

RWE INNOGY

FACTS & FIGURES – OFFSHORE WIND & GWYNT Y MÔR OFFSHORE WIND FARM

Strong growth off the coast

RWE Innogy is a market leader in the development, construction and operation of offshore wind farms in Europe. We have already gained significant experience through the delivery and operation of our existing wind farms – North Hoyle and Rhyl Flats off the Welsh coast, and Thornton Bank off the Belgian coast. Our first German project – Nordsee Ost – is due to start construction next year, some 22 miles off the island of Helgoland. In addition, we aim to be using our own construction vessels from 2011 onwards. RWE Innogy has major plans for the future for offshore development and for helping tackle climate change through its pipeline offshore wind portfolio.

A list of current projects:

In operation:

- North Hoyle¹⁾ (UK/60 MW)
- Rhyl Flats (UK/90 MW)
- Thornton Bank²⁾ (Belgium/30 MW)

Under construction:

- Greater Gabbard³⁾ (UK/504 MW)

Investment/construction decision granted:

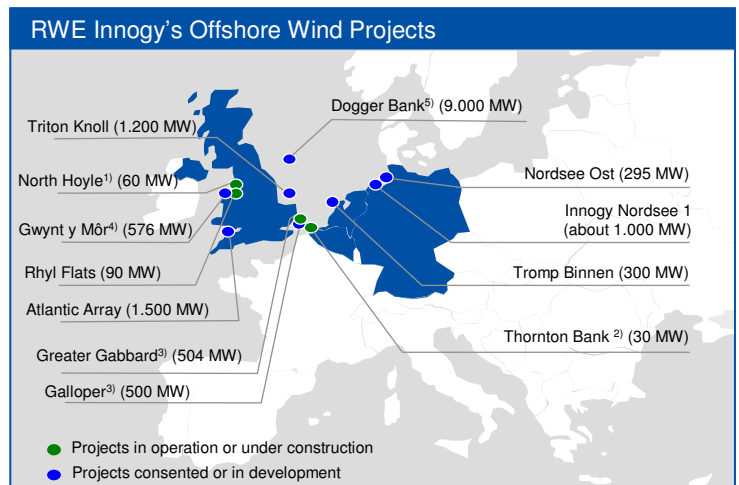
- Nordsee Ost (Germany/295 MW)
- Gwynt y Môr⁴⁾ (UK/576 MW)

Project pipeline:

- Thornton Bank 2 & 3 (Belgium/295 MW)
- Innogy Nordsee 1 (Germany/approx. 1,000 MW)
- Triton Knoll (UK/1,200 MW)
- Galloper³⁾ (UK/500 MW)
- Atlantic Array (UK/1,500 MW)
- Dogger Bank⁵⁾ (UK/approx. 9,000 MW)
- Tromp Binnen (Netherlands/300 MW)

Offshore construction vessels (Seabreeze)

- > By building its own installation vessels, RWE Innogy is closing an important gap in the construction of offshore wind farms.
- > The completion of the first vessel has been scheduled for 2011. It will be followed by a second vessel.
- > The order value per vessel is approx. EUR 100 million.
- > With a length of 100 meters and a width of 40 meters, such vessels can transport and erect up to four turbines in the multi-megawatt category.



- 1) North Hoyle offshore windfarm (60 MW) is owned by Zephyr Investments Ltd, which is 1/3 owned by RWE Innogy UK. The capacity is 100% contracted to RWE npower through PPAs (power purchase agreements).
- 2) RWE Innogy holds a share of 27%; extension phase 2 and 3 (up to the final capacity of 325 MW) under development.
- 3) 50% owned by RWE Innogy.
- 4) Offshore wind farm will be built by RWE Innogy (60%), Stadtwerke Munich (30%) and Siemens (10%).
- 5) Site developed by the Forewind consortium (RWE Innogy, SSE, Statoil and Statkraft).

Offshore Logistics: RWE Innogy's Seabreeze Program

Main dimensions

Length over pontoon:	100.00 m
Breadth moulded:	40.00 m
Depth to main deck:	8.00 m
Max. Payload:	4,200 t (= 4 sets of 6MW turbines)

Main crane - lifting capacity

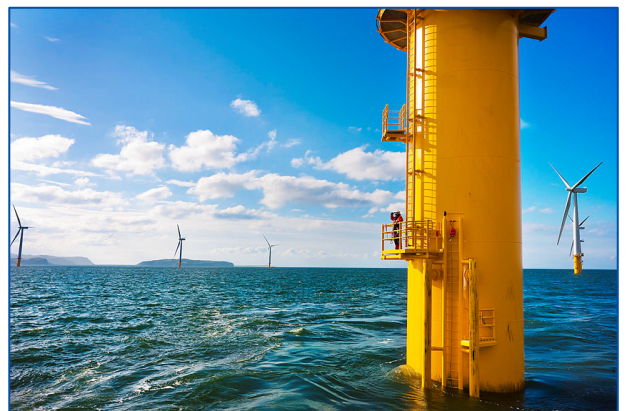
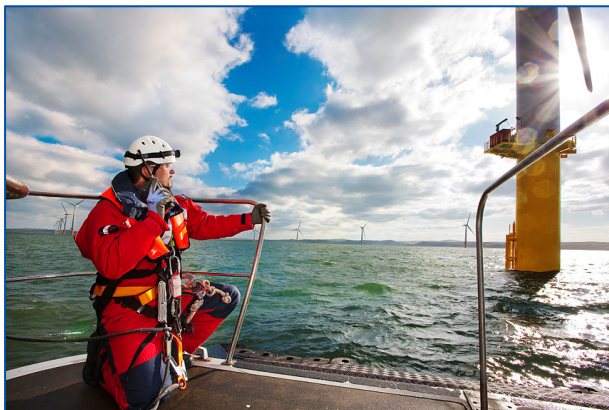
Max. hook height above Deck:	110 m
Max. Load:	800 t @ 25m ; 500 t @ 38m
Propulsion:	6 retractable thrusters: 6 x 1,600 kW; approx. 6 knots
Accommodation:	max. 60 persons, mainly single cabins
Helideck:	D=17,0m (AW 139)

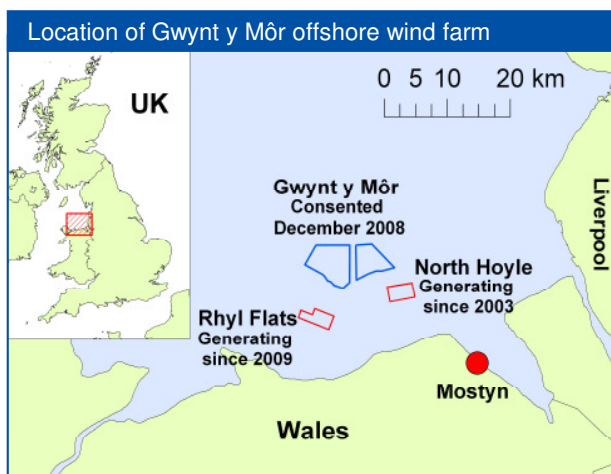
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GWYNT Y MÔR OFFSHORE WIND FARM

Facts & Figures – Gwynt y Môr Offshore Wind Farm

- > At 576MW, Gwynt y Môr (Welsh for “wind in the sea”) Offshore Wind Farm will be one of the largest offshore wind farms in construction in the world.
- > RWE Innogy, Stadtwerke Munich (Munich Municipal Utility) and Siemens have entered into a joint venture to build Gwynt y Môr. RWE Innogy will hold a 60% stake in this joint venture, Stadtwerke Munich 30% and Siemens 10%.
- > The project represents an investment of over €2billion into the European offshore wind industry.
- > The project is being developed by RWE Innogy’s UK-subsi-dary RWE npower renewables and will be the company’s third major offshore wind farm in Liverpool Bay, the two existing wind farms being the 60MW North Hoyle and 90MW Rhyl Flats Offshore Wind Farms.
- > The Department of Energy and Climate Change granted consent for the offshore works in December 2008.
- > In 2009, permissions for onshore substation works and the approx 11km cable route were granted by Denbighshire County Council and Conwy County Borough Council.
- > Gwynt y Môr is located 13 km off the North Wales coast, in water depths of 12 – 28m, adjacent to RWE Innogy’s existing North Hoyle and Rhyl Flats projects.





Facts & figures at a glance

- > Capacity of 576 MW
- > Site area of 79km²
- > 160 x 3.6 MW wind turbines
- > 13 km off the coast of North Wales
- > Water depth 12 - 28 m
- > Application submitted in 2005
- > Consent received 3rd December 2008
- > Consent for grid connection received
- > Offshore installation planned to take place from 2011 – 2014

- > It will use similar wind turbines to those installed at the Rhyl Flats and Greater Gabbard wind farms.
- > Gwynt y Môr has a 50-year UK lease and has received all material consents and permits.
- > The assets to be constructed comprise 160 x 3.6 MW wind turbines (total installed capacity 576MW).
- > Two offshore substations as well as subsea and onshore interconnection cables will export the wind farm's electricity to the National Grid.
- > A dedicated operations and maintenance service base will be provided to support the wind farm.
- > The total development area is 124km² (48 square miles) although the area within which the turbines will be built will be no more than 79km² (31 square miles).
- > The development of Gwynt y Môr will generate a Community Benefit Package of £768,000 per annum, index-linked in line with inflation, to become available when the wind farm becomes operational. The community Benefit Package will be available throughout the operational life of the wind farm and for the benefit of communities in North Wales.
- > Once complete, the average annual energy generation expected at the site would be equivalent to the approximate domestic needs of around 400,000 average UK households.¹

^{1) Footnote:}
 (Energy predicted to be generated by the proposal is derived using wind speeds monitored in the local area. This enables a calculation to be made to estimate the average annual energy production for the site based on 160 turbines each of rated capacity 3.6 MW. The energy capture predicted and hence derived homes equivalent figures may change as further data are gathered.)
 (Equivalent homes supplied is based on an annual electricity consumption per home of 4700 kWh. This figure is supported by recent domestic electricity consumption data available from The Digest of UK Energy Statistics and household estimates and projections from the UK Statistics Authority.)



Project details – Gwynt y Môr Offshore Wind Farm

Onshore details

- > Approx. 11km of underground power cables will be installed to connect the wind farm from the beach landing point to the new electricity substation at St. Asaph.
- > By burying the onshore power cables underground we avoid the need for lengthy overhead power lines.
- > A 132/400kV electricity substation will be constructed at St Asaph Business Park, Denbighshire, North Wales. The will convert the electricity into the voltage required for the National Grid.
- > A short section of around 500 metres of overhead power line, will transfer electricity from the substation to the national grid. The substation was deliberately located close to the existing National Grid transmission lines to minimise the requirement for lengthy overhead power lines.
- > Enabling works for the new onshore electricity substation were completed in May 2010 by Jones Bros, a Ruthin based civil engineering company.
- > The site of the new onshore electricity substation has been handed over to National Grid for their construction of a new 400kV substation.
- > The project's new 132kV electricity substation will commence construction in August 2010 and complete in Q3 2012.

- > Installation of the onshore power cables will commence around Q4 2010.

Offshore details

- > Offshore foundations installation works will commence by the end of 2011.
- > Wind turbine installation will commence in Q2 2013 and the wind farm will be fully operational in 2014.
- > The Gwynt y Môr site is located 13 kilometres (8 miles) off the North Wales coast at the nearest point to shore, 16 kilometres (10 miles) from Llandudno, and 18 kilometres (11 miles) from the Wirral.
- > The turbine tip height will be up to 150m above mean sea level.
- > Two offshore 33/132kV substations will be constructed
- > Subsea power cables will be installed to take the electricity from the wind turbines to the two offshore electrical substations, and onwards to underground transition pits on the shore.
- > A meteorological mast which collects wind and weather data has been operational since 2005. The collected data has been crucial in the design of the wind farm.

