Challenging offshore wind

Make better use of offshore wind power

The intermittent nature of wind farms requires specialised systems for high power quality and maximum grid stability. Alstom Grid offers efficient and reliable solutions.
**Baltic 2 - Germany**

Client & Operator:
EnBW Baltic 2 GmbH

Completion date:
2012

Project scope:
288 MW offshore wind farm with 80 wind turbine generators  
(Siemens 3.6 MW)

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**Global Tech 1 - Germany**

Client & operator:
Global Tech 1 Offshore Wind GmbH

Completion date:
2012

Project scope:
400 MW offshore wind farm with 80 wind turbine generators  
(AREVA Multibrid MS000)

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**Veja Mate - Germany**

Client & operator:
BARD Engineering GmbH

Completion date:
2012

Project scope:
400 MW offshore wind farm with 80 wind turbine generators  
(BARD 5.0)

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**Our scope of supply**

Turnkey delivery of a self-floating and self-installing substation platform including  
- 155/33 kV transformer (2x 150 MVA)  
- 170 kV & 33 kV GIS switchgear  
- 33 kV GIS switch-disconnector in all  
80 wind turbine towers  
- Substation protection & control  
- Cabling on platform  
- AC/DC equipment  
- Emergency diesel generators  
- Boat landing  
- Heli hoist  
Installation, erection & commissioning of offshore substation (onshore and offshore)

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**Our scope of supply**

Turnkey delivery of a self-floating and self-installing substation platform including  
- 155/33 kV transformer (4x 120 MVA)  
- 170 kV and 33 kV GIS switchgear  
- Substation protection & control  
- Cabling on platform  
- AC/DC equipment  
- Emergency diesel generators  
- Helicopter landing deck  
- Boat landing  
- Permanent accommodation facilities for up to 32 persons and 5 day guests  
Installation, erection & commissioning of offshore substation (onshore and offshore)

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**Our scope of supply**

Turnkey delivery of substation and platform equipment including  
- 155/33 kV transformer (2x 240 MVA)  
- 170 kV & 33 kV GIS switchgear  
- Substation protection & control  
- Cabling on platform  
- AC/DC equipment  
- Emergency diesel generators  
- Fire detection and protection system  
Installation, erection & commissioning of offshore substation (onshore and offshore)
Sheringham Shoal - UK
Client & Operator:
Scira Offshore Energy Limited
Completion date:
2011
Project scope:
315 MW offshore wind farm with 87 wind turbine generators (Siemens 3.6 MW)

Our scope of supply
Onshore 132 kV GIS substation. Turnkey delivery including civil works of two bays to receive the transmission cables from the offshore substation plus connection towards EDFE

- Two offshore 132/33 kV GIS substations
- Design and fabrication of an integrated topside including load out
- Power transformer (2x 90 MVA)

System design
- System studies
- Liaison with WTG and cable suppliers
- Liaison with National Grid and EDFE
- Provision of data for National Grid, including compliance statements

Electrical system commissioning of substations (onshore and offshore)

Borkum West II - Germany
Client:
TWB TRINALE Windkraftwerk Borkum GmbH & Co. KG
Completion date:
2011 onshore, 2012 offshore
Project scope:
400 MW offshore wind farm with 80 wind turbine generators (AREVA Multibrid M5000)

Our scope of supply
Turnkey delivery of 170/33 kV offshore substation including
- Topside and foundation structure
- Power transformers (2x 225 MVA)
- Substation protection & control
- 170 kV & 33 kV GIS switchgear
- Cabling on platform
- AC/DC equipment
- Emergency diesel generators
- Helicopter landing deck
- Boat landing
- Marine equipment and fire protection

Erection and system commissioning of offshore substation (onshore and offshore)

Ormonde - UK
Client & Operator:
Ormonde Energy Ltd. (owned by Vattenfall Wind)
Completion date:
2011
Project scope:
150 MW offshore wind farm with 30 wind turbine generators (REpower 5M)

Our scope of supply
System level
- Overall system electrical design
- Electrical system SCADA
- Telephony system
- Substation commissioning

Offshore substation
- Design, supply, and install into modules of 4 bays 132 kV GIS including local control, 8 bays 33 kV GIS switchgear including protection,
- Assembly onto the deck of equipment modules, 132/33 kV transformers (2x 85 MVA)

Onshore substation
- Turnkey construction of 132 kV AIS bay
- Dynamic reactive compensation system
REALISED PROJECTS

Barrow - UK

Client & Operator:
Barrow Offshore Wind Ltd.
(Centrica & DONG Energy)

Completion date:
2006

Project scope:
90 MW offshore wind farm with 30 wind turbine generators
(Vestas V90/3.0 MW)

Our scope of supply

Electrical connection modelling and system studies

Onshore substation at Heysham to connect into the grid

Onshore cable system
- 2.8 km of single circuit, 3 cable, 132 kV system

Module supply and installation onto deck
- 132 kV & 33 kV GIS switchgear including protection
- Power transformer
- Relay and control panel suite room
- LVAC and DC plant room, refuge, mess and workshop modules
- Two capacitor bank modules (2x 5 Mvar)

Electrical system commissioning

Robin Rigg - UK

Client & Operator:
E.ON UK Solway Offshore Ltd.and
E.ON UK Offshore Resources Ltd.

Completion date:
2009

Project scope:
180 MW offshore wind farm with 60 wind turbine generators
(Vestas V90/3.0 MW)

Our scope of supply

Two separate platforms - Robin Rigg East and Robin Rigg West

Connected in 4 groups at 33 kV to offshore 132/33 kV substation

Onshore 132 kV substation
- Connection to United Utilities Network
- 132 kV substation equipment
- 33 kV reactive compensation equipment and control

Fit out of modules with all substation and platform equipment

Offshore modules and equipment fitted onto platform at Barrow docks

Electrical system commissioning

Alpha Ventus - Germany

Client & Operator:
DOTI GmbH

Completion date:
2008

Project scope:
60 MW offshore wind farm with 12 wind turbine generators
(6x AREVA Multibrid M5000 and 6x REpower 5M)

Our scope of supply

Turnkey delivery of substation and platform equipment including
- 110/30 kV power transformer (75 MVA)
- Substation protection & control
- 110 kV & 30 kV GIS switchgear
- Cabling on platform
- AC/DC equipment
- Diesel generators
- Marine equipment
- Fire protection

Electrical system commissioning of offshore substation (onshore and offshore)