

Transformed into the largest substation provider in just 15 years





HSM yard Schiedam, The Netherlands



Horns Rev C 400 MW HV Substation for Energinet 2016

In 2002 the first ever offshore high voltage substation was delivered by HSM Offshore. This was under an EPCI contract from Eltra/Energinet, for the Horns Rev A project, off the Danish West coast. Things have gone from strength to strength since then, as this report to PES shows.

Earlier this year the company signed the EPCI contracts for the TenneT TSO B.V. Borssele Alpha and Beta Substations. It really is remarkable to see the growth in transformer capacity lead to larger topsides and substructures.

Lately we have also seen further increases in inter array and export voltages, as well as significant growth in the supply scope for EPCI contracts.

The Horns Rev A Substation featured a transformer capacity of 160 MW and topside weight of 1,100 mt and was placed on a multiple pile foundation. The Asian Hercules II floating sheerlegs and the IB 909 jack-up were used for the installation.

In 2007 there was another EPCI contract for the same customer, for a 250 MW Substation, featuring 1,300 mt topside and this time, with a jacket weighing 1,000 mt, the installation of both were undertaken by the Matador 3 floating sheerlegs.

The 325 MW Thornton Bank Substation was HSM's first Substation project in the Belgian sector and featured a 2,200 mt topside, delivered under an EPC contract from ABB for C-Power, a utility company.

HSM were also awarded the Substation for the third phase of the Horn Rev Offshore wind farm, by long-time customer Energinet, in the Danish sector, with 400 MW transformer capacity and 2,400 mt

deck weight. The handover was last year.

The current order book comprises 3 Substation projects.

The 450 MW Substation, for DONG Energy's Borkum Riffgrund 2 Offshore wind farm, is the first one for the German sector and the work features a 2,500 mt topside and a 1,700 mt jacket, which together with the piles, brings the overall weight of this project to almost 5.500 metric tons.

The jacket was delivered and installed earlier this year, whilst the topside is scheduled for sailaway during first half of 2018.

By far the largest project, with extensive EPCI scope of work, covers the provision of 2 identical 700 MW Substations, for the first large scale Offshore wind project in the Netherlands, designated Borssele, named after the town where the export cables reach the shore and connect to the onshore substation.

The contract is for TenneT TSO B.V., who has been assigned by the Dutch government, to establish and operate the grid connections associated with the current and future Dutch offshore wind farms and, as such, is HSM's first project for the Dutch sector.

The total weight per project of 8,000 mt is divided between 3,700 mt topside, a 2,900 mt, six legged jacket and 1,400 mt piles.

Deliveries are to be spread over a 3 year period and will be completed in 2020.

Each substation will connect two Offshore wind farms of 350 MW each, with inter array voltage of 66 kV and export voltage at 220 kV.

In addition to the general services covered by an EPCI contract, HSM will also be responsible for soil investigations, anti-scour protection by means of rock dumping, full HV integration and the provision of a jack-up unit to support offshore hook up and commissioning activities.

Construction recently started on the Borssele Alpha Substation, with a special event for the first cut of steel. This was attended by our customer, TenneT TSO, and also coincided with the formal contract signing for the Borssele Beta Substation.

We note a growth in topside weight in excess of factor 3, when compared with the first Substation. For the installed transformer capacity this factor is more than 4.

This growth is directly driven by the size of the offshore wind farms, wind turbine generators and the increased distance to shore.

The following factors have been of paramount importance to the continued success of HSM in this market:

QHSE performance and track record

During its long presence in the offshore energy sector HSM has developed and implemented comprehensive, effective management systems and procedures, which are testament to excellent safety statistics and high quality in-time project deliveries.

This has been verified by many customers and relevant certifying authorities during regular audit sessions, project execution and full certification is in place.

Relevant experience

HSM has been a prominent supplier of platforms, jackets and modules for the offshore oil & gas industry since 1962 and has successfully completed numerous projects predominantly in the North Sea area.

Notwithstanding the fact that not all parameters are the same for the offshore renewables industry, there are many similarities and in some cases the customers were/are active in both sectors.

Resources

HSM is extremely proud of the fact that the average employment time of the staff on their payroll is more than 18 years, which is quite unique and means the projects benefit from extensive experience gathered on the basis of many successfully completed projects. Many employees started as apprentices or trainees.

HSM has established successful long term relationships with reputable suppliers and subcontractors, for subcontracted activities and procured items. Thus forming

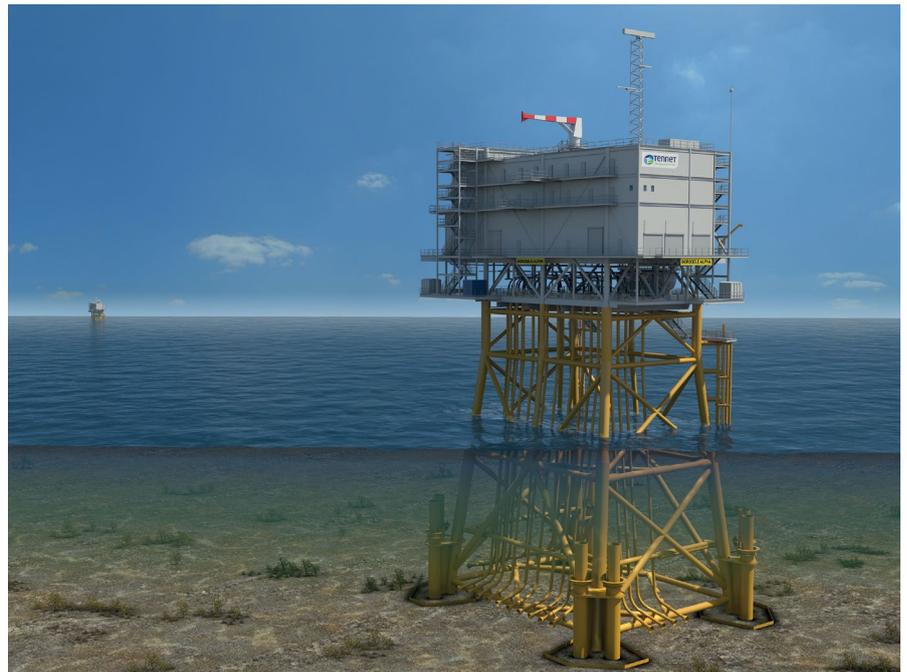


Homs Rev A 160 MW HV Substation for Eltra/ Enginet 2002

integrated project teams together with HSM staff and other subcontractors.

Facilities

The fully owned facilities of HSM are ideally situated in the greater Rotterdam harbour area, with deep water quaysides and a jetty giving unrestricted access to the North Sea and cover a total area of 70.000m² with ample room for expansion.



Borssele Alpha and Beta HV Substations for TenneT TSO – Artist Impression

These also provide large covered, fully climate controlled fabrication and assembly halls, so the weather conditions are not an issue. Thus giving optimum control over the schedule and quality. Plus the lifting apparatus is always available.

All painting and preservation activities are undertaken by payroll staff in dedicated facilities on the premises.

EPCIC experience

Initially in the offshore oil & gas sector and continued in the offshore renewables sector HSM successfully executed many contracts under EPC, EPCI and EPCIC contracts, which have today, become a preferred standard for Substation contracts.

HSM staff has been extensively involved in all phases of such contracts, starting with conceptual and FEED design work and finishing with transport installation hook up and final commissioning.

Parent Group

The ANDUS Group, which owns HSM are a financially strong conglomerate of companies, providing investment support and additional resources and facilities for engineering support and structural fabrication services.

This all provides HSM with a solid basis to continue their successful presence in the growing offshore renewables market.

HSM have recently decided to extend one of their assembly halls, to cater for the construction of larger sized and heavier platforms for future developments, which may include more compact HVDC

converter platforms and reactive compensation platforms, thus allowing two smaller topsides or one larger to be built simultaneously fully indoors.

Furthermore the load out quay will be upgraded to accommodate larger local loading. The planning is for these upgrades to be completed during the course of 2018

Potential synergies in the offshore energy market

Following on from an active involvement in both the offshore oil & gas and renewables sectors, HSM is ideally positioned to actively pursue projects and developments which seek to combine both.

This would allow for new functionalities to be added to existing oil & gas infrastructures, including green hydrogen generation and provision of facilities for offshore renewables projects, like accommodation and logistic support, whilst at the same time becoming a potential user of renewable energy provided, from an offshore grid and serving as clean power source for platform power and gas compression purposes.

Significant costs savings can be achieved whilst decommissioning existing offshore oil & gas facilities, which could be deferred for a significant period of time.

HSM are keen to take on the challenges associated with these prospects and to further enhance their role in the Energy Transition for many years to come.

www.hsmoffshore.com