Project information

Year: 2009
Customer: RWE (NPOWER)
Location: Constable Bank, UK
Solution: Wind Farm Grid Interconnection Solution
Segment: Renewable Energy (RES) – Offshore Wind Energy
N. of Wind Turbines (WGT): 25
Model: Siemens SWT-3.6-107

Background

Rhyl Flats wind farm is located on the eastern end of the Constable Bank between Abergele and Rhos-on-Sea, approximately 5 miles (8 kilometers) off the coast of North Wales. It comprises 25 Siemens SWT-3.6-107 wind turbines and has a maximum installed capacity of 90MW. Rhyl Flats Offshore Wind farm will provide enough clean, green electricity to satisfy the needs of approximately 61,000 homes every year.

Challenge

Experience from the construction of previous existing offshore wind farms has shown that it was important to take care of harsh environmental conditions of the installation.

A detailed technical study identifying what was the best electric grid configuration according to wind turbines localizations on Rhyl Flats, in accordance with the extreme conditions of installation was sent to wind turbine manufacturer.

Ormazabal CGM-CGC gas insulated switchgear with integrated control units at circuit breakers position, fulfilled all requirements presented at the project, thanks to:

- Resistant to highly corrosive environments: 720 hour salinity chamber test.
- Highly robust and compact design: 3D vibration tests.
- Verified operation of driving mechanism at very low temperatures: From -5ºC down to -30ºC.

A total amount of 73 cubicles diagram through the 25 wind turbines were configured for the grid interconnection of the whole wind farm obtained the complete satisfaction of the customer requested needs.

Martin Gray – EPDL Project Manager

“Rhyl Flats offshore wind farm represents the Ormazabal’s capability to face challenge projects with most extreme environmental conditions.”

EPDL / Partner information

EPDL is now in its 12th year of operation and is based in the North West. The company concentrates on products and services associated with the HV electricity distribution industry.

With an internal grid of 30 kV through the wind farm, Ormazabal took care of the protection and distribution of the energy generated on each turbine and subsequent interconnection to the collector substation.

Ormazabal worked with EPDL to create a logistics plan designed to meet the unique needs of the site.

A challenging industrialization process was coordinated with Ormazabal Secondary Distribution division established in Igorre, Biscay (Spain).
**Ormazabal solution**

Ormazabal supported the customer from the first planning to the commissioning once turbines were installed at sea:

- **Distribution Network Solutions (DNS)**
- **CGM-CGC System:** Secondary distribution gas insulated switchgear.
  - **Electrical Characteristics:** 36 kV – 630 A – 20 kA 1 s
  - **Scope of Supply:** 73 Cubicles

- **ekorSYS Family:**
  - General protection unit for circuit breaker cubicles, ekorRPG.

**Engineering**

Complete grid interconnection design of the wind farm.

Specific fixation design for the switchgear to assembly it at the transition piede due to its subsequent handling for installation at sea.

- **Factory Acceptance Service (FAT)**
  - Switchgear routine customized tests.
  - Program and testing of operation relay settings (ekorRPG).
  - Busbar resistance test.
  - Power frequency test (56 kV).
  - Insulation resistance test (5kV).
  - HV SCADA operation test.
  - Complete switchboard operation and inspection test.

**Installation**

Switchgear installation at wind turbine transition piece at port and environmental protection wrapping during the transportation to the wind farm final location.

**Commissioning & Field Testing**

Of the installation at wind farm final location on 15th July 2009.

**Conclusions**

The development of the Medium Voltage (MV) internal grid in Rhyl Flats confirmed Ormazabal as one of the leaders in the supply of customized switchgear for power generation in offshore wind farms.

The level of specialization required in Rhyl Flats, confirms Ormazabal ability to adapt it facilities to the requirements of the installation, as well as flexibility in dialogue with the client.

No matter how difficult the challenge can be, we are ready to contribute in the development of green generation projects, building Personal Solutions, providing Reliable Innovation.

**Key benefits**

- Proven technology with almost 11 years offshore experience.
- Customized design for switchgear installation at wind turbine transition piece.
- Optimization of operational expenditures due to reduced maintenance.
- Switchgear requirements designed and tested according to specific offshore wind farm harsh environmental conditions.
- Proven operation at offshore conditions: Low temperatures and high salinity.