SAG – Your Partner for Energy-related Infrastructure

Overview of services for connecting offshore wind farms to the power grid
The SAG Product and Service Range

Product and service overview along the transmission of offshore wind energy

1. Transmission line routing
2. Windfarm
   - Infield submarine cable laying
   - Offshore substation
   - Operation of substation
3. Cables
   - Submarine cable laying nearshore
   - Island and Wadden Sea cable laying
   - Landfall
   - Onshore cable laying
4. Grid connection
   - Onshore substation
   - Operative service for substation
   - HV overhead transmission lines

Services are performed in all areas for planning, engineering, erection, taking into operation and servicing

Grid connection of offshore wind farms
Focus on Product and Service Range
Comprehensive routing and engineering services

Working Areas & Solutions

- Feasibility studies
- Pre-planning
- Permit planning and management
- Route planning
- Electrical engineering planning
- Execution planning and engineering
- Construction support
- Construction supervision

Grid connection of offshore wind farms
Focus on Product and Service Range
Substations

Working Areas & Solutions

- Engineering for offshore substations
- Platform planning
- Conception and engineering design of GIS substation
- Construction of offshore substations
- Operation of substation
- Service and maintenance of substations

Source: 50Hertz Transmission GmbH
Focus on Product and Service Range
Submarine cable laying

Working Areas & Solutions

- Submarine cable laying with self-developed equipment
- Route clearing
- Submarine cable installation and connection (also end-terminals)
- Submarine cable repairs
- Submarine cable dismantling
- Landfalls (also in HDD process)
- Overbridges
- Laying, assembly and taking into service of infield submarine cables
Focus on Product and Service Range
Cable landfall and onshore cable laying

Working Areas & Solutions

- Complete earthworks
- Delivery and laying sheath pipeline systems
- Cable delivery, laying, assembly and taking into operation
- Trenchless laying (HDD (bore lengths up to 2,500 m), plough-in)
- Cable drawing
- Installation up to 170 kV (sleeves and sealing ends)
- Cable testing
- Documentation
- Maintenance and Service

Grid connection of offshore wind farms
Comprehensive Special Equipment
Own developments and a focus on environmental friendliness

Equipment & Marine Engineering
- Self-developed equipment
  - Vertical injector for environment-friendly infield submarine cable laying
  - Vibration plough for environment-friendly cable laying in the Wadden Sea
- Approx. 20 ships and pontoons
  - Self-propelled working ships for inland waterways and coastal waters
  - Pontoons without propulsion as equipment carriers or materials storage
  - Working ships for drilling and refurbishments

Environment-friendly cable laying without polluting the Wadden Sea
Focus on Product and Service Range
Service / Disruption reaction and remedy

Working Areas & Solutions

- 24 hour / 365 day emergency standby
- Cable inspection and fault localisation
- Fault repair on cable (only assistance on submarine cables)
- Maintenance work on substations (onshore and offshore)
Grid connection of offshore wind farms

Focus on Product and Service Range
Onshore substations and overhead lines

Working Areas & Solutions

- Engineering for onshore substations
- Conception and engineering design of AIS and GIS substation
- Turnkey construction of substations
- Service and maintenance of substations
  - On-call standby
  - Inspections and maintenance
  - Remote monitoring
  - Disruption search and repairs
  - Replacement part stocks
- Operation of substation
- Planning and construction of HV und extra HV transmission lines
SAG Strengths … for Your Benefit

- Full service performance for energy transmission from offshore production to the end-customer
- Comprehensive value-added:
  - Project development, alignments / routing
  - Permits planning and procurement, submitting applications
  - Delivery, installation, taking into operation
  - Operation
  - Servicing, maintenance, fault remedy
- Optimised realisation processes building on specialisation
  - Reduced interfaces, e.g. between onshore and offshore sections
  - Short planning times, fast construction times
- Modular concept for linking up regenerative plant
- Know-how transfer from the core competences
  - in offshore wind energy
  - in the transmission line and substation construction segment, as well as cable laying
- Extensive knowledge about the particular requirements demanded for crossing the Wadden Sea
- Experienced and trained service personnel onshore and offshore
- Strategically favourable location of Bohlen & Doyen with company facilities near to the coast
- Wide-area coverage location structure in North Germany
- Decades of experience gained in dealing with relevant public authorities, network operators and suppliers in numerous projects