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Impact of oil price in offshore wind

EXECUTIVE SUMMARY

Offshore wind is at the centre of the UK decarbonisation strategy with lower cost than many other forms of electricity generation, including new nuclear, and aspires to limit the traditional role oil and gas plays in energy system balance. Oil is a commodity characterised by high volatility in price and has a significant direct and indirect impact on global economic growth. There are a number of visible and less visible relationships and areas of competition between the two industries, but it appears that the influence of oil price on offshore wind costs is, and will continue to be, in decline.

- Competition for vessels – High oil prices lead to increased offshore activity, meaning high demand for vessels which has traditionally increased costs of offshore wind installation. This remains true to some extent, but the growing scale of offshore wind turbines and foundations means installation cost is increasingly driven by the pace of construction of bespoke vessels.
- Fuel and commodity prices – Oil price is a key driver of transport fuel price and of steel and copper; fuel and commodities comprise a relatively low share of offshore wind cost but low oil prices can contribute to the reduction of overall cost.
- Competitiveness in the energy mix – only a small percentage of electricity supplied (<0.5%) in the UK currently comes from oil and other by-products, meaning that fluctuations in the oil price have negligible direct impact on overall costs of electricity generation and so have little impact on the relative attractiveness of renewable energy as low-cost forms of generation.
- Competition for investment – oil majors' propensity to invest in offshore wind is driven as much by shareholder drive and national decarbonisation targets as by oil price. Higher oil price can encourage more investment in oil projects at the expense of offshore wind; oil price too low however can mean no investments are sanctioned in either industry by oil majors. Continued entry of oil majors into offshore wind could be key to unlocking the levels of investment required.

INTRODUCTION

Background

The purpose of this report is to investigate the impact that oil price may have on the cost of offshore wind in the UK. These impacts are driven by the global and national macroeconomic effects of oil price as well as competition between the two sectors for the same sets of vessels, facilities, investment sources and workforce skills. After an overview of oil price trajectory, the following areas are discussed:

- offshore wind vessel supply cost in installation and O&M;
- commodity prices affecting offshore wind (e.g. steel and copper);
- fuel prices affecting offshore wind;
- development, project management and operations and maintenance services crossing over between oil and gas and offshore wind; and
- investment in electricity generation from renewables compared to conventional fuel.

Why oil?

Oil is the commodity which attracts the most attention as the volatility of its price creates instabilities in the economy in exporting and importing countries. Although crude oil is the dominant energy source in the world, renewable energy technology has shown dramatic growth in recent years and is a significant part of the energy mix in many countries. The climate change and environmental concerns arising from the high greenhouse gas (GHG) emissions associated with crude oil as well as the depletion of natural resources which risk the security of energy supply are some of the reasons that have led to the expansion of renewable energy. The UK government has a commitment to combat climate change and promote the transition to a greener economy. Last year the UK became the first major economy to pass net zero emissions law. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels.ⁱ

Why offshore wind?

Renewable energy is reaching its milestone year with a pledge to hit 15% share of UK energy consumption by 2020 – 30% of electricity, 12% of heat and 10% of transport. In 2019 the electricity generated from renewable energy exceeded 37% so this sub-target has been exceeded.ⁱⁱ However, the transport and heating sectors are transforming much more slowly, with little progress made towards these targets. Offshore wind is a major contributor in the power mix and the cost of technology has shown a rapid reduction, increasing its competitiveness and reducing its reliance on government subsidies. To reach the 2050 net zero target, more than 75GW of offshore wind will be needed, accounting for ~50% of UK electricity generation by 2050.ⁱⁱⁱ

UK oil & gas

Oil and gas is an industry with a long history in the UK. In 2015 the sector celebrated 50 years of exploration for oil and gas on the UK continental shelf and over 40 years of production. In 2018 oil and gas provided 75 % of the UK’s primary energy, a trend that its estimated to continue at least until 2035 according to the UK’s Department for Business, Energy and Industrial Strategy (BEIS).^{iv} About 65% of UK primary energy demand was met from indigenous production, making an estimated contribution of £20 billion to the UK’s balance of trade.^v Most of the UK’s large offshore oil fields are in the Northern and Central North Sea Basin where offshore wind is also developed.

Oil price volatility and knock-on impacts

Oil price volatility has a strong influence on the oil and gas industry, an industry which presents a number of synergies with the offshore wind sector. As shown in *Figure 1*, oil price experienced a series of fluctuations in the last five years while offshore wind cost has followed a consistent downward trend since 2012. At an industry-aggregated level, there appears to be no direct correlation between annual average oil price and offshore wind costs. However, the strong synergies between the Oil and Gas sector and offshore wind could have some indirect influence on installation, operations and maintenance (O&M) and project management services. The performance of the Oil and Gas industry can change the supply and demand of support vessels which are involved in similar processes on installation, and O&M in offshore wind. In addition, it is expected that there is some direct or indirect impact of oil price on commodity prices and exchange rates in offshore wind farm development.

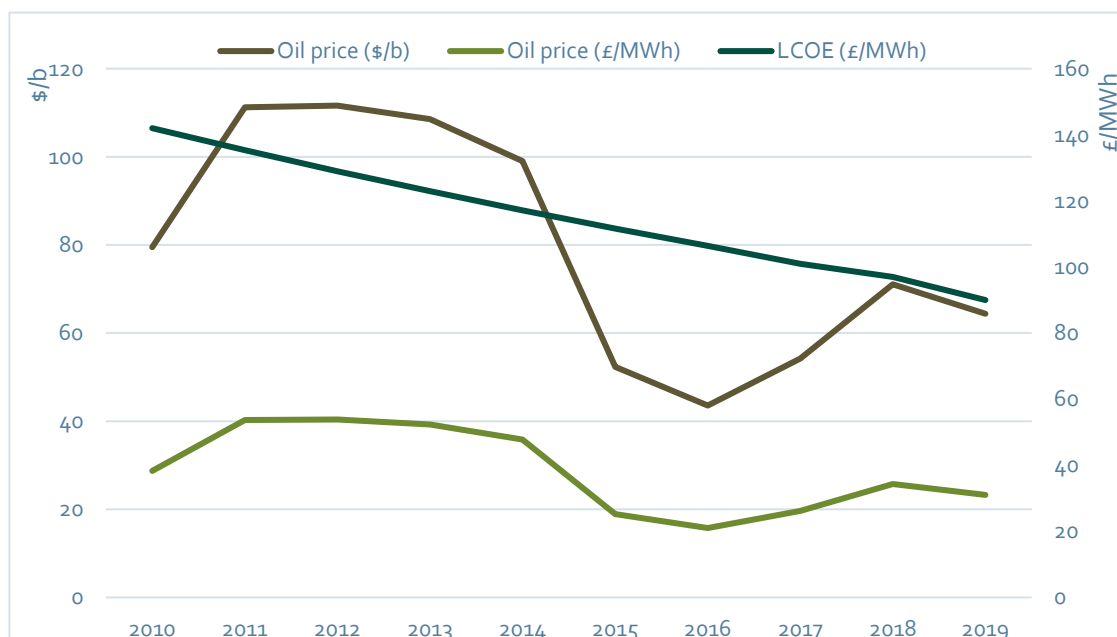


Figure 1 Annual average Brent Oil price and Levelised Cost of Energy (LCOE) of offshore wind in the UK from 2012 to 2019

OIL PRICE AND OFFSHORE WIND OUTLOOKS

Oil price, production and reserves

Oil price has a significant direct and indirect impact on economic growth. The generic term “oil” refers to the crude oil (petroleum in its unprocessed form) and its price is benchmarked against a list of reference blends. The most common reference prices are West Texas Intermediate (WTI), Brent North Sea oil, Dubai Crude and the OPEC Reference Basket. Brent is the benchmark for global oil prices and is used to price two thirds of the world's internationally traded crude oil supplies. OPEC is the Organization of the Petroleum Exporting Countries founded in 1960 and currently consists of 13 oil producing members: Algeria, Angola, Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, the United Arab Emirates and Venezuela. OPEC controls 40 % of the world's supply of oil which stands at 1.215 billion barrels of proven OPEC oil reserves.^{vi} Figure 2 shows the oil reserves by country and their annual production in 2019 to understand the balance of power in global oil supply.

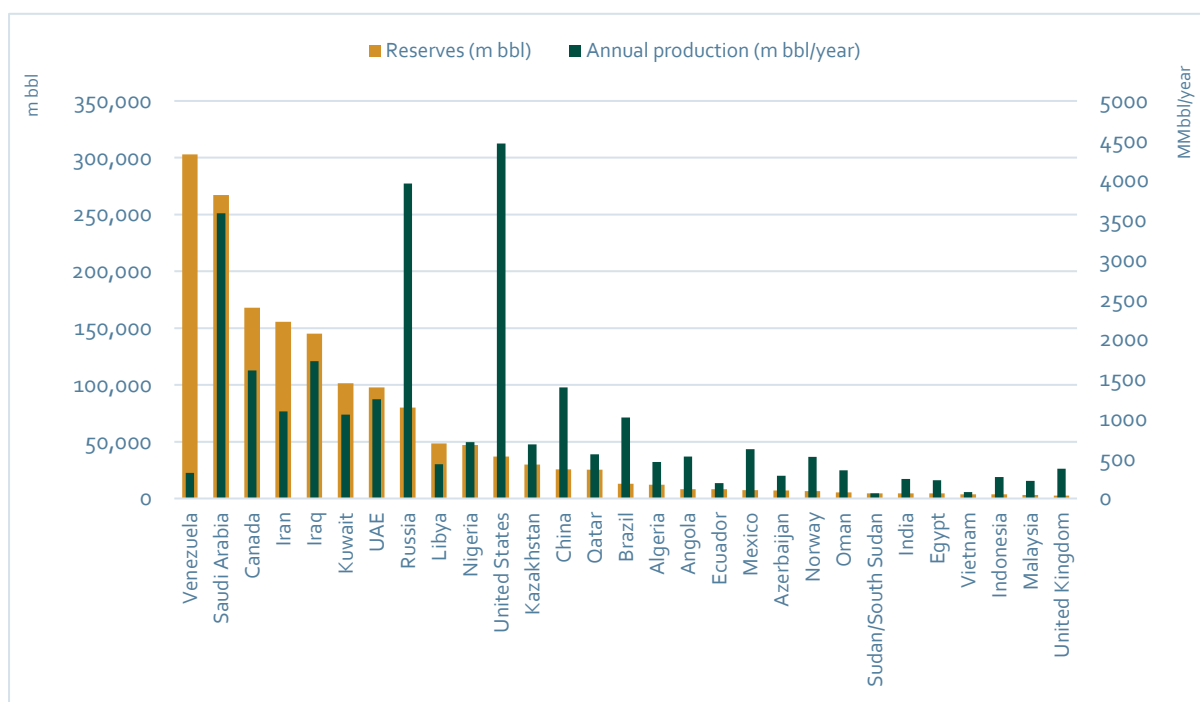


Figure 2 Oil reserves by country^{vii}

Changes in production levels or demand have an immediate effect on the price. In 2014, OPEC agreed that the oil price which guarantees profitable production for all its members is between \$70 and \$80 per barrel. Nevertheless, the oil price faced strong fluctuations in the last two decades especially due to ups and downs in oil demand, economic crises, geopolitical instability, forex trading and US shale oil. The increase in US shale oil production since 2015 due to more efficient extraction practices led to fierce international competition on market shares (United States- Iran-Saudi Arabia-Russia). Therefore, OPEC (with cooperation from Russia) implemented a series of strategic reductions in oil supply to secure the profitability of its members amid the oil price drop.

Oil price shocks

In November 2018, the Brent oil price dropped 30 % in one month to \$59.36 per barrel after concerns for a glut of crude oil supply and economic growth slowdown. The price recovered to \$72 per barrel in April 2019 supported by the steady growth of the Chinese economy and the reduction of US crude oil inventories.^{viii} However, the US was the world’s largest oil producer in 2019 continuing to produce cheap shale oil so the price started to fall again after a series of fluctuations sparked by the rise in Middle East tensions. In December 2019, OPEC and its allies agreed to cut an extra 500,000 barrels of global oil a day in 2020 to support oil prices amid fears of an economic downturn. The outbreak of COVID19 slowed down economic growth and oil demand, and a decision by OPEC to lift production restraints lead to a drop in Brent oil price below \$30 per barrel in March 2020. In April, OPEC producers and allies agreed to a historic cut in oil production by 10%, the largest cut in history.

Oil price outlook

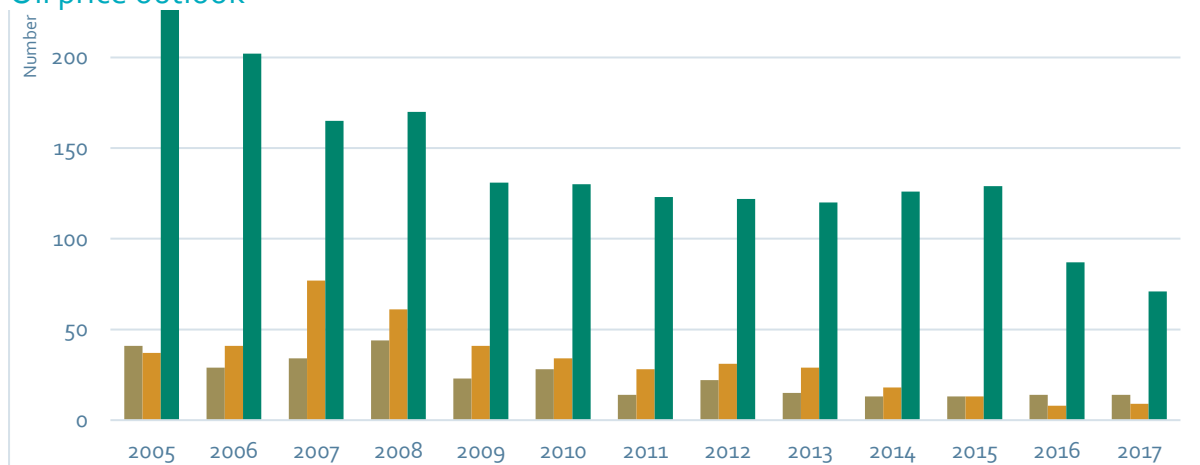


Figure 3).^{xi,xii} DNV GL expects that the UK will reach a peak of oil demand in 2022, remain stagnant by 2030 and then decline sharply.^{xiii}

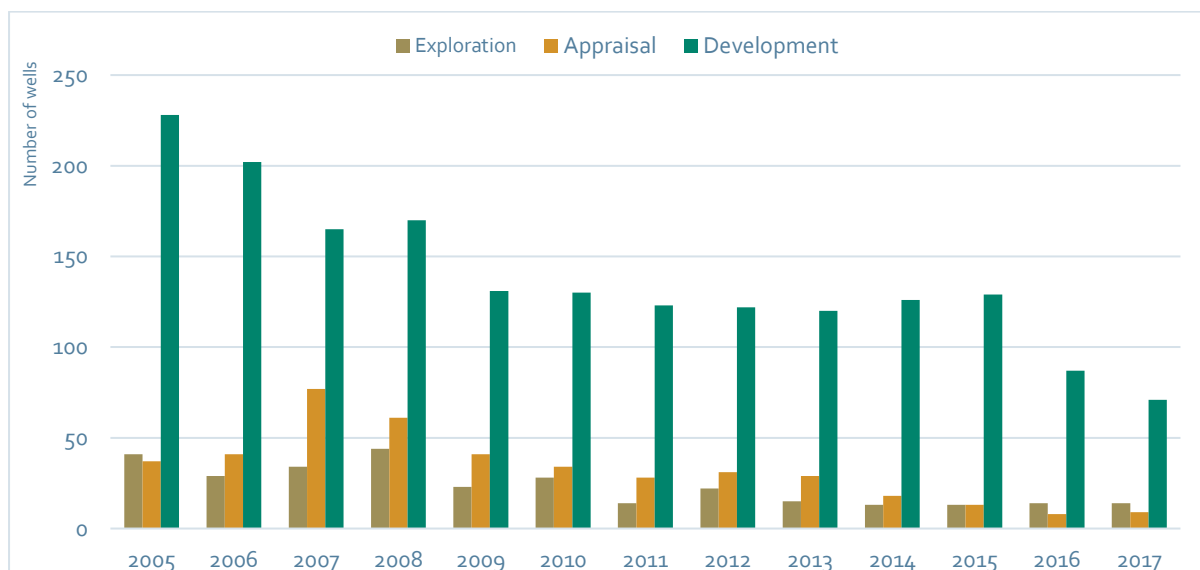


Figure 3 UK drilling activity

UK offshore wind

In contrast, the contribution of renewable energy in the global energy mix is following an upward trend driven by the need for a sustainable, clean energy source as an alternative to conventional fuels. Strategies to combat climate change are becoming part of government plans in an increasing number of countries. These include cutting fossil fuel subsidies and introducing carbon taxes to help the transition to renewables, boost decarbonisation and secure energy supply. In 2019, 37 % of UK electricity came from renewables of which 53 % from wind energy (27 % offshore and 27 % onshore wind).ⁱⁱ The offshore wind industry has been active less than 20 years at commercial scale and the UK is the global leader with about 9.5 GW operational in its waters. There is a need for at least 75 GW by 2050 to reach net-zero GHGs fed mostly by the abundance of wind resources and the rapid cost reduction of the technology. The recent announcement of strike prices for Contracts for Difference (CFD) Allocation Round 3 (AR3) auction saw prices as low as £40/MWh (2012 real) for projects commissioning after 2023, a drop of 72% in 15 years pushing costs even lower (Figure 4). Other countries such as Germany have already accepted subsidy-free bids from offshore wind farm developers (although grid connection is secured and publicly funded by the government in contrast to the UK where the offshore generation developers pay for the connection to the mainland). The pace of innovation, volume of commercial scale projects, learning through experience and economies of scale will drive cost reduction even further.

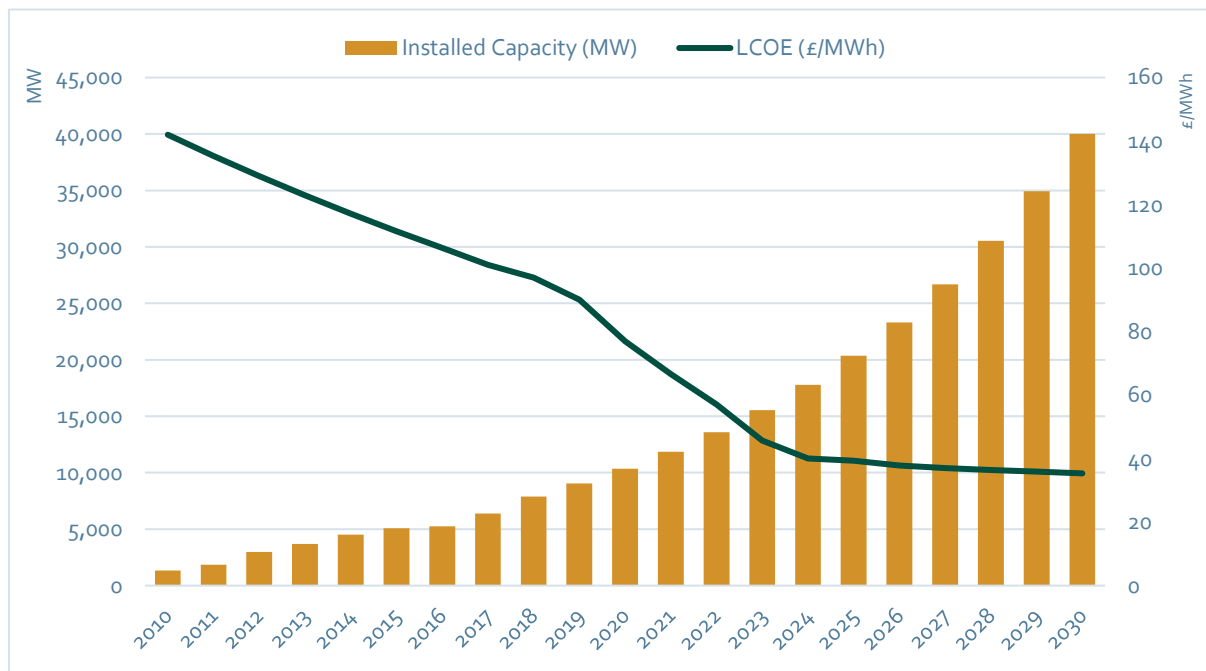


Figure 4 UK installed offshore wind capacity and LCOE projections

IMPACT OF OIL PRICE ON OFFSHORE WIND COSTS

This section provides brief analysis on areas where oil price does, or could be expected to, have an impact on the cost of offshore wind.

Turbine and foundation installation vessels

Turbine and foundation installation costs currently account for roughly 10% of total capex and 7% of LCOE. This is therefore a significant cost centre in any offshore wind project.

Offshore wind developers from 2003 to 2009 were hiring existing general-purpose jack-ups or modified vessels for turbine installation, and (heavy lift) crane vessels for the installation of foundation structures usually from the oil and gas industry, creating competition between the sectors. This led to a lack of availability of suitable vessels and costly delays especially in the installation phase. There was clear evidence at that time that increased oil and gas activity, driven by high oil prices, had a direct impact on the cost of offshore wind projects. However, with the rapid deployment of offshore wind, the industry and its evolving supply chain started to manufacture purpose-built offshore wind vessels with more deck space and capable of operating in longer weather windows. In 2003, the first dedicated wind turbine installation vessel designed specifically for the installation of both foundations and turbines entered service.

As the number of bespoke offshore wind installation vessels increased, the direct competition with the oil and gas sector for vessels decreased, loosening the tie between oil and gas activity and offshore wind costs. However, offshore project developers face a limited supply of vessels capable of installing new higher-capacity turbines in deeper waters. In 2015, the European offshore wind industry had a fleet of 75 vessels but almost half of the jack-up vessels in use were not capable of installing the 8-MW turbines planned in deeper waters and more frequent adverse weather conditions.^{xiv,xv} Shipbuilders are responding to the demand for purpose-built installation vessels with a new generation of ships designed specifically for offshore wind. The demand for 3rd generation offshore wind vessels will continue to rise after 2020 when the existing fleet will not be sufficient to service the continuous upscaling of wind turbines and foundations. ORE Catapult's internal analysis forecasts that the global offshore wind turbine installed capacity will be further expanded with a compound annual growth rate (CAGR) of 17% from 2019 to 2030. **The extent of the relationship between oil and gas activity and offshore wind costs will depend largely on the extent and rate of development of next generation offshore wind installation vessels. The introduction of more new installation vessels will increase supply competition and is likely to reduce the charter rate of vessels for the offshore wind industry, but offshore wind installation costs may well increase if there is insufficient investment in new bespoke vessels able to serve the industry when this is required.**^{xvi} The demand for bespoke vessels is expected to increase rapidly so some shipbuilders will struggle to upscale their fleet size at the rate required to address the needs of the market. Shipbuilders, OEMs and developers should be in close contact to find the right balance between meeting market needs and funding high capital investments in new vessels.

Other installation - offshore support vessels (OSV)

Offshore wind project construction also requires the use of several types of OSV used commonly in the oil and gas industry. These include cable-laying vessels, crew transfer vessels (CTV's), crew accommodation vessels and subsea operating equipment.

The maturing North Sea oil and gas sector will require a large programme of oil platform decommissioning, presenting a significant opportunity for OSV's. Nearly 150 oil platforms in the UK North Sea are expected to be scrapped over the next 10 years, with over 80 decommissioning projects in Northwest Europe in either the working, tendering, possible, or planned stages according to IHS Markit.^{xv} The vast majority of projects are located in the UK (68%) and in Norway (18%).^{xvii} This will increase the demand for vessels, which will then be unavailable to serve offshore wind, making the development of bespoke vessels an imperative.

In the last decade (until 2014), the oil price was rising and the need for fleet replacement encouraged high offshore vessel building activity. In 2015 and 2016 reserve numbers fell in oil and gas due to few discoveries while the production from in-fill drilling in mature fields showed a steady increase.^{xviii} The oil price did not exceed £55 per barrel on average from 2015 to 2017. According to Oil & Gas UK's (OGUK) *Business Outlook 2019*, 2018 had the lowest number of wells spudded in the UK since 1965, with 8 exploratory, 9 appraisal and 85 development.^{iv} A similar trend was observed for total offshore exploration drilling wells in 2018 which was slightly lower than 2017 reaching 237.^{xix} The low oil price decreases drilling rig utilisation, freezes the renewal of contracts and decreases the delivery and day rates of offshore vessels usually with at least two years lag.^{xx} This means that the impact of oil price changes are not instantly visible and are passed on with a delay into the OSV market making it difficult to observe the direct impact of shifts in the oil price or market. Figure 5 shows the global utilisation level in terms of OSV/rigs ratio of platform support vessels (PSV's) and anchor handling tug supply (AHTS) vessels between 2013 and summer of 2019.

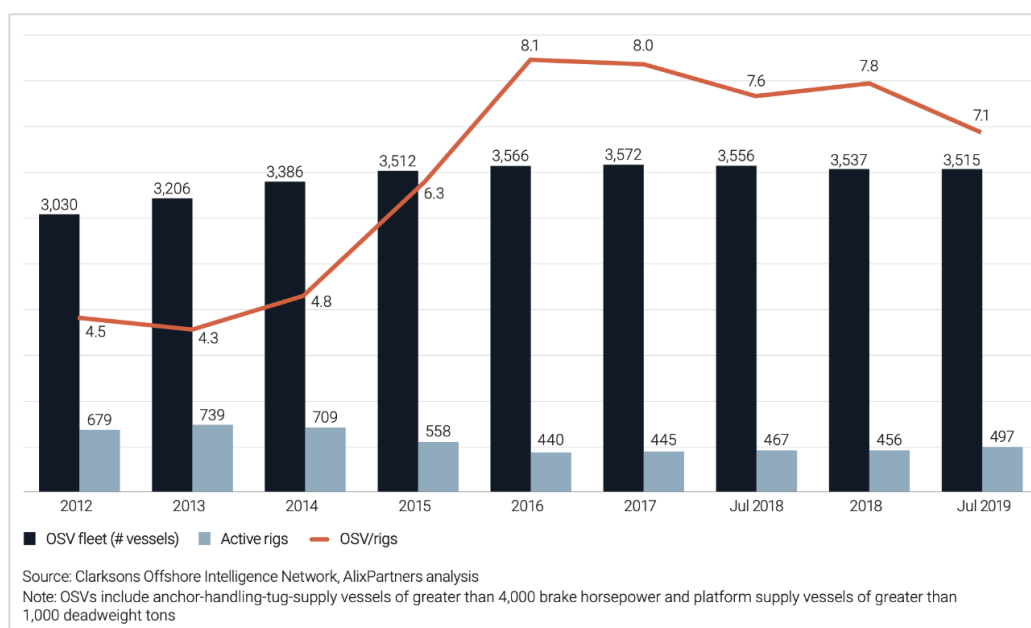


Figure 5 Global OSV fleet ^{xxi}

In 2018, the low oil price and the oversupply of vessel building activity in shipyards across Asia kept global utilisation weak especially in North America, Asia Pacific, and West Africa. Although there was some improvement in demand in 2019 mostly driven by a slight drop in the size of the active OSV fleet, debt restructurings, improved cost management and emergence of massive new supplies of shale oil in the last decade, the OSV industry seems unlikely to recover any time soon.^{xxi} In the North Sea, the steadily rising rate of utilisation is not expected to change the current status in the short term. An example of this trend can be seen in Figure 6 showing the global OSV supply, demand and fleet utilisation. After 2018 the rising expenditure on offshore oil exploration drives the global OSVs market which is anticipated to grow at a CAGR of 6.5% by 2025.^{xxii} **Some of the heavy lift jack-up vessels used in offshore wind are serving the oil and gas industry as well so the demand will be increased when the oil price starts to recover, leaving less space for offshore wind projects.** Both oil and gas and offshore wind will help provide profitable returns on investment for vessel owners. **As oil demand falls gradually and the offshore wind pipeline grows, shipbuilders will have an opportunity to shift production towards purpose-built vessels for the offshore wind sector.**

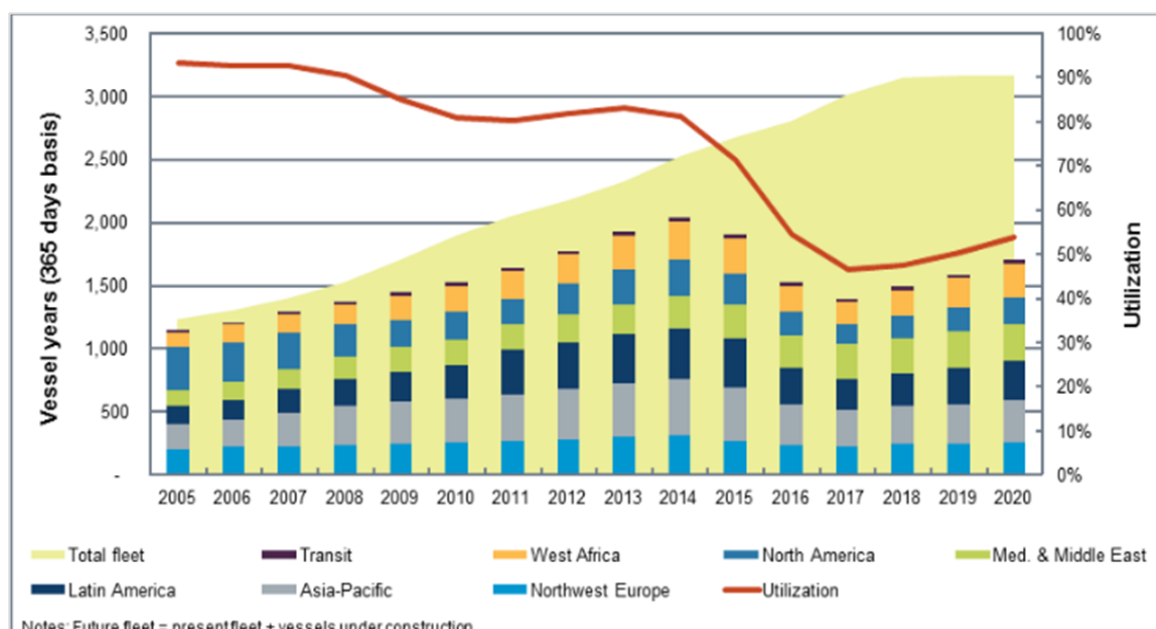


Figure 6 Global offshore supply vessels market by region^{xxiii}

The increasing deployment of floating wind could also trigger a new competition for vessels with oil and gas as both types of floating platforms can be similar in design. In general, the vessels used to install floating wind platforms are expected to be more akin to offshore support vessels (particularly AHTS and tugs) and so the impact on the cost of floating wind installation costs is likely to be in line with the points addressed in this section. **The upside of this is that as offshore oil activity declines, floating wind provides a natural market for existing SOV's to continue to operate profitably.**

O&M vessels

Demand from offshore wind will also rise for CTV's and service operation vessels (SOV's) used for O&M. In the early days of the sector, fishing boats and survey ships were used to transport technicians to offshore wind sites. Larger turbines, larger and more complex turbine arrays and deeper waters require an established O&M supply chain able to offer innovative technological solutions which can maximise long term turbine performance. Some vessels traditionally used in oil and gas like PSVs and multipurpose support vessels (MSVs) were converted into accommodation vessels for technicians in the past, but this practice does not look set to continue as offshore wind requires specific vessel sea-keeping characteristics that suit the walk-to-work system. **As more dedicated wind-specific vessels are being built, the sector will rely less on oil and gas and the impact of oil price volatility will be reduced.**

Transport fuel

Oil is the primary fuel used in transportation accounting for 5% of total oil demand according to the IEA so the fluctuations in its price can immediately be reflected in charter rates in both installation and O&M vessels. Fuel cost accounts for in the region of 1% of total offshore installation costs and up to 2% of total O&M costs of an offshore windfarm.^{xxiv} **So, while fuel costs are significant in absolute terms, they are a relatively small proportion of overall project costs.**

Bunker fuel is any type of fuel oil used in the shipping industry and is the biggest component of the operational cost of a ship, being the main reason for concern by ship owners. What happens in the crude oil market has direct correlation in bunker fuel oil. The maritime industry usually follows hedging strategies such as fixed-price swap which allows organisations to fix fuel prices at a predefined level, independent of future market movements.

However, the recent International Maritime Organisation (IMO) 2020 rule added an extra challenge having a big impact on the bunker market. Aiming to reduce air pollution, the new regulation bans ships from using fuels with a sulphur content above 0.5%, compared with 3.5% High Sulphur Fuel Oil (HSFO) most ships have been using.^{xxv} Shippers either need to use fuels with a sulphur content not exceeding 0.5% or install scrubbers that can clean higher-sulphur fuels to reduce emissions. The decarbonisation pathway of the sector will also lead to the adaption of alternative fuels like LNG, methanol or hydrogen which can be produced either from natural gas or renewable sources. In the short term, the correlation between charter rates and fuel oil is unstable. Compliant fuel, low and very low-sulphur fuel oil (V)LSFO and marine gasoil (MGO), currently have low availability which increases their price, although the supply is expected to improve when refineries are reconfigured to produce more low sulphur fuel oil.

Commodities

Oil price plays a minor role in the cost of the main components of an offshore wind farm. Its effect is complex and interacts with other commodities like steel and copper as well as currency rates. As shown in Table 1, although steel is the most integral material in offshore wind construction this accounts for only around 12 % of the capital cost of an offshore wind farm, and **a sensitivity testing to a 50 % increase/decrease in price changes LCOE by around 5 %** in either direction.^{xxvi} According to Voormolen, J.A. et al. (2016), the share of commodities related to the price of offshore wind CAPEX is shown in Table 1.^{xxvii}

	Turbine (%)	Monopile foundation (%)	Jackets foundation (%)	Cable (%)
Steel	30	40	35	5
Copper	10	0	0	45
Oil	15	20	15	10
Others	45	40	50	40

Table 1 Share of commodities related to the price of important offshore wind energy components^{xxvii}

If combining the effect of all the commodity price movements involved, the change in the LCOE would be higher. Currency is also another factor out of control of the developer. The supply chain for wind energy components is global and exposed to international competition. For Europe, many of the manufacturing stages are completed outside Europe and/or need imported raw materials and parts so international commodity prices can have a domino effect on the final technology costs of the developer. Over 80% of European wind energy companies have a commercial presence and manufacturing sites outside of Europe in more than 80 countries.^{xxviii} The establishment of a strong domestic supply chain reduces the uncertainty fed by these fluctuations, increases competition in the market and supports economic growth. **It is worth noting that there is usually a lag between the commodity price and currency rate changes and their incorporation in the cost of components which is the result of hedging strategies.**

Services

As oil demand slows, oil majors are looking to invest more in the energy transition. It seems that there is a strong linkage between their proved oil reserves and renewable energy strategies. The oil and gas industry has an established base of skills in development and project management services which are easily transferred into offshore wind due to the similarities of operations in a maritime environment. **Companies providing these services in oil and gas and offshore wind should have the flexibility to adjust their portfolio to cope with the instabilities arising in both sectors.** This increases competition, pushing down the cost for developers and supporting local supply chains and economy. In general, renewable energy is expected to cover a small proportion of their operations, in the short to medium term at least, but its gradual bloom provides a stable investment option in their portfolio able to work as a buffer to the impacts of the volatility in the oil market.

INVESTMENT IN ELECTRICITY GENERATION

Fossil fuels in the energy mix

While oil extraction becomes more expensive, energy from renewable energy shows rapid cost reduction, attracting more investment than ever before. The analysis of correlation between the oil price and renewable energy cost is complex. In general, a low oil price has a direct effect on the electricity price as the incremental generation cost from oil-fired plants drops. However, the world's electricity generation does not rely on oil resources as much as it did back in the 1970s where 19% of total electricity was generated from oil.^{xxx} The figure in 2018 was 3%, although there are broad differences depending on geography.^{xxx} In the UK only 0.3 % of electricity came from oil in 2019 while renewables generated 37%.^{xxxi} **This means that fluctuations in the oil price currently have negligible direct impact on overall costs of electricity generation and so have little impact on the relative attractiveness of renewable energy such as wind and solar as low-cost forms of generation.** Oil is mostly used in the transport sector so drops in oil price can mainly restrain the development in electric vehicles and biofuels. This may have an indirect impact on the pace of renewables build-out as a slower roll-out of electric vehicles, for example, will slow down the pace of overall energy system electrification including demand for renewable energy.

Natural gas dominates the electricity market as a lower-carbon alternative to coal-fired power stations and emits 50 to 60 percent less carbon dioxide (CO₂) when combusted in a new, efficient natural gas power plant compared with the emissions from a typical new coal plant. Gas generated about 41% of UK electricity in 2019. The cost of gas-fired electricity generation is a more appropriate benchmark to assess renewables' competitiveness. In the past, gas showed a closer correlation with oil especially during price peaks but since 2008 the prices have decoupled.

The International Energy Agency (IEA) Sustainable Development Scenario projects that almost 50% of global energy demand will still be covered by oil and gas in 2040 although both will show a gradual decline.^{xxxii} Due to the variable nature of renewable energy sources, their increasing integration in the energy system requires the presence in the near-term of a strong oil and gas sector to maintain a balanced energy mix and secure supply. However, the oil and gas industry will continue to face strong pressure to limit GHG emissions with direct contribution from oil and gas operations of 9% of all human-made GHG emissions and 33% from the related value chain.^{xxxiii} In the longer term, batteries and hydrogen energy storage can help decarbonise the energy sector and give an effective alternative environmentally friendly solution.

Oil majors and offshore wind

Almost all the oil majors have announced in recent years their ambitions to decarbonise activities while adapting to the reality of energy transition. This will require a 90% reduction on current emissions accounting for at least 3.4 GtCO₂e per year by 2050. Achieving this goal will require the shift to low carbon operations or/and carbon offsetting mechanisms. However, a recent analysis from Rystad Energy indicates that oil majors show a modest to low appetite to invest in renewable energy projects in near term. Investment in renewables from the oil and gas sector currently accounts for less than 2% of global solar and wind capacity. In spite of this, green investments are expected to

grow to 25% of all energy spending and surpass traditional fuel sources like oil and gas for the first time in 2021 as clean technologies are now more mature, cost of capital is falling and regulatory framework is adjusted.^{xxxiv} During the next five years, Big Oil is expected to pump \$166bn (£134bn)¹ into new oil and gas ventures, while the currently specified outlay for solar and wind energy projects will total just \$18bn (14.5bn).^{xxxv} This means that only 1 dollar out of 10 will be invested in renewables with a large part of spending referring to offshore wind projects by Equinor. Although Equinor's current annual capital expenditure in renewables is low, the company plans to invest in new energy solutions and raise its capital expenditure share up to 20% by 2030.^{xxxvi} Apart from this investment portfolio, other companies show a decline in renewable investment by 2023. After 2025 only Royal Dutch Shell has announced plans to increase its future low carbon investments to be in line with the company's shift to the energy transition. Orsted is a striking example of a company's transformation from oil and gas to renewables. For decades, DONG (now Orsted) managed the gas and oil resources in the Danish sector of the North Sea before entering the electricity market and then expanding its operations in offshore wind in the 2000's. It is the largest offshore wind farm company in the world with 7 GW offshore wind installed capacity and has a vision to reach 15 GW by 2025 and 30 GW by 2030.^{xxxvii}

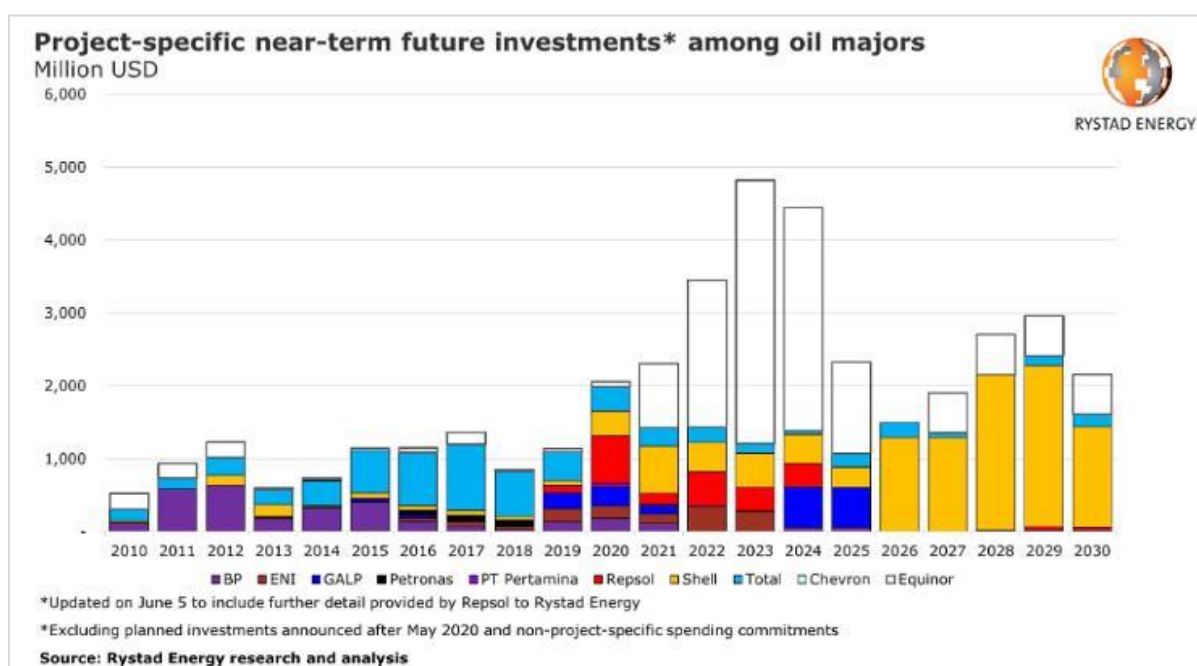


Figure 7 Project-specific near-term future investments among oil majors²

Oil and renewable energy investments are based on different business models; although both require high capital up-front investment, electricity price volatility is low for renewable energy (especially if support mechanisms like CfDs are considered), while oil price fluctuations impose a higher risk on oil extraction. The factors which influence the decisions on low carbon investment strategies are fossil fuel prices, geography, asset mix (offshore versus onshore, gas versus oil, upstream versus downstream), proved oil reserves (low levels of reserves encourage a faster transition to renewables)

¹ FOREX USD:GBP (19/06/2020) = 0.81

² The recent stake acquisition of Total in the Seagreen 1 offshore wind project is not included in the graph.

and local policies and practices (regulations, carbon pricing, the availability of renewables, and the central grid's reliability and proximity).^{xxxiii}

Offshore wind is currently in the spotlight of the decarbonisation plan due to rapid cost reduction and high energy potential. Few oil majors have currently invested or have immediate plans to invest in offshore wind. Equinor has already been involved in offshore wind for a decade and has placed a leading position in floating wind after installing the 30MW Hywind Scotland, the first floating wind pilot park in the world. Royal Dutch Shell is a member of The Carbon Trust's Offshore Wind Accelerator (OWA) scheme looking to reduce the cost of offshore wind and has recently agreed to buy the French floating wind developer Eolfi SA. In the last three months, Total acquired the majority stake in the 1.1 GW Seagreen 1 offshore wind project and signed an agreement with the developer Simply Blue Energy to acquire an 80% stake in the 96 MW floating wind project Erebus located in the Celtic Sea.^{xxxviii} Eni, the Italian oil and gas major, has shown its intention to grow its offshore wind capacity and formed partnerships with Mainstream Renewable Power (MRP), GE Renewable Energy and Equinor to collaborate on clean energy projects.^{xxxix, xl}

These offshore wind projects are generally financed through a mix of debt and equity, with the amount of non-recourse debt financing in European projects having increased significantly from €1.5bn in 2010 to €16.5bn by 2018.^{xli} The 2018 figure is comprised €8bn new asset debt and €8.5bn refinance debt. While there are challenges in mobilising and co-ordinating the large sums required for increasing numbers of multi-billion-pound offshore wind projects, project developers, investors and lenders are becoming increasingly comfortable with offshore wind as a relatively low-risk asset class. These existing and expanding sources of funding are not at risk from potential competition from the oil and gas sector.

It is possible that a sustained upturn in oil price which encourages increased oil and gas investment will reduce the pace at which oil and gas companies enter, or increase their activity in, offshore wind. Some increase in oil price could, however, be beneficial for renewables as current extreme low prices reduce the confidence in large oil and gas companies to make any kind of major investment and increase the need to cut spending. Low-carbon investments by oil majors have slowed amid the oil price shock, with clean energy deals closed in 1Q 2020 down 82% year-on-year and 25% cut in planned capex for 2020.^{xlii} In general, as oil demand slows down and extraction cost increases without the adequate revenue return, the oil industry starts to consider other resources to diversify and direct their capital.

European offshore wind capacity today is 22GW, representing investment in the order of €60bn over the last (approximately) 10 years. Reaching an expected ~100GW offshore wind in Europe by 2030 and upwards of 300GW by 2050 is likely to require investment in excess of €180bn over the next 10 years and a further €400bn over the following 20 years. The average annual investment required over the next 30 years will be around triple the already significant annual average over the previous 10 years. Large oil and gas players are ideally placed to play a crucial role in offshore wind, with decades of offshore experience, access to large cash balances and influential investors. Unlocking these as a source of investment for the next stages of the exponential growth of the global offshore wind market could be crucial given the vast sums of money required.

CONCLUSIONS

- Upscaling of offshore wind turbines (turbine and foundation size and mass) means offshore wind requirements are fast becoming more than many oil and gas vessels can handle so competition between the industries is diminishing and availability of bespoke vessels is a greater cost driver.
- Some of the heavy lift jack-up vessels and OSVs used in offshore wind are also serving the oil and gas industry so the demand will be increased when the oil price starts to recover leaving less space for offshore wind projects – causing a potential increase in offshore wind costs.
- In the long term, increase in supply of new bespoke offshore wind installation and O&M vessels will limit the competition between offshore wind and oil and gas and will reduce their charter rate for the offshore wind industry – causing a potential decrease in offshore wind costs.
- As well as oil price, fuel price is impacted significantly by the IMO 2020 rule which is reflected in charter rates both in installation and O&M vessels serving offshore wind – this could potentially cause a small increase in the cost of offshore wind compared to current levels, but also accelerates the need for vessels using cleaner fuel (e.g. electric, hydrogen, etc).
- Oil price interacts with prices of steel and copper but has a low impact on offshore wind component costs.
- The oil and gas industry and services have an established base of skills in development and project management to serve both the oil and gas and offshore wind sectors. More oil and gas service providers entering the offshore wind market will increase competition, reducing offshore wind cost and supporting local supply chains.
- Natural gas is now the main source of the world's electricity generation, which does not rely on oil resources as much as in the past. Fluctuation in the oil price has negligible to no impact on renewable energy investments such as wind and solar as they do not compete directly with each other but may have high impact in electrification pathways especially in the transport sector and transition to electric vehicles.
- Short-term and long-term changes in oil price have different impacts on renewable energy investments as oil price is one factor among many in companies' investment strategies. Shareholder drive and national decarbonisation targets provide more emphasis for oil majors to diversify into low carbon activities in the next decade.
- Prolonged periods of low oil prices, leading to low investment returns, can also drive up the entry of oil and gas majors into offshore wind and so unlock crucial, new sources of funding. Conversely, some increase in oil price could be beneficial for renewables as current extreme low oil prices reduce the confidence in large oil and gas companies to make any major investments at all.
- Large oil and gas players are ideally placed to play a crucial role in offshore wind, with decades of offshore experience, access to large cash balances and influential investors. Unlocking these as a source of investment for the next stages of the exponential growth of the global offshore wind market could be crucial given the vast sums of money required.

Appendices

RECOMMENDED READING

[OIL&GAS UK, BUSINESS OUTLOOK 2019](#)

[OGUK, ECONOMIC REPORT 2019](#)

[Barclays, 7 May 2019, Oil in 3D: the demand outlook to 2050](#)

[BP, 2019, BP Statistical Review of World Energy](#)

[Wind Europe, April 2019, Financing and investment trends - The European wind industry in 2018](#)

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