



RPS OFFSHORE WIND

NATURAL
RESOURCES



Transforming the global energy landscape



We have deep expertise in things that matter and we are easy to work with.

Our clients trust us and we are respected for our creative thinking.

Together we build strong relationships by repeatedly delivering on our promise.

MAKING COMPLEX EASY



A MARKET DISRUPTER FAST ENTERING MAINSTREAM SUPPLY

Renewables are rapidly transforming the global energy landscape. Offshore wind has become an important element of this transformation, and increasingly so on a global basis.

As competition increases for developers as their search widens for clean energy resources offshore, RPS is right in the thick of it - with our deep commitment to global energy security through the development of high yield and low impact infrastructure.

We offer a range of technical consultancy and operational support to this growing market including: Environment and Permitting; Site Investigation; Metocean (including wind resource measurement); Port Infrastructure and Logistics; Marine Assurance; and Unexploded Ordnance. Our breadth of services allows our teams to sit alongside our clients throughout the asset lifecycle, providing international standard advice.



SUPPORT ACROSS THE ASSET LIFECYCLE

As the offshore wind industry develops and matures around the world and developers seek to capitalise on the clean energy potential within local markets, RPS specialists are supporting renewable energy investment, innovation and commercialisation.

Define

What we do	Making complex easy
Managing the permitting and consents process	Navigating the complexities of multiple regulatory frameworks and stakeholder engagement needs specialist knowledge and experience – getting this right can prevent your project becoming tangled in unnecessary and expensive delays and escalating development and operating costs. RPS have advised on offshore energy projects successfully for over 40 years – our local expertise is backed by an international network to help clients navigate the nuances of increasingly complex regulatory landscapes.
Applying new technology and innovation to collect reliable wind resource data - Floating LiDAR	<p>We provide high quality and durable LiDAR buoys for the site-specific long-term measurement of wind resource. Our buoy design is supported by decades of offshore measurement experience in the harshest environments, together with the application of industry leading technology.</p> <p>Our Metocean buoys are environmentally friendly - they've been carefully designed with moorings that minimise seabed disturbance and marine life entanglement risk, which simplifies the permitting process.</p>
Robust interpretation of ground conditions to de-risk development areas.	<p>Uncertainty regarding offshore ground conditions, can introduce unwanted ambiguity to a development project - particularly during a competitive bidding process.</p> <p>RPS are acknowledged experts in the assessment and interpretation of ground conditions - reducing uncertainty, facilitating optimisation and informed decision making within a competitive process.</p>
Applying international standard advice to provide investment confidence	<p>When you're looking to apply international standards at a local level, it helps to engage with teams who have a wealth of international experience to back you up.</p> <p>Our teams have experience advising in a range of regulatory environments around the world and bring this experience to bear on projects, to provide confidence in the standard of advice provided.</p>



OUR EXPERIENCE

RPS has deep expertise in the delivery of onshore and offshore energy projects. Our team of project managers, EIA experts and technical specialists bring a comprehensive understanding of a range of potential marine and terrestrial, human, biological and physical environmental impacts to design and deliver the right solution to meet the challenges of these projects.

Floating LiDAR

A bankable assessment of the available resource is the most critical element of any resource or energy project. For offshore wind farms, the resource that needs quantifying is the wind, with the strength and consistency over the long term requiring definition.

We took traditional LiDAR technology and integrated it into a buoy with power, data storage and satellite communication capabilities.

Applying our deep expertise of offshore measurement, our design and development process focussed on creating a reliable design to maximise data accuracy and return, while making the process of information gathering easier and more cost-effective for our clients. Fixed to a buoy, our LiDAR measures the doppler shift/

effect - changes to laser light wave formations - as a way of determining wind speeds at sea.

It's environmentally friendly - our mooring design minimises damage to the seabed and marine life entanglement risk. The buoy is powered by solar and wind energy – helping meet the stringent environmental consenting conditions often associated with renewable wind farm projects.

Our buoy design has achieved Level 2 certification. This is an important milestone in the development of our technology as it qualifies the RPS LiDAR 4.5 buoy type to collect bankable wind resource data for clients wishing to develop offshore wind farms.

During the 6-month validation deployment off Blyth in the UK, our buoy NEVER missed a 10-minute data transmission, and the validation accuracy is excellent, achieving the best practice KPI.

Additional construction and further development of our Floating LiDAR buoys change is underway and will continue to meet the rapidly expanding renewable offshore wind sector.

Deployments

July 2018:
Centaur Beacon Reference LiDAR deployment – Perth, Western Australia

November 2018:
ORE Catapult Metmast LiDAR deployment – Blyth, UK

December 2018:
Equinor - Empire Wind Project LiDAR deployment, New York, USA

July 2019:
Equinor - Empire Wind Project LiDAR deployment, New York, USA

July 2020:
Equinor - Windy Hill II Project LiDAR deployment, Ulsan, South Korea

July 2020:
Centaur Beacon Reference LiDAR deployment – Perth, Western Australia

September 2019:
Centaur Beacon Reference LiDAR deployment – Perth, Western Australia

July 2019:
RPS Floating LiDAR buoy type achieves L2-Certification

Design and manage

What we do

Design and manage offshore surveys to ensure fit for purpose results

Provide a dedicated team of EIA and permitting project managers

Metocean forecasting for operations planning

Making complex easy

Offshore surveys can be costly from a financial and a program perspective. It's critical that surveys are appropriately designed to achieve a given objective. Our teams of in-house technical specialists have deep expertise and experience designing surveys. Hard-earned experience built up through our involvement from the very early days of the offshore wind industry in Europe. We have specialists who design offshore geophysical and geotechnical surveys, metocean surveys and the full range of environmental surveys (onshore and offshore). We routinely sit alongside our clients helping to procure and manage surveys as well as managing quality control and analysing outputs.

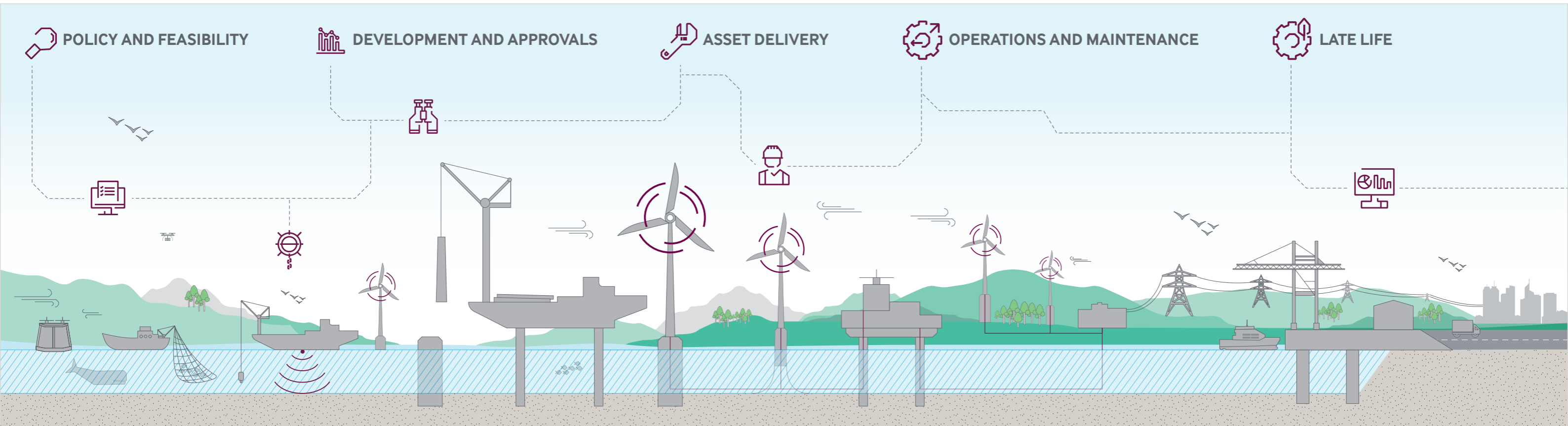
The EIA process for offshore wind can be complex and demanding.

Our team of dedicated and experienced offshore wind EIA project managers are supported by a breadth of in-house technical specialists. This team comprises our problem solvers – working closely with our clients to find solutions to complex issues.

We provide unique metocean forecasting that integrates site specific, real time measurements with advanced model predictions to provide a high-quality forecasts. These improve significantly on traditional forecast products, providing our clients with better information on which to make important decisions.



INTEGRATED PROGRAM DELIVERY



- Wind resource measurement and metocean sciences
- Planning, environment and consents
- Site investigation and survey
- Port Infrastructure and Logistics
- Marine Assurance and QHSSE
- Unexploded ordnance (UXO)
- Data management and visualisation

Hornsea Projects One, Two and Three, UK

Since 2012, RPS has led the Environmental Impact Assessment (EIA), providing offshore and onshore consultancy services, on these three Hornsea offshore wind farm projects.

RPS are proud to have provided uninterrupted EIA consultancy support to all three projects, with each Hornsea project setting new records in terms of consented capacity. Hornsea Project Three, if built out to full capacity, will be the largest proposed offshore wind farm to date - anywhere in the world.

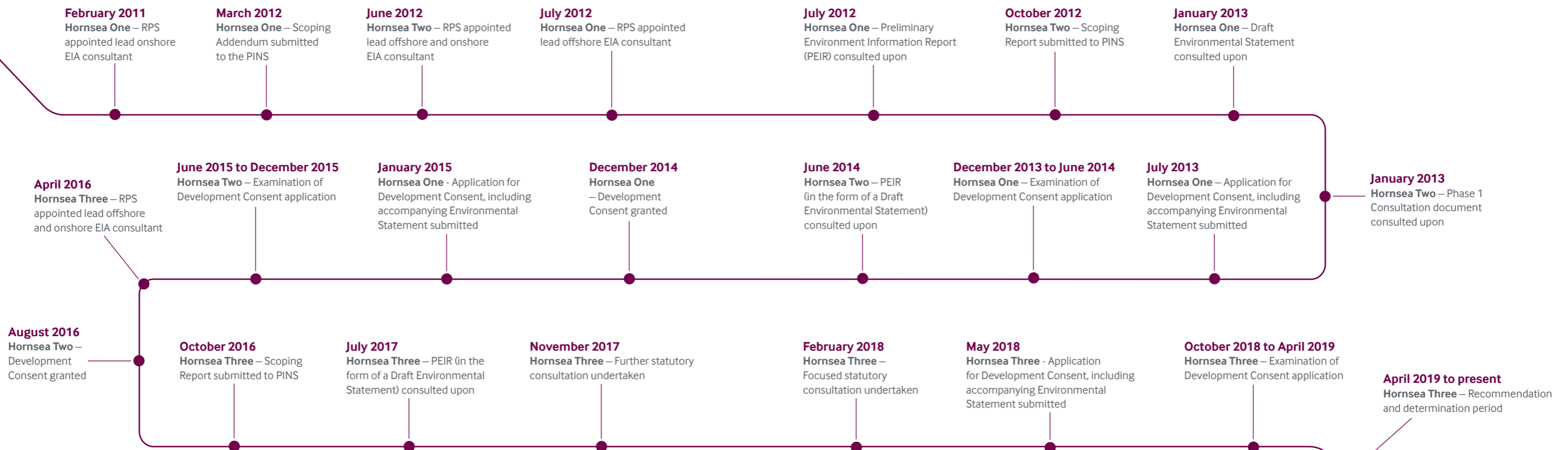
Hornsea Project One, a 1.2 GW, project was consented in December 2014 and is now generating power, and Hornsea Project Two, a 1.8 GW project was consented in August 2016. Based on the successful delivery of the first two projects, we were awarded Hornsea Three in 2016 to provide project management, lead EIA, and technical services, both onshore and offshore, throughout the pre-application phase, up to the point of application and during the Examination phase. In early April 2019, the Examination Phase for Hornsea Three was completed and RPS has continued to provide consenting support during the recommendation and determination period.

Onshore and offshore services

- Lead EIA Consultants
- EIA coordination and project management, including key point of contact between consents, engineering and legal teams
- Provision of majority of onshore technical specialists (in-house)
- Provision of majority of offshore technical specialists (in-house)
- Stakeholder engagement / consultation
- Pre-application and Examination phase consenting support
- Expert witness advice during hearings
- Coordination and management of subcontracted technical specialists

“RPS have played a central role in preparing the Hornsea Three application and providing technical advice through the testing examination phase. Their multi discipline team has been instrumental in preparing a robust evidence led assessment and have played a central role in responding to stakeholder and Examiners questions and concerns. They are a dedicated team and became trusted advisors on complex matters.”

Stuart Livesey, Ørsted's former Hornsea Project Three Development Manager (now Head of Project Development Japan)



Borssele, Hollandse Kust Zuid, Noord and West, Ten Noorden van der Waddeneilanden and Ijmuiden Ver, Netherlands

Since 2014 RPS has been working with the Government of the Netherlands (the Government) to supply offshore site investigation consultancy services to support their plan to significantly expand Dutch offshore wind.

RPS continue to provide site and desk-based support services, for tendering, survey design and management, survey QC and post survey operations for the current Netherlands offshore wind farm program with a potential current capacity totalling 10GW.

We were engaged to deliver specialist offshore QC consultancy services for geophysical and geotechnical surveys and onshore geotechnical and geophysical expertise to support the delivery

of comprehensive reconnaissance survey datasets. These data sets enable engineering ground models, and geotechnical parameters to be developed in support of an optimised procurement process for the development of offshore areas within Dutch territorial waters.

Independent audits of the resultant data packages concluded that the survey methods, resultant data and reports to be state of the art.

The overall contracting approach departed from the previously adopted processes for the Government and resulted in a more robust data set and bid process, significantly reducing bid prices from developers and in some cases delivering zero subsidy bids saving them significant sums of money.

The timeline below demonstrates our 5+ years of support to the government, and via our strategic partnerships, as a preferred consultant across multiple projects.



2015-2016:

Borssele: offshore geophysical and geotechnical QC, report review and geotechnical / geophysical advice

2015-2016:

Borssele: supply of full onshore consultancy, survey design, laboratory testing management and report QC, ground model development and general foundation consultancy

2015-2016:

Hollandse Kust Zuid: offshore geophysical and geotechnical QC, report review and geotechnical / geophysical advice

2015-2017:

Hollandse Kust Zuid: supply of full onshore consultancy, survey design, laboratory testing management and report QC, ground model development and general foundation consultancy, (in partnership with BLIX)

2019:

Hollandse Kust West: offshore geophysical and geotechnical QC, report review and geotechnical advice

2018-Ongoing:

Hollandse Kust West: supply of full onshore consultancy, ITT, contract and survey design, laboratory testing management, onshore geotechnical survey management and report QC, ground model development and general foundation consultancy, (in partnership with BLIX)

2017-2018:

Hollandse Kust Noord: offshore geophysical and geotechnical QC, report review and geotechnical advice

2016-Ongoing:

Supply of adhoc offshore QC services for the deployment and recovery of floating metocean LiDAR units

2019:

Ten Noorden van der Waddeneilanden: offshore geotechnical and geophysical QC, report review and geotechnical advice

2019-2020:

Ijmuiden Ver offshore: geophysical QC, report review and geotechnical advice

2019-2022:

Ijmuiden Ver: supply of full onshore consultancy, ITT, contract and survey design, laboratory testing management, onshore geotechnical survey management and report QC, ground model development and general foundation consultancy, (in partnership with BLIX)

2021:

Ijmuiden Ver: offshore geotechnical QC, report review and geotechnical advice, (contract awarded July 2020)

Minke whale, ORJIP study, Europe

RPS and project partners Marine Conservation Research (MCR) completed a strategic environmental research project for the Offshore Renewables Joint Industry Project (ORJIP) - to test the effectiveness of an Acoustic Deterrent Device (ADD) as a mitigation tool to reduce potential injury to low frequency cetaceans, such as the Minke whale, during offshore construction piling operations. The project, managed by the Carbon Trust, was part of a UK-wide, collaborative program of environmental research aimed at reducing consenting risks for offshore energy projects.

A team of researchers spent five weeks in Faxaflói Bay, southwest Iceland, during August and September 2016, tracking the

Minke whale. The aim of the study was to understand their behavioural response to an ADD during a controlled exposure experiment (CEE). Data analysis showed that the whales reacted strongly to the ADD, swimming quickly and directly away from the playback site in all 15 CEEs. We were able to confidently recommend that ADDs be used as an effective mitigation tool to reduce the potential for injury because of noise generated during pile driving. We were also able to conclude there was little potential for inducing temporary or auditory injury through exposure to the ADD. The study methodology and results will be used in future to inform government guidance on the mitigation strategies during the development of marine projects.



Star of the South, Australia

RPS is providing a range of environmental services and planning expertise to support Australia's first offshore wind proposal – Star of the South. If approved, the project will offer a clean and reliable source of energy for the state of Victoria, with the capacity to power up to 1.8 million homes.

Initially commissioned by Copenhagen Offshore Partners (COP) in 2017 in the feasibility stage, RPS provided a high-level due diligence report to identify any environmental or consenting risks associated with the project proposal.

Now in the consenting and approvals phase, our team is leading the offshore approvals and EIA, including design and management of the Marine Ecology Survey Program. This is a large-scale program of baseline environmental studies to inform the approvals

process and feed into Star of the South's Environmental Effects Statement (EES) and Environmental Impact Statement (EIS).

The baseline studies we are overseeing will document marine mammals (such as whales, dolphins and seals), seabirds and shorebirds, fish communities and sharks, and benthic habitats (ocean floor animals and sediments) across different seasons. The program also includes deployment of wave and current meters to inform a coastal processes assessment.

With few detailed environmental studies completed in the project area before, the investigations provide a great opportunity to better understand the nature of ecological communities not just for this proposal, but for the ongoing protection and conservation of marine life in the Bass Strait.

Geo-hazards study for US offshore pacific wind farms, Bureau of Ocean Energy Management, USA

This BOEM funded study assessed the potential threats to wind energy developments off the U.S. Pacific coast, including catastrophic geohazards (e.g. seismic activities, landslides, and tsunamigenic earthquakes), gas plumes, liquefaction, and turbidity currents. The study considered the effects of these geohazards on the mooring and anchorage systems, and buried cables. Designed to support suitable site selection for Floating Offshore Wind Farms, the study focused on areas already designated as potential lease sites using the best available science, to thoroughly understand the potential impacts.

RPS analysed publicly available datasets of seabed and soil conditions, ground acceleration and bathymetry slope in the region in the form of geospatial raster maps. The geospatial indexed datasets were then weighted and overlaid to determine suitability of an area and the installation risk for a floating offshore wind project. The desktop study, including the suitability maps were delivered to BOEM through report and interactive web-based map interface.



Environmental assessment studies offshore New York, USA

The National Environmental Policy Act (NEPA) requires BOEM to prepare environmental assessments (EA) or impact statements to ensure review of natural, physical, and socioeconomic impacts associated with alternative energy activities. RPS contributed to the EA for commercial lease issuance and site assessment activities in the Wind Energy Area offshore of New York.

The US wind energy industry is young, and development involves some unique challenges. It's vital to understand potential effects of offshore wind developments while the industry is still relatively new. Included as part of

this EA were the site assessment surveys and related potential impacts needed to assess the wind energy resources within the WEA offshore New York and determine which areas are suitable for commercial-scale wind energy.

RPS conducted a thorough literature review to characterise the baseline conditions of marine resources. We completed sections of the EA relating to water quality, marine biological resources, coastal habitats, and commercial and recreational fisheries.

Fisheries co-existence study, Japan

Our client was in the early development phase of their offshore wind projects in Japan. They were keen to understand how they might manage the interaction of their proposed developments with the fishing industry, maximising the opportunities for co-existence and minimising the risk to ongoing project development.

In Japan, the influence of fisheries on offshore wind developments is substantial, with permission needed from the relevant fishing cooperatives in addition to consent from the regulator. Our client wanted to understand the potential risk to their development projects and how they might mitigate these by working with the relevant fisheries cooperatives to find workable solutions to address potential effects on fishing operations.

Advice based on a deep understanding

With our specialist subcontractor Macalister Elliott and Partners, we examined the fisheries operating in the relevant project areas, including vessel types, fishing gear used and the key target species of fish and shellfish. Using this information combined with our UK experience, we were able to identify potential impacts. We then reviewed the mitigation, compensation and livelihood enhancement option examples from UK developments to propose recommendations for discussion with the Japanese fishing industry. This included inviting our client to the UK to visit some offshore wind farms to get a deeper understanding of how they operate and interact with the local fishing industry.



Vineyard Wind construction and operations support and modeling studies, USA

RPS has written sections and appendices of the Construction and Operations Plans (COPs) for the Vineyard Wind, wind farms to be developed offshore Massachusetts. This work includes hydrodynamic and sediment transport analysis of cable installation activities, analysis of fisheries and benthic invertebrate resources in the project area, design of the benthic habitat monitoring plan, Essential Fish Habitat assessments, Oil Spill Response Plans and associated

oil spill modelling, response to inter-agency review comments, and presence at public meetings pertaining to fisheries concerns. Additionally, our team provided further analysis to support discussions relative to the Massachusetts Energy Facility Siting Board (EFSB) siting process. RPS is also collecting, analysing and reporting on benthic data for integration of habitat characterisation maps within the COPs.

East Anglia ONE (EA1) Offshore Wind Farm, UK North Sea

Scottish Power Renewables (SPR) has just completed the construction of the East Anglia ONE Offshore Windfarm, which covers an area of approximately 300 km². With 714 MW of installed capacity and 102 wind turbines, it is one of the biggest offshore wind farms in the world.

Prior to and during construction RPS worked with SPR providing independent UXO consultancy.

This included site specific risk analysis and strategy design followed by geophysical survey and data QA/QC, processing and interpretation. Based on the geophysical data RPS identified potential UXO targets for further investigation and oversaw the entire investigation process which culminated with the disposal of nearly 100 items of UXO including WWII bombs and sea mines.





OUR STORY

Founded in 1970, RPS is a leading global professional services firm of 5,000 consultants and service providers.

Operating in 125 countries across six continents, RPS define, design and manage projects that create shared value for a complex, urbanising and resource-scarce world.

We deliver a broad range of services across the asset lifecycle in: property, energy, transport, water, defence & government services and resources.

We provide services in project & programme management, design & development, water services, environment, advisory & management consulting, exploration & development, planning & approvals, health, safety & risk, oceans & coastal, laboratories, training and communication & creative services.

The stand out for our clients is that we use our deep expertise to solve problems that matter, making them easy to understand and we're easy to work with – Making complex easy.



Sustainable energy solutions

MAKING COMPLEX EASY