

RWE INNOGY

GWYNT Y MÔR OFFSHORE WIND FARM LTD

Facts & figures – offshore wind. Strong growth off Europe 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 starting construction some 22 miles off the island of Helgoland. In addition, we aim to be using our own construction vessels to reduce the risk of construction bottle-necks. 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)
- Gwynt y Môr⁴⁾ (UK/576 MW)

Investment/construction decision granted:

- Nordsee Ost (Germany/295 MW)

Project pipeline:

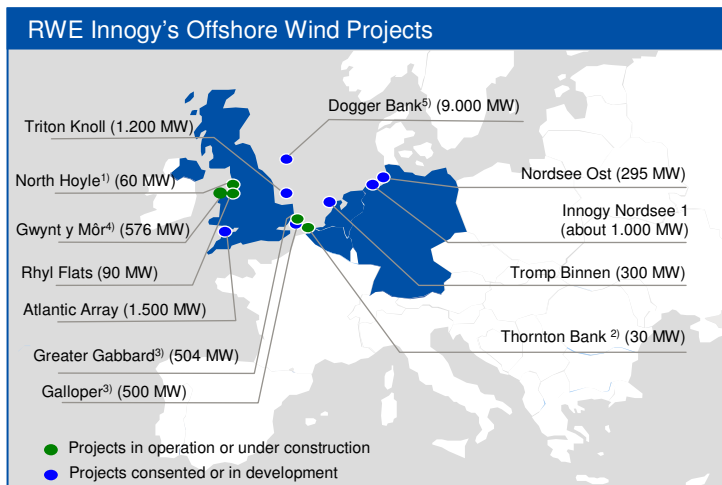
- Thornton Bank ^{2&3)} (Belgium/295 MW)
- Innogy Nordsee 1 (Germany/approx. 1,000 MW)
- Triton Knoll (UK/1,200 MW)
- Galloper ³⁾ (UK/500 MW)
- Atlantic Array (UK/1,500 MW)
- Dogger Bank ⁵⁾ (UK/approx. 9,000 MW)
- Tromp Binnen (Netherlands/300 MW)

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 order value per vessel is approx. EUR 100 million.

> At 100 meters long and 40 meters wide, such vessels can transport and erect up to four turbines in the multi-megawatt category.

> The sailing distance from the construction port in South Korea to Liverpool Bay, for the Seabreeze delivery, is 15,000 km and is scheduled to take 48 days.



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

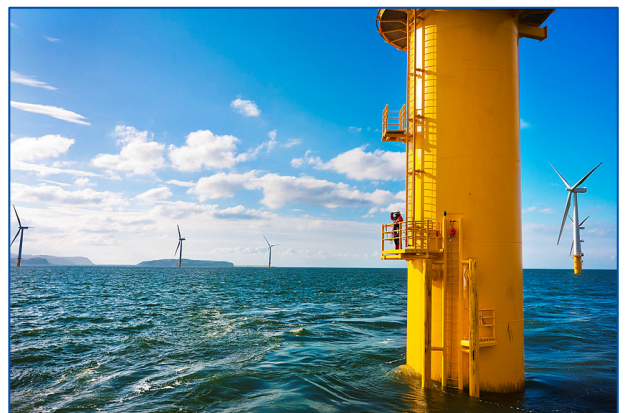
Main dimensions	
Length over pontoon:	100.00 m
Breadth moulded:	40.00 m
Depth to main deck:	8.00 m
Max. Payload:	4,200 t (= 4 sets of 6MW turbines)
Main crane - lifting capacity	
Max. hook height above Deck:	110 m
Max. Load:	800 t @ 25m ; 500 t @ 38m
Propulsion:	6 retractable thrusters: 6 x 1,600 kW; approx. 6 knots
Accommodation:	max. 60 persons, mainly single cabins
Helideck:	D=17,0m (AW 139)

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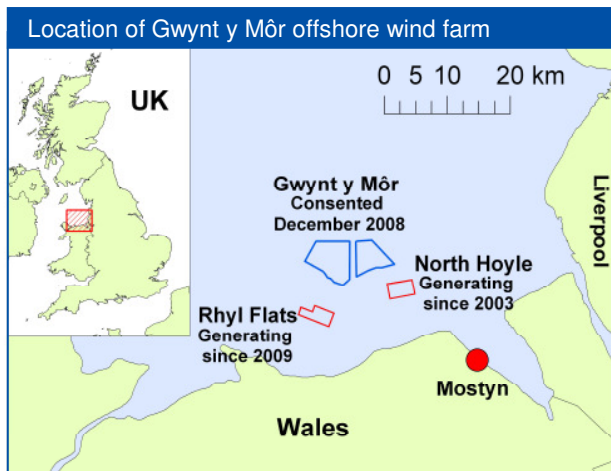
Facts & Figures – Gwynt y Môr Offshore Wind Farm

- > At 576MW, Gwynt y Môr (Welsh for “wind of the sea”) Offshore Wind Farm will be one of the largest offshore wind farms in construction in the world.
- > RWE Innogy, Stadtwerke München GmbH (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 München GmbH 30% and Siemens AG 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-subsiary RWE npower renewables and will be the company’s third major offshore wind farm in Liverpool Bay, alongside the 60MW North Hoyle and 90MW Rhyl Flats Offshore Wind Farms.
- > Gwynt y Môr has a 50-year UK lease and has received all material consents and permits. The Department of Energy and Climate Change (DECC) granted consent for the offshore works in December 2008. In 2009, permissions for onshore substation works and the 11km cable route were granted by Denbighshire County Council and Conwy County Borough Council.
- > Project will use similar wind turbines to those installed at the Rhyl Flats and Greater Gabbard wind farms.
- > Two offshore substations, subsea and onshore interconnection cables will export electricity to the National Grid.
- > A dedicated operations and maintenance service base will be constructed to support the wind farm.
- > 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.)



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 from 2012 – 2014.

Supply chain and community investments

Gwynt y Môr Offshore Wind Farm offers significant opportunities for the UK supply chain, and has so far awarded around £200m in contracts to UK firms. These include:

Contractor/Business	Value
> Port of Mostyn (Flintshire, North Wales)	£50 (over 25yrs)
> Cammell Laird (Birkenhead, Wirral)	£5m+
> Prysmian (North Wales)	£15m
> Jones Bros (North Wales)	£1m+
> Burntisland Fabrication (Scotland - jacket foundations for offshore substations)	£12m
> Global Marine Systems (SE England - subsea export cable installation)	£20m+
> Siemens Transmission & Distribution (Manchester - on and offshore substations, incl. Harland & Wolff sub-contract for offshore substation platforms).	£100m+
> Granada Materials Handling (Rochdale) contract for cranes	£multi-million
> Large Diameter Drilling (LDD) contract for specialist monopile drill and services.	£multi-million

Community investment

Gwynt y Môr Offshore Wind Farm is accompanied by a Community Benefits Package of £768,000 per annum, index-linked in line with inflation, to become available when the wind farm becomes operational, and available throughout the operational lifetime of the wind farm. A further £690,000 Tourism package will be delivered over a three year period from the start of construction.



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 began construction in August 2010 and is due for completion in Q3 2012.

- > Installation of onshore power cables commenced Q4 2010.

Offshore details

- > The Offshore construction programme commenced in Q1 2012 with the laying of scour protection.
- > 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 138m above LAT (lowest astronomical tide).
- > 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.

