as one of three main levers to decarbonise the energy system

**Lower CO₂ emissions**

> Reduce CO₂ emissions by 20% (possibly 30%) by 2020 vs. 1990 levels

**More renewables**

> Increase renewable share in Gross Final Energy Consumption to 20% by 2020

**Efficient use of energy**

> Reduce primary energy consumption in the EU27 by 20% until 2020

**CO₂ emissions EU27**

- **in mt**
  - Actual
  - Target path

- **Estimated share primary energy consumption 2020**
  - ~1754 Mtoe
  - ~30% Nuclear
  - ~15% Gas
  - ~14% Coal
  - ~28% Renewables

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1 WEO 2011: Current Policies Scenario; Renewables: Hydro, Biomass and waste and other renewables.
EU has committed itself to ambitious renewable targets by 2020

**Overall share of renewable energy in EU (in %)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Gap</th>
<th>Target 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>12.5</td>
<td>20.0</td>
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</tbody>
</table>

> Target of 20% share of renewables in gross final EU energy consumption by 2020, i.e. covering
– Power
– Heating/cooling
– Transport

> At least 10% of gross final consumption of energy in transport in 2020 in each country

**Individual country targets**

<table>
<thead>
<tr>
<th>Country</th>
<th>Sweden</th>
<th>Latvia</th>
<th>Finland</th>
<th>Austria</th>
<th>Portugal</th>
<th>Denmark</th>
<th>Estonia</th>
<th>Slovenia</th>
<th>Romania</th>
<th>France</th>
<th>Lithuania</th>
<th>Spain</th>
<th>Germany</th>
<th>Greece</th>
<th>Italy</th>
<th>Bulgaria</th>
<th>Ireland</th>
<th>Poland</th>
<th>UK</th>
<th>Netherlands</th>
<th>Slovakia</th>
<th>Belgium</th>
<th>Czech Republic</th>
<th>Cyprus</th>
<th>Hungary</th>
<th>Luxembourg</th>
<th>Malta</th>
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<tbody>
<tr>
<td>RES share</td>
<td>47.6%</td>
<td>35.1%</td>
<td>33.0%</td>
<td>30.9%</td>
<td>26.8%</td>
<td>23.5%</td>
<td>26.6%</td>
<td>18.5%</td>
<td>24.1%</td>
<td>13.2%</td>
<td>18.3%</td>
<td>13.1%</td>
<td>12.3%</td>
<td>11.2%</td>
<td>11.6%</td>
<td>12.8%</td>
<td>6.2%</td>
<td>10.6%</td>
<td>3.8%</td>
<td>4.4%</td>
<td>9.5%</td>
<td>3.5%</td>
<td>10.4%</td>
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<tr>
<td>2011 (%)</td>
<td>40.0%</td>
<td>38.0%</td>
<td>38.0%</td>
<td>34.2%</td>
<td>31.0%</td>
<td>33.3%</td>
<td>26.0%</td>
<td>25.3%</td>
<td>24.0%</td>
<td>23.0%</td>
<td>24.0%</td>
<td>22.7%</td>
<td>19.6%</td>
<td>20.2%</td>
<td>16.15%</td>
<td>15.2%</td>
<td>15.5%</td>
<td>15.0%</td>
<td>14.5%</td>
<td>15.3%</td>
<td>13.0%</td>
<td>13.5%</td>
<td>13.2%</td>
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Source: European Commission; Eurostat; Directive 2009/28/EC; National renewable energy action plans (NREAP); EurObserv’ER 2012.
RWE Group already contributing more than 4 GW of operational renewable assets in Europe

> A total of 4,133 MW operational renewables assets account for roughly

- 8% of the Group’s generation capacity (as of 31 December 2012) and
- 5% of electricity generation (in fiscal 2012).

> Thereof, 2,803 MW is operated by RWE Innogy, in which RWE pooled its renewable energy activities.

> The difference of 1,330 MW is comprised mainly of Tilbury power plant (742 MW) converted to biomass combustion, two biomass co-firing plants in the Netherlands (Amer und Cujk, together 320 MW) and several small, distributed renewable assets owned by RWE’s regional companies.

1) Capacity with <50% RWE Innogy ownership is consolidated to 0 MW, capacity with 50% is consolidated to 50% of capacity, and capacity with >50% RWE Innogy ownership is consolidated to 100% of capacity.
RWE Innogy with strong European footprint mainly in wind and hydro

### RWE Innogy in a nut shell

- **RWE Innogy was established in February 2008 and bundles renewables activities and competencies across the RWE Group**

- **Focus on Europe and growth in commercially mature renewable technologies, concentrating on onshore and offshore wind**

- **On average, RWE Innogy invested €1 billion per annum from 2008 to 2012**

- **Asset portfolio of 2.8 GW in operation and more than 1 GW is currently under construction (Accounting view + PPA as of Dec 2012)**

- **Project pipeline of >10GW consisting mainly of wind and hydro assets**

### Operational asset base (MW) as of Dec 2012

- **Onshore Wind**
- **Offshore Wind**
- **Hydro**
- **Biomass**

[Map showing operational asset base]
Going forward, RWE Innogy focused on being the trusted partner for a sustainable future

**Vision**

“To be a trusted partner for competitive renewable energy.”

**Mission Statement**

**RWE Innogy** – we deliver value in renewable energies as a trusted and reliable partner to our stakeholders and society, leveraging capex light solutions through our highly knowledgeable and motivated employees.

**RWE Innogy is part of the solution**

- Providing sustainable energy to our customers and RWE’s portfolio
- Delivering services around sustainable energy in capex light models
- Creating local acceptance through Green Gecco and other local partnerships
- Supporting retail OpCos through delivering services to their partners
Streamlined investments in renewables, concentrating on onshore and offshore wind farms

> The expansion of electricity generation from renewables remains a focus of the investing activity of the RWE Group.

> Innogy will invest about € 1 billion in 2013 and approximately € 500 million in each of the two following years in capital.

> Due to streamlined investments on the entire RWE Group level, RWE Innogy will not achieve the capacity target set for the end of 2014 until later: the new focus is that the total installed capacity should amount to approximately 3.5 GW and the operating result should exceed € 300 million by the end of 2014.

> At the same time, Innogy will enhance its existing value approach in order to add the maximum value from renewables to RWE group.

![Capacity growth targets (in GW)](chart)

- 2012: ~3.5 GW
- 2013: ~3.5 GW
- 2014: ~3.5 GW

![Operating result growth target](chart)

- € 300 million
- 2012: < € 300 million
- 2014: > € 300 million
Capacity and earnings target largely driven by 3 major construction projects

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<tbody>
<tr>
<td>Markinch (Biomass CHP(^2), 46 MW(<em>{el}), 88 MW(</em>{th}), 100%)</td>
<td>0.3</td>
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<tr>
<td>Gwynt y Môr (Wind offshore, 576 MW, 60%)</td>
<td>2.5</td>
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<tr>
<td>Nordsee Ost(^2) (Wind offshore, 295 MW, 100%)</td>
<td>1.1</td>
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Large scale projects, especially in offshore wind, play a vital role in achieving European renewable targets as growth potential in other areas is limited.

Utilities like RWE have a competitive advantage in these large-scale projects as we can build on expert knowledge gained in our other large projects.

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\(^1\) Capex at 100% share; UK offshore includes investment for grid connection.

\(^2\) CHP: Combined Heat and Power

\(^3\) The construction schedule was revised several times in 2012 due to the delay in the offshore grid connection by TenneT. The first feed-in of electricity is now only expected by Mid 2014 and the commissioning of the wind farm is delayed at least until Q4 2014.
Biomass CHP plant Markinch – nearing completion

MAIN PROJECT FIGURES

> Combined heat and power (CHP) plant with an electrical output of 46 MW while also supplying industrial steam to paper manufacturer Tullis Russell – largest plant of its type in Scotland and Great Britain

> Steam supply up to 120 tonnes per hour

> Fuel requirement of ca. 400,000 tonnes per year covered by recovered wood waste (approx. 90%) and virgin wood – large share of required quantities for next 5 years already contractually secured

DETAILS ON PROJECT STATUS

> Gas package (backup) boilers commissioned in 2012 and have already undergone first revision

> Also biomass storage facilities completed and first wood deliveries of both recovered and virgin wood have been already received

> CHP plant mechanically completed, also steam blow completed and first firing on biomass during Q2 2013

> First commissioning activities already ongoing, to be completed to end of Q3 2013
Offshore project Gwynt y Môr – continued progress

MAIN PROJECT FIGURES

> Installed capacity of 576 MW with RWE Innogy holding 60% of the project shares, remaining shares held by German municipal utility Stadtwerke München (SWM, 30%) and Siemens (10%)
> Use of 160 Siemens 3.6 MW turbines installed on monopile foundations
> Distance to shore of 13 to 15 km off North Wales coast, water depth between 12 and 28 m LAT

DETAILS ON PROJECT STATUS

> Both offshore substations already installed in 2012 and onshore substation essentially complete
> Both export cables to first offshore substation completed until May 2013, installation of cables to second substation to start shortly
> Also installation of inter array cables has started
> 80 monopile foundations already installed, foundation installation to be commenced in May 2013
> Installation of first wind turbines to start with next weather window, more than 40 turbine sets already stored in port
Offshore project Nordsee Ost – foundation installation ongoing but remaining challenges on grid connection

**MAIN PROJECT FIGURES**

- **Total capacity of 295 MW** with 48 REpower 6.15 MW turbines
- **High voltage direct current (HVDC) grid connection** to be provided by grid operator TenneT
- Use of jacket foundations for turbines and offshore substation at **water depth about 22 to 26 m**
- **Distance to shore ca. 45 km**

**DETAILS ON PROJECT STATUS**

- Turbine foundation installation started end 2012 with limited progress in Q1 2013 mainly due to weather conditions, **improved installation progress in Q2 with 13 foundations installed until Mid May**
- Delay of completion of TenneT grid connection well into 2014, **first electricity grid feed-in only expected by Mid 2014**
- While RWE is making necessary steps to ensure entitlement for compensation payments from the grid delay under German Energy law (EnWG), the **timing and final extent of compensation payments is not known yet**
Also several small to medium scale onshore wind projects currently under construction

<table>
<thead>
<tr>
<th>Project</th>
<th>Capacity (MW)</th>
<th>Ownership</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titz</td>
<td>21</td>
<td>51%</td>
<td>2011</td>
</tr>
<tr>
<td>Middlemoor</td>
<td>54</td>
<td>100%</td>
<td>2012</td>
</tr>
<tr>
<td>Bradwell</td>
<td>20</td>
<td>100%</td>
<td>2013</td>
</tr>
<tr>
<td>Nowy Staw</td>
<td>45</td>
<td>100%</td>
<td>2014</td>
</tr>
<tr>
<td>Goole Fields</td>
<td>33</td>
<td>100%</td>
<td>2015</td>
</tr>
<tr>
<td>Düshorner Heide</td>
<td>26</td>
<td>100%</td>
<td></td>
</tr>
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RWE Innogy with strong foothold in onshore wind in Europe with already more than 1.7 GW installed as of end 2012

Use of similar main components and focus on few established turbine suppliers leverages RWE market position and supports drive for operational excellence

Good access to projects at low cost that allow relatively fast construction – low risk projects with good returns, also providing growth flexibility to our portfolio
Two flagship onshore wind projects in core markets

Wind farm **Titz**

**Location**
- In the RWE lignite mining region (“Rheinisches Revier”), 35 km west of Cologne

**Technical data**
- Installed capacity: 20 MW
- 10 wind turbines REpower, type MM92-Evolution, each with a capacity of 2 MW
- Rotor diameter: 92.5 m
- Tip height: approximately 150 m
- Start-up: 3rd quarter 2012

Wind farm **Westereems**

**Location**
- In Eemshaven, Province of Groningen / NL

**Technical data**
- Installed capacity: 156 MW
- 52 wind turbines type E82 a 3 MW from Enercon
- Rotor diameter: 82 m
- Tip height: approximately 140 m
- Start-up: 1st quarter 2009
- In the middle of wind farm Westereems two wind turbines type 6M from Repower, each with a capacity of 6.15 MW
Overall, RWE Innogy well prepared to deliver on future requirements of RWE Group

> Despite the planned annual investments being reduced to below € 1bn after 2013, **RWE Innogy will continue to be the main contributor for delivering renewable growth within the RWE Group and thereby supporting the transition to a low carbon producer**

> RWE Innogy has already **started a number of measures to increase organisational efficiency after a period of rapid growth** since its founding in 2008, being directed at enhancing value during the whole value chain of development, construction and operation of renewable assets

> We are **already successfully building on “partnering concepts”** to ensure funding and realise further renewable growth in RWE core markets:

  – Special purpose vehicle Green Gecco set up in 2010 together with nearly 30 municipal utilities to jointly develop and realise renewable projects – in 2013 five onshore wind projects in Germany and Scotland jointly owned (RWE Innogy holds 51%)

  – Required funding of offshore construction projects Greater Gabbard, Gwynt y Môr and Thornton Bank is already shared with established partners through different consortia approaches

> **In addition, further access to finance is getting ensured by the sale of projects**, both by selling project shares in on- and offshore wind projects (still generally targeting to keep majority shareholding) and by the complete sell of non-core assets
Thank you for your attention!
Backup slides – Offshore experience and challenges
Offshore Wind – more than 8 years of experience with considerable amount of assets in operation

**Operation***

- **North Hoyle, UK, 60 MW:** Completely commissioned 2004
- **Rhyl Flats, UK, 90 MW:** Completely commissioned 2009
- **Thornton Bank I+II, BE, 215 MW:** Completely commissioned 2013
- **Greater Gabbard UK, 504 MW:** Completely commissioned 2012

**Construction***

- **Nordsee Ost, GER, 295 MW**
- **Gwynt y Môr, UK, 576 MW**
- **Thornton Bank III, BE, 110 MW**

**Development***

- **Innogy Nordsee 1, Germany, ca. 1,000 MW**
- **Galloper, UK, 500 MW**
- **Triton Knoll, UK, 1,200 MW**
- **Tromp Binnen, Netherlands, 300 MW**
- **Atlantic Array, UK, 1,500 MW**
- **Doggerbank, UK, 9,000 MW**

* Full project capacity shown, RWE share may be lower.
Industry must realise remarkable cost reductions with 2020 target level of €120/MWh in mind.

UK industry task force has shown development paths to achieve a LCOE\(^1\) level of £100/MWh (€120/MWh) by 2020 – reduction in the range of 30% required.

Main cost reduction drivers:
- Cost reduction turbines
- Design & cost improvements foundations
- Advanced O&M solutions and increased reliability

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1) LCOE: Levelised cost of energy including development and capital expenditure.

Data source: Desertec Initiative 2011; RWE 2012.
Availability of capital poses an increasing challenge – additional sources of finance required

> Realising growth of ca. 40 GW means capital expenditure in the order of €150bn\(^1\)

> Balance sheets of energy utilities can only partly fund this growth – and it has to be avoided to overburden (developer) balance sheets with further consolidated debt

> New sources of finance required to come to the market

UK Offshore Wind Developer Forum (OWDF) has identified a number of sources...

- Equity finance from non-(UK-) utility players such as Statoil
- Further equity capital from OEMs and construction contractors
- Senior debt from banks and international lenders
- Further finance has to be attracted from investment funds\(^2\) in projects through the construction and early operation

... but several (perceived) obstacles need to be overcome:

- **Regulatory uncertainty**, incl. Electricity Market Reform (EMR) in UK and grid connection regime in Germany
- **Cost and risk-reward challenges**
- Long project lead times and **no cash yield during construction**
- Perception of risk during construction and operations

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1) Assuming an invest of €3.75m/MW (£3m/MW), excluding the cost of grid connection.
2) Incl. Infrastructure Funds, Pension Funds, Insurance Funds, Equity Funds etc.
Overview of main challenges that need addressing by RWE, the whole industry and also by politics

- Political & regulatory support
- Economic sustainability
- Financing large scale infrastructure projects
- Bankability of project structures
- Managing risks in a changing environment

Realising future on- and offshore projects with attractive risk-reward profiles