Global Market Insights

RenewableUK *Project Intelligence*

OFFSHORE WIND CABLE MANUFACTURING AND INSTALLATION FORECAST *2019–2029*

ARRAY AND EXPORT CABLES

NEW 10 YEAR FORECAST

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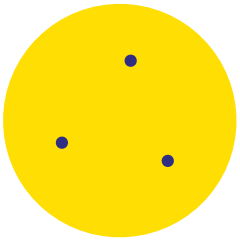


Offshore Wind Cable Manufacturing and Installation Forecast 2014–2024

Offshore Wind Country Forecasts 2019–2029

Forecast Comparisons — 2018 vs 2019

Selected Supply Chain Analysis

REPORT OVERVIEW

GLOBAL OFFSHORE WIND CABLES MARKET OVERVIEW

Offshore wind is a successful, rapidly expanding market. As countries seek to bring forward new power projects, offshore wind is playing an increasing role around the world. With falling costs, offshore wind now represents a low-cost option for many countries, while also supporting economic development and action to tackle climate change.

A few years ago, the offshore wind market was restricted to a small number of European markets. While these countries remain market leaders with significant future ambition, offshore wind is now a truly global opportunity, with rapid growth in the Asian and US markets in particular.

The safe and secure connection of these wind farms is a critical success factor in our industry, and a growing opportunity for cable manufacturers and suppliers working in the UK and international markets. At RenewableUK we support an active supply chain, providing business intelligence and B2B opportunities to help them compete successfully in this exciting market. This cables report draws out the data and expertise found in our *Project Intelligence* member hub to help leading market players better understand the scale and growth in this part of the market.

The annual rate of global array and export cable installations is forecast to nearly double in the next five years, with total installations for both types of cables increasing from 1,642km in 2019 to 2,647km in 2024. 2019 installations of array cables and export cables are due to be 846km and 796km respectively. This will greatly increase in 2024, with array cable installations forecast to be 1,741km and export cable installations totalling 906km. The manufacturing value of array cables being installed in 2019 will be over £238m and export cables will be over £479m. The value for 2024 installations will increase to £504m for array cables and £539m for export cables.

Installations of array cables are forecast to be at their highest rate in 2028, with a total of 2,928km of cables due to be installed in that year. The manufacturing value for array cables being deployed in 2028 year will total £875m. These installations are being driven

primarily by projects in the UK and USA, Ireland and Vietnam. The latter two countries have yet to establish a commercial offshore wind sector, however we forecast that they will being developing large-scale projects towards the end of the next decade.

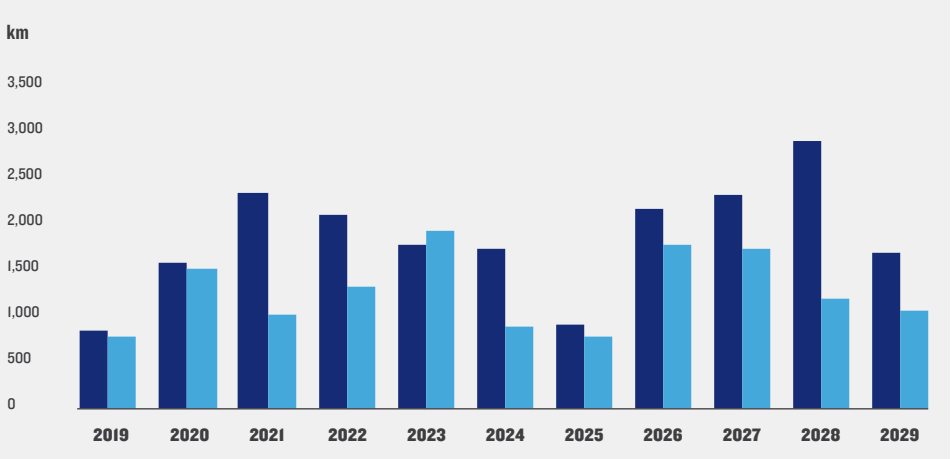
Export cable installations will peak in 2023, with 1,951km of export cables due to be installed in this year. These installations are being driven primarily by projects in the UK, Germany, Taiwan and the USA. The global cable manufacturing value for 2023 is forecast to reach £1.13bn.

The global offshore wind supply chain has expanded rapidly into a multi-billion pound industry, offering extraordinary opportunities to companies based in the UK and around the world. Many firms are seizing the chance to supply projects in their own countries, and to export goods, services and expertise around the world. In the UK for example, companies involved in the offshore wind sector are doing business in 22 countries across five continents.

There is an abundance of supply chain opportunities in the global array and export cable markets, with over 75 percent of contracting opportunities still available to companies involved in the offshore wind cables sector. A total of 9,606km of array cables are forecast to be installed between 2020 and 2024, with 7,428km of this yet to be awarded to cables manufacturers. Furthermore, 7,218km of array cable installations have yet to be contracted during this period.

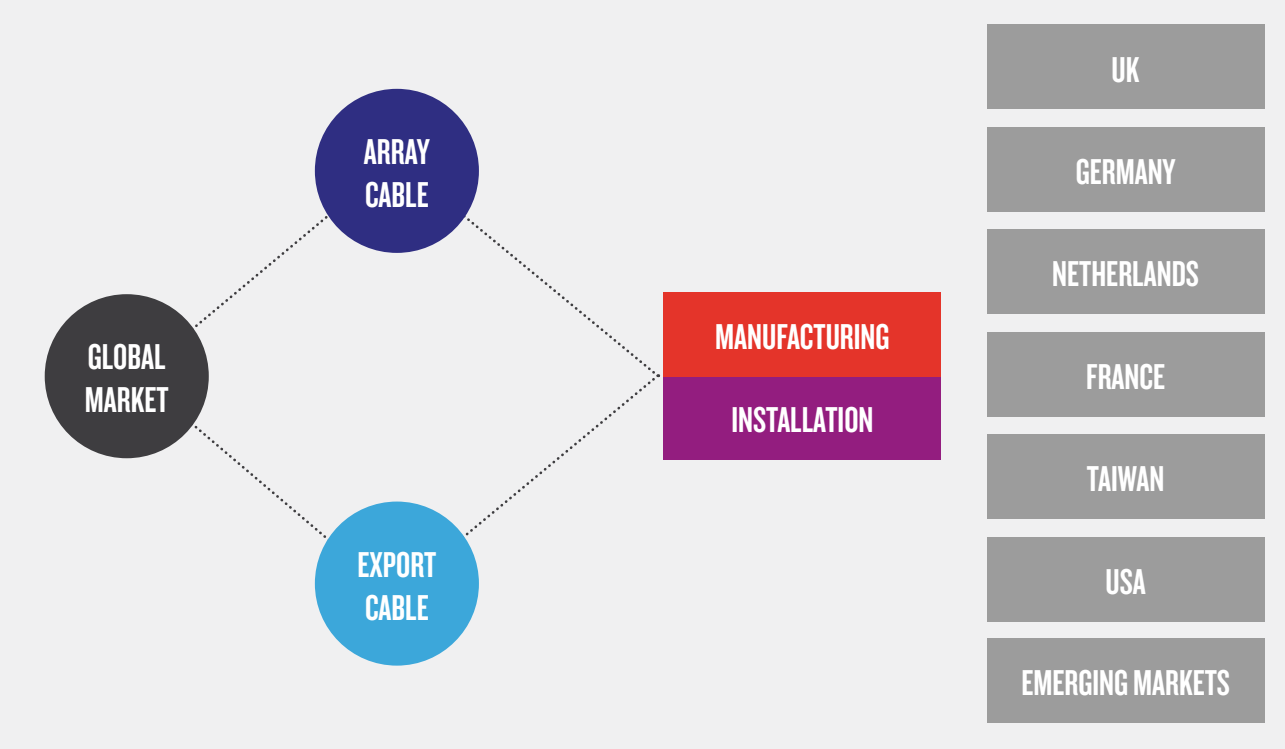
In terms of future manufacturing opportunities for export cables, a total of 6,750km of export cables are due to be installed between 2020 and 2024, with 5,064km of this yet to be awarded to cables manufacturers. Future contracting opportunities in the export cable installation sector are rife, a total of 5,300km of global export cable installations between 2020 and 2024 have yet to be awarded.

Global Array & Export Cable Installation Forecast
2019–2029



GLOBAL OFFSHORE WIND CABLES MARKET SEGMENTATION

This report looks at the manufacturing and installation of both array and export cables in the offshore wind sector. It analyses these markets on a global level, a regional level, and then on a country-specific level. The figure below illustrates the breakdown of this report.



HOW THIS REPORT DELIVERS VALUE

This report delivers added value by revealing:

— Global market forecasts and analysis covering the period 2019 to 2029
— Regional and national market forecasts and analysis from 2019 to 2029
— Cables manufacturing value analysis and forecasts from 2019 to 2029
— Details and analysis of contracting activity
— Exclusive interviews with key contributors in the cables market
— Profiles of leading companies working within the sector
— Conclusions

KEY QUESTIONS ANSWERED BY THIS REPORT

— How many kilometres of export and array cables will be installed annually between 2019 and 2029?
— Which companies have been awarded contracts for the installation and manufacturing of export and array cables between 2014 and 2024?
— What are the annual manufacturing value of export and array cables forecast to be installed between 2019 and 2029?
— Which countries are forecast to witness the largest number of cables installations?
— How will the market shares of the market spaces change by 2029, and which geographical region will lead the market in 2029?
— Which companies make up the offshore wind cables supply chain, and what services do they provide?

WHY YOU SHOULD READ THIS REPORT

— Enhance your strategic decision making
— Strengthen your research, presentations and business plans
— Learn which emerging market opportunities to focus upon
— Increase your industry knowledge
— Keep up to date with crucial market developments
— Develop informed growth strategies
— Build your technical insight
— Discover trends to exploit
— Strengthen your analysis of competitors.

METHODOLOGY

Primary Research

To provide added value to the readers of this report, RenewableUK has undertaken interviews with key individuals working in the offshore wind cables sector. Interviews have been conducted with companies involved in manufacturing, installing and repairing offshore wind cables, as well as firms involved in the development of offshore wind projects. These interviews have provided key information that has helped to shape this report.

Secondary Research

Information for this report has been gathered from contracting data contained in RenewableUK's Project Intelligence Database. All data is sourced from publicly available information. Our comprehensive relational database is updated by RenewableUK analysts daily and is available to all company members of RenewableUK. The database helps to provide members with accurate, current data on our wind industry, helping them to keep track of this fast-moving sector. Further secondary research has also been undertaken for this report from sources such as company annual reports, company web sites and news reports.

Model Methodology

The forecasts in this report have been created using RenewableUK's Project Intelligence model. Where real dates and values are known, they are represented in the data. Unknown dates and values are modelled using assumptions and trends derived from the installed global base of offshore wind projects augmented with firsthand data. To provide a market forecast, known and modelled values are phased per project between known and modelled dates. As RenewableUK is an association which represents companies across the wind, marine energy and storage spectrum, we have to remain unbiased with regards to our forecasts. It is for this reason that the forecasts which are illustrated in this report assume that all projects currently in the database will be fully commissioned. The forecasts from the database have also been supplemented with assumptions from external sources to fill in the gaps for projects that have yet to be announced beyond 2025. The data is accurate as of **5th August 2019**, and the latest data can be obtained by members from the Project Intelligence Hub.

Cable Value Methodology

RenewableUK has forecast the value of manufacturing array and export cables by analysing past contracts that have been awarded and then generating a base figure for a single kilometre of cable by identifying an average trend with regards to the values of the contracts. This figure is then applied to the installation forecasts which are derived from the Project Intelligence model, and these values are then adjusted based on the total length of cables forecast to be installed. Quantitative economic price adjustments are utilised to reflect the impact of market conditions on values.

ABOUT RENEWABLEUK

RenewableUK members are building our future energy system, powered by clean electricity.

We bring them together to deliver that future faster; a future which is better for industry, billpayers, and the environment. We support 400 member companies to ensure increasing

amounts of renewable electricity are deployed across the UK and access markets to export all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry.

Our work is led by a Senior Management Team and supported by a Board of senior industry figures with a Business Plan setting out our work and priorities.

Collectively our members employ over 250,000 people — from international energy companies to small companies keen to build new markets and ready to disrupt our energy market with new products and services. The UK has some of the best natural resources in the world for these technologies. Renewables have proven their ability to deliver, and alongside gas and nuclear will be central to keeping the lights on and powering our economy. Our role is to maximise this opportunity and create the conditions that will see the renewable sector continue to thrive here.

DISCLAIMER

Forecasts presented in this document are derived from the Offshore Wind Project Intelligence model. Projections in this document do not represent a RenewableUK position and should only be used as guides to possible outcomes. For more information on methodologies and terms used please see the Methodology section and Glossary. RenewableUK takes no responsibility for losses incurred by the use of this information.

Name: Andrew Lloyd
Job Title: Director of Power Cables
Company Name: Global Offshore

As Director of Power Cables, Andy is responsible for business and project growth at the company. Andy joined the Group in 2000, gaining a wealth of experience managing both telecom and power cable related installation and maintenance projects within Global Marine, before moving across to Global Offshore, the Group's power focused part of the business, in 2017.

EXPERT INSIGHT

CABLE INSTALLATION AND MAINTENANCE: HOW IS THE CABLE INSTALLATION AND O&M SECTOR EVOLVING WITH REGARDS TO OFFSHORE WIND DEVELOPMENTS?

"As the offshore wind market in the UK and Europe matures, and markets in other parts of the world evolve and grow, there is an increasing number of critical subsea assets and infrastructure in place which means that the need for a fresh and more comprehensive approach to cable maintenance, repair and replacement has emerged. Earlier this year, Global Marine Group (GMG), supported by its business units Global Offshore, Global Marine and CWind, signed a framework agreement for cable repair with offshore wind farm developer and operator Ørsted through the Atlantic Cable Maintenance Agreement (ACMA). This is an entirely new way of working for the offshore renewables industry, although an approach which has been tried and tested with huge success over several decades within the telecoms sector, and is believed to set the blueprint for the future of combined cable and subsea asset agreements, bringing about benefits for everyone across multiple industries.

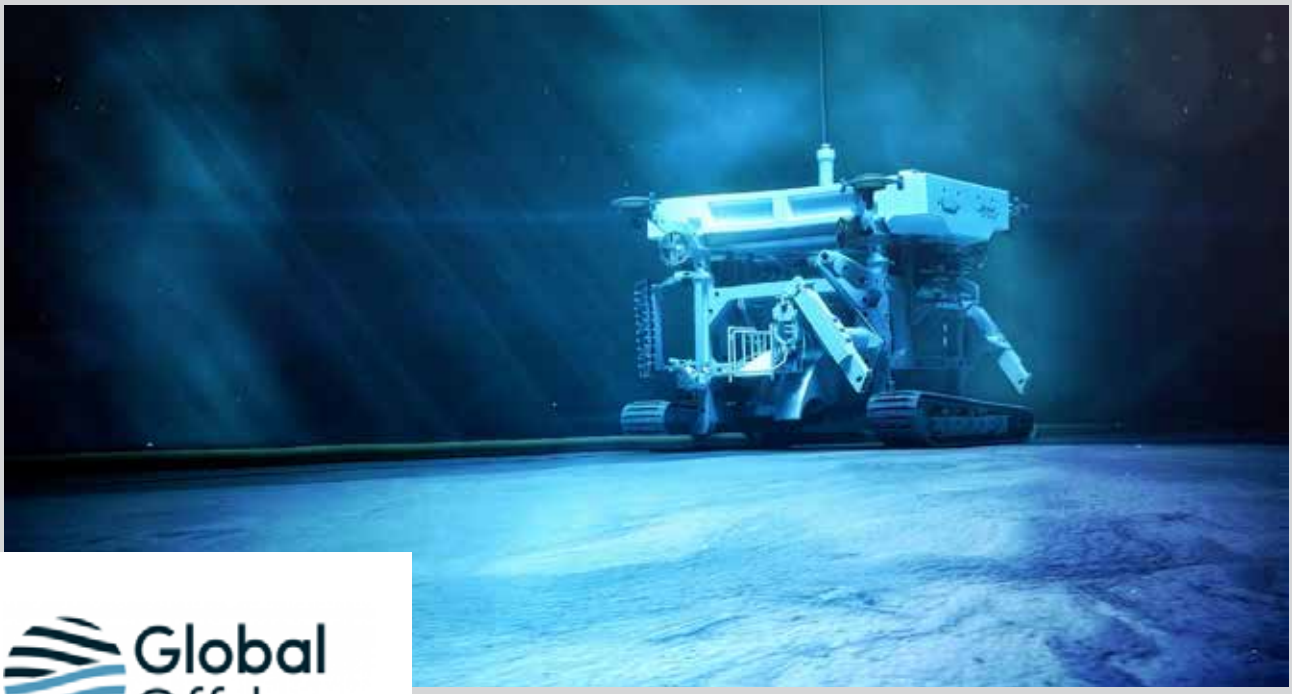
This approach also integrates many of the supplementary services related to cable installation and maintenance

Images: Global Offshore

as well as pre-mobilised vessels and pre-engineered repair scenario planning. Wrapping support together in this way makes the process much more convenient for operators via a single service provider which seems to be the preferred approach for many in the industry. In-situ repairs to rectify faults within the confined space of each affected turbine, temporary power for both planned and unplanned power outages, logistics and personnel, plus cable pull-in teams, termination and testing can be delivered to support the main cable works delivering a turnkey solution for installation as well as ongoing O&M.

Another driver within offshore wind in the UK is the government initiative to bring all greenhouse emissions to net zero by 2050. The UK has taken a lead role in the development of key low-carbon technologies and has become the largest market for offshore wind in the world, driving down costs through deployment and innovation. Meeting this ambitious target could see increased electrification within things such as transport and heating, and therefore according to a report published by the Committee on Climate Change in May 2019, a doubling of electricity demand, with all power produced from low-carbon sources compared to 50% today. That could require 75 GW of offshore wind in 2050 requiring 7,500 turbines, compared to 8 GW today and 30 GW targeted by the Government's sector deal by 2030.

Supporting this drive are other developments in technology and engineering that deliver efficiencies for both the construction and O&M phases of a windfarm. Working in collaboration with offshore technology company Osbit, GMG has added the new PLP240 to their subsea portfolio; a pre-lay plough which offers an unrivalled single pass capability and integrates route preparation, cable laying and trenching, which is an industry first. Utilising this technology, work which would otherwise be done utilising potentially two different subsea assets and vessels in multiple passes, saves significant time, risk, money and importantly delivers towards lowering



Global Offshore provides comprehensive power cable installation, repair and trenching services to the offshore renewables sector. To date, the Group has provided service support for over 13 GW of power generated by the offshore wind sector, working on over 50 sites, most recently at Kincardine, Merkur and Rampion. Global Offshore is part of the Global Marine Group, an innovative market leader in offshore engineering and consists of three business units CWind, Global Marine and Global Offshore.

Images: Global Offshore

emissions and the use of fuel for the projects. This technology works in conjunction with another of the Group's assets, the Q1400 trencher, which again offers a hybrid solution. The trencher can complete both cutting and jetting operations, and can uniquely switch between the two modes whilst at sea again delivering cost, resource and time efficiencies. Likewise, GMG has been working with a key customer to develop a hybrid propulsion surface effect ship (SES) which will offer reduced vessel time, increased operational limits, enhanced transit comfort and reduced CO2 emissions using a hybrid electric propulsion system.

Offshore wind is maturing in the UK and Europe, learning lessons from other sectors including the oil & gas and energy industries, but markets in geographical locations such as Taiwan and the US are just beginning to emerge. GMG continue to utilise Group assets, engineering expertise, a dedicated innovation team and successful project delivery to convert its extensive experience and lessons learnt in Europe into local solutions, as a catalyst to support growth and success within those emerging markets.

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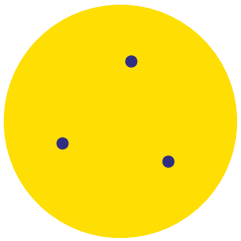

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