MARINE RENEWABLE ENERGY
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INTRODUCTION TO OCEANEERING RENEWABLES

The accelerated transition from fossil fuels to renewable energy creates many obstacles to successful projects. Commercial scale wind farms, larger turbines, stronger currents, and environmental considerations all pose additional risk to your project at a time where the LCOE is vital to project viability.

From routine to extreme, our long-standing offshore experience, coupled with our robust and innovative products, tools, and services, safely de-risk operational systems, increase reliability, and lower total cost of ownership. We have a successful track record of solving our clients’ toughest challenges, in the harshest environments, making us a preferred project partner.
Survey experience

With decades of experience and access to a fleet of reliable, state-of-the-art vessels and ROVs, we provide safe, cost-effective site investigations that generate reliable data to support your development decisions. Our SAIL data transfer solutions enable the exchange of large quantities of high-quality survey data from work vessel to shore, for faster shore-based batch processing. Our solution minimizes the number of offshore personnel required and provides rapid turnaround processing times, ensuring fast decision making where needed.
We can provide:

» Geophysical - pre/post-route surveys
» Geotechnical - 2DHD seismic, coring, cone Penetrometer testing
» Environmental
» Unexploded ordnance (UXO)
» Archaeological surveys
» Hydrographic surveying - positioning
» Desktop studies
Oceaneering’s front-end capability, technology, and hands-on experience makes us the ideal engineering partner for delivering offshore renewables projects. Our global engineering team works with the most advanced software to simulate your projects’ and products’ operational environment. Providing clients with independent assessments gives them confidence in proposed engineered solutions before they are implemented. Our in-house services include:

- Conceptual engineering
- Structural stress analysis (i.e. lifting, transportation, installation, operation)
- Fatigue and dynamic analysis
- Vortex-induced vibration analysis
- Thermal and electrical analysis
- Pull-in, free span, on-bottom, and installation analysis

**ENGINEERING SERVICES**

- **CONCEPT**
  - Strategy Development
  - Integrated Field Planning
  - Conceptual Engineering
  - FEED
  - Gate Deliverables
  - Regulatory Applications
  - Development Estimates

- **DETAIL**
  - Project Planning
  - Geotechnical Assessment
  - Foundation Design
  - Route Planning
  - Detailed Design
  - Installation Engineering
  - Assurance Services

- **IMPLEMENT**
  - Package Management
  - Procurement Support
  - Subsea Ops Management
  - TA Support
  - Vessel Assurance
  - Offshore Support
  - Client Representatives
DESIGN VALIDATION AND TESTING

We deliver solutions that help prove the performance characteristics of products and materials for our clients. Our Test, Qualification, and Reliability Laboratories can perform a suite of tests on independent cable designs and samples to verify dynamic and static fatigue, crush, impact, tensile with bending over sheath, torsion, and friction. These tests build confidence that the cable can be installed within allowable parameters, and verify engineering calculations for the cable’s operational design life.
Our ROV fleet continues to evolve to meet our energy customers’ need for vehicles that offer efficient, flexible operations in all water depths, offshore environments and weather conditions.

In addition to our resident E-ROV and Freedom vehicles, Oceaneering’s diverse ROV offerings include our Spectrum light electric work class ROV, which can perform light underwater intervention tasks in up to 10,000 fsw / 3,000 msw. Spectrum provides a high thrust, cage-deployed system that can support oil and gas drilling, construction and production activities.
Our Isurus ROV, the latest in our Magnum class systems, is designed for holding station in currents greater than 3 knots, increasing our efficiency and expanding the weather window in which we can operate. Isurus is ideal for supporting wind farm installation projects and work in shallow water environments.
For more than 25 years, we have delivered over 4,000 km (2,500 mi) of subsea cable to complex projects. Our engineering and design expertise, along with state-of-the-art facilities, will support the manufacture and delivery of medium- and high-voltage power cables. We can serve global offshore wind, tidal, wave and interconnect projects with manufacturing facilities in key regions, such as the U.K., the U.S., and Brazil.

**Our facilities provide:**

- Quay-side access of 9 m (29.5 ft) water depth
- Storage access to a fleet of DNV-rated reels or carousels ranging from 300 te to 7500 te capacity
- Safe loadout by qualified personnel
INSTALLATION AND COMMISSIONING

Lower your project execution risk and keep your project on schedule with our fleet of vessels, equipped to meet your project needs with modular hardware that includes carousels, reels, lay spreads, and tensioners.

» Large fleet of US-flagged Jones Act compliant vessels
» Vessels ready to mobilize, equipped with ROVs and survey spreads
» Dredge Act compliant cable burial
FARM PREPARATION AND CABLE ROUTE CLEARANCE

We design the most effective site preparation and route clearance programs to meet our clients’ objectives. With more than 5,000 km (3,701 mi) of cumulative boulder clearance and pre-cut trenching successfully performed, our original, patented, and proven tools offer a flexible approach for project needs ranging from soft to hard soils, dense or spread boulder arrangements.

Our setup lowers project cost and minimizes environmental impact by requiring significantly less field time than conventional bolder grab solutions. For removal of scattered formations or large boulders from berms, our intelligent boulder grab can be quickly deployed to keep your project on track.
CABLE BURIAL

Pre-cut trenching enables repeatable, guaranteed depth of cable burial by eliminating in-trench boulders that cutter solutions can’t. Our process enables continuous product lay at the desired installation tension, reducing cable lay project risk and providing contracting certainty in depth of burial.

Our patented Manta tool offers a step change in traditional jetting prior to and during installation of an offshore renewable facility. Designed for shallow water projects, our patented energy containment system ensures that soil stays in a suspended, fluid state for longer, resulting in the best opportunity to meet the project-specified depth of burial. For environmentally sensitive areas, surface mounted pumps make Manta the quietest jetter available.

» Compact and lightweight
» Deployable from construction or AHTS vessel
» Easy mobilization and demobilization
» Contained sediment and quiet operations
CABLE INSTALLATION SUPPORT

With over 1,500 km (932 mi) of subsea products installed by Oceaneering vessels, we understand the challenges associated with safely handling a valuable commodity. From pre- and post-lay surveys, pre-lay grapnel run operations, touchdown monitoring with our PortVision global data solution, and onboard technician support for pull-in and hang-off operations right through to burial and protection, we are the right EPCI project lead to support your needs.
CABLE PROTECTION

Our backfill plough ensures that product lay and burial are separate, again removing heavy assets from the critical path. It replaces soils removed during trenching and creates a soil cap that ensures product snagging by nets during trawling is eliminated. The cable is not contacted by the plough, eliminating the risk of cable damage when compared to simultaneous lay and burial-type solutions.
INSPECTIONS, MAINTENANCE, AND MONITORING

TURBINES, FOUNDATIONS, AND SUBSTATIONS

By continuously monitoring the health of your aging assets with our EdgeSmart solution, we identify lifecycle patterns and enable you to make better spend decisions across your assets.
Our maritime business systems that enhance efficiency, reduce cost, and increase safety and security around the world. Our satellite connectivity services enable you to process data remotely. Our software enables you to monitor the location, health, and productivity of your offshore assets.

Our services:

**EdgeSmart**
Aggregate data from sensors or OEM interfaces, safely store in our media vault, and quickly access information from all of your assets when needed.

**PortVision**
Monitor your assets and projects in real time from anywhere, including vessels moving in and out of a cable-lay corridor, or wind farm, and customize to focus on the data you need most.

**Remote Monitoring**
Through our Asset Intelligence and Monitoring Center, we provide customers with comprehensive, centralized offshore asset monitoring and protection services, improving the decision-making process and making operations more efficient.
Our asset maintenance solutions meet the demands of larger assets installed farther from shore and in deeper water. We push the boundaries with our autonomous underwater vehicle (AUV) and ROV fleets to support your project above and below the waterline. We provide independent inspection and verification services, as well as non-destructive testing (NDT) to support the fabrication of your large-scale structures, including foundations, towers, nacelles bedplates, and other large components.

**Our diverless inspection services include:**

- Anode depletion checks
- Subsea weld inspections (piles and jackets)
- Scour and grout inspections
- Cable condition surveys
- Topside asset inspections

Our resident E-ROV and Freedom vehicles enable vessel-free inspections by deploying remotely operated assets that live subsea in the field. Piloted over a 4G/LTE connection, data is gathered via our EdgeSmart solution and assessed remotely, enabling our clients to rapidly evaluate assets without deployed personnel or vessels. Our PortVision data solution enables our clients to monitor the movement of vessels in and out of wind farms.

We also design, manufacture, and assemble bespoke carousel storage and loadout systems to store project cables onshore to support project maintenance requirements, and can assist with cables/umbilicals testing.
For nearly 10 years, we have deployed robotic crawlers to perform monopile surface inspections, cleaning operations, and ultrasonic weld inspections. Our multi-purpose, modular-designed crawler system removes the need for people to be in enclosed, confined, and hazardous spaces, and is capable of operating in up to 100 m (328 ft) water depth.

Marine growth hinders performance of dynamic cable applications. We offer a range of field-proven marine growth removal tools that are ROV-deployed to keep divers out of harm’s way. These tools traverse along the cable following the dynamic catenary, removing marine growth and restoring the performance of the system for floating wind, wave and tidal applications.
With the very first wind farms now beyond economical repair, Oceaneering can safely remove and dispose of cables, monopiles, and other wind farm structures. Our technology is adapted to suit the ever-evolving size of today’s monopiles. With expert cutting services, diamond wire saw and water jet cutting, we can cut any structure with an outside diameter greater than 9.8 ft (3 m). We also offer engineered decommissioning consultative services, cable retrieval, and recycling, and can design decommissioning plans for consent at the project FEED stage.

With more than 40 topside platform decommissioning operations and over 400 complex platform, string or pile cuts performed to date, we are the trusted partner to remove your substation structures with limited impact on the offshore environment.
PERSONNEL

At Oceaneering, we solve complex challenges. It is our people that ensure that projects are delivered to the satisfaction of our clients.

The very best industry talent is within your reach—including engineers, project managers, designers, offshore managers, supervisors, ROV pilots, trenching operators, technicians, riggers, independent inspectors, and more. Through our established network of professionals, we can serve all of your project needs.