Wind Energy Farms
Solutions for Offshore Platforms
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At Wärtsilä we understand the marine and wind farm energy industries. We know the challenges and are aware of the specific requirements involved; we listen to our customers and strive to meet their needs; we develop innovative leading technologies; and we integrate our extensive range of products, systems and solutions to provide lifecycle safety, reliability and efficiency. By connecting all these individual dots, we provide real value for our customers.

We Provide
- Basic & detailed design
- Navigation/communication systems
- Bird scare technology
- CCTV systems
- Fire protection and firefighting systems
- Door access control
- Public address/general alarm technology
- Monitoring and control systems
- Condition monitoring systems
- Low and medium voltage switchboards
- UPS and battery systems
- Resistors
- Sonar transponders
- Lighting
- Sea markings
- Cable network
- Integrated system solutions
- O&M
- Service

Wärtsilä, through its many subsidiaries in the field of electrics, electronics and automation, is uniquely experienced in developing technologically advanced products, systems and solutions that serve the maritime sector. Access to the Group’s extensive portfolio of reliable products, coupled with the know-how of highly qualified engineers, has enabled the creation of a broad offering of concepts and solutions that allow our customers to operate safely, efficiently, and profitably. Together with our customers, we have developed comprehensive packages covering platforms for HVAC and HVDC technology and wind power plants. We are committed to helping create a reliable and environmentally sustainable power supply, and are working hard to support its ongoing development.
SCADA System - Wind farm Remote Control and Monitoring System

The Wärtsilä Platinum Remote Control and Monitoring System is completely LAN based, offering scalability and flexibility to cover the functionality of all tasks defined and required for the supervision of wind farms.

All alarms and control functions common to marine applications are supported by highly standardized components. Continuous operations are guaranteed through extensive online diagnostics, support for maintenance, and remote diagnosis.

Communication between the Transformer platform and the Land Based Station is via fiber optic cable.

Features
- Combined IP Radar / ECDIS
- High resolution wide screen displays
- Tracking of up to 100 Radar and 1000 AIS targets
- Chart maintenance based on real-time updates and dynamic licensing
- Field station for process IO’s in a variety of sizes
- Standard interfaces/protocols by RS485/RS422 to all major marine suppliers
- Power Management System (PMS)
- Alarm management
- Unmanned operation.

Connected Devices
- Automatic Identification System (AIS)
- Voyage Data Recorder (VDR)
- Wind / Weather Information System
- Marine radio Systems VHF
- Aeronautical VHF
- Helideck Monitoring System
- Environmental data process
- Wind turbine systems
- Sea markings of complete wind farm installations.

System configuration
Sea Markings – Solutions for Transition Pieces

Wärtsilä’s scope of supply includes the selection, arrangement, delivery and installation of sea-marking components in accordance with the requirements of all relevant authorities (e.g. BSH).

- LED navigational lanterns, 5 NM
- LED illuminated marking sign plates
- LED light tubes
- GPS synchronisation
- Visibility meter, twilight switch
- Interface, control and monitoring modules
- UPS with battery back-up for sea markings
- Sonar transponders with monitoring and remote maintenance
- Floodlights for tower spotlighting, LED type

- Self-contained LED signal compact system
- Reference systems for DP operations, e.g. reflective tube targets
- Control concepts for sea markings of complete offshore wind farm installations.

Control concept for sea markings of complete offshore windparks
Wind and waves complicate physical access to offshore systems, making effective fire demand protection essential. Wärtsilä can provide effective protection for your investment in wind power.

**Fire Detection**

Fire detectors provide early warning help to protect life, property and the environment. Should you use an air intake system to detect smoke or a thermometer to monitor temperature? Do you want a system that recognizes fire or an early warning device that tests for smoke? Or a combination of several different interdependent sensitive detectors that provide several levels of warning and control? Intelligent observation and warning devices that communicate with a central fire alarm network form the nucleus for modern fire detection.

**Fire Fighting Systems**

CO2, water, scum, inert gas, IG 55 and FORREX are extinguishing agents used in modern fire fighting systems. It requires thoughtful investigation and a study of the area and the project to choose the right agent for your situation. All attributes and potential fire hazards will be taken into account in such an investigation. Usually, a particular combination of extinguishing agents is identified as the most effective approach.

**CCTV**

Video surveillance systems, also called CCTV, are an important element for fire detection systems onshore and offshore. They provide security, the archiving of video and remote surveillance. Wärtsilä’s video surveillance systems transmit high resolution images at a high transfer rate. They enable you to maintain remote visual surveillance around the clock, 24 hours a day/7 days a week, from anywhere in the world.
Furthermore, CCTV systems can be networked with other systems, such as access control or time registration.

Public Address and General Alarm
An electronic public address system facilitates efficient announcements and evacuation procedures. Wärtsilä systems always meet the standards of Electroacoustic Emergency Warning Systems (DIN VDE 0829 and IEC 60849). Public Address applications include paging, general alarm, and PBX & VOIP telephone paging.

Door Access System
Electronic access control systems are an alternative to traditional mechanical locking systems. They allow or prevent access to restricted areas. At the highest levels of security, a system of identification is necessary. There are a variety of options, including ID cards or contactless systems such as key fobs, to withstand the most challenging environments and conditions, onshore and offshore.

Communications
Communications technology describes a broad range of systems transmitting voice and data across complex networks. The system components can include telephone switchboards, data stores, public address systems, light-call systems, interphones or audio systems.

Bird Scare Technology
Using Wärtsilä’s bird scare technology will reduce damage caused by bird crud, nest building or fish cadaver.

Fire Detection
- Optical smoke detectors
- Thermo sensitive detectors
- Multi criteria detectors
- Flame detectors
- Aspiration smoke detection

Rugged CCTV Camera Solutions
- Fixed & Pan / Tilt / Zoom camera systems
- Ethernet CCTV solutions
- Digital recording & archiving
- Fiber optic CCTV
- Aspiration smoke detection
- POS / Digital CCTV recording integration
- Video analytics
- HD decoders
- Vandal proof / weatherproof cameras
- Matrix control

PA/GA System
- General alarm system
- Redundancy in speaker lines A/B
- Public address
- Telephone interface
- Outdoor speaker
- Vandal proof / weatherproof cameras
- Indoor speaker
- Matrix control

Door Access System
- Monitoring of hatches
- Monitoring of doors
- Personal access control
- Personal tracking
- Remote control
ELAC ST 30

Offshore wind farms in the North and Baltic Seas will be installed partly in areas that have been used for military test purposes. In order to avoid the possibility of submarines colliding with pylons, the German Navy requires a sonar transponder system to be installed at each boundary of the wind farm.

A submarine can communicate with the sonar transponder by using an underwater telephone system. Underwater telephones have been manufactured and delivered by Wärtsilä for many years, and are installed on all German and most international non-nuclear submarines. For the ELAC ST 30, Wärtsilä also uses many of its long-term proven underwater telephone components. This guarantees a reliable and very robust solution.

The fully compliant ELAC ST 30 consists of three main components:
- Electronic unit UM 31 (located inside)
- Transducer (sensor) group LEG 117 (to be installed at half the water depth). A special quick release facilitates any diver activities.
- Special transducer (sensor) cable interfacing the electronic unit UM 31 and the transducer group LEG 117.

A connection box AK 152 is used to separate the sensor cable so as to facilitate the installation. The system requires only a power supply and an interface to the control room/SCADA (Supervisory Control and Data Acquisition). Concepts and references for all foundation structures are available.

Power Supply

The uninterrupted power supply to systems and consumers onboard HVAC- and HVDC-platforms is a matter of course nowadays. This is, however, only possible if a reliable power distribution system adapted to the needs of the customer is installed. Be it automation, communication or safety systems: the various consumers are all dependent on a network, and the controlled flow of power is essential for smooth operation.

UPS Systems

The uninterruptible power supply of the controlling components on wind energy plants is of essential importance for efficient and safe production of wind energy. A sudden loss of position lights, elevator failures, or the shutdown of the emergency stop systems have to be avoided. At the same time, it is absolutely essential to ensure the continuous availability of the communication and controlling systems.
Wärtsilä has established a leading position in the field of customized manufacturing, and has the capability to meet the diverse requirements of industrial power supply even under abnormal environmental conditions. Our specially equipped UPS-systems are operating in the most challenging conditions. Thanks to their compact design, and through the use of special technical adaptations, such as extreme vibration-/shock resistance, the systems are adapted to overcome the harshest operating conditions, both on- and offshore. The following types of UPS are used within the range of on-/offshore wind energy applications:

- Wärtsilä JOVYLINE, small and robust UPS systems with 625 - 1200 VA
- Wärtsilä JOVYTEC PMS and Wärtsilä JOVYTEC P, UPS systems 1 kVA up to 3 kVA, freestanding or 19-inch-rack
- Wärtsilä JOVYTEC L, 1-phased double conversion UPS systems, built into industrial cabinets 6 -10 kVA
- Wärtsilä JOVYSTAR, 3-phased double conversion UPS systems, freestanding, 10 up to 800 kVA.

**Batteries**
Wärtsilä supplies various battery types and series. In order to meet special on/offshore requirements, the battery systems are installed in air-conditioned/heated cabinets to ensure long life, even under extreme environmental conditions. The perfectly adapted battery types „J“ and „JL“ are maintenance-free, sealed lead acid batteries with AGM-technology (Absorbent Glass Mats). The electrolyte is bound in a glass fiber fleece.

**Resistors**
Wärtsilä manufactures customized resistor systems specialized for on-/offshore wind energy applications that meet the challenging demands involved.

Our product range includes starpoint earthing resistors for transformer stations, braking resistors for converter protection, and filter resistors for high sinusoidal voltages. We also serve many other applications, including rotor blade adjustment, energy absorption from crane motors on jack-up vessels, speed control of generators, power compensation in case of mains disturbances, and the smoothing of arising harmonic distortions. The reliability and high quality of Wärtsilä resistors are renowned worldwide.
Wärtsilä takes responsibility for the delivery of navigational and general lighting systems, as well as cable network and installations.

**Navigational and General Lighting Systems**
- Calculation of illumination levels
- Selection, arrangement, delivery and installation of sea marking components in accordance with the requirements of all relevant authorities (e.g. BSH)
- Selection and arrangement of lighting fixtures and sockets in close cooperation with the yard and owner
- Delivery of lighting fixtures, sockets, sea markings etc.
- Provisional self contained LED navigational lanterns for building period (if necessary)
- Installation and connection works
- Commissioning
- Measuring of illumination levels

**Cable Installations**
- Delivery and installation of cable trays and mounting materials
- Installation of electrical components
- Delivery, installation and connection of cables
- Assistance for system tests and commissioning.
Integrated System Solutions – Your Partner from Design to O&M

Wärtsilä is a leading system house for the supply of complete electrical and electronic system packages – turnkey solutions.

Turnkey solutions represent system performance, typically in close partnership with the building yards. Starting at the preliminary design stage of projects, our company can assume responsibility for the integration of multiple electric and electronic systems to create a uniform turnkey solution.

With competent project management, together with professional cross-system capabilities for all electric and electronic systems, the most diverse building specifications will be implemented to ensure complete customer satisfaction.

We take care of the project management, the basic & detailed design, planning, owner and class approvals, mechanical coordination, installation, design and development, as well as the interface optimization between shipyards and sub-contractors.

The range of system integration varies from a package delivery of products, including product related engineering, up to complete system integration (the turnkey solution) where we act as the shipyard’s electrical department.

Dealing with a single partner helps to minimise costs and ensure optimal functionality of all components.

We Provide

- Project management and complete electrical system integration
- Planning of technical and commercial issues throughout the design and construction phases
- Turnkey solutions
- Training
- Logistics support
- Engineering, design and development
- Interface optimisation between the shipyard and sub-suppliers, based on computer aided tools
- Testing and approval with the owner and classification society.
Wärtsilä is a global leader in complete lifecycle power solutions for the marine and energy markets. By emphasising technological innovation and total efficiency, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers.